

No 4/2015

# CLR News

## Construction Labour, Work and Climate Change

**CLR**

European Institute for  
Construction Labour Research

[www.clr-news.org](http://www.clr-news.org)



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# Note

from the editors

Colin Gleeson  
and John Calvert  
30.11.2015

*(This editorial was written before the outcomes of the Paris COP21 were known)*

## JUST TRANSITION

*'Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.'* (IPCC, 2014:2)

Unpredictable weather, driven by global warming, will result in droughts, floods, heat waves and cooling as the global climate reaches for a new equilibrium at a higher temperature. Rapid warming on a planet of 9 to 10 billion people by 2050 will create havoc as global agricultural growth patterns shift, leading to mass migrations that will dwarf those currently witnessed in Europe. The immediate struggle is to ensure that warming is limited to less than 2°C in to avoid positive feedback mechanisms<sup>1</sup> leading to runaway temperature rise. This struggle will entail a global transition from energy intensive fossil fuels to low carbon renewables that has unprecedented implications for all economic sectors.

As we digest the output of December's 21st Conference of the Parties (COP21) in Paris we need to reflect on the full implications of global warming, climate chaos and the world of work. Data from the International Institute for Labour Studies (IILS, 2012:7 & 12) state that 'approximately 80 per cent of all CO2 emissions occur in the production process and not from the direct energy consumption of households'. These figures are based on IPCC greenhouse gas (GHG) accounting and cover all GHG emissions in the country of origin and its dependencies. Production emissions cover all aspects of the economy: energy, industrial, agricultural, waste and the category 'other'. Generally, fossil fuel energy is currently required

1. An example of positive feedback is the melting of tundra permafrost, releasing trapped methane (with a global warming potential 70 to 80 times that of carbon dioxide) and causing runaway global warming.

for production and, since work is associated with all of these sectors, any substantive shift from fossil fuels will impact on jobs. If such a transition occurs – and it must - then it must be a ‘just transition’.

The Cancun Agreements in 2010 of the United Nations Framework Convention on Climate Change (UNFCCC, 2011:4), recognized that ‘addressing climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development ... while ensuring a just transition of the workforce that creates decent work and quality jobs’.

The International Trade Union Congress (ITUC) is demanding that the Paris Climate agreement include a commitment to just transition measures. This is essential to support the challenge of industrial transformation in all sectors, in particular jobs and livelihoods for workers in emission-intensive industries. The UK experience of meeting its Kyoto targets, primarily through the replacement of coal with gas, provides a sobering lesson about previous transitions that left a legacy of mass unemployment in former mining districts and were characterized by job creation

dominated by precarity and zero-hours contracts. The concept of just transition is therefore critical if there is to be an equitable response to climate change through both adaptation and mitigation measures.

The ILO, at its October 2015 Geneva meeting (ILO website, no date) on drafting a climate agreement for the ‘Parties to the United Nations Framework Convention on Climate Change,’ included the terms ‘just transition’ and ‘decent work’. The ILO recognised the challenges of such a policy. Cunniah (2010: 294) argues: ‘If the big policy challenge today is how to make the transition to a carbon-efficient society socially sustainable – a “just transition” for all, it remains true that this will take place in a context where half of the global workforce still lives on less than two US dollars a day; where one third of the global workforce is either unemployed or under-employed; and where half of the world’s population does not have any sort of social security. Women are especially vulnerable, owing to their high numbers in unpaid, low-paid, part-time, frequently interrupted, or informal economy work.’

According to the ILO, eight sectors are particularly affected due to

## Note from the editors

their dependence on natural resources and a stable climate, their large consumption of resources and their role as significant polluters. These are: agriculture, forestry, fisheries, energy, resource-intensive manufacturing, recycling, building and transport. End-use emissions reallocate mainly energy emissions to the transport, residential and services sectors where globally, approximately 35% arise from buildings. According to the IPCC (2007:11), emissions reductions in the building sector provide the greatest savings per unit cost, see Figure 1.

According to the ILO (2013: xv): 'The building sector, which employs at least 110 million construction workers worldwide, has the highest potential for improving energy efficiency and reducing emissions in both industrialized and developing countries. Construction of energy and resource-efficient buildings requires competent enterprises and skilled workers, however. Therefore, skills upgrading and certification of building firms, formalization, and improvements in working conditions to retain qualified workers will be key components of strategies in this

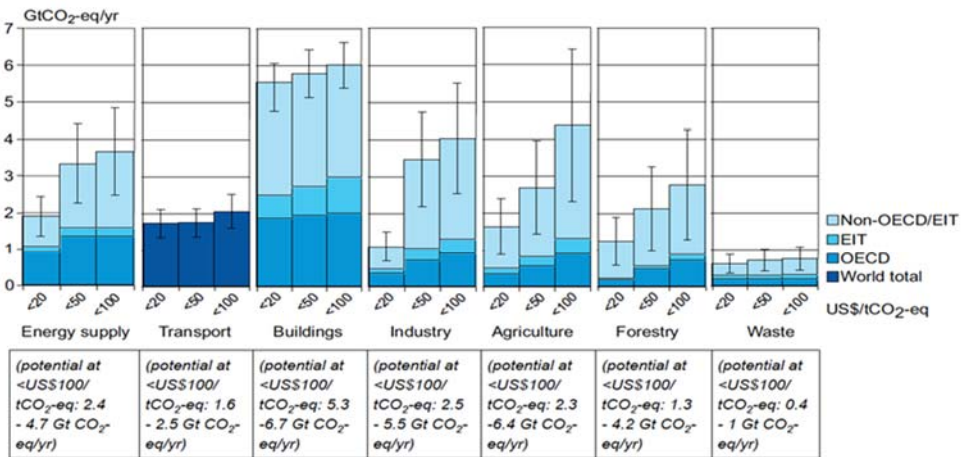


Figure SPM.6: Estimated sectoral economic potential for global mitigation for different regions as a function of carbon price in 2030 from bottom-up studies, compared to the respective baselines assumed in the sector assessments. A full explanation of the derivation of this figure is found in Section 11.3.

Figure 1: Potential CO<sub>2</sub> savings per \$100 expenditure (IPCC, 2007)

sector. Investments in retrofitting of buildings can have a strong immediate effect on employment generation in the construction sector and among its suppliers. For example, a large-scale renovation programme in Germany that was initiated jointly by trade unions, employers and non-governmental organizations (NGOs) has mobilized investments of almost €100 billion since 2006 and maintains as many as 300,000 jobs in the building industry. For emerging and developing countries, leapfrogging directly to high-performance new buildings will avoid a legacy of high energy, water and resource consumption which otherwise will endure for decades.'

There are different strategies to achieve emissions reductions. These range from decarbonisation of the electricity grid based on shifting from gas and oil to renewable electricity, to a massive investment in retrofitting. The latter focuses on making much better use of the energy we produce. To the extent that we can use our energy more efficiently, we can reduce the amount of new energy required from renewable sources and, correspondingly, reduce the size and scope of investments in this sector. Conversely, decarbonisation without energy saving retrofitting will lead to higher bills as consumers pay for

'super-grid' investments, resulting in increased fuel poverty and winter deaths. Construction trade unions are therefore at the forefront of the battle to reduce energy use through advocating a programme of 'nearly zero energy buildings' (EC, 2010) both for new build and refurbishment of existing stock.

Heating and cooling of buildings accounts for roughly half of the EU's end-use energy consumption ahead of transport at one third. The building heating and cooling load reflects the quality of the building envelope, its fabric energy efficiency, and the energy efficiency of the building services providing heating, cooling, hot water and lighting. Construction unions have an opportunity – and a responsibility - to demonstrate how investments in large scale energy efficiency in buildings can be a major source of new jobs. Implementing low carbon construction is labour intensive. Investment in this activity has the potential to create much greater employment than in the development of capital intensive new energy projects, a fact which is not adequately recognized in much of the climate debate. Job creation in the building sector thus offers a major opportunity to address the

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need for new, highly skilled jobs as part of a just transition strategy.

Construction trade unions have a pivotal role in driving a just transition strategy and tactics that rebrand construction workers as energy champions, carbon cutters and frontline troops in the battle to save the planet. All construction workers, from the design office through to the building site, need to upgrade their knowledge, skills and competence, their thermal or energy literacy, to ensure that low energy building specifications are achieved under site conditions. Construction trade unions and their allies must transform the image of construction to celebrate the building worker as the engine of a just transition to a low carbon society.

Since global warming will affect all sectors, construction unions also need to develop a broad-based strategy to achieve a just transition. Analysis by the International Working Group for ACW<sup>2</sup> has identified four key aspects that climate justice must address to promote work enhancing pathways in the transition to a low carbon economy:

- engagement with the new framework of sociotechnical transitions in contrast to the established frameworks of ecological modernisation or market based instruments. This embraces purposive transformative goals, a mix of social and technological innovation, and a key role for a diverse coalition of societal actors;
- recognition that there are alternative transition pathways and that choices between them have significantly different implications for job creation, employment, working conditions, and skill development arising from contrasting emphases on technological production and social use, singular new products/processes versus wider system innovation, one-off skills or long term vocational change;
- action at multiple levels of governance, not just at the national or sectoral level. Of particular interest is the role of new developments in policy and practice involving partnership with cities, local authorities and regions;

2. Adapting Work and Workplaces to Climate Change: Canada in an International Perspective (York University, Toronto and University of Westminster, London)



- interventions that are not simply reactive in terms of justice or job protection but proactively intervene to shape the nature of the green transition and promote an awareness of the potential role of trade unions as environmental actors and innovators.

This edition of CLR News explores some of these themes. Contributors from Europe and North America provide essays, reports, book reviews and commentary on and around the concept of a just transition. We recognize the lack of input from developing nations where climate change is likely to have its greatest impact and hope to return with a more global perspective to ‘just transition’ in a future edition of CLR News.

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# Subject articles

Industrie-  
gewerkschaft  
Bauen-Agrar-  
Umwelt, IG BAU  
Dietmar  
Schäfers,  
Vice President  
of IG BAU and  
President of  
EFBWW

## CLIMATE PROTECTION POLICY OF THE GERMAN TRADE UNION FOR CONSTRUCTION

Climate protection is an important issue for the Union of the Environment (IG BAU). For us the planning necessary for energy transformation comes under the subject of fair work, as it is a safeguard for sustainable working and living conditions. The clean and safe provision of energy through renewables is the foundation for the socio-ecological modernisation of society with better living and working conditions for all. Therefore IG BAU has formulated three aims:

1. Until 2050 greenhouse gas emissions have to decline by 95 percent;
2. During the same time span, the use of energy has to decline by one half;
3. The share of renewable energy has to increase by double the amount.

In common with other organisations and environmental federations, we are active in the implementation of these aims. Therefore, as a member of the action group

'initiatives for housing construction' (*Impulse für den Wohnungsbau*) we presented, for instance, a common declaration for the promotion of energy efficient retrofitting in construction. The construction sector provides a particularly large potential for climate protection. Much of the housing in Germany was built in the 1950s and 1960s. Immediately after



the Second World War millions of families had to be supplied with housing lost during the war through bombing, fire and expulsion. In those times, low-energy consumption was not yet a matter of concern. This did not change until the oil crisis in the early 1970s. As a result, the first regulation for thermal protection was introduced in 1979. Since then construction has become increasingly energy saving.

However, most post-war buildings are still being used. They represent an enormous energy-saving potential. The German Federal Government estimates that technically correct retrofitting and modern construction technology may allow for savings of up to 80% in energy demand. In order to really exploit this potential though, much too little is happening; there are a lack of state subsidies, unclear political guidelines, too few transparent incentives, too little investment, too few qualifications and too little promotion of qualified young trainees. The Federal Government has to be questioned on how it intends to implement its own aims under these policies.

IG BAU is demanding significantly stronger and manifold incentives for energy-efficient construction retrofitting. About three quarters of housing in Germany is privately owned. About 40 percent is used by the owners themselves, almost another 40 percent of housing units is rented out by small investors. Only little more than 20 percent is let out by professional investors. Whoever wants to make use of this savings potential has to make an effort with these private owners.

To produce a flow of private investment requires a bundle of different provisions because the primary conditions and interests of private owners are distinctly different from professional investors. A decisive factor for success might be tax incentives to stimulate owners to carry out energy saving measures for their housing associated with partly high investment.

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These incentives might be a meaningful addition to existing governmental intervention programmes destined to promote energy-saving renovation in construction. At present, intervention is provided by the governmental '*Kreditanstalt für Wiederaufbau*' (Credit Institute for Reconstruction), which provides credit at low interest rates or subsidies to private owners if they renovate their house to save energy.

These programmes have to be extended and stabilised. That they exist at all is due to the political success of IG BAU. Under the conservative-liberal Federal Government, subsidies for energy-saving renovation in construction were scrapped. It was IG BAU which stood up for resuming previously existing programmes.

The success achieved, however, is not yet satisfactory. In reality existing government intervention is only moderately effective because it is insufficiently framed. It is quasi incalculable for those willing to invest because it is unpredictable for how long government subsidies will flow. This means that somebody who takes money for planning energy-saving construction renovation may have bad luck if subsidies are stopped again before the subsidy application is agreed.

This is why IG BAU is not only concerned that the means for subsidies are increased. Above all, these have to become plannable for investors, which is only possible if the Federal Government eventually decides to include these funds permanently in its budget.

Another important incentive demanded by IG BAU is tax subsidies for energy-saving retrofitting in construction. Though the Federal Government had already started a modest step in this direction, this was not at all suitable for effectively promoting investment.

On the one hand, subsidies were to be financed through cuts in the existing tax subsidies for the work of small enterprises. This idea was rejected by IG BAU because it promotes illegal working. Due to the possibility of tax deductions for small enterprise work today, many private clients demand a bill from the small enterprise. Without the possibility of tax deductions, it is likely that some workers work without a bill and avoid fiscal obligations.

On the other hand, the form of the subsidy was much too halfhearted to make real reconstruction measures attractive. The rate of subsidy was not more than 11 percent, spread over a span of 10 years or the equivalent of 1.1 percent per year. This extremely small rate hardly offers an incentive for energy-saving, which is why this government initiative also failed in the Federal Council (Bundesrat, second chamber).

Finally, the Government has transferred part of the budget intended for the above-mentioned tax subsidies into an "Incentive Programme for Energy Efficiency" (*Anreizprogramm Energieeffizienz*) presented by the Federal Government this summer. Because of the much too small amount of subsidies, IG BAU does not believe that this programme will noticeably raise the rate of retrofitting.

According to IG BAU, to achieve success in the revival of energy-saving retrofitting in construction noticeable tax-effective incentives are needed. About one third of owner occupiers and small landlords are employees. For this large number of persons, improved conditions of tax reduction represent a particularly high incentive for investment.

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# JUST TRANSITIONS: ORIGINS AND DIMENSIONS<sup>1</sup>

## Introduction

During the last twenty years a number of national and global unions have promoted “just transition” as a strategy intended to make green transitions more humane while tempering the rising tide of green neoliberalism. Here we trace the origins of the strategy, explore a couple of important dimensions and offer some insights into the challenges facing building and construction unions in the U.S. and beyond.

## 1. The Origins and Globalization of the “Just Transition”

The concept of just transition has its origins during the 1970s in the USA. Industries in Northern America that were strongly affected by environmental policies during the 1970s were those in energy and chemicals. Some unions in these sectors adopted the “jobs vs environment” dilemma promoted by emerging neoliberalism. But a few recognized that this dilemma was real only because it allowed capital to engage in “job blackmail” (Kazis and Grossman (1991[1982])). Tony Mazzochi of the Oil Chemicals and Atomic Workers (OCAW) sought early on to reconcile environmental policies with the fate of workers (Leopold 2007; Mazzochi 1993). To his union and other unions he argued that environment and jobs are not inherently at odds. In fact, more jobs could be created in an environmentally friendly economy. To the environmentalists he argued that environmental policies could and would have adverse impacts under a liberal capitalist system that shifts negative externalities to workers and communities.

1. This contribution draws on Felli and Stevis (2014) and Stevis and Felli (2015)
2. Dimitris Stevis, Colorado State University, Fort Collins, CO 80523-1782, USA, [dimitris.stevis@colostate.edu](mailto:dimitris.stevis@colostate.edu); Romain Felli, Université de Genève, UniVogt, 66 boulevard Carl Vogt, 1205 Genève, Suisse, [Romain.Felli@gmail.com](mailto:Romain.Felli@gmail.com)

The earliest framing of transitional policies evoked the post WWII policy of providing substantial resources for returning veterans to allow them to reintegrate themselves into the US political economy. During the 1980s it was reframed as the “Superfund for Workers”, evoking a parallel to the Superfund that was created to mitigate the impacts on areas polluted by chemicals, mining, and energy production. In 1997 Oil Chemical and Atomic Workers International Union (OCAW) adopted a resolution explicitly calling for a “just transition” (Young 1998), while in 2000 the Canadian Labour Congress (CLC) adopted a statement on the subject. The British Trade Union Congress adopted a “just transition” agenda in 2007. The International Trade Union Confederation (ITUC) has made a “just transition” for workers and their communities one of its three ‘topline’ demands for climate policy. Global unions have indeed been active in global climate negotiations where they have promoted “just transition” and “green jobs” (Rosemberg, 2010). Although the idea of “just transition” is used in global climate negotiations, it is at the national and local levels that trade unions have been most proactive in using it for mobilizing their members.

## **2. The Dimensions of Just Transition**

Like all policy proposals “just transition” can be examined in tactical, strategic and political terms. At the tactical level, it involves provisions, such as education and training, unemployment benefits, relocation assistance, early retirement, and so on to help workers adjust to a change due to redundancy due to environmental policy (or, as we suggest, any policy). At the strategic level, it can be seen as a means towards forcing capital and the state in the direction of a more solidaristic greener transition. And, at the political level, it can be used as an agenda towards a more egalitarian social-ecological political economy.

*Beyond the Environment.* Green transitions are not necessarily just. Indeed, environmental justifications can be used by the

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employer or the state to hide or dilute the political and economic reasons behind plant closures or other economic restructuring. Yet, the coupling of “just transition” to “green transition” is both inspiring and limiting. It is inspiring because it argues that those committed to a green transition – often as a matter of international solidarity and planetary survival- must recognize the enormity and implications of the project and be willing to adopt measures that will bring and keep workers and unions within the green transition alliance. It makes no sense to call for global planning to mitigate and adapt to climate change and, at the same time, stop planning at the doors of workers and vulnerable communities.

On the other hand, the connection of “just transitions” with “green transitions” singles out the latter as possibly uniquely unjust processes and perpetuates the mythology of “jobs vs environment”. This is not to deny that green transitions can present specific challenges for workers as they do for communities. Nor to reject the possibility that environmental rules can lead to the demise of particular industries over time. But such outcomes are not limited to environmental policies and, in fact, in the aggregate green transitions can create significantly more employment than the most environmentally damaging sectors, many of which are capital intensive (UNEP 2008; Pollin et al. 2014). Other factors, such as subcontracting, offshoring, and capital-intensive production, can have even more profound impacts on work, workers and communities.

Environmental transitions are one set amongst many types of transitions - including energy transitions that affect the life of workers and their communities (for example, Swilling and Annecke 2012). That does not make them insignificant while the way in which they are handled is important. But there may be a good practical reason, at this juncture, for highlighting the need for just and green transitions. The nature of green transitions is deeply contested (Klein 2014). Neoliberals are eager to totally commodify nature – an



approach that will enmesh the green transition into a frenzy of cyclical crises and speculation. Even a neoliberal turn, however, requires enabling global and national policies. Labor unions, therefore, are fully justified in arguing that green transition strategies must also be socially just.

*Proactive and Reactive Transition Strategies.* Early on just transition, at least in the US, was associated with reactive strategies in sectors declining due to their adverse environmental impacts, such as coal (Brecher 2012). Increasingly, however, unions associate just transitions with green transitions. Whether in response to declining or emerging sectors, unions can be either proactive or reactive – they can be leaders or followers.

U.S. unions, as well as unions in other parts of the world, have often been followers rather than leaders with respect to renewables. The move towards a green transition is an opportunity for unions to be agents of equitable and environmental sound social change, a task that also requires extensive political work within unions and within communities. This is all the more necessary because a green sector can be as socially unjust as a grey sector (Mulvaney 2014). Unionization in renewables, for instance, is minimal in the US and British unionists have bitter memories of the Danish wind power manufacturer Vestas, now deeply ensconced and non-unionized in Colorado (for the UK, see Hampton, 2015). Environmentally they can be regressive by encouraging overproduction and overconsumption of energy and other resources. In this case labor unions enter into a partnership with capital in order to increase “competitiveness”, and externalize the effects of this new relation unto the natural environment and the local communities (by expanding consumption and pollution) and unto other workers elsewhere (by raising the production standard to which workers are submitted).

### **3. US Building and Construction Trades and the Challenges of Green Transition.**

The adoption of environmental priorities by unions is not a simple matter. Transitions to more inclusive workplaces – whether in terms of ethnicity, race or gender- have also not come easily. In this part we want to comment briefly on the challenges faced by US Building and Construction unions.

US building and construction trades have been at the center of the jobs vs environment debate. To a large degree this is due to characteristics of industrial relations in the sector that make workers quite vulnerable. Contractors and unions have established close relationships, despite frequent contentious cases. These relations involve various institutionalized forms of collaboration, including training, and what are known as Project Labor Agreements (PLA) (see [http://www.ongil-mc.org/get-informed/news/pipeline\\_and\\_in\\_particular](http://www.ongil-mc.org/get-informed/news/pipeline_and_in_particular), <http://bit.ly/1I4s7XO>). The latter are agreements between contractors and unions regarding the use of largely union labor in particular projects –usually large projects. Contractors commit to hiring union members for the duration of the project, but these workers are not their employees. As a result, building and construction trades are supportive of management because employment opportunities are episodic, particularly during hard times, and because good relations with willing contractors ensure that unionized workers will not be fully displaced by non-unionized workers in an aggressively neoliberal country. On the positive side, these relationships also facilitate a more seamless route between training, including green training, and employment. On the other hand, it is difficult for building and construction unions to oppose management, even if management is engaged in the building of facilities that are arguably damaging to the environment, such as nuclear plants, fossil energy plants, dams, highways or pipelines or if they engage in the building of solar and wind power farms or biofuel terminals without any concern for their environmental and social impacts or their contribution to energy overproduction or threats to the food supply.

The frustration of building and construction unions over the rejection of the Keystone XL Pipeline is understandable since these unions signed a PLA with the company in 2010. One could also argue that Transcanada's commitment during the height of the financial crisis is something worth honoring. However, the pattern of supporting the employer regardless of the project has such a long history that it cannot be explained by reference to hard times. During the 1970s and 1980s building and construction unions (but also some manufacturing and energy unions) were at the forefront of support for nuclear energy in the U.S. and vigorous proponents of the "jobs vs environment" dilemma. Today they are at the forefront of rebuilding infrastructure (a desirable goal) but one that does not move the country towards more public transportation, instead reproducing and aggravating sprawl.

Building and Construction unions (like unions in every sector) can be differentiated in terms of whether they adopt proactive or reactive strategies and whether they do so with respect to declining or ascending sectors. Replacing asbestos tiles would be a reactive strategy in response to a declining practice. But so would be the retrofitting of inefficient buildings. These are both valuable jobs that unions should do.

An important reactive strategy should focus on adapting to the effects of environmental degradation. Working conditions are affected by environmental and climate change – something that will increase in all likelihood. The increase of extreme weather should be expected. The number and length of heat waves, for instance, is a well-documented effect of climate change. Heat waves are all the more preoccupying in cities, because of the "urban heat island" effect. Construction and building unions should negotiate for better protection, and compensation (for lost working days), for workers affected in these areas.

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However, unions must also be proactive. They should clearly be at the forefront of environmental retrofitting. Some European unions have indeed been quite successful in pushing employment in their sector through publicly financed retrofitting programmes. In fact, unions should move one step further and demand that only green buildings be built and that society adopts provisions that help workers acquire new skills. But why stop at green buildings and not be part of a coalition for rethinking and/or preserving public spaces, avoiding sprawl, and building just cities? As Good Jobs First argues, sprawl is a worker issue and a long term environmentally proactive labor strategy has to treat it that way (see <http://www.goodjobsfirst.org/smart-growth-working-families>).

Denser cities with green buildings and more public transportation offer a greater quality of life. An inspiring example in this regard comes from the Australian building industry workers in the 1970s (Burgmann 2000). Building and Construction unions would find allies in unions in other sectors, such as energy, transportation and health that are making bolder demands for more democratic power to lead the green transition, especially in an urban context (ITF 2010; Sweeney et al., 2015; Building and Wood Workers International [BWI] 2015). Such a proactive just transition would not only be about workers but it would also be about the communities in which they live and work (McFarland 2015). Clearly it would place them at odds with capital and neoliberal states. But then, again, the more unions ally themselves with capital and neoliberal states the more they will strengthen the exact forces that treat them as cogs in the chain of production rather than as citizens and agents of democracy.

### **Closing Comments:**

The concept of just transition is aspirational. It runs against the grain of neoliberalism. However, there are elements of public policy as well as instances of negotiated transition

practices that contain elements of justice and fairness. Public policies – at whatever level- that provide workers and communities enough resources to move into different employment and different economic sectors are evident if not enough in countries with social democratic and labor traditions. In more liberal capitalist countries, such as the USA, such public policies are limited and workers must negotiate any transitional measures with employers. Identifying and analyzing such cases is a useful exercise to the degree that they provide templates for future strategies (for example BWI 2015).

However, even though there are such examples of negotiated “just transitions” a fuller strategy requires the kinds of policies we would associate with socially progressive regimes. In that sense “just transition” is a political statement that conveys a preference for another, more democratic world. Yet, it would be folly to assume that everyone that uses the term has the same image of what a democratic and socially just society looks like. In the same way that actual transitional policies vary, so does the aspirational content of “just transition”.

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## **The Contribution of the BC Insulators to the Campaign to Implement Low Carbon Building Techniques in the Construction Industry of British Columbia**

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Mainstream discussions of climate change normally overlook the role that labour can play in both mitigating and adapting to global warming. Labour's voice is largely absent – or ignored – in the way climate issues are reported in the media. However, there are examples of unions that have been working energetically to implement significant climate measures. Buildings account for approximately 35% of energy use and GHG (greenhouse gas) emissions, primarily resulting from burning natural gas, oil and other fossil fuels. Reducing emissions from this sector is a critical objective if we are to avoid the catastrophic consequences of a 4 degree increase in temperatures by the end of this century. This means dramatically reducing the energy consumption of the many types of buildings in which we live, work and socialize. Improving the energy efficiency of buildings will significantly reduce the demand for fossil fuels and mean that there is less total energy to replace by investments in renewable energy.

The Heat and Frost Insulators Local 118 (BC Insulators) is a Canadian trade union located in the western province of British Columbia (BC). The union represents journeypersons and apprentices who install and maintain mechanical insulation systems. These systems are referred to in Canada as HVAC (Heating Ventilation and Air Conditioning) installations. Furnaces, boilers and air conditioning systems are a major component of the energy consumption of buildings so that improving their efficiency is key to reducing GHG emissions and energy use. The members of the BC Insulators' union have a Trades Qualification (TQ) based on completion of a 4 year apprenticeship in HVAC systems and related building insulation methods. Consequently, they are fully capable of installing the latest energy saving systems and technologies in

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virtually every type of building and they handle the most challenging installations that are currently being introduced into new buildings and major retrofits in the province.

Partly because of the nature of the building work its members perform, which is intimately associated with improving energy efficiency, and partly due to the union's leadership, who are committed to addressing climate change, the union has embarked on a remarkable campaign to encourage the BC Provincial Government and a large number of municipal governments within the province to raise the standard of mechanical insulation in the public buildings that they commission.

Based on the experience of its members in working on these systems, the union's leadership came to believe that the various levels of government within the province were not requiring the highest standards of insulation in their contracts for new buildings or in renovations to existing facilities. Low standards meant that contractors with poorly qualified workers and little knowledge of the requirements of good mechanical insulation were getting contracts which they were fulfilling poorly. In many cases the governments were not fully aware of the latest developments in mechanical insulation systems and were not, as a consequence, requiring these standards in their contracts. Low standards coupled with inferior workmanship meant that public buildings were not achieving the energy savings that were perfectly feasible and highly desirable from a climate change perspective.

Aside from the negative impact on the public, the union believed that the way governments were contracting for mechanical insulation installations placed the contractors with whom they had collective agreements at a significant disadvantage in the bidding process. Failure to understand the standards that could be achieved meant that governments too often accepted the lowest bids on contracts, even though they were being submitted by employers utilizing poorly trained,



non-union workers (or sub-contractors) and outdated mechanical systems. This meant that the contractors with whom the union had collective agreements – and who therefore had a highly skilled workforce - were not able to take full advantage of their employees' higher level skills because the tender documents did not require the use of advanced HVAC technologies and systems.

This problem was compounded by the fact that the requirements of the BC provincial building code – which was the minimum all governments were required to follow – were outdated due to industry pressure keep to costs down. This was exacerbated by bureaucratic delays in modifying the BC Code, which was normally upgraded only once every 10 years. In turn, the BC Code was based on the model National Building Code. The latter reflected the lowest common denominator that all provincial governments across Canada found acceptable.

Despite these barriers, the union felt that governments had an obligation to provide leadership on climate issues and that a key way to do this was to demonstrate that public buildings could become much more energy efficient if the right systems were put in place. This meant adopting standards above the minimal requirements of current provincial and municipal building codes. To accomplish this goal, municipal governments could include more stringent energy conservation requirements in the tender documents that they used when asking building contractors to bid on public construction projects.

In 2010, the BC Insulators commissioned - and funded - a detailed study from a major engineering consulting firm to identify the specific standards that could be included in new and renovated buildings to significantly reduce their energy use and carbon footprint. The purpose was to provide a model, or template, for higher energy efficiency standards in government procurement contracts so as to encourage

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governments to install the latest and most energy efficient systems. HB Lanark Consultants produced a 75 page study entitled "Pipes Need Jackets Too" that outlined the part mechanical insulation could play as a key component of an overall climate change strategy to reduce energy consumption in buildings.

Armed with this study, over the past 5 years, the BC Insulators union has made presentations to the elected councils of all the large municipalities in BC, asking them to consider including higher insulation standards in their development plans, building plans and future procurement tenders. They have encouraged these governments – and particularly mayors and council members - to demonstrate climate leadership by including the highest standards allowed by the building code and by demanding much more stringent oversight of the work carried out by contractors to ensure that the standards they set are fully met. The union has also met with many municipal managers, such as purchasing staff responsible for drafting contracts, offering them assistance on the specifics of mechanical insulation standards that they could include in their contract tenders.

In British Columbia, there is considerable public support for government action on climate issues. Both the provincial government and many BC municipalities have introduced measures to encourage energy efficiency and shift energy consumption away from fossil fuels. Consequently, the union's recommendations for raising mechanical insulation standards were targeted at a fairly receptive audience. Taking steps to improve energy efficiency is popular within the electorate. However, a key issue is to define precisely what measures need to be implemented and this is where the union's campaign, which focused on the precise nature of the required changes, has a sympathetic audience. Another issue is to persuade decision makers that investing in energy efficient systems is an essential part of the work needed to address the challenge of global warming.

However, the insulators have not limited their campaign to governments in BC. The union has paid for booths at a number of industry, environmental and public policy conferences, both in Canada and in the US, promoting the view that mechanical insulation is a key component of the campaign to address climate change. It now regularly hosts information sessions at the annual conference of the Union of BC municipalities, an organization that represents all the municipal governments in the province. It also attends the Federation of Canadian Municipalities annual conference to meet with mayors and council members and encourage them to think about the benefits of higher mechanical insulation standards.

In addition to its government lobbying, the insulators' union works with a number of private sector industry and environmental organizations. One of these is the Canadian Green Building Council, an association that includes contractors, planners, architects and others interested in climate innovations. At the latest conference of the Council in Vancouver in 2015, it hosted an information booth staffed by a number of its elected officials to promote the latest developments in mechanical insulation to engineers, consultants and contractors attending the conference. It has followed up these contacts with further meetings with a number of key engineering firms in the province.

It recently hosted a booth at the BUILD EX Canada Conference which is the largest trade show for the construction industry in Western Canada and hosts over 600 exhibits from all sectors of the industry. The union has also reached out to property managers, such as Brookfield Global Integrated Solutions which oversees over 100 million square feet of property, globally, and whose properties consume very large volumes of energy that could benefit from improved insulation systems.

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The Insulators Union also works with the Canadian Standards Association, a body that establishes guidelines for a wide range of industrial and consumer products, including building materials and HVAC systems. And it has pursued discussions with a number of the leading edge producers of the various components that are now included in mechanical insulation systems to keep on top of recent developments and to build links between unionized contractors and equipment suppliers.

Another element of the union's campaign has been to work with other unions in British Columbia and nationally. It has been a major supporter – and active participant – in a number of conferences within BC involving the BC Federation of Labour and a broad range of environmental NGOs. Partnering with the environmental movement has been one of its key priorities. The work of its members coincides with the goals of many of these NGOs who are intent on reducing Canada's carbon footprint but not knowledgeable about the technical side of the industry. The union has cultivated support from major environmental NGOs for its lobbying campaigns, recognizing that this support can enhance its climate credibility and its effectiveness.

One other aspect of the union's climate work is also of interest. Uniquely, the union has developed the entire training and apprenticeship curriculum which all qualifying insulators in BC are required to take in order to obtain their tradesperson's qualification. The classroom components of the union's curriculum are taught by its own instructors, but delivered through BC's public college system. The main public college is the BC Institute of Technology (BCIT), which provides the facilities for the apprentice trainees. Because the training is offered in a public institution, the union's programme is available to all who wish to become certified insulators, regardless of union membership. For apprentices who work for contractors with whom it has collective agreements, the union also assists with finding them ongoing employment to ensure they obtain the hours of on-the-job

experience to move, successfully, through each year of their apprenticeship.

Because it is involved in providing the curriculum for all qualified insulating workers in the province, the union has been able to incorporate climate components into the training it provides. The training is not simply technical, but also includes a broader understanding of the need to reduce GHG emissions and energy consumption in buildings as part of the industry's efforts to address climate change.

Local 118's various activities are, admittedly, unique in Canada. It has established itself as a significant player in the ongoing debate about how to address climate issues and has also become a major environmental advocate, both within the industry, and in the labour movement. It has tried to bridge the gap between the technical requirements of good mechanical insulation and the broader public policy and environmental issues associated with implementing low carbon construction on building sites. As an advocate, it has tried to shape the actions of governments, contractors and environmental NGOs through its extensive lobbying campaigns.

The nature of the work its members perform and the employment benefits they hope to achieve through expanding the role of unionized insulators in the industry have certainly facilitated its willingness to support 'greening' the building sector. To its credit, it has taken advantage of these opportunities, finding creative and innovative ways to leverage its position into becoming a significant voice for low carbon construction. Its programme of political and social action supported with enhanced vocational education and training provides an exemplary model for all construction trade unions of proactive climate activism targeting jobs for members with sound economic and engineering arguments.

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### **ON THE ENERGY [R]EVOLUTION: A SUSTAINABLE WORLD ENERGY OUTLOOK 2015**

The publication of *Energy [R]evolution Scenario 2015* (IRENA 2015) prepared by Greenpeace International, Global Wind Energy Council and SolarPower Europe was accompanied by the self-description 'well known and well respected energy analysis since it was first published for Europe in 2005'. The 364-page document mentions '*just transition*' and '*training*', although there is little discussion of these two themes, and no mention of 'capitalism'. The report focuses on a technical, quantitative analysis of future projections in order to show that a global transition to 100% renewable energy is possible. The report opens with a cry of joy (p8):

The good news first: the Energy [R]evolution is already happening! Since the first edition was published in 2005, costs for wind power and solar photovoltaics (PV) have dropped dramatically and markets have grown substantially. Between 2005 and the end of 2014 over 496,000 MW of new solar and wind power plants have been installed – equal to the total capacity of all coal and gas power plants in Europe! In addition 286,000 MW of hydro, biomass, concentrated solar and geothermal power plants have been installed, totaling 783,000 MW of new renewable power generation connected to the grid in the past decade – enough to supply the current electricity demand of India and Africa combined.

Of particular interest to the construction sector is section 11.4.2, *Energy measures in buildings*. This review focuses on a critical analysis of the '*possible energy saving measures*' proposed for space heating, hot water and electricity use (pp279 to 282). The section begins with an account of energy in buildings globally: 'buildings accounted for 32% (118.6 EJ) of final energy consumption in 2012 and 53% of global

electricity consumption (IEA ETP 2015)'. *The On the Energy [R] evolution* (IRENA 2015) authors state (p281):

For existing buildings, retrofits help reduce energy use. Important retrofit options are more efficient windows and insulation, which can save 39% and 32% of space heating or cooling demand, respectively, according to the International Energy Agency (IEA 2006). Furthermore, the IEA reports that average energy consumption in current buildings in Europe can decrease overall by more than 50%. In 2015, the IEA reconfirmed that energy use by space heating, cooling and lighting, which represents 38% of global buildings energy consumption, could be reduced by more than half by ensuring that building envelopes are energy efficient (IEA ETP 2015). While the technologies are there, the political process is far too slow to exploit these large cost effective efficiency potentials.

Projections for retrofitting have been found susceptible to 'prebound' and 'rebound' influences (Galvin 2016). The prebound effect is the assumption that poorly insulated buildings with inefficient heating will provide large energy savings when retrofitted. For a variety of reasons, including fuel poverty, it has been found that people who live in such dwellings generally do not heat rooms to the same temperatures as those modelled. Many households heat only one or two 'living rooms' and for other rooms rely on increased clothing (personal insulation), activity (increased metabolic rate) and blankets, duvets, hot water bottles and electric blankets. Even in the UK where central heating is found in about 90% of homes, assuming that it provides an average house temperature of 18 - 21°C is foolhardy. While energy savings based on such temperatures show that insulation and draught-proofing reduce energy demand significantly, this is often not the case in practice.

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Allied to pre-bound is rebound whereby occupants decide that energy saving initiatives provide additional comfort, at the same cost, through heating previously unheated rooms, setting higher thermostat temperatures and longer heating periods. For many, the benefits of greater comfort outweigh those for cost saving. Retrofitting existing housing to offset the rebound effect requires further increases in the fabric energy efficiency of the building envelope through additional insulation.

Heat loss is dominated by the walls, which make up the largest percentage area of most dwellings and where additional wall insulation is either external or internal. Fitting external insulation may be more difficult than would initially appear, and often requires major preliminary works including moving external drain pipes and boiler flues and extending eaves depth. Internal insulation requires the complete removal of carpets, furniture and fittings, including skirtings and electrical outlets from external walls, cutting, fitting, finishing and redecorating. Such work is highly disruptive and to be cost effective requires access to all rooms, a process that may require occupants to move to temporary accommodation. Any large-scale deep retrofitting policy needs to consider this movement of people.

Where such works have been completed, testing has revealed an 'energy performance gap' that indicates, among other things, a quality gap associated with onsite production driven by a lack of appropriate knowledge and integrated teamwork, exacerbated by sub-contractor 'silo mentality' and allied in some way to employment conditions (Gleeson 2014; Gupta et al 2015). Thus, rebound and the performance gap combine to require yet deeper retrofit targets in order to outweigh their influences. The implications of great cost for effective retrofit may have influenced government policy towards electricity grid decarbonisation as the more effective measure, albeit that consumers end up paying the cost for both grid upgrade and continuing high energy use.



Decarbonisation of the grid without home energy efficiency will result in increased fuel poverty. The IRENA (2015) report states that (p.281):

To improve the efficiency of existing heating systems, an option is to install new thermostatic valves, which can save 15% of energy required for heating. On average, this option is installed in an estimated 40% of systems in Europe.

UK Research published by the Department of Energy and Climate Change (DECC 2015:5), into domestic heating controls states: 'Of all the homes with a boiler, 38% have no room thermostats, 45% have no thermostatic radiator valves and 71% lack some part of the recommend minimum controls'. This appears to support the *On the Energy [R]evolution* (IRENA 2015) findings. However, DECC also states that there is currently no robust evidence that standard heating controls reduce heating demand, with no significant difference between the average maximum temperatures of living rooms with and without standard heating controls, or between homes controlled manually compared to those controlled with a timer or programmable thermostat. It is not the presence or absence of particular controls that is important, but rather how people choose to interact with the technology that really matters.

The failure of controls to provide savings is not solely a British phenomenon. DECC notes that there are even evaluations that show that homes in the USA with programmable thermostats consume more energy than those relying on manual thermostats. Contrary to the authors of *On the Energy [R]evolution* (IRENA 2015), we may conclude that the energy saving potential of heating controls, a complex socio-technical amalgam, is still to be established. The report comments on air tightness, ventilation and MVHR (p281):

Effective air sealing can reduce heating and cooling energy by 20% to 30% and needs to be implemented as part of any construction and renovation project. When

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sealing is done correctly, with controlled ventilation and advanced heat recovery, it can improve indoor air quality....Besides reducing the demand for heating, another option is to improve the conversion of efficiency of heat supply. A number of options are available, such as high efficiency boilers that can achieve efficiencies of 107%, based on lower heating value. Another option is the use of heat pumps.

There is no doubt that draughty buildings waste heating and cooling energy. However, sealing buildings reduces ventilation, increases smells, volatile organic compounds (VOCs) and moisture, resulting in poorer indoor air quality (IAQ), condensation and mould growth. Sealing buildings demands continuous ventilation that can only be achieved through mechanical means and thus has an energy footprint. Offsetting this energy leads to mechanical ventilation with heat recovery (MVHR). Developed for the Passivhaus market, effective MVHR demands a high efficiency (and highly expensive) heat exchanger, supply and extract fans, ductwork, adequate space allowance and competent design, installation and commissioning allied to usability in order to achieve its theoretical energy savings. In the UK MVHR installations have proven to be poor substitutes for standard ventilation solutions and in many cases resulted in higher energy costs and poor IAQ and the need for recommissioning (White et al 2015). Retrofitting MVHR demands a deep retrofit approach since overall efficiency requires very high levels of air tightness along with the disruption of fitting rigid or semi-rigid supply and extract ductwork within the envelope.

Boilers with efficiencies of 107% represent maximum possible condensing efficiency at net calorific value. Viewed from a gross calorific perspective, this is about 96% efficiency. UK trials have long established that annual efficiencies for condensing boilers are actually between 80 and 85% (Carbon Trust 2007; DECC 2009). Again we note a discrepancy between assumed efficiencies and those resulting from practice. Whilst

condensing boiler performance is well established across the domestic sector, consistent high efficiency MVHR remains the domain of specialists.

The *On the Energy [R]evolution* (IRENA 2015) report states that heat pumps are capable of efficiencies ranging from 250% up to 400%. A cross European analysis of heat pump performance has shown that, whilst 400% is possible for ground and water source heat pumps, their mean efficiencies are nearer to 3.5 and that air source heat pumps struggle to achieve much more than 2.5 (Gleeson and Lowe 2013). Air source remain the dominant UK heat pump technology at about half the cost of ground source and at current grid carbon intensities, a minimum performance of about 2.5 achieves no emissions savings. In addition, a wide range in efficiencies or seasonal performance factor (SPF) is observed in field trials, indicating that this technology, unlike condensing boilers, is particularly sensitive to design/installation quality and system operation. Heat pump installed efficiency is critical if emissions are to be lower than those for gas boilers and offer an effective option to gas, the dominant central heating fossil fuel. The *On the Energy [R]evolution* (IRENA 2015) authors comment (p281):

Energy savings options for hot water include pipe insulation and high efficiency boilers. Another option is heat recovery units that capture the waste heat from water going down the drain and use it to preheat cold water before it enters the household water heater. A heat recovery system can recover as much as 70% of this heat and recycle it back for immediate use. Furthermore, water-saving shower heads and flow inhibitors can be implemented. The typical saving rate (in terms of energy) for shower heads is 12.5% and 25% for flow inhibitors.

It is clear that pipe/cylinder insulation and condensing boilers offer energy savings. What is less clear is the practical savings from wastewater heat recovery. Water from baths, showers,

washing machines, dish washers and kitchen sinks provides the source of this heat. However, to access all these sources in a typical dwelling the recovery unit needs to be in the underground drain (not a standard option), otherwise a separate unit is attached to each appliance waste pipe. Paradoxically, water saving technologies such as flow inhibitors act to reduce the energy saving potential since there is less hot water. Each unit will require a significant life cycle to offset the embodied energy in the copper heat exchange pipes, leading to some cynicism about the overall energy saving potential of such devices unless their use is restricted to more industrial applications.

### **Conclusion**

A micro-analysis of the options given in the *On the Energy [R]evolution* (IRENA 2015) report provide some discontinuity between the technical model and reality. There is no economic or labour analysis of the massive retrofit programme envisaged, nor any health and safety or social considerations of the dynamics of deep retrofitting millions of occupied dwellings. The authors are not alone since the report is largely based on International Energy Agency (IEA) data. Too much credence is given to manufacturers' product claims and too little attention to the socio-technical nature of widespread retrofit and the need for advanced vocational education and training. Energy saving in buildings will be driven by thermally literate construction worker knowledge, skill and competence, supported by building occupiers. Without substantive input to and from construction actors, claims for a 50% sectoral energy reduction lack credibility.

The *On the Energy [R]evolution* (IRENA 2015) authors state that to make the Energy [R]evolution a reality, immediate political action is required. Within the EU, the pursuit of nearly zero energy buildings (EPBD, 2010), increased renewable energy (RES, 2009) and energy efficiency (EED, 2012) directives provide a legislative framework for lowering built environment emissions. However, within the UK,

Conservative government policy has been to remove Planning powers for sustainable dwellings (Code for sustainable homes) and to renege on policy from 2006 to introduce Zero Carbon Homes in 2016 in the name of 'Planning freedoms and more houses to buy'. There is clear evidence (Zero Carbon Hub, 2014) that UK construction companies are struggling to keep up with changes in the energy Building Regulations and it could be argued pragmatically that the construction industry is not yet ready for zero carbon homes. Alongside the energy 'performance gap', overheating (Zero Carbon Hub, 2015) is also being identified as a new phenomenon in the UK where overheating has been observed in super-insulated dwellings. There is clearly the need for further research and development that is locked into practice-based analysis before we accept the findings in the *On the Energy [R]evolution* (IRENA 2015) report.

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## STRUCTURAL CHALLENGES FOR LOW-CARBON SKILLS DEVELOPMENT IN UK CONSTRUCTION

### Introduction

Construction labour and energy policy have traditionally been treated as separate research fields of, each with their own concerns, methodologies and ways of viewing the world. The construction labour research community has a long-standing interest in workers' rights, trade union representation and - in recent times - the steady erosion of the social contract in labour relations. In contrast, the energy policy community tends to focus on the strategic goal of improving energy efficiency and technology deployment through market mechanisms, using models to describe future scenarios for industrial sectors and nation states.

This paper explores where these two areas of research intersect. My own starting point is very much from the energy policy side, where I have been concerned with policy for a low-carbon future, especially in relation to housing. That interest started with quantitative analysis of technical and market potential for climate change mitigation in buildings. Over time, that interest has shifted away from the questions of

what can be done and how much theoretical potential exists, and now my focus is on how the work can be done and by whom.

The work of innovators can be very instructive, even when they are few in number. Innovators inhabit the same work environments and policy context as the rest of the industry, which makes their novel approaches to problems very grounded. Finding cases of innovation is relatively straightforward, but the diffusion of such innovation is notoriously difficult. A third branch of research is useful here – the study of socio-technical transitions (Geels 2002).

### **The challenge of Low Carbon in construction**

In the fields of energy research and policy there is a broad consensus around the importance of the built environment in meeting CO<sub>2</sub> emissions reduction targets. At a global scale buildings show the greatest potential for reduced energy demand and integration of renewable energy technologies, compared with other sectors (IPCC 2014). Even so, the trade-offs between sectors are highly constrained: the idea that one sector's emissions can be off-set by reductions elsewhere is flawed. All sectors require deep transformations in terms of energy demand and low-carbon supply technologies if 2050 climate change targets are to be met.

Carbon dioxide emissions from energy used in buildings accounts for 40% of all emissions across Europe, and closer to 50% in the UK. By 2050 those emissions need to be reduced by close to 100% (Skea et al. 2009). New sources of energy supply will be needed, but so will major investments in energy efficiency. These changes need to take place across both new and existing building stocks.

The UK construction industry recognises the potential of this as yet unrealised market, with one industry report characterising the then government's 2009 Low Carbon Plan as being 'a blueprint for construction for the next 40

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years' (Department for Business, Innovation and Skills 2010). There are at least two good reasons why, despite the technical and market potential, the construction sector remains largely unresponsive to the challenge and largely unable to 'do' low-carbon buildings. The first reason is simply a case of lack of demand. In a context where government policy has been fragmented and incentive programmes have had a history of stop-start support, the decision to enter a fledgling market has to be seen as risky. Given that there is plenty of work to do without needing to engage with the low-carbon agenda, it seems that the vast bulk of industry actors simply do not bother. The second reason is that industry lobbying has been instrumental in watering down successive attempts at introducing regulation into the market, effectively keeping change incremental, not transformative. Recent examples include the consultation process which led to a definition of 'zero carbon homes' to include important trade-offs through 'allowable solutions'; followed by the decision to abandon the 'zero carbon' policy altogether.

And yet radical transformation is precisely what is needed. The second Egan Review of the UK construction sector characterised the industry as 'a series of sequential and largely separate operations undertaken by individual designers, constructors and suppliers who have no stake in the long-term success of the product and no commitment to it' (Egan 2002: 13). A more recent review argued that changes since 2002 had been 'skin deep' (Wolstenholme 2009) and there is no evidence to suggest that the industry is making radical change. The fragmentation identified by Egan is important in the context of the low-carbon agenda precisely because the technical demands of doing the work mean that the efforts of different project partners need to be coordinated well.

The Zero Carbon Hub's report on the design-performance gap identified three key reasons why UK construction systematically fails to deliver on energy performance targets:



a lack of technical understanding among construction teams; poor communication between team members; and unclear boundaries between roles and responsibilities on-site (Zero Carbon Hub 2014). The first two of these are strongly suggestive of a problem of training; and the third echoes the problems identified by Egan and others. The failings are cultural and managerial as well as technical.

This is not a promising background in which to consider a process of change, and yet there are cases of innovation to learn from. It seems important to understand how a sector really works before trying to work out how it might change.

### **Innovation in construction**

Despite being regularly labelled 'conservative', the construction sector can and does innovate, albeit in ways which are hidden from conventional metrics, and therefore often ignored in policy debates. The Standard Industry Classification (SIC) codes, which are used to compile economic data across the economy, are organised in such a way that many of the people who do relevant innovative work are not classed as being in 'construction' at all, but in industries such as 'design', 'consultancy' etc. (Winch 2003).

Also, because innovation in this sector tends to be collaborative and project-based, it is not reflected in statistics for patent applications and size of dedicated R&D budgets (Harris and Halkett 2007). A narrow equation of the term 'innovation' with 'new technology' means that novel building practices, business models and other industry processes go largely ignored. The point needs to be re-asserted that, in this industry, innovation 'is not what is new per se, but what is new to the firm' (Barrett et al. 2007).

Innovation has also a structural dimension across the entire industry, operating at a level beyond the individual firm. The concept of the 'system of professions' provides a conceptual framework for thinking about how different groups of

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workers become assigned certain tasks or areas of work – termed ‘jurisdictions’ - in response to market demand. Thus, architects might be characterised as being primarily concerned with aesthetics in design, while engineers have a remit that is more about function than form. Among tradespeople, there are similar delineations between, say, carpenters, plasterers, general builders, electricians etc. Each trade has a set of tasks which is generally accepted as its jurisdiction, sometimes reinforced through systems of training and accreditation, which give the right of ‘sign-off’ on certain types of work to those whose job it is to know about and be proficient in that work.

Sometimes new societal needs emerge, giving rise to new jurisdictions, or blurred boundaries between existing ones. Such new jurisdictions become contested between existing professions, and may give rise to new groups claiming the jurisdiction for a profession that did not previously (need to) exist. The policy-led task of creating low-carbon building stocks is one such societal need, and recent years have indeed seen the new jurisdiction being contested. A new job role of ‘integrator’ has been identified as needed (but currently missing) by the World Building Council for Sustainable Development (WBCSD 2014). A new organisation in the UK, the Centre of Refurbishment Excellence (CoRE) has been set up to train a new cadre of Retrofit Coordinators<sup>1</sup>. CoRE has been set up by a group of practitioners with diverse experience of design, installation and project management, and their course draws from that experience of what is needed to make things work in the specific context of renovating existing homes.

The job of ‘Retrofit Coordinator’ or ‘Integrator’ is a good example of a new jurisdiction, which is not assigned to an existing job role. The coining of new terms to capture what this role is underlines the point that this is a new kind of work, which does not fit into conventional descriptions of job

1. <http://www.core-skills.com/>

roles. Some practitioners have likened it to the role of Clerk of Works, which used to exist but is no longer current. However, the emphasis on building energy performance is new, and the Clerk of Works is likely a better fit in terms of project oversight and managerial responsibility than technical understanding. In any case, the purpose here is not to try to define the new role, but simply to highlight that the role is contested, uncertain and not (yet) fully defined.

The Retrofit Coordinator course had some 100 graduates at the time of writing, but is clearly barely scratching the surface of the bigger challenge of making 'low-carbon' mainstream. The next section explores the question from the perspective of mainstream institutions, how they develop and fund courses, and their capacity to relate to mould-breaking innovations like CoRE.

### **How VET works – the legacy of a retreating public sector**

In their comparison of construction training in the UK and Germany Clarke and Herrmann (2007) use employment and training statistics to chart the steady erosion of technical content in UK construction training over several decades. In comparison with France, the English VET system is narrowly focused on job roles and practical skills, rather than on workers as knowledgeable and productive citizens (Brockmann et al 2008).

Sector Skills Councils (SSCs) operate under licence from the British government to administer VET and work up strategic priorities for training in different economic sectors<sup>2</sup>. The SSC for construction is the Construction Industry Training Board (CITB). The licensing arrangement for SSCs gives the elected government an ultimate power of veto, but in practice it is not in anyone's interest to revoke the licence except in extreme circumstances. The SSC model is intended to give

2. Policy for education and training is devolved to the Scottish, Welsh and Northern Irish Assemblies, but the CITB levy system remains UK-wide.

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industry representatives a strong influence on operations and strategy for VET.

The short-term and narrow focus of this 'industry-led' system for VET is seen in the much reduced time deemed appropriate for training. Short sessions of up to an hour (such as 'tool box talks') are designed to give updates on changes to legislation or introduce mechanistic innovations (eg new tools or time-saving products). They do not equip trainees with technical understanding, based in theoretical principles, which can then be applied to problem-solving in new situations. Nowadays, apprenticeships are offered on 'day release' from the workplace, whereas college courses used to be done in 'block release', giving trainees several weeks of classroom training at a time. The erosion of time for training goes hand in hand with the shift away from technically rich, intellectually demanding topics.

UK construction training is funded through a levy system. All eligible firms pay into a fund, administered by CITB, and those same firms can bid to secure funding from the fund for CITB-approved courses. CITB also makes grants for projects, for example on the development of innovative courses, training materials or for background research. The funding situation appears healthy, therefore, but it is not set up to be particularly innovative. This is partly connected to the policy environment and lack of a significant market for innovative work. But conservatism is perpetuated within the system in other ways too. For example, there is no evaluation system for projects funded by CITB, which means that any lessons learned (good or bad) go unanalysed and un-communicated. The question of eligibility also represents a barrier to innovation. At the time of writing the Retrofit Coordinator course run by CoRE is not eligible for CITB funding because CITB cannot assign the course to an existing trade or group of trades. The course falls foul of an administrative function which thinks primarily in terms of inputs (existing job roles) not in terms of outputs (well-performing buildings).

### **VET for low-carbon construction: a complex set of wicked problems**

This paper has reviewed three important elements of potential systemic change in construction. The VET system, which has been analysed by researchers with a main focus on labour relations, has witnessed a steady decline in the technical content of training. This steers the whole industry away from the up-skilling required by the low-carbon agenda, taking it instead towards a de-skilling agenda. The fact that low-carbon building work requires project-based technical knowledge means that, no matter how smart the technology becomes, there will always be a need for knowledgeable people to come up with workable solutions on-site.

The design-performance places three overlapping demands on the industry workforce: improved technical understanding, better communication, and a new culture of risk management, which looks for collaborative solutions, rather than the current dominant culture of aversion to both risk and liability.

For those whose research in this sector is primarily motivated by a concern for labour rights, the low-carbon agenda reinforces the arguments that have been made about the need to invest in a skilled, knowledgeable workforce. For those whose primary concern is climate change mitigation, the labour and training issues represent barriers to progress, which are not typically known to those who specialise in computer models and scenarios, framed narrowly in terms of technical and market potential. The many market failures in this domain are compounded by failures in innovation policy and a long-standing 'race to the bottom' when it comes to VET.

However, there are other problems too, which relate specifically to the requirements of doing low-carbon. First of all, while the market for low-carbon construction work is small, so too is the incentive to train. A handful of innovative

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courses and new training centres have been set up on the promise of delivering the training required, only to find that there are simply not enough trainees to make the training viable. The underlying challenge is one of market transformation, whereby the low-carbon works become an integral part of normal construction projects (Killip 2013). Key to this is a clear and consistent policy environment, and a commitment to stimulate demand and supply at the same time: to provide work opportunities for low-carbon trainees, as well as training courses.

A second problem relates to the nature of the many technical and managerial challenges of doing low-carbon construction consistently well. Many of the skills and knowledge required sit at National Vocational Qualification (NVQ) level 4, which is in the domain of both further education (FE) in colleges and higher education (HE) in universities. The cross-fertilisation of ideas between the two domains could in theory be a source of innovation in itself, but the conventional institutional boundaries are also a barrier to change. The construction training sector has difficulty contemplating skills which are not pre-defined by existing trades. In the HE sector, the Royal Academy of Engineering has backed four UK universities as 'centres of excellence' in sustainable building design. One emerging theme across all four centres is a blurring of the traditional boundary between the roles of architects and engineers in a new, energy-literate design discipline of 'architectural engineering'. While welcome in itself, the focus remains primarily in the HE sector and on design rather than construction, and is yet to make any impact with FE.

So long as training funding can only be spent on courses for pre-defined trades, important innovations, such as work to coordinate, integrate and quality-assure the work of project teams, get ignored. The construction training sector in the UK operates primarily in terms of labour inputs (pre-defined trades), not in terms of the overall construction process, let alone the outcomes of the process in terms of building energy

performance. The issue of trade-based training, rather than industry-based training, has been analysed in relation to the negative impact on the long-term employability and adaptability of workers in an uncertain future labour market (Clarke, Wall 2000; Dainty, Andrew, R., J., Green et al. 2007). The rigours of doing low-carbon construction add a further rationale to the argument for a more holistic approach to training, rather than one which is narrowly focused on tasks and trades.

A third problem is the highly fragmented nature of the industry, and the challenges that fragmentation represents for governance and decision-making. Construction is vast and very diverse. Its output of over £100bn per year covers everything from large-scale infrastructure projects (eg new airports, rail lines) down to the much less prestigious, everyday activities like shop-fitting and handyman services. Some firms may operate in more than one sub-sector (eg builders with a main focus on repair and maintenance may also do small-scale new development), so the categorisation of sub-sectors is not hard-and-fast. Nonetheless, the predominance of certain actors in different markets underlies the value of a sub-sectoral approach to policy and industry strategy.

### **Ways forward**

Without reform in the training and innovation systems, the prospects for the UK's building stocks to get anywhere close to 2050 CO<sub>2</sub> emissions reduction targets seem bleak. For VET the challenge is to increase quality in terms of technical and managerial knowledge and skill, but the VET system has been moving steadily in the opposite direction for decades, so this is not a simple task. The dynamism and creativity of innovators also need to be harnessed if the built environment is to get even close to its technical and market potential for low-carbon. The fact that radical improvement is possible, in theory, with existing technology has led to an assumption that innovation is not needed. The 'hidden' and project-based

nature of innovation in the sector is yet another hurdle to overcome. Bringing these different themes together into a forward-looking programme will take a willingness among the energy, innovation and VET communities to work together much more closely and whole-heartedly than they have done until now. The cross-fertilisation of ideas from different perspectives is needed to get to grips with these problems in a constructive, but realistic way.

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# Reports

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## **Adapting Work and Workplaces to Climate Change: Canada in an International Perspective**

The threat posed by climate change has become an increasingly important issue within the EU and internationally. With every new scientific study, the impact of rising global temperatures appears more worrisome and the challenges faced by our society in addressing the change more daunting. Studies by the Intergovernmental Panel on Climate Change (IPCC), the World Bank, the UK's Stern Commission and many other highly credible international and national scientific organizations have underlined the enormous adverse impact of a 2 degree warming of our planet, which increasingly seems likely. More alarming, the possibility of a 4 degree increase by the end of the century is now a distinct possibility, a development that will threaten our very civilization. Climate change is the most important challenge humanity has every faced.

However, the impressive depth of scientific research on this issue has not been paralleled by corresponding research on its impact on work. Climate change will not only trigger major shifts in our economy and society: it will also result in major changes in employment patterns and in the work that many of us perform. The way in which we respond, as societies, to these changes will also have major economic, social and political implications, depending on whether we follow a path of 'just transition' or one that relies on market forces with the inherent inequalities that they perpetuate.

In Canada, a group of trade unions and academics have been working together for a number of years to carry out research and develop responses to the question of how work can - and should - be reorganized to meet the challenge of climate change. Starting with a modest initiative in the mid-2000s that asked some basic questions concerning what we know

about the impact of climate change on work and what we needed to know to respond effectively to it, the group has expanded its activities, incrementally, over the following decade.

In 2008, it succeeded in obtaining its third major grant, a 5 year, \$1 million grant from Canada's Social Science and Humanities Research Council (SSHRC) to explore these questions. Naming its project, "Work in a Warming World" (W3), the group proceeded to carry out a number of research projects examining the way in which unions in various sectors of the Canadian economy, including construction, were dealing with climate issues. This body of research, which includes a large number of working papers, journal articles and two major books, is posted on the W3 web site: (<http://www.workinawarmingworld.yorku.ca/>)

The participants also hosted a number of public meetings, research workshops and a major conference in December, 2013 which brought together over 200 union officials, climate activists and academics to discuss climate change options that unions could pursue in the workplace and in the broader public arena. (A report on this conference was included in CLR News 1/2014)

Based on this experience - and the momentum from the conference - the group applied for another, larger, grant to expand the research programme. In August, 2013, SSHRC awarded the group's proposal "Adapting Canadian Work and Workplaces to Climate Change: Canada in an International Perspective (ACW)" \$2.5 million, spread over 7 years to continue this research. This new initiative includes 47 academic researchers from 4 countries: Canada, the UK, the US and Australia. It also involves 23 partner organizations, primarily Canadian unions, but also some Canadian and US environmental organizations and several public policy think tanks.

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Since the announcement, the number of participating unions has grown significantly and includes the Canadian Labour Congress (CLC), the nation's major labour federation, one of whose Vice-Presidents now sits on the grant's Steering Committee. The President of the British Columbia and Yukon Territory Building and Construction Trades Council (BCYBCT), Lee Loftus, is another of its members. In addition, key CLC affiliates, including Canada's two largest unions (CUPE and NUPGE), are active supporters of its research projects and one of the grant's four directors is from the Canadian Union of Postal Workers, underscoring the extent to which the initiative is a partnership between labour and the academic community.

A key premise of the project is that the debate about how best to respond to climate change has neglected the importance of work and the role of workers in finding solutions. Bringing work back into the picture will rebalance, to some degree, the current discussion about what needs to be done. In the process, hopefully, it will open the door to a much larger role for workers and the unions that represent them as active participants in formulating solutions to climate change, both in the workplace and in the larger policy arena.

ACW is examining the following questions:

- How best can Canada's diverse workplaces adapt work to mitigate greenhouse gases?
- What changes in law and policy, work design and organizational models for industry and services, would assist the 'greening' of workplaces and work?
- What can Canada and its unions learn from other countries to deepen its understanding of strategic options?

The project assumes that 'greening' work and workplaces will require a major redesign of work processes and practices to reduce the production and/or emission of greenhouse gases.

The physical and social impacts of climate change are already changing the availability of jobs, what is produced and where it is produced. The project assumes that responding to climate change will also require deep changes in how goods and services are produced and transported; what – and how much – energy is used; the technology selected; and, what green skills the workforce will need in the future.

Bringing workplaces, workers and work itself ‘in’ to the struggle to slow global warming will entail rethinking the labour process through a green lens, and adapting key steps in the chain of production to mitigate greenhouse gases. It will entail reconsidering the legal and policy contexts to facilitate low-carbon adaptation at the workplace. And it will involve examining work design and current organizational models to eliminate their carbon footprint. This process will open the door for workers and their unions to play a much larger role in adapting work to mitigate GHGs, including shaping future patterns of work organisation.

In its submission to SSHRC for the funding to carry out its research, ACW identified the following specific objectives:

1. Create the enabling conditions for organisations and work groups to carry out green reform of work design on a large scale using the discoveries provided by ACW research.
2. Produce new research to identify the policy and legal tools and work designs that foster green adaptation of workplaces in construction, services, energy and manufacturing.
3. Develop work-based strategies to reduce GHGs and energy use. Implement them in workplaces in partnership with unions, professional associations and employers.
4. Strengthen green workforce skills, leadership and collaboration through high-level education and training in ACW’s Green Workplace Training Programme and through participation in workplace adaptation projects.

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5. Integrate international and national best practices into Canadian work-based adaptation projects. Disseminate the information to partners and their members widely in English and French.
6. Make training resources available to groups considering workplace adaptation.
7. Disseminate ACW training materials and curriculum to partners. Assist in their use.
8. Train the next generation of highly qualified researchers, trainers, policy makers and practitioners in work-based and social climate change research and its applications.

ACW's research programme is divided into two streams. One deals with four specific economic sectors: construction, energy, manufacturing and services. The other deals with issues that cut across all sectors of the economy and society, including: law & policy, work design, climate training and international experience. It has established a working group for each of these eight sets of issues. As the project's research evolves, it is hoped that it will expand to address the actual design of workplaces and work process and also the development of training modules and climate education programmes for union stewards and lay representatives at the workplace.

Of relevance to readers of CLR, one of the key research streams deals with the building industry. The research team includes the President of the British Columbia and Yukon Building and Construction Trades Council which represents all the major construction unions in Canada's most western province, along with academics from Simon Fraser University and York Universities in Canada and the University of Westminster in the UK that share an interest in construction sector labour issues. This group is at an early stage in the development of its work plan, but already has identified a number of research projects that it believes would be worth pursuing. It is also intent on expanding its membership, both on the labour side and on the academic research side due to

its belief that reducing the GHG emissions and energy use of buildings is the most promising way to lower our society's carbon footprint.

At the ACW team meeting in November 2015, the Built Environment Working Group reviewed its baseline work plan with the view to identifying the research areas it planned to explore in the coming years. The overall aim is to research the labour and labour process implications of transitioning to a low carbon, energy efficient building industry.

The Baseline Report has identified the following goals:

1. To establish the current state of knowledge about the contribution of the construction workforce to 'greening' the construction industry;
2. To assess the potential of workers and their unions to shape the industry's carbon footprint.
3. To identify barriers to the successful participation of the workforce in developing pathways to low carbon construction and develop strategies to circumvent these barriers.
4. To identify needed modifications to employment, employment conditions, working practices and the overall organization of construction work that will improve the capacity of the workforce to implement low carbon construction (effective health and safety provisions, integrated team-based work practices, improved vocational education and training (VET), union representation and a greater say for the workforce in shaping the industry's future).
5. To examine the current and potential role of unions and professional organizations in advancing this process.
6. To analyze the workforce implications of widely used policy tools, such as energy efficiency targets, building codes and contract procurement requirements in facilitating the transition to low carbon construction.

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7. To carry out research on the role of workers and the organizations that represent them in implementing specific, innovative low carbon projects which can serve as models for wider application in the building industry.

The Built Environment Working Group recognizes that this is a large and broad research agenda. The extent to which specific areas become the focus of individual research projects will depend partly on the interests, background and resources of group members as well as input from the Group's union partners. However, the grant will provide funding over the next 6 years, providing opportunities to explore a number of these concerns in some depth.

A key focus of the overall research agenda will be to provide workers and the unions that represent them with the evidence and communication tools they need to put "labour" more forcefully into the conversation about implementing low carbon construction. Providing new research on the contribution building workers can – and should – be making in the effort to limit global warming will, hopefully, also address an important gap in the current debate about the most appropriate pathways to address climate change. (A copy of the full baseline report will be posted on the Work in a Warming World – Adapting Work and Workplaces to Climate Change website, as will the various research projects once they are completed.)



## Labour and Climate Transition

University of Westminster, 35 Marylebone Road, London NW1 5LS, 21 September 2015

Paul Chan,  
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This seminar comprised two keynote presentations by Fred Stewart (Policy Studies Institute, University of Westminster) and Dimitris Stevis (Colorado State University). John Calvert from Simon Fraser University opened the seminar by reporting on the programme 'Work in a Warming World (W3): Adapting Canadian Work and Workplaces in response to Climate Change' (see <http://www.workinawarmingworld.yorku.ca/>). This \$2.5m, 7-year programme seeks to bring together labour academics and environmentalist to come up with a response on climate change. The central question deals with how we can transition to a lower carbon economy by considering adaptations to the built environment, public services, and transportation. At its core is an exploration of how work in general needs to be reorganised. This programme also highlights the instrumental role that all trade unions can play in getting input on what should be researched on climate change.

Fred Stewart kicked off the first of two presentations by tracing the evolution of policy instruments in response to climate change. His presentation started by outlining key policy approaches, ranging from neoliberalism to ecological modernisation to Marxism. He also noted how there were varieties of green capitalism, and how trade unions have played a significant role, albeit in a context where values of collectivism and fairness have been neglected. He observed the dominance of market-based instruments in regulating behaviour, and highlighted how the balance has shifted away from zero-growth discourse to companies and industry being key gatekeepers in providing (technological) solutions. He argued that the Stern Review had sparked the emergence of the transitions approach, and that climate change is the greatest and widest-ranging market failure ever seen.

Fred traced how, at European Level, trade union actors have been calling for action to mitigate climate change long before the Stern Review. The ETUC recognised early on in 2003 that there was a need to consider how climate change will impact on the nature of work, skills and qualifications, and the way businesses operate. There was also recognition that the distribution of jobs will change radically, alongside changes in the use of energy in transport and housing. He also pointed to the trade union movement's call for 'just transition'. Nevertheless, he noted how the trade unions moved towards a more defensive position in arguing for the protection of jobs (safety net), and that this stymied the possibilities for more radical proposals. This was a missed opportunity, as he indicated that there is a renewed focus on the economy, and emphasis on so-called co-benefits of climate change policy. This renewed focus on the economy is less about dealing with climate change and more about reframing industrial policies in order to find ways out of the financial crisis. In summing up his presentation, Fred offered some insights into new emphases, including a move to look beyond micro-level firm interventions to see how actions occur through meso-level networks.

The discussion that followed centred on the changing role of the state, scepticism of the transition approach and how socio-technical approaches fudges the fact that emission levels are still rising. There was a sense that trade unions needed to get their house in order so that clarity can be sought on what all these projections on climate change mean for the worker. A number of contradictions also emerged in the discussion, including the paradox of the 'jobs transition', where workers are protesting against actions for climate change because of empty promises made on investment in adaptations to skills and work. There was also a sense that lots of initiatives were not radical enough, and more needed to be done to dream up an overhaul of the dominant market system. An argument was made that the focus on property-based capitalism simply licenses the exploitation of labour

and natural resources. The group was finally called to join in the Climate March in London on 29 November 2015 (<http://www.campaigncc.org/climate march london>).

Dimitris Stevis followed on with his presentation on labour unions and green transitions in the U.S. He focussed on the sociotechnical transitions approach, and criticised the institutional approach (the study of social institutions and social power) as neglecting politics. He stressed that power relations create path dependencies, and that the path to decarbonisation cannot ignore how the political economy can implicate upon the adoption of particular pathways. Dimitris noted the relatively low union density in the U.S. (6% in the private sector, with 35% in the public sector). Only those covered by unions are protected by employment contracts. He stressed that businesses are hostile to unionism, although he observed islands of collaborative relations. In terms of responding to climate change, the evidence is patchy. There is limited role played by the Federal State in regulating and funding research laboratories. This does not filter down to sub-Federal State level, which tends to be characterised by predatory competition. There is, nevertheless, hope in the Blue-Green alliance, formed between trade unions and environmentalists. But, think tanks and advocates have limited power.

# Review Essay

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## Climate change and the power of naming – Anthropocene versus Capitalocene

'The Capitalocene' Part I and Part II, by Jason W Moore (2014).  
Retrieved from: <http://www.jasonwmoore.com/Essays.html>

The debate over climate change and planetary environmental degradation forces us to take up a position and to defend it; the time for fence-sitting is over. From a technical perspective, we negotiate our position on global warming and climate change over computer-modelled evidence (with all our scepticism of long-term complex modelling) and our 'common sense' feeling that "estimated cumulative emissions 592 billions tonnes...[of green house gases] since industrialization began"<sup>1</sup> 'must surely' have some impact on the atmosphere's greenhouse effect. This emotional response is strengthened by the latest IPCC report which categorically states that anthropogenic carbon dioxide emissions are resulting in climate change: 'the world emits 48% more carbon dioxide from the consumption of energy now than it did in 1992 when the first Rio summit took place' (Rogers, 2012). An ecological crisis of global warming, air and water pollution, loss of forest and soil productivity, industrial fisheries, and industrial waste (all resulting in the 6<sup>th</sup> Extinction<sup>2</sup>) has led to the current geological era being re-classified from 'Holocene' (recent or post glacial) to 'Anthropocene' (Crutzen & Stoermer, 2000<sup>3</sup>). The Anthropocene, it is argued, is the new era where humanity (*anthropos*) has caused mass extinctions of plant and animal species, polluted the oceans and so altered the land and atmosphere as to bring us to a new geological era that is recognisable by earth scientists. Crutzen, the Nobel Laureate who jointly proposed the term, states that the Anthropocene

1. <http://trillionthtonne.org/> accessed 14/08/2015
2. [https://en.wikipedia.org/wiki/The\\_Sixth\\_Extinction\\_%28book%29](https://en.wikipedia.org/wiki/The_Sixth_Extinction_%28book%29)
3. First proposed in the IGBP Newsletter 41 (2000: 17-18) Policy for education and training is devolved to the Scottish, Welsh and Northern Irish Assemblies, but the CITB levy system remains UK-wide.

“could” be said to have started in the late eighteenth century when analysis of air trapped in polar ice showed the beginning of growing global concentrations of carbon dioxide and methane.

Whilst Crutzen remains ambivalent regarding the start of the Anthropocene, the general consensus of most reportage is that it begins with the industrial revolution and is largely reversible through decarbonisation. How decarbonisation is to be effected is the subject of the Stern Review (2006), of carbon trading, nuclear power, large scale off-shore wind farms, energy efficient housing, etc. The Lancet (2015:2) report on *Health and climate change* focuses on greenhouse gas emissions and states that: ‘Achieving a decarbonised global economy and securing the public health benefits it offers is no longer primarily a technical or economic question - it is now a political one’, and yet nowhere in the report is ‘political’ defined. This projection of the Anthropocene is dependent on the assumption that ‘humanity’ is the root cause rather than a political and economic system operated globally by the powerful, where Capitalism and Gaia<sup>4</sup> struggle to co-exist.

In contrast to the industrial revolution focus, Jason W Moore places climate change in the context of capitalism’s European development from the fifteenth and sixteenth centuries, the ‘long sixteenth century’, as the base of social production shifted from feudal land holding to low interest banking providing loans for trade, manufacture, and commodity markets, that is production driven by the accumulation of money. This socio-economic change resulted in, among other things, early ‘agribusiness’ feeding a growing urban population, pan-European banking, European stock markets and luxury goods trade with Asia. Voyagers such as Columbus,

4. Gaia, the Earth Goddess, who gave the name to the Gaia hypothesis developed in the 1970s, that organisms interact with their inorganic surroundings on Earth to form a self-regulating, complex system helping to maintain the conditions for life on the planet.

## Review Essay

da Gama and the Dutch East India Company's captains further enhanced the international aspect of this global mapping and trading system, leading to forms of industrialised slavery with South American gold and particularly silver mining, sugar and later rubber plantations that terrorised and exploited whole populations while 'terraforming' global tracks of river basin, virgin forest and prairie.

Moore proposes that within this scenario, a Marxist analysis asserts that nature is objectified as source of unpaid appropriated labour in the production of raw materials and in the reproduction of human labour. Eco-degradation is the logical outcome and, although claims for humans as a part of nature reflect the eco-zeitgeist, the dominant economic model remains wedded to nature as an externalized, exploitable resource of 'natural capital'. The development of fossil fuel-based manufacture is then just an extension of this fundamental relationship and carbon dioxide emissions are but the latest waste stream of globalizing capitalism driven by the need to generate profit. Moore therefore proposes that only by understanding the power structures of capitalism can we understand its ecological impacts and reflect on the naming process – 'Capitalocene' rather than 'Anthropocene'. Moore's view of the Capitalocene through a Marxist lens, developed in Part II of the essay, requires the reader to tackle concepts outlined in Marx's *Capital*, no easy jaunt for a non-political scientist. What follows is an attempt to unwrap the principal concepts.

The production of commodities, that is marketable products, necessarily results in an abstraction of humanity from itself, the 'alienation' of the individual from the labour process, from life itself. This is the use of abstract labour tied not to the life of an individual and its self-expression but to the capitalist production process. Within capitalist production we are all reduced to quanta or lumps of *abstract social labour* where our working lives are dependent on the market's

assessment of the *socially necessary labour time* required to produce commodities at the marketable price. Socially necessary labour time is the cost required for the reproduction of labour, the ability to live, to return to work each day with the necessary vim to keep up the production process.

Let us suppose, simplistically, that it costs €100 per week for the reproduction of labour and a five day working week. If the value of €100 is produced in three days, the surplus value – the profit for the employer - is extracted during the remaining two working days. Here we are assuming that socially necessary labour time is based on the full needs for the reproduction of labour. However, feminist analysis has identified the *appropriation of unpaid labour* as the real condition of capitalist production where, in particular, women's labour in the production and upkeep of the nuclear family, shopping, cooking, cleaning, childcare, etc., is unpaid. Given that capitalism is marked by periodic crises, cycles of downturn, then unpaid socially necessary labour is in fact central to its survival and growth, without this, its crises would be even more apparent.

Moore expands this zone of appropriated labour to nature where, initially through conquest and colonialism, nature is appropriated as raw materials, plantations, mines, fisheries, etc. Nature is thus treated as external, alienated, a perspective encompassed in a 'Cartesian' dualistic view<sup>5</sup> of *humans and nature* as opposed to *humans-in-nature*, where unpaid socially necessary nature is an integral and necessary function of capitalist production, appropriated and externalized, leading to ecological destruction.

From the perspective of *appropriated nature*, the historical process of global ecological breakdown begins with the development of commodity production as a global regime.

5. René Descartes – 'I think therefore I am' – the separation of mind and body, a dualistic approach to existence.

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The industrial revolution is just an acceleration of the motor of production and not the driver of this appropriation. Focusing on the industrial revolution results in a perspective described as *technological determinism*, where technological development rather than the social conditions of production is seen as the prime cause of environmental degradation. Since all forms of appropriated nature result in exploitation and waste - whether in the form of dust bowls, contamination, overfishing, greenhouse gases, etc., focusing on reducing carbon dioxide emissions or on any one of these waste streams without challenging the underlying mode of production does not provide the solution. The concept of 'Anthropocene' and its expression through, for example, 'Deep Ecology's'<sup>6</sup> Malthusian targeting of population growth, or, at the opposite end of the spectrum, technological fixes such as 'Geo-engineering' the planet, understate or ignore this underlying fundamental contradiction between capitalism and nature.

Moore's analysis of the 'Capitalocene' provides useful tools to analyse both the personal and the political level in addressing climate change and the destruction of Earth's life forms. Responding to a deepening sense of our own alienation from work and a better understanding of from whom, and how, we appropriate unpaid labour in our lives can only help to address and repair personal relationships. For construction workers in particular, the basic restatement of employment conditions, both in selling labour power as a commodity to employers and in producing buildings as commodities, explains why these conditions are fraught with conflict in our personal and social lives and in our broader environmental commitments. From an environmental perspective, some 40% of end-use emissions result from the built environment, whilst construction is the largest waste producer in the UK

6. Deep Ecology Platform: <http://www.deepecology.org/platform.htm> For a critique of Deep Ecology see <https://libcom.org/library/social-versus-deep-ecology-bookchin>



(DEFRA, 2015) and accounts for approximately 25% - 30% of all waste generated in the EU<sup>7</sup>. Construction workers and construction trade unions therefore have a critical role in developing new approaches to understanding and responding to the 'Capitalocene' as a destructive mode of production through a refocused approach to political-economy, promoting new forms of vocational education and training (VET), explicitly focused on education in its widest sense and on low energy and low waste employment practices. In a more general sense, Moore's exposition of the 'Capitalocene' will prove vital in promoting a just transition (ILO, 2010) to a sustainable future.

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# Reviews

John Calvert

Paul Hampton. 2015. **Workers and Trade Unions for Climate Solidarity: Tackling Climate Change in a Neoliberal World.** Routledge (Studies in Climate, Work and Society). Oxford and New York

Global warming is now the most important challenge facing the human species. Yet despite the overwhelming evidence that humanity is heading rapidly to the precipice of a 4 degree increase in average temperatures by the end of this century, thus far efforts to curb the emission of greenhouse gasses have been wholly inadequate. Paul Hampton argues that the climate crisis is a direct consequence of the nature of capitalist production. The failure to implement effective measures to address the climate challenge reflects the dominant narrative that market-based solutions are the only viable response. However, Hampton argues that these solutions are inherently incapable of coping with the scope of the crisis we now face because they rely on the same market system that has caused the problem in the first place. In contrast, he believes that the labour movement, despite its numerous contradictions, is the one social force that has the potential to address the severity of the impending crisis. If global warming is to be contained, labour must be at the centre of the solution.

Hampton believes that the concept of class is almost entirely missing from the conventional narrative about the causes and solutions to climate change. Hampton is concerned that so much of the current discussion of climate issues is disconnected from any analysis of the structures of power and class in society. Instead it defines the problem as an inevitable consequence of economic development. It takes for granted the existing political and economic framework and, consequently, focuses on narrow, technical solutions that are compatible with maintaining the status quo. His book is intended to bring class back into the discourse.

He begins with the observation that the prevailing discourse around climate change is missing a key voice: organized labour. Despite the enormous contribution that the scientific community has made to our understanding of the scope and significance of the climate crisis, it lacks a corresponding political analysis about the causes of the problems it so effectively documents. The prevailing assumption in the mainstream narrative is that the existing power structures are capable of addressing climate change if only they can be motivated to act. Hence solutions do not require the involvement of workers or the organizations that represent them. Hampton strongly disagrees.

Drawing from a wide range of scholarly literature Hampton argues that there are three basic theoretical approaches to understanding the climate crisis. The first is the prevailing neoliberal view. It sees the problem in terms of what mainstream economists refer to as market failure. The price of carbon is not adequately factored into the cost of goods and services. Accordingly, the solution is to modify market signals through measures such as pricing carbon. Emissions trading systems or carbon taxes will encourage investors and corporations voluntarily to reduce their GHG emissions. The role of government in this approach is to see that the right signals are sent to the market players: otherwise all it needs to do is to allow the private sector to get on with the task of reorganizing production in a more climate friendly manner. Supply and demand will do the rest. In Hampton's view this is the prevailing climate orthodoxy as articulated by the IPCC, Stern and numerous other well-known climate authorities.

The second approach, which has shaped much of the activity of unions and social democratic political parties, is what Hampton refers to as the 'ecological modernization' approach. While not challenging the dominant role of markets, this approach creates space for government as a significant player that attempts to use its influence to shape the way in which the economy should be restructured to deal

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with global warming. The ecological modernization approach has room for other players such as NGOs and unions as 'partners,' but in a subordinate role to capital. Hampton locates much of the work of the trade union movement both in the UK and at the international level within this framework. However he believes that neither the neoliberal, nor the ecological modernization, approaches are even remotely likely to foster the kind of radical changes in both the economy and society that are now needed.

The third approach is based on a class analysis of the climate crisis. Global warming is the result of capitalism's never ending pursuit of profits. This requires continued expansion of production, more extensive exploitation of labour and, most significantly, the treatment of the planet's resources as an infinite source of raw materials and energy. As Marx noted, capitalism is based on the principle of never ending growth, a view that starkly contrasts with the reality that the planet's capacity to support such growth is physically limited. It also treats the degradation of the earth's ecosystem as little more than an externality of the productive process. By understanding the underlying role of class relations in shaping production, Hampton believes it is possible to understand why current policies are failing and to articulate solutions that get at the root of the climate crisis.

Hampton devotes several chapters of his book to an account of the development of the trade union movement's understanding of – and approach to resolving – the climate challenge. His very detailed account of the position papers, statements, conference resolutions, and lobbying activities of various UK unions and international federations over the past 30 or so years provides an excellent overview of the internal debates and conflicts that have shaped the evolution of labour's climate policies. While he views unions as generally adhering to the ecological modernization framework, he also sees evidence of an emerging recognition of the need to move beyond this view to incorporate explicit elements of

class analysis. Organized labour's shift from concepts such as 'sustainable development' to 'just transition' is a reflection of the growth of this understanding, albeit a growth that is uneven and at times inconsistent.

One of the key challenges unions face is how to deal with the employment impacts of shifting to a low carbon economy. The environment versus jobs question has been particularly difficult for unions whose members work in the fossil fuel sector. The challenge of representing workers' interests in maintaining employment while advocating an end to reliance on fossil fuels has – understandably - triggered heated debate within the union movement and, at times, has resulted in policies which are at odds with climate objectives. Hampton outlines the various elements of this debate and provides examples of how some unions have worked to resolve it. He notes a parallel with the earlier efforts of the Lucas Aerospace workers to implement peaceful conversion policies by shifting production from military to civilian uses of the investments made by their employers in advanced technologies. The Lucas shop stewards challenged the priorities of the arms industry and outlined a way to maintain employment and skills through implementing a wide range of technological innovations designed to meet social, rather than military priorities.

The 2009 factory occupation by workers at the Vesta wind turbine manufacturing plant is the subject of an entire chapter of the book. Hampton believes it provides important lessons for the broader trade union movement, even though the employer eventually succeeded in closing the factory. The plant produced a key renewable energy product that was widely seen as an essential element of the shift to green energy. The jobs of the workers were seen as 'green jobs' so the closure symbolized a major setback to the achievement of a greener economy. The closure also underlined the limitations of relying on the private sector to achieve climate progress. It demonstrated that privately owned green plants

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were as profit driven as private operations in other areas of the economy.

Hampton's account documents the way the campaign against closure evolved. It describes the tensions and the alliances that emerged both within the labour movement and in the environmental NGOs during the struggle. Both mainstream labour unions and established NGOs had difficulty deciding how to react to the occupation. But numerous rank and file union members and a number of smaller, more radical environmental groups built support networks to help the occupiers and to pressure their own organizations, as well as the Labour government, to stop the closure. The occupation highlighted the limitations of ecological modernization as the Labour Government proved unable to find a way to save the plant, given that it rejected calls for nationalizing the industry or imposing other legislative constraints on the company. The failure also highlighted the contrast between its public commitment to climate change and its inability to protect green jobs.

Hampton notes that, despite the tension between jobs and the environment, trade unions are increasingly open to working with environmental NGOs and other civil society organizations. They recognize that these organizations can be allies in their efforts to challenge corporate control of the climate agenda as part of a broader 'red-green' alliance. He sees in this development the seeds of a much broader movement in which labour takes a key role in articulating climate goals.

One of the most interesting components of the book is the chapter documenting the large number of workplace-based initiatives that union members have promoted through their work as environment stewards and members of locally negotiated environmental committees. The extensive description of the surprisingly large number of such initiatives in recent years is a major contribution to our

understanding of what workers and their unions have been doing on the ground in the UK. And while some of these initiatives were facilitated by the previous Labour Government's efforts to accommodate union demands, Hampton notes that such initiatives have been almost entirely promoted – and funded by – the unions themselves.

Turning to the limitations of the book, it is somewhat vague about the transition process that a class based analysis envisions. While it is not Hampton's agenda to describe in detail the key elements of a new society – and to be fair in addition to his extensive discussion of Marx, he does briefly reference the visions of other British socialists such as William Morris – there is still not much concrete discussion of the link between the analysis and the actual steps needed to transform society. His discussion of the kind of society that working people should strive to achieve is also not extensively developed, beyond criticism of the drawbacks of the consumerist culture that capitalism promotes. A bit more discussion of the values underlying the establishment of a low carbon, environmentally sensitive society would not be amiss. Similarly, a useful addition to the book would be an outline of the kind of role the state could play in promoting a progressive climate agenda.

While Hampton does provide a good discussion of the policies and activities of the international trade union federations, he says relatively little about labour's experience in other parts of Europe outside the UK. I agree that the trade union movement should be the key driving force in developing a progressive alternative to the existing climate impasse. However, changes to the organization of work and employment over the past three decades have resulted in a much more fragmented working class and a corresponding erosion of union membership and union political influence. This is most notable in the US, the leading capitalist country, but also has occurred in most other developed countries. At the same time, there is enormous, pent up frustration among

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working people about the failure of the economic and political system to address the very real problems they face on a day to day basis. That unions must find a way to tap into this frustration by providing a voice for change is clear, particularly as the environmental crisis deepens year by year. But how to do this in the face of capitalism's restructuring of employment relations and its effective promotion of individualist, rather than collective approaches to solving our economic and social problems is the key challenge labour now faces.

Hampton's book is well organized, well researched and clearly written. It contains a comprehensive analysis of the different approaches to understanding the trade union movement's response to climate change, including an evaluation of the strengths and weaknesses of the various strategies it has followed. It also indicates labour's potential to reframe the entire climate narrative to address the root causes of the climate crisis, rather than attempting to influence those who control the existing system to adopt greener policies. In developing a Marxist analysis of the climate crisis, Paul Hampton has made a major contribution to the debate over the role unions can – and should – play in leading the struggle to address global warming. He has also made a contribution to putting labour back into the climate debate.



**Work in a Warming World:**Graham Sharp<sup>1</sup>

Carla Lipsig-Mummé and Stephen McBride (Editors), Queen's University Policy Studies Series, 2015, 244pp

This book of eleven chapters by different authors is an outcome of a five-year collaborative research project based at York University, Toronto, Canada. The authors' aim is to bridge the research and policy gap between containing and reducing global warming and employment security, particularly since the global economic recession starting in 2008. This is a dilemma that's been around for some time. In the UK for instance many environmentally-aware trade unionists are questioning, in retrospect, the wisdom of the historic struggles in the 1980s to keep coal mining afloat and prolonging a carbon based economy.

Divided into two themes the first five chapters analyse the difficulties and often setbacks in trying to implement climate change mitigation or adaptation policies. The second half focuses in on particular industrial sectors or themes. There are three chapters that are likely to be of interest to CLR readers - two on the construction industry by John Calvert and the third on sustainable infrastructure and engineers (which in reality involves many issues of construction).

Calvert's first chapter looks at the potential role of construction unions influencing sustainable practice in the UK and Germany. In the case of the UK, construction unions are relatively weak in terms of membership density, despite occasional strong pockets of activity on particular large projects. UK construction is characterized by high degrees of fragmentation as a result of most work subcontracted to numerous smaller employers. This in turn impacts on levels of training where the numbers of formal apprenticeships are

1. Graham worked in the London building industry as a carpenter and joiner in the 1960s and early 1970s where he was an active trade unionist and member of the Amalgamated Society of Woodworkers, which became UCATT in 1971.

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low. The unions have little policy influence on training and even less on issues of sustainability. The converse is true in Germany where the unions are stronger and have representation and influence not only directly with employers but also through membership of works councils. This enables them to have a double influence – with government policy – and with individual construction companies.

Calvert's second chapter focuses on training to meet the demands of climate change in Canada. He argues that the craft apprenticeship system based on traditional skills is unsuitable for low carbon construction methods. He gives a number of generalized examples such as electricians attending short course modules in photovoltaic panel installation on roofs to enhance their skill range. The importance of skills in retrofitting older buildings is also discussed. However, it is here that I see a gap in the analysis. Calvert argues, *"...trades must have a comprehensive knowledge of many different building systems and technologies so that they are able to apply the most effective approach to each specific project"* (p. 158) The problem lies in the fact that individual tradespersons usually don't have any say or involvement in the (re)design of particular technologies or in the specifications of materials and components; this is left to the designer and managers to decide.

This difficulty crops up in most of the chapters of this book. While the role of trade unions is approvingly acknowledged there is little discussion of where real power (political, economic) lies. Nor is there mention of workers' real labour processes in neo liberal economies. Despite these reservations, this is a welcome contribution to the debate.

**Trade Unions in the Green Economy: Working for the Environment**, Nora Räthzel, David Uzzell (eds.), Routledge, New York, 2013, pp. 266.

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The future development of production will be highly affected by the consequences of climate change and corresponding policies of adaptation and mitigation. However, which challenges these developments pose for workers and how trade unions respond to them are still topics on the brink. In the course of opening up 'new research area: environmental labour studies' (10), this publication aims at exactly these questions, but is focused on trade unions of the industrial sector. All of the contributors, ranging from practitioners to academics from a variety of disciplines and world regions, assume, *first*, that trade unions are indispensable in the fight against climate change, *second*, that the integration of environmental issues as a vital part of trade union action is – at least in the long-term – of interest to the unions because, *third*, there is, in fact, not a contradiction but a concurrence of environmental and job interests.

In the first part of the volume, officials, mostly of international trade unions and organizations, depict current developments, fields of activity, and challenges regarding the unions' environmental policies and climate change. Since 2006, the concept of a *just transition* represents a key aspect of the engagement of the ILO and international trade unions. The second part consists of eight case studies of unions' climate change policies in different countries (e.g. Australia, South Africa, Brazil, Sweden, US) and more general examinations of the role of trade unions in the current tensions between ecology and economy.

In the concluding article, the editors, amongst others, highlight particular frictions that are evident in the various contributions as well as in actual trade unionist practice. *First*, there are different opinions whether the trade unions' environmental policy should be more reformistic or more

radical. On the one hand, authors such as Burgmann, Snell and Fairbrother discuss the positions of Australian trade unions and cast a critical vote for an ecologically and socially modernized capitalism, whilst Rosemberg sees the unions “as a potential bridge” between a “transformational agenda” and the “dominant growth model” (23). Barry, on the other hand, argues for a progressive “repoliticisation, re-radicalisation and revitalisation» of unions (228), quite similar to Cock/Lambert and Bennie, who predict a new social movement against neoliberal globalisation should unions, environmental groups and southern local communities unite.

*Second*, there is a strain between unions of the Global North and South. Indeed, there are positive examples of North-South-cooperations among unions, which are exemplarily discussed by Veiga and Martin in the case of cooperation between the Finnish trade Union Solidarity Centre (SASK) with Brazilian communities and a Rural Workers Trade Union (STTR). However, southern unions often criticise the dominance of northern unions in international unions and their occasional demand for abdication of development and the predominance of competitive forms of weak ecological modernisation.

The *third* contradiction exists between local and global actions of trade unions: the farther away from the shop-floor level, i.e. concrete requirements of daily routine and securing employment, the more progressive environmental positions can be, particularly on the level of international unions. Therefore, the editors' identification of “locally rooted” unions as “'glocal organisations'” (241) which, resulting from the processes of capitalist dynamics, have to operate in a more and more globalised world, has yet to be strategically transformed into bargaining power.

Article Review of: **“Employee Participation and Carbon Emissions Reduction in Australian Workplaces”**, Raymond Markey, Joseph McIvor and Chris Wright. (2015) International Journal of Human Resource Management June 19. John Calvert

Readers of CLR will be familiar with the view that the active participation of building workers and their unions is critical to reducing the carbon footprint of buildings. Regrettably, much of the academic literature on reducing energy consumption and GHG emissions from the built environment tends to ignore the role of workers and their unions in this process. So it is encouraging to see more research being carried out in this area. This large Australian survey provides strong support for the positive contribution of the workforce to effective implementation of climate change initiatives. Markey, McIvor and Wright analyzed 1329 enterprise-level agreements and surveyed 682 employers to assess the contribution of workers, either directly or through their unions in implementing climate mitigation activities at the workplace or in the larger enterprises employing them. Their central research question was “To what extent are the different forms of employee participation and interaction between them, associated with the adoption of carbon emissions reduction activities at the workplace or enterprise level?” They found that “Engagement with emissions reduction at the workplace level is far more likely where employee participation has a substantive role involving deeper and wider influence on organizational decision making.”

The authors included a variety of different forms of worker participation in their definition of employee engagement, including both direct participation in climate mitigating activities by workers themselves, and representative forms of participation. Direct forms included a wide array of individual or group consultative mechanisms at the workplace, whether employer initiated or supported by labour agreements. Representative engagement included the role of unions

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acting as agents for workers through joint consultative committees, health and safety committees and/or representation at the enterprise level.

Supported by an extensive literature review, they argue that the knowledge, skills and commitment of those who actually perform jobs is a necessary requirement for successful mitigation of workplace carbon emissions. They conclude that effective participation cannot be restricted to those with specific technical expertise, but rather has to include all workers. This is because each worker has an intimate knowledge of the work process involved in the job he/she performs and is, therefore, in a position to contribute practical suggestions in support of mitigation efforts. The involvement of the entire workforce in decisions associated with how to implement carbon reductions is key to achieving better outcomes.

The authors recognize that the extent of workers' participation can be analyzed on a continuum. At one end, workers can simply be informed or consulted about environmental objectives by management. At the other end, they can be extensively involved in making major decisions about the changes needed in their workplace to address climate change. They distinguish between the "breadth" of decision making, that is the range or scope of the decisions in which workers participate, and the 'depth' of participation, that is the extent to which workers are actually involved in significant decisions. From this analysis they adopt two approaches to evaluating participation: consultative, which is narrow in scope and shallow in depth; and substantive, which is both deeper and wider, and provides workers with a much more extensive role.

The authors note that the effectiveness of worker participation is also influenced by the number and range of participatory mechanisms to which workers have access. Where workers have multiple channels of influence,

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including both consultative and substantive forms, their study indicates that workers' involvement with - and contribution to - climate mitigation is correspondingly greater. Moreover, access to multiple vehicles for participation tends to reinforce the overall effectiveness of worker involvement. Thus where workplace consultative arrangements are supported by collective agreement provisions, joint union-management committees or dedicated environment committees, workers contribute more effectively to achieving environmental objectives.

Turning to the actual details of their research, Markey and his colleagues pursued two separate lines of investigation. One involved an extensive survey of human resource managers in 682 enterprises in 14 sectors of the economy, spanning both public and private sectors. Their questionnaire focused on three main areas: the nature of the organization's carbon reduction program; the mechanisms adopted to involve the workforce in reducing carbon emissions; and the specific initiatives undertaken. The findings indicated a strong positive relationship between organizations in which a significant level of worker participation was present and the extent of climate mitigation activities.

The second line of investigation involved an analysis of 1329 Enterprise Bargaining Agreements (EBAs) negotiated between 2009 and 2012 that included clauses addressing climate change. Their analysis looked at the same 14 economic sectors of the Australian economy. They found a wide variety of different kinds of environmental clauses dealing with climate mitigation. Some provided only very limited commitments, such as making a vague undertaking to take account climate issues in carrying out the work, while others involved much more precise targets, including specific goals and measures to achieve these goals.

As their study covered a wide swathe of economic sectors, differences among the sectors in pursuing climate objectives

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were also of interest. Of the seven top performing sectors in terms of their climate measures, four also ranked highly in terms of both consultative and substantive participation measures. Australia's education sector ranked highest, both in terms of overall worker participation in climate mitigation activities and in the extent of union involvement through collective agreement provisions. These included dedicated environment committees or the inclusion of specific environmental mandates in existing joint union-management committees. Conversely, the economic sectors with the lowest level of climate mitigation activity were also the sectors with the lowest level of worker and union participation.

Construction was one of the 14 sectors included in the study. However, the research findings were somewhat disappointing as the role of construction workers and their unions was not as extensive as in other sectors. Unfortunately, the study did not provide a detailed analysis of the sectors of the industry or the specific occupational or trades categories it included. It would also have been valuable to have had a more detailed analysis of the reasons for the more limited participation of building workers and their unions, but this was not provided in the author's account of their research.

Markey and his colleagues summarize the main conclusions of their study as follows:

*“Currently, much of the green HRM (Human Resource Management) literature suggests that employee participation helps organizations to better harness the knowledge, skills and commitment of employees; but appears largely to assume that the impetus for engagement with environmental issues comes from management. However, employees and unions may also provide an important impetus for action, as most strongly suggested in the case of the education and training sector and the actions of the NTEU. Their concern for the environment and climate change per se may have played an important role in facilitating organizational emissions*



*reduction, and the greater employee commitment observed in other studies may also be intensified by the fact that environmental management concerns social issues beyond production and profit.”*

While the Australian experience differs in many respects from that of Europe – or at least many European countries - as a result of the liberal-market framework within which the industry, its workers and their unions operate, nevertheless, the findings of this study are relevant to the ongoing debate in Europe about the relationship between worker participation, union organization and effective climate mitigation. Reliance on a survey of human resource managers for evidence of the extent of worker participation has clear limitations, given that this component of the study does not include the views of the workers themselves and may reflect the biases of those interviewed. However, the fact that the conclusion of the study affirms the importance of worker participation and union involvement as critical factors influencing climate mitigation efforts at the workplace is an important contribution to the literature. Arguably, it is also a modest, but still worthwhile contribution to the ongoing debate about how best to implement climate objectives in the building industry as well.

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CLR News 4/2015 ISSN 1997-1745