

An Infrastructural Pathway to Degrowth

The Role of Deliberation

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► **Abstract:** We argue for consideration of deliberative democratic pathways to governing infrastructure systems to enable a planned reduction in economic activity. Given the dominant perspective is “infrastructure facilitates growth”, we first consider contemporary criticisms of growth. We critique the large-scale, complex infrastructures implied, and the forms of democratic governance envisaged. Such infrastructures drive forms of economic activity that advocates of degrowth demonstrate are incompatible with attempts to reduce resources consumed by contemporary economies and their emissions. We argue any deliberation on infrastructures must acknowledge they are not simply physical objects but rather bundles of relationships. With dominant economic relationships challenged by the view that infrastructures ought to be managed as commons we argue that the relational perspective sets the stage for deliberation over physical, social, and environmental infrastructure that escapes what are incorrectly assumed to be insurmountable path dependencies.

► **Keywords:** degrowth, deliberation, democracy, democratic theory, governance, infrastructure

The consciously pluralistic combination of activism, empirical critique, and political project marshaled under the banner of degrowth (Demaria et al. 2019; Kothari et al. 2019; Nesterova 2022) would appear to offer multiple pathways to right sizing the economy. In this article, we draw on insights from urban planning to argue attention needs to be paid to one of the more neglected – the infrastructural pathway. Furthermore, there are specific implications to this were infrastructural systems to be planned, governed, and owned in line with the claims made for deliberative democracy (Durrant and Cohen 2023; Niemeyer 2011 Smith and Setälä 2018).

We begin with the way contemporary criticisms of economic growth tend to fetishize the small-scale and bottom-up forms of economic



governance (Kallis and March 2015). Within this is a strong preference for deliberative mechanisms for managing the economy and the infrastructure that it rests upon. Yet this leads to two linked assumptions. First, it is only possible to achieve this at the local level, small scale through mechanisms such as deliberative forums. And second, if degrowth is fostered at the local level, the aggregate will take care of itself. As contemporary infrastructure and its politics often appear to jump scales (Rozema et al. 2015) and the issues they generate (Marres 2007) will frequently traverse political and geographical boundaries, the planning and governance of infrastructure would appear to offer a unique perspective. Through this lens, it is possible to explore questions of whether both degrowth and deliberative democracy can function at the multiple scales traversed by contemporary infrastructures. In particular, can deliberation facilitate decision-making supportive of degrowth beyond the local? The latter in particular is a question that is made more pertinent by the recent turn toward deliberation among invited publics in preordained democratic spaces (so-called mini publics, of which the most common example is the citizens' assembly). This raises further questions of where such democratic innovations sit in relation to the existing institutions of representative democracy (Bussu et al. 2022; Durrant and Cohen 2023) that make general policy and, more specifically, grant consent for infrastructure.

The politics of infrastructure may not connect with the structures and discourses that shape representative politics in the same way as the major macroeconomic issues of pensions, taxation, and funding for public services, for example. At the national level it is rare for them to be a significant determinant of electoral choices by voters. The temporal mismatch between infrastructure decisions and elections has often been cast as problematic – not only do physical infrastructure projects often take a long time to implement, but their lifespan is commonly measured in decades. The typical electoral cycle, meanwhile, has consistently been associated with short-termism. Recent shifts toward financialization in infrastructure governance are oftentimes presented as solutions to this problem by shifting the risk of infrastructure investment onto consumers (Helm 2013; Loftus and March 2016). Yet, in the case of infrastructure politics, financialization only adds a further layer of “unauthorized actors” (Beck 1999 cited in Swyngedouw 2005) to an already highly technocratic manifestation of state authority. Such attempts to de-politicize decisions around infrastructure only serve to illustrate the ways they are nested in the wider and highly political projects of modernity and state building (Graham and Marvin 2001; Jasanoff and Kim 2015; Scott 1998).

Governing the form new infrastructures take has traditionally been the role of the planning system that includes both giving consent for specific projects but also the more strategic spatial planning aimed at aligning policy at the regional and national level. Scholars are beginning to explore the role of such systems and practices in meeting the challenge of degrowth (Savini 2019), particularly the implication that it means less of some types of infrastructure and the repurposing of others (Durrant et al. 2024). Financialization raises further questions of how the ownership and allocation of returns from infrastructure relates to the governance of the economy more generally. Thus, in this respect, any analysis must also encompass both granting consent for specific infrastructures and also consider the level of wider spatial and economic policymaking in order to capture the mechanisms available to reconfigure such systems.

In the following sections of this article, we first analyze the degrowth perspective on democracy and the preference for deliberative democracy as an alternative to forms of representative politics where arguments for voluntary limits on resources and energy consumption are almost completely absent (Deriu 2012). We then take the planning and management of infrastructure, something intimately connected with the state (Scott 1998), as a lens through which to explore the implications of degrowth for democratic theory and practice. In doing so, we seek to examine the concept and move toward a broader definition of infrastructure. Reaching beyond defining infrastructure purely in terms of the physical object, taking in the web of economic, social, and ecological relationships that constitute the underlying structures of our existence¹ invites us to consider how they may be brought into the conversation. In the third section, we develop our argument that the infrastructural pathway is an important missing dimension in considerations of economic democracy both as an often unnoticed manifestation of underlying structures and as a potential generator of path dependencies. This raises the question of how deliberative democracy might be embedded within the existing democratic and technocratic structures through which infrastructure is usually planned and managed. This is located within the expansion degrowth envisages of the role of structures and practices like cooperatives and commoning that already introduce democratic ownership and management into economies. We conclude with a call for more attention to the deliberative pathway to infrastructural degrowth given it is an important route through which the tensions between the different tendencies and multiple relationships of infrastructure can be equitably negotiated.

Degrowth, Democracy, and Deliberation

Degrowth is a “coherent policy to reduce ecological impact, reduce inequality, and improve well-being” (Hickel 2021: 1108). It is the most explicitly critical of capitalism among a whole host of associated terms from post-growth through to the agnosticism toward growth (A-growth) of approaches such as Kate Raworth’s “Doughnut Economics.” The latter being somewhat easier for urban policymakers to embrace. Its proponents are at pains to emphasize that degrowth is a planned adjustment rather than a recession, and something that, if executed correctly, need not imply any hardship. A critique of contemporary forms of technological development and in particular large-scale technological systems and infrastructures is a key theme within the degrowth literature (see Cattaneo et al. 2012 for a fuller discussion). Degrowth has constructed its own particular technological form of the “local trap” (Russell 2019) cited by Bernd Bonfert in this issue. Foundational authors such as Ivan Illich (1973) create a starting point from which anything other than small-scale collectively managed infrastructures are problematized as inherently technocratic (and, thus, undemocratic). The well-worn distinction between democratic and authoritarian infrastructures drawn by writers such as Lewis Mumford and Langdon Winner is also given new life, rolled up within this contemporary critique of the pursuit of economic growth (Schmelzer et al. 2022). Alongside the urgency injected into these arguments by a looming ecological crisis, there is the added weight given by an increasingly robust empirical critique of claims that policies that pursue growth are anything other than obstacles in the path toward low-carbon and significantly less resource-intensive economies (Hickel and Kallis 2020). The lack of evidence of any decoupling of GDP from resource consumption and sufficient and sufficiently rapid decoupling from greenhouse gas emissions (Parrique et al. 2019; Vadén et al. 2020) supports calls for voluntary and planned reduction of economic activity in the Global North on a hitherto unseen scale (Hickel 2019).

Notwithstanding the relevance of policies intended to foster and maintain GDP growth to the planning and management of infrastructure (as we discuss in more detail below, the two are often intimately connected), such a narrow interpretation of degrowth would obscure the broader democratic content of the project (Ott 2012). Degrowth scholars tend to envisage a deeper (in the sense of both a greater engagement with the issues and a transfer of power) form of economic democracy than the more corporatist, workers as shareholders and board members in the mainstream use of the term to describe practices within firms operating

in a capitalist economy (Johanisova and Wolf 2012). The cooperative is frequently cited as a preferred model for the delivery of goods and services from food to housing (Demaria et al. 2019; Kallis and March 2015; Savini 2019). While there is nothing inherently small-scale in the cooperative model (given its capacity to function at a larger scale through federal structures [Savini 2019]), it is claimed to be less vulnerable to a narrow focus on maximizing returns and thus more suited to a degrowth economy (Johanisova and Wolf 2012). Combined with other threads of the degrowth movement, such as the skepticism of large-scale socio-technical infrastructures, bottom-up activism and the emphasis, alongside cooperatives, on commoning and locally owned social enterprise (Deriu 2012; Johanisova and Wolf 2012), degrowth suggests a movement more comfortable engaging with this scale.

Deliberation and Democracy

Although the tectonic shifts toward deliberative democracy envisaged by activists may not have materialized, advocates have certainly witnessed a “deliberative wave” (OECD 2020) swelling the practical application of the theory. This reflects a striking growth in commitment to deliberative methods on the part of both those in government and those seeking to shift governance. For example, citizens’ assemblies have been widely used at the national, regional, and local levels by government agencies, with notable recent examples including Ireland’s deliberation on abortion and the British Columbia deliberation on electoral reform, and with an increasing focus on climate change in particular (King and Wilson 2022). Certain nations, including Belgium and Poland, are sufficiently committed to citizens’ assemblies that they have incorporated them formally and (it seems) permanently into policymaking (Macq and Jacquet 2021).

Supporters of deliberative democracy tend to emphasize the capacity for its methods to promote deeper consideration of issues by participants than generally occurs when issues are the subject of classical methods such as referenda when carried out without a planned deliberative element. The central proposition is that the typical participant arrives at a more informed position on the issues (Cooke 2006). Alongside this claim is a less well supported argument that deliberative methods have a greater propensity to lead to (or toward) consensus. That is, points of difference are softened, rather than accentuated, through the process of contemplation and dialogue, or new, less polarized views form as part of the process.

In contrast with electoral systems, which prove quite resistant to modification, recent innovations in deliberative democracy such as mini

publics exhibit a certain “designability” (Kuyper and Wolkenstein 2019), they can be commissioned relatively quickly and can be calibrated to reflect the priorities of the time. Infrastructures often pose distinct spatial questions given their tendency to defy administrative geography, by having impacts over areas that are not co-extensive with jurisdictions. The malleable nature of mini publics may be seen as a strength when tackling such infrastructural questions – the catchment from which participants are recruited can be customized to suit the circumstances. However, the growing enthusiasm for mini publics is not yet matched by clarity concerning either their functioning alongside existing governmental systems, the setting of limits on what such processes might recommend, and whether those recommendations can be expected to be enacted (G. Smith 2021). There is growing empirical evidence that mini publics are already in use governing infrastructure systems and urban policy in locations as diverse as Australia, Canada, and Lebanon (Beauvais and Warren 2019; Niemeyer 2011; Shehabi et al. 2021) both in the planning phase in France (Marshall 2016) and in governing existing systems in the UK (Durrant and Cohen 2023). Yet a picture emerges of a somewhat ad hoc application that still leaves questions of how such mechanisms are embedded within the existing democratic architecture (Bussu et al. 2022).

As with degrowth, deliberative mini publics also face questions of scale. The larger the spatial area, the more difficult it is to convene a sample of participants that is large enough to be representative but also small enough to allow the process to run successfully – few assemblies have had more than 100 participants, for example. But this need not be a serious obstacle. For example, a mini public on climate change should, by rights, include participants representing all parts of the globe, and a reasonable attempt at this was made in the run up to COP 26 (Global Assembly 2023). Other examples of international or transnational deliberative exercises include World Wide Views on Climate Change (Bedsted and Klüver 2009) and the success of the Northern Ireland peace process, which can be partly attributed to the establishment of meaningful cross-border deliberative mechanisms (Bohman 2012). Thus, the challenges of major physical infrastructure, where new transport corridors, power grids or waste and water networks cut across political boundaries or affect the lives of publics spread over a large area ought not to be insurmountable.

The Qualities of Infrastructure

The term *infrastructure* is highly plastic, encompassing a vast array of functions and spatial arrangements. Yet, as a concept, *infrastructure* has come

to form and organize a whole set of relationships and practices. Crucially, expectations about the way it underpins the functioning of the economy have come to dominate (Carse 2016). The power, transport, water, and information systems the term is generally used to describe remain invisible (or unnoticed) until their functioning ceases to meet expectations (Star 1998). At this point, and in the construction, siting and expansion of physical infrastructure, the politics break through and attain a degree of visibility (Griggs and Howarth 2013). Thus, it is through the connections to wider political projects and the relationships and expectations bound up within the term, that we need to consider infrastructure in relation to the democratic (and we would argue deliberative) governance of the economy. The plasticity of the concept requires, if not a full-fledged definition, then at least an attempt to get beyond the physical artifact. Defining key relationships within the concept that connect it to economic governance and growth allows us to explore how deliberative democracy may act as a vehicle, both for challenging the dominance of some relationships and helping with the interrelated task of bringing suppressed or ignored voices into deliberation over infrastructure. The powerful influence of mainstream economics over policymaking has, to some extent, been challenged by those that have sought to engage with a wider political economy. Were we only to consider infrastructure as public goods or private revenue streams it may be sufficient to stop there. For some, a shift back toward public ownership offers a window of hope, yet history would suggest caution in assuming the state is automatically a guarantor of the type of restraint degrowth calls for. More significant, to narrow discussion of infrastructure purely to one of public versus private ownership would risk an incomplete account of the full set of human and nonhuman relationships the term encompasses.

The Economic Relationships within Infrastructure

The increasing complexity of infrastructure networks under the current wave of globalization saw Adam Smith's idea of "public works" (1776: 560) – commercial infrastructure funded through tolls on commercial activities – give way to a greater acceptance of the role of the state than that of regulation (through designing and managing tolling infrastructure). Modern welfare states, often in response to the demands of a newly enfranchised populace, enveloped the foundational economy (Bonfert in this issue), expanding the concept of infrastructure beyond commercial and military functions taking in health and education. At the same time, the state flowed into infrastructural relationships. Often, it was because of the booms and busts associated with capitalist production of

infrastructure, such as railways, but also because the monopolistic tendencies of the new networked technologies demanded state regulation and ownership to “overcome collective action problems” (Whiteside and McBride in this issue) such as the extraordinary inefficiency and blighting of the public realm generated if multiple (for example, electricity) providers were to be allowed to compete for consumers (Hughes 1983). Furthermore, the way infrastructures manifest some of the qualities of a public good, being non-rivalrous (albeit within a certain range – see the discussion of the work of Brett Frischmann below) and generating positive externalities, provides a justification for public investment.

The position of the modern state as the default funder and manager of infrastructure reached its zenith under the postwar Keynesian consensus, at least in democracies of the Global North. A period characterized by far greater ownership through state-owned enterprises and the integration of the social infrastructure of the foundational economy (Bonfert in this issue; Whiteside and McBride in this issue). The “splintering” of this consensus, privatization and the retrofitting of financial infrastructures to state-led systems is something bemoaned to a greater or lesser extent by the considerable body of academic literature influenced by the work of Stephan Graham and Simon Marvin (2001). With the pendulum appearing in some instances to be swinging back toward the public provision of infrastructure, now appears to be an apposite moment to raise questions of the extent to which it can be assumed that the state is immune from capture by “growth machines” (Kirkpatrick and Smith 2011) and able to deliver infrastructures that neither rest upon nor validate assumptions of perpetual growth. Yet infrastructure has always exhibited something of a hybrid public/private character given the other economic relationships embedded within it. The nature of the goods provided, such as public health or education, mobility or clean water, is such that universal access is something that is desirable, that citizens have increasingly demanded, and that governments, both democratic and autocratic, have been willing to provide. Also, the economies of scale and the extent of the capital required for such public infrastructures make the state the only realistic funder in many cases (Perry 2000).

Within the economic relations that are embedded within infrastructure, assumptions about its role in generating a certain form of growth are not hard to find. New infrastructure is generally associated with new activity. It can simply replace old infrastructure like for like, but this rarely happens. Instead, the possibility of including innovations and additional features proves hard to resist and easier to finance. This may take the form of technologies offering novel types of treatment as part of a new hospital; a more mundane example is that an old road is replaced

with one that can accommodate more movement at a higher speed. Thus, there still exists the pervasive relationship between infrastructure and growth (of activity). In all but the most extreme cases of corruption, infrastructure construction will have multiplier effects within local and national economies and, in the simple calculus of supply and demand, new infrastructure almost invariably reduces the cost (of the service offered), leading to an increase in demand. In this respect though, important questions remain as to whether simply lowering costs is sufficient to drive the sort of transition in infrastructural systems necessary for a low-carbon economy where rates of profit rather than cost remain the key driver of capital investment (Christophers 2021).

When speaking of physical infrastructure, there is in fact a long history among policymakers and others of associating its expansion with economic growth (Tomaney and Marques 2013). One notable example is the HS2 rail scheme in the UK, at times explicitly described as an “engine for growth” (Department for Transport and HS2Ltd. 2013). Despite this, the reality of the relationship between infrastructure expansion and growth is, in fact, complex, contested, and not always positive (Ansar et al. 2016). In the case of transport, extensive research has produced powerful counter-arguments. One example of this from the UK was SACTRA’s report on Transport and the Economy (1994), which went on to inform further targeted investigations and, perhaps more important, led to substantive changes to the guidance on appraising transport projects. One of its most potent arguments came to be known as the “two-way road”: just as a new or faster link can bring economic activity into a relatively deprived area, it can also extract activity by exposing the area to cheaper competitors who were previously excluded. In other words, infrastructure change can lead to both decline and growth, depending on the circumstances. But the political need for economic growth to result from infrastructure expansion persists. London’s recently opened Crossrail provides an interesting example of evidence-backed policy, with agglomeration benefits in effect “discovered” in the effort to develop a sufficiently positive business case for the scheme (Graham 2007).

The Moral Economy of Infrastructure

Given that the considerable technical component of infrastructural decision-making requires significant technical expertise, it is easy to see how it has become the domain of the technocrat. And technocrats will tend to turn to technocratic decision-support tools, which helps to explain the dominant role of quantitative and unemotional methods such as cost-benefit analysis, with its roots in utilitarian philosophy, and its apparent

avoidance of subjectivity. This tendency has to be set against the growth in public participation in planning at all scales that has introduced the principle that citizens must be present and informed about decisions even if most practices stop short of full citizen control (Arnstein 1969).

It often appears that the distinct spatial qualities of the politics of infrastructure and the issues they generate stubbornly resist confinement within the administrative boundaries that characterize the representative politics through which political decisions are legitimated (Marres 2007; Rozema et al. 2015). Infrastructural networks rarely align neatly with the boundaries of local government, one important level for the democratic participation in planning, with larger projects also planned and justified at the national and transnational scale. The impact of construction, however, is often highly localized, allowing objectors to be dismissed as not in my backyard (NIMBYs) (Burningham 2000; Devine-Wright 2013), a reflection of the utilitarian, aggregated benefits often ascribed to infrastructure. In a similar way, outages and breakdowns are often localized and individualized and only emerge as political issues when they are both regular and affect groups with sufficient political resources to demand a resolution to failing infrastructures.

In the Global North, it could be justified to view the situation purely through the lens of local political opposition to bearing the burdens of infrastructure that may or may not deliver generalized benefits. This would still ignore the moral framing of the economic growth it is assumed to deliver in contemporary political discourses (Durrant et al. 2024). It is however, in the Global South where the moral economy of infrastructure comes into clearer focus. This reveals the paradoxes inherent within the relationships infrastructures reflect as they, on the one hand, deliver universal services, such as clean water or reliable energy, that too many living in the Global South lack. Meanwhile they, on the other hand, drive the (in many cases, over-)consumption of resources (Coutard and Florentin 2022). When the full reach of these relationships and logistical networks they generate is taken into account, the role of infrastructures in facilitating extractivism in the Global South and over-consumption in the Global North becomes more apparent (Guarneros-Meza 2022). Indeed, it is one of the tenets of neoliberal conceptions of modernity that such relationships are impossible to disentangle. In the Global South the injustice of the under-provision of basic infrastructure is more apparent than in the Global North with its relatively well-developed infrastructural systems. Yet even here, configuring of infrastructures to align with the narrow demands of finance is often in direct conflict with the general social benefits many of these systems were originally conceived (and are often still widely expected) to deliver (O'Neill 2013).

Nonhuman Relationships

There is a further conceit in assuming humans are the only creatures that create structures that shape their own world and the worlds around them. Thus, within conventional discourses most attention tends to focus upon the impact the construction of infrastructure has on the natural world. Well-established tools and techniques, such as Environmental Impact Assessment, applied with varying degrees of integrity and success, create a sense among humans that these relationships can be managed. In a similar vein, humans have more recently sought to apply an infrastructural framing to the nonhuman world through concepts such as ecosystems services. While it is beyond the scope of this article to analyze the value of such tools and concepts, we would certainly not wish to dismiss mechanisms for moderating the more destructive elements of human/nonhuman relationships. It is, however, important to reiterate the human-centric nature of such measures. Yet still more important is the need to draw attention to the rarely acknowledged fact of the tragic nature of decisions that bring the needs of our own species into conflict with, sometimes with the very existence of, other forms of life.

What is also rarely acknowledged in discussions over the governance of infrastructure is the multitude of ways in which nonhumans use and inhabit the physical infrastructures we create, some benign and some destructive. Following Bruno Latour (1993), we must clarify that any attempt to reconfigure the relationships embedded within infrastructure in order to restrain the more destructive manifestations of human dominance needs to accept the full plurality of those relationships. Moreover, this calls for the development of new tools and techniques or the modification of existing ones to achieve this.

Infrastructure and Path Dependency

The final set of relations embedded within infrastructure are with the futures toward which inherent path dependencies (particularly those shaped by the capitalist economic relationships that govern infrastructure) lead. First, there is the problem of the way infrastructures and the spatial patterns they enable—for example, fossil-fueled energy systems or suburban or distributed settlement patterns—lock societies in to high-carbon lifestyles (Unruh 2000). These can be politically difficult to challenge with the related problem of the capital, value (both monetary and social) and resources that are “sunk” into these existing infrastructure systems. One only has to witness the extent of political opposition generated by relatively minor changes to local road networks in the form

of Low Traffic Neighborhoods (certainly in comparison with the scale of change envisaged by degrowth arguments) to appreciate the political challenges created by such path dependencies (Hickman 2021).

Yet to persist with business as usual given the lack of evidence of either sufficient decoupling of environmental damage from economic growth or of a viable technological pathway risks courting disaster. The resource implications of continuing to invest in certain infrastructural systems in an era of carbon budgeting should certainly not be underestimated (Krausmann et al. 2020). This is primarily because carbon emitted by one sector is carbon that cannot then be emitted by another sector, one of which may ultimately have a stronger claim to fostering both energy transition and wider social value. The temporal mismatch between infrastructure decision-making and representative politics again becomes problematic but for different reasons. The durations of the planning, production, and lifespans of many forms of infrastructure are such that decisions must be made a long time in advance. Decisions are also potentially binding on future generations, locking them into both particular forms of infrastructure and, through their financialization, repayment of the debts incurred in their production.

From such a perspective, it would be easy to surmise that the political and practical challenges created by path dependencies constitute an almost insurmountable hurdle to any reduction in economic activity. Yet we would argue against such a pessimistic reading of the evidence. Certainly from a technological perspective, the notion of path dependency is far less deterministic than the term implies when analyzed historically, with multiple infrastructural pathways adopted and then abandoned (Moss 2020). One tentative step toward the necessary “loosening of neoliberal trade agreements” (Whiteside and McBride in this issue) may be the recent slew of EU member states leaving the Energy Charter Treaty out of dissatisfaction with the European Commission’s inability to end the protection it offers to investors in fossil-fueled energy infrastructure (Mathieson and Aarup 2022). A development that suggests that the structures that support the financialization of infrastructure are not impossible to overcome where the political will to do so exists. The fact that it is national governments acting in this instance raises the question of where deliberative mechanisms sit within the structures of democracy.

One answer is that deliberative democracy may function as an alternative to financial mechanisms to counter the short-termism of representative politics (G. Smith 2021). Deeper democratic participation in the economy would appear to offer the opportunity to develop forms of economic activity that reach a wider range of needs as well as a means of bringing normally adversarial economic interests into dialogue with

each other (Thorpe 2020). A greater role for deliberation may begin to acknowledge the value of deliberative traditions among cultures that have historically been marginalized or made the victims of the extractivist tendencies within current economic practices (Reedy et al. 2020). Indeed, it may even open up the potential for “dialogue” with nonhumans (Houston et al. 2018) that have arguably also been violently and unwillingly enrolled into the economy (Moore 2015).

While balancing out tendencies toward the short-term interests of a few may be one function of deliberative democracy, assuming a wholesale rejection of representative politics in its favor places a considerable burden upon the mechanism, even within the relatively narrow politics of infrastructure. Yet the tendency of this sort of politics to defy such attempts to contain it (Rozema et al. 2015) suggests instances of deliberation around the localized issues that infrastructure generates could be viewed as part of something greater, potentially forming part of a larger deliberative system around the direction and costs of economic activity as a whole (Vlahos 2022). In looking beyond the technocratic tendency to contain this form of politics within either structured mini publics or allegations of NIMBYism, there is a pathway to seeing this localized disquiet, particularly around the construction of new infrastructures, as a more fundamental critique.

If the path dependencies of infrastructure are to be overcome by a politics that is able to legitimize decisions to shift direction and abandon sectors of the economy such as coal, oil, or gas production, which still represent considerable interest of both labor and capital; if established property rights such as those that protect investors are to be redefined, nation-states acting unilaterally or as a group may be one solution. Public ownership has in some cases provided a means of removing declining sectors from the market economy while maintaining the societal benefits they offer (Whiteside and McBride in this issue). The question remains whether a democratic economy can take the next step of actually shutting down industries based on fossil fuel-based. On a smaller scale, when for example, the state has to redefine the property rights of householders to mandate forms of domestic heating or insulation, or perceived rights like the use of the private car, then the full range of democratic mechanisms will be required to legitimate what will often be perceived and framed as an antidemocratic overreaching of state power. The evidence that the existing democratic toolbox may be inadequate in this respect may well create an opening for deliberative mechanisms but important questions still remain as to how they are embedded within the temporalities, spaces, and practices of the current system (Bussu et al. 2022).

The risks generated by path dependencies within economic and political institutions are real but no more insurmountable than the path dependencies of physical infrastructure. Abandoning canals, waterwheels, and coal for heating in major urban centers all incurred costs, generated winners and losers and left legacies on our built environment that are still with us, but they were not impossible. These were not preordained by the technology but involved, drove, and were shaped by shifts in social, political, regulatory, and economic infrastructural systems and the local and global ecologies that sustain them. Clearly these infrastructural shifts took place in the context of far lower levels of democratic participation in society and the economy and at a timescale that at least allowed shifts in capital to do much of the work of forcing change in power or transport systems. The case of coal was different as urban politics intervened more directly through regulating this energy system out of existence. Those that are critical of the more overtly revolutionary strands within the degrowth movement (Ott 2012) miss the inherently revolutionary nature of the shifts in our economy and the infrastructural systems that underpin it that are required if we are to remain even close to international agreements to limit climate change to tolerable levels.

Infrastructure as the Missing Dimension of Democratic Economic Governance

Degrowth as a means of averting ecological breakdown injects an urgency to the need to tease apart the relationships embedded within infrastructure. It is vital to challenge assumptions that the only infrastructural pathway available leads toward economic growth, as defined by those with most to gain from its current form. And to show well-being, human and ecological flourishing are equally achievable. This makes the planning and governance of infrastructure crucial to the democratic governance of the economy. We have observed above that physical infrastructure tends to cut across and overflow administrative geographies because of its distinctive “footprint.” This renders involving different publics in the decision-making process challenging but not insurmountable through mini publics designed to work across administrative boundaries. Yet, there is a further, more granular and context-specific set of decisions required, for example, how the balance between different human and nonhuman groups, and the materiality, legacies and potential of infrastructures are negotiated. There is a clear direction of travel away from fossil fuels and resource-intensive forms of infrastructure. What is best selected from the palate of forms and functions encompassed by the term is highly context

specific. Thus, we argue in the following section that it is not only the governance and scale of infrastructures and the nature of the publics they generate but also the balance between the services they provide, resources they consume and the path dependencies they create in doing so that makes them a crucial missing element of economic governance.

The previously mentioned strands within the degrowth literature point toward a role for deliberation in the management of the economy, for example, through cooperatives. We have no reason to dispute claims that democratically organized enterprises ought to align better with a planned reduction of economic activity (Johanisova and Wolf 2012). Yet as Robin Jervis and Neil Harris (in this volume) point out the transformative promise of cooperatives has struggled to break out of the “islands within the capitalist economy” they form. As with trade unions, cooperatives bring in many progressive agendas such as the collective voice of labor in relation to capital, yet, as organizations, they are ultimately bound to act in the interests of their (human) members. In a similar vein, the re-municipalization of infrastructure can in some instances still be seen through the lens of anthropocentric conflicts between public and private models of ownership and management, technocracy, and popular democracy (Popartan et al. 2020). Yet in other circumstances it appears that ecological relationships are addressed more directly in the process of re-municipalization of urban infrastructures, particularly when utilities are viewed as “urban commons” (Becker et al. 2017).

Indeed, the concept of commoning points toward another important angle on the democratic management of resources that flow into economies, based on the work of Elinor Ostrom. Here the links between governance mechanisms, deliberation and voluntary restraint become much clearer and they can be viewed as components within favorable pathways to degrowth (Jakob and Edenhofer 2015; Keyßer and Lenzen 2021) as negotiating equitable access to scarce common pool resources requires forms of deliberation. In one argument for applying such management strategies to infrastructure, Brett Frischmann (2005) uses his own unique definition of the term “non-rivalrous.” This defines the way infrastructure permits the consumption of resources and the production of positive externalities as non-rivalrous within a certain range. This is the range at which a renewable resource is not depleted or a network does not suffer congestion caused by additional users, for example, when transport or energy networks are used outside of peak hours. Through his demand-side theory, Frischmann constructs an argument for commons management of infrastructures in order to maximize the production of social value. While not explicitly a degrowth argument, his work has influenced recent calls for a more “sober internet” managed under these

principles (Pansera et al. 2023). Thus, commoning is a key component in the management of the economy in order to maximize social value, something that must ultimately be defined through deliberation (Jakob and Edenhofer 2015).

An example of another deliberative approach to the financing of infrastructure is participatory budgeting (PB), which, in its most radical forms, has enabled citizens to direct public money toward infrastructure investment considered pressing, such as water and sewage works and housing improvements (Chavez 2008). And, where this has happened, a bridge can be seen to have been created between the technocratic decision-making processes commonly associated with infrastructure and the wishes of local communities. The medium of finance appears critical to this, as it forms the common ground between the two constituencies: both can speak the language of money, which can transcend the possible impasse created when technocrats prefer using terms that may exclude citizens. This most radical form of PB has, however, proved elusive (Goldfrank 2007), with most PB instead involving the distribution of small sums at the margins of more conventional policymaking.

As with commoning, a role for deliberation is certainly implied by an emphasis on cooperatives as widespread communicative participation by workers is central to how this type of organization is governed. Yet the assumption of a natural or easy deliberative pathway to degrowth more recently reflected in the demands of the activist organization Extinction Rebellion for citizens' assemblies on climate change (Extinction Rebellion 2023) reveals a number of tensions when explored in depth. The problem of scale discussed above is one. While we argue that the design of mini publics helps to resolve this, there are still questions of how they expand existing mechanisms for participatory planning and governing infrastructure, and ultimately shift existing concentrations of power into the wider economy. Next, there is the question of the extent to which the more radical interpretations of degrowth represent a departure from the complex structures of the current liberal political order with its protections of diversity, cosmopolitanism, individualism, and at least some form of technological development. This is important because the energy and resource costs of maintaining this complexity need to be acknowledged as they potentially limit the resources left to be allocated through any political process, deliberative or otherwise (Kish and Quilley 2017). Then there is the extent to which any radical departure can really escape the path dependencies generated by the big political macroeconomic issues such as taxation, immigration, and funding for health, social security and pensions as well as infrastructure funding (Ott 2012). This raises questions of the capacity of deliberative mechanisms to

legitimize on their own such radical shifts, more because of the enormity of those shifts than any inherent weakness in deliberative democracy as a mechanism.

One starting point is the consenting role in planning new infrastructure and questions concerning specific projects or programs. The impasse experienced in the UK concerning onshore wind farms seems a good case, given the seemingly irreconcilable tension between the need for renewable energy and the desire of people to retain the landscape they cherish. A citizens' assembly would not be guaranteed to overcome the stalemate, but it may enable a rapprochement between the two positions. Could deliberative democracy assist with bigger questions concerning the governance of infrastructure? The designability of such mini publics suggests they also have a role in spatial planning. Mechanisms such as commoning look like productive avenues to explore both the uses of resources and the allocation of infrastructural "goods." Cooperatives may, in certain circumstances, address questions of ownership and participatory budgeting the allocation of funds. It may well be that, via spatial planning, deliberation can develop the strategic frameworks to move beyond the local trap and ensure such prefigurative solutions fit within a wider framework. Nevertheless, big questions still remain. Could any deliberative process allow states to restrict and even phase out infrastructure associated with major emissions or excessive resource use? While there are growing mechanisms for bringing future generations into deliberation (Smith 2021), the question of how to bring in nonhumans remains an open one. What is, however, clear is that it will not be resolved if the plurality of relationships within contemporary infrastructures is ignored.

Conclusion

The assumption that it is impossible to overcome expectations of an economy that delivers increasing standards of living conceived purely in terms of increasing opportunities for consumption frames potentially catastrophic path dependencies. Yet it remains woefully untested. Where there is any evidence, it is that perceptions of the value of growth are neither universal nor monolithic (Drews and van den Bergh 2016). In addition to testing such assumptions in abstract terms at the level of the economy, deliberative forums also offer more concrete testing of the assumption that citizens are unwilling to accept measures to manage demand (Durrant and Cohen 2023). Clearly any governance space created around the politics of infrastructure cannot achieve the necessary scale

of societal change alone and is dependent upon relationships and connections to other parts of the democratic system. Democratic practices and management structures, such as cooperatives or communing, already function within economies and offer alternative pathways such as commons/public partnership in the management of infrastructure (Milburn and Russell 2019) or even transition from private to cooperative ownership of corporations (Karatani 2014). Furthermore, the evidence from the growing body of literature and empirical examples of how deliberation functions in practice demonstrates, publics are often more flexible and open to change than policymakers believe. In many cases groups of citizens have shown themselves more advanced than what can often be the ossified, polarized discourses that play out both in representative politics and in the public realm of mainstream and social media in which it operates.

We conclude with the point that decisions concerning infrastructure are complex. The role of some of our infrastructural systems, at first propelling us into a crisis through the pursuit of growth, must be acknowledged but cannot ignore their potential in guiding us out of the crisis they have helped to create, through a just transition to a low-carbon, low-resource consumption economy. Simplistic binaries between local and global, public or private, technocracy or democracy, capital or labor, nature or society, dangerous path dependencies or effective socio-technical transitions clearly shape the contours of any deliberation that must still somehow reach workable solutions in the spaces between these poles. These include tactical decisions about when to challenge the dominant economic relationships that govern infrastructure and thus the economy directly and when to simply grow the spaces and reach of the forms of economic activity that evade their grasp. Such solutions must also balance the different levels of legitimacy, accountability, legal weight, and even in some circumstances acquisition and enforcement capacity of the state legitimated via different parts of our democratic system. From this perspective, a deliberative pathway to infrastructural degrowth may appear as one component of a bigger picture. However, the ability to bring ethical human and nonhuman relationships into conversation, to challenge assumptions of path dependence and the domination of some economic relationships over others make it a vital component that ought not to be overlooked.

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► NOTES

1. We note that the Latin prefix “infra” means *below*, *underneath* and *beneath*, and even *within*. Thus, infrastructure can be seen as that which permeates a given system.

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