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Future conditional: from Just Transition to radical transformation?

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Abstract

Within the context of an accelerating climate emergency, the introduction frames the strategies and actions adopted by labour and unions to reduce carbon emissions that are presented in the articles contributing to this special issue. Industrial relations scholarship, which has been slow to address the climate emergency, has focussed on the jobs versus environment dilemma, the role of unions, technical innovation versus social unionism, and just transition approaches. Whilst labour and union approaches in different sectors across Europe are largely confined to variants of ecological modernisation, a more proactive transformative strategy opening up an alternative eco-socialist vision for the future is emerging. The issue highlights the contradictions in union strategies, the drivers of change, and the way forward in pursuance of a green economy through a focus on the roles of government and the public sector, the organisation of labour and the labour process, and education and training.

Key words: ecological modernisation, just transition, union strategies, global warming, social transformation, labour process

Introduction: where this special issue stems from

This special issue presents different strategies adopted by workers and their unions across Europe to combat climate change and to address the challenges of a just transition to a zero-carbon economy. In doing so, the intention is to pinpoint the drivers of change, contradictions in approaches, and the way forward, through examples from particular industries at European, national and local levels. As well as providing a valuable source for academic researchers, the issue seeks to contribute to the debate on ‘just transition’ and to make labour-climate strategies accessible and usable by labour unions throughout Europe and elsewhere. It builds on a twelve year-long international research programme, *Adapting Canadian Work and Workplaces (ACW)*ⁱ, which aims to explore the role of work and global warming and the role of organised workers as a force for adaptation., addressing these questions:

- How best can diverse workplaces adapt work in order to mitigate greenhouse gases?
- In the present economic and social environment, what changes in law and policy, work design and business models for industry and services, would assist the ‘greening’ of workplaces and work?
- What can we learn from other countries to deepen our understanding of strategic options?

As part of this programme, special streams focussed on these questions were organised at the International Labour Process Conferences of 2016 and 2017, leading to the idea of this special issue.

Since that time, despite international efforts, the world has been warming more rapidly than expected. This is a major issue for all those concerned with industrial relations as work, worksites and production supply chains are major polluters. In the European Union (EU) approximately 80 per cent of all CO₂ emissions occur in the production process and roughly 85 per cent of these come from the top 15 polluting industries, which account for close to 12 per cent of total employment – or some 24 million workers (ILO, 2011). Work may be a prime polluter, but because unions remain the largest member organisations in civil society, the organisation of work is a promising staging point for reducing the greenhouse gases that fuel global warming. Bringing workers and unions and work itself

'in' to the struggle to slow global warming means rethinking the social relations of production and the labour process through a green lens, and adapting key steps in the chain of production to mitigate greenhouse gases. It entails reconsidering the legal, political and economic contexts that hinder or facilitate workplace low-carbon adaptation, bringing labour and environment law together, criticising work design and current business models for their carbon excesses, and rediscovering the influential roles that workers, their unions and professional associations can play in adapting and improving the labour process. And, finally, it means understanding the ways in which political economies and responses to climate change affect not only the labour process, but union goals, alliances, modes of action, organisation of young workers, political strength and strategic creativity.

However, labour movements have yet to address effectively the complex interdependence between work and the struggle to slow global warming. With important exceptions, the response in industrialised countries, has often been more defensive than proactive, focussing on the creation of green jobs and the destruction of jobs in carbon intensive industries, with little attention paid to the reduction of energy consumption, low-carbon adaptation of labour processes, vocational education and training (VET), emerging, union-led, climate literacy programmes and inter-union sharing of green collective bargaining clauses. As recently highlighted by Philip Alston (2019), the UN's Special Rapporteur on Extreme Poverty and Human Rights, although climate change has been on the human rights agenda for well over a decade, it remains 'a marginal concern for most actors' though representing an 'emergency without precedent', which requires 'bold and creative thinking from the human rights community, and a radically more robust, detailed, and coordinated approach' (2019: 1).

The physical and social impacts of climate change are already changing the availability of employment, what and where we produce, the vulnerability of particular groups, and the education and training needed. Responding to the impact of climate change requires deep changes in the labour process: how goods and services are produced and transported, what energy, materials and technology we use, what green knowledge and skills we need, how and for what purpose the built environment is constructed, and how workers and young people are educated. The geographical and spatial fragmentation of the production process across countries and global supply chains, widely lauded by neoliberal policy makers, has now emerged as a major carbon polluter and societal threat. Above all, the implications for migrants, for women, and for those from different ethnic groups need to be understood and acted on. This special issue is intended to contribute to this process of understanding and action.

Slow academic awareness

The academic field of industrial relations has been particularly slow to address the issue of climate change. A special session of the British Universities Industrial Relations Association (BUIRA) annual conference in 2014 presenting the work of ACW and Paul Hampton's (2015) pioneering thesis attracted less than a handful of academics, just as the participants in the special streams of the ILPC were largely confined to those already involved in the ACW programme. This situation is now rapidly changing, and there were in any case always important exceptions, most notably Nora Räthzel and David Uzzell (2013). Most recently, these authors, together with Dimitris Stevis (2018) edited a special issue of *Globalizations* on 'The labour-nature relationship' and the book *Just Transitions* (Morena et al., 2019) was published.

Particular themes and a subtle change in emphasis are evident from those industrial relations scholars specialising in climate change and work and in what Räthzel and Uzzell (2013) have termed 'environmental labour studies'. As well as the broad over-arching theme of the relation between labour and the environment, a particular theme is the role of unions as environmental actors, whether as social partners in Germany, in relation to health and safety issues, as green representative in the United Kingdom (UK), or in alliance with environmental groups like the Blue Green Alliance in the United States (US) (Snell and Fairbrother, 2010; Soder et al., 2018). It is a familiar theme from the Lucas aerospace experiment in the UK of the 1970s, when 13,000 workers were threatened with redundancies and sought to convert production from weapons to socially useful goods (Räthzel et al., 2010). Another theme is unions and innovation. Antonioli and Mazzanti's (2017) research, for

example, in which the European Trade Union Confederation (ETUC) was involved, shows that, whilst unionised firms are not necessarily associated with the adoption of environmental innovation, there is a positive relation between union involvement and the propensity to introduce environmental innovation, either through bargaining or disseminating information. On this question of innovation, a social response is required, as pleaded for by Snell (2011) in relation to phasing out coal power generation in Australia and unions focus rather on a technological fix through carbon capture storage innovations and other 'clean' coal uses. This theme relates therefore to the jobs versus environment dilemma, the conflict between unions' concern to protect jobs and making jobs more environmentally responsible, as recently expressed by Houeland et al (2020) in relation to Norwegian petroleum extraction and the contradictory climate change policies of the Norwegian Confederation of Trade Unions (LO).

Partly in an attempt at 'shattering the 'jobs versus environment frame' (Brecher et al., 2014: 42), another prominent theme has been different approaches by unions to climate change, the kind of transition envisaged and the proposal for a 'new deal', whether based on the market (e.g. carbon trading), local initiatives (e.g. renewable energy) or government led public investment. The preoccupation by a number of authors with the need for alternatives to defensive and market-based union strategies corresponds to Hyman's (2007) call for a new vision, and for unions to become subjects rather than objects of history. Hrynshyn and Ross (2011), for instance, elaborate on the contradictions of social unionism for Canadian autoworkers, who continue to preserve existing jobs rather than bargaining for a strategy of public investment in the production of ecologically sustainable vehicles. Galgóczi (2014), drawing from studies of the US, Canada and Greenland, echoes this pessimistic outlook, seeing no 'true paradigm change' yet visible and stressing the need for a 'just transition' strategy by unions to overcome an unsustainable production model and 'shape the restructuring process of the entire economy towards a resource efficient and low-carbon economy' (66-7). Finally, Felli (2014) identifies three union strategies - deliberative, collaborative growth, and socialist - and argues, with the example of the International Transport Federation (ITF), for an alternative socio-ecological strategy addressing the social relations of production at the heart of the climate crisis and overcoming 'business unionism', green capitalism and the concern of ecological modernisation only with value redistribution.

Pursuance of a just transition

These various themes addressed in the industrial relations literature - jobs versus the environment, technical innovation versus social unionism, and alternative strategies, including public investment, a just transition, a new deal and eco-socialism - mirror dichotomies faced by the labour movement and the unions themselves. One of the most prominent examples of a labour movement divided in terms of the job versus environment dilemma is the US, as illustrated by the pipeline from the Tar Sands in Canada, questioned as being in labour's interest by the Transport Workers Union and the Amalgamated Transit Union but on which the AFL-CIO took no position (Byrd and Widenor, 2011; Brecher, 2013). Jeremy Brecher, research and policy director of the Labor Network for Sustainability, which promotes ecologically sustainable policies, good jobs and a just transition, bemoans the absence of a coordinated and proactive response to climate change from organised labour in the US though this provides 'labor's greatest opportunity to reconstruct our economy' (Brecher and LNS, 2013: 75; Brecher, 2018).

A more coordinated response was evident in the struggle and success of the international trade union movement in inserting a 'just transition' clause into the COP (Conference of the Parties) of the UNPCCC held in 2010, which was subsequently significantly strengthened in the 2015 COP held in Paris at which targets to limit a temperature increase to 1.5 °C were agreed (Rosemberg, 2010; TUC, 2011, 2015). Raising a just transition and environmental justice to the top of the political agenda represented a historically significant moment and a tremendous victory for the national and international trade union movement. Following the Paris COP and the activation of 'just transition', the door was opened for a broader and more strategic role for labour and trade unions as well as for union-to-union climate bargaining and the establishment of joint union-employer environment committees. As evident in this special issue, the notion of 'just transition' itself has, however, been

variously interpreted, including how far it embraces worker agency and direct participation and to what extent the green transition vision is centred on transforming political and economic power structures (Stevis and Felli, 2015), with further myriad adaptations emerging in implementation on the ground (Morena, et al., 2019). The impact of labour engagement on the struggle to slow climate change is also bringing unions into new realms of influence, though this new-found clout varies from sector to sector and country to country.

Just Transition has become the 'framework developed by the union movement to encompass a range of social interventions needed to secure workers' rights and livelihoods when economies are shifting to sustainable production' (Galgóczy, 2020: 13; ETUC, 2016). As Galgóczy explains in this issue, the notion of Just Transition can be traced back to the 1960s in a dispute over uranium mining in Canada. Yet historians will be familiar with the even earlier 'Transition Debate' which followed the 1946 publication of Maurice Dobb's *Studies in the development of capitalism*, reviewed by Karl Polanyi (1948), debated by Paul Sweezy (1954) and Rodney Hilton (1976), and culminating in the 1980s in what had become the Brenner debate (Ashton and Philpin 1985). This post-war period was similarly one in which a major transformation of society was envisaged, and where the transition debate sought for lessons from the past as to how this might be accomplished. Above all, the debate concerned the 'prime mover' of capitalist development, whether class struggle, the role of the state, technological development, or trade and markets. In this respect, the earlier Transition debate, in focussing on the different roles of the same 'movers' as those addressed in the articles in this issue, continues to have relevance today.

The concept of transition from one epoch to another or, in the case of the transition debate, from a feudal to a capitalist mode of production and from one stage of capitalism to another, thus has historical significance. As Laurent (2020: 1) expresses in a recent publication on *Just Transition* by the Friedrich Ebert Stiftung and Social Europe:

And yet, the concept of transition is actually a very powerful tool to think about what we should be doing in the face of worsening ecological crisis—and to act upon it. Imagining a transition means having to answer three fundamental questions: why is the world we live in not desirable anymore, what world do we want and how to get from here to there?

The problem is, as Sharan Burrow, General Secretary of the ITUC, has put it:

The just transition will not happen by itself. It requires plans and policies. Workers and communities dependent on fossil fuels will not find alternative sources of income and revenue overnight. This is why transformation is not only about phasing out polluting sectors, it is also about new jobs, new industries, new skills, new investment and the opportunity to create a more equal and resilient economy. (Just Transition Centre, 2017)

Despite this acceptance of the problem, all too little attention has been paid by unions to issues of VET, skills and retraining for a green economy. Such neglect is perhaps explained in institutional terms, as elaborated in a report by the European Centre for the Development of Vocational Training (CEDEFOP, 2018: 11) on *Skills for Green Jobs*:

There tends to be a weak connection between organisations involved in national policy making on environmental topics and those involved in labour markets and skills policy, including skills anticipation. This parallels a generally weak connection between environmental and skills policies.

Much therefore depends on how a just transition is approached, what or who are the agents or drivers of change, and in what sense it is 'just'; unions may take opposing directions, whilst still striving for a 'just' transition. As a result, the notion has become multi-faceted and blurred, even attracting critics when it is aligned not so much with a transformation but rather a smooth transition, aided by technology and the market. As Frank Hoffer of Action, Collaboration, Transformation (ACT) recently wrote:

The narrative of ‘green growth’ and just transition is basically a variation of the Keynesian compromise of market-driven innovation combined with social-democratic industrial restructuring. It assumes that through technological progress plus government policies the circle can be squared: energy- and resource-saving innovation allow simultaneously improved material wellbeing, reduced resource utilisation and lower CO₂ emissions. We can enjoy continued growth in consumption —and still save the planet ... But there should be no illusion that a global economy based on permanent growth and powered by the pursuit of profit maximisation is environmentally sustainable. It is not. (2020: 38-9, 41)

The interpretation of just transition that Hoffer criticises echoes ‘official’ versions (e.g. ILO 2015), whereby the social dimension of just transition is reduced to calls for decent jobs and basic human and employment rights, side-lining questions of social justice and restricting the role that unions and labour might play to what is possible within the parameters of existing power relations. The ‘official’ view, in other words, accords with Stevis and Felli’s (2015) *shared solution* approach, which is aligned with green Keynesianism or with the Treadmill of Production, discussed by Tomassetti in this issue, whereby: ‘industrial relations institutions embrace the capitalistic illusion of ‘infinite growth on a finite planet’, which is at the root of the global environmental crisis’. However, as against this identification of Just Transition with green Keynesianism, a shift towards a more transformative agenda can be discerned in union approaches.

Growing awareness of need for transformative change

An important policy shift has occurred with the introduction of the European Green Deal, the first EU climate law, which provides for investment and sets targets for 2030 to reduce greenhouse gas emissions to at least 50% and towards 55% of 1990 levels (EU, 2019). The deal relates in particular to carbon pricing and border adjustment measures and to the enactment of a circular economy, whilst also acknowledging the needs for ‘proactive reskilling and upskilling’, enforcement of energy efficient standards, a ‘fair and inclusive’ Just Transition’ mechanism, and social dialogue ‘to anticipate and successfully manage change’ (EU, 2019: 16). The European Green New Deal contains, however, no specific recognition of the role of unions and the need for any change in the employment model or the labour process.

Galgóczy (2020) recently questioned how far unions are up to the challenge of a zero carbon economy by 2050 and able to act in the common interest as ‘social movement’ unions, given internal tensions concerning job losses in traditional sectors and their customary position as ‘business unions’ managing change driven by profit. Lundström (2018: 546), in an interesting article on the lack of a dialogue between the climate policy developments of unions at national level and the climate interests of members in relation to the greening of transport in Sweden, pinpoints the difficulties involved, as national unions:

... commonly do not challenge the overarching relations of production, nor do they provide new visions for the role of workers and unions in the economy. In other words, they promote a quite comfortable discourse, similar to the ‘technological fix’ arguments, and in line with the post-political logic of consensus reproduced by the discourses of ‘ecological modernization’. They may acknowledge the validity of climate concerns, but they do not challenge the social and economic relations that are causing climate change in the first place.

Such considerations have long been to the forefront of concerns of different trade union networks, including the global Trade Unions for Energy Democracy (TUED), the Labor Network for Sustainability (LNS) based in the US, and the Greener Jobs Alliance (GJA) in the UK. TUED membership embraces 77 trade union bodies, including four Global Union Federations, 3 regional organizations, and 10 national centres, as well as allied policy, academic and advocacy organizations. Sweeney and Treat (2018) from TUED have argued that a just transition is not possible without challenging ownership relations and ‘green growth’, expanding public ownership, participatory planning and economic democracy. The question remains how such a just transition can take place,

especially given its lack of priority for many unions, and what role social dialogue as opposed to social power might play in a transformational decarbonisation strategy (Petersen and Pearson, 2018). In the meantime, on the side of nature, transformation is already taking shape at great pace.

Future conditional and climate apartheid

From the newspaper media, it is apparent that ordinary communities have gone a long way in their thinking about climate change. Comparing just a decade ago, then and now: how easily people had made fun of climate change then, not yet frightened enough about the destruction, the fires, the flash floods and the health deaths; how hungrily they now scoop up any information about new disasters as the language of defensive caution is the natural way of communicating with the world. Climate apartheid, which is too new yet to grasp its dimensions, has just entered UN language (Alston, 2019). Climate apartheid is a threat multiplier.

Increasingly, climate change has become so destructive that it is breaking down health systems in long-established parts of the world (IOM, 2017). The new imbalance created will upset fragile health ecosystems as well. Wild destructive weather, particularly in Africa and Asia but increasingly in Australia, New Zealand and the South Pacific, is throwing millions out of home and community. The expelled are struggling to make their way to more stable regions like the EU. The interweaving of lack of water, flash floods, climate warming, lack of nutritious food, conflict and forced migration, makes climate change a threat multiplier. By 2050, between 50 and 200 million could be displaced. The UN also projects that by 2050, 2.5 billion people will move to cities, 90% of whom will be in Asia and Africa (UN, 2018). Faced with the threat multipliers, regions of the world like the EU and the UK have already found themselves faced with climate-derived pressures they are not prepared for, including climate refugees, floods and rising sea levels. These exclusions are not specific to Asia or Africa or the EU. In the US, small, long established communities of 'Native Americans' in the deep South, are beginning to be removed by government from the now drowning lands of their ancestors. They are referred to as the US' first 'climate refugees'. The state government in Louisiana hopes for 'climate resilience', but the logistical and moral dilemmas of the removals expose, in microcosm, a new category of displaced people. In this part of the US they remember the rising waters and helpless deaths of the Black communities of New Orleans. Where are the new laws needed to make climate resilience effective? In

It is only recently that we are learning that the chaos climate heating is creating all over the world is both directly and indirectly weakening human rights. Alston (2019) from the UN explains: 'Climate change will have the greatest impact on those living in poverty, but it also threatens democracy and human rights. The more that climate change pushes people into extreme poverty, the easier it is for the wealthy to feast off water, natural resources, and the land of the poor' (17). Climate change is indeed a threat that reproduces. Alston (2019: 17) continues: 'The risk of community discontent, of growing inequality, murderous racism and of even greater levels of deprivation among groups, may stimulate racist and xenophobic responses We risk a climate apartheid scenario.' Concluding his Report for the Human Rights Council in 2019, he looks further ahead and warns that the impact of climate apartheid is so destructive that 'Human rights might not survive the coming upheaval' (21).

Special issue – typologies and contribution

On the side of labour, therefore, there is considerable urgency to combat the climate emergency. Much of this special issue is devoted to how unions approach and wrestle with the challenge of transitioning from a carbon-intensive to a carbon-neutral green economy. It addresses above all the questions of how to conceptualise and frame the different issues, for which the authors offer an array of typologies, including:

- Treadmill of Production and Just Transition (Paolo Tomassetti)

- Just Transition: Shared and differentiated responsibility and transformative ambition (Béla Galgóczi)
- Opposition, hedging and support (Adrien Thomas and Nadja Doerflinger)
- Ecological modernisation and radical transformation (Linda Clarke and Melahat Sahin-Dikmen)
- Liberal Market Economies (LMEs) vs Coordinated Market Economies (CMEs) (Dean Stroud, Claire Evans and Martin Weinel)

These typologies refer to different aspects and problems. Tomassetti refers to the distinction between union allegiance to a model based on growth and one founded on a just transition, with examples from the Italian petrochemical and electronics industries. Galgóczi distinguishes approaches by unions to just transition, as applied in the coal and automobile sectors, drawing on Stevis and Felli's (2015) notions of responsibility and ambition and referring in particular to the roles of the state in Poland, France and Germany. Thomas and Doerflinger provide a variant of this, focussing directly on the opposing, hedging or supportive approaches of different unions to addressing climate change, this time in the Polish and French coal, steel and electronics sectors. Drawing on critiques of the capitalist growth-profit paradigm (e.g. Hampton, 2015; Foster, 2002; Barca and Leonardi, 2018), Clarke and Sahin-Dikmen distinguish between market-based, stronger and weaker variants of ecological modernisation and radical transformation approaches by unions in examples from the construction sectors of Denmark, Germany, Italy and UK (Scotland). Finally, Stroud et al. show the very different responses of workers in LMEs in contrast to CMEs to technological measures intended to improve energy efficiency, with the case of the steel industry in Germany, Norway and the UK. So, we have a wide range of approaches, themes, countries and sectors considered, as well as emphases placed on different aspects, whether the roles of labour and the unions, the state, technology or the market.

From the articles, it is apparent just how diverse union strategies are in relation to climate change in these different sectors, and even – as in the cases of construction and steel – within the same sector but between different countries. Indeed, Thomas and Doerflinger draw on Hyman's (2001) distinction between unions as market bargainers, partners in social integration, and mobilisers of class opposition. Broadly, strategies are more positive and *supportive* of measures addressing climate change in sectors critically important to the realisation of a green economy and thus anticipating employment gains, such as construction and electronics. In these industries, unions may embrace a transformative vision of society (Esping Anderson, 1990), though regard responsibility for the structural changes required to achieve this as either *differentiated* through social partner negotiation, along the lines of the European social model, or dependent on the socialisation of the means of production, so corresponding to the *social ecological* approach outlined by Stevis and Felli (2015). In industries subject to major change in order to reduce their carbon footprint and environmental impact, including the petrochemical, automotive and steel industries, strategies are more mixed, either assuming *differentiated* responsibility, or, according to Thomas and Doerflinger's typology, reliant on 'hedging'. In contrast, for sectors targeted for employment reduction, or phasing out, above all coal, unions, as in Poland, can simply oppose green transition measures or adopt an affirmative position and rely on a *shared solution* that does not alter the balance of power or relations between society and nature (Stevis and Felli, 2015).

Underlying different union strategies are of course the very different strengths and identities of unions in different countries. This is very clear in the cases of Germany and Poland, in particular in relation to the coal industry, as discussed by Galgóczi. Germany, with the highest greenhouse gas emissions in Europe in terms of tons of CO₂ equivalent (936m), will fall short of its 2020 emission reduction targets and is unlikely to reach its 2030 goals (Eurostat, 2019). Compared to the 330,000 people employed in renewables in Germany, the coal sector employs only about 20,000, two-thirds of whom will go into retirement by 2030, so that a just and well-planned phase out is possible without significant harmful effects for those currently working in the sector (Heilmann, 2018). Yet Germany is also, as discussed by Stroud et al. as well as Clarke and Sahin-Dikmen, a CME characterised by strong networks of social institutions, including employer associations and unions, embedded in the constitution and regulating economic action. Thus, though the country has a low level of unionisation, unions play a critical role. Indeed 80% of those in the coal sector are unionised, a far higher rate than for those in renewables, and the Industrial Union for Mining, Chemistry and Energy (IG BCE), with

650,000 members and representing 10% of the German Trade Union Confederation DGB (*Deutscher Gewerkschaftsbund*) members, argues for the continuity of the fossil regime (Prinz and Pegels, 2018). In Poland, with a similar level of greenhouse gas emissions (416m tons), overall union density, at 12%, is even lower, though the coal sector, which employs about 80,000, far more than in Germany, is 100% unionised.

Thomas and Doerflinger, who discuss the Polish coal unions' stance in depth, cast the attitude of NSZZ Solidarność as one of 'opposition', in that it entails a denial of human-induced climate change. According to their typology, the attitude of IG BCE might in contrast be closer to one of 'hedging', which is ascribed to unions seeking to minimise compliance costs, for which they give the example of steelworkers in IndustriAll Europe. Based on Stevis and Felli's (2015) distinctions, however, the *status quo* approach to just transition adopted by Polish trade unions, in particular NSZZ Solidarność, in its lack of any *transformative* ambition to alter the balance of power, could be associated with a *shared solution*. In contrast, the IG BCE approach might be closer to one of *differentiated responsibility*, whereby some transformation of jobs and transfer of workers is accepted, subject to negotiation with unions, and more responsibility is required of the state towards workers put at risk. The German construction union's (IG BAU) stance, as recounted by Clarke and Sahin-Dikmen and which they ascribe to a version of weak ecological modernisation, might also be regarded as one of *differentiated responsibility* to climate change, though representing an industry set for employment growth rather than reduction but with low levels of construction union membership in contrast to coal.

Thomas and Doerflinger contrast a 'hedging' attitude with the 'supportive' attitude shown towards decarbonisation policies by EPSU and IndustriAll Europe in relation to the energy sector and the signing of a joint 'Just Energy Transition Statement' with Eurelectric. Electricity is, of course, like construction, an industry set for an expansion in employment. Clarke and Sahin-Dikmen's example of the Danish union 3F, presented as a strong version of *ecological modernisation*, might also be described as falling into this 'supportive' category, which again corresponds with high union membership as 80-90% of the construction workforce in Denmark belongs to a union. Similarly, Paolo Tomassetti provides a strong version of *ecological modernisation* in the 'supportive' and cooperative union approach in the energy company Enel, where union membership is relatively high (57%). Does this imply that, when membership is high in sectors benefitting from a green transition, unions are likely to be 'supportive' and to adopt strong versions of *ecological modernisation* or *differentiated responsibility*, whilst in sectors being wound down they will be in 'opposition' or 'hedging', adopting weak versions of *ecological modernisation* or *differentiated responsibility*, depending on the role of the state?

Much does depend on the role of the state, including the local state. Thus, in Poland, the highly unionised coal sector discussed in the articles by Galgóczi and Thomas and Doerflinger is largely state-controlled, whilst in Germany unions, including IG BCE and IG BAU, are embedded in the constitutional structure and pivotal to a CME. The article by Stroud et al. shows how the deployment of a new technology, digital gamification, aimed at mitigating climate change in the steel industry, will differ depending on whether this is in the context of a CME, in this case Norway and Germany, or LME, in this case UK. This well illustrates the role of technology and environmental innovation, not as inevitable 'mover' or 'behaviour modifier', but as relative to the industrial relations context.

Beyond *ecological modernisation* or *differentiated responsibility*, we are given insights into what a *transformative eco-socialist* union approach might look like, with Clarke and Sahin-Dikmen's example from the construction union FILLEA-CGIL in Italy, with their stance against building for building's sake and against concrete construction. The example they give of union involvement in City Building Glasgow can also be regarded as *transformative*, certainly in the context of the construction industry where it provides a radical alternative green employment and training model, supported by the Scottish government. Indeed, both these cases, as well as that of Enel, are examples where unions have also been involved in VET initiatives, though, unlike employment or the number of jobs, this is an issue less prominently on unions' agendas despite its critical importance to a just transition. These examples therefore illustrate the potential of labour and the unions as 'movers' in the green and just transition together with the support of the state.

Any one particular strategy is not necessarily unique to a particular union, especially as unions themselves are also less and less sector-specific, as evident from those referred to in the various articles, including 3F in Denmark, Unite in UK, CSIL, UIL and CGIL in Italy, CFDT, FO and CGT in France, and NSZZ Solidarność in Poland, as well as the European federation IndustriAll Europe. Indeed, it is only in Germany that the unions referred to – IG BAU, IG BSE and IG Metall – are more sector-based. When unions cover sectors very differently impacted by climate change, then their position may even appear contradictory as evident in Thomas and Doerflinger’s depiction of IndustriAll Europe’s approach as ‘hedging’ in relation to the steel industry and ‘supportive’ in relation to electronics. And when a union clearly aligns with government policy, as is the case of NSZZ Solidarność in Poland with its close links to the ruling Law and Justice Party, then its ‘oppositional’ stance is predominantly political rather than representative of members in particular sectors. On the ground too, as apparent from many of the cases explored, for instance by Galgóczi for the automobile sector, local unions may take rather different positions from their national unions. For all these reasons, the umbrella notion of a Just Transition to a green economy, almost universally adopted by unions, comes in many different shades.

The context: Unions and CO₂ emissions in different countries/industries

Unions are organised locally, nationally and at European levels and it is apparent from the various articles that their approach will also differ according to level and the national and industrial context, in particular their position vis à vis the state. In the countries discussed in the different articles, greenhouse gas emissions in terms of tons of CO₂ equivalent per head of population, are highest in Germany (11.3) and Poland (10.9), followed by Norway (10.4), Denmark (8.8), UK (7.6), Italy (7.3) and finally France (7.2) (Eurostat, 2019). This gives an indication of the task confronting the different states. Union density in these countries places them in a different sequence, being highest in Denmark (67%) and Norway (52%), followed by Italy (35%), UK (26%), Germany (18%), Poland (12%) and France (8%) (ETUI, 2020). Thus, in the countries covered in the articles presented in this special issue, those with the smallest populations – Norway (5.3 million) and Denmark (5.8 million) – have the highest union densities, whilst Germany, with the largest population (83 million) and the highest emissions (21%) in the EU, has one of the lowest union densities.

The articles also cover a number of different industries, with varying significance in terms of the environment and employment and associated with very different strategies on the part of the unions to the reduction of emissions. Construction, which is the focus of Clarke and Sahin-Dikmen, accounts for up to 18 million direct jobs in the EU and for about 9% of EU Gross Domestic Product (GDP), with buildings contributing the largest share of total EU final energy consumption (40%) and producing about 35% of all greenhouse emissions (EC, 2020). The automotive industry, discussed by Galgóczi, provides 13.8 million direct and indirect jobs, accounting for 6.1% of total EU employment, with 2.6 million people working in the direct manufacturing of motor vehicles, representing 8.5 % of EU employment in manufacturing. Like construction, the electronics industry, from which Tomassetti and Thomas and Doerflinger provide examples, is also important to a green transition and employs approximately 2.4 million workers in the EU, or about 8 percent of overall manufacturing employment. Another large industry in Europe, and especially in Germany, UK, Italy and France, is petrochemicals, from which Tomassetti provides disturbing cases, employing about 1.1 million people and in 2017 producing 135 million metric tons of CO₂ equivalent. Far smaller and concentrated is the steel industry, the focus of Stroud et al.’s article and also included in Thomas and Doerflinger’s account, which employs 330,00 in the EU and accounts for about 5% of EU emissions. Finally, the coal industry, discussed by both Galgóczi and Thomas and Doerflinger, employs 53,000 in power plants and 185,000 in mines, totalling 238,000 (Eurostat, 2018), with 16% of the EU’s total greenhouse gas emissions in 2016 coming from burning coal. Combined, therefore, the industries from which examples are given – construction, automotive, electronic, petrochemical, steel and coal – employ nearly 40 million people across the EU, or about 16% of the economically active population.

Drawing together these different threads in the articles, in an attempt to explain the various union strategies and actions presented and to evaluate how far they play or can play an active role in the transformation so desperately necessary to addressing climate change, a few conclusions are

suggested. First, union strategies depend very much on the sector, whether it is associated with greater or lesser carbon emissions and whether employment gains or losses are envisaged. They depend too on unions' histories, identities and position in society, whether embedded in social partnership models, defenders of member interests in the market, or active representatives of working class interests. Finally, they depend on the industrial relations system in place and on the role of the state and how far these provide opportunities or obstacles to union intervention.

Conclusions

Over and above the approaches currently pursued and returning to the 'movers' of the earlier transition debate, it is evident from this special issue that the transformation of the production and labour processes required hinges predominantly on the active involvement of labour and the unions and on state intervention, not on technological innovations, trade or the market. As opposed to a focus only on the quantity of jobs created or phased out, qualitative social aspects also need to be at the forefront of the green transition, including the relations of production, the labour process, VET and qualifications. This means too that education has an important role to play.

As well as highlighting the movers or drivers of the transition, this special issue exposes the contradictions in union approaches, in particular between those wedded to technological 'fixes', green Keynesianism or ecological modernisation and those perceiving a transformative social agenda as essential. These contradictions are nowhere more apparent than in the debates surrounding the just transition, to which this special issue represents a contribution. Through the analyses of case studies, it enables a grounded understanding of what a just transition can mean in practice, not just as an abstract strategy for industrial relations. The examples presented also point to possible ways forward in pursuance of a green economy, the need in particular for more research on the governmental and regulatory, educational and labour process implications. By exposing these, including through significant practical initiatives, abstract policies take on a concrete reality for those at work.

Above all, the issue reveals not just differences but the commonalities between states and union approaches and the importance of a European-wide and global overview of the problems addressed. As the complexity, destructiveness, and speed of changes to the climate increase, responding to climate change has become the century's most important challenge (Dupressoir, 2008). Any retreat into defensive nationalism adds to the difficulties of combatting at an international level the global danger we confront. It is vital to re-connect work and political economy, so that the transition to a low carbon economy becomes an international driver for transforming the labour process to the benefit of workers.

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