

BOND UNIVERSITY, AUSTRALIA

Impacts of climate change policy on the European construction industry employment and the workplace

THE EUROPEAN REAL ESTATE SOCIETY, ERES 12 CONFERENCE, EDINBURGH

Peter J Glynn & Dr Ros Taplin

6/1/2012

The construction sector in Europe is active but has to be more dynamic and tackle challenges. There is a need to mainstream the employment potential of the green economy and the training of its workers in skills to deliver sustainable buildings.

Authors

Peter J Glynn

pglynn@bond.edu.au

Dr Ros Taplin

acsmp@unsw.edu.au

Bio sketch

Peter Glynn's professional background is in industry association management, with specific expertise in labour relations and labour market management. Prior to commencing Doctoral studies he was engaged by the International Labour Organisation and the International Organisation of Employers in the development of policies and tools to guide the implementation of labour market strategies to manage the impacts of climate change policies. His doctoral research addresses the question of how industry (employers organisations and trade unions) can ensure the impacts on employment and the workplace are considered in climate policy.

Professor Roslyn Taplin is Research Director of ACSMP at the University of New South Wales, Sydney. She was formerly Professor of Environmental Management at Bond University and prior to that, Director of Environmental Management Program and Director of the Climatic Impacts Centre, Macquarie University. She has also held positions at the University of Adelaide and RMIT University, Melbourne. Her current research interests include: sustainability and mining practices; corporate responses to climate change; climate change adaptation decision-making; renewable energy policy; climate change mitigation approaches including the Clean Development Mechanism and emissions trading.

Contents

Introduction

Climate Change Policy and the Labour Market

Climate Change Regulation and the Construction Sector

Drivers and Barriers

Skill requirements

Low Carbon Workplace

Ecological modernisation theory: the value chain considerations.

Findings and conclusion

Introduction:

This Paper explores the impact of climate change policy on construction industry employment and the workplace. The contention is that labour market planning is an essential component of policy if the emission reduction targets and the ecological objectives are to be fulfilled.

The research draws on the valuable contributions by the international agencies including the OECD and the ILO, the academic institutions and the industry. As well, there are a number of influential and representative discussions in recent months that inform this subject and allow an evaluation that is based on the current state of play:

- EPE Train-Rebuild Forum, October 2011
- European Commission ILO Skills and Occupational Needs in Green Building, June 2011
- 12th European Forum on Eco-Innovation, Scaling-up sustainable construction, April 2012
- European Retrofit Network: Retrofitting Evaluation Methodology Report, Gleeson et.al, August 2011
- The Role of Employers organizations and trade unions in the development of climate change policy, UK case study (unpublished), May 2012

This Paper will address the developments in Europe with a Case Study of the UK

The research takes the opportunity to further examine the utility of ecological modernisation theory and the potential for the value chain concept to explain the relationships that form the base of the theoretical model and whether there are gaps.

Climate Change Policy and the Labour Market

It is only in recent times that the labour market impact of climate change policy has been acknowledged, attributable to some major research initiatives and the inclusion of social factors in international climate agreements.

The formal link was established when governments resolved to include provision for a just transition and decent work in the Cancun Agreements from the UNFCCC COP 16 (UNFCCC 2010). The four tenets for decent work as articulated by the International Labour Organisation (ILO) are creating good jobs, guaranteeing the respect of workers and recognition of their rights, extending social protection and promoting social dialogue (ILO, 2011). These are not remote concepts and it should be expected they will be provided in industry and labour market policy and planning.

The OECD (2010) in considering the economic impacts observes that

“climate change related regulations and policy frameworks will result in changes in production (supply side) and in consumer habits (demand side). This implies an important adjustment of the overall economic activity, chiefly affecting enterprises and the workforce, either directly or indirectly. Labour market institutions will therefore have to deal early on with these changes in order to limit the potential negative effects (on the labour market) and to seize the emerging opportunities (p 11).”

It contends that labour and skills policies are important, and that labour policies should focus on preserving employment, not jobs and must ensure that workers and companies are able to adapt quickly (OECD 2011).

The International Labour Organisation (ILO) Green Jobs Report (Worldwatch Institute 2008) created the awareness of the labour market issues arising from climate change policy and quantified the direct impact on employment, much as the Stern Report (Stern 2007) heightened awareness of the economic factors. The ILO report encapsulates the findings that are common across the research (CEDEFOP for the EU, ETUC, and OECD), that jobs will be lost, jobs will be created and jobs will change; on balance there will be modest net growth in employment and all sectors of industry will be affected. It contended that governments must have policy to manage the changes, and that social protection systems needed to be in place to afford workers a just transition.

Climate Change Regulation and the Construction Sector

The construction sector in the EU is active but has to be more dynamic and tackle challenges. There is a need to mainstream the employment potential of the green economy and the training of its workers in skills to deliver sustainable buildings. Some EU member states (six surveyed) do not have explicit overarching national strategies targeting green skills (EPE 2011), and in the UK the government's environmental strategies do not generally have a significant skills development component (Strieska-Illina 2011).

Much of the domestic climate policy of EU member states is framed by requirements through its Climate and Energy Package and related regulation intended to combat climate change and increase the EU's

energy security (Europa 2010). At an EU summit led by the UK in 2005, member states gave the European Commission a mandate to develop a common energy policy for the first time. In March 2007, the European Council “approved the ambitious climate change and energy package to build a low carbon economy in Europe (DECC 2007, p 34).” The targets, to be met by 2020 are:

- A reduction on EU greenhouse gas emissions of at least 20% below 1990 levels
- 20% of EU energy consumption to come from renewable resources
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency

The package became European law in 2009 and the national targets became legally binding.

The climate and energy package is supported by a suite of complementary legislation including the EU Emissions Trading Scheme, binding renewable energy targets and carbon capture and storage (Europa 2010).

The EC regulatory and statutory framework guides the member states in the development of domestic policy, benchmarks performance toward the agreed targets and monitors progress. Its flagship initiatives addressing sustainable construction fall under the banner of “A resource-efficient Europe” and provide a long-term framework for actions in many policy areas:

- Low carbon economy 2050 roadmap
- roadmap for resource efficient Europe
- Energy 2050 roadmap
- European Energy efficiency plan 2020

These are far reaching and long term, supported by statutory infrastructure suitable to provide the public and private sectors the certainty required for planning and investment. The initiatives include targets to reduce emissions in the residential and services sectors progressively for up to 37% by 2030 and 91% by 2050, that 2% of building stock is to be refurbished each year and 3% of public building stock by 2020. As well, standards are to be revised and stimulus provided for innovation and legal obstacles eliminated. The suite of legislation to underpin the initiatives includes:

- Energy services directive 2006/32/EC
- Eco design directive 2009/30/EC
- Labelling directive
- EPBD 2010/31/EU
- Construction Products directive (Reg EU No 305/2011)

The work that this commentary summarises was undertaken by the Building Performance Institute of Europe (BPIE) and found that there are many pieces of the puzzle that exist, but there are both overlaps and gaps between the pieces that is one of the barriers to the take up of retrofit programmes across Europe (BPIE 2012).

The question that is left unanswered is whether the workforce will be available in the number and with the skills required to do the work.

Drivers and Barriers

While all sectors of industry are impacted by climate change policy, the building and construction sector is particularly affected being a major contributor to the problem, labour intensive and highly regulated. It was identified in the International Energy Agency Blue Map scenario as requiring a radical action globally (ILO 2011).

The WEF (2011) reported the findings of its survey that 43% of cities are dealing with the effects of climate change, and 79% report that climate change could hinder the ability of business to work in their cities. Further, that while the new energy efficient systems and equipment are cost effective and available, retrofits are not occurring at the rate required and Europe is already experiencing shortages of labour and deficiencies in the supply of skills and training that are stifling the sectors ability to undertake the work (ILO 2011).

There are a number of underlying drivers of policy necessary to make the transition to a low carbon construction sector. There are of course the broader issues of sustainability such as water use reduction but more directly related are the need for energy security and affordable energy prices, management of population growth and urbanisation, and employment creation (ILO 2011). The barriers faced in making the transition are variously described (BPIE 2011, WEF 2011, ILO 2011) but can be summarised as:

- Costs are incurred in front of a long payback period
- Principal agent issues
- Multi dwelling housing where communal decision making is complex
- Labour market is not aware or skilled
- Retrofit theory in its infancy
- Building owners rarely make energy efficiency retrofit a priority, unless mandated
- Few businesses have prioritised or have the capital available
- Uncertainty of government actions
- Property owners are hesitant because retrofit debt appears as debt on balance sheet
- Retrofitting is not core business of building occupants
- Financial markets Lack data to inform whether energy efficiency retrofit can pay for itself
- Banks lack standards for collateralising debt

Governments have at their disposal a number of policy levers which, in consultation with industry can guide the transition, providing consistency and stability for private sector decision making and investment. These measures include building codes, technical and product standards, mandatory building labelling, fiscal incentives, tax reductions, energy efficiency obligations and market mechanisms such as an emissions trading system (ILO 2011).

Skill requirements

The decisive early action by the European Parliament provided the certainty required by member states, industry and investors to commit the institutional support necessary to invest in product and business development. Despite the early action, retrofitting of buildings to reduce emissions has not been occurring on the scale required (WEF, 2011). It has also been observed that skills gaps and shortages would be a “binding constraint” on the constructed environment and that “the majority of architects and engineers worldwide are unaware of the materials, design and construction techniques available for energy efficient buildings and are therefore unable to put them into use in their projects” (UNEP 2008, p. 19). While one suspects that reference is probably now dated, the OECD (2011) suggests skill shortages are already a concern with construction and retrofitting among the most effected sectors. ILO research attributes the problem to an underestimation of growth in the small and medium enterprise sectors, the general lack of scientists and engineers, national skills structures which don't meet demand and the low reputation of some occupations (Strietska-Illina et.al. 2011).

While some authorities (UNEP, ILO, French OPCA and Pauwels) contend that the industry occupations will evolve, others (ILO, Friedl-Schafferhans, Gleeson) believe the green construction team will add occupational profiles and new occupations that will require new sources of labour, to supplement the existing workforce. The ILO (2011) sees the emergence of additional functions such as assurance, financing, research, education and policymaking (p.3). Gleeson (2011) asserts that construction teams will require competent emissions assessors, project managers, assessors, appraisers, skilled labour and auditors. Austrian research finds the additional competencies required of a new green plumber tradesperson include customer orientation, ability to communicate and decide, to consult and sell, planning competencies, a high level of independence and global thinking (Friedl-Schafferhans 2011).

Whether occupational profiles will evolve or new and different professions will be required is possibly more a matter of scale or situation rather than a contradiction. They represent overlapping elements of the constructed environment.

Low Carbon Workplace

In the achievement of a low carbon business and the process of transitioning the workplace, it is important not to lose sight of the core business requirement to deliver goods and services produced to specification, for which the workers were rewarded fairly and provided a safe and healthy working environment. Pauwels (2011) reminds us of the need to be vigilant, that while the new materials and techniques can create major opportunities, it is important to be aware of possible long term health and safety risks as it is not always known how a particular situation influences health. A Japanese government initiative had the effect of reducing worker productive capacity, adding stress and the potential to induce depression (Horie 2009; Kjellstrom 2010). The Australian governments home insulation programme was withdrawn after four fatal electrocutions and numerous house fires (Combet 2010). A safe and healthy workplace is a basic human right and must be respected, in all circumstances.

A labour market plan is a key responsibility of the state and industry if the transition to a low carbon economy is to be smooth and effective. It is not merely the single dimension of labour and skill shortages, but also the recrafting of occupational profiles and the emergence of new occupations involved in the delivery of a low carbon installation. To this must be added the new products and regulations, particular sensitivity of the unknown and asking people to do work for which they have not been properly trained. The green workplace is still a workplace and the participants are entitled to be prepared and protected.

Case Study: the United Kingdom

The UK government has committed to the long term vision of reduction in greenhouse gas emissions by at least 80% by 2050; relative to 1990 levels (DECC 2010). The 2050 Pathway Analysis, the Carbon Plan, the Energy Act and the Climate Change Act are the suite of resources that deliver the UK climate change policy. The objective is to achieve decarbonisation in the UK while maintaining energy security and minimising cost to consumers (DECC 2010). They also offer some certainty for decision makers against the potential short-termism in policy and regulatory coherence. These initiatives are considerate of industry, the need to facilitate innovation and to maintain the competitiveness of UK business. However they do not explicitly integrate industry policy, the social dimension of climate change, the impact on the labour market, employment and skills requirements. Nor do they reference the principles of engagement with civil society and social dialogue which is so much a part of EU practice, concepts that will be further analysed as part of this research.

The EU Climate and Energy Package became European law in 2009 and legally binding on the UK. The OECD (2010) and the EU Climate Policy Tracker (Climate Policy Tracker 2011) have generally agreed that the UK policies and programmes are appropriate to ensure its commitments under the package can be met. These assessments are not unqualified but any criticism goes to potential weaknesses in implementation rather than policy flaws.

The EU Lisbon Strategy for Jobs and Growth provided the bridge between the EU Climate and Energy Package and labour market and skills policy. It set the aim of “sustainable economic growth with more and better jobs and greater social cohesion (p 31)” by 2010, objectives the UK government endorsed but which have not been taken up uniformly by the departments concerned (BIS 2008).

The ILO UK country study (Strietska-Ilina et. al. 2011) finds that there is no centralized national framework for the UK labour market and that although the government acknowledged that skills gaps and shortages as a potential threat, “these are through generalized statements rather than specific policy measures” (p 421). It concludes that the government’s environmental strategies do not generally have a significant skills development component. However, the weight of evidence and the changes anticipated for the construction sector labour market change the risk profile of the policy and particularly the national Green Deal retrofitting programme.

The EU Climate and Energy Package and the UK Energy Act mandate energy efficiency as a core element of the initiatives to build a low carbon economy. In the UK, the Green Deal and Smart Meters are the flagship energy efficiency strategies designed to improve the UK building stock. Domestic buildings are responsible for 25% of the emissions, and just over 40% of its final energy use, so it is logical that buildings would be the initial focus. Over three quarters of the energy used in homes is for space and water heating. The government intends that all new non domestic buildings will be zero carbon from 2019 and all new homes from 2016 (DECC 2011).

Smart meters will be mandatory in the 30 million homes and small businesses in the UK from 2019, and the information they provide should enable people to better understand their energy use and maximise the opportunities for saving (DECC 2011). The roll out will begin in less than 3 years for which the government is regulating stringent consumer protection, will include energy efficiency advice as part of the installation visit and will provide support through a centralised communications activity to help all consumers understand how to use and the benefits (DECC 2012).

The Green Deal will provide the opportunity for households and businesses to improve their energy efficiency at no upfront cost, paying back through future savings in energy bills. The legislation also provides the Energy Company Obligation which allows supplier subsidy and integration with the Green Deal Finance.

The DECC proposes to invest \$3m to train Green Deal Assessors and to address skill shortages. Estimates suggest as many as 65000 jobs could be created by the green deal with up to 54000 of these being for installers. For the longer term, DECC is working closely with Sector Skill Councils, employers and the Department of BIS to develop new apprentice schemes to support the demand likely to be generated by the Green Deal (DECC 2012).

The reports by Gleeson (2011), ILO (2011) and OECD (2011) analyse the issues confronting the construction sector labour market as property owners move to reduce energy consumption and emissions generation. Gleeson's case study of the UK finds that there are few additional specialised skills required for most of the methods proposed for retrofitting under the Green Deal, to meet the current "carbon reduction targets requires a substantial increase in the capacity of the construction industry to carry out this work and training programmes to produce the necessary skills (p 3)." The report also observes that that the green construction team will add new occupational profiles and occupations and new sources of labour will also be required to meet the increased demand (Gleeson et. al. 2011)."

The Green Deal targets the retrofitting of 23m dwellings to acceptable standards of energy efficiency, "one building per minute to 2050" (DECC 2010). The government has underwritten through finance or regulation the resources for each link in the chain. However, there are two presumptions that are fundamental to its success:

1. The householder will agree to the retrofit, and
2. The labour and materials are available to meet the additional demand, assuming that the construction industry in the UK is not currently retrofitting at the rate of one dwelling per minute, and that demand for other construction activity will not be impacted by the Green Deal.

As to the first, Gleeson (2011) conducted a pilot study which in essence found that householders are reluctant to undertake the retrofit and amongst the reasons are the disruption factor, and that any roof insulation requirement may reduce their already limited storage space. The governments marketing could address this concern.

As for the labour market considerations, the government has projected there will be 65,000 (approx) jobs created but its planning does not extend to the timing of the growth in demand, the source of the labour and how it will be up-skilled. In a labour intensive industry requiring skills and occupational registration, should the labour market be a relationship in the value chain?

While the Green Deal is a well resourced programme, research within the UK and across Europe (Gleeson, CEDEFOP) point to the additional demands on the labour market that should also be a factor in its preparation. To not do so leaves open the risk that the labour will not be available to do the work in the number and with the skills required.

Reviews of UK policy and strategies find they are responsible and appropriate but warn that further action is required to maintain the rate of delivery against the commitments. They also do not conform to the principles articulated by academic and expert institutions. The OECD (2010) review of UK strategies post GFC recommends that more could be done to align economic and environmental objectives that would to unleash opportunities for green investment and to undertake labour market planning to ensure the workforce is available in the numbers and with the skills required of the new low carbon economy (OECD 2010).

In sum, while there has been material commitment and action by the government there should be no illusion that the work is complete and that further significant policy initiatives are necessary to make the shift to a low carbon economy through a national retrofit programme.

Ecological modernisation theory: the value chain considerations.

Does it add to our understanding of the issue to consider the research theoretical model in the context of the value chain?

Ecological modernisation (EM) is the conceptual framework for the research. EM theorists support the school of thought that environmental outcomes are achieved through the relationship between the nation-state, the economy and innovation, and social movements (Mol & Sonnenfeld 2000). The project will research the impacts of climate change policy on the constructed environment and its labour market in Europe which provides a relatively mature model of environmental management hosting a comprehensive suite of programmes.

Porter conceptualised the value chain¹ (The Competitive Advantage of Nations, 1985) as the interdependent processes that generate value that accrues to the customer. Applied to this research, it

¹ The Value Chain concept was developed and popularized in 1985 by Michael Porter, in "Competitive Advantage." Porter defined value as the amount buyers are willing to pay for what a firm provides, and he conceived the "value chain" as the combination of nine generic value added activities operating within a firm – activities that work together to provide value to

would be an examination of the relationships between the products and service (processes) that are active in the construction sector that deliver energy efficiency and reduced emissions (accrued benefits). In EM, the value chain would be represented through the relationships between public policy, the economy and civil society to achieve the ecological outcome. This research contends that employment and the workplace should be added as relationships necessary is value is to accrue to the customer.

The rating of the relationships in the value chain is not common across the construction sector but is closely aligned to the contractual responsibilities of the actors. The construction contractor is responsible to the architect/consultant who is acting on behalf of the client, and is also responsible for the performance to specification of the subcontractors and suppliers. The value chain of the project developer is much more rigorous reflecting the greater risk that comes from the increased number of links in the chain. The value chain for the architect includes aesthetics not apparent in others. The institutional actor external to the value chain adds the intellectual or lateral considerations of conceiving and research, and the feeder mechanism of education. The academic adds advisors to the actors as links in the chain, and overlays market forces issue-the supply and demand of labour. Absent from the various actors considerations is the legal obligations as influence behaviour along the value chain through contractual obligations, law and regulation.

As a practical exercise, the value chain for the UK governments Green Deal was constructed. The Green Deal targets the retrofitting to acceptable standards of energy efficiency by its 23m dwellings by 2050, “one building per minute to 2050” (DECC 2010). The value chain constructed to reflect the relationships the government has part of the process to generate the value that accrues to the customer.

Government policy→Law and regulation→technical specifications and standards→marketing to industry and consumer→accreditation of Green Deal Installers→finance agreement→householder

The government has underwritten through finance or regulation the resources for each link in the chain. However, there are two presumptions that are fundamental to its success:

1. The householder will agree to the retrofit, and
2. The labour and materials are available to meet the additional demand, assuming that the construction industry in the UK is not currently retrofitting at the rate of one dwelling per minute, and that demand for other construction activity will not be impacted by the Green Deal.

As to the first, Gleeson (2011) conducted a pilot study which in essence found that householders are reluctant to undertake the retrofit and amongst the reasons are the disruption factor, and that any roof insulation requirement may reduce their already limited storage space. The governments marketing could address this concern.

As for the labour market considerations, the government has projected there will be 65,000 (approx) created but its planning does not extend to the timing of the growth in demand, the source of the labour and how it will be up-skilled. In a labour intensive industry requiring skills and occupational registration, should the labour market be a relationship in the value chain?

customers. As this name implies, the primary focus in value chains is on the benefits that accrue to customers, the interdependent processes that generate value, and the resulting demand and funds flows that are created. Effective value chains generate profits. (Value Chains Versus Supply Chains, by Feller, A., Shunk, D. and Callarman, T, BPT Trends 2006)

In sum, this analysis does not answer the question posed at the outset, and the most that could be said is that the value chain is a convenient demonstration of the issues to be or that is being considered. However, there is sufficient variations value chains of the various actors in the construction value chain to require further research.

Box: Construction industry actor value chains

Contractors View (Strand-Hanssen, 2012):

The value chain is based on the three objectives of economic, social and environmental sustainability:

Customer/tenant → architects/consultants → contractor → sub-contractor → producer/supplier

Project Developers view (Lichtenburg, 2012):

To mobilise the value chain, the construction industry needs to create value especially for stakeholders who may be users, investors, housing associations and must be based on a coherent vision encompassing opportunities for individual links in the chain.

*Resources/materials → components parts** → Elements → Wholesale → Contractor** → Project manager* → Principal → Tenant*

**Project manager → architect → structural engineer/services consulting engineers/others*

***Component parts → Installer/sub-contractor → Contractor*

Architects view of the retrofit of an historic building (Gustafsson, 2012):

Client requirements → trading zone → project planning → conservation → new activities on improved premises*

**Sustainable development/labour market policy/cultural heritage/creative industries/environment protection/tourism*

Institutional actor (ILO Greening of the Building Sector is held back by skill shortages, 2011)

Policy making → financing → conceiving, planning and designing → education and research → green building clients

↓

Product and distribution of green building products and materials

↓

Construction, installation and maintenance

Academic, ecological modernisation theory value chain (Glynn, 2012)

Traditional model:

Ecological targets→Government→Economic activity→Civil society→Ecological outcomes

Construction industry model:

Ecological targets→Government→Economic activity**→Civil society***→Ecological outcomes*

**European Union/Domestic public policy/Programmes*

***Business/Labour market (employment/workplace/skills)*

****Environmental activists/business organisation/trade unions*

UK Green Deal Value Chain (notional):

Government policy→Law and regulation→technical specifications and standards→marketing to industry and consumer→accreditation of Green Deal Installers→finance agreement→householder

- *Government policy: 2050 Roadmap, Carbon Plan*
- *Law and regulation: Energy Act 2011, Energy performance in buildings directive*
- *Technical specifications and standards: CEN standards and building codes*
- *Marketing to industry and consumer*
- *Accreditation of Green Deal Installers, Training: Green Deal accreditation/energy efficiency technologies,*
- *Sector Skills Alliance (1000 apprentices)*
- *Finance agreement: Energy Companies Obligation, Energy company/consumer contract*
- *Householder*

Findings and conclusions

The study research finds that the constructed environment is a substantial consumer of energy and contributor of greenhouse gas emissions. It also has the capacity to reduce its consumption and its emissions by half and potentially much more with the right regulatory leadership, financial incentives and labour market initiatives. The impacts on the labour market are material, and will require targeted initiatives both in the supply of labour and skills if the industry is to provide the capacity required for the work.

The Paper establishes that the labour market is significantly impacted by climate change policy, and has the potential to inhibit the ability to achieve the emissions reduction targets, and the fulfilment of the objectives of public policy.

Ecological modernisation theory provided a suitable framework for the study and further research into the impact of climate change policy on employment and the workplace, and the value chain approach could complement the utility of the theory.

The case study found that in the UK the labour market, employment, workplace and skills issues are not debated as integral elements of the policy necessary to achieve the emission reduction targets. However, while the UK has met its short term targets under international and domestic agreements, and has set a path for ongoing emissions reductions through to 2050, informed observers believe programmes in the UK must be scaled up if the future targets are to be met and that labour market considerations are at the core of this effort.

The constructed environment offers significant potential to reduce energy consumption and greenhouse gas emissions. However, the labour market is a significant barrier to the potential available and immediate action is necessary. The social partners in this regard have an important role to play.

Peter J Glynn

Dr Ros Taplin

1 June 2012

Bibliography

BIS 2008, *Lisbon Strategy for Jobs and Growth: UK National Reform Programme*, Department for Business, Industry and Skills UK, HM Treasury, London.

BPIE 2011, *Europe's Buildings Under the Microscope: A country-by-country review of the energy performance of buildings*, Buildings Performance Institute Europe, Brussels.

Climate Policy Tracker for the EU 2011, *EU Climate Policy Tracker 2011 United Kingdom*, World Wildlife Fund, Brussels.

Combet, G. 2010, *Ministerial Statement; Home Insulation Program*, Hansard. All House Debates March 10 edn, Department of Climate Change and Energy Efficiency, Commonwealth of Australia, Canberra.

- DECC 2012, "Davey puts energy saving at heart of strategy", [Online], vol. 2012, no. 09, pp. 8 February 2012. Available from: http://www.decc.gov.uk/en/content/cms/news/pn12_009/pn12_009.aspx.
- DECC 2012, January 30-last update, *Green Deal* [Homepage of Department of Energy and Climate Change UK], [Online]. Available: http://www.decc.gov.uk/en/content/cms/tackling/green_deal/green_deal.aspx[2012, January 30].
- DECC 2011, *The Carbon Plan: Delivering low carbon future*, Department of Energy and Climate Change UK, London.
- DECC 2010, *2050 Pathways Analysis*, Department of Energy and Climate Change UK, London.
- DECC 2007, *Meeting the Energy Challenge: A White Paper on Energy*, Department of Trade and Industry UK, London.
- EPE 2011, "Green Jobs" Creation Through Buildings Retrofitting in the EU Policy Options and Best Practice Examples with Pan-European Multiplier Effect, European partners for the Environment, Brussels.
- Europa 2010, May 17-last update, *The EU climate and energy package* [Homepage of European Commission's DG Environment.], [Online]. Available: http://ec.europa.eu/environment/climat/climate_action.htm[2010, October 1].
- Friedl-Schafferhans, M. 2011, "Qualification-Green Jobs: Study on Behalf of the Austrian Federal Ministry Agriculture, Forestry, Environment and Water Management", *Greening the economy: what impact on the quality of work*. Walqing-European Trade Union Institute, Brussels, September 29, 2011.
- Gleeson, C., Yang, J. & Lloyd-Jones, T. 2011, *European Retrofit Network: Retrofitting Evaluation Methodology Report*, University of Westminster, London.
- Horie, M. 2009 , "Cool Biz" Leaves Japan's Workers Sweltering [Homepage of Bloomberg], [Online]. Available: <http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aPqViejK.hxU> [2009, July 24].
- ILO 2011 , *Decent Work Agenda* [Homepage of International Labour Organisation], [Online]. Available: <http://www.ilo.org/global/about-the-ilo/decent-work-agenda/lang-en/index.htm> [2011, September 16].
- ILO 2011, *Greening of the building sector is held back by skill shortages. Skills-led strategies can drive green building forward.*, International Labour Organisation, Geneva.
- ILO 2011, *Skills and Occupational Needs in Green Building*, International Labour Office, Skills and Employability Department, Geneva.
- ILO 2009, *Rules of the Game: A brief introduction to International Labour standards*, International Labour Organisation, Geneva.
- Kjellstrom, T. 2010, *Impact of climate change on working people*, June 29 edn, Email, Gold Coast.

- OECD 2011, *Green growth strategy synthesis report*, Organisation for Economic Cooperation and Development, Economic Policy Committee, Paris.
- OECD 2010, *United Kingdom Policies for a Sustainable Recovery*, Organisation for Economic Cooperation and Development, London.
- Pauwels, F., Den Kamp, H. & Ramioul, M. 2011, *Greening in construction and the impact on work: New challenges or more of the same?*, Walqing, Leuven, Belgium.
- Rapf, A. 2012, *A review of European policy for sustainable construction*, Buildings Performance Institute Europe, Amsterdam.
- Stern, N. 2007, *The Economics of Climate Change*, Cambridge University Press, Cambridge.
- Strietska-Ilina, O. 2010, "Skills for green jobs: a global view", *Technical validation workshop on skills for green jobs*. International Labour Organisation, Geneva, 17-18 May 2010.
- Strietska-Ilina, O., Hofman, C., Duran Haro, M. & Jeon, S. 2011, *Skills for Green Jobs: A global view. Synthesis report based on 21 country studies. Executive Summary*, International Labour Organisation, Geneva.
- UNFCCC 2010, *Climate Change Conference in Cancun delivers balanced package of decisions, restores faith in multilateral process*, United Nations Framework Convention on Climate Change, Cancun.
- WEF 2011, *A Profitable and Resource Efficient Future: Catalysing Retrofit Finance and Investing in Commercial Real Estate*, World Economic Forum, Geneva.
- Worldwatch Institute 2008, *Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World*, UNEP/ILO/IOE/ITUC, Nairobi.