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Climate Change, Construction and Labour in Europe: A Study of the Contribution of Building Workers and their Unions to 'Greening' the Built Environment in Germany, the United Kingdom and Denmark

John Calvert
Associate Professor
Department of Political Science,
Simon Fraser University, Canada
jrc@sfu.ca
Assisted by Kaylin Woods

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Introduction: Research Objective and Summary of Conclusions

The purpose of this research initiative is to examine the way in which labour in Europe, and specifically the building trades in three countries, Germany, the UK and Denmark have addressed the issue of global warming. The study reviews the overall policy framework of the European Union (EU) on this issue and then examines what governments in the three countries have done to reduce energy consumption, cut greenhouse gas emissions (GHGs) and move away from reliance on fossil fuels. It then proceeds to look at the climate policies being implemented in the construction industry and the responses of the three trade union movements to these changes. Finally, it looks, in more detail, at various activities of the building trades unions to further the transition to a 'greener' economy. This includes a review of union policy prescriptions, specific union initiatives and an assessment of the extent to which they have exercised some influence over the restructuring of their industries to deal with global warming.

The study concludes that the ability of unions to play a constructive environmental role is partly dependent on the broader policy framework established by governments and partly dependent on their influence within their own industry. Where unions are significant players in training and workforce development and where they exercise significant control over the practice of the skills of their members, such as in Denmark and to a lesser extent in Germany, they have had some success in shaping the environmental policies of the construction industry. Conversely where union representation is weak, where they are marginal players in the overall labour relations regime and where they have little say over training and apprenticeship, such as in the UK, they have not been able to exercise significant influence over how their industries have dealt with global warming. The role of labour is only one factor in determining the effectiveness of climate policies in the construction sector. However, the presence - or absence - of labour support does make a difference in the capacity of the three countries to implement the goal of promoting a 'greener' economy and society.

The European Public Policy Context

The role of the construction industry and its unions in addressing climate change in Europe has been significantly influenced by the broader environmental debate within the EU, and internationally. This debate has been premised on the assumption that there is a pressing need to reduce GHG emissions and lower energy use, while shifting energy production away from reliance on fossil fuels (IPCC 1996, 2001, 2007, Stern 2006). Hence, the key question is how best to do this. The European Parliament, European Commission and the Council of Ministers have implemented a number of measures to achieve the EU's goals. These are now collectively known as "The Climate and Energy Package." (Kelovesi et. al.). The overriding objective of the package is to reduce GHG emissions by 20% by 2020 from their 1991 levels, raise the share of renewable energy to 20% of total energy

consumed and improve energy efficiency by 20%. These are commonly referred to as the 20-20-20 goals. The European Parliament ratified the Climate and Energy Package in December, 2008 and it came into force in June the following year.[1] The EU also has a longer range objective of reducing GHG emissions by between 80% and 95% by 2050 compared to 1990 (Hedegaard 2011).

The EU has also funded a great deal of research on climate change. This has provided much of the scientific and policy foundation for the measures it has introduced. The EU believes that it can reach its 2050 target if its member countries are able to invest 270 billion Euros, or 1.5% of GDP, annually, over the next four decades (Hedegaard 2011).

A key issue for the EU has been how to transform its economy – and the skills of its citizens - to address global warming. It believes that major skills shortages will emerge as industry tries to adapt to the impact of climate change and to the policy responses of government to it. If not addressed, skills shortages will severely impede its ability to respond to climate change while placing EU industries at a competitive disadvantage, internationally (Council of the European Union 2011).[2]

In the construction sector, the EU believes that the principal focus will be on upgrading the skills of current workers to enable them to renovate the existing building stock (European Commission Roadmap 2011, ECORYS 2008). But is also recognizes the need for new occupations in the construction of renewable energy systems as well as in building major infrastructure projects. Thus its approach to addressing climate change is not limited to targeting emerging 'green' industries. Rather, the objective is to transform, or 'green' all sectors of its economy (ECORYS 2008, p. 61).

In response to EU initiatives, as well as domestic pressures, a number of the EU 27 members have passed measures that go beyond the EU's targets (Andrews and Karaisl 2010, Kulovesi et. al. 2010). These measures signal a commitment by these governments to take a leadership position in climate mitigation and adaptation.[3]

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[1] The package consists of a number of EU Directives, including: 29/28 EC (Renewables Directive), 29/29 (Emissions Trading Directive), 29/30 (Fuels Directive), 29/31 (Carbon Capture and Storage Directive), 443/2009 (Passenger Car Regulation) and 406/2009 (member state EffortSharing).

[2] The Council of the EU expressed its concern as follows: "A strong human capital base is the key to sustainable growth, employment and international competitiveness. By 2020 85% of jobs will require high or medium level skills and the proportion of jobs for the low qualified will reduce to 15%. It is therefore essential that Member States continue, in line with integrated guidelines 8 and 9 and with the Strategic framework for European cooperation in education and training (ET2020) **1**, in reforming their education and training systems and equipping people with higher and more relevant skills and key competences" (Council of EU 2011 p. 15.)

[3] While the EU has passed a number of directives requiring member states to meet specific environmental targets, as we shall see in our examination of the experience of Germany, Denmark and the UK, there is still considerable diversity in the response of the various national construction industries to climate change. This reflects a number of factors, including: the extent to which national governments have made global warming a major policy focus (and have put in place policies to

The efforts of the trade union movement in Europe and, more specifically, the unions representing workers in the construction sector, have thus been developed within the context of this broader public policy framework – a framework which has underlined the need for significant action and provided a range of measures and targets to guide the climate change activities of industry and labour.

The European Union's Agenda for 'Greening' the European Building Sector

The EU has focused considerable attention on the building sector due to the large impact of the built environment on energy consumption and carbon emissions. Perhaps the most significant initiative is the 2003 Energy Performance of Buildings Directive (EPBD 2002/91/EC and subsequent revisions). The Directive established a common methodology for evaluating the GHG emissions and energy efficiency of buildings and requires both new and existing buildings to have an energy efficiency certificate as well as regular inspections of furnaces and air conditioning systems. By 2009 five countries, including Germany and Denmark had met all requirements (Deutche Bank Research, 2010).

The EU has also established a number of research and co-ordinating bodies that deal with construction and climate change issues. These include: the Economic and Social Committee, the European Construction Forum, which brings together a wide variety of stakeholders in the industry (ECF), the Forum for Construction in the European Parliament (FOCOPE), the European Council for Construction Research, Development and Innovation (ECCREDI), the European Construction Industry Federation, the European Federation of Engineering Consulting Associations, the European Insulation Manufacturers Association, the Architects Council of Europe, the European Union of Developers and House Builders and the European Federation of Building and Woodworkers. The reason so many organizations are now involved in this process is clear: the built environment holds out the prospect of major reductions in energy consumption and GHG emissions.

European Labour and Climate Change

Labour in Europe has been a strong supporter of tough measures to address climate change (ETUC 2005a, ETUC 2006, ETUC 2011, Dupressor, n.d.). But it has a

address the issue, including domestic legislation to implement EU Directives); the organizational structure and capacities of the different national construction industries, the specific labour market regimes and labour relations practices of the different jurisdictions, the commitment of employers to implementing green working practices and the extent to which unions in the industry have a voice in shaping the climate change policies of the industry.

particular interest in how the labour process will be restructured. While new jobs in low carbon industries will emerge, jobs in other sectors of the economy will disappear. There will be 'winners' and 'losers'. Sound labour market policy will facilitate the transition of workers from declining sectors to expanding ones in a manner that minimizes disruption to workers' lives, protects their employment and maintains good incomes. It will also ensure that existing industries are able to incorporate new, more climate friendly ways of working in a manner that protects the workers affected (ETUC 2007, ETUC 2009b, ETUC 2011).

Unions believe that a key component of the transition must be to provide additional training and education to equip workers with the knowledge and skills needed to function effectively in a low carbon economy. Some of this will entail retraining workers in declining sectors for entirely new 'green jobs'. But much of the transition will involve the introduction of more environmentally responsible ways of working to existing jobs. Labour is also concerned that workers and their unions are able to participate in shaping how work is restructured in the future, both because they have a direct interest in this process and because they believe they can contribute significantly to it.

Labour's Role in European Union Policy Development

The EU has incorporated the trade union movement into a significant number of its policy-making and consultative bodies, many of which are mandated to address climate change. While the overall thrust of the evolution of the EU has been to expand the scope and depth of the integrated European market – and this has a distinctly neo-liberal focus - the quid pro quo of strengthening the reach of the market was to obtain labour's agreement, or at least its acquiescence, to European integration by providing certain statutory rights for workers, such as embodied in the 1989 *Community Charter of Fundamental Social Rights of Workers, a*nd the *Posting Directive 96/71/EC* which deals with the terms under which workers from one EU member are employed in another EU member.[4]

Economic integration has been accompanied by an institutionalized role for trade unions in the evolving governance structures of the EU. While labour's influence is far less than that of business, it still plays a modest role as a 'social partner' in EU decision making, particularly in areas such as employment policy, labour relations and training. Perhaps the best example is the EU's powerful Economic and Social

[4] This is not to suggest that unions agreed with many of the market based changes introduced by the EU during its evolution. But their opposition did result in governments attempting to accommodate some of the concerns of unions into their policies and their policy making institutions. More recently the Posting Directive has become a source of major controversy as EU court decisions have interpreted its provisions in a way that weakens the ability of unions to enforce national collective agreement provisions. For a brief history of the negotiations that preceded the enactment of this Directive, see: Clarke, Cremers and Janssen, 2004. It should also be noted that many unions were strongly opposed to the pro market orientation of the emerging EU framework seeing the entrenchment of market principles as a threat to the rights of workers.

Committee which has an explicit mandate to involve representatives of the employed as set out in the *Treaty on the Functioning of the European Union (Article 300).*[5]

Various national union federations have established EU-level labour organizations to represent their interests, the most important being the European Trade Union Federation (ETUC). It now represents 86 union federations in 38 European countries and consults with the Commission and Parliament on a wide range of social, economic and labour issues.[6] The ECTU has been an active participant in EU policy debates on global warming, arguing for strong, co-ordinated EU action to incorporate the principles of a 'just transition' to a low carbon economy. The ETUC has been a strong supporter of the UN Framework Agreement on Climate Change (UNFCCC) and the accompanying 1997 Kyoto Accord (ETUC 2005b, 2006, 2007, 2009a, Decaillon 2009).[7] EU Unions have also used existing bipartite or tripartite institutional arrangements, such as the statutory works councils, to advance the interests of workers.[8] The role of labour in the European climate debate thus reflects its broader involvement in EU policy making.[9]

The European Building Industry

[5] The Commission outlines the role of the representatives of employees as follows: "The Workers' Group (Group II) comprises representatives from national trade unions, confederations and sectoral federations. Its members represent over 80 trade union organisations – the vast majority of them affiliated to the European Trade Union Confederation (ETUC) or its sectoral federations."

[6] This includes some countries, such as Norway and Switzerland that are not formally members of the EU.

[7] Decaillon is the General Secretary of the ETUC. The ETUC website contains literally dozens of policy papers, resolutions, press releases and other material dealing specifically with various aspects of its position on climate change and its assessment of the various initiatives of the EU Parliament and Commission. See: http://www.etuc.org/

[8] An example of bipartite arrangement is the agreement between the EFBWW and the European Construction Industry Federation (FIEC) to participate as collaborators in the European social dialogue for the construction industry. The union federation represents workers from 27 EU member countries and a total of 69 national trade unions with a membership of 2.3 million workers. The FIEC is composed of 32 national employers' federations from 25 countries.

[9] The ETUC has outlined the specifics of a just transition program for the EU as follows:

a. Consultation between Government and key stakeholders, including representatives from business, trade unions, local government and regional bodies and voluntary organisations.

b. Green and decent jobs through investments in (new) low carbon technologies and R&D.

c. Green skills: Government-led, active education/training and skills strategies for a low carbon, resource efficient economy.

d. Respect for labour rights and human rights: democratic decision making and respect for human and labour rights are essential in order to ensure the fair representation of workers' and communities' interests at the national level.

e. Strong and efficient social protection systems. (ETUC Roadmap 2050 2011)

The European construction industry is a major employer and a major driver of the economies of its 27 member countries. In 2010 it employed 16.5 million or 7.6% of Europe's 216.5 million workers (OECD Labour Force Statistics). Construction accounts for 10.5% of Europe's GDP and has approximately 1.9 million employers. Most are very small, with 97% employing less than 20 workers (EFBWW). At the same time there are also a number of very large, multinational construction contractors who are active both across Europe and globally.

Construction is strongly affected by fluctuations in the business cycle (Bosch and Philips 2003, Reico 2007). Demand for building work exhibits a 'boom and bust' pattern far more pronounced than in most other sectors of the European economy. The industry is also affected by seasonal factors, particularly in Northern Europe, where work is often much more difficult to perform in winter (Bosch and Phillips 2007).

These, and other factors, increase the risks of construction, for both employers and workers. The inherent uncertainty leads construction firms to try to transfer risks to others in the industry (i.e. other firms, sub-contractors, clients, project developers, purchasers of construction services and building workers). Among their most common approaches are extensive sub-contracting and shedding labour during slack periods or economic downturns. There is also a significant grey or 'black' construction economy that exploits illegal workers and is characterized by extensive tax and regulatory evasion. These factors have led to an increasingly competitive European labour market, which imposes continuous downward pressure on costs, while incessantly pushing firms to raise productivity to remain in business (Bosch and Philips 2005).

A key challenge for the industry is how to ensure that the workforce performs efficiently. There are different ways to solve this problem. One is to focus primarily on organizing work in such a way that workers only need to perform a limited number of specialized and clearly defined tasks – tasks organized and assigned by employers.[10] While requiring core of more highly qualified trades workers, it concentrates on maximizing the use of the least well-trained – and hence cheapest – workers. Consequently, there is less need to invest in the skills of the workforce (Bosch and Philips, 2003, Brockmann et. al 2010a). With some limited exceptions, this is the approach of the UK.

The other approach assumes that the best way to fulfill the industry's labour needs is by supporting a high level of training and qualifications. It assumes that a well trained workforce will be a productive workforce. This entails a commitment to lengthy apprenticeships, normally augmented by formal study, to enable workers to acquire the knowledge and skills needed for a lifelong career in the industry. It also

[10] This approach is consistent with traditional 'Taylorist" management strategy which attempts to shift all aspects of the planning, organization and performance of work into the hands of management.

involves providing financial assistance to trainees, through levies on employers, government grants or money from social partnership funds. And it requires that employers will provide jobs to apprentices so that they can complete their training. Although their mechanisms for achieving these objectives vary considerably, both Denmark and Germany have followed the latter course.[11] [12] [13] Unions and Climate Change in the EU's Construction Industry.

Turning to the role of labour in the European construction industry, the key federation representing building workers is the European Federation of Building and Woodworkers (EFBWW). It is affiliated to the ETUC. The EFBWW brings

[11] A major challenge faced by the EU construction industry is how to reconcile the fact that responsibility for training the workforce rests largely within each country, while the commitment to establishing an EU wide labour market is not accompanied by a corresponding EU-wide training system. The EU now provides all citizens the right to work in any of its member countries. This commitment to labour mobility has resulted in tensions because the labour relations and employment regimes still differ significantly among EU members. These distinctions continue to exist despite various directives from the EU designed to create an integrated labour market and harmonize labour and employment standards. Of relevance to this study is that increased labour mobility in the absence of EU wide standardization of training and qualifications may be disruptive to established national training and apprenticeship systems. Full labour mobility has only been implemented in the past year, but the right to reside in a country other than one's own in the EU was earlier implemented and this meant that workers could work in the 'grey' economy in another country based on their right to live in that country. Thus 'illegal' employment has been relatively common for quite a number of years within the EU.

[12] As a result of the labour mobility rights, some construction firms have increasingly made use of practices such as posting workers from one country to work on projects in another country. Employers may recruit individually, or through labour agencies established specifically to engage in the posting of workers. These practices present major challenges to long term labour market planning and skills development in the countries affected, although the significance of this concern varies considerably among EU members. Arguably, these practices also may make it more difficult for national governments to plan the training and labour adjustment component of the transition towards a greener construction industry. This is not to suggest that the EU is unaware of the problem or that it is not attempting to find ways to address it. But there are basic conflicts between the neoliberal philosophy underlying the move to an integrated labour market and the need for governments to provide the training and apprenticeship support needed to ensure they have a competent and productive labour force.

[13] The development of a highly trained workforce, capable of implementing green building principles, is only one part of a larger process of 'greening' the construction industry. Obviously, many of the key decisions associated with low carbon construction are made by other members of the industry. The design of buildings, or infrastructure projects, is normally carried out by architects and engineers, while the overall approach to a new development (or a re-development of an existing facility) is the responsibility of planners, developers and, ultimately, the purchasers of construction services.

Public policy decisions about financing and regulating the industry also have a major impact in determining what is done. Government policy, in conjunction with the operation of the market in construction services, determines what gets built, or renovated, and these decisions establish the framework within which building workers exercise their skills. It is necessary to make this point as the current study should not be misinterpreted as suggesting that developing a highly trained construction labour force is the only - or indeed the most important - component of the process of implementing climate change objectives in the built environment. Rather the study should be viewed as examining only one of the factors that support, or limit, the ability of different countries to implement their environmental goals in the built environment. At the same time it is an area which, arguably, has not received the amount of attention that has been focused on some of the other factors discussed above.

together 75 major construction unions from 31 European and neighbouring countries and represents over 2.3 million workers (EFBWW web site). It is mandated by its national affiliates to represent their interests in a variety of EU level forums, as well as to work with its counterpart on the employers' side, the European Construction Industry Federation (FIEC). The EFBWW's role parallels that of other sector-wide EU federations such as the Metal Workers' Federation, the Federation of Public Sector Unions and the Transport Workers' Federation. It also works closely with the Building and Woodworkers' International (BWI), the key union federation for building trades unions, globally.[14]

Like other European labour federations, the EFBWW has been working with environmental NGOs to pressure the EU to move more quickly in implementing Europe's 2020 energy targets. On June 20, 2011 in a joint press release, it announced that it would be co-operating with the Climate Action Network Europe (CAN-Europe) on a campaign to encourage governments to accelerate the renovation of the existing building stock. CAN-Europe is the largest environmental NGO coalition in Europe and includes 149 environmental organizations from 25 countries.

Another function of the EFBWW is to co-ordinate information sharing among the 60 construction Works Councils established under EU Works Council Directive 94/45/EC.[15] Their legal status gives them the right to participate in a range of decisions affecting the management of firms within their sector. Thus Works Councils (and the unions from which most of their members are selected) provide labour with another vehicle for advancing a variety of policy matters, including policies to address climate change.

The EFBWW also engages in a 'social partnership' dialogue with the major construction employers in the EU represented by the European Construction Industry Federation (FIEC). On climate change, the EFBWW and the BWI have

[14] The BWI has also developed an extensive policy response to global warming. It participates in a number of international forums, including the UN climate change conferences and the ILO meetings on climate change. It articulates the concerns of building workers that construction can and should play a central role in combating climate change. Like other international labour organizations, it also argues that the transition to a low GHG and more conservation focused economy should not undermine the living standards or working conditions of workers. Like other international labour organizations, It focuses on the concepts of 'just transition' and 'decent work' as key objectives. See the various policy statements on the BWI web site.
http://www.bwint.org/default.asp?Index=3501&Language=EN

[15] The works council model derives from the establishment of similar councils in Germany in the period shortly after WWII. The Allies were committed to providing workers in the major sectors of German industry with representative structures that would give them a voice in industrial decision making. The elected works councils shared management responsibilities with the owners under a system known as co-determination. In practice the worker representatives on works councils generally worked co-operatively with the established unions. However, works councils were established by law in all companies with more than a certain number of workers (2,000) and their management functions were distinct from the normal collective bargaining functions of unions.

developed a "Platform of Action for a Social and Green Europe". It makes 23 demands on various EU institutions and member governments, including a demand for tougher EU climate legislation. The proposals include public investments in climate-friendly buildings and renovations, funding environmentally sound infrastructure, new training programs for workers and implementation of energy conservation technologies throughout the built environment. The Platform also calls for new EU legislation to guarantee decent wages for all construction workers, including those involved in the green transition process (EFBWW and BWI 2008).

While EFBWW articulates the collective voice of European labour on climate change, as we might expect, there is considerable variation in the degree to which its national affiliates have developed effective responses to the challenge of global warming. Of particular concern for this study is how national differences also reflect, to varying degrees, the economic and political influence of unions in each country, and the role they play in shaping decisions associated with employment, training and skills development. The ability of building workers and their unions to play a role in shaping climate change policies reflects, in part, their broader role and influence within the construction industry. In this regard, there is a major contrast in the role played by labour in Germany and Denmark compared with the UK.

Germany: The Public Policy Context for Responding to Climate Change

The climate work of labour, and more specifically, the construction unions in Germany, takes place within a broader social and political context. For over three decades, Germany has been a leader in climate change mitigation, particularly through its support for renewable energy sources (Andrews and Karaisl 2010, Weidner and Metz 2008).[16] In 1990, the Federal Government established a target of 25% CO2 reduction by 2005, based on a 1987 benchmark (Watanabe, 2004). In 1991 it introduced an electricity feed in tariff to stimulate the development of renewable energy from wind, biomass, solar and hydro. In 2000, it implemented a National Climate Program to reduce CO2 emissions by between 50 and 70 million tonnes. In the same year it passed the *Renewable Energy Sources Act* to double the share of renewable in Germany's electricity consumption.
In 2002, the Federal Government introduced a Building Energy Efficiency Ordinance with a target of reducing energy use in new buildings by one third (Watanabe 2004). This Ordinance also imposed home insulation requirements in older homes and required new homes to have an energy certificate indicating their overall energy consumption. It also committed Germany to replacing 2 million older furnaces (boilers) over a 5 year period. These initiatives were to address the fact that

[16] Weidner and Metz attribute the success in finalizing the Kyoto Protocol to the vigorous interventions of Andrea Merkel, Germany's (former) Minister of the Environment. Interestingly, the research team at Climatico have taken a more critical view of recent developments in Germany, arguing that the 2008 – 2009 stimulus package has, at best, only problematic environmental benefits. (Billett et. al. 2009)

buildings were the largest single source of GHGs and accounted for 37% of CO2 emissions (Auer 2008, Andrews and Karaisl 2010).[17]

In 2007 Germany introduced a new federal Integrated Energy and Climate Program with provisions on retrofitting existing buildings and raising the energy efficiency ratings for new buildings. Germany also committed to retrofitting 100,000 roofs with solar panels (Weidner and Metz 2008). These Federal policies have been mirrored by state governments who, depending on resources and geography, have put in place more stringent energy conservation and GHG reduction programs (Weidner and Metz 2008). The coalition government, formed in 2005, adopted even tougher climate change and renewable energy goals (Weidner 2008). By 2012 Germany is hoping to have GHG emissions 28% below 1990 levels.

Climate Change and the German Construction Industry

Spending in the German construction industry totaled 245 billion Euros in 2009 (Federal Ministry of Economics and Technology). It accounted for 52% of new investment, making it one of Germany's most important industries. According to the OECD, it employed 2.6 million workers in 2010 (OECD Labour Force Statistics).[18] The focus of construction activity has also changed from new building to renovating the existing building stock.

German construction is based on a strong craft tradition. "In marked contrast to other countries (e.g., the United Kingdom), the craft structure of the German construction labour market has thus been strengthened in recent decades." (Bosch and Zuhlke-Robinet 2003b, p. 54). The apprenticeship system expanded significantly during the 1960 to 1980 period, by which time approximately 60% of school leavers opted for training through Vocational Education and Training (VET) programs (Bosch and Charest 2008). Despite EU and international pressures to deregulate the German labour market, its VET system remains largely intact,

[17] For a comprehensive listing of key pieces of German climate change legislation, see: Andrews and Karaisl 2010)

[18] The size of the construction industry in the economy has been the subject of widely varying estimates, depending on what is included or excluded in the definition of the sector. In relation to the UK economy, Ruddock notes that the range of variations is quite large, from a narrow definition of about 5% to a broad definition of about 20% of GDP (Ruddock 2007). In his 2003 report, Pierce argues that estimates for the UK industry vary from 5% to 10% of the country's GDP. With respect to the size of the industry in Germany, Bartholmai and Gorning assert that it has a larger impact than the figure cited in the text above. They estimate it to be 368 Euros. (Bartholmai and Gorning, 2007) The Deutsches Institut fur Wirtschastftsforschung provides somewhat narrower estimates for both expenditure and employment, due to a different definition of the scope of the industry. Its tables indicate that construction expenditure was 264 billion Euros in 2007, 279 billion Euros in 2008 and 280 billion Euros in 2009 (DIW 2010). Regardless, it is a major component of the economy, accounting for just over half of all new investment. With respect to the size of the construction labour force, some of the same issues emerge. For data comparing employment estimates from different sources in Germany, see: DIW 2010, table 4.

providing the basis for a highly skilled trades workforce. It is a "dual system" which combines school-based and on the job training and links federal government, *Lander* (federal states), social partners and industry (Danish Technological Institute 2009).

Germany has a highly regulated construction labour market, including legislation specifying the craft skills that workers much possess in order to work in the industry (Bosch and Zuhlke-Robinet 2003b p. 69). For example, the system imposes severe penalties on anyone who performs construction work without the required qualifications. The fine can be as much as 100,000 Euros (approximately $140,000 Cdn.) - a not insubstantial sum. And the German regulations are generally enforced due to the culture of the industry with its commitment to high standards and quality workmanship.[19]

The system has produced a high skill, high productivity workforce in which a significant majority of construction workers are well trained and view their trade as a lifelong career. Productivity in the industry has risen rapidly in recent years (Bartholmai and Gorning, 2007). According to a 1999 survey, fully 77% of building companies, accounting for 73% of construction workers, were registered as pursing a handicraft trade. These companies, in turn, have to employ trained masters (Bosch and Zuhlke-Robinet, 2003). Very few German construction workers (5.6%) have no or limited qualifications. This compares very favourably with Britain where the proportion of unskilled workers is estimated to be 33% (Richter 1998).

The Role of German Labour in Promoting Climate Change Initiatives

The German Federation of Trade Unions (*Deutscher Gewerkschaftsbund*) (DGB) is the major union federation in Germany. It includes 8 affiliated unions in the major areas of the private sector and represents about 6.2 million workers or four fifths of all unionized workers, including most organized construction workers (Addison et. al. 2006).[20]

[19] EU posting regulations permit workers from EU countries freedom to seek employment in any other EU member state. More recent EU decisions also permit a company based in one country to send workers it employs to work in another EU country. In doing so, it is only required to meet the employment standards prevailing in its own country. This has caused tensions because employment standards and wage levels within the EU vary significantly. Firms have attempted to take advantage of their right to deploy workers to other countries to undercut German labour standards. However, its impact has been limited significantly by the German Law on the Posting of Workers (*Arbeitnehmer-Entsendegesetz*) and by certification requirements that do not permit workers without the requisite qualifications to perform skilled work on construction projects. (Bosch and Weinkopf, 2010)

[20] There are two other major German trade union centrals: the White-Collar Workers' Union (DAG) and the German Federation of Career Public Servants (DBB). As noted, German union membership has been declining in recent years, a development that indicates that the role of unions in influencing public policy in Germany may gradually diminish in the future. However, at this juncture, DGG remains a significant participant in German politics.

Approximately 40% of German construction workers are in unions (Bosch, 2003a, OECD, 2007). The principal union representing construction workers is the DGB-affiliated IG BAUen-Agrar-Umwelt (IGBAU) which has about 330,000 members. IGBAU is affiliated through the DGB to the Building and Woodworker's International (BWI) and the European Federation of Building and Woodworkers (EFBWW). Centrally coordinated negotiations on both the employer and union sides result in binding collective agreements (with some regional flexibility in wages and salaries between the West and former East German sectors).[21]

However, union density data underestimate the impact of collective bargaining. Collective agreements establish prevailing employment standards throughout the industry. Fully 72% of construction workers were covered by these standards in 2007.[22] As a result, the disparity in wage rates between unionized workers and unorganized or 'self employed' workers in other jurisdictions such as the UK, is not found to the same extent in Germany. In 2008, only 10% of construction workers earned less than 2/3 of the median construction wage (Bosch and Weinkopf, 2010). The Federal Minister of Labour also has the authority to establish minimum wages for skilled and unskilled construction workers in the Western and Eastern parts of the country.

Although union density in Germany has declined over the past 25 years, the DGB remains a major participant in the shaping of German labour and industrial policy, as well as a major force in the German Social Democratic Party. It has strongly endorsed government climate policies, most notably in its 2008 New Deal on Environment, Economy and Employment.[23] The DGB and other German unions also support the government's 'Green New Deal' (Eurofund 2011). This initiative has funded 30 scientific projects to improve resource efficiency in German industry (Eurofund 2011).

[21] In the broader economy, collective bargaining coverage is also still relatively high. Fully 62 percent of workers in western Germany and 51% in eastern Germany were covered by the terms of collective agreements in 2007. However coverage has been declining as some employers have withdrawn from the employers' associations involved in bargaining or sub contracted work to circumvent paying negotiated rates (Bosch and Weinkopf 2010).

[22] In addition, a number of the larger construction firms also have works councils. Under German law, workers in companies with 5 or more employees have the right to form a works council. In practice, such councils are normally only found in larger firms, that is, those with over 500 employees. In 2007, 18% of construction workers were employed by firms having works councils. (*IAB-Betriebspanel 2007* as cited by EIRO online downloaded June 12, 2011. http://www.eurofound.europa.eu/eiro/2008/11/articles/de0811019i.htm)

[23] The government's 'Ecological Industrial Policy' has been summarized as follows: "...an innovation-based environmental policy that represents a 'New Deal' for economy, environment and employment and will achieve a 'double dividend' for the environment and German trade and industry. It predicts that growth in environmental technology markets will vastly outstrip traditional economic sectors, with a 4% annual growth rate taking turnover in Germany to 1000 bilion (euros) by 2030" (GHK p. 21).

In addition to their unions, German workers have another major vehicle to advance climate change initiatives: statutory Works Councils. These were established as part of the reconstruction of German industry and the democratization of German industrial relations in the period immediately following WWII.[24] They give workers in individual companies with more than 20 employees the right to have a voice in decisions affecting the operation of their firm and particularly decisions relating to employment, training and the operation of their workplaces.[25]

The German Alliance for Work and Environment illustrates the commitment of German unions on climate action. Established in 1998 by IGBAU, its objective was to create 200,000 new jobs through a comprehensive package of building conservation initiatives. It was designed to reduce CO2 emissions by 2 million tonnes annually, lower energy used for heating by as much as 80%, stimulate the development of new energy conservation technologies and reduce Germany's dependence on imported energy (UNEP Trade Union Assembly on Labour and the Environment; Schneider, 2009). Between 2001 and 2006, the government allocated 5.2 billion Euros in public subsidies to the project. A total of 342,000 apartments were retrofitted during this period through improved heat insulation and installation of renewable energy technologies (PV and solar thermal).

The program created 25,000 new jobs, while saving an estimated 116,000 that otherwise would have been lost due to the downturn in construction activity during this period[26] (Green Jobs: Toward Decent Work in a Sustainable, Low-Carbon World). According to DGB, the program resulted in the following outcomes during the three years from 2006 to 2008:

	2006	**2007**	**2008**
Apartments Renovated	327,000	204,000	280,000
Green Jobs Created	217,000	177,000	221,000
CO2 Reduced in t/a	1,038,000	568,000	767,000
Saved Heating Costs (US$)	$68 billion	$227 billion	$309 billion

[24] The two key pieces of early post war German labour legislation were the *Collective Bargaining Act* of 1949 and the *Works' Constitution Act* of 1952. The history of works councils in Germany dates back to WW1. Muller-Jentsch notes that initially unions opposed the post war establishment of works councils, viewing them as a way to divide workers and weaken the role of organized labour. More recently, works councils have become an accepted part of the overall industrial relations system in Germany. (Muller-Jentsch 1995).

[25] While the legislation gives workers the right to establish Works' Councils if they have more than the threshold number of employees, in practice it is mainly the larger employers where works councils are well established.

[26] Green Jobs: Toward Decent Work in a Sustainable, Low-Carbon World

Source: Schneider, (DGB) 2009

The DGB also encouraged the German government to include $4 billion in new low interest loan funding targeted specifically to improving building efficiency in its December, 2008 stimulus package. When the government decided to add a second stimulus package in 2009, the unions again succeeded in getting it to allocate additional funds for the building sector. It provided $8 billion in stimulus money to renovate buildings in the public sector (Schneider, 2010). As a result of this stimulus, in 2009 the government claimed it had renovated 617,000 apartments, created 292,000 green jobs and reduced CO2 emissions by an estimated 1.4 million tonnes (Schneider, 2010).

The DGB also lobbied the German government to push for EU-wide building conservation standards during its 2007 EU Presidency. As a result the EU Commission issued an energy efficiency directive that year which applies to all EU member countries. In pushing for these changes, the German unions worked closely with environmental NGOs and the European Trade Union Confederation (Schneider, 2009).

The IGBAU has also worked with Greenpeace and other environmental NGOs, to promote its policy of investing in the energy efficient refurbishment of buildings. It has also launched a campaign entitled 'Precedence of Jobs by Environmental Protection' to promote job creation through renewable energy investments and better energy efficiency in buildings.

In response to the economic downturn of 2008 (and consistent with its role as a social partner in the construction sector), IGBAU pressured federal and state governments to support a major program of environmentally focused public infrastructure investments to prevent a major slump in the industry. This included further subsidies for retrofitting buildings, expanding 'green' investments in public buildings such as schools, universities, child care centres and municipal facilities, and providing loans to the construction industry to maintain investment levels (Laux et. al. 2010). The union believes governments should raise the required funds through progressive taxes, rather than reductions in social spending, or wage restraint.

In sum, a number of interconnected factors have shaped the response of the German construction industry and its unions to climate change. The policies of the government, along with widespread public concern about global warming, have provided a supportive framework for advancing climate initiatives. Both the DGB and its construction affiliate IGBAU have been strong supporters of progressive climate policies. They have also recognized the potential benefits of investing in 'greening' the built environment, both in terms of jobs and in terms of addressing global warming. Workers in the industry have a strong sense of craft ownership over working methods and skills which have given them a major role in shaping the industry, including the capacity to carry out the work required. While it would be

stretching the analysis to suggest that Germany's response to climate change has been primarily the result of union activity, it would be fair to say that the labour movement and its workers have played a positive and constructive role in this area, pushing governments and employers to raise the bar.

United Kingdom: The Public Policy Context for Responding to Climate Change

Like Germany, the UK's policy response to climate change has been shaped both by international and domestic factors. The former Labour governments of Blair and Brown were strong supporters of international measures to limit global warming, both at the UN and in other international forums.[27] Domestically, the UK government made a commitment to reduce GHG emissions by 12.5% by 2012 and endorsed the EU's aggressive '20-20-20' targets (Parkes 2010, EC 2009). The issue of climate change has also been the subject of considerable public debate, encouraged by government initiatives, as well as the contribution of its scientific community.[28] While the level of public concern over global warming in the UK is, arguably, not as high as in Germany or Denmark, nevertheless there is a widespread public consensus that the problem is serious and that major policy initiatives are needed to address it.

The UK government commissioned Nicholas Stern to assess the economic costs – and benefits – of aggressively addressing climate change. He produced an extensive report outlining steps the government should take to address the issue (Stern 2006). To meet its EU targets and its own policy objectives, the government passed the 2008 *Climate Change Act*. Under the *Act,* the UK aims to reduce CO2 emissions by 26% by 2020 and 80% by 2050 compared with 1990. The *Act* also supports the EU's carbon emissions trading regime. The UK government has adopted a target of increasing renewable energy to 30% of electricity requirements by 2020 (Billett et. al. 2009). It has committed to meet the EU Energy Performance of Buildings Directive (DIAG n.d.) All new public buildings are to be zero carbon by 2018 (DIAG n.d). The UK also has set a target of reducing carbon emissions from the construction process by 15% by 2020 (Department of Energy and Climate Change 2008 (a); *Climate Change Act* 2008: Impact Assessment, 2009).[29] The Act also established the Committee on Climate Change (CCC) with a mandate to assess

[27] Thus far, it appears that the new Conservative-Liberal Democratic government is far less committed to major climate change initiatives, but the legacy of legislation and policy of the previous government is still largely in place.

[28] In recent years, the UK government has commissioned a variety of studies on the potential impact of climate change, including White Papers on Energy (2003 and 2007) and, perhaps most notably, the 2006 Stern report, which focused on its economic impacts, using sophisticated macro-economic modelling, and outlined policy options the UK government could adopt to address it. (Stern, 2006) The Stern report emphasized that the costs of failing to deal with climate change would significantly outweigh the costs of adopting aggressive mitigation and adaptation programs

[29] For a comprehensive recent listing of UK legislation on climate change see: Andrews and Karaisl 2010)

progress and make further policy recommendations, including revised targets. Thus far, the Committee has published four major reports assessing the UK's GHG emissions and energy use (CCC 2008).

Climate Change and the United Kingdom Construction Industry

As in other jurisdictions, the built environment is a key generator of UK GHG emissions and a major user of energy. The CCC estimates that buildings account for 36% of GHG emissions. Residential buildings represent two thirds of this total, while industry accounts for the remainder. The CCC estimates that the potential for reducing building emissions is very large: the total could be reduced by 74% by 2030, primarily through better insulation of lofts, cavity walls and solid walls, more efficient furnaces, installing heat pumps and replacing energy inefficient appliances (CCC 2010).

The government has established new 'zero carbon' housing standards for 2016 to reduce heating consumption by 80% in new homes from current levels. For existing buildings, the CCC proposes an aggressive program of insulating lofts and walls, window double-glazing, installation of heat pumps, and increasing use of energy efficient appliances.[30] Implementation will involve a great deal of construction work, as well as the adoption of new approaches to renovations that incorporate the latest conservation research. The UK has also passed measures that require building owners to have an Energy Performance Certificate listing the sources of energy consumption and the amounts used. Since 2008, all existing rental apartments, or rented houses, must have a certificate (CCC 2008).

These various policies have major implications for the UK's construction industry and its labour force. With 2.2 million workers in 2009, the industry is one of the largest UK employers, accounting for approximately 300 billion pounds or 8.3% of the country's overall economic activity.[31] In 2008 the industry had 186,000 contractors, 93% of whom employed fewer than 13 workers (Brockmann, Clarke and Winch 2010b). However, labour productivity is quite low compared with

[30] Significantly, in outlining the barriers to implementing its recommendations for energy saving in the building sector, the 2008 CCC report mentions training for installers of energy saving equipment only once in its 479 page report. There is no other mention of the need to train the construction workforce in the requirements of low carbon construction. The question of how building workers will acquire the skills and qualifications to be able to implement the ambitious program set out by the CCC is not addressed. Nor is there a single mention of UCATT, other building unions or the TUC in the report.

[31] UK Department for Business, Innovation and Skills, Low Carbon Construction Final Report, 2010. See the earlier note in the section on the German construction industry on the issue of defining the scope of the construction industry with respect to its share of the economy and its impact on employment.

Germany or Denmark.[32] The industry also relies much more on sub-contracting than these counterparts and it has, proportionately, fewer very large construction firms.

There is a broad consensus that the UK construction industry is poorly organized, inefficient, badly managed and, in the view of some analysts, chaotic (Bosch). This has been compounded by a break down in the system of training and apprenticeship in recent years, with the result that many UK building workers have only limited skills and training. Thus the UK's challenge in implementing climate policy is compounded by the limitations of the industry itself. To the extent that both Conservative and New Labour governments have taken steps to modernize the industry, their goal has been largely to meet the more traditional demands of the purchasers of construction services to cut costs and the concerns of building contractors to improve profitability.

The gap between the government's climate goals and its ability to implement these goals in the construction sector was recently highlighted by a UK House of Commons report which noted the lack of environmental monitoring on the majority of government funded building projects (UK House of Commons Committee of Public Accounts, 2007). Given that construction procurement involved over 3 billion pounds of publicly funded projects, meeting the government's own climate change objectives should have been a central part of the construction procurement process. But the Committee found otherwise:

Mandatory environmental assessments were carried out in only 35% of new builds and 18% of major refurbishment projects in 2005–06, and only 9% of projects could be shown to meet the required environmental standards. Departmental uptake of mandatory "Quick Wins", products pre-assessed to be more sustainable, was limited. Monitoring against estate-wide operational sustainability targets does not set out clearly performance against Quick Wins or sustainability targets for individual projects. Departments did not undertake post occupancy evaluations… and did not carry out whole life costing which is necessary if the most sustainable option is to be chosen (UK House of Commons Committee of Public Accounts, 2007).

In recognition of the weaknesses of the industry, the UK government commissioned Paul Morrell to oversee a major study of low carbon construction. The 2010 report noted that the organization of the industry was characterized by a number of separate 'silos' rather than a unified structure. It recommended a comprehensive planning framework involving the national and local governments, industry professionals, construction firms, clients and other stakeholders (UK Department for Business, Innovation and Skills, Low Carbon Construction Final Report).[33]

[32] Brockmann, Clarke and Winch 2010b. Brockman et. al. assert that labour productivity in the UK industry is 50% of that of Denmark and 39% below that of Germany.
[33] For example, a search of the study did not find a single reference to UCATT, unions or the TUC.

A significant part of the UK's problem lies in the fragmentation of its vocational education and training (VET) system. Government involvement in VET is divided among a number of agencies. The Skills Funding Agency is responsible for training those over 18 years of age while the Young People's Learning Agency deals with those younger. Colleges of further education also play a major role. The new Conservative-Liberal Democratic government has shifted responsibility for overseeing the programs of the two above noted agencies to local governments, although how this will work in practice is not clear (Brockmann, Clarke and Winch 2010b). In addition, the central government funds the Sector Skills Councils whose role is to determine industry skills requirements and co-ordinate training among employers, colleges and other private training agencies (Brockmann, Clarke and Winch 2010b).

ConstructionSkills oversees the content of the National Occupational Standards (NOCs) and the National Vocational Qualifications (NVQs) (Brockmann, Clarke and Winch 2010b). In addition the Qualifications and Curriculum Development Agency is responsible for new educational programs, revamping educational qualifications, lifelong learning and overseeing educational awards. In recent years the delivery of training and apprenticeship has shifted to colleges of further education, who now enroll two thirds of trainees, while fewer than one third now take employer sponsored apprenticeships.[34]

Most skills development in UK construction is limited to training workers to perform narrow, specific tasks, rather than providing a well rounded, trades education. Employers are reluctant to make long-term investments in workforce development and have generally resisted paying for training, except where it is of immediate advantage to them. Their primary focus is to ensure that the VET programs give workers the minimum training needed to carry out the tasks that they, as employers, require (Brockmann, Clarke and Winch, 2007). Consequently, UK construction is characterized by a relatively high proportion of low wage, unskilled workers, approximately half of whom work on self employment contracts, without standard employment conditions or a long term attachment to the industry. Employers see minimizing labour costs through keeping wages low, rather than utilizing highly trained, highly productive workers as the key way to maximizing productivity (Harvey 2002, 2007,Clarke 2007, MacKenzie et. al., 2010).[35] [36]

[34] In its final years, the previous Labour government did pass new legislation to expand apprenticeships and to provide every school leaver with the opportunity to enrol in an apprenticeship. However, the new Conservative and Liberal Democrat government has brought a halt to this initiative. Given the other problems with the organization of training in the UK's construction industry, discussed elsewhere in this paper, it is not clear how effective Labour's new program may have been in any case.

[35] There have been efforts to address this issue. For example the UK government recently established the national Construction Industry Training Board (CITB) ConstructionSkills levy system. It requires employers that sub-contract work to self employed workers to contribute 1.5% of the value of the contracts to a fund established to provide training to the construction workforce. However, it excludes firms paying less than 80,000 pounds in contracts, a major limitation, given the extent of

The Role of United Kingdom Labour in Addressing Climate Change

The UK's major union federation, the Trades Union Congress (TUC) recognizes that global warming is the major challenge facing the UK in the coming years.[37] As with union federations in other countries, the TUC has outlined the 'just transition' principles which it believes should shape the UK's response to climate change. They are incorporate into five key principles. These are: a commitment to sustainable development; inclusion of workers in the policy making process; new employment opportunities and income security for workers affected by the transition; an equitable sharing of the costs; and a substantial role for government in shaping the transition, rather than relying on the market (Dromey and Hunt, 2009;TUC 2008).

While it might be expected that New Labour would have implemented major changes to assist the UK's labour movement, its policies in this area have been quite limited. Although it has recognized the need to expand training and apprenticeship, it has been reluctant to give the trade union movement a significant role in shaping the UK's climate agenda (Brockmann, Clarke and Winch 2010b). While small sums have been provided to pilot projects that involve unions directly, these have, at best, been marginal to the overall development of the UK's system of training and apprenticeship. As a senior TUC representative has noted:

Under New Labour, unions have had to adapt to a so-called "post voluntary" system. It is very much about meeting employer demand through employer -dominated bodies, retaining employer prerogative and not increasing collective bargaining over learning and skills (Clough, 2009).

The new government is even less likely to expand the role of the TUC and its affiliates in the areas of training and climate policy.

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sub contracting within the industry. As it only began to receive funds in 2009, it remains to be seen how effective it will be. http://www.cskills.org/

[36] The weaknesses of the UK system have been highlighted by the experience of the London Olympics. The City argued that this project would showcase its ability to incorporate progressive training and employment measures with environmentally sustainable construction methods. However, despite projections that the Olympics would provide numerous jobs to the city's socially deprived areas and provide several thousand new apprenticeships, as of June, 2011, the 5.2 billion pound project had employed 426 apprentices of whom only 60 had completed their full apprenticeship. (O'Sullivan as cited by Clarke and Holborough, 2011) This represented less than 1 percent of the project's employees.

[37] The TUC's General Secretary made the following comment about the 2008 Climate Change Act: "This is a major step forward in the fight against climate change and should lead to a big effort across government and wider society to change behaviour. We expect the greater discipline of binding targets to lead the Government to look more closely at energy efficiency in the workplace as well as the home and to consider the central role that clean coal and carbon capture and storage should play in future power generation in the UK."Press Release, March 13, 2011.

The major UK construction unions are the Union of Construction Allied Trades and Technicians (UCATT) which has the largest membership of building workers, UNITE, Britain's largest union which has a major construction division (formerly the Transport and General Workers Union) and the General and Municipal Workers' Union (GMB) which also has a significant number of members in the sector. UCATT, with about 130,000 members is primarily a construction union while the other two are 'general unions' most of whose members work in areas other than construction.[38] Several other unions have smaller numbers in specialized parts of the construction industry.

The UK's Office of National Statistics Labour Force Survey estimates that union density in construction fell from 30.5% in 1995 to 14.5% in 2010.[39] [40] Union membership is highest among skilled trades and lowest among semi-skilled or unskilled manual construction workers, of which the UK has a much larger proportion than many other European countries. Unlike Germany and Denmark, the UK has a very limited commitment to 'social partnership'. Instead employers dominate. Absent institutional arrangements give them a substantial voice in the training system, UK unions are not able to act as strong advocates for the training needs of their members. Nor are they able to participate as partners with employers in shaping industry policies. Low union density makes it difficult for the building unions to claim that they represent the average construction worker. Low membership also means union resources are quite limited, making it difficult for unions like UCATT to participate in the education and training activities in which they might otherwise wish to engage.

UK construction unions recognize the need for re-skilling the labour force to enable workers to implement new technologies and new building techniques associated with a low carbon economy. They also believe that many industry practices, such as self-employment are major barrier to modernizing apprenticeship and training. They have repeatedly lobbied successive UK governments for major reforms to address these practices, largely without success. In addition they have witnessed a major decline in areas where workforce training was being effectively implemented

[38] In addition to being a member of the TUC, UCATT is affiliated to the Building and Wood Workers International and the European Federation of Building and Woodworkers.

[39] Moreover, even the 2010 official figure may over-state union density. This is because the sampling techniques used in the Labour Force Survey for the UK are based on workers identifying themselves as employees – that is having an employment relationship. This designation does not correspond to the status of self-employed contractors who account for almost half of those working in the industry, many of whom are not anxious to reveal their involvement in the industry. Consequently, many of the workers surveyed may not self identify as construction employees. Taking this issue into account, the actual proportion of workers who are union members may be closer to 10%, or perhaps even less.

[40] The statistics on union presence in a workplace are considerably higher at 27.3%, but this appears to have little impact on the wages of construction workers as the Labour Force Survey indicates that the earnings of only 17.7% of workers are affected by the presence of union collective agreements at the workplace.

such as direct labour schemes and public procurement (UCATT Unionization Fund Round 2: *Modernization Across the Union* Sept. 2010).[41]

Despite these challenges, building workers' unions have tried to use their role in the Sector Skills Councils (SSCs) established by government to identify future skill requirements and develop programs to meet worker training needs.[42] UCATT represents the construction unions (arguably as a junior partner) in the Strategic Forum for Construction, a consultative organization composed of various industry stakeholders established in 2001 to liaise with government and engage in long term strategic planning for the industry. UCATT also works with the National Skills Academy for Construction to promote sustainable construction practices (CS 2006). However, UCATT's effectiveness has been limited largely due to a lack of commitment by unorganized employers, many of whom are reluctant to see the union working with their employees (UCATT and Constructionskills, 2006).[43] [44]

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[41] UCATT has describes the problems as follows: *Historically, UCATT's operation and organisational focus had been predicated on the traditional construction site and on construction workers employed by local authorities. However, in recent years these environments have changed radically. Current sectoral, business, societal and political trends have resulted in the re-structuring of local authorities, the externalisation of council services through subcontracting, the creation of arms-length management organisations (ALMOs) and housing associations, the industrialisation of on-site building practices (including 'lean' building, 'just-in-time' and 'no waste' production techniques), off-site pre-fabrication, a sizeable influx of migrant workers, and an increasing focus within the industry on sustainability and corporate social responsibility. Key features of the industry include a highly mobile workforce and union membership, 'nomadic' employees, an inadequate health and safety record, a poor training culture, a high proportion of employers that are SMEs (98% of the industry consists of firms employing 11 or fewer staff); and a high level of 'bogus' self-employment.* UCATT Unionization Fund Round 2: *Modernization Across the Union* Sept. 2010

[42] SSCs are employer-led bodies involved in setting qualifications and organizing apprenticeships. At the national level the key body responsible for training and apprenticeship is the Learning and Skills Council which has overall responsibility for all industrial sectors. It too is employer dominated, with only one union representative on its governing board. (Clough, 2009)

[43] At the same time UCATT participation in the SSC framework has been controversial within the labour movement. Some see it as simply promoting an employer driven skills strategy. (the board has 14 employer representatives, two employee (union) representatives, two from the education sector and one member representing clients along with two government observers). Union involvement has been characterized by critics of the system as essentially tokenism, a perspective reinforced by the almost complete dominance of employers in shaping the policies of these bodies. (Clough, 2009) Critics also argue that providing the training employers demand in the short term may not equip workers with the right skills for the future, given the constant changes in materials and working practices in the industry. In response to this concern, unions are advocating top-down strategies led by government to strengthen the demand for sustainable building measures, and thus the skills that would go along with them (Green Alliance 2009). This would help assure workers that their efforts dedicated to re-skilling will be relevant to their future work. It may be worth noting that UCATT has also tried to push the industry towards using materials that avoid damaging the environment or contributing to climate change. For example, in 2003, it joined with Greenpeace UK in a campaign to put pressure on the industry to source its lumber from sustainable forests. http://www.greenpeace.org.uk/media/press-releases/ucatt-and-greenpeace-join-forces-to-green-timber-procurement

[44] Unions are also concerned that government policy supports an integrated approach in which the greening of manufacturing will complement the greening of construction. They are wary of repeating

In sum, UK construction unions (and the industry in which they work) face major challenges in implementing a 'just transition' program. The structure and organization of the industry is not conducive to long term labour market planning. Self-employment, combined with a decentralized, fragmented industry and weak unions makes it difficult for the UK to carry out the training and retraining needed for the industry to meet climate change objectives, particularly given the priority given to cost cutting by contractors and the purchasers of construction outputs. In addition, the building trades unions have other problems that absorb much of their energy. Unions such as UCATT have had to focus too much of their attention on basic survival in the context of an industry in which their role is already marginal and in which their very existence is questioned by many employers.[45] In this context, their capacity to take a leadership role in promoting climate change initiatives is extremely limited, regardless of their interest in supporting such initiatives.

Denmark: The Public Policy Context for Climate Change Initiatives

Perhaps more than any other country, Denmark is characterized by a high degree of public awareness about – and concern for - the long-term impact of climate change. There is a broad public consensus that the consumption of fossil fuels must be curtailed and GHG emissions dramatically reduced if global warming is to be stopped. Denmark has a vibrant environmental movement which has pushed energetically for policies to address global warming. Successive governments over the past several decades have been strong supporters of both the Kyoto process and the work of the EU in establishing clear targets for reducing in GHG emissions. Denmark has also been a strong promoter of international measures designed to shift the planet towards sustainable, renewable energy sources.

The government believes that the country should be able to reduce GHG emissions by between 80% and 95% by mid-century (Danish Commission on Climate Change Policy 2010). Denmark also has a target of eliminating the use of fossil fuels entirely by 2050. To achieve this objective it has established a detailed policy framework to improve energy efficiency in the built environment, shift energy consumption to renewable electricity, replace oil and gas by biofuels and initiate a major push to support research on renewables (Cedelop 2010). Under the EU 20/20/20 targets in the shorter term, Denmark is committed to achieve a 20% reduction in GHG emissions in sectors not covered by the Emissions Trading System (ETS) by 2020 (relative to 2005 levels) (SOER 2010) and a 4% absolute reduction in energy use by 2020 compared with 2006 (Denmark, *National Reform Agenda* 2011).

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cases like Vestas, where England lost its only wind turbine manufacturing plant and good quality jobs vanished to China and the US (Green Alliance 2009).

[45] Another factor is that UCATT has experienced considerable internal conflict over the legitimacy of its election process. Internal wrangling over the fairness of the process of selecting a new General Secretary has taken a toll on the union's credibility and on its ability to carry out its basic labour relations functions.

Denmark has a long history of supporting policies promoting environmental sustainability and encouraging higher production of renewable energy, starting with the first building regulations in 1961.[46] Policies to promote energy conservation in buildings and to develop wind energy date back to the 1970s and today Denmark is a world leader in installed wind energy and in the production of advanced technology in this area of manufacturing (Klassen 2005). In 2005 Denmark had 5500 operational wind turbines and wind energy met 16% of its national electricity demand (Sharman, 2005). In 2011 wind is projected to reach 21.1% of Denmark's energy production (SOER 2010).

Like Germany, Denmark has taken the view that it can benefit from the development of world-class renewable energy technologies and related innovations that many countries will need to address the impact of climate change in the future. In recent years, Denmark has become a major exporter of renewable energy equipment such as wind turbines. The government believes that maintaining Denmark's lead in renewable energy technologies provides a path to continued economic development with corresponding benefits to employment and living standards (Danish Commission on Climate Change Policy 2010, CEDEFOP 2010 pg. 8; GHK p. 21).

Climate Change and the Danish Construction Industry

Denmark's construction industry is a major component of the nation's economy, with output averaging about 220 million Kroner, annually. This represents approximately 7% of the country's GDP.[47] Like the construction industry in many other countries, it is composed of a large number of very small firms. Fully 70 percent of construction companies have four employees, or less, and 94% employ fewer than 20 workers. Of the 34,547 registered firms in 2007, only 115 had more than 100 employees (Statistics Denmark). However, these large firms represent a significant portion of the total employed workforce. Moreover, unlike the UK, even small construction firms in Denmark are normally members of an employers' federation through which they participate in the management of key components of their industry.

The construction industry is characterized by an extensive system of voluntary regulation, a high degree of self-organization on the part of employers and unions and a centralized collective bargaining system. Consistent with Denmark's 'light touch' regulatory approach, the legal requirements for starting a contracting firm are minimal. Contractors establish their credentials by registering with the private

[46] The International Energy Association (IEA) has compiled a comprehensive list of the major energy conservation policies and acts of the Danish Parliament, dating back to the 1979 Heat Supply Act. See: http://www.iea.org/textbase/pm/?mode=pm&action=view&country=Denmark

[47] The amount has varied considerably over the recent period largely due to the impact of the 2008 economic crisis. The actual numbers from Statistics Denmark for the past three years are: 2007 – 230 million kr, 2008 - 227 million kr; and 2009 - 198 million kr. (Statistics Denmark 2010, Table 356)

Danish Contractors Association or the Federation of Small and Medium-sized Enterprises. There are four major employer associations (Lubanski p. 80).

The Danish system of voluntary regulation has been very effective in training professional and craft workers (Danish Technological Institute, 2009). The system provides employment stability and income security for most workers, including generous unemployment and disability insurance to cushion the impact of business cycles. The combination of extensive training and employment security has contributed to ensuring high quality building outcomes (Lubanski p. 73).

Buildings account for approximately 40% of total energy consumption in Denmark. Over the past 30 years the country has taken major steps to improve overall energy efficiency and reduce energy use in the built environment. Although Denmark's GDP increased by 50% between 1980 and 2005, its energy consumption did not increase at all (Danish Ministry of Transport and Energy, 2005).

Denmark recognizes that the biggest opportunity for improving energy efficiency lies in retrofitting the existing building stock. New construction only accounted for an 11% increase in the total residential building stock between 1991 and 2008 (Statistics Denmark). According to the Danish Commission on Climate Change, existing buildings still use 2.5 times more energy, on average, than new buildings. Consequently, Denmark can make major gains by retrofitting.[48] The government now requires full energy audits of existing homes and other buildings put up for rent, or sale, on the resale market. Audits must include a list of energy improvements the purchaser, or renter, should incorporate into the building. Just over one million audit certificates have been issued between 1997 and 2010 (Aggerholm 2010).

On June 10, 2005 the major political parties entered into an all-party agreement on an action plan to advance energy conservation in the built environment. This plan included the *Act on Energy Saving in Buildings* and further tightening the requirements in the *Building Regulations Act* (Danish Ministry of Transport and Energy, 2005). The action plan listed a number of specific regulatory changes including heat reduction targets in new buildings of 25% by 2006 and an additional 25% by 2010 (Danish Ministry of Transport and Energy, 2005). In 2008 the government approved a National Energy Agreement to further strengthen its overall commitment to energy conservation (Thomson et. al., Cort 2002).[49] The government

[48] Unlike Canada, 61% of residential housing in Denmark is heated by district heating systems. Oil and natural gas account for another 15% each, with the rest of residences being heated by electricity, or other energy sources. Residential heating accounts for 50% of total heat used in the built environment, with commercial and industrial buildings accounting for 40% and recreational facilities the remaining 10% (Statistics Denmark)

[49] The National Energy Agreement was passed in 2008. With this Agreement Denmark has committed to a 4% reduction by 2020, compare to 2006 levels. Other provisions include 20% of energy production from renewable sources by 2011. Initiatives to meet these targets include two large (200MW capacity) off shore wind farms, energy taxes on Co2 and NOx, research in transport

further strengthened its commitment to conservation with Danish Building Regulations (BR 10) that came into force in January 2011 (Aggerholm 2010).

The Role of the Vocational Education and Training

The Danish VET system places a heavy emphasis on trades training. There are a total of 85 separate trades (Bosch and Charest). As in Germany, but in contrast to the UK, the Danish construction industry relies primarily on a highly skilled workforce, supplemented by general workers who also must undertake a significant period of training. The VET system has been described as a "cultural bridge between the German dual apprenticeship systems and the schools-based models of other Nordic countries" (Lubanski, p. 74). Apprentices spend more time learning theory compared to Germany, but have more on-the-job-training than in Sweden. The public education system also plays a key role in vocational training (Lubanski p.85). Jensen and Buch summarize this approach as follows:

The Danish (upper secondary) national vocational education and training (VET) system offers qualifications that are recognised nationally by employers, trade unions and educational providers. The system is characterised by close, institutionalised, tri-partite collaboration at all levels, guaranteeing that VET programmes are responsive to the labour market and that qualifications are recognised in business and industry. The vocational colleges that offer upper secondary vocational qualification are all public (Jensen and Bush 2010).

The wages of apprentices are paid by the employers. However, employers are reimbursed from a national training fund for the time apprentices attend school, normally two days per week (Bosch and Charest). The fund is financed by a levy on all employers and is designed both to give employers the resources to support apprenticeships and to deter 'free riding' or 'poaching' by employers who might otherwise try to avoid shouldering their share of the costs of training. Unions and employers jointly administer the training fund (Bosch and Charest). In addition, many collective agreement provisions entitle regular workers to 10 days with pay for training after 3 months of work (Dansk Byggeri, 2010).

A distinguishing feature of Danish vocational education is the extent to which unions and employers – the 'social partners' are directly involved in shaping curriculum, appointing senior education officials and establishing the standards for trades qualifications (CEDELOP 2010b). Employers and trade unions determine much of the content of training programs and the standards for certifying occupations and trades. They have introduced a major green training component in both VET and IVET (Initial Vocational Education and Training) for construction

(biofuels) and a tax exemption for hydrogen and electric cars and campaigns to promote energy savings in buildings (Source: http://www.denmark.dk/en/menu/Climate-Energy/Denmarks-Energy-Policy-2008-2011/Denmarks-Energy-Policy.htm).

qualifications (Cort, 2002, Cedelop 2010a). Many programs in VET, CVT and tertiary education also now include a focus on energy efficiency (Cort 2002). In addition, the Ministry of Education has integrated climate and energy topics into the curriculum in compulsory school programs and higher education (Cedelop 2010a). Prior to Denmark's introduction of targets for retrofitting of building stock, VET competency objectives for the construction industry were revised to include more green skills.

Turning to the construction industry, Denmark has also established new 'in service' training programs for building workers and a new training and certification program for energy conservation experts. These individuals are licensed to carry out comprehensive building energy audits. By 2009, Denmark had trained over 1,000 such experts. A recent assessment of Denmark's progress in implementing the EU's Energy Performance of Buildings Directive concluded it had achieved its objectives fully (Aggerholm 2010).

The Role of Danish Labour in Addressing Climate Change

Starting with the 'historic compromise' in 1899, the Danish industrial relations system evolved according to the principle that employers had the right to manage and workers had the right to unionize. It also reflected a longstanding practice of co-operative problem solving (Lubanski p.81). One reason for this is the role unions play in administering unemployment insurance and other social benefit programs for the industry (Classen and Viebrock, 2007). High union density, combined with a highly centralized collective bargaining system in which employers are also well organized, has enabled the construction unions to negotiate industry-wide collective agreements that apply even to small employers (Laux 2009).

Danish labour legislation is quite limited compared to most other countries (Scheuer, 2007). The Danish labour relations system differs from that of most other industrialized countries in that it is largely voluntary. The two major employers' federations and the major union central, LO, believe that it is preferable to keep the state out of labour relations.[50] As a result, Denmark – almost uniquely among developed countries except, perhaps, the US – has not ratified many of the ILO conventions (Scheuer, 2007). Employers have no legal obligation to recognize unions or enter into collective agreements. But at the same time, absent a collective agreement, there is no constraint on employees taking strike action and no penalties for so doing. However, once an agreement is reached, both parties enter into legally binding obligations enforced by an Industrial Court on which employers and unions

[50] Denmark – almost uniquely among developed countries except, perhaps, the US – has not ratified many of the ILO conventions, (Scheuer, 2007). However, Danish membership in the EU is increasingly affecting this voluntary system. This is because Denmark must incorporate EU Directives Danish law, resulting in the Danish government regulating a number of areas of employment policy, labour relations and human rights through EU compliant legislation. It is not clear what the impact of this EU driven policy change will be on the industrial relations system, but it may weaken the role of the trade unions.

have an equal number of nominees. The voluntary character of the industrial relations system does not mean that unions are weak. Arguably, Danish unions are among the most powerful of any in the developed world. This is because they not only represent workers in the customary collective bargaining function: they also share control with employers over a wide range of training and occupational certification matters. And they effectively control the system of unemployment insurance.

Overall union membership in Denmark is relatively high by international standards and has been so for over a century (Trampusch 2010). Over the past two decades, it has declined slightly to 71% (2008) Union density in construction is 73% (Camilla Vakgaard, BAT Kartellet. correspondence, Sept 16, 2011). However, because collective agreements cover non-members as well as members, collective bargaining coverage is 83% (2008). The major labour confederation is the Danish Federation of Trade Unions (LO) which includes 17 member unions with a total membership of 1.20 million workers in 2010 (Statistics Denmark, 2010). Its membership as a proportion of the employed labour force has been gradually declining over the past decade at a rate of about 1% per year (Scheuer, 2007), but other unions have experienced slight gains during the same period. As a result, overall union density in Denmark has only fallen slightly in recent years. LO represents approximately two thirds of unionized workers. In addition Denmark has a number of smaller union federations representing public sector workers, salaried workers, professionals, managers as well as some independent unions. In total, unions outside the LO represent about another 750,000 workers. While the LO is a general union, its affiliates organize largely on a craft or occupational basis (Scheuer, 2007).

Unions play a major role in administering unemployment insurance in an arrangement normally referred to as the 'Ghent" system.[51] There are 32 funds, all but one of which are administered by unions (Classen and Viebrock, 2007). Ten of these are restricted exclusively to workers in specific occupations while another 13 are primarily based on occupational identity, but admit workers from outside their core occupation as well (Madsen, 2007). The unions, rather than the government, are responsible for managing the funds, including collecting levies and paying benefits. Just under 2.1 million workers were insured through this system in 2010 with the LO accounting for over 941,000 of this total (Statistics Denmark). Other, smaller unions accounted for the bulk of the remaining workers covered the unemployment insurance schemes (Madsen, 2007).

[51] Van Rie et. a. argue that these Ghent funds have played a key role in sustaining union membership in the Nordic countries and Belgium due to union involvement in their creation and the perception by many workers that the funds are integrally linked with union membership. They note that this connection may have weakened in recent years. Interestingly, while rising unemployment normally has a negative impact on union membership, the authors note that in the 'Ghent' countries, the opposite occurs, perhaps because concern about job loss makes workers more inclined to join the union that is associated with the insurance fund (Van Rie et. al. 2011)

The LO recognizes the urgent need to deal with greenhouse gas emissions and believes it is preferable to take major steps now, rather than to wait until global warming gets worse. This means supporting investments in measures to reduce reliance on fossil fuels, promote renewable energy and expand energy conservation initiatives (LO 2008). The union federation also believes that the Kyoto protocol should be renewed in 2012 and that European Union targets should be strengthened. In terms of preparing Denmark for a low carbon world, the union believes three measures are essential: extensive research; adequate investment in low carbon technologies; and, adequate training of the workforce (LO 2008).

LO has also developed a set of specific recommendations for transforming the Danish economy. Key to advancing these recommendations is a national agreement among the social partners and government to achieve a long-term climate action plan that would provide the framework for Denmark's next steps in addressing global warming (LO 2008). This agreement would promote climate research, fund training and re-training, impose new environmental taxes, support measures to reduce energy consumption (such as new investments in public transport coupled with lower fares to reduce automobile use) and further the development of renewable energy, including wind, solar and domestic biofuels.

The LO's position on energy conservation in construction focuses on three areas: reducing the emissions and energy used in the construction process; reducing energy consumed by the built environment and developing more environmentally friendly materials and related inputs (LO 2008). It believes that the Danish construction industry should be a world leader and that Danish innovations such as intelligent design houses can also be the basis of a growing export platform.

While much of the federation's climate work has focused on Denmark, the LO also believes in promoting international solidarity on this issue, both through participation in UN and EU forums on climate change and in providing assistance to unions and other social movements in the developing world in their efforts to 'green' their economies (LO, 2008). It has proposed that Denmark establish a new fund, equivalent to 0.5% of Danish GDP, specifically earmarked for international climate change assistance. The LO saw the UN's December, 2009 Copenhagen summit as a key opportunity to advance its position that there should be a broad international commitment to a 'Just Transition' incorporating measures to reduce carbon output with training and labour adjustment programs for workers. Unfortunately the outcome was a disappointment to the LO which expressed concern at the actions and policy positions of a number of countries at the summit. However, it felt that it had succeeded in keeping the issue of a Just Transition on the agenda for the next UN summit:

For the entire duration of the summit we fought for agreement among the countries on a just transition to climate-friendly production. And, fortunately, we succeeded. The parties have agreed to continue to strive to safeguard the workers who lose their jobs on account of the transition to green production. So unless some countries

actively work to remove the phrase "just transition" from the document, we trade unionists have a good point of departure when the countries meet for COP16 in Mexico (http://www.lo.dk/English%20version/Climate%20Change.aspx).

Danish construction workers are represented by several different unions. The largest is the United Federation of Danish Workers (3F). It is a 'general' union, representing workers in a variety of economic areas, but primarily in the private sector. In recent years it has expanded through a number of mergers and now represents about 340,000 workers in six major industrial sectors, including 48,000 workers in its Building and Construction Group (3F web site). TF was another major union that, until recently, represented a significant group of construction workers. However, TIF merged with 3F on January 1, 2011. The merged union now represents over three quarters of all construction workers in Denmark. As noted, employers are also well organized making it possible for the unions to negotiate agreements that apply to almost all construction workers.

Although both the regulation of qualifications and the collective bargaining system are based on voluntary arrangements, this approach has been very effective in training professional and craft workers (Danish Technological Institute, 2009). It provides a high degree of employment stability and income security for most workers, including generous unemployment and disability insurance to cushion the impact of business cycles. The combination of extensive training and employment security has contributed to ensuring high quality building outcomes (Lubanski p.73).

Compared to the UK, the number of self-employed workers is very low, representing just over 10% of the construction workforce in 2010 (Statistics Denmark). Both unions and employers are opposed to the expansion of self-employment because it undermines the industry's ability to maintain high standards of training and workmanship. It also means that legitimate firms end up supporting those who are avoiding (sometimes illegally) paying their contributions to the industry's training funds. Since the expansion of the EU's labour mobility provisions to include workers from the newly admitted Eastern European countries after 2004, both employers and unions in the construction industry have pushed the government to ensure that foreign workers receive the same pay as workers covered by existing construction collective agreements (EFBWW and FIEC 2009, Cremers, 2006).

The construction unions are strong supporters of the government's climate policies. They have participated extensively in the development of the LO's policies that promote green construction and they have initiated a number of their own policies on improving climate change initiatives in their sector. One example of this is their role in developing new training programs in the emerging wind technology sector:

In the wind turbine sector, skills gaps were identified by a project led by representatives from the Federation of Danish Industry and the unskilled workers employees' organisation 3F. The specifics of the requested training programme were

identified by surveying wind turbine companies, in particular Vestas and Siemens, who dominate the industry and represent most employees in the industry (CEDEFOP Appendix 1).

As in other countries, the economic crisis, which began in the fall of 2008 has had a major impact on the Danish construction industry, with unemployment rising to just over 20% of construction workers in 2010 (Odgaard et. al. 2010). Like construction unions in other countries, the Danish unions have pressed the government to provide various measures to cushion the impact of the crisis on construction. What is significant about the approach of the Danish unions is that that their proposals are extensively focused on accelerating Denmark's 'green' agenda.

BAT-kartellet (BAT) which includes 8 union federations in Denmark, representing about 125,000 workers has put forward a set of proposals for both the public sector and the private sector. In the public sector, it recommends that the government increase its capacity to monitor energy use in all government owned buildings with the view of ensuring that it is achieving its energy and carbon reduction targets fully (Odgaard et. al. 2010). It also recommends that the government provide additional funds for building maintenance and for new green investments in public infrastructure including schools, day care centres, municipal facilities and the like. In addition, BAT proposes that the government provide the funds to ensure that the energy efficiency targets earlier proposed for public buildings are fully achieved by 2018 (Odgaard et. al. 2010). It also proposes that all of Denmark's 98 municipalities achieve the status of 'climate municipalities' meaning that they meet a range of specific conservation targets.

BAT's proposals for the private sector include giving priority to renovating buildings that were constructed before 1978 and extending the scope of Denmark's existing program of energy counseling to ensure that every home owner or apartment dweller has the opportunity to develop an energy conservation program for their residence. It proposes amending Denmark's that the mortgage regulations to enable home owners to borrow up to 80% of the value of their dwellings if the purpose is to pay for energy conservation initiatives. The government should guarantee these loans to minimize the interest rate paid by the home owner, thus increasing the attractiveness of financing retrofits. Far from retreating from earlier conservation initiatives, Danish construction unions have taken the view that the recent economic crisis should be addressed by accelerating Denmark's efforts to reduce GHG emissions and improve the energy efficiency of its built environment.

In sum, the construction sector and its unions have been major contributors to Denmark's climate initiatives. While broad public support for measures to reduce GHG emissions and lower energy consumption provide the framework for much of what the industry and its unions have accomplished - and supportive government policies have played a major role - the industry itself has established new environmental skills, introduced major 'green 'components in its workforce training, lobbied for more stringent environmental standards and developed the capacity to

deliver a high standard of environmentally sound construction services. Unions have played a central role in this process because they represent almost three quarters of construction workers and because Denmark's social partnership approach provides them with a number of institutional vehicles through which they can implement their environmental objectives.

Conclusion

In the preceding discussion we have examined three different national approaches to implementing climate change policies within the construction sector, with a specific focus on the role of labour. The examination of Germany, the UK and Denmark has revealed significant differences among the three countries – differences which impact on their respective abilities to implement effective GHG reduction and low energy programs in the built environment. The construction industry in the UK operates within a liberal-market economic framework characterized by a very low level of unionization. Its approach to industry productivity is through keeping labour costs as low as possible and minimizing employer commitment to the workforce by extensive sub-contracting and 'self-employment'. The organization of work is based on a top down, management approach in which it assigns specific tasks to workers. The broader development of well-rounded, knowledgeable crafts persons is not a priority.

While the UK state plays a significant role in funding VET, principally in colleges of further education and in other parts of the publicly funded training system, the duration of most training is relatively short and linkages with employment are weak. Trainees are often unable to complete their vocational program due to lack of on-the-job opportunities. Despite the recently introduced – and very modest – training levy, employer financial support for sector wide training and apprenticeship programs is very limited and responsibility for obtaining the required qualifications is left largely up to the individual worker. As a consequence, the training system is not well suited to providing its workforce with the new skills required to implement the 'greening' of the UK's construction sector.

Union density in the UK construction sector is low compared with Germany or Denmark. The main construction union, UCATT is largely preoccupied with its own survival in the context of an industry that is difficult to organize, given the high mobility of labour and the ever changing location of construction projects. UK unions have only a marginal role in influencing the occupational standards and training programs for workers in the industry. Government commissions and review of the industry have normally ignored their potential role in advancing climate change initiatives. When they have discussed union involvement it is largely as an afterthought. Hence the trade union movement has little ability to exercise significant influence on the climate change policies introduced into the construction sector or to oversee the training and development of the workforce in the new skills required to implement low carbon construction.

The German construction industry has been at the centre of much of the nation's policy response to climate change. Supported by a high degree of public consensus that global warming is a major issue, the federal and state governments, construction employers and unions have co-operated in implementing very ambitious programs to reduce energy consumption in new buildings and retrofit much of the existing building stock with the latest energy conservation technologies. The industry's approach to maintaining productivity is to focus on training a highly skilled workforce. As a result, Germany has a high proportion of master crafts workers and a correspondingly small proportion of unskilled workers. Standards are maintained by regulations that limit many areas of construction to crafts workers with the requisite certifications. It thus limits competition based on low skill, low wage workers. Over 50% of school leavers in Germany decide to take VET programs. These combine classroom learning with on-the-job experience. Trades training is extensive, normally taking between 3 and 4 years duration and newer programs provide linkages to more technical training at the university level. The system provides workers with an opportunity not only to learn specific skills but also to acquire a theoretical understanding of the principles or their craft or trade.

Construction employers are well organized at both national and state levels. Membership in these federations gives them the capacity to play a major role in overseeing training programs, including determining the curriculum content. Training is funded in part through a sector wide employer levy which covers much of the cost of wage replacement for trainees as well as their tuition and other education expenses. Employers are generally committed to providing trainees with the on-the-job experience needed to complete their apprenticeships. Qualified crafts workers have a relatively high occupational status and workers normally view their training as the basis for a life-long career in the industry. As a consequence of its approach to training, Germany's construction workforce has considerable capacity to deliver innovative climate change programs.

Germany has a 'social partnership' model in which the unions have a voice in a wide range of construction sector issues, including training and the establishment and maintenance of the standards of the various trades. While only two fifths of construction workers are unionized, collective agreement coverage, enhanced by labour ministry directives, means that over two thirds of workers have their terms and conditions of employment regulated by unions. Unions also exercise indirect influence through the election of union members to the governing body of Works Councils. These bodies have responsibility for overseeing various policy decisions within the firms where they have been established. Thus they are able to participate in shaping climate change programs at the level of individual firms.

In practice, German construction unions have been strong supporters of the government's climate change initiatives and have used their influence to lobby for even stricter standards in the building sector, as well as for new financial support for a variety of energy saving and low carbon initiatives in the built environment.

Denmark has been a world leader in climate policy over the past four decades. There is a broad social consensus that the country must take major steps to deal with global warming. There is also a widespread view that Denmark should be a global leader in the development and implementation of climate initiatives. Due to the built environment's potential for reducing GHG emissions and due to the significant opportunities it offers to lower energy consumption, Denmark has put in place a number of innovative conservation programs in the construction sector.

The VET system in Denmark provides a strong basis for the development of craft skills. The training program is lengthy and combines both theoretical approaches taught in the classroom with practical experience gained on the job. Unions and employers jointly manage the national training programs and are influential in shaping the curriculum used for VET in the state supported education system. Funding for training is based on a sector wide employer levy which provides income replacement for apprentices during the classroom portion of their training, as well as some financial support to employers that take on apprentices. Although the establishment of the qualifications for craft occupations is managed jointly by unions and employers (the social partners), these qualifications are widely respected across the industry. As a result the Danish system is well suited to providing workers with the new skills needed to implement innovative climate change initiatives in the built environment. Like Germany, it has taken the view that the way to enhance productivity is to have a well-trained workforce whose efficiency is dependent on high skills and expertise rather than on low wages.

The role of unions in the Danish construction industry is more extensive than in the UK or Germany. Union density is very high by international standards, even though state involvement in regulating the Danish construction industry is minimal. Both unions and employers are highly organized, making the national collective bargaining system an effective approach for regulating the terms and conditions of employment of construction workers. Under the 'Ghent' system, unions effectively control the unemployment insurance system and the system for insuring sickness and disability. Although construction workers are not required to join one of the union controlled funds, most do. These factors have given Danish unions the capacity to become significant actors in Denmark's efforts to meet the challenge of climate change.

At the policy level, Danish unions have been very supportive of the government's climate program, encouraging it to move more aggressively in financing new programs in the built environment, as well as establishing tougher building codes. They have also co-operated extensively with their employers in pilot projects and in developing new industry standards. In sum, the Danish approach facilitates effective incorporation of the ideas and commitment of workers into its climate agenda.

The conclusion derived from the analysis of the jurisdictions examined is that where workers and their unions play a major role in shaping the organization of labour and

the training of the workforce – whether through state mandated arrangements as in Germany, or voluntary, as in Denmark – they have also had the ability to influence the way their industries have responded to the challenge of climate change. Conversely, where their role is marginal, as in the UK, their ability to contribute to the development of the climate change policies of their industry has been, correspondingly, very limited. While inclusion of labour in the development of policy and the delivery of environmental programs is only one factor in the broader approach of these jurisdictions to addressing climate change, nevertheless, unions can make a positive contribution, but only if they have the resources and influence to make a difference.