Practices of shared living: Exploring environmental sustainability in UK cohousing, community living, and coliving

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Abstract

The environmental impacts of the UK's domestic sector must be lowered if they are to meet UK government greenhouse gas emissions (GHGs) reduction targets. However, government initiatives to lower domestic GHGs have had little success, and progress has been too slow. Given this lack of top-down impetus, it is worth investigating alternative housing solutions. Previous research has shown that shared living – in which residents share spaces, resources, and social time – tends to have lower environmental impacts than the average household. However, this issue has not yet been explored within the UK. There is also research which shows that social networks can be effective in encouraging practice transitions and maintenance. This has not yet been thoroughly investigated within the context of shared living and environmental sustainability.

This research aimed to explore the practices and infrastructures which enable pro-environmental outcomes within shared living. This aim was achieved through in-depth research in six shared living case studies. The research mainly adopted an ethnographic approach, complemented by quantitative measurement of GHGs.

This research shows that the shared living case studies have significantly lower GHGs than the average UK household. This builds upon previous quantitative environmental evaluations of shared living. In studying practices, infrastructures and social networks within shared living, this research identifies four types of sharing that are significant to pro-environmental outcomes: shared ideals, shared governance, shared materials and spaces, and shared endeavour. For each type of sharing, the findings describe and analyse how processes of negotiation enable and constrain pro-environmental practices and outcomes. By exploring these processes, this research generates new knowledge on how and why shared living can produce lower-than-average domestic environmental impacts. Thus, the research demonstrates the potential and the mechanisms by which shared living may offer environmentally sustainable housing solutions for the UK.

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Author's declaration

I declare that all the material contained in this thesis is my own work.

Abbreviations

AR4/5	Fourth/Fifth IPCC Assessment Report
BEIS	Department for Business, Energy & Industrial Strategy
BIT	Behavioural Insights Team
CBRE	Coldwell Banker Richard Ellis
CCC	Committee on Climate Change
CDA	Critical Discourse Analysis
CF	Carbon footprint
CO2	Carbon dioxide
CO2e	Carbon dioxide equivalent
CNVC	Centre for Nonviolent Communication
CRAG	Carbon Rationing Action Groups
DCMS	Department for Digital, Culture, Media and Sport
DECC	Department for Energy and Climate Change
DEFRA	Department for Food & Rural Affairs
DfT	Department for Transport
DLHC	Department for Levelling Up, Housing and Communities
EAC	Environmental Audit Committee
EF	Ecological Footprint
EIO-LCA	Economic input-output lifecycle assessment
EPDs	Environmental Product Declarations
GAP	Global Action Plan
GEN	Global Ecovillage Network
GHGs	Greenhouse gas emissions
GU	General understandings
GWP	Global warming potential
HCLG	Ministry of Housing, Communities and Local Government
IPCC	Intergovernmental Panel on Climate Change
ISO	International Standards Organisation
JLL	Jones Lang LaSalle

kWh	Kilowatt hours
LCA	Life Cycle Analysis
LILAC	Low Impact Living Affordable Community
MHOS	Mutual Home Ownership Scheme
MoH	Ministry of Housing
MHCLG	Ministry of Housing, Communities and Local Government
NASA	The National Aeronautics and Space Administration
NEF	National Energy Foundation
NHS	National Health Service
NVC	Nonviolent communication
ONS	Office for National Statistics
OWCH	Older Women's Cohousing
POE	Post occupancy evaluation
RCT	Rational Choice Theory
RIBA	Royal Institute of British Architects
SAP	Standard Assessment Procedure
SMA	Social Marketing Approach
SPT	Social Practice Theory
TAS	Teleoaffective structures
TAR	Teleoaffective regimes
UKGBC	UK Green Building Council
UN	United Nations
WWF	The World Wide Fund for Nature

Chapter 1. Introduction

This chapter introduces this research. It briefly explores the background of the research, before stating the research aims and objectives. It gives an overview of the methodological and theoretical approach, and explains the significance of the research. Finally, it describes the layout of the rest of the thesis.

1.1 Introduction

Decreasing the greenhouse gas emissions (GHGs) of the UK's domestic sector will play a vital role in mitigating climate change. The domestic sector makes up 29 percent of all energy use (BEIS, 2020a), and 15 percent of GHGs in the UK (CCC, 2018). Initiatives to lower GHGs in the home have tended to underperform (e.g. The Green Deal, the Green Homes Grant), and progress is not being made fast enough given government targets (CCC, 2019).

Housing in which residents live as a community may form part of the solution for lowering the environmental impacts of homes. This research explores environmental sustainability within three types of community housing: cohousing, community living and coliving (this research refers to these three types of housing collectively as "shared living").

- Cohousing is a form of housing in which residents have their own households, and share and manage community space and engage in community activities (UK Cohousing Network, *no date1*).
- Community living is a habitation where five or more residents, some of whom are not related by blood, marriage or adoption, choose to share one dwelling, and engage in an intended and self-managed sharing in meanings and doings.

- Coliving as a form of managed habitation where residents have minimal private space, shared communal space, and where social connections between residents are encouraged.

Due to practices of sharing spaces, resources, social time, and potential knowledge, know-how, meanings and endeavour, shared living has the potential to reduce the GHGs of residents when compared with the average equivalent household.

Whilst these types of shared living have gained some traction, and/or have strong potential for growth, they are still niche housing options in the UK, with little support being given by the government and little awareness on the part of the public. Therefore, despite previous research indicating that shared living has lower environmental impacts than the average equivalent household, its potential as more environmentally efficient models of housing in the UK have not yet been explored. There is also an established body of research which shows that social networks (defined as relational ties between individuals) can be effective in encouraging practice transitions and maintenance. This has not yet been thoroughly examined within the context of shared living and environmental sustainability.

This research investigates environmental sustainability within shared living through exploring practices, infrastructures and social networks within shared living, looking at the sharing of spaces, resources, competences, know-how, meanings, and endeavour. It measures the GHGs linked to domestic practices and infrastructures, and compares these measurements with that of the average UK household.

This research uses multiple case studies, working with six shared living communities in total. It utilises mixed methods, mainly taking an ethnographic approach which is also supplemented by quantitative measurement of GHGs. This research is underpinned by an interpretivist ontology and epistemology, and is interpreted through a social practice theory (SPT) framework, which also draws upon social norms theory to enhance understanding of the negotiations between individuals-as-part-of-a-group.

1.2. Background

This section provides a brief background for the research topic, which is covered more extensively in *Chapter 2.*

This research explores the potential for shared living to be an environmentally sustainable housing solution. The context of this research is the UK's domestic sector, which currently makes up 15 percent of GHGs (CCC, 2018). Currently, progress towards lowering GHGs within the home is not happening fast enough, given government targets (CCC, 2019). The various government schemes to increase the environmental efficiency of housing have tended to severely underperform. Examples of failed schemes include the plan to make all housing carbon neutral beyond 2016, which folded in 2015 (Ares, 2016), the Green Deal, which folded in 2015 (Syal, 2016), and the Green Homes Grant, which folded in March 2021 (Harvey, 2021). The Future Homes Standard is currently still in development, and whilst it is a positive step, there has been concern from industry organisations that it does not go far enough (RIBA, 2021). Plus, domestic practices are over-consumptive due to norms of privacy and private ownership (Jarvis, 2019), plus energy, food supply and transport infrastructures (BEIS, 2020b; Dunne, 2017; Audsley *et al.,* 2009; DfT, 2019) and unsustainable practices, such as wasting food (Wrap, 2020). In addition, there is a continuing rise in people living alone (ONS, 2019a), which is environmentally less efficient when compared with multiple-person households (Ivanova and Buchs, 2020).

UK government strategy has been mainly focused on innovating technology rather than challenging household practices. This research looks towards a different type of solution for lowering the environmental impact of homes. Types of shared living, in which certain resources are pooled, and residents share spaces, social time, and potentially knowledge, know-how, meanings and endeavour, may offer an innovative solution to lower domestic GHGs.

This research explores the potential of cohousing, community living and coliving to be more environmentally efficient housing than the average household. In particular, this research investigates the role of social networks in relation to pro-environmental practices and infrastructures within shared living. A social network can be defined as a set of individuals and the relations (collection of ties) between them (Wasserman and Faust, 1994). Shared living communities will tend to have strong social networks, made up of multiple relations, for various reasons, including a desire to live as a community (Wang, 2020), regular social contact (Sanguinetti, 2014), a careful selection process for new members (Bergan *et al.,* 2020; Meltzer, 2005; Rogers, 2005), and development of shared goals and internal rules (Ruiu, 2016).This research looks at how what is shared is negotiated by residents, including materials, spaces, practices, knowledge, know-how, endeavour, and meanings.

An established collection of empirical work has demonstrated people's tendency to conform with those around them (e.g. Asch, 1951; Jenness, 1932; Sherif, 1935). Evidence has furthermore shown that social networks can be effective in the spreading and maintenance of practices (Brown *et al.,* 2011; Cartwright and Zander, 1968; Lewin, 1958). Some limited research has looked specifically at the impact of social networks (in the form of community-based initiatives) on pro-environmental practices (Buchs *et al.,* 2012). The evaluations which have been conducted suggest that social networks (as community-based initiatives) can increase and help maintain pro-environmental practices (DEFRA, 2006; Hargreaves *et al.* 2008; Howell, 2009; Nye and Burgess, 2008). Some research into cohousing has touched upon the positive correlation between social networks and pro-environmental practices in cohousing (Sherry, 2014; Jarvis, 2012; Williams, 2005b). In particular, Meltzer (2000a, 2000b) found a positive correlation between the perceived strength of social networks within the community and levels of pro-environmental practice. This research builds upon the existing literature in exploring the role of social networks (in the form of shared living communities) in relation to pro-environmental practices and outcomes.

Existing quantitative research indicates that cohousing communities have lower environmental impacts than the equivalent average home (Daly [2017] provides a useful overview of quantitative environmental evaluations of cohousing and ecovillages). However, there is a lack of quantitative environmental measurement of UK cohousing communities. No research has been found which measures the environmental impacts of community living or coliving communities. Yet, research which measures the environmental impacts of house-sharing (which is spatially similar to community living and coliving) has found that this form of shared habitation has a lower impact when compared with a relevant equivalent (Fremstad *et al.*, 2018; Ivanova and Buchs, 2020; Underwood and Zahran, 2015). This indicates that there is potential for community living and coliving to help provide low-impact housing solutions. This research gathers data on the GHGs of shared living case studies, along with detailed qualitative data on the practices of those communities. It links these practices with GHG measurements, allowing the quantitative and qualitative data to enrich each other.

1.3. Aims and objectives

This research explores environmental sustainability within cohousing, community living and coliving communities (referred to collectively as "shared living" communities). It looks at the role of social networks in relation to pro-environmental practices and infrastructures, through exploring how what is shared is negotiated, including spaces, resources, social time, and potentially knowledge,

know-how, meanings and endeavour. It furthermore measures the GHGs linked to the practices of shared living communities and compares these measurements with that of the average UK household.

1.3.1. Research aim one: Qualitative exploration of environmental sustainability in shared living communities

The first aim of this research is to explore the negotiation of pro-environmental practices and infrastructures within UK cohousing, community living and coliving communities, utilizing multiple case studies.

Research objectives:

i) **Shared meanings**

Explore how meanings of environmental sustainability are and are not shared. Look at the negotiation between shared meanings at the community level and meanings held by individuals. Investigate how these meanings relate to pro-environmental practices;

ii) **Shared governance**

Examine how communities are governed. If they are agreeing to carry out pro-environmental practices, how is it that they reach these agreements? Look at how information is shared, how practice transitions are implemented, and how conflicts are resolved;

iii) **Shared materials and spaces**

Look at what and how materials and spaces are shared. Explore states and meanings of privacy and sharing and their attached social norms;

iv) **Shared knowledge, know-how and endeavour**

With a focus on pro-environmental practices, investigate ways in which knowledge and know-how are shared. Explore the shared work of community (referred to as "endeavour"), and how it supports pro-environmental practices;

v) **Social networks**

Explore what it is that can be learned about the role of social networks within shared living communities in relation to environmental sustainability. Do social networks within shared living communities help to spread and maintain pro-environmental practices? If so, how?;

vi) **How cohousing, community living and coliving differ**

Analyse and discuss the key differences between cohousing, community living and coliving in relation to the aforementioned objectives.

1.3.2. Research aim two: Quantitative measurement of GHGs in shared living communities

The second research aim is to measure the GHGs of shared living community case studies and compare them with the average UK household.

Research objectives:

vii) Measurement of GHGs

Measure the GHG emissions arising from UK cohousing, community living and coliving community case studies, comparing and contrasting the different community typologies;

viii) Comparison with the average UK household

Compare these emissions with an average UK household;

ix) Discuss and relate GHG measurements to qualitative data

Explore how GHGs can be related to practices and infrastructures within the shared living communities; discuss what *matters* in achieving lowered environmental impacts in shared living

1.4. Methodological and theoretical overview

This research used a multiple case-study approach, working with six shared living communities in total. Mixed methods were utilised. Qualitative data collection methods consisted of participant and non-participant observation, interviews, focus groups and document and image analysis. Qualitative data was analysed thematically, with a mixture of an inductive and deductive approaches, using qualitative data analysis software (NVivo). Quantitative data collection methods consisted of surveys for primary data collection and desk-based secondary data collection. The survey data was processed to produce measurements of GHGs for four of the six participating communities. The secondary data was processed to produce a figure for the average GHGs for a UK household, which was used as a comparison figure.

Although this research uses both quantitative and quantitative methods, it is chiefly grounded in an interpretivist ontology and epistemology.[1] The interpretivist ontology views objective social reality and subjective social reality as deeply intertwined, and sees phenomena as inextricable from their contexts.

The main theoretical framework of this research is social practice theory (SPT) with some elements of social norms. SPT emphasises actions, enables pro-environmental practices to be viewed as meaning-laden, interconnected and enabled/constrained by their environment. The addition of social norms allows exploration of how individuals situate themselves as part of the community, and how they negotiate, shape and are shaped by what is shared.

1.5. Significance of this work

The context of this research is the need for environmentally sustainable housing solutions. Existing homes must on average reduce their overall CO2 emissions by 24 percent by 2030 on 1990 levels (CCC, 2019). So far, top-down technological adaptations are not happening rapidly enough (CCC, 2019), and the rise of single-person households (ONS, 2019a) adds to the environmental impacts of UK homes. This research explores whether and how cohousing, community living and coliving may form part of the solution for environmentally sustainable housing.

This research is centred around three housing typologies, and as such is most of interest to local authorities, national government, town planners, housing developers, academics who specialise in housing, and those who have a professional or personal interest in forms of shared housing. Currently, community-led housing projects in the UK face considerable barriers. The findings of this research illustrate the potential GHG savings and engagement in pro-environmental practices within cohousing, community living and coliving, which may offer greater justification and impetus for government, local authorities and housing developers to support such projects.

Cohousing within the UK is a fairly new movement (Tummers 2017), having begun at the end of the 1990s (UK Cohousing Network, *no date2*). Coliving as a housing typology is a recent iteration of shared living, emerging around 2012, and becoming more prominent from 2015 onwards. Community living is a housing typology identified and defined by this research. Therefore, relatively little or no UK-based research exists for the housing typologies this research focuses on (examples

[1] See *4.2.1.* for a discussion of the theoretical challenges of taking a mixed methods approach.

include Jarvis 2011, 2015; Hocking, 2020; Scanlon and Arrigoitia 2015; Williams 2003). Nor has there been a UK-based study which focuses upon the environmental impacts of shared living. This research therefore offers new information on shared living within the UK, in particular, in relation to pro-environmental practices and infrastructures. Previous UK studies which have quantified the environmental impacts of types of shared living have focused on ecovillages (rural communities) (e.g. Tinsley and George, 2006; Lammas Ecovillage, 2010-2015), whereas this research explores a mix of urban and rural communities, with greater focus on urban communities. This urban focus is useful considering that as of 2018, 55 percent of people reside in urban settings (predicted to rise to 68 percent by 2050) (UN, 2018). It not only quantifies the GHGs of these types of housing, but explores in detail the practices and infrastructures which lie behind these emissions. In particular, it looks at how residents negotiate different forms of intra-household, inter-household and communal sharing (e.g. sharing meanings, governance, spaces, materials and endeavour). It therefore sheds insight into how these communities operate.

This research is also relevant for professionals with an interest in pro-environmental practices and/or practice transitions (a.k.a. behaviour change), as it explores in detail how certain environmental practices are enabled and constrained within a shared living setting. The insight gained into the role of social networks in pro-environmental practice transitions may prove useful in better understanding how social networks can be best utilised for practice transitions.

1.6. Thesis layout

This section briefly describes the chapters that follow.

Chapter 2. Literature review

This chapter explores the potential for cohousing, community living and coliving to reduce domestic GHGs. It begins by describing the scope of UK domestic emissions and initiatives to improve housing stock, demonstrating that more needs to be done. It defines and discusses cohousing, community living, and coliving, relating and situating them to other forms of communal living. The chapter then explores what it is about shared living that gives it the potential to have lower-than-average environmental impacts, including existing research which measures the environmental impacts of the same or similar shared living typologies, evidence that social networks may enable pro-environmental transitions and maintenance, and the types of sharing in shared living which may

enable pro-environmental outcomes. The chapter concludes with a chapter summary, and with what this research contributes to the literature.

Chapter 3. Theoretical Framework

This chapter explains the theoretical approach adopted for this research. It begins with interpretivism, which underpins the ontological and epistemological approach of this research. It then explains and explores social practice theory (SPT), which is the main theory used by this research. It explores how SPT has been related to emotions, identity, social groups and social norms. In particular, the chapter highlights social norms as a concept that this research adopts alongside SPT. In the final section the overarching theoretical framework of this research is explained, showing how SPT and social norms form a complementary framework.

Chapter 4. Methodology

This chapter begins with a summary of the research structure. It goes on to discuss and provide a rationale for the research approach, exploring the use of mixed methods, ethnographic methods, quantitative research methods and the use of case studies. It then looks at the research design and data collection. It describes the process of case study selection, then discusses reflexivity and how to best mitigate the impact of the researcher on the research. It explores the use of qualitative methods and analysis, including a discussion of challenges and limitations. It then explains and discusses the quantitative methods, giving a rationale for the approaches taken, describing how research was carried out, and discussing assumptions, challenges and limitations.

Chapter 5. Introduction to the findings

This chapter provides an introduction to the findings chapters (chapters 6-10). It outlines the approach that is taken, explaining how findings chapters 7-10 each explores a type of sharing within shared living communities. This chapter also frames the quantitative findings on the GHG measurements in this research as firstly, being inherently valuable given the need to lower domestic emissions, and secondly, providing a useful counterpoint in discussing the qualitative results. The chapter gives an overview of each of the community case studies. Finally, it gives an overview of the findings chapters.

Chapter 6. GHG emissions

This chapter is primarily concerned with the quantitative results of this research. It begins by showing a quantitative overview of the GHG emissions of the shared living case studies, using an

average UK household as a comparison. It is shown that all case studies have significantly lower household GHG emissions than the average UK household. It then goes on to look at each different emissions stream (energy and water, food, purchases, transport, and waste), outlining some of the practices and infrastructures which contribute to the GHGs.

Chapter 7. Shared pro-environmental ideals? Negotiating fields of acceptable orders in relation to environmental sustainability

This chapter explores the negotiation of community-level pro-environmental ideals and individual practices within shared living communities. It explores the co-created documentation expressing pro-environmental values and aims with some shared living communities, before looking at how individuals negotiate sustainability-related practices. It explores the impact of social norms, and instances of challenging one another on practices. Finally, this chapter investigates the hierarchy of pro-environmental ideals in relation to ideals of sociability.

Chapter 8. Tools for negotiating "intentional we practice"

This chapter explores the communications tools used to negotiate "intentional we practice". The chapter begins by defining what is meant by "intentional we practice", and how this concept relates to pro-environmental practices. It goes on to look at decision-making practices, contrasting cohousing, in which systems are more often used, with coliving and community living, which are more often governed by social norms. It argues that the process of shared decision-making increases the salience of practices, thereby helping to facilitate changes which align with how sustainability is understood and practiced. The chapter discusses digital communication methods within communities, looking at some of the challenges of the systems used. The chapter also investigates one community's use of nonviolent communication (NVC), a communication tool to mitigate conflict. Finally, how practices of deep listening and reflexivity (engendered by decision-making and conflict resolution processes) may "suffuse" into pro-environmental ideals and practices is tentatively explored.

Chapter 9. Sharing materials and spaces

This chapter examines how the sharing of materials and spaces are negotiated within shared living communities. The chapter begins by exploring materials. It looks at practices of borrowing, communal ownership, and the sharing of food. It is shown that cohousing communities require more complex systems to accommodate sharing between greater numbers of people. It then looks at carpooling as an example of how sharing rather than owning an object (a car) may change the

meanings, routines and competences attached to that object. Competences of sharing are briefly discussed. The chapter then explores the sharing of spaces. It looks at the challenges of achieving states of privacy, especially in shared spaces. It is argued that privacy is not a label which should be attached to a space, but rather, to temporalities, routines and practices. How community living and coliving communities formed norms around shared spaces is examined. Sharing space within cohousing is also briefly explored.

Chapter 10. Community endeavour

This chapter explores the shared work of shared living communities, referred to as "endeavour". It mainly discusses the cohousing and community living residencies, as there is little endeavour at the community level within the coliving case study. The chapter begins by explaining how endeavour relates to environmental sustainability, before defining the different types of endeavour which take place within shared living communities. It then explores how residents negotiate expectations of, and manage, endeavour. The chapter argues that endeavour is a key way in which social fabric and ritualized practice of community is created and woven together. The chapter then explores how the meaning of community "work" is conceptualized as having an innate value by community members. Finally, the chapter looks at how endeavour can lead to emergence: that is, the possession of properties or capabilities that extend beyond the individuals which make up the whole.

Chapter 11. Discussion

This chapter reflects on the differences between the housing typologies explored in this research, and the generalisability of the case studies. It goes on to explore the significance of social networks in promoting and maintaining pro-environmental practices and outcomes, and the merging and negotiation of multiple individual agencies within shared living.

Chapter 12. Conclusions

This chapter begins with a summary of the conclusions of this research. It then explores the potential impacts of the research upon academia, practice and policy, before discussing contributions to knowledge and research implications, and limitations and areas for future research.

Chapter 2. Literature review

This review of the literature argues that shared living may form part of the answer to the UK's need for environmentally sustainable housing alternatives, and that how social networks in shared living relates to environmental sustainability is a topic worthy of investigation.

The chapter begins by demonstrating that pro-environmental housing innovation in the UK has been largely unsuccessful, and focused on top-down, technological solutions. The chapter introduces shared living as an alternative type of housing which may have lower GHGs. It expores definitions of cohousing, community living, and coliving, comparing them and situating them in relation to other forms of communal living.

The chapter then explores what it is about shared living that gives it the potential to have lower-than-average environmental impacts. It looks at existing quantitative research on the environmental impacts of various types of communal living. It examines the evidence for social networks (which are typically numerous in shared living) to be means for spreading and maintaining pro-environmental practice. It explores the different forms of sharing which take place in shared living, many of which have pro-environmental outcomes. It is argued that through studying how residents negotiate these different forms of sharing, new insight will be generated into how social networks within shared living may enable pro-environmental outcomes. Finally, there is a summary of the chapter and of what this research contributes to the literature.

2.1. The need for housing innovation

Decreasing the GHG emissions of residential housing will play a vital role in mitigating climate change. The domestic sector makes up 29 percent of all energy use (BEIS, 2020a) and 15 percent of

greenhouse gas emissions in the UK (CCC, 2018). Whilst there have been some improvements (e.g. the average Standard Assessment Procedure (SAP) rating has improved from 45 in 1996 to 62 in 2016 [HCLG, 2017]), progress has not been fast enough considering government CO2 reduction targets. According to the Committee on Climate Change (CCC) (2019), existing homes must on average reduce their overall CO2 emissions by 24 percent by 2030 on 1990 levels.

UK Government strategy has been mainly focused on innovating technology rather than challenging domestic practices. One such strategy has been to increase the energy efficiency of houses, with a particular focus on heating and cooling (Zero Carbon Hub, 2017). The idea of energy efficient housing gained traction between 2005 and 2008, with the conceptualisation of the 'zero carbon house' (EAC, 2005), the announcement of the 2006 Code for Sustainable Homes and the Zero Carbon Homes Target, leading to the establishment of the UK Green Building Council in 2007 and the government-industry sponsored Zero Carbon Hub in 2008 (Cherry *et al.,* 2017). With the election of the Conservative-Liberal Democrat Coalition Government in May 2010, support for low carbon housing policy decreased (Cherry *et al.,* 2017), and the plan to make all homes built from 2016 onwards carbon neutral was scrapped in 2015 in order to relieve house developers of regulatory burden (Ares, 2016). Some elements of the zero carbon homes concept were instead consolidated into Building Regulations (HM Government, 2015) – a decision which proved unpopular with environmental groups (Oldfield, 2015). Therefore, despite the high impact of housing on the UK's carbon footprint, the national average Energy Performance Certificate rating of UK homes is "D" (ONS, 2020a). The government has since announced the Future Homes Standard, which aims for all homes to be 75-80 percent lower carbon emissions compared with current levels by 2025 (HCLG, 2021). This includes the phasing out of gas boilers in favour of heat pumps, as well as other technologies to increase energy efficiency. This scheme is still in consultation phase as of Q1 2021, and though it is too soon to say what impact it will have, a letter from a coalition of construction and environmental organisations have expressed concerns that it does not go far enough (RIBA, 2021). The Green Homes Grant, which offered vouchers of up to £5000 to pay for up to two thirds of technologies (such as air pumps, solar thermals, insulation or double/triple glazing), was beset with problems (Brignall, 2020; LaVille, 2021) and quickly folded six months after its launch (Harvey, 2021). This echoes the failure of the Green Deal, in which individuals could receive loans for technologies to increase household energy efficiency, which would then be repaid through the resulting money saved on energy bills. This scheme ran from 2012-2015, but folded due to its complexity, unfavourable publicity and a lack of government support (Guertler *et al.*, 2016), with only 1 percent of eligible households taking up a loan (Syal, 2016). These examples show while there is awareness

for the need of technological innovation, attempts to upgrade housing have been and currently are falling short of what is needed to hit government CO2 reduction targets (CCC, 2019).

The environmental inefficiency of housing stock is coupled with a continuing rise in people living alone, with the number of single-person households rising by 16 percent to 7.7 million between 1997 and 2017 (ONS, 2019a). Those living alone are mainly older, and it is speculated that this may be due to a large number of those born in the 1960s reaching old age, and may also be due to more people in this age group being divorced or single (ONS, 2019a). Whatever the cause, single-person households do not have the same economy of scale as multiple-person households, and are therefore often less environmentally efficient (Ivanova and Buchs, 2020).

The environmental impacts of domestic practices are also inherently overly consumptive. Arguably, this is largely due to a neoliberal housing model which inhibits sharing (Jarvis, 2019). On top of these interlocking cultural and market forces, infrastructures beyond the control of individual households means that sustainable domestic practices are difficult, if not impossible, for many to achieve. For example, the majority of UK energy (60 percent) was non-renewable in 2020 (BEIS, 2020b), food supply chains are regarded as being overly carbon intensive (Dunne, 2017; Audsley *et al.,* 2009), and arguably, a lack of cycling and public transport infrastructure contributes heavily to the majority of trips still being made by private car (DfT, 2019). Some research shows that pro-environmental practices within the remit of individual households have become normalized, for example, almost nine out of ten households reporting that they regularly recycle (Smithers, 2020), and most people report that they “often”, “very often” or “always” engage in energy-saving practices such as switching off appliances when not in use, walking for short journeys and only using heating or air conditioning when really needed (Phillips *et al.,* 2018). However, the average household wastes an estimated 22 percent of edible food (Wrap, 2020), and whilst people are buying less, (Canavan, 2019) consumerism is still a dominant way of life, with indirect emissions from goods and services counting for approximately two thirds of a total UK household’s carbon footprint (Druckman and Jackson, 2010).

It is within the context of carbon-intensive domestic practices, rising single-person households and this lack of top-down success in building or retrofitting to a high environmental specification, that this research looks towards alternative housing solutions. Types of shared living, in which residents share spaces, resources, social time, and potential knowledge, know-how, meanings and endeavour, may offer an innovative solution to lower the GHGs of housing. This research explores the potential

of three types of shared living that are rising in popularity and/or have strong potential for rapid growth: cohousing, community living and coliving.

2.2. Types of shared living explored in this research

People live and have lived together in many different arrangements, which are shaped by and shape social, psychological, cultural, political, and economic environments of the spaces and times they inhabit. Some living arrangements are easily distinguishable from one another; for example, squatting, in which residents illegally occupy empty buildings, is technically and culturally distinct from owner-occupied housing, lived in by a nuclear family. Other living arrangements are far more difficult to separate, for example, where a house-share (unrelated residents sharing a home) might become living as a community (unrelated residents sharing a home and engaging in intentional and self-managed sharing in meanings and doings) and vice versa.

This research is interested in living arrangements where homes are shared by residents including some which are not related by blood, marriage or adoption. There is considerable slippage in language and terminology used by practitioners and scholars in regard to communities including cohousing, coliving, ecovillages, housing co-operatives, communes and intentional communities (Jarvis, 2011). Indeed, in many cases characteristics overlap, or one category subsumes another (e.g. an ecovillage can also be a cohousing community and can be subsumed by the category of intentional community). This section defines and discusses the three types of living arrangement that this research explores: cohousing, community living and coliving. For practical reasons, this research sometimes refers to these three types of living collectively as “shared living”, although it should be noted that there are far more types of shared living than the three categories which this research focuses upon.

2.2.1. Cohousing

The UK Cohousing Network (*no date1*) defines cohousing communities as ‘intentional communities, created and run by their residents’ where each household has a ‘self-contained, private home as well as shared community space’ and residents come together to ‘manage their community, share activities, and regularly eat together’. As each community is unique, a precise definition is not possible, and indeed, wouldn’t be appropriate. However, scholars and organisations (Bamford, 2001; Fromm, 1991; Jarvis, 2012; Lietaert, 2010; McCamant and Durrett, 1994; Williams, 2003; UK

Cohousing Network, *no date1*) find that cohousing communities tend to share the following characteristics:

- a participatory development process: residents organise and participate in the planning and design process for the housing development;
- design to encourage social contact: the building is architecturally designed to facilitate social connections;
- resident management: the ongoing development of the building and the community is fully managed by community members via a collaborative, non-hierarchical process;
- extensive common facilities: e.g. dining halls, kitchens, washing facilities, communal gardens, gyms, recreation rooms;
- private dwellings: residents have their own private living space which is generally smaller than the average single-family home;
- a minimal shared economy: residents do not pool all or most of their income, although they will pay towards overall building maintenance, and may participate in informal exchanges of labour, skills, gifts etc.;
- embedded within an urban setting: cohousing communities are not removed from "normal" society. They tend to be urban, with residents working in "normal" jobs;
- inclusive: cohousing residents often hold activities for the wider community;
- pragmatic social objectives: cohousing communities tend to share an ethos, which is often centred around the benefits of community life, or ecological living.

Within the UK cohousing has been slow to take off, in part due to little infrastructural support. Prospective residents must take on certain risks and uncertainties because they are usually involved at a much earlier stage in the house-building process than those who purchase standard housing (Scanlon and Arrigoitia, 2015). Risks may include time and costs overrunning, other members of the group pulling out at any stage, and operational failings occurring post-occupation (Scanlon and Arrigoitia, 2015). It is also difficult to compete with property developers when obtaining land. For example, Cannock Mill Cohousing, a group in Colchester who completed their build in 2019, took 12 years to establish their community, largely due to difficulties in obtaining a site (Cowell, 2019). Similarly, OWCH (Older Women's Cohousing) took 18 years from conceiving the idea in 1998 to the move-in date of 2016, with their development phase lasting from 2009-2016 (OWCH, *no date*).

Support for cohousing in the UK has grown. The government offered funding of 60 million pounds to community-led housing projects (including cohousing) in 2016, which was awarded to 148 local

authorities. A further 60 million pounds was allocated for the same purpose in 2017, with the intent that a portion of it go towards establishing advisory networks (Sharma, 2017); and four million was allocated in early 2021 (National Community Land Trust Network, 2021). Some further government support has been given in Wales and Scotland. Both the Welsh and Scottish governments have recognised cohousing as a viable option for housing an ageing population (Phillips, 2016; Scottish Government, 2011), and the Welsh Government has recommended that financial and professional support be made available (UK Cohousing Network, *no date3*). Umbrella advocacy bodies which support cohousing also exist. Some are exclusively for cohousing, for example, the UK Cohousing Network (UKCN), while others support cohousing along with other types of community-led housing, which include Community Land Trusts (CLTs), development trusts, mutual and co-operatives, and self-build (Jarvis, 2015a). Examples of these organisations include Community Led Homes (CLH), Co-operatives UK, and location-specific organisations, such as Community Led Housing London. Professional bodies, such as architects, project management firms, housing associations and legal and financial companies are also increasingly beginning to identify as experts or supporters in the field (Tummers, 2017), indicating that support for cohousing groups is growing. The following table by Arrigoitia and Tummers (2019) compares types of existing professional support for cohousing within The Netherlands, the US and the UK, indicating that UK support has some comparability with the other featured countries, in which cohousing is either very or reasonably established.

Table 2-1: A comparison of the professionalisation of cohousing in The Netherlands, the US and the UK

Arrigoitia and Tummers, 2019

Professional title	Role/Description/jurisdiction	NL	US	UK
Architects (including eco-specialists, and sustainability experts)	Commissioned by the housing association, developer or the group itself to design homes with common areas; they sometimes also act as group and process facilitators, or 'building coach'.	X	X	X
Engineers	Technical advise on building structures and utilities and, as such, important influencers for the sustainability approach. Usually hired via architects' networks.			
Legal specialist	Advises on legal aspects or regulatory constraints	X	X	X
Contractor	Carries out (or subcontracts) all aspects related to the construction/ build/ refurbishment	X	X	X
Developers Investors	Can be a housing association, individual or group. If not the group, then developer negotiates with the group's wishes and delivers the scheme.	X	X	X
Development or procedural consultant/ 'Building coach'	A type of management professional who guides a group through decision-making and 'translates' the technocratic planning vocabulary.	X	X	X
Social or cooperative process consultant/ Group or process facilitator / Group dynamic expert/Project enabler	Provides personal and group consultations and assistance; offers perspective, knowledge, advice, as well as tools, tours, trainings, and referrals.	X	X	X
Outreach volunteer	Outreach education for would-be residents and other interested stakeholders		X	
Marketing consultant	Educating and informing people about co-housing opportunities; setting up short or long-term marketing programme for community.		X	
Policy advisors	For local authorities	X		

Despite this growth in support for cohousing, it often largely excludes less affluent groups (Williams, 2008) as a substantial amount of capital is often needed to enter the community e.g. a mortgage. Perhaps as a result, a typical (self) observed criticism of cohousing communities is that residents are often homogenous (Alpine, 2019), frequently being white, middle-class, highly educated and politically left-leaning/progressive (Bresson and Denèfle, 2015; Meltzer, 2000; Rogers, 2005; Williams, 2008). This homogeneity is problematic in its exclusion of those from lower-income and/or less educated backgrounds, or ethnic minorities. These groups therefore become somewhat

excluded from a form of housing that offers potential sociability, support, opportunities for sustainable practice and infrastructures, and – once entered – is more affordable (Durrett, 2013). This exclusion must be rectified – especially if cohousing is to scale as a housing option.

Cohousing as a movement began chiefly in Northern Europe, and has spread around the globe, so an acknowledgment of its international history is important in better understanding its UK context. Like many forms of communal living the grassroots nature of cohousing has resulted in patchy-at-best records of how many communities there are, where they are and when they have happened. Summarising cohousing as a movement, therefore, becomes a task of sourcing the available information, rather than generalising upon a wealth of facts. This next section details a brief history and current global context for cohousing, although details are more abundant for some times and places than others.

Williams (2005a) conceives of the cohousing movement as having three "waves", with the first beginning in the 1970s and the third in the 2000s. The first wave of cohousing occurred in Northern Europe, originating in the 1970s. It is generally believed that the first cohousing development was built in 1972 in Denmark, by 27 families who were seeking a greater sense of community. The Danish term for these communities is "bofællesskaber", which translates as "living communities" (McCamant and Durrett, 2011). The idea caught on, and more bofællesskaber began to be established. Between 1980 and 1982, the number of bofællesskaber increased from 12 to 22, with another 10 within the planning phase. In 1982, the Danish Ministry of Housing passed legislation which offered loans to build properties and favoured smaller constructions. This proved to be a boon for bofællesskaber, and, according to McCamant and Durrett (2011), the result was that 'cohousing came to the rescue of the sagging Danish housing industry' (p.44). It became common for many bofællesskaber to be structured as non-profit owned rentals backed by government-guaranteed loans. Whereas once banks were reluctant to loan money to bofællesskaber, they now are considered a "preferred risk", as most units are pre-sold long before construction is finished, and bofællesskaber have a good track record of paying back their loans. As of 2010 there were an estimated 400 bofællesskaber or bofællesskaber-like projects (Tummers, 2015).

Alongside the development of Denmark's bofællesskaber in the 1970s, similar housing projects were being established in The Netherlands (where they were known as "centraal wonen", which means "central living") and Sweden (Meltzer, 2000a). In Sweden, cohousing was particularly influenced by the feminist movement, with the communal way of life seen as a method to share household chores

more equally between the genders (Lietaert, 2007). Most properties were and are state-owned, and as of 2010, there were 44 occupied cohousing units in Sweden (Egerö *et al.,* 2010). In The Netherlands, there were 90 properties defined officially as cohousing in 2009, although there are far more similar properties which have certain elements of communal living (the exact numbers of which are not known, but are estimated at 10,000) (Bakker, 2009). Like Sweden, most Dutch cohousing properties are rented by residents and owned by housing co-operatives. Cohousing communities are supported by well-established associations (the Landelijke Vereniging Centraal Wonen [the National Union for Cohousing] and Landelijke Vereniging Groepswonen van Ouderen [The National Union of Group-living Older People] which fall under the Federatie Gemeenschappelijk Wonen [The Dutch Federation of Intentional Communities]). During the 1990s, Dutch cohousing initiatives benefitted from governmental programs and subsidies for sustainable building (Tummers, 2017); furthermore, cohousing for older populations also has greater support from local government, as it is seen as a way in which to reduce care costs (Bakker, 2009). Overall, cohousing in Denmark, Sweden and The Netherlands is now a mainstream concept (even if still only adopted by a relatively small population), and as such, members have the benefit of legislative support (Williams, 2009), as well as support from various professional bodies, which offer group mediation, financial, legal and policy advice, as well as project management, architectural and construction-related services (Tummers, 2017).

The second wave of cohousing occurred in the USA during the 1980s and ’90s. American architects McCamant and Durrett visited several bofællesskaber in Denmark, and, inspired by them, brought the idea back to the US, coining the term “cohousing” (Bamford, 2001). Driven by Americans’ desire for community, social support, interaction and security in their local neighbourhood, a cohousing movement grew (Williams, 2005a). As of 2019, there were 176 established communities, most of which are clustered along the eastern and western coasts. There were furthermore 139 which were in the process of forming as of 2020 (The Cohousing Association of the United States, *no date*). Unlike in Northern Europe, the movement had little political support. However, it did receive interest from professional bodies such as property developers, financiers (Williams, 2003) and consultants (Tummers, 2017).

The third and most recent wave of cohousing has been taking place since 2000 and is mainly located in Australia and Southeast Asia, although, there has been little information on development in Southeast Asia, which suggests that the movement in this region has slackened. In 2005, it was stated by Williams (2005a) that Australian cohousing projects were in receipt of some financial and

political support, and Crabtree (2018), writing more recently, finds that 'developer-driven' variants of cohousing have come onto market, due to a growing interest in 'ecologically sensitive and/or community-oriented design' (p.20). Indeed, Williams (2003) states that the ideological focus of this latest wave has been environmental, social and economic, with communities typically aiming for environmentally-friendly, socially inclusive and affordable housing.

The three "waves" of cohousing capture the general trend of how the movement has grown, evolved and spread since the 1970s, though beyond this, cohousing has spread to other countries including France, Spain, Belgium, Germany, Austria, Poland, Portugal, Italy, Canada and the UK (Lietaert, 2007; Tummers, 2017).

Attempts to know how many cohousing communities exist are difficult, as firstly, not all will be recorded by umbrella organisations (e.g. Landelijke Vereniging Centraal Wonen, an association supporting Dutch intentional communities), and secondly, there is slippage in terminology and definitions of cohousing and cohousing-like communities (Tummers, 2017). The table below is an attempt to list some existing records of cohousing communities by country, to further contextualise cohousing within the UK, which is still relatively new when compared to Northern European countries and the US.

Table 2-2: Records of cohousing projects by country

Country	Number	Source	Defining features according to source
Australia	14 established, 10 in formation	Cohousing Australia (*no date*)	• Sustainable and affordable • Intentional community • Resident management • Self-contained private home and shared communal space • Residents come together to share activities, manage their community and regularly eat together • Usually between 8-50 households

Canada	15 established, 28 in formation, development or construction	Canadian Cohousing Network (*no date*)	• Participatory design process • Social contact design • Private homes supplemented by common facilities • Resident management • Non-hierarchical structure and decision-making
Denmark	106 bofællesskaber listed	Bofællesskabeb.dk (*no date*)	No information defining cohousing (bofællesskaber)
	Estimated 5% of the population of Denmark (259,850 of 5.197 million people) living in cohousing in 1994	Daly, M. (2015)	Daly cites McCamant and Durrett's (2011) six foundational principles of cohousing: • Participatory design process • Social contact design • Private homes supplemented by common facilities • Resident management • Non-hierarchical structure and decision-making • No shared community economy, with residents having independent income sources
	150 'traditional' cohousing communities, plus additional senior cohousing, cohousing	Larsen, H.G. (2019)	• Village-like developments in a suburban or quasi-rural setting • Distinctive architectural style: low-rise, detached or semi-

	for those with specialised needs/marginalised groups. Estimated that 1% of the population of Denmark (roughly 50,000 people) live in cohousing as of 2011	 Sargisson, L. (2012)	detached homes surrounding a common house • Clear division of private and public settings • Typically inhabited by the "well-to-do" No specific comments made on the characteristics of Danish cohousing
France	19 eco habitat groups (like cohousing, residents have their own private homes, but share communal spaces and come together for group activities).	Eco habitat groupe (*no date*)	• Groups of citizens design, create and manage their housing collectively • Having private and common spaces • Homes which meet residents' aspirations and values, in particular in terms of social justice and ecology, underpinned by ideas and sharing and solidarity
Germany	Approximately 500 projects	Ache, P. and Fedrowitz, M. (2012)	• Inhabitants cultivate closer-than-usual social relationships • Participatory design process • Social contact design • More projects tend to be based in cities • 70% of projects based in a single large house with separate flats; approximately 20% of

			projects consist of a series of houses, 8% take the form of flat shares • 50% of projects have less than 30 people • There are a variety of project types including houses with high ecological standards, projects for older people, and inter or multi-generational projects • There is a combination of rental and owner-occupier models • There are a combination of public and private developers • There is a combination of bottom-up and top-down initiated projects
The Netherlands	72 cohousing + other intentional communities listed on the LCVW (Dutch association for intentional communities). 100+ Centraal Wonen projects	Foundation for Intentional Community (*no date1*) UK Cohousing Network (*no date4*)	• Incorporate both private houses and shared communal spaces • Supports neighbourly connections • Cohousing communities are at large scale, but divided into clusters of 5 to 10 units • Each cluster has its own common facilities and right to choose new members

	Approximately 300 Groepswonen van Ouderen (cohousing for seniors)		• There is one large communal building for occasions such as parties and meetings No specific details given about Groepswonen van Ouderen
Sweden	45	Nyberg, M. (2011)	• Shared facilities and private space • Living which facilitates social interaction • Some level of rules/responsibilities e.g. residents must participate in cooking for the community • A fairly extensive interview process before becoming a member • Some communities have age restrictions e.g. over 40s only
UK	21 established, 32 developing, 21 forming	UK Cohousing Network (*no date5*)	• Intentional communities, created and run by residents • Shared facilities and private space • Resolving isolation and recreating neighbourly support • Usually comprised of between 10-40 households • Non-hierarchical resident self-management • Inclusive and part of the wider community

			• Can be intergenerational or for specialised groups e.g. seniors, LGBT people
	38 established, 75 in development, 1 forming	Hudson (2021)	N/A
US	176 established, 20 in construction, 109 forming as of 2020	The Cohousing Association of the United States (*no date*)	Common characteristics are defined as: • Connected relationships and a culture of caring and sharing • A reduced ecological footprint • Private homes • Common spaces • Participative decision-making and managing/maintaining the property together • Shared values Different types of cohousing are defined as: • Multigenerational • Senior • Urban • Rural • Mission-oriented • Retrofit builds

Table 2-2 shows the difficulty of obtaining accurate records. In some countries (not included within this table) no aggregated online records appear to exist. In others, such as Denmark, several sources give different estimations of overall numbers.

These different sources, whether they are umbrella bodies, academic articles or news stories, give descriptions which indicate that there are considerable similarities between cohousing projects across different countries. The most common descriptive element tends to be the demarcation of

private and shared space, and the facilitation of social interaction and relationships, either through architectural design or simply through intention. McCamant and Durrett's (2011) six foundational principles of cohousing (participatory design process, social contact design, private homes supplemented by common facilities, resident management, non-hierarchical structure and decision-making, and no shared community economy) are often repeated in totality or in part, though whether their principles have reflected existing cohousing characteristics, or influenced them, is unclear. The latter principle is also, perhaps, misleading: "no shared community economy" belies the types of economy beyond monetary income which are often found in cohousing (e.g. gift, sweat, exchange) (Jarvis, 2012). Umbrella bodies for the US and France mention communities having some form of shared value system, although ideology is not featured as defining by any others. In countries in which cohousing is more established i.e. Dutch countries, Germany and the US, there is more mention of niche forms of cohousing, such as cohousing for older people, those with special needs or marginalised groups. It perhaps makes sense that countries in which cohousing has existed for longer would have a greater diversity in cohousing typologies.

There are some mentions of architectural design which indicate differences across nationalities. Germany in particular is different to the Dutch model, with the former having more highly urban large shared homes, split into flats, and the latter having suburban or rural semi or semi-detached houses which surround a common house. There are also occasional mentions of different tenure types, with owner-occupier appearing to be the most common, and housing co-operatives and rental tenure less common.

Relative to the countries listed, there are a fairly small number of cohousing communities in the UK, which reflects its young status as a UK housing typology (with the first purpose-built cohousing community being completed in 2003). Architecturally, the UK appears to have been influenced by the Dutch model, with new builds consisting of detached or semi-detached houses which surround a common house. The defining features cited by the UK Cohousing Network are fairly reflective of McCamant and Durrett's (2011) foundational principles, although they make no mention of a lack of income sharing, and add wider community inclusion into the mix.

2.2.2. Community living

This research defines community living along two central tenets: firstly, five or more residents, some of whom are not related by blood, marriage or adoption, choosing to share one dwelling; and secondly, an intended and self-managed sharing in meanings and doings. This definition draws

together several elements. It uses Ergas' (2010) definition of an intentional community ('a group of five or more people, including some not related by blood, marriage or adoption' [p.34]), combining it with Kozeny's (1995) distinction that an intentional community must *actively choose* to live together, thereby excluding residents of institutions such as hospitals and prisons. It furthermore loosely echoes Kozeny's (1995) definition of an intentional community as a group who 'live together with a common purpose, working cooperatively to create a lifestyle that reflects their shared core values'. To these definitions it adds the condition that residents share *one* dwelling. In essence, community living is defined as an intentional community who share one dwelling. This definition is deemed necessary for this research, as definitions of an intentional community do not specify the way in which residents co-exist spatially (or indeed, that they necessarily must live together at all). For example, the Foundation for Intentional Community, a global umbrella organization for intentional communities, defines intentional communities as 'a group of people who have chosen to live together or share resources on the basis of common values' (*no date*2). The term "intentional community" tends to be applied as an umbrella term for numerous types of community, including cohousing, ecovillages, communes or housing co-operatives. The definition of community living for this research enables discussion on how spatial design impacts pro-environmental practice and GHG emissions for this shared living typology. The decision to call this typology "community living" has emerged from how those who live in these communities refer to themselves as (to paraphrase) "community living" or "living as a community".

The documentation of intentional communities tends to be patchy (Coates, 2012), and community living is no exception. Perhaps the most comprehensive public database of intentional communities is hosted by the Foundation for Intentional Community, an umbrella organization which has been running for thirty-five years to support and promote the development of intentional communities. Community living is described by the Foundation as 'Shared Housing – multiple individuals sharing a dwelling' (Foundation for Intentional Community, *no date3*). Of the 989 intentional communities listed in the directory (587 of which are established, as opposed to forming [388], reforming [52] or disbanded [4]), there are 180 established communities which include community living, and 159 forming communities which include community living. *Table 2-3* (below) details some of the characteristics of established communities which include community living, according to the database.

Table 2-3: Records from the Foundation for Intentional Community on established intentional communities which include community living

Foundation for Intentional Community, *no date3*

Established intentional communities which include community living n = 180	
<u>Geographical location</u>	
Cambodia = 1	Moldova = 1
Canada = 8	Philippines = 1
Czech Republic = 1	Portugal = 1
Ecuador = 1	Spain = 1
Germany = 1	Switzerland = 1
Ireland = 1	UK = 5
India = 2	US = 150
Italy = 1	
Mexico = 1	
<u>Tenure type</u>	
Purchase = 33	
Rental = 107	
<u>Location type</u>	
Rural = 68	
Urban = 84	
Suburban = 15	
Small town or village = 13	
<u>Income sharing</u>	
Do not share income = 136	
Partially share income = 34	
Share all or close to all income = 10	
<u>Diet</u>	
Mostly vegetarian and/or mostly vegan = 119	
Vegetarian only = 46	
Vegan only = 30	

This table is compiled from self-reported information which is reviewed by Foundation staff before being added to the directory. Therefore, there is some risk that that some data may be missing or

incorrect. The directory offers a snapshot of community living, yet as the data is self-reported, cannot be said to be representative of all community living.

As *Table 2-3* shows, the majority of community living featured within the Foundation for Intentional Communities' database are based in the US, which is likely to be due to the Foundation's US roots, rather than the US having a preponderance of community living in comparison to other countries. Despite this geographical bias, some generalisations may tentatively be made. The majority of community living residents have rental tenure rather than owning their homes. The location of these homes is more often within a conurbation (whether city, town or village), although a significant amount of communities are rural. The majority do not share income, and there is a strong trend of communities having mostly vegetarian and vegan diets.

The UK-based organization *Diggers and Dreamers* has a directory of intentional communities, and lists 39 (out of 76) communities which specifically state that they share one or more houses together (and can therefore be classed as community living). Of these communities, there is an approximate 50/50 split between rural and urban, and an average number of 20 residents per community (bearing in mind that some communities consist of multiple shared households). Most are either registered charities or industrial and provident societies. The oldest community was founded in 1946, and the newest in 2014. Whilst *Diggers and Dreamers* presents an interesting snapshot of some community living, much like the Foundation for Intentional Community directory, it cannot be said to be representative of community living in the UK. The data in the *Diggers and Dreamers'* directory is self-reported, and it is likely that there are many intentional communities, community living or otherwise, which are not listed. In particular, community living properties which are rented from a private landlord are less likely to be listed under an umbrella organisation as they are more likely to be transient, as residents will have less autonomy and security. It is likely that the number of those engaging in community living in the UK is far higher than those listed on *Diggers and Dreamers.*

Certain living typologies fall under the category of community living, and an exploration of these typologies may extend an understanding of what it means to engage in community living. One of these typologies is squatting within industrialised countries.[2] Squatting is defined by the government

[2] The distinction of squatting within industrialised rather than unindustrialised countries is made because whilst squatting in the former is frequently linked with political movements, the same generalisation cannot be made for the latter, which takes place on a far larger scale in the Global South (Vasudevan, 2017).

as an illegal act in which 'someone deliberately enters property without permission and lives there, or intends to live there' (GOV.UK, *no date*). Hodkinson (2012) defines squatting as an '[o]vertly politicised act of defying private property and creating (temporary) autonomous living spaces outside of market and state control as part of a squatting movement' (p.447), perceiving squatting as part of a lineage of attempts to improve housing conditions and find alternatives to the private market. While echoing this link between squatting, political and housing movements, Vasudevan (2017) also emphasises that squatting is a housing solution for those seeking housing in an 'increasingly hostile and impenetrable housing market' (p.6).

Within the UK, a post-war housing shortage prompted people to begin squatting in disused army huts in 1946. This practice spread to several cities, and during that year there were mass squatter communities briefly set up in London, with hundreds of families moving into hotels and blocks of flats in locations including Bloomsbury, Pimlico and Regent's Park. The authorities cracked down on these communities, however, and they were forced into camps, with long waiting lists for housing provision (Coates, 2012). Squatting communities had a revival in London during the late 1960s and early 1970s due to high property prices and a lack of council housing. Indeed, this rise in squatting during the 1960s and '70s was reflected in other Northern European cities and the US, due to similar rises in house prices (Vasudevan, 2017). At its peak in 1975, it was estimated that there were between 40-50,000 people squatting in London in one form or another (Coates, 2012). Within these squats almost everyone lived in shared or communal houses, often because the occupied buildings could not easily be compartmentalised into self-contained flats, but sometimes due to residents seeing the benefits of communal living as a response to depression and alienation (Anning *et al.,* 1980). Indeed, during this time, a significant number communities, including squats, were linked in some way with political activism, and sought to challenge what they viewed to be political, cultural and economic problems of the time (Lee, 2016). One movement called the Diggers (founded in 1967) had communities squatting in London, Cambridge and Coventry, and ran shelters for those sleeping rough. They had a strong interest in theoretical aspects of communal living, and ran a magazine and a forum to advance their ideas (Lee, 2016). The Angry Brigade, a left-wing group who carried out several bombings between 1970-1972 (Horspool, 2009) were based in an Islington squat. The Prince of Wales Crescent in Camden had a community of around 280 squatters, which became a hub of alternative community enterprises, including community newspapers, musical events, workshops on electronics, engineering, silk-screening, jewellery and carpentry. Leaflets at the time promoted ideas of finding new ways of human relationships, decentralised urban self-managed communities and green revolutions in the city, yet, day-to-day, many of these squats had problems

with drug and alcohol abuse and thievery (Coates, 2012). The vast majority of squatting communities were eventually evicted. A rare and interesting success story was that of the "Free and Independent Republic of Frestonia", a group of squatters who decided to make a declaration of independence from the Queen, and, through a clever mix of publicity stunts and engaging with the local government, managed to remain in their property and set up The Bramleys Housing Co-operative, receiving "foreign aid" from the Notting Hill Housing Trust (Coates, 2012). However, due to an overall decline in engagement with politics and conflicts around the future direction of communal activism, activism-related communities (including squats) diminished in the 1980s (Lee, 2016).

Another housing typology which may fall under the category of community living is housing co-operatives, where residents share one dwelling. Housing co-operatives are not-for-profit community-led homes which are typically owned by their members (though rental models also exist) (Community Led Homes, 2018). They are intended to be affordable homes, detached from a housing market which prioritises profit; and as self-managed housing, they are also intended to give control back to residents (National Cooperative Law Centre, 2017). Housing co-operatives have a long and rich history in the UK, with the first housing provided by a co-operative built in Rochdale in 1861 (Co-operative Housing International, *no date*). Since then, there has been several waves of housing co-operatives throughout the twentieth century (Birchall, 1991). In the 1990s changes to the political agenda meant that large-scale housing associations and social housing were favoured over housing co-operatives, which resulted in a steep decline in new housing co-operatives (Co-operative Housing International, *no date*). The total number of housing co-operatives is difficult to know. However, according to research by Co-operatives UK, there are 685 housing co-operatives in the UK, with over 70,000 members (Co-operatives UK, 2018). Yet, not all housing co-operatives may be defined as intentional communities. A database compiled by Hudson (2021), collating sources from a survey and existing records, lists 84 co-operatives that are in one location and are of small enough size to be truly self-managed (as opposed to large-scale, top-down managed housing co-operatives). Residents of these housing co-operatives may have their own homes (and in this sense could be defined as cohousing) or may share a home (in which case, they may be defined as community living). Underpinning housing co-operatives is the idea that residents have an equal stake in the organisation and play a part in its running (Co-operatives UK, 2011), and the emphasis within housing co-operatives is on the sense of community (Scholl, 2017). Self-managed housing co-operatives therefore embody this idea of intentionally sharing in certain meanings and doings through shared management. Whilst there has been an increase in support for community-led

housing (Sharma, 2017; National Community Land Trust Network, 2021), housing co-operatives still make up a very small sector of UK housing.

Both squatting and housing-co-operatives can be interpreted as offering alternatives to mainstream housing, which is centred around individual home ownership or private renting. Squatting subverts the mainstream housing paradigm through an overtly political act of defiance; and housing co-operatives offer a legal means of collectively reducing the cost and labour associated with housing (Hodkinson, 2012). This reduction in cost and labour can also be seen in what are referred to as "house-" or "flat-sharing" (which will be referred to here as "house-sharing"): where unrelated adults share a (usually rented) residency. In terms of spatial arrangement, community living is similar to house-sharing, and so the distinction between house-sharing and community living requires examination. The number of rented house-shares has grown (ONS, 2019b), especially for adults in their twenties and thirties, with home-ownership amongst 25-34 year olds falling from 55 percent in 2004 to 38 percent in 2014 (MoH, 2019). Ownership of housing is still regarded as aspirational (McKee and Soaita, 2018), and the fall in housing ownership is typically attributed to rising house prices and stagnating wages (Partington, 2019). While research shows that saving money is the most common reason given for house-sharing, other key reasons for sharing have included greater sociability, independence to pursue careers, and the ability to live in a "nicer" accommodation/location through the economy of sharing certain facilities (Maalsen, 2019; Kenyon and Heath, 2001). In fact, for a certain group of middle-class and upwardly mobile young people, house-sharing is considered as a rite of passage (Kenyon and Heath, 2001). This type of sharing, however, should not be mistaken for community living. The key difference between house-sharing and community living is that the latter's sharing in meanings and doings is articulated, intentional, and practiced, rather than unarticulated and coincidental. Community living residents may have a specific shared ethos, such as prescribing to the same religion. They may commit to eating a certain number of meals together per week, or to gardening together, practising yoga together or running activities such as a reading group together. However, intentionality is a spectrum rather than a binary state: residents who eat every meal together and set aside several times a week to share in hobbies and social activities are showing greater intentionality to share in meanings and doings than residents who routinely eat Sunday lunch together, but otherwise live independent lives. Intentionality may also arise over time, e.g. perhaps shared meals began as a coincidence of routines, and became a shared arrangement. Similarly, intentions to share may fade over time. Levels of intentionality may also vary between residents. Plus, intentionality only becomes meaningful if those intentions are practiced. Whilst house-sharing and community living are

different, the boundary between them is blurred, and what community living looks like may be adaptive to each case.

2.2.3. Coliving

This research defines coliving as a form of managed habitation where residents have minimal private space, shared communal space, and where social connections between residents are encouraged. This section begins by discussing the origins of the term "coliving", and the rationale behind the definition used in this research, before exploring different coliving typologies and the quantitative data on coliving.

"Coliving" is a relatively new term which represents a form of communal living. A number of journalists/online writers attribute the emergence of the term to so-called "Hacker Houses" in San Francisco (e.g. Widdicombe, 2016; Wood, 2017; Xie, 2013 and to some extent Kasperkevic, 2016). Hacker houses are house-shares in which fledging tech entrepreneurs live in close quarters to save on rent costs, whilst attempting to get their start-up enterprise off the ground. Seen as a cheap rental option in otherwise prohibitively expensive cities such as New York and San Francisco (Downs, 2014), life in a hacker house comes with the expectation that living conditions will be basic, and that cleanliness, health and safety and personal space will be at a minimum (Frawley, 2017)! Hacker houses are generally known as a US phenomenon, though may exist in other countries, for example, Clipster, a coliving development in Gdansk, Poland, which aims to support tech entrepreneurs (Popowska, 2016). They were most prolific around 2013 (Wood, 2017), and still exist today in smaller numbers (no record of precise numbers appears to exist). A key proponent of the hacker house is that by living together, residents not only save on rent, but create a supportive and stimulating environment which engenders greater chances of success.[3] Activities such as shared meals, coworking, socialising, practicing business pitches and exchanging ideas are reported to aid in intellectual stimulation (Chen, 2012) as well as offering genuine social connection (Downs, 2014). Similar to, and potentially inspired by, this concept of the hacker house, coliving emerged as entrepreneurs spotted an opportunity to solve the problems of prospective renters who were moving to prohibitively expensive cities where they knew few people (Kaysen, 2015). Through facilitating social interactions between residents, and providing homes where residents share spaces

[3] Indeed, the coliving and coworking movement have often been linked together, with coworking enterprises such as WeWork seeing opportunities to commodify the desire for shared, flexible workspaces.

and amenities, operators could offer residents an instant social network and lower-than-average rents.

According to Wood (2017), a San Francisco developer called the term “coliving” a “rebranding” of communal living. Yet there is no authoritative source which defines where the term first emerged. Google Trends, a Google tool which analyses the popularity of search terms, shows when Google searches were made in significant numbers between 2004 and 2021.

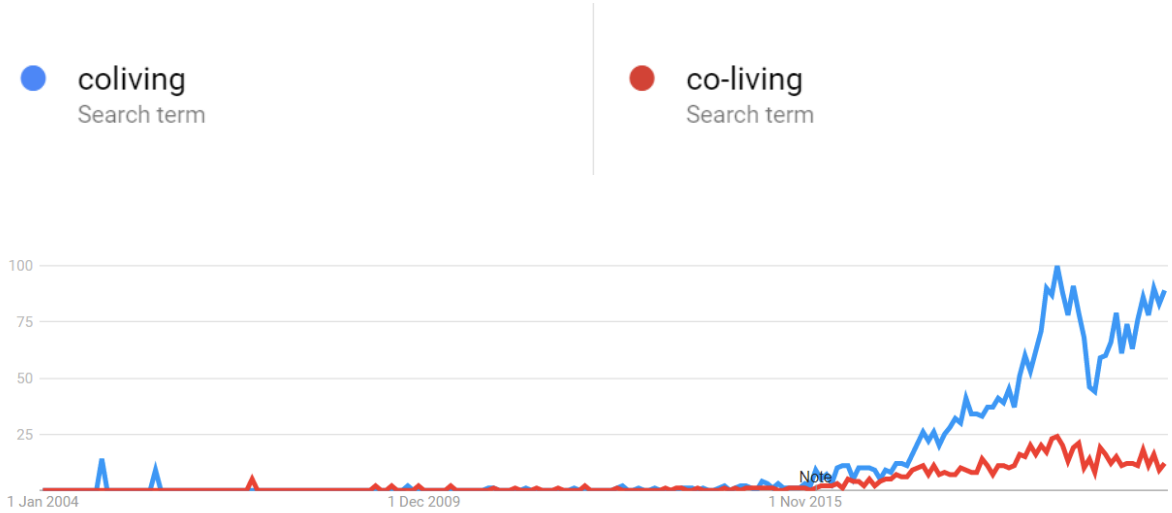


Figure 2-1: Amount of worldwide Google searches for “co-living” and “coliving” from 2004-2021

Google Trends, *no date*

Figure 2-1 represents worldwide Google search interest relative to the highest point on the chart. A value of 100 means peak popularity for the term, 50 represents popularity that is half that of the peak, and 0 means that there is not enough data relative to peak popularity for the search term to be registered. Also included in the chart is the lesser-used spelling “co-living”. The chart shows that the term “coliving” was being searched for in significant numbers as far back as December 2004, although it only really gained traction in 2015.

Coliving has been defined in various ways. The table below lists definitions from academia, non-profit organisations and industry experts.

Table 2-4: Definitions of coliving

Definition	Source
Academia	
'Coliving is for-profit, intentional, purpose-driven, privately managed and delivered shared housing, emerging as a "commercial [response] to the specific needs of young professionals sharing in large cities"' (Tegan *et al.,* 2020, p.4, citing Heath *et al.,* 2018, p. 129)	Journal article titled 'Coliving housing: home cultures of precarity for the new creative class'.
'Although co-living accommodations come in various forms, in general, these spaces offer users furnished rooms with lots of shared common areas and co-working spaces with an all-inclusive rent under flexible terms. In addition, the feature of having a community manager onsite is the key element that sets co-living accommodations apart from other accommodation products in the market. Community managers not only are responsible for handling administrative tasks and handling complaints, they are also responsible for organizing events, so that these events create opportunities for networking, socializing and a feeling of community to breed.' (von Zumbusch and Lailicic, 2020, p.440).	Journal article looking at the role of coliving in digital nomad's wellbeing.
'Coliving is a form of rental housing that seeks to create community among its residents by providing features such as extensive shared spaces and community managers paired with typically small, furnished private spaces.' (Osborne, 2018, p.3)	PhD thesis exploring best practice coliving design.
Grey literature	
'A form of managed habitation where people share space and resources to access a better quality of life' (Flurin, 2021).	Claire Flurin, co-founder of the world's largest coliving non-profit, Co-Liv.

‘When more than two unrelated people live together voluntarily in a home-as-a-service residence that has a communal focus and is life-enhancing’ (Moore, 2021).	Connor Moore, Head of Content at Co-Liv.
‘[C]oliving is a modern form of housing where residents share living space and a set of interests, values, and/or intentions. It’s a new take on an old idea, imagined by a millennial generation that values things like openness and collaboration, social networking, and the sharing economy’ (OpenDoor, *no date*).	OpenDoor is a coliving company which was an early adopter of coliving (circa 2015/16), and have been influential in defining what coliving is. They have properties in San Francisco and have expanded to other US cities.
‘Co-living refers to housing models where individuals have a private housing space, but also have access to a range of communal facilities such as shared living areas, dining spaces, gyms, gardens and cinema rooms. ‘The private housing space would be a self-contained flat or house, or, as has recently been the case in co-living developments, a micro-studio flat or room. The types of communal facilities on offer could also vary drastically, catering for a range of budgets. […] ‘One of the key distinguishing aspects of co-living is its heavy emphasis on facilitating social interaction and supporting the development of active communities […]’ (Corfe, 2019, p.4).	A report from Social Market Foundation, a UK-based think tank. In the report it is posited that coliving may be a solution to the affordable housing crisis.
‘A form of housing that combines private living space with shared communal facilities. Unlike flat shares and other types of shared living arrangements, co-living explicitly seeks to promote social contact and build community. Co-living encompasses a diverse range of models, from co-housing mutuals to options in the private rental sector.’ (Shafique, 2018, p.7)	A compilation of essays entitled ‘Co-Living and the common good’.
Grey literature: Real estate companies	

'A community of tenants seeking socializing, convenience, flexibility and affordability. A multifamily building with a coliving situation is one where community and sharing of common space is fundamental, often facilitated by the operator's platform. […] A coliving unit is comprised of shared areas such as living room, dining room and kitchen with private bedroom and bathroom for each renter.' (Tjarksen *et al.,* 2019, p.23).	A report by Cushman and Wakefield, who are a is a global commercial real estate services firm, based in the US.
'[A] form of housing which combines private living spaces with shared communal facilities. The idea of co-living is to create a community-centred environment that not only provides privacy in living arrangements but also promotes social contact through community events.' (Nandan *et al.,* 2019, p.4).	A research report by Knight Frank, a global property consultancy for residential and commercial real estate.
'All-inclusive communal living, where tenants enter into individual lease agreements in exchange for private bedrooms, shared community spaces and building amenities' (JLL, 2019, p.1)	JLL, a global commercial real estate company.

As can be seen, definitions have significant crossover, but also at times direct contradiction. *Table 2-5* (below) categorises what is included in the definitions featured in *Table 2-4,* and displays the frequency at which each feature is mentioned.

Table 2-5: Frequency of features mentioned in definitions of coliving

Included in the definition of coliving	Frequency
Shared housing with private spaces and shared communal areas	XXX0000ΔΔΔ
An emphasis on community and social connections	XX000ΔΔ
Management	XX00Δ
Rented accommodation	XXXΔΔ
Flexibility and convenience	XΔΔ
Mention of typical demographic (young professional, Millennials)	XΔΔ

Positive impact on wellbeing	00
Affordability	Δ
A self-contained private space	0
Encompassing a wider range of shared housing types e.g. co-operatives, communes	0
The number of people	0

Key	
Academia	X
Think tanks/influencers	0
Real estate companies	Δ

Table 2-5 shows that there is clear agreement on the spatial arrangement of coliving being shared housing with private spaces and shared communal areas. Though, in practice, the delineation between what is private and shared differs widely, with some coliving communities having private spaces consisting of self-contained flats or "micro-units" which include kitchens and bathrooms (similar to cohousing), and others where the only private spaces are bedrooms, or even sleeping pods. Another common feature in defining coliving is the emphasis on community. Within coliving communities the nurturing of social connections is most often facilitated by a member of staff (e.g. the community manager or facilitator) (von Zumbusch and Lailicic, 2020). This facilitation of social networks is linked to the feature of coliving being managed, which is mentioned in five of the eleven definitions (this is sometimes referred to as "housing-as-a-service" – a concept originally applied to software [see Dishotsky, 2016]). This top-down management is one clear difference between coliving and cohousing/community living, which are jointly self-managed by residents. Five out of eleven definitions also mention coliving residents having rental tenure, as opposed to coliving homes being owner-occupied. Whilst this does tend to be the case, the existence of owner-occupied homes which have some form of management (e.g. gated communities) indicates that rental tenure is a characteristic of existing coliving habitations rather than a determining factor for whether a habitation is coliving or not.

This research chooses to collate the most commonly mentioned features of coliving in creating a definition. As such (and as mentioned at the beginning of this section), this research defines coliving as a form of managed habitation where residents have minimal private space, shared communal space, and where social connections between residents are encouraged.

Since 2015, the rise in numbers of coliving operators has been rapid, particularly in India (Nadar *et al.,* 2019), China (Kumar and Hatti, 2019) the US (JLL, 2019a) and Europe (CBRE, 2020; JLL, 2019b). It has largely been driven by an increase in young professionals and students moving to cities for economic opportunity (Nandan *et al.*, 2019; Tjarksen *et al.,* 2019). The desirability of flexible leases and a ready-made social network reflects a more mobile population who may not be able to afford home ownership, who are marrying and having children later (CBRE, 2020; Tjarksen *et al.,* 2019), and whose work opportunities are more precarious and impermanent than the generation that came before them (Tegan *et al.,* 2020). Coliving tends to be aimed at Millennials and Gen Zs (CBRE, 2020; Nandan *et al.*, 2019; Tegan *et al.,* 2020) although some evidence shows that coliving may attract a significant amount of older solitary individuals (Hocking, 2020). Indeed, there are some coliving communities in formation or early stages which target the over-40s market (e.g. Willa, The Embassies). *Table 2-6* (below) lists the available data on the number of coliving units either already in operation or in the pipeline.[4]

Table 2-6: Number of coliving units/tenants by region

Region	Currently operating	In the pipeline	Source
Europe	3,473 units	19,678 units	JLL, 2019b
US	3,182 units	16,730+ units (lower bound)	Tjarksen *et al.,* 2019
China	Estimates of 2 million tenants staying in managed properties with the majority of these being coliving	Unknown	Kumar and Hatti, 2019
India	Estimates of 130,000 tenants	Unknown	Kumar and Hatti, 2019

There are numerous coliving typologies which vary in their spatial design, tenure, target market and community experience, not all of which are captured by the data in *Table 2-6* (as real estate reports tend to focus on larger operators). *Table 2-7* (below) gives a non-exhaustive list of the most prevalent typologies.

[4] Regions have been selected based upon available data.

Table 2-7: Coliving typologies

Coliving typology	Spatial design / no. of units	Target market	Community experience	Length of stay	Example
Networked houses	A network of standalone homes of 3-5 bedrooms	Young professionals and students	Residents may be engaged through occasional community-wide events which extend beyond their individual household	Typically 6-12 months	LifeX (Berlin, Copenhagen, London, Munich, Paris)
Mid-scale coliving	Small to mid-size, ranging from 10-49 units. Private spaces may include an en suite and kitchenette.	Young professionals and students	A regular calendar of events, often with significant input from the residents	Typically 6-12 months	Gravity Coliving, London
Purpose-built large-scale coliving	Mid to large scale buildings, ranging from 50-500 units. Private spaces may include an en suite and kitchenette. Shared spaces are extensive and varied, with some	Young professionals and students	An extensive and diverse calendar of events	Typically 6-12 months, though some offer stays as short as one night	The Collective, London

	being open to the public.				
Workation / Digital nomad	Varies, though typically buildings will be small to medium scale (potentially networked houses), with less than 50 units. There may be a mix of private rooms and shared dorms. There must be coworking facilities	Location-independent workers	A calendar of events	Short term: a matter of weeks or perhaps months	Sun & Co., Javea
Entrepreneurial	Varies, though typically buildings will be small to medium scale (potentially networked houses), with less than 50 units. Rooms are likely to be shared. There must be	Residents who are at the beginning of a creative career or are part of a start-up	An intense community experience fostered by close-living quarters, with events to support professional development. The community may run an accelerator	Short term. If residents are there to take part in an accelerator programme their stay may be a few weeks. Otherwise, residents may stay	UpstART, Los Angeles

	coworking facilities		programme with residents for a set amount of time	for 3-6 months.	

Adapted from Salto KS and Conscious Coliving, 2020

Coliving has proved popular with renters and investors. Yet coliving has also faced controversy and criticism, with concerns that it is simply a means to increase density and rental yields (Coldwell, 2019), and that it is linked to the trend of gentrification and studentification (e.g. Panchuk, 2019). In 2020 Irish Housing Minister Darragh O'Brien issued a 'de facto ban' on new coliving developments, due to concerns that they were becoming too numerous, were located too far from city centres, and could play a role in driving up land prices (Daly, 2020). Similarly, in 2020 further coliving development in Manchester was halted due to concerns from local authorities about room sizes (Robson, 2020). Yet, the New London Plan's Policy H18 (called 'Large-scale purpose built shared living') shows that there has been a shift towards acknowledging coliving as an asset class. Given the level of investment and viable market for coliving, it is likely that this housing typology is here to stay, although how it will evolve is yet to be seen.

2.2.4. Cohousing, community living and coliving: a comparison with other communal residencies

Cohousing, community living and coliving are three of a wide range of communal residency types, which can differ architecturally, practically, socially and ideologically. There is considerable slippage in language and terminology used by practitioners and scholars in regard to communities including cohousing, coliving, ecovillages, housing co-operatives, communes and intentional communities (Jarvis, 2011). Furthermore, residents of flat-shares, various types of shelter/group homes (Jarvis, 2013) and gated communities (Ruiu, 2014) all share living space to some extent.

To summarise the key differences between these diverse types of communal residencies, *Table 2-8* (adapted from Jarvis, 2013) gives a generalised classification of the aforementioned communal residency types. This serves to demonstrate where cohousing, community living and coliving fits within its wider category of communal residencies, which enables a better understanding of what makes these residential typologies unique.

Table 2-8: The characteristics of communal residency types

Table adapted from Jarvis, 2013, p.946

	Shared dwelling space	**Collective food production/consumption**	**Social support and caretaking**	**Income pooling**	**Governance (decision-making)**	**Resident-led ideology or ethos**
Cohousing	Common house with kitchen, outdoor space, some bathrooms	Some	Some: wellbeing practice, emotional support	Mainly not, but may pool finances for maintenance and some food	Self-governance	Possibly
Coliving	Kitchen, living space, gym, cafe/restaurant	Possibly	Some: curated activities and events	No	Managed	No
Commune	Kitchen, living space, bathroom, bedrooms(?)	Frequent	Yes	Yes	Self-governance	Yes
Community living	Kitchen, living space, bathroom	Some	Some: wellbeing practice, emotional support	Possibly for food and cleaning items	Self-governance	Possibly
Ecovillage	Common house, outdoor food growing space	Some	Maybe	No	Self-governance	Yes

House-share/Flat-share	Kitchen, bathroom, possibly living space	Possibly	No	Possibly for some food and cleaning items	Landlord	No
Gated community	Gym, social space	No	No	No	Management committee	No
Housing co-operative	Kitchen, social space	Some	Maybe	Some	Self-governance	Some
Intentional community	Yes - varied	Some	Yes - varied	Some	Self-governance	Yes - varied
Shelter/group home	Bedrooms, bathrooms, social space, dining space	Frequent	Practical support, possibly emotional support	No	Management committee	No
Squat	Bedrooms, bathrooms, social space, dining space	Some	No	No	Self-governance or unmanaged	Possibly

Table 2-8 illustrates some key distinctions between these different residential typologies. However, it does not show how some categories may subsume others, for example: cohousing, communes, housing co-operatives, squats and ecovillages are arguably all forms of intentional community. *Figure 2-2* displays these categorizations, and furthermore places different typologies along a spectrum, showing the extent to which they are resident-led or managed.

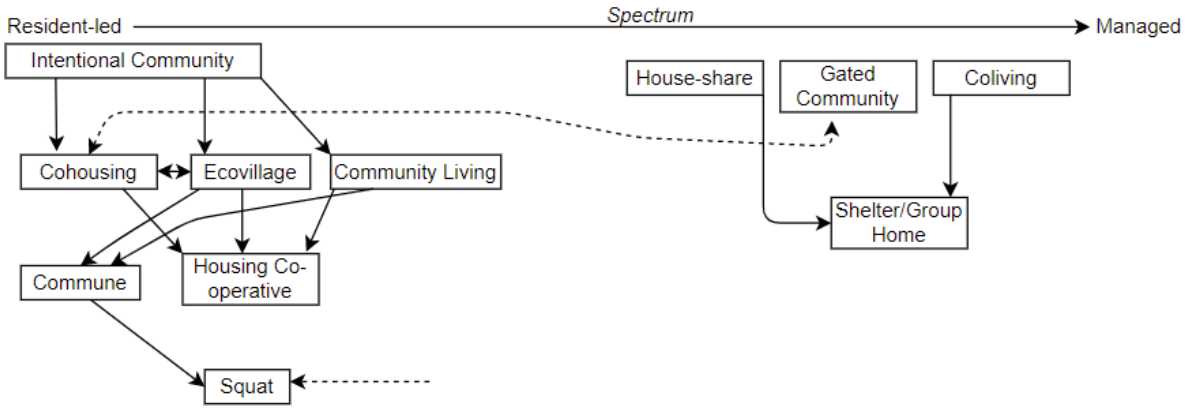


Figure 2-2: Relating communal residential typologies to one another, and the extent to which they are resident-led or managed

The list below explains the placement of each communal residential typology.

- **Intentional community:** Intentional communities can be defined as 'a group of five or more people, including some not related by blood, marriage or adoption' (Ergas, 2010, p.34) who choose to live together 'with a common purpose, working cooperatively to create a lifestyle that reflects their shared core values' (Kozeny, 1995). Other typologies may therefore fall under this categorization. This residential typology is resident-led.
- **Cohousing:** The UK Cohousing Network (*no date1*) defines cohousing communities as 'intentional communities, created and run by their residents' where each household has a 'self-contained, private home as well as shared community space' and residents come together to 'manage their community' and 'share activities'.

  There is debate as to whether cohousing communities are intentional communities, with some scholars arguing that cohousing communities are *not* formed to express specific shared core values, but rather live there for social or pragmatic reasons (Bamford, 2001; McCamant and Durrett, 1989; Williams, 2003). However, Sargisson (2012) argues that despite cohousing residents tending to distance themselves from the 'negative colloquial connotations of utopianism' (p.37) to avoid being perceived as unrealistic or fanciful,

cohousing communities *are* somewhat ideological in nature, and possess common values, intentions and practices, and are therefore more closely associated to intentional communities than other scholars have stated. This research sides with Sargisson's perspective, although it is acknowledged that some cohousing communities will be more or less openly intentional in their shared values and goals than others.

Cohousing communities may overlap with ecovillages, as those which have an ecological focus and are situated in rural locations may also be defined as ecovillages (see Daly [2017] who grouped cohousing and ecovillages together in his literature review). See below for more discussion of how these two residential typologies overlap.

- **Ecovillages:** According to the Global Ecovillage Network (GEN) (*no date*), an ecovillage is 'an intentional, traditional or urban community that is consciously designed through locally owned participatory processes in all four dimensions of sustainability (social, culture, ecology and economy) to regenerate social and natural environments.' Although GEN posits ecovillages as being 'intentional, traditional' *or* 'urban', this research categorises all ecovillages as intentional, as residents share in an aim to 'regenerate social and natural environments'.

  Ecovillages tend to be resident-led, though as they often rely on (volunteer) tourism there are elements of top-down management (i.e. volunteers and tourists will be "managed" by some residents).

  Ecovillages may also be defined as cohousing communities if they have communal spaces and are jointly managed by residents. There are some ecovillages which are more individualistic both in terms of spatial design and governance, however. Although there is crossover, Choi's (2008) meta-analysis of ecovillages and cohousing communities found that ecovillages had the more explicit aim of living in an environmentally sustainable way, and that cohousing communities tended to have an urban setting on a smaller plot of land, and that ecovillages tended to be rurally situated with a larger amount of land.
- **Community living:** This research defines community living as five or more residents, some of whom are not related by blood, marriage or adoption, choosing to share one dwelling, who have an intentional and self-managed sharing in meanings and doings. Community living is a type of intentional community where residents share one dwelling. By its nature it is

resident-led, although as residents often have rental tenure they may have limited autonomy over their built environment.

- **Commune:** Communes may be defined as '[c]o-operative living without any private homes' where 'all spaces are shared (Pickerill, 2016, p.220), in which income is pooled and decisions are made jointly by residents (Metcalf, 1996). This emphasis on the importance of the group acting in unity means that communes can be defined as a form of intentional community. *Figure 2-2* also acknowledges that communes may be a type of communal living, as residents will share a habitation. Potentially a commune could also fall under the category of ecovillage, if residents shared one habitation and had an aim to regenerate social and natural environments.
- **Housing co-operatives:** Housing co-operatives are not-for-profit community-led homes which are typically owned by their members (though rental models also exist) (Community Led Homes, 2018). They are intended to be affordable homes, detached from a housing market which prioritises profit; and as self-managed housing, they are also intended to give control back to residents (National Cooperative Law Centre, 2017).

  As co-operatives are self-managed and offer an alternative to the mainstream housing market, it is reasonable to categorise them as intentional communities, although it should be noted that co-operatives can vary widely in the extent to which values and governance are shared.

  Community living, cohousing and ecovillages may often (though not always) have an ownership structure that is essentially that of a housing co-operative. Yet as their spatial arrangements, locations and self-identifications tend to differ, it would be reductive to simply label them all as "housing co-operatives".
- **Squats:** Squatting is defined by the government as an illegal act in which 'someone deliberately enters property without permission and lives there, or intends to live there' (GOV.UK, *no date*). Hodkinson (2012) defines squatting as an '[o]vertly politicised act of defying private property and creating (temporary) autonomous living spaces outside of market and state control as part of a squatting movement' (p.447), perceiving squatting as part of a lineage of attempts to improve housing conditions and find alternative to the private market.

As squats are self-managed and have a history of being associated with political movements (Coates, 2012), it is reasonable to categorise them as intentional communities, although it should be noted that not all squats are intentional communities. It is argued that the lack of private space in squats (Coates, 2012) makes it reasonable to categorise squats as a type of commune (and therefore, feasibly, a squat *could* also be an ecovillage or community living). The dotted arrow connected to the term "Squat" in *Figure 2-2* serves to indicate that whilst squats are being categorised as intentional communities and communes, this is not always the case. Squats may also become habitations because their residents have a lack of other viable options.

- **House-share:** A house-share is where unrelated adults share a (usually rented) habitation. These households are not intentional communities. As these households are usually rented, the landlord/lady is ultimately responsible for management of the building, though residents may have responsibilities including paying bills and general upkeep.
- **Gated community:** Gated communities can be defined as gated or guarded habitations in which residents have exclusive access to private facilities, and manage their common services (Ruiu, 2014). Communities are both resident-led and managed, as residents have a say in how certain elements of the community are run, but also depend upon professional services to maintain and manage communal areas, amenities and services. The dashed line between gated communities and cohousing in *Figure 2-2* represents discussion as to the similarities between gated communities and cohousing (see Ruiu, 2014; Chiodelli, 2015). This research will not enter into this debate, but acknowledges its existence.
- **Coliving:** This research defines coliving as a form of managed habitation where residents have minimal private space, shared communal space, and where social connections between residents are encouraged. As such it is not an intentional community, and is managed by a third party.
- **Shelter/Group home:** A shelter or group home can be defined as a shared habitation for a group of people who are perceived as vulnerable and in need of housing as well as potentially other forms of support. For example, shelters may be aimed at people with no homes, alcohol or drug addictions, or people at risk of domestic violence. Depending upon the type of shelter and level of management, these homes may be defined as house-shares (in which residents are mainly responsible for maintaining the household and socialising is not specifically encouraged). Or, if a third party plays a larger role in household management and encourages social interaction between residents, a shelter could be defined as a type of coliving community.

Figure 2-2 highlights where cohousing, community living and coliving sit within different communal living typologies. Cohousing and community living are both resident-led intentional communities, whereas coliving is not an intentional community, but is managed by a third party. This difference is an interesting factor when exploring pro-environmental practice. Another difference which intersects these three residential typologies is that of spatial design. Cohousing communities have their own self-contained homes, whereas community living residents share a household. Spatial typologies within coliving differ: in some cases coliving consists of shared households, in other cases, residents live in self-contained units, and additionally have access to communal spaces. These differences also have evident environmental, as well as social, implications, which this research investigates.

2.2.5. Why cohousing, community living and coliving?

As has been explored in the previous section, there are many iterations of community living. This section explains why this research focuses on cohousing, community living and coliving.

The types of shared living that this research explores are appealing to (aspiring) residents for reasons other than economic necessity. Cohousing has been found to be motivated primarily by its social aspects (Wang *et al.,* 2020), and community living is inherently fuelled by a desire to share in meanings and doings. The picture with coliving is more nuanced. Survey research has shown that the reason most people would consider coliving is for its affordability (Corfe, 2019), yet as most UK coliving options are priced at a premium compared with shared rental housing, arguably their popularity is not due to theirs being an economical living choice. Qualitative research into coliving found that motivations included affordability, convenience and sociability, but that what emerged during discussions was the 'normative belief in the good of social interaction' (Hocking, 2020, p.24). Indeed, within the coliving sector exists the oft-said phrase "people come for the convenience and stay for the community" [e.g. Gray, 2016]). This emphasis from cohousing, community living and coliving on social connections is unlike many forms of shared living, which are more likely to be perceived as chiefly preferable for economic or other practical reasons (e.g. house-sharing [Maalsen, 2019] or homeless shelters). Therefore, the types of shared living explored in this research may be regarded as, to some extent, aspirational, and offering residents a preferable alternative to the privacy and private ownership which in part constitutes the dominant housing paradigm (Jarvis, 2019).

The types of shared living explored in this research are growing, or have a strong potential to grow. Coliving is growing most rapidly in economically prosperous cities where a shortage of housing has driven up prices (JLL, 2019b). Globally, funding for coliving has increased by over 210 percent annually since 2015, with a total of more than 3.2 billion (JLL, 2019a). Coliving has proven most popular with Millennials (JLL, 2019c), who now make up the largest segment of the world's population (Nandan *et al.,* 2019). UK-based research found that 53 percent of under 40s were willing to consider buying a coliving product (Corfe, 2019).

The rise of cohousing in the UK has been slower in comparison with coliving, yet research indicates that interest has grown (Jarvis *et al.,* 2016), with membership of the UK Cohousing Network tripling from 2016 to 2018 (Bearne, 2018), and positive attention from mainstream media (e.g. Brown, 2021; Verde, 2018). As of 2020, there were 21 established communities, and 53 either forming or in development (UK Cohousing Network, *no date5*). Infrastructural and governmental support is still minimal, yet allocation of government funding to community-led housing projects (National Community Land Trust Network, 2021; Sharma, 2017) and increasing professional support (Fernandez and Tummers, 2016) indicates that the path to establishing a cohousing community is becoming easier over time (for more detail, refer to *2.2.1.*).

Community living is niche, yet it has potential for rapid growth. Unlike cohousing, which often requires an extensive retrofit or new build, the architectural infrastructure for community living is already in place within many urban locations, with an estimated 497,000 HMOs in the UK (Parliament. House of Commons, 2019). So-called "multi-family households" make up the smallest share of households in the UK (1.1 percent), yet are the fastest growing household type (ONS, 2019b).[5] With many people already sharing their homes with unrelated adults, arguably, all that is missing are various forms of social architecture and tools for governance in order for house-shares to become community living. Therefore, research which investigates the environmental benefits of this type of housing, and how such benefits are achieved, may constitute valuable knowledge in the context of the housing landscape and the climate crisis.

The three housing typologies also present an interesting and profound difference in terms of social networks. Cohousing and community living can be grouped into the category of community-led homes, which can be defined as 'homes that are developed and/or managed by local people or

[5] The short term impacts of Covid-19 may be a fall in this type of household, as residents left cities to stay with extended family. The long-term effects of Covid-19 on housing is unknown at this point. Arguably, shared living may become more desirable as awareness of the negative effects of isolation have become more salient.

residents in not for private profit organisational structures' (Gooding, 2013; cited in Jarvis, 2015a). As such they are bottom-up, resident-led communities. Coliving communities are top-down, managed, for-profit homes, in which residents are "customers" as well as community members. Cohousing will more often be owner-occupied, and deemed as long-term housing, whereas coliving offers rental tenure, and is far more likely to be a transient form of housing. Community living more often has rental tenure, though may be owner-occupied. Lengths of stay may also vary from short to long term. These difference presents interesting opportunities for comparison.

It is the combination of these types of shared living having notable differences, being aspirational, motivated by a desire for sociability, and growing in popularity or having strong potential for growth, that has prompted this research to focus on cohousing, coliving and community living. Added to this, these are three forms of shared living that are often (though not always) urban. As 68 percent of the population is predicted to live in urban environments by 2050 (UN, 2018), it is important to explore the sustainability-potential of urban living solutions.

2.3. Quantitative research into the environmental impacts of cohousing, community living and coliving

Cohousing and environmental sustainability have an established link (McCamant and Durrett, 2011; Meltzer, 2000a). In contrast, there is little research relating types of housing which can be regarded as community living or coliving to environmental sustainability, with the most relevant literature looking at house-sharing and to a certain extent, ecovillages in which many facilities are shared. This section reviews and discusses the quantitative research on this topic. It begins by reviewing macro quantitative evidence which explores whether shared living *is* a more environmentally sustainable option than single-family housing, before examining research which links quantitative measurements of environmental impacts to infrastructures and practices within shared living. Overall, it is shown that the majority of evidence points towards shared living having significantly lower environmental impacts, although gaps in the research exist, in particular for quantitative measurement of community living and coliving communities, indirect emissions, and UK-based cohousing communities.

It appears that the earliest study looking at the potential of shared living to have lower environmental impacts, is an assessment of 12 communes in Minneapolis in the 1970s. Corr and Macleod (1972), in a study which they admit had many limitations, found that that per person, the communes used approximately 40 percent less natural gas than the average Minneapolis household,

approximately 82 percent less electricity, and 36 percent less gasoline. Since then, a number of studies have explored the environmental impacts of similar types of community. Daly (2017) conducted a literature review of studies which have quantified the environmental impacts of cohousing communities and ecovillages, finding a total of 16 studies which covered 23 unique communities (some of which were studied more than once). Most of these communities would be chiefly labelled as "ecovillages" rather than cohousing, yet as has been discussed in *2.2.4.*, there is overlap between these two typologies. Furthermore, ecovillages in which residents share kitchens and bathrooms may also overlap with this research's definition of community living. The results of these different studies have therefore been deemed as relevant for this research.

Studies were conducted by a mixture of academics, consultants and community reports, with the majority being conducted in Northern Europe and the US. Daly chose to focus on studies which have measured environmental impacts using an Ecological Footprint (EF) and a carbon footprint (CF), as these are widely used, accepted and rigorous tools for environmental impact measurement. EF measures the environmental impact of a resource by estimating the amount of bioproductive land that is necessary to support the consumption of that resource during its full life cycle (Wackernagel and Rees, 1996). The way in which CF is measured can vary between tonnes of CO2 or tonnes of CO2 equivalent (CO2e, a measurement of greenhouse gases), or as a component of overall global hectares (gha, an average biologically productive hectare – a type of measurement that relates to defining an EF) (Daly, 2017).

The graph below shows results from studies that used EF as a metric, comparing results with the most relevant comparison figure. This comparison figure was usually the average emissions of a household/person within same region of the ecovillage/cohousing community, gathered using secondary data.

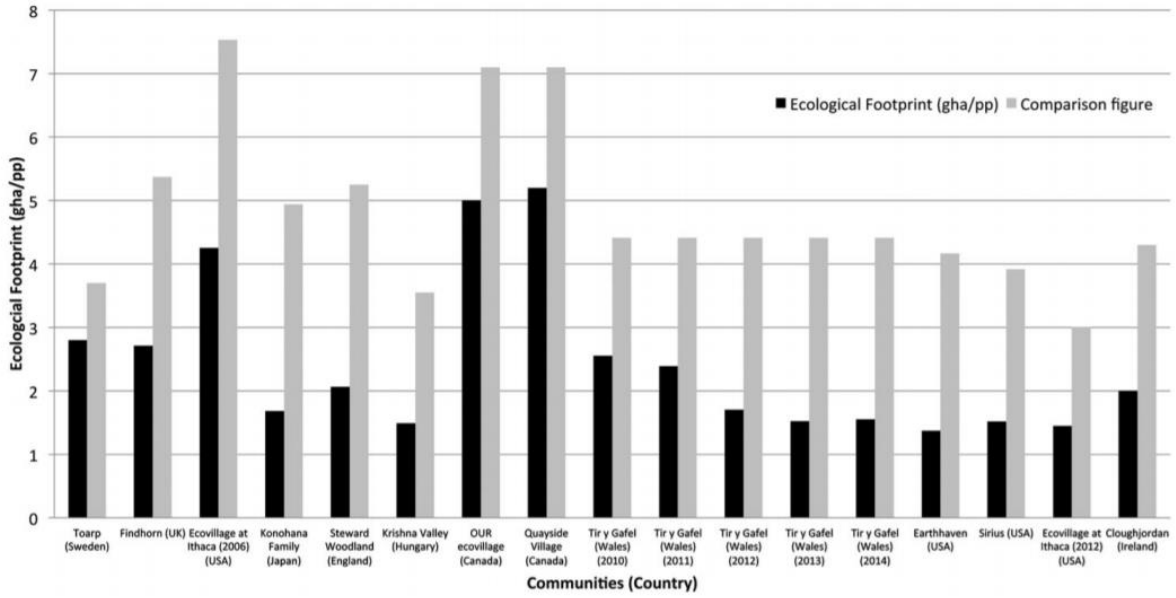


Figure 2-3: The EF of ecovillages/cohousing

Daly, 2017, p.1369

Figure 2-3 shows that all studies found ecovillages and cohousing communities to have a lower EF than their relevant comparison figure.

The next graph shows results from studies that used carbon footprint as a metric, again, comparing results with the most relevant comparison figure.

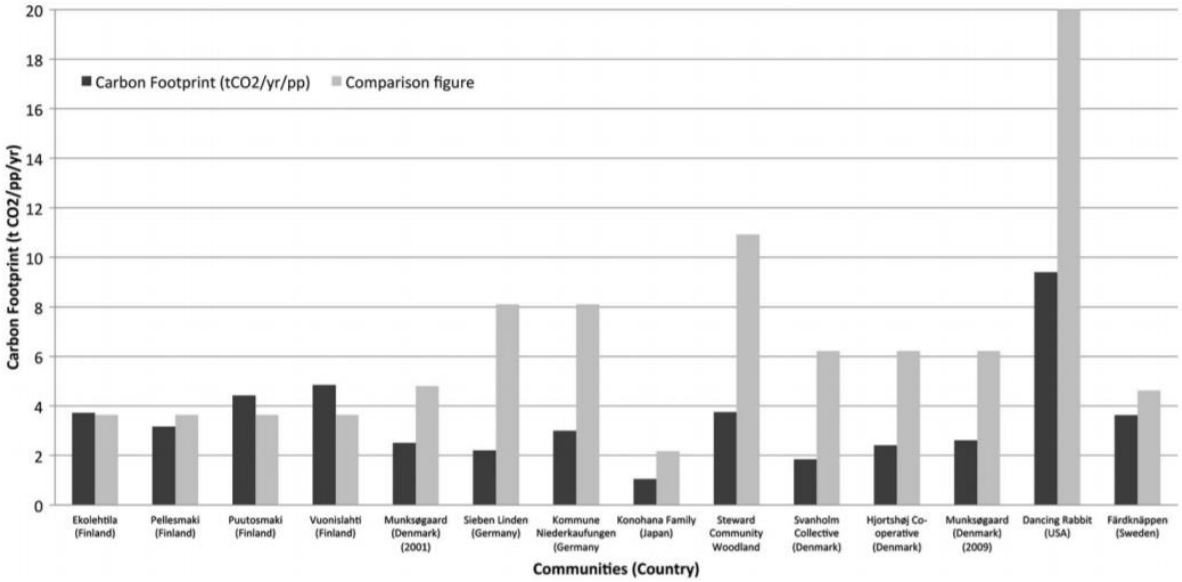


Figure 2-4: The CF of ecovillages/cohousing

Daly, 2017, p.1369

With the exception of three ecovillages, measured by Harmaajarvi (2000),[6] it can be seen that all studies have found ecovillages and cohousing communities to have a significantly lower impact than their relevant comparison.

A minimal amount of quantitative research also indicates the potential low environmental impacts of community living and coliving, through calculation of the CO2 attached to household density. Within EU countries, the carbon and energy intensity per capita is most intensive for one-person households, and the average carbon footprint of a household of five or more has been found to be about half that of an average one-person household (Ivanova and Buchs, 2020). Another study, which used an economic input-output lifecycle assessment (EIO-LCA) to attribute CO2 to household expenditure, found that through cohabitation a person would on average reduce their carbon footprint by 23 percent when compared to living alone (Underwood and Zahran, 2015). A further study, which focused on household density, found that dense urban areas have per capita emissions approximately 20 percent lower than rural areas, and that the addition of a person to a household lowers per capita emissions by roughly six percent (Fremstad *et al.,* 2018). All of these studies provide an indication for the potential for shared housing (and therefore community living and coliving) to have lower environmental impacts due to density. However, no research has been found which takes a micro/case study approach to measuring the GHGs of shared housing (and by extension, community living and coliving), as this research does. The studies by Ivanova and Buchs (2020), Underwood and Zahran (2015), Fremstad *et al.* (2018), plus Daly's (2017) review provide macro evidence to suggest that, for the most part, ecovillages, cohousing, community living and coliving are offering a way of living with a lower environmental impact.

Beyond this high-level view, there has also been numerous documentation and evaluation of what contributes to these lowered environmental impacts. Much of the literature highlights the adoption of lower floor-space consumption as an environmentally-friendly characteristic of shared living. In particular, community living and coliving residents occupy less floor-space due to their sharing of kitchens, lounges and bathrooms. One study of secondary data found that residents living in house-shares consumed on average 23 percent less space than those who live alone (Williams, 2003). There are a number of claims about the space saving of cohousing: Bamford (2001) found cohousing residencies to be 15 percent smaller than residents' previous homes, or 5 percent smaller when the

[6] The three ecovillages in Harmaajarvi's (2000) study had particularly high travel emissions due to their rural locations, and furthermore had significant emissions from construction.

household share of common space is added. Research by Williams (2005a) shows that US cohousing communities are on average 31 percent smaller compared to mainstream households; Meltzer (2000b) found that cohousing projects had a mean net residential density that was almost double that of the US and Australia (23 vs. 12); and McCamant and Durrett's (2011) comparison shows even larger differences: they report cohousing residences to be approximately 60 percent the average size of a new house in the USA. Increased density leads to less energy consumption for lighting and space heating, the latter of which accounts for the largest share of energy use in UK households (BEIS, 2020c). *Table 2-9* shows the UK's typical domestic consumption values (TDCV) for gas.

Property type	**TDCV gas in kWh**
Average one to two bedroom property	8,000
Average three to four bedroom property	12,000
Average five to six bedroom property	17,000

Table 2-9: TDCV of gas in UK households

Ofgem, 2021

Table 2-9 shows that, firstly, there are significant economies of scale when sharing a household rather than living alone: the amount of kWh to heat a house of four bedrooms is not double the amount of kWh to heat a house of two bedrooms. Secondly, it shows the potential energy savings of having a smaller-than average home.

As well as the buildings themselves being more space efficient, it has been found that within cohousing, renewable energy technologies and energy-saving design (e.g. high levels of insulation, passive solar design) are frequently adopted (Daly, 2017). As the majority of building emissions occur during the operation of that building (UKGBC, 2020), infrastructure which enables more energy-efficient building operation plays an important role in minimising environmental impacts. Moreover, reduced private space goes in hand with an increase in shared amenities, such as freezers, launderettes, and tools, which further increases emissions savings (Meltzer, 2005). This is especially the case within community living and coliving communities, where an even greater amount of shared furniture, amenities and spaces leads to reduced environmental impacts (Underwood, 2015; Williams, 2003; Yates, 2018).

Practices surrounding food procurement and cooking have also been found to play a significant role in emissions reductions (Daly, 2017). Food growing within communities is common, as is shared

meals, sharing farm produce, vegetarianism or reduced meat consumption (Daly, 2017). However, this is not always the case. In his case study of a Swedish cohousing community, Sundberg (2014) found that food emissions were equivalent to that of the mainstream, as the community did not have any special diet, and tended to eat as much as an average person. Yet, a detailed study into energy and food waste by Carlsson-Kanyama (2004) found that shared meals within cohousing communities were more efficient than individual meals. In her study of two cohousing communities she concluded that whilst the energy used to store food was slightly less efficient, the energy used to cook food was around 25 percent more efficient, and that the communities of study produced far less food waste. Such efficiencies from shared meals are also likely to occur within community living and coliving communities. A survey which compared single-person and shared households found that 73 percent of meals eaten by respondents from shared households were eaten with others (with a likelihood of greater energy efficiency in cooking and a possibility of reduced packaging), compared to 23 percent in single-person households (Yates, 2018).

Lower emissions from travel are common to many communities. Cohousing communities in particular benefit from car-sharing schemes and coworking spaces (Daly, 2017; Moos *et al.* 2006), which enable residents to work from home. However, the rural locations of some communities means reliance on private vehicles. Harmaajarvi (2000), who found four case study ecovillages in Finland to be *more* environmentally impactful than the average equivalent household, states that the use of private cars played a prime role in their higher emissions. Giratalla (2010) notes that of the two Canadian ecovillages he studied, one was highly dependent on private vehicles, with a large portion of their emissions being attributable to car fuel emissions. Within urban areas, where there is less need to drive (where many community living and coliving communities are situated), it has been found that emissions from air travel significantly offset gains from reduced private transport (Ottelin *et al.,* 2014). Air travel has also been found to play a major role in transport emissions within studies of ecovillages/cohousing (Giratalla, 2010; Tinsley and George, 2006).

Typically, ecovillages and cohousing tend to produce less non-recyclable waste. Giratalla (2010) measured that one ecovillage produced significantly more waste per person than the equivalent mainstream housing, although recycled approximately four times more. Similarly, Sundberg's (2014) case study cohousing community produced 30KG more per person per year than the local area average, but of this waste a greater proportion was recycled. Harmaajärvi (2000) reports that the Finnish case study ecovillages produced on average 63 percent less non-recyclable waste, and Sherry (2014) found that an ecovillage in the US produced 75 percent less waste than the US average.

When these different factors come together, the results are most often a lowered environmental footprint. For example, in his assessment of three ecovillages which used a cohousing format, Sherry (2014) measured home energy use, transportation energy use, food consumption and waste disposal, and found that when compared with the average within their local area, reductions ranged between 43 and 76 percent.

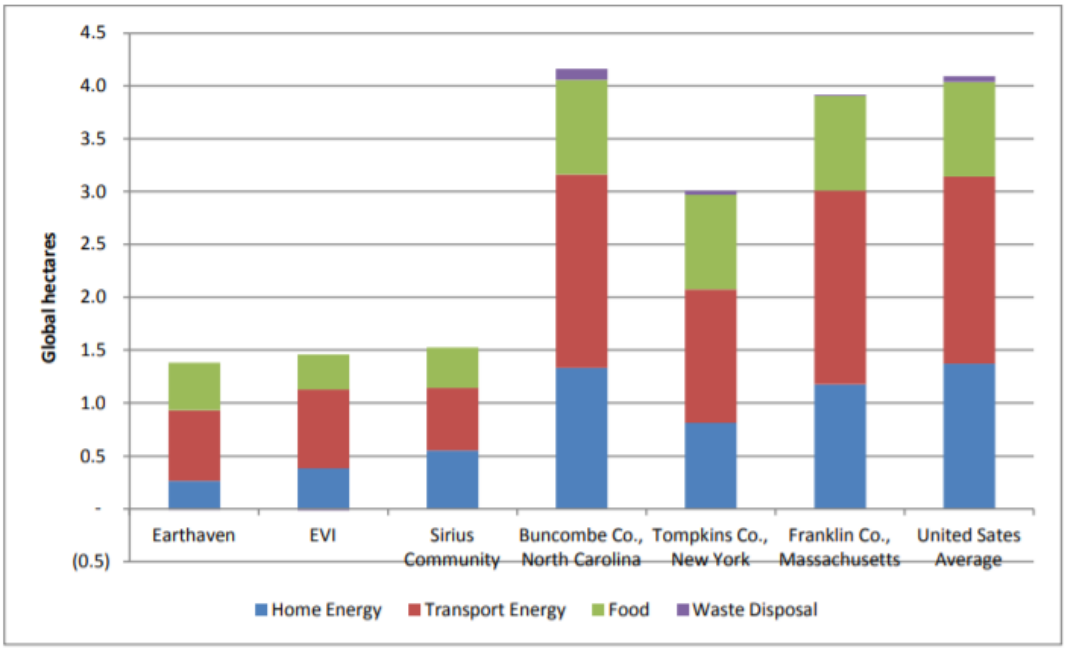


Figure 2-5: The EF of three US ecovillages

Sherry, 2014, p.164

Figure 2-5 shows the EF of three US ecovillages which used a cohousing format (depicted by the three left-hand bars), along with comparison figures for the average local equivalents (fourth, fifth and sixth bars from the left) and a US average (the right-hand bar).

Similarly, Sundberg's (2014) study found GHGs per person of a Swedish cohousing community to be at 78 percent of the average equivalent, mainly due to lowered energy consumption.

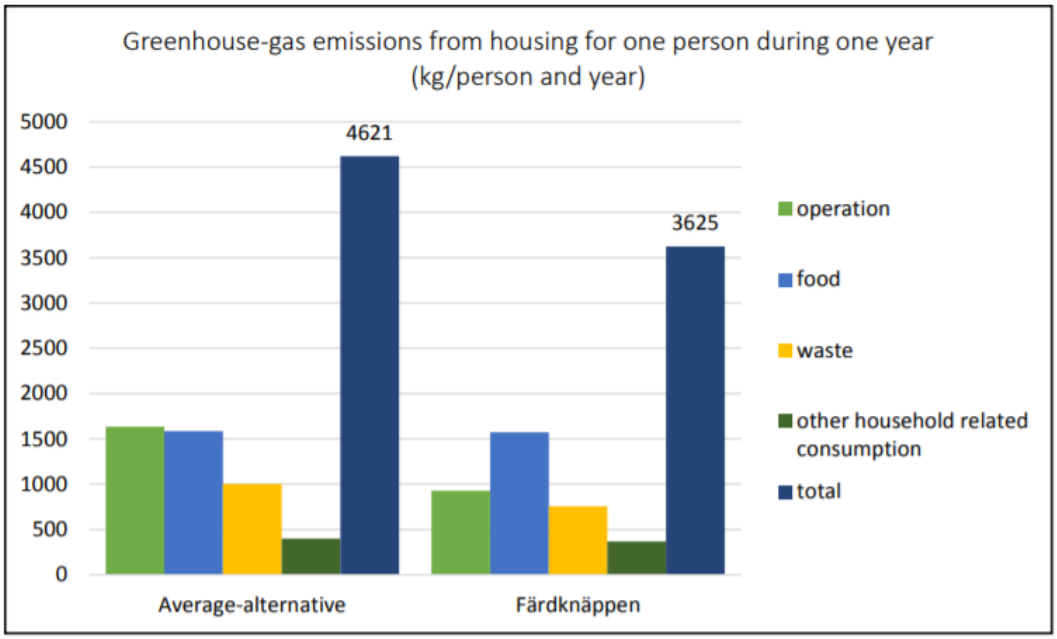


Figure 2-6: Swedish cohousing community Fardknappen's GHGs

Sundberg, 2014, p.47

Figure 2-6 shows the average KGs of GHGs per person per year of Swedish cohousing community Fardknappen in comparison with the average equivalent.

Most studies of ecovillages/cohousing do not account for the environmental impacts of indirect emissions (emissions which occur along the supply chains of the goods and services purchased by households) (see for examples: Boyer, 2016; Lammas 2011-2015; Sherry, 2014). Sundberg (2014) is one of the rare exceptions. He uses a mixture of community expenditure records and estimates of the amount that private households purchase to construct a figure (which falls under 'other household related consumption'). The number of items recorded are relatively few,[7] as is perhaps indicated by the small amount of GHGs attributed to this category (see *Figure 2-6*). According to Druckman and Jackson (2010), indirect emissions can account for approximately two thirds of a total UK household's carbon footprint; Sundberg's assessment attributes a little over ten percent to this category. This acknowledgement of some indirect emissions is commendable given their significance in overall emissions, and the potential for shared living to reduce certain goods (Yates, 2018), yet Sundberg's methodology can perhaps be further developed. Research into the emissions relating to household/urban density (Ivanova and Buchs, 2020; Underwood and Zahran, 2015; Fremstad *et al.*,

[7] Sundberg lists these as: books, magazines and newspapers for the library, TV, computers, copy machine, printer and ink, treadmill, furniture and inventories, kitchen equipment, cleaning material and consumables and 'various other things' (Sundberg, 2014, p.38).

2018; Williams, 2003) have taken a macro approach, using secondary expenditure data to calculate indirect carbon emissions. Whilst this approach is valuable in the reliability of its results, the GHGs attributed to various forms of consumption are not linked with specific practices, or data which explains how these lowered forms of consumption are managed as part of everyday life. Part of this research's contribution to knowledge is that it includes a bottom-up assessment of the indirect emissions of goods (see *4.3.4.2.* for details of the method), and explores their connection with meanings and practices within the communities.

This section has shown that there is quantitative evidence to suggest that UK cohousing, community living and coliving communities may have lower-than-average environmental impacts. This is a topic that this research investigates through measuring the GHGs of case study communities.

2.4. Current and past approaches to domestic pro-environmental practice interventions

Beyond these quantitative measurements, this research is also interested in the role of social networks in relation to pro-environmental practices within shared living. The rest of the literature review explores this topic. This section (*2.4.*) argues that UK government approaches towards lowering the environmental impacts of homes typically ignore or underutilise the role of social networks, before Section *2.5.* explores the evidence that social networks can be an effective means for encouraging pro-environmental practice transitions and maintenance. Section *2.6.* explores what is shared within these social networks, as well as different sharing typologies which are utilised in this research.

As the majority of a building's environmental impacts occur during its operation (UKGBC, 2021), there is a need for increased engagement in pro-environmental practices within and around the home. Initiatives to lower GHGs within domestic settings have either focused upon top-down, regulatory approaches (e.g. zero carbon homes, Future Homes Standard); encouraged home-owners to install energy-efficient technologies (e.g. the Green Deal, the Green Homes Grant); or dispensed energy-saving advice, mainly under the guise of lowering the cost of bills (e.g. Ofgem's 2020 'How to save money and use less energy' report).

These approaches either do not account for the building's inhabitants, or approach those inhabitants as rational, self-interested consumers (Shove, 2010). This latter approach stems from traditions of economics and psychology, utilising theoretical approaches such as Rational Choice Theory (RCT).

According to RCT, action is fundamentally underpinned by rationality, and individuals will calculate the costs and benefits of a proposed action before considering what to do (Scott, 2000). RCT has been criticised for its simplistic approach to behaviour change, with evaluative research finding that pro-environmental campaigns based on knowledge dissemination have little to no long-term impact (Bartiaux, 2008; Lucas *et al.,* 2008).

Approaches which acknowledge the role of the environment (e.g. nudge theory) and the role of the social world (e.g. the Social Marketing Approach [SMA]) in shaping practices have had some success in pro-health and pro-environmental interventions (e.g. BIT, *no date*; Burchell, 2016; Corner and Randall, 2011; McKenzie-Mohr, 2000; Peattie and Peattie, 2009). However, these approaches have been criticised for only making incremental changes, whilst not questioning the dominant paradigm of the citizen-as-consumer (Barr *et al.,* 2011; Corner and Randall, 2011; Hargreaves, 2011), therefore making them ineffective for bringing about the kind of behavioural changes required to solve "big problems", such as climate change (Goodwin, 2012). As Barr *et al.* (2011) state: '[i]n applying a fundamentally market-based concept to behaviour change, there is an implicit assumption that behaviour changes are only likely to emerge within existing and dominant discourses of consumption' (p.713). Such a discourse can, in certain situations, limit the positive effects of environmental practices. If such practices are motivated by financial gain, this could conceivably lead to the so-called "rebound" effect, whereby the money saved from, for example, cheaper energy bills will be spent on something which produces as much or more carbon emissions, such as additional travel. If individuals are only approached to engage in environmental practices for reasons of self-interest, then increased inconvenience (such as the extra work involved in recycling) will have greater validity as a reason to not engage in such practices. Indeed, Barr *et al.* (2011) found that notions of inconvenience were acceptable within the discourse of not engaging with environmental practices. In these models, then, individuals tend to be persuaded rather than challenged, which hearkens back to the basic concept of RCT that individuals act on self-interest. Such an ontology is limiting, especially when studying social groups, where the interplay of who benefits from what action extends beyond simple self-interest.

Initiatives to lower GHGs within domestic settings have rarely engaged with social networks, which some studies suggest can be a fruitful way to encourage adoption and maintenance of practices. The next section draws upon some of these studies as a way to discuss the potential of social networks for pro-environmental practice transition and maintenance.

2.5. Social networks and practice transition/maintenance

A social network can be defined as a set of individuals and the relations (collection of ties) between them (Wasserman and Faust, 1994). This research looks at how the relations between individuals within shared living communities may enable the spreading and maintenance of pro-environmental practices, through the negotiation of shared resources, meanings and practice. Existing research shows the potential for social networks within shared living to help foster pro-environmental practices. A key example is Hausknost *et al.* (2018), who compared a top-down, local government initiative to encourage the consumption of nutritious foods with a similar bottom-up initiative by an intentional shared living community. They found that the intentional community had a greater ability to substitute undesirable practices for desirable practices, through interlocking practices within 'communalization' (p.379) – that is, the shared commitment of the group, along with shared material infrastructures. This section discusses other relevant research, arguing that this is an area which warrants further investigation.

Studies of social influence in psychology are well-known. From Jenness' (1932) experiment involving guessing beans in a jar, to Sherif's (1935) study on auto-kinetic effects, and Asch's (1951) famous line-length experiment: there are numerous examples where people have been shown to conform with those around them. Beyond these clever but rather simplistic demonstrations of conformity, some studies have looked more specifically at conformity over time when practices are negotiated at the group level. An experiment by Lewin (1958) looked at this phenomenon: Lewin compared a group who received instruction from an "expert" with a group who discussed the same issue between them, comparing the number of people who maintained the desired practice transition (to eat more offal) four weeks afterwards. It was found that within the former group 52 percent maintained the desired practice, whereas within the latter group the figure was 85 percent (Lewin *et al*., 1958). Lewin found similar results across other practice interventions, including encouragements to feed babies more orange juice, to increase the production of pyjamas, to improve the reliability of merit ratings and to consume more whole wheat bread (Cartwright and Zander, 1968). It was his theory that 'because individuals act always as constituent elements in larger social systems, a decision by a group into which the individual has been incorporated will be a more powerful influence than individual instruction by an expert' (Stephenson, 1999, p.570). A similar field experiment also found that when participants were involved in negotiating a new practice, they were more willing to engage in that practice. In this study by Coch and French, which took place in a factory, one set of workers was instructed to take up a new work method (which was no more difficult than the former work method) whereas another set of workers was involved in making

decisions about the transfer to the new work method. Of the group who were instructed, several workers lowered their production rate and exerted strong pressure for other workers to do so too; whereas the workers who had been involved in the transition to new work methods increased their productivity (Cartwright and Zander, 1968).

Evaluation of community-based public health interventions has indicated that the support of social networks can increase changes in practice. For example, a community-based breast cancer screening programme was found to increase awareness by 30 percent, and participation in screening by 25 percent (Brown *et al.,* 2011). Some studies have furthermore found that once group standards have been established for practices (such as health habits, farming practices, production methods, religious customs, and washing habits) those practices are extremely resistant to change, even when individuals are away from the group in which those standards were formed (Cartwright and Zander, 1968; Maller and Strengers, 2013).

There have been a number of schemes which make use of social networks to encourage engagement in pro-environmental practices. Community-based groups have included programmes run by Global Action Plan (GAP), Carbon Rationing Action Groups (CRAG), Carbon Conversations, Carbon Watchers and the Transition Town Network (Buchs *et al.,* 2012), although evaluation of the effectiveness of these groups is difficult to conduct (DEFRA, 2006), and has been fairly minimal (Buchs *et al.,* 2012). Evaluations that have taken place indicate that social networks can play a formative role in increasing and maintaining pro-environmental practice. The EcoTeams programme, run by GAP, brought together groups of 4-6 households from the same community, facilitating discussions about the environmental impacts of certain domestic practices, as well as having the households monitor their waste generation and energy use. It was found that on average waste was reduced by 19.66 percent, recycling was increased by 7.71 percent (based on data collected by EcoTeam organisers) and electricity consumption was reduced by 6.86 percent per team (Hargreaves *et al.* 2008). A report from CRAG estimated members' carbon footprints to be 31 percent lower than the UK average (Howell, 2009). In these groups it was indicated that the social and moral support, accountability and location-specific sharing of knowledge about technologies were key factors in driving changes of practice (Nye and Burgess, 2008; Howell, 2009). In a meta-review of pro-environmental community groups, a DEFRA report furthermore found that they could be successful in building a sense of ownership and empowerment, and that mutual support could transpire as increased community capacity to support long-term pro-environmental practice (DEFRA, 2006). It has also been shown that within community-based pro-environmental practice interventions, awareness and engagement

in pro-environmental practices was particularly apparent amongst those who had not had a strong interest in environmental issues before participating in community-based schemes (Middlemiss, 2009). This suggests that social networks have the potential to recruit new carriers of pro-environmental practices, rather than just strengthening or extending pro-environmental practices of existing carriers. However, these new carriers had still volunteered to take part in those schemes in the first place. An ethnographic study of an office which took part in GAP's Green Champions Challenge, in which a handful of volunteers encouraged their office to adopt certain pro-environmental practices, found that it was difficult for the Champions to persuade their colleagues to change their habits (Hargreaves, 2011). This raises the point that within social networks there may be different levels of engagement in pro-environmental values and practices. Plus, while social networks within community-based sustainability programmes were found to be of value, this does not necessarily mean that social networks are inherently useful in spreading adoption and maintenance of pro-environmental practice.

It should moreover be noted that community-based groups tend to carry certain challenges. The negotiation which usually occurs within groups means that momentum towards action can take a long time, and that outcomes are relatively unpredictable (DEFRA, 2006). Changing practices tends to be a complex and time and resource-intensive process (Burchell *et al.,* 2016; DEFRA, 2006), requiring skilled facilitators and commonalities (a "glue") between group members which extends beyond simply living on the same street (DEFRA, 2006). Community-based schemes also had greater success in encouraging some practices than others. While reductions in non-recyclable waste and energy-usage were achieved by some groups (Hargreaves *et al.* 2008; Howell, 2009), encouraging travel via public transport has been noted as difficult to change, as public transport infrastructure is perceived as beyond the remit of community groups (DEFRA, 2006; Steward *et al.*, 2009).

Despite these challenges, the available evidence indicates that social networks may encourage adoption and maintenance of pro-environmental practices. This research builds upon existing research of pro-environmental community-led initiatives, by exploring social networks within shared living communities, to investigate their role in environmental sustainability. Shared living communities present specific and interesting social networks, as individuals are sharing spaces, resources, social time, and potentially knowledge, know-how, meanings and endeavour. For each of these types of sharing, this research explores the processes of negotiation that take place which enable and constrain pro-environmental outcomes. The next section explores what is shared between residents within shared living, and how that sharing may be conceptualised.

2.6. Sharing in cohousing, community living and coliving

The high levels of sharing within shared living embody much of what enables these communities to have lower environmental impacts, and indeed, what sets shared living apart as an alternative living paradigm to the neo-liberal housing model, which prioritises privacy and sole ownership (Jarvis, 2019). This section explores types of sharing which occur within cohousing, community living and coliving communities, and questions and concepts around these types of sharing which this research explores.

The concept of "sharing" is extremely broad (Martin, 2016), and is often used as a catch-all description for practices which have different functions and motivations (Kennedy, 2016; Wittel, 2011). The term "sharing economy" has created a somewhat misleading idea of sharing, as it represents online peer-to-peer sharing of goods and services which includes companies that enable users to profit from the loaning of their assets, (e.g. Airbnb); whereas a common sense understanding of sharing is that which excludes exchanges which involve payment from any party involved (Martin, 2016). Belk (2007) describes sharing as 'the act and process of distributing what is ours to others for their use and/or the act and process of receiving or taking something from others for our use' (p.126). Belk thereby frames sharing as a practice which does not involve reciprocity, compensation or transferal of ownership (Kennedy, 2016). Whilst this description is helpful in illuminating what Belk sees as the underpinning guidelines of sharing, some elements of this framing are questionable. The assumption of ownership over what is shared also does not always apply to shared living, where some shared items are jointly owned. Plus, whilst sharing ostensibly carries no expectation of reciprocity, in practice this may not be the case (this will be explored in this section).

To begin to understand sharing in shared living communities, it may first be helpful to explore what is typically shared. Sharing within these communities tends to be myriad and complex. Drawing in part upon work by Jarvis (2011) and Yates (2018), *Table 2-10* gives a non-exhaustive list of what may be shared within these different types of community.

Table 2-10: Types of sharing within cohousing, community living, and coliving communities

Type of sharing	**Examples in cohousing**	**Examples in community living**	**Examples in coliving**
Architectural space	Common house, which may contain a kitchen/dining area and meeting space; garden; bicycle storage; guest rooms	Kitchen, bathroom, living space	Living space (may include lounge, coworking space, gym, outdoor area), potentially kitchen and bathroom
Objects and amenities	Lawnmowers and gardening equipment, cars, some kitchen appliances e.g. a bread-maker, books, toys, possibly utilities e.g. Wi-Fi, heating	Furniture and white goods, crockery and cutlery, pots and pans, books, exercise equipment, cars, lighting, heating, Wi-Fi	Furniture and white goods, crockery and cutlery, pots and pans, exercise equipment, cars, bicycles, lighting, heating, Wi-Fi
Food	Large communal meals (pot luck or rota-based sharing of cooking responsibilities); allotments; sharing of baked goods/leftovers	Shared meals, shared food (e.g. one carton of milk for everybody); sharing of baked goods/leftovers; homegrown fruit/vegetables	Shared meals (may or may not be provided by the operator); sharing of baked goods/leftovers;
Social time	Spontaneous socialising; socialising that occurs while spending time together completing any task; organised social events e.g. music night, pot luck	Spontaneous socialising; socialising that occurs while spending time together completing any task; organised social events e.g. watching a film, sharing circles	Spontaneous socialising; organised social events e.g. weekend hike, cookery class
Domestic tasks	Childcare, gardening, cleaning the common areas, building	Cleaning, cooking, building maintenance, DIY projects	Cooking, tidying

	maintenance, DIY projects		
Management and administration	Discussing running of community; rotas, agreements and organizational structures; making decisions on joint purchases, projects and events; resolving interpersonal difficulties	Discussing running of household; making decisions on joint purchases; resolving interpersonal difficulties; sharing tasks of managing utilities and rental payments	N/A
Finances	Sharing costs of furnishing, utilities and maintenance of common areas, costs for projects and events; possibly some income pooling/subsidising for mortgage payments or financial help during times of need	Sharing costs of furnishing and utilities; possibly some subsidisation for rent payments or financial help during times of need	Sharing costs of shared spaces/utilities (though as part of one fee which includes rent)
Remunerative work	Engaging in an enterprise together, e.g. selling allotment produce; organising events open to the public	Engaging in an enterprise together, e.g. start-up/“side hustle”	Engaging in an enterprise together, e.g. start-up/“side hustle”
Know-how (teaching others a skill, or doing something for others)	Growing food, cooking, baking, mending furniture, applying for a grant	Cooking, baking, mending clothes, IT skills, massage	Cooking, baking, IT skills, massage, coaching, mastermind session (for entrepreneurs)

Values	Political (e.g. left-leaning, favouring localism and/or activism); environmental (e.g. veganism, purchasing practices, or communal living situation)	Political (e.g. left-leaning, favouring localism and/or activism); environmental (e.g. veganism, purchasing practices, or communal living situation)	Political (e.g. left-leaning, morally liberal); environmentalism (e.g. veganism, attending pro-environmental demonstrations)

Amongst this variety of shared spaces, objects, time, work, know-how and values, there are different types of sharing. Sharing may be serendipitous (a chance social encounter) or intentional; it may be simultaneous (sharing a meal together) or sequential (sharing the same washing machine, though not at the same time) (Jarvis, 2019; Yates 2018). Sharing may be of things or spaces which are jointly owned, or privately owned and borrowed for a period of time. Sharing may reduce access to that which is shared, for example, sharing a car may mean that you may not always be able to access it when you want; a person who shares a cake has less of that cake left for themselves. Inversely, sharing increases access to things which individuals otherwise could not have afforded, had time to do themselves, or had room (or inclination) to store. The sharing of knowledge, ideas and values may lead to inhibitions and the stifling of innovation, or it may lead to novelty and transformation (Jarvis, 2011). Sharing can lead to social relationships being strengthened, affective interactions being enhanced (Wittel, 2011) and events – even those which are mundane and domestic – gaining cultural significance (Jarvis, 2019). Within communities there are likely to be social norms around sharing, just as there are norms for sharing within cohabiting households, married households and households with children (Belk, 2010). Some types of sharing within shared living may also require certain infrastructures, from the “hardware” of district heating equipment to the “software” of participatory governance (Jarvis, 2012). Shared living may support practices which would be unfeasible in a standard neighbourhood, such as communal meals and extensive sharing of objects and amenities (Sherry, 2014), collaborating to purchase otherwise unaffordable solar panels, and of course, the sharing of intangible assets, such as know-how, beliefs and values.

Whilst some (though not all) of what is shared is physical, sharing in itself is inherently a social activity. Although some research has positioned even the most intimate forms of sharing (for example, between married couples) as an economic exchange (Ruskola, 2005), other researchers have emphasised that sharing creates trust and social bonding (Belk, 2010). Linked to this, sharing is

also perceived to require a level of trust and social connectedness; as Wittel (2011) notes, people must carefully consider whom they share with and what it is that they share. From this perspective, sharing both requires and creates social bonds. However, different types of sharing may require different levels of social connectedness and trust. Ingold (1986) uses the terms “sharing in” and “sharing out” to categorise two different types of sharing. Sharing in means to share with others who you are intimately acquainted with, where ownership is perceived as common (e.g. the nuclear family). With sharing in, those shared with are regarded as an extended part of the self (Belk, 2010). Sharing out means to give to those who are outside of these boundaries of the extended self, and, according to Belk (2010) is closer to gift giving and commodity exchange, and is less likely to create social bonds. Belk (2010) gives the example of how sharing a car can be sharing in or out dependent upon who it is being shared with. Sharing a car with family counts as sharing in, whereas sharing a car within a large carsharing organisation can be defined as sharing out. A car share that occurs between a group of people who are acquaintances may be somewhere in between. The relationship characterised by sharing in is termed as ‘Mothering’ by Belk (2010, p.712), who lists characteristics including non-reciprocity, love and care, the strengthening of social bonds, and not involving money as typifying this type of intimate sharing. As indicated by the term “mothering”, Belk clearly links this type of sharing with close family. Indeed, within Western families this type of sharing is usually based within a household, with a distinction being drawn between the private sphere of the home and the public sphere outside of the home (Allan, 1989). Within this sense of extended self, norms for what is and is not shared still exist. For example, siblings are likely to share games and toys, but not undergarments, and married couples are more likely to share income than unmarried couples (Belk, 2010). It has also been found that this sense of extended self can reach beyond family to romantic partners and close friends (Belk, 2010). A question arises as to whether and what extent shared living residents perceive each other as part of the extended self, and where they sit on the spectrum of sharing in and sharing out. Furthermore, what properties or capabilities might emerge from this extended self which were not possessed by its individual parts (Elder-Vass, 2010)? This is a topic which this research explores.

A further element of sharing that warrants consideration is whether sharing is reciprocal. According to Belk (2010), sharing in is non-reciprocal: that is, resources are shared without any need or expectation of a mutual response. In a discussion of hunter-gatherer societies, Woodburn (1998) presents a similar perspective, arguing that a hunter who is required to share his or her catch with the tribe (termed “demand sharing”) is not reciprocal sharing, in the same way that our taxes should not be deemed as reciprocal sharing. However, given the differences in scale between a hunter-

gatherer tribe and a society where members contribute taxes, the analogy perhaps falls short, as taxation removes any aspect of sociality between those sharing. Sahlins (1972) views sharing where one does not keep track of who has given how much as creating obligations of reciprocity, albeit vague ones. Using the example of the nuclear family, parents are expected to care for their children without immediate reciprocity. However, there may be some obligation for those children to provide care for their parents as they grow older or if they fall ill. This non-specific expectation of reciprocity is close to the concept of gift giving. Gift giving enables continuing social linkages through perpetual indebtedness, as gift-giving is always staggered in time (Belk, 2010). This form of exchange places importance on social rather than economic motivations to circulate objects (Jenkins *et al.,* 2013), and leads to a destabilization of the economic value of goods, but maintains relationships, and may also allow some individuals to accrue social status through providing others with what are perceived as valuable resources (Baker, 2012). Given the plethora of sharing practices in shared living communities, one topic of interest is the role that obligations for reciprocity plays in what and how things are shared.

Beyond the sharing of resources, community living and cohousing communities also share in governance. Some research has linked forms of shared governance within intentional communities to pro-environmental outcomes. Boyer (2016) finds that the governance and interpersonal relations tools used in Dancing Rabbit ecovillage facilitate 'collaborative consumption' (p.10) which can lead to environmental savings. In a comparison of pro-environmental practice transitions, Hausknost (2018) similarly finds that the shared vision, values and joint decision-making which takes place within intentional communities is highly enabling for the reconfiguration of practice. The coordination required for these types of shared governance conceivably demands that the community becomes a form of extended self (as with the concept of sharing in). Jarvis (2019) uses the term 'we-intentions' (p.262) to encapsulate the intention to entangle individual agencies into a "we", which engages in mutual belief, group goals and joint action. This is not the same concept as "groupthink", whereby there is implicit or explicit pressure to conform, and unanimity of viewpoints (Janis, 1982). Conflict (although often respectfully conducted) is frequently a part of reaching consensus (Jarvis, 2019), and negotiation skills and reflexivity are needed for collaboration at the community level. Even then, there are still differences and tensions in certain values, for example, levels of pro-environmentalism, or tensions between privacy and communality (Jarvis, 2019). This raises interesting questions as to the processes to arrive at "we-intentions", and how these processes translate into "we practice".

Some research has found that cohousing residents influence one another to engage in pro-environmental practices (Sherry, 2014; Meltzer, 2000a, 2000b; Jarvis, 2012; Williams, 2005b), and no research has specifically looked at pro-environmental social influence within community living or coliving communities. There are suggestions that within cohousing communities, the stronger the interpersonal relationships, the greater the influence. Williams (2005b) reports that the high levels of social capital within cohousing allow for the sharing of ideas and an increased awareness of environmental practices, which she states may be reinforced by the internal culture of the community or through peer pressure. In his survey of 346 households across the majority of US cohousing communities, Meltzer (2000a) quantified levels of community support and levels of environmental practices and found a positive correlation between the two, suggesting an 'association between levels of practical, social and moral support and the degree to which communities are successfully able to instigate pro-environmental systems' (ch.4, p.85). Many of Meltzer's (2000b) survey respondents named the support of 'friends, neighbours, and the community at large' as the greatest influence upon their pro-environmental practices (p.122). According to Meltzer, this influence occurred either 'overtly via discussion, education or leadership, or covertly through socialisation and/or behaviour modelling' (p.119). Meltzer created a theory for how engagement in pro-environmental practices gradually and iteratively increase within cohousing communities, linking strong social networks and environmental practices using the following steps:

- living in community facilitates human *interaction* which builds meaningful social *relationships*;
- supportive *relationships,* in a context of community, imbue a strong sense of belonging to that community;
- "belonging" (to geographical community and therefore, "place") induces confident *engagement*; and
- *engagement* with *circumstance* (that is, *empowerment*) is critical to effective pro-environmental praxis.

Meltzer, 2000a, ch.6, p.4

The mention of relationships and a sense of belonging does have some alignment with sharing being congruent with social ties and trust, as well as a sense of the extended self (Belk, 2010). Though, Meltzer's emphasis is on empowerment, which he believes is the intermediary motivational force acting between a sense of community and environmental practices. In the context of considering communities as an emergent extended self (that is, having qualities which are not possessed by the sum of its parts) (Elder-Vass, 2010) the notion of resulting empowerment can arguably be conceptualised as one of these emergent qualities. One criticism of Meltzer's steps, however, is that

they present a very positive view of social influence, which is questionable. Could negative emotions (e.g. guilt, fear of judgment or reprisal) have a role to play in pro-environmental practices? Meltzer's steps indicate an important linkage between social relationships and pro-environmental practice, yet they can perhaps be built upon. This research looks at the role of social influence as part of a larger context of what is shared within communities.

The 'we-intentions' (Jarvis, 2019, p.262) needed for shared governance, processes and the myriad of shared resources arguably requires a different living paradigm. Unlike the neo-liberal ideals of home, which are based on high levels of consumption, ownership and privacy, shared living moves away from sole ownership, embraces closeness with others and requirements to negotiate, which potentially enables environmental impacts to be lowered. Conceivably, as a result, the shared living community becomes more than the sum of its parts, gaining certain qualities and capabilities which each individual cannot have in isolation (Elder-Vass, 2010). This research explores these emergent qualities and capabilities of shared living, examining how they relate to lowered environmental impacts.

This research focuses upon how sharing relates to pro-environmental outcomes in shared living. It views each type of sharing as a relational tie between individuals. Its focus is on how residents negotiate each of these relational ties in order to share spaces, resources, pro-environmental meanings, decisions, and endeavour. The concepts mentioned in this section (sharing in and out, we-intentions, reciprocity, influence) are used when appropriate to better understand these negotiations.

2.7. Chapter summary and gaps in the research

The context of this research is the need for environmentally sustainable housing solutions. Existing homes must on average reduce their overall CO2 emissions by 24 percent by 2030 on 1990 levels (CCC, 2019). So far, top-down technological adaptations are not happening rapidly enough, infrastructures which constrain domestic pro-environmental practices remain, and the rise of single-person households (ONS, 2019a) adds to the environmental impacts of UK homes. This research posits that cohousing, community living and coliving, which are types of shared living, may form part of the solution for environmentally sustainable housing.

These three housing typologies differ spatially, with cohousing communities having larger numbers of people and self-contained households, community living consisting of smaller numbers of people

who share one living space, and coliving falling under both of these spatial typologies. They also differ in their social arrangement: cohousing and community living are self-managed communities, whereas coliving communities are managed communities. Cohousing within the UK is a fairly new movement (Tummers 2017), having begun at the end of the 1990s (UK Cohousing Network, *no date2*), therefore, relatively little research focused upon UK cohousing exists (examples include Jarvis 2011, 2015, 2019; Scanlon and Arrigoitia 2015; Williams 2003). Little attention has been given to community living or coliving, the latter of which is a recent iteration of shared living circa 2012 (examples of coliving-related research include: Bergan *et al.,* 2017; Hocking, 2020; Frichot and Runting, 2017; Popowska, 2016; von Zumbusch and Lailicic, 2020). For all housing typologies, there has not been a UK-based study which focuses upon environmental impacts. This research therefore offers new information on cohousing, community living and coliving within the UK, in particular, in relation to pro-environmental practices.

This review has explored existing quantitative research into the environmental impacts of cohousing and house-sharing (which is somewhat akin to community living and coliving), which shows that the majority of studies find these types of shared living to have significantly lower environmental impacts than the average equivalent household. This research builds upon and contributes to these findings in several ways. Firstly, the quantitative elements of this research will add to the currently scant body of knowledge which measures the environmental impacts of UK communities. Thus far, only Findhorn Ecovillage (Tinsley and George, 2006) and Lammas Ecovillage (Lammas, 2011, 2012, 2013, 2014, 2015) have undertaken this type of environmental measurement. Neither of these communities can be strictly defined as cohousing, community living, or coliving, and both are rural. The addition of measurement of urban UK communities will be novel, and useful when considering that the majority of people reside in urban settings. Secondly, non-macro quantitative measurements often miss or undervalue indirect emissions, which can account for approximately two thirds of a total UK household's carbon footprint (Druckman and Jackson, 2010). This research contributes to knowledge by including a bottom-up assessment of the indirect emissions of goods (see *4.3.4.2.* for details of the method).

This review of the literature has also made the case that the majority of UK government approaches towards lowering the environmental impacts of homes typically ignore or underutilise the role of social networks. It has explored the evidence that social networks can be an effective means for encouraging pro-environmental practice transitions and maintenance. This research posits that the social networks within shared living merit further investigation, as much of the pro-environmental

outcomes within shared living are a result of different types of sharing (e.g. sharing spaces, resources, meanings, decisions, and endeavour). Therefore, through studying these types of sharing as relational ties, and focussing on how residents negotiate these different forms of sharing, new insight will be generated into how social networks within shared living may enable pro-environmental outcomes. This research therefore also contributes knowledge towards the study of social networks and domestic pro-environmental practice, adding to the evaluation of other community-based pro-environmental programmes such as Hargreaves (2011), Hargreaves *et al.* (2008), Howell (2009), Middlemiss, (2009) and Nye and Burgess (2008). The uniqueness of this study is that the communities share domestic space, and are not taking part in a time-limited programme, but rather daily domestic practice. In this sense, this research will add to the existing research that has explored social influence and pro-environmental practice in non-UK cohousing and ecovillages, e.g. Boyer (2016), Meltzer (2000a, 2000b, 2005), Hausknost (2018) Jarvis (2012) Williams (2005b). It investigates these topics in a UK context, and explores community living and coliving, as yet underexplored housing typologies.

Finally, this research contributes to knowledge by relating quantitative and qualitative data, exploring the connections between GHG measurements and pro-environmental practices within shared living communities.

Chapter 3. Theoretical framework

This chapter explains the theoretical approach adopted for this research. It begins with interpretivism, which underpins the ontological and epistemological approach. It then explains and explores social practice theory (SPT), which is the main theory used. It outlines the basic tenets of the theory, and then goes on to explore how SPT has been related to emotions, identity, social groups and social norms. In particular, the chapter highlights social norms as a concept that this research adopts alongside SPT. In the final section the overarching theoretical framework of this research is explained, showing how SPT and social norms form a complementary framework which explores pro-environmental practices within these communities as something which transcend, yet are negotiated by, individuals as part of a community.

3.1. Interpretivism

This research is grounded in an interpretivist ontology and epistemology. The interpretivist ontology posits that objective social reality and subjective social reality are deeply intertwined (della Porta and Keating, 2008), and that, epistemologically speaking, social reality cannot be measured objectively, but can only ever be understood subjectively as a series of interpretations (Magnusson and Maracek, 2015; Mills, 1940). Studies which are based upon an interpretative ontology and epistemology tend to focus upon exploratory research, which aims to explore in-depth how meanings and actions are situated within specific contexts (della Porta and Keating, 2008), and so seeks to understand the site and subjects of study holistically. Interpretative approaches therefore embrace complexity, and favour methods which allow for ambiguity (della Porta and Keating, 2008). Such methods are often (though not always) heavily reliant on qualitative data (Bilton *et al.,* 1996). Within social science research, interpretation is seen to work at two levels: the way that people within society interpret their world, and the way that social scientists then interpret those interpretations (della Porta and Keating, 2008). This focus on reflexivity reflects the interpretivist

view that we cannot separate ourselves from our subjectivity, and, as such, the researcher's experience is often deemed as forming an important part of the data.

It should be noted that part of this research consists of taking GHG measurements of shared living communities, to conduct a comparison between the GHG emissions of these communities and the average UK household. Quantitative surveys typically stem from a positivist ontology, and arguably, there are challenges with reconciling this type of method with an interpretivist perspective (Creswell, 2011; Hall, 2012). As this research is grounded in interpretivism, the use of quantitative GHG measurements are viewed as the adopting of a discourse which uses GHGs as a means to measure climate change. Through bringing data from this discourse together with an interpretivist/social practice theory perspective, it is hoped that these two discourses may enrich the other. Taking a mixed methods approach is discussed more fully *4.2.1.*

3.2. Social practice theory (SPT)

Social practice theory (SPT) is the dominant theory used in this research. SPT stems from Bourdieu's and Giddens' theories of practice (Spaargaren, 2011), and is not one agreed upon theory (Gram-Hanssen, 2011); rather, it is used to describe ways of understanding human action which focuses upon the action rather than the person performing that action. Actions are referred to as "practices", which can be conceived as collectively shared sayings and doings held together as coordinated entities (Gram-Hanssen, 2011).

Within SPT, the term "practice" has been conceptualised by theorists in different ways. Schatzki (2002) categorises different mental and bodily doings into four categories. The first two are "practical understandings", which is embodied know-how of a practice, and "general understandings", which is the shared idea of what a practice is and how to execute it (Lamers and Duim 2016). A third category is "rules", which is a knowledge of stated rules e.g. traffic laws. Finally, there are "teleoaffective structures" (TAS). TAS can be described as ethical or moral meanings, which are goal-oriented, and form parts of the properties of practices (Gram-Hanssen, 2010). TAS are not based within individuals, instead they are the properties of practices. Therefore, an individual may carry that practice without being aware of its teleological end (Gram-Hanssen, 2010), e.g. when individuals explain their choices in clothing, they are not likely to refer to cultural norms of dress, even though it is likely they abide by them. Practices which fall within a TAS are referred to by Schatzki (1996) as a 'field of acceptable orders' (p.187), reflecting the complex and fluid contexts in which agents operate, in which what is acceptable practice extends beyond what is

marked as correct. Reckwitz (2002) similarly breaks mental and bodily doings into categories. One is "bodily activities". Another is "mental activities", which are 'certain routinized ways of understanding the world, of desiring something, of knowing how to do something' (p.251), and can be labelled as understandings (consisting of background knowledge), know-how, states of emotion and motivational knowledge. Reckwitz adds "things" (also referred to as "materials") and their use to this mix, as do Warde (2005) and Shove (2010). Things are not only necessary components of many bodily activities (e.g. to cycle you need a bicycle), but can also shape mental activities. Reckwitz (2002) gives the example of communicative objects, such as the printing press and electronic media, having a key role in shaping knowledge and social interaction. Shove (2010) and Warde (2005) condense the categories of mental and bodily doings: Shove to "competences" (both general understandings and embodied know-how) and "meanings"; and Warde to "engagements" (which are in essence a combination of TAS and general understandings).

Also relevant to this research are Welch and Yates' (2018) development of SPT concepts to better explain collective action. Welch and Yates extend the meaning of general understandings (GU) beyond that of a specific practice, instead positing that GU may be defined as a broad term which encapsulates collective concepts, for example, nation states, ethnicities, or environmental sustainability. This type of GU can play an important role in group identification and reproduction, sits 'across the boundary between the discursive and non-discursive' and may have tacit, affective, or pre-reflexive aspects (Welch and Yates, 2018, p.292). GU may broadly encapsulate how a wide-ranging collection of practices are carried out. Welch and Yates (2018) also extend upon teleoaffective regimes (TAR), a concept first developed by Schatzki (2002). TARs join multiple practices which share a teleology and affectivities. These practices are chiefly viewed through the lens of being heterotelic (a means to another end) rather than autotelic (the practice being an end in itself). TAR may be defined as the specific application of GU into practices (Welch and Yates, 2018).

Within SPT literature there is also a difference between "practice-as-entity" and "practice-as-performance" (Schatzki, 2002). Practice-as-performances are the specific doings and sayings of individuals (Spurling *et al.,* 2013), whereas practice-as-entities exist 'beyond and between their instantiation in specific performances, they have a history and trajectory of their own and involve socially-shared meanings, materials and competences' (Macrorie *et al.,* 2015).

What is conceived of as a practice can be anything from making a cup of tea to purchasing a car to listening to music; and indeed, one of the challenges of practice theory is determining where to

bound practices. Each practice has its own conventions in terms of elements: in the case of making a cup of tea, Wilson and Chatterton (2011) (adopting Shove's model of materials, meanings and competences) describe how this practice is constituted by relationships between 'materials (kettles, teapots, cups, mugs, teabags), meanings (tea breaks, relaxation, revitalisation, work rhythms and other temporalities, cultural traditions, social class), and procedures [competences] (gathering, brewing, pouring, refilling, dunking)' (p.2784).

Within SPT, individuals are carriers of a practice, and the inner aspects of knowing, understanding and desiring to do something are necessary elements of the practice, not characteristics which the individual possesses. SPT decentres the mind, instead focusing on movements of the body, objects, practical knowledge and routine (Reckwitz, 2002). The body is therefore seen as a site of routinized performance, and a way in which to make social order visible. The carriers of practices – referred to as "agents", consist in the performance of practices, though they are not unthinking replicators of norms, but are engaged in interpreting the world and their own actions in relation to it. Practices are defined and constituted through participation (Shove and Pantzar, 2007), as well as entities within themselves (practice-as-entities) which can "capture" practitioners (Shove, 2010). In this sense, to perform a practice is to both reproduce and produce it. Another important aspect of SPT is that practices themselves are interlinked or "bundled" together, with each impacting the other in difficult-to-predict ways. Practices are in constant states of reconfiguration through bundling, un-bundling, convergence and divergence (Shove and Pantzar, 2007). From the aforementioned example of making tea, it can be seen how one practice may have a myriad of objects, meanings and competences, which may be combined in a multitude of different ways, with each element relating to or impacting others.

3.2.1. Practice stasis and change: the roles of materiality, competences and meaning within practices

Practices can travel across time and space, being maintained even when more convenient and comfortable alternatives are available; they can be reawakened from periods of dormancy and can be passed between generations, even if the new generation being recruited has never experienced the former context of that practice (Maller and Strengers, 2013). Of course, practices also undergo change, as explored by Elizabeth Shove in *Comfort, Cleanliness and Convenience* (2003). Practices stick, practices shift, but how does this happen? Changing practices are often conceptualised as a result of the transformation of one or more of its elements, which then causes innovation in, recruitment to or defection from that practice (Groves *et al*., 2015). This section utilises Shove's

definition of practice elements (materials, competences and meanings) to explore what we may learn about their roles in practice emergence, maintenance and defection.

Before looking at each of these elements, it is worth noting that practice emergence has also been conceptualised in terms of different structural levels (i.e. macro/landscape, meso/regime, micro/niche [Shove, 2003; Geels *et al.,* 2017]). Shove uses an illustrative figure to give a simplistic demonstration of how practices may emerge as niches and spread (bottom-up).

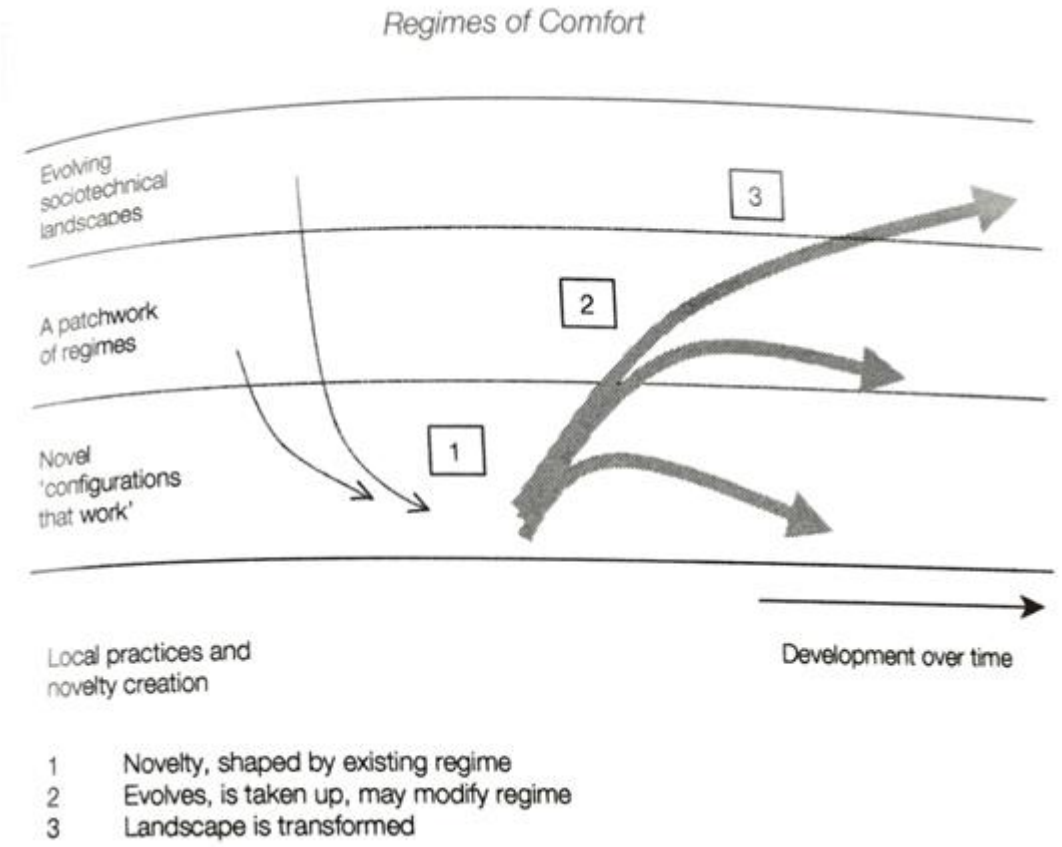


Figure 3-1: Bottom-up emergence of practice

Shove, 2003, p.69

The diagram shows how new regimes of comfort may evolve from micro-level local practices which develop against a backdrop of regimes (meso-level) and landscapes (macro-level). These first 'novel configurations' (Shove, 2003, p.69) are constrained by existing rules at regime and landscape level, however, over time new sociotechnical developments enable these novel configurations to transcend their local origins and become macro-level practice. As this happens, the evolving rules and sociotechnical configurations "lock in" these new practices. Geels (2011) has tentatively

suggested linking practices with hierarchies by viewing regimes as “stabilised” or routinised practices, and niches as consisting in emergent, fluid practices. Certain environmental practices can be taken as examples of the routinisation of what were originally novel and niche. Fairlie (1996) observes that the first organic farmers were viewed as “cranks”, and the “alternative technology” pursued by “hippies” in the seventies has now become renewable energy. In Diffusion of Innovations theory, this process of adoption from a minority to the majority is divided into stages, with approximate percentages of a given population adopting an innovation, from the ‘innovators’ (2.5 percent of a population) to ‘early adopters’ (13.5 percent), ‘early majority’ (34 percent), ‘late majority’ (34 percent) and ‘laggards’ (16 percent) (Rogers, 2003).

The opposite may also occur, with transitions being appropriated at the micro level from macro and meso level influence. Shove uses a similar diagram (below) to illustrate how technologies imported from other cultures may initiate top-down practice transitions.

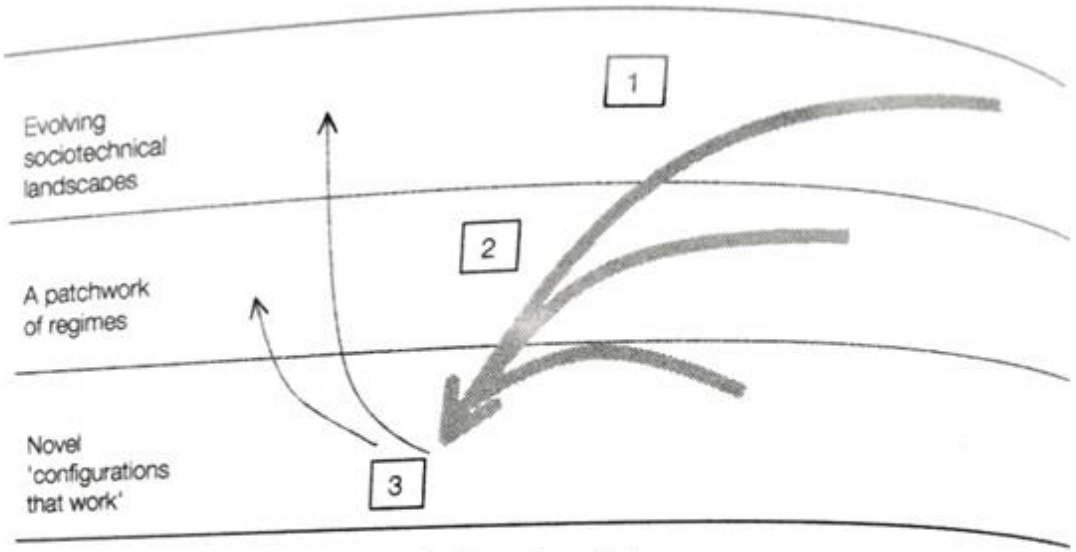


Figure 3-2: Top-down adoption of practice

Shove, 2003, p.70

Shove illustrates how westernised meanings around comfort have been imported into Japanese culture, prompting the importing/manufacture of air-conditioning systems and the purchase of such systems becoming normalised in Japan.

Of course, these conceptual overviews leave no room for detail. In the next sections, examples are used to explore each different element within practice, and its potential role in practice adoption, maintenance and defection.

3.2.1.1. Materials

Various research has shown the impact of materiality on practices. Research by Hobson (2006) into a pro-environmental initiative in Sydney shows how the introduction of various material elements appeared to cause long-term changes to sustainable practices. She found that many individuals' reported changes of practice revolved around the use of free sustainability-related items e.g. shower timers, compost bins and worm farms. Hobson's research furthermore explored how meanings around recycling, in particular emotional and ethical mental processes, were shaped by recycling bins, which, through their material presence implied the demands and the limitations of what should be recycled, how it should be recycled and how much recycling there should be. In this sense, Hobson (2006) observes that objects can be 'collaborators in ethical environmental self-governance' (p.326). In Hobson's research, material elements both prompted changes in practice, and shaped the meanings surrounding the practice of recycling (as well as the competences of using the recycling bins correctly). Similarly, research by Shirani *et al.* (2017) found lapses in pro-environmental practices which were chiefly driven by loss of certain materials e.g. one participant stopped cycling after she changed job and had no safe cycle storage at her new workplace.

A series of interconnected objects may also "lock" agents into a practice. Shove (2003) gives the example of laundering consisting of the 'practical integration of a variety of relatively self-contained systems' (p.118). The size of the laundry basket relates to the washing machine drum. The washing machine settings interrelate with the fabrics of clothing, as do laundry detergents. Therefore, for practice innovation to occur, points of intervention must take these material interdependencies into account.

Yet, materials alone do not determine actions. Materials are interpreted by their agents, and can be rejected or subverted from their intended use. For example, on occasions installation of smart meter devices have led to reinforcing rather than reducing energy consumption (Burchell *et al.,* 2016). Yet materials have a role in guiding sayings and doings, and holding actions together (Gram-Hanssen, 2011).

3.2.1.2. Competences

A key tenet of SPT is that competences consist not only of intellectual knowledge but practical and embodied "know-how". Although competences may originate from knowledge (Gram-Hanssen, 2011), the carrying out of those knowledges is perceived as highly situational and subjectively interpreted rather than uniform and objective (Upham *et al.,* 2009). For example, according to Simcock *et al.* (2014) in their study of domestic energy practices, actionable know-how is contextualised within existing know-how within the household, existing ways of doing things and specific buildings and appliances.

Know-how may flow beyond its original context (Catney *et al.,* 2013) from unconsciously learned bodily habits. For example, a family who enjoy sailing for leisure mimic sailing conditions when creating their indoor climate, through opening windows and doors and frequently sitting outside in conditions that most others find cold (Gram-Hanssen, 2011). Another reason for know-how transcending context may be the meanings attached to them. In their study of the transition and dissolution of practices among migrants, Maller and Strengers (2012) found that practices of washing and bathing were transported to new cultural contexts due to attached meanings of hygiene and wastefulness. They compared the embodiment of know-how with the notion of muscle memory, finding that practices can lay dormant and then be resurrected; much like a muscle, once trained, can be re-trained more quickly to its previous strength even after a lapse in exercise. Maller and Strengers (2012) showed that migrants engaged in bathing and washing practices traditional to their native home, even if they had not engaged in those practices before migration, and even if they had access to technology which enabled more convenient alternatives (e.g. dishwashers and showers). Although this transportation of practice was not universal amongst the migrants who participated, and sometimes faded over time (much like a muscle may atrophy).

3.2.1.3. Meanings

The final broadly categorised element of practices, as defined by Shove (2010) is meanings. A wide variety of terms sit under meanings, for example, meanings can represent the moods, morals, ethics, attitudes, dispositions, goals and values which are attached to practices. The meanings attached to practices have an important role to play in shaping actions. Research by Shove and Pantzar (2007) found that the meanings attached to different practices can link those practices together, as agents transition from one practice to the other. In their exploration of agents transitioning from the use of film to digital cameras, they note that the idea of what makes a "good" picture was transposed from using film to using digital cameras. Further, Hobson (2006) found that, for some participants in her research, the manner in which they related to their eco-efficient materials evolved through their use

over time and prompted changes in other practices. For example, use of a compost bin made one participant more aware of her food purchasing practices, and prompted her to buy items with less packaging. Hobson's (2006) and Shove and Pantzar's (2007) research shows that practices can develop through agents' meanings, which are continuously shifting in relation to the practices that they reproduce or produce (Shove and Pantzar, 2007). At a macro level, such transference of meaning throughout different practices has been called "suffusing". This term describes the enveloping spread of a liquid or gas, and the use of it in SPT suggests that it is possible for certain phenomena to permeate practices in this manner. Hui *et al.* (2017) describe suffusing phenomena to be 'often intangible in some sense, even though they are grasped by participants, expressed in doings and sayings and materialised in objects' (p.1) and characterise suffusing phenomena as including affect, general understandings, linguistically articulated meaning and some forms of sociomateriality.

Research has also shown that meanings and practices can clash. For example, some practices can be strongly regulated by meanings of environmental sustainability, whilst other practices are compartmentalised from such meanings (Gram-Hanssen, 2011). Groves *et al.* (2016) report one such case of a participant whose use of a patio heater was at odds with her self-perception as "wise manager" of resources. The participant, Lucy, openly acknowledges this clash, saying '"we know it's bad, but we're still gonna use it"' (p.494). Groves *et al.* (2016) speculate that meanings of wise management are overridden by an identity that focuses on 'the aesthetic and ethical values of homeliness and friendship' (p.494), meanings which may be further emphasised by Lucy's perception that a lot of other residents in her area do the same thing. In cases such as these, Schatzki's stratification of rules, TAS (teleoaffective structures) and concepts such as Welch and Yates' (2018) GU (general understandings) and TARs (teleoaffective regimes) may be helpful in determining what combination of elements may lead to the prioritisation of one practice over an alternative. Similarly, an acknowledgement of whether a transition of practice has been cultivated and naturalised (brought into conscious reflection and then made into part of a routine) (Wilk, 2009) or has been adopted without reflection, may give some insight what role these different stratifications of meaning had to play.

3.2.2. SPT, emotion and identity

The broad category of meanings also encapsulates how practices may be attached to emotions and identities. Research suggests that emotions have a significant role in how individuals reflect upon their subjective responses to changes in practice. In particular, defensiveness, evasion (Hoggett,

2013), humour (Parkhill *et al*., 2011), anger (Hobson, 2006), guilt and elation (Whittle, 2015) have arisen in discussion around practices, with Whittle finding that in her study of workplace practices, forms of environmental governance (of self and others) were 'inherently emotional in how they are felt, communicated and experienced' (p.583). Whittle reports high levels of trying and striving in participants' attempts to embody the role of the idealised environmentally conscious citizen, accompanied by different levels of guilt and judgement. Whittle concludes that emotions are not only the subject of but are a *vehicle for* governmentality of practices, environmental or otherwise. This echoes Hards' (2012) research in which, using biographical interviews, she found that participants attributed major changes in the sustainable practices they engaged in as resulting from emotionally intense epiphanies. Similarly, Shove (2003), speaking in reference to bathing norms, posits that practice-as-entities are responses to 'shared structural anxieties', with new practices arising as these anxieties change (p.190). There is some indication, then, that emotions have a role to play in recruitment to and defection from practices. Therefore, a psychosocially sensitised approach may be needed in understanding practices and practice transitions (Groves *et al*., 2013).

Some researchers have explored how individuals' life events have shaped practices, which, it has been argued, may allow for biographically-patterned webs of practices to emerge (Thomas *et al.*, 2015). This may both generate greater levels of knowledge around how various practices are interconnected, and around how transitions in practices occur. Research by Groves et al. (2015) into sustainable practices found links between emotions and biographical narratives. In one example, they report that the rewards of cycling for one of their interviewees: 'are connected to more private emotional meanings which […] are rooted in an expanded secure space in which her work place is tangibly linked to a biographical narrative' (p.11). Here, the interviewee's biographical narrative offers a context for her emotional response to the practice of cycling, and demonstrates how, through evolving meanings and competences, the practice of cycling can be traced back to a series of earlier cycling practices throughout the interviewee's life course. Her life story offers a means through which the interconnectedness of cycling practices can be understood. Hards (2011) conducted narrative interviews with participants who perceived themselves as proactive in mitigating climate change, and found that the participants tended to describe their action on climate change as gradually increasing over time, both in terms of the number of environmental issues they were concerned about, and the intensity of that concern.

A self-related account of personal biography links with self-perceived notions of identity; as Giddens (1991) says, identity is to be found within the capacity to construct a coherent life narrative. An understanding of individuals' concepts of their identity forms an important component in the study of practices, as this understanding better enables comprehension of how certain biographical experiences are interpreted as influencing practice (Groves *et al*., 2015). For example, Thomas *et al*. (2015) note that one of their interviewees, Jack, 'associates his Yorkshire identity and familial background with frugal norms and practices' (p.743), and that perhaps as a result this reproduces certain practices of frugality in his day-to-day life. Groves *et al*. (2015) also report that the emotional rewards of cycling for interviewee Sarah were connected with her biographical narrative and identity, at the core of which are memories of a community that she lived in when she was younger; implying that it is this rather than practical aspects of exercise and convenience that are more important in Sarah's continued commitment to cycling. In either case, an understanding of identity is perceived as key in interpreting the meanings around these practices. Just as identity may inform practice, the carrying out of practices have furthermore been conceived as having an identity-forming component. Thomas *et al*. (2007) note that 'identifying as a practitioner of a given skill can endow subjects with access to value and meanings internal to that practice' (p.737). Indeed, in Horton's (2006) study of the everyday life of green activists, he found that 'green distinction' was created through 'the embodied performance of appropriate green identity' (p.64), which included competences of selecting organic and locally produced food, as well as possessing (and utilising) a bicycle rather than a car, and owning a computer, but not a television. In her study of eco-community dwellers, Pickerill (2015) furthermore found that some eco-communities actively seek discomfort through the forgoing of certain material items, such as private bathrooms, in order to show themselves as sufficiently dedicated to their environmental goals.

These explorations of emotions, biographical narratives and identity in relation to practices are intended to demonstrate how considerations of individual sense-making are incorporated into SPT through exploration of how the meanings surrounding practices both shape and are shaped by agents, and co-evolve along with agents' notions of identity. It has been acknowledged that SPT does not sufficiently take account of individual agency, viewing agents as carriers of practices and adoptees of the social meanings of the practices which they perform. Welch and Yates (2018) point out that in the most extreme cases adoptees of practice theory "quarantine" actors from their accounts of social life, whilst at the same time resorting back to a classic paradigm of agentic actors; the most obvious example being where policy recommendations about practice interventions are made, in which governments/corporations are cast as agents, whereas the intervened upon have no

agency at all. The aforementioned research on identity and practices (Hards, 2011; Groves *et al.,* 2015; Thomas *et al.*, 2015) shows that it is possible to bring the role of the individual into an explanation of practices.

Also relevant to this research is an exploration of how groups shape and are shaped by practices, and the interplay between individuals and groups when it comes to practices. The next section draws upon social psychology in exploring this topic.

3.2.3. SPT and social norms

Agents do not attach meanings to practices or engage in those practices within a social vacuum. Normativity, that is, the acceptability of a practice, along with its "oughtness" or "rightness" (Schatzki, 1996, pp. 101-102), is in part socially situated. The range of acceptable or unacceptable actions, thoughts or feelings in a given situation, which are shaped by perceived actions, thoughts, feelings and expectations of relevant others, can be referred to as "social norms" (Giguère *et al.,* 2016). Social norms can be regarded as the 'grammar of society', in the sense that they are implicit, undesigned rules which define how the social world operates (Bicchieri, 2005, p.ix). These norms are acquired through social learning, and once embodied can influence mental processes or actions even when others are not present (Nolan *et al.,* 2008), without any awareness that those processes or actions are the result of social influence (Jacobsen *et al.,* 2011). What others are doing can be used as a guide for how to act, especially when in a novel situation (Brown, 2000). The desire to belong to and fear of exclusion from reference groups[8] are assumed as key in motivating conformity to social norms (Cialdini and Trost, 1998). There is strong empirical backing for social norms, which originates in social conformity experiments during the early to mid-twentieth century (e.g. Asch, 1951; Jenness, 1932; Sherif, 1935) (Cialdini and Goldstein [2004] provide a helpful review of empirical research on this topic).

Social norms can be distinguished as either descriptive (what most others do) or injunctive (what most others think ought to be done) (Cialdini *et al.,* 1990). Which type of norm is more influential in shaping actions and intentions to act is unclear, as there is evidence for both. For example, a meta-analysis of health-related practices revealed descriptive norms to be more influential than injunctive norms in changing practices (Rivis and Sheeran, 2003); and a meta-analysis of alcoholic drinking

[8] Reference groups can be defined as friends, family or relevant others who an individual compares and evaluates their own practices and meanings with (Koger and Du Nann Winter, 2010).

practices found that injunctive norms were more associated with drinking practice than descriptive norms (Borsari and Carey, 2003). It has also been argued that injunctive norms are more significant in impacting practices, as injunctive norms may more easily be applied across a wide range of contexts, whereas descriptive norms tend to be more specific (Reno *et al.,* 1993). Whilst these types of norm are posited as conceptually and motivationally distinct (Cialdini *et al.,* 1990), it is often difficult to distinguish between the two, as describing what most other people do 'inevitably introduces *injunction*; that is, "most people do this" becomes "people should do this"' (Burchell *et al.,* 2013, p.3). People may also assume injunctive norms *are* descriptive norms (Farrow *et al.,* 2017). It is furthermore possible for descriptive and injunctive norms to not align. For example, a descriptive norm of energy wastage may occur in tandem with an injunctive norm of energy conservation (Smith *et al.,* 2012). This misalignment, however, does not necessarily clarify what influences actions: in their study on littering, Cialdini *et al.* (1990) commented that what was intended as a descriptive norm of littering may have triggered reminders of injunctive norms not to litter. What is injunctive and what is descriptive is therefore not always clear, and so care should be taken when labelling social norms or attributing practices to one or the other. In terms of influencing practices, there is evidence that conformity rates are highest when there is alignment between injunctive and descriptive norms (Gockeritz *et al.,* 2010; Lee *et al.,* 2007; Smith *et al.,* 2012).

Social norms (and norms in general) should not be confused with practices. Practices are observable actions, whereas social norms influence actions, and must be identified through analysis (Holmelin, 2019). Schatzki (1996) posits that perceived social approval or disapproval is an 'unstable and potentially fragile' enabler or constrainer of actions, as, unlike physical impossibility or lack of knowledge/ability, it does not close off the possibility of action, but only makes that action easier or more difficult (p.163).

Despite the unstable impact of social norms, some research has found them to be key within recruitment to, maintenance of and defection from pro-environmental practices. In Thomas *et al.'s* (2015) biographical study of waste practices, participant Jack perceives his practices of frugality as stemming from witnessing his mother's frugality practices, and similarly, in their research of sustainability practices, Groves *et al*. (2015) view one of their participant's commitment to cycling practice as being rooted in memories of a close-knit community. Research has also shown that some who adopt pro-environmental practices are keen to influence others to take up these practices too. Examples include individuals taking part in a sustainability initiative communicating what they were doing to friends and colleagues in a bid to encourage them to take up more pro-

environmental activities (Hobson, 2006); reports of household members who installed smart meters "policing" the energy usage of other residents; and an anecdotal, but probably not isolated incident of an irate note left in a staff kitchen, urging colleagues to recycle milk cartons (Whittle, 2015).

Importantly, groups of agents which share GU, TARs, and resulting practices can be held together through the production and reproduction of such arrangements (Welch and Yates, 2018), a phenomenon referred to as 'communities of practice' (Hards, 2011, p.37), which can be understood as a social learning system (Wenger, 2010). Collins (2014) refers to such shared production and reproduction of arrangements as producing "emotional energy", that is: the practices engaged in can produce shared meanings surrounding symbols and objects, shared standards of morality and group solidarity/group identity. This sharing in practices which reflect a common concern or passion of the group leads to betterment of those practices (Wenger, 2006), with a significant body of research suggesting that a strong group identity correlates positively with intent to conform to that group's social norms (Dixon *et al.,* 2015; Louis *et al.*, 2007; Neighbors *et al.,* 2010; Neighbors *et al.,* 2011; Reed *et al.,* 2007; Terry *et al.*, 1996; Terry *et al.*, 1999). This phenomena in part consists of social norms which are specific to a selected group, but also goes beyond them in creating meanings and doings which create a shared sense of *being*. Social norms, group identity and practice are interconnected, and so an understanding of social norms and group identity enhances an understanding of the meaning and significance of that group's practices.

3.2.4. Norms and salience

Empirical research from social psychology has found that salience is key for actions to be impacted by norms. Salience means bringing something to prominence, which could potentially make it the subject of deliberation, or could still mean that action is taken heuristically (without deliberation), shaped by pre-defined "rules" which are triggered through contextual stimuli (Bicchieri, 2005). In their study of littering and social norms, Cialdini *et al.* (1990) found that when participant's attention was drawn specifically to littering (in an otherwise clean environment), or to other norms which were somewhat akin to littering (e.g. recycling and energy-saving practices), they would tend to litter less. However, if littering was made salient in an environment that was full of litter (depicting littering to be a descriptive norm) participants would litter more. Kallegren *et al.* (2000) undertook a similar experiment which looked at littering and personal norms. They found that when participants' attention was drawn to their personal norms of anti-littering (through being shown an image of themselves before being given an opportunity to litter) they littered less. Kallegren *et al.* (2000) concluded that 'personal norms […] appear to be weak predictors of conduct unless they are focal

when the opportunity for norm-relevant behavior arises' (p.1010). The concept of salience of social norms impacting practice is useful for this research, as the act of shared decision-making engenders deliberative practice.

3.3. The theoretical framework of this research

This research mainly uses SPT. This enables the research to view pro-environmental practices as meaning-laden, interconnected and enabled/constrained by their environment. This research also uses social norms theory to explore how group norms impact those practices, and how individuals negotiate practices and social norms as part of a group.

In essence, this research explores what is being *shared*: the acts, objects and meanings which transcend belonging to any one resident. This investigation of what is shared is therefore an investigation of what transcends the individual. SPT provides a framework for this through shifting attention from the individual and on to actions and the meanings and competences attached to those actions. Unlike most theories for explaining behaviour, which are focused upon the individual and their mental processes, SPT gives far greater emphasis on a person's environment in shaping practice. Through the lens of SPT, this research views domestic space as a site which shapes practice through its materials and objects, as well as through the meanings, know-how and shared experiences possessed by the communities. The interconnectedness of actions and routines (whether within the communities or extending beyond them) are acknowledged as part of what shapes practices.

SPT theorists use a number of different terms to describe practice elements. This research broadly ascribes to Shove's (2010) division of practices into three elements of meanings, competences and objects, which provides a useful summary of the general categorisations of a practice. However, Schatzki's (2002) definitions (practical understandings, general understandings, rules and teleoaffective structures) are used to unpack the terms "meanings" and "competences" when more detail is needed. Welch and Yates' (2018) SPT concepts which help to explain collective action are also utilized. Their interpretation of general understandings (referred to as GU) and teleoaffective regimes (TARs) are used to explore how (and if) broadly held concepts of environmental sustainability are translated into shared TARs. Schatzki's (1996) concept of a 'field of acceptable orders' (p.187) is also used to explain the nuanced contexts in which pro-environmental practices are or are not undertaken.

In exploring what is shared (that which transcends the individual), this research is also interested in how what is shared is negotiated and managed between individuals-as-part-of-a-group. The concept of social norms (which is also sometimes referred to as “group norms”) is used to explore this process of negotiation and management. Social norms enable an exploration of what is and is not perceived as expected and/or acceptable (and what hovers ambiguously in between) within communities. It links practices with group norms, though accommodates individual differences in perspectives on what those norms are. This allows for a discussion of how the meanings attached to practices may be diverse, and subject to the varying perspectives of individuals, who perceive what is and is not acceptable practice differently. It allows a consideration of how these varying perspectives may lead to perceived or real social pressure to engage or abstain from certain practices. Plus, the concept of the salience of practices prompting conformity to social norms is useful in highlighting the “examined life” which frequently occurs within shared living communities.

While SPT frames the findings of this research, social norms are used to help explore how meanings are attached to, shape and are shaped by practices. Concepts from SPT (e.g. TAS, competences, objects, know-how etc.) and concepts from social norms (e.g. injunctive and descriptive norms) are used interchangeably and linked together throughout this research.

This research, and its lens of SPT and social norms, is situated underneath an interpretivist ontology and epistemology. As such, it views social reality as ambiguous, complex, and as something which cannot be measured objectively. Enfolded into this interpretivist research is quantitative data on GHGs, which serves to contextualize and enrich the findings and discussion on pro-environmental practices through linking them with a discourse on GHG measurement.

3.4. Chapter summary

This chapter has explored the theoretical underpinnings of this research, and then outlined the theoretical framework of this research. It began by situating the research within an interpretivist ontology and epistemology, which perceives social reality as subjective and multi-faceted. The chapter highlighted that within this paradigm, the quantitative element of this research is treated as an additional type of discourse which adds further insight to the qualitative data gathered.

The chapter then went on to explain and explore social practice theory (SPT), looking at how different elements (i.e. objects, competences and meanings) may shape practices. It looked at the

relationship between SPT and emotions and identity, before going on to explore SPT and social norms, as well as the concept of salience as being useful when explaining practice interventions.

This chapter then explained the theoretical framework of this research, which brings together SPT and social norms, underpinned by an interpretivist approach. It was explained that together SPT and social norms are used to explore pro-environmental practices within these communities as something which transcends, yet is negotiated by, individuals-as-part-of-a-group. SPT frames how pro-environmental practices are enabled and constrained through things, knowledge, know-how, routines, and meanings; and social norms explores how these practices are negotiated and managed in accordance with perceived expectations of the group. This is situated within an interpretivist ontology and epistemology, which views social reality as ambiguous and complex. This research links this qualitative element together with quantitative data on GHGs, which serves to enrich the qualitative findings through linking them with quantitative data.

Chapter 4. Methodology

This chapter begins with a research summary, outlining the methods used for the research and analysis. It then goes on to explain the rationale for the research approach, discussing the mixed methods approach, the purpose of using ethnographic and quantitative approaches, and the decision to use case studies. The chapter then gives a detailed explanation and discussion of data collection and analysis methods. It explains why and how the case study communities were selected, and the role of reflexivity throughout the research and analysis process. It outlines how each qualitative method was implemented, along with the challenges and limitations. It explores and explains the process of analysis, and how inductive and deductive processes were combined. The chapter then explains how GHGs were measured within the case study communities and for an average UK household, once again discussing challenges and limitations of the approaches taken.

4.1. Research summary

This research explores environmental sustainability within shared living communities, using a multiple-case study mixed methods approach. The case studies consist of two cohousing communities, one community living and one coliving community. In these communities, ethnographic exploratory research was conducted using participant and non-participant observation, document and image analysis and semi-structured interviews. Focus groups were undertaken within one additional cohousing community and one additional community living residency, meaning that in total six communities took part in the research. The data generated was analysed using a deductive and inductive approach, drawing upon grounded theory, and a theoretical framework comprised of social practice theory and social norms. Further, four communities' GHGs were measured through surveys and the gathering of various quantitative data. Results were normalised to be representative of GHG emissions for an average household within

each community. Secondary data was used to calculate GHGs of an average UK household, as a comparison. The measurement of GHGs serves to contextualise the qualitative data generated around pro-environmental practices.

Figure 4-1 (over the page) depicts an outline of the research process. For clarity, the figure represents this process as linear. However, Section *4.3.5.* details moments of overlapping, iteration, feedback, validation and evolution which occurred during the research.

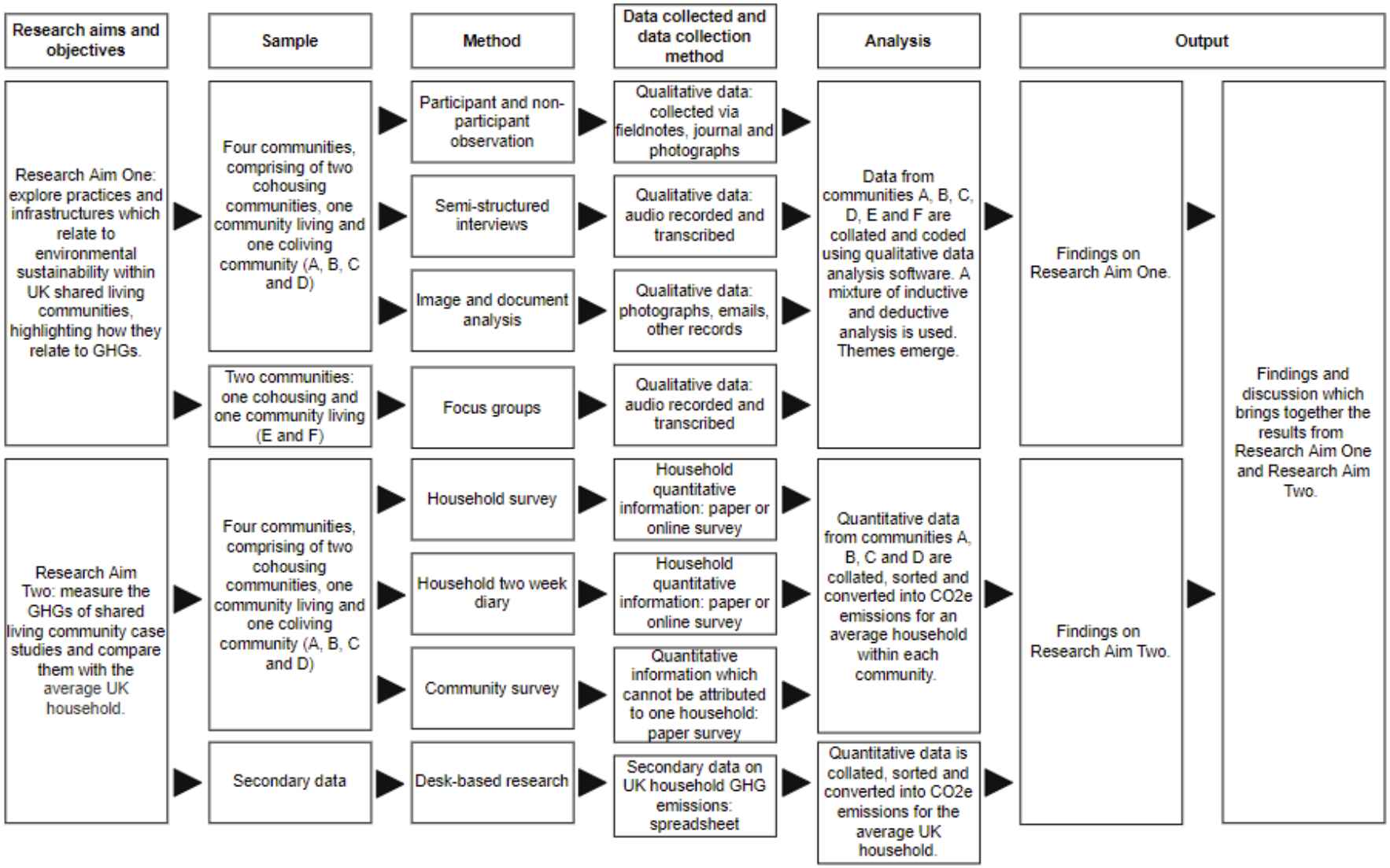


Figure 4-1: Research structure

4.2. Research approach

This section provides a rationale for the research approach.

4.2.1. The mixed methods approach

For this research I have opted to use a mixed methods approach, with an emphasis on qualitative data. Mixed methods can be defined as not only combining qualitative and quantitative methodologies, but as combining all phases of the research, including ontological and epistemological positions and interpretations, data collection and analysis techniques (Johnson *et al.*, 2007; Creswell, 2011). As such, the validity of this approach has provoked debate, with the case being made that quantitative and qualitative methods are inherently incompatible, as they have evolved from different ontologies (Bergman, 2008; Hall, 2012). Whilst positivist and interpretivist traditions *tend* to be associated with quantitative or qualitative methods respectively, there are many instances where ontological perspectives and methodologies are not aligned in this way (Bergman, 2008; della Porta and Keating, 2008). For example, the results of quantitative surveys (which are traditionally attached to a positivist ontology, in which variables are isolated in order to determine cause and effect) are often analysed in relation to the context in which the data was collected – a traditionally interpretivist approach (Creswell, 2011). Based upon this observation, the terms "qualitative" and "quantitative" should be used to describe methods rather than epistemologies, and the criteria for choice of methodology should be those which will best illuminate the research topic (Flyvbjerg, 2006). Nevertheless, the traditionally opposing ontologies of quantitative and qualitative research methodologies have presented a challenge which has been the subject of debate (Creswell, 2011; Hall, 2012). Greene and Caracelli (1997) suggest that multiple paradigms can be adopted, with each paradigm being honoured and their combined use contributing to new insights through the identification of tensions. Creswell and Plano-Clark (2011) have used different paradigms at different stages of research, for example utilising a postpositivist approach for the first quantitative phase of research before adopting an interpretivist epistemology for ensuing qualitative research. Hall (2012), however, advocates for use of a single paradigm, arguing that some paradigms, such as postpositivism and constructivism are inherently incompatible.

In this research I have opted for mixed methods single paradigm approach, utilising an interpretivist ontology, and predominantly using qualitative methods. The order in which qualitative and quantitative data has been collected has been non-prescriptive: though often, an induction to the quantitative survey has formed the initial contact with communities, and has been followed up with

qualitative data collection. As participants spent two weeks filling in their survey diary, it is usually also the case that the actual collection of quantitative data occurred after the main part of qualitative data collection was finished. The quantitative element therefore acted somewhat like "bookends" of the research, and perhaps from a participant's perspective may have appeared as the most involving part of the project. However, in terms of breadth and depth of data gathered, the emphasis of this project is on the qualitative data. It is often the case that in mixed methods research qualitative methods are somewhat subordinated or marginalised by quantitative methods, and so as a tendency (despite methods and epistemologies in theory being detached) a positivistic paradigm is adopted (Creswell, 2011). By reversing this usual trend, I view the mixed methodologies employed as providing, as Greene (2007) states: 'multiple ways of seeing and hearing, multiple ways of making sense of the social world, and multiple standpoints on what is important' (p.20).

Whilst the qualitative methodologies generate data on social realities and illuminate the elements of practices and the manners in which those practices interconnect, the quantitative aspect of the research will link these practices with a different discourse. The quantitative measurement of GHGs (which are detailed further in *4.3.4.*) are acknowledged as a method of measurement (way of seeing) which is based upon academic conventions in both the measurement of GHGs (which have been adopted from Druckman and Jackson, 2010 and Skudder *et al.,* 2016), and the conceptualisation of CO2 emissions as a means of measuring climate change, an approach which has been taken by the UK Government (see UK Government, 2008; DEFRA 2017) and international bodies in quantifying the cause of climate change (for examples see IPCC, 2007; NASA, *no date*; United Nations, 2019). Through linking social practices with the climate change discourse in this manner, it is hoped that the investigation of social practice will be linked to the wider discourse around GHGs and climate change, with the relationship between social practice and GHGs being explored. This research embeds the GHGs measured within interconnected webs of social practice, exploring their contexts in terms of their competences, objects and meanings. Indeed, it was found that the process of taking the quantitative survey has generated qualitative data through individual and group reflexivity on pro-environmental practices. It is hoped that this combination of methods will provide a better understanding of the research topic than either qualitative or quantitative data would alone.

4.2.2. An ethnographic approach

For the qualitative elements of this research I have adopted an ethnographic approach. An ethnographic approach involves studying people in their own environment. It often encompasses a range of perspectives and activities (Mason, 2006), such as observation and participation, analysis of

textual materials, and conversation and interviews (which can be indistinguishable in field research settings) (Atkinson *et al.,* 2001). This approach is suitable for exploratory research (Atkinson and Hammersley, 1998) as its multi-modal nature allows for numerous and diverse data generation, unconstrained by pre-determined data collection formats (such as surveys) or pre-existing hypotheses (Atkinson and Hammersley, 1998). Additionally, this multi-modal approach is appropriate for research conducted within an interpretivist framework, as it enables the generation of data from multiple sources, allowing for different perceptions, meanings and understandings to be captured (Mason, 2006). This approach can also be responsive to changes that occur during the research, allowing participants to have a greater role in shaping the direction of study (della Porta and Keating, 2008), which is appropriate for the topics of interest. An ethnographic approach is furthermore concerned with the study of culture within its social context (Mason, 2006; McQueen and Knussen, 2002), with a focus on the dynamic nature of people (Grills, 1998), making it suitable for investigating changes within the daily lives of social groups (Marvasti, 2004), especially from an SPT perspective, which has an interest in how routines are socially embedded and interconnected (Schatzki, 2015). Ethnography is moreover aligned with the proposed research in that it will tend to investigate a small number of cases in-depth, with analysis tending to consist of verbal descriptions and explanations (Flick, 2006).

4.2.3. The quantitative aspect of this research

Although the overall focus on this research is exploring the pro-environmental practices of shared living communities, I have also quantitatively measured the GHGs of four communities, to compare their emissions with that of an average UK household. This aspect of the research links social practices and engagement with domestic infrastructures with the climate change discourse, deepening the knowledge around both discourses by showing how they interrelate.

4.2.4. The case study approach

For this research I have used a multiple case study approach. A case study may be defined as an empirical method that investigates a phenomenon within its real-world context, and is therefore an especially suitable method for when the relations between the phenomenon and the context are not clearly defined (Yin, 2018). The rich, descriptive data generated by case studies are ideal for explaining *how* and *why* a social phenomenon works (Yin, 2018), as case studies are adept in showing the processes of phenomena over time, rather than just occurrences or frequencies of events (Yin, 2018). Rather than the data collected from participating cases being viewed as sets of isolated variables, they are studied holistically, with the data being understood in terms of its

interdependence with other data (Yin, 2018). For this research, this approach enables an understanding of how different factors, such as objects, spaces, location, competences, community governance, social networks and social norms combine to shape practices, and practice transitions.

Case studies typically rely on multiple sources of evidence (Yin, 2018) which may include different methods (e.g. interviews, observation, surveys) and different sources of data (e.g. numerous individual participants, social groups); therefore case studies are suitable for a mixed methods approach as well as research framed by an interpretivist perspective, as they allow for the acknowledgment of multiple realities, multiple meanings and findings that are observer dependent (Yin, 2018).

There are some challenges to this approach. Firstly, the results are difficult to summarise. Flyvbjerg (2006) warns against attempting to summarise case studies, stating that 'the problems in summarising case studies […] are due more often to the properties of the reality studied than to the case study as the research method' (p.25). In other words, complex realities resist being simplified and summarised without a loss in validity. According to this view, case studies are not just difficult to summarise, but *should not* be summarised. Nevertheless, as the act of producing a report must always be an interpretation and a summary of reality, the practical implications of Flyvbjerg's point is that the complexities within findings should be left intact to as great an extent as possible, which makes data dissemination and "simple" answers more challenging to achieve. Secondly, case studies tend to not be comparable to other studies (Flyvbjerg, 2006), which makes it more difficult to see clear causes and effects which surpass specific cases (something at odds with the ontological and epistemological perspective of this research in any case). Finally, case studies are typically lengthy procedures (McQueen and Knussen, 2002), generating large amounts of data, which must then be categorised and analysed. This is both a challenging and time-consuming process.

A commonly cited weakness of the case study approach is that it does not allow for generalisation (Barzelay, 1993; Flyvbjerg, 1996; McQueen and Knussen, 2002; Platt, 1992; Stake, 1995; Yin, 2018). This is based upon the view that the more people for whom an observation is found to be consistent, or a prediction is found to be true, the more validity this brings to a hypothesis, and by extension a theory (McQueen and Knussen, 2002).

According to Stake (1995), the purpose of a case study is not generalisation, but particularisation, with the first emphasis being on understanding the case itself. However, there are various

suggestions as to how inferences from case studies can be drawn. McQueen and Knussen (2002) suggest that case studies can be used to provide first, tentative hypotheses, which can then be a starting point for a larger piece of research. Similarly, Barzelay (1993) states that case studies can be useful in either helping to further confirm existing hypotheses, question existing hypotheses, or can be useful in offering new possible hypotheses for consideration. Accordingly, Flyvbjerg (2006) views the role of case study as falsification rather than verification. He furthermore perceives case studies as being generalisable to theories, but not to specific populations. Therefore, to him, case studies should be contextualised within existing research and theory, rather than generalised to the population to which the phenomenon belongs. Platt (1992) highlights the significance of negative case studies (which disprove previous hypotheses) and marginal case studies (which generate unusual results), with the former said to show where further research is needed, which will usually result in a more accurate theory; and the latter said to accentuate the most important variables of the previous cases, leading to theoretical refinement. In almost all cases, academics posit that case studies can play the role of pivots for relevant theoretical perspectives, capable of changing the direction of future research through falsifying pre-existing hypotheses, or coming up with tentative new results. Therefore, whilst not generalisable, case studies can play a valuable role in generating new knowledge.

4.3. Research design and data collection

This section explains and discusses the research design and the process of data collection.

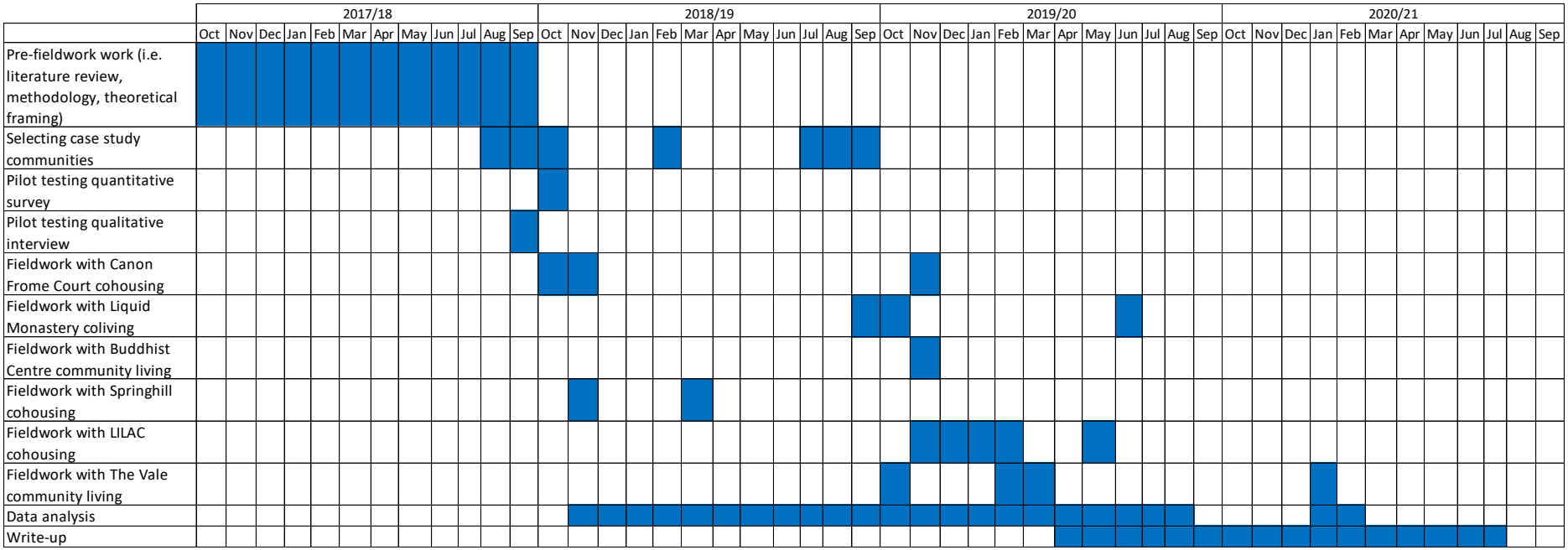


Figure 4-2: Research timeline

From *Figure 4-2* it can be seen that fieldwork with the six community case studies was staggered, from October 2018 to January 2021, with the majority of fieldwork taking place between July 2018 to June 2019. The final episode of fieldwork for each of the four communities which took part in quantitative measurements of GHGs (i.e. Canon Frome Court cohousing, Liquid Monastery coliving, LILAC cohousing and The Vale community living), consisted of feeding back GHG measurement results to some or all community members. This formed part of the data validation, as well as evoking reflections on those results, which then added to the qualitative data. Discussion of this and of iterations and evolution of the research can be found in Section *4.3.5.*

4.3.1. Case study selection

The first step in selecting the case studies was to define what the cases of interest were (Yin, 2018). At first, it was my goal to focus on cohousing, however, as the research developed, and I learned about community living and coliving, the decision was made to include types of community which shared one household. Defining which communities to include as cohousing, community living or coliving does pose a challenge, as the terms for communal housing tend to be loosely defined (Jarvis, 2011). How each housing typology has been defined by this research is discussed in *2.2.1., 2.2.2.,* and *2.2.3.* In the case of cohousing, the UK Cohousing Network Directory was used as a source for potential case studies. This is because their presence on this website indicated with reasonable certainty that the groups listed have collectively identified themselves as a cohousing group, and that they are also recognised externally as living in cohousing. In the case of community living and coliving, a mixture of umbrella organisations (e.g. Diggers and Dreamers) and personal networks were used to source potential case studies.

Choosing the number of cases to study was an important step which had large implications upon the data gathered. More cases can give a greater variety of results; however, a greater number of cases then limits the amount of in-depth information which can be gathered from each case (Plowright, 2011). I looked at similar studies into cohousing or ecovillages, finding that the number of communities studied ranged between one and eight, with a mean average of four.

Table 4-1: Number of case studies used in similar research projects

Research	**Case study type**	**Number of case studies**
Bohill, 2010	Intentional communities, ethnography	5
Jones, 2011	Intentional communities, ethnography	4
Kasper, 2008	Ecovillages, ethnography	8
Kirby, 2003	Ecovillage, ethnography	1
Tolle, 2011	Ecovillage, mixed methods	1
Wallbridge, 2011	Intentional communities, ethnography	6
Williams, 2003	Cohousing, mixed methods	6

Considering that I planned to conduct in-depth qualitative work and a quantitative survey, the decision was made to work with four case studies. Two communities expressed an interest in taking part, though decided that they were not interested in the quantitative survey. With these communities I took the opportunity to conduct focus groups instead.

Given the exploratory nature of the research, I approached case study selection with few exclusionary criteria. It was important that the communities should self-identify as a "community", showing an intentionality beyond living together as a house-share, or as just friendly neighbours. Plus, the communities had to be recognisable as one of the housing typologies of study, with residents accepting the label of "cohousing", "coliving", or "community living", even if it was not how they primarily referred to their own community (for example, some Canon Frome Court residents primarily referred to their home as a "community farm", but accepted the label of "cohousing"). It was also important that the communities presented some contrasts with each other, which would enable comparisons in the analysis. The criteria for inclusion were that the communities possessed some features which were of interest given the context of the framing and focus of my research. For example, Canon Frome Court cohousing presented an interesting case study because of the community's shared endeavour of running a farm. As this research had a focus on social practices, the shared routines, and interconnectedness of food and farming-related practice at Canon Frome Court presented a promising opportunity to develop insights into sustainability in cohousing. LILAC cohousing presented a good contrast to Canon Frome Court, as it was urban, rather than rural. Plus, LILAC's focus on low-impact living made it an interesting case study in and of itself. For Liquid Monastery coliving, it was the notable spatial design and multi-functional spaces that drew my interest. I was keen to explore how space was shaping practice. For The Vale community living, it was their very intentional use of social infrastructures to coordinate practices that I felt to be particularly relevant to my research. Of course, case study selection also involved practical factors, such as the community's willingness to take part, and opportunities to visit, stay and take part in community life.

As mentioned, case studies were selected in part for their variability. *Figure 4-3* approximates how the four case studies (named Canon Frome Court, LILAC, The Vale and Liquid Monastery) varied in terms of rural/urban location, average resident age, and tenure status.

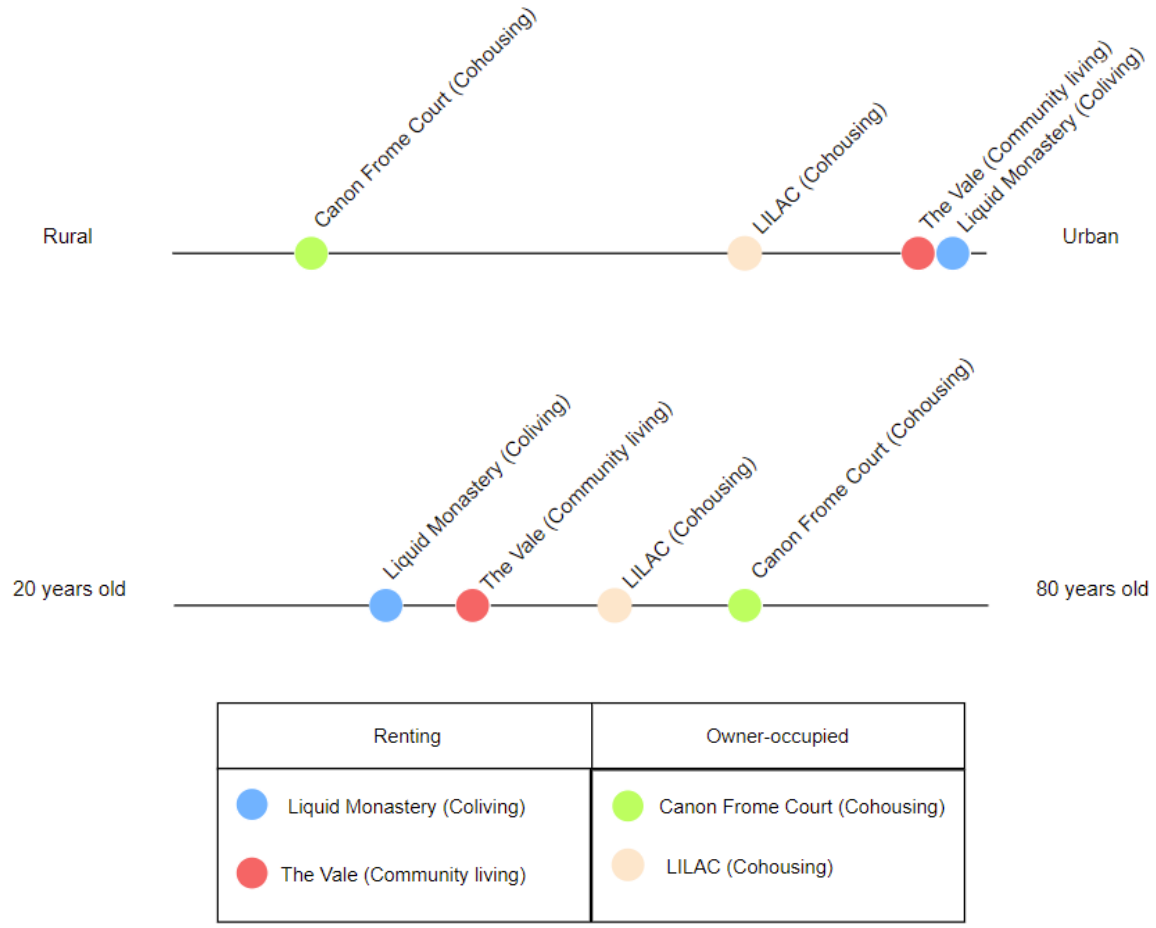


Figure 4-3: Variability of case studies

These variabilities were intended to enable potential discussion of how different infrastructures and life stages may have influenced pro-environmental practices and GHGs within these communities.

For all case studies involved in this research, it is likely that there is a bias towards eco-conscious shared living communities, simply because these were the types of communities who were interested in taking part in the study. When working with these communities, it was therefore important to explore the nuances of how pro-environmental practices may be supported by pro-environmental norms, other motivations (such as frugality), and/or were a result of, or enabled by, shared living infrastructures.

A variety of approaches were used to source the case studies. For the cohousing community case studies, I began with some initial online research, from which I built a database of UK cohousing communities. After this I used a mixture of attending conferences, cohousing open days, making

phone calls and sending emails in order to establish some links and pursue leads. The two cohousing communities responded to email outreach, and both had opportunities to visit and volunteer. The community living and coliving community were contacted through personal connections. Initial emails and calls preceded the fieldwork.

The next section gives an overview of each case study, and describes the process of engaging the community and community members to participate in the research.

4.3.1.1. Canon Frome Court cohousing

Canon Frome Court was a cohousing community, rurally situated in the Southwest of England, home to approximately 40 adults and ten children. The community is described in greater detail in *5.2.1.*

A resident of Canon Frome Court responded to an email, and it was agreed that I could go and do some volunteer work within the community for a period of two weeks and conduct my research whilst I was there. They were deemed a suitable case study due to their stated interest in environmental sustainability, and the opportunity they provided for me to stay for an extended period of time. Being able to volunteer was ideal, as it allowed involvement in everyday roles, and so enabled an enhanced understanding of norms and daily practices. It furthermore facilitated contact with community members, which meant increased opportunities to observe, build rapport and recruit participants for undertaking interviews or surveys.

Sourcing participants to take part in the quantitative and qualitative aspects of the research was a process of negotiation and relationship building (Flick, 2006) which began remotely as soon as my placement there was confirmed and continued throughout the two-week fieldwork period. Participants were recruited using signs on the community noticeboard, emails, word of mouth and opportunistically during social interaction. The results were that six out of twenty households took part in the quantitative survey, and thirteen residents were interviewed. The sample of participants represented a diverse cross-section of the community: with a range of ages, a range of new and long-standing community members, retirees and employed people, single and double parent families, parents of young children and older or adult children, and in one case, parents of a child with special needs. As participants understood that my research was about environmental sustainability, one limiting factor is that those who took part are perhaps more likely to have environmental sympathies; however, as this was said to be an overarching value within the community, any biases to the sample are unlikely to be extreme.

4.3.1.2. LILAC cohousing

LILAC was a 50-person cohousing community based in Leeds, roughly four miles from Leeds city centre. The community is described in more detail in *5.2.2.*

I initiated contact with LILAC via email. Discussion of the research took place via email, and I arranged several in-person survey inductions over the period of one day. I furthermore had the opportunity to stay at the community for two separate weekends, taking part in activities, ranging from landscaping, workshops, climate meetings, general meetings, shared meals and music nights, giving me ample opportunity to conduct observational research. Nine out of 20 households took the quantitative survey, and also took part in qualitative interviews, either in person or via a video call.

4.3.1.3. Liquid Monastery coliving

Liquid Monastery was a seven-person coliving community based in Dalston, London. In terms of coliving typology, they were representative spatially of networked houses (see *Table 2-7*), although the operators were yet to expand upon one residency. There were seven people renting a four-bedroom flat. The community is described in more detail in *5.2.3.*

After a mutual friend introduced me to one of the residents, I established communications via email, and was able to visit the community for an evening meal. It was during this time that I introduced my research and gave a survey induction. Getting residents to participate proved to be a challenge. Two of the residents moved out, and so did not take part. Another resident was too busy with work commitments. In the end, four out of the seven filled out the survey and were qualitatively interviewed. However, I was able to make several visits, and was able to stay at the flat in a vacant room for two days, which gave me opportunities for observational research.

4.3.1.4. The Vale community living

This final case study was a six-person community living residency in Clapham, London. The community is described in more detail in *5.2.4.*

The participation of this final case study has in some ways been the most challenging. I initially reached out via an online message to one of the community members, who I had met several times through various community-related events. After some protracted discussions and negotiations, I was able to send this person an adapted version of the surveys via the post, which he then asked his

housemates to fill out. Some months later I was invited over for dinner to meet the residents and collect the surveys. During this visit I was given a tour of the space, and was able to speak with the residents about their community. At a later date I had a qualitative interview with two residents via Skype, plus attended both social and formal events at which I had a chance to learn more about the community. I also had two follow-up interviews with one of the residents. All residents participated in the survey, however, not all information was collected – some was missing and had to be deduced using other means, and only two out of six residents were formally interviewed (although all took part in informal conversations). However, I felt that the interesting social practices and insight into communal living that the residents possessed, made this a community worth engaging with.

4.3.2. Reflexivity

Before looking at the specific methods employed in this research I will discuss the importance of reflexivity, and the role it played in this research.

Inherent within an ethnographic approach is being reflexive about the role of the researcher, considering the impact of their preconceptions, normative perspectives and of the research itself upon those participating, their social world, the researcher and the knowledge generated (Tisdall *et al.,* 2009). Reflection, and where possible subsequent action, helped to minimize, provide transparency on and clarify moments where I may have affected the results of the research (Blaisdell, 2015), serving to make the results of the research more robust.

A key part of the reflexive process is acknowledging my own normativity, and what prompted my interest in this research topic (Creswell, 1998). Normatively speaking, this research did stem from a view that shared living presents possible neat solutions to several prominent issues which those in developed countries face today: the unaffordability of housing, problems of social isolation and environmentally unsustainable domestic practices and infrastructures. The risk stemming from this is that I allowed the desire to advocate for shared living to influence the knowledge produced as a result of the research.

Key to mitigating normative impulses as much as possible was self-awareness throughout the research process. Therefore, practices which encourage such self-awareness were vital. Awareness of my own normativity led to a conscious consideration of the potential negative impacts of shared living (environmental or otherwise). I read research exploring the potential negative impacts of community. A journal was also kept during fieldwork (and on occasion during analysis). It mainly

contained observational descriptions, though included details on researcher mood and affect, with the purpose of providing reflective data on potential biases during data collection. To increase my accountability for the quantitative aspect of the research, I also kept a separate methodological journal in which I detailed my rationale behind development of the surveys and collation of secondary data, as well as any perceived assumptions and limitations of the methods chosen. Conversations with supervisors, colleagues and professionals in related fields also served to challenge my own preconceptions through the gaining of different perspectives (Husbands, 2017).

As the qualitative elements of this research took an exploratory approach, part of the process of self-awareness involved consciously adopting an inductive mindset during the fieldwork, and during part of the analysis (the analysis is discussed further in *4.3.3.5.* Although it is not possible to completely lose subjectivities gained during pre-fieldwork research, care was taken to let data emerge from the fieldwork through detailed documentation in the form of photographs and fieldnotes (i.e. nothing was consciously excluded because it did not seem relevant to the proposed theoretical framework, or even the topics of interest). Within reason I recorded as much as possible, as indiscriminately as possible to allow new ideas to emerge from the data (Becker, 2008). Having said this, in our observations we must for practical reasons be selective, as we simply cannot record everything, and a lack of situational knowledge may limit our interpretations. Plus, the act of writing itself demands 'transformation and recontextualisation' (Fine, 1993*,* p.277). Bearing this in mind, it is helpful to acknowledge that the researcher is a selector of knowledge, and as such, to ask questions such as: *what have I not taken photographs of? Who have I not spoken to? What have I not written about in my observations? Why not?*

I also attempted to account for and minimize the effect that I as the researcher (and the research itself) had on the participants. During the fieldwork process I tried to remain aware for signs of social desirability bias occurring. I did indeed find that with the surveys, which involved keeping records of various emissions for a two-week period, some participants expressed a desire to start the survey during *this* week rather than *that* week in order to "improve" the results. In these situations (which were a rare occurrence) I suggested that the participants base when they took their survey on convenience (thereby increasing their chance of completing the survey) rather than any other factor. It is likely that there was some social desirability bias going on, as communities' environmental sustainability "credentials" were in effect being assessed. Having said this, overall, I found community members to be open to self-criticism and complex views in regards to the successes of the community, in terms of environmental sustainability or otherwise (the question of possible bias

in the surveys is further explored in *4.3.4.2.*). Having said this, their reflexivity in itself was encouraged by the act of research. Therefore, while I may find it pertinent to discuss the community members' self-awareness in my results, I should also be aware that it is a self-awareness which this research played a role in creating. To this end, I was conscious of recording any thoughts or observations from participants on my role as a researcher, being mindful to look for moments where participants gave indications of how I was perceived, or of how they saw themselves as being perceived by me.

At the two cohousing communities I was able to volunteer as part of my fieldwork. Being a volunteer was ideal for building rapport, as volunteering shifts the emphasis of the relationship from what the researchers' to the participants' needs (Garthwaite, 2016), plus presents good opportunities to make contacts and conduct ethnographic observation. The building of rapport was helpful in creating more opportunities for interviews and survey participation. The establishment of greater levels of trust also allowed for more nuanced information to be shared, as well as a more holistic understanding of that information (Stevenson, 2016). Yet, an awareness was maintained that the rapport built with residents could influence later interactions, including interviews. Therefore, during fieldwork, authenticity of self was held in tension with adopting the role of a researcher whose purpose is to gather data, while influencing that data as little as possible. The practical outcomes of this stance were nuanced, heavily contextual and difficult to generalise, but examples include foregrounding the self that listens and asks questions and is interested, without becoming so questioning as to "sound like" an interviewer; or holding tension between being helpful and "one of the group" without disrupting the processes that community members have put in place e.g. suggesting doing something differently. With emotional closeness also comes the risk of a loss of distance (Kleinman, 1999), which could result in less willingness to be critical of those I regard as friends (Garthwaite, 2016). I endeavoured to maintain an awareness of this possibility, and to be reflexive in ensuring that the friendships formed did not blinker me to the negative aspects of community life, or result in bias when measuring a community's environmental impacts. It is worth noting that the gap in time between fieldwork and write-up served to somewhat re-instil the distance which is lost through intense shared social experiences.

Taking a reflexive approach also entails acknowledging what impact the research has on the researcher (Tisdall *et al.,* 2009). Creswell (1998) views the researcher's experience as forming an important part of the data, as his or her experiences and subjectivities may generate insight as well as error (Hammersley, 2013). By staying with the community during my fieldwork, I feel that I was

able to gain some emotional insight into both the pressures and pleasures of community life. There was one moment in particular, which I wrote about in my journal, in which I had first-hand experience of the complexity of feeling that comes with living closely with others:

> After helping XXX, I then went to weigh the compost in order to calculate its weight. On the way there it had begun to rain. As I walked past some washing on the line I thought... should I take it down? It felt too uncaring and un-community like to just walk by and leave it (and I also imagined someone seeing me walk by and thinking that I was a bit selfish) so I started taking it down and putting it in a nearby basket. Though as I reached some underwear I thought, I can't take that down, it's far too personal! And plus the rain was waning... so should I stop? Even if kindly meant, you never know what people might think about you taking the washing down. "I should have just left it!" I thought. I decided to keep going to the compost heap, and if it stopped raining, return and hang the washing back up. It did indeed stop raining five minutes later, and I returned and hung the washing back up, feeling a bit foolish, and hoping that nobody would come across me doing it. Nobody did, but I also felt some anxiety that I was being watched bemusedly from a window. (Journal entry, 26/10/2018)

Questions of just how communal I was meant to be mingled with an anxiety over being watched and judged for my actions. It is likely that this is an experience that new rather than established members were more likely to feel, yet, this moment gave me an emotional insight into the complexity of trying to predict others' expectations, wishes and opinions within a communal setting: an insight which was substantiated by situations which community members spoke about experiencing themselves.

It was also important that I was accountable for the wellbeing of research participants in relation to this research. This research adhered to the University of Westminster's ethical guidelines, and the Economic and Social Research Council's core ethical principles of research:

- research should aim to maximise benefit for individuals and society and minimise risk and harm;
- the rights and dignity of individuals and groups should be respected;
- wherever possible, participation should be voluntary and appropriately informed;
- research should be conducted with integrity and transparency;
- lines of responsibility and accountability should be clearly defined;
- independence of research should be maintained and where conflicts of interest cannot be avoided they should be made explicit.

(ESRC, 2021)

Participants taking part in interviews and/or surveys were made aware of the topics that would be covered, of their rights as a participant to stop the process at any time and to request that their data not be included, as long as this request was made before data had been consolidated with other data. It is also important to protect participants beyond the fieldwork period. The participants themselves are all anonymised for this reason. It was agreed with participating communities that the communities would be named in this research. The aim of this was to increase the potential for research impact, however, there was a possibility that due to certain specific information revealed in interviews, participants could be identifiable to other community members. Care was taken to mitigate this possibility by obscuring specific details which could reveal identities, and by treating any conflict/personal information sensitively. The communities were also interested to know the results of the surveys they took which measured GHG emissions. The overall results were shared with each community, whilst the results of individual households or persons remained anonymous, both in terms of who took part and how community emissions could be disaggregated into individual households. Individual households/persons were able to access their own results.

4.3.3. Qualitative methods

This research generated qualitative data through the methods of semi-structured interviews, participant and non-participant observation, image and document analysis, with these methods being conducted on an ad-hoc basis throughout the research period. In this next section I will go into more detail on each method employed.

4.3.3.1. Observation

Overt participant and non-participant observation was an important method employed during this research. Observation is useful for the study of social groups within a real-life setting, allowing the researcher to perceive aspects of life such as daily routines, interactions and styles of behaviour (Mason, 2006). This method furthermore can be utilised to understand how physical spaces and objects can offer insights into social norms, and can shape the practices of those who inhabit them (Liamputtong and Ezzy, 2006). Observation allows the researcher to generate data which may not be articulable within an interview (Mason, 2006) either because it is an uncomfortable topic to discuss (Creswell and Creswell, 2018), lacks salience as an event, or is difficult or impossible to convey in words (Mason, 2006). This method was therefore vital to the research, as the research topic is

concerned with daily routines (which may have low salience) and the dynamics of behaviour within a social group, which may be difficult for participants to define or articulate.

Observations were written within a research journal. Typically notes were made discreetly on site when possible, and then written up in full at the end of the visit/end of the day. Opportunities to write fieldnotes varied dependent upon the length and type of visit.

One challenge of this methodology was selecting the most appropriate locations in time and space for the observations to take place, as these factors will greatly affect the knowledge that is generated (Flick, 2006; Mason, 2006). At Canon Frome Court cohousing, preliminary observations helped me to identify the shared spaces where social interaction and observable behaviour was most likely to occur (McQueen and Knussen, 2002; Pohland, 1972). A kitchen known as the "dairy kitchen" (where dairy produce was made and stored), was very much at the heart of the public space within the community. Secondly, the vegetable garden, which residents frequented to take care of or harvest vegetables, was a space used by residents with a fair amount of frequency. Finally, a courtyard upon which several residences faced was a third prime spot for observing everyday life. Despite having identified these spaces, all of them were small enough and quiet enough to make the presence of a researcher (especially one armed with a notebook) extremely conspicuous. It is indeed a particular challenge of observation that the observer may influence the observed (Flick, 2006), and may be perceived as intrusive in some situations (Creswell and Creswell, 2018). Fortunately, being a volunteer enabled my presence in these and other public spaces to be legitimised by the work that I was doing, and furthermore presented valuable opportunities for participation in community practices. This participation, plus the culture of the community in relation to visiting volunteers, allowed me to access many of the small informal social situations which would otherwise have been hidden, such as impromptu tea breaks in the garden area, evenings sharing drinks within somebody's home, dinner with various families, and small talk in passing. The two-week stay also meant that I was able to be in the community during all times of day and different times of the week, and as such, gain some idea of the daily and weekly routines and rhythms of the community. As well as these informal events, I was also able to take part in and observe several formal events, including a group meeting, a communal pot luck (a shared meal), an open day, apple picking and apple juicing. These were excellent opportunities to observe and take part in the community's social dynamics and practices. One surprising observation was the extent to which communication occurred through signage and notes. For the majority of the time public spaces were empty, and so residents would use a community blackboard to communicate. Therefore, much observation could

be conducted through the reading of this signage. Email and WhatsApp were also frequently used for communication, but I was unable to gain more than a passing look at these communication channels.

The opportunity to spend time at LILAC cohousing community was more limited. There were many opportunities to engage in community activities during my time at LILAC (including communal meals, a bonfire, music nights, landscaping sessions and meetings), which gave me the chance to observe some of the community's social occasions. However, as the activities that I was involved in were more densely clustered together, there was less free time to observe spaces during more typical everyday life. However, as this fieldwork took place after two weeks at Canon Frome Court, I felt better equipped to more quickly identify observation points of interest e.g. the common house, community signage, play areas, shared pathways, views onto common spaces from residents' homes. I furthermore followed up these more limited observations on use of public and private space with interview questions at a later point.

I had two days staying at Liquid Monastery coliving community, plus a number of ad hoc visits. Where I could and could not observe was demarcated by the public/private boundaries of the space, with bedrooms being off limits. As much as possible, I positioned myself in the communal space, which was a spacious living/dining room with an adjoining kitchen. Here it was easy for me to work and discreetly take fieldnotes. As a participant observer I also experienced the audible presence of others from my bedroom, giving me an insight into the more intimate state of shared space in a coliving (as opposed to cohousing) community.

I had very little time to observe the space and use of space at The Vale community. A member of the community gave me a guided tour and allowed me to take photos, and I observed mealtime practices when joining the community for dinner. I also visited the house for a social event some time after the fieldwork. As with LILAC cohousing community, I followed up on my more limited observations with interview questions on use of public and private space.

During observation my role on the spectrum of complete participant and complete observer tended to change for practical and social reasons (Mason, 2006), although often it was found that offering to participate was appropriate in building rapport, and is likely to have decreased the Hawthorne

effect.[9] Indeed, my role as a volunteer at Canon Frome Court cohousing and sometimes at LILAC cohousing necessitated participation, which enabled an embodied understanding of certain aspects of community life, aided in rapport-building with community members, plus offered opportunities to speak with community members on topics which otherwise may not have occurred. Some of the tasks I participated in included apple picking, digging up weeds, shovelling, cutting grass, laying tables, cleaning dishes and making cheese. The challenge during these tasks become not forgetting my role as a researcher (Adler and Adler, 1977). At the opposite end of the spectrum, in both cohousing communities I was allowed to attend a community meeting, but was either specifically asked not to contribute to it, or to contributed in a limited fashion. The role as participating observer sometimes involved some emotional labour in order to fit in to the research setting (Arbour, 2006), for example, personal sharing during a community meeting on an emotive topic.

During observation I avoided giving obvious external signals of being a researcher, as I felt that acts such as visible note-taking or "interview-style" probing or in-depth questions during casual conversation would only undermine rapport with community members. It was often a challenge to find the time for ad hoc note-taking, as between volunteering, attending dinners and carrying out interviews and survey inductions, times at the communities were frequently very busy. Field notes were recorded as often as possible, but almost always in private or very discreetly.

4.3.3.2. Semi-structured interviews

The semi-structured interview was a key data-gathering tool for this research. When using semi-structured interviews, researchers will have topics, themes or issues that they wish to cover, but will conduct the interview in a relatively informal style (Mason, 2006), with wording and question order being adjusted as needed (Berg, 2004), new topics being broached if relevant, and to a certain extent allowing participants to guide how the interview proceeds. They are a method which enables the generation of complex and nuanced data, and allows access to participants' knowledge, views, understandings, interpretations and experiences, which are all 'meaningful properties' of the social realities that this research aims to explore (Mason, 2006, p.63). As such, semi-structured interviews are suitable for building explanations of social practices (Mason, 2006).

[9] An effect whereby individuals consciously or unconsciously modify their actions, due to an awareness that they are being observed.

A pilot interview with a resident from Copperlane Cohousing was conducted in preparation for the fieldwork. This gave me an opportunity to test my questions and recording equipment, as well as understand more about the cohousing model.

Participants for semi-structured interviews at Canon Frome Court cohousing were sourced through a mixture of notices put on the community notice board, emails, word of mouth and opportunistically, during conversation. In the community living and coliving community, participants were similarly sourced opportunistically, both through email and conversation. At LILAC cohousing, participants agreed to both the interview and the quantitative survey by email before my first visit.

In total, 33 participants took part in 22 semi-structured interviews, which ranged from 35 minutes to an hour and a half, with an average length of just over an hour. Interviewees were broadly representative of their community in terms of demography (i.e. age, gender, nationality, household composition), although the sampling methodology was opportunistic and as a result non-probabilistic rather than probabilistic and/or stratified to be representative of the sample populations. *Table 4-2* (below) details the breakdown of interviewees at each community.

Table 4-2: Interview participants

Community	Number of interviewees	Gender breakdown	Nationalities	Age categories	Household compositions
Canon Frome Court (cohousing)	13 (26 percent of the community)	8 female, 5 male	White British	Mid-thirties to Seventies	Couples with young children, couples with older children, grandparents, single parents, widows, single people and both the employed and retirees.
LILAC (cohousing)	14 (26 percent of the community)	7 female, 7 male	White British,	Early thirties to Early seventies	Couples with young children, couples with older children, couples without children, grandparents, single

					parents, widows, single people and both the employed and retirees.
Liquid Monastery (coliving)	4 (57 percent of the community)	2 female, 2 male	White British, British-Italian, Spanish	Mid to late thirties	Couples without children
The Vale (community living)	2 (33 percent of the community)	1 male, 1 female	White British	Early thirties	Couple

Although fewer coliving and community living residents were interviewed, as a percentage the participation of coliving/community living residents in interviews was higher than cohousing residents due to the small size of these communities. Nevertheless, with The Vale community living in particular, it is likely that a greater variety of perspectives could have been gleaned through interviewing more residents.

Interviews were either conducted face-to-face or via an online video call (in one case, where technological difficulties were encountered, a phone interview was used instead). Interviews were either audio or video recorded, which allowed as full a possible engagement with the participants (Fielding and Thomas, 2008). Interviewees were given a choice of when and where they wanted interviews to take place. For the most part, interviews took place inside the participants' homes, sometimes over a meal or refreshments. Three participants were interviewed whilst milking cows and goats. In one interview I worked together with the participant on re-purposing newspapers into paper bags during the interview. It was felt that through giving control to the participants on when and where they were interviewed, they were more likely to feel at ease and engage more fully with the interview topics.

Before the interview, participants were required to read an information sheet and sign a consent form (see *Appendix 15.1.*) to ensure that they understood what the research entailed and what their rights were. Contextual data, such as when and where the interview took place, and any general or reflexive observations, were recorded in a journal at a later point on the same day. The topic

schedule was designed to reflect the research questions (Flick, 2006), and was refined after an initial pilot study interview (Brewer, 2000). Each community had a slightly different topic schedule, although there were consistently two main topics: the first was shared living and environmental sustainability, exploring participants' identities as individuals and as a community, and their values in relation to environmental sustainability; the second looked at daily practices and change, exploring the tensions between individuals and the community when it came to practices which have notable environmental impacts. See *Appendix 15.2.* for a sample topic schedule. It was common that during each stint of fieldwork the original topic schedule evolved. For example, during the first period of fieldwork at Canon Frome Court cohousing the questions were more focused on pro-environmental practice transitions, whereas as time went on, questions became more geared towards use of space, shared work and individual/community alignments and tensions.

One challenge with this method was the tension between the perceived formality of the interview format impeding upon rapport, and so potentially negatively effecting the data generated. As pro-environmental practices are socially desirable, and there was furthermore some social pressure to present the community as harmonious and functional, there was a particular risk that participants may have felt unwilling to be candid about environmentally unfriendly practices or community conflicts. This may have been increased by participants' knowledge that the communities were not being anonymised. When I felt it was necessary, I adopted some characteristics of feminist interviewing by sharing my own experiences and through making the interview more conversational. The level of success in mitigating social desirability bias is difficult to ascertain. The use triangulation with other data generating techniques, such as participant and non-participant observation, plus careful analysis of the interview transcripts, helped to address the extent to which social desirability bias has occurred, something which itself is a meaningful finding.

One form of social desirability bias that it was important to be aware of and mitigate was my own. My results were written in the knowledge that the participants could read them, and that the communities would not be anonymised in the thesis. Reflection upon this, and the knowledge of the impact it could have on my results (i.e. a pressure to not be "negative" about the communities) helped me to interrogate my own perspective, and maintain integrity through not shying away from analysis which could be perceived as negative.

4.3.3.3. Image and document data

This research views written documents, objects, spaces and their aesthetic properties as an important part of what constructs practices within the social world (Mason, 2006), and as a specific version of reality which has been constructed for a specific purpose (Flick, 2006). As such, images and records of some documentation formed part of the data gathered during this research.

Photography has certain advantages: photographs can allow for the recording of visual reality in detail, and are less selective than observations; they can furthermore be returned to for re-analysis by the researcher, or by others (Flick, 2006). However, when photographs are taken the photographer must choose which visual imagery to include and which to omit; therefore, photographs also present the world in a specific shape (Flick, 2006). As such, the researcher must be reflexive when choosing how to visually record data. In-keeping with my ethnographic approach, my method here was to be prolific in the number of photographs taken, except for where such photography intruded on people's sense of privacy (generally this meant avoiding taking photographs of private spaces i.e. bedrooms in community living and coliving communities and households in cohousing communities). Similarly, photographs were not taken of people unless permission was asked first, or unless it was evident that photography was socially acceptable (e.g. other people were also taking photographs). The photographs taken were furthermore viewed as supporting and supported by the different types of data being generated (e.g. observations recorded in a journal, semi-structured interviews, surveys). Notably, the act of photography itself was helpful in prompting questions about surroundings.

After the fieldwork, the photographs were sorted into the following categories:

- Artwork: to gain potential insight into the community's meanings, in particular their values, interests and aesthetics; also as a prompt to ask who the artwork belongs to and who it was made by (what might this say about the community?);
- Shared spaces (including interiors, exteriors and green spaces): to see spatial design, opportunities for social interaction, how furnishings and objects are placed within these spaces, and how this reflects/shapes use of the space;
- Shared objects: to record what objects are shared and how they are arranged within spaces;
- Objects relevant to environment-related practices: to have a record of what these objects are like, what condition they are in, whether their appearance gives any clue as to how they are used, whereabouts they are placed within the home and what impact this may have on their use;

- "Gangs" – the name that Canon Frome Court cohousing residents used for when a group assembles to complete certain tasks e.g. apple-picking. Images of these occasions were socially much more permissible, as group work was seen as a social as well as a work occasion. These images were useful as supporting data on how individuals interacted when engaging in shared endeavour;

In most of the communities I also found that written notices and documents were an essential means of communication for community members, and a key way in which communities expressed some form of shared identity. Photographs were taken or copies were made of materials containing written information, which included signage/documentation that communicated rules, competences, practices, and requests, such as shared tasks (e.g. rotas), knowledge (e.g. recipes), instructions on processes, warnings (e.g. "mind your head"), records, news and requests (e.g. "Please leave the bottom freezer drawer empty"). Signage often conveyed more than just information. The way in which notices were written, for example, sometimes using humour, sarcasm, rationalisations, emotional pleas and more, revealed some of the meanings and discourses at play within the community. Certain documents were particularly helpful in illuminating community rules and processes, such as templates for raising a proposal to the community, worksheets for community workshops, and in one case, a community's house agreement. These documents were not perceived as something to be understood in isolation, but as part of a holistic picture of the community that they belong to, although they are still regarded as objects which individuals or groups can attach diverse meanings to (Mason, 2006).

4.3.3.4. Focus groups

Semi-structured focus groups were held with one additional community living residency (a Buddhist community) and one additional cohousing community (Springhill Cohousing, the UK's first purpose-built cohousing community). The table below shows some details of these two focus groups, which both lasted in between one to one and a half hours.

Table 4-3: Focus group participants

Community	Number of interviewees	Gender breakdown	Nationalities	Age categories	Household compositions
Buddhist Centre	6 (86 percent of	All female (an all-	British	Ranging from late twenties	Single women all sharing one house. No

Community living	the community)	female community)		to late sixties	mention of partners or children.
Springhill Cohousing Community	6 (7 percent of the community)	4 females, 2 males	British	Forties to seventies	All aside from one person retired. Participants either married with adult children, or divorced/widowed with adult children. One single mother with a child living at home.

These focus groups served to test out and add further validity to hypotheses which were being tentatively generated while working with the four main case studies. A semi-structured approach was chosen to observe how the broad topics of interest would be interpreted (i.e. in what ways would interpretations be similar or differ to other shared living communities?). The focus group format was particularly helpful in that it enabled the gathering of a range of responses (Hennink, 2007) in a time-efficient manner. The process of a focus group, whereby participants listen to each other, and perhaps as a result refine their own response or raise new issues (Hennink, 2014) was furthermore useful in generating data. I was able to observe participants interacting with each other (Liamputtong, 2011), negotiating meanings, agreeing and disagreeing, sharing knowledge and socialising; processes which are somewhat reflective of elements of community life.

4.3.3.5. Analysis of qualitative data

Analysis of the qualitative data has been a protracted process which has extended far beyond the coding of the data, beginning with setting a plan for analysis before the fieldwork and continuing throughout the writing process. In this section I describe and discuss the how findings were shaped from the data.

The plan for analysis, put in place prior to fieldwork, involved mixing both inductive and deductive approaches. An inductive approach was prioritised during fieldwork, so as not to delimit the data gathered through application of theoretical perspectives, which prioritise certain kinds of data. In practical terms, this meant conscious efforts to maintain an inductive mindset, and prolific recording

of data through observational fieldnotes and photographs to allow new ideas to emerge from the data (Becker, 2008). This was held in tension with an understanding of the broad topic (pro-environmental practices), and in reality, there were moments where a knowledge of my theoretical framework was triggered by events in the field. This is likely to have shaped initial deductive ideas which were developed at a later stage. Periods of fieldwork were spread over roughly a year, so work to prepare data for analysis (e.g. transcribing interviews) was undertaken in between periods of work in the field. This allowed some initial ideas about possible themes to emerge (Silverman, 2013), plus allowed the research topic to evolve (for more on this process of research evolution, see *4.3.5.*

During and after fieldwork, data was prepared for coding during through sorting images, documents and journal entries, and sorting and transcribing interviews. The qualitative software package Nvivo was used for data analysis. I began the coding process with an initial round of open coding, which aims to express the data and phenomena in the form of concepts (Flick, 2006), that is, initial codes. Although the coding process combined inductive and deductive approaches, initial coding was (non-intentionally) more focused on deductive coding. In hindsight I believe that because a theoretical framework to some extent offered a pre-determined structure through which to categorise data, deductive codes were at first more evident than inductive codes. As I worked through the data, developing initial codes, codes from inductive reasoning began to arise. They tended to be based around practical topics which kept recurring, for example “time”, “money” and “responsibility” were three such codes. This process often meant re-examining data for evidence of codes which had arisen after their initial coding. Once a round of open coding had been completed, I used axial coding to combine any similar codes and subcategorise codes together where appropriate in order to work towards a paradigm model (Strauss and Corbin, 1990). During this process I saw how my inductive codes might relate to one another and to some of the deductive codes. It had been my original intention to use a final round of selective coding to refine my axial codes towards a higher level of abstraction (Flick, 2006). However, the next stages of data analysis became more protracted, and tied in with the quantitative results of the research, and with the writing process itself.

It was always my intention with this research that the qualitative and quantitative data should act to inform and enrich each other. It was with this in mind that as an exercise (and potential structure for the findings) I wrote about how the qualitative data related to each category of quantitative data gathered (energy and water, food, purchases, transport and waste). This process involved taking the coded data, categorising it via the quantitative research, and then translating and relating the codes

into narratives relating to their respective categories (e.g. food, transport, etc.). The development of ideas allowed a further development of themes, which, it became evident, extended beyond the quantitively defined categories. It was clear that using a structure defined by the quantitative research was unsuitable for this research. Instead, common themes between the different quantitatively defined categories became a foundation for the paradigm model that the analysis was working towards (Strauss and Corbin, 1990). This foundation was further evolved through a return to the codes to add the data which had not evidently related to the quantitative categories (see *Appendix 15.3.* for a table showing how codes were applied to emergent themes at this stage). As a structure for the findings was developed, inductive and deductive reasoning continued to be used in tandem. Some chapters were based around specific concepts in the theoretical framework which appeared to resonate strongly with the topic (e.g. a chapter discussing GU and TARs, concepts from SPT), other chapters were based around topics which emerged from the data (e.g. a chapter on the shared endeavour of community).

During analysis, it also became evident that my initial theoretical framework was unsuitable for the data which had emerged. I had originally intended to use a mixture of SPT and critical discourse analysis (CDA). However, the concepts of CDA did not relate strongly enough to the data. Instead, it was decided that social norms would be more helpful in framing the findings, as indeed, concepts from social norms had arisen inductively throughout the coding process. In this sense, the inductive approach shaped the deductive approach.

It was only once an initial draft of the findings had been written that I identified that the unifying theme of the emergent results was *sharing*, and how acts of sharing were negotiated. With this understanding I redeveloped the findings, and furthermore found ways to link in the quantitative findings with the qualitative results, to generate further insight.

Qualitative data analysis has taken place throughout the research. In particular, the process of writing was an important stage of analysis, as the articulation of ideas involved in writing enabled the linking together of codes into themes in ways which were not apparent during the coding process. Inductive and deductive methods were combined and iterative, and the final results are reflective of this joint approach.

4.3.4. Quantitative measurement

This research quantifies the GHGs of four shared living communities by measuring their CO2 equivalent (CO2e) emissions. CO2e is a measurement used to compare the emissions of various GHGs with CO2, based upon their global warming potential. For example, the emissions of one million metric tons of methane are equivalent to emissions of 21 million metric tons of carbon dioxide (OECD, 2013). The rationale behind using CO2e is discussed in *4.3.4.1.*

The CO2e measurements in this research are broken down into five sub-categories:

1. Energy and water
2. Food
3. Purchases
4. Transport
5. Waste

This data serves to add further context to pro-environmental practices, and vice versa. The data are furthermore contextualised through a comparison with the CO2e of the average UK household. This comparison is constructed through secondary data.

There are three categories of data gathered for the quantitative research:

1. Direct CO2e emissions of shared living communities (discussed in *4.3.4.2.*);
2. Indirect CO2e emissions of shared living communities (discussed in *4.3.4.3.*);
3. Direct and indirect CO2e emissions of an average UK household (discussed in *4.3.4.4.*).

Stages 1 and 2 involved surveying a sample of households/individuals from each community, accessing already existing data (e.g. utility bills), plus capturing CO2e emissions which could not be attributed to specific households (e.g. electricity used to light communal areas, or waste generated from community-wide events).

Table 4-4 shows the number of residents or households who completed the quantitative survey. It was felt that a meaningful sample size was obtained from LILAC cohousing, Liquid Monastery coliving and The Vale community living. The percentage of those participating at Canon Frome Court cohousing was lower than other communities, which did mean there was greater risk that the sample was not representative of the population (this is discussed in *4.3.4.2.1.* In light of this, Canon Frome Court's results were presented to the community for feedback, and community members

shared that the results were in-keeping with expectations. This provided an indication that it was reasonable to view the sample as representative of the community.

Table 4-4: Details of quantitative survey participants

Community	Number of participating households / residents	Household compositions
Canon Frome Court (cohousing)	6 households (30 percent of the households within the community)	Slightly more females than males. Couples with dependent children, couples with adult children, grandparents, single parents, widows, single people and both the employed and retirees.
LILAC (cohousing)	9 households (45 percent of the households within the community)	Couples with dependent children, couples with adult children, grandparents, single people and both the employed and retirees.
Liquid Monastery (coliving)	4 (57 percent of the community)	Two males, two females. Two couples. Aged early to mid thirties.
The Vale (community living)	6 (100 percent of the community, although some participants left some sections incomplete)	Three male, three female. Two couples, two single people. Aged early to late thirties.

The remainder of this section is structured as follows: *4.3.4.1.* defines and gives a rationale of the use of CO2e as a measurement metric, and then *4.3.4.2.* and *4.3.4.3*. describe and provide a rationale, challenges and limitations for measurements of direct and indirect CO2e respectively. Finally, *4.3.4.4.* describes, provides a rationale and discusses challenges and limitations for the construction of CO2e emissions of an average UK household.

4.3.4.1. Measuring environmental impacts

This section begins by explaining why I have opted for measuring CO2e using a life cycle analysis methodology. It first explores and critiques one other established method, Ecological Footprint Analysis, before going on to provide a rationale for use of CO2e. The section then explains why emissions streams for energy and water, food, purchases, transport and waste were chosen, and why some other emissions streams (i.e. indirect emissions from the built environment, emissions from use of services) were omitted.

Ecological Footprinting (EF) presented a viable option for environmental measurement of shared living communities, though it was *not* used in this research. It is a popular and well-known method for measuring environmental impacts. Daly's (2017) literature review of quantitative environmental studies into ecovillages and cohousing shows that from 16 quantitative studies measuring the environmental impacts of 23 unique communities, 12 of those communities were measured using EF. EF provides a measurement of environmental impacts which is linked to a specific population (Barrett *et al.,* 2005). It does this through estimating the amount of bioproductive land that is necessary to support consumption of resources throughout their lifecycle (Wackernagel and Rees, 1996). This is typically done through either compound methods (using statistics gathered at a national level to conduct large-scale studies) or component methods (typically employed by smaller-scale studies, a component method means applying pre-calculated life cycle metrics to data gathered at a local level). Most EF studies of cohousing and ecovillages used the latter component method.

Perhaps the greatest advantage of EF is the tangibility of its results (Moffat, 2000); take, for example, the WWF's (2020) statement that 'We would need the regenerative capacity of 1.6 Earths to provide the natural resources and ecological services we currently use'. However, the measurement of land is most suited to renewable resources such as crops and timber, and even then is static and somewhat simplistic. It ignores technological change and flows of resources through land, does not account for bodies of water or under the ground (Moffat, 2000) or measures such as increased crop density from fertilisers (Ferguson, 1999). Therefore it is a largely symbolic 'attention-grabbing device' (Moffat, 2000, p.361) rather than a literal measurement of land use. The picture grows even more complex when attempting to equate non-renewable resources, which are measured by their estimated impact on or use of renewable bioproductive land (Barratt *et al.,* 2005); with the logic of accounting for CO2 emissions on the basis of the amount of land needed to absorb that carbon being noted as 'extremely shaky' (Ferguson, 1999, p.152). It was felt that as a significant portion of

what was measured in this research were likely to be non-renewable resources, compared to the chosen method, EF offered a far less valid picture of environmental impacts.

The other well-established and commonly used metric for measuring environmental impacts is measurement of a so-called "carbon footprint" (CF). CFs are used as a measurement for both micro and macro scales (e.g. from the CF of a piece of fruit [see Berners-Lee, 2020] to the CF of countries and continents). This form of measurement is so widely accepted that anybody can calculate their CF through a plethora of online carbon calculators (see for examples the carbon calculators from WWF, NEF, carbonfootprint.com and Climatecare). Advantages of this form of measurement include that it is widely accepted and forms an established part of the discourse around climate change (for example, measurements of carbon emissions form a key part of the IPCC reports). Therefore, good quality tools for measurement exist, making a carbon-based measurement a practical choice. For this research in particular, the carbon measurement tools used (created by DEFRA) help to situate the results within the context of UK sustainability-related housing targets.

However, the term "carbon footprint", and carbon-based measurements in general are broadly defined, and there is no one agreed-upon definition of what these types of measurement encompass (Wiedmann and Minx, 2008). CF measurements may, for example, include or exclude other GHGs, include or exclude indirect emissions (Wiedmann and Minx, 2008), and may be expressed in tonnes, kilograms, or as component of an EF (Day, 2017). Therefore, when choosing to use a form of carbon measurement as representing environmental impacts, decisions must be made as to how to define the parameters of measurement.

Environmental impacts can be measured solely in terms of carbon dioxide (CO2), however, to do so omits almost a third of greenhouse gases (GHGs) (Wright *et al.,* 2011). A GHG is any kind of gas in the atmosphere which absorbs and then re-emits heat, thereby warming the atmosphere to a higher temperature than it would otherwise have been (Brander and Davis, 2012). Aside from water vapour (which dissipates within days), the main GHG in the atmosphere is carbon dioxide (CO2). To account for the impact of other GHGs, yet to display information in an easy-to-comprehend format, this research measures environmental impacts using the concept of CO2 equivalent (CO2e). With CO2e, CO2 plus other GHGs are measured in terms of their global warming potential (GWP) when compared with CO2. The IPCC calculates GWP in terms of 20, 100 and 500 years, although the almost universally used time scale for calculating GWP is 100 years (Gillenwater, 2010). CO2e is typically composed of seven gases, which were identified during the Kyoto Protocol in 1996 (Brander

and Davis, 2012). The table below details these gases and their different GWPs according to the IPCC's AR4 report.

Table 4-5: Greenhouse gases (GHGs) and their global warming potential (GWP)

IPCC, 2007; Gillenwater, 2010

Greenhouse Gas (GHG)	**100 Year Global Warming Potential (GWP)**
Carbon dioxide (CO2)	1
Methane (CH4)	25
Nitrous oxide (N2O)	298
Hydrofluorocarbons (HFCs)	1430/14800
Perfluorocarbons (PFCs)	7390
Sulfur hexafluoride (SF6)	22800
Nitrogen trifluoride (NF_3)	17200

The IPCC has released updated GWP figures in the AR5, however, most measurements of CO2e still use AR4 multipliers in order for the results to maintain consistency with other reports (Gillenwater, 2010).

Whilst CO2e is a useful tool for summarising GHGs, it must be noted that methane (one of the gases which comprises CO2e) acts differently in the atmosphere to carbon, breaking down within approximately twelve years, whilst carbon takes approximately one hundred years to break down (Allen *et al.,* 2018). Therefore, over a long time period, a figure which defines these gases as equivalent has limited validity. Furthermore, CO2e does not take account of other forms of environmental impact, such as biodiversity loss or soil degradation. However, as a key purpose of the quantitative research is to make a meaningful comparison with an average UK household, it is argued that the practical benefits of using CO2e to summarise the impact of GHGs outweighs these disadvantages.

This research has also defined what the CO2e emissions of shared living communities/households are comprised of. This measurement is based upon the topic of interest for this research, which is domestic practices, and the shared use of domestic infrastructures, that is: actions and their attached meanings which are related to home and household infrastructure. Emissions streams are divided into five categories. For each category CO2e was quantified, and they were furthermore

explored qualitatively, looking at meanings, objects and competences, routines, norms and negotiations attached to these emissions streams.

How emissions from transport are bounded warrants further discussion, as this is a practice which extends beyond the home. Aeroplane flights, although not strictly a domestic practice, were included in this measurement due to the familial/social nature of holidaying decisions[10] (situating them within the realm of the domestic), plus the high environmental impact of flights. It is debatable as to whether travel for commuting purposes should be attributable in this research, as arguably those emissions "belong" to the businesses that household members are commuting to. However, the decision was made to include commuting CO2e because of this research's interest in the interlinked nature of practices within these communities, which includes how work and domestic practices intertwine. The locations of the communities of interest (and therefore their commuting practices) are inextricably linked with other practices those communities are able to engage in. A good example of this is Canon Frome Court cohousing, whose rural location and large amount of land enabled food growing and producing practices. A more urban location (with the likelihood of diminished commutes) would have meant less abundance of land, and therefore less opportunity to grow and produce food. Therefore, the need to commute long distances is interlinked with how Canon Frome Court cohousing operates as a community. However, *business* travel (travel relating to work that is not commuting) was *not* included, as it was judged that these emissions do belong to that business.

The decision to focus on the emissions streams detailed above meant that certain types of emissions are not included. One measure not being included is the embedded emissions within the buildings that residents occupied. It was felt that the addition of CO2e from the buildings (and the complexities of how to attribute the CO2e from those buildings between past, current and future inhabitants) would have drawn too much focus to the built environment in a study that is more interested in domestic practices.[11] This research does have an interest in certain elements of the built environment, but chiefly in terms of how they impact domestic practices and/or CO2e generated from other emissions streams (e.g. heating and lighting).

[10] Although, the CO2e impacts of holidaying have not been included. It was found that secondary data on the CO2e emissions of holidaying were not of sufficient quality to reliably construct a comparison figure.

[11] It should be noted that the CO2e generated from building *work* (e.g. decorating a room, adding an extension, repair work) was included. This is because that building work was carried out or commissioned by current inhabitants, and so was counted as a domestic practice.

A further emissions stream that has been omitted from this research is the embedded impacts of using services, for example, insurance, banking, cleaning companies, doctors etc. It is possible that communities may use certain services which lower their CO2e impacts, for example, Triodos Bank, which only invests in projects and organisations which have positive social and environmental impacts (Triodos Bank, *no date*). However, accurate measurement of the CO2e impacts of services would have been extremely difficult to ascertain, and once again would have directed too much attention away from domestic practices.

The next section details the rationale, process, challenges and limitations behind gathering data on direct impacts (energy and water use, food, transport and waste).

4.3.4.2. Measurement of the direct impacts of shared living communities

"Direct" CO2e emissions include emissions such as space heating, hot water, lighting and transport fuel use (Druckman and Jackson, 2010). The methodology for this element of the research was developed based upon the method of CO2e measurement used by the charity, Global Action Plan (GAP), who conduct CO2 audits of businesses. This method was chosen as it was well-established, methodologically well-grounded, and practical given the scope of the research. It can also be regarded as a form of post-occupancy evaluation (POE), which is defined as the act of 'evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time' (Prieser and Vischer, 2005, p.8). POE has been used to conduct some forms of environmental impact assessment (e.g. energy use) in shared living. For examples, see Stevenson (2019), Stevenson *et al.* (2016). GAP's method was to survey and obtain records from respondents to ascertain certain data, and then convert that data into CO2 or CO2e using multipliers supplied by DEFRA. I met with the Technical Development Manager of GAP on several occasions to learn about their methodology and refine my own with their guidance. Having developed my own survey and received feedback on it from GAP, I then pilot-tested it with three individuals. Using their results and feedback, I then refined the survey, making it easier to fill out, and creating a digital version of the survey, to give participants the option between paper and digital surveys.

Table 4-6 lists which direct emissions I have gathered data upon, how this information was acquired from participants, and what time period the data covers. It should also be noted that this survey included collection of information on some indirect emissions (defined as CO2e emitted along the supply chains of the items in question). These items were included within this part of the survey as this was the most practical way of gathering data for these items (see footnotes for details).

Table 4-6: Data gathered via participant survey on direct emissions

Emission type	Emission sub-type	Method of data gathering	Time period covered
Energy use & water	Bioenergy and solid fuel (e.g. logs and woodchips)	Utility bill records or weight	1 year
	Electricity[12]	Utility bill records	1 year
	Gas	Utility bill records	1 year
	Water (supply and treatment)	Utility bill records	1 year
Food and drink	Store-bought	Survey (participants asked to weigh their food shopping bags, plus categorise their and household members' level of meat consumption)	2 weeks
	Home grown	Survey (participants asked to weigh all food and drink, plus categorise their and household members' level of meat consumption)	2 weeks
Transport (private)	Car	Survey (participants were asked to note the milometer of their private vehicles for the period of two weeks, submitting a final figure of the number of miles travelled, as well as information about their vehicle make, model and the type of fuel used)	2 weeks
	Motorbike	Survey (same method as above)	2 weeks
	Bicycle	Survey (participants were asked to note down journey start point and journey end point)	2 weeks

[12] It should be noted that electricity is an energy carrier rather than a fuel burnt directly by households. Emissions from electricity production occur upstream where, for example, coal or gas are burnt. However, as electricity is commonly perceived as a direct household fuel (Druckman and Jackson, 2010), that is how it is perceived in this research.

Transport (public)[13] [14]	Taxi	Survey (participants were asked to note down journey start point, journey end point and number of household members who took this journey)	2 weeks
	Bus	Survey (same method as above)	2 weeks
	Coach	Survey (same method as above)	2 weeks
	Train (surface rail or underground)	Survey (same method as above)	2 weeks
	Aeroplane	Survey (same method as above)	1 year
Waste	Recyclable waste	Survey (participants were asked to weigh their recyclable waste)	2 weeks
	Non-recyclable waste	Survey (participants were asked to weigh their non-recyclable waste)	2 weeks
	Compostable waste	Survey (participants were asked to weigh their compostable waste)	2 weeks

See *Appendix 15.4.1.* and *Appendix 15.4.2.* for surveys measuring the direct impacts of households.

The time period of a year was required for information which was gathered using utility bills (e.g. electricity, gas and water). This is to capture seasonal differences in energy use. Furthermore, as records were likely to be kept, the request of a long time period posed little practical difficulty for participants. Participants were asked to list aeroplane journeys within the last year, as it was speculated that these would be reasonably infrequent and salient events.

For emission types which were not documented and so required recall or a more continuous effort from participants in order to compile data (food and drink consumption, private and public transport, waste) a shorter time period of two weeks was required. The use of such time periods for data capture attempted to strike the balance between generating generalisable results and minimising drop-out rates or incomplete data due to participant fatigue.

[13] Participants were also asked to record their ferry journeys; however this was not included in the final data as no reliable comparison figure could be found (as emissions occurring from this transport method were minimal this was not deemed as having significant influence on the overall results).

[14] Arguably, all public transport may be counted as indirect emissions, as they are emissions which arise from services. However, they have been included as direct emissions by this research, to maintain a consistency in how travel-related emissions are conceptualised.

Some of the data on direct impacts had to be gathered at the community level rather than the household level. With some elements of the surveys, such as utility bills, I was able to gain access to centrally held records for the entire community. There was also a certain amount of CO2e that was generated by communities which could not be attributed to any one household. Whilst attempts were made to predict what data would need to be gathered, it was only upon arrival in the field that I could ascertain what measuring these communal CO2e impacts would involve. *Table 4-7* details the types of communal data which were gathered from each community. A survey for gathering community-level data can also be found in *Appendix 15.4.4.*

Table 4-7: Data gathered on communal CO2e emissions

Emission type	Canon Frome Court (cohousing)	LILAC (cohousing)	Liquid Monastery (coliving)	The Vale (community living)
Communal indoor waste: non-recycling, recycling, compost	Communal non-recycling, recycling and kitchen compost weighed for 2 weeks. Amount of waste is dependent upon number of community volunteers, which differs throughout the year. A qualitative interview with cleaning staff was conducted to ascertain a reasonable way of scaling the measurement of the 2 week period to a year.	One week's worth of communal non-recycling, recycling and kitchen compost weighed. Qualitative interviews conducted with five residents to ascertain how this one week's worth of rubbish compared with the average weekly waste generated. Measurements were scaled to a year's worth of weight according to their answers.	All waste was communal, so participants recorded this as part of their survey.	All waste was communal, so participants recorded this as part of their survey.

Communal garden compost	The community had one compost heap per year. The volume of the most recent heap was calculated to ascertain weight.	The community has on average one compost heap per month. The volume of the most recent heap was calculated to ascertain weight, and then this was scaled to be representative of a year.	No garden compost, N/A.	No garden compost, N/A.
Communal bonfires	Weight estimation based upon qualitative interview with resident responsible for bonfires.	Weight estimation based upon qualitative interview with residents responsible for bonfires/wood used in the community house wood burner.	No communal bonfires, N/A.	No communal bonfires, N/A.
Communal food	Communal food weighed for 2 weeks. Amount of meat consumption noted.	Residents asked to weigh ingredients for communal meals over a period of one month. Qualitative interview with resident who coordinates communal meals to ascertain how representative one month sample was of the year (as there are seasonal	A negligible amount of communal meals, N/A.	All meals are communal, so this data was captured through community records of food purchases.

		differences in frequency of communal meals).		
Communal energy consumption: gas, electricity, water	Electricity and gas ascertained through existing records. No record of communal water usage, as water is drawn from a borehole and treated on site.	Ascertained through existing records from utility companies.	Ascertained through existing records from utility companies (aside from water, which is unmetered. Used average water use estimates).	Ascertained through existing records from utility companies.
Farm animals: cows, sheep, goats, chickens	Accessing records, online research, qualitative interviews. See *Appendix 15.5* for breakdown of how animal emissions were calculated.	No animals, N/A.	No animals, N/A.	No animals, N/A.
Growing vegetables	Impacts captured through utility bills, surveys, compost calculations and other. See *Appendix 15.5* for details.	Impacts captured through utility bills, surveys, compost calculations and other. See *Appendix 15.5.* for details.	No vegetables grown, N/A.	No vegetables grown, N/A.

All data collected over a two-week period was scaled to represent a one year time period, and then all data was converted into CO2e using conversion factors made available by DEFRA (2017, 2018) which are based upon the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) (DEFRA, 2017). These conversion factors have been made available to aid UK-based organisations in assessing their GHG impacts, as is required by the Climate Change Act (2008) (HM Government, 2013); however, they can also be used to provide estimations of household GHGs, as in this case. This database was chosen for its UK-specificity, its usability and for the fact that it has been

tried and tested by professionals who specialise in measurement of environmental impacts (e.g. GAP).

Data gathered at the community level (as detailed in *Table 4-7*) was divided by the total number of households within the community (e.g. Canon Frome Court cohousing consisted of twenty households). Therefore, emissions at the community level were divided by twenty, with each household receiving a "share" of communal emissions as part of their household's CO2e emissions). At this stage of the research, each participating household had a single CO2e figure which represented their direct emissions. This was added to their indirect CO2e emissions (the methodology for this is detailed in *4.3.4.3*.

There were certain challenges and limitations to the survey data. One challenge was the necessary caution when gathering self-reported sustainability-related information (De Young, 1996). There was a risk of social desirability bias, where participants alter practices in order to seek social approval (Brewer, 2000). When giving participants an induction to the survey, they were instructed not to change their typical actions, and were given assurances that their results would remain anonymous at the household level. Furthermore, throughout the surveys participants were invited to write whether the data they were recording represented the "norm". This encouraged truthfulness, as it allowed a method of justification if participants happened to be doing a particularly environmentally impactful activity e.g. holding a party; plus it enabled the gathering of helpful contextual data (it should be noted that no participants reported the practices recorded over a two week period to be outside of the norm, though this does not mean that this was the case). None of the data collected was visibly linked to certain carbon outcomes, and whilst participants are likely to have known that (for example) journeys by public transport are less carbon-intensive than journeys by car, and that beefsteak has a higher carbon footprint than tofu, the lack of visible connection may have helped mitigate social desirability bias, which could conceivably have prompted the hiding of certain practices. It was also observed that those who took part were genuinely interested to know their GHG measurements, and so I am of the opinion that this will have prompted truthful intentions when recording survey data. Although, it should be noted that even if this was the case, participant's memories may have been inaccurate, or they may have made errors.

A limitation that it is important to note is that using CO2e multipliers for pre-set categories means the CO2e impacts of items are simplified into a representative aggregate. For example, the conversion factor for food and drink does not take into account aspects such as type of food or food

origin, which can have a significant impact on actual CO2e; and multipliers for transport give measurements for an average vehicle type, and cannot account for differences in vehicles which may come with age and the unique conditions that the vehicles are operated in. In some cases, as with food, additional variables were introduced to make the resultant CO2e more granular (see *Appendix 15.6.2.* for details). However, the CO2e measurements should not be regarded as absolutely precise. Much of their significance lies in being able to make a valid comparison with an average UK household.

4.3.4.2.1. Challenges and limitations

There were certain challenges in conducting this survey. One such challenge was attempting to get a sufficiently large sample within each community. As I worked with each community I learned that setting clear expectations of what I was hoping to achieve from the research was important. Overall, I feel that communicating this more strongly did improve participation in the ensuing case studies; although, as my initial lines of communication were always channelled through one or two people, it was sometimes the case that I did not have control over what was and was not communicated.

This issue meant that with Canon Frome Court cohousing in particular, the sample size was relatively small. Whilst a sample of 30 percent of the population may be of decent size for a large population; amongst a small population, a 30 percent sample means that there is more likelihood of outlier cases skewing the overall results, and so less likelihood that the sample is representative of the overall population. The bar chart below shows how the household composition of participating households compares with the household compositions of Canon Frome Court overall.

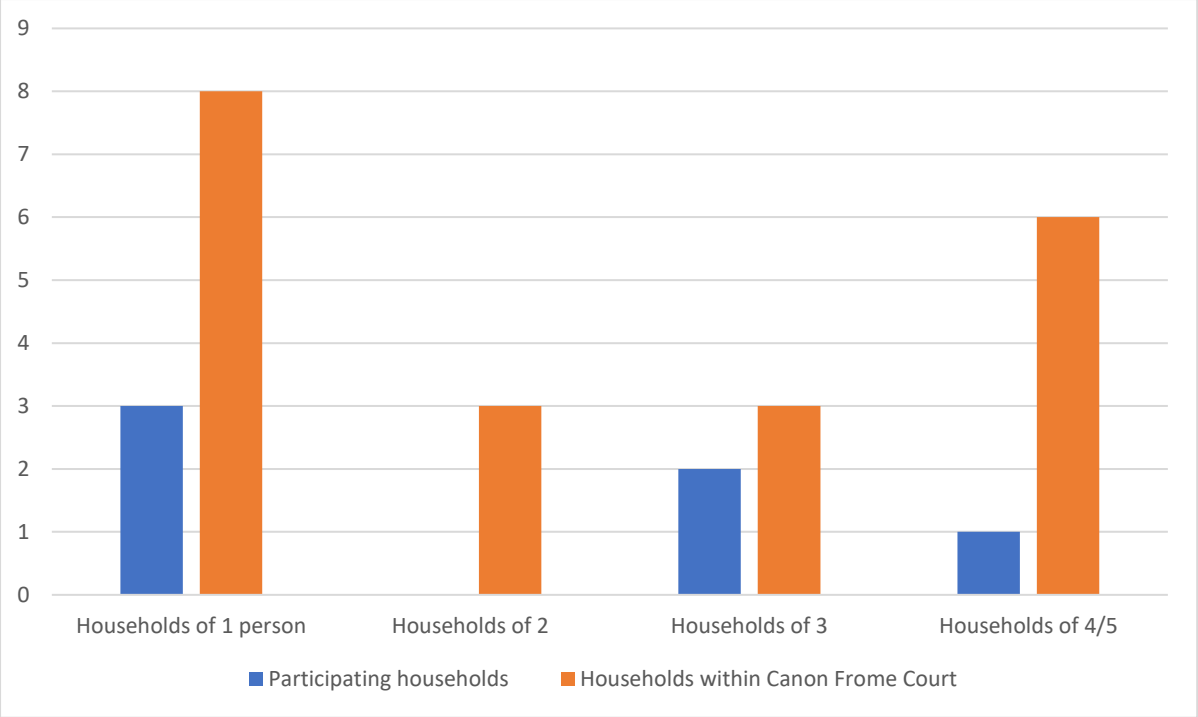


Figure 4-4: A comparison of household size distribution between participating households and overall number of households at Canon Frome Court cohousing.[15]

Participants were skewed towards single person households. However, the average participating household consisted of 2.3 people, which was close to the average household for the sample population: 2.4 people. This similarity in average household size does not account, however, for the different practices which may be linked to different household sizes and compositions. For example, many households of four consisted of two adults and two children. Their practices were likely to be quite different when compared to a single-person household. Information on such differing practices was in part captured by qualitative data, although it is possible that it is not reflected quantitatively. In an attempt to query the validity of the quantitative data gathered, the results were cross-checked with the community through a presentation and feedback session, in which feedback was that the quantitative results appeared to be reflective of the community's practices.

Some other measurements of direct emissions in this research were not especially meaningful; in particular, the weight of food at Liquid Monastery coliving. The sample size (2/7 residents) was too small to be representative of the community. Though, as residents did not usually eat together, in theory their eating habits bore little significant difference to that of a single-family household. Any differences are likely to have been more related to individual eating habits, and the availability of

[15] Please note that households of 4/5 have been conflated to protect anonymity.

food given their location (e.g. some residents shopped at their local market), rather than being directly linked to shared living (though arguably, shared living is what enabled them to afford a central location). Liquid Monastery coliving also did not have a water meter, so could not submit measurements of water use. Though, once again, as residents did not report in engaging in water-saving practices (beyond minimal practices such as turning off the tap while brushing teeth) there is little expectation that their water usage would be different from the average household. Although, conceivably, there may have been some more significant water saving through sharing a dishwasher and washing machine. Yet, overall, in both of these cases, the practices being measured (water and food consumption) did not appear to be significantly impacted by shared living. Therefore, I deemed it acceptable that accurate measurements could not be obtained.

An unanticipated issue was that on occasion not all household members were enrolled in the idea of taking the survey, meaning that they had to be persuaded by other more enthusiastic household members. Having noticed this, I made extra efforts to emphasise that this was a survey for the entire household, and to be as clear as possible from an early stage about the labour involved in the survey.

Ensuring completion of the surveys could also be a challenge, as the survey itself was fairly labour-intensive for participants. Household members had to coordinate with each other in order to ensure that data was neither missed nor duplicated (e.g. in the weighing of waste), and participants had to fit data gathering around busy schedules. Emails offering help and gentle reminders aided in completion in most cases. Some participants also encountered technical difficulties with the online survey. In these cases, help was given via email. After my first case study (Canon Frome Court cohousing) I switched from using survey software Qualtrics to using Microsoft Excel for data gathering from participants, as this better suited the kind of repetitive record-keeping that some of the survey required. When working with The Vale (community living), I also adapted the survey to place most burden upon one member of the community (my liaison point and biggest advocate for taking part in the survey) and lessen the burden on other community members, who had less time to take part. I also found that a detailed induction session with a person from each household participating was essential in ensuring that participants understood what was expected. A survey checklist also helped participants to remember what needed completion.

4.3.4.3. Measurement of the indirect impacts of shared living communities

Indirect or embedded CO2e emissions are the emissions from the supply chains of the goods and services purchased by households (Druckman and Jackson, 2010). Measuring CO2e in this way is known as a "life cycle analysis" (LCA). The LCA approach is based on the ISO (International Standards Organisation) ISO 14040 methodology (ISO, 2006), and typically consists of assessing the production, use and disposal of a specific product (Finnegan, 2013). Taking plastic bags as an example, an LCA would include: the impact of the extraction and production of raw materials; bag production processes; packaging at both production and point-of-sale stages; any transport, which may include transport from the location of raw material production to the location of plastic bag production; finally, depending on the type of life cycle analysis, end-of-life impacts can be included (Environment Agency, 2011).

Assessing the life cycle of a product is difficult, and is still a fairly young discipline (Kazer, 2013); yet as indirect emissions can account for approximately two thirds of the total UK household carbon footprint (Druckman and Jackson, 2010), it is important that these emissions are included within this research. Measurements of indirect CO2e in this research have focused upon the acquiring of physical objects for in and around the home, such as furnishings, white goods, gardening equipment, transport equipment (e.g. cars, bicycles), games, toys and any object which is found in the home. As shared living communities share certain objects, spaces and amenities, some insight into the amount of *things* in relation to domestic life was deemed to be of value to this research. As mentioned in *4.3.4.1.,* the embodied emissions of the buildings themselves are *not* included, as this research is chiefly interested in domestic practices, and it was felt that inclusion of the buildings would distract from this focus. However, emissions arising from building work (e.g. room decoration, extensions, maintenance) have been included, as this forms part of the practice of current residents. Furthermore, the indirect emissions of using services (e.g. insurance, banking, doctors etc.) have not been measured, as it was felt that, again, this would have directed too much attention away from domestic practices; plus accurate measurements would have been extremely difficult to ascertain.

Conducting an LCA is a bottom-up approach which allows for highly specific data to be collected (Skudder *et al.,* 2016); however, it is generally a cost and labour-intensive task (Wiedmann, 2009). In this case, conducting an LCA was not pragmatic, as calculating the supply chain emissions of a wide range of products (as is intended by this research) involves time and resources which are beyond this project's scope. Instead, I adopted an LCA *approach*, through using an environmentally-extended input-output analysis (EE-IOA). An EE-IOA is a top-down approach which adopts economy-wide

modelling in order to estimate supply-chain emissions (Wiedmann, 2009). It is appropriate for measuring the environmental impact of a variety of larger entities (such as countries, industries, or in this case, households), rather than singular items (Wiedmann, 2009). The data produced by an EE-IOA is based upon economic input-output tables that detail money earned through wages and profits (input) and the value of goods and services provided (output) (HM Treasury, 2017). This data is used to calculate gross domestic product, but by extending this analysis the environmental impacts of an economic system can be identified (Skudder *et al.,* 2016). This extended analysis produces multipliers which provide a measure of indirect impacts per (monetary) unit of output by industry (UN, 2013). This means that the indirect emissions of a product are calculated by inputting its monetary value. EE-IOAs are an established method and have been applied to studies on environmental impacts in housing (Fremstad *et al.,* 2018) as well as water, air pollution, energy and labour, waste, deforestation, and forms of air and land pollution (Lenzen [2000] provides a helpful summary of past studies).

One other potential option was to use Environmental Product Declarations (EPDs) to measure the environmental impacts of specific objects. An EPD gives independently verified information on the environmental impact of a product throughout its lifecycle (EPD, 2020). Whilst EPDs have a high level of validity, it was not practical for them to be incorporated into the methodology for this research. The database is not extensive enough to cover the vast number of consumable items, even in the sense that specific products could act as a proxy for other, similar items. Furthermore, as this is a tool chiefly used by businesses, the types of product listed within the EPD database are fairly irrelevant to households (e.g. the transport section mainly lists trains). Moreover, asking participants to provide exact specifications of their possessions in order to cross reference it with the EPD database would be impracticable, and would have most likely led to incomplete data.

There are several existing data sets which contain EE-IOA multipliers. It was decided that DEFRA's *Table 13* would be used. This table measures items in terms of their cradle-to-gate CO2e emissions (from the point of production to the point of the product reaching the factory gate [or factory gate equivalent]). The decision to use DEFRA's *Table 13* was based upon several reasons. Firstly, the database consists of an appropriate number of economic sectors (106, which are categorised by Standard Industrial Classification [SIC]) within which participants' possessions can be categorised. The accuracy of an EE-IOA has been shown to increase with the number of economic sectors included within the model, as this enables a greater number of production technologies to be considered (Lenzen, 2011; Wiedmann *et al.,* 2007). Importantly, this categorisation by SIC enabled a

comparison to be made with UK households via supply and use tables (more on this in *4.3.4.4.*). Adopting a hybrid approach by supplementing more accurate measurements of certain embodied materials when those measurements were available (using information from other frameworks, e.g. the Embodied Energy and Carbon theoretical framework) would have interrupted this process of comparison between the shared living communities and the average household, as such specific information is not available via supply and use tables. Secondly, DEFRA's *Table 13* has multipliers which account for taxes, subsidies and distributor's margins, thereby negating the need to remove these from the data submitted by participants (Skudder *et al.,* 2016): a process which would have been highly difficult and time-consuming. Thirdly, unlike other databases, DEFRA's is UK-specific, and so is likely to have a more relevant application to UK-based items (although it is acknowledged that not all items will have been manufactured in the UK). Finally, this database has been successfully utilised by other research studies to measure the carbon footprint of the impact of crime (Skudder *et al.,* 2016), the NHS (NHS SDU, 2010) and UK Central Government departments (Wiedmann and Barrett, 2011).

To measure their indirect impacts, participants estimated their household's average yearly expenditure on private possessions (see *Appendix* 15.4.3. for the survey). These possessions were categorised and mapped onto the SIC, which make up the categories of DEFRA's *Table 13* database. The value of these possessions were converted into CO2e figures using the conversion factors of *Table 13*. For example, a participant might input that they spend £100 per year on games and toys. Games and toys are listed within the SIC category 32: 'Other manufactured goods', which has an EE-IOA conversion factor of 0.45. Therefore £100 is multiplied by 0.45 to calculate the amount of CO2e in kilograms that results from the manufacture of £100 of games and toys: in this case, it is 45KG. For a small selection of items, participants were asked to approximate their expenditure per month (e.g. for clothing, cleaning products and newspapers). As the majority of household fittings and furnishings are purchased on a less frequent basis, for the majority of items in the survey, participants are asked how often they buy that item, and how much they spent on that item last time they bought it. Using these two pieces of information, yearly expenditure on that item is calculated, e.g. if a participant buys a television every ten years, and last time they bought a television they spent £500, then their yearly expenditure on that television is £50 (which, as the conversion factor for electronics is 0.41, equates to 20.54 KGs of CO2e). This method was arrived at through ideation, testing, feedback and iterative development with mentors and colleagues. The survey was then pilot tested by five individuals. Their feedback then led to some adjustments to

increase ease of use, as well as some advice which informed the induction to the survey for participants who professed to be unfamiliar with the technology being used.

The expenditure on communal possessions over the last year also had to be obtained. With Canon Frome Court cohousing this was a reasonably straightforward process, as records had been kept. I was given access to the community's accounts, and could categorise the purchased items into the SICs, then attributing *Table 13's* conversion factors to them to produce a CO2e measurement. In the case of LILAC cohousing, the process was more complex. Maintenance records did not differentiate between costs of parts and costs of labour. Therefore, I had to research costs of parts and estimate LILAC's purchase costs based upon this. Liquid Monastery coliving had no communal purchases, as the two lead tenants had provided the furniture (which was included in their expenses). The Vale community living did not complete this part of the survey (more on this when discussing challenges and limitations of this approach).

To find the total CO2e measurement for the community in question, the monetary values of the private possessions of participating households was firstly converted into CO2e using the appropriate multipliers. Then these CO2e measurements were added together and then divided by the number of participating households (for cohousing) or residents (for community living/coliving) in order to come up with a mean average per household (cohousing)/per resident (community living/coliving), which represented the average household/resident for the entire community. Inversely, the CO2e derived from the monetary value of the communal expenditure was divided by the number of households (cohousing)/residents (community living/coliving), to represent the environmental impact of communal space per household/resident. These two figures were then summed to produce CO2e values across the different SIC categories that represented a mean average of each household/resident.

This CO2e measurement was summed with the average CO2e emissions produced by the data gathered on direct impacts. This gave the average CO2e emission per household within each community. All data was normalised to be representative of 2.4 people (the average size of a UK household).

4.3.4.3.1. Assumptions, limitations and challenges

The EE-IOA approach is an established and well-described model, which can be applied at many different levels of consumption and production, such as households, lifestyle types, regions, and

nations (Wiedmann, 2009). Similarly, DEFRA's *Table 13* database provides a useful framework for estimating direct impacts, which is designed for businesses to use (DEFRA, 2017). However, both approaches to measurement of environmental impacts carry a number of assumptions and limitations.

A major limitation of the data being used to measure indirect CO2e emissions is that it only accounts for two regions: the UK, and the rest of the world. There is an assumption that the production processes of countries other than the UK are homogenous (Manfred, 2008), therefore emissions coefficients from countries other than the UK have been averaged, and a loss of detail is likely to have occurred (Skudder *et al.,* 2016). As Wiedmann (2009) points out, the complexity of production processes is immense, with many imports from one country in fact being produced from a number of different countries which have different production structures. Furthermore, within countries, production processes, which include input requirements, the commodity produced and the resulting emissions (Skudder *et al.,* 2016) will also differ. This assumed homogeneity of production processes and resulting emissions is an overriding limitation of EE-IOA (Skudder *et al.,* 2016).

The tools used for both direct measurement and indirect measurement take a top-down approach, meaning that data from multiple producers is aggregated to produce average emissions (Majeau-Bettez *et al.,* 2011). For example, DEFRA's database on direct emissions bases the emissions caused from a bus journey on the average number of passengers on a UK bus and the average amount of fuel consumed by a bus (Hill *et al.,* 2017). DEFRA (2014) in fact advises that their EE-IOA data is intended a 'high-level diagnostic tool for initial scoping/estimating', and suggests that if more specific information about the supply chain emissions of particular products are available then users should make use of these instead. As previously mentioned, this hybrid approach has not been taken, as this would have detracted from the ability to conduct a comparison the average UK household. Aggregation also occurs through the combining of different processes constituting an industry category (Majeau-Bettez *et al.,* 2011). DEFRA's *Table 13* condenses all economic activities into 106 categories, making it effectively blind to measuring individual products (Majeau-Bettez *et al.,* 2011). This means that any efforts that participants make to purchase "green" products is discounted by this survey. As it was found that participants did indeed go to some effort to purchase environmentally sustainable products, this indicates that the resulting CO2e figure will potentially be higher than participants' actual CO2e impacts. However, if anything, if the CO2e figure of a shared living household is found to be lower than that of the average household, this may lend more credibility to the overall result, as it will be a "high" estimate.

A further limitation of both the direct and indirect measurement methodologies is that the emissions of each industrial sector are assumed to be proportional to the inputs (Skudder *et al.,* 2016). Furthermore, it is assumed that monetary value is proportionate to production output (Manfred, 2008), with economies of scale not being taken into account (Druckman and Jackson, 2010). Nor are accumulating or depleting stocks accounted for, and nor is the influence of black markets (Skudder *et al.,* 2016).

The data used for DEFRA's *Table 13* is generally collected from surveys, and therefore is subject to risks of sampling error, coverage error, non-response error, measurement error, missing/incomplete data, response bias etc. (Manfred, 2008; Skudder *et al.,* 2016). It should also be noted that the survey does not account for inflation or the changing value of items.

The data from participants also relies on estimates, so will contain some level of error, and answers may also have been influenced by social desirability bias. Participants were asked for estimates of expenditure and not proof of actual expenditure, as it was felt that the labour involved in checking or ascertaining expenditure records would lead to participant fatigue and incomplete data. Indeed, as mentioned, residents in The Vale community living did not fill out this part of the survey as they felt it was too labour-intensive, though the majority of participants found this survey straightforward to fill out. This method of basing environmental measurements on participant estimates is not unique: in their EF measurement of food, Tinsley and George (2006) asked participants to estimate different types of food by expenditure or weight; and Underwood and Zahran (2015) and Fremstad *et al.* (2018) used secondary expenditure data which was based on estimations to calculate GHGs. That said, I could not found any prior research which explored how accurate people are when estimating their expenditure, and so I conducted a small experiment where participants[16] first estimated their expenditure on various household items, and then were randomly allocated five items on that list for which they were required to look up their actual expenditure, providing proof through the form of a receipt or equivalent proof of purchase. I then compared their estimates with their actual expenditure to see how accurately expenditure was predicted.

[16] These participants did not take part in any other aspect of the research, and were not residents of shared living communities.

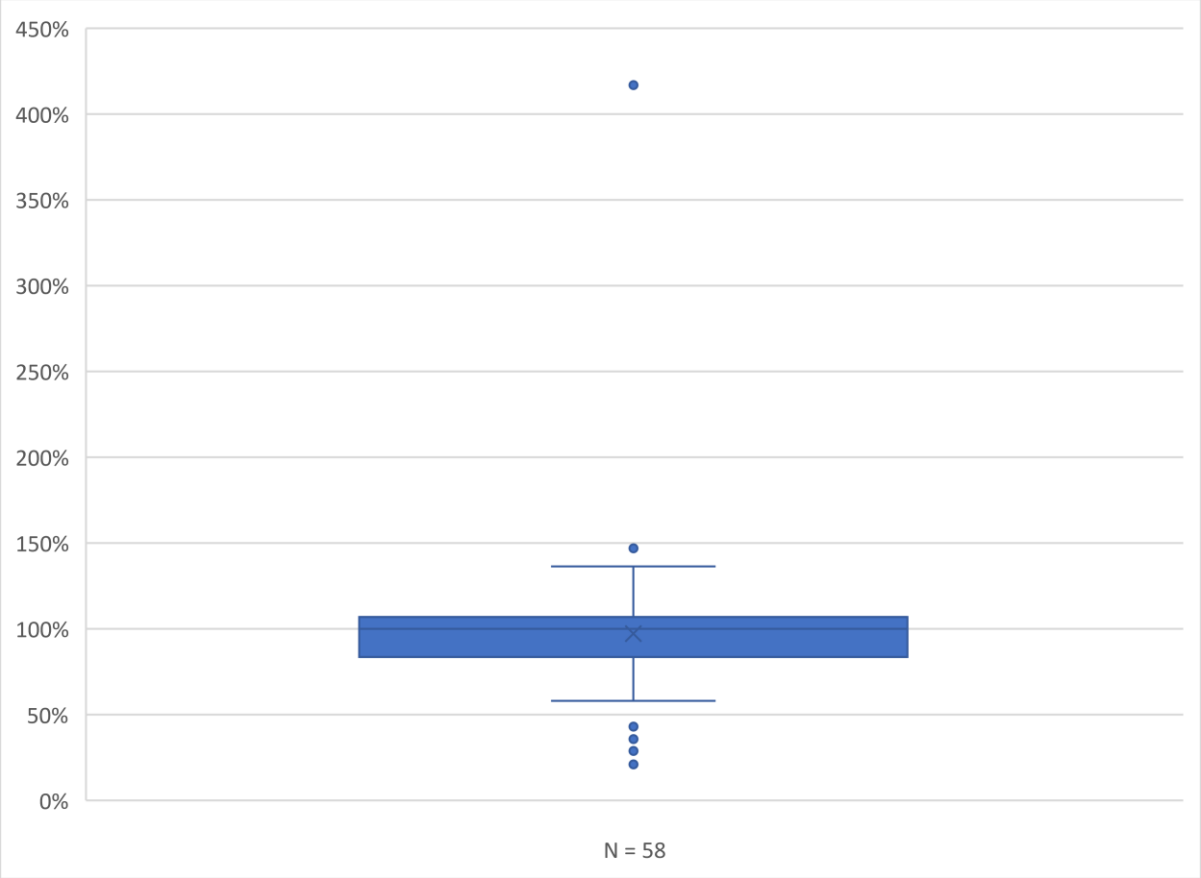


Figure 4-5: Difference between actual expenditure and predicted expenditure

Figure 4-5 shows that of the 58 estimations made for the cost of household items, participants tended to slightly underpredict how much they spent. On average, participants underestimated the cost of an item by 3 percent, with the lower and upper bounds of a 95 percent confidence interval of ± 12.98 (lower interval = 84.1, upper interval = 110.1 percent respectively). This was not found to have a significant impact on the results. See *Appendix 15.7.* for details. There was no significant difference between how accurately participants estimated expenditure for items above £1000, items between £999-£100 and items below £100. Participants did tend to be worse at predicting the cost of more frequently purchased items which ostensibly have lower salience (e.g. clothes and shoes), compared with less frequent, one-off purchases (e.g. cars, sofas, fridges). It is worth noting that the majority of items within the survey were one-off purchases.

This experiment did not show how accurately people predict how often they buy certain items, which also played a factor in calculating a yearly CO2e figure. Plus, it should be noted that participants in this experiment could still have made an error, for example, through accidental

omission of additional purchased items. Yet, this experiment does provide some proof that people tend to be capable of reasonable estimates of their expenditure.

4.3.4.4. Comparison of the shared living communities' CO2e with the equivalent CO2e for an average UK household

To contextualise the measurements of CO2e from the shared living communities, a comparison figure of the CO2e emissions from an average UK household were constructed using secondary data. The types of secondary data gathered were as similar as possible to the types of primary data gathered from the communities, in order that the same DEFRA CO2e multipliers could be used across both, e.g. Kwh for gas and electricity, KGs of food, vehicle type and mileage etc.

The use of secondary data was suitable for two reasons: firstly, because it enabled the sourcing of *average* CO2e emissions for UK households, meaning that the communities' CO2e could be meaningfully compared with an average household. Secondly, this approach was more practical than conducting additional fieldwork with single-family households, which would have been time-consuming, and would have taken focus away from conducting fieldwork with shared living communities. A limitation of this comparison is that it is only quantitative, and I am not gaining an academic insight into single-family household pro-environmental practices, although there is existing literature on this topic (see for examples Burchell *et al.,* 2016; Collins, 2015; Hargreaves *et al.* 2008; Reid *et al.,* 2015; Waitt *et al.,* 2012).

See *Appendix 15.6.1.* for details of the secondary data sources for each CO2e emissions category. *Appendix 15.6.2.* details how the data gathered was converted into CO2e.

4.3.4.4.1. Assumptions and limitations

In this section I discuss some broad assumptions and limitations. A detailed case-by-case list of assumptions and limitations can be found in *Appendix 15.6.2.*

With most categories, the methodology for obtaining the average household comparison figure and the case study measurement was essentially identical. However, for some categories the methodology for obtaining the comparison figure and the case study figure were different. For example, in the case of waste, community participants weighed their waste, whereas to obtain the comparison figure total amounts of UK waste by weight and processing method were cross-referenced with percentage of waste generated by households in order to produce average CO2e

emissions. These differences in methodology make a comparison less valid (as mentioned, details of this can be found in *Appendix 15.6.2.*).

Whilst attempts were made to source recent data, some data sets used are several years old (in particular, the data used for aviation statistics was gathered in 2011). This makes comparisons less valid, as UK practices, technologies and therefore CO2e emissions may have changed since that data was gathered.

One limitation of the comparison figure constructed is its lack of granularity. Arguably, the comparison could have been more meaningful if it reflected certain attributes of each community. The most important unacknowledged factor is wealth. Studies have shown that there is a positive correlation between income and emissions (Baiocchi *et al.,* 2010; Buchs and Schnepf, 2013; Brand and Boardman, 2008; DEFRA, 2008; Druckman and Jackson, 2008; Fahmy *et al.,* 2011; Gough *et al.,* 2011; Weber and Matthews, 2008), and so a figure that reflected the wealth of each community would have provided a more meaningful comparison for their emissions. However, the lack of available data and methodological complexities in categorising levels of wealth meant that I decided against this type of categorisation.

Another factor which I considered was whether to construct different figures for rural and urban households, so that Canon Frome Court, a rural cohousing community, could be compared with an average rural household. Rural households are more likely than urban households to belong to the highest emissions quartile (Buchs and Schnepf, 2013) largely due to private transport emissions. Therefore, it can be argued that such an approach offers a more like-for-like comparison. However, questions arise here as to how certain (emission-emitting) factors enable the shared living case studies to exist as they do. For example, the rurality of Canon Frome Court is what enables the community to have enough land to grow and produce so much of their own food. In an urban area acquisition of 40 acres of land would have been unaffordable and most likely, unavailable. Therefore, the use of private transport (and the high level of emissions that comes with it) is a "payoff" of having sustainable food production. Based upon this, comparison with a rural household would not acknowledge this payoff. To give one further example, a similar debate may be had with The Vale community living's heating bill. The Vale rented a large Victorian house which was poorly insulated. Their gas consumption for space heating was therefore much higher than that of a new build, and their status as renters prevents them from improving the insulation of the property. It could be argued that their gas consumption should be compared to that of a similar property.

However, their ability to live together as a community relied upon being able to rent a large enough property within a certain area of London – in which case, their poorly insulated home can be conceived as a "payoff" of their community being able to exist.

This decision to not make the comparison figure more granular also reflects the focus of this research and shapes the nature of the quantitative results. For research which is qualitatively focused, it was felt that one comparison figure would serve well in broadly contextualising the emissions from the shared living communities.

4.3.5. The research process: iteration and evolution

Whilst *Figure 4-1* in Section *4.3.* depicts the research aims, and stages of gathering and analysing data as linear and siloed, these stages were in fact overlapping and iterative. Each stage affected, and was affected by, other stages, and evolved throughout the research. This section describes some key ways in which these different stages overlapped, impacted one another, and evolved.

Fieldwork played an important role in shaping the evolution of the research aims and objectives. Prior to fieldwork, aims and objectives were centred around pro-environmental practice transitions within shared living. During the first period of fieldwork with Canon Frome Court cohousing, it became apparent that how things *were* was just as, if not more interesting, than how things changed. Indeed, given the two-week fieldwork period, change was difficult to observe. Interviews and documentation were the main sources of information to understand transitions. Transitions could therefore most often be explored as artefacts, related or recorded. Whereas, there was a wealth of living data to be gathered via observation on current practices and routines. As this first case study community ran a working farm, there was much to be learned about the shared work of community, the interconnectedness of practices, as well as the "mess" of conflicting meanings which were attached to those practices. This laid a groundwork for themes which would later come to the fore during analysis. Fieldwork with Liquid Monastery coliving occurred almost a year after fieldwork with Canon Frome Court cohousing, and caused another shift in focus. Liquid Monastery was an urban, seven-person flat. Within Liquid Monastery, focus was naturally drawn to the relatively small space that residents shared, as well as the negotiation of shared objects and amenities. This caused data from prior fieldwork to be analysed in light of this focus. Overall, fieldwork was an important part of the emergent process of the research, with data from the field impacting the focus of ongoing fieldwork and the analysis of previously gathered data.

Part of the fieldwork also involved feeding back the quantitative data gathered to the communities. In part, this was done as communities were interested to know the outcome of their quantitative environmental measurement. However, this exercise was also extremely valuable in validating and deepening my understanding of the data. Participants were able to provide a "sanity test" of the results, confirming their validity. This was particularly useful for Canon Frome Court cohousing, where there was a smaller sample than desired (as discussed in *4.3.4.2.1.*). Sharing the results also prompted reflection on the infrastructures and practices underpinning the environmental outcomes, and so became a form of semi-structured interview, and a valuable way to gather additional qualitative information. It serves as an example of how a feedback loop in the research can enhance the validity and depth of the results.

The quantitative results also impacted my own understanding of the qualitative data. For example, viewing the per person efficiency of heating-related energy in the coliving and community living case studies helped in developing my ideas around sharing space being a pro-environmental practice.

As discussed in *4.3.3.5.*, qualitative data analysis was undertaken throughout the research process. As fieldwork was staggered (see *Figure 4-2* in Section *4.3.* for a timeline), this included periods of analysis between fieldwork. Data was revisited and re-analysed as new directions were discovered, due to new directions discovered during fieldwork. Topics which emerged from the data, such as the work of community, and tools for conflict management and governance, were only at a late stage conceptualised under the theme of "sharing", and so were reviewed within the context of this framework. This iterative process of reviewing the data enabled me to shift my focus from what I ostensibly perceived as "pro-environmental practice" (e.g. cycling, lowering meat consumption, recycling waste), to reframe other practices, such as negotiating shared space and engaging in joint governance, as being pro-environmental within the shared living context. It was only through lengthy explorations and re-explorations of the qualitative data that these ideas began to emerge. The emergence of these ideas then required a revisit to the literature, to incorporate concepts of sharing into the literature review and data analysis. It also meant that research aim one was reframed around the concept of sharing. The process of qualitative data analysis therefore resulted in the entire reframing of the thesis around the concept of sharing.

Data analysis also prompted me to critically engage with how to categorise shared living typologies. Originally, I had planned to explore cohousing and coliving communities (and not community living). The Vale and the Buddhist Centre were originally referred to as examples of "coliving" (and indeed,

these and similar communities have been labelled as “coliving” by shared living stakeholders). However, upon analysing the data, I realised that the differences in governance between Liquid Monastery coliving (top-down governance) and The Vale and the Buddhist Centre communities (bottom-up governance) were so significant, that it would be remiss to categorise them under the same community typology. This led me to revisit and interrogate the literature on community typologies, and spend time refining my definition of coliving, plus create a novel definition for The Vale and the Buddhist Centre: community living. Definitions of the case study communities therefore evolved during analysis. This led to a contribution to the literature in terms of defining different community typologies. Plus, the significance of top-down vs. bottom-up shared living communities were explored as part of the analysis.

A research process which has allowed for iteration, flexibility and evolution of the research topic, has been vital in enabling results which bring together deductive and inductive approaches; and has enabled exploration and discovery of what is significant about social networks, shared living and environmental sustainability.

Chapter 5. Introduction to the findings

This chapter provides an introduction and framing to the findings chapters (chapters 6-10). It begins by outlining the approach taken to defining environmental sustainability within shared living communities. It argues that the concept at the heart of this topic is sharing, in particular the sharing of resources, endeavour, and pro-environmental meanings and practices. Therefore, understanding the processes of negotiating these shared elements is a meaningful way in which to understand pro-environmental practices and infrastructures within shared living. This chapter also frames the quantitative findings on the GHG measurements in this research as firstly, being inherently valuable given the need to lower domestic emissions, and secondly, providing a useful context in discussing the qualitative results. The chapter then gives an overview of the case study communities. Finally, the chapter ends by giving an overview of the findings chapters, explaining their ordering.

5.1. The approach to environmental sustainability in this research

This research posits that a useful way to understand environmental sustainability within shared living communities is through exploring the processes of negotiation around what is shared. At the heart of community is the idea of sharing. What is shared depends upon the type of community. Communities may share geographical space, demographic similarities, certain interests, beliefs or activities. In the case of shared living communities, a group of people are sharing a home. This includes the sharing of certain resources, which may consist of indoor and outdoor spaces, furniture, objects, food, and utilities such as heat and light. This sharing of resources is likely to have pro-environmental outcomes, as resource consumption is lowered when resources are shared. When exploring environmental sustainability within shared living this became a place to start. What

physical resources are shared, and how? This is explored in *Chapter 9*, which investigates how the sharing of materials and spaces are negotiated.

More than simply increasing their resource efficiency, the people that are living together are sharing a home because to some extent, they want to be part of each other's lives. This can be manifested in multiple ways, from shared presence and social activities, to endeavour (the shared work of community), to shared meanings and rules ("house rules"/"community culture"). The pro-environmental outcomes here are present, though more nebulous. While resource efficiency may be an outcome (e.g. eating meals together might lower food packaging and energy used to cook) there is a social element too. The social bonds created through shared presence may lead to the spreading or deepening of pro-environmental social norms or the sharing of pro-environmental know-how. Agreements on meanings and doings may include pro-environmental policies or values. The ability to combine time, know-how and resources may enable the completion of pro-environmental projects which would be out of reach for a single person or single household. This research has investigated what meanings and doings were shared, and how. This is explored in *Chapter 7*, which investigates shared meanings around environmental sustainability, and *Chapter 10*, which looks at the endeavour of community.

In coming to understand more about how communities were sharing physical resources and pro-environmental meanings and doings, it became apparent that these elements of environmental sustainability within the communities were deeply intertwined with what the community *is.* The community consists in shared resources, meanings and doings, and so how it coordinates to negotiate these types of sharing forms part of the picture for this research. This is mainly discussed in *Chapter 8*, which explores how communities coordinated their decisions and managed interpersonal conflicts, and is in part covered by *Chapter 7,* which looks at the agreement of shared meanings within communities.

Quantitative data on the GHG emissions of communities approaches environmental sustainability within shared living communities from a different perspective. These previously discussed topics view environmental sustainability as a part of holistic life within the communities, deeply intertwined with the meanings and social worlds of residents, which must be continuously negotiated with one another. The quantitative data in this research isolates certain emissions types, quantifies their attached GHGs and makes simplistic observations about what practices are attached to these different emissions. Given the importance of lowering GHGs relating to the home (CCC,

2019), these findings have an inherent value in offering some data on whether shared living communities may provide a more environmentally sustainable housing solution in the UK. Beyond this, they also offer an interesting context and counterpoint to the qualitative data, prompting questions such as: to what extent do shared meanings, doings and resources impact overall GHGs? What "matters" when we think about environmental sustainability in housing? To what extent is it the emissions, and to what extent is it the meanings and doings that residents share, and their impacts, which may not be acknowledged by the quantitative measurements of this research? The qualitative and quantitative data can be used to interrogate one another. *Chapter 6* displays the quantitative data, and Section *11.3* discusses this question of what "matters" when it comes to sustainable housing.

The next section gives an overview of the communities which took part in this research. Overall, three cohousing communities, two community living and one coliving community took part in the research. Two cohousing, one community living and one coliving community took part in quantitative GHG measurement, observation, image/document analysis and interviews (these were Canon Frome Court cohousing, LILAC cohousing, Liquid Monastery coliving and The Vale community living). For Springhill cohousing and the Buddhist Centre community living, visits and focus groups were conducted.

5.2. The shared living communities

5.2.1. Canon Frome Court cohousing

Canon Frome Court was a cohousing community situated in a rural location in the South West of England. Their community was home to approximately 40 adults and ten children. They lived in a large Georgian manor house which had been converted into 22 self-contained owner-occupied homes (referred to as "units"), and all residents were part of a housing association. As well as these private units, there were communal areas, including two communal kitchens, meeting spaces and workspaces. They also had 40 acres of land on which they collectively ran an organic farm, which they used to produce much of their own food, including fruits and vegetables, dairy produce and meat. Food production was what brought the community together in a sense of shared endeavour. Residents were a mixture of retirees and those who worked, couples, single people, and families. The adults tended to be over forty, and all were white British, and university educated.

Figure 5-1: Images of Canon Frome Court cohousing

Starting top-left and going clockwise: the main building and carpark, one of the communal kitchens known as the "dairy kitchen", chickens, and the "walled garden" where much of the fruits and vegetables were grown.

5.2.2. LILAC cohousing

LILAC was a cohousing community based in Leeds, roughly four miles from Leeds city centre. Their site spanned ¾ of a hectare of land, and they had 20 households, ranging from one-bed flats to four-bed houses, with a total of 50 people. They had a common house with a kitchen and flexible meeting space, a meeting room, bathroom and an office. The community were comprised of couples with young children, and couples/single people both retired and working. Compared to Canon Frome Court, the demographic was generally slightly younger. It seemed that the majority, if not all, were university educated. There was some ethnic diversity, though residents are mainly white. Their name, LILAC, was an acronym for 'low impact living affordable community', which summarised their community values. The community owned their homes via an MHOS (mutual home ownership society) whereby the whole community pays a joint mortgage, and all paid a maximum of 35 percent of their earnings towards it, keeping mortgage payments affordable.

Figure 5-2: Images of LILAC cohousing

Starting top-left and going clockwise: LILAC buildings and communal outdoor space, the allotments, LILAC's straw bale insulation and the ground floor common house.

5.2.3. Liquid Monastery coliving

Liquid Monastery was a coliving community based in Dalston, London. There were seven people renting a four-bedroom flat. The two managing residents (a married couple) had retrofitted the interior of the flat, adding in more bedrooms to sub-lease the space (they had gained agreement from their landlord to carry out this work). They took responsibility for managing utilities, providing furniture and amenities, and took the lead in sourcing other residents (although all residents had a say in new house-mates). The shared spaces consisted of two bathrooms, one living space and one kitchen. The residents were aged between late-twenties to mid-to-late thirties, with three males and four females. They were an international mix, with three British, two Spanish, one British-Italian and one Argentinian-Portuguese. All had careers which required a high level of qualification: there was a quantity surveyor, two architects, a management consultant, doctor and a graphic designer.

Figure 5-3: Images of Liquid Monastery coliving

Starting top-left and going clockwise: Liquid Monastery's shared living space, shared kitchen, kitchen counter-top, and shared bathroom.

5.2.4. The Vale community living

The Vale was a six-person community living residency in Clapham, London. The residents rented a four-bedroom, four-storey semi-detached Victorian house. The shared space consisted of one bathroom and an additional toilet, a kitchen, a garden and a large living area, which could be separated into two living areas via a folding door. The household was made up of three males and three females, with two couples and two single people. Residents were in their thirties and early forties, were university educated and were almost all white. There were three psychotherapists, a civil engineer, a mental health worker and a master's student.

Figure 5-4: Images of The Vale community living

Starting top-left and going clockwise: The Vale's kitchen, their TV room, community blackboard, and living room.

5.2.5. Springhill Cohousing

Springhill Cohousing was a cohousing community based in Stroud. There were 34 homes, ranging from five-bedroom houses to one-bedroom flats. Most were owner-occupied, with some available to rent. All residents also had shares in a three-story common house, which included a kitchen and dining space, workshop and living area. There were also shared outdoor spaces. Approximately 85

people lived in the community, with the majority of people tending to be over forty. Residents tended to be white and middle-class.

Figure 5-5: Images of Springhill Cohousing

Starting top-left and going clockwise: The common house and resident homes, resident homes, the communal laundrette, and the interior of the second floor of the common house.

5.2.6. Buddhist Centre community living

The Buddhist Centre community was a six-person coliving community based in Tower Hamlets, London. This was a female-only community for practicing Buddhists. The homeowner was the London Buddhist Centre, which residents rented from at an affordable rate. The London Buddhist Centre owned several properties, which it let to its members, and so this coliving community was part of a network of Buddhist communities in London. The youngest resident was in her late twenties/early thirties, and the oldest resident may have been in her sixties or seventies. Most residents were forty and over. Residents were mostly white, some were retired, and of those who were working, jobs included a receptionist, a yoga teacher and a piano teacher.

(No photographs were taken of this community.)

5.3. Order of the findings chapters

The findings chapters are ordered to build an understanding of environmental sustainability in shared living in a helpful way. However, they do not offer a "step-by-step" guide to the topic. What is being investigated by this research are complex and dynamic social phenomena that interconnect process, practice, physical objects and social worlds. The holistic nature of the topic means that, for example, isolating meanings from doings would be reductive, as would positing one as coming before the other. Therefore, the chapters do not attempt to order how environmental sustainability "happens" within communities, but they do offer a loose progression of ideas to help the readers orient themselves.

The chapters begin with *Chapter 6*. This chapter shows the overall GHG emissions of each community, with the emissions from an average UK household as a comparison point. It also breaks these emissions down into five emissions streams: energy and water, food, transport, purchases, and waste, and discusses the materials, infrastructures and practices which conceivably explain these emissions. By placing this chapter first, the information in the following chapters can be understood within the context of the communities' GHG emissions.

Next, *Chapter 7,* looks at how meanings (and resulting practices) of environmental sustainability are negotiated within communities. This chapter begins with an examination of co-created expressions of a community-wide interest in environmental sustainability (e.g. documented community values/agreements). This is intended as a useful starting point to understand how important environmental sustainability is to the communities as a shared meaning.

The following chapter, *Chapter 8*, continues this focus on social networks (as opposed to the sharing of physical things). Though, it shifts from concentrating on meanings to instead look at processes, by exploring how communities coordinate the sharing of resources, projects and practices.

The examination of shared meanings in *Chapter 7* and coordination in *Chapter 8* are intended to give a grounding for what the communities are "about" and how they function. What follows, *Chapter 9* looks at the physical things which are shared within the communities. The sharing of these physical things should not be automatically regarded as the *result* of shared meanings or as necessarily enabled by communicative and governmental tools, but in part the placement of this chapter is to acknowledge that for some materials and spaces this may be the case.

The final findings chapter, *Chapter 10*, explores the shared work of community (referred to as "endeavour"). Endeavour is embedded within community life, and mentions of endeavour are interspersed throughout the preceding chapters. Devoting a chapter to this topic is intended to signal its importance as a phenomenon which enables pro-environmental outcomes in a multitude of ways, as well as an acknowledgment that endeavour is a central part of what community living and cohousing communities consist of. Its placement as the final findings chapter, despite its almost ubiquitous role in community life, is due to exploration of the concept of emergence when discussing this topic. Emergence can be defined as possession of properties or capabilities that extend beyond the individuals which make up the whole (Elder-Vass, 2010). In different respects this is a concept which has been explored throughout *chapters 7-9*: what are the pro-environmental outcomes from shared meanings, doings, processes and resources? Yet this chapter confronts this question more directly. Its placement at the end of the findings chapters reflects that emergence has the quality of being a result of something (the sum of its parts, plus something more).

Chapter 6. GHG emissions

This chapter looks at the quantitative results of this research. It begins by showing a quantitative overview of the GHG emissions (measured in carbon dioxide equivalent [CO2e]) of the shared living case studies, using an average UK household as a comparison. It is shown that all case studies have significantly lower household CO2e emissions than the average UK household (with CO2e emissions ranging between 32-67 percent of an average UK household). It then goes on to look at each different emissions stream (energy and water, food, purchases, transport and waste), outlining some of the practices which contribute to the CO2e attached to each of these streams. This chapter focuses on quantitative outcomes, whereas chapters 7-10 explore community practices relating to environmental sustainability and lowering CO2e emissions in depth.

6.1. A summary of CO2e emissions

In this chapter the key results of the quantitative data are summarised. The case study communities are compared with each other and with an average UK household. To enable a meaningful comparison, data from case studies have been normalised, and represent a household of 2.4 (the national average household size during the period of this research) (ONS, 2017a; ONS, 2021).

Emissions are measured in carbon dioxide equivalent, known as CO2e. With CO2e, CO2 (the main GHG, which accounts for approximately two thirds of global warming [Wright *et al.,* 2011]) plus six other GHGs are measured in terms of their global warming potential (GWP) when compared with CO2. This means that information on GHGs is displayed in an easy-to-comprehend format. CO2e is typically constructed of seven gases which cause global warming (Brander and Davis, 2012). Further information on the use of CO2e can be found in *4.3.4.1.*

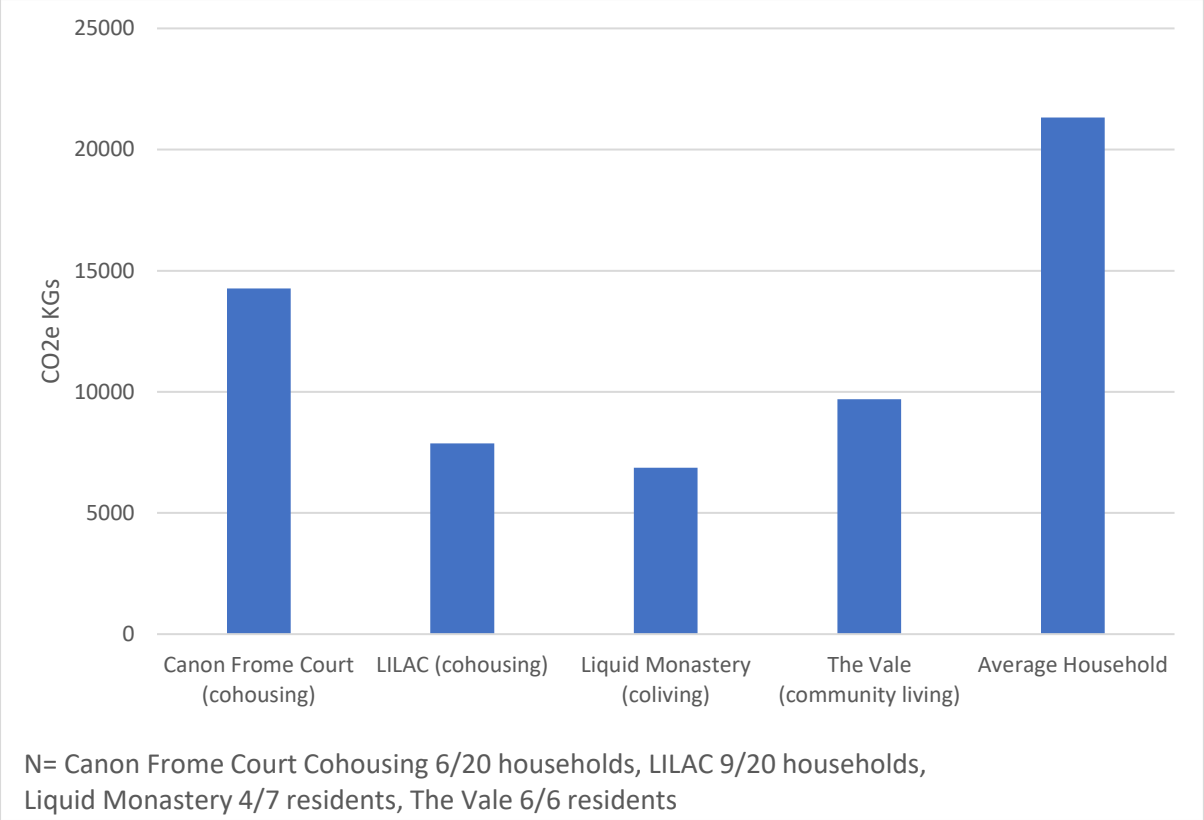
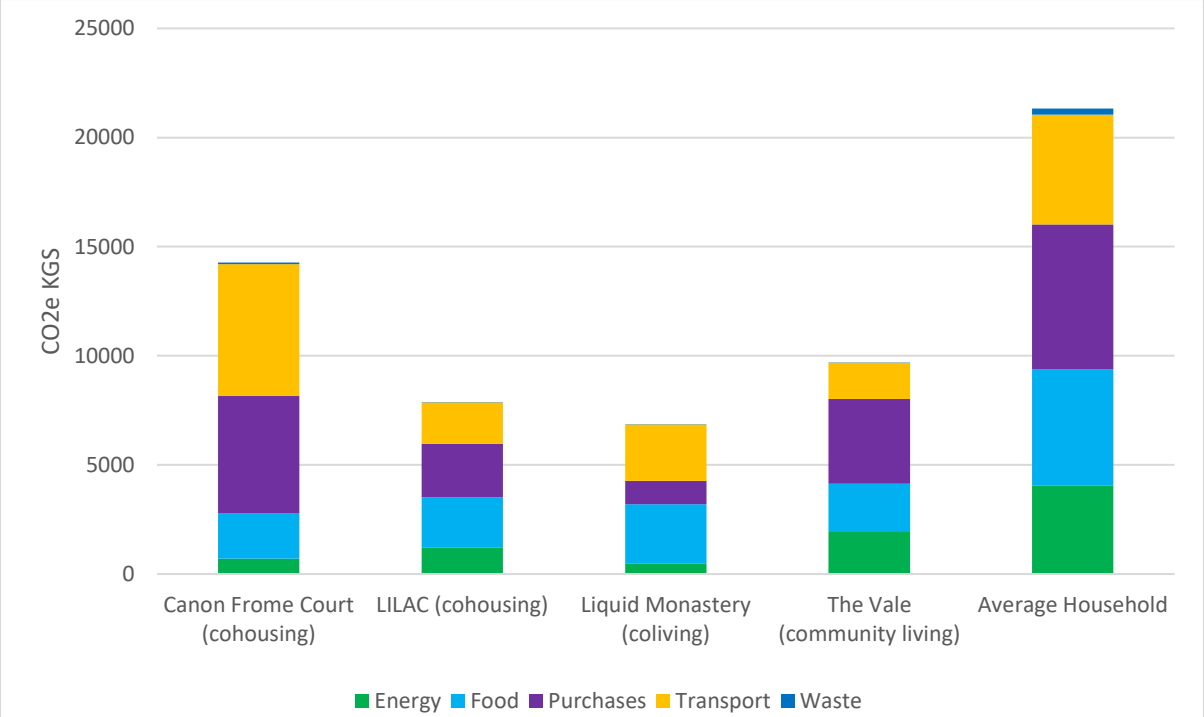


Figure 6-1: A comparison of case study communities and UK average household CO2e emissions per year[17]

Figure 6-1 shows that all communities were found to have significantly lower CO2e emissions than the average household. Liquid Monastery coliving was found to have the lowest emissions of all, at 32 percent of the average household. This was closely followed by LILAC cohousing, at 37 percent, The Vale community living at 45 percent, and Canon Frome Court cohousing at 67 percent.

[17] The Vale did not submit data estimating their purchases, therefore an estimate has been used in figures 18/19. This estimated figure has been obtained through finding the mean average between the other three communities and the average UK household. The Vale's actual emissions arising from purchases is likely to be lower than the estimated figure, as residents shared furniture, amenities and objects, reported mainly purchasing second-hand items when furnishing their home, and expressed anti-consumerist attitudes.



N= Canon Frome Court Cohousing 6/20 households, LILAC 9/20 households, Liquid Monastery 4/7 residents, The Vale 6/6 residents

Figure 6-2: Breakdowns by emissions stream[18]

Figure 6-2 shows the overall CO2e KGs for the four case study communities broken down by each emissions stream, with an average UK household as a comparison point.

Below is a brief explanation of the quantitative results for each community.

6.1.1. Canon Frome Court cohousing

Canon Frome Court households have lower CO2e emissions than the average household across all emissions streams aside from transport. Their high transport emissions are due to their rural location, which meant a reliance on private transportation. Their low energy impacts are due to energy-efficient infrastructure, such as their biomass boiler district heating system and solar panels. Their food impacts are also significantly lower, as they grow and produce a significant proportion of their own food. Low emissions from waste are due to minimising waste and careful recycling practices.

[18] The Vale did not submit data estimating their purchases, please see previous footnote for details.

6.1.2. LILAC cohousing

LILAC's CO2e impacts are lower than the average household across every measured emissions stream. Their energy emissions are particularly low due to the high standard of insulation in their homes, some electricity being obtained through PV, and energy-saving practices. Low food-related emissions are mainly due to low-meat diets, and low emissions from purchases are due to practices of sharing, buying second-hand, mending and "making do". Low emissions from waste are due to minimising waste, careful recycling practices and Leeds Council's waste management processes.

6.1.3. Liquid Monastery coliving

Liquid Monastery's CO2e emissions are lower than the average household across all emissions streams. Their energy-use is lower mainly due to the high density of their household. Minimized purchases are a result of their rental tenure status, density (less room to store extraneous items) and practices of buying second-hand and "making do". The majority of their transport emissions are due to aeroplane flights, as they otherwise mainly rely on cycling and public transport. Their waste emissions are low due to waste-minimising practices, careful recycling and Hackney Council's waste management processes.

6.1.4. The Vale community living

The Vale's CO2e impacts are lower than the average household's impacts across all measured emissions streams. The Vale's lowered food impacts is mainly due to their mostly vegetarian/vegan diet. Their transport emissions are low as they cycle and take public transport. Their waste emissions are low due to careful recycling coupled with practices Lambeth Council's waste management processes.

In the following *sections 6.2-6.7*, each different waste stream will be explored in more detail.

6.2. Heating and electricity

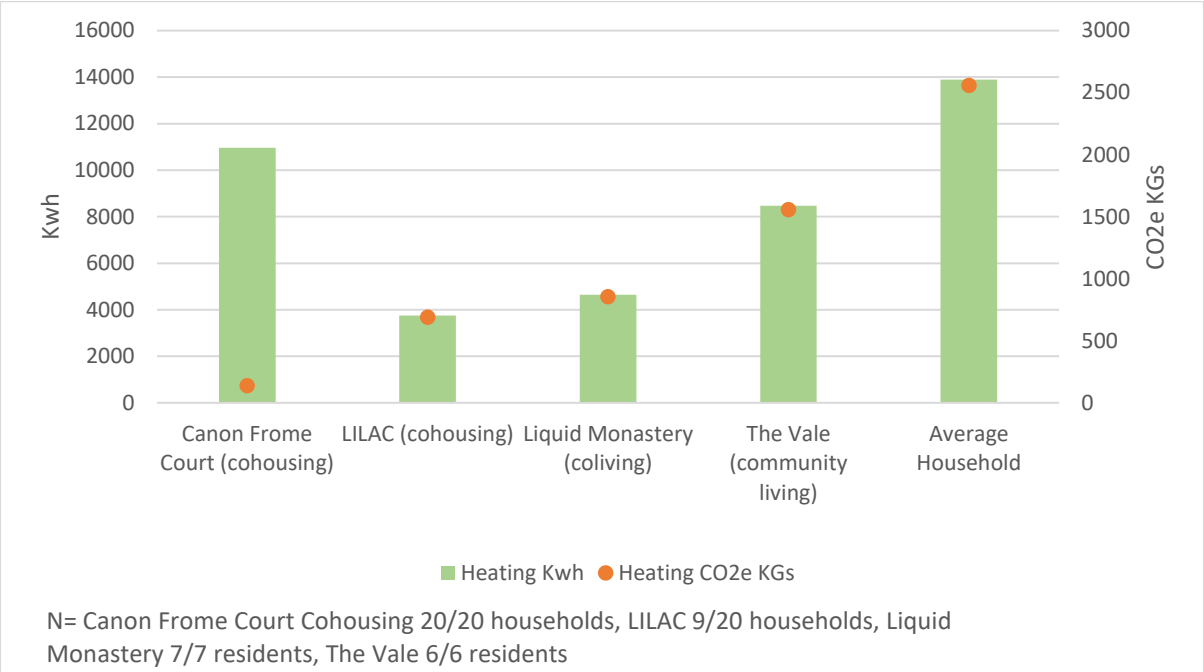


Figure 6-3: Space and water heating average per household per year

Figure 6-3 shows the Kwh and attached CO2e emissions for space and water heating per household per year. All communities have a lower rate of Kwh and CO2e when compared with the average household, with Canon Frome Court's CO2e being particularly low. This is mainly due to the majority of the community obtaining their space and water heating through a shared biomass boiler, which is highly energy efficient.

Figure 6-4: Canon Frome Court cohousing's biomass boiler, exterior and interior

LILAC cohousing, Liquid Monastery coliving and The Vale community living utilise mains natural gas, but LILAC benefits from well-insulated homes with straw bale walls, and both The Vale and Liquid

Monastery benefit from higher density, which lowers Kwh and CO2e per person. Within all communities it was observed that care was taken to not “overheat” homes. Residents were energy conscious, for both environmental and financial reasons.

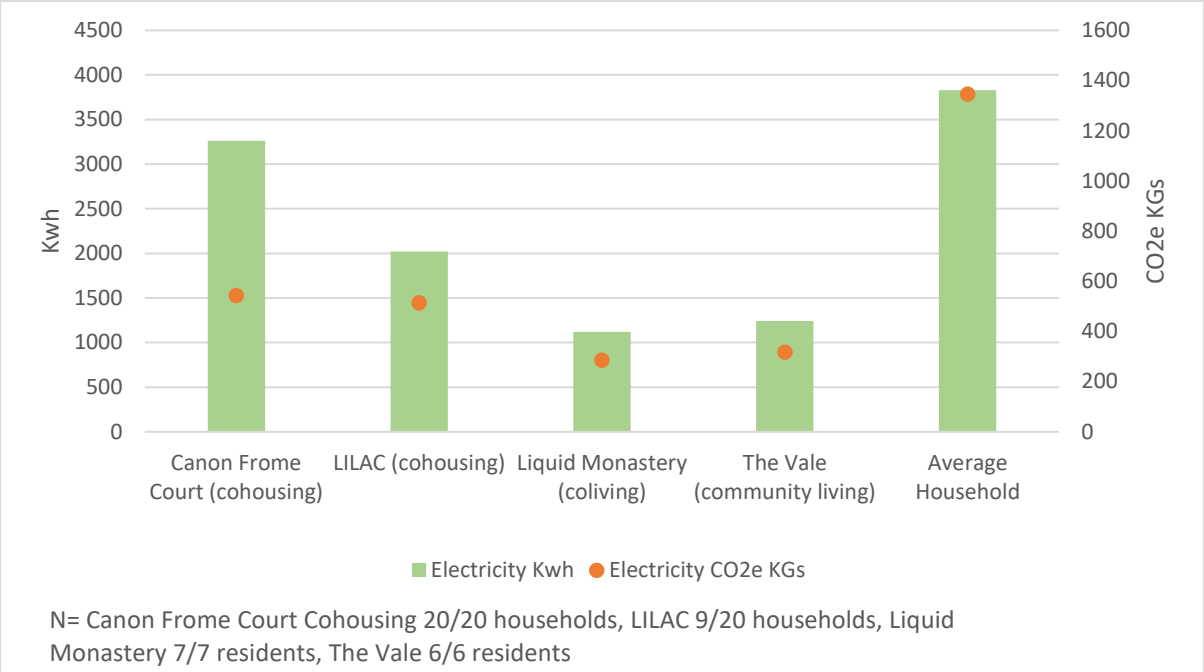


Figure 6-5: Electricity average per household per year

Figure 6-5 shows the Kwh and attached CO2e emissions for electricity per household per year. Canon Frome Court cohousing and LILAC cohousing have their own solar PV: in 2017, over half of Canon Frome Court’s electricity was produced via solar PV, which significantly reduced the CO2e emissions attributed to their electricity usage (as it can be seen on *Figure 6-5,* Canon Frome Court and LILAC cohousing have lower CO2e emissions relating to their Kwh of electricity in comparison to other communities, and the average household).

Figure 6-6: Solar PV array at Canon Frome Court cohousing

LILAC cohousing generated an average per household of 1914Kwh of electricity using solar PV throughout 2018, although according to best estimates, 80 percent of this was sold back to the grid. Liquid Monastery coliving and The Vale community living benefit from greater household density, which lowers Kwh and CO2e per person.

LILAC cohousing, Liquid Monastery coliving and The Vale community living all use “green” energy suppliers. However, as the use of carbon neutral energy does not impact the amount of renewable energy generated in the UK (unless those energy suppliers specifically build new renewable energy generators, which currently the majority are not) (Wexler, 2017) the use of such suppliers does not change how mains electricity is converted into CO2e.

Certain practices and their associated materiality will have contributed to lower-than-average electricity emissions; for example, at Liquid Monastery coliving residents were coffee rather than tea drinkers, and normally used a mocha pot to make their coffee, rather than an electricity-hungry kettle. They also used their laptops for watching TV shows, and did not have power-hungry televisions or sound systems. Within all communities it was observed that care was taken to switch off lights when rooms were unoccupied.

6.3. Water

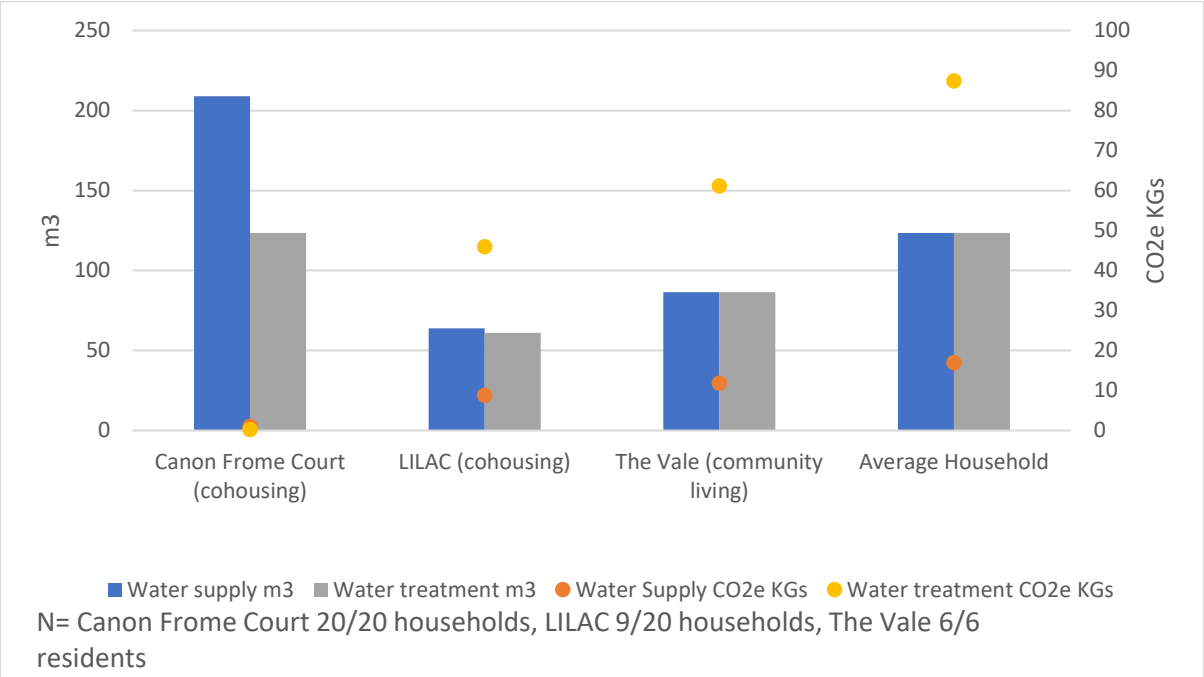


Figure 6-7: Water supply and treatment average per household per year[19]

Figure 6-7 depicts water supply and water treatment in m3, and the attached CO2e KGs per year. In particular, Canon Frome Court cohousing presents an anomalous case, with higher than average water usage, but very low resulting CO2e. Their high water usage is due to the running of their farm, which requires large amounts of water for growing produce and animal care, as well as the filling of their swimming pool (using 112m3 per annum, which is equal to 5.6m3 per household). Their CO2e emissions for both water usage and treatment are effectively zero as they obtain their water from a bore hole, and treat water on site themselves, though a small amount of water from the mains (7.5m3 per household during 2017) is used for irrigation. They also have water-saving materials, such as water butts, which collect rainwater to use for watering the plants; a water-efficient drip irrigation system; and some households have low-flow toilets or showers. A guest Airbnb caravan on site also has a compost toilet.

[19] Liquid Monastery has not been included here, as their water usage is unmetered, although an estimated usage based on the national average per person and attached CO2e emission has been included within Liquid Monastery's overall results. Canon Frome Court's water usage is also based on an estimate, but it was decided that their results should be included in this graph, as their water source and water usage are atypical in a manner that is of interest to this research.

Figure 6-8: The compost toilet at Canon Frome Court cohousing

LILAC cohousing's water usage and treatment is especially low, at under half the m3 of the average household. In part this is due to water-saving infrastructures, such as a communal launderette, which encourages bigger loads of washing, a communal waterless urinal, small baths, dual-flush toilets, and no water-intensive materials such as power showers, sprinklers, hot tubs or pressure washers.

Communities also engaged in various water saving practices. All reported turning off the tap when brushing teeth. Some residents of Canon Frome Court cohousing and LILAC cohousing also reported not taking long showers, and not always flushing the toilet in order to save water. Many LILAC members also used greywater from washing up or bathing to flush toilets or water the garden. Claire of LILAC said that 'It's quite normal to see LILAC-ers wandering round with washing up bowls of water in hot spells!'. Liquid Monastery coliving and The Vale community living's water usage is also lowered by not watering any gardens (Liquid Monastery do not have outdoor space, The Vale did, but did not water it).

6.4. Food

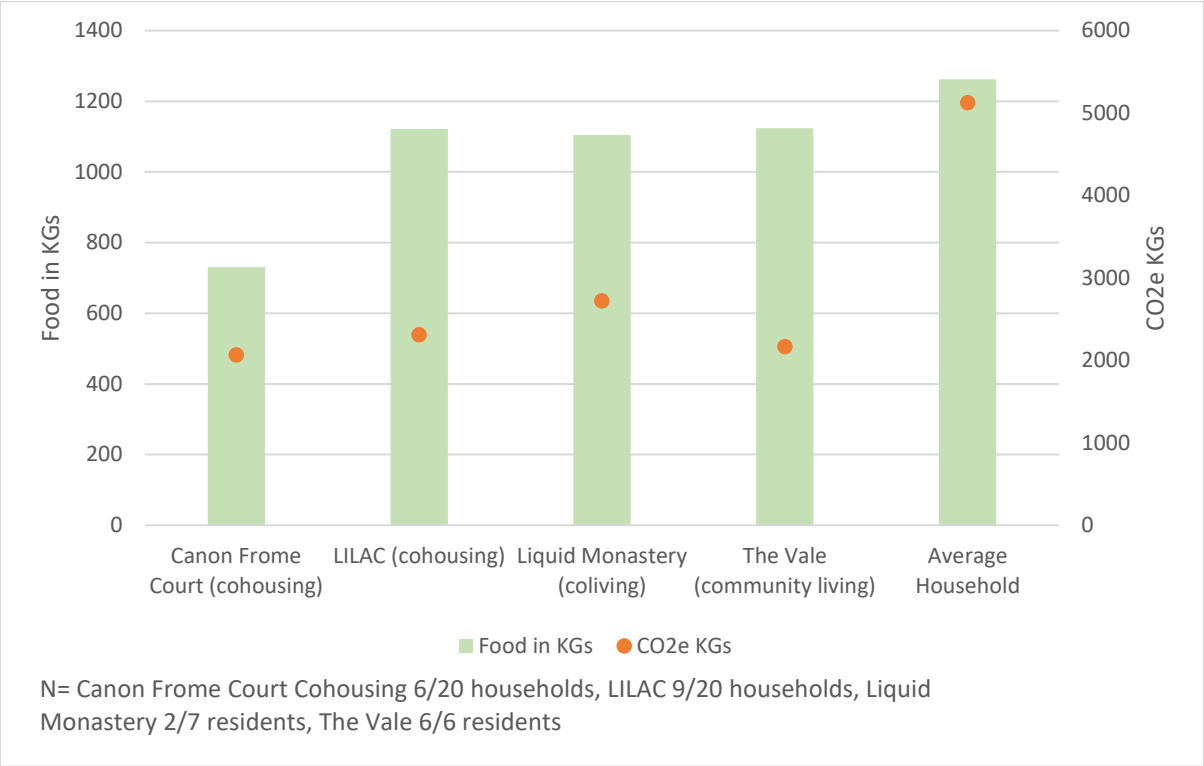


Figure 6-9: Food in weight and CO2e KGs average per household per year

Figure 6-9 shows that Canon Frome Court cohousing households purchase/obtain significantly less food in terms of weight. When asked about this result, the consensus from residents was that they wasted very little of their food in comparison to the average household (some residents citing food waste statistics that they had heard). As residents grew/produced much of their own food, this theory seems feasible, as when harvesting home-grown food it is easier to take only what you need at that moment, rather than portions being predetermined, which may lead to more food being wasted. There also may be an element of what Vannini and Taggart (2014) refer to as the "Thoreau Effect", that is, having greater appreciation of something which has required personal effort, and therefore being less willing to discard it. However, even if residents at Canon Frome Court did not waste any of their food, the overall weight of their food would still not be close to the average household. As of 2018 the average UK household threw away 174.72KGs of edible food per year (Wrap, 2020, p.13). The addition of this sum to Canon Frome Court's measurement would bring it up to 904.62KGs – still 28 percent less than average. More of the discrepancy may further be explained by less of their food weight being attributable to packaging. It is also possible that their lower quantity of food may in part be due to the data gathering method. Participants were asked to weigh food in its packaging when it was purchased over a two-week period. This two-week period was then

multiplied to be representative of a year. Arguably, patterns of obtaining home-grown food are different from supermarket shopping (more likely to be “little and often” rather than a weekly shop). Nevertheless, the results of the four communities do suggest a pattern of less food in weight purchased per household. At Canon Frome Court cohousing, LILAC cohousing and The Vale community living, residents spoke about attempting to reduce food waste, so arguably, this may account for these lower than average measurements.

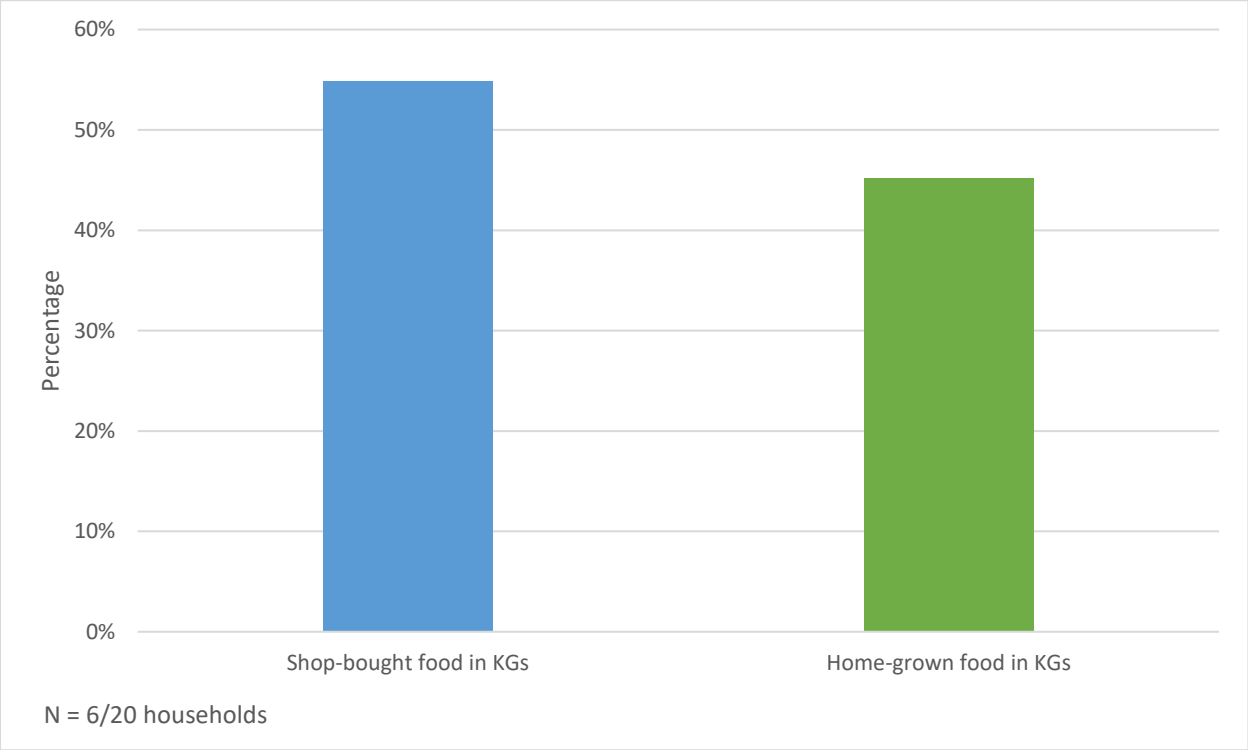


Figure 6-10: Canon Frome Court cohousing, home-grown food vs. shop-bought food by percentage

Figure 6-10 shows that Canon Frome Court cohousing residents grow and produce 45 percent of the food that they obtain for consumption. However, it should be noted that this data was gathered during late October/early November, and that the amount of food harvested will differ according to the season. LILAC cohousing residents also had their own allotment plots on site, which most members used to grow fruits and vegetables. Their plots were small in comparison to Canon Frome Court, and members predicted that they grow on average 10 percent of their own food (Bonner, 2020).

Figure 6-11: LILAC cohousing's allotments

Figure 6-11 shows that in terms of weight, LILAC cohousing, Liquid Monastery coliving and The Vale community living all purchase/obtain slightly less but essentially similar quantities of food to the average household, yet, their resulting CO2e emissions are roughly half as much. This is mainly due to their lower-than-average levels of meat consumption.

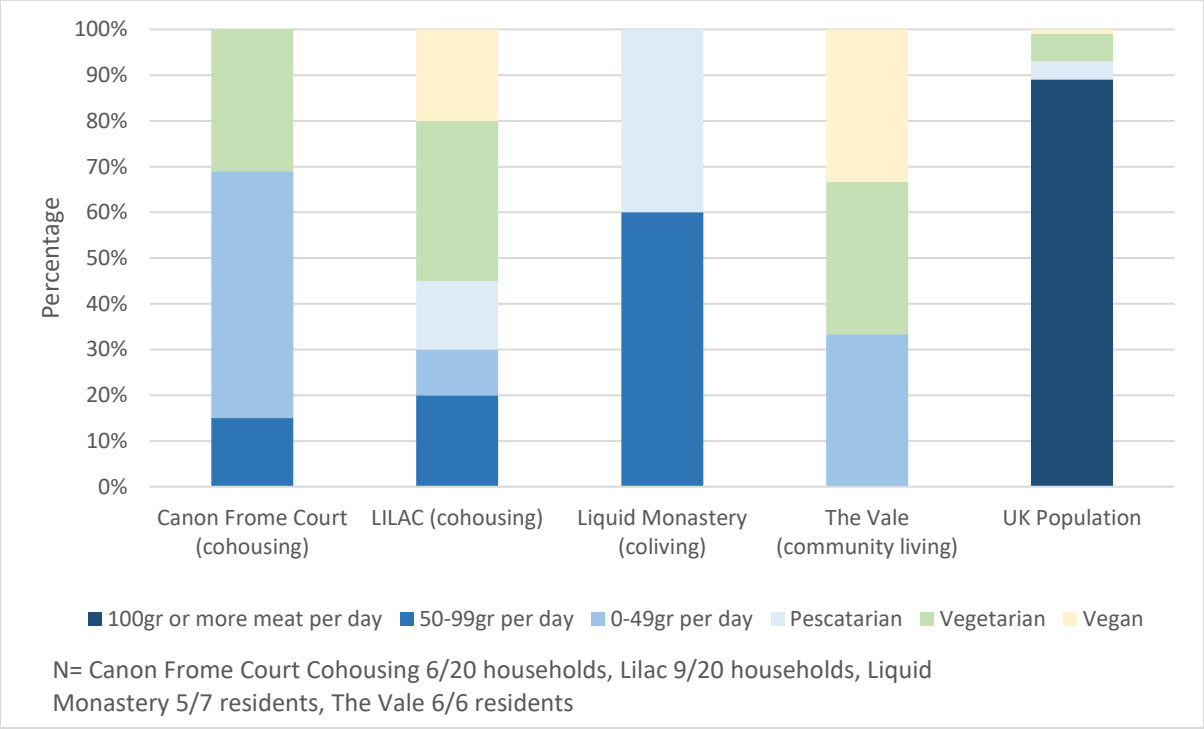


Figure 6-12: Diet types by percentage[20]

[20] UK-wide data on average meat consumption was available, showing that on average the UK population consumes >100gr meat per person per day (see *15.6.1.* Figure breakdown for details), although a breakdown of levels of meat consumption (e.g. N=0-49gr per day, 50-99gr per day) was not available.

Figure 6-12 shows the percentage of different diet types amongst the different communities. The Vale community living reported the lowest levels of meat and dairy consumption, with 66 percent of residents being vegan and vegetarian, and the remaining 33 percent reporting that they ate on average 0-49gr of meat per day. Plus, shared meals meant that the omnivorous residents often ate vegan food. LILAC cohousing residents have the second lowest level of meat consumption, with 55 percent being vegan or vegetarian. In Canon Frome Court cohousing, 31 percent were vegetarians. Within all communities those residents who did eat meat claimed to have lower-than-average levels of meat consumption (that is, less than 100gr meat per day).

6.5. Purchases

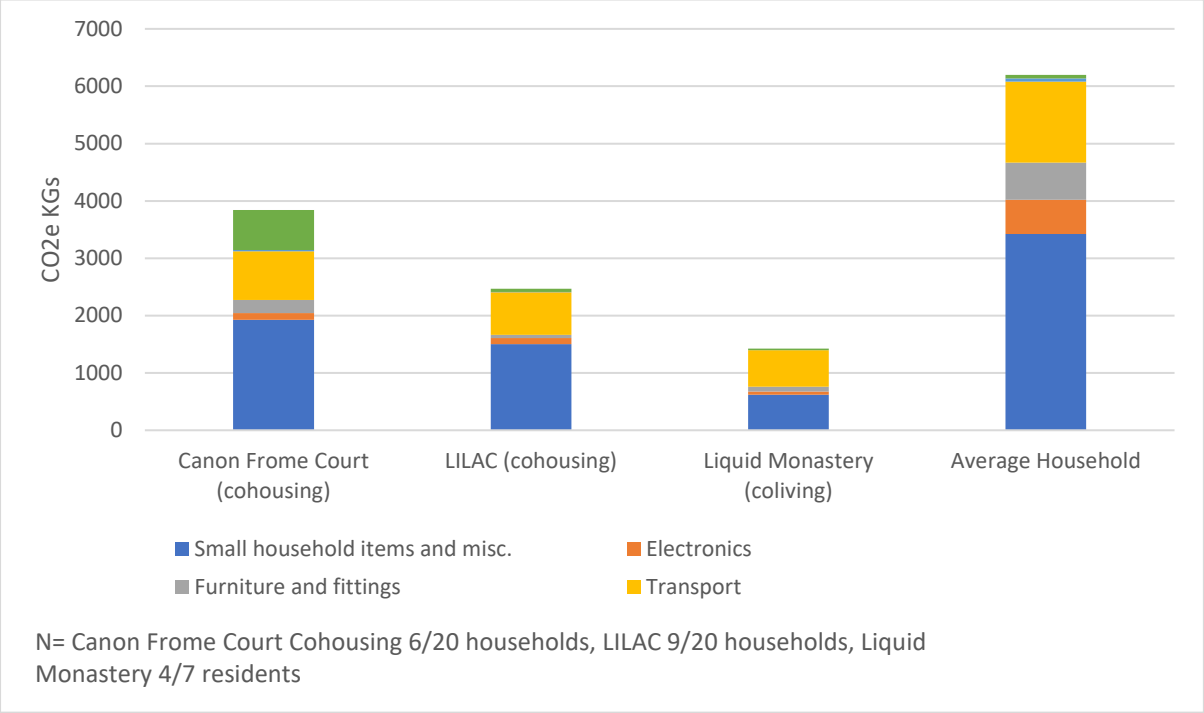


Figure 6-13: Purchases in CO2e KGs average per household per year[21]

Figure 6-13 shows the annual CO2e emissions which can be attributed to average household purchases. The data is based on household expenditure (obtained through a mixture of cost estimates and records) which has been converted to CO2e using an environmentally-extended input-output analysis (EE-IOA). The figure for the average household was obtained via household

[21] 95 percent confidence intervals for cost estimation accuracy were calculated at ± 12.98 percent, which does not greatly impact the overall outcome of the communities' household indirect impact being significantly lower than the average household. See *Appendix 15.7* for details.

consumption expenditure data which was converted into CO2e using the same EE-IOA method. Considering the assumptions and limitations of this methodology (which are explored in *4.3.4.3.1.*), the results should be regarded as an indicative snapshot, and have been taken into consideration alongside evidence obtained through observation and interviews.

The quantitative results indicate that the communities do have lower purchase-related CO2e across almost all categories measured, the exception being Canon Frome Court cohousing's higher-than-average emissions linked with building and construction. This high level of expenditure can be explained by the continuing maintenance required to maintain upkeep and improve the old Georgian mansion which the community inhabits.

Within all communities the sharing of everyday items appeared to be a common practice (see *9.1.* for a detailed exploration of this topic). Some borrowed items were specifically asked for, and other instances of sharing were the result of spontaneous interaction, perhaps where residents may have witnessed each other using certain items, or conversation led to instances of borrowing or swapping. The ease of loaning items was further enhanced by the close proximity of residents to one another – fetching an item to lend to a neighbour took up very little time. Therefore, the shared communal areas and domestic practices which took place within them fostered borrowing practices. Both cohousing communities placed unwanted household items in communal areas, to offer them to other residents.

When comparing cohousing, community living and coliving, it seemed to be the case that borrowing and sharing personal items was most common within cohousing, perhaps because the greater number of households and amount of private space led to a larger pool of items being available for borrowing, and fewer items being shared in the first place.

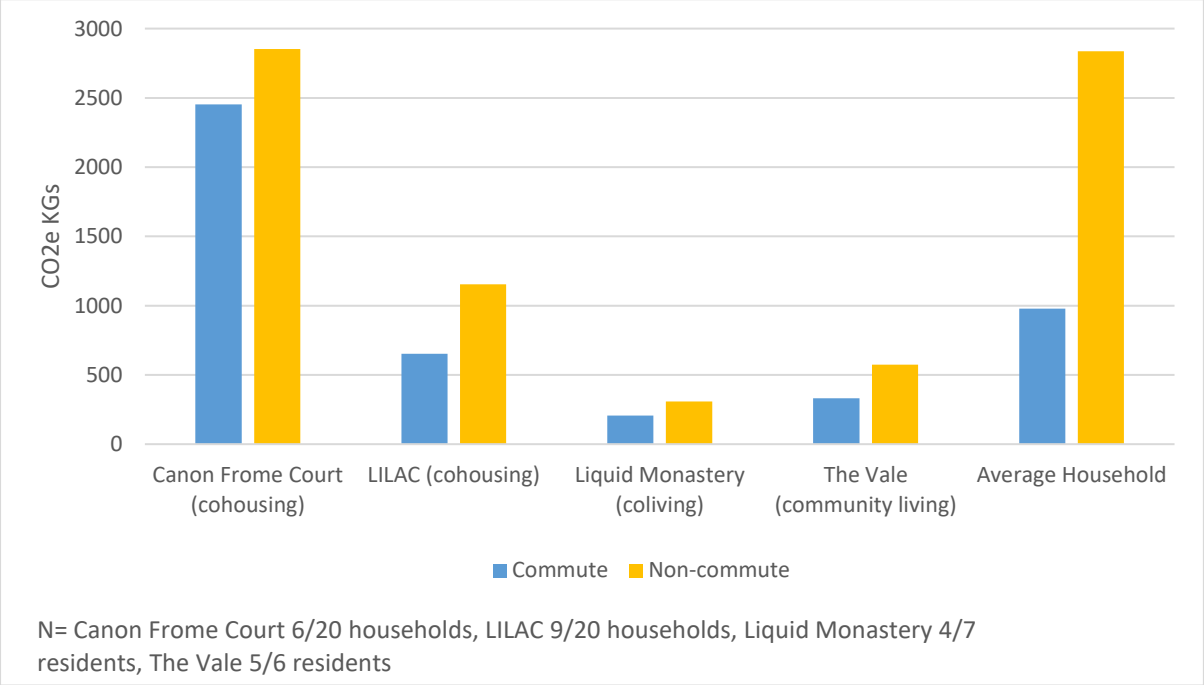
Within all communities there were certain objects which were kept in communal areas and available for communal use. Communal items included washing machines, books, DVDs, gardening tools, bike maintenance equipment and toys. Community living and coliving communities also shared amenities such as bathrooms, kitchens and living spaces, and all of the furniture and items that those spaces entail (e.g. sofas, tables, kitchen utensils). Several communities also engaged in carsharing, either informally or through an official community carpool.

Within all communities it was commonplace to avoid buying new items, and/or buy items second-hand. Many residents within the shared living communities chose second-hand rather than new furniture and appliances. For community living and coliving residents, purchasing fewer items in part came down to simply having less space to store things, and to sharing a greater amount of objects and amenities when compared with cohousing.

Many residents described themselves as “anti-consumerist” or words to that effect, and favoured the aesthetic of mismatched and rustic-looking items, which was a look that aligned with practices of shopping second-hand and/or “making do” with what is available. Shared living was also linked with enabling lower levels of consumption through either normalising not purchasing new things, or fulfilling social relationships supplanting the need for buying new things.

6.6. Travel

6.6.1. Everyday travel



N= Canon Frome Court 6/20 households, LILAC 9/20 households, Liquid Monastery 4/7 residents, The Vale 5/6 residents

Figure 6-14: Travel, average CO2e emissions per household per year split by commute/non-commute journeys

Figure 6-14 shows the average CO2e emissions per household per year, split by journeys for commuting or non-commuting purposes. This graph does not include emissions from aeroplane journeys, which are quantified in *6.6.2. Figure 6-14* indicates that all communities aside from Canon

Frome Court cohousing have significantly lower CO2e arising from transport than the average household, with Liquid Monastery coliving being the community with the lowest emissions. Canon Frome Court is the only community which has higher emissions than the average household. Their emissions arising from commuting are particularly high, at approximately 2.5x more, and their emissions arising from non-commuting purposes are roughly equivalent.

It was found that methods of transport by each community are to a certain extent shaped by the available transport infrastructures (although pro-environmental social norms also shaped practices – see *Chapter 7*). The Vale community living, Liquid Monastery coliving and LILAC cohousing were all based in cities. LILAC was within easy cycling distance of Leeds city centre (approximately 3.5 miles along the canal towpath), and there were regular buses nearby. The Vale community living and Liquid Monastery coliving were based in London, Zone Two, and so had access to good public transport links, as well as cycle routes. For residents of Liquid Monastery, their location meant that it was more convenient to cycle than to take public transport. On top of these city infrastructures, the communities also had places to safely store bicycles. Liquid Monastery residents had ample space in their stairwell to store their bicycles, and residents of The Vale were able to store their bicycles in the front or the back garden. LILAC cohousing had the most extensive cycling amenities, with secure outdoor storage, spare parts and tools readily available.

Figure 6-15: Secure bicycle storage at LILAC

Within Liquid Monastery coliving, The Vale community living and LILAC cohousing, cycling, underground and train travel were the predominant modes of transport.

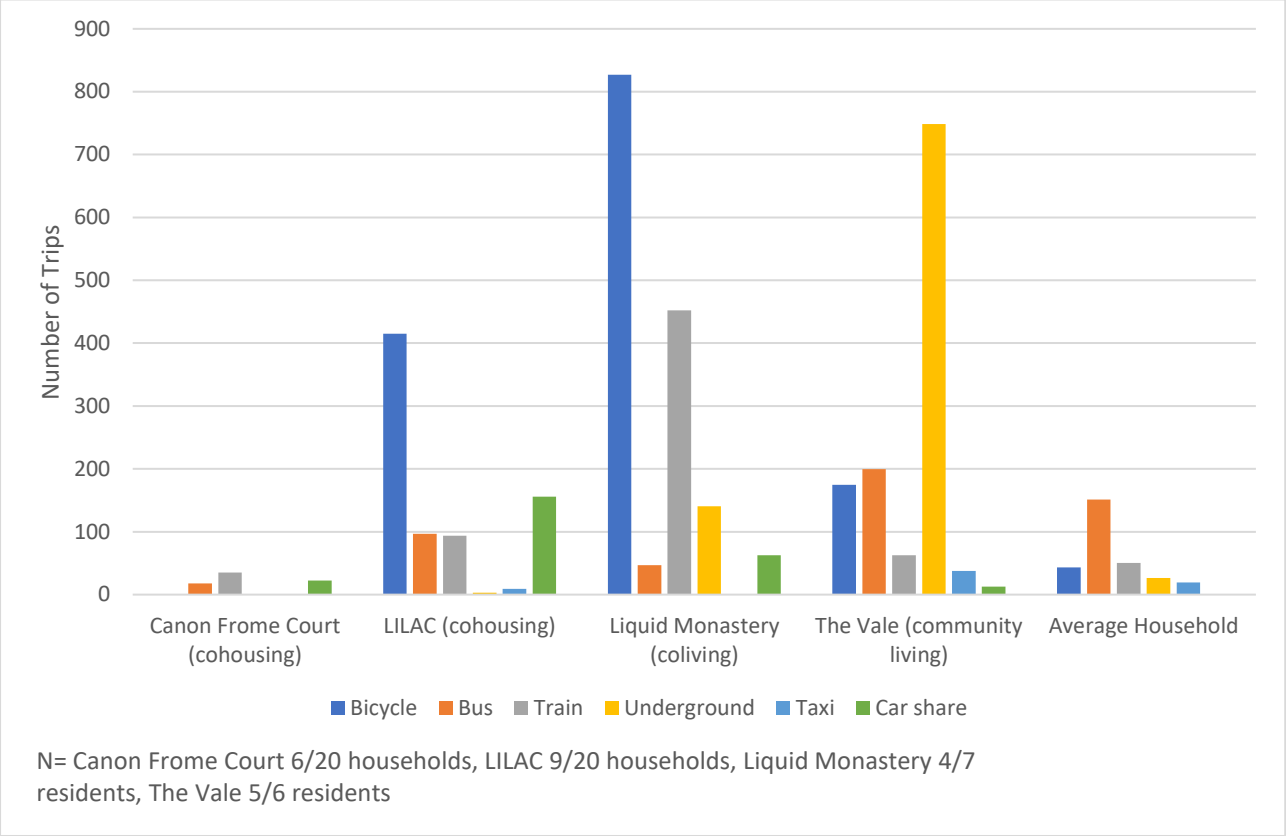


Figure 6-16: Other transport modes, average number of trips per household per year[22]

Figure 6-16 shows the number of trips by transport mode other than private car. The average Canon Frome Court cohousing household has few trips which did not use a private car. LILAC cohousing had a large number of trips by bicycle, and out of all communities had the largest number of trips taken by car share. Liquid Monastery coliving had the most trips by bicycle, and also took a significant number of journeys by train. The Vale community living had a middling amount of journeys by bicycle and by bus, and a significant number of journeys by underground.

Canon Frome Court cohousing was situated in rural Herefordshire with no direct public transport links, connected by an A road which is regarded by residents as too dangerous to walk or cycle on. The nearest station was 6.6 miles away, and the nearest city was 11.7 miles away. This reliance on cars was the key reason why Canon Frome Court's transport emissions were higher than the average household.

[22] Please note that data for the number of car shares per year for the average UK household could not be sourced.

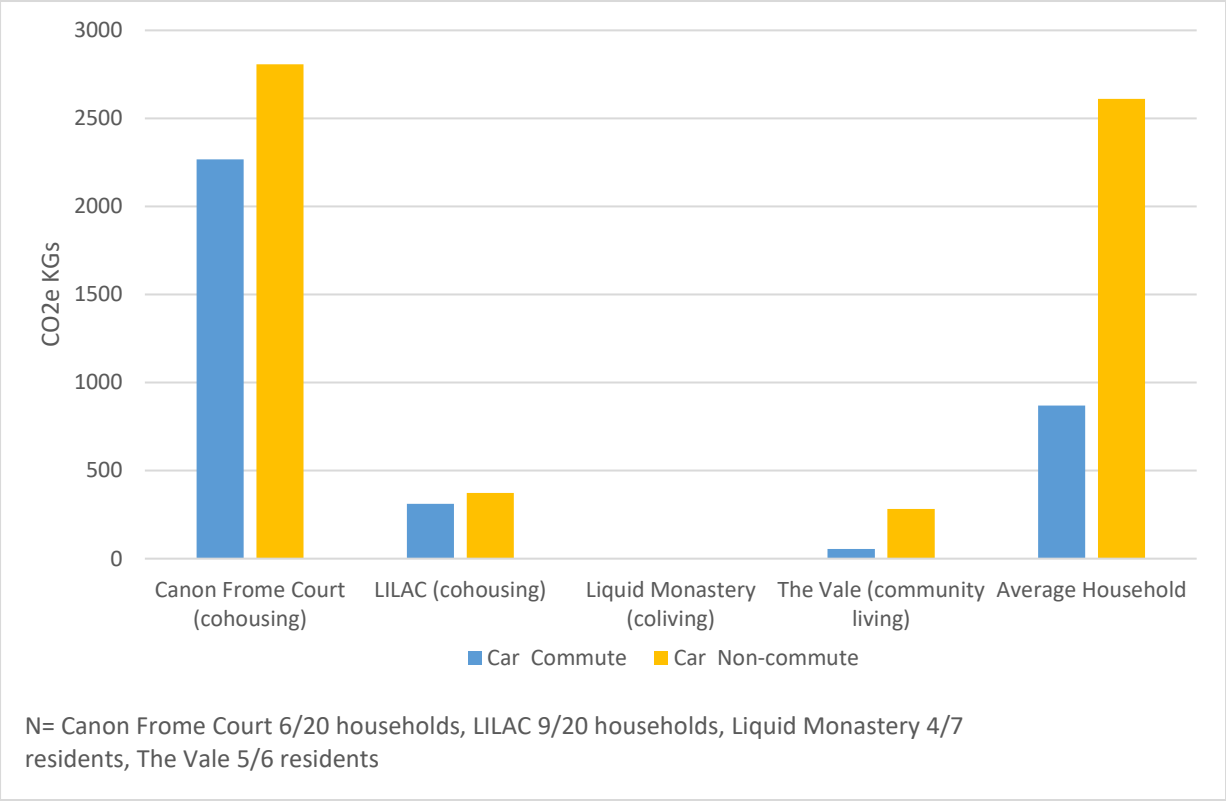


Figure 6-17: Car CO2e emissions average per household per year

Figure 6-17 shows CO2e emissions per household which arise from car journeys. The graph shows that emissions from Canon Frome Court cohousing are significantly higher than the average household, particularly when it comes to journeys for the purpose of commuting.

Car sharing and lift sharing was a common practice amongst all communities aside from Liquid Monastery coliving (none of the residents owned a car within this community). At The Vale community living one resident owned a car, and had added other residents to his car insurance so that on rare occasions they could use it. At LILAC cohousing, car sharing was taking place informally, and there were ambitions to start a formal carpool that was open to the local community. Canon Frome Court cohousing was just putting a formal carpooling system in place during my fieldwork (Autumn 2018), which included an electric car. By 2021 Canon Frome Court had a carpool which half of households were using, with five of those households no longer having their own private car. Of the five cars in the carpool, three were electric. It should be noted that as the quantitative fieldwork took place in 2018, the quantitative results do not include the electric cars, which will have lowered

Canon Frome Court's travel-related CO2e impacts. The topic of carsharing is explored in more detail in *9.1.3.*

Findings also indicated that within some communities, residents influenced each other to cycle more, mainly through setting an example by demonstrating cycling practice. Cycling was furthermore encouraged through sharing knowledge on cycling practice and maintenance, and occasionally through residents borrowing bicycles from one another.

Within all communities there were high levels of working and, to a certain extent, socialising at home, which is likely to have lowered the amount of travel that residents undertook (and by implication, travel-related emissions).

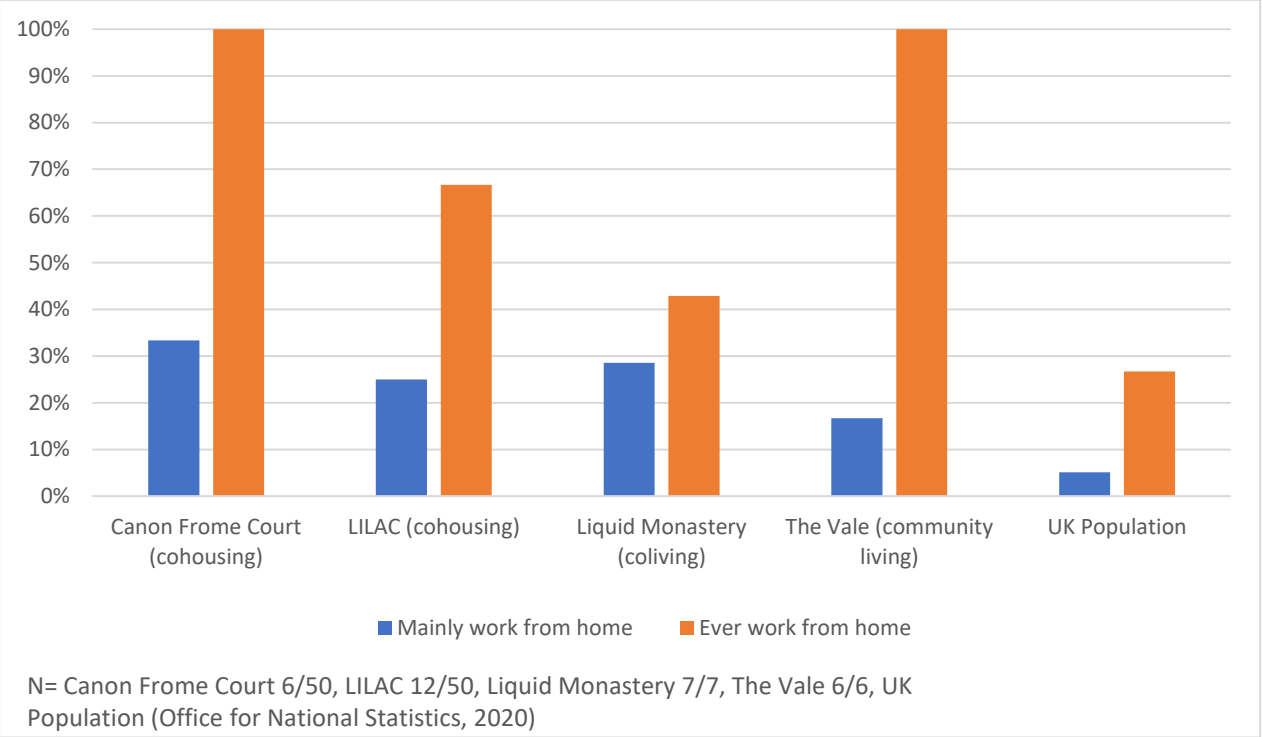


Figure 6-18: Amount of working from home, average per person

Figure 6-18 shows just how common working from home is within the communities when compared with the average household.[23] Within both Canon Frome Court cohousing and The Vale community living, 100 percent of those surveyed worked from home some of the time; and for three out of four communities the proportion of people who mainly worked from home hovered at a third or just under – much higher than the UK average pre-Covid-19, which was just over 5 percent.

[23] Figures for the average household are based on 2019 (pre-Covid19).

6.6.2. Aeroplane travel

Within most communities of study there was some anti-flight sentiment and avoidance of aeroplanes for environmental reasons.

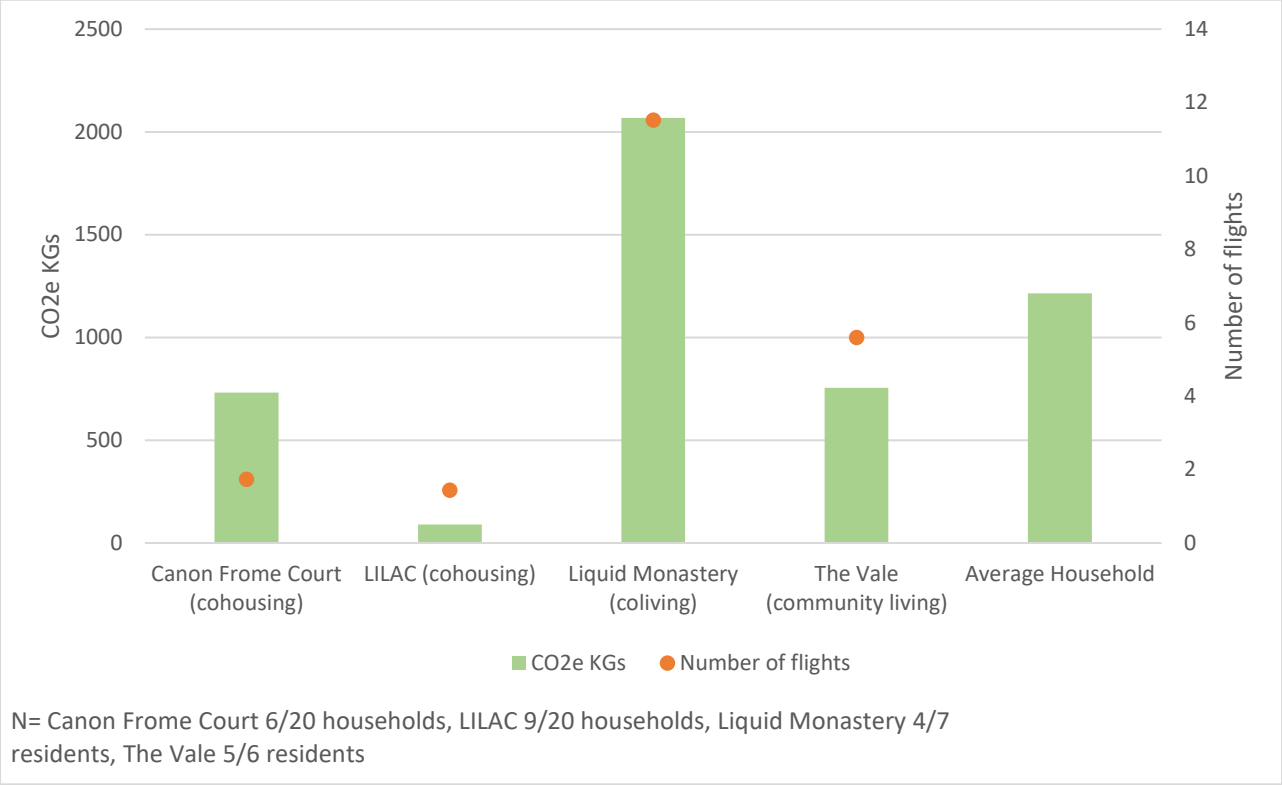


Figure 6-19: Aeroplane CO2e emissions and number of flights, average per household per year[24]

Figure 6-19 shows the average CO2e emissions and number of flights per household. All communities aside from Liquid Monastery coliving have lower-than-average emissions from aeroplane flights, with LILAC cohousing being the lowest, both in terms of emissions and number of flights.

There was some anti-flight sentiment expressed in all communities, although the extent of this differed between residents. Some residents did not fly at all, some tried to minimize their flights, whilst some flew regularly. Overall, however, anti-flight sentiment and avoiding flights was the norm. The exception to this was Liquid Monastery coliving residents, who frequently took flights to holiday or visit family abroad. Flying practice is further explored in *7.3.* Alternative long-distance travel options (e.g. the train) were also more normalised within some communities. One resident

[24] Data for number of flights for the average UK household is not available.
Please note that business-related flights were not included within this data.

mentioned that their time-rich lifestyle (partly engendered by living in a community) enabled slower travel. Some community members also expressed the view that the "contentedness" that community life engendered reduced a need to "escape" on holidays in distant locations.

6.7. Waste

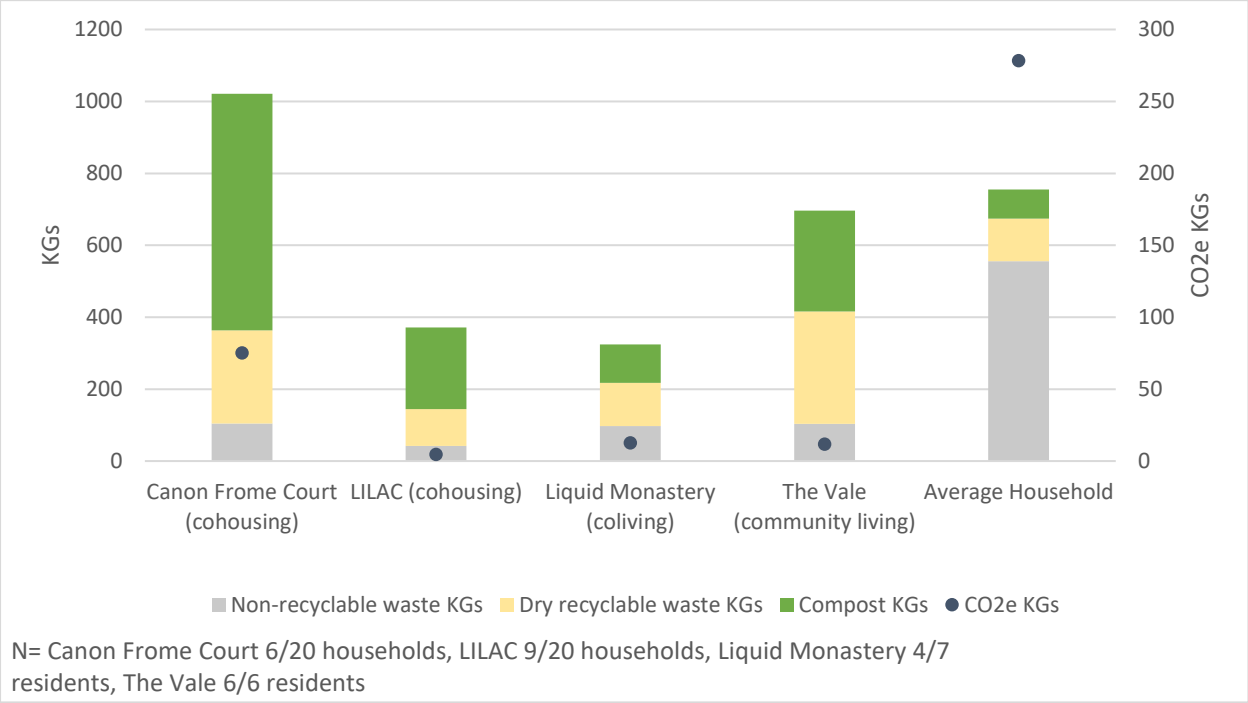


Figure 6-20: Waste by weight and CO2e emissions per household per year

Figure 6-20 shows a breakdown of non-recyclable, recyclable and composted waste by weight, plus associated CO2e emissions per household per year. The graph shows that all communities have significantly lower CO2e emissions than the average household. The trend for all the communities is that non-recyclable waste is significantly lower, and recycled waste and compost is higher. In particular, Canon Frome Court cohousing has an overall higher amount of waste, though the majority of this is composted on site, and so emits very little CO2e.

Notably, the CO2e emissions attached to the waste of each community are significantly lower than the CO2e emissions of the average household. In part, this is due to the communities having lower amounts of non-recyclable waste, as recyclable waste and compost have much lower CO2e emissions when compared with waste which is not recycled. However, the level of emissions is also greatly impacted by how the municipalities which the communities belong to process their waste. LILAC cohousing, Liquid Monastery coliving and The Vale community living are all situated within

municipalities where non-recyclable waste is primarily incinerated. Whereas, for Canon Frome Court cohousing and the average UK household, a greater proportion of waste is sent to landfill, which is a much more CO2e-intensive form of waste disposal.

The different ways in which communities obtained food link closely with the amount and type of waste produced. Residents of LILAC cohousing and The Vale community living bulk bought food from wholesale food company Suma, plus had subscriptions to fruit and veg boxes. LILAC cohousing had furthermore signed up to a bread cooperative, and had their bread delivered. These practices are likely to have somewhat reduced the ratio of packaging to food, thereby reducing waste. Both Canon Frome Court cohousing and LILAC cohousing also grew and produced a proportion of their own food, and therefore reduced the amount of food-related packaging that they consumed. All communities demonstrated a strong commitment to recycling practice, which tended to be conceptualised by residents as part of their routine, and enshrined variously through written instructions, rotas and specific bins for different waste types.

Figure 6-21: Second-hand bottles being used to store homemade apple juice at Canon Frome Court cohousing

Both cohousing communities also composted their food waste on site (although LILAC cohousing did not compost their cooked food waste, as doing so could have attracted rats). Canon Frome Court cohousing produced approximately 8.3 tonnes of compost from garden waste alone per year (not including food waste and animal manure), and LILAC cohousing produced approximately 4.5 tonnes of compost from garden and food waste in total.

Figure 6-22: The composting system at LILAC cohousing

The images above show LILAC's composting system. Compostable material is deposited at the metal container on the far right of the left-hand image (the right-hand image shows the interior of this container). The compostable material is then "turned" into the container on the left-hand side about once per month, until the waste has fully decomposed into usable compost.

Figure 6-23: Garden waste at Canon Frome Court cohousing

Each year residents would pile up garden waste (pictured left). Then this garden waste would be covered and left to decompose for five years (pictured right) before being used.

Interestingly, *Figure 6-20* shows that there is no particular correlation between the spatial typology of the communities and amounts of waste (e.g. the cohousing communities, where residents do not share a household, and the community living/coliving communities, where residents do share a household). Canon Frome Court cohousing and The Vale community living both have amounts of waste which are similar to the average household, whereas LILAC cohousing and Liquid Monastery coliving have far lower weights of waste than average. The research suggests that the reasons for the low weights of waste within these two communities may have differed.

The Vale's routine of eating together should in theory mean lower levels of waste due to less packaging. *Figure 6-20* shows, however, that their weight of waste is the second highest of all the communities. It is speculated that this is due to community member's commitment to dinners together meaning that they rarely ate out – therefore waste which may otherwise have been generated in restaurants etc. was instead generated in the home. Plus, it could be the case that their monthly bulk buys of food meant a greater amount of preserved food was bought, which may have led to more purchases of food stored in heavier types of packaging, e.g. cartons, glass and tins. Their vegan and vegetarian diet may also have led to higher amounts of food waste in terms of vegetable peelings and trimmings. A look at their food cupboard also showed that the portion sizes bought were for the most part standard issue, which may have meant that the community did not necessarily gain much benefit from communal meals in terms of reduced waste.

Figure 6-24: One of the communal food cupboards at The Vale community living

In contrast, Liquid Monastery coliving, who did not share meals, had the lowest amount of waste – a result that was unexpected. However, there are several factors which may explain this. The first is efforts from residents to buy unpackaged food when possible, and to recycle what they can. Resident Emily mentioned that they also tend to wash out their containers before putting them in the bin or recycling in order to avoid bad odours, which she explained was both good recycling practice and part of being a considerate housemate. This may have made a minor reduction to the weight of waste. Residents' eating habits may also have reduced their amount of waste in several ways. Emily described how she and Francesco would typically eat out two to three times per week (displacing associated waste to other locations), and how Isabella and Pablo were also fond of getting takeaway chips for their dinner, which would come in a paper bag (more lightweight than

other types of packaging). Overall, residents' frequent long working hours and sociable lifestyles meant that eating out frequently was likely to occur. Resident Marta also tended to batch cook: a practice that creates less waste than cooking smaller portions. Emily also remarked that there was not a lot of storage space in their shared kitchen, and residents had one shelf each in the fridge. This meant careful consideration when purchasing food, and less purchasing of long-life foods, which tend to have heavier packaging.

Figure 6-25: Kitchen space and the shared fridge at Liquid Monastery coliving

6.8. Conclusion

This chapter has described the quantitative results of this research, and has outlined the key practices, materials and infrastructures which explain these results. The extent to which these results may be representative of shared living is discussed in *11.2.* Next, *chapters 7-10* explore how these practices, materials and infrastructures are negotiated and managed within the shared living communities.

Chapter 7. Shared pro-environmental ideals? Negotiating fields of acceptable orders in relation to environmental sustainability

This chapter explores the negotiation of community-level pro-environmental ideals and individual practices within shared living communities. Firstly, it looks at documented community-level pro-environmental ideals through the lens of Welch and Yates' (2018) concepts of general understandings (GU) and teleoaffective regimes (TARs). It then investigates moments of tension, where individual's practices do not align with community ideals, or where residents had different social norms in terms of pro-environmental practices. The chapter shows that while community-level, documented, sustainability-related ideals are important in creating a field of acceptable orders, individuals mainly refer to social norms when situating theirs or other's practices. The extent to which documented pro-environmental ideals enable residents to challenge one another in relation to their practices is explored, and it is argued that the more specific and instructive documentation is, the more residents are able to challenge each other. It was found that in cohousing communities, despite some tensions over perceived unsustainable practices, instances of challenging are rare, though the blurring of what is private and what is shared in cohousing can lead to tensions over pro-environmental practices. Finally, this chapter investigates the hierarchy of pro-environmental ideals in relation to ideals of sociability. It finds that the desire to foster a hospitable social environment sometimes overrides ideals of environmental sustainability, although communities use certain strategies to accommodate both, and that indeed, in many cases, practices relating to sociability and environmental sustainability are aligned.

7.1. GU (general understandings), TARs (teleoaffective regimes) and fields of acceptable orders

This chapter explores how pro-environmental values and/or rules agreed by the community are negotiated by individuals-as-part-of-a-group. In this chapter, three SPT concepts are utilised. The first of these is "general understandings" (GU). GU may be the shared idea of what a practice is and how to execute it (Lamers and Duim 2016); or it can be defined as a broad term encapsulating collective concepts, such as environmental sustainability, which forms a component of a wide range of practices (Welch and Yates, 2018). It is this second definition that this chapter utilises. This type of GU plays a key role in group identification and reproduction, sits on the boundary between the discursive and non-discursive, and may have pre-reflexive, affective or tacit aspects (Welch and Yates, 2018). It furthermore informs how the TAS (teleoaffective structures) of practices are ordered (Welch and Yates, 2018).

The second SPT concept used in this chapter is teleoaffective regimes (TARs). This term, fleetingly mentioned by Schatzki (2002), has been further developed by Welch and Yates (2018). A key reason for this development is that the focus in many accounts of practice is autotelic (on the practice as an end in itself) rather than heterotelic (the practice as a means to another end). Heterotelic ends may 'orient and integrate practices into a wider configuration' (Welch and Yates, 2018, p.293), e.g. that of environmental sustainability. A TAR is a concept that joins multiple practices which share a teleology and affectivities, and may be defined as the specific application of GU into practices (Welch and Yates, 2018). Schatzki (2002) uses the religious group The Shakers to illustrate an example of a TAR, citing how their commonly held concept of creating a "Kingdom of God on earth" was translated into a 'particular configuration', and institutionalised through hierarchies of governance (Welch and Yates, 2018, p.293).

Finally, this chapter also occasionally refers to a concept linked with teleoaffective structures (TAS), which is referred to as a 'field of acceptable orders' (Schatzki, 1996, p.187). To understand this term, it is helpful to explain TAS. TAS are defined by Schatzki (2002) as 'a range of normativized and hierarchically ordered ends, projects and tasks, to varying degrees allied with normativized emotions and even mood' (p.80). A TAS does not necessarily have to have affect attached to it, and may be simply teleological i.e. end-oriented (e.g. cooking according to a recipe); *or,* affect may be an inherent part of a TAS, such as the love and affection which is part of child-rearing (Schatzki, 1996). The emotions and moods attached to ends, projects and tasks can be defined as goal-oriented ethical or moral meanings. TAS are unlike explicit rules in the sense that they do not need to be

'spelled out', although this does sometimes occur, particularly in 'learning situations, in the face of nonstandard doings and sayings', or when there is a breakdown in what Schatzki refers to as 'continuous absorbed coping'[25] (Schatzki, 1996, p.100). A key difference between TAR (teleoaffective regimes) and TAS (teleoaffective structures) is that the concept of TAS is more focused upon practices, whereas TAR is more focused on heterotelic ends, under which there are a group of practices. For this reason, this research utilizes TAR over TAS, as it better suits an exploration of how shared living communities express the heterotelic end of environmental sustainability into various practices.

The usefulness of TAS for this research, is a concept linked to it, known as a "field of acceptable orders". Practices which fall within a TAS are part of what Schatzki calls a 'field of acceptable orders of life conditions that is wider than whatever range of orders is marked as correct' (Schatzki, 1996, p.187). To give an illustrative example, in a workplace there may be a technically correct procedure, but, in addition to this are a range of possibilities which, whilst not "by the book" are doings and sayings which are acceptable in that context. The "field of acceptable orders" as a concept is useful because it encompasses the complexity, nuance and contextual specificity of when doings and sayings are and are not acceptable, allowing for ranges of acceptability.

One thing that GU, TARs and fields of acceptable orders do not encompass are individual agencies and individual differences. An omission of these factors in the context of this research does not allow an exploration of how individuals interpret and negotiate GU and fields of acceptable orders. Therefore, this chapter uses the concept of social norms to discuss these topics, highlighting how perceived group expectations play an important role in shaping sustainability-related practice.

7.2. Co-created, documented GU/TARs

A practice that is typical of intentional communities (including cohousing and community living) is co-created[26] documentation of shared values and goals (Meltzer, 2005). Coliving communities do often outline shared values and rules, although this is more often created by community managers than all residents. In this sense, GU and TARs of the community are articulated. This practice in domestic space appears to be one that is reasonably unique to shared living. More directive

[25] Which may be explained as engaging in acceptable doings and sayings, and/or comprehending the appropriateness of occurring doings and sayings.

[26] Co-created by the founding community members, or those who happen to be part of the community at the time of creation. Members joining afterwards are usually expected to abide by this documentation.

instructions (i.e. rules) on how to act in households tend to be applied to children (Holloway and Valentine, 2001) or those employed by the household, such as au pairs (Cox and Narula, 2003), seemingly to protect certain doings and meanings within the home which ensure the comfort of the rule-makers (Cox and Narula, 2003; Holloway and Valentine, 2001). There is variation on how directive documentation co-created by communities are. Some documents only contain certain values which are embodied by the community, whereas others include specific rules e.g. "The community will have dinner together twice per week". Yet, whether directive or not, to some extent they appear to serve a similar purpose to rules, in that they make embodied meanings explicit (Cahill, 2000). The next sections explore the documentation of GU/TARs, how residents negotiate them, and what impacts documentation of pro-environmental GU/TARs has on pro-environmental practices.

LILAC cohousing was the community where the GU relating to environmental sustainability were most prominently expressed, and were embedded within the name of the community itself. The two first letters of 'LILAC' stand for 'Low Impact', which forms a part of their 'key aspects' and 'values'.

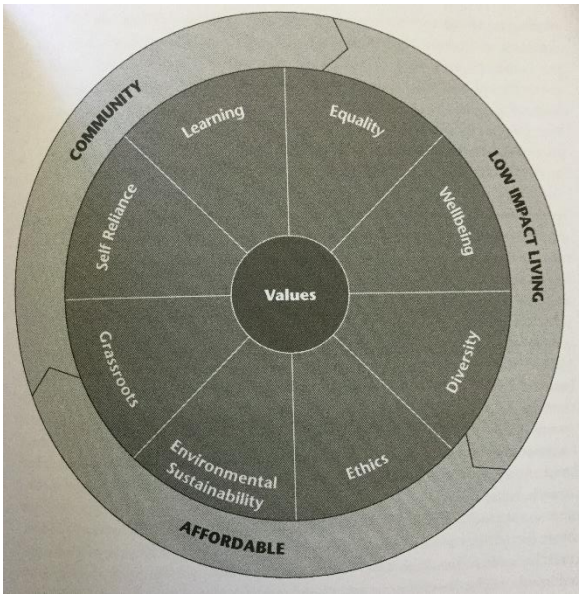
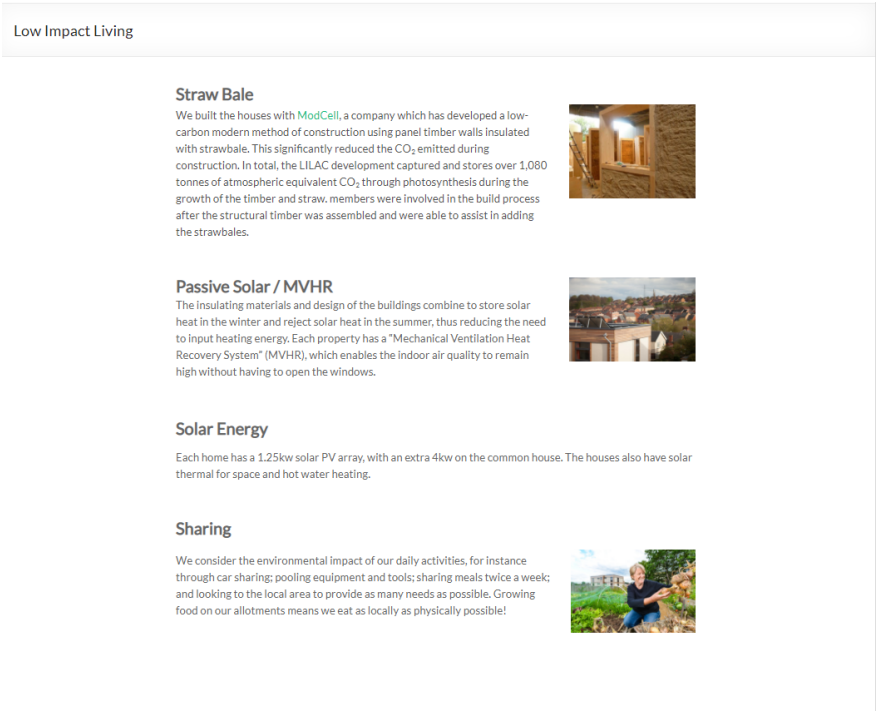


Figure 7-1: LILAC's three aspects (community, low impact living, affordable) and its values

Chatterton, 2015, p.9

These key aspects and values (which include 'Low Impact Living' and 'Environmental Sustainability') were developed by six founding members during the initial development phase of LILAC, with other members who joined being expected to ascribe to them (Chatterton, 2015). They are part of a set of values which includes social justice ('Equality', 'Diversity', 'Affordable', 'Ethics'), autonomy ('Self

Reliance', 'Grassroots'), quality of life, relationships, and personal growth ('Wellbeing', 'Community', 'Learning'). Some applications of GU around environmental sustainability (i.e. TARs) are also documented on LILAC's website, which has a page that describes a number of their low impact-related materials and practices.



Low Impact Living

Straw Bale

We built the houses with ModCell, a company which has developed a low-carbon modern method of construction using panel timber walls insulated with strawbale. This significantly reduced the CO_2 emitted during construction. In total, the LILAC development captured and stores over 1,080 tonnes of atmospheric equivalent CO_2 through photosynthesis during the growth of the timber and straw. members were involved in the build process after the structural timber was assembled and were able to assist in adding the strawbales.

Passive Solar / MVHR

The insulating materials and design of the buildings combine to store solar heat in the winter and reject solar heat in the summer, thus reducing the need to input heating energy. Each property has a "Mechanical Ventilation Heat Recovery System" (MVHR), which enables the indoor air quality to remain high without having to open the windows.

Solar Energy

Each home has a 1.25kw solar PV array, with an extra 4kw on the common house. The houses also have solar thermal for space and hot water heating.

Sharing

We consider the environmental impact of our daily activities, for instance through car sharing; pooling equipment and tools; sharing meals twice a week; and looking to the local area to provide as many needs as possible. Growing food on our allotments means we eat as locally as physically possible!

Figure 7-2: LILAC's 'Low Impact Living' web page

LILAC, 2020

The page emphasises the environmentally sustainable material elements of the community, referencing LILAC's straw bale insulated walls, their efficient insulation and air circulation system and solar PV. There is also information on their practices of sharing everyday items, shopping locally and growing food on site. Overall, at LILAC there was a clear message that there were strong GU and TARs around environmentally sustainable practices.

Canon Frome Court cohousing also had a word cloud which communicated their shared values, displayed on their website.

Figure 7-3: A word cloud about what Canon Frome Court members like most about their lifestyle

Canon Frome Court, 2020

In this word cloud, values, materials and practices relating to environmental sustainability ('Sustainability', 'Green', 'CarbonReduction', 'RenewableEnergySources', 'Nature') were mingled with concepts around shared living, mutual support, farming, rural life, quality of life and alternative political and domestic paradigms. The central GU of Canon Frome Court was growing food and food production, i.e. 'FabulousFood', and many of the other concepts are connected to this. For example, it has links with 'Sustainability', ideas of shared living ('WorkingTogether'), autonomy ('Antiglobalisation') and rural life ('LandStewardship', 'QualityofLife').

This word cloud was co-created by the community after a disagreement over whether to obtain eco-friendly district heating caused a significant conflict. It was felt that this exercise formed part of a process of healing and alignment on values. Like LILAC, their values are a series of connected concepts, although their visual representation (which clusters these ideas together loosely) perhaps reflects less alignment than the symbolic coherence of LILAC's graphic representation.

The Vale community living had a house agreement which was more directive than Canon Frome Court and LILAC cohousing, as they extended beyond GU into TARs, in the form of instructions and aims for practices. For the most part this agreement had little mention of topics relating to environmental sustainability, and those tended to be fairly non-directive. There were some mentions of environmentally ethical practice, for example:

> We aim to buy organic and fairtrade food, and ecological cleaning supplies where possible. (The Vale House Agreement)

The words 'aim' and 'where possible' show the non-directive nature of this statement. There were also mentions of food-related practices within the House Agreement that have pro-environmental impacts, though they do not necessarily fall under general understandings of environmental sustainability. These include:

> Shared meals are vegan/vegetarian and friendly towards people with other dietary requirements (e.g. gluten free).
>
> We aim to cook a fairly large amount, ideally so that there are leftovers for people coming home late or for lunch the next day.
>
> We aim to purchase bulk supplies from a cooperative wholesaler such as Suma, where possible. (The Vale House Agreement)

The most directive statement relates to the meals being vegan and vegetarian (as indicated by the word 'are' as opposed to 'aim to'), which related to the dietary requirements of some of the residents, so was arguably more about the community accommodating the needs of its members, rather than strictly environmental concerns. Yet, veganism and vegetarianism eating practices are often linked with TARs of environmental sustainability. Finally, a vague reference is made to environmental sustainability in the opening statement of the House Agreement.

The Vale

We are a mindful community seeking to create a shared space of warmth, acceptance, inspiration and authentic connection.

We are committed to living together in a way that cultivates a wise flourishing of life for ourselves, each other and the world around us.

Figure 7-4: The Vale's House Agreement, Page 1

The words 'We are committed to living together in a way that cultivates a wise flourishing of life for ourselves, each other and the *world around us*' (researcher's italics) may indicate a declaration of GU of environmental sustainability, although considering the ambiguous wording, this claim is largely validated by the contextual knowledge of the pro-environmental practices that residents engaged in.

Not all communities documented their GU or TARs. This was the case at Springhill Cohousing. The example of Springhill shows that co-created documentation of pro-environmental GU is not possible if residents do not share in GU and/or do not *aim* to share in GU. Resident Vince observed that Springhill was 'a group of individuals in regards to environmental sustainability'. While it appeared to be the case that many of the residents did care about the environment, not all residents were willing to enshrine this in documentation or community policy. To one resident, Rebecca, the idea of a sustainability-related policy of some kind would have felt like an imposition on her freedom and sense of comfort within the space: 'I would hate to feel… that I was being monitored by the environmental police as I was wandering around or something' (Rebecca, Springhill Cohousing). Residents reported that the founder of Springhill Cohousing "banned" discussions around values, not wishing the residents at Springhill to be an intentional community.[27] The results were that there was no mandate to collectively engage in pro-environmental practice.

Liquid Monastery coliving also did not engage in co-creating documented GU/TARs. The managing residents did link the setting up of the community with meanings of pro-environmentalism and sociability. Yet, they wanted to 'keep the ideology level really low' as they were concerned about making their meanings explicit being akin to 'top-down […] morality' (Francesco, Liquid Monastery coliving). This contrasts with the co-creative method for determining house agreements and values which LILAC cohousing, Canon Frome Court cohousing and The Vale community living were engaged in. Indeed, this co-creative element is a key difference between cohousing, community living and coliving, with the latter community typology being a managed community, rather than a community with an egalitarian power structure. However, within intentional communities it tends to be the case that a core of founding members will define an initial vision for the community, which joining members are expected to be aligned with (even though visions/values documents are typically perceived as living documents which can evolve over time). Nevertheless, in this sense, the difference between cohousing, community living and coliving is not absolute. Yet, Francesco of Liquid Monastery's unease about imposing his morality on other residents, reveals how such power imbalances can restrict discussion and intentional practice-based applications of GU. Francesco, who

[27] It should be noted that this "banning" of discussion of shared values is atypical for cohousing communities.

was one of the managing residents of Liquid Monastery, said that he wanted their home to be a 'nice relaxing retreat' and that 'you don't want even more pressure' (i.e. explicit rules and expectations) considering the demanding pace of life in London. This suggests that when articulated GU/TARs (in the form of rules or otherwise) are created by those who manage, there are meanings of pressure and control attached to them, whereas when they are co-created, this is less overtly the case, as – in theory – all residents are aligned in their GU/TARs, and they therefore do not have the same meanings attached. The reality may be more fraught, as explored in the next section.

7.3. Negotiating interpretations of sustainability-related GU

Co-creation of shared GU/TARs enabled alignment on a shared sense of identity, as group members had a shared understanding of what concepts they held in common, potentially (though not always) how those concepts were applied, and therefore to some extent how they defined themselves as a group (Tajfel and Turner, 1986). Broadly speaking, members of the communities were fairly aligned in their GU/TARs relating to environmental sustainability. Most residents purported to have some concern about the environment, and engaged in similar pro-environmental practices. However, this section explores instances of misalignment and tension, either between community GU and individual meanings, or between different individuals' meanings within the same community.

Underneath these community-level documented GU, practices relating to environmental sustainability were variable, were negotiated by individuals-as-part-of-a-group, and were sometimes contested. Whilst LILAC residents may generally be described as very eco-conscious (an attribute backed by the results of the quantitative data – see *Figure 6-1*), there were indications that some LILAC residents had an image of their community TAR which sometimes did not match with the practices of community members. One resident described LILAC as an 'almost zero flight community', and during a survey induction workshop at LILAC, another resident expressed a concern that a flight she had taken would 'skew' or 'ruin' the data gathered from the community (to which none of the others present openly disagreed). Qualitative evidence showed that there were certainly anti-flight group norms at LILAC for environmental reasons. Some residents did not fly at all, some reduced their flights through choosing to holiday in the UK or turning down opportunities for trips abroad, some mentioned offsetting their flights. Yet, the survey results perhaps belied the perception of LILAC being 'almost zero flight': of the nine LILAC households that took part in the

survey, four had taken flights within the last year.[28] One resident discussed why people at LILAC flew, and whether flights "needed" to happen or not:

> Irene (LILAC cohousing): people do fly, maybe because they've got family abroad or, or it's a once in a ten-year flight or something like that, and one or two people fly for, er work or leisure or something that, that doesn't need to happen.

Irene separates flights that do and do not need to happen. Flights to see family, or rarely undertaken flights are something that LILAC-ers do (as she says, 'people do fly' for these reasons). However, 'one or two people' fly for 'work or leisure or something […] that doesn't need to happen'; though presumably, a 'once in a ten year' flight, or seeing family may also overlap with flying for leisure or work. This vagueness between flights that do or do not "need" to happen indicates the contextual nuances of what justifies the environmental toll of a flight to Irene. Irene's observation that some LILAC resident's flights do not 'need to happen' implies that the field of acceptable orders on flights is contested (though not necessarily overtly). A further example of this can be seen with the negotiation of when it was and was not acceptable to take a car rather than public transport. LILAC residents had a target to have 0.5 cars per person, and it was regarded as a social norm to minimise car use through carsharing and use of sustainable alternatives. To some residents, such as John, the transport practices of neighbours could be a slightly contentious issue:

> John (LILAC cohousing): most people in LILAC are actively up for reducing their car journeys. Well, there are a small number of families who haven't quite got that yet who maybe come from a different background who are just, built in that mindset of, you have a car and you go everywhere by car that's how you get around…

The phrase 'haven't quite got that yet' suggests that John assumes or desires that these residents will eventually align with 'most people' at LILAC in terms of transport practice. John's opinion does match the quantitative data: LILAC's emissions from car journeys were significantly lower than the average household (see *Figure 6-17*), and they cycled and took the train far more often (see *Figure 6-16*). John suggests that those who do not actively reduce their car journeys have a different 'background' and 'mindset', in other words, their driving practice is related to a different TAR. All residents may align with a GU that environmental sustainability is important, yet they do not always

[28] This is close to the national average. According to the National Travel Survey (2019c), 51 percent of those surveyed had taken one flight or more abroad within the last 12 months.

align on how it should be applied in practice. As with aeroplane flights, the field of acceptable orders differed between residents, leading to some tension.

This research found that expressions of resentment were rarely communicated, perhaps due to the social norms of social supportiveness within the communities, plus a social norm against showing resentment, though this emotion was occasionally touched upon. In an interview, John reflectively explored his own feelings of resentment in relation to transport.

> John (LILAC cohousing): I think a lot of people have inconvenienced themselves by not taking the car […] our journey times are longer and more difficult, and I think there's probably some unresolved tension between those people that are making the effort and those people that aren't. You know you see somebody driving out of the car park you think, I kind of know where you're going, why, why are you driving there? […] so there's a little bit of that, comparing with each other, and there might be some shame and guilt and we don't want to precipitate those kind of feelings…
>
> […]
>
> I wouldn't want to give you an impression that there's a huge amount of, unpacked resentment, you know about different car use. Um, I think it's quite a big thing for me […] but other people might not see it this way at all.

John's words indicate that to him, minimising car use is an injunctive norm at LILAC. Indeed, the community had a target of having 0.5 cars per person, which is implicitly linked with minimisation of car use. He spoke reflectively about the affects attached to driving and not driving: shame and guilt on the part of those who drive more than others, and resentment on the part of those who are 'making the effort', but see 'people that aren't'. Notably, the spatial and social intimacy of life at LILAC may increase these emotionally loaded observations, as, according to John, residents are more likely to know where their neighbours are travelling to, and so are more likely to apply judgments of the appropriateness of a car for that journey. If we are to interpret the term "precipitate" by its literal definition (meaning to make something happen suddenly or sooner than expected), then John was not suggesting that there should *not* be any guilt or shame attached to driving, but rather that these emotions should be handled in a sensitive and timely manner. The implication of that statement is that this is not a case of "live and let live", but rather, "they should change", though the change should happen without precipitating negative emotions. John also reflected that this was his

own perception, and that others may feel differently. This statement may be interpreted as a comment on the opacity of the feelings of others, or it may be perceived as him being cautious about speaking for the community as a whole, despite it potentially being reasonable to do so, given LILAC's co-created GU and TARs, i.e. the target of 0.5 cars per household, and documentation which features "low-impact" living as a core value. Rather than cite LILAC's agreed values and target, John prefers to rely on LILAC's social norms, as suggested by his words, cited earlier: 'most people in LILAC are actively up for reducing their car journeys. Well, there are a small number of families who haven't quite got that yet', and his indication that there should be an (appropriate) amount of guilt and shame attached to driving a lot. Perhaps, as with the managing residents of Liquid Monastery coliving, there is some discomfort in referring to documents in a manner that frames them as rules.

At Canon Frome Court cohousing, whilst documented GU contained several terms which related to caring for the environment ('Sustainability', 'Green', 'CarbonReduction', 'RenewableEnergySources', 'Nature'), the TARs that residents were carriers of differed. One resident, Tom, shared that whilst residents were broadly 'sympathetic to the environment':

> Tom (Canon Frome Court cohousing): […] that ranges hugely, er from people who, yes want to grow food organically […] and that's really for their own consumption because they want to eat food which isn't contaminated - pesticides and antibiotics - um er, to people who do really have a really profound, er, view […] on the environment where you know where, they don't own a car, er where they don't go on aeroplanes.

The growing of organic food was the main uniting GU and TAR of Canon Frome Court community, as expressed by their word cloud (see *Figure 7-3*), in which the phrase 'FabulousFood' is the most prominent. Meanings of environmental sustainability tend to be attached to the growing of organic food; but, as Tom expressed, this was not the case for everyone. The range of views on environmental sustainability were brought up by several residents during interviews, including Julie, in relation to the decision of whether to purchase pigs:

> Julie (Canon Frome Court cohousing): […] it came up in a small discussion group […] we were talking about having pigs again next year and actually someone else was in my small group said "well yeah I'm concerned about the global impact of, meat production and so yeah that's a reason to think about not having them again", and the looks on the faces of the three other people in my group yeah it was really clear that they just think that's nonsense.

This moment illustrates that the TARs relating to environmental sustainability were not wholly aligned between residents. To different residents, certain practices may or may not be attached to meanings of environmental sustainability. This misalignment could particularly occur when pro-environmental practices may have interrupted the TARs surrounding food production. Whether to have pigs (one of two animal groups reared purely for meat consumption) was acknowledged as being a controversial issue, with the debate changing over time as the composition of the community had changed. One resident, Ted, shared that when he first joined the community the majority of people were vegetarian, and so there was less support for keeping pigs, with some residents getting 'quite upset and agitated' about having pigs; whereas by 2017 vegetarians made up a much smaller portion of the community, and so the conversations about purchasing pigs were much more 'positive'. Ted's observation indicates that although GU of environmental sustainability have been broadly shared by the community, what practices the group have linked with this GU changed according to the composition of individuals that make up the group, and the negotiation of their meanings. Therefore, it seems, as with LILAC cohousing, the negotiation of social norms which played out within a community that has co-created GU were significant in determining actual practices.

Within all shared living communities, there was evidence that resident's pro-environmental practices *were* influenced by other community members. Some examples of this included Justin of Canon Frome Court cohousing flushing the toilet less after moving to the community (because he heard that 'it was something that was done here to save water, so [he] just joined in'); Emily and Francesco of Liquid Monastery coliving getting into second hand clothes shopping after seeing their flatmates doing the same; and Harry of The Vale community living reporting that his housemates now flew less, having been exposed to the anti-flight norms of other residents (and indeed, quantitative data shows The Vale's emissions from flights to be below the UK average [See *Figure 6-19*]). Levels of influence appeared to be strongest at LILAC cohousing, which had the clearest documented GU of environmental sustainability. For example, over half of residents at LILAC reported that their change to a more sustainable form of commuting of was due to living at LILAC (Bonner, 2020), and whilst there may have been numerous reasons which contributed to this (including proximity to better sustainable transport infrastructure), the qualitative research suggests that the social norms of the community had a significant role to play.

> Jamie (LILAC cohousing): If you see your neighbours making an effort, try not to drive, getting the bus more than you're more inclined to do it yourself and there's definitely a little bit of that that's rubbed off on me.
>
> Irene (LILAC cohousing): Having a car here feels the bit that's countercultural. And I'm constantly challenged as to why when I live three miles from the city centre, and [have access to] public transport I would need to drive.

Jamie positioned his inclination to drive less as a social norm: influenced by the perceived effort and actions of others within the community. Similarly, Irene said that she understood having a car at LILAC as not the norm ('countercultural'), and that this had increased her salience of her own driving practices ('I'm constantly challenged'). The documented GU of environmental sustainability at LILAC meant that the field of acceptable orders in which residents negotiated their actions was different to that of a community in which such goals had not been collectively articulated, for example, Liquid Monastery coliving. Residents at Liquid Monastery *did* report being influenced by their housemates to adopt new pro-environmental practices, for example, Isabella and Pablo said they were attempting to reduce their use of plastic, having noted their house-mates' efforts to do so. However, residents did not express the same feelings of obligation that LILAC residents tended to feel (e.g. 'If you see your neighbours making an effort…' Jamie, LILAC cohousing; compared with Pablo, Liquid Monastery: 'I'm not going crazy with these things' [pro-environmental practices]).

At times, these expectations led to residents challenging one another about their practices, or making requests for other residents to engage in certain practices. This could apply to straightforward tasks (e.g. requesting that someone adheres to an agreed-upon cleaning rota) or actions which are attached to GU (e.g. proposing that the community purchases solar panels, based upon shared pro-environmental GU). The Vale community living, which had a documented TAR, detailing how their shared GU translated into an assemblage of practices, was the community where residents most often requested other residents to change their actions, often using a communication method known as nonviolent communication to do this (more on this in *8.4*). In reference to their House Agreement, resident Harry said that 'rules are freeing' in the sense that they remove uncertainty around group norms, thus ensuring the comfort of those who have made the rules (Cox and Narula, 2003; Holloway and Valentine*,* 2001). Though Harry emphasised that 'rules have to be lived as well as written down', and mentioned that he would 'name' parts of the House Agreement when appropriate, giving the example of mentioning that a weekend gardening activity was not part of the cleaning rota, so nobody should feel guilty about not taking part. It

should be noted that within The Vale community living, Harry was one of three people who conceived the vision for the community, and that 'it was take it or leave it, in terms of the [other residents], although they did contribute' (Harry, The Vale community living). Therefore, Harry – along with the other two residents who originally visioned the community – may have felt particularly comfortable with the House Agreement. The Vale's documented TAR provides an interesting example of how a co-created agreement can be used as a means to maintain agreed-upon practices, including, in the case of The Vale, the pro-environmental practice of all residents eating vegan/vegetarian meals together, despite half of the community being omnivorous.

Compared with The Vale community living, LILAC and Canon Frome Court cohousing's documentation was more focused on GU, and less focused on how those understandings translated into specific practices (TARs). As has been discussed, this possibly led to some division on social norms around acceptable practices. Perhaps somewhat as a result, residents usually refrained from directly challenging one another on certain practices with environmental implications. Most residents suggested that influence through visibility of pro-environmental practices was most effective (creating perceived social norms); as John of LILAC said: 'I think the best way to shape it is not to lecture somebody but just, do it differently and so maybe they'll just get on board with it.' LILAC resident Irene felt that conversations about flying were 'almost out of bounds beyond the fact that we say we don't fly' (perhaps a way of attempting to pass an injunctive norm ["I think you should do this"] as a descriptive norm ["most of us do this"]), and went on to talk about eating meat (although LILAC residents had some communal meals, the majority of meals took place within households rather than communal spaces):

> Irene (LILAC cohousing): there are conversations in LILAC that are […] harder, and another one that's a bit out of bounds [is] the meat-eating discussion. […] there are people from different cultures, you know, European cultures, who might say […] it's really part of my culture, and um, nobody wants to sort of shame or oppress anybody else. So, actually […] it can go underground […] it flares up every now and again […]

Irene's use of the term 'a bit out of bounds' is significant, as it frames certain practices as somewhat untouchable, although the words 'a bit' indicate ambiguity. Certain elements within LILAC may, to some extent, shift these practices towards being "within bounds". Elements include GU around environmental sustainability, particularly as they have been codified; the decision to live together as a community and extend typical notions of what is shared; physical proximity making practices more

visible; and the close relationships and familiarity often fostered between community members enabling more open communication. Pushing back against these factors are the perceived danger of oppression and shaming; the desire to maintain social harmony with fellow community members; and existing norms around rights to privacy, which are spatially maintained through family units having their own households. These elements each exert their own force which may change from moment to moment in accordance with varying situations. Issues such as meat eating therefore are present but 'underground', and 'flare up every now and again'. Inherent within such moments is the question of where the boundaries are between what should and should not be shared. This is partly dependent on the spatial and social arrangements of the community: The Vale community living shared a household and had agreed to share their meals, and so unlike LILAC cohousing had to align on certain eating preferences. Though it is also dependent upon what is perceived as acceptable discourse within the communities. LILAC resident Harriet spoke about how she challenged *herself* to challenge others on their unsustainable practices:

> Harriet (LILAC cohousing): we're trying – it's really hard to be consistent […] there are discussions you'll have here... you watch yourself not have them… It's really interesting to try and, er […] in the nicest possible way just challenging people […] I did it to someone the other day, heading off to Primark to get some T-shirts and I sort of said "Why Primark?"

Harriet was attempting to form a new norm for herself where she consistently and in the 'nicest possible way' challenged people on what she perceived as their unsustainable practices. Reflexivity on her part ('you watch yourself') helped to make this communicative practice salient, making these challenges conscious and intentional rather than heuristic reactions. The words 'we're trying' and 'it's really hard' showed the difficulty she felt in engaging in a discourse which transgressed norms of private/shared practice.

Often, where residents collaborated at a communal level there was some obligation to consider environmental sustainability (e.g. all communal meals at LILAC were vegan/vegetarian), but what people did within their own households was 'a bit' (that is, not entirely, but mostly) 'out of bounds'. Canon Frome Court cohousing was similar. One resident, Ted, remarked that he felt they did 'better' in regards to environmental sustainability on collective endeavours rather than those things left to individual households (giving the example of his children ordering 'as much stuff from Amazon as most teenagers do'). One Canon Frome Court resident, Roisin, did report challenging her neighbours about perceived unsustainable practices. She spoke about how she was 'always trying to get people

to program their heating', and how she had corrected one neighbour who was not recycling correctly. However, these examples appeared to be the exception rather than the rule.

Overall, when residents spoke about influencing or being influenced in relation to pro-environmental practices, they framed it in terms of the perceived expectations of others (social norms) rather than a co-created/shared community commitment to environmental sustainability. Yet, it seems that documented GU at the community level created a field of acceptable orders in which pro-environmental practices were a social norm, in which residents could negotiate and situate actions for themselves and others within the group.

7.4. Hierarches of TARs: negotiating sociability and environmental sustainability

A key GU within communities was a desire to live *as* a community. This was expressed through practices which developed social bonds with fellow residents, through sharing in certain elements of each others' lives, and supporting one another both practically and emotionally. This TAR is referred to by this research as sociability. This section explores the relationship between TARs of environmental sustainability and sociability, exploring moments where practices attached to these different TARs interrupted one another, where residents used strategies to negotiate between the two, and where the two TARs were aligned in terms of practices.

There were numerous instances in which practices which sat within TARs of sociability overrode practices sat within TARs of environmental sustainability. In particular, this was seen in the use of resources to ensure the comfort of others. Research has linked certain heating practices, such as log fires and higher temperatures, with meanings of homeliness and care of others (Groves *et al.,* 2016). Such meanings, linked to notions of welcome and sociability, were also apparent in this research. One such example of this took place at LILAC cohousing, during a music night in the common room. The community had opened up its space to some refugees on a temporary basis, as part of refugee programme. One of the refugees (Ali), spotting the log burner, mentioned how much he enjoyed sitting by the fire, and so a LILAC resident obligingly stoked and lit the log burner. As more people arrived for the music night, and the heat of their bodies increased the temperature of the room, the door was propped open to let the cool air in whilst the fire still burned. In terms of energy use the lighting of the fire was not particularly efficient; yet the act was significant in extending a sense of welcome to Ali. At Canon Frome Court cohousing, the point was made that meanings of welcome

and sociability can also be attached to light. During a social gathering, resident Dan told the group how he and his wife Sal had felt guilty about being the only ones in the courtyard who had their porch light on, due to its energy consumption. As a solution, they had changed their porch light to being motion-sensor operated, yet, he still felt that now it didn't seem as 'welcoming' as it had done previously. A similar negotiation was witnessed in regards to water usage. During a visit to a home of two LILAC residents, it was mentioned that they saved their greywater in a bucket and used it to flush their toilet. However, when I went to use their toilet, I was told by one of the residents 'not to worry' about using the bucket, and that I should go ahead and use the flush. One final example of prioritizing sociability over sustainability was given by a Springhill Cohousing resident, who spoke about how the purchase of new furniture for the common house had contributed to it being used more by residents.

> Veronica (Springhill cohousing): initially, it [the common house] was full of people's dumped furniture. People had arrived with big old sofas they couldn't fit into their house they thought ooh that'll be nice in the middle floor, so there's a load of, of really rubbish old furniture, you know we needed to get rid of and get agreement, to buy modern furniture, um, and gradually over time this, it is used more... and I think that's really good because, you know, it's, it's a brilliant resource.

Arguably, the purchase of modern furniture, as opposed to the more environmentally sustainable option of using second-hand furniture, enabled more sociability between residents, through encouraging more use of the communal space.

Within Liquid Monastery coliving and The Vale community living, similar practices took place with meanings attached of "being a considerate housemate". Thermal comfort formed a part of this TAR, and so whilst the temperature maintained was generally not perceived as high, some residents indicated that if it were not for their housemates, they could have stood it to be a bit lower. It was reported to be common practice in cohousing communities to not always flush the toilet in order to save water. However, this was never reported as the case in coliving or community living communities. As residents shared the same bathrooms, such a practice would have contravened meanings of being a "considerate" housemate – a factor that was mentioned frequently by residents as being important in maintaining harmony.

The link between heating, lighting, water use and purchase of materials in relation to meanings of welcome and sociability is their connection with the idea of comfort. Comfort is not a universally agreed-upon or measurable concept, but rather an 'ongoing process' and a 'negotiation between different elements' (Pickerill, 2016, p.148). Whilst this concept is malleable, there are certain broadly shared understandings of what physical comfort within western societies entails, and certain domestic assemblages of materials and practices that typically support these understandings. For example, heat sources (central heating, log burners) for warmth; food and drink to satiate hunger and thirst; and furniture (chairs, couches) to support the body and prevent or accommodate fatigue. As Pickerill (2016) notes, there is a tension between comfort and environmental sustainability, with the former more often linked with a generous use of energy (e.g. turning the heating up to make sure that guests are kept warm) and the latter linked with frugality. In the examples mentioned above, TARs of sociability were ordered above TARs of environmental sustainability, although it would be reductive to claim that this would always be the case. The invitation to use the toilet flush rather than the greywater bucket may not have been extended to someone who Norma judged to be more familiar with using the greywater bucket, for example. During fieldwork it did seem that comfort in relation to sociability[29] "trumped" environmental sustainability, although my role as a guest perhaps restricted my access to group norms for ordering sociability-related comfort and environmental sustainability in daily life.

However, during fieldwork some alternative strategies which negotiated these two TARs were witnessed. One novel method of negotiating thermal comfort (and by extension, sociability) with TARs of sustainability was demonstrated during a visit to a LILAC cohousing household. My host, Norma, offered me an extra cardigan and a pair of slippers upon arrival to ensure that I was thermally comfortable. This practice of sharing clothing with a near-stranger was an intriguing example of how shared living communities tended to blur traditional concepts of what materials are private and what could be shared.

In relation to heating, Canon Frome Court cohousing faced particular challenges with their building, which was a large and poorly insulated Georgian manor house. The building had extensive communal areas, many of which were infrequently used. Yet, when they were used for sedentary/semi-sedentary activity during cold weather, heating was essential for comfort. As a

[29] It is important to make the distinction between comfort relating to sociability (i.e. ensuring others feel comfortable) and comfort in general. Community members undertook numerous pro-environmental activities which are not attached to broadly understood meanings of comfort, such as cycling rather than driving, or growing food rather than shopping in the supermarket.

result, in some communal spaces heating was treated like lighting: turned on when people were in the room, turned off when people were not. The knowledge of how to carry this out was enabled in some rooms through heating programmers, instructions for which were communicated through signage.

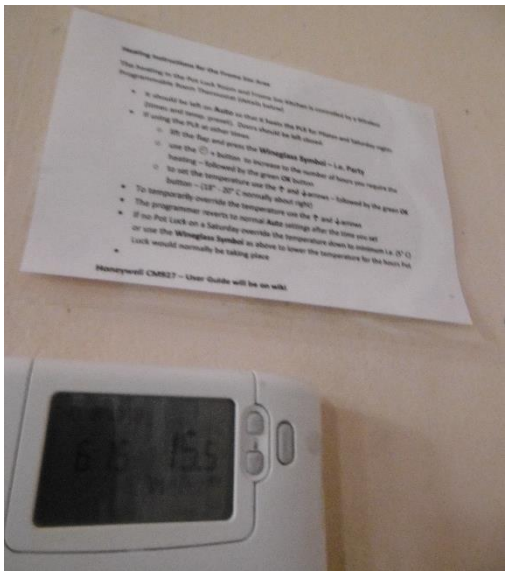


Figure 7-5: Heating instructions at Canon Frome Court cohousing

This same approach was taken by LILAC cohousing in their guest bedroom and bathroom. Instructions made it clear that residents should feel empowered to look after their own thermal comfort.

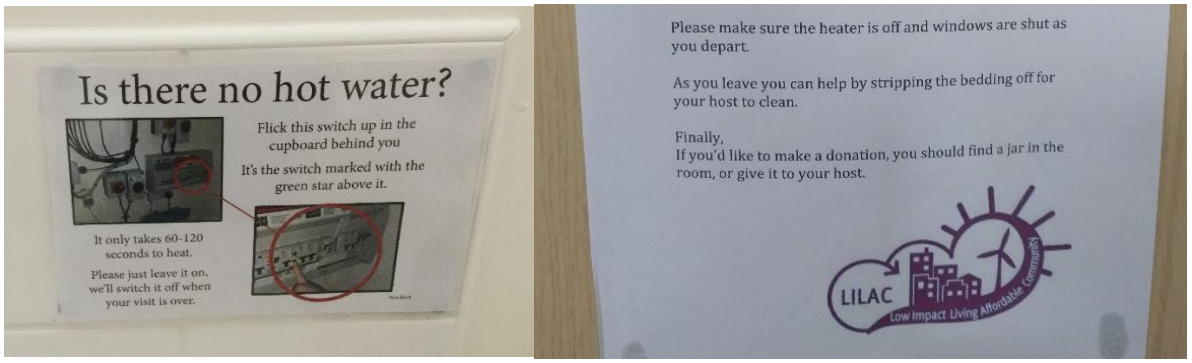


Figure 7-6: Instructions on turning on / turning off the hot water / heating at LILAC cohousing

Activities in communal spaces at Canon Frome Court and LILAC cohousing which were leisurely and/or sedentary (e.g. pot luck meals, fortnightly meetings) were planned in advance (a necessary step in coordinating large groups of people), consequently enabling a designated person to prepare

the space thermally beforehand if necessary. It was therefore through the routinized nature of leisure/sedentary activity in communal spaces, and the enablement of spaces to be independently heated on an ad hoc basis, that thermal comfort could be achieved in a manner which did not greatly denigrate TARs of environmental sustainability. These time and location-specific heating practices were found to be mirrored in some residents' homes. When Dan and Sal of Canon Frome Court cohousing had people over in the evening, they would light the log burner in the living room and shut the door, keeping the room inhabited by people warm, and the rest of the house comparatively cold.

It is also worth noting that the endeavour-based nature of practices within some communal spaces at Canon Frome Court cohousing meant that heating was sometimes not necessary or expected. In areas such as the hallway, the so-called "dairy kitchen" (where dairy and other food products were stored and processed) and the gym (an old school gymnasium), people's shoes remained on, spaces were unheated and doors to the outside were sometimes left open. The expectation of these spaces was that they were places of physical endeavour rather than places of leisure (e.g. carrying buckets of milk into the dairy kitchen, passing through the hallway on your way to the garden, storing bags of apples in the gym). It would not, for example, be typical to see a resident in the hallway, sitting on a sofa and reading a book. As the Canon Frome Court community was frequently brought together through shared physical work, warmth could be obtained through other means, such as the physical labour of gardening (and the accompanying hot drink during a tea break), and the practical clothes that residents tended to wear, which were perhaps warmer than typical leisurewear. Therefore, sociability could often be achieved without space heating. This was not so much a negotiation between TAS of sociability and sustainability, but rather is a way in which the two were aligned.

The above was one of many ways in which the TARs (teleoaffective regimes, i.e. concepts which join multiple practices under the same teleology and affectivities) of sociability and sustainability aligned in terms of practice. Shared amenities (e.g. communal cooking facilities), transport (e.g. carsharing), objects and meals all encouraged sociability and had GHG-lowering impacts. These practices tended to fall under both TARs of sociability and environmental sustainability, though were often motivated by one more than another. For example, Springhill cohousing residents maintained that the key reason for their launderette was that they had read it was a good way to facilitate social interaction. In contrast, carpooling in Canon Frome Court and LILAC cohousing fell chiefly under sustainability-related TARs. Further, whilst TARs of sociability sometimes led to greater environmental impacts, the

social bonds formed and reinforced through the prioritisation are likely to have increased opportunities for knowledge-sharing and influencing relating to pro-environmental practices.

7.5. Conclusion

This chapter began by exploring the documentation of pro-environmental GU and TARs within shared living communities, as well as those who did not engage in this practice, either due to non-alignment of GU and/or no aims *to* be aligned, or due to perceptions that creating GU/TARs would risk imposing those GU/TARs on others, due to power differentials within the community. The two cohousing case studies mainly had shared GU, with one community having some TARs, and one community living case study had both a shared GU and associated TARs. The chapter then looked at instances of tension, where residents practices did not align with community GU, or where residents had different social norms on what was and was not acceptable practice in relation to environmental sustainability. It was shown that documented, pro-environmental GU influence the field of acceptable orders within a community, making pro-environmental practices more of a social norm. Yet, residents tended to refer to social norms (rather than documented commitments to sustainability) when negotiating expectations on whether they or others *should* engage in certain sustainability-related practices. This included many instances of residents adopting pro-environmental practices due to the influence of others. More specific TARs appeared to enable residents to challenge one another's practices, though instances of this were generally rare. GU of environmental sustainability were more likely to be embodied by practices jointly engaged in by the community, whereas "private" household practices in cohousing were *somewhat* "out of bounds", although tensions around these practices existed.

This chapter also explored the hierarchy of pro-environmental TARs and TARs relating to sociability. It showed that often within communities, sociability is above in the hierarchy when compared with environmental sustainability. Though, the chapter demonstrated some strategies used to accommodate both TARs, and showed that often the two were aligned.

In this chapter, the SPT concepts of GU (general understandings), TAR (teleoaffective regimes) and the "field of acceptable orders" were utilised to explore how pro-environmental ideals are shared. GU were conceptualised by Welch and Yates (2018) to help explain collective action. They are defined as a 'category component' which is common to many practices, and may sit across discursive and non-discursive boundaries (p.292). This was a fitting way to understand the concept of environmental sustainability within the shared living case studies, most of which did engage in some

form of discursive alignment upon this concept, which did indeed form a component of different practices. What was significant about this concept within the context of this research was how the discursive and/or corroborative process of shared living led to the translation of GU into TAR, which are defined as 'the specification or application of general understandings' (Welch and Yates, 2018, p.292). These two concepts alone would not have been enough to describe the complex lived experience of collective engagement in pro-environmental practices, as engagement was not always consistent or, indeed, collective. Rather, it was highly contextual, and often shaped by the perceived expectations of others. This is where the concept of the field of acceptable orders, shaped by group norms, was useful in explaining these contextual nuances and ambiguities. However, within this conceptual framework, a limitation exists on its lack of investigation into how pro-environmental practices may have been shaped by personal experiences, convictions, and biographies.

Chapter 8. Tools for negotiating "intentional we practice"

This chapter explores the communications tools used to negotiate "intentional we practice". The chapter begins by defining what is meant by "intentional we practice" and how this concept relates to pro-environmental practices. It goes on to look at decision-making practices. It shows that communities tended to use consensus-like approaches, and that cohousing communities tend to have a structured approach to accommodate larger numbers of people, whereas within community living and coliving communities, residents could rely more on having shared norms (therefore taking a less structured approach to shared decisions). The chapter explores the lived experience of using these decision-making systems. It argues that the process of shared decision-making increases the salience of practices, thereby helping to facilitate changes which align with pro-environmental general understandings (GU). The chapter discusses digital communication methods within communities, looking at some of the challenges of the systems used. The chapter also investigates one community's use of nonviolent communication (NVC), a communication tool to mitigate conflict. The practice of "making" NVC a social norm is discussed. This use of NVC is contrasted with conflict resolution processes in some other communities, where a lack of clear process means that conflicts take longer to resolve, are emotionally burdensome and/or remain unresolved. Finally, how practices of deep listening and reflexivity (engendered by decision-making and conflict resolution processes) may "suffuse" into pro-environmental meanings is tentatively explored.

8.1. "Intentional we practice"

Within shared living communities there is an intention to live together in a way that extends beyond co-existence. Residents have an aim to share in spaces, resources, and social time, and potentially certain doings and meanings. As such, communities typically have certain processes in place to enable shared governance. Borrowing and extending upon Jarvis' (2019) concept of 'we-intentions'

(p.262), which describes the entanglement of individual agencies into shared general understanding (GU), group goals and joint action, this chapter uses the term "intentional we practice". This means the actively engaged in agreement or alignment of certain actions, in which meanings attached to those actions do not necessarily need to be aligned. This is not "groupthink", in which there is implicit or explicit pressure to conform, and unanimity of viewpoints (Janis, 1982). Conflict, whilst usually respectfully conducted, is often part of reaching agreement (Jarvis, 2019), and competences of negotiation and reflexivity are needed for such collaboration to occur. Even once agreed practices are arrived at, individuals may still have differing viewpoints. Yet the objective to align upon practices overrides the desire for those viewpoints to be adhered to, especially if the individual is in the minority.

This chapter explores the processes in place which enable "intentional we practice", looking at how decisions are made, how information is communicated and how conflicts are managed. The relation of this topic to pro-environmental outcomes lies in so many of these outcomes being dependent upon the ability to coordinate: whether in the sharing of resources or the engagement in joint projects. For shared processes to be put in place, and shared projects to move forward within cohousing and community living, individuals within the community must hear each other, be heard, and arrive at an agreement which then becomes lived practice. This process of coordination therefore plays an inherent role in pro-environmental practices. The coliving community case study had a different process, which will also be discussed.

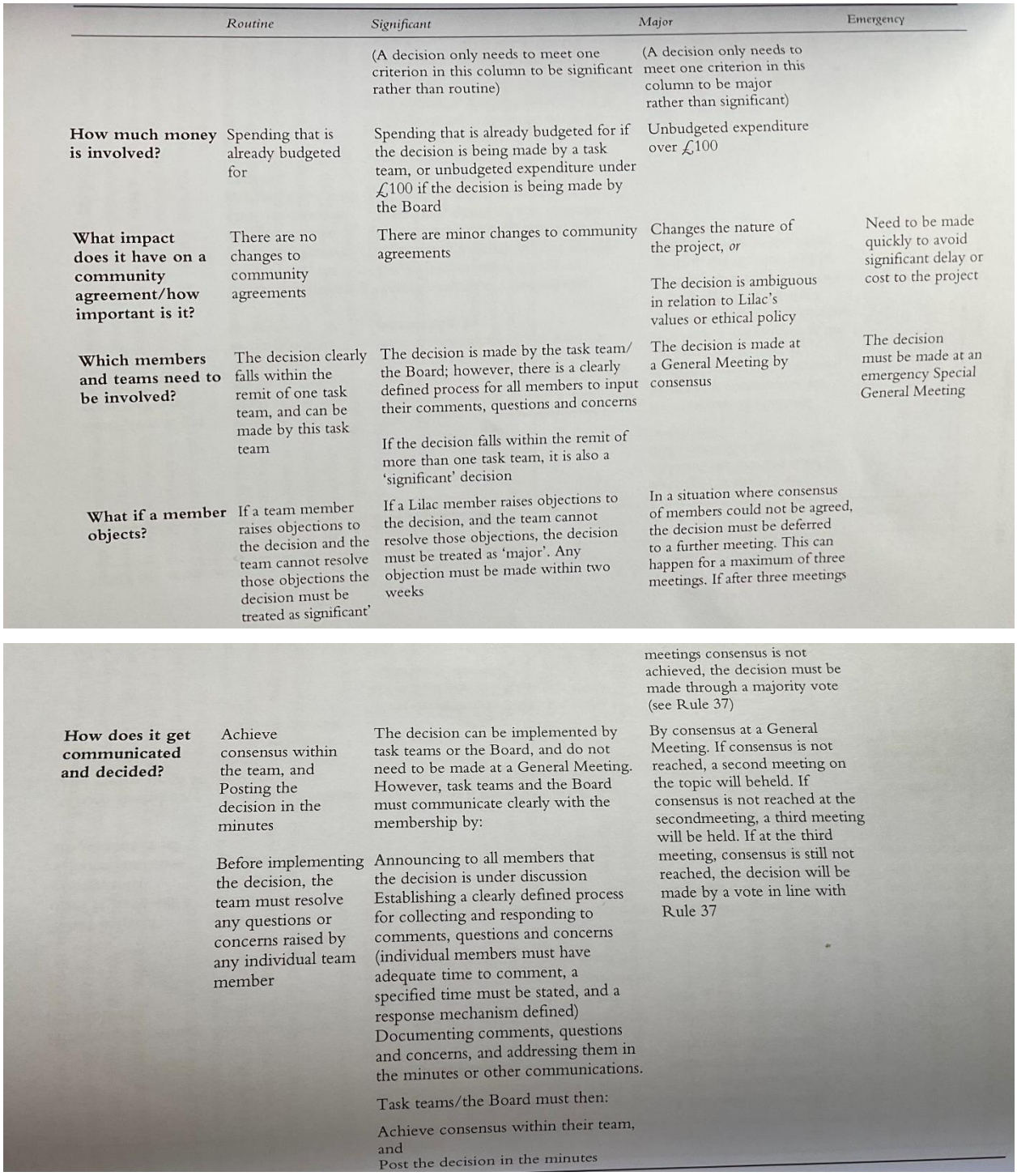
8.2. Decision-making

In this section the process of decision-making within communities is explored. A desire to share resources, routines, infrastructures, projects and practices meant that most communities in this study would agree upon decisions together using egalitarian decision-making processes.[30] One of these tools was consensus decision-making, which was used within cohousing and community living. Consensus is a decision-making model where decisions made are actively supported by all, with all opinions, ideas and concerns being taken into account. It is the most typical decision-making process for cohousing communities (Sargisson, 2007; Meltzer, 2000; Ruiu, 2016). Existing research which touches upon consensus decision-making and cohousing mainly refers to consensus as being important in creating a sense of community (Brenton, 2013; Ruiu, 2016; Sargisson, 2004), and as a technique that requires time, patience and commitment (Sargisson, 2012) that becomes harder with

[30] Egalitarian decision-making processes are defined here as decisions in which all participating in that decision have an equal say in the outcome.

larger groups of people (Ruiu, 2016). Boyer (2016) and Hausknost (2018) link governance within intentional communities with pro-environmental outcomes, as they argue that it enables collaborative consumption and the carrying out of shared visions and decisions. Meltzer (2000) also comments that consensus decision-making is one of the ways in which pro-environmental knowledge can be distributed. This research offers a contribution through its more detailed exploration of how community governance is linked with a community's pro-environmental practices, and its exploration of the differences in decision-making between the coliving, community living and cohousing case studies.

In the cohousing communities, making decisions tended to involve a formalised process, designed to accommodate different types of decisions, and to balance egalitarianism with expediency. While some decisions were made by the whole community, others were delegated to smaller groups of people (referred to as "working" groups or "steering" groups). Communities divided types of decisions into different categories, with different rules and processes for each. The image below shows the rules surrounding the different types of decision at LILAC cohousing.



	Routine	*Significant*	*Major*	Emergency
		(A decision only needs to meet one criterion in this column to be significant rather than routine)	(A decision only needs to meet one criterion in this column to be major rather than significant)	
How much money is involved?	Spending that is already budgeted for	Spending that is already budgeted for if the decision is being made by a task team, or unbudgeted expenditure under £100 if the decision is being made by the Board	Unbudgeted expenditure over £100	
What impact does it have on a community agreement/how important is it?	There are no changes to community agreements	There are minor changes to community agreements	Changes the nature of the project, *or* The decision is ambiguous in relation to Lilac's values or ethical policy	Need to be made quickly to avoid significant delay or cost to the project
Which members and teams need to be involved?	The decision clearly falls within the remit of one task team, and can be made by this task team	The decision is made by the task team/ the Board; however, there is a clearly defined process for all members to input their comments, questions and concerns If the decision falls within the remit of more than one task team, it is also a 'significant' decision	The decision is made at a General Meeting by consensus	The decision must be made at an emergency Special General Meeting
What if a member objects?	If a team member raises objections to the decision and the team cannot resolve those objections the decision must be treated as significant'	If a Lilac member raises objections to the decision, and the team cannot resolve those objections, the decision must be treated as 'major'. Any objection must be made within two weeks	In a situation where consensus of members could not be agreed, the decision must be deferred to a further meeting. This can happen for a maximum of three meetings. If after three meetings meetings consensus is not achieved, the decision must be made through a majority vote (see Rule 37)	
How does it get communicated and decided?	Achieve consensus within the team, and Posting the decision in the minutes Before implementing the decision, the team must resolve any questions or concerns raised by any individual team member	The decision can be implemented by task teams or the Board, and do not need to be made at a General Meeting. However, task teams and the Board must communicate clearly with the membership by: Announcing to all members that the decision is under discussion Establishing a clearly defined process for collecting and responding to comments, questions and concerns (individual members must have adequate time to comment, a specified time must be stated, and a response mechanism defined) Documenting comments, questions and concerns, and addressing them in the minutes or other communications. Task teams/the Board must then: Achieve consensus within their team, and Post the decision in the minutes	By consensus at a General Meeting. If consensus is not reached, a second meeting on the topic will beheld. If consensus is not reached at the secondmeeting, a third meeting will be held. If at the third meeting, consensus is still not reached, the decision will be made by a vote in line with Rule 37	

Figure 8-1: LILAC cohousing's decision-making process

Chatterton, 2015, pp. 181-182

Figure 8-1 defines the different types of decisions at LILAC cohousing (labelled as 'Routine', 'Significant', 'Major' and 'Emergency'), and outlines the processes for each type of decision, including who is involved, what happens if there are disagreements and how the decision is made

and communicated. Canon Frome Court and Springhill Cohousing also used similar processes to define and outline different types of decisions and processes.

This next section explores the process in place for decisions which required the agreement of the whole community. These decisions were made during general meetings, which tended to be held every few weeks, and were meant to be attended by at least one resident per household. In these meetings the communities would tend to use practices typically seen in professional organisations and bodies: there would typically be a meeting chair, an agenda and meeting minutes and actions being taken. They also used decision-making frameworks and processes to coordinate. All cohousing communities made joint decisions via a consensus-based model. *Figure 8-2* illustrates a typical process for consensus decision-making.

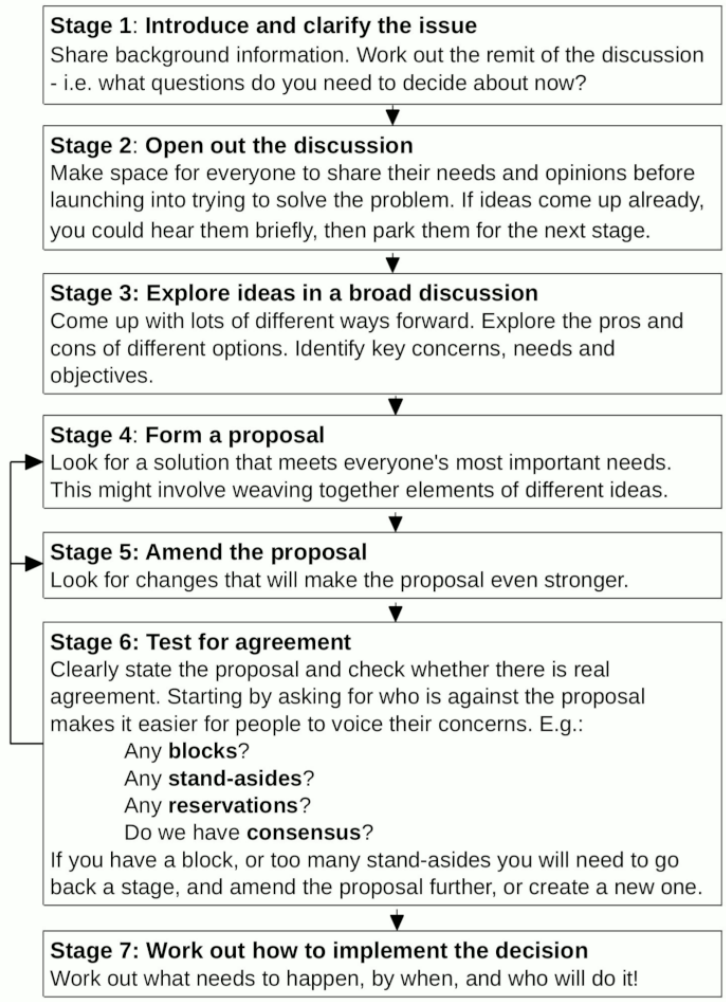


Figure 8-2: A typical consensus decision-making process

Seeds For Change, *no date*

Consensus is typically a slow process, as everyone's opinions must be taken into consideration by the group. For example, Springhill Cohousing residents spent two years coming to an agreement about installing new radiators in the common house. However, it was generally reported that whilst consensus was slow, the decisions which communities arrived at were better for it (e.g. in the case of the radiators at Springhill Cohousing, discussion led to the installation of other heat retention materials such as draft-excluders to increase insulation). Both LILAC and Canon Frome Court cohousing did not use a full consensus model: the communities would vote should consensus not be reached after a certain number of meetings.

Using a consensus model required certain competences, and all cohousing communities had undergone training on consensus decision-making. Competences consisted of knowledge of the consensus process, administrative skills, and "people" skills i.e. active listening, reflexivity, and thinking in terms of what was in the best interests of the *group* and its goals and values. How the consensus process shaped how residents had to relate to one another was encapsulated by Sal's description of what was required to enact change within Canon Frome Court cohousing (in this case, the setting up of a carpool):

> Sal (Canon Frome Court cohousing): If you follow the process, there's a chance. […] everybody talked about a carpool. There was […] worries […] So you hear all of that stuff […] So I go back, and I start writing a proposal, taking all that into account […] and at that point, I could have gone: "that's nonsense". […] But every one of those bothers, I was like, right OK, so if we include that, that makes sure their bothers are all right. […] Then I do research, and I come back with the proposal, and […] I've got all the answers […] And it passed, and we now have a carpool. […] ten years ago I wouldn't have done it […] I'd have gone: "why are you even...?"

Sal's description shows that gaining agreement for a carpool at Canon Frome Court involved the ability to follow an administrative process (writing and submitting the proposal), and the ability to listen and adjust the proposal accordingly. Sal reflected that ten years ago she would have been likely to dismiss objections and concerns, rather than engage with and accommodate them, implying that these are learned practices which the consensus process has engendered through requirement. Her references to the concerns of others as 'bothers' and 'nonsense' indicates that she still may not feel these to be meaningful; yet, she has an understanding that for change to be enacted she must 'follow the process'.

Cohousing communities also used certain types of visual communication. An example of this is the colour cards used at Springhill Cohousing which residents held up to indicate where they stood on a decision. Visual communications were also used to manage conversations more effectively, for example, raising both index fingers to indicate that you have a direct response to what somebody is saying (meaning that you should be allowed to speak before those who want to communicate on a different topic). The figure below illustrates and explains some of the hand signals that were used within LILAC cohousing.

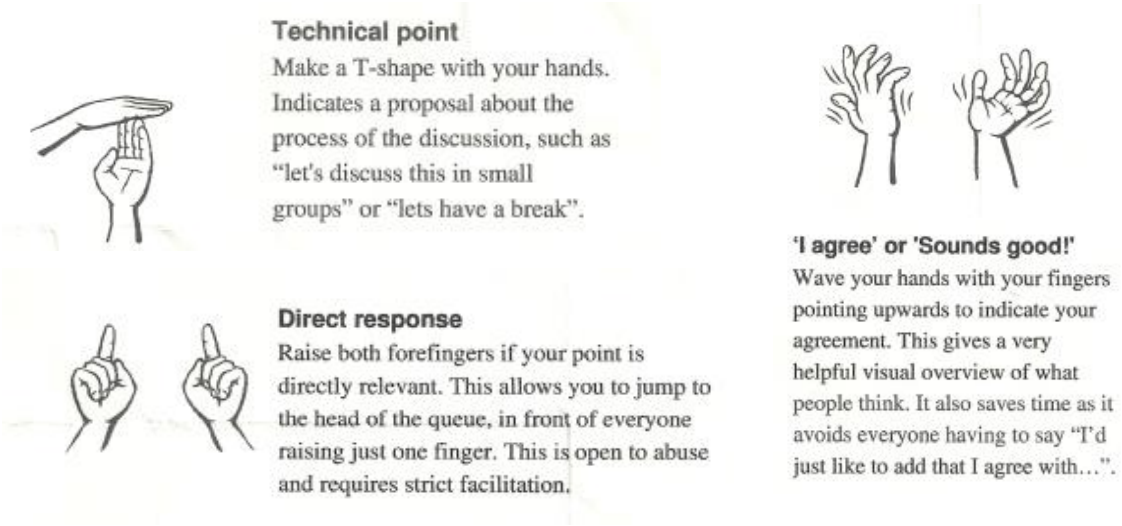


Figure 8-3: Hand signals used in LILAC cohousing general meeting

Seeds For Change, 2020

According to some LILAC residents, these hand signals had been adopted from activist circles (some residents had activist backgrounds). Another physical form of communication used by LILAC and Canon Frome Court cohousing was gaining a snapshot of opinion by asking people to position themselves physically along an imaginary spectrum. In these several different examples, the use of a literal body language rather than verbal communications enabled multiple people to express themselves without disrupting one another, and also enabled individuals to gain an overview of how other residents felt. This latter point was important given residents' commitment to do what was in the best interest of the group. These processes, along with meeting practices typically used within organisational contexts, helped to manage joint decision-making.

Engagement in some of these practices was inconsistent or self-conscious. At Canon Frome Court's co-op meeting, despite there being a procedure in place whereby people raised their hand to talk and were permitted to do so by the meeting chair, in reality some spoke without raising their hands. Who did and did not raise their hands appeared to have some links with what was being said (replies and humorous remarks were more often not preceded by raised hands) and who was saying it (different residents had different practices). Occasionally people would also have whispered exchanges whilst others were talking, which appeared to attract some attention and chagrin from other meeting attendees. At LILAC cohousing, hand signals were sometimes used incorrectly, as resident Lorna said.

> Lorna (LILAC cohousing): […] the hand signals […] we do use them but […] incorrectly […] it's hard to get a group of 30, maybe 40 adults to remember something differently, so we just sort of give up […] we muddle through well enough.

This "muddling through" was perceived during fieldwork, where a general meeting was attended. Hand signals were rarely used, except for when the chair asked attendees to use them to show whether they agreed upon a decision. There was a distinct self-consciousness about this practice, with the chair often using humour to encourage attendees to give their hand signals. This is not to say that the meetings themselves were ineffective or self-conscious. As Meltzer (2000b) notes, the governance processes within cohousing communities means that residents often develop skills in management, organisation, communication and presentation; Canon Frome Court and LILAC residents were no exception to this. Yet, as Lorna said, 'it's hard to get a group of 30, maybe 40 adults to remember something differently'. The embodied history of communicative practice was difficult to disrupt; hence, the discomfort or unfamiliarity with using hand signals, and the inconsistency of speaking only when given permission by the chair. What was witnessed was an in-between state in terms of practice adoption: these practices had been agreed upon beforehand, and sometimes were engaged in, sometimes not. The injunctive norms (what should be done) did not quite translate into descriptive norms (what most people did). This, along with other slippages in agreed-upon communications practices within the cohousing communities, may have had some negative impact on decisions being made with all perspectives being expressed and observed.

While the inconsistent use of communications processes usually went unremarked upon, there were rare occasions where residents corrected each other, thereby directly attempting to align practices with agreed upon rules. These tended to be during moments where deviations from the rules were

more apparent, interrupting the format or ordering of information in the meeting. One example was witnessed at Canon Frome Court cohousing, during a discussion about whether to purchase pigs. Residents were asked to say a number to the whole group to indicate whether they wanted no pigs, four, six or eight. When the time came, the first person began to explain what he thought, only to be politely interrupted by another resident, who reminded him that they had agreed to just give a number. He acquiesced, and after that, all other residents followed suit. Another such example was witnessed during a meeting at LILAC cohousing. During the meeting check-in, one resident began to explain an idea she had that she wanted to discuss during the meeting. The facilitator interrupted her, thanked her for her idea, but pointed out that the check-in was for emotional sharing, and that she would have an opportunity to share her idea at a later point. Examples like this depicts the complexity of arriving at shared communicative norms, even when the rules of communication have been laid out. Individuals have different ideas of what is appropriate communication, and of when it is and is not acceptable to follow the rules, or indeed what those rules are. These examples also show that corrections to communicative practice tended to occur when a communication was deemed to be out of place or disruptive to the communicative flow of the meeting. This highlights that rule deviation in the form of not raising a hand before speaking, or not using hand signals was tolerated because these actions did not interrupt agreed-upon orderings of information. Within meetings, there did seem to be a mostly shared sense of how communication and information should flow. Part of this involved stopping communicative flows which were deemed inappropriate (e.g. sharing an idea during a check-in). This was a challenge which lay at the heart of shared decision-making between cohousing communities: picking the appropriate information to communicate at the appropriate time, and agreeing upon what that information and what that time was! The blending of organisational meeting practices (e.g. agendas, chairs, meeting minutes) and activist practices (e.g. hand signals, check-ins, consensus) provided cohousing communities with a way to order information and for the individuals within the group to hear each other and be heard.

Operating via rules and processes was also reflected in the decisions and agreements which were arrived at, which also were often rule-oriented (e.g. we agree that we will do *X* in this way/we agree that we will no longer do *X*, but will do *Y* instead). One Canon Frome Court cohousing resident explained how he could sometimes find this approach frustrating, giving an example of how the community had a no-dogs policy.

> Andy (Canon Frome Court cohousing): […] talking about protocols is really, really important... but part of me is going: "OK well why?" If everyone agrees fine […] we

> don't have to have a proposal […] but some people would say […] you know it gives you the security […] people are often really fearful […]
>
> There's always been a resistance to dogs in the community […] and it then [was] agreed Nina can put forward a proposal [to have a dog] […] it was constrained because […] what if everybody else wants to have a dog, and suddenly we have thirty dogs running round? Well, it's not gonna happen […] it therefore presumes that somebody coming in would say "Actually fuck you I'm gonna bring a dog because the person across has a cat, even though I'm in an environment where actually people are expressing dis-ease", right? […] I just don't […] personally […] like being bound up with rules and kinda regulations […] I see the advantages, absolutely, but actually, why can't we trust people?

Andy's words show that there is a lack of confidence within the community that people (especially perhaps newcomers) will act in the interests of the group as a whole. The hypothetical fear that if dogs were allowed there might be 'thirty dogs running round' frames those living within the community perceiving themselves as individual households rather than a community of people who will consider each other's needs, which Andy believes is a false fear. He names rules as giving people a sense of security, and indeed, rules have been posited as protecting certain doings and meanings which ensure the comfort of the rule-makers (Cox and Narula, 2003; Holloway and Valentine, 2001). Implicit in this is a lack of trust. This is not necessarily a lack of trust in the integrity and goodwill of other residents (although Andy hinted that this may be the case), but rather a lack of trust that residents share in social norms, that is: an intuitive shared sense of what constitutes acceptable practice. In a community where norms are not necessarily (though may be) shared, a decision-making process enables "intentional we practice" through practices being discussed and agreed upon, often with a rule-like outcome.

Community living residencies also followed a consensus-like approach, although it was less structured, with less need for rule-like outcomes. The smaller number of residents and fewer decisions to be made meant that coordination was less complex when compared with cohousing, and residents could more often rely on shared norms. At the Buddhist Centre community living, residents had a weekly meeting where they could raise any decisions to be made by the group. These decisions tended to be minor, e.g. how much money to put into a communal kitty for the month. Grace from the Buddhist Centre community described how the decision-making process felt natural rather than purposefully structured.

> Grace (Buddhist Centre community living): […]when you live in a healthy spiritual community like this, it's so integrated with people's practice... like there's such kindness and friendship between everyone, I think there's such faith that actually people want the best for each other. So […] there kind of isn't [a decision-making process] because […] we've had like one time where we just went around and everyone spoke... took it in turns […] it's just everyone being heard.

Grace links different ideas together: the 'healthy spiritual community' in linked with practices of 'kindness and friendship' and trust in goodwill, which in turn leads naturally to hearing each other when making decisions. As practicing Buddhists, the community's residents had aligned TARs which were codified in Buddhist texts, which are likely to have reduced potential conflicts and differences in meanings and doings. At The Vale community living, house meetings reduced in frequency as time went on, from once a week to every fortnight, to once per month, to every six weeks. There were more decisions that needed to be made when the community began, e.g. what should we put in this room? Do we need a rule for being quiet after a certain time? What's the protocol for having friends round for dinner? But over time:

> Harry (The Vale community living): you just kind of know what is going to be OK, and what isn't half the time and then […] it can be often dealt with […] a WhatsApp message to the group that everyone's OK with.

While at first the community appeared to question many elements of how to live together, Harry's words indicate that over time, group norms emerged, and that residents felt more able to minimalize communications and discussions about their actions, with an understanding that they had a sense of what 'everyone's OK with'. Eventually, according to Harry, 'the agenda was tiny, and it was easy.' There is a notable contrast between Grace and Harry's descriptions of decision-making, and cohousing resident Sal's rather more onerous description of gaining agreement on a proposal, and cohousing resident Andy sharing that, without rules, 'people are often really fearful'. These differences are emblematic of the greater complexity of projects, and of making shared decisions within cohousing communities. Coordinating greater numbers of people required more structure to manage the greater number of different perspectives. The process of decision-making was designed to remove assumptions that 'you just kind of know what is going to be OK and what isn't', as Harry of The Vale community living felt that he could.

Coliving has a different decision-making model, with power resting with a managing party, as opposed to each individual within the community. Certain decisions may be given to community members, such as thermal control, decisions about social events, or in some cases, budgetary responsibilities for communal expenditure. At Liquid Monastery coliving, the only joint decision was agreeing on new house-mates. Other decisions tended to be taken by the managing residents. There were no regular house meetings to discuss decisions or shared practices. Whilst they did not make decisions together, they did appear to have a broad shared understanding of what was and was not acceptable when it came to day-to-day routines and practices. Their group norms in this sense were fairly aligned, although the lack of conscious articulation meant that Liquid Monastery – unlike The Vale and the Buddhist Centre community living – were not engaged in "intentional we practice". The impacts of this were less ability and likelihood of coordination, for example, to share food, meals, domestic labour, social time, or other forms of endeavour, all of which can potentially have pro-environmental outcomes.

As well as being a method to coordinate groups, the consensus process, which is an expression of "intentional we practice", was a way to make meanings and doings salient. Research has shown that for actions to be impacted by norms, salience is key (Cialdini *et al.,* 1990; Kallegren *et al.,* 2000). In particular, it has been shown that mindfulness (which can be defined as being aware of what is happening both in ourselves and around us [Ericson *et al.,* 2014]) is positively correlated with self-reported pro-environmental practices (Amel *et al.,* 2009). Through a consensus-like process, residents could consider and negotiate group norms in agreeing practices and processes. In communities where residents held pro-environmental social norms and/or communities where there was co-created and documented pro-environmental GU/TARs, a decision-making process which encouraged discussion is likely to have increased pro-environmental outcomes.

8.3. Digital communication practices

Shared decision-making, along with the sharing of news and general conversation between residents often involved digital communications. This section discusses whether these digital communications aided or mitigated "intentional we practice".

The communications tools most commonly used were email and WhatsApp. These tools and the manner of communication were sometimes perceived as problematic. It was universally said by cohousing residents that the sheer amount of community-related emails they received (with meeting agendas, meeting minutes, proposals, news and updates) could be overwhelming, although

arguably, the real issue was the amount of information shared rather than the platform through which it was shared. This could result in lost communications, which could impede projects from moving forwards (e.g. people not giving feedback on a proposal in the allotted timescale, instead raising their objections at a later point). This "information overload" shows how the aim to engage in "intentional we practice" can result in practices of information-sharing which are difficult to manage. The Vale community living also used emails, though none reported this same feeling of being overwhelmed. One resident within The Vale mentioned their small number as a benefit of their type of community living, citing the "two pizza" rule (meetings are most productive when the number of attendees does not exceed the amount of people who can share two pizzas).

Most communities also used WhatsApp. One challenge of this communication platform was that not all residents used WhatsApp, and so some were excluded from the 'chitter chatter' (Andy, Canon Frome Court cohousing) which occurred on that platform. It tended to be older residents who did not use WhatsApp, so this could cause somewhat of a generational divide. At LILAC there was a 'NotsApp' group: an email group for those not on WhatsApp. One member of the group mentioned that 'there is sometimes a feeling of being marginally side-lined because [of] a lack of information/communication at times'. The existence of this group indicates that WhatsApp has certain meanings attached to it. The platform requires a smartphone, seen by some as a symbol of consumer culture, a concept which LILAC residents were broadly against. Therefore, a rejection of WhatsApp was a symbolic rejection of consumerism (symbolic because residents still possessed other similar technology, such as computers). Interestingly, this is an example where meanings around consumption interrupted communications.

WhatsApp could be a useful tool for quick communications, for example, when one resident at Canon Frome Court cohousing was concerned that her son was seriously ill, she was able to reach out for support and gain an immediate response from those who were able to help. However, some residents also complained about being privy to too many messages, and residents from both LILAC and Canon Frome Court cohousing furthermore voiced concerns that with text-based communication chances for misinterpretation rose and nuance was lost. The WhatsApp platform – where messages are textual, typed and read on a small interface, and appear consecutively one after the other – does not easily enable the type of emotionally sensitive, lengthy and considered conversation that is an injunctive norm within communities, and facilitates the alignment of doings that forms "intentional we practice". The role of WhatsApp within communities remained somewhat ambiguous and controversial.

The use of email and WhatsApp, and reports of feeling overwhelmed from the sheer amount of communications, shows the danger of making large amounts of information available. Face-to-face meetings, which were temporally bounded, required careful curation of information so that only what needs to be shared is shared. With emails and WhatsApp, however, there is not this same level of curation, and so it is left to the time-stretched individual to curate that information and decide what they want to engage with (or in the case of WhatsApp, whether they want to use that particular technology). This can lead to fatigue, and a fracturing of who is "in" on what conversations. Nevertheless, the ready accessibility of information, and not needing to communicate in person made email and WhatsApp useful, if imperfect tools to supplement face-to-face communications.

8.4. Conflict resolution practices

Part of being able to collaboratively agree upon certain doings and meanings involves resolving conflicts. Conflict has been reported to be the most difficult aspect of living within an intentional community, with conflicts over principles being the most destructive (Sargisson, 2004). Conflicts can also serve a useful purpose, as they may stimulate novel solutions, yet without systems to manage conflicts they are not likely to be socially useful (Jones, 2011). Most communities do have systems for conflict resolution (Rubin *et al.,* 2019). This section looks at tools and processes for conflict resolution used by the case study communities. It highlights use of nonviolent communication (NVC) at The Vale community living as an interesting example of how residents normalised a communications tool to help facilitate "intentional we practice". The section then looks at conflict management within the cohousing communities, drawing attention to Canon Frome Court cohousing, where a "gap" in the process was leading to an inability to move forwards with an entrenched interpersonal conflict. Finally, this section explores the idea that the conflict resolution skills which are often learned within community settings can lead to greater care for the environment through "bigger-than-self" thinking.

Conflicts (that is, disagreements and incompatible practices) occurred frequently within communities. The "classic" conflicts within communities are known as "The four Ps": pets, parking, parenting and painting (the latter alluding to the colour one paints the outside of their house, and the tension between what is a household decision and what is a community decision). Conflicts extended far beyond these four topics, however, and can be categorised in the following ways:

- Conflicts over meanings: what meanings are held at group and individual levels. These

conflicts may surface at moments where meanings translate into (shared) practice;

- Conflicts over acquisition of materials: disagreements over what materials to acquire (e.g. should we buy pigs? Should we only eat vegan food? How much money should we spend?) and how they are acquired (e.g. should we grow our own grain or purchase it? Should we take a loan? Is this item too expensive?);
- Conflicts over use of shared space/materials (e.g. untidiness, taking up too much freezer space, making too much noise, using something which somebody else wants to use);
- Conflicts over practices which impact upon others, either impinging upon practices which may be seen as private (e.g. disciplining other peoples' children) practices perceived as being carried out improperly (e.g. a meeting chair not allowing somebody to speak as much as others) or effecting their practices (e.g. at Canon Frome Court, a decision to stop feeding the chickens waste whey from the cheesemaking meant that those making cheese were no longer sure what to do with their whey);
- Interpersonal conflict (e.g. personality clashes, hostility and perceived power imbalances).

These different types of conflict could furthermore overlap with and exacerbate one another. The latter type of conflict in particular could cause severe emotional burden, and indeed, some people left communities largely as a result of interpersonal conflict.

Those communities which had co-created documented GU and teleoaffective regimes (TARs) also tended to have strategies in place for dealing with conflicts. Some of these strategies were embedded into the community governance itself e.g. having consensus-based decision-making allowed disagreements to be discussed and compromises reached. However, this section explores the strategies which were designed for handling or diffusing interpersonal conflict or practices which impacted negatively upon others, exploring the processes in place and the importance of setting expectations for interaction.

The Vale community living used nonviolent communication (NVC). NVC is a communication technique which is often used to manage potential conflict. It was developed during the 1960s and is now used in over sixty-five countries (CNVCa). Its basic tenets are about self-empathy, empathy for others and self-expression (CNVCb). It is a well-known method, and within intentional communities, correlates with high levels of satisfaction about group decision-making (Rubin *et al.,* 2019), although there has been little empirical academic research on its effects. Existing research has demonstrated that NVC training can increase empathy (Marlow *et al.*, 2012; Wacker and Dziobeck, 2018) and lower

negative social behaviours (Džaferović, 2018). Residents of The Vale decided to train themselves in NVC, normalising the use of NVC through practice.

> Harry (The Vale community living): We made a thing of having a workshop and then practising it in a positive way… so you can use NVC to land compliments on people. So, everyone had a homework to like go away and land a compliment on someone using NVC in the house. […] Everyone had homework to do like a minor thing like "when you wash up like this…" so doing it as kind of half in jest but something that is kind of minor.

The residents made conscious efforts to embed NVC into their routines, acclimatising themselves to the technique by using it to communicate something pleasant (a compliment) and something negative but minor, with low emotional or practical stakes. This setting of 'homework' showed that residents were acknowledging this form of communication as a type of work; and it also indicates a recognition that for the communication tool to become a regular practice within the household, residents needed to gain a sense of know-how over NVC (making it feel "natural"). At the time of the fieldwork, residents had been living together for three years, and Harry acknowledged that using NVC was a 'cultural shift' which can 'take months, if not years… and we're only… most of the way there'. Yet living together afforded them the opportunity to learn NVC in a supportive environment, through practicing and being practiced upon.

Resident Josie spoke about how NVC had helped residents to work through difficult interactions.

> Josie (The Vale community living): NVC is used for […] where people have felt hurt or misunderstood or […] something's not meeting their needs in the community […] there's someone who has like lots of difficulties sleeping, and so really needed like doors to be closed very quietly after a certain time, and then some of us would forget […] we actually needed more feedback from them about like, "Oh, please keep letting us know," and then it was really helpful to like hear why, because that stuff that's like slightly annoying like "Oh I don't want to close door quietly it's just, you know, it's ten o'clock." But, really, NVC really allowed us to like hear or allowed me to really hear why […] it was really important for this person and it wasn't just a little thing was actually […] connected to quite a lot of different things in that person's life and, um, and that you know helped me change my behaviour.

Josie talks about how with NVC it is desirable for people to express their needs, and, in this example, her housemate was thanked for *reminding* others of his/her need. As Josie explains, through understanding why this person needs the doors to be closed quietly changed the mood and meaning which Josie attached to this action from something that was 'slightly annoying' to something that was 'really important for this person'. This change in turn helped Josie to change her practice. NVC facilitates "intentional we practice" through encouraging alignment of meanings (e.g. shutting the doors quietly after 10PM is important) and practices which are aligned in the sense that they meet everybody's needs.

Josie's example of NVC in action can be contrasted with Isabella from Liquid Monastery coliving (where they did not have any conflict mediation), who talked about feeling that it was unreasonable to ask her house-mates to be quiet so that she could sleep: 'you might want to go to bed at nine because you have an early flight or something... you can't expect everyone else to […] shut up at nine.' At Liquid Monastery, Isabella did not feel it was reasonable to voice her need for quiet to sleep; at The Vale the use of NVC created an expectation that residents *should* voice their needs. NVC provided a structure which enabled residents to resolve conflict and have their needs met, which arguably, aided in creating a long-term community. Residents at The Vale had lived together for three years at the time of the fieldwork, with none leaving. At Liquid Monastery there was a higher level of churn, with residents typically staying for around a year.

The Vale community living were the only community who all used NVC, although some LILAC residents had also undergone NVC training. LILAC and Canon Frome Court had similar conflict resolution policies. At Canon Frome Court cohousing, conflicting parties could first ask to each have an "advocate" to hear their perspective and help mediate a discussion. If this still did not lead to a satisfactory resolution, there was budget available for professional mediation. At LILAC cohousing, the conflicting parties could have an informal discussion with a member of the community to mediate, and then, like at Canon Frome Court, the next step was to bring in a professional mediator. A clear difference between this approach and NVC is that the former was used after interpersonal conflict has already occurred, whereas the latter was intended to prevent interpersonal conflict occurring in the first place. The self-regulating nature of the mediation process also meant that conflicting residents might not opt for resolution. On the whole, those living within communities tended to have a high level of people skills, and the conflict resolution policies were regarded as helpful. Yet, entrenched interpersonal conflicts could occur. At Canon Frome Court cohousing some residents spoke about a conflict between two people where the opposing parties were both

'adamant […] that they're right [and] unwilling to take any steps towards each other to find some kind of resolution' (Nigel, Canon Frome Court cohousing). Some residents used the term "bullying" as a description when talking about this conflict, and the resident who was perceived by some as being bullied had announced her decision to leave the community, in part due to this conflict. Residents at Canon Frome Court generally appeared to be very open about their conflicts (e.g. discussing past rows and difficulties without self-consciousness) but they were reticent to talk about this disagreement. This may have been due to uncertainty around whether and how to intervene, and where the line was between a protracted conflict and bullying behaviour. One resident, Sean, said in relation to this conflict that 'it's all of our responsibilities to ensure that space is safe for people to conduct themselves', but that he felt frustrated sometimes because he wanted to 'step in' and mediate, but did not feel that he could do so. Another resident, Pippa, spoke about how she felt that this conflict should be addressed by the community, and feared that not doing so meant jeopardising her own and other's sense of safety.

> Pippa (Canon Frome Court cohousing): […] sometimes you might not get on with someone and they […] might leave if you continue not being nice to them. […] I think that is really difficult and I think personally you need to address that because […] what if someone decides that they don't like you? They make your life miserable. […] And then […] your security and safety in […] your *home* […] is jeopardised because you haven't helped create a system where people feel supported no matter what.

Both Pippa and Sean felt that it was the community's responsibility to create a safe, supportive system for all, and both expressed a desire to address the conflict, yet because there was not a process in place at the *community* level (rather than individual level) for intervening to resolve conflicts, residents appeared to be at some loss about how to handle the situation. The emotive terms Pippa uses ('make your life miserable', 'security and safety […] is jeopardised') indicate that this conflict was having a significant emotional impact upon her. This points towards the potential damage to a community which can be done when conflicts are not managed. The processes to manage conflict shape the conversations which can and cannot be had, and what moods and meanings can be expressed and to whom.

Beyond these official conflict management processes, life within a shared living community itself impacted how individuals managed conflicts. While living and working together created more opportunities in which conflict could arise, it also created more opportunities in which conflict could

be healed. Residents' spatial closeness meant that they had a commitment towards resolving conflicts, as 'you're faced with the fact that if you don't sort it out you've got a problem on your own doorstep' (Harriet, LILAC cohousing). Further, the commitment to spending a certain amount of social time together also meant a greater commitment to working through conflicts. As Harry of The Vale said, such a commitment meant 'turning over the rock and discovering underneath that you can keep going', whereas spending time together in an 'ad hoc' way meant that if you hit a 'tricky patch' you might 'cop out' (Harry, The Vale community living). At Liquid Monastery coliving, residents did not report any major conflicts. Nor did they specifically commit to spending social time together, or engaging in shared projects. Speculatively, if conflict had arisen, residents may not have had the same commitment as with cohousing and community living residents to resolve that conflict.

All communities which spoke about a commitment to working through conflicts also spoke about how this process encouraged reflexivity. This notion was reflected upon by residents within almost every community. During a group gathering, one resident at Canon Frome Court cohousing described community as being like a "rock polisher". Living with many others 'knocks the edges off of you', i.e. you perceive and have to deal with your own shortcomings.

> Ted (Canon Frome Court cohousing): Most of my life when it was difficult I've kind of effectively turned my back on it […] I can't do that here, and that's really challenging because what it does is it throws up all of these things which are kind of pressing your buttons […] but […] I'm thinking […] *why* am I getting so wound up by it you know? And that's really interesting because it kind of makes you […] reflect. […]
>
> I think I have changed, I think I've got much greater understanding […] that […] there are lots of different ways to do stuff […] I think I've... becoming a better listener […]

Ted says that reflection occurred directly because of conflict and the necessity to deal with rather than avoid it. The competences which grow as a result are greater abilities to self-reflect and to listen to others, both of which Ted phrases in the present tense ('why am I getting so wound up by it you know?', 'becoming a better listener') indicating a perception of these abilities as a work in progress. Feasibly, the reflexivity encouraged by community life and managing conflicts aid in "intentional we practice", as they enhance people's listening and negotiation skills, which facilitates an ability to compromise, and reach an alignment on actions.

Some residents furthermore linked the reflexivity that managing conflicts encouraged with meanings of environmental sustainability.

> Lorna (LILAC cohousing): we make each other better people […] [living at LILAC] sort of forces you to work through your own your own […] trauma and […] become a better version of yourself but also within thinking about the environmental stuff […]

Self-reflection at LILAC took place within an environment of sustainability-related GU and TARs, and therefore the 'better version of yourself' is more likely to involve consideration of 'the environmental stuff'. Beyond the influence of specifically pro-environmental GU/TARs, however, some residents also linked community living (and the self-work that it entails) with environmental sustainability.

> Andy (Canon Frome Court cohousing): […] having healthy relationships lends you much more ready and open to that idea of sustainable kind of living, because […] if […] [our interactions] are good and […] healthy and respectful, yeah and nurturing, other things are more likely to follow.

> Irene (LILAC cohousing): I think the community thing it's related to something like… thinking beyond yourself […] [and] being willing to change your perception of your own needs for… a greater benefit. I think that's […] why the community stuff feels really key to this.

The quotes above frame community living as aligned with or leading to GU of environmental sustainability, through 'healthy' and 'nurturing' relationships and through being encouraged to think about and adapt to the needs of others. This research speculates that the practices of living (harmoniously) within a group, and the negotiations that entails, may suffuse (Hui *et al*., 2017) into aligned GU of caring for and living in harmony with the non-human world, extending the "we" beyond the community.

8.5. Conclusion

This research investigated communicative tools used to govern and coordinate shared living communities going into greater detail than existing research on this topic (Boyer, 2016; Brenton,

2013; Hausknost, 2018; Meltzer, 2000; Ruiu, 2016; Sargisson, 2004; 2007; 2012). As many pro-environmental outcomes within communities are dependent upon the ability to coordinate: whether in the sharing of resources or the engagement in joint projects, it was argued that alignment on certain actions is an intrinsic part of environmental sustainability within shared living (as is similarly argued by Boyer [2016] and Hausknost [2018]. The chapter began by defining "intentional we practice" as the actively engaged in agreement or alignment of certain actions. The chapter then went on to examine decision-making processes within the community. It argued that cohousing communities used a structured approach, often with rule-like outcomes; whereas community living residencies tended to use a consensus-like approach, but also relied more on having shared norms; and coliving communities did not make shared decisions, though did share in norms. The chapter explored the lived experience of decision-making within cohousing communities, showing that despite some inconsistencies in communicative method, residents generally had a shared understanding of how information should be ordered and communicated. It was also argued that the practice of discussing decisions together (as required via consensus) aided in pro-environmental outcomes through making practices salient. The chapter then looked at digital communications methods within communities, discussing the challenges of email and WhatsApp. In particular this section looked at the sometimes overwhelming amount of information shared via digital channels within cohousing communities, as well as problems over the lack of nuance and risks of splitting who has and who has not been privy to certain communications. Finally, the chapter looked at conflict resolution practices. It highlighted The Vale community living's use of NVC, showing how it helped residents with "intentional we practice" through alignment on certain meanings and doings. The chapter also showed how residents normalised this type of communication through practice. It then looked at conflict management within the cohousing communities, drawing attention to Canon Frome Court cohousing, where a "gap" in the process was leading to an inability to move forwards with an entrenched interpersonal conflict. Finally, it explored the idea that the conflict resolution skills which are often learned within community settings can lead to greater care for the environment through "bigger-than-self" thinking.

A commonality that the different communication tools discussed in this chapter have is facilitating the means to listen and to be heard. This may be what is key to enabling "intentional we practice". The active engagement in alignment upon certain actions may not result in agreement, or shared meanings on everything, but should result in something that all community members are happy to live with, knowing that any doubts or disagreements have been acknowledged and considered. The

communications tools provide frameworks to shape the multitude of perspectives and needs to aid residents in going from “I” to “we”.

Chapter 9. Sharing materials and spaces

In shared living communities, environmental impacts are lowered through the sharing of materials and spaces. This chapter examines how those materials and spaces are shared. Section 9.1 looks at materials. It begins by looking at how privately owned materials are borrowed, and how communally owned materials are shared. It then explores group norms around the sharing of objects and food. It is shown that cohousing communities require more complex systems to accommodate sharing between greater numbers of people. The section then looks at carpooling as an example of how sharing rather than owning an object (a car) changes the meanings, routines and competences attached to that object. Finally, competences of sharing are briefly discussed. In Section 9.2, the sharing of spaces is explored, with a focus on community living and coliving communities. The section begins by looking at the challenges of achieving states of privacy, especially in shared spaces. It is argued that privacy is not a label which should be attached to a space, but rather, to temporalities, routines and practices. Then, how community living and coliving communities formed group norms around shared spaces is examined. It is argued that the intentionality of forming norms at The Vale community living aided in the longevity of the community. Sharing space within cohousing is also briefly examined, arguing that, as with community living and coliving, privacy and communality of space is attached to practices.

9.1. Shared materials

9.1.1. Borrowing and sharing

Within all communities the sharing of everyday items appeared to be a common practice, and took two forms: the borrowing of privately owned items, and the sharing of communally or jointly owned items/amenities. This section explores the group norms around both types of sharing.

A survey of LILAC cohousing residents found that all claimed to borrow things from their neighbours[31] (Bonner, 2020). Indeed, interviews and observational fieldwork corroborated this finding, and indicated similar practices in the other communities of study. Some borrowed items were specifically asked for, for example, Tom of Canon Frome Court cohousing borrowed a suitcase from a fellow resident after emailing around to ask for one; Kelly of the Buddhist Centre (community living) mentioned how she had been able to borrow her housemate's laminator 'rather than go out and buy a new one.' Other instances of sharing were the result of a spontaneous interaction, perhaps where residents may have witnessed each other using certain items, or conversation led to instances of borrowing or swapping. An example of this was demonstrated during a bonfire evening at LILAC cohousing, where Sam brought out a homemade contraption for roasting chestnuts. Ensuing admiration and conversation about this item resulted in the offer for it to be loaned to his neighbour Irene. Observation of daily life indicated that co-presence of residents (particularly when engaging in domestic practices in communal areas, as the example of Sam and Irene mentioned above) could lead to instances of borrowing and sharing. The ease of loaning items was further enhanced by the close proximity of residents to one another – fetching an item to lend to a neighbour took up very little time. Therefore, the shared communal areas and domestic practices which took place within them fostered borrowing practices.

On some occasions, items within cohousing residents' homes were also shared. Canon Frome Court cohousing resident Sal related that she and her neighbour shared a bread-maker, which was kept in Sal's house. It was indicated by Sal that this sharing was facilitated by their close proximity and high levels of trust (residents typically kept their doors unlocked, and it was regarded as acceptable to enter one another's homes without the permission or presence of the owner), as well as a shared general understandings (GU) and teleoaffective regimes (TARs) of wanting to reduce their environmental impacts.

As well as borrowing, both cohousing communities practised offering unwanted household items to other residents. This was not the same thing as sharing, as it involved a transfer of ownership. Yet, it bore similarities to the underlying principle of borrowing in that residents were offering neighbours an opportunity to use their (discarded) possessions.

[31] For context, 38 percent of UK residents say the same thing (Understanding Society Survey, 2018).

Figure 9-1: A shelf for recycling unwanted items at Canon Frome Court cohousing

Canon Frome Court cohousing had a shelf and a box where residents could place small unwanted items for anybody else to take. After a certain amount of time had elapsed, items left there would be donated, recycled or disposed of. At LILAC cohousing there was a similar process in place, whereby unwanted items would be put in the common house for a couple of weeks with a sticky-note explaining that they would go to the charity shop if nobody else wanted them.

Usually, it was the case that borrowing or sharing supplanted the need for residents to purchase that item themselves. However, sometimes the ability to borrow was a way for residents to ascertain whether they would like to own a certain item. LILAC resident Peter spoke about how he was currently borrowing his neighbour's television:

> Peter (LILAC cohousing): I suppose I, I personally want a TV because I want to watch [names of various TV shows]. So the fellow LILAC community member upon hearing this, realised that he was getting addicted to TV so he's, he's sent his TV out on respite to me for three months, and I'm using it. I think it's gonna be returned to him at Christmas and then I will see how I am.

The ability to try before buying can be seen as giving residents an opportunity to make more considered purchases. Arguably, it could also encourage purchasing of items which otherwise would

not have been bought, although, aside from one LILAC resident borrowing an e-bike to see if she would like to commit to buying her own (an outcome which would have most likely had GHG-lowering impacts) no examples of this were observed during fieldwork. Notably, the exchange of information between Peter and his neighbour (in particular, the neighbour's disclosure that he was becoming 'addicted' to TV) indicates a level of friendship and trust between the two of them which echoes Sal and her neighbour's sharing of a bread-maker.

There were high levels of trust between residents in all communities, and the borrowing of items both facilitated and reinforced social bonds between the residents. Though as borrowing fostered sequential rather than simultaneous sharing, this reinforcing of social bonds came more from meanings of trust and generosity rather than the increased familiarity which arises from engaging in activities together. Specific reciprocity was not expected, although sharing through borrowing was the norm, and so there was a general expectation that borrowing practices were acceptable. Inherent within the concept of borrowing is private ownership. Within cohousing communities, most objects were still privately rather than communally owned (with clear delineations between the two). In this sense, cohousing communities mostly maintained the norms of non-cohousing households. Community living and coliving communities differed slightly in this respect (as will be discussed).

Some residents linked borrowing practices with environmental benefits.

> Sam (LILAC cohousing): I think it does reduce the amount you buy because I think you could pretty much guarantee that whatever you need when you might not have somebody will probably have it however random it is.

> Tom (Canon Frome Court cohousing): This is one of the benefits of living here […] you don't need one of everything, there just needs to be enough of things spread amongst the community. (Quote taken from journal, 23/10/17)

Indeed, the quantitative data indicated that the average household at Canon Frome Court and LILAC cohousing and the (normalised) Liquid Monastery household spent less money on clothes and shoes, small household items, electronics and transport-related equipment than the average UK household (see *Figure 6-13*). This lower-than-average figure was in part attributable to borrowing rather than

buying. Although, the anti-consumer ethos of many residents, plus, in the case of Liquid Monastery coliving, less storage leading to more considered purchases, also had a role to play.

When comparing the different shared living typologies, it seemed to be the case that borrowing personal items was most common within cohousing, perhaps because the greater number of households and amount of private space led to a larger pool of items being available for borrowing, and fewer items being shared in the first place. Cohousing residents had their own self-contained homes and therefore each household had a greater number of private possessions when compared with coliving residents.

Within all communities there were certain objects and facilities which were kept in communal areas and available for communal use. Communal items included washing machines, books, DVDs, gardening tools, bike maintenance equipment and toys. Community living and coliving communities also shared amenities such as bathrooms, kitchens and living spaces, and much of the furniture and items within those spaces (e.g. sofas, tables, kitchen utensils), as well as utilities such as heating, lighting and Wi-Fi. Both Canon Frome Court and LILAC cohousing shared some utilities too. They both had solar PV, and Canon Frome Court also shared biomass district heating. Some households within the cohousing communities also shared their Wi-Fi. All communities aside from Liquid Monastery coliving engaged in carsharing (nobody in Liquid Monastery had a car), either informally or through an official community carpool.

Figure 9-2: A montage of shared items

Clockwise, starting top left: the shared kitchen at Liquid Monastery coliving, shared mugs at Liquid Monastery coliving, children's trampoline at LILAC cohousing, DVD library at Canon Frome Court cohousing, shared washing machines at Canon Frome Court cohousing, shared gym equipment at The Vale community living.

As community living and coliving residents shared more spaces, many items tended to be communally used (e.g. pots and pans, furniture and amenities) which meant that they were not borrowed (as more often the case in cohousing communities) but rather jointly owned and shared. Sharing was therefore less salient as a practice in community living and coliving communities. For most items in communal spaces there were no questions of "Can I use this?", rather, sharing many items was an inherent practice as part of sharing a household. For example, in The Vale community living's lounge there was a bookshelf which held books from all residents, and gym equipment which belonged to one resident but could be used by anybody.

Figure 9-3: Shared books and gym equipment at The Vale community living

Who these items "belonged to" was therefore somewhat ambiguous. They belonged to both the person who had originally contributed that item *and* to the community. The way in which these items were shared within community living and coliving spaces is akin to a form of "sharing in" (Ingold, 1986). "Sharing in" is defined as a form of non-reciprocal sharing with those whom you are intimately acquainted with, and whom you regard as part of the extended self (Belk, 2010). Just how intimately acquainted the residents were with each other varied. At The Vale and the Buddhist Centre (community living) residents intentionally spent social time together, and so feasibly had an intimate knowledge of one another akin to familial relations. The Vale's resident Harry indeed said that sharing at The Vale was based on 'a trust economy and you become like a family like, you know, your parents don't ask you to pay […] to borrow a car'. At Liquid Monastery coliving there was not the same intentionality in spending time together. Rather, residents comfortably co-existed, with social interactions tending to be spontaneous. At Liquid Monastery the majority of furniture and items within the communal spaces had been provided by the lead tenants, Emily and Francesco (this was unlike The Vale and the Buddhist community living, where there was a more evenly distributed contribution/ownership of furniture and objects). This had an impact on how residents perceived objects in shared spaces. One of the residents, Isabella, expressed uncertainty about who objects (plants) in the shared space belonged to.

> Interviewee: Whose are all the plants?
>
> Isabella (Liquid Monastery coliving): Yeah the plants, they're... *(awkward tone)* Francesco and Emily have left those here. I would say it's their plants, but, they're sort of the flat's plants? But I don't think they have a name *(laughs)* still I mean

they're sort of the flat's thing... so it's like a receptionist area *(laughs)* yeah [the] flat's plants […]

Figure 9-4: The 'flat's plants' at Liquid Monastery coliving

First, Isabella said the plants were 'left there' by Francesco and Emily (indicating Francesco and Emily's ownership). The word 'left' rather than 'placed' or 'put' indicates a lack of intentionality – as if Isabella is uncertain of whether there was intention behind this action. Then, the plants are both 'theirs' *and* the 'flat's plants', though Isabella questioned the notion of plants belonging to the flat. 'I don't think they have a name', she said, meaning that the concept of plants belonging to the 'flat' seems strange. Isabella then jokingly compared the room with an institutional reception room (perhaps seeking a familiar concept to contrast with her discomfort about the plants belonging to the flat), before finally reiterating the idea of the plants belonging to the flat. Her awkward and questioning tone, pauses, laughter, and oscillation between different ideas indicates uncertainty about the status of these plants, which conceivably extended to other items in the shared space, which had been decorated and furnished by Emily and Francesco. This contrast between Liquid Monastery coliving and The Vale community living indicates that social intimacy, plus greater collaboration in contributing furniture and objects to shared spaces, aids in the sense of sharing in. Harry of The Vale community living observed that this type of sharing 'frees everything up' because 'you're not even thinking about tit for tat'. With sharing in, resources flow more easily between residents. One result of this is lowered environmental impacts.

As most items were shared sequentially rather than simultaneously, it was important for residents to leave shared items in a state that was ready for use by the next resident, that is, in the "correct"

place and – in the case of items such as crockery – clean. Liquid Monastery coliving resident Emily called this having a 'hotel mentality', explaining that:

> Emily (Liquid Monastery coliving): […] the public space, is always, er kept in a manner, you know that is photo ready. It's always […] clean and everything cleared away ready for the next person to use it... And that concept is really important because if every time you come to use the sink, there's always, like, dirty dishes in the sink... It gets to you after a while […] if […] you're always putting right someone else's mess […] then we just don't want that […] kind of creeping into any relationship […] between housemates.

Emily blends together reasoning about enabling other residents to use what is in the 'public space' with ideas of a correct aesthetic (as indicated by the terms 'photo ready', and 'putting *right* someone else's mess' [researcher's italics]). In this sense, notions of cleanliness and tidiness are linked with beauty and depicted as an injunctive norm: something which *ought* to be. The absence of what ought to be (i.e. always finding dirty dishes in the sink) 'gets to you after a while', that is: incorrectly placed items have negative affects attached to them. This highlights the intense level of alignment needed in what constitutes an acceptable space in community living and coliving communities. Emily also relates this maintenance of objects being correctly placed within shared space to the relationships between housemates. Household norms exist over the arrangement of material items, and so resident relationships are not just comprised of their social interactions, but are also formed through how they use objects within the space, and the use of the space itself (more on this in *9.2.*).

Residents also tried to influence "correct" use of shared objects and materials through written notes and signage. This was particularly the case in cohousing communities. There were a greater number of signs at Canon Frome Court cohousing than LILAC cohousing, potentially due to Canon Frome Court residents undertaking a greater amount of endeavour (requiring more coordination) and the older building and furnishings requiring more know-how to operate efficiently. Some of this signage had directions with pro-environmental outcomes. For example, a sign at Canon Frome Court cohousing which read 'CALABRESE READY TO EAT' was there to encourage residents to harvest and eat the crop. The normative implication of this sign was that eating homegrown food is a desirable action – a practice which lowers environmental impacts.

Figure 9-5: A sign at Canon Frome Court cohousing notifying residents that the calabrese is ready to eat

Other example of signs with pro-environmental outcomes included: a sign giving instructions on how to switch the heating on and off in a communal area (encouraging heating spaces only when in use), and a sign asking people to keep a door shut to prevent heat loss. Signage was a way in which reminders of desirable practices and their attached injunctive norms could be embedded into the environment, and acted as "nudges" towards what the author of the sign perceived as appropriate practice.

It appeared to be the case that the community living and coliving communities in this study typically successfully managed the items within their shared spaces, and that cohousing communities tended to find this a little more challenging. In particular, the sharing of tools led to frustration amongst cohousing communities. This was brought up during a sustainability workshop at LILAC cohousing, where residents were discussing how to increase sharing practices. Residents spoke about not being able to find communal tools, and, as noted in a journal entry, residents agreed that they:

> Have to buy in to sharing and put stuff away properly, maintain it and advertise that it's for use. Have a system in place. (Journal, 17/11/2019)

A similar topic was touched upon during a Canon Frome Court cohousing meeting:

> There was a lot of joking and groans when Andy brought up the matter of a system for keeping track of tools right at the end of the meeting. (Journal, 19/10/2018)

Within both cohousing communities it was mentioned that a 'system' was needed to be able to successfully share tools. It seemed that their larger number of people, larger amount of space and greater number of items (with possibilities for confusion between what was communally and privately owned) led to more items being misplaced. Therefore, agreements on correct placement of items were more difficult to arrange and maintain. Similarly, all shared living communities shared certain energy infrastructures e.g. electricity or heating. Within the community living and coliving communities management of these shared systems was simpler, whereas the larger sizes of cohousing communities meant that an extra layer of administration and competences of community governance were required to manage maintenance and billing for utilities.

Communal items will have certainly led to lowered environmental impacts, especially in the community living and coliving communities, where residents shared many items such as televisions, sofas, and white goods. Liquid Monastery coliving had the lowest GHGs arising from indirect impacts, with particularly low impacts relating to small household items and furniture and fittings (see *Figure 6-13*). Whilst family units in the cohousing communities had their own self-contained households, residents still shared many items. For example, at LILAC cohousing they had three lawn mowers, ten cars and five washing machines between twenty households. They too had significantly lower indirect impacts attached to small household items and furniture and fittings, which in part will have been due to sharing some of these items.

9.1.2. Sharing food

Another material frequently shared by communities was food. When residents shared communal meals it was common for those meals to be vegetarian or vegan, to be inclusive to the dietary needs of all residents. This was the case in The Vale community living, The Buddhist Centre community living, Springhill cohousing and LILAC cohousing (though not the case for Canon Frome Court cohousing, where communal meals included meat, and Liquid Monastery coliving, where communal meals were extremely rare). These vegetarian/vegan communal meals often resulted in non-vegetarian/vegan residents forgoing meat, with the result of lowered environmental impacts. Similarly, if meals were shared, all residents could become carriers of practices which had moral meanings to one or some residents.

The frequency of communal meals differed, with the community living residencies cooking a shared meal every evening, and Springhill and LILAC cohousing tending to eat together between one to three times per week (although not all residents would attend these meals). Canon Frome Court

cohousing shared communal meals less often, as their shared meals were based around special occasions (e.g. Christmas, the harvest). As was the case with communal items and energy infrastructures, sharing meals at the scale of cohousing required greater coordination when compared with community living and coliving. The Vale community living's system for shared meals was relatively simple: each person cooked once per week (which was scheduled on a blackboard), everyone contributed the same amount of money for food, and the shopping list was jointly compiled. Whereas within cohousing communities with regular shared meals there were more sophisticated rotas, schedules and roles, payment systems and attendee lists, shopping lists and notes of dietary requirements. So too, the experience of cooking and eating together differed: at The Vale community living, residents generally ate with the same six people each day (plus the occasional guest); in cohousing communities shared meals could be an opportunity for people who had not seen each other for a while to socialise, exchange news and gossip. Arguably, within cohousing, coordinating communal meals was more complex, yet environmentally yielded greater efficiency when compared with community living, in terms of lower energy consumption during the cooking process (as found by Carlsson-Kanyama [2004]), and potentially less food packaging due to the large portions prepared. The opportunities for exchange with a greater number of people may also have increased the chances for exchanging knowledge and resources (with potential pro-environmental benefits). However, community living residencies tended to share meals more frequently than cohousing communities, so whilst the efficiency of each shared meal between six people would be lesser than the efficiency of a meal shared between (for example) twenty people, the meals between six occurred far more frequently within the case study communities.

Some communities also had significant amounts of communal food. At The Vale community living every type of food and drink aside from a selection of alcohol was communal, with an expectation that if somebody popped to the shops because, for example, they had a hankering for ice cream, they would also buy enough for everybody else too. This type of sharing was closely aligned with that which is typically seen within family units, whereby anyone in the household may eat any food. Belk (2010) refers to this type of sharing as "mothering", which he characterises as non-reciprocal, strengthening social bonds and based on love and care. However, whilst The Vale's sharing of food was alike to that of a family unit, it was not mothering. As a community of adults there was not the same dynamic of care-giver/dependent that there is with parents and children, and therefore, to at least some extent every house member was expected to contribute. There was, therefore, an expectation of reciprocity enshrined in co-created rules, e.g. everybody cooks once per week, everybody contributes the same amount of money to purchasing food. Beyond that, high levels of

trust and social connectedness, plus the desire to live as a community, mitigated potential quibbles on fairness over who ate more and ate less (in this sense The Vale's sharing of food does bear some similarities to Belk's [2010] "mothering"). This sharing in of food meant that, as with all shared meals being vegetarian/vegan, the ethical and moral meanings that shaped some residents' practices when acquiring food (e.g. that food should be Fairtrade, with minimal packaging) were adopted by all residents. There were also examples of pro-environmental influence at The Vale community living, regarding milk consumption. The Vale's resident Josie said how over time, all residents had been 'converted' to drinking oat milk (regarded as the most environmentally friendly milk alternative):

> Josie (The Vale community living): Yeah we completely, completely switched to oat milk which I was very proud of […] when we first started, we had like a bottle of oat milk, a bottle of soy milk and a bottle of like cow's milk […] And we've exclusively, we've converted everyone to oat milk!

As a comparison point, at Liquid Monastery coliving, where residents almost never shared meals, or intentionally spent social time together, different residents used different types of milk.

Figure 9-6: Three different types of milk used at Liquid Monastery coliving

Arguably, the sharing of all foods at The Vale community living made it easier for other residents to try oat milk, with the eventual pro-environmental outcome of residents eschewing less environmentally friendly milks.

Canon Frome Court cohousing also collaboratively grew and produced much of their own food, much of which was shared amongst the community on a "take-as-much-as-you'd-like" basis,

although, as with all types of sharing, there were certain group norms; whether food was communal or not tended to correlate with whether it was situated within communal or private spaces. Fruits and vegetables were entirely communal, as were dairy products (e.g. yoghurt, cheese) which were processed in the communal kitchen; whereas meat from a slaughtered animal was split between households with portions reflective of household size; and baked items, such as cakes and bread, were made in private households and belonged to those households (though were often shared with members of the community). The "take-as-much-as-you'd-like" approach was facilitated by high levels of trust, plus the abundance of the farm. The sharing of some produce could in fact be a mechanism for engendering social favour (it was common to hear praise for so-and-so's cheese). The practice of sharing so much home-grown food and produce lowered environmental impacts, as food did not need to be transported, and much of it did not need packaging. The joint endeavour of so many residents also enabled the community to produce a wide variety of foods – a feat which would have been much more difficult with fewer people. This reduced residents' dependency on supermarkets, which is likely to have reduced journeys by car.

Within shared living communities where food production, acquisition and/or consumption were shared, this joint endeavour served an important role in bringing together the communities, and had pro-environmental benefits of greater energy efficiency, less packaging and less transport required.

9.1.3. Sharing cars

Some form of car sharing took place amongst all communities aside from Liquid Monastery coliving (as none of the residents owned a car within this community). At The Vale community living one resident owned a car, and had added other residents to the insurance so that on rare occasions they could use it. At LILAC cohousing, car sharing was taking place informally, and there were ambitions to start a formal carpool that was open both LILAC residents and their surrounding community. Canon Frome Court cohousing was just putting a formal carpooling system in place during fieldwork (Autumn 2018), and after fieldwork had been completed, a carpool of five cars, three of which were electric, was up and running. This section explores how the sharing of cars altered the meanings, routines and labour attached to cars within the communities.

Cars are regarded by some as a signifier of status or social prestige (Eastman *et al.,* 1999). Yet, cars do not form part of desirable material assemblages amongst the environmentally conscious (Horton, 2006). This was the case within the communities of study. One of the strongest expressions of this came from Kelly, a resident at the Buddhist Centre community, who said: 'The only person who

unfortunately in the household that has a car… is me. It's a great burden to me'. This sense of the *cumbersomeness* of cars, and a negativity attached to their size and the space they took up was echoed by several residents from different communities, who commented upon how "daft" or frustrating it was to see cars sitting around, unused for the majority of the time. LILAC cohousing resident Laura described having a car at LILAC as 'countercultural' (although between twenty households there were ten cars), and several residents articulated attaching feelings of guilt to driving rather than cycling or taking public transport. At Canon Frome Court cohousing, many residents framed the necessity of driving as negative. One resident, Julie, emphasised the *poor* condition of her household's car, and the lack of choice she had in using a car for transporting her children to and from school ('at the moment I'm driving this rickety old car, having to do the school run'). When Canon Frome Court acquired their communal electric cars, however, there were indications of excitement and pride from residents. 'Carpooling is a joyous community endeavour', said Julie. Another resident, Roisin, mentioned during email correspondence that 'We've just got an electric car in our carpool so we're all busy playing with that at the moment!' The words 'playing' and 'joyous' contrast notably with Julie's prior utilitarian statement about 'having to do the school run'. Canon Frome Court's communal purchase of electric cars seemed to enable residents to detach feelings of guilt from driving, instead being replaced with feelings of shared joy.

The sharing of cars did, however, mean that journeys usually had to be planned in advance, and that it was possible that a car would not be available when desired. At Canon Frome Court cohousing the residents who carpooled used an app, a shared calendar and a WhatsApp group to facilitate this system. This app was able to record when there were no cars available, and according to those records, this had not happened for at least half a year. At LILAC cohousing, three residents who used one car had complementary routines, and so managed to share a car between them with little disruption. Having said this, not all community members were willing to use a carpool rather than have their own vehicle. Canon Frome Court cohousing resident Tom shared that to him the inconvenience was too great.

> Tom (Canon Frome Court cohousing): the shared car system that we have now which is recently introduced... but not everybody's in it. We think it's a good idea […] but many of us are not prepared to go to that step and get rid of our car, er for the inconvenience of having to book […] you know to save the... you know…

Tom said that for many the inconvenience of having to book car use outweighs GU around environmental sustainability (his incomplete sentence seems to indicate some discomfort over this

statement). The tension between GU of environmental sustainability and the use of a privately owned, non-shared vehicle was more apparent for those who used cars for commuting purposes, and therefore were often at work for the majority of the day (taking a car off site with them for that time). There is evidence that those who live in cohousing and community living residencies conform less to daily "nine to five" work routines, which may enable higher levels of car sharing (this topic is explored in *Chapter 10*). Yet, for those with a nine to five work routine, carpooling was far more difficult. However, those that did carpool agreed that this practice of having to plan journeys meant that the salience of using the car was increased, which was likely to have resulted in fewer journeys by car.

> Daisy (LILAC cohousing): I like the fact that my brain always considers bike walking or public transport […] before thinking about using a car and one of the ways to make sure my brain continues to do that is to share a car as it forces me to [consider whether a] journey in the car is absolutely necessary.

As Daisy's words indicate, coordinating use of a car with others demands a lack of spontaneity, meaning that there is no "hopping in a car". Every journey must be considered, which enables greater opportunities for environmental considerations to form part of the decision on whether to drive or not. Residents reported carpooling as leading to more instances of shared journeys and picking things up for one another (e.g. from a supermarket), for example, Julie of Canon Frome Court cohousing said that since joining the carpool 'I have saved up all my errands to do in one go. I have leapt at the chance to share when someone is already going into town.' This may in part be due to a carpooling WhatsApp group at Canon Frome Court enabling easier communications relating to car journeys, and it may also be the reframing of cars and therefore car journeys as shared.

One further difference between sharing a car and having a private car is that the car was no longer a private space, and therefore, much as with other shared materials, there were norms (shared or not shared) about how the car should be maintained. This included levels of tidiness and cleanliness. One cohousing resident, while reflecting on sharing her car with her neighbours, said jokingly: '[I] do wish they would clean the car more often […] we've got different cleanliness standards definitely'. Whilst her tone was light-hearted, her point does indicate that when cars become shared rather than private spaces, there is the potential for conflict and emotional labour over the condition of that space; plus the potential additional labour of keeping fewer personal items in that space.

Despite the additional labour of keeping shared cars clean and tidy, residents also remarked that

overall labour attached to the cars decreased when compared with having a private vehicle. Jobs such as MOTs and repairs were shared between a greater number of people. Having said this, there were certain new additional competences that residents had to get to grips with. As well as getting used to the booking system, setting up the insurance and agreeing on how to split the costs at Canon Frome Court cohousing took considerable endeavour. Though, according to resident Julie, it still felt like 'less hassle than owning a car'.

Carpooling will have played some role in the lower-than-average environmental impacts of the communities. However, it should be noted that the Canon Frome Court cohousing carpool was initiated after the fieldwork, so its GHG impacts have not been captured quantitively by this research; though one Canon Frome Court resident did mention he had refrained from purchasing a motorbike as he knew that he would soon have the opportunity to use the carpool. This lowered indirect impact will have been captured quantitively in *Figure 6-13.* Whether a carpool prevented the purchase of additional cars within LILAC cohousing or The Vale community living has not been determined. Would residents simply have used another mode of transport if they did not have access to a car? The quantitative results depicted by *Figure 6-13* do show indirect impacts on transport-related materials to be estimated as lower than that of the average household (e.g. less money was spent on the purchase/repair of motor vehicles). Whether and to what extent this is due to carpooling is not known, though arguably, it is reasonable to suggest that carpooling contributes to these lower transport-related indirect emissions.

9.1.4. Meanings and competences of sharing materials

As has been discussed, shared living communities shared a significant quantity of materials, including small household items, furniture, amenities, food and cars. Sharing, rather than having sole use of these various materials, required shared knowledge and know-how (for example, in the form of record-keeping, and knowledge of where to find and return items), and teleoaffective regimes (TAR) which favoured sharing. In terms of the latter point, many residents communicated that sharing of items was an important part of community life, and was linked with meanings of environmental sustainability.

> Peter (LILAC cohousing): Probably the biggest thing about community is sharing life, […] and the effects of that, hopefully have meant, a, a sort of lesser impact, on, available resources, both, both human and non-human.

> Pam (Buddhist Centre community living): The fact that that we're sharing resources, it's like, for me a real bonus, and now, for me it would feel really, not, it wouldn't fit my values, I don't think to not live communally in some in a lot of ways because I've become very recently much more aware of the environment.

There were indications that certain group norms about what materials should be shared evolved over time. Residents across different communities reported that initially communal furniture tended to be an un-curated mixture of people's cast-offs, and so communal areas could feel like a "dumping ground"; but over time, residents took a more selective and purposeful approach to furnishing communal areas, which resulted in more use of these spaces.

During fieldwork at LILAC cohousing, residents held a workshop on responding to the climate crisis. One subgroup discussed how they could improve sharing practice, making the following points:

- We should make efforts to not just dump stuff, but to have expectations of the things we share;
- Think of easy things to share, such as books;
- Part of sharing more is having knowledge about who to go to for something;
- We should have a better system in place for borrowing the communal tools, though with all sharing systems, they shouldn't be too complex. We should think about what systems are realistic given our energy levels;
- The bike sheds are a collective responsibility, but sometimes this means that nobody takes responsibility. Unless people really take responsibility for a bike pool, there shouldn't be one;
- There are different modes of sharing: private possession and borrowing, and things which belong to everyone. We should think about which items fit best into which category.

(Journal entry, 17/11/2019)

The notes of the conversation above signify the multiple practical and general understandings required to facilitate sharing and borrowing practices within a community setting. They show how these practices are complex, require coordination and shared understandings on what should be shared and how. One important element that this workshop discussion highlighted was the *intentionality* of sharing at LILAC cohousing, which was also perceived within other communities. As discussed in

Chapter 8. Tools for negotiating “intentional we practice”*Chapter 8*, negotiating “intentional we practice” prompted actions to become salient, which, as some studies have shown, makes actions more likely to be impacted by norms (Cialdini *et al.,* 1990; Kallegren *et al.,* 2000), including pro-environmental norms.

9.2. Shared spaces

9.2.1. Shared spaces in community living and coliving

In terms of lowering GHGs, the most valuable thing that residents within northern hemisphere-based community living and coliving communities share is space. The increased density of coliving communities leads to less energy consumption for lighting and space heating, the latter of which accounts for the largest share of energy use in UK households (BEIS, 2020a). Sharing domestic space has also been found to be a challenge. Research into house-sharing has found that common causes of conflict centre around a perceived lack of privacy (Klocker *et al.,* 2012) and managing the cleanliness of shared spaces (Clark *et al.,* 2017). Plus, a survey of British house-sharers found that 43 percent reported staying in their rooms at times to avoid interaction (Avis-Riordan, 2018). Sharing space lies at a nexus of being a social challenge and a pro-environmental opportunity. Understanding how residents within shared living communities negotiate sharing spaces is therefore valuable. This section explores how residents within the communities studied negotiated sharing space, with a focus on community living and coliving communities. In particular, it contrasts The Vale community living – a community where the same residents lived together for three years, with Liquid Monastery coliving – a community with a greater level of transience, arguing that the practices of negotiating space at The Vale are one of the factors that was likely to have aided its longevity.

Upon first glance, there was a clear demarcation between shared and private space within communities which shared one dwelling (i.e. community living and coliving). Private spaces were spaces over which a person or a couple had a sense of exclusive ownership. This ownership manifested itself in that person or couple being able to arrange their possessions as they wished in that space, and to control access to that space. Private spaces were residents’ bedrooms, although

many residents used them for more than just sleeping. They were also places in which residents worked, relaxed and socialised. All other spaces were known as shared spaces: available for the use of all residents and the occasional guest. These consisted of kitchens, lounges, outdoor spaces and bathrooms. Yet, regarding a *space* as private or shared is reductive. It is more useful to view privacy as an affect linked with particular temporalities, routines and doings within a space and proximate to that space (although the terms “private spaces” and “shared spaces” are used in this section for expediency). This affect of privacy may more often be experienced in so-called “private spaces”, but it may also be experienced in shared spaces. It may furthermore be experienced in the presence of others (as expressed by the phrase “being alone together”) or there may be a lack of privacy even when a person is alone in a room, due, for example, to the intrusion of noise, or the knowledge that noises made in that room are audible to others. What follows explores how residents negotiated privacy and sharing within their spaces.

Within the community living and coliving communities noise in nearby rooms could be a disruption to a desired state of privacy. For example, at The Vale community living there were two lounge areas which were separated by a folding door which did little to insulate sound. All residents practised meditation, and one issue residents spoke about was that if somebody was meditating in one lounge, and someone was watching TV in the other, then this would disrupt the meditator. Similarly, one half of the lounge was occasionally used as a guest room, and so if a guest was sleeping, then conversation in the other lounge had the potential to disturb them. Residents therefore had to negotiate their practices whilst in proximate spaces to others. One way in which this was apparent was that while in corridors and hallways, voices were notably kept to a low volume. Residents at The Vale community living seemed to be particularly sensitive to the disruptive potential of noise, and it seemed that minimising noise was a norm shared by the community. Liquid Monastery coliving residents were by no means loud, yet there was more tolerance for the overlapping of one resident’s noise into another resident’s environment. In part this was due to the low auditory insulation in the flat. In the communal lounge it was possible to hear something as quiet as a person’s sigh from their bedroom, even while their door was closed. Conversations between residents were louder when compared with residents at The Vale community living, and it was regarded as acceptable for a resident to listen to music in their room with their door open, so that the music was audible to those in communal spaces. There was less expectation that residents *should* be quiet according to the needs of others:

> Isabella (Liquid Monastery coliving): It's not like a “party flat”[…] but sometimes […] it's not like it's happened often, it's just that you know you might want to go to

> bed at nine because you have an early flight or something... you can't expect everyone else to you know… shut up at nine.

As Isabella's words illustrate, within certain temporal boundaries (e.g. at 9PM) there was a norm that a resident's noise could overlap into another's space; whereas at The Vale community living, the acceptability of noise was more closely linked with whether it interrupted the practice that residents were engaged in. In this auditory sense, there was less privacy at Liquid Monastery coliving: residents were more likely to hear and be heard by others.

The use of spaces for practical purposes had to be negotiated. The bathroom was the shared space that was always accessed sequentially and privately. The Vale community living had a bathroom and a toilet and Liquid Monastery coliving had two bathrooms, which helped to alleviate the likelihood of residents having to wait to use toilets or showers. Residents had also configured their morning routines to prevent overlapping use of these amenities. At Liquid Monastery coliving residents did not typically share meals, and so sometimes had to negotiate kitchen space during mealtimes. Resident Isabella commented that 'we're really good at making good choreographies in the kitchen when there's more than one cooking'. At The Vale community living one person cooked for everyone, so coordination of kitchen 'choreographies' was less of a challenge.

Figure 9-7: Liquid Monastery's kitchen, where 'choreographies' were sometimes performed

Use of shared spaces is also impacted by perceived levels of control over that space. The more residents feel they have control over a space, the greater their sense of wellbeing and confidence within that space (Green, 2017). Indeed, control is one of the key emotions linked with feeling happy within your home (Happiness Research Institute, 2019). At Liquid Monastery coliving, Emily and

Francesco were the managing residents, who sublet to the other tenants. They had retrofitted, decorated and furnished the property, sourced tenants, paid rent to and communicated with the landlord, as well as carrying out administrative tasks such as paying utility bills. They had control over certain decisions, for example, Emily shared that after receiving a 'bit of a shock' over an unexpectedly expensive heating bill, and discovering that some of the bedroom thermometers had been set 'a bit silly high at times like 27 degrees', they made the decision to set the thermostat at 20 degrees. In all of these ways they had control over the space, although they tried to create a shared sense of ownership within the home.

> Emily (Liquid Monastery coliving): everyone […] has a responsibility to maintain it [the home] and everyone feels that they want space to stay nice […] that kind of feeling of possession, of […] feeling that this is our home and our shared home, um it is really important and the fact that we have never explicitly said that […] we are providing a service to you […] or that we are running a sort of hotel for you […] kind of stops us ever… being imposing on them. Because we see them as […] people we need to please, rather than people we need to control […]

The words 'we have never explicitly said' indicates that Emily perceives hers and Francesco's roles are as service providers; yet, Emily was aware that the perception of being a service provider leads to a power imbalance ('being imposing'). This perceived status remains unarticulated to fellow residents, as Emily said that creating the 'feeling' that the home is shared was vital in encouraging shared responsibility. She further indicated that their desire is to use the power they have benevolently – to 'please' their flatmates, rather than 'control' them. Yet, control is inherent in their actions: deciding what rent to charge (which they set at below market rate), making decisions on utility providers and decorating the interior space. Liquid Monastery coliving resident Isabella's aforementioned uncertainty about who the plants in the shared space belonged to arguably reflects feelings of uncertainty about her sense of ownership and control of the shared space (see *9.1.1.*). Perhaps as a result, Isabella and her partner Pablo tended to spend a lot of leisure time in their bedroom. This minimal use of shared space was not the case with all residents, however. For example, another resident, Marta, frequently used the communal space to carry out solitary activities, such as working and reading.

Perceptions of control over shared spaces could also increase with frequent use of that space. One challenge acknowledged by residents of The Vale community living was tensions which could arise

from mis-aligned perceptions on the “right” to use shared spaces for private moments. Resident Harry gave the following example:

> Harry (The Vale community living): people would get into habits of like, I like to meditate at 7.30 each morning, then they get used to that, and then they think it's their kind of right to meditate at 7.30 in the morning. And then if someone else wants to do it, even just occasionally, then they can feel a bit their noses are a bit out of joint […] and the other person can feel resentful, because you know, this person uses it 99 percent of the time, and I just wanted to this one… So it's difficult.

Here the “rights” to use the shared space are viewed through two different prisms. The first is that of routine: “I always do this at this time” becomes “it is my right to do this at this time”, which has echoes of a descriptive norm introducing injunctive elements (Burchell *et al.,* 2013). The second of these is based upon principles of having a “fair share”. According to this principle, the distribution of privacy within shared space matters, and the fact that one person has the space to themselves regularly gives another person the right to even up this distribution through exercising the same privilege within that space. Both principles are based around temporality, which illustrates that privacy within space has a temporal element – shared spaces can at times be private spaces, although clearly the “rights” to that privacy can be contested. The affect of privacy is also attached to certain practices. In the example above, the need for privacy is attached to the practice of meditation. Privacy is therefore not an attribute of a space, but an attribute linked with temporality, routines, and practices within that space.

Figure 9-8: The lounge where residents liked to meditate (The Vale community living)

Similarly, tensions arose when resident's actions within a space created social norms which restricted other's actions. For example, a resident working in the kitchen created an expectation that noise should be kept to a minimum. If two other residents entered the space to have lunch and socialise, their actions were restricted by these expectations. Residents of The Vale community living resolved this tension through discussing and agreeing upon which practices were acceptable in which spaces.

> Harry (The Vale community living): we made a rule in the end that was like, it's fine to talk in the kitchen, and it's fine to put the radio on. And if you want, you know, more quiet space, you should be in the living room. So like, you didn't get a right just because you'd started working five hours earlier in the kitchen to for other people to not feel welcomed there […]

Attaching group norms to spaces rather than practices resolved a lot of the tensions around sharing space. By creating shared norms that the kitchen was a social space and the living room was a quiet space, residents could share those spaces with less tension, as they were more aligned on appropriate doings and ways of being within those spaces (this was, in fact, an example of "intentional we practice").

At Liquid Monastery coliving the managing residents had designed the shared space so that residents engaged in different practices were brought together.

> Francesco (Liquid Monastery coliving): We deliberately decided to design out privacy from the common space. So in the first design we had a living area and a dining area, and then realised there is an opportunity for people not talk to each other… so […] we actually brought a massive table in the centre, and then seats all around […] chairs and sofas […]
>
> Emily: The focal point is the social conversation…
>
> Francesco: Exactly. The focal point is the person in front of you.

Figure 9-9: One table at Liquid Monastery coliving

Residents at Liquid Monastery worked, ate, read, watched TV shows on their laptops and socialised around this table. Their proximity did lead to spontaneous interactions and the forming/reinforcing of social bonds, although the optional nature of socialising meant that interpersonal relationships were not as strong as The Vale and the Buddhist Centre community living residencies, where residents set aside regular times to socialise or do things together. Liquid Monastery's group norms of co-existing independently rather than intentionally spending time and doing activities together was in-keeping with a space in which people doing different things in close proximity was the norm. As such, residents maintained a tolerance for the practices of others, whilst simultaneously considering other's preferences. Group norms around how spaces should be used were generally not discussed, yet residents did what they could to notice other resident's preferences and negotiate their own practices to align with them (e.g. Isabella [Liquid Monastery coliving]: 'certain people might not like certain things you just have to understand that').

As with Liquid Monastery's optional socialising, The Vale's residents also spoke about the "relaxed" socialising which occurred in shared spaces.

> Harry (The Vale community living): you get a different type of relationship which isn't actually possible with friends that you just meet for coffee with, and it's more relaxed – so I go into the kitchen and have a cup of tea with Alan, and there's no time limit, none of us have travelled to be there. So we're, we're just stopping purely because we want to in that moment and when we don't anymore, we'll go right back upstairs or, or say "I'm going to read my paper" […] So, and we're used to saying that kind of thing: […] "Actually I'm going to be quiet", like "Don't mind

> me I'm just in my own thoughts". […] So you can be in the communal spaces without interacting too much if you want to […]

As Harry points out, most socialising with friends is intentional, e.g. you meet at an agreed place and time. Socialising occurs on agreed-upon terms. When being co-present in a space, the verbalised bounding of interaction (e.g. 'I'm going to read my paper') enabled residents to opt out of a perceived expectation to socialise, should they want to. This allowed them to have a sense of privacy with others present. As with The Vale's rule about the kitchen being a social space and the lounge being more of a "library" space, the clarification of expectations appeared to play an important role in resolving tensions and helping residents to feel comfortable within shared spaces.

The Vale community living and Liquid Monastery coliving were two different types of community. At The Vale residents had a clear and articulated intention to live as a community. At Liquid Monastery, the managing residents had the intention of creating a pleasant home for their house-mates, although this was based upon an idea of harmonious co-existence rather than shared endeavour. The Vale community living lived together for three years before the lease came up for renewal and for various reasons residents decided to move on. At Liquid Monastery coliving residents tended to stay for around a year. These differences in length of stay are likely to be numerous, and in part dependent upon the individual life circumstances of residents. Yet, arguably, the efforts that residents at The Vale community living made to ensure their own needs were met within shared spaces contributed to the long-standing nature of the community.

9.2.2. Shared spaces in cohousing

Cohousing communities also have designated "private" and "shared" spaces, although, as with community living and coliving communities, how spaces are used is more fluid than this simple binary definition. Within cohousing communities, residents' homes are self-contained, meaning that in theory residents do not or rarely *need* to venture into shared space. Shared spaces usually consist of a common house with a communal kitchen and dining area, and outdoor space. At Canon Frome Court cohousing there were numerous communal spaces: two kitchens, meeting spaces, a swimming pool, gardens and forty acres of farmland. At LILAC cohousing there were allotments, garden space and a common house, which included a kitchen and events space, meeting space and an office. At Springhill Cohousing there was a three-storey common house, which included a kitchen and dining space, a workshop, laundrette and lounge.

Figure 9-10: A montage of shared spaces in cohousing communities

From top left going clockwise: LILAC's shared bike shed; Canon Frome Court's communal kitchen, adaptable event space, greenhouse; Springhill's communal lounge.

The greater amounts of space, plus the self-contained nature of resident's private space, meant that co-presence was far less common in cohousing communities when compared with community living and coliving. Indeed, another study of US cohousing communities found that residents spent approximately 5 percent of their time in communal spaces (Williams, 2005b). This research found that communal areas were often empty or perhaps would have one or two people in them, though residents reported plenty of "bumping into" one another, which often led to social exchanges. Nevertheless, there were generally not the same challenges of negotiating shared spaces and achieving privacy as there were within community living and coliving communities.

The negotiation of shared spaces in cohousing generally took the form of making sure that spaces had been booked for events or social gatherings in advance, which was usually managed via a shared communications tool, such as an online calendar. In the case of such events, the boundaries of privacy and communality changed according to the nature of the event. For example, meetings were usually open to community members only, some events were open to the public (such as music nights or open days), and some events, such as those with intimate emotional sharing, might consistently be attended by a smaller group. In the case of an event which involved intimate emotional sharing, the appearance of someone who was not part of the event may be felt as intrusive. As with community living and coliving communities, the status of shared spaces as "shared" therefore morphed according to the practices within that space.

Within the cohousing communities it was common practice for residents to leave the doors to their homes unlocked, and to enter each other's homes without the homeowner being present or giving permission. For example, at Canon Frome Court cohousing I witnessed one resident entering another's home to look for them, and walking through almost every room in the house (including bedrooms) to do so. During a bonfire, residents at LILAC cohousing discussed whether they should go into an absent resident's flat to close her windows in case the smell of smoke got in. They decided against it in the end as they realised that the MVHR system should prevent that from happening, but from their discussion it was clear that such a practice was regarded as acceptable. Whilst I was a guest at these communities the same liberty was extended to me: my hosts would invite me to come and go as I pleased and "help myself" to things from the kitchen. As a result, cohousing resident's "private" spaces were not *as* private as is conventional for a regular street. The entering of each other's homes without explicit permission carries some elements of familial "sharing in" (Ingold, 1986). This was somewhat a result of the high levels of trust between community members, although the fact that I was invited to participate in using space in this way indicates that this was a norm within cohousing communities.

9.3. Conclusion

This chapter has explored the sharing of materials and spaces in shared living communities. It began by looking at looking at practices of borrowing, which are more common in cohousing than in community living and coliving communities, largely due to cohousing residents having sole ownership of a greater number of items. It was argued that strong borrowing group norms existed (and were linked with high levels of trust), but that overall there was minor disruption to the dominant paradigm of privately owned items. The chapter then looked at communally shared items, which was more prevalent within community living and coliving communities. It was found that this communal ownership somewhat resembled familial sharing, although with non-specific reciprocity attached. It demonstrated that communal items could have an ambiguous status in terms of ownership, and argued that in Liquid Monastery coliving this led to some residents to feel less comfortable in communal spaces. It was shown that when sharing materials, it was important to have shared norms over their "correct" use and placement. These shared norms could be created explicitly, through a house agreement, discussion or signage; or implicitly, for example, a new resident follows existing examples of how to do things. The chapter then looked at the sharing of food within communities. It named the pro-environmental outcomes attached to sharing food: greater adoption of pro-environmental eating habits, less waste, and if residents grew their own

food, less transport-related emissions linked with food. It showed that cohousing required more complex systems for sharing when compared with community living or coliving. It then explored how driving in a carpool changed the meanings, routines and competences attached to cars.

Next, the chapter explored the sharing of spaces, with a greater focus on community living and coliving communities. It explored how spaces were shared, looking at meanings of "privacy" and at negotiating what practices are acceptable within spaces. Whilst spaces are commonly labelled as "private" or "shared", this research argues that privacy and communality are affects attached to temporalities, routines and practices which may occur in "private" or "shared" space. In community living and coliving, residents negotiated shared spaces through creating shared norms on what were and were not acceptable practices within spaces, which could be adaptable dependent on the time of day or week. Shared norms could be arrived at implicitly, and/or through explicit agreements. Residents in community living also created privacy within shared spaces through articulating a desire not to communicate, "booking" communal areas in advance, or agreeing that certain spaces were "quiet" areas, chiefly used for work and study rather than socialising. What was key in each case was creation of group norms, enabling residents to feel socially comfortable in shared spaces. In cohousing there were designated "private" and "shared" spaces, but as with coliving and community living, privacy and communality tended to be fluid, and attached to practices and temporalities rather than spaces. It was quite typical for cohousing residents to go into each other's homes without explicit permission, or whilst the owner of that home was not present. This more fluid relationship between the private and communal within shared living communities was facilitated by high levels of trust between residents, yet was also a group norm.

Chapter 10. Community endeavour

This chapter explores the shared work of shared living communities, referred to as "endeavour". It begins by explaining how endeavour relates to environmental sustainability, before defining the different types of endeavour which take place within shared living communities. It then explores how residents negotiate expectations of endeavour, making the point that the lowered cost of living means residents are less dependent on remunerative work, and therefore have more time to give to other projects (including endeavour). The chapter goes on to explain that despite this, residents are often very busy, and sometimes managing endeavour is a challenge, especially in cohousing communities. Emotional management relating to norms and expectations of the reciprocity of endeavour forms a part of this challenge, as does the blurring of (community) "work" and "life". Yet, this blurred boundary is also seen as a strength: endeavour is a key way in which social fabric and ritualized practice of community is created and woven together. The chapter then explores how the meaning of community "work" is conceptualized as having an innate value by community members. Finally, the chapter looks at how endeavour can lead to emergence: that is, the possession of properties or capabilities that extend beyond the individuals which make up the whole. This is explored through three vignettes, which show the impacts of certain endeavours within three of the case study communities.

10.1. Defining endeavour

This chapter explores joint work, referred to as "endeavour". The pro-environmental outcomes of endeavour are woven deeply into the "DNA" of community. Endeavour facilitates lowered environmental impacts through the sharing of resources (e.g. the cooking of shared meals, the maintaining of shared spaces). Endeavour enables the completion of large-scale projects (e.g. the installation of district heating, large-scale food production) which would be out of reach for single households, who do not possess the social and organisational capabilities of shared living

communities. Endeavour strengthens social bonds and collective identity, and provides opportunities for pro-environmental knowledge and know-how to be learned, and pro-environmental norms to shared. For cohousing in particular, endeavour is to some extent what allows the community to exist as a collective which has greater qualities and capabilities than that of a group of friendly neighbours. The exploration of endeavour therefore intrinsically deepens an understanding of environmental sustainability within shared living communities.

The word "endeavour" has been purposefully chosen, as it is a term used by Ahrentzen (1996) to describe one of the key types of sharing which fosters collaborative neighbourhoods. Using the word "endeavour", as opposed to "work" broadens what is encapsulated, detaching it from remunerative work and indicating how it transcends (although may be partly formed of) domestic chores. The term furthermore links the concept to a notion of collaborative striving, from which unique qualities and capabilities can emerge.

First, it is helpful to have an overview of what kinds of community-related endeavour are undertaken. Community-related endeavour can take many forms, and indeed differed in type and amount between communities. The table below details the different forms of shared endeavour that four of the six communities who were part of this research engaged in (the table does not include endeavour involving the building and establishing of the communities. It focuses upon operational endeavour).

Table 10-1: Community-related endeavour

	Canon Frome Court cohousing	LILAC cohousing	Liquid Monastery coliving	The Vale community living
Cleaning	Community responsible for keeping shared spaces tidy. The community has a yearly "spring clean" which most residents will be involved in.	Community responsible for keeping shared spaces clean and tidy. Certain residents take it in turn to clean via a rota.	Community responsible for keeping shared spaces tidy. Residents will sometimes clear up each other's mess (e.g. putting everyone's plates in the dishwasher).	Community responsible for keeping shared spaces clean and tidy. All residents take it in turn to clean via a rota, and have committed to cleaning for at least

	A professional cleaner is employed to clean the most frequently used communal areas on a weekly basis.		A professional cleaner is employed to clean communal areas on a fortnightly basis.	30 minutes per week.
Food	Residents produce much of their own food through the joint running of their farm. This involves a multitude of work, including both "hands-on" tasks and extensive coordination and planning (which involves various meetings and working groups). Some important social events are based around food-related activities e.g. apple-pressing. Occasionally residents have joint meals, and share between them the tasks of setting up, cooking and clearing/washing dishes.	Some residents bulk buy food together. Residents will sometimes pick things up for each other at the supermarket. Communal meals happen approximately once per week, with certain people assigned roles of coordinating, cooking and cleaning.	Occasionally the community will have a shared meal, but generally there is little to no community endeavour related to food.	Residents take it in turns to cook, and will almost always eat dinner together. Residents purchase all food together through a weekly online shop.

Household governance (e.g. looking after utility bills, identifying repairs) and maintenance	A bi-weekly meeting which at least one person from each household should attend. Plus additional steering groups to look after specific governance-related tasks. Where possible, all maintenance carried out by a resident maintenance team. Ad hoc building projects e.g. building of a new barn.	A meeting every six weeks in which at least one person from each household should attend. A 'process' working group, whose job it was to define how governance processes worked. Where possible, all maintenance carried out by a resident maintenance team. Maintenance events such as 'landscaping' days, where residents would share gardening and landscaping jobs.	No shared endeavour. Governance carried out by the managing residents, and maintenance is the responsibility of the landlord.	Household governance shared by the group through meetings. Maintenance is the responsibility of the landlord.
Community governance (e.g. arranging social events, managing relationships)	A bi-weekly meeting which at least one person from each household should attend. Participation in one or more steering groups.	A meeting every six weeks, which at least one person from each household should attend. Participation in one or more steering groups.	New house-mates must be approved by all residents.	Two weekly social events. All residents trained themselves in nonviolent communication, which they used to manage conflicts.

	Various social events jointly arranged by residents e.g. Tai Chi, pot luck meals. Processes for managing conflict which involved a resident acting as mediator.	Various social events jointly arranged by residents e.g. music nights, shared meals to mark special occasions. Processes for managing conflict which involved a resident acting as mediator.		
Local community outreach	Various events arranged, including political activism (Green Party), choir practice and improv classes.	Various events arranged, including political activism (Labour Party), being a polling station during elections, music nights open to neighbours. Shared maintenance of a park which is open to the public.	No shared endeavour.	No local community outreach as such, though the household occasionally hosts meditation evenings for a meditation group that household members are part of.
Personal development	Some interest in nonviolent communication, though as of the fieldwork (Autumn 2018) no formal training.	Some residents trained in nonviolent communication. Some occasional events for emotional sharing, though these were	No shared endeavour.	Residents had a strong shared interest in personal development. They meditated together most mornings and trained themselves in nonviolent communication.

		infrequent and not well attended.		

Table 10-1 shows that Liquid Monastery coliving has significantly less endeavour than the other shared living communities. This is one of the key differences between the community typologies: within coliving, the work of community resides with one party, whereas within cohousing and community living, that work is spread amongst residents, with all expected to contribute a proportionate amount of endeavour, according to their ability.

Within the community living and cohousing communities, there is a wide variety in the amounts and types of shared endeavour engaged in by each community. It should be noted that *Table 10-1* gives an overview but cannot capture the many incidences of endeavour that may occur. From everyday domestic tasks, such as helping a neighbour to take their washing down because it has just started raining, to one-off projects, such as two neighbours deciding to build a treehouse for the community's children, the spatial and temporal co-presence of residents, along with TARs of sociability, encouraged many moments of shared endeavour to take place. For example, during a visit to Canon Frome Court cohousing I was spontaneously asked to help with the building of a new barn:

> We came out the other side of the walled garden and came across a few people putting the roof on the barn. At their request we gave them a hand with lifting some of the metal sheets onto the roof. (Journal entry, 24/11/2019)

Figure 10-1: Helping with the barn roof at Canon Frome Court cohousing

Endeavour could be part of a routine (e.g. watering the garden), or an irregular event (e.g. draft-proofing a window). It could take the form of working together (as in the above example of building a barn), or could comprise of splitting labour between residents. In fact, the sharing of tasks and know-how was a key way in which communities were able to function. For example, at The Vale community living, residents had a cooking and cleaning rota.

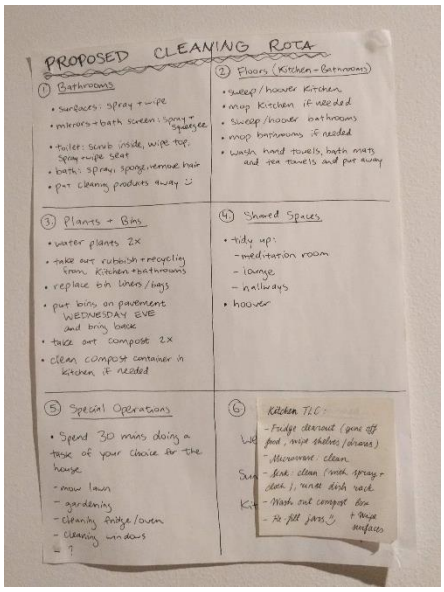


Figure 10-2: The Vale community living's cleaning rota

Through sharing these tasks, residents were able to have a quality of life they desired with less labour. For example, at The Vale community living residents had the benefit of home-cooked meal every day, but only had to do the cooking once per week. Sal of Canon Frome Court cohousing reflected that through the ability to share tasks, she was able to engage in a variety of jobs, and could take holidays, preventing feelings of monotony and fatigue. These tasks often formed part of an interconnected web of tasks which contributed towards a larger project. An example of this was Canon Frome Court cohousing's food production. At the macro level, the joint project was for Canon Frome Court cohousing to produce a large quantity of its own food. Within this project it is possible to identify a myriad of different tasks, requiring a wealth of practical and general understandings. Cheese production can serve as an example.

Figure 10-3: Canon Frome Court's dairy cows are brought in to be milked

Tasks relating to cheese production were caring for the cows and goats, milking them, storing their milk, processing that milk and making and storing different types of cheese. At Canon Frome Court cohousing some residents were involved in milking, others in making the cheese, and most in neither of these tasks; yet all could benefit by eating the cheese produced. Similar sets of tasks and attached practical and general understanding were attached to each food, and all community members had the right to share in the yields of each other's know-how and labour. Such sharing of labour was what made food production at Canon Frome Court possible, and indeed, was central to enabling all communities to function in the way that they did.

Specialisation of labour enabled residents to choose the practical and general understandings that they would like to develop, too. In the cohousing communities, new residents would typically spend time trying out different tasks, ascertaining where their interests and talents lay and where support might be needed in order to find their roles within the community. Residents also tended to change tasks over time, dependent upon their changing circumstances, a wish for novelty and/or others' needs. The cohousing communities had shared but uncodified understandings of work expectations, although resentment, risk of burnout and guilt over a perception of not doing enough were frequently reported as being a challenge (more on this in *10.2.*).

Developing specialisations also required practices of sharing knowledge and know-how, which was commonly practised within cohousing communities (examples of this in community living and coliving communities were less common). This finding is in-keeping with research by Meltzer

(2000b), who found that in his study of American cohousing communities, 'cohousing members find themselves in a somewhat privileged place of learning' due to their 'appreciation of the knowledge and experience of other members of the group and the high level of expertise available to them' (p.119). Teaching and learning could take place through shadowing, one-on-one demonstrations, and through extended handover periods which enabled residents to take on new practices whilst still receiving support from those who were more experienced. On occasion, one resident might receive external training or education, financed by a communal budget, on the proviso that they then teach the skill they have learned to others. For example, during fieldwork, Canon Frome Court cohousing residents were discussing paying for one person to undertake a sheep shearing course (rather than several people) as that one person could then train the others. Similarly, during fieldwork at LILAC cohousing, residents ran an allotment workshop where those with greater general and practical understandings around gardening and food growing practice shared advice with other residents. Within the cohousing communities, there was a recognition that people were valuable sources of knowledge and skill, as demonstrated by Julie of Canon Frome Court cohousing, when she spoke about another member who was planning to leave:

> Julie (Canon Frome Court cohousing): I definitely feel a very strong need to kind of just learn from Laura as much as I possibly can before she goes, because um people are very sad about, you know the amount of knowledge that's disappearing, that's gonna leave with her.

People's competences were valued, both as something which could be shared, and something which enabled those people to contribute specific practices which benefitted the community. This applied to sustainability-related practices too. Residents brought their different skills and interests to share with their community, e.g. energy-saving, biodiversity, food growing, recycling etc., meaning that residents adopted sustainability-related practices that they may otherwise have not.

The wide array of know-how, interests, tasks and projects meant that endeavour required considerable time and management. The next section explores this process, in doing so further defining endeavour in terms of how its processes and meanings are negotiated by residents.

10.2. Negotiating endeavour

Whether the amount of work which should be given to the community was codified or not varied. The Vale community living took the most structured approach. It was specified in their House

Agreement that they should spend 30 minutes per week cleaning, and were expected to complete certain tasks each week (e.g. cook once, clean the dishes once). At Springhill Cohousing each person committed to 20 hours of community work per year, though it was remarked by residents that this was a small amount, and it was very likely that everybody contributed more. In all other communities rules were not codified, and yet there were shared norms approximating what was expected. At Canon Frome Court cohousing, for example, residents tended to say that between one a half to two days was the "normal" amount, with some households being able to contribute more than others depending on their situation (e.g. families with young children were not able to contribute as much). At LILAC cohousing, general consensus appeared to be that "a few hours" per week should be given to community work, and at Liquid Monastery coliving, the commitment to shared work extended to an agreement to keep the communal areas clean and tidy.

Within the cohousing communities (particularly Canon Frome Court), community endeavour required significant time and energy. A question exists as to how residents managed this demand. An important piece of the puzzle is the lowered cost of living typically experienced by shared living residents. Lowered living costs meant that residents were less dependent on remunerative work, thereby freeing up their time, which they could then in part "give" to the community (or to other enterprises). The table below details the ways in which costs were reduced within each community.

Table 10-2: Lower costs of living within the case study communities

	Canon Frome Court cohousing	LILAC cohousing	Liquid Monastery coliving	The Vale community living
Food	Reduced monetary costs through growing and producing a large amount of their own food. Residents pay a fixed monthly fee per person, which covers the costs of food production.	Reduced monetary costs through growing and producing approximately 10 percent of their own food (this varies between households). Savings gained by some households who club together	Some potential cost savings through living in a highly urbanized location, with a range of options for purchasing food (including local markets and a range of supermarkets). However, it is unlikely that	Significant cost savings. Residents shared all food, putting £23 per month towards joint food purchases, which were organic, Fairtrade, vegan or vegetarian.

	Whether this represents cost savings will depend upon how much home produce residents consume.	to do joint bulk buys of food. A high number of residents are vegan or vegetarian, which often enables cost savings.	residents made many savings compared with the average single-family household.	
Furniture and amenities	Cost savings through borrowing and sharing, some shared amenities (e.g. washing machines) and practices of buying second hand, making do and mending.	Cost savings through borrowing and sharing, some shared amenities (e.g. launderette, office space) and practices of buying second hand, making do and mending.	Cost savings through borrowing and sharing of items, plus sharing of furniture and amenities (e.g. kitchen, bathroom, living spaces). Cost savings through furniture largely being second hand.	Cost savings through borrowing and sharing of items, plus sharing of furniture and amenities (e.g. kitchen, bathroom, living spaces). Cost savings through furniture largely being second hand.
Housing costs	No savings for most residents. Regular mortgage, house prices linked to the market. One affordable unit.	LILAC operates as an MHOS (Multiple Home Ownership Society). This is an equity-based leaseholder approach to cooperatively owned housing. Residents pay between 10 and 35 percent of their income towards their mortgage.	The managing residents increased density of the flat through a retrofit, adding two double bedrooms. They charged below market rent to increase affordability.	Through sharing the house between six people, residents paid below market rents. Some residents who were studying had their rent subsidized by residents who were working.

Maintenance	Residents pay a monthly fee which goes towards a maintenance budget, which covers certain costs which may include maintenance work in their private unit. Whether this presents savings or not may vary from household to household.	Residents' mortgage payments also contribute towards a maintenance budget, which covers certain costs which may include maintenance work in their home. Whether this presents savings or not may vary from household to household.	No maintenance costs, as this is the responsibility of the landlord. As maintenance costs are in theory built into rent costs it is unclear whether this represents savings or not.	No maintenance costs, as this is the responsibility of the landlord. As maintenance costs are in theory built into rent costs it is unclear whether this represents savings or not.
Social and leisure needs	Events and informal socialising frequently occur within the community. This lowers the need to travel out of the community to socialise/engage in leisure activities, saving on associated costs such as travel and restaurant meals etc.	Events and informal socialising frequently occur within the community. This lowers the need to travel out of the community to socialise/engage in leisure activities, saving on associated costs such as travel and restaurant meals etc. Some residents furthermore reported holidaying less due to community life being less stressful.	Informal socialising may have curtailed some need to leave the home to fulfil social needs, though it is not clear whether and to what extent this was the case.	Events and informal socialising frequently occur within the community. This lowers the need to travel out of the community to socialise/engage in leisure activities, saving on associated costs such as travel and restaurant meals etc.

Utility costs	Reduced costs from obtaining the majority of water from a bore hole and processing sewage on site. Savings made from generating electricity from solar PV are given to a "carbon reduction fund", rather than residents. Heating from biomass boiler has been cheap, but this was reported to be due to their heating costs to be linked with oil prices, which have been low.	Reduced costs of electricity due to generating some electricity via solar PV. Some residents share their internet connection, thereby reducing costs. Reduced heating costs due to efficient building insulation. Reduced water costs through water-saving practices.	Reduction of costs for gas, electricity and internet connection through shared spaces and amenities.	Reduction of costs for gas, electricity and internet connection through shared spaces and amenities.

As can be seen, cost savings are both structural (i.e. due to shared spaces and energy infrastructures) though also based on certain social norms (i.e. norms of borrowing, shared meals etc.).

It should be noted that whilst living costs in the case studies were lowered through shared living, shared living still typically excludes those with little or no income. Indeed, a critique often levelled at cohousing is that it excludes less affluent groups (Williams, 2008) due to initial capital needed to enter the community. Difficulties of access for less affluent groups was reported at Canon Frome Court (although they had an affordable unit, with plans to develop more). LILAC was unusual in that it had affordability built into its model (this is summarised within *Table 10-2*). However, it would still

be unaffordable to some. Coliving is frequently cited as offering affordability (e.g. Tjarksen *et al.,* 2019; Indah and Wardono, 2021), however, this "affordability" is usually conceptualised as offering a quality of living which would be out of reach for those on mid-level incomes who are living in particularly expensive cities. Of the living typologies included in this research, community living is likely to offer the lowest cost of living, although, if residents rent rather than own, their living situation is still potentially precarious.

Despite these – not insignificant – caveats, the cost of living *was* lowered for case study residents through shared living. For cohousing and community living residents, the cheaper cost of shared living was an important part of what enabled less engagement in traditional work, with many residents not working full time in a traditional 9-5 salaried role. Many worked part-time, had started their own business, had gone back into education or had retired/semi-retired. Meltzer's (2000) research into US cohousing communities showed similar results, with 50 percent of adult residents surveyed *not* working full time (sixteen percent worked part-time, 11 percent were students, 5 percent homemakers, 5 percent retired, 4 percent had independent means of support). This was not the case with coliving residents. Although they too had lower living costs than if living alone or as a couple, the residents all had full-time work. Coliving enabled them to benefit from the economic opportunities of living in London, while minimizing their living costs. Though, research has found that, due to its flexible, short-term leases, coliving accommodates those in economically precarious work (e.g. short-term/zero hours work contracts) (Bergan *et al.,* 2020).

For cohousing and community living residents, needing less money gave them more time to engage in community endeavour, and more time pursuing their individual passions and interests, whether in a remunerative capacity or otherwise. Cohousing and community living residents were generally very busy people, actively engaged in the running of their own community as well as various side projects (which were often socially and environmentally impactful). Merging endeavour into daily routines could therefore require extensive coordination of practices, especially for cohousing residents, where there tended to be greater amounts of endeavour. This was well-encapsulated by Julie, a Canon Frome Court cohousing resident who had recently moved to the community at the time of fieldwork, when she described the forethought needed to grow and produce food (e.g. butter) rather than buy it.

> Julie (Canon Frome Court cohousing): […] how much forethought and planning needs to go into making sure that you've got the right kind of milk at the right time and then the time to make the butter and then knowing that you've got the places

> to store it and, yeah will you be able to freeze it so that you've then got enough until next time? When all those stars need to align […]
>
> […] so we're just very aware all these kind of... parallel lines in our heads […] what food do we need to plan according to what is actually in the walled garden at the moment and... yeah there's kind of a lot of um brain-space and, cunning and um, just knowledge about loads of stuff that we […] haven't got yet…

Julie's description shows how she must bring together numerous factors, including considerations of materials (the right kind of milk, a freezer) and temporality (when to fit having the right milk with time to make the butter; when is there available freezer space? What else is in the freezer at this time? How long will the butter last for?). This is reflected by the alignment of their food planning according to seasonal availability requiring similar considerations, referred to as 'parallel lines in our heads'. This image evokes a sense of holding different factors in mind simultaneously, and indicates high levels of complexity, which, according to Julie requires 'brain-space', 'cunning' and 'knowledge'. Whilst the example given is related to food production, it is emblematic of the sheer amount of community endeavour within the two cohousing communities, which was reported by some residents to be challenging. A portion of this difficulty took the form of emotional burden, with residents worrying about whether they were doing their "fair share". Many cohousing residents spoke about the challenges of managing guilt from worries of doing too little.

> Gillian (Canon Frome Court cohousing): […] this guilt thing […] it's a subtle kind of […] tax to living here […] that you need to kind of feel a little bit of anxiety that you need to pull your weight […] and that's really important, that in some subtle ways that we kind of, encourage people to do that... but it seems like sometimes it goes a bit out of control […]

Gillian frames guilt as an external factor which comes with living at Canon Frome Court cohousing, rather than an emotion that comes from within her. The anxiety Gillian mentions to 'pull [her] weight' arises from a perception of what others are doing, and a desire to contribute equally. In other words, it is a social norm. Gillian portrays this guilt as inevitable: a 'tax' which serves a purpose of driving endeavour, yet sometimes 'goes a bit out of control'. Guilt is therefore framed by Gillian as something which will exist but should be managed. Indeed, Gillian was certainly not the only one. Many also spoke about the dangers of becoming burnt out and resentful from doing too much.

> Matt (LILAC cohousing): I think that's the pattern that a lot of us have seen ourselves, where you know a project like this is so kind of exciting […] It's easy to get really enthusiastic and just throw a load of time and energy and love into it... But […] you can do that too long and then you can start to become resentful […]

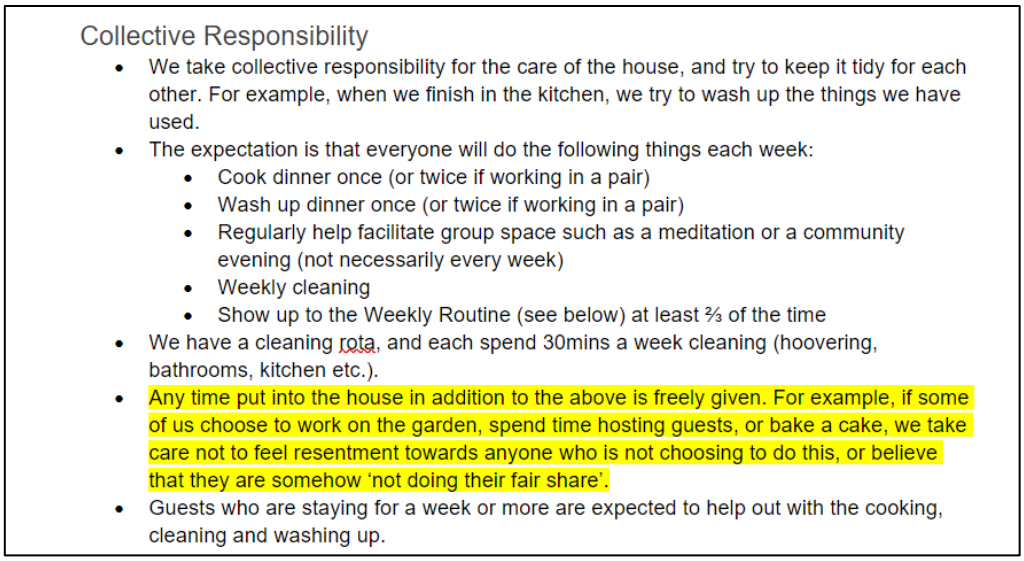
Like Gillian, in Matt's words there is some indication of a loss of control ('just throw a load of time and energy and love into it') except that this time the dynamic is reversed: whilst Gillian describes guilt being put upon her by the community, Matt describes putting himself (time, energy, love) into a project. The implication of both Gillian's and Matt's words is that the give and take of community-related endeavour must be controlled or balanced in order to manage emotions effectively, with that balance relating to both how much the individual had capacity to give, and how much they felt that *other* residents were giving. Reciprocity therefore formed a part of this calculus, although residents reported being sensitive to the capacity of others. In both communities, there was a recognition that what people were able to give to the community would fluctuate according to life circumstances.

> Jamie (LILAC cohousing): […] we've sort of recognised that it's OK to have periods of time when you're less engaged because… sometimes you have busy periods don't you?

> Tilly (Canon Frome Court cohousing): […] it's about the sum of the whole isn't it? And everybody playing their part… and there's always somebody who's going to be so stretched in their home life that they're not... contributing as much as they'd like... and seeing that come and go […]

Both Tilly and Jamie remark upon the waxing and waning demands of life, with an expectation that busy periods which prevent community endeavour were not permanent, and that residents in time would be able to contribute. In this sense the type of reciprocity expected tended to be close to the rules which govern gift-giving: reciprocity may be expected, but in a fairly non-specific and time-staggered way, which acts to perpetuate continual indebtedness (Belk, 2010). Underlying this commonly articulated recognition was a trust in the goodwill of the community, and the belief that the desire to contribute as well as benefit from community endeavour was shared by others. No formal sanctions for not contributing existed. Instead, a long and careful selection process of new residents and shared TAR (teleoaffective regime i.e. a concept that joins multiple practices which share a teleology and affectivities) around community life served to maintain a narrative of generosity, goodwill and reciprocity.

At The Vale community living, residents had recognised the risk of guilt and resentment, and had a concept within their House Agreement to mitigate these emotions.



Collective Responsibility

- We take collective responsibility for the care of the house, and try to keep it tidy for each other. For example, when we finish in the kitchen, we try to wash up the things we have used.
- The expectation is that everyone will do the following things each week:
  - Cook dinner once (or twice if working in a pair)
  - Wash up dinner once (or twice if working in a pair)
  - Regularly help facilitate group space such as a meditation or a community evening (not necessarily every week)
  - Weekly cleaning
  - Show up to the Weekly Routine (see below) at least ⅔ of the time
- We have a cleaning rota, and each spend 30mins a week cleaning (hoovering, bathrooms, kitchen etc.).
- Any time put into the house in addition to the above is freely given. For example, if some of us choose to work on the garden, spend time hosting guests, or bake a cake, we take care not to feel resentment towards anyone who is not choosing to do this, or believe that they are somehow 'not doing their fair share'.
- Guests who are staying for a week or more are expected to help out with the cooking, cleaning and washing up.

Figure 10-4: The 'freely given' rule in The Vale's House Agreement (see highlighted section)

The Vale community living had set out obligations for shared responsibilities, and stated that anything done by a resident beyond that was 'freely given' with no expectations of reciprocity. The statement '[w]e take care not to feel resentment' is particularly interesting as the expectations around an emotion are codified, shifting emotions from being private and personal to making them a 'Collective Responsibility' (the title under which this rule sits within the House Agreement) which can be worked on actively at a collective level ('we take care to […]'). The Vale therefore not only created group norms around actions, but also around the affects attached to those actions. Whilst The Vale is the only community who codified managing resentment, there was acknowledgment from residents within both cohousing communities too that management of both guilt and resentment required work. Daisy of LILAC cohousing mentioned that during the first five years at LILAC, the community had gone through 'a learning process' about guilt and resentment, and that they were 'in a much healthier place with that now than [they] were a few years ago'. A recognition of how guilt and resentment around community work could impact negatively on the community, and of how these emotions could be triggered by the actions of others, nudged these emotions into the communal (as opposed to private/household) sphere. Therefore, emotional management became linked with management of the work itself.

Community endeavour by its nature largely took place within a domestic setting. Therefore, residents lived and engaged in endeavour on the same site, and so “work” and “life” could be hard to separate. For example, Graham of LILAC cohousing commented that whilst he had an official role on the maintenance task team, residents would sometimes approach him ‘just for a bit of help with a handy person job’. More than one resident at LILAC mentioned a shared concept they had of being “LILAC-ed”:

> Jamie (LILAC cohousing): this idea this concept of being “LILAC-ed”, which is where you're just at social time, and someone asks you a LILAC work question, you know... “I just need to get this figure from you for this” or “actually can you read that piece of paper and sign it?” […] we should […] try not to do any of that stuff basically outside of… if you want to talk about talk to someone about work […] you don't just do it at a communal meal for example... is the […] theory but it doesn't work like that all the time.

As Jamie shared in the quote above, there were attempts to stop endeavour from infiltrating social time, although these attempts did not always work.

10.3. Endeavour creates strong social ties

The term ‘being “LILAC-ed”’, whilst no doubt somewhat tongue-in-cheek, is also a telling indication how closely residents linked their image of their community with the work that it took to sustain it. Indeed, it was largely acknowledged by residents in both cohousing communities that endeavour was significant in creating the shared relational ties which made up the community. As one Canon Frome Court cohousing resident (half-seriously) mentioned, ‘Gang work [work which requires a group of people] is the only time we really see each other!’. Therefore, just as work could infiltrate social occasions, social occasions infiltrated work.

> Henry (LILAC cohousing): […] yesterday me and Jack were building – finishing - the treehouse, so we spent two hours on that. So that's two hours of LILAC work which I hadn't even thought about or remembered […] so we were just chatting hanging out building the treehouse on a Sunday afternoon […] it's those kinds of things you know that, what I really like and I think what a lot of people really like is just um, er the kind of like collective work times which is quite fun... doing stuff together.

The words Henry uses to describe building the treehouse have strong affiliations with a leisurely weekend activity ('chatting', 'hanging out', 'Sunday afternoon') and yet they are blended with references to the activity as work. Although, Henry does not refer to building the treehouse as work; instead it is 'LILAC work' or 'collective work' – work that is linked to the community, that is inherently social and enjoyable. The social significance and shared nature of work changed the meanings attached to that work. One LILAC resident mentioned that they tried to call work days "celebration days". At Springhill Cohousing, one resident spoke about how they had re-conceptualised community work:

> Veronica (Springhill Cohousing): every adult member should do a minimum of twenty hours community work, throughout the year […] some people do far more […] and some people do, very little […] somebody said, "Well, the people who don't do it are the losers" […] the people who don't, sort of put in to the community get less out. And I think that just became accepted you know, that um, oh it's a shame so-and-so doesn't ever come to work days but, it's their loss really.

Veronica reconceptualises the traditional notion of work, whereby the reward for work comes after it has been completed (in the forms of gaining value through remuneration or otherwise e.g. a cooked meal). Instead, the work itself is viewed as the reward, with those who do not take part being the ones who suffer a 'loss' and are the 'losers'. The narrative around work was that it had its own innate value as a way of enriching and sharing in each others' lives and lowering environmental impacts (e.g. through the growing and producing of food on site, through the cooking of shared vegetarian meals, through management of shared green energy systems and other amenities). This is not to say that (as has been mentioned) managing workloads and emotions about expectations of how work was shared was not challenging. However, undeniably, the "work" of community life was regarded by residents as important in creating the community.

Liquid Monastery coliving provides an interesting contrast to the other communities, as endeavour was minimal and not equally spread. The two managing residents took on all of the administrative work of running the household, and there was coordination between all residents in keeping communal areas clean and tidy, although this was supplemented by a professional cleaning service. The residents co-existed harmoniously, appearing to appreciate the presence and implied support of others, but they were not engaged in joint projects and shared goals. Social time spent together appeared to usually be incidental or spontaneous rather than intentional. Perhaps as a result, of all the communities, social ties within Liquid Monastery appeared to be the weakest.

This highlights the inherently social nature of endeavour. As Jarvis (2015b) notes, even the most mundane domestic chores are endowed with a sense of occasion and ritual through the sociality of endeavour. Sociality bestowed endeavour with this special status within communities, creating shared norms and ritualised, meaningful practices, as well as a shared sense of achievement; and endeavour is often what brought residents together, strengthening their social bonds. For community living and cohousing communities, endeavour was at the nexus of community life.

10.4. Emergence through endeavour

In addition to strengthening social networks and facilitating the development of ritualised practices, shared endeavour was important in enabling new qualities and capabilities within communities, which consisted of more than the sum of their parts – a concept known as emergence (Elder-Vass, 2010). This final section consists of three vignettes to illustrate instances where emergence occurred through shared endeavour, drawing upon Canon Frome Court cohousing, The Vale community living and LILAC cohousing.[32]

10.4.1. Shared green infrastructure at Canon Frome Court cohousing

When Canon Frome Court cohousing was initially formed in the late 1970s, one of the site's homes was occupied by a caretaker and his wife. Upon their deaths, the money from the sale of that cottage went to the community. It was agreed that rather than the money being split between the different households, it would remain in a communal pot and would be used to reduce the community's carbon impacts (being referred to as the "carbon reduction fund"). A large part of these funds went towards the purchase of a PV array.

[32] Liquid Monastery coliving have not been included here, as they did not engage in much community endeavour.

Figure 10-5: Solar PV array at Canon Frome Court cohousing

Over a number of years, the electricity generated from the PV array lowered the impacts of electricity at Canon Frome Court, and, through selling electricity generated back to the grid, paid for itself. Once the cost of the array had been paid, it generated on average £14,000 per annum. Once again, rather than split the financial gains between households, the community chose to invest these funds into a carpool through the purchase of three electric cars. The investment in solar PV at a community level therefore had a "cascade" effect in terms of enabling investment in further GHG-lowering equipment.

The carbon reduction fund was also used to replace some households' single-glazed windows with double-glazed windows: something which financially would not have been possible for those households at that time. Through framing the goal of the funds as reducing the carbon impact of the community, those funds could in part be distributed in a way which happened to benefit individual households financially (as biomass heating was metered by household) without (overtly) putting noses out of joint. Households were perceived as a part of the community, and therefore increasing a household's energy efficiency was fulfilling the goal of lowering the community's carbon impact.

The use of shared electric cars also had GHG-lowering impacts which extended beyond the lack of need for petrol when driving. Some residents also decided not to own their own private vehicles, thereby lowering their indirect impacts. Residents also reported sharing journeys more often in comparison to when they had their own cars, and more frequently picking up things for other people (e.g. items from the supermarket) if travelling into town. This was largely facilitated by a carsharing WhatsApp group, which enabled easy communication. Unrelated to GHGs, but still significant, is that the acquisition of electric cars turned driving from a practice which had environmental guilt attached

to it, to one with meanings of fun and joy. Community members *liked* driving the electric cars, and felt proud of them.

Significant resources were needed to set up the PV array and the carpool in terms of labour and certain knowledge and know-how (knowledge about GHG-lowering materials, financial and real estate know-how, administrative skills etc.). Such resources came from the residents, with different projects being driven by different individuals. It was acknowledged by many residents that their household would not have been able to afford solar PV or electric cars alone. Through choosing a joint financial endeavour and combining their time, labour and know-how, the community increased their GHG-lowering capabilities beyond the means of singular households.

10.4.2. Shared meals at The Vale community living

From the beginning, it was agreed by residents at The Vale community living that communal meals would be the "glue" that bound the community together. Residents shared dinner each day, and to enable all residents to share meals, the food needed to accommodate everyone's dietary requirements. Of the six residents, two were vegan, two vegetarian and two ate meat. It was stated in the House Agreement that:

> Shared meals are vegan/vegetarian and friendly towards people with other dietary requirements (e.g. gluten free). It is fine for people to supplement their own diet with meat or fish, but this isn't cooked as part of the main dish.
>
> The Vale House Agreement

Despite the option to add meat or fish to communal dinners, this was overwhelmingly not practised. According to resident Harry, in practice the two residents who were 'omnivores' were 'basically […] vegan with a little bit of vegetarian diet, when they [were] in the house'. The "omnivores" did not feel strongly about eating meat or dairy, and were therefore happy to forgo these food-types during shared meals. It is worth noting that the omnivores aligning their eating practices with the vegans and vegetarians was characteristic of several pro-environmental practices in The Vale community living, where those who had certain preferences for practices based upon ethical/environmental meanings felt strongly, whereas those who did not have these same preferences were not strongly attached to their practices, and so happy to align with the actions of others ("intentional we practice"). For example, one resident felt strongly about trying to prevent food waste, and so other residents supported her in subscribing to a veg box. Thereby all residents may become carriers of

certain pro-environmental practices, because a minority attached moral or ethical meanings to those practices.

Through sharing meals, the six residents had largely vegan or vegetarian diets, thereby lowering the environmental impacts of their food. The process of cooking in bulk also lowered the amount of energy used to cook the food, as well as it being likely that there was less food packaging.

Shared meals at The Vale also had benefits on resident wellbeing, a finding supported by research that shows eating with others has been found to be strongly associated with wellbeing (Oxford Economics, 2018). The cooking rota also meant that residents saved time through only having to cook dinner once per week, and residents commented that they had never eaten so well, so ethically and so cost effectively.

The Vale's shared meals are a meaningful example of emergence from shared endeavour, because the sharing of meals has such a multitude of positive social and environmental impacts. It is emblematic of community life in that it is a practice which is symbolically at the heart of community (Meltzer, 2000), and in that it is also commonplace for communal meals to be vegetarian or vegan-friendly (which was the case at Springhill Cohousing, LILAC cohousing and the Buddhist Centre community).

10.4.3. Events and community outreach at LILAC cohousing

LILAC cohousing can be described as a "porous" community, in the sense that it was not a community that was exclusively formed of its residents. Instead, certain spaces, events and opportunities enabled and encouraged the inclusion of local residents and other members of the public.

LILAC held regular social events, which were mainly hosted in their common house. Most events were for residents (e.g. communal meals, festive celebrations, watching a film or sports event) though some events were opened out to local residents, for example music nights. The space was also available for hire, and was used for certain classes and events.

Figure 10-6: LILAC cohousing's common house, ground floor

LILAC households' access to shared spaces such as the common house enabled these social engagements. Residents commented that a lot of their social and leisure needs were met within the community, both in terms of using the space to socialise, and socialising with community members. This meant that residents were less reliant upon public spaces and hospitality venues, such as pubs or restaurants, to meet their social and leisure needs. This is likely to have had GHG-lowering impacts, as it is feasible that holding social events in community spaces meant that residents travelled less. Arguably, through opening the space and certain social events to the local community, LILAC residents passed on this ability for some of their social and leisure needs to be met closer to home too, thereby reducing travel. Shared meals also had environmental benefits through greater energy efficiency in cooking, and in all meals being vegan/vegetarian.

Holding events meant taking on a certain amount of endeavour, from organising the space, providing food and drink to facilitating the event and clearing up afterwards. Whilst efforts were usually led by one or two people, it was routine for all attendees to help, for example by rearranging furniture beforehand and clearing up afterwards. Beyond the actual event itself, a working group formed of LILAC residents were responsible for maintaining the common house, and all residents contributed financially towards its maintenance. The shared spaces were therefore a result of community endeavour, which was governed through agreed-upon processes.

LILAC had also made some of its outdoor space available to the local community and public. Five of their allotments were used by residents in the local area (including one plot which had been raised from ground-level to accommodate a local resident's back trouble).

Figure 10-7: LILAC cohousing allotments

LILAC also had a portion of outdoor space which they referred to as the "pocket park". This was green space with a path, some trees, and a bench. It had a gate which opened to the street, and was available for members of the public to visit. As with the common house, the shared work to maintain these spaces facilitated the ability for residents to use them, and through shared use make social connections.

Figure 10-8: LILAC cohousing pocket park

The relationships developed between residents within LILAC and the local community led to the loaning of items. For example, one local resident borrowed an e-bike from a LILAC resident to see if

she would be interested in owning one herself. LILAC residents also took in three chickens from a local resident, after that resident decided that she could not provide them with adequate outdoor space. These examples of loaning and exchange both have potential GHG-lowering outcomes: the former potentially leading to the purchase of an e-bike and more trips by bicycle, and the latter decreasing GHG relating to a small number of eggs consumed by LILAC residents. However, beyond these environmental benefits, these interactions are likely to have important positive social impacts, including stronger social bonds and increased community resilience.

LILAC residents also utilised their shared spaces to engage in the local democratic process through political campaigning. The common house was sometimes used as a space in which meetings could be held or campaign activities (e.g. envelope stuffing) could be carried out. LILAC was also registered as a polling station. They furthermore held "learning days", where members of the public could learn about various facets of cohousing. There was a perception that their community might 'inspire others' (John, LILAC cohousing) to do something similar, or to adopt sustainable practices; although this was often said alongside an acknowledgement that theirs was not a perfect model.

LILAC's various connections with their local community empowered residents. Ninety-six percent of LILAC residents tended to or definitely agreed that they had an ability to influence decisions in their local area[33] (prior to living at LILAC, 36 percent of residents felt this way) (Bonner, 2020). Through their shared spaces, and the endeavour of maintaining these spaces and hosting or enabling social events, LILAC residents turned their home into a neighbourhood hub which fostered lower environmental impacts, social networks and increased community resilience.

The vignettes of emergence within communities are three of many ways in which endeavour resulted in capabilities and qualities which extended beyond the sum of their individual parts. They illustrate that the impact of endeavour is multiple are sometimes unexpected, spanning across both social and environmental benefits.

10.5. Conclusion

This chapter has explored endeavour within shared living communities. It has argued that because endeavour enables the sharing of resources and the completion of pro-environmental projects, it is intrinsically linked with environmental sustainability within communities. Its role in bringing people

[33] For comparison, 26 percent of people in the UK tend to or definitely agree that they have an ability to influence decisions in their local area.

together and fostering co-dependence also strengthens the social networks of communities. The chapter showed that the lack of endeavour within coliving is a key difference between coliving, cohousing and community living. It argues that within coliving, there tend to be weaker social ties as a result. The chapter has investigated how endeavour is negotiated by residents. In particular, it has shown how the time and resources needed for endeavour can be a challenge for cohousing communities. It has shown how the meaning of endeavour expands beyond notions of remunerative work, and is enmeshed in social and domestic life, and notions of community. The final part of the chapter explored how endeavour enabled communities to have qualities and capabilities which extended beyond that of the individuals who made up those communities. It also showed the multiple and interconnected pro-social and pro-environmental impacts of endeavour.

Chapter 11. Discussion

This chapter reflects on the differences between the housing typologies explored in this research, and the generalisability of the case studies. It goes on to explore the significance of social networks in promoting and maintaining pro-environmental practices and outcomes, and the merging and negotiation of multiple individual agencies within shared living. These are topics which have been touched upon throughout Sections 2.5. *and* 2.6.*, and throughout Chapters 7, 8, 9, and 10. This chapter brings together the different elements which have been considered and discusses them further. This is with an aim to provide a more specific exploration around social networks and sharing, as well as summary view of the different housing typologies featured in this research.*

11.1. The differences between cohousing, community living, and coliving

In cohousing communities, residents will tend to have their own self-contained homes, and additional communal space, whereas in community living and coliving communities, residents have less private space, and will often share kitchens, lounges and bathrooms (as was the case with coliving communities participating in this research). These spatial differences impact where these communities are situated, the type of occupancy residents have, who chooses to live there and how much control they have over the space. Cohousing communities are mainly owner-occupied and often purpose-built. They are more commonly situated away from urban centres, where the price and availability of land is often prohibitive. For many cohousing communities, significant capital is required during the building process, and unless funding can be obtained from external sources, these requirements for capital can act as a barrier for entry into the community. Partly because of this, cohousing residents tend to skew older in comparison with community living and coliving

residents. Community living and coliving occupants tend to be younger, and do not often have children. They will more often tend to rent, and have homes closer to urban centres.

Community living and coliving communities tend to be more transient, and cohousing communities more long term. Coliving communities may be especially transient. Many are aimed at a particular type of young working professional, who may prefer flexible leases to suit the economic precarity of their work (e.g. short-term/zero hours contracts) (Bergan *et al.,* 2020). This has implications on the commitment that residents are likely to have to that community, with it being likely that the ties between residents are less numerous when compared with community living and cohousing. The pro-environmental gains of community living and coliving residents sharing much of their space and amenities is arguably somewhat mitigated by the impermanence of communities, with the implication that this way of living is a "phase". In contrast, cohousing is at least perceived as a long-term, sustainable form of communal living.

This research explored the differences between coordinating different shared living typologies. The community living and coliving communities that were part of this study tended to consist of six or seven people, whereas the cohousing communities consisted of between fifty to eighty-five people. In many respects community living and coliving communities were easier to coordinate. There were less perspectives and needs to consider and less people to consult on decisions. Residents could know all other residents more intimately. Over time, residents within community living appeared to rely less on discussion and articulated agreements to coordinate and align on practices, instead more often operating via social norms. The coliving community in this research coordinated their practices almost entirely by social norms, rather than articulated requests or agreements. Cohousing communities made more use of tools and systems to manage shared decisions and coordination between community members.

In coliving and community living, the types of sharing engaged in were more akin to familial-style sharing. It was more common for residents in these communities to use each other's things without asking permission. Cohousing communities were more like conventional households in the sense that family units had self-contained homes and privately owned items, though borrowing was commonplace, and some amenities and items were communal. Plus, it was normal for cohousing residents to enter each other's homes while the owner of the home was absent. Whilst the type of sharing within cohousing was not familial in nature, it certainly extended beyond the level of sharing typically seen between neighbours. Coliving and community living residents shared more space, and

in this sense negotiated their routines and preferences more intensely than cohousing residents. Residents developed shared norms on what practices were appropriate in given spaces at given times, and on the correct placement and condition of items within spaces. These norms were also negotiated within cohousing communities for communal spaces and objects (and indeed could be a challenge), but were less significant to the overall living experience of the community.

The types and amount of endeavour within the three housing typologies also differed. Within community living, the endeavour that residents shared reduced the resources required by individuals for domestic life. Through sharing meals, housework and administrative tasks, individuals spent less time cooking, cleaning and dealing with administrative tasks. In the coliving community, the managing residents took on certain household responsibilities, thereby reducing endeavour required by other tenants, whilst not increasing their own endeavour significantly. In cohousing, the picture was more complex. As with community living, many instances of shared endeavour did reduce the burden upon individuals, for example, sharing childcare, group meals, cleaning and DIY. However, other factors meant that cohousing added more work to resident's lives. One of these factors was the aforementioned time and negotiation needed to coordinate a larger group of people. Another was the additional maintenance and building tasks attached to being owner-occupiers, which the community living and coliving communities with rental tenure did not have to deal with. Broadly, however, additional factors arose because of the emergent qualities of cohousing communities. The physical and human resources and infrastructures of cohousing enabled a multitude of projects, often driven by ideals of environmental sustainability and social justice. Each of these projects took time, energy, skills and work, and the number of people within the communities meant more people to share the load, but also more ideas to pursue, and projects to be involved in.

Whereas coliving and community living are to some extent a way to cope with the expense and social isolation of city life, cohousing resident's access to greater physical and human resources means that they are more empowered to create an alternative living paradigm, which is less connected to overly carbon intensive food chains (Dunne, 2017; Audsley et al., 2009), consumerism, and non-renewable energy sources, and which promotes community resilience, sustainable transport and environment-centred politics.

11.2. Are the case studies representative?

It would not be appropriate to make generalisations about the GHGs of cohousing, community living and coliving as a whole based upon these case study examples. Instead, GHGs may be carefully linked with their related infrastructures, materials and practices. Based on previous research, tentative generalisations may be made about whether the case study communities embody characteristics typical of their housing typology.

The results show the benefits of green energy technologies (e.g. solar PV) and energy efficient infrastructures (e.g. triple glazing, high quality insulation) on lowering energy-related emissions. Such technologies and infrastructures are commonly found within cohousing communities (Daly, 2017). Similarly, the results illustrate the pro-environmental significance of density in reducing heating-related emissions. High density is typically seen in coliving and community living. It is reasonable to suggest that this high density may also typically lead to less purchases per person within community living and coliving, as residents will share furniture, amenities and objects, and are likely to have minimal storage space. However, for many coliving communities, residents may have private bathrooms, or even self-contained "studio" apartments, which would reduce environmental savings from indirect emissions.

The below average meat consumption is reflective of cohousing communities (Daly, 2017) and community living (see *Table 2-3*). Most research has also found that cohousing communities tend to recycle and compost more than the average equivalent (Daly, 2017), though this may in part be due to many studies focusing on rural communities, which will more commonly grow a portion of their own food.

Emissions from travel are more difficult to generalise. Cohousing communities have been found to often have lower impacts from travel, due to carsharing and practices of working from home (although, as explored in *2.3.*, this is not always the case) (Daly, 2017). Yet, for the case study communities, transport emissions were closely linked with the communities' locations, with high travel emissions linked to rural locations, and low emissions to urban locations. Coliving is most often situated in urban environments, as it is primarily aimed at young professionals in cities (Tegan *et al.,* 2020). Therefore, it may be reasonable to suggest that coliving communities will typically have low impacts from travel emissions. Though, it is possible that emissions from aeroplanes could be above average. Community living and cohousing may be urban or rural, so for these typologies it is more appropriate to generalise based on urban/rural location than housing typology.

The case study communities do appear to be *somewhat* typical of their housing typologies. As mentioned, however, it is not appropriate to infer generalisations about the GHGs of cohousing, community living and coliving as a whole. Rather, the quantitative element of this research builds upon the body of knowledge which suggests that shared living will tend to have lower environmental impacts than their average equivalent household (Daly, 2017; Fremstad *et al.*, 2018; Ivanova and Buchs, 2020; Underwood and Zahran, 2015; Williams, 2003).

11.3. Infrastructure and "intentional we practice"

Interestingly, the case study community with the lowest emissions (Liquid Monastery coliving) was, of all the participating communities, least engaged in "intentional we practice". They did not have co-created environmental goals, and while residents maintained that they did care about the environment, levels of concern differed, and there was no united engagement in defining GU or TARs. They also did not share meals or intentionally spend social time together, rather, time spent in each other's company tended to be spontaneous and unplanned. A lesson to take from this example is that whilst practices did in part have pro-environmental meanings attached to them, they were also engaged in because they "made sense" for other reasons e.g. financially, practically, socially. Cycling and public transport were quicker and cheaper than taking a car. Sharing a flat was cheaper and more socially fulfilling than living alone. Purchasing lots of clothes and furniture was impractical and unnecessary given that the home was already furnished, and there was not enough space to store lots of things. This shows that pro-environmental practices will be engaged in when they are embedded in and facilitated by infrastructures. This shows the importance of regime and landscape-level infrastructures in determining environmental impacts. Given the urgency of the climate crisis, this is perhaps a hopeful message: not everybody needs to be an "eco-warrior" to live a low-impact lifestyle. However, relying too much on infrastructures risks the "rebound" effect, and perhaps does not do enough to challenge the dominant paradigm of citizen-as-consumer (a criticism levelled at approaches to pro-environmental initiatives based on the premise of individual self-interest) (Barr *et al.,* 2011; Corner and Randall, 2011; Hargreaves, 2011).

Unlike the coliving case study, not all communities were situated in areas with top-down pro-environmental infrastructures. It is here that intentionality plays an important role in lowering

environmental impacts. Pro-social general understandings (GU) and teleoaffective regimes (TAR)[34] prompted cohousing and community living residents to share in resources, endeavour and practices, often with pro-environmental outcomes. Pro-environmental GU/TARs led to communities creating their own physical and social infrastructures to enable pro-environmental practice. Notably, the cohousing case studies were more likely to have lower impacts than their immediate neighbours due to infrastructures and practices they put in place, such as carpools, growing and bulk buying food, district heating etc., whereas this was less likely to be the case with the community living and coliving case studies. Moreover, cohousing communities, with their wealth of spatial and human resources, and shared pro-environmental meanings and doings, could project these GU/TARs into the local community and beyond through political campaigning, events, tours and workshops, offering an alternative living paradigm, and perhaps playing some role in creating awareness and the demand for infrastructures which enable pro-environmental practices and community resilience.

11.4. The significance of social networks

This research contributes to the body of work which suggests that social networks may be an effective way to spread and maintain pro-environmental practices. A social network can be defined as a set of individuals and the relations (collection of ties) between them (Wasserman and Faust, 1994). Shared living communities present interesting examples of social networks, as social networks within shared living communities are likely to have multiple ties (Meltzer, 2005; Rogers, 2005; Ruiu, 2016; Wang, 2020), are spatially bounded and domestically situated.

Schemes which make use of social networks to encourage engagement in pro-environmental practices through community initiatives (hereafter referred to as initiatives) have been numerous, although their success is difficult to evaluate (DEFRA, 2006), and evaluations have not often occurred (Buchs *et al.,* 2012). Those evaluations that have taken place indicate that social networks can play a formative role in increasing and maintaining pro-environmental practice (DEFRA, 2006; Hargreaves *et al.* 2008; Hausknost *et al.*, 2018; Howell, 2009; Nye and Burgess, 2008). A meta-analysis by DEFRA (2006) found that initiatives could be successful in building a sense of ownership and empowerment, and that mutual support could transpire as increased community capacity to support long-term pro-environmental practice. Research into nutrition within an intentional

[34] GU may be defined as a broad term encapsulating collective concepts, such as environmental sustainability, which forms a component of a wide range of practices. TAR may be defined as a concept that joins multiple practices which share a teleology and affectivities, and may be defined as the specific application of GU.

community found that the intentional community could substitute undesirable practices for desirable practices, through interlocking practices within the shared commitment of the group, along with shared material infrastructures. This research supports and elaborates upon these findings, drawing upon the rich and multiple social networks within shared living communities.

Interest in this research was originally piqued by how the "informal" social architecture of shared living impacted upon pro-environmental practice (e.g. how social relationships might impact actions). This emphasis was prompted by the established collection of empirical work which demonstrates people's tendency to conform with those around them (e.g. Asch, 1951; Jenness, 1932; Sherif, 1935), and the evidence that social networks can be effective in the spreading and maintenance of practices (Brown *et al.,* 2011; Cartwright and Zander, 1968; Lewin, 1958). It was perceived that there was a gap in the research: no research had specifically looked at pro-environmental social influence within community living or coliving communities, and a limited amount of research had found that cohousing residents influence one another to engage in pro-environmental practices (Sherry, 2014; Meltzer, 2000a, 2000b; Jarvis, 2012; Williams, 2005b), with some research suggesting that the stronger the social networks, the greater the influence (Williams, 2005b; Meltzer, 2005a). Only Meltzer (2000a) had looked at this topic in depth. He conducted extensive research on US cohousing communities, and identified that influence occurred either 'overtly via discussion, education or leadership, or covertly through socialisation and/or behaviour modelling' (p.119). Meltzer found that pro-environmental practices within cohousing communities increased gradually and iteratively over time, and he explained this through linking together social networks and pro-environmental practices. According to Meltzer (2000a), the sense of belonging engendered within cohousing leads to 'engagement with circumstance' or 'empowerment', which is key to pro-environmental practice (ch.6, p.4).

This research did indeed find that living in a community could be empowering in enabling pro-environmental practices. The combining of human and material resources enabled pro-environmental outcomes that would be difficult or impossible for many single-family households, such as growing and producing large quantities of food, setting up carpools and holding sustainability-related events. Plus, through witnessing fellow residents proposing and actioning pro-environmental projects, residents had models of success which they could then emulate. However, this research finds a slightly different emphasis in regards to the impact of social networks on pro-environmental practices. Arguably, Meltzer's (2000a) focus on empowerment perhaps downplays the effects of social norms, which shapes individual actions through that individual's perception of

what is expected by others. Although, it should be noted that in his 2005 paper, Meltzer does mention socialisation as one of the underpinning drivers of sustainability in US cohousing. This research found that this was reported to be a driver for a number of pro-environmental practices, including cycling and taking public transport, flying less, energy and water saving practices, and eating less meat. Practices such as driving or flying, which outside of the community may be the norm for many, within communities often had meanings of guilt attached to them, whereas pro-environmental practices were congruent with the ideals of communities (which were often articulated through co-created documentation).

During the research, it soon became apparent that social relationships were one of numerous ties between residents that impacted pro-environmental practices. The importance of having an articulated shared goal, value, or vision (hereafter referred to as "visions") which was related to pro-environmental outcomes emerged. The research found that such agreed upon visions could create and express alignment on meanings and correlated with a sense of obligation on pro-environmental practices. It should be noted that these types of alignment often went hand-in-hand with strong social relationships, which may not be surprising, as their creation signifies an intent to share in one another's lives. Having pro-environmental visions may also be similar to many initiatives (e.g. the EcoTeams Programme aimed to reduce the impact of certain domestic practices such as energy use and waste). However, the immersive nature of shared living communities means that these visions can be more closely integrated into domestic life (as found by Hausknost *et al.,* 2018), and that residents may support and pressure one another to engage in pro-environmental practice on a long-term basis, plus mitigate pressure to engage in unsustainable practices which exist outside the community.

Social influence also aided in pro-environmental practice in the sense that residents desired to share their lives in some way, which often had pro-environmental outcomes. This meant that residents could still engage in many pro-environmental practices in the absence of shared pro-environmental visions. These practices included living in a shared space for social reasons, or eating meals together (which then have to be vegan to accommodate vegan residents). Despite some exceptions, it was generally found that pro-social actions correlated with pro-environmental actions, as the former frequently involved forms of sharing, which tends to be less environmentally impactful.

This research did not seek to isolate and test the significance of different types of social network between residents. However, it became evident that for different community case studies, different

types of tie were more or less significant in enabling pro-environmental practices and outcomes. The residents of the coliving community case study operated within a low-impact infrastructure: they had easy access to sustainable transport options, and shared a relatively small space, which lowered heating and lighting emissions, plus led to less purchasing of goods. As renters, the non-managing residents had little control over their environment. In their case, a significant pro-environmental tie were the social norms on sharing spaces and objects, which enabled residents to cohabit an inherently low-impact infrastructure. The community living case study residents also inhabited low-impact infrastructures, but engaged in more forms of sharing than the coliving residents, through the intentional sharing of meals, chores, social time and meanings. To share in these practices, additional ties, such as methods of co-governance, were used. The resulting coordination led to a number of pro-environmental outcomes (e.g. reduced meat consumption through shared vegan meals, increased borrowing and sharing of items). Unlike the coliving and community living case studies, the cohousing communities had some level of control over their built environment. Therefore, community members were not simply inhabiting low-impact infrastructures, they were able to have some role in creating or shaping those infrastructures (e.g. through installing district heating, setting up and participating in a carpool, and growing their own food etc.). The ability to create and maintain pro-environmental infrastructures required more extensive ties, both to coordinate larger groups of people, as well as more complex endeavours. In particular, shared pro-environmental ideals were key in coordinating pro-environmental projects and practices.

Shared living communities offer insightful examples of how social networks can be utilised to lower a group's domestic environmental impacts. The immersive nature of shared living communities means that life in these communities may impact a multitude of practices, and, due to the domestic setting of these communities, these practices are embedded within domestic life. This research contributes knowledge through its exploration of how social networks relate to pro-environmental outcomes within shared living, identifying four types of sharing as being particularly significant (shared meanings, governance, materials and spaces, and endeavour), and exploring how residents negotiate and manage these types of sharing through social norms and tools (e.g. consensus, NVC, creation of group visions).

11.5. Negotiating "we" and "I" in shared living

This research has explored how shared living residents negotiate different forms of sharing in relation to pro-environmental practices. Throughout, the research has touched upon how group

coordination/sharing and individual need/ownership are managed. This section brings together and explores these concepts.

This research used Ingold's (1986) concept of "sharing in" and "sharing out" when discussing the sharing of materials (e.g. furniture, objects, amenities). "Sharing in" means that ownership is perceived as common, and those shared with are regarded as part of the extended self. "Sharing out" means to share with those who are outside of the extended self, and is not likely to create social bonds (Belk, 2010). Between sharing in and out is a spectrum. This research has explored where the sharing of materials within shared living lies on this spectrum. However, further questions lie as to what happens to this sense of self when sharing in.

Considering that objects may be valued for their symbolic meaning, and may reinforce or create an individual's identity (Wheeler and Bechler, 2020), the sharing of objects may have implications on identity. Identity may be found in the ability to construct a coherent life narrative (Giddens, 1991), and the objects that we own and/or are surrounded by may create, reinforce, or go against that narrative. Through sharing ownership of objects the self is inherently extended: objects are not "mine" but "ours". Some objects may not be important in shaping or reflecting identity. For example, cutlery in a house-share may not hold much symbolism for the residents that use them. Yet, it was found that certain objects within the case study communities appeared to be linked with identity. In cohousing communities, green infrastructures and objects, such as solar panels, electric cars or straw bale insulation, formed part of resident's perception of themselves as eco-conscious, just as Horton (2006) found that green identities were in part created through owning certain objects, including bicycles and computers. Given that for many residents, use and possession of green infrastructures and objects would not have been economically feasible as a single household, the act of extending the self through joint ownership allowed resident's identity as eco-conscious individuals to be more fully realised. The joint practices attached to some of these green infrastructures and objects, for example, growing food or sharing cars, could act to hold together carriers of those practices, creating and enhancing group identity (Collins, 2014).

This could only be the case, however, if residents shared in a narrative about who they were and what certain objects represented. This is illustrated by the conflict at one cohousing case study over whether or not to invest in district biomass heating, which some residents attributed to climate-related ideological differences. In the end, the district heating system was adopted, and the family who were most strongly opposed left the community due to the conflict. In this example, an object

which had meanings of climate change mitigation attached to it served to make residents' differing meanings visible. Whereas other practices and their attached objects, such as those related to the growing and producing of food, held multiple meanings (e.g. self-reliance, healthy food, environmental sustainability). This meant that the "sharing in" of objects did not necessarily lead to a sharing of meanings, even if it did lead to an enhanced group identity.

The concept of "sharing in" does not serve to illustrate the process of shared governance within shared living, as shared governance is not best defined as an extension of the self, as Belk (2010) describes the process of sharing in, but rather an entangling of individual agencies, as Jarvis (2019) depicts with her term, 'we-intentions' (p.262). This research, building upon Jarvis' 'we-intentions', uses the term "intentional we practice" to describe the active engagement in agreement or alignment of certain actions. During this process, the objective to align practices may supersede individual wills, especially if those wills are in a minority. Entanglement of individual agencies therefore may involve a negotiation between the will of the self and the perceived will of others.

This research explored how some commonly used communication tools could shape this negotiation and entanglement of individual agencies in the process of shared governance. One of these tools was consensus decision-making, of which some variation was used within the cohousing and community living case studies. Consensus is a decision-making model where decisions made are actively supported by all, with all opinions, ideas and concerns being taken into account. It is the most typical decision-making process for cohousing communities (Sargisson, 2007; Meltzer, 2000; Ruiu, 2016) (for a description of how consensus decision-making works see *8.2.*). Consensus is not only a structure for decision-making, but is a way of thinking which prioritises the needs of the group over the needs of the individual, while still allowing for all individual perspectives to be voiced and listened to. With a full consensus decision-making structure, all participants must agree to a decision before it can be made, therefore consensus sometimes necessitates a surrendering of individual agency for the "good" of the group. However, in theory, the "I" is not lost within the "we". Rather, individuals are listened to and acknowledged, and voluntarily back down for the sake of the group when they perceive that the majority do not share their perspective (the reality may be more complex and fraught). Practices may therefore be agreed upon in the knowledge that they are not what all would have chosen as individuals, and/or those practices may be a conglomeration or compromise between individuals. Consensus provides a structure for this negotiation.

This research also explored the use on nonviolent communication (NVC), which is another popular communications method within intentional communities (Rubin *et al.,* 2019). NVC is typically used for handling conflict (for further explanation of NVC, see *8.4.*). A basic tenet of NVC is being able to identify and express your own needs, as well as listen to the needs of others. Indeed, research has found that training in NVC can increase empathy (Marlow et al., 2012; Wacker and Dziobeck, 2018). NVC bears a similarity to consensus decision-making in that there is an emphasis on listening and being listened to, which enables acknowledgment and negotiation between the needs of individuals.

Within a group of people who have chosen an egalitarian power structure, there is likely to be disagreements. However, consensus decision-making and NVC provide frameworks to help with competences of self-reflection and active listening, which aid in negotiating the agencies of individuals.

The coliving community case study did not use communication tools to govern or to communicate their needs. They instead relied upon social norms to negotiate individual agencies. Social norms may be perceived as a subsuming of individual agency into a collective, as individual's actions are shaped by the perceived expectations of others. This may at times oppress individual agency. The community living and cohousing case studies also had social norms, which also may at times have oppressed individual agencies, although their communications tools provided a forum for open discussion of expectations and needs, which could then inform social norms.

The coliving community did not have an egalitarian power structure. Instead, two of the tenants managed the space. They did so with a strong intention to provide a pleasant living environment for their fellow residents. Inevitably, though, their agencies were expressed to a greater degree than that of the other residents, through their choice of design in the shared living space and their management of utilities. The lack of agency on the part of other residents may have in part led to less commitment to the community when compared with the other case studies. This suggests that less individual agency within shared living correlates with lower commitment to that community. This is supported by Greene (2017), who found that increasing coliving residents' control of communal spaces increased their engagement with those spaces. Research on workplaces has similarly found that employee motivation, outcomes and desire to stay is in part dependent on having a degree of agency (Baard *et al.*, 2004; Deci *et al.*, 2001; Lynch *et al.*, 2005; Shih *et al.,* 2011).

This research found that there were some instances where collective mechanisms to mitigate tensions between residents were lacking, and this could have a negative emotional and relational impact upon residents. One example of this was aggregated misplacement of items by individuals leading to perceived mess within communal spaces. Some communities had “spring cleans” or other similar events to mitigate this. Yet, it was a common frustration. Another example was a conflict between two individuals at one cohousing case study, which several members expressed was having a negative impact upon the community, but also expressed that there were not the structures in place at a communal level to resolve the conflict. Both examples show that collective mechanisms are needed to meet the needs of all individuals, whether those mechanisms are in the form of shared norms and practices, shared visions and values, or communications frameworks. The entanglement of “I” into “we” requires structure to enable the careful negotiation of individual agencies.

Chapter 12. Conclusions

This chapter first provides a summary of the findings, stating that environmental sustainability in shared living can be understood through different forms of sharing, and is a combination of physical and social infrastructures. The chapter then explores the significance of this research to academia, practice and policy. It highlights the framework of sharing used in this research as a useful way to understand social networks and environmental sustainability. It suggests that the examples and methodology in this research may be useful for forming and established shared living developments. It also advocates for the recognition of social structures and tools by policymakers in community-related pro-environmental initiatives.

12.1. Summary of the findings

This research explores environmental sustainability in shared living. It engages with this topic through measuring the GHG emissions of the case study communities, and through looking at the practices and infrastructures which support these outputs. It then has delved deeper, in examining the role of social networks (the collection of ties between individuals, i.e. that which is shared) in the spreading and maintenance of pro-environmental practice, and/or the sharing of pro-environmental infrastructures. The research identified four types of sharing that are significant to pro-environmental outcomes in shared living: shared ideals, shared governance, shared materials and spaces, and shared endeavour. For each type of sharing, this research has shown the processes of negotiation which residents engage in with each other, and/or with the group as a whole, that enables sharing to take place.

This research has found that lowered environmental impacts may largely depend upon negotiating pre-existing low-impact infrastructures, as was the case with the coliving case study. Or, as was the

case with the cohousing and community living case studies, communities may also engage in "intentional we practice" to co-create low-impact infrastructures. These low-impact infrastructures combine the coordination and negotiation of routine practices, meanings and things (e.g. the shared growing and consumption of plant-based foods, the sharing of cars, or the combining of funds, meanings, competences and time to obtain solar PV). In understanding these processes of negotiation and sharing within the different shared living case studies, this research generates new knowledge on how shared living may enable lower-than-average domestic environmental impacts.

12.2. Significance of the research

12.2.1. Academia

One contribution that this research offers is the framework of "sharing", through which pro-environmental outcomes within social networks are explored and understood. Whilst previous research has drawn upon similar components in exploring environmental sustainability in shared living, e.g. sharing of spaces and resources (Bamford, 2001; Fremstad *et al.,* 2018; Ivanova and Buchs, 2020; Meltzer, 2000b, 2005; McCamant and Durrett, 2011; Underwood and Zahran, 2015; Williams, 2003, 2005a), the sharing of food (Carlsson-Kanyama, 2004; Meltzer, 2005; Sundberg, 2014; Yates, 2018), sustainable infrastructures e.g. waste management (Giratalla, 2010; Harmaajärvi, 2000; Meltzer, 2005; Sherry, 2014) exchange of knowledge and know-how (Meltzer, 2005), relationships and support (Meltzer, 2000a, 2005; Williams, 2005b), tools for governance and conflict management (Boyer, 2016; Hausknost *et al.,* 2018; Schäfer *et al.,* 2018), this research is the first to bring these elements together under a unifying concept. The usefulness of this framework rests upon a broadly held assumption that when things are shared, environmental impacts tend to be lowered. There may be some instances where this is not true e.g. the sharing of unsustainable practices and social norms, or a group of people able to access something highly polluting through sharing, such as a private jet (which is technically more environmentally efficient than one person taking a private jet, yet still far more polluting than everyone taking a passenger flight). However, it is reasonable to suggest that when we share spaces, objects, amenities, and transport (and pro-environmental norms and practices), our environmental impacts are lowered. What this research does is explore the social mechanisms that are employed for these types of sharing to occur, and indeed, frame them as worthy of study within a pro-environmental context.

This framework can be used to explore any relational tie that has pro-environmental outcomes. It can explore and evaluate what is shared, with who, and how. It is malleable: it can be used to

investigate the sharing of physical objects and infrastructures, social phenomena, and relational ties which encompass both elements. It also has the potential to be applied at niche, regime and landscape level (e.g. from a carpool, shared amongst a cohousing community, to public transport infrastructure). This research has applied this framework to social networks of individuals who are co-present within domestic space; however, it could be applied to other social networks, which are linked by other geographical boundaries, or are even digitally connected. Through focussing on relational ties, it encourages innovative thinking on what may be shared to lower environmental impacts. It may raise useful questions, such as what materials, competences and meanings prevent or promote sharing within different contexts, or what tools may be implemented to enable types of sharing which have pro-environmental outcomes.

The framework of sharing in this research has mixed social practice theory (SPT) with social norms. In doing so, its focus is upon how shared practices and infrastructures were negotiated by individuals-as-part-of-a-group. By exploring these processes of negotiation, this research has contributed to and developed SPT. Firstly, this research has broadened the understanding of the complexity of shared practices/assemblages of practice. This research has demonstrated that the same action or assemblage of actions, engaged in collaboratively by agents, can have different meanings attached. For example, coordinated actions relating to growing, harvesting and cooking vegetables may have diverse meanings of environmental sustainability, monetary savings, personal health, and autonomy, attached. Agents may engage in one, some or all meanings. Arguably, this shows that, when it comes to shared practices, the ability to *align and coordinate actions* (e.g. using meetings, rotas, agreements etc.) is more significant than an alignment of meanings. Though, contradictory meanings (e.g. climate change belief vs. climate change denial) can sometimes be extremely disruptive to alignment of practice. This broadened understanding of how group practices/assemblages of practice are engaged in, is helpful in comprehending how groups may adopt and maintain pro-environmental practices.

Secondly, this research has not chiefly viewed practices as pre-existing entities to be carried, reproduced and adapted by agents. Rather, the emphasis was instead on practices being explicitly negotiated by the shared living communities. Whilst the practices engaged in did exist prior to their adoption by community members, this emphasis enabled an exploration of the role of expectation in practice adoption and maintenance. The findings suggest that in communities with a strong shared commitment to one another, group norms were more significant than rules in shaping action, even

when carriers of that action were not in the presence of relevant others. This research therefore adds to the understanding of practices as being socially embedded.

Thirdly, this research adds to the limited amount of research which uses SPT when exploring intentional communities and environmental sustainability (e.g. Boyer, 2016; Hausknost *et al.,* 2018; Schäfer *et al.,* 2018). It expands upon the use of this theory through adopting Welch and Yate's concepts of general understandings (GU) and teleoaffective regimes (TAR).[35] In doing so, it contributes to SPT through offering a practical application of SPT concepts which are designed to explain and explore collective action. These concepts were developed through their combination with Schatzki's concept of a field of acceptable orders,[36] as well as social norms, which facilitated an in-depth analysis of when certain pro-environmental practices were and were not regarded as acceptable. This combination of SPT concepts enables exploration of the relationship between shared ideals, practices, and the lived experience of engagement in sustainability-related practice. Given the rise in residential typologies which emphasise social networks (see *2.2.5.*), and the growing need for pro-environmental practice to be the norm, this framework could prove helpful in a continuing understanding of the role that social networks may play in lowering emissions.

This research also offers a contribution in terms of its quantitative measurement of environmental impacts. Firstly, it adapts a tool primarily intended for businesses to measure their CO2e, instead using it to measure direct household emissions. This innovative use of a readily available tool offers a practical and repeatable solution for measurements of other UK shared living communities and households.

Secondly, this research offers a contribution in its method for measurement of indirect impacts from goods. Case study quantitative measurements of environmental impacts often miss or undervalue indirect emissions (see for examples Boyer, 2016; Lammas 2011-2015; Sherry, 2014; Sundberg, 2014; Tinsley and George, 2006). This research contributes to knowledge by developing and including a bottom-up assessment of the indirect emissions attached to goods. This is significant in studying the environmental impacts of shared living, as an environmental benefit of these types of housing is the ability residents have to share items and amenities.

[35] GU may be defined as a broad term encapsulating collective concepts, such as environmental sustainability, which forms a component of a wide range of practices. TAR may be defined as a concept that joins multiple practices which share a teleology and affectivities, and may be defined as the specific application of GU.
[36] A field of acceptable orders may be defined as the range of acceptable doings, sayings and meanings within a given context.

12.2.2. Practice

This research also has implications for practitioners who are related to the housing sector, including planners, policymakers, developers, architects, engineers and other stakeholders. Firstly, it frames these housing typologies as being potential sustainable housing solutions. As discussed in *Chapter 2*, there has been scant academic research on the environmental impacts of UK cohousing, community living and coliving. Quantitative evidence of the lower-than-average environmental impacts of these housing typologies may provide greater impetus for recognising and enabling them, given the climate crisis, and the need for sustainable housing solutions. This may take many forms: from planners being more receptive to approving applications; developers designing for shared living, as they see the demand for sustainability rise; or more specialisation from architects, interior designers and engineers in shared living design. Through its exploration of coliving and community living, this research draws attention to increasing density as a sustainability solution, and whilst it is not the first to do so (e.g. Berrill *et al.,* 2021; Flatow, *no date*), it combines the quantitative evidence of the environmental benefits of density with qualitative data on social practices within shared living. This draws attention for the potential for social infrastructures (e.g. tools and frameworks for negotiation and conflict management) in facilitating a high quality of life in dense shared living arrangements.

This research may also have implications on what is included in the scope of post-occupancy evaluation (POE) for shared living arrangements, as it makes the case that shared living can impact sustainability elements that may not often be included in standard POE, namely diet, travel and purchase-related embedded emissions (POE more often includes evaluations of energy and water, temperature, humidity, light and sound, for example. For a detailed explanation of what is often included in POE, see Fionn [2019]). Overall, the method for measuring and exploring sustainability in this research broadens expectations around what practices and infrastructures shared living arrangements can impact. For example, considerations of nutrition relating to wellbeing are included in certification frameworks, such as WELL V1, yet the framework of data generation in this research looks more specifically at how shared living arrangements impacts the environmental sustainability of diets. It does this through a mixture of quantitative measurement and qualitative data, to build a rich picture of how social and physical infrastructures can come together to result in lowered environmental impacts. These findings emphasise the importance of a joined-up approach between all stakeholders within shared living arrangements, to ensure that physical and social infrastructures are aligned. The point should further be made that social infrastructures should not be neglected, as they have great potential to spread and enable pro-environmental practice. This requires greater levels of resident engagement and cooperation, which may mean that residents and built

environment professionals, such as architects and engineers, must gain new competences around co-design.

This research may be significant for forming shared living groups, whether resident- or developer-led. The quantitative demonstration of lowered environmental impacts offers important exemplars which show the potential of shared living as a sustainable housing solution. In particular, naming the communities which took part in this research enhances its potential for advocacy and impact. This may help forming shared living groups to successfully achieve planning permission, as well as funding support. Indeed, the quantitative measurements of LILAC cohousing have already been featured in an update to the Leeds Local Plan (Leeds City Council, 2021), showing that this research can increase the recognition of shared living as a sustainable housing solution. As ESG reporting becomes more common, proven examples such as this are important in advocating for types of shared living.

This research also offers forming and established groups a method for measuring their operational environmental impacts. This method can be made available to groups through organisations, such as the UK Cohousing Network. The ability to self-assess environmental impacts can empower communities to make data-backed pro-environmental decisions. For example, for one community who took part in this research, their decision to purchase communal electric cars was in part validated by knowledge of their travel-related emissions. The ability to self-assess environmental impacts may also help communities win funding or investment to scale. Given that the types of shared living in this research are still niche, an ability to scale is important, if these types of housing are to have a strong positive impact on lowering domestic emissions.

This research may also contribute to a cultural shift in mindset about shared living, recognising it and its associated practices of sharing as pro-environmental, as well as desirable, rather than a way of living motivated by economic necessity. Sharing a household with unrelated people, or practices of sharing with neighbours is notably absent from online advice on adopting environmentally friendly practices (see for examples: Çaki, 2021; Rahman-Jones, 2021; Ramos, 2020), despite the numerous quantitative evidence of its environmental benefits (see *2.3.*). This message is part of the paradigm shift which includes movements such as Transition Towns and voluntary simplicity, which emphasise relationships, connectedness and sharing over private ownership and consumerism.

12.2.3. Policy

This research also has implications for policy. The most significant policy relating to reducing UK domestic emissions is the Future Homes Standard. This policy is currently focussed on the physical elements of a home e.g. installation of heat pumps, triple glazing, and high-quality insulation (HCLG, 2019). Given the results of this research, it is suggested that The Future Homes Standard provides additional financial and practical support for shared living.

Support for shared living may first begin with educating town planners and local authorities on different shared living typologies and their potential environmental and social benefits, which may include developing planning policies to accommodate shared living (e.g. the New London Plan's Policy H18, for large-scale purpose-built shared living). Prioritising the sale of land to shared living projects (especially those which are community-led, and may be at a financial disadvantage in comparison to developers), would also be highly valuable in encouraging more shared living, particularly for cohousing communities. Further government funding and support for shared living and its related umbrella bodies, such as the UK Cohousing Network, would also be useful. It is also cautiously suggested that there is a re-evaluation of HMO regulations, which can be discriminatory against larger numbers of non-related adults living together (e.g. there are rules on number of cooking facilities per person, and floorspace per resident). This caution stems from the risk of abuse by landlords, who may increase household density, and sharing of facilities to the detriment of resident wellbeing. However, inherent in these regulations is the normative belief that – for example – sharing cooking facilities with more than a certain number of unrelated others is undesirable. A shift is required in how we conceptualise what makes a *good* home, from a prioritisation of ownership and seclusion, to homes being sites of social conviviality and sharing, as well as providing safety and privacy. Community-led housing, cohousing and coliving have already been noted by the Department for Digital, Culture, Media and Sport as potential ways to mitigate loneliness (DCMS, 2018). So too should they be perceived as housing typologies which can lower domestic emissions. Exploration of good examples of shared living by policymakers may reveal the limitations in current HMO regulations, and ways in which regulations may be adjusted, while still ensuring the wellbeing of HMO residents.

The qualitative findings of this research shed insight into the practices and infrastructures which account for the GHG emissions of the communities, in particular showing how the quantitative data is not only linked with the built environment and physical infrastructures, but the social infrastructures of community living, which facilitates high levels of sharing, engagement in pro-

environmental endeavour and encouragement of pro-environmental practice. By linking the qualitative findings to the quantitative data this research attaches GHG emissions to pro-environmental practices and infrastructures. The implication of these findings for policy is that attention should be paid to social infrastructures when considering the lowering of domestic emissions. Rather than thinking in terms of "behaviours", which are intrinsically individualistic, reframing our understanding of pro-environmental practices as socially constructed opens up different possibilities. Firstly, it recognises the role of coordination, interconnectedness of routines, and social norms in shaping practice. Secondly, this perspective facilitates the use of social structures and tools, such as working groups, rotas, nonviolent communication (NVC) and consensus decision-making models in enabling pro-environmental outcomes. Such tools should be recognised by policymakers as a method to lower domestic emissions, and may even be implemented in government-led initiatives to empower local communities in engaging in pro-environmental practice.

As working from home has become more normalised, the things that we need from our homes and local communities have changed. Shared living can fulfil some of these needs, such as the need for a social network, coworking spaces, other amenities such as outdoor space and gyms, as well as social and cultural events. Often, these amenities and their impacts extend beyond shared living residents and into the local community. In this sense, shared living can form part of the strategy for the government's levelling up agenda, which aims to empower local communities. Community investment programmes have so far focussed on employment, strengthening of infrastructure and the saving of communal assets and amenities (DLHC *et al.,* 2021). Categorising the support for shared living within the levelling up agenda would show recognition – and set expectations – around the role that shared living should play in revitalising local communities.

12.3. Limitations and areas for future research

Specific and detailed assumptions and limitations of the methodology are discussed in *4.3.3., 4.3.4.2.1., 4.3.4.3.1., 4.3.4.4.1.,* as well as *Appendix 15.6.2.* This section discusses some overarching limitations of the research, as well as suggesting potential areas for future research.

A pertinent question for case study research is the extent to which the results can be generalised, with a commonly cited weakness of case studies being that they are not generalisable (Barzelay, 1993; Flyvbjerg, 1996; McQueen and Knussen, 2002; Platt, 1992; Stake, 1995; Yin, 2018). Barzelay (1993) states that case studies can be useful in either helping to further confirm existing hypotheses,

question existing hypotheses, or can be useful in offering new possible hypotheses for consideration. Given that there is existing research which shows that other, similar types of shared living have significantly lower environmental impacts than their average equivalent household (Daly, 2017; Fremstad *et al.*, 2018; Ivanova and Buchs, 2020; Underwood and Zahran, 2015; Williams, 2003), it can be argued that this research both confirms and extends the body of knowledge which suggests that forms of shared living in which resources are shared have lower environmental impacts than a comparative average household. The rich and descriptive data which a case study analysis enables also means that there is an understanding of how different pieces of data interrelate (Yin, 2018) (e.g. how practices and infrastructures are linked with GHGs). This knowledge may shed some insight into how similar practices within other communities may impact their GHGs.

For some quantitative data collection, the sample size from some of the communities was smaller than would have been ideal, which raises questions as to how representative the data obtained is. To mitigate this risk, the researcher discussed results with each respective community (in particular, for the community with the smallest sample size a presentation of the results was made to the entire community). Community members were given an opportunity to feed back on the measurements and results, and reflect upon whether those who participated gave a fair representation of the community. From these feedback sessions, plus from time spent gathering qualitative data, the quantitative data gathered was judged as representative of the communities.

The average household comparison figure may have been more meaningful if it had been constructed from data gathered from households which had a similar level of wealth to the participating communities. Studies have shown that there is a positive correlation between income and emissions (Baiocchi *et al.,* 2010; Buchs and Schnepf, 2013; Brand and Boardman, 2008; DEFRA, 2008; Druckman and Jackson, 2008; Fahmy *et al.,* 2011; Gough *et al.,* 2011; Weber and Matthews, 2008), and so a figure that reflected the wealth of each community would have provided a more meaningful comparison for their emissions. However, the lack of available data and methodological complexities in categorising levels of wealth meant that this type of granularity in comparison was not possible.

As this was exploratory research, some themes did not emerge until the point of analysis, which meant that there was certain quantitative data that would have been relevant which was not collected. Given this research's focus on sharing, quantitative data on the borrowing and sharing of objects would have added a useful counterpart to the data on goods purchased. This would have

enabled greater understanding as to what extent the lower volume of items purchased within communities was due to borrowing and sharing supplanting a need to purchase. Similarly, quantitative data on what spaces people occupied and when would have given greater insight into how residents negotiated shared spaces. Both of these topics could be valuable future research for extending an understanding of sharing and environmental sustainability within shared living.

The level of detail of the quantitative data has been judged as adequate in giving meaningful GHG measurements. However, the quantitative assessment of food, purchases, and to some extent waste could have been more accurate if requirements for greater detail had been made during quantitative data collection (e.g. asking participants to record exactly what they ate). The level of detail of the quantitative data was bounded by assumptions of what participants would be willing to record, which were configured during pilot testing. It was judged that greater demands from participants would have resulted in less take-up, and too high a risk of incomplete surveys. Full details of the quantitative surveys, assumptions and limitations can be found in *4.3.4.* Future research which has less of a broad focus may be able to offer a more accurate insight into specific emissions streams.

Given the rapid rise in coliving (JLL, 2019), and the diversity in spatial design of coliving models (see *Table 2-7*), conducting similar research within coliving communities would be valuable future research. Might they offer the speed and scale needed given the urgency of the climate crisis? Though, what potentials for pro-environmental practice might be lost when residents are closer to customers than community members? In relation to this, research which explores how different types of community influence residents' practices beyond their stay in the community would constitute useful future research, especially given the often-transitory nature of coliving.

Another key area for research is to explore the relationship between design, density and resident wellbeing. This research found that high density played a significant role in lowering environmental impacts. This is not new: various prior research has identified this correlation (Berrill *et al.,* 2021; Flatow, *no date*; Fremstad *et al.,* 2018; Ivanova and Buchs, 2020; Underwood and Zahran, 2015). Yet, with the rise of micro apartments and coliving, there are legitimate concerns about a lack of private space or overall living space negatively impacting resident wellbeing (see Hocking, 2020; Kollewe, 2021). Research which provides recommendation on how to create dense shared living spaces which fulfil resident wellbeing would be highly valuable.

Finally, this research explored available records on the number of cohousing, community living and coliving communities in the UK. Further research to investigate the quantity and defining characteristics of these and other shared living typologies would be useful in increasing the recognition of these residential typologies by national government. For example, a paper by Hilder *et al.* (2018) quantifies types of communal living in Australia, and argues that they should be added to the Australian census as a distinct housing typology. Such research may encourage greater recognition of shared living in the UK, and will offer greater context to the role that shared living typologies may play in mitigating loneliness, enriching social networks, and providing environmentally sustainable housing solutions.

13. References

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14. Glossary

Cohousing

A type of community housing created and run by residents, which typically consists of between ten and 40 households. Each household has a self-contained, private home and shared community space. Residents will collaboratively manage the community and share in social time. For more details see *2.2.1.* Cohousing

Coliving

A form of managed habitation where residents have minimal private space, shared communal space, and where social connections between residents are encouraged. For more details see *2.2.3.* Coliving

Community living

A household intentionally shared by five or more residents, some of whom are not related by blood, marriage or adoption, who engage in an intentional and self-managed sharing in meanings and doings. For more details see *2.2.2.* Community living

Competences

An SPT term, referring to intellectual knowledge and embodied know-how. For more details see *Competences*

CO2e

An acronym for carbon dioxide equivalent. CO2e is a measurement used to compare the emissions of various GHGs with CO2, based upon their global warming potential. For example, the emissions of one million metric tons of methane are equivalent to emissions of 21 million metric tons of carbon dioxide.

Direct emissions

Refers to emissions which occur as a direct result of an activity, e.g. GHGs emitted due to running the engine of a car.

Endeavour

The joint work engaged in by shared living residents, which helps to facilitate community life. This term encapsulates a diverse range of activities, e.g. cooking a communal meal, building maintenance, running an event, growing food, tidying communal spaces.

Field of acceptable orders

An SPT term, meaning the range of acceptable doings, sayings and meanings within a given context. For more detail see *7.1.* GU (general understandings), TARs (teleoaffective regimes) and fields of acceptable orders

GHGs

An acronym for greenhouse gas emissions. GHGs are any kind of gas in the atmosphere which absorbs and then re-emits heat, thereby warming the atmosphere to a higher temperature than it would otherwise have been. For more details, see *Measuring* environmental impacts

GU

An acronym for general understandings. This is an SPT term. GU may be defined as a broad term encapsulating collective concepts, such as environmental sustainability, which forms a component of a wide range of practices.

Indirect emissions

Refers to emissions which occur as a result of the supply chains of goods and services. This is also sometimes referred to as “embedded” emissions.

Intentional we practice

A phrase used in this research, meaning the actively engaged in agreement or alignment of certain actions.

Interpretivism

A theoretical perspective which views objective social reality and subjective social reality as deeply intertwined. According to this theory, social reality cannot be measured objectively, but can only ever be understood subjectively as a series of interpretations. For more details, see *3.1.* Interpretivism

Know-how

An SPT term, meaning the embodied understanding of how to do something e.g. play tennis, knit, cook a recipe.

Meanings

An SPT term, which can refer to the moods, morals, ethics, attitudes, dispositions, goals and values which are attached to practices.

NVC

An acronym for nonviolent communication. NVC is a communication technique which is often used to manage potential conflict. Its basic tenets are about self-empathy, empathy for others and self-expression.

Practice/practices

An SPT term, referring to collectively shared sayings and doings held together as coordinated entities, in the form of actions. For more details, see *3.2.* Social practice theory (SPT)

Pro-environmental practices

A term used to denote actions which, relative to other substitutable practices, have a low impact on the environment, or a beneficial impact to the environment.

Salience

To bring something to prominence, which could potentially make it the subject of deliberation, or could mean that action is taken without deliberation, shaped by pre-defined “rules” which are triggered through contextual stimuli.

Shared living

A term used in this research to collectively describe cohousing, community living and coliving.

Sharing in, sharing out

Sharing in means to share with others who you are intimately acquainted with, where ownership is perceived as common (e.g. the nuclear family). With sharing in, those shared with are regarded as an extended part of the self. Sharing out means to give to those who are outside of these boundaries of the extended self, and is less likely to create social bonds.

Social network

A set of individuals and the relations (collection of ties) between them.

Social norms

The range of acceptable or unacceptable actions, thoughts or feelings in a given situation, which are shaped by perceived actions, thoughts, feelings and expectations of relevant others. This is also sometimes referred to as “group norms” by this research.

Social norm, descriptive

The perception that a range of acceptable or unacceptable actions, thoughts or feelings in a given situation are what most people do, think, or feel.

Social norm, injunctive

The perception that a range of acceptable or unacceptable actions, thoughts or feelings in a given situation are what most people believe *ought* to be done, thought, or felt.

SPT

An acronym for Social Practice Theory. SPT is not one agreed upon theory. Rather, it is used to describe ways of understanding human action which focuses upon the action rather than the person performing that action. For more details, see *3.2.* Social practice theory (SPT)

TAR

An acronym for teleoaffective regimes. This is an SPT term. A TAR is a concept that joins multiple practices which share a teleology and affectivities, and may be defined as the specific application of GU (general understandings, which describe broad concepts e.g. environmental sustainability) into practices. For more details, see *7.1.* GU (general understandings), TARs (teleoaffective regimes) and fields of acceptable orders.

TAS

An acronym for teleoaffective structures. TAS is an SPT term, which can be described as ethical or moral meanings, which are goal-oriented and form parts of the properties of practices. For more details, see *7.1.* GU (general understandings), TARs (teleoaffective regimes) and fields of acceptable orders

15. Appendices

15.1. Participant information sheet and consent form

PARTICIPATION INFORMATION SHEET

Title of the study: UK Cohousing and Environmental Sustainability

Researcher: Ms Penny Clark (p.clark@my.westminster.ac.uk / +44 (0)7562 657210
Supervisor: Dr Rachel Aldred (r.aldred@westminster.ac.uk / +44 (0)20 7911 5000 ext 65021)

You are being invited to take part in a research study which is exploring environmental sustainability in UK cohousing communities.

This research is being undertaken as part of the researcher's doctoral studies at the University of Westminster.

This study will involve you [researcher will tick which applies]:

1) providing copies of various utility bills, and giving information on various energy-related activities e.g. aeroplane flights □
2) completing a survey which estimates your expenditure over the last year □
3) completing a survey on various types of energy consumption over a period of two weeks □
4) taking part in an interview about cohousing, environmentally sustainable behaviours within your household and within the community. This interview will be audio recorded and will take approximately 45 minutes to one hour. The recording will be transcribed and the audio file will then be deleted □

Please note

- Your participation in this research is entirely voluntary.
- You have the right to withdraw at any time without giving a reason.
- You have the right to ask for your data to be withdrawn as long as this is practical, and for personal information to be destroyed.
- You do not have to answer particular questions if you do not wish to do so.
- Your responses will be made anonymous, and will be kept confidential unless you provide explicit consent to do otherwise.
- No individuals will be identifiable from any collated data, written report of the research, or any publications arising from it.
- All computer data files will be password protected. The researcher will keep files in a secure place and will comply with the requirements of the GDPR.
- All hard copy documents, e.g. consent forms will be kept securely, wherever possible on University premises. Documents may be scanned and stored electronically. This may be done to enable secure transmission of data to the university's secure computer systems.
- Data collected from this research may also be used in future research projects.
- If you wish, you can receive information on the results of this research. You will have the opportunity to indicate whether you would like this or not on the Consent Form (overleaf).
- The researcher can be contacted during and after participation by email (p.clark@my.westminster.ac.uk) or by telephone (+44 20 3506 6809).
- If you have a complaint or any concerns about this research project you can contact the project supervisor Dr Rachel Aldred via email (r.aldred@westminster.ac.uk) or by telephone (+44 (0)20 7911 5000 ext 65021).

CONSENT FORM

Title of the study: UK Cohousing and Environmental Sustainability

Researcher: Ms Penny Clark (p.clark@my.westminster.ac.uk / +44 (0)7562 657210
Supervisor: Dr Rachel Aldred (r.aldred@westminster.ac.uk / +44 (0)20 7911 5000 ext 65021)

Please read the following statements and check the box to indicate whether you agree or not.		
I have been given the Participation Information Sheet and/or had its contents explained to me.	Yes ☐	No ☐
I have had an opportunity to ask any questions and I am satisfied with the answers given.	Yes ☐	No ☐
I understand I have a right to withdraw from the research at any time and I do not have to provide a reason.	Yes ☐	No ☐
I understand that if I withdraw from the research any data (which may include demographic information, information on household environmental impacts, interview or observational data) included in the results will be removed if that is practicable. I understand that once anonymised data has been collated into other datasets it may not be possible to remove that data.	Yes ☐	No ☐
I have read and agree to everything on the Participant Information Sheet, and confirm that I am a willing participant in this research study.	Yes ☐	No ☐
I would like to receive information relating to the results from this study. **If yes, please provide a contact email address here:**	Yes ☐	No ☐
I wish to receive a copy of this consent form.	Yes ☐	No ☐
I note the data collected may be retained in an archive and I am happy for my data to be reused as part of future research activities. I note my data will be fully anonymised.	Yes ☐	No ☐

This consent form will be stored separately from any data you provide so that your responses remain anonymous.

Participant's Name:

Signature:

Date:

I confirm I have provided a copy of the Participant Information Sheet to the participant and fully explained its contents. I have given the participant an opportunity to ask questions, which have been answered.

Researcher's Name:

Signature:

Date:

15.2. Topic Schedule

Topic schedule

This is an updated version based upon how my questioning evolved whilst interviewing at Canon Frome Court.

Topic 1: Cohousing and environmental sustainability

The focus of this topic is upon the meanings that participants attach to living in their cohousing community, how they relate their own identity/life story to cohousing, and how they relate cohousing, and the community of people that they live with, to environmental sustainability. Some appropriate questions may be:

- Can you tell me a bit about your background, and what brought you to live in this community?
- How do you refer to where you live when you tell others about it?
- Why do you want to live in a community?
- What are the main benefits/challenges of living within a cohousing community?
- Would you say that your community has shared values? How so?
- How important is environmental sustainability to the community as a whole? Has this level of concern changed while you've been here? How so?
- How is environmental sustainability and cost effectiveness/convenience negotiated, when they happen to clash? Can you think of some examples?
- Observation and documentary analysis will also aid in building an understanding of this topic.

Topic 2: Daily practices and change

This topic explores the daily practices of cohousing residents (with a focus on the environmental sustainability of these practices), investigating what these practices are, and how individuals negotiate their actions, meanings and skills with those of the community. This topic also seeks to explore the process of changing practices and social norms within the community. Some appropriate questions may be:

- How are decisions made within the community?
- How are changes made within the community? Do you think that it's an effective way of doing things?
- Are there any formal community rules relating to environmental sustainability? To what extent do people stick to them? Is there ever any conflict about them?
- Are there any conventions within the community that relate to environmental sustainability, which are not rules as such, but are considered as normal behaviour? Is there ever any conflict over these?

- Observation and documentary analysis will also aid in building an understanding of this topic, especially when it comes to observing every day practices and social norms.

15.3. Codes/chapter allocation

Table 15-1 shows how codes were grouped into initial chapters during analysis. These chapters were later changed, although this table has been included to show this stage of the analytical process.

Table 15-1: How codes were grouped to form findings chapters

Key: Inductive code | Deductive code

Chapter 5	Environmental sustainability | Travel [1/4]
Chapter 7: Teleoaffective structures	CDA: Assumptions | Community: Support | Openness | Reflexivity | Regulations [1/2] | Relationships [1/2] | Responsibility [1/2] | Self-narration or definition [1/2] | SPT: Meanings [1/5] | Values [1/2]
Chapter 8: Sharing	Food and farming [1/2] | Learning | Money [1/2] | Sharing: shared experiences | Sharing: shared space | Sharing: shared resources | SPT: Convenience | SPT: Materials [1/2] | SPT: Meanings [2/5] | SPT: Practices [1/2] | SPT: Skills [1/2] | Travel [2/4] | Trust [1/2]
Chapter 9: Social norms	Aesthetics | Children | Chit chat | Community: Individual-community | Emotion [1/2] | Peer pressure | Example to others | Humour | Self-narration or definition [2/2] | SPT: Materials [2/2] | SPT: Meanings [3/5] | SPT: Normal | SPT: Past practices | SPT: Practices [2/2] | SPT: Routine [1/2] | Travel [3/4] | Work talk [1/2]
Chapter 10: Endeavour	Autonomy | CDA: Power [1/2] | Community: Insularity | Community: Wider community | Emotion [2/2] | Food and farming [2/2] | Gangs | Infrastructure | Jobs | Money [2/2] | Politics | Regulations [2/2] | Relationships [2/2] | Responsibility [2/2] | SPT: Interconnectedness | SPT: Meanings [4/5] | SPT: Routine [2/2] | Time | Travel [4/4] | Trust [2/2] | Values [2/2] | Work | Work talk [2/2] | Working from home
Chapter 11: Communication, Change, Conflict	CDA: Discomfort | CDA: Power [2/2] | Change | Communication | Conflict | Social justice | SPT: Meanings [5/5] | SPT: Skills [2/2]

15.4. Surveys for measurement of CO2e

This section contains the surveys used to obtain data for measuring the CO2e of each community. It should be noted that surveys were adjusted slightly to suit each community. However, the surveys below represent the types of information obtained.

15.4.1. Household survey 1

Please note that there was also an online version of this survey, and a version of this survey on Microsoft Excel.

Measuring your environmental impact

Thank you for taking part in this research.

This research is about exploring environmental sustainability and cohousing communities. This study is the first of its kind, so your contribution will be part of something unique! There are no "good" or "bad" answers – please just fill out the survey as accurately as you can.

This survey asks you to supply the data needed to measure your environmental impact. In some cases this involves supplying information about energy bills and best estimates of aeroplane flights over the last year, and in other cases this involves recording data over a period of two weeks. For each section you will be given instructions.

The information you supply will be converted into the equivalent tonnes of greenhouse gases using information which has been supplied by DEFRA (the Department for Environment, Food and Rural Affairs).

All information which you supply will be treated as strictly confidential, will only be accessed directly by the researcher, and will only be used for academic research purposes.

If you find that you cannot supply all of the information required there will be a space at the end of the survey where you can give details of any questions which have not been answered.

If you have any questions you can contact the researcher, Penny Clark (see contact details below). **Once you have completed the survey, please return it to Penny Clark via post, or scanned via email.**

Researcher

Name: Ms Penny Clark

Email: p.clark@my.westminster.ac.uk

Office number: +44(0)20 3506 6809

Address: Penny Clark, School Office (Architecture), 35 Marylebone Road London NW1 5LS

If you have any concerns or a complaint about this research project you can contact the project supervisor (see contact details below).

Supervisor

Name: Dr Rachel Aldred

Email: r.aldred@westminster.ac.uk

Office number: +44 (0)20 7911 5000 ext 65021

START HERE

PART B: Household details

Please answer the following questions by filling out the document. **Only one person per household is required to answer Part B.**

Section 1 – Your Household

Please write the name of the person who would like to be the point of contact for this survey

Please supply an email address of the person who would like to be the point of contact for this survey. If you would prefer, you can provide a phone number or a postal address

How many people have lived **full time** in your household from October 2017 until now?

Please provide details of any people who have lived in your household on a **non-full time basis** from October 2017 until now, noting **how many people and how long each person has stayed in the property for**. E.g. this may be a lodger who stays during the week, or adult children who stay for several months per year

Can you describe what type of property you live in? You may want to think about whether it is detached/semi-detached, the approximate age of the property, the approximate size of the property, how many rooms it has, how well insulated the property is, and whether it has any eco-friendly features such as solar panels.

PART C: Record of 1st October 2017 – 30th September 2018

Please fill out this survey as a household.

For this part of the survey, you will be asked to record information covering the period of the 1st October 2017 to the 30th September 2018.

Section 2 – Public transport: ferries and aeroplanes

Please record any journeys made by ferry or aeroplane by some or all household members during the period of the **1st October 2017 to the 30th September 2018.** Please specify the ferry port or airport of departure and arrival.

Please note: do not include commuting to and from work, or business trips (they are part of your employer's footprint, not yours).

Transport type (ferry as a foot passenger/ ferry with a car/ aeroplane [PLEASE SPECIFY WHETHER YOU FLEW ECONOMY, BUSINESS, OR FIRST CLASS])	**Ferry port or airport of departure**	**Ferry port or airport of arrival**	**How many household members took this journey?**	**Did the household members return by the same route?**
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)
				Yes / No (delete as appropriate)

Section 3 – Hotel Stays

Please record the country, number of nights and number of hotel rooms in which some or all household members stayed in a hotel during the period of the **1st October 2017 to the 30th September 2018.**

Please note: do not include business trips (they are part of your employer's footprint, not yours).

Country	**Number of nights**	**Number of hotel rooms**

Did you go on holiday and use any other types of accommodation? E.g. camping, caravan, AirBnb, staying with a friend. If so, please give a summary in the box below.

Section 4 – Energy and Utility Bills

In this next section, you will be asked about your household's gas, electricity and water supply/treatment usage. However, it may be the case that you share gas, electricity and water supply systems and meters with your community, thereby making it impossible to separate out your usage from that of your community's usage**. Please tick whichever box below best applies to your household.**

- ☐ Our household shares gas, electricity and water supply systems/meters with the community, therefore it is not possible to separate out our usage from the community's usage
  >If you tick this box then skip Section 4

- ☐ Our household shares *some* energy supply systems/meters (i.e. gas and/or electricity and/or water). Therefore, in *some* cases it is not possible to separate out our usage from the community's usage, though in *other* cases we can
  >If you tick this box then fill out the parts of Section 4 which apply to you

- ☐ Our household does not share gas, electricity and water supply systems/meters with the community, therefore we can find out how much gas, electricity and water our household has used
  >If you tick this box then please fill out the rest of Section 4

- ☐ None of the above
  >If so, please explain by writing in the box below

The majority of people heat their homes using natural gas. However, alternative methods of heating exist. **Please tick the appropriate box to indicate how your household was heated between the 1st October 2017 to the 30th September 2018**.

- ☐ Biomass (wood)
- ☐ Coal-based solid fuels
- ☐ Electricity
- ☐ Hot water mains (district heating)
- ☐ LPG (liquid petroleum gas)
- ☐ Natural gas
- ☐ Oil

☐ I don't know

Please supply the following information:

Gas

How much gas has your household used **over a one year period** in Kwhs?

Kwhs

Electricity

How much electricity has your household used **over a one year period** in Kwhs?

Kwhs

Water

How much water has your household used **over a one year period** in cubic metres (m3)?

m3

How much water/sewage from your household has been treated **over a one year period** in cubic metres (m3)?

m3

How to find information about your gas, electricity and water usage

Below are several ways for you to find the needed information from your gas, electricity and water bills. Please choose whichever option is most convenient.

- If you manage your bills online you will be able to view your consumption of gas/electricity/water here.
- Refer to your paper bills.
- If you have one paper bill, you can find out your annual energy usage by scanning the QR code on this bill using a smartphone device.
- A recent gas or electricity bill will contain an estimate of your annual gas/electricity requirement in Kwh. This information can normally be found near to your personal details (name and address). **Please note, this is not the case for water bills.**
- You can ring your gas/electricity/water supplier and request an annual statement, although there may be a charge attached to this being delivered by mail. An electronic statement is more likely to be free – make sure you check! If there is a cost associated, you can contact the researcher Penny Clark at p.clark@my.westminster.ac.uk, and the cost may be covered for you.

Thank you

Thank you for completing PARTS B and C of this survey.

****PLEASE NOTE that there is an additional PART D to complete****

Please give details of any questions which you could not answer, or could not answer fully, below.

If you have any questions at all, please contact Penny Clark; see the first page for contact details.

15.4.2. Household survey 2: two week diary

Please note that there was also an online version of this survey, and a version of this survey on Microsoft Excel.

PART C: Survey of a two week period

In Part C, which encompasses Sections 5 to 8, you will need to keep a record of various activities for a period of two weeks. It does not matter which two weeks this period covers.

It is suggested that you carry this part of the survey with you if possible (e.g. in your bag) and fill it out as you go (e.g. as soon as you take a journey on public transport/as soon as you purchase food).

Please write your name

Please write the name of the person in your household who is the point of contact for this survey

Please write the date at which this two week period starts

Please write the date at which this two week period ends

Section 5 – Private Transport

****Please note: only one person per household will need to fill out "Section 5 – Private Transport"****

In order to measure the environmental impact of your household's private transport (which includes cars, motorcycles, caravans, vans or any other vehicle owned and operated by you or members of your household), **you will need to log the miles covered by that vehicle over a period of two weeks.** This can be done by simply **reading your vehicle's mileometer** at the beginning and at the end of the two week period. Use the form below to record this information.

1. Vehicle type (delete as appropriate): Car | Motorcycle | Other vehicle, please specify:			
Vehicle make			
Vehicle model			
Fuel type (Diesel, Petrol, Hybrid, Other: please specify)			
Date starting		No. of miles on milometer at this date	
Date finishing (the finishing date should be two weeks after the starting date)		No. of miles on milometer at this date	
2. Vehicle type (delete as appropriate): Car | Motorcycle | Other vehicle, please specify:			
Vehicle make			
Vehicle model			
Fuel type (Diesel, Petrol,			

Hybrid, Other: please specify)			
Date starting		No. of miles on milometer at this date	
Date finishing (the finishing date should be two weeks after the starting date)		No. of miles on milometer at this date	

3. Vehicle type (delete as appropriate): Car | Motorcycle | Other vehicle, please specify:			
Vehicle make			
Vehicle model			
Fuel type (Diesel, Petrol, Hybrid, Other: please specify)			
Date starting		No. of miles on milometer at this date	
Date finishing (the finishing date should be two weeks after the starting date)		No. of miles on milometer at this date	

Were some (or all) of the journeys made using private transport commuting to and from work?

Yes / No (delete as appropriate)

If you answered **Yes** to the question above, please write which vehicle(s) you are referring to

And please estimate in miles the amount of the distance travelled over the two week period for which the purpose was commuting to and from work.

miles

Section 7 – Public Transport and Lifts with Friends

In order to measure the environmental impact of the public transport plus shared car journeys which your household takes part in (which in this section includes trains, taxis, buses, coaches and lifts with friends), **you will need to log the vehicle type and journey starting point and destination over a period of two weeks.** If possible, please enter a full address for both the starting point and the journey destination.

If your journey involves more than one mode of transport (e.g. a bus and a train) please record each mode of transport separately.

Please note: do not include commuting to and from work, or business trips (they are part of your employer's footprint, not yours).

Date	**Vehicle type** (Bus/Coach/Train /Taxi/Friend's car)	**Journey starting point (enter address if possible)**	**Journey destination (enter address if possible)**	**Did you return by the same route and means of transport?**

			Date		
			Vehicle type (Bus/Coach/Train /Taxi/Friend' s car)		
			Journey starting point (enter address if possible)		
			Journey destination (enter address if possible)		
Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	**Did you return by the same route and means of transport?**	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)

	Date				**Date**
	Vehicle type (Bus/Coach/Train/Taxi/Friend's car)				**Vehicle type** (Bus/Coach/Train/Taxi/Friend's car)
	Journey starting point (enter address if possible)				**Journey starting point (enter address if possible)**
	Journey destination (enter address if possible)				**Journey destination (enter address if possible)**
Yes / No (delete as appropriate)	**Did you return by the same route and means of transport?**	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	**Did you return by the same route and means of transport?**

			Date		
			Vehicle type (Bus/Coach/Train/Taxi/Friend’ s car)		
			Journey starting point (enter address if possible)		
			Journey destination (enter address if possible)		
Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	**Did you return by the same route and means of transport?**	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)

	Date				**Date**
	Vehicle type (Bus/Coach/Train/Taxi/Friend's car)				**Vehicle type** (Bus/Coach/Train/Taxi/Friend's car)
	Journey starting point (enter address if possible)				**Journey starting point (enter address if**
	Journey destination (enter address if possible)				**Journey destination (enter address if possible)**
Yes / No (delete as appropriate)	**Did you return by the same route and means of transport?**	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	**Did you return by the same route and means of transport?**

Yes / No (delete as appropriate)	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)

Date		
Vehicle type (Bus/Coach/Train/Taxi/Friend' s car)		
Journey starting point (enter address if possible)		
Journey destination (enter address if possible)		
Did you return by the same route and means of transport?	Yes / No (delete as appropriate)	Yes / No (delete as appropriate)

Yes / No (delete as appropriate)				

Does the travel logged during these two weeks represent “the norm”? If the answer is no, please give details of what was different about these two weeks

Yes/No [delete as appropriate]

Section 8 – Waste

The environmental impact of your recycled and non-recycled waste will be calculated via its weight. Please record:

i) The weight of your non-recycled waste *and*
ii) The weight of your recycled waste

in the two separate tables below, for the period of **two weeks.** It is suggested that you record the weight of each bag of rubbish before taking it to your outdoor bin or recycling box.

Waste: non-recycled	
Date	Weight in KGs

Your recycled waste must be separated into the following categories:

- Recycling taken by the council
- Food/organic waste for personal/community composting

Date	Recycling type (delete as appropriate)	Weight in KGs
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	

Does the amount of recycled and non-recycled waste logged during these two weeks represent "the norm" in your household? If the answer is no, please give details of what was different about these two weeks

Yes/No [delete as appropriate]

Section 9 – Food

Section 9.1 – Food shopping

Please **weigh your food shopping bags** for a two week period, and record the weights in the table below.

For ad hoc food shopping e.g. picking up a couple of items for dinner, or getting a sandwich for lunch, please just do your best to estimate the weight of your shopping, or, alternatively, write the items that you bought into the table.

Date	**Weight of one bag (KGs)**

	Total: KGs

Tick which of the following statements best describes you and your household's diet in relation to meat consumption

	You	Household member 1	2	3	4	5	6
I eat more than 100gr meat per day							
I eat between 50-99gr meat per day							
I eat between 0-49gr meat per day							
I am a pescatarian							
I am vegetarian							
I am vegan							

Does the amount of food logged during these two weeks represent "the norm" in your household? If the answer is no, please give details of what was different about these two weeks

Yes/No [delete as appropriate]

Thank you

Thank you for completing PART D of this survey.

If you could not answer every question, please detail omissions in the space below.

If you have any questions at all, please contact Penny Clark at p.clark@my.westminster.ac.uk. Or, if you would prefer to speak on the phone, you can call 020 3506 6809 during regular office hours.

15.4.3. Household survey 3: expenditure survey

Below is the survey which participants were given to estimate their yearly expenditure. Microsoft Excel was used. For easier viewing this survey can be accessed online here.

Expenditure Survey

For this survey, you will be asked how much money in British Pounds you spent on various items.

Giving approximate figures is absolutely fine.

Using what is called an environmentally-extended input-output analysis, your expenditure will be automatically converted into CO2e* emissions.

Please note that the categories within this survey have been selected to reflect how the CO2e emissions are calculated.

*CO2e, or carbon dioxide equivalent, is a measurement of the impact of each different greenhouse gas in terms of the amount of CO2 that would create the same amount of warming. CO2e includes emissions from the seven main GHGs that c

Please estimate how much you spend on the following items per month

		Estimated expenditure per month	Estimated expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
This is an example	Clothes	£40	£480.00	324.34
	Clothes		£0.00	0.00
	Shoes		£0.00	0.00
	Bags		£0.00	0.00
	Jewellery		£0.00	0.00
	Paper stationary e.g. notepads, envelopes, printer paper, sketchpads		£0.00	0.00
	Paper newspapers		£0.00	0.00
	Books			0.00
	Printer cartridges		£0.00	0.00
	Dental and medical supplies e.g. toothbrush, toothpaste, mouthwash, paracetamol, eyedrops, bandages, plasters		£0.00	0.00
	Soap and detergents e.g. soap, washing up liquid, shower gels, shampoos, conditioners		£0.00	0.00
	Essential oils		£0.00	0.00
	Cleaning and polishing products		£0.00	0.00
	Brooms and brushes		£0.00	0.00
	Batteries		£0.00	0.00
	Lightbulbs		£0.00	0.00
	Plastic products e.g. bottles and other containers, plastic furniture, buckets, plastic dishware and glassware, insulated cups, foam cushions, electrical circuit boards, fillers, putty, food wrap, garden hose, insulation foam, plumbing pipes, toys, tubing		£0.00	0.00

	Small rubber products, e.g. welcome mat, garden hose, pond liners, mattresses, cushions, pillows, bathtub plugs, doorstops, earplugs, hot water bottles, aquarium tubing, faucet washers and rug backings			£0.00	0.00
	Sports goods e.g. tennis racquets, footballs, ski equipment, boxing gloves, skipping rope, dumbells, yoga mats			£0.00	0.00
	Games and toys			£0.00	0.00
	The growing of fruits and vegetables (including related equipment)			£0.00	0.00
	Domestic animal care			£0.00	0.00

Please estimate how often you purchase the following items (e.g. if it is once every 3 years, put 3; if it is once every 6 months, put 0.5), PLUS how much money you spent on such an item last time you made a purchase

	Electronics	How often (in years) do you purchase this item?	How much did you spend last time you purchased this item/these items?	Your expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
This is an example	Landline telephones (purchase, not ongoing bills)	5	£45.00	£9.00	3.7
	Landline telephones (purchase, not ongoing bills)			#DIV/0!	#DIV/0!
	Mobile phones (purchase, not ongoing bills)			#DIV/0!	#DIV/0!
	Video cameras			#DIV/0!	#DIV/0!
	Cameras			#DIV/0!	#DIV/0!
	Personal computers			#DIV/0!	#DIV/0!
	Laptops			#DIV/0!	#DIV/0!
	Games consoles			#DIV/0!	#DIV/0!
	Computer games			#DIV/0!	#DIV/0!
	Touchscreen devices (not including mobile phones)			#DIV/0!	#DIV/0!
	Television sets			#DIV/0!	#DIV/0!
	Music players (e.g. CD player, iPod, MP3 player, turntables, gramaphone)			#DIV/0!	#DIV/0!
	Air conditioning			#DIV/0!	#DIV/0!
	Blender			#DIV/0!	#DIV/0!
	Ceiling fan			#DIV/0!	#DIV/0!
	Electric hand-tools			#DIV/0!	#DIV/0!
	Electric motors and electric generators			#DIV/0!	#DIV/0!
	Fan heater			#DIV/0!	#DIV/0!
	Hair dryer			#DIV/0!	#DIV/0!
	Humidifier			#DIV/0!	#DIV/0!
	Iron			#DIV/0!	#DIV/0!
	Kettle			#DIV/0!	#DIV/0!
	Microwave oven			#DIV/0!	#DIV/0!
	Patio heater			#DIV/0!	#DIV/0!
	Refrigerator			#DIV/0!	#DIV/0!

Sewing machine			#DIV/0!	#DIV/0!
Toaster			#DIV/0!	#DIV/0!
Vacuum			#DIV/0!	#DIV/0!
Any other electric appliances			#DIV/0!	#DIV/0!
Repair of electronic equipment			#DIV/0!	#DIV/0!

Furniture and Fittings	How often (in years) do you purchase this item/these items?	How much did you spend last time you purchased this item/these items?	Your expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
Ceramic sanitary fixtures e.g. toilets, sinks, baths			#DIV/0!	#DIV/0!
Metal structures, e.g. doors, windows, radiators, boilers, tanks, containers			#DIV/0!	#DIV/0!
Ovens			#DIV/0!	#DIV/0!
Kitchen countertops			#DIV/0!	#DIV/0!
Matresses			#DIV/0!	#DIV/0!
Seating e.g. chair, bean bag, stool, bench, sofa, ottoman			#DIV/0!	#DIV/0!
Bed e.g. double or single, bunk bed, sofa bed, water bed			#DIV/0!	#DIV/0!
Bookcases, filing cabinet, shelving			#DIV/0!	#DIV/0!
Cabinets, cupboards, chest of drawers, chest, sideboard, wardrobe			#DIV/0!	#DIV/0!
Safe			#DIV/0!	#DIV/0!
Other furniture			#DIV/0!	#DIV/0!
Repair of furniture and fittings			#DIV/0!	#DIV/0!

Transport	How often (in years) do you purchase this item?	How much did you spend last time you purchased this item/these items?	Your expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
Motor vehicles e.g. cars, vans, campervans			#DIV/0!	#DIV/0!
Electronic equipment for motor vehicles e.g. CD player, Sat-nav			#DIV/0!	#DIV/0!
Rubber tyres			#DIV/0!	#DIV/0!
Vehicle engines			#DIV/0!	#DIV/0!
Other parts and accessories for motor vehicles			#DIV/0!	#DIV/0!
Bicycles and wheelchairs, mobility scooters			#DIV/0!	#DIV/0!
Motorcycles			#DIV/0!	#DIV/0!
Ships, pleasure and sporting boats			#DIV/0!	#DIV/0!
Other transport equipment			#DIV/0!	#DIV/0!
Repair and maintenance of ships and boats			#DIV/0!	#DIV/0!
Repair and maintenance of transport equipment e.g. bicycle, mobility scooter, car			#DIV/0!	#DIV/0!

Decoration	How often (in years) do you purchase this item?	How much did you spend last time you purchased this item/these items?	Your expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
Floor and wall covering			#DIV/0!	#DIV/0!
Painting and glazing			#DIV/0!	#DIV/0!

Building and Construction	How often (in years) do you purchase this item?	How much did you spend last time you purchased this item/these items?	Your expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
Parquet floor			#DIV/0!	#DIV/0!
Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials			#DIV/0!	#DIV/0!
Wallpaper			#DIV/0!	#DIV/0!
Paints, varnishes and similar coatings			#DIV/0!	#DIV/0!
Glass e.g. window or door panes			#DIV/0!	#DIV/0!
Ceramic tiles			#DIV/0!	#DIV/0!
Bricks			#DIV/0!	#DIV/0!
Building materials including cement, lime, concrete, plaster, mortar, iron pipes, steel pipes, and other metal objects (e.g. precious metals, aluminium, lead, zinc, tin, copper etc.)			#DIV/0!	#DIV/0!
Locks and hinges			#DIV/0!	#DIV/0!
Building project management and labour			#DIV/0!	#DIV/0!
Installation of electrical implements, plumbing, heat, air-conditioning, joinery or other			#DIV/0!	#DIV/0!
Plastering			#DIV/0!	#DIV/0!
Other building completion and finishing			#DIV/0!	#DIV/0!
Scaffold erection			#DIV/0!	#DIV/0!

Miscellaneous	How often (in years) do you purchase this item?	How much did you spend last time you purchased this item/these items?	Your expenditure per year (automatically calculated)	CO2e in KGs (automatically calculated)
Luggage			#DIV/0!	#DIV/0!
Perfumes			#DIV/0!	#DIV/0!
Glue			#DIV/0!	#DIV/0!
Ceramic ornaments			#DIV/0!	#DIV/0!
Weapons and ammunition			#DIV/0!	#DIV/0!
Cutlery			#DIV/0!	#DIV/0!
Tools			#DIV/0!	#DIV/0!
Wire products, chains and springs			#DIV/0!	#DIV/0!
Fasters and screws			#DIV/0!	#DIV/0!
Other metal products			#DIV/0!	#DIV/0!
Non-electric domestic appliances, e.g. boiler, cooker, gas fire, gas stove, grate, heat emitter, plate-warmers, water heaters, gas refrigerators			#DIV/0!	#DIV/0!
Musical instruments			#DIV/0!	#DIV/0!
Repair of miscellaneous items			#DIV/0!	#DIV/0!
			TOTAL CO2e in KGs	-

15.4.4. Community survey

This is the survey which was used to capture environmental impacts at community level. This survey was also available online and via Microsoft Excel.

Please note that where appropriate, information on communal wood burned was gathered (although this was not included in the survey).

Measuring your community's environmental impact

Thank you for taking part in this research.

This research is about exploring environmental sustainability and cohousing communities. This study is the first of its kind, so your contribution will be part of something unique! There are no "good" or "bad" answers – please just fill out the survey as accurately as you can.

This survey asks you to supply the data needed to measure your community's environmental impacts. This involves recording some general information about the community, information on utility bills, waste and food shopping. For each section you will be given instructions.

The information you supply will be converted into the equivalent tonnes of greenhouse gases using information which has been supplied by DEFRA (the Department for Environment, Food and Rural Affairs).

All information which you supply will be treated as strictly confidential, will only be accessed directly by the researcher, and will only be used for academic research purposes.

If you find that you cannot supply all of the information required there will be a space at the end of the survey where you can give details of any questions which have not been answered.

If you have any questions you can contact the researcher, Penny Clark (see contact details below). **Once you have completed the survey, please return it to Penny Clark via post, or scanned via email.**

Researcher

Name: Ms Penny Clark

Email: p.clark@my.westminster.ac.uk

Office number: +44(0)20 3506 6809

Address: Penny Clark, School Office (Architecture), 35 Marylebone Road London NW1 5LS

If you have any concerns or a complaint about this research project you can contact the project supervisor (see contact details below).

Supervisor

Name: Dr Rachel Aldred

Email: r.aldred@westminster.ac.uk

Office number: +44 (0)20 7911 5000 ext 65021

START HERE

PART A

Section 1 – The Community

Please write your name

Please write an email address which can be used as a point of contact. If you would prefer, you can provide a phone number or a postal address

How many people have lived **full time** in your community from October 2017 until now?

Please provide details of any people who have lived in your community on a **non-full time basis** from October 2017 until now, noting **how many people and how long each person has stayed in the property for**. E.g. this may be a volunteer who stayed for one month, or adult children who stay for several months per year

Estimates/approximations are fine

Can you describe what type of property the community lives in? You may want to think about the approximate age of the property, the approximate size of the property, how much communal space it has, how well insulated the property is, and whether it has any eco-friendly features such as solar panels.

Section 2 – Energy and Utility Bills

Does your community share the same heating, gas and water supply/treatment system?

- ☐ Yes
- ☐ Somewhat
- ☐ No

If the answer is “Yes” or “Somewhat”, please fill out Section 2. If the answer if “No”, you may skip this section.

The majority of people heat their homes using natural gas. However, alternative methods of heating exist. **Please tick the appropriate box to indicate how your community was heated between the 1st October 2017 to the 30th September 2018**.

- ☐ Biomass (wood)
- ☐ Coal-based solid fuels
- ☐ Electricity
- ☐ Hot water mains (district heating)
- ☐ LPG (liquid petroleum gas)
- ☐ Natural gas
- ☐ Oil
- ☐ I don’t know

Please supply the following information:

Gas

How much gas has your community used **over a one year period** in Kwhs?

Kwhs

Electricity

How much electricity has your community used **over a one year period** in Kwhs?

Kwhs

Water

How much water has your community used **over a one year period** in cubic metres (m3)?

	m3

How much water/sewage from your community has been treated **over a one year period** in cubic metres (m3)?

	m3

How to find information about your community's gas, electricity and water usage

Below are several ways for you to find the needed information from your gas, electricity and water bills. Please choose whichever option is most convenient.

- If you manage your bills online you will be able to view your consumption of gas/electricity/water here.
- Refer to your paper bills.
- If you have one paper bill, you can find out your annual energy usage by scanning the QR code on this bill using a smartphone device.
- A recent gas or electricity bill will contain an estimate of your annual gas/electricity requirement in Kwh. This information can normally be found near to your personal details (name and address). **Please note, this is not the case for water bills.**
- You can ring your gas/electricity/water supplier and request an annual statement, although there may be a charge attached to this being delivered by mail. An electronic statement is more likely to be free – make sure you check! If there is a cost associated, you can contact the researcher Penny Clark at p.clark@my.westminster.ac.uk, and the cost may be covered for you.

PART B

In Part B you will need to keep a record of various activities for a period of two weeks. It does not matter which two weeks this period covers.

Please write the date at which this two week period starts

Please write the date at which this two week period ends

Section 3 – Community Waste

The environmental impact of your community's recyclable and non-recyclable waste will be calculated via its weight. Please record:

iii) The weight of the community's non-recyclable waste *and*
iv) The weight of the community's recyclable waste

in the two separate tables below, for the period of **two weeks.** It is suggested that you record the weight of each bag of rubbish before taking it to your outdoor bin or recycling box.

Waste: non-recyclable	
Date	Weight in KGs

Your recyclable waste must be separated into the following categories:

- Recycling taken by the council
- Food/organic waste for personal/community composting

Waste: Recyclable		
Date	**Recycling type (delete as appropriate)**	**Weight in KGs**
	Taken by the council / Composting	
	Taken by the council / Composting	

	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
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	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	
	Taken by the council / Composting	

Section 4 – Communal Food Shopping

Please **weigh communal food shopping bags** for a two week period, and record the weights in the table below.

For ad hoc food shopping e.g. picking up a couple of items for dinner, please just do your best to estimate the weight of your shopping, or, alternatively, write the items that you bought into the table.

Date	**Weight of one bag (KGs)**

Total:	KGs

Tick the following statement which best describes your community's communal meals in relation to meat consumption.

- ☐ Over 100gr meat per person
- ☐ Between 50-99gr meat per person
- ☐ Between 0-49gr meat per person
- ☐ Pescatarian
- ☐ Vegetarian
- ☐ Vegan

Thank you

Thank you for completing this survey.

Please give details of any questions which you could not answer, or could not answer fully, below.

If you have any questions at all, please contact Penny Clark; see the first page for contact details.

15.5. Calculating the CO2e of Canon Frome Court cohousing produce/LILAC cohousing home-grown fruits and vegetables

Table 15-2 shows how the environmental impacts of the livestock kept at Canon Frome Court were captured.

Table 15-2: How environmental impacts of livestock were captured at Canon Frome Court cohousing

Environmental impacts	**How does the research capture these impacts?**				
	Cows	**Sheep**	**Goats**	**Pigs**	**Chickens**
Food consumed	Grass which is growing anyway, and then any bought food (e.g. oats) should be captured by the EE-IOA				Odd leftovers, and then any food that is bought should be captured by the EE-IOA
Methane produced*	117KG per head per year	8KG ph/py	5KG ph/py	1.5 py/ph	N/A
Expenditure e.g. medicine, equipment	Captured in Coop accounts				
Space occupied	Only important if fields were deforested etc. in order to house animals (which they were not)				
Water	Captured within bore hole estimates and water meter records				
Animal waste*	1KG ph/py	0.28KG ph/py	0.2 KG ph/py	1KG ph/py	0.03KG ph/py
Transport for the slaughterer?	Negligible - deemed unnecessary to include				Slaughtered by residents
Processing after slaughter	Equipment? Only be captured if equipment was bought within the last year. Heat and light etc. captured by utility bills.				
Storage of the meat	Captured already by utility bills				

*Source: Dong *et al.,* 2006.

Table 15-3 (below) shows how the methane produced by animals was calculated and converted into CO2e. The overall figure (20792.54 KGs CO2e) was divided between Canon Frome Court households, forming a part of their average yearly emissions.

Table 15-3: Methane from livestock, converted to CO2e

Animals from October 2017 - October 2018				Multiplication to work out methane produced from the animals within a year							
Animal type	**Number**	**Date animals present**	**Notes**	**Number of months alive/present during 2017/2018**	**Percentage of a year**	**Multiplication factor for enteric emissions (KG CH4 per head per year)***	**CH4 per head per year from enteric emissions**	**Multiplication factor for waste (KG CH4 per head per year)***	**CH4 per head per year from manure***	**Total CH4 KGs**	**Convert to KGs CO2e (multiply by 25)**
Cow (Jersey - milker)	1	October 2017 - October 2018		12	100	117	117	1	1	118	2950
Cow (Jersey / Swedish Red - milker)	1	October 2017 - October 2018		12	100	117	117	1	1	118	2950
Cow (Jersey - offspring)	1	October 2017 - October 2018		12	100	117	117	1	1	118	2950
Cow (Jersey - offspring)	1	December 2017 - October 2018		10	0.83	117	97.5	1	0.83	98.33	2458.33
Cow (British blue - meat)	1	October 2017 (slaughtered)	No account is being taken for the fact that this was an infant, so is likely to have produced slightly less methane etc.	1	0.083	117	9.75	1	0.08	9.83	245.83

Sheep - ewes	12	October 2017 - October 2018	No account is being taken for the fact that this was an infant, so is likely to have produced slightly less methane etc.	12	100	8	96	0.28	3.36	99.36	2484
Sheep - lambs (replacement ewes)	4	March 2018 - October 2018	No account is being taken for the fact that this was an infant, so is likely to have produced slightly less methane etc.	7	0.58	8	18.67	0.28	0.65	19.32	483
Sheep - lambs (for slaughter)	9	October 2017 - January 2018		4	0.33	8	24	0.28	0.84	24.84	621
Sheep - ewe (for slaughter)	1	October 2017 - January 2018		4	0.33	8	2.67	0.28	0.09	2.76	69
Sheep - lambs (for slaughter)	11	October 2017 - September 2018	No account is being taken for the fact that this was an infant, so is likely to have produced slightly less methane etc.	11	0.92	8	80.67	0.28	2.82	83.49	2087.25
Sheep - ewe (for slaughter)	2	October 2017 - September 2018		11	0.92	8	14.67	0.28	0.51	15.18	379.5
Sheep - ram	1	Six week visit		1.5	0.13	8	1	0.28	0.04	1.04	25.875

Goats (Saanen nanny goats)	2	October 2017 - October 2018		12	100	5	10	0.2	0.4	10.4	260
Goats (Saanen kid)	1	May 2018 - October 2018	No account is being taken for the fact that this was an infant, so is likely to have produced slightly less methane etc.	6	0.5	5	2.5	0.2	0.1	2.6	65
Goats (Saanen kid)	4	May 2018 - September 2018	No account is being taken for the fact that this was an infant, so is likely to have produced slightly less methane etc.	5	0.42	5	8.33	0.2	0.33	8.67	216.67
Pigs (Gloucester Old Spot)	4	June 2018 - September 2018	No account is being taken for the fact that these pigs started off as piglets, so would have produced less emissions then	4	0.33	1.5	2	1	1.33	3.33	83.33
Chickens (Calder Rangers and Rhode Rock [layer species])	75	October 2017 - October 2018	There was a few weeks' gap between the slaughter of thirty-two chickens and the purchase of forty more, but the environmental impact of this is not meaningful, so has not been included here.	12	100	N/A	N/A	0.03	1.31	98.55	2463.75

	TOTAL	778.15	20792.54

*Multiplication factors were obtained from Dong *et al.* (2006); aside from estimations of emissions arising from chicken manure, which was calculated using information from Williams (2013).

Table 15-4 below shows how the environmental impacts of growing fruits and vegetables at Canon Frome Court have been accounted for. This research has not isolated the environmental impacts of growing and consuming fruits and vegetables. Instead, the impacts have been included as part of other measurements (e.g. utility bills, community expenditure).

Table 15-4: How the environmental impacts of home-grown vegetables were captured at Canon Frome Court cohousing and LILAC cohousing

Environmental impacts	**How impacts have been captured**
Food storage in communal space and private households (fridge, freezer, indoor heated space)	Communal utility bills, household utility bills
Water	Included in water use measurements/estimates
Purchase of seeds	Communal expenditure accounts
Purchase of gardening equipment	Communal expenditure accounts
Food preparation at communal and household level (heat)	Communal utility bills, household utility bills
Wastage (from eating and from gardening)	Compost measurements
Land use change	Not considering this because land has not been recently deforested in order to grow crops. Land was otherwise unused.
Purchase of material for polytunnels etc.	Communal expenditure accounts

15.6. Average household CO2e

Secondary data was used to construct a figure representing the CO2e emissions of the average UK household. This section details the breakdown, data sources and methods used for constructing this figure.

15.6.1. Figure breakdown

Table 15-5 (below) shows how the CO2e emissions for an average UK household are broken down between the emissions streams of energy and water, food, purchases, transport and waste. The table shows the data sources used for calculating these emissions.

Table 15-5: Average UK household CO2e emissions breakdown

Emission type	Emission sub-type	Main source	Year	CO2e KGs per UK Household
Energy & Water	Electricity	BEIS (Department for Business, Energy & Industrial Strategy) (2018) *Energy Consumption in the UK 2018 update*, [Microsoft Excel Spreadsheet]. *GOV.UK*. 'Tab 3.03: Average domestic gas and electricity consumption, UK, 2008 to 2017'. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).	2017	1345.78
	Natural gas	BEIS (Department for Business, Energy & Industrial Strategy) (2018) *Energy Consumption in the UK 2018 update*, [Microsoft Excel Spreadsheet]. *GOV.UK*. 'Tab 3.03: Average domestic gas and electricity consumption, UK, 2008 to 2017'. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).	2017	2559.14
	Coal	BEIS (Department for Business, Energy & Industrial Strategy) (2018) *Energy Consumption in the UK 2018 update*, [Microsoft Excel Spreadsheet]. *GOV.UK*. 'Tab 3.03: Average domestic gas and electricity consumption, UK, 2008 to 2017'. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).	2017	38.99
	Other solid fuels	BEIS (Department for Business, Energy & Industrial Strategy) (2018) *Energy Consumption in the UK 2018 update*, [Microsoft Excel Spreadsheet]. *GOV.UK*. 'Tab 3.03: Average domestic gas and electricity consumption, UK, 2008 to 2017'. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).	2017	0.37
	Water supplied	DEFRA (Department for Environment, Food & Rural Affairs) (2018c) 'Water Conservation Report', *December 2018*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766894/water-conservation-report-2018.pdf (Accessed: 26 March 2018).	2017	42.49

	Water treated	DEFRA (Department for Environment, Food & Rural Affairs) (2018c) 'Water Conservation Report', *December 2018*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766894/water-conservation-report-2018.pdf (Accessed: 26 March 2018).	2017	87.45
Food	N/A	DEFRA (Department for Environment, Food & Rural Affairs) (2018a) Family Food Survey Table 2.1: Quantities of household purchases of food and drink in the UK. Available at: https://www.gov.uk/government/statistics/family-food-201819/family-food-201819 (Accessed: 26 March 2018).	2017/18	5124.44
Purchases	N/A	ONS (Office for National Statistics) (2017b) *Supply and Use Tables 1997-2016,* [Microsoft Excel Spreadsheet]. *GOV.UK.* 'Household final consumption expenditure 2016' tab. Available at: https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/inputoutputsupplyandusetables (Accessed: 26 March 2018).	2016	6627.46
Transport	Commute: Car/van driver and passenger	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	870.04
	Commute: Motorcycle	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	7.32
	Commute: Other private transport (bus)	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	2.43
	Commute: Bus in London	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	9.83

	Commute: Other local bus	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	20.05
	Commute: Non-local Bus	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	1.98
	Commute: London Underground	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	10.65
	Commute: Surface Rail	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	57.08
	Commute: Taxi	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	4.82
	Car/van driver and passenger	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	2611.25
	Motorcycle	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	8.79
	Other private transport (bus)	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	38.01

	Bus in London	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	13.63
	Other local bus	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	64.82
	Non-local Bus	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	21.79
	London Underground	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	6.50
	Surface Rail	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	53.83
	Taxi	DfT (Department for Transport) (2017) 'Table NTS0410: Average distance travelled by purpose and main mode, England 2017', *National Travel Survey.* Available at: https://www.gov.uk/government/statistics/national-travel-survey-2017 (Accessed: 3 March 2021).	2017	25.93
	Aeroplane	Hargreaves, K., Preston, I., White, V., and Thumim, J. (2013). The distribution of household CO2 emissions in Great Britain. *Joseph Rowntree Foundation, York*.	2013	1215.00

Waste: non-recyclable	Energy Recovery	DEFRA (2018b) *UK Statistics on Waste*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf (Accessed: 1 December 2018).	2014	0.40
	Incineration	DEFRA (2018b) *UK Statistics on Waste*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf (Accessed: 1 December 2018).	2014	1.59
	Landfill	DEFRA (2018b) *UK Statistics on Waste*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf (Accessed: 1 December 2018).	2014	273.21
Waste: recyclable	Food Waste	DEFRA (2017b) *Statistics on waste managed by local authorities in England in 2016/17*, 5 December. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664594/LACW_mgt_annual_Stats_Notice_Dec_2017.pdf (Accessed: 1 December 2018).	2016	0.04

	Other organics	DEFRA (2017b) *Statistics on waste managed by local authorities in England in 2016/17*, 5 December. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664594/LACW_mgt_annual_Stats_Notice_Dec_2017.pdf (Accessed: 1 December 2018).	2016	0.45
	Dry Recycling	DEFRA (2017b) *Statistics on waste managed by local authorities in England in 2016/17*, 5 December. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664594/LACW_mgt_annual_Stats_Notice_Dec_2017.pdf (Accessed: 1 December 2018).	2016	2.58
			TOTAL	**21614.31**

15.6.2. Method for calculating emissions

This next section details the methods for calculating each of the emissions shown in *Table 15-5*. For each emission type the method of calculation, data sources and assumptions and limitations are detailed.

15.6.2.1. Energy and water

a. Electricity

Data sources

UK electricity consumption and number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. 'Tab 3.03: Average domestic gas and electricity consumption, UK, 2008 to 2017'. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk

(Accessed: 26 March 2018).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Method

1. Total UK electricity consumption was divided by the number of UK households.
2. DEFRA's electricity multiplier was used to obtain the CO2e emissions per household.

Assumptions and Limitations

BEIS assumes that all households are connected to the electricity grid, which is not the case.

b. Gas

Data sources

UK gas consumption and number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. 'Tab 3.03: Average domestic gas and electricity consumption, UK, 2008 to 2017'. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk

(Accessed: 26 March 2018).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Method

1. Total UK gas consumption was divided by the number of UK households.
2. DEFRA's natural gas multiplier was used to obtain the CO2e emissions per household.

Assumptions and Limitations

The ECUK gas consumption figure is temperature adjusted to account for year-by-year fluctuations in temperature, whereas this is not the case with data gathered from the shared living communities. The shared living community's data was gathered between 2018-2019, so may be subject to temperature-based fluctuations that the average household data is not subject to.

c. Coal and other solid fuels

Data sources

Amount of logs and other solid fuels burned: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2014) DEFRA Table_13_Indirect_emissions_from_supply_chain_2007-2011, [Microsoft Excel Spreadsheet]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/404542/Table_13_Indirect_emissions_from_supply_chain_2007-2011.xls (Accessed: 26 March 2018).

Number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).

Method

1. Data on the amount of coal and other solid fuels burned by the domestic sector in weight was obtained.
2. These amounts were divided by the number of households in 2017 (which was the year of the data obtained) to get an average weight per household.
3. These weights were then multiplied by the appropriate DEFRA multiplier. There was no specific multiplier encompassing “other solid fuels”, so a mean average of the multipliers for wood logs, wood chips, wood pellets and grass/straw was configured and used as a multiplier.

Assumptions and Limitations

It was assumed that the category of “other solid fuels” was comprised of wood and grass/straw, however this may not be the case.

d. Water

Data sources

Data on average household water usage and treatment: DEFRA (Department for Environment, Food & Rural Affairs) (2018c) ‘Water Conservation Report’, December 2018. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/766894/water-conservation-report-2018.pdf (Accessed: 26 March 2020).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Method

1. Data on average household water usage and treatment was obtained from DEFRA’s report.
2. This was multiplied by the appropriate DEFRA conversion factor.

Assumptions and Limitations

This report uses data obtained from UK water companies to estimate average litre per person per day use. However, this measurement does not take into account the greater efficiency of larger household numbers.

15.6.2.2. Food

Data sources

Amount of food and drink consumed: DEFRA (Department for Environment, Food & Rural Affairs) (2018a) Family Food Survey Table 2.1: Quantities of household purchases of food and drink in the UK. Available at: https://www.gov.uk/government/statistics/family-food-201819/family-food-201819 (Accessed: 26 March 2018).

Impact of meat consumption on GHG emissions: Scarborough, P. *et al.* (2014) 'Dietary greenhouse gas emissions of meat-eaters, fish-eaters, vegetarians and vegans in the UK', *Climatic Change,* 125(2), pp. 179–192. doi: 10.1007/s10584-014-1169-1.

Number of vegetarians, vegans and pescatarians in the UK:

Tatum, M. (2018) '12% of Brits now follow a meat-free diet, The Grocer research shows', *The Grocer,* 13 April. Available at: https://www.thegrocer.co.uk/home/topics/future-of-meat/12-of-brits-follow-meat-free-diet-the-grocer-research-shows/565771.article (Accessed: 25 March 2020).

The Vegan Society (2018) 'Survey' (a survey by The Vegan Society and Ipsos Mori). Available at: https://www.vegansociety.com/my-account/the-vegan/issue-3-2018/survey (Accessed: 25 March 2020).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).

Method

1. Data from DEFRA's Family Food Survey is given for how many grams of food the average UK person consumes per day. This was multiplied by 2.4 to get grams for an average household, and then multiplied by 365 to get the amount of food in weight that an average UK household consumes per year.

2. This figure was then multiplied by the DEFRA conversion factor for 'Food and Drink', to get a CO2e measurement.
3. This figure was made more granular by factoring in the number of households with vegetarian and vegan diets, and adjusting those household's CO2e impacts according to Scarborough *et al.'s* (2014) research into impacts of different diet types.
4. The overall figure is then divided by the total number of UK households.

Assumptions and Limitations

DEFRA provides one conversion factor for food and drink, which does not take account the varying processes for growing, harvesting, manufacturing and transporting different food and drink and their packaging. It also does not take account of home-grown produce.

The surveys which assess percentages of vegans/vegetarians are of individuals were obtained from grey literature, have not been subject to academic peer review, and may not be representative of the UK population.

The surveys which assess percentages of vegans/vegetarians are of individuals, rather than households. This research equates those individuals to households i.e. it is assumed that over an entire population a measurement of X percent of vegetarian/vegan individuals will be equivalent to the same percentage of vegetarian/vegan households in terms of overall lowered meat consumption. However, this may not be the case, due to for example, the way in which meat is sold (bulk buys perhaps encouraging the "meat-eaters" in a household with one vegetarian to simply consume more meat per person, rather than buy less).

There appears to be no data available on the number of pescatarians in the UK.

Scarborough *et al's* (2014) study does not take into account different amounts of food wastage which may occur from different diets. It is speculated that vegetarian/vegan diets may result in more food wastage (due to a greater amount of vegetable trimmings). Furthermore, the study estimated weights of food consumed based on raw ingredient weight rather than cooked ingredient weight, which will most likely be lower.

15.6.2.3. Purchases

Data sources

Data on household expenditure: ONS (Office for National Statistics) (2017b) *Supply and Use Tables 1997-2016*, [Microsoft Excel Spreadsheet]. *GOV.UK*. 'Household final consumption expenditure 2016' tab. Available at: https://www.ons.gov.uk/economy/nationalaccounts/supplyandusetables/datasets/inputoutputsupplyandusetables (Accessed: 26 March 2018).

A detailed breakdown of SIC categories: Eurostat (2013) COICOP FIVE-DIGIT STRUCTURE AND EXPLANATORY NOTES, *6 December*.

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2014) DEFRA Table_13_Indirect_emissions_from_supply_chain_2007-2011, [Microsoft Excel Spreadsheet]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/404542/Table_13_Indirect_emissions_from_supply_chain_2007-2011.xls (Accessed: 26 March 2018).

Number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk (Accessed: 26 March 2018).

Method

An EE-IOA was used to measure the environmental impacts of items bought by UK households. My aim was to make this measurement as comparable as possible with the expenditure survey given to research participants (see *Section 13.4.3.* for the expenditure survey).

1. Data on UK household expenditure was combed through, and anything that had been included within the participant survey was selected for inclusion in this comparative figure. The categories which featured services rather than goods were not included.
2. The items selected were then assigned with the appropriate conversion factor from DEFRA's EE-IOA data on indirect emissions. The Eurostat document which had a detailed breakdown of which items were applied to which SIC category was used to check that the appropriate conversion factors were used.
3. Once each item had been multiplied by the appropriate conversion factor, the results were summed, and then divided by the number of UK households to get a household average.

Assumptions and Limitations

This approach shares assumptions and limitations of the EE-IOA, which are detailed in Assumptions, limitations and challenges

During the process of examining UK households' expenditure, it was discovered that there were some items that had been missed on the participant survey, which should have been included (e.g. books, camping equipment, carpets). As a result, these had to be left out of this figure too, to ensure that it was comparable with the results of the survey.

15.6.2.4. Transport

a. All transport modes, aside from aeroplanes and ferries[37]

Data sources

Travel by mode and distance: DfT (Department for Transport) (2017) National Travel Survey: Table NTS0410.

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Method

1. Data showing the average yearly travel mode, purpose and distance for individuals was obtained from the National Travel Survey.
2. Distance was multiplied by 2.4 (the size of the average UK household) in order to be representative of households. Miles were converted into kilometres, as CO2e conversion factors use kilometres.
3. Average kilometres per transport mode were then multiplied by the appropriate DEFRA conversion factors to get KGs CO2e.
4. The CO2e for each mode of transport were then split into commuting/business travel and travel for all other purposes, using information from the National Travel Survey.

[37] Data could not be found on frequency of ferry journeys.

Assumptions and Limitations

The way DEFRA and the National Travel Survey categorise types of vehicle is slightly different. Whereas the two data sources were on the whole well aligned, there were some cases where the DEFRA conversion multiplier did not wholly match with the type of vehicle e.g. the National Travel Survey gave more categorisations of bus types than DEFRA's conversion multipliers.

This research assumes that transport information for individuals scales to households, yet this is not necessarily the case. For example, it is likely that some household members would share car journeys, thereby lessening environmental impacts.

The DEFRA conversion factors cannot accurately measure 'real-world' effects including the use of vehicle air conditioning, lights and heaters, vehicle payload, poor maintenance (e.g. tyre under inflation), gradients or driving style. DEFRA therefore adds an estimated 'uplift' effect to account for these impacts.

b. Aeroplanes

Data sources

Aeroplane emissions: Fahmy, E., Thumim, J., White, V. (2011) 'The distribution of UK household CO2 emissions: Interim report'. JRF programme paper: climate change and social justice, University of Bristol and Centre for Sustainable Energy.

Method

Fahmy *et al.* (2011) estimated the average household emissions arising from aeroplane travel through data from the Civil Aviation Authority Air Passenger Survey. Through sampling and weighting, this survey was designed to be representative of the UK population. Fahmy *et al.* obtained data from this survey detailing UK passengers travelling outside of the UK for leisure purposes, for all airports from 1999-2008, for a two month randomly selected sample. They developed a method to calculate distance travelled (allowing for circumference of the globe and landing and take-off) from start/destination airport for each survey record (using a database of airports). Distance was then converted to carbon emissions using the relevant factors (by cabin class). Total emissions were then divided by number of UK households to come up with a mean figure for emissions resulting from aeroplane flights.

Assumptions and Limitations

Fahmy *et al.* appear to only be accessing data on international flights. However, in their results they report estimated average emissions from domestic flights. How they arrive at this figure for domestic flights is unknown.

The data used from 2008 is relatively old, and flying habits may have changed since then. According to Nats, the total number of flights in the UK have increased by 12 percent from 2000-2015 (Nats, 2015).

15.6.2.5. Waste

a. Non-recyclable

Data sources

Waste quantities and processing: DEFRA (2018c) *UK Statistics on Waste*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746642/UK_Statistics_on_Waste_statistical_notice_October_2018_FINAL.pdf (Accessed: 1 December 2018).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk

(Accessed: 26 March 2018).

Method

1. Data showing yearly household waste was obtained. Waste that was recycled was subtracted, leaving a remaining figure of 15,114,000 tonnes.
2. Information on the amount of waste that went to landfill/was incinerated etc. was also obtained. These amounts were greater than the figure of 15,114,000, because they included industrial waste. The categories of 'backfilling' and 'land treatment released into water bodies' were removed, as neither of these treatments are used on household waste. Recycling was also removed, as this had already been factored out of the 15,114,000 tonnes of waste. What remained was landfill, incineration and energy recovery.
3. The amounts of waste under each of these categories were converted into percentages: 3 percent of waste fell under energy recovery, 13 percent under incineration and 83 percent went

to landfill. The 15,114,000 tonnes of waste were then apportioned out according to these percentages.

4. DEFRA's conversion factors were then used to calculate the CO2e KGs for each of these different types of waste.
5. The resulting figures were finally divided by the number of households in 2017 (when this data was gathered) to get an average figure per household.
6. The weight of non-recyclable waste per household was cross-checked with other data sources on the amount of household waste per year. The figure was found to be in line with other sources, and so deemed as a reasonable estimate.

Assumptions and Limitations

It is an assumption that household waste would be treated in the same way proportionately as all waste (e.g. that 83 percent of waste would go into landfill). This may not be the case.

b. Recyclable

Data sources

Waste types and quantities: DEFRA (2017) *Statistics on waste managed by local authorities in England in 2016/17*, 5 December. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664594/LACW_mgt_annual_Stats_Notice_Dec_2017.pdf (Accessed: 1 December 2018).

The conversion factor to calculate CO2e emissions: DEFRA (Department for Environment, Food & Rural Affairs) (2017a) Direct Impacts Conversion_factors_2017_-_Full_set__for_advanced_users__v02-00, [Microsoft Excel spreadsheet]. GOV.UK. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017 (Accessed: 26 March 2018).

Number of UK households: BEIS (Department for Business, Energy & Industrial Strategy) (2018) Energy Consumption in the UK 2018 update, [Microsoft Excel Spreadsheet]. GOV.UK. Available at https://www.gov.uk/government/statistics/energy-consumption-in-the-uk

(Accessed: 26 March 2018).

Method

1. The total amounts of food waste, other organics and dry recycling in weight were obtained.
2. The appropriate CO2e conversion factors from DEFRA were applied to these weights. This resulted in the total amount of CO2e KGs produced by each of these categories.
3. These figures were each divided by the total number of UK households at the time this data was gathered to get an average figure per household.

Assumptions and Limitations

As this is a top-down approach, it does not account for the efficiency of recycling plants, or the environmental impacts of the individual items which are recycled, both of which may vary.

15.7. Confidence intervals for purchase-related emissions

This appendix is in reference to *Measurement* of the indirect impacts of shared living

Figure 15-1 shows the lower and upper bounds of a 95 percent confidence interval, with a lower interval of 84.1 percent, and an upper interval = 110.1 percent. The graph shows that this does not significantly impact the results, as the CO2e attributable to purchases is substantially lower for the shared living communities than it is for the average UK household.

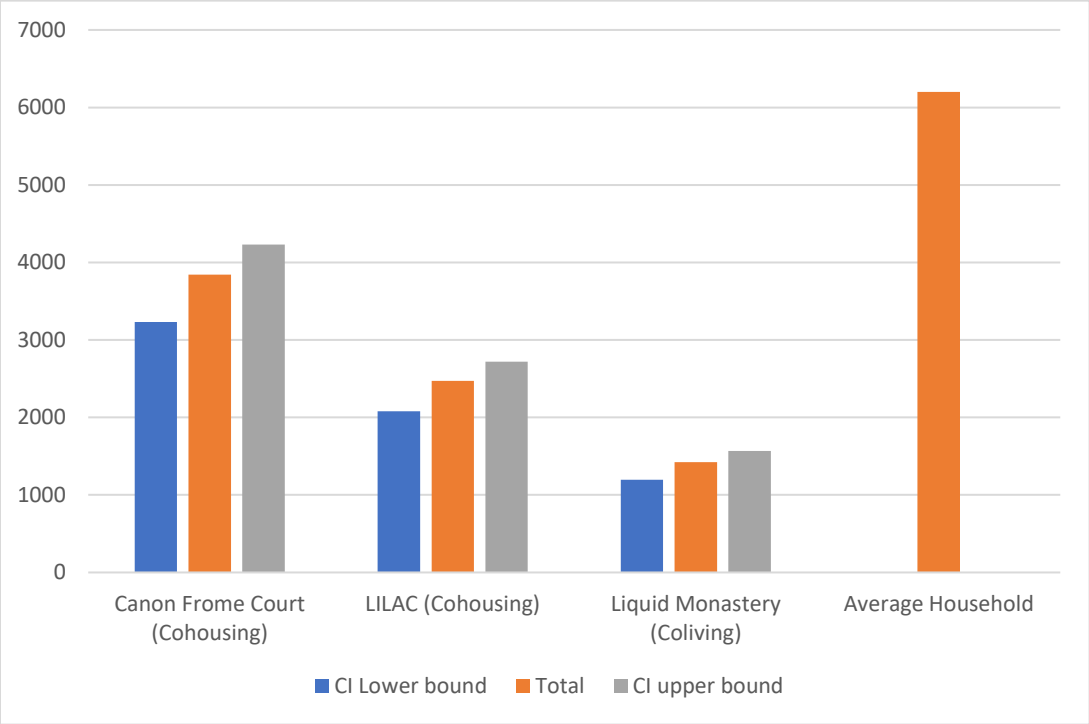

Figure 15-1: Confidence intervals for purchase-related emissions