

International Journal of Labour Research

2012

Vol. 4

Issue 2

Are “green” jobs decent?

INTERNATIONAL LABOUR OFFICE, GENEVA

Copyright © International Labour Organization 2012
First published 2012

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorization, on condition that the source is indicated. For rights of reproduction or translation, application should be made to ILO Publications (Rights and Permissions), International Labour Office, CH-1211 Geneva 22, Switzerland, or by email: pubdroit@ilo.org. The International Labour Office welcomes such applications.

Libraries, institutions and other users registered with reproduction rights organizations may make copies in accordance with the licences issued to them for this purpose. Visit www.ifro.org to find the reproduction rights organization in your country.

International Journal of Labour Research
Geneva, International Labour Office, 2012

ISSN 2076-9806

green jobs / working conditions / employment creation / women workers / trade union role / climate change / China / Korea R / South Africa R / EU countries / equal employment opportunity / renewable resources / industrial engineering / environmental policy / social dialogue / trade union role / waste disposal / service sector / Austria / Bulgaria / Denmark / Italy

13.06.3

ILO Cataloguing in Publication Data

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications and electronic products can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland. Catalogues or lists of new publications are available free of charge from the above address, or by email: pubvente@ilo.org

Visit our website: www.ilo.org/publns

Contents

133

Foreword

Dan Cunliffe

135

*What policies for a green economy that works
for social progress?* Lene Olsen

151

*Green Growth and Green New Deal policies in the Republic of Korea:
Are they creating decent green jobs?*

Young-Bae Chang, Jae-Kak Han and Hyun-Woo Kim

173

*Green and decent? Working conditions in the waste sector
in Europe and implications for trade union policy*

Dr Vassil Kirov and Jerry van den Berge

189

The reality and challenges of green jobs in China: An exploration

Chris King-chi Chan and Maggie Ching Lam

209

Working conditions in "green jobs": Women in the renewable energy sector

Lisa Rustico and Francesca Sperotti

231

Climate jobs and manufacturing in South Africa

Woodrajh Aroun

Foreword

Dan Cunliffe

Director,
Bureau for Workers' Activities
International Labour Office

Over the past decade, an international consensus has emerged on the need to move to a green, low-carbon economy. This has of course been reflected in the discussions and commitments made around the United Nations Framework Convention on Climate Change (UNFCCC) process, then more recently at the Rio+20 United Nations Conference on Sustainable Development held earlier this year, and also increasingly in concrete policies in many countries around the world.

Of interest to workers around the world is the growing recognition of the need for a “just transition” to this new economy. This is usually understood as ensuring that workers are provided with the necessary social protection to face the shift in job opportunities, as well as the skills and training needed for the new jobs. But an essential aspect of the concept is, of course, that the new “green” jobs themselves should be “decent”, providing respect for workers’ fundamental rights at work, health and safety protection, as well as the means to live with dignity.

For all the talk about green jobs, there had been until recently a dearth of research on them, the analysis often remaining at the level of projections and generalizations about the job potential of the shift towards a green economy. There is even the need to have an agreed definition of green jobs for statistical purposes. In order to help fill this void, a workshop entitled “A Green Economy that Works for Social Progress” was convened under the auspices of the Global Union Research Network (GURN) in October 2011. The workshop gathered researchers from several countries, presenting their studies on a certain number of employment-related aspects of the green economy.

This issue of the *International Journal of Labour Research* is essentially the product of that encounter. The articles cover a wide range of experiences in different regions, most notably in Asia but also in Africa and Europe. They examine the quality of jobs created in the renewable energy sector and also in the recycling sector. One piece also offers some perspective on whether the

prospects of green jobs for women are materializing and how trade unions might help this process along.

In the end, the assessment that is made is quite sobering. Green jobs as they are presented in the articles are not a new Eldorado for workers. In fact, more often than not, they do not seem to compare well with more “traditional” jobs. And not surprisingly, part of the explanation lies in whether or not workers have access to collective bargaining...

While these results remain very partial, this should be seen as an important reminder that “green” employment is not decent by definition and that in any other sector, green jobs require careful stewardship from public authorities to ensure that workers are able to exercise their rights. This is all the more the case given the central role government policy plays in creating the enabling conditions for these industries to emerge and thrive. Indeed, government subsidies and procurement to encourage the shift to a greener environment should be attached to strict clauses protecting the rights to freedom of association and to bargain collectively and ensuring decent minimum conditions for workers.

If a consensus to address climate change is to emerge and solidify, the question of the quality of the jobs created in the transition to a greener economy will no doubt be a litmus test in the minds of workers around the world, and one for which concrete answers will be needed. We hope this issue of the *Journal* will be a small contribution in this endeavour to promote green jobs as decent jobs.

Editorial

*What policies for a green economy
that works for social progress?*

Lene Olsen

International Labour Office

Introduction

In October 2011, a workshop entitled “A Green Economy that Works for Social Progress” was organized in the framework of the Global Union Research Network (GURN). Based on the need for more research on a number of employment-related aspects of the green economy, the workshop brought together researchers from several countries presenting their studies on these issues.

The shift to a greener economy is creating employment across a range of sectors. In fact, an increasing number of assessments are showing that net gains are possible (ILO, 2012a). However, the green economy also presents challenges at different levels, such as policy choices, working conditions in green jobs and trade union participation. National policy strategies are central to addressing these challenges and building a Just Transition towards an environmentally respectful and socially empowering economy. Which policies are adopted may vary from country to country and may generate different outcomes. However, what is important is that while developing and implementing such policies, the quality of employment opportunities arising from investments should be taken into account. The studies presented in this *Journal* discuss the situation in countries such as China, Republic of Korea and South Africa, and their policy choices, particularly those related to renewable energy and working conditions in this sector. A European Union-wide study looks at the gender issue in the renewable energy sector, while the article on the waste and recycling sectors in Europe also describes the quality of work in this sector.

It is clear from the articles that policy choices are determinant factors on whether jobs are genuinely “green” (in the narrow environmental sense) and whether working conditions are taken into account or not. This is also confirmed in the recently published ILO report *Working towards sustainable development: Opportunities for decent work and social inclusion in a green economy*, which shows how a shift to a greener economy is creating employment across a range of sectors. A key finding of this report is that “outcomes for employment and incomes are largely determined by the policy instruments used and the institutions which implement them, rather than being an inherent part of the shift to a greener economy” (ILO, 2012a).

The importance of institutions and good governance was acknowledged by Heads of State and Government in the vision statement of the RIO+20 outcome document *The Future We Want*, highlighting that “democracy, good governance and the rule of law, at the national and international levels, as well as an enabling environment, are essential for sustainable development, including sustained and inclusive economic growth, social development, environmental protection and the eradication of poverty and hunger.” They also reaffirmed that “to achieve our sustainable development goals we need institutions at all levels that are effective, transparent, accountable and democratic” (United Nations, 2012).

Trade unions have a central role to play in putting the issue of working conditions higher on the agenda in national policy strategies. For this to happen, strong labour rights and engagement are needed. All the articles address this issue and in their conclusions come up with suggestions and strategies for greater inclusion of trade unions in national policy development and institutions.

Employment creation opportunities

Looking at the specific sectors covered by the articles in this issue of the *Journal* – renewable energy and waste/recycling – there are positive outlooks concerning employment opportunities, according to the ILO report *Working towards sustainable development* (ILO, 2012a).

Renewable energy

Job growth has, for instance, been particularly strong in the renewable energy sector, increasing globally at a pace of 21 per cent per annum. As a result, renewables now employ close to 5 million workers – more than double the number employed only a few years ago (ILO, 2012a).

The articles addressing this sector confirm this. In the Republic of Korea, 20,999 new jobs were created in this industry between 2003 and 2010. In China, the renewable industries, such as hydropower, wind power and solar photovoltaic (PV), are expected to grow greatly in the next few decades. Currently, it is estimated that 1 million people are working in China's renewable sector, approximately 600,000 in the solar thermal industry alone. Projections may vary from one source to another. In South Africa, one source foresees 1.2 million direct and indirect jobs by 2020, while another sees between 35,000 and 50,000 new jobs, mainly for skilled and semi-skilled workers in the manufacturing and engineering industries. The production of energy from renewable sources is also expected to have an exponential occupational potential in the European Union. The European Commission has estimated an increase in new energy jobs of up to 2.5 million in 2020. These are all positive figures. However, despite the job creation potential of the renewable energy sector, women may face challenges in accessing green jobs in renewable energies. The article on the European Union looks at the gender balance in this sector and it is evident that the female workforce is strongly under-represented. This is mainly due to the fact that these are traditionally male-dominated industries and occupations, and because women often lack the requisite skills, qualifications and experience needed in this sector.

Waste management and recycling

The abovementioned ILO report is also positive when it comes to employment-creating opportunities in the waste management and recycling industry. This is already a significant employer. Based on studies of China, Europe and the United States, an estimated 4 million workers are employed in the formal sector. The numbers, however, are much more significant when informal workers are taken into account: approximately 15 to 20 million people work as informal waste pickers in developing countries. Recycling offers one of the most promising responses to the challenge posed by the growing generation of waste, as well as one of the best options for reducing the environmental footprint of energy- and resource-intensive industries. The employment potential is likely to rise in industrialized and developing countries alike. For instance, an additional 1.8 million direct jobs over the next one to two decades could be created in the European Union and the United States alone by increasing recycling rates to 70–75 per cent. In general, the employment potential is particularly strong in countries whose recycling rates are currently low, such as eastern and southern European countries and also in developing countries, notably in Africa (ILO, 2012a).

According to the article on the waste sector in Europe,¹ the employment growth experience in this sector in several European countries is due in part to the “green transition”. For example, in Italy, waste sector employment rose between 1996 and 2006. The employment rate increased on average by 3.72 per cent. The reasons for this are new management ways and new typologies of jobs created mainly after the expansion of separate refuse collection. However, a particular increase is observed in manual occupations. The operators in the sector are mainly blue-collar workers (about 83.6 per cent) and their share is much higher than in other sectors of the Italian economy. However, new functions such as sorting, consulting, high-tech and engineering could lead to high-road or to low-road job configurations. For example, sorting contributes to a problem zone of fast-paced, low-wage, risky conveyor belt work.

Policy choices

Even though the projected figures seem positive, they will largely depend on which national policies and incentives are put in place. The five studies presented in this issue clearly show that governments’ choices of certain types of policies and investment lead to different outcomes. They also demonstrate how policy coherence, consistence and coordination are important

1. The article focuses on national sectoral reports of the waste sector in Austria, Bulgaria, Denmark and Italy.

in creating green jobs that effectively reduce negative impacts on the environment, as well as on social and working conditions. Labour market and skills policies have also been highlighted as being important to link to green jobs policies, in order to ensure the estimated job creation potential.

The article on the Republic of Korea questions the government's Green Growth strategy by comparing its flagship "Four Major Rivers Restoration Project" (FMRP) to its support for renewable energy, both in terms of whether the jobs created are environmentally sustainable and in terms of its employment potential. The government is investing heavily in the FMRP (about 22.2 trillion Korean won, 2009–12) while support for renewable energy is rather modest (3.75 trillion Korean won during the same period, plus 3.18 trillion Korean won of Green New Deal investment). The authors of the article argue that despite the huge gap in investment, the job creation impacts of the FMRP are not as good as they could have been with the same amount of investment in the renewable energy industries. They also question the environmental impact of the project. It is said that the focus is on "growth" rather than on "green". There are significant differences between policies for green industries and policies for resource-intensive economy and industries. This is largely due to the fact that, without the longer-term transformation of existing energy-intensive, export-oriented economic and industrial structure towards a genuine green economy and jobs, a set of policies for a green economy have just been added to the current policy regime, resulting in the inconsistency and instability of the government's overall policy framework. Within the government itself, the ministries that are in favour of economic growth, export expansion, and policies tuned to the needs of big conglomerates have much greater political clout in policy-making than the ministries directly devoted to the environment and to labour issues. This raises the critical issue of policy coherence in the Korean government's initiatives to create green jobs. There is also ambiguity in the concrete policy goals such as decent jobs and long-term change in employment structure that are to be achieved for the creation of green jobs. When the government announced Green New Deal policies and associated programmes to create 960,000 new jobs, there was little, if any, consideration for the training and education required for these jobs and how decent wages and working conditions were to be secured.

China is spending billions of dollars each year to build and expand its own renewable energy industry and has a large number of renewable energy policies, which can be grouped into three major categories depending on their nature and scope. The first provides direction and guidance for the overall development of the country's renewable energy; the second sets out specifying objectives and outlines for development plans; and the third provides practical guidelines or incentives for the management and execution of the development plans. The first and second levels are often set by the central government, while the third is usually determined by local governments.

However, the article on China indicates that the lack of coherence and coordination in the policy environment is one of the major barriers for the development of renewable energy. This is, for instance, needed to integrate the electricity generated from wind energy into the existing power grids. Another issue raised in the article is that of skills. Most workers who lose their jobs in the conventional energy sector have difficulty finding a new job. This is because renewable energy involves new technologies and requires higher education and skill levels. It has been shown that workers in the wind power plants are generally more educated compared to those working in the thermal power units. The renewable energy sector is a knowledge-intensive rather than a labour-intensive sector. The current speed of structural change in the labour's educational level is far below the pace required to meet the needs of the industry, resulting in structural unemployment. In other words, instead of being able to rely on some employment security, the workers from the conventional energy sector are facing immediate job losses. Another issue linked to this is the fate of middle-aged workers who have been laid off. To help them cope with the transition through training alone might not be enough, since it seldom guarantees re-employment. In most cases, the enterprises are more willing to train fresh graduates from universities or vocational colleges simply because they have a longer working life ahead of them. Another group of workers that has been affected by lay-offs in the traditional power industry is the migrants. The rights and interests of this group have been neglected by the government's labour policy.

The article on South Africa also recognizes that skills policy is important and states that the government acknowledges that the country is falling short in this area. Various skills requirements depend on the support of the Sector Education and Training Authorities; this support must accommodate the large pools of unskilled and semi-skilled workers in rural, undeveloped areas. The article refers to a report by the ILO Skills and Employability Department that provides an analysis of the country's skills shortage and argues that "current policy is found to be inconsistent" and skills development driven by market demand. The report recommends that "... a cohesive approach is taken to green skills anticipation at a national level which will ensure correct identification of needs, and strong implementation of the pre-existing skills framework".

It will be important to also look at the gender issue when taking action on skills development in relation to renewable energies. As mentioned earlier, while referring to the study from Europe, it is clear that women may face challenges in accessing green jobs in this sector because they often lack the necessary skills, qualifications and experience. According to this article, a qualified workforce, involving specific skills for renewable energy, will account for about 30 per cent of total employment, with the rest of the workforce exploiting specific skills and competencies already acquired in other industrial sectors.

When it comes to the policy choices in the waste sector in Europe, the recent EU legislation on waste, the growing importance of climate change and the need for a transition to a “recycling” society all impact strongly on the policies in this sector. However, it is a complex sector with a multitude of markets, evolving legislation, and changing structures and actors. The European Union framework legislation on the environment and its measures, including Directive 2008/98/EC of the European Parliament and that of the Council of 19 November 2008 on waste, are not sufficient to envisage “decent work” solutions as this framework legislation does not determine the concrete conditions for its implementation. The greening of the sector cannot be examined separately, but rather within the framework of a complex context of the provision of services through public or private entities and an increasing concentration on the European markets. The waste sector in Europe is also increasingly internationalized through the new opportunities for contracting, and policies will have to look at this aspect as well. When it comes to skills upgrading, there are some cases (environmental consulting) even if they are limited (Italy, Denmark). However, there is a political focus on job creation and skills rather than quality.

Working conditions

The challenge of taking into account economic, social and environmental concerns in national policies for a transition to a greener economy is not new. However, even though it has been stressed as a prerequisite through the concept of sustainable development since the 1980s and governments have committed to it both nationally and internationally for decades, much still needs to be done. Looking at the policies and actions put in place to foster the greening of economies, it is clear that certain aspects are lacking in attention. The findings in the studies presented in this *Journal* show that national policies designed to green the economy often focus mainly on job growth and do not take sufficient account of whether or not the green jobs are decent.

The International Labour Organization has defined decent work as being productive work for women and men in conditions of freedom, equity, security and human dignity. Decent work involves opportunities for work that is productive and delivers a fair income; provides security in the workplace and social protection for workers and their families; offers better prospects for personal development and encourages social integration; gives people the freedom to express their concerns, to organize and to participate in decisions that affect their lives; and guarantees equal opportunities and equal treatment for all. Several of these conditions are examined in the articles presented in this issue. In some cases, certain working conditions have been found to be better in the sectors described. However, in many circumstances, the authors point out the real lack of concern for this aspect of the green economy agenda.

For instance, despite the increasing importance of green jobs in China, the working conditions they provide (i.e. wage level, occupational health and safety, etc.) remain a largely unexplored area. To offer some perspective on the working conditions of green jobs, the article on China compares the wind power sector with the conventional power sector, focusing on working hours, wages and benefits, social security, and the working environment. On the subject of working hours, while it is almost a norm that workers in the power generation industry are required to work overtime and long shifts, the situation in the renewable sector seems even more severe. The industry is growing so fast that the training of qualified labour is failing to catch up. According to studies on wages presented in the article, the average annual income of the workers in the wind power plant was higher than those working in thermal power units. However, since overtime work is so common in the wind power plants, there is reason to believe that the portion of income generated by overtime pay could be substantial. The working environment seems to be significantly better in wind power plants than in thermal power plants. However, China has seen a number of serious accidents in several wind farms since 2010, which raises concerns about the safety of the industry. It seems that there are still quite a large number of workers in the green industry working on jobs that are unstable, low-tech and are subject to limited occupational health and safety concerns.

The article also considers labour relations. All of the energy enterprises examined in the report had labour unions. However, most of the union representatives are not always designated through direct and democratic elections. Chinese workers do not enjoy freedom of association, which is a problem for the promotion and implementation of wage bargaining in the green industry like the wind power industry.

The Korean article also looks at wages and at occupational health and safety. Doubts are raised about the wage levels offered in the new jobs created in the FMRP. Among these jobs, the period of employment for 140,000 new jobs is less than 10 months. Furthermore, 558 new jobs are recorded where employees receive 63,530 Korean won (less than US\$60) per day and are employed for no more than 60 days. For example, according to a survey of workers who have received unemployment insurance after working at one of the 389 companies that have participated in the FMRP, as of late April 2010, 2,425 new jobs have been generated as compared with December 2009, 95 per cent of which, 2,295 new jobs, were filled with day labourers, and only 130 of these were relatively good jobs (regular workers and workers with an employment contract for more than one year). This shows at least part of the dire reality behind the façade of purported green job creation. It is also stated that the FMRP has had a negative impact on employment, destroying the jobs of 700 workers who collected natural aggregates and the jobs of 24,000 farmers; and if the family of these workers and farmers were included, a maximum of 64,000 people might have lost their jobs and livelihoods.

When it comes to occupational health and safety issues, there is a continuous stream of media reports that a number of industrial accidents have been occurring on the construction sites of the FMRP causing injuries among the workers, and even some deaths. According to the same survey, workers have been working longer than the legal working hours in 153 of 154 FMRP worksites. The proportion of fatal accidents in total industrial accidents in the FMRP amounts to 30 per cent, ten times higher than the average (2.7 per cent) for the construction industry in Korea.

The FMRP is also said to create a structural problem. The construction industry might be vulnerable to an employment crisis after the completion of the project since there is little, if any, opportunity for sustainable employment in the FMRP due to the very limited number of workers needed for the management and maintenance of major facilities built by the FMRP.

Looking at working conditions in the renewable energy sector in South Africa, the study from this country dwells on the case of solar water heater manufacturing. According to data from the Labour Research Service (LRS), the actual conditions of employment tend to cluster around the legislative minima. They vary across industrial sectors and have remained unchanged over the past few years. There is also some evidence that the principle of Decent Work exists, although benefits may vary amongst the different sectors. However, this applies to workers who are covered by collective agreements and excludes workers in the informal sector.

According to Eurostat, looking at gender pay disparities, women earned on average 17 per cent less gross hourly than men in the EU27 in 2009. The gender pay gap extends well beyond the question of equal pay for equal work since it is an issue encompassing several aspects: the way in which women's competences are valued compared to men's within a firm; segregation in the labour market as women and men still tend to work in different sectors/jobs; other inequalities in the labour market mainly affecting women – in particular their disproportionate share in family responsibilities and the difficulties in reconciling work with private life. It is likely that these trends also apply to the renewable energy and waste sectors. Collective bargaining can play a crucial role in tackling emerging issues related to equal opportunities by consequently preparing workers (both women and men) and companies to cope with current and future labour market challenges.

Social dialogue and collective bargaining are issues that are specifically addressed by the study on the waste sector in Europe. In fact, the social dialogue at the EU level is not yet formalized in the waste sector. In the countries examined in the study, the composition of the social partners and the coverage and outcomes of collective bargaining differ widely.

Trade union involvement

The ILO report *Working towards sustainable development: Opportunities for decent work and social inclusion in a green economy* is very clear about the importance of trade union involvement in greening the economy:

... given that the transition towards a greener economy will entail profound changes in production processes and technologies as well as reallocation of jobs, close cooperation between government and the social partners will be central to the success of this transformation. Indeed, in the 1992 Rio Declaration the social partners and tripartism are referred to as key constituents and mechanisms for addressing the challenges and leveraging the opportunities that the transition towards a green economy can offer, notably with regard to (i) productivity; (ii) skill development and employability; (iii) income dynamics; (iv) labour standards; and (v) the acceptance of environmental reforms and of greening the economy. More specifically:

- Social partners can play a key role in how productivity gains are achieved and how they are distributed between workers and firms;
- Social dialogue can inform national systems and institutions concerning the implications of a transition towards a green economy for qualifications and employment prospects;
- Promote and organize skills upgrading and training schemes for workers;
- Ensure fair transitions for workers and enterprises;
- Ensure that labour standards are, at a minimum, respected, and ideally, improved in the context of greening;
- Measures are more effective and long-lasting when they are consultative and inclusive. (ILO, 2012a)

There are very different experiences of trade union involvement in the countries studied in this issue of the *Journal*. Trade unions in the Republic of Korea, for instance, have for decades been operating in a very hostile, anti-union environment. This has tended to make them distrustful of bipartite or tripartite consultations and negotiations with the government and employers on key policy issues relevant to workers and trade unions. It has also caused trade unions to concentrate on maintaining current jobs and workplaces and to be reluctant to pay attention to broader social projects for the transition to green economy and the creation of new green jobs.

A very low union membership rate (9.8 per cent as of 2010) likely contributes to such defensive approaches of trade unions in Korea. Secondly, the large core of trade unions in the country has mainly been organized in energy- or resource-intensive sectors such as car manufacturing, shipbuilding and electricity industries, while few workers employed in ecological sectors such as renewable energy industries have been organized into unions.

When it comes to cooperation with the environmental movement, the article regrets that the promotion of the transition to the green economy and the creation of green jobs have not been promoted through cooperation between civil NGOs and trade unions. Very few experiences of this kind have taken place in Korea. Since and during the 1980s, there have been only a few cases: for example, joint campaigns to eliminate industrial pollution and accidents and to fight against the government's attempt to privatize the electricity industry. This might be changing, with the establishment of a broader solidarity network, the "Solidarity for Climate Justice in Korea", in 2011, which focuses on the climate change agenda and includes a variety of environmental and social movements and NGOs and trade unions. If such alliances and networks continue to be built between environmental movements, NGOs and trade unions, they might become a powerful force capable of pushing forward an agenda to address climate change and the transition to a green economy in the Republic of Korea.

In China, the fear of job loss has been raised as one of the major factors preventing workers from supporting the country's green transition. Because of the numerous lay-offs related to this transition, the current social security system might not be able to offer sufficient protection for the workers laid off from the conventional energy sector. Trade unions have looked at this issue, and in the mid-1990s, responding to the rising protests from the laid-off state workers in large-scale state-owned enterprises, the All China Federation of Trade Unions (ACFTU), the official trade union in China, and some local governments initiated active labour market policies by providing retraining programmes and job search agency services for the laid-off workers.

In South Africa, trade unions have been much more involved. Towards the latter part of 2010, the Congress of South African Trade Unions (COSATU) released a draft discussion document called *A growth path towards full employment*. The document sets out the vision of the federation to transform the economy of the country so that people have access to decent work, housing, quality education, quality health, comprehensive social security and access to water, energy and sanitation. It also provides a space in which to integrate the campaign for a million climate jobs, while the campaign itself offers a platform to engage the State on issues of policy and an opportunity to challenge the liberal economic policies that underpin South Africa's development agenda.

The trade union federation is involved in activities linked to capacity building to strengthen union educators and leadership on matters of climate change and energy, and has established Research and Development Groups to coordinate and monitor its work in energy efficiency and renewable energies. In 2012, it convened an International Energy Conference and brought together a number of energy experts, environmental activists, academics and trade unionists from Europe, Latin America, the United States, Asia and Africa to share experiences and exchange ideas about renewable energies and

models of social ownership. As a result of such initiatives, COSATU has submitted proposals to its National Executive Committee to consider the issue of collective ownership in the context of government's policy to increase the supply of renewables in the South African energy system. It has directly engaged government on matters of policy including, but not limited to, the country's Integrated Resource Plan (IRP 2010), the Green Paper on Climate Change and the Department of Energy's proposal to outsource the provision of renewable energies to Independent Power Producers.

In March 2012, the National Union of Metalworkers of South Africa (NUMSA), an affiliate of COSATU, presented a labour perspective on solar water heating to the Solar Water Heating Advisory Committee (made up of employer organizations, large manufacturers and other interested parties associated with the industry). The union is confident that through such engagements it could play a positive role in areas of policy development and advocacy. NUMSA also occupies a strategic position in the manufacturing sector, and through its shop steward committees the union it is able to generate a wealth of information and knowledge that could be used to profile emerging industries associated with the renewable energy sector. This would help to bridge some of the gaps that currently exist, e.g. identifying the scope of the sector, working conditions, skills requirements, job creation and ownership.

In Europe, research carried out within the framework of WALQING² allowed the identification of several initiatives by social partners that address the quality of work in new and expanding jobs. These initiatives concern collective bargaining which is strong in some countries but weak in others. In Denmark, for example, the role of clients and public procurement, as well as the issue of health and safety feature on the collective bargaining agenda; training initiatives have been developed (but the overall perception of generic low-skill sector remains). In Bulgaria, the integration of vulnerable groups (Roma) in waste collection activities has been included. In Italy, some environmental services are contracted out to social cooperatives, which are required to apply the same working conditions as other companies. However, in some cases, outsourcing to a social cooperative could generate contractual dumping, in order to reduce taxation for companies. But if the trade union action should be coordinated at European level it does not mean that all the participants will be equally interested and involved. Still, in this sector, as in other sectors in Europe there is a need to fill "institutional gaps", especially in the new Member States.

This is also highlighted in the article that focuses on the gender dimension. There is still a lack of specific social dialogue processes and structures in renewable energies, while also acknowledging that trade union and employer

2. The WALQING project addresses the aim of EU policy to create "more and better jobs" (<http://www.walqing.eu/index.php?id=3>).

representatives could support women's access to renewable energies in different ways. Although it is part and parcel of the overall energy sector, the renewable energy sector needs to be addressed with proper instruments, owing to its expanding production capacity. This also means that trade union and employer representatives should be trained to cope with the problems related to the emerging of new jobs and to offer a range of viable solutions. First, promoting education, training and skills development opportunities for women, who would otherwise lack the qualifications, skills and expertise necessary to benefit from green jobs opportunities, might lower access barriers. OECD data show that women are still under-represented among graduates in science, technology, engineering and mathematics, while vocational training programmes continue to be considered as male-oriented options. Empirical research, conducted within WiRES, suggests that occupational requirements in renewable energy jobs (e.g. international mobility and experience in the electricity sector) might tend to exclude women.

Conclusion

As there is still a long way to go to ensure that jobs created in the name of the green economy are decent, all the articles in this issue of the *Journal* are advocating greater policy coherence, broader social alliances with trade union participation and improved working conditions in green jobs.

These are also issues that have been raised and supported by Heads of State and Government in the vision statement of the RIO+20 outcome document *The Future We Want* (United Nations, 2012). In relation to policy coherence, the document states how important it is to “further mainstream sustainable development at all levels, integrating economic, social and environmental aspects and recognizing their inter-linkages, so as to achieve sustainable development in all its dimensions” (Paragraph 3). On trade union participation, it reaffirms “the importance of the participation of workers and trade unions in the promotion of sustainable development. As the representatives of working people, trade unions are important partners in facilitating the achievement of sustainable development, in particular the social dimension. Information, education and training on sustainability at all levels, including in the workplace, are key to strengthening the capacity of workers and trade unions to support sustainable development” (Paragraph 51). The importance of promoting decent work for all is also highlighted several times and it is particularly recognized that “workers should have access to education, skills, health care, social security, fundamental rights at work, social and legal protections, including occupational safety and health, and decent work opportunities” (Paragraph 152).

It is now the responsibility of governments to act on these commitments at the national level in cooperation with the social partners – representatives

of workers' and employers' organizations – and make sure that the statements will not be empty words. The ILO can play a significant role in supporting its constituents in this work. The 316th Session of the Governing Body has discussed priorities and follow-up by the ILO to the outcome of the United Conference on Sustainable Development 2012 and these discussions have included issues such as sustainable development goals (SDGs), social protection floor, capacity building for social dialogue, as well as the upcoming general discussion on sustainable development, decent work and green jobs for the International Labour Conference in June 2013.

It will be important for the ILO to create a Just Transition framework to a greener economy in which the social dimension will hold a central place. Such a framework could take the form of an ILO instrument, as recently proposed by workers from the Asian and Pacific workers' group after three days of sharing experiences with governments and employers at the ILO's Green Jobs Conference in Asia, which took place in Indonesia in September 2012.³ Even though the ILO has a number of Conventions and Recommendations that might guide and assist governments, workers and employers in implementing a Just Transition towards a greener society (Olsen, 2010), a framework may outline when and how these standards can be used. A Just Transition framework will have to include several elements, but good governance including participation of the social partners in developing policies and implementing changes at enterprise level, as well as at national and international levels, will be central, as will be the use of social dialogue and references to international labour standards.

A clearer definition of green jobs will also have to be included. At present, there is no consensus among researchers and practitioners on a common definition of green jobs. Most take an industry approach, identifying green jobs in industries that are judged to produce green products and services. The ILO and UNEP offer a broader definition in their 2008 report *Green jobs: Towards decent work in a sustainable, low-carbon world*, which comprises employment in green sectors as well as green occupations; it also includes employment in parts of non-green sectors, such as agriculture, forestry, construction, manufacture or transport, which operate in an environmentally friendly manner. Many national governments are developing their own definitions either to serve as a basis for collecting statistics or to make policy choices. However, more often than not, there is no agreement at the national level on what is green or not. In October 2013, the ILO will host the 19th International Conference of Labour Statisticians where it will present a concept paper reviewing current practice in selected countries and suggest a standardized definition for green jobs that could be applied by countries in all regions and at all stages of economic and social development. This will be very helpful for a Just Transition framework.

3. See <http://www.ituc-csi.org/asian-trade-unions-take-up-the.html?lang=en>.

In order to measure how decent green jobs are or how much progress is being made in relation to working conditions in green jobs, statistical indicators are also needed. The ILO should include – in the Just Transition framework – references and guidance on how to apply its decent work indicators. Following a Tripartite Meeting of Experts held in September 2008, the Governing Body agreed to test a comprehensive approach to the measurement of decent work during 2009, by compiling detailed indicator definitions and preparing Decent Work Country Profiles for a limited number of pilot countries. The 18th International Conference of Labour Statisticians endorsed this approach. A four-year project (2009–12), Monitoring and Assessing Progress on Decent Work is currently aiming to facilitate the identification of decent work indicators that are relevant at the national level (based on the outcome of the Tripartite Meeting of Experts held in September 2008); support data collection; and use the collected data for an integrated policy analysis of decent work, in order to make them relevant for policy-making (ILO, 2012b).

If the ILO could develop and adopt an instrument on the Just Transition framework, including the elements outlined above – and if member States were to ratify and implement it, we would be better able to ensure that the green economy can indeed be socially sustainable.

References

Note: Since the editorial is based on the articles published in this issue of the *Journal*, it does not reference them individually. A few additional references have been used as background for this editorial:

- ILO. 2012a. *Working towards sustainable development: Opportunities for decent work and social inclusion in a green economy* (Geneva). Available at http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_181836.pdf.
- . 2012b. *Measuring decent work* (Geneva). Available at <http://www.ilo.org/integration/themes/mdw/lang-en/index.htm>.
- Olsen, Lene. 2010. “Supporting a just transition: The role of international labour standards”, in *International Journal of Labour Research*, Vol. 2, Issue 2 (Geneva). Available at http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---actrav/documents/publication/wcms_153352.pdf.
- United Nations. 2012. *The Future We Want*. Outcome document adopted at the United Nations Conference on Sustainable Development (RIO+20). Available at <http://www.uncsd2012.org/content/documents/727The%20Future%20We%20Want%2019%20June%201230pm.pdf>.

Green Growth and Green New Deal policies in the Republic of Korea

Are they creating decent green jobs?

Young-Bae CHANG

Associate Research Fellow, Science and Technology Policy Institute (STEPI)/
International Secretary, Korean Federation of Public Services and Transportation
Workers' Unions (KPTU), Seoul, Republic of Korea

Jae-Kak HAN

Deputy Director, Energy and Climate Policy Institute
for Just Transition (ECPI), Seoul, Republic of Korea

Hyun-Woo KIM

Researcher, Energy and Climate Policy Institute
for Just Transition (ECPI), Seoul, Republic of Korea

This paper was originally prepared for, and presented at, the GURN/ITUC workshop "A Green Economy that Works for Social Progress", Brussels, Belgium, 24–25 October 2011. The authors would like to express their thanks to Lene Olsen, ILO, for the constructive comments on an earlier version that were very helpful for revising the paper. In revising the paper, the authors also greatly benefited from another paper (Kim, Han and Park, 2012), co-authored by two of the authors (Jae-Kak Han and Hyun-Woo Kim) with Jin-Hee Park, and funded by the Korea Office of the Friedrich-Ebert-Stiftung. Any errors or omissions are the sole responsibility of the authors.

Since 2008, the government of the Republic of Korea has been actively introducing and pursuing so-called “Green Growth” and “Green New Deal” policies, which were highly controversial and generated heated social debates about the genuineness of their “green” character and their social impacts.

In this paper, we make a preliminary evaluation, based on a survey of the literature, of these policies and their contribution to generating green jobs, as well as the quality of those jobs.¹ For this purpose, the broad outlines and key features of Green Growth and Green New Deal policies of the Korean Government will be briefly presented. We will then review these policies in order to assess whether or not they have produced their intended outcomes and achieved their social objectives, especially their impact on the creation of green jobs and the quality (“decency”) of these jobs. It is an appropriate time to do this given that many critical voices are now arguing that the goals of these green policies, with respect to the creation of decent green jobs, have mostly been rhetoric. In addition, we compare the impact on decent and sustainable green job creation of two different policy options, that is, the “Four Major Rivers Project” (FMRP), the centrepiece of the Korean government’s Green Growth policies, and policies that promote renewable energy production and use, which are grossly neglected by the government. We also provide a critical perspective on how the Korean government’s Green Growth and Green New Deal policies have helped prepare for the challenges of climate change, the eventual industrial transformation and the resulting changes in overall employment structure within and across industries.

By way of conclusions, we suggest that there should be a drastic reorientation and reprioritization of the Green Growth and Green New Deal policies if they are to achieve the intended policy outcomes and to contribute to realizing sustainable green economy and decent green jobs in the Republic of Korea.

Rising greenhouse gas emissions and policy responses

Total greenhouse gas (GHG) emissions in the Republic of Korea were 599.5 million tonnes CO₂Et (CO₂equivalent) in 2006, which was twice the total of 1990. During this period, the average annual rate of increase was 4.5 per cent, the highest among OECD countries. As a result, per capita GHG emissions have almost doubled, from 6.95 tonnes CO₂Et in 1990 to 12.41 tonnes CO₂Et in 2006.

If we look at the origin of GHG emissions by sector, energy accounts for 84.3 per cent of total emissions, at 554 million tonnes CO₂Et; industrial processes 10.6 per cent, at 63.7 million tonnes CO₂Et; wastes 2.6 per cent, at 15.4 million tonnes CO₂Et; and agriculture 2.5 per cent, at 15.1 million

1. For an attempt to define green jobs, see UNEP/ILO/IOE/ITUC (2008).

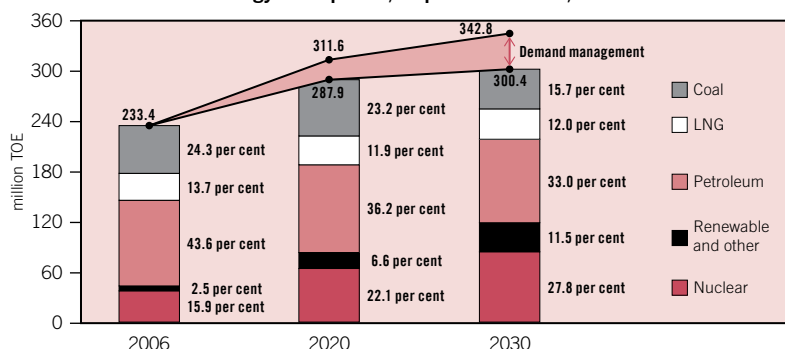
tonnes CO₂Et. Within the energy sector, electricity generation is responsible for 35.5 per cent of its total emissions, industry for 31.3 per cent, transportation for 19.8 per cent, households and commerce for 11.3 per cent, and public and others for 0.9 per cent. GHG emissions due to electricity generation, transportation and energy consumption in industry have been increasing substantially (MKE, 2009).

As of 2008, annual energy consumption in the Republic of Korea was 226 million TOE (tonne of oil equivalent), the tenth largest consumer in the world, accounting for 2.1 per cent of the world total. The country is also heavily dependent on energy imports. In 2005, for example, 97 per cent of total energy consumption was supported by energy imported from abroad. That year, Korea was the fourth largest oil importer and the eighth largest natural gas importer in the world, which means that it is very vulnerable to a global energy crisis. Accordingly, the country needs to reduce its heavy dependence on energy imports and manage energy demand to curtail energy consumption; however, the Korean government is still adhering to its supply-oriented energy policies.

According to the government's National Basic Energy Plan, total energy demand is predicted to increase by 1.1 per cent annually, reaching 300.4 million TOE in 2030, which is 32 per cent higher than in 2006 (see figure 1). According to this scenario, per capita energy demand will increase from 4.83 TOE in 2006 through 5.84 TOE in 2020 to 6.18 TOE in 2030 (PMO, 2008).

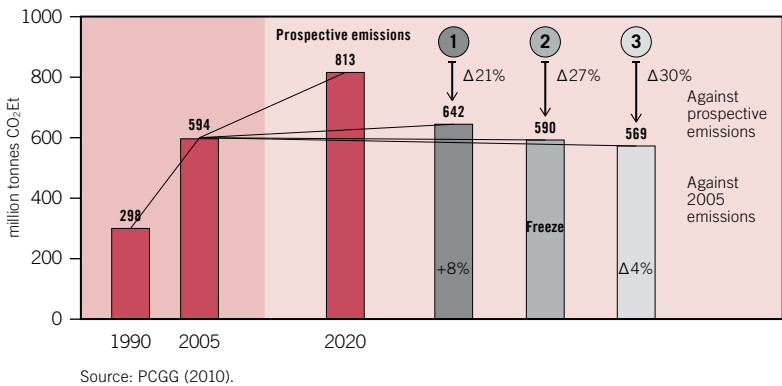
The Republic of Korea belongs to “non-Annex 1 countries without commitment”, but there has been increasing pressure from the international community for the country to shoulder its fair share of responsibility for GHG emissions reduction considering the relative size of its economy and energy consumption in the world. At the G8 summit in Japan in 2008, Mr Myung-Bak Lee, President of the Republic of Korea, declared that Korea would behave as an “early mover” in tackling climate change and set GHG emissions reduction targets accordingly.

Figure 1. Government predictions of trends in energy consumption and energy mix options, Republic of Korea, 2006–30



Source: PMO (2008), p. 62.

Figure 2. The Korean government's GHG emissions reduction scenario, 1990–2020



One year later, in November 2009, the government announced its plan to reduce GHG emissions by 30 per cent by 2020, relative to the BAU scenario (4 per cent less than total GHG emissions of 2005). The Republic of Korea seems to have promised a progressive approach to GHG emissions reduction, but the emissions reduction target proposed by the government is based on BAU and in 2020 Korea will still have GHG emissions twice as high as in 1990 (see figure 2).

The country is the ninth largest GHG emitter and ranks twenty-second in the world for accumulated GHG emissions. Considering that 41 countries in the world are committed to compulsory GHG emissions reduction as specified in the Kyoto Protocol, the GHG emissions reduction target for 2020 proposed by the Korean government leaves much to be desired (Lee, 2009).

The government's Green Growth strategy

On 15 August 2008, President Lee proclaimed “low-carbon Green Growth” strategy as a new national vision over the coming 60 years. According to him, Green Growth refers to sustainable growth reducing GHG emissions and pollution and is a new national paradigm for development, which would provide a new engine for growth and create new jobs by means of green technology and clean energy. Green Growth would, he argued, provide opportunities for Korea to jump into the group of leading countries and is an inescapable development path for a country that faces both environmental and resource crises. In February 2009, the government established the “Presidential Committee on Green Growth” (PCGG) and introduced a new bill named the “Basic Law for Low-Carbon Green Growth” in January 2010.

In January 2009, the Korean government announced a Green New Deal plan as a core of low-carbon Green Growth policy. This plan aims at

creating jobs while protecting the environment, with the ambition of creating 960,000 jobs by investing 50 trillion Korean won (about US\$40 billion) between 2009 and 2012 (MOSF, 2009a). In July 2009, the government also made public a national strategy for Green Growth and presented three key areas and ten policy guidelines to achieve the goals of the Green Growth strategy (see table 1).

However, how green is the Korean government's Green Growth strategy? First of all, the strategy is more focused on "growth" rather than "green". It is through nuclear policy that we can clearly understand that the Green Growth strategy consistently pursues economic growth whatever it takes.

According to the government's plan, 12 additional nuclear power plants are to be built by 2022 as a way of responding to climate change, as a result of which nuclear power will account for 48 per cent of total electricity production (while the current share is 24 per cent). If these new nuclear power plants are completed as planned, the number of nuclear power plants will grow to 40, which is twice as many as the number of such plants currently operating. In our opinion, this is a fundamentally wrongheaded policy in that it would continue to increase energy demand and threaten risks and social conflict for the whole Korean society, which has still failed to find a sufficient number of nuclear waste disposal sites. The Korean government seems concerned only with making profit through building and exporting nuclear power plants. Even after the Fukushima nuclear disaster in Japan, there has been no fundamental change in the government's policies regarding the expansion of nuclear power.

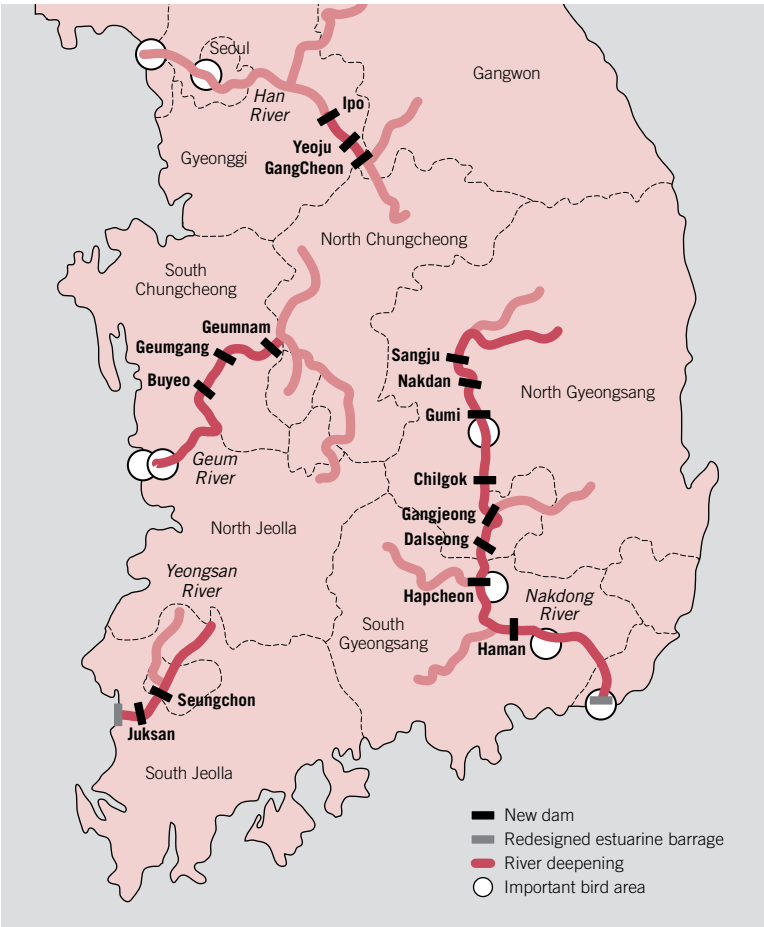
In contrast, support for renewable energy in Korea is deficient and lacking. Recently even the "feed-in tariff" system was abolished by the government, although it was widely regarded as being very conducive to expanding renewable energy in the country. This reveals a dark side of the so-called Green Growth strategy of the government, which appears to be solely focused on making money by promoting such risky and conflict-ridden technology as nuclear power.

Table 1. Key components of the Korean government's Green Growth strategy

Key areas and policy guidelines of the Green Growth strategy	
Climate change adaptation and energy independence	<ol style="list-style-type: none"> 1. Efficient GHG emissions reduction 2. Beyond oil and energy independence 3. Strengthening adaptation capacity
Creating new engine of growth	<ol style="list-style-type: none"> 4. Developing green technology as new engine of growth 5. Greening industry and promoting green industry 6. Enhancing industrial structure 7. Building a basis for green economy
Improving living standards and national status	<ol style="list-style-type: none"> 8. Constructing green territory and transportation 9. Green revolution in everyday life 10. Building and showing a model of Green Growth

Source: PCGG (2009).

Box 1. The Four Major Rivers Project (FMRP)



Map of four major rivers in the FMRP

More critical attention should be paid to the actual state of affairs of the FMRP, the core of the Korean government's Green Growth strategy. The FMRP's annual budget is 22.2 trillion Korean won (about US\$20 billion), which amounts to 8 per cent of the annual national budget. To raise money for the FMRP, budgets for pivotal public services such as welfare and railway construction have been curtailed.

The core mission of the FMRP is to build 16 dams on four major rivers (Han, Nakdong, Geum, and Yeongsan – see above map) in the country, to dredge the riverside of each river deeper and wider to a depth of 6 metres and a width of more than 200 meters, and to construct banks along both sides of each river.

According to the Korean government, the FMRP has the following objectives:

- Securing water resources to prepare for water shortage and climate change
- Flood management
- Improving water quality and recovering ecosystem
- Creating multi-purpose social spaces for local residents
- Local development around rivers

However, these objectives are neither appropriate nor realistic. First of all, there is no water shortage in Korea, a country which has sufficient annual rainfall, a number of mountains, and is well-equipped with water supply facilities. Rather, the problem is excessive per capita water consumption (40.02 litres per person daily), which is two to six times as much as in other developed countries.

Second, major rivers in Korea have already been prepared against flooding. Ninety-eight per cent of floods in the country do not occur in the rivers where the FMRP is being implemented, but rather in the tributaries of those rivers. Instead, a rise in river levels after the building of planned dams may lead to immersion and flooding in the areas around the rivers.

Third, to improve water quality, the first priority should be to prevent pollutants from flowing into the rivers and branches. Storing water at 22 dams will inevitably cause the deterioration of water quality.

Fourth, local farmers have been evicted from the land around the riversides and replaced by such speculative businesses as casinos or real estate speculation. This is far from building sustainable local communities.

For these reasons, opposition parties and more than 2,400 professors in Korea have been strongly opposed to the FMRP even from its planning stage and 70 per cent of the population is against the FMRP. Over the last two years, numerous demonstrations and campaigns against the FMRP have been organized by environmental and social movement organizations, four major religious bodies, and the opposition parties. In 2010, a Buddhist monk named Moonsu burned himself to death in opposition to the FMRP. Despite all this opposition and resistance from civil society and opposition parties, half of the FMRP has been completed in just one year in blitzkrieg-like fashion without any public hearings. In the meantime, beautiful scenery of sand banks and wetlands along the riverside has disappeared, fish and birds have lost their own habitats, and ancient cultural heritage has been destroyed. Irreversible damage has been caused to the ecosystem and the landscape.

We cannot possibly say that the FMRP is a climate change policy. Indeed, it will actually magnify GHG emissions by destroying water areas and wetland, and consuming large amounts of fossil fuels for the large-scale construction of dams and dredging works. Seen from a modern ecological perspective, managing water resources by constructing dams and banks is not a very clever idea.

However, the FMRP will continue, mainly because the Korean government wants to show off with a major national, symbolic project and is keen to secure profits for the construction and engineering industries.

The Green Growth strategy is also revealing a number of problems in the area of ecological sustainability. The Four Major Rivers Project (FMRP), the centrepiece of the Korean government's Green Growth strategy, has been highly controversial and has engendered heated public debates on its alleged greenness from its very inception and is now opposed by more than 70 per cent of the general public in Korea. For the critics, the FMRP is just a huge public engineering works causing an immense destruction of the environment, but the government has tried every means to disguise it as a policy tool to adapt to climate change.

Unfortunately, some international agencies made serious mistakes in understanding the nature of the FMRP. For example, in its *Overview of the Republic of Korea's National Strategy for Green Growth*, UNEP gave a very positive assessment of the strategy and maintained that it would serve as a model case for other countries, especially in Asia. According to the *Overview*, the Republic of Korea is going to invest 107 trillion Korean won (about US\$90 billion), equivalent to 2 per cent of its GDP, in the green economy from 2009 to 2013, a much appreciated commitment for UNEP (UNEP, 2010).

However, the FMRP accounts for 63.7 per cent of the budget for "climate change adaptation and energy independence", which is responsible for 50 per cent of the total investment (107 trillion Korean won) in the green economy. UNEP neglected this fact and thus made a crucial mistake in judging the greenness of the Korean government's Green Growth strategy.

Assessing the job-creation impacts of the Green Growth strategy

It is quite difficult to investigate the current state of green jobs in the Republic of Korea as there are very few reliable statistics on the issue. According to a government source (MOSF, 2009b), in 2009 there were 101 occupational categories of green jobs scattered over 64 industrial sub-sectors among the total 164 industrial sub-sectors listed in the standard industrial classification. The total number of green jobs is estimated to be 610,000 (the entire labour force numbers 24 million).

If we examine the sub-sectoral variations of green jobs, the "energy sources" sector provides 24,000 green jobs; the "enhancing energy efficiency" sector, 54,000; the "greening industry and space" sector, 251,000; the "protecting the environment and recycling resources" sector, 102,000; and the "low carbon economic activities" sector, 179,000. The annual average rate of increase of the number of green jobs is estimated to be 6.0 per cent from 2009 to 2013 and the number of green jobs will thus reach 810,000 in 2013. That is, 200,000 new green jobs are expected to be created in four years (ibid.).

The number of green jobs the Green New Deal policies are currently striving for is much bigger than the above estimation. According to the government, Green New Deal policies include the following programmes:

- Investing 18 trillion Korean won in the FMRP and associated works and creating 280,000 new jobs;
- Investing 11 trillion Korean won in greening transportation and creating 160,000 new jobs;
- Investing 3 trillion Korean won in forest biomass production and generating 230,000 new jobs;
- Investing 9 trillion Korean won in building energy-saving houses, green schools and green offices, and creating 150,000 new jobs.

However, there are strong doubts about the practicality of these job-creating programmes and the quality of the jobs to be created. As of July 2010, a year and a half since the launching of Green New Deal policies, even by the government's own account, the number of newly created jobs was only 140,228, or 47.7 per cent of what had been envisioned. Many components of the Green New Deal policy programmes were actually no more than a reclassification into a "green programme" of what the government had already been doing

Table 2. The budget of key programmes of Green New Deal policies and the estimated number of jobs to be created

Project title		Budget size* (Hundred million Korean won)			Number of jobs
		Spent (2009)	Additional (~2012)	Total	
Total		43,626	456,866	500,492	956,420
Core projects (9)	Four Major Rivers Project	4,881	139,895	144,776	199,960
	Green Traffic Network	18,349	78,187	96,536	138,067
	Nation Space Information System	250	3,467	3,717	3,120
	Mid-sized Dam	1,845	7,577	9,422	16,132
	Green Car and Clean Energy	3,209	17,318	20,527	14,348
	Recycling of Waste Resource	506	8,794	9,300	16,196
	Green Forest Protection	3,131	21,043	24,174	170,702
	Green Car and Clean Energy	–	80,500	80,500	133,630
	Eco-River	52	4,786	4,838	10,789
Related projects (27)	Disaster Risk Area Maintenance	5,137	19,901	25,038	41,567
	Clean Korea	437	1,666	2,103	14,546
	Green Waterside Area	331	7,669	8,000	19,900
	Bio-Mass Energy	362	10,858	11,220	24,372
	Disaster prevention, Forest restoration	786	6,541	7,327	52,648
	Public Facility LED Replacement	–	13,356	13,356	10,030
	Green IT Technology Test-Bed	–	1,100	1,100	10,000
	Other	4,350	35,208	39,558	80,000

* The budget is composed of national treasury, local government budgets and private sector contributions.

Source: MOSF (2009a).

under different names, such as managing and cultivating forests, and R&D programmes. Thus a substantial number of “newly created” jobs have existed for some time.

There is still the other issue of how “decent” the newly created jobs are. By definition, green jobs should be both environment-friendly and decent in terms of wages and other working conditions.² When the government announced Green New Deal policies and associated programmes to create 960,000 new jobs, there was little if any consideration of how training and education needed for these jobs were to be provided, if at all, and how decent wages and working conditions were to be secured for these jobs. According to the government, only 250,000 new jobs (26 per cent) of the 960,000 new jobs mentioned above had some description of the wage level and the period of employment, which made it impossible to assess the quality and sustainability of employment for the rest. Even for the 250,000 new jobs for which some description of wage level and employment conditions is available, a substantial number were characterized by quite poor working conditions and low wages. For instance, the period of employment for 140,000 new jobs was less than ten months. Also included were 558 jobs that paid less than 63,530 Korean won (US\$60) per day and provided employment for no more than 60 days. This offers a glimpse of the more sober reality behind the façade of green job creation.

For us, there is also a critical issue of policy coherence in the Korean government’s initiatives to create green jobs. Overall, we could say that there has been a slight reduction in the use of environmental resources per unit of economic growth and environmental quality of life has been gradually improving in the Republic of Korea, including the increase of basic natural and environmental resources. However, there remains a huge gulf between policies for green industries and policies for resource-intensive economy and industries. This is largely because without the longer-term transformation of the existing energy-intensive, export-oriented economic and industrial structure into a genuine green economy and jobs, a set of policies for a green economy have merely been added to the current policy regime, resulting in the inconsistency and instability of the overall policy framework of the Korean government. Within the government itself, the ministries that are in favour of economic growth, export expansion, and policies tuned to the needs of big conglomerates have much larger political clout in policy-making than the ministries directly devoted to the environment and labour issues.

There is a conspicuous lack of political leadership to change this state of affairs, aggravated by the relatively weak political weight and competences of the ministries and public agencies such as the PCGG responsible for the

2. For the continuing relevance and importance of international labour standards for a Just Transition and green jobs, see Olsen (2010).

Table 3. An evaluation of policy coherence/integration of green jobs policies in the Republic of Korea

Focus of evaluation	Main points of evaluation
Policy coherence/integration	<p>Role of the MOEL to be improved; lack of policy coordination between the MOEL and other relevant ministries, for example, in sharing policy goals.</p> <p>Absence of reporting and evaluating the progress in the creation of green jobs.</p> <p>Gap between policy goals of reducing the consumption of resources/energy and delay in the introduction of relevant supportive legal structure.</p> <p>Ambiguity in policy goals of environment recovery, GHG emissions reduction, and enhanced energy efficiency.</p>
Decent jobs (in the case of the FMRP)	<p>Exaggeration of the number of newly created green jobs by mechanical application of employment inducement coefficient.</p> <p>Low quality of newly created jobs (low wages, job instability).</p> <p>Marginalization of industries with high employment potential such as renewable energy industry.</p>
Long-term changes in employment structure	<p>No consideration is given to the possibility of job losses in existing industries due to transition to green economy.</p> <p>Lack of government preparation for Just Transition, with specific regard to institutional adaptation and finance.</p>

Source: Adapted from ECPI (2010).

environment and Green Growth. This leads to a lack of policy coherence in the government's overall policy framework for Green Growth and the creation of green jobs.

We should also mention a deficiency in policy coherence and integration in a group of policies much more narrowly focused on the creation of green jobs. Even in this policy area, there is a lack of policy coordination between the Ministry of Employment and Labour (MOEL) and other relevant ministries. There remains an ambiguity in the concrete policy goals such as decent jobs and the long-term change in employment structure which are to be achieved for the creation of green jobs, as is summarized in table 3 (ECPI, 2010).

Comparing the job-creation impact: The FMRP vs renewable energy

In this section we compare the job-creation impact of two different policy options, that is, the FMRP and renewable energy. Regardless of the relative merits of Green New Deal policies on the environment, the focus of comparison here is the number and quality of new jobs created by these policy options.³

3. Rosenberg (2010) offers an excellent discussion of employment impacts of climate adaptation and mitigation, including renewable energy industries.

The FMRP and job creation

The FMRP is responsible for the lion's share of Green New Deal policies and the Korean government announced it would create, through the FMRP, more than 200,000 new jobs between 2009 and 2012. According to the master plan of the Ministry of Land, Transport and Maritime Affairs (MLTM) in June 2009, the FMRP was forecast to create 340,000 new jobs with its total budget of 22.2 trillion Korean won, based on the 2006 employment inducement coefficient for the construction industry (17.3 new jobs per 1 billion Korean won).

According to the MLTM, after the launching of the FMRP in October 2009, on average there were 10,364 workers per day who worked on the construction sites. Among those, 2,166 were managers and technicians of the construction companies, 388 were construction inspectors of the construction inspection firms, and the remaining 7,810 were workers who operated construction equipment and simple tools.

However, doubts have been raised about the quality of the new jobs thus created. For example, according to a survey carried out by a member of the Republic of Korea Assembly of those workers who had recently taken out unemployment insurance at the 389 companies participating in the FMRP (Choi, 2010), as of late April 2010, of the 2,425 new jobs generated since December 2009, 95 per cent had been filled by day labourers (Group B, see table 4) and there were only 130 relatively good jobs (regular workers and workers with more than a one-year employment contract, Group A).

According to the MLTM, just 2,425 of the 10,364 new jobs provided work on a daily basis at construction sites, the remainder appearing to be beyond the reach of unemployment insurance and offering low-quality wages and working conditions (ibid.).

Also at issue was the number of new jobs allegedly created by the FMRP. According to a prominent critic of that programme, Heonho Hong, a researcher from People's Institute of Economic & Social Studies, an independent civil society think tank in Korea, the MLTM made a critical mistake by mechanically applying an employment inducement coefficient for the construction industry when calculating job creation impacts of the FMRP. Even with the

Table 4. Number of workers who have newly taken out unemployment insurance at the companies participating in the FMRP, classified by four major rivers and type of workers

Type of workers	Han River (17 CAs*)	Geum River (11 CAs)	Yeongsan River (10 CAs)	Nakdong River (31 CAs)	Total
Group A	16	14	7	93	130
Group B	288	14	226	1,767	2,295

* CAs = construction areas
Source: Choi (2010), p. 26.

High rates of industrial accidents in the FMRP

The unjustifiable speed at which the FMRP has proceeded has brought about a stream of injuries and casualties. In order to complete the whole FMRP by late 2011, just one year before the end of the term of office of the current President of the Republic of Korea, Myung-bak Lee, the construction work on the FMRP proceeded around the clock, leading to high stress and accumulated fatigue of workers on the ground. According to a survey undertaken by an Assemblyman (ECPI, 2010), workers have been working longer than legal working hours in 153 of 154 the FMRP worksites. The ratio of death to total industrial accidents in the FMRP amounts to 30 per cent, ten times higher than the average ratio (2.7 per cent) of the construction industry in Korea. As of April 2011, industrial accidents in the FMRP had led to the deaths of 20 workers, meaning, on average, more than one worker death per month since the launching of the FMRP in November 2009.

investment of 22.2 trillion Korean won, Hong argued, the employment effect of the FMRP would be limited to creating 31,350 new jobs, the reason being that heavy construction equipment is intensively used at the FMRP construction sites, leading to exaggerated job creation forecasts (Hong, 2009).

According to another critic, Professor Jeongwook Kim of the Seoul National University, the FMRP has had a negative impact on employment, destroying the jobs of 700 workers who collected natural aggregates, as well as those of 24,000 farmers. If the families of these workers and farmers are included, up to 64,000 people might have lost their livelihoods (*Hankyoreh Daily News*, 2010). In addition, there is a continuous stream of media reports that a number of industrial accidents have been occurring in the FMRP construction sites causing injuries among the workers, and even some deaths.

Another complicating factor is that the government has no reliable figures on the jobs created on the construction sites. Under these circumstances, what might be termed a broad consensus among experts and the companies participating in the FMRP, based on interviews and surveys, is that it is likely to have created, over a two-year period, between 72,770 and 88,400 new jobs.

Another structural problem with the FMRP is that the construction industry might be vulnerable to an employment crisis after the completion of the FMRP since there is little, if any, opportunity for sustainable employment due to the very limited number of workers needed for the management and maintenance of the major facilities built under this programme (KEIS, 2010a).

Renewable energy promotion and job creation

Green New Deal policies in the Republic of Korea do include investment in renewable energy. If we look at the government's plan, the total amount of investment in renewable energy amounts to 3.18 trillion Korean won between

2009 and 2012 (see table 5), and it has been estimated that 53,500 new jobs have been created through this investment.

According to the Ministry of Employment and Labour (MOEL), programmes for promoting R&D and expanding the use of new renewable energy with the investment of 2.8 trillion Korean won for three years (2008–10) have had the effect of creating 30,065 new jobs in total. According to an evaluation report on the government’s renewable energy policies (KEIS, 2010b), although the immediate short-term employment effects of renewable energy industries are not high, renewable energy industries are expected to contribute, in the longer term, to the creation of stable decent jobs based on the strengthening of technological competences and the consequent growth of renewable energy industries in the Republic of Korea.

Renewable energy industries in Korea have experienced remarkable growth in recent years, but the size of total employment in these industries still remains quite low. According to a survey on renewable energy industries (solar, wind, bio, geothermal, fuel cell) in Korea carried out in April 2010 by the Ministry of Knowledge Economy (MKE), the number of renewable energy companies (renewable energy equipment manufacturers) has increased from 41 in 2004 to 146 in 2009, the annual rate of increase being 29 per cent. The total number of employees in these companies has increased from 689 in 2004 to 9,151 in 2009 (an annual rate of increase of 62 per cent), and is expected to reach 11,715 in 2010 (MKE, 2011).

At the moment, we do not have a direct measure of the quality of the jobs in renewable industries but, using the relative share of different job categories as a proxy, we could obtain an indirect measure of the qualities of jobs in these industries. According to a 2007 survey by a research institute of the then Democratic Labour Party in the Republic of Korea, the share of technical jobs among those workers employed in renewable energy equipment

Table 5. Investment in renewable energy and its job creation effects, aggregated from the Green New Deal policies of the Korean government

Name of programme	Investment plan (2009–12, 0.1 billion Korean won)	Job creation effects (number of jobs created)
V. Promoting new renewable energy	7,391	4,348
V-3-1. Bio-ethanol (E5) demonstration project	212	260
V-3-2. Bio-ETBE demonstration project	60	315
VI. Turning wastes into energy sources	9,300	16,196
VI-1. Using floral and maritime biomass as energy sources	11,220	24,372
VI-2-1. Building production infrastructure for using biomass	758	3,019
VI-2-2. Using livestock excrement as energy sources	2,050	1,905
VII-1. Promoting forest biomass as energy sources	881	3,130
Total	31,872	53,545

Source: ECPI (2010).

installation firms was 54.9 per cent. Another recent survey by the MKE showed that the share of research and development jobs among those employed in the firms producing renewable energy equipment was 18.07 per cent. Since technical and R&D jobs are usually regarded as enjoying better wages and greater job security, this might lead us to believe that the quality of jobs in renewable energy industries is, on average, relatively better than that of jobs in more traditional manufacturing industries (ECPI, 2010).

Comparing policy options

In this section we will compare, in a very sketchy way, the employment effects of two different policies, that is, the FMRP and renewable energy promotion. Firstly, it should be noted that the government invested almost six times as much in the FMRP (22.2 trillion Korean won, 2009–12) as in renewable energy industries (3.75 trillion Korean won, 2003–10). Even if we add to the latter a renewable energy component (3.18 trillion Korean won) of Green New Deal, there still exists a huge investment gap between the commitments to the two policy options.

Secondly, the job creation impacts of renewable energy industries seem to be greater than those of the FMRP. Referring to the data currently available (already mentioned), as of May 2010, 3.1 trillion Korean won had been invested in the FMRP out of a total of 22.2 trillion Korean won (representing 13.9 per cent of the total project), leading to the creation of 10,364 new jobs. On the other hand, the 3.7 trillion Korean won invested in renewable energy industries in Korea between 2003 and 2010 led to some 20,999 new jobs in these industries. Based on this admittedly rough estimation, we can conservatively assume that renewable energy industries have a greater potential for job creation than the FMRP. However, we certainly need a more detailed analysis before we are able to derive firmer conclusions.

Thirdly, there is the issue of the quality of jobs created. Most jobs created through the FMRP are construction jobs, which will end after the completion of the construction of major facilities (dams and banks) and are in that sense unsustainable, while jobs generated in renewable energy industries are expected to be more stable due to the continued growth of the industries. We could also use job categories as a convenient proxy for wages and working

Table 6. Comparison of job creation effects of two policy options

Points of comparison	FMRP	Renewable energy industries	
Number of jobs created	10,346 (daily average)	20,999 Manufacturing (2010)	Installation (2007)
		11,715	9,824
Investments (estimation)	3.1 trillion Korean won (October 2009 – May 2010)	3.7 trillion Korean won (2003–2010)	

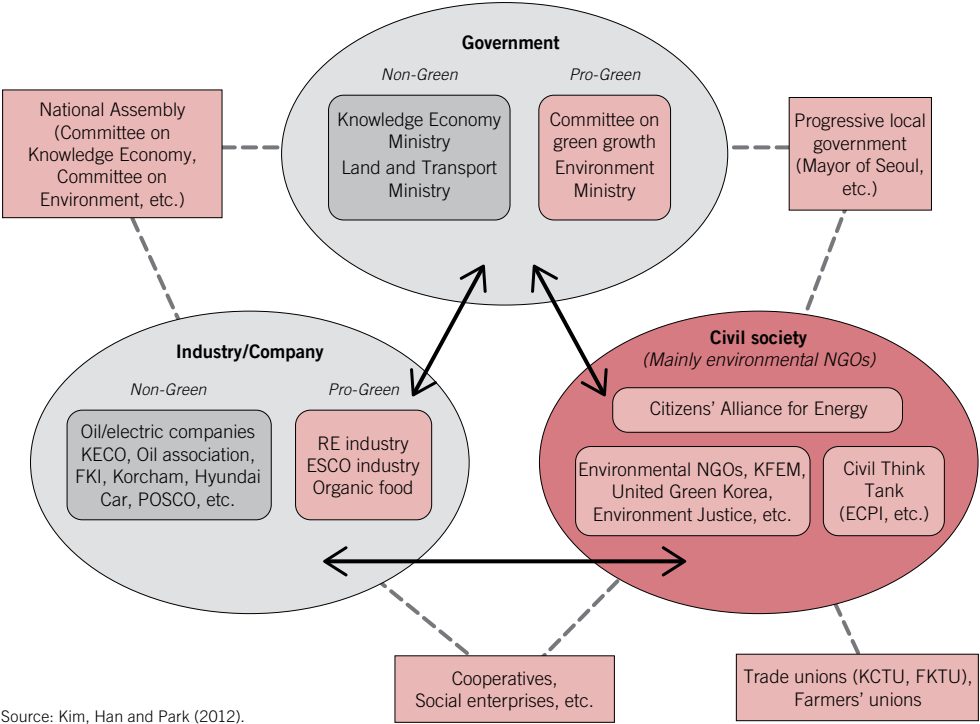
Source: ECPI (2010).

conditions to compare the quality of new jobs created. More managerial and R&D jobs (46.1 per cent) are found in renewable energy industries than in jobs created by the FMRP and its associated programmes (24.1 per cent). This could mean that wages and other working conditions would be much better in renewable energy industries than in the FMRP-related construction jobs. Here again we need more empirical surveys and research to have more reliable information to guide us in the search for relevant policy and strategy for creating decent green jobs.

Social and political conditions surrounding green jobs policies in the Republic of Korea

Broadly speaking, there are three major groups of stakeholders in the country regarding the transition to green economy and the creation of green jobs. The first group is composed of industry, firms and industry associations such as the Korea Photovoltaic Industry Association (KOPIA), which are engaged in renewable energy businesses. The second group comprises government ministries like the MOSF, the MKE, and the Ministry of Environment (ME), as well as public agencies like the PCGG, and the standing and special

Figure 3. Groups of stakeholders in the transition to green economy and green jobs in the Republic of Korea



Source: Kim, Han and Park (2012).

committees of the National Assembly. The third group is more diverse and includes environmental NGOs and consumer groups such as the Korean Federation of Environmental Movement (KFEM) and the YMCA, solidarity organizations of NGOs like the Korea NGOs' Energy Network (ENET), and civil society think tanks like the ECPI working in the area of energy and climate policies (Kim, Han and Park, 2012).

As shown in figure 3, there are complex relationships of tension/conflict and cooperation/solidarity within and among these groups of stakeholders. Unfortunately for the promotion of the transition to green economy and the creation of green jobs, civil NGOs and trade unions have not had much experience working together to promote common programmes with the environmental movement. There have been only a few instances of cooperation between trade unions and environmental organizations in the country since the 1980s' joint campaigns to eliminate industrial pollution and accidents and to fight against the government's attempt to privatize electricity industry. Recently, however, there seems to have been a change and a broader solidarity network, called the "Solidarity for Climate Justice in Korea", was established in 2011. The network focuses on the climate change agenda and comprises a variety of environmental and social movements, NGOs and trade unions. If such alliances and networks continue to be built between the environmental movement, NGOs and trade unions, they might be capable of becoming a powerful force to push forward the climate change agenda and the transition to a green economy. However, there do seem to be barriers to overcome before trade unions in Korea can take a more proactive approach to the transition to green economy and green jobs policies.

Firstly, for decades, trade unions in Korea have been operating in a very hostile environment, facing anti-union policies and attitudes from the government and employers. This has tended to make them distrustful of bipartite or tripartite consultations and negotiations with the government and employers on key policy issues relevant to workers and trade unions. This has also caused trade unions to concentrate on maintaining current jobs and workplaces and to be reluctant to pay due attention to broader social projects for the transition to a green economy and the creation of new green jobs. A very low union membership rate (9.8 per cent, as of 2010) (*Kyunghyang Daily News*, 2012) likely contributes to such defensive approaches. Secondly, the core of trade unions in Korea is found mainly in energy/resource-intensive sectors such as car production, shipbuilding and electricity industries, while few workers employed in ecological sectors such as renewable energy industries have been organized into unions. For example, the Gunsan plant of Hyundai Heavy Industries, one of the big conglomerates in Korea which produces wind turbines, is known to employ mostly irregular, non-union workers. Under these circumstances, trade unions in Korea are likely to be under the influence of "productivism" and to show relatively low awareness of the environmental crisis and climate change agenda, as well as the need for a transition to a green economy.

On the other hand, it might be useful to direct our attention to the cooperative movement and the social economy sector for their potential to provide opportunities for creating green jobs. They have the possibility of achieving dual objectives of environmental protection and job creation. For example, social enterprises could participate in the energy efficiency programmes for the houses of the poor and be also involved in recycling activities and initiatives, helping create green jobs for the poor families. Consumer cooperatives would be able to create green jobs through the production, distribution and consumption of organic agricultural products.

We should also consider the potential power of green and progressive political forces, which are strong supporters of a Just Transition to a sustainable green economy and the creation of green jobs. In Korea, there are such green progressive political parties, although they are a minority at the moment. If they could continue to broaden their constituencies and build broader social alliances with progressive, reform-minded heads of local governments, local council members and Members of the National Assembly, this would become an influential power bloc to promote a Just Transition to a green economy in the Republic of Korea.

Conclusions

In this paper we made a preliminary analysis of the Korean government's Green Growth and Green New Deal policies, with particular reference to their impact on the creation of decent green jobs. Considering the limitations of the data currently available, we need further research and systematic empirical data collection on this crucial issue. However, we believe that we could suggest the following as conclusions for this paper.

Firstly, the focus of Green New Deal policies in the Republic of Korea has not been on the protection of the environment and the creation of decent green jobs. These policies have rather been designed as a green façade for policies of economic growth through technology development and exports. In our view, Green New Deal policies do not constitute a serious approach to tackling climate change and achieving the greening of industry. They have, unfortunately, been misrepresented by UNEP, for example, as a “model for Green Growth” for other countries. In assessing Green New Deal policies, we must move beyond the mere size of alleged green investment to delve into the fundamental orientation and specific impacts of the policies.

Secondly, as we have seen, there is confusion and a lack of consistency in the data on the number and quality of jobs created by Green New Deal policies. We could say this is largely due to the lack of a clear definition of green jobs. Although some research and investigation has been carried out by international institutions such as UNEP, the ILO and the ETUC on green jobs, we need to develop a clearer definition and standard of green

jobs and this will make it easier to do an international comparative study on green jobs.

Thirdly, the Green Growth strategy and the Green New Deal were not successful in creating decent jobs. Generating decent green jobs was not the first priority of the Green New Deal policies and as these policies were being implemented, there was no proper monitoring of the creation of green jobs.

Fourthly, while the FMRP, the core of Green Growth strategy, was not effective in creating the number and securing the quality (wages and employment stability) of green jobs, renewable energy industries have shown the possibility of creating more decent stable green jobs with much less investment by government. Renewable energy industries have a greater potential for generating local employment of workers with differing skill levels and to sustain employment due to the need for continuous maintenance and development of facilities.

Fifthly, scant attention has been paid to the quality and working conditions of new green jobs created in the Republic of Korea. Trade unions and civil society organizations have a central role to play in putting these issues higher on the agenda and need to search for ways to organize those workers in newly created green jobs and to improve their working conditions through collective bargaining and policy development and intervention (UNEP and Sustainlabour, 2008). As one way of overcoming a low membership rate of unions and a lack of tradition of social consultation and dialogue, trade unions and civil society organizations in Korea could begin by developing policy programmes and implementing small-scale policy experiments in those areas where there are relatively high expected effects of green job creation and where it is relatively easier to engage local people and communities. Supplying and distributing renewable energy and raising the energy efficiency of the houses of the poor and socially vulnerable could be examples of such areas of activities.

Sixthly, we need joint, concerted campaigns and strategies that could go beyond the limitations of single issue-centred civil society organizations, the short-term interest orientations of trade unions and the narrow individual focus of green firms. Through these common campaigns and strategies, we would be able to develop a shared vision of the framework for the transformation of social and industrial structure towards a Just Transition to a sustainable green economy. In developing this vision, utmost attention should be paid to developing policies to protect workers from the threat of unemployment or job insecurity and to provide jobs and livelihoods for the socially vulnerable. To confront and cope with the reluctance or even refusal of the government and industry to tackle proactively green economy issues and jobs in the current context of the environmental crisis and climate change, we need to construct broader social alliances for a Just Transition to a low-carbon green economy.

Last but not least, more theoretical discussion and empirical work is needed on the quality (wages and other working conditions) of green jobs,

the number of which is expected to grow as the share of green industries increases in the whole Korean economy. Considering a weak protection of labour rights in Korea, trade unions need also to actively engage, in order to ensure that basic labour rights, proper wages and working conditions are guaranteed in the green jobs to be created (Olsen, 2010; UNEP and Sustainlabour, 2008).

References

In English

- Kim, Hyun-Woo; Han, Jae-Kak; Park, Jin-Hee. 2012. "Green Jobs in Korea: Potential and Perspectives", ECPI and the Korea Office of the Friedrich-Ebert-Stiftung, Seoul.
- Olsen, Lene. 2010. "Supporting a Just Transition: The role of international labour standards", in *International Journal of Labour Research*, Vol. 2, Issue 2, pp. 293–318.
- Rosemberg, A. 2010. "Building a Just Transition: The linkage between climate change and employment", in *International Journal of Labour Research*, Vol. 2, Issue 2, pp. 125–161.
- UNEP. 2010. *Overview of the Republic of Korea's National Strategy for Green Growth*, Geneva.
- ; ILO; IOE; ITUC. 2008. *Green jobs: Towards decent work in a sustainable, low-carbon world*, Nairobi.
- ; Sustainlabour. 2008. *Climate Change, its Consequences on Employment and Trade Union Action: Training Manual for Workers and Trade Unions*, Madrid.

In Korean

- Choi, Young-Hee. 2010. "95 per cent of Jobs in the FMRP are Day Labourers", press release, 30 June.
- ECPI (Energy and Climate Policy Institute). 2010. *Evaluating Green Growth and Green New Deal Policies of the Myung-bak Lee Administration in Korea: The Case of Green Job Creation*, Report submitted to the Offices of three Assemblymen, Mikyung Lee, Chanyeol Lee, and Youngpyo Hong.
- Hankyoreh Daily News*. 2010. "Revealing the Hidden Truth of FMRP", 27 Aug.
- Hong, Heonho. 2009. "Issues surrounding FMRP's Investment Impacts and its Effects on Revitalizing Local Economies", Seoul.
- KEIS (Korea Employment Information Service). 2010a. *Analysis and Evaluation of the Employment Effects of Government Policies: The Case of FMRP*, Seoul.
- . 2010b. *Analysis and Evaluation of the Employment Effects of Government Policies: The Case of Renewable Energy Policies*, Seoul.
- Kyunghyang Daily News*, "Korea, a Nation Hostile to Unions", 23 June.
- Lee, Jin-Woo. 2009. "On Principles of Setting GHG Emissions Reduction Targets: the Case of Korea", Energy and Climate Policy Institute (ECPI), Seoul.
- MKE (Ministry of Knowledge Economy). 2009. *2006 National Statistics on Greenhouse Gas Emissions*, Seoul, 2 Feb.

- . 2011. “The Number of Firms in Renewable Industries in Korea has Increased 2.2 Times Compared with Three Years Ago”, Press Release, 15 Feb.
- MOSF (Ministry of Strategy and Finance). 2009a. *Green New Deal Initiatives for Creating Jobs*, Seoul.
- . 2009b. “Plans to Create Green Jobs and Foster Manpower”, Seoul.
- PCGG (Presidential Committee on Green Growth). 2009. *National Strategy for Green Growth and its Five-Year Plan*, Seoul.
- . 2010. “Greenhouse Gas Reduction Target”, Seoul.
- PMO (Prime Minister’s Office). 2008. *The First National Basic Energy Plan 2008–2030*, Seoul, 27 Aug.

Green and decent?

*Working conditions in the waste sector
in Europe and implications
for trade union policy*

Dr Vassil Kirov

Institute for the Study of Societies and Knowledge, Bulgarian Academy of Sciences

Jerry van den Berge

European Federation of Public Service Unions (EPSU)

The objective of the proposed paper is to investigate the question of the quality of work in the waste sector in the context of the transition towards a recycling society and to formulate some recommendations for trade union strategies at the European level. Very often greening is associated with positive outcomes but there is evidence that “green” jobs are not always “good” jobs (Ponce, 2011). What is the situation in waste collection? The transition from collecting and “landfilling” to sorting, selecting and recycling is under way in many European societies, and this affects the work organization and the job characteristics of employment in this sector, thus opening a space for more green jobs. But are “greener” jobs always better jobs? What could the representatives of trade unions in Europe do to improve the quality of work?

This paper is based on the current research done in the framework of a European comparative project, WALQING (a project in the European Union’s 7th Framework Programme, involving research institutes and universities in 11 countries that ran from November 2009 to October 2012) and discussions within the European Federation of Public Service Unions (EPSU) (www.epsu.org). The WALQING project aims to identify the conditions of favourable “new and growing” job configurations, involving stakeholders in this assessment and identifying gaps in stakeholder, national and European policies, among others.

After briefly presenting WALQING research in the waste sector, the article discusses how greening, Europeanization and privatization impact the quality of work, thus enabling the actors to be located and strategies for improving the quality of work to be analysed; it also formulates some implications for trade union policy. The article develops some recommendations for trade union action at the European level that could take into account the various processes impacting the quality of work such as greening and outsourcing, in order to create better conditions for workers.

The WALQING project and research in the waste sector

WALQING¹ explores the linkages between “new jobs”, their conditions of work and employment, and the outcomes for the employees’ quality of work and life. It connects micro- and macro-levels of analysis and, on the basis of this evidence, identifies critical configurations and examples of good practice. It uses the data from the most important European surveys (EU LFS, EWCS, EU-SILC and ESQLE) to detect patterns of job growth, job and life quality, in order to build enriched typologies and identify the likely causes and effects of employment growth. On the basis of this analysis, salient sectors and functions were identified in which bad and good configurations of

1. See www.walqing.eu.

job and life quality are to be found.² These sectors are waste collection, construction, elderly care, cleaning and catering.

For all these sectors, the question of quality of work is investigated through qualitative case studies of work organizations and business functions (case studies are done in ten organizations in four countries, completed by four case studies on individuals in waste collection) and through the analysis of stakeholders' strategies for addressing the quality of work. The institutional analysis (that was completed through action research methodology in some of the participating countries) was done on the basis of national sectoral reports, desk research and interviews with key stakeholders. The objective was to investigate collective actors' policies and their limitations, and to take stock of successful arrangements.³ The present analysis is based on the national sectoral reports of the waste sector in Austria, Bulgaria, Denmark and Italy (working papers⁴), as well as the analysis and interviews carried out at the European level. The national sectoral analyses for Austria, Bulgaria, Denmark and Italy and at the European level are based on some 30 interviews. Case studies are in progress in four countries (ten cases comprising over 100 interviews; the results were expected in September 2012). In addition, a stakeholders' seminar was held in Brussels with sectoral actors in 2011⁵ and some additional discussions took place between WALQING researchers and EPSU at other seminars organized by the trade union federation.

Mapping the sector: A growing but heterogeneous sector with considerable variation within Europe

The waste sector in Europe is growing rapidly. The major trends towards outsourcing are continuing and, at present, two-thirds of companies are publicly owned, but the role of the private sector is increasing. The sector is experiencing a strong concentration: three of the largest private companies have a turnover 50 per cent greater than the following 13 smaller companies, although this situation is not found evenly in all European countries. There

2. The project team identified patterns of job growth and job and life quality, built enriched typologies, and identified likely causes and effects of employment growth (Vandekerckhove and Ramioul, 2011; Vandekerckhove, Capéau and Ramioul, 2010; Holman and McClelland, 2011; Poggi, Bizzotto, Devicienti, Vesan and Villosio, 2011).

3. A second objective was to go beyond mere description by connecting institutional contexts and case studies and by proactively translating and disseminating successful solutions and strategies with the help of action research.

4. National reports are available at the Walqing Social Partnership Series, <http://www.walqing.eu/index.php?id=64>.

5. It is important to reiterate that the research work was closely coordinated with the sectoral stakeholders and that the debates with the sectoral social partners in the waste collection were not limited to this seminar, since EPSU has also organized other seminars for the sector.

are trends towards convergence with other sectors, for example the utility sector, in which Suez and Veolia are market leaders (for further details, see Hall, 2010a).

Diverse actors and markets

The development of the waste sector in Europe is complex for many reasons, including, for example, the multitude of markets, evolving legislation, and the changing structures and actors. During the last few decades, attention has shifted from waste collection to disposal, and later to recycling. As a result, the waste sector is developing into three markets – collection, disposal and treatment – the integration of which varies across European countries.

This complex situation is reflected in the coexistence of actors belonging to the traditional public sector (municipalities), the traditional private sector (business-to-business, construction, logistics, etc.), more or less privatized utilities (multinational companies (MNCs), regional, local players), and various hybrids (public–private partnerships, or PPPs).

Diverse unions

This fact makes the representation of employees even more difficult – as unions from the public sector, unions for the private sector (from manufacturing, construction) or large, merged unions (coordination across departments) are all acting in the sector.

The social dialogue at the EU level is not yet formalized in the waste sector. On the employers' side there are several organizations that represent different players in the field, such as the Municipal Waste Europe for the municipal enterprises and FEAD for the private sector (this organization stresses its business orientation but for the moment refuses to act as an employers' organization). On the trade union side, the main organization is EPSU. Since 2010, EPSU has made efforts to develop social dialogue and involve employers, in order to establish formalized social dialogue. Its priorities in the waste sector are the development of social dialogue, health and safety, skills development, environmental services and the launch of the European Day of Action for Waste Workers (Van den Berge, 2011).

In the countries examined, the composition of the social partners and the coverage and outcomes of collective bargaining differ widely. In Austria, the employer side has been aiming for a sector-specific collective labour agreement since 2005, with no success so far. According to the social partners interviewed, the main reason for this is the heterogeneity of the sector, and wages specifically have been the sticking point in negotiations. Currently, a range of collective agreements apply. They have been established at company

level where works councils are in place, or have been inherited from the company's original sector (Holtgrewe and Sardadvar, 2011).

In Bulgaria, there is no employers' association in the waste sector, just an association for companies involved in recycling. The explanation provided by one of the interviewees is that the majority of the players in the sector are connected with different grey practices and interests, and there are few companies that would like to engage in a common defence of their interests. On the union side, there are two federations belonging to the confederations

Table 1. Social partners and social dialogue

Country	Employers' organizations	Trade unions	Collective Labour Agreement (CLA)
Austria	Waste Management Association leading negotiations, although all in all five guilds are involved.	Several unions representing employees: <i>ProGe</i> , the manufacturing union, <i>GdG</i> , the union of municipal employees, <i>vida</i> , the service sector union, and the white-collar union, <i>GPA-djp</i> , for clerical and white-collar employees.	A range of collective agreements apply. They have been established at the company level; there is no sectoral CLA yet, but it has been under negotiation for five years.
Bulgaria	There is no employers' organization.	Two sectoral trade unions: the National Federation Trade, Services, Control Bodies and Tourism (NFTSCBT) (CL "Podkrepa") and the Independent Trade Union Federation of Employees in Commerce, Cooperatives, Tourism, Credit and Social Services (ITUFECCS) (CITUB).	There is no sectoral CLA; there are 3–4 company agreements.
Italy	Confservizi, representing the public sector – 843 associated firms which includes Federambiente* (<i>Federazione Italiana Servizi Pubblici Igiene Ambientale</i>) for environmental/refuse sector – 250 associated firms; Confindustria – representing the private sector (including FISE** – Assoambiente (<i>Federazione Imprese di Servizi</i>), Federsolidarietà, Legacoopsociali and Agci-Solidarietà (representing social cooperatives).	Cisl (FIT-Cisl); Uil (Uil-Trasporti); Fiadel-Ambiente (an autonomous trade union of the environmental sector); FP-Cgil, Fisascat Cisl; Cisl Fps; Uil Fol (trade unions representing workers in social cooperatives).	Both FISE and Federambiente bargain with FP-Cgil, FIT-Cisl, Uil-Trasporti and Fiadel-Ambiente (which together represent 95 per cent of the total unionized workers). Sometimes cooperatives apply different collective agreements (e.g. Social Cooperatives National Collective Agreement).
Denmark	Confederation of Danish Industry (DI) and Danish Chamber of Commerce (DCC).	United Federation of Danish Workers (3F), affiliated to the Danish TUC (LO).	There is a valid CLA for waste collection (2010–12). Virtually all waste collection in Denmark is covered by this CLA.
EU level	FEAD (representing private companies, but does not recognize itself as an employers' organization); Municipal Waste Europe (representing municipal enterprises).	EPSU.	There is no formalized social dialogue at EU level, but EPSU is working towards this.

* Federambiente bargains contractual conditions of public companies. ** FISE bargains contractual conditions of private companies.

Source: Walqing Social Partnership Series (<http://www.walqing.eu/index.php?id=64>).

CITUB or to CL “Podkrepa”. These federations represent a small number of employees in the few municipal companies. There is no collective bargaining and there are no collective labour agreements (CLAs) at the sectoral level, and only a few company-level CLAs (which are found mainly in municipal organizations). In general, these agreements offer slightly better working conditions than the legal minimum. However, there are indications that the companies in this sector coordinate their wage and working conditions policies. As was observed in the case studies, one very important element of working conditions was the timely payment of wages (Kirov, 2011b).

The main actors of industrial relations in Italy are the representatives of the public administration, of firms and of workers (Bizzotto, Ferraris and Poggi, 2011). Federambiente represents municipal and public companies and FISE represents the private companies; their actions are coordinated. The three most representative trade unions are Cgil, Cisl and Uil. Social partners representing employees enjoy a good level of cooperation (*ibid.*). Collective bargaining takes place at the national, sectoral and enterprise level. The main players involved in the negotiation process at national level are the representatives of the three major trade-union organizations and other minor trade unions on the employees’ side, and the Federambiente delegation on the employers’ side.

The general agreement has direct consequences for the transfer of personnel: tendering cannot have negative effects on workers because the new company has to ensure the continuity of employment, wages and other employment conditions (*ibid.*). Firm-level bargaining can improve on the national agreements, in order to contribute towards better conditions for workers. At the enterprise level, actors define conditions for shifts, wages, career paths, organization, quality of service and absence from work (*ibid.*).

Waste collectors in Denmark have traditionally been a group of unskilled workers with relatively high salaries and relatively strong unionization with a tradition for “wildcat” strikes related to working conditions and political protest. According to experts, the Danish waste sector had a “golden age” between 1992 and 2002, when stakeholders had a close network cooperation that improved environmental standards and solved working environment problems such as heavy lifting, chemical components and accidents (Sørensen and Hasle, 2011). From 2002, the focus changed to improving the efficiency of the sector, and new public management practices and outsourcing have since transformed the sector from one with a majority of public workplaces to one dominated by private haulage contractors (DAKOFA, 2007). Although there are indications that efficiency has improved, the stakeholders interviewed do agree that the working conditions of garbage collectors have deteriorated. In waste collection, the two main organizations are the Confederation of Danish Industry and the United Federation of Danish Workers. The employers’ association and the unions negotiate in CLA that are renewed every second or third year. The valid

collective agreement for waste collection covers 2010–12 and includes specific provisions on additional payments for waste collection, working time, conditions of employment and the organization of work. In addition, an umbrella agreement for the whole transport sector includes general provisions on minimum salary, general working hours, vacation and the conditions of employment. These collective agreements are enforced by bipartite labour courts. Almost all the waste collection in Denmark is covered by these CLAs. Smaller employers who may not be affiliated with an employers' association will normally be asked by the union to sign an individual collective agreement with the same terms as the general agreement. In this sector, there is no experience with foreign firms or workers undercutting the collective agreement. There is also a legal framework to establish a close working relationship between the social partners at the organization level.

Diverse products

According to a recent report by the Public Services International Research Unit (PSIRU) (Hall, 2010b), waste generation varies considerably between countries and richer countries tend to produce more waste per person. For example, the municipal waste generated per person ranged from 294 kg in the Czech Republic to 801 kg in Denmark. The next lowest levels after the Czech Republic were in Romania, Latvia, Poland and Slovakia. Of all the municipal waste generated in the EU, 42 per cent is landfilled, 38 per cent is recovered and 20 per cent is incinerated. Poorer countries still undertake the most landfilling; richer countries are the biggest users of incineration. The highest amount of waste is landfilled in Bulgaria, Romania, Lithuania, Malta and Poland (90 per cent or more). Germany, Belgium, the Netherlands and Austria recycle or compost the most (59 per cent or more), while Denmark, Luxembourg and Sweden incinerate the largest proportion (all 47 per cent or more).

“New jobs” through greening?

The experience of employment growth in many European countries in the sector is due in part to the “green transition”. For example, in Italy, the waste sector employment rose between 1996 and 2006. The employment rate increased on average by 3.72 per cent annually. The reasons for this are new management ways and new typologies of jobs created mainly after the expansion of separate refuse collection (Bizzotto, Ferraris and Poggi, 2011). However, a particular increase is observed in manual occupations. The operators in the sector are mainly blue-collar workers (about 83.6 per cent) and their share is much higher than in other sectors of the Italian economy. New functions such as sorting, consulting, high-tech and engineering could lead to

high-road or to low-road job configurations. For example, sorting contributes to a problem of fast-paced, low-wage, hazardous conveyor belt work. While in the countries examined there are some cases of skill upgrading (environmental consulting), even if limited (e.g. Italy, Denmark), there is also some secondary labour market in recycling (Italy), and it remains the only employment opportunity for Roma in Bulgaria.

In conclusion, the sectoral complexity contributes to diverse trends in Europe. The public sector is still dominant but coexists with the private sector. Different companies compete in the different markets for collection, disposal and treatment. The representation of interests of employees is complex and varies between countries and the European-level social dialogue is still absent.

The processes shaping the quality of work in the waste sector: Transition to a recycling society?

The main developments shaping the quality of work in this sector concern the increasing importance of environmental issues, the continuing privatization of municipal services and related problems of public procurement, and the growing Europeanization. In other words, greening cannot be examined separately; the greening changes are in the framework of a complex context of the provision of services through public or private entities and increasing concentration on the markets in Europe.

Greening and environmental legislation: What consequences for the quality of work?

The recent European legislation on waste (Hall, 2010a), the growing importance of climate change and the need for a transition to a “recycling” society impact strongly on the waste sector. The transition from collecting and landfilling to sorting, selecting and recycling is taking place in many European countries and this affects the work organization and the job characteristics in the sector.

Recently, greening has been high on the European agenda. According to the European Commission’s 2011 document *A resource-efficient Europe – Flagship initiative under the Europe 2020 Strategy*:

- by 2020, waste will be managed as a resource. Waste generated per capita is in absolute decline;
- recycling and reuse of waste are economically attractive options for public and private actors due to widespread separate collection and the development of functional markets for secondary raw materials;

Table 2. Hierarchy of waste

Processes	
Prevention	Waste per capita in decline
Reuse	Waste per capita in decline
Recycling	Separate collection and stimulation of secondary materials market
Recovery	Restrict energy recovery to non-recyclable materials
Landfilling	Virtually eliminated

Source: Kirov (2011a).

- waste legislation is fully implemented. Illegal shipments of waste have been eradicated;
- energy recovery is limited to non-recyclable materials, landfilling is virtually eliminated and high-quality recycling is ensured.

These aims should be reflected in the hierarchy of waste corresponding to the European Commission (EC) strategy for 2020 (see table 2).

This development will certainly impact employment in the waste sector in various ways, such as the change in the work organization of existing jobs, and the creation of new jobs in the new activity areas, both on the high end (environmental consulting, etc.) and on the low end – manual collection of the sorted waste, sorting on the conveyor belt, etc. There is no need to enter into the details of the changing regulations, but on the whole these objectives contribute to multiple changes in waste management. The following citation from an Austrian stakeholder sums up the changes in a concise way:

In the 1980s, the picture was, here's the bin, that gets emptied into a truck, then brought to the waste site, tipped out, that's it, that's how it started. And nowadays, waste management is about management. You divide up these material flows and consider at the collection point what gets collected separately and so on, and then these flows go through particular treatment routines (Expert, Austria).

Privatization: Ownership and value chain restructuring → quality of work

The role of the private sector in the waste sector is continuously increasing but the public sector still represents an important share of the activities. For a long time, the belief that privatization could bring efficiency explained the push for the externalization of public services, including in the waste sector. According to the abovementioned PSIRU publication, recent empirical research has confirmed that, contrary to common assumption, there are no

significant differences in efficiency between public and private waste operators (Hermann et al., 2007; Hall, 2010b).⁶

To what extent do these changes find a place in the framework of public procurement in order to negotiate social or other clauses in the procurement procedures? The situation differs in the countries considered. In Austria, privatization is limited and most municipalities retain a controlling interest in waste disposal, and state-owned or partly state-owned utility companies also play a part. Generally, “private companies continuously aim to cut the cost associated with the provision of services, to discover and develop lucrative areas of business, and spot areas that do not cover cost and either improve their revenue or reduce their extent. Of course, occasionally deficient services are continued, for example in order to remain in a promising market or to be able to offer a full service to clients” (Hutterer et al., 2009, p. 128, cited in Holtgrewe and Sardadvar, 2011, translation by the authors).

In Bulgaria, the waste sector was publicly administered right up until the end of the communist era. Every municipality had its own municipal service(s) or companies. After 1989, the municipal services in the country started to experience changes. By 1990, many municipalities had started to outsource waste collection. According to National Statistics data, between 2003 and 2004, the sector was still dominated by the public sector; in 2004 there were 11,318 employees in the public sector and 6,059 in the private sector. The overall number of employees in the sector decreased between 2004 and 2009, from 17,837 to 11,447, with 2,803 of them in the public sector and 8,644 in the private sector (Kirov, 2011b). The strong presence of Austrian-based smaller MNCs should also be noted.

According to the Danish report, since the mid-1990s garbage collection has increasingly been outsourced from municipalities to private haulage contractors who currently represent 80 per cent of the sector and dominate it (DAKOFA, 2007; Sørensen and Hasle, 2011).

In Italy, the trend is towards a regulated, semi-privatized monopoly rather than delegation through tender. According to Bizzotto, Ferraris and Poggi (2011), the taxonomy of the organizational and management conditions in the Italian refuse sector is particularly complex. In order to simplify the taxonomy, solid waste management can be classified into three main groups: direct municipal management by local authorities, whose employees are public servants; public companies, which are mainly joint-stock companies created by municipalities that operate at the local level and whose workers are company employees; and private operators, which are usually joint-stock companies operating at national or international level. In the primary market, a significant proportion of collection systems are already delegated to private firms. Wherever public management arrangements are maintained there has

6. Note that empirical studies also find the same result in respect of water and electricity providers, as well as other sectors (Hermann et al., 2007; Hall, 2010b).

been an intensive trend towards outsourcing over the last decade. In the secondary market, local authorities developing their own disposal solutions frequently use public–private partnerships (Bizzotto, Ferraris and Poggi, 2011).

The analysis carried out in WALQING enabled it to be shown that the impacts of privatization are related to:

- workload intensification (also in the public sector) – due to the use of public procurement and the introduction of competition, the providers of waste collection services are asked to do the job with fewer people;
- uneven and difficult representation and social partnership – the lengthening of the value chain makes the representations of employees’ interests more difficult;
- limited time of contracts – this leads to losses of tenure with a new contract or the need to transfer employees to new employers;
- the diversification also leads to unequal working conditions for new entrants and fragmentation of workforce – e.g. in Bulgaria, the employees of the examined municipal enterprise have open-ended contracts while those of the private provider have short-term contracts.

Europeanization of regulations, business and products: Professionalization, downgrading and corporate social responsibility?

The role of large MNCs that contract municipal services of waste collection and waste treatment is increasing (Hall, 2010b). But the question is to what extent does this Europeanization impact on the quality of work? How are European Work Councils (EWC) and structures of EU social dialogue in a position to address these issues, in order to preserve and improve the quality of work? These questions have to be addressed, so that recommendations can be made for the public services trade unions’ strategy to address greening in this sector and its impact on the quality of work.

The impact of EU environmental legislation on the waste sector in Member States has been to require higher investment and greater activity in collecting, processing and treating waste. It has improved public services and generally increased employment in this sector. There is no sector-specific legislation requiring increased privatization, liberalization or competitive tendering. However, the growth in the sector has raised business interest, the greater use of incineration has led to an increase in public–private partnerships (PPPs) – often linked to privatization of “feeder” refuse collection contracts, and the interpretation of EU procurement and internal market laws has put pressure on municipalities to open more work to tenders from the private sector (Hall, 2011).

The 2020 strategy itself expects that business opportunities in this sector, as in others, will be more open for EU-based companies. The waste sector in Europe is becoming increasingly internationalized through the enlarged opportunities for contracting. Mostly, it is the multi-utility (dealing with energy, water, construction or waste services) MNCs that have expanded their businesses by taking over municipal or smaller enterprises (see table 3).

The continuous internationalization of the sector raises a number of questions. What is its effect on the quality of work? To what extent are social models exportable? What is the link between waste and the other sectors in multi-sectoral enterprises? The first elements of answers are that the social models are not exportable and that very often, companies tend to align to local conditions. As the next section suggests, many initiatives to address quality of work are embedded in the particular national contexts. So far, no EU social dialogue has been established (although EPSU is working on it), although there are some transnational collective agreements with these multi-utility MNCs.

Table 3. The largest companies in the European waste sector

Company	Parent	Parent country	Parent type	Sales (€m)
Veolia ^a	Veolia	France	S	7 668
Suez Environnement ^a	GdF-Suez	France	S	5 770
Remondis ^b	Rethmann	Germany	P	5 660
FCC ^c	FCC	Spain	S	2 788
Alba ^d	Alba	Germany	P	2 700
Urbaser ^b	ACS	Spain	S	1 480
AVR/Van Gansewinkel ^d	KKR/CVC	USA/UK	PE	1 197
Biffa ^e	Montagu PE	UK	PE	788
Shanks ^e		UK	S	697
Seche-SAUR ^f		France	S	695
Cespa ^d	Ferrovial	Spain	S	606
Ragn-Sells ^d		Sweden	P	408
Delta ^a		Netherlands	Mun.	405
Lassila and Tikanoja ^a		Finland	S	300
CNIM ^a		France	S	271

a. Waste management, Europe b. Includes water c. Environmental services, excluding water
d. Total company sales e. Year to March 2009, total company sales f. including waste business of SAUR.
P=private; PE=private equity; S=Stock Exchange listed; Mun.=municipal.

Source: Orbis; company reports; PSIRU calculations (combining sales of merged companies); Lindauer Managementberatung, 2006, reported in Hall (2010a).

Recommendations for a European trade union agenda

Working
conditions in
the waste sector
in Europe

The research done within the framework of WALQING has allowed the identification of several initiatives by social partners (or even stakeholders) that address the quality of work (Kirov, 2011a). These initiatives concern collective bargaining that remains strong in some countries but weak in others; the role of clients and public procurement; the issue of health and safety (for example in Denmark); training initiatives that are developed (despite the overall perception of a low generic skill sector); the integration of vulnerable groups (Roma in Bulgaria); and the ambiguous impact of the social economy on improving work quality (in the Italian case).

On the basis of the analysis held in WALQING, some recommendations for trade union actions are being developed in the following directions related to the greening, and the other processes in order to improve quality of work.

The first is related to the need to develop a strategy, in order to find European answers. Already, EPSU has put the focus on the coordination of employees' interests in the largest MNCs in the sector. The work on establishing a formalized European sectoral social dialogue is a way to coordinate the action of workers in these diverse circumstances. The development of social dialogue at EU level would allow the identification of better ways to tackle diversity in a very heterogeneous sector and to transfer good practices among social partners in the different countries. There are already some results of this budding EU cooperation: representatives of the employees and the employers already discuss how to address one of the most important health and safety challenges in the sector, the quick pace of work (that allows employees to finish work earlier but causes health problems).

The greening agenda is complex and our next recommendation will be about the need to critically analyse the effects of greening. The general framework of the EU environmental legislation and measures is not sufficient to envisage "decent" work solutions. But this framework legislation does not determine the concrete conditions for its implementation. For example, the sorting of material can be carried out alternatively by waste management companies and by the citizens themselves. Similarly, the transportation can be achieved again by the providers of services or by citizens going to the recycling centres, for example. Moreover, the various solutions could require different use of technologies and different profiles of employees. Consequently, it is very important for unions to be able to analyse the measures proposed in the different countries and to evaluate possible consequences for the quality of work.

From this perspective, the exchange of practices and initiatives that are transferable is the third recommendation. There is a need to address the processes based on the benchmark of what is being done in other countries and also in other sectors. For example, the Italian social partners have developed an observatory for monitoring public procurement.

But if the trade union action should be coordinated at European level, it does not mean that all the participants will be equally interested and involved. Still in this sector, as in other sectors in Europe, there is a need to fill the “institutional gaps”, especially in the New Member States (NMS). As it was shown in the Bulgarian case (and the situation in many other NMS is similar) the representation of the employees’ interests is very limited. Some capacity-building measures introduced by the European unions in the sector could be very useful.

Working with “clients” is also very important. As has become clear, working conditions and the overall quality of work depend on the role of the client (e.g. municipality) in defining the terms of reference for public procurement (for example, if the competition proceeds on the basis of the lowest price or the most advantageous economic offer) and in the daily monitoring of the activities of the service provision. Sectoral trade unions should cooperate with one another, in order to collectively defend workers’ interests instead of seeing each other as competitors for recruitment of members. The heterogeneous waste industry is a clear example that decent work can only be achieved and safeguarded by coordinated advocacy and united action among workers in the different parts of the industry.

The coordination of actions through the existing EWCs is something that exists but could be developed further. In parallel with the existing EWCs the unions could be active, in order to initiate EWCs, means of information, consultation and participation of workers in smaller MNCs, e.g. the Austrian companies active in Central and Eastern Europe.

Conclusion

On the basis of the finding of the research in the framework of the European comparative project WALQING, the authors can agree with the conclusions reached by other scholars that the greening of jobs does not automatically make them “good jobs”. In the waste management sector, there is a political focus on job creation and skills rather than on quality. But greening can serve as a focus of attention. Greening is not a single process impacting the quality of work, and in order to understand social realities there is a need to analyse privatization leading to fragmentation of the workforce and work intensification, the role of public procurement (most advantageous offer versus cost-cutting), etc.

The national practices examined outline a number of concrete initiatives adopted by the stakeholders (mainly social partners), in order to address quality of work issues. At the EU level, EPSU supports the vision that there is a need to first try to minimize waste, and secondly to try to reuse or recycle wherever possible.

From this perspective, EPSU is dealing not only with employers but also with environmental agencies. This strategy may create employment in

recycling and reuse, and may create better employment. For example, according to the representative interviewed at EPSU, if jobs are transferred from incineration and landfill to recycling, this may improve employees' skills and they will thus have better jobs. He considers that if the EU helps transform the sector towards better quality jobs and higher skills jobs, it would be good for workers and the environment alike. Recent research (undertaken by Friends of the Earth: Hall, 2010) points to an inverse relationship between the number of jobs and the amount of waste. Waste recycling is seen as a factor that could create more jobs in Europe, and the move from a wasteful to a recycling society is expected to result in better jobs. However, at present, there is no evidence that waste sorting in itself creates better jobs; this is contingent upon technology and the way it is implemented, and will require a conscious effort by stakeholders.

References

- Bizzotto, G.; Ferraris, M.; Poggi, A. 2011. *Quality of work in the changing sector of waste collection in Italy*, Walqing social partnership series 2011.2, a report for WP5 of the of the WALQING project, SSH-CT-2009-244597.
- DAKOFA (Danish Competence Centre on Waste). 2007. *DAKOFA – Fra komité til kompetencecenter*, Copenhagen.
- EPSU. 2011. *Impact of climate change on public services in Europe* (discussion paper prepared for EPSU by Sophie Dupressoir), Brussels. Available at http://www.epsu.org/IMG/pdf/climate_change_FINALreport_0511_-_EN.pdf.
- Grimshaw, D.; Lehndorff, S. 2010. "Anchors for job quality: Sectoral systems of employment in the European context", in *Work Organisation, Labour and Globalisation*, 4 (1).
- Hall, D. 2010a. *Waste management in Europe: Framework, trends and issues* (<http://www.psir.org/reports/waste-management-europe-framework-trends-and-issues>).
- . 2010b. *Waste management companies in Europe 2009*, PSIRU, Feb.
- ; Popov, V.; Thomas, S. 2011. *Impact of 2020 strategy on energy, water and waste sectors in eastern neighbourhood and enlargement countries*, PSIRU.
- Hermann, C. et al. 2007. *Varieties and Variations of Public-Service Liberalisation and Privatisation in Europe*, Synthesis report on liberalisation and privatisation processes and forms of regulation, Deliverable for the Project Privatisation of Public Services and the Impact on Quality, Employment and Productivity (PIQUE). Available at http://www.pique.at/reports/pubs/PIQUE_028478_Del4.pdf.
- Holman, D.; McClelland, C. 2011. "Job Quality in Growing and Declining Economic Sectors of the EU", Walqing Working Paper 2011.3, May. Available at http://www.walqing.eu/fileadmin/download/external_website/Newsletters_policy_briefs/WALQING_244597_WPaper2011.3_Del4.pdf.
- Holtgrewe, U.; Sardadvar, K. 2011. *Heterogeneity and conflict: The waste sector in Austria*. Walqing social partnership series 2011.2, A report for WP5 of

- the WALQING project, SSH-CT-2009-244597, Vienna, July. Available at http://www.walqing.eu/fileadmin/download/external_website/publications/WALQING_SocialPartnershipSeries_2011.2_Waste_AT.pdf.
- Hutterer, H.; Frühwirth, W.; Stark, W. 2009. *Organisatorische Aspekte der österreichischen Abfallwirtschaft. Endbericht für das BMLFUW*, Vienna.
- Kirov, V. 2011a. *How many does it take to tango? Stakeholders' strategies to improve work in Europe*, Research Report, Deliverable 5.7 of the WALQING project, SSH-CT-2009-244597, Sofia, Nov. Available at <http://www.walqing.eu/index.php?id=38> (http://www.walqing.eu/fileadmin/download/external_website/publications/walqing_Del5.7_SynthesisreportWP5_fin.pdf).
- . 2011b. *Waste collection in Bulgaria: Low skilled employment for the less educated ethnic minorities*, Walqing social partnership series 2011.19, a report for WP5 of the WALQING project, SSH-CT-2009-244597, Sofia. Available at http://www.walqing.eu/fileadmin/download/external_website/publications/WALQING_socialpartnershipseries_2011.19_Waste_BUL.pdf.
- Martinez, E. 2010. *Les salariés à l'épreuve de la flexibilité*, Brussels, Editions de l'Université de Bruxelles.
- Poggi, A.; Bizzotto, G.; Devicienti, F.; Vesan, F.; Villosio, C. 2011. *Quality of life in Europe: Empirical evidence*, LABORatorio R. Revelli Working Paper Series 107, LABORatorio R. Revelli, Centre for Employment Studies.
- Ponce, A. 2011. *Health and safety on green jobs*. PPT presented at the WALQING Stakeholders Seminar "Greening the economy, what is the impact on the quality of work?", 29 Sep., Brussels.
- Sørensen, O.; Hasle, P. 2011. *Waste collection in Denmark*. Walqing social partnership series 2011.7, a report for WP5 of the WALQING project, SSH-CT-2009-244597, Trondheim, Copenhagen, Mar. Available at http://www.walqing.eu/fileadmin/download/external_website/publications/WALQING_SocialPartnershipSeries_2011.7_Waste_DK.pdf.
- Vandekerckhove, S.; Capéau, B.; Ramioul, M. 2010. *Structural growth of employment in Europe: Balancing absolute and relative trends*, Walqing Working Paper 2010.1, Nov. Available at http://www.walqing.eu/fileadmin/download/external_website/Newsletters___policy_briefs/WALQING_244597_WPaper2010.1_Del3.1.pdf.
- ; Ramioul, M. 2011. *Working with business functions. How occupational groups provide insight in Labour Force Survey statistics*, Walqing Working Paper 2010.1, May. Available at http://www.walqing.eu/fileadmin/download/external_website/Newsletters___policy_briefs/WALQING_244597_WPaper2011.1_Del3.2.pdf.
- Van den Berge, J. 2011. *Waste services in a green economy*. Presentation at the WALQING Stakeholders Seminar "Greening the economy, what is the impact on the quality of work?", 20 Sep., Brussels. Available at <http://www.walqing.eu/index.php?id=62>.

The reality and challenges of green jobs in China: An exploration*

Chris King-chi Chan

Department of Applied Social Studies, City University of Hong Kong

Maggie Ching Lam

Department of Applied Social Studies, City University of Hong Kong

* This exploratory research is sponsored by the College Grant, College of Liberal Arts and Social Sciences, City University of Hong Kong.

The remarkable economic growth experienced by China since the beginning of the economic reform in 1978 has been widely praised as a “miracle”. The tremendous wealth generated in the country through its rapid industrialization in the past 30 years is indeed impressive. However, such an astonishing economic achievement does not come without a cost. Although China is expected to remain the fastest growing economy in the world for the next decade, such growth will not be sustainable in the long run due to serious environmental degradation and overexploitation of natural resources.

China’s economic development has been heavily dependent on carbon-based energy. According to the International Energy Agency’s statistics, in 2010, China had already overtaken the United States to become the world’s biggest energy consumer (IEA, 2010). China’s total primary energy consumption had jumped from 776 million tonnes of oil equivalent in 2000 to 2,164 million tonnes of oil equivalent in 2009 (NBS, 2010, as cited in Cheung, 2011). Nevertheless, coal is still the major energy source in China. Over 60 per cent of the energy consumption in China is from coal (Chang et al., 2003). Coal-fired power generation not only causes serious air pollution in China, it also contributes significantly to the nation’s greenhouse gases emissions. The total annual CO₂ emission in China is now about 6 billion tonnes, which makes it one of the top emitters of the world. In 2000, the total amount of SO₂ emission had reached 20 million tonnes, the highest in the world (Liu, Liu and Sun, 2011). Both of these are known to be among the major greenhouse gases.

According to the 4th Assessment Report from the Intergovernmental Panel on Climate Change (IPCC), the rate of warming has nearly doubled over the past 50 years (Solomon et al., 2007). There is general consensus among the scientific community that humans are causing global climate change. As one of the major strategies to mitigate climate change, the Chinese government is now spending billions of dollars each year to build and expand its own renewable energy industries. It is estimated by the WorldWatch Institute that there are about a million people currently working in China’s renewable sector, and that the solar thermal industry alone employs approximately 600,000 workers (WWI, 2011). The number of green jobs created by the renewable industries, such as hydropower, wind power, and solar photovoltaic (PV), is expected to grow tremendously in the next few decades.

Despite the growing importance of these newly created green jobs, their working conditions (i.e. wage level, occupational health and safety, etc.) still remain largely unexplored. This paper aims to explore the working conditions of the green jobs created by the renewable energy sector, and we narrow down our focus to wind power plants in order to allow for a more concentrated analysis. Renewable energy can be generated from a variety of sources, including solar, wind, hydro, geothermal and biofuels. It would be difficult, if not impossible, to discuss all renewable industries in China effectively. For instance, a person working at a geothermal power plant may be subjected to occupational

hazards that are different from those at a hydropower plant. Besides, among all the renewables, some are more developed than others. China started to develop its wind power in the early 1980s, and in 2011, it overtook the United States to become the country with the highest installed capacity, reaching 44,733.29 MW (CWEA, 2011). Some of the wind turbine manufacturing companies, like Sinovel, Goldwind and Dongfang, are even among the world's top ten. Considering its significance in China's renewable industry, comparing the wind power sector with the conventional power sector will provide us with some insights into the working conditions of green jobs in China.

In this paper, we will use the case of wind power plants to evaluate the working conditions of green jobs and to identify potential strategies to help to ensure that green jobs are decent jobs. Data are drawn from academic literature, legislation, policy papers and media reports while the analyses have also been informed by the authors' interviews with labour and environmental campaigners in China.¹

Defining green jobs

In general, there are two main aspects involved in green jobs. One is the environment and the other is employment. There is a notion suggesting that environmental protection would result in unemployment. The logic behind this is that if the environmental standards set by a government were stringent, this would increase the cost of production, decrease competitiveness and eventually result in unemployment. This "jobs versus environment dilemma" does indeed affect workers' perception of the transition to a green economy (Räthzel and Uzzel, 2011). Therefore, giving green jobs a proper definition serves as an important step in conceptualizing the relationship between jobs and environmental protection. Green jobs are a relatively new concept, and the scope and content of such jobs are constantly evolving under the global transition from an unsustainable to a sustainable economy. There is no standard definition of green jobs and each country, depending on the stage of economic development, may have a different definition.

For instance, the Center on Wisconsin Strategy in the United States describes green jobs as "family-supporting jobs that contribute significantly to preserving or enhancing environmental quality", and adds that "most green-collar jobs are and will be middle-skill jobs requiring more than high school, but less than a four-year degree". On the employment side of green jobs, they emphasize that it should also be a good job, which "pays more than a poverty wage ... offer[s] benefits, at least health-care and ideally pensions, paid sick

1. For example, an interview was conducted with two prominent NGO environmental researchers in Beijing, in August 2011.

leave, safe working conditions, reasonable schedules, organizing rights, and a modicum of job security” (White and Walsh, 2008, p. 6).

In contrast, the definition given by the Institute of Labour Studies of China’s Ministry of Human Resources and Social Security (MOHRSS) skews more towards the environmental and technical aspects of green jobs. It defines green jobs as the positions created by any industry or department which are “low-input high-output, low wastages, low emissions, recyclable and sustainable” (MOHRSS, 2010a).

For the purpose of the essay, we choose to adopt a more comprehensive definition (i.e. one that covers both the environmental and employment aspects) created under the Green Jobs Initiative by the United Nations Environmental Programme (UNEP), International Labour Organization (ILO), International Organisation of Employers (IOE) and International Trade Union Confederation (ITUC). According to the report released by the Initiative, *Green jobs: Towards decent work in a sustainable, low-carbon world*, green jobs are defined as “positions in agriculture, manufacturing, construction, installation, and maintenance, as well as scientific and technical, administrative, and service-related activities, that contribute substantially to preserving or restoring environmental quality”, and they “also need to be good jobs that meet longstanding demands and goals of the labour movement, i.e., adequate wages, safe working conditions, and worker rights, including the right to organize labour unions”(UNEP/ILO/IOE/ITUC, 2008, p. 39).

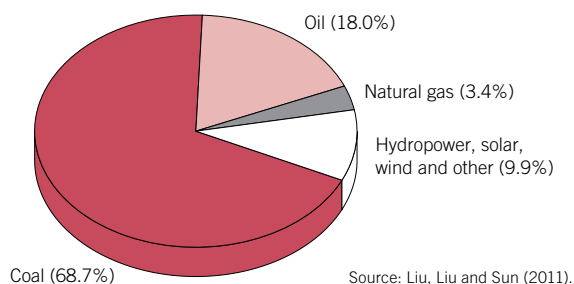
Evaluating China’s renewable energy policies

China’s renewable energy policies can be grouped into three major categories depending on their nature and scope (Li, Shi and Ma, 2007). The first level basically provides direction and guidance for the overall development of country’s renewable energy. The second level usually sets out specifying objectives and outlines for development plans. The third level provides practical guidelines or incentive for the management and execution of the development plans. While the first and second levels are often set by the central government, the third level is usually determined by the local governments. A list of policy documents concerning the development of China’s renewable energy sectors between 1983 and 2001 is shown in Appendix 1.

The development of policy support

It was suggested by Li, Shi and Ma, (2007) that the lack of environmental policy was one of the major barriers to the development of renewable energy. For instance, the lack of consistency and coordination in policy would make it difficult to integrate the electricity generated from wind energy into the

Figure 1. China's energy structure, 2009



existing power grids. For the same reason, without the policy support from the government, the process to put biogas technologies into practice would be largely impeded since it would require the enforcement of waste water discharge standards.

Compared to conventional energy (carbon-based), renewable energy is not yet cost-competitive due to its high capital investment and low capacity. As mentioned earlier, over 60 per cent of the energy in China is still generated from coal-fired power plants (see figure 1). Wind energy, together with other renewable sources, contributes to less than 10 per cent of the nation's total energy production. The share of renewable energy in China's energy profile had only increased slightly between 2000 and 2009 (see table 1). In order to raise the competitiveness of renewable energy in China, support from the government is much needed, and this can be accomplished through measures like providing economic incentives (e.g. favourable taxation or direct financial subsidy) or support for technological research and development.

Table 1. China's energy structure, 2000–09

Source	Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Coal	67.8	66.7	66.3	68.4	68.0	69.1	69.4	69.5	68.7	68.7
Oil	23.2	22.9	23.4	22.2	22.3	21.0	20.4	19.7	18.0	18.0
Natural gas	2.4	2.6	3.0	2.6	2.6	2.8	3.0	3.5	3.8	3.4
Other	6.7	7.9	7.7	6.8	7.1	7.1	7.2	7.3	9.5	9.9

Source: China statistical abstract 2010 as cited in Liu, Liu and Sun (2011).

China's Renewable Energy Law

In response to the deepening threats posed by the global climate change and local energy shortage, the Renewable Energy Law was adopted by the National People's Congress on 28 February 2005. It was an important piece of legislation, not only because it identified renewable energy as a government priority but also because it provided clear and practical measures to foster the

growth and development of renewable energy. Most importantly, the law requires the power grid operators to purchase all of the electricity generated from the approved renewable energy producers, and any non-compliance is subject to a penalty. The National Development and Reform Commission (NDRC) is responsible for setting the prices for the renewables and it can adjust the prices from time to time. Beside financial incentives and management guidelines, the law also specifies requirements for technology standards, building codes, resource surveys and long-term development plans. Since renewable industry needs high capital investment, all the measures laid out by the above law can significantly lower the cost of capital of renewable energy producers, and hence increase their profits.

The missing issue: The challenges facing workers laid off under the transition

In terms of building a bigger and stronger market for renewable industries, the Renewable Energy Law and similar legislation are powerful tools. However, the missing issue in here is that, in order for a society to move away from a brown economy to a green one, a strong “green-collar” workforce is a must. It is an issue that has often been overlooked by the Chinese government. Dr Cheng Ying from the Chinese Academy of Social Sciences, which is currently working with the WorldWatch Institute to study the development of green employment in China, pointed out: “Right now there are still quite a large number of workers in the green industry working on jobs which are unstable and low-tech, and those jobs are not the green employment that we like to pursue”; however, “according to our data, the possibility for our government to release policy relating to green employment is relatively small” (*People’s Net*, 2011). Until now, there is still no specific policy or legislation designated for green jobs.

The fear of job loss could be one of the major factors preventing workers from supporting China’s green transition. As the Chinese government continues its ambitious and aggressive approach for greening the country’s economy, factories which lack the resources to meet the new environmental standards will be forced to close down and more jobs will be lost in this way. In 2007, the NDRC released the policy paper *Opinions on speeding up the shut-down of small thermal power units*, asking that all thermal power plants with a capacity below 50 MW and all those 20 years old or more with a capacity below 100 MW close down within the 11th five-year planning period (i.e. 2006–10). It was estimated that the closing down of the small, inefficient thermal power units had caused about 236,000 job losses by 2008, and among those who lost their jobs, only one-tenth were re-employed (MOHRSS, 2010a).

Most of the workers who were laid off had difficulties finding a new job. This is because renewable energy involves new technologies and requires

workers with higher education and skill levels. It has been shown that workers in the wind power plants are generally more educated compared to those working in the thermal power units (see table 2). Some studies suggested that if direct and indirect employments were taken into account, the transition from fossil fuels to renewable power generation would eventually result in a net job gain (Cai et al., 2011; Pan, Ma and Zhang, 2011). Nevertheless, renewable energy is a knowledge-intensive rather than labour-intensive sector. Cai et al. (2011, p. 6001) suggested in their recent study that “the current speed of structural change in labour’s educational level is far below the pace required to meet the needs of the industry, resulting in a structural unemployment”. In other words, instead of job gains, what the workers from the conventional energy sector are facing is immediate job losses. Furthermore, middle-aged laid-off workers are the people most adversely affected by the transition. To help them cope with the transition through training alone might not be enough, since it seldom guarantees re-employment. In most cases, the enterprises are more willing to train fresh graduates from universities or vocational colleges simply because they have a longer working life ahead of them.

In the old days, before the economic reform started in 1978, workers were allocated to different work units in the state-owned enterprises (SOEs) by the local governments. Thirty years after the reform, even though the energy sector still remains largely state-owned, workers are now mostly employed from the labour market. They have to compete with each other for jobs and older workers are generally less competitive than younger workers due to their old age or low education level. With the advancement in technology, the demand for unskilled labour will decline further.

In an age where lifetime employment has become history, social security plays a crucial role in ensuring that laid-off workers are still able to maintain a basic living standard (at least for a short period of time). In 1986, the Chinese government promulgated the first unemployment insurance policy in response to the foreseeable massive lay-off of workers due to the marketization reform of SOEs. However, at the time, the policy only covered workers from the SOEs. To improve the unemployment insurance system, the State Council approved and released the Regulations on Unemployment Insurance

Table 2. Education levels of workers among different power enterprises (percentages)

	Junior middle school and below	Senior high school	Vocational high school	Technical school	Secondary technical school	Junior college	University	Master's and above
Wind power	0	4.0	0	2.0	4.0	38.0	50.0	2.0
Large thermal power	2.5	3.3	3.0	10.5	9.8	26.1	43.1	1.8
Small thermal power	4.8	3.6	9.6	10.8	14.5	25.3	27.7	3.6

Source: MOHRSS (2010a).

in 1999, expanding the coverage of the insurance to workers in joint-venture or other private sectors. Nonetheless, the current unemployment insurance system still has a number of critical shortcomings, making it inept in providing adequate financial support for the laid-off workers to maintain a basic living standard. The shortcomings include:

1. *Narrow coverage:* The unemployment insurance policy only applies to urban economy and rural economy is not being covered. Within the urban areas, its implementation is primarily on SOEs, workers from the private or foreign-funded enterprises are, to a large extent, yet to be integrated.
2. *Low security level:* In general, the unemployment compensation in China is about 60 to 80 per cent of the local minimum wage, which can only replace roughly 25 per cent of the wages. Compared with the typical replacement rate of 40 to 75 per cent in other countries, China's unemployment benefits are too low. It is clear that policy does not take into account that a worker may have a family to raise.
3. *Insufficient monitoring:* Workers, enterprises and the government each contribute to the unemployment insurance funds. The premium rate for workers is 1 per cent of their wage, and the rate for enterprises is 2 per cent. In order to lower the cost, an enterprise might reduce a worker's wage and make up the amount by means of subsidies. As a result, when workers become unemployed, the compensation they receive might not be enough to make a basic living (You, 2008).

Because of the above reasons, the current social security system might not be able to offer sufficient protection for laid-off workers from the conventional energy sector. In the mid-1990s, responding to rising protests from the laid-off state workers in large-scale SOEs, the All-China Federation of Trade Unions (ACFTU), the official trade union in China, and some local governments, initiated Active Labour Market Policies (ALMPs) by providing retraining programmes and job search agency services for laid-off workers (Johnson, 2002). Together with the Passive Labour Market Policies (PLMPs) such as unemployment insurance, these measures have played a significant role in constraining the wave of labour unrest and are helping thousands of workers to adapt to the new economic structure. Since the new millennium, however, the government's labour policy concern has turned to migrant workers, and the rights and interests of this group of laid-off workers who were previously working in the traditional power industry have been neglected.

Evaluating the working conditions of green jobs

Review of existing literature

Several studies have been done on describing the role and importance of renewable energy (Liu, Liu and Sun, 2011; Chang et al., 2003; Liu et al., 2011), but very few of them examine the social impacts or the working conditions of green jobs in the renewable sector. *Study on Green Employment in China* (MOHRSS, 2010a) (hereafter “the Report”) is the most comprehensive study on the working conditions of green jobs in China that is conducted by the central government ministry. In this section, we are going to evaluate the Report by comparing its findings with other examples from media reports, hiring ads and other sources.

Parameters for evaluating working conditions

In the Report, surveys were carried out among front-line workers from different types of power generation plants. Eight power plants were selected in total. Three of them represent large thermal power plants equipped with modern technology; two of them are small conventional thermal power plants; one of them is a wind energy plant; one of them has both new and old generators; one of them represents regional power plants (the technology used by the plant was not specified in the study). Six out of the eight power plants studied are SOEs and the remaining two are joint ventures.

The differences in working conditions between conventional and renewable power plants are evaluated based on the following parameters:

- Working hours
- Wages and benefits
- Social security
- Working environment

Working hours

It is almost a norm for workers in the power generation industry to be required to do overtime and work long shifts, but the situation seems even more severe within the renewable sector. It was reported that in the course of one year 93.5 per cent of workers from the wind power plant had worked overtime, compared with 89.3 per cent and 87.7 per cent of workers in the large-scale and small-scale thermal power plants, respectively. One of the reasons for overtime being so common in the wind power plant is that the industry is growing so fast that the training of qualified labour is lagging behind. This results in a strange phenomenon in which unemployment and an increase in job vacancies occur at the same time.

Even though the majority of workers were compensated with either overtime pay or supplementary leave, long working hours are a sign of poor working conditions. They reduce workers' performance, making them more susceptible to occupational hazards. It is suggested that working in jobs with overtime schedules is associated with a 61 per cent higher injury rate compared with jobs without overtime (Dembe, 2005). Moreover, long working hours may also lower the quality of a worker's family life.

Wages and benefits

Wages

According to the Report, the average annual income of the workers in the wind power plant was higher than those working in the small-scale or large-scale thermal power units by around 4,800 to 9,400 renminbi (US\$1 ≈ 6.5 renminbi). In terms of wages, the results from the Report suggest that working conditions are better in the renewable power plants than in the conventional power plants.

However, there are a number of problems associated with the methodology of the Report, which may reduce the representativeness of the results. First of all, the sample size of interviewees from the wind power plant (i.e. 9.1 per cent of the total sample) is much smaller than those of the small-scale (27.8 per cent of the total) and large-scale (63.1 per cent) thermal power plants. The relatively small sample size for the renewable energy sector and concentrating in one wind power plant may result in greater sampling error, so reducing the precision of the results.

In China, the power generation industry is largely dominated by SOEs. Guodian (Longyuan Electric Group), Datang and Huaneng are the top three developers of wind farms in China and they are all large SOEs. The wages in SOEs are generally higher than those in the private sectors. In 2010, the average annual salary in China's non-private sector was 37,147 renminbi, while the average annual salary in the private sector was only 20,759 renminbi (MOHRSS, 2010b). Since the only wind power plant studied in the Report was a joint-venture enterprise, this might not be representative for the industry as a whole.

The Report only shows the average annual "incomes", which may include both basic salary and overtime pay. Since overtime work happens so frequently in the wind power plants, there is a reason to believe that the

Table 3. Average annual income of workers in power enterprises

	Last year's income			
	Lowest	Highest	Average	Standard deviation
Wind power	27000	100000	51687.50	14715.446
Large thermal power	7500	120000	46792.74	17750.316
Small thermal power	15000	95000	42219.34	20373.406

Source: MOHRSS (2010a).

portion of income generated by overtime pay could be substantial. Besides, the average incomes were not grouped or analysed according to the nature of the jobs or length of service, which makes it difficult to draw any firm conclusions regarding the possible factors contributing to the observable discrepancy in wages among different types of power enterprises.

Two hiring ads (HIMET, 2011; YJS, 2010) from two privately owned wind power companies from Hebei show that the basic monthly salaries for the front line workers range between 1,300 and 2,500 renminbi, depending on the nature of the work. In terms of annual basic salary, the range is between 15,600 and 30,000 renminbi. When compared with the numbers in figure 3, the lowest annual salary (i.e. 15,600 renminbi) offered by the privately owned wind farms is much lower than the 27,000 renminbi average annual income for wind farms suggested by the Report. Again, we cannot compare the numbers from the ads directly to those from the Report since we do not know the basic salaries of the workers surveyed.

One possible explanation for this discrepancy could be that the difference in average annual incomes between the two types of wind power enterprises (i.e. privately owned vs joint venture) is small when the overtime pay earned by the workers in the privately owned plants is taken into consideration. If this is true, it means the basic salaries for the front line workers in wind farms are generally quite low, and a large portion of their income actually comes from overtime pay and other subsidies. Another explanation would simply be that some wind power plants are failing to offer decent wages.

Benefits

In terms of subsidies for meals and transportation, people working in the conventional power plants are generally better off, as suggested by the Report. About 61–77 per cent of the workers from the thermal power plants received a meal subsidy, while only 32 per cent of the workers from the wind power plant enjoyed such benefits. Only 26 per cent of the workers from the wind power plant enjoyed the benefit of a transportation subsidy, whereas 73 per cent and 54 per cent of the workers from the large-scale and small-scale thermal power plants enjoyed this subsidy. Similarly, the percentage of workers who received the living allowance for needy employees was higher in the thermal power plants than in the wind power plant. Regarding health checks, some 82–84 per cent of the workers in the thermal power plants had access to this benefit as compared with 94 per cent in the wind power plant. Overall, the proportion of workers able to receive the benefits is higher in the conventional power plants than in the wind power plant.

Social security

The results of the Report show that the participation rates of the five mandatory social insurances (i.e. basic pension, basic medical, unemployment, child-birth and occupational injury) and enterprise annuity are generally higher

among workers from the power generation industry than the national average. Except for childbirth insurance, the differences in participation rates for pension, medical, unemployment and occupational injury insurances between conventional and renewable power plants are small, the same as for enterprise annuity. Workers in the small-scale thermal power plants had the lowest participation rate (i.e. 52 per cent) for childbirth insurance compared to the workers in large-scale (i.e. 74 per cent) or wind power plant (i.e. 77 per cent).

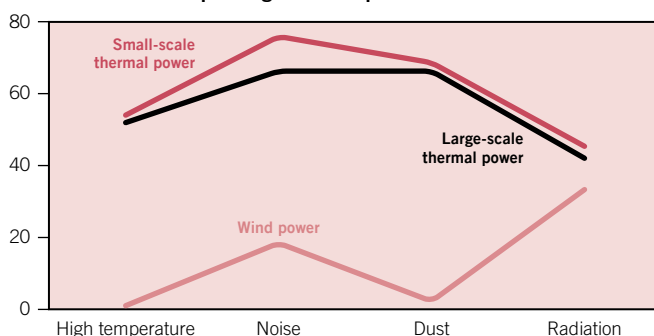
Working environment

The working environment is significantly better in the wind power plant than in the thermal power plants. As indicated in figure 2, workers in the coal-fired power plants were generally more prone to heat, noise, dust and radiation hazards. According to the Report, over 50 per cent of the workers from the thermal power plants had encountered heat pollution in their workplace and even more people (60–75 per cent) had encountered noise and dust pollution during work. In addition, over three-quarters of the workers from the wind power plant felt that the working environment was very good, whereas only 13–18 per cent of the workers from the conventional power plants felt the same.

None of the workers in the wind power plant had developed any occupational diseases. In contrast, 47–55 per cent of the workers in the coal-fired power plants had suffered from different occupational diseases. When they were asked to assess the risk of occupational diseases associated with the workplace, no workers from the wind farm thought that there was any significant risk, but about one-third of the workers from the conventional power plants felt that the risk of occupational diseases at their workplace was significant.

Compared to conventional coal-fired power plants, the working environments of wind farms are substantially better. Nonetheless, the power generation industry as a whole is a high-risk industry. There are many sources

Figure 2. Occupational hazards faced by workers in the power generation plants



Source: MOHRSS (2010a).

of risk associated with wind power systems, including blade ejection, tower collapse, overheating, the use of high voltage electricity, the use of rotating machinery, working at significant heights and handling heavy equipment. (Ragheb, 2011). China has seen a number of serious accidents in several wind farms since 2010, which raises concerns about safety within the industry. Here are just a few examples to illustrate the seriousness of the issue:

- At least five wind turbines had collapsed in five different wind power plants in less than two years since 2010 (Liang Post, 2011; WindpowerMonthly.com, 2011).
- In January 2011, three workers were killed by electric shock during the installation of a new turbine in Hebei Province (WindpowerMonthly.com, 2011).
- In October 2011, five people were crushed to death when the arm of the crane holding a to-be-installed wind turbine fell to the ground (Recharge News, 2011).

Labour relations

All of the energy enterprises examined in the Report had labour unions. More than 90 per cent of the surveyed workers were members of the unions, and more than 80 per cent of them said that the union or worker representatives were able to participate to the company's management. Except for the annual workers' representative meeting, the Report does not explain how and through which channels these representatives influence the decisions of the enterprises. Furthermore, even if there are channels for the representatives to get involved in the decision-making, it does not mean that the workers' voice can be truly reflected. This is because most of the union representatives are not produced through direct elections.

Chinese workers are not entitled to freedom of association. Under the Chinese Labour Law, all trade unions have to be affiliated with the ACFTU, and the formation of competing unions is prohibited. In SOEs, union representatives are generally appointed by party officials, while in the private sector it was up to the management to decide who would become the trade union officials, instead of these being elected by the members of the union. This is the major reason why the ACFTU is often been regarded as an organ of the Chinese Communist Party (CCP), which tends to side with the management rather than protect its members' rights. As quoted by Bai (2011, p. 22), the ACFTU Chairman Wang Zhaoguo had once said: "All trade union organizations must consciously accept the leadership of the Party, resolutely implement the Party's line and directives and also comply with all decisions and plans adopted by the Party Central Committee." The Chairman's speech somehow reveals the inherent top-down organizing approach of the ACFTU.

As a result of the growing frustration with the ACFTU's failure in safeguarding workers' rights and interests, the number of independent collective actions by workers has been increasing over the past decades (Chan, 2009; 2010; 2012a). The ACFTU, in response to the growing pressures, has accelerated its reform in recent years, and one of the measures is to allow a greater degree of direct elections among grassroots unions. In many cases, however, that does not prevent managers or their relatives from standing and being elected as union chair (Bai, 2011; Chan and Hui, forthcoming). Moreover, direct elections are often limited to grassroots unions, whereas in the provincial or industrial level's trade unions, the leaders are simply appointed by the party and overlapped with the party cadres (Taylor and Li, 2007) to ensure a certain degree of stability and control. Since union leadership is usually not elected by workers, it is hard to guarantee that workers' interests will be represented properly when conflicts arise between enterprises and workers (Chen, 2010). In addition, as pointed out by Zenglein (2008, p. 15), "the local governments are in competition for foreign investment domestically as well as with other rising regional economies such as Vietnam, and may prefer to keep trade unions tame". That gives another explanation as to why trade unions in China often side with the management or government instead of protecting the interests of the members. Even though more and more cases of workplace trade union direct election are being reported (Howell, 2008), wage bargaining is very rare (Clarke, Lee and Li, 2004). The possibility of change has been evidenced in a Honda factory where workers staged a 17-day strike in May 2010 (Hui, 2011; Chan and Hui, forthcoming). From 25 February to 1 March 2011, almost a year after the strike, wage negotiation took place between the trade union and the management with the facilitation of the Guang Dong Provincial Federation of Trade Unions. In the end, both parties agreed to a pay rise of more than 30 per cent (*Southern Metropolitan Daily*, 13 March 2011, in Chinese). The rise of independent trade unionism is unlikely without more significant political change in China (Howell, 2008). However, as Clarke, Lee and Li argue, the fatal weakness of Chinese workplace trade unions to represent workers in wage bargaining is management's manipulation of trade unions. They suggest that "[s]uch a change [disengagement of the trade union from management] is not likely to occur ... unless unions at a higher level recognize the need for the change and develop their capacity to support genuine collective bargaining at the enterprise level" (Clarke, Lee and Li, 2004, p. 252). In this regard, the possibility of releasing workplace trade unions from the management's control rests on the power of higher-level trade unions to back up its enterprise affiliates in collective negotiation.

Apart from the Honda factory, the party-State or high-level trade union backed up wage bargaining has been also recently reported in the catering industry in the city of Wuhan in Hubei province (*Workers Daily*, 24 May 2010). However, there is still no sign that the green industry, like the wind power industry, will promote and implement wage bargaining in the near future.

Conclusion

Workers as part of the solution to global climate change

In order to mitigate and adapt to global climate change, there is an urgent need for our society to reorganize production on the basis of environmental protection and sustainable development. Without the active support of the workers and their agencies, however, this goal will barely be accomplished. It is important to ensure that the green jobs created by each sector during the transition to a green economy will not only improve the environment but will also provide workers with more decent jobs.

To reduce greenhouse gases emissions, China has made big moves to promote renewable energy. However, the closing down of the small, inefficient thermal power units had caused thousands of job losses. Most of the laid-off workers have great difficulty in finding a new job. Since the greening of our economy is for the benefit of the whole of society, the negative impacts resulting from the transition should, therefore, be borne by society as a whole and not the workers alone. It is the government's responsibility to minimize the adverse transitional impacts on the laid-off workers by providing training, financial assistance and other social support services. Active and passive labour market policies (PLMPs) should be taken, in order to help the laid-off workers to find new jobs and maintain a decent life. One of the possibilities is to provide retraining programmes for those laid-off workers who were previously employed in the conventional energy industry.

Although when it comes to social security and OHS the working conditions in the renewable energy sector are significantly better than those in the conventional energy sector, it is still too soon to declare it a success. For one thing, renewable energy is a new field in China; furthermore, it requires not just technology but also ideological, political and economic changes in society. Workers should be regarded as part of the solution and, to achieve this, workers at all levels should be given an opportunity to participate in the planning and decision-making processes relating to the management of their workplace. In the long run, it is crucial to revise the top-down organizational structure of the ACFTU. In the current political context, both the Chinese State and the ACFTU should guarantee direct elections for worker/union representatives in the workplace and support the workplace trade unions to hold regular collective bargaining with the management. The green industry, with its mission to promote sustainable development and decent work, should take a lead in this initiative to promote trade union direct election and collective bargaining. Through this effort, it is hoped that the abuses of long working hours in the wind power industry can, as the MOHRSS research suggested, be improved.

The role of NGOs and collaboration between different stakeholders

One of the obstacles in promoting a just transition towards a green economy is the lack of national policies on green employment. As mentioned above, the current focus of the Chinese government is to promote the growth of the renewable energy industry by measures such as the Renewable Energy Law, rather than by promoting green jobs as decent jobs or by helping those who are negatively affected by the closing down of the inefficient power plants. To be sure, there is an important role for the ACFTU to guarantee that workers in the green industries enjoy decent working conditions. However, given the unique situation of the ACFTU under China's party-State system, attention should also be paid to other potential social actors. Community-based labour NGOs have been flourishing in China since the mid-1990s (Chan, 2012b). These organizations have played a significant role in organizing and educating workers to monitor the implementation of labour laws and labour standards in the workplace. They are also increasingly active in promoting policy advocacy in cooperation with other stakeholders such as progressive academics, lawyers, journalists and trade union cadres. However, the environmental issue, apart from industrial injuries and occupational health, is not the major concern for most labour NGOs. The development of environmental NGOs, which has also played a pivotal role in the transformation of Chinese society (Ho and Edmonds, 2008), is separated from the blooming labour activism. The concern for green jobs and sustainable development is a good starting point for promoting a more inclusive alliance in China, with environmental and labour NGOs as the key players.

Finally, we have found that the green economy and its impacts on workers and working conditions are largely an unexplored area, except from a number of survey-based official researches that we have reviewed for this paper. We therefore call for independent studies based on policy analysis and empirical case studies to further bring out the reality of green job creation in China.

References

- Bai, R. 2011. "The Role of the All-China Federation of Trade Unions: Implications for Chinese Workers Today", in *WorkingUSA*, 14:1:19–39, p. 22.
- Cai, W.J.; Wang, C.; Chen, J.N.; Wang, S.Q. 2011. "Green economy and green jobs: Myth or reality? The case of China's power generation sector", in *Energy*, 10 January 2011, pp. 1–10.
- Chan, C.K.C. 2009. "Strike and workplace relations in a Chinese global factory", in *Industrial Relations Journal* 40 (1), pp. 60–77.
- . 2010. *The Challenge of Labour in China: Strikes and the changing labour regime in global factories* (New York/London, Routledge).

- . 2012a. "Class or citizenship? Debating workplace conflict in China", in *Journal of Contemporary Asia*, Vol. 42(2), pp. 308–328.
- . 2012b. "Community-based organizations for migrant workers' rights: The emergence of labour NGOs in China", in *Community Development Journal*, in press.
- ; Hui, E.S.I. (forthcoming). "The dynamics and dilemmas of workplace trade union democratization in China: The case of the Honda workers' strike", in *Journal of Industrial Relations*.
- Chang, J.; Leung, Y.C.; Wu, C.Z.; Yuan, Z.H. 2003. "A Review on the Energy Production, Consumption, and Prospect of Renewable Energy in China", in *Renewable and Sustainable Energy Reviews*, Vol. 7, pp. 453–468.
- Chen, F. 2010. "Trade Unions and the Quadripartite Interactions in Strike Settlement in China", in *The China Quarterly*, Vol. 201, pp. 104–124.
- Cheung, K. 2011. *Integration of renewables – Status and challenges in China*, OECD/IEA, Paris.
- Clarke, S.; Lee, C.H.; Li, Q. 2004. "Collective consultation and industrial relations in China", in *British Journal of Industrial Relations*, Vol. 42(2), pp. 235–254.
- CWEA (China Wind Energy Association). 2011. "China's installed wind mills capacity statistics". Available at http://www.cwea.org.cn/download/display_info.asp?id=39 (in Chinese).
- Dembe, A.E. 2005. "The impacts of overtime and long working hours on occupational injuries and illnesses: New evidence from the United States", in *Occupational and Environmental Medicine*, Vol. 62, pp. 588–597.
- HIMET (Hebei Institute of Mechanical and Electronic Technology). 10 June 2011. Hiring Notice from the Huayuen Electricity Ltd. Co. <http://hbjd.university-hr.com/showarticle.php?actiontype=0&id=365> (accessed 23 Sep. 2011) [Chinese].
- Ho, P.; Edmonds, R.L. 2008. *China's embedded activism: Opportunities and constraints of a social movement*. Routledge, London.
- Howell, J.A. 2008. "All-China Federation of Trades Unions beyond reform? The slow march of direct elections", in *The China Quarterly*, Vol. 196, pp. 845–863.
- Hui, E.S.I. 2011. "Understanding labour activism: The Honda workers' strike", in C. Scherrer (ed.): *China's Labour Questions* (Munich, Rainer Hampp Verlag), pp. 133–151.
- IEA (International Energy Agency). 2010. *World Energy Outlook 2010*, OECD/IEA, Paris.
- Johnston, M.F. 2002. "Elites and agencies: Forging labor policy at China's central level", in *Modern China*, Vol. 28(2), p. 147.
- Li, J.; Shi, J.; Ma, L. 2007. *China: Prospect for Renewable Energy Development*. Available at http://www.hm-treasury.gov.uk/d/Final_Draft_China_Mitigation_Renewables_Sector_Research.pdf.
- Liang Post. 16 April 2011. "Behind the broken wings of wind turbines". Available at http://epaper.indaa.com.cn/lb/html/2011-04/16/content_265455.htm (accessed 1 Oct. 2011) [Chinese].
- Liu, L.-Q.; Liu, C.-X.; Sun, Z.-Y. 2011. *A Survey of China's Low Carbon Application Practice-Opportunity Goes with Challenge*. Renewable and Sustainable Energy Reviews, Vol. 15, pp. 2895–2903.

- Liu, W.; Lund, H.; Mathiesen, B.V.; Zhang, X.L. 2011. "Potential of renewable energy systems in China", *Applied Energy*, Vol. 88, No. 2, pp. 518–525.
- MOHRSS (Ministry of Human Resources and Social Security). 2010a. *Study on Green Employment in China*. International Labour Organization.
- . 2010b. *Statistics Release* 2010. Available at http://w1.mohrss.gov.cn/gb/zwx/2011-05/24/content_391125.htm (accessed 10 Sep. 2011) [Chinese].
- Nanfang Weekly*. 12 September 2010. "The broken wings of wind turbines". Available at <http://www.infzm.com/content/53348> (accessed 1 Oct. 2010) [Chinese].
- NBS (National Bureau of Statistics). 2010. *Statistical Communiqué on the 2009 National and Economic and Social Development*. National Bureau of Statistics.
- NDRC (National Development and Reform Commission). 26 January 2007. "Opinions on speeding up the shut-down of small thermal power units". Available at http://nyj.ndrc.gov.cn/ggtz/t20070131_115039.htm (accessed 13 Sep. 2011) [Chinese].
- Pan, J.H.; Ma, H.B.; Zhang, Y. 2011. *Green Economy and Green Jobs in China: Current Status and Potentials for 2020*. Worldwatch Institute, Washington, D.C.
- People's Net. 2011. "Green employment letting more people become green-collar", 23 March. Available at <http://env.people.com.cn/BIG5/14215480.html> (accessed 13 Sep. 2011) [Chinese].
- Ragheb, M. 2011. *Safety of Wind Systems*. Available at <https://netfiles.uiuc.edu/mragheb/www/NPRE%20475%20Wind%20Power%20Systems/index.htm> (accessed 1 Oct. 2011).
- Räthzel, N.; Uzzell, D. 2011. "Trade unions and climate change: The jobs versus environment dilemma", in *Global Environmental Change*, Vol. 21, No 4, pp. 1215–1223.
- Recharge News. 11 October 2011. "Five crushed to death at Sinovel wind turbine plant in China". Available at <http://www.rechargenews.com/energy/wind/article282866.ece> (accessed 11 Oct. 2011).
- Solomon, S. et al. 2007. *Climate change 2007: The physical science basis; Contribution of Working Group I to the fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.
- Taylor, B.; Li, Q. 2007. "Is the ACFTU a Union and Does it Matter?", in *Journal of Industrial Relations*, Vol. 49, pp. 701–715.
- UNEP (United Nations Environment Programme). 2008. *Green jobs: Towards decent work in a sustainable, low-carbon world*, p. 39.
- White, S.; Walsh, J. 2008. *Greener pathways: Jobs and workforce development in the clean energy economy*. The Center on Wisconsin Strategy, p. 6.
- WindpowerMonthly.com. 2011. Available at <http://www.windpowermonthly.com/channel/technology/news/1048294/Three-wind-turbine-workers-killed-Sinovel-incident/>
- WWI (World watch Institute). 2011. "Jobs in Renewable Energy Expanding". Available at <http://www.worldwatch.org/node/5821#notes> (accessed 14 Sep. 2011).
- YJS (Yingjiesheng.com). 18 March 2010. Hiring Notice from Heibi Dehe New Energy Development Ltd Co. Available at <http://www.yingjiesheng.com/job-000-762-563.html> (accessed 1 Oct.) [Chinese].

- You, J. 2008. “The basic situation of China’s unemployment Insurance System”, Unemployment Insurance Reform Seminar. EU-China Social Security Co-operation Project, pp. 27–29.
- Zenglein, M.J. 2008. *Marketization of the chinese labor market and the role of the unions*, Global Labour University Working Papers No. 4. Global Labour University, Berlin, p. 15.

Appendix I

China’s Renewable Energy Policy Documents

First level	
1983	Suggestions to Reinforce the Development of Rural Energy
1992	China Agenda 21
1992	Ten Strategies on China’s Environment and Development
1995	State Science and Technology Commission (SSTC) Blue Paper No. 4: China Energy Technology Policy
1995	Outline on New and Renewable Energy Development in China, State Planning Commission (SPC), SSTC, State Economic and Trade Commission (SETC)
1995	Electric Power Law
1996	Guidelines for the Ninth Five-Year Plan and 2010: Long-Term Objectives on Economic and Social Development of China
1996	State Energy Technology Policy
1997	Energy Saving Law
2003	Renewable Energy Promotion Law
Second level	
1994	Brightness Programme and Ride the Wind Programme, formulated by SPC
1995	New and Renewable Energy Development Projects in Priority (1996–2010) China, by SSTC, State Power Corporation and SETC
1996	Ninth Five-Year Plan and 2010 Plan of Energy Conservation and New Energy Development by the State Power Corporation
1996	Ninth Five-Year Plan of Industrialization of New and Renewable Energy by SETC
1998	Incentive Policies for Renewable Energy Technology Localization by State Development and Planning Commission (SDPC) and Ministry of Science and Technology (MOST)
2001	Tenth Five-Year Plan for New and Renewable Energy Commercialization Development by SETC
2003	Rural Energy Development Plan to 2020 for Western Areas
Third level	
1997	Circular of the Communication and Energy Department of SPC on Issuing the Provisional Regulations on the Management of New Energy Capital Construction Project
1999	Circular of MOST and SDPC on Further Supporting the Development of Renewable Energy
2001	Adjustment of Value Added Tax for Some Resource Comprehensive Utilization Products by Ministry of Finance (MOF) and State Tax Administration
2001	Electricity Facility Construction in Non-Electrification Townships in Western Provinces of China or Township Electrification Programme by SDPC and MOF

Working conditions in “green jobs”: Women in the renewable energy sector

Lisa Rustico

WiRES coordinator

Francesca Sperotti

WiRES researcher

WiRES (Women in Renewable Energy Sector) is a project about women and green jobs. It was implemented in 2009 and 2010 by Adapt, the Association for International and Comparative Studies in Labour Law and Industrial Relations, in cooperation with its partners: the University of Szeged (Hungary) and the Union for Private Economic Enterprise (Bulgaria). WiRES' main objective was to investigate the role of social dialogue in boosting female employment rates and improving working conditions of women workers in the renewable energy sector (RES) in Europe.

The idea of the project stemmed from the analysis of the impact of the new environmental regulatory framework – at a European and national level – on employment and the labour market. The Climate and Energy Package, adopted by the European Union (EU) Parliament and Council in October 2008 (European Parliament and Council of the European Union, 2009), set new binding standards aimed at tackling climate change. One of the ambitious objectives is to increase the use of renewables (wind, solar, biomass, etc.) to 20 per cent of the total energy production by 2020.¹ The production of energy from renewable sources is expected to have an exponential occupational potential; the European Commission estimated that new energy jobs will increase up to 2.5 million in 2020 in the EU alone, with 60–70 per cent of the workforce engaged in manufacturing, engineering and installation services, and the remainder in agriculture. A qualified workforce, involving specific skills for renewable energy, will account for about 30 per cent of total employment, with the rest of the workforce exploiting specific skills and competencies already acquired in other industrial sectors (D'Orazio, 2009). The new environmental legislation is also expected to significantly affect production methods and processes. On the labour demand side, the so-called “job churn” effect is likely to be experienced, across sectors and within the same industry. New jobs will be created: some occupations may be replaced and others will disappear without any replacement; yet more will undergo changes in job content, required skills and work methods. This requires a well-managed restructuring, so that the competitiveness of enterprises is maintained and employment is preserved, and the transition of workers to other jobs of equivalent or even better quality is facilitated.

Given this context, the research question that inspired the WiRES project was whether social dialogue and industrial relations can support the restructuring processes related to the implementation of EU climate change policies, turning them into a driver for the creation of new and better employment opportunities not only for men but for women as well. Female employment, in fact, remains a challenging issue in many European countries. Historically, women have been more affected by underemployment than men and have also tended to be concentrated in more precarious types of jobs (Eurostat, 2010).

1. In 2009, the share of renewable energy sources in final consumption was around 11.7 per cent (Eurostat, June 2012).

In addition to this, a lot remains to be done in terms of the *quality* of women's participation. This includes issues surrounding the gender pay gap, horizontal and vertical segregation, and the organization of working time and work–life balance. According to Eurostat, in 2009, women's gross hourly earnings were on average 17 per cent lower than men's in the EU27. The gender pay gap extends well beyond the question of equal pay for equal work (EC, 2010a), as it encompasses several other aspects: the way women's competences are valued compared with men's within a firm; horizontal and vertical segregation; other inequalities mainly affecting women – in particular their disproportionate burden of family responsibilities and the difficulties in reconciling work with private life. When it comes to concerns of horizontal and vertical segregation,² there was not much positive improvement in sectors and occupations between 2003 and 2008. It is only recently that women have made advances into some jobs that were previously male-dominated (such as construction, electricity, gas and water supply, transport and communications, manufacturing and agriculture). Evidence of governmental policy efforts to feminize traditional industrial sectors in European countries is widespread but difficult to report here consistently. Among other initiatives, relevant policies have focused on developing childcare facilities and on reconciliation between work and family life. Research shows encouraging trends in the use of part-time work, job sharing, flexible hours and accounts for a narrowing of the gender gap.³

Institutional support has consistently improved female participation in the labour market. As an example, the Communication from the European Commission “Strategy for equality between women and men 2010–2015” (EC, 2010a) spelled out actions under five priority areas: equal economic independence; equal pay for equal work and work of equal value; equality in decision-making; dignity, integrity and an end to gender-based violence; and gender equality in external actions. The Strategy follows the dual approach of gender mainstreaming (meaning the integration of the gender dimension in all policy areas) and specific measures. The European Parliament fuelled governmental efforts to feminize national labour markets, even in times of crisis: the Resolution of 17 June 2010 on gender aspects of the economic downturn and financial crisis stressed the importance of including gender-related measures in recovery plans for all industries, and of giving women a voice in the decision-making process, by supporting their qualification in fields where they are still relatively little represented, such as IT, engineering and physics. In addition to institutional support, a good practice for the cause of the feminization of employment in industrial industries that is emanating from social

2. For definitions, see European Economic and Social Committee: *Women and Labour Market*, April 2008, p. 12.

3. See the project LIBRA, Let's Improve Bargaining, Relations and Agreements on work and life times balance, <http://www.adapt.it/libra>.

dialogue is to be found in the electricity sector. In 2007, Eurelectric, EPSU and EMCEF agreed the *Equal opportunities and diversity toolkit*, whereby they offer a set of guidelines and best practices for electricity companies to promote equality and diversity in the workplace (see below).

Regarding vertical segregation, the most striking feature is the low percentage of women in managerial and decision-making posts. In most Member States, women continue to be under-represented in decision-making processes and positions, in particular at the highest levels, despite the fact that they make up nearly half the workforce and more than half of new university graduates in the EU. Finally, the organization of working time and work-life balance continues to be hindered by modest changes in family roles (for instance, housework and care for children and elders are still predominantly the responsibility of women).⁴

The green economy has scarcely been analysed from a gender perspective. One reason is that the sectors in which green jobs are mainly concentrated are characterized by female workforce under-representation (UNEP/ILO/IOE/ITUC, 2008). A second reason is that studies have mainly focused on economic investments and strategies that governments have chosen to promote more environmental friendly jobs without taking into consideration the situation of women. On the contrary, the European Parliament called on the EU and its Member States to give higher priority to green jobs for women (European Parliament, 2010a). This is a great challenge considering that the geography of the renewables sector's development varies across the EU and that female workers are strongly under-represented there. They are mostly concentrated in staff profiles such as administration and public relations. Now there is a risk that this segregation will be replicated in new green businesses and in the RES, leading to an unbalanced gender representation in certain occupations, especially in the highly technical ones. For instance, the typical value chain of a company in RES includes core businesses employing mainly engineers, technicians and specialized workers. But these are professional profiles where women have traditionally been – and continue to be – under-represented, also as a consequence of a lack of skills and qualifications in hard sciences.

The limited participation of women in the labour market and the challenge of equal opportunities promotion (such as fair treatment, recruitment, equal access to employment, gender pay gap, career paths and family-friendly policies) are likely to represent a relevant bargaining ground in eco-industries like renewables. Hence, it could be argued that restructuring processes related to the enactment of climate change policies could turn into a driver for the promotion of new and better employment opportunities for women too, especially in new Member States and other specific geographical areas,

4. European Commission: *Men and gender equality: Tackling gender-segregated family roles*, March 2010.

where women are over-represented in low-paid jobs. Thus, as WiRES research points out, a possible role for social partners and stakeholders would be supporting the transition to low-emitting economies by guaranteeing that female workers, typically employed in services, do not lose their jobs. Similarly, women who have spent a long time out of the labour market could be involved in information and awareness-raising activities, as well as being targeted for educational and training opportunities for requalification, promoted jointly by local institutions and social partners. Therefore, though RES can be part of the solution to environmental problems, it is also true that there are still challenges on the front of female employment, from access to the labour market and their working conditions to the safeguarding and promotion of equal opportunities, also taking into account the traditional prevalence of the male workforce in the energy industry. Social dialogue at the European, national and company level can help in preventing or limiting possible negative social consequences of change. In the broader framework of the restructuring processes linked to climate change policies, collective bargaining can play a crucial role in preparing workers (both women and men) and companies to cope with current and future labour market, environmental and gender-related challenges.

WiRES' findings and outcomes

First, the WiRES project contributed to increasing awareness on gender issues in green jobs among social partners,⁵ institutions and scholars, in many countries and among international and EU institutions. As an example, the European Parliament emphasized WiRES' core issues in its Resolutions on the negative impact of the crisis on women workers (European Parliament, 2010a) and on the need to give higher priority to green jobs for women, suggesting that the European Social Fund finances will be used for training projects in areas such as renewable energy (idem, 2010b).

Secondly, WiRES offered a contribution to enhancing studies on the impact of climate change policies on the labour market. Most of the existing

5. During the WiRES project, a consultation among social partners operating in the energy sector, at a national and European level, was launched about the role of social dialogue in initiating and influencing gender-oriented policies and practices in the field of renewable energy. Unfortunately, apart from the British employers' and trade unions' representatives and Eurelectric officials, very little feedback was received. The WiRES research team regrets to record limited support from the European Trade Union Confederation (ETUC) for the whole project. Nevertheless, having considered the decentralization trends in collective bargaining at a European and national level in the EU Member States (EC, 2011), further research might include interviews with social partners' representatives at enterprise level (instead of or in addition to national policy officers), although this would require greater efforts and time to ensure representativeness of the analysis.

literature builds on the assumption that an increase in green jobs flows from the positive relationship between environmental policies and the expansion of the renewable energy sector. Nonetheless, empirical research is not univocal about this; the lack of a shared definition of green jobs (UNEP/ILO/IOE/ITUC, 2008) and the coexistence of different approaches to data analysis hamper a reliable quantitative and qualitative assessment of the occupational effects of the green economy. Most studies do, however, conclude in favour of a neutral or slightly positive assessment, suggesting that negative effects are less likely to occur.

As far as the comparison between the traditional energy sector and the renewable energy sector is concerned, a study issued by UNEP in 2008 shows that, compared to fossil-fuel power plants, renewable energy generates more jobs per unit of installed capacity, per unit of power generated and per dollar invested. Despite such a job creation potential, women may face challenges in accessing green jobs in RES, which tend to concentrate in traditionally male-dominated occupations, and also because women often lack the necessary skills, qualifications and experience. Moreover, unlike the United States' labour market, where green jobs may also be viewed as "green-collar jobs",⁶ European trends suggest that green sectors do not curb job polarization (i.e. low-paid unskilled jobs and highly skilled occupations). The limited research on the subject⁷ also reports that the energy sector has a highly masculine image, based on a stereotype about women not being technologists and not capable (even when provided with appropriate support) of building, operating and maintaining sophisticated technologies. This idea seems to be reflected in the workforce gender composition in the energy sector: the share of female technical staff is at most 6 per cent; it is about 4 per cent in decision-making positions, and in the top management positions the share is less than 1 per cent. In contrast, other studies have argued that women typically demonstrate more inclination towards green issues than men, therefore presenting a more fertile terrain for female employment (OECD, 2008).

Thirdly, WiRES argued that social dialogue could play a role in easing and possibly shaping the transition towards a greener economy in renewables; even though there is still a lack of specific social dialogue processes and structures in RES, trade unionists and employers' representatives could support

6. According to Pinderhuges, "green-collar jobs" represent an important new category of workforce opportunities because they are relatively high-quality jobs, with relatively low barriers to entry, in sectors that are poised for dramatic growth. The combination of these three features means that cultivating green-collar jobs for people with barriers to employment can be an effective strategy to provide low-income men and women with access to good jobs, i.e. jobs that provide workers with meaningful, community-serving work, living wages, benefits, and advancement opportunities (Pinderhuges, 2007, p. 1).

7. Major obstacles to research advancement are a lack of gender-disaggregated data and of EU-wide indicators on women and the environment.

women's access to RES in different ways. Although it is part and parcel of the overall energy sector, the renewable energy sector needs to be addressed with proper instruments, owing to its expanding production capacity. This also means that trade unionists and employers' representatives should be trained to cope with the problems related to the emergence of new jobs and to offer a range of viable solutions.

Firstly, a way to lower access barriers would be to promote education, training and skills development opportunities for women, who would otherwise face a lack of the qualifications, skills and expertise necessary to benefit from green jobs opportunities. OECD data show that women are still under-represented among graduates in science, technology, engineering and mathematics, while vocational training programmes continue to be considered as male-oriented options. Qualitative interviews, conducted within the scope of WiRES, suggested that occupational requirements in renewable energy jobs (e.g. international mobility and experience in the electricity sector) tend to exclude women. Skill needs analysis and forecasting, as well as higher and updated qualifications⁸ are required to increase and adapt the current and future vocational skills of the workforce, thereby contributing to close the current skills gap.

Secondly, social dialogue can tackle organizational hurdles, in terms of working hours, childcare services and the culture of organization (EMCEF, Eurelectric and FSESP, 2007), that today cause women's scant interest in this sector. In particular, if long working hours or shift turns are requested (e.g. for PV cells manufacturing), some measures and innovative working arrangements are needed so as not to disadvantage working parents. Women with childcare responsibilities usually face significant difficulties in combining work and family life and this is often a barrier to their career progression. As a consequence of the unequal care burden and the inability to prioritize income commitment within the family, women will search for shorter and more flexible working hours. The frequent result is their reluctance to accept occupations with high or irregular working hours and workload, with a consequent re-segregation into occupational niches that tend to be more hour-friendly. In some cases, the need for shorter working hours leads to part-time work, which, however, is likely to further restrict the choice of occupation. Moreover, formal childcare services are often unavailable, unaffordable or of dubious quality. Thirdly, social partners can work towards reducing the gender pay gap; mandatory pay audits could be introduced through collective bargaining, in order to inject transparency in relation to pay systems, thus enabling employees and unions to engage in deliberative learning processes with employers over narrowing the pay gap.

8. This would allow skills development to tie in directly with policies and investments, as reflected by the experiences reported by Ecorys (2008) concerning the identification of skills analysis methodologies.

Fourthly, the WiRES study also pinpointed the challenges ahead for social dialogue.⁹ A decade of discussion and debate on the transition to a low-carbon economy and its impact on the labour market has increased awareness about the importance of accompanying these processes through social dialogue and social partnership.¹⁰ Building on previous knowledge, WiRES argues that social partners are expected to play three complementary roles in easing and somehow shaping the ecological conversion of the economy:

1. Social partners can be key players in influencing climate change and environment-related policy-making, and in supporting more sustainable production processes.¹¹
2. In order to make the shift to a low-carbon and sustainable society as fair as possible, social partners are called to promote the conditions for decent jobs, primarily in terms of health and safety, fair wages, greener workplaces, gender equality and work–life balance.
3. While guaranteeing equal opportunities and overall labour rights in green jobs, social partners are expected to take action in governing the green labour market, at the local level. They have the opportunity to create the conditions to support human capital development and to facilitate labour demand and supply matching, acting as a source of information about the potential – but also the risks – of green jobs. In this connection, social

9. The present paragraph is the result of the joint work of Lisa Rustico and Paolo Tomassetti, within the scope of the WiRES project.

10. One of the latest Commission staff working documents on the functioning and potential of European sectoral social dialogue (EC, 2010a) reaffirms social dialogue as “one of the pillars of the European social model, and as a tool of social cohesion and resilience”.

11. Remarkably, the electricity sector has played a major role in supporting the shift to the production of clean energy, in the field of renewable energies. For instance, Eurelectric, the European social partner for the electricity industry, published the *Eurelectric Environmental Guidelines* in 2003 and, in 2004, launched the Roadmap for Sustainable Development, an initiative aimed at providing its members and staff with an approach to the core sustainable development values that should guide the organization’s strategic choices, the commitment to resources, activities and publications. Most recently, Eurelectric issued its *4th Environment and Sustainable Development Report* (Eurelectric, 2010), which shows trends in environmental performance and the significant emission reductions made by the electricity industry during the last two decades. The report contains a special feature on Power Choices, a project that sets out Eurelectric’s vision on how to establish pathways to carbon-neutral electricity generation in Europe by 2050 (idem, 2009). As for the gas sector, Eurogas has so far issued as many as 12 papers on the role natural gas plays in a sustainable energy market, such as Eurogas Views (S/EUR)/87/806) on the Commission strategy paper for reducing methane emissions (COM(96)557), the Eurogas Comments (S/EUR/97/924) on the Commission communication on the energy dimension of climate change (COM(97)196), *Climate change – The road to Kyoto* (COM(97)481) issued in 2007 and the 2008 Position Paper on the role of natural gas in a sustainable energy market. On the union side, for instance, in its 2006 energy policy the European Mine, Chemical and Energy Workers’ Federation (EMCEF) underlines the need to promote renewable energies as they are essential to guarantee supply security in Europe.

partners can take initiatives for workforce training and development programmes, as well as for dealing with future occupational, training and professional needs.

Despite the positive future prospects and the possible room for manoeuvre brought about through social dialogue, WiRES recorded that sustainable energies remain at an early stage of development, especially in comparison to the energy sector as a whole. The renewable energy sector, in fact, is still playing a secondary role within the overall energy sector, which continues to be characterized by higher investments in non-renewable energies. This entails the following effects at a national level:

1. In European countries, there are no agreements in place to cover this sector as such.
2. It is rare to find specific social dialogue experiences in the field of alternative energies.
3. Proper gender-oriented initiatives have not yet been implemented, thus undermining the creation of a gender-friendly sector as described above.

These are the reasons why the role of social dialogue is considered to be vital in preventing gender discrimination from spilling over into the renewable energy sub-sector.

The energy sector is currently covered by four European Sectoral Social Dialogue Committees, namely chemical industry, electricity, extractive industry and gas.¹² The European Sectoral Social Partners have made steps forward to promote a “fair” energy market, although proper social dialogue initiatives for the renewable energy sector have not yet been put in place. In fact, social partners are mostly inclined to discuss cross-sectoral issues like demographic changes, restructuring, corporate social responsibility, health and safety, gender equality and work–life balance. This should be considered an efficient way to make their national affiliates familiar with the European policies and, at the same time, to facilitate the implementation process of those cross-industry social policies developed by cross-sectoral European social partners, such as the agreements and framework of actions on Lifelong Development of Competencies and Qualifications (2002), Work Related Stress (2004), Gender Equality (2005) and Harassment and Violence at Work (2007).

Looking at the EU Member States, the renewable energies landscape at a national level refers to four industrial fields included in the overall energy sector, namely the chemical industry, gas, electricity and water, the exception

12. The WiRES research did not take into account social dialogue within the extractive industry, which has not been considered representative of the renewable energy context.

being the extractive industry. Renewable energies are therefore covered by at least two different collective agreements, i.e. the Collective agreement for the chemical industry, as chemical products are used in many green technologies, and the Collective agreement for utilities or, where applicable, services (gas, electricity and water). Moreover, several companies operating in the field of renewable energies fall within the Metalworkers' collective agreement, as a result of their particular activities. As a consequence of its wide scope, the renewable energy sector is subject to different regulations. Indeed, it could be defined as a cross-industry sector. Consequently, the lack of a delimited sector regarding alternative energies leads to the absence of dedicated social dialogue initiatives. This can be seen as a paradox, since the renewable energy sector does exist but it is not managed with the proper tools.

According to the European Commission (EC, 2011), social partners at a national level mainly engage in unilateral lobbying actions towards public authorities. Employers are concerned with the opportunity costs of different energy policies; they also require investments to export green technologies and incentives to adopt sustainable energetic policies at firm level. Unions, for their part, have expressed their concerns about the following topics: new skills for new jobs, investments for the creation of new jobs and infrastructures, membership in new sectors. Joint actions are rare, the only exceptions being recorded in Austria, where social partners expressed their views on the Action Plan on Environment and Economy, and in Germany, where social partners played an active and synergetic role in the debate that has led to the abandonment of nuclear power. The Commission also reports the paucity of social dialogue tripartite structures that have addressed the issue of employment impact of the green economy. Among the latter, one finds the Dutch Social and Economic Council, the Belgian Central Business Council and National Labour Council and the Spanish Table on Climate Change.

A third observation relates to the scarcity of experiences on firm-level bargaining regarding green jobs and, more generally, climate change. Spain is an exception, as energy efficiency has been included in the guidelines for secondary bargaining. Belgium stands out as well for the 2009 agreement on "ecocheques". Nevertheless, the number of supplementary company level agreements in the field of environmental and energetic policies is increasing.¹³ Fourthly, European social partners at the cross-sector level have included climate change in the joint action plan for 2009–2010 and they have also promoted a joint study on the occupational dimension of policies for climate change. Meanwhile, at a sectoral level, the green economy is debated in eight

13. The European Commission reports two best practices: the Italian national collective labour agreement of chemicals, which broadens the competences of worker's representatives in charge of health and safety to environment; the British Trade Union Congress, which, in 2010, introduced the so called "green reps", company level unionists in charge of monitoring the implementation of energetic policies and support programs to shift to a greener economy.

of the 40 Committees for European Sectoral Social Dialogue (agriculture, chemicals, electricity, mining industry, iron, wood).

The 2009 report issued by the Dublin Foundation (Eurofound, 2009) shows a number of results. Firstly, there are a lot of examples of tripartite structures dealing with green issues, ranging from the Environmental Councils and ad hoc Committees established in Denmark and Finland, to the Romanian National Standing Committee on Sustainable Development and the Slovenian Council for Sustainable Development. Elsewhere, in Spain, social dialogue on green issues is carried out within the framework of the country's standard tripartite social dialogue structures and is linked to the debate on the modernisation of the economy. The report also shows recent development in France where a range of ad hoc working groups have been created and the Economic and Social Council (*Conseil économique et social*) has now become the Economic, Social and Environmental Council (*Conseil économique, social et environnemental*). Secondly, there are a number of examples of bilateral dialogue on green issues between management and labour. In Denmark, for instance, a bilateral initiative called the Energy Camp brings together social partners and businesses associations to develop practical initiatives and identify common goals on environmental and climate change issues. In Norway, the trade union confederation (LO) and the Confederation of Norwegian Enterprise (*Næringsliets Hovedorganisasjon*, NHO) published a joint statement encouraging their members to join green campaigns and highlighting the importance of challenges related to climate change. Thirdly, both employers and trade unions have been active in raising awareness of the major green issues among their members, also by means of information and training programmes for their members on green issues (see Annex 1). On the employers' side, activities focus on issues related to compliance with environmental legislation, reducing emissions, enhancing competitiveness in the green economy, and making the most of the business opportunities presented by the new green economy. Among other things, the following examples have been reported: the Malta Chamber of Small and Medium-sized Enterprises (GRTU) has organized a number of public meetings to explain the obligations and opportunities arising from the EU Directive on waste management and the Directive on waste collection of packaging to its members; in the United Kingdom, the Confederation of British Industry (CBI) holds regular events on issues related to climate change for its members; an innovative competition organized by the Association of Building Entrepreneurs of the Czech Republic (*Svazvypodnikatelů a stavebnictví ČR*, SPS ČR) aims to inform the Czech public about construction projects that are environmentally friendly, but also modern and affordable. For their part, trade unions encourage social dialogue, negotiation, seminars and overall dissemination of good practices within companies or public organisations on the subject of environment, as well as promoting the use of renewable energy. In this framework, this paper highlights, among other things, the following good practices: the German

trade union federation (DGB) is providing experts to give information and assistance to local authorities wishing to carry out the energy-efficient refurbishment of buildings; the Trades Union Congress (TUC) in the United Kingdom has issued a guide for trade union representatives and members who are interested in becoming involved in green issues at the workplace. Nonetheless, the Eurofound report confirms that no formal social dialogue is yet in place that deals specifically and only with the renewable energy sector.

The role of social partners seems, therefore, to be restricted within the wider area of environmental and sustainable development. They are key stakeholders in implementing the “green agenda”, although they have failed to create formal structures of social dialogue for the renewable energy sector. This means that the second role that they are expected to play – i.e. addressing the existing mismatch between skills supply and demand in the green economy, anticipating future skills needs, as well as ensuring fair working conditions for green jobs – has been overshadowed.

As far as gender issues are concerned, a good practice originates from the European social partners representing the electricity industry. Eurelectric, EPSU and EMCEF published, in March 2007, the *Equal opportunities and diversity toolkit. Best practices guide*, which aims to promote understanding and awareness of the management of equality and diversity in the workplace. The toolkit suggests relevant policies, practices and procedures with regard to recruitment and selection, dignity at work, sexual harassment, harassment and bullying, equal pay for work of equal value, and other issues. Furthermore, the toolkit offers examples of how to promote workplace equality and a culture of diversity by providing training for staff and managers, and supporting the move of women into senior and leadership positions and into occupations in which they are under-represented, as well as mentoring, buddy and other support systems.

Besides this sector’s good practices, understanding that public policy, strategic management and investments are probably not enough to support the shift to greening workplaces and productions, participatory industrial relations are needed to involve all workers in better use of energetic resources and waste reduction. Along with the information and vocational training initiatives promoted by European employers’ and workers’ representative associations (see Annex 1), environmental targets have become a bargaining chip in collective agreements. In this connection, another gender-neutral practice to boost all workers’ participation and performance, also in traditional industries, is the “green salary”, namely incentive pay measures linked to green targets such as energy efficiency and energy conservation (see Annex 2).

Despite good practices, a lot remains to be done, especially with regard to gender equality challenges outside companies’ boundaries, mainly in access to the labour market, job placement and the replacement of older women workers. Generalized gender policies in the specific renewable energy context do indeed remain limited and are, at best, tackled at the company level. So

far, energy companies¹⁴ have mostly been (at least from a quantitative point of view) smaller independent ones (Sustainlabour, 2010; Ires, Filctem Cgil, 2010), which probably have no agreements with the trade unions, especially the new generation businesses and in countries where company or territorial social dialogue is not fully developed. In these contexts, experiences of social dialogue are likely to be limited to the core issues of employment law, while gender equality is not addressed in any systematic way.

Conclusions and policy recommendations

According to the WiRES project, social dialogue in the renewable energy sector is still weak. The renewable energy sector is definitely part and parcel of the overall energy sector. However, it requires proper social dialogue support to fully develop its dynamism and employment potential. A number of conclusions flow from the fact that the traditional energy and the renewable energy sectors are represented by the same social partners, both at the national and international levels. This, perhaps, could also explain some considerations pointed out by Eurofound (Eurofound, 2009):

1. In some countries, employers still fear that transition to a greener economy will increase costs and therefore reduce competitiveness.
2. While in some countries trade unions see the emergence of new green industries as a recruitment opportunity, in other countries they fear the decline of more traditional industries with strong trade union membership and recognize that it may be harder to recruit members in new green industries.

Therefore, there seems to be a sort of competition between the two sectors, which the national and European environmental policies contribute to amplify. This is likely an important reason behind the scant development of social dialogue in the renewable energy sector.

The roadmap for change in this area should move from this basic consideration: although the energy sector continues to be characterized by higher investments in non-renewable energies, the production capacity of alternative energies is increasing. This is expected to produce two effects:

14. Energy companies that operate in the EU market can be divided into two groups. The first group includes traditional big energy companies (e.g. Shell, Eni, Total, Statoil, etc.), which are developing their capacity to take advantage of the opportunities offered by the renewables sector. These companies continue to invest in non-renewable energies, in order to face the need to modernize the transmission and distribution grids as well as investing in the construction of new low-carbon generation power stations. The second group includes new generation businesses specifically set up in the field of renewable energies. All these companies interact with a universe of smaller enterprises, encouraging development in the green economy.

1. The increasing relevance of the renewable energy sector within the overall energy sector. Social partners in the renewable energy sector will have more opportunities to make their voice heard within the energy landscape in the years ahead.
2. Self-determination of social partners within the field of renewable energies. Collective bargaining, as well as new distinct national social dialogue structures, strictly relevant to the emerging employment issues related to the green economy, will start to be arranged in the coming years. This will allow new social partner organizations or sub-sections of existing organisations to fully accomplish their role, widely described in this article, within companies and, notably, in the labour market.

In order to make the sector more accessible and more attractive to women, social partners are called upon to support, first of all, vocational education and training (VET) in parallel with the anticipation and forecasting of future skills needs for WiRES. Secondly, they are called to play a key role in promoting gender mainstreaming for policies to make the renewable energy sector more women friendly by guaranteeing a better reconciliation between work and private life. Thirdly, awareness and information about the opportunities offered by a green career might help fighting stereotypes.

Taking into consideration the results of the research, the WiRES team proposed a set of policy recommendations for social partners to make the renewable energy sector more gender-friendly and improve the general working conditions not only for women but also for men employed in RES.

Devising ad hoc social dialogue processes and structures for RES

Ad hoc social dialogue processes and structures covering the renewable energy sector as such might be a first step to making the transition towards a green economy an opportunity for women workers as well, for two main reasons. Firstly, they would help to overcome the conflicts of interest faced by employers and trade unions in the traditional energy sector when coping with issues related to the greening of the industry (Eurofound, 2009). Secondly, they are needed considering that new markets (renewables) require different and proper employment policies compared to those already set up for existing labour markets (traditional energy). New actors could promote direct actions and tools, such as sectoral specific committees, ad hoc lobbying towards relevant institutions, joint projects, bilateral bodies, to negotiate on gender issues and female employment, without having to compromise with the claims of the traditional energy sector representatives, while also being able to focus on the specific new sectoral needs. This would not limit the focus on women in the traditional energy sector, as the parallel creation of new actors

and processes would limit the competitiveness among social partners. In any case, gender mainstreaming should inform all policies in all sectors, without forgetting that gender issues (e.g. work–life balance) concerns men as well as women. At the same time, we should bear in mind that participative and bilateral bodies (more than collective bargaining) are likely and prone to address gender issues, due to their dynamic nature and function, contrasting with the conflicting nature of collective bargaining negotiators.

Promoting education, training and skills development

Social partners could play an important role in decreasing the mismatch between labour supply and demand in the renewable energy sector and, in general, in the green economy. The requirements for some of the most widespread occupations in renewable energy tend to exclude women, as they often lack the skills and expertise needed for these jobs. Endeavours to close the current skills gap and anticipate future needs are essential for a transition to a low-carbon economy. Given this scenario, social partners could support educational institutions in VET curriculum design, as well as in organizing multidisciplinary learning environments within companies in RES. This underpins a lifelong learning perspective, which is essential in shifting towards a green economy. Good practices are reported in Annex 1.

Addressing specific gender-related issues such as work–life balance, the gender pay gap, occupational segregation and the glass ceiling

Among the existing barriers for female participation in the labour market, a relevant role is played by flexible working hours, childcare needs and the culture of an organization. Therefore, social partners are requested to promote gender mainstreaming for policies in RES. These policies could be integrated by the promotion of a more environmental friendly behaviour within companies.

Removing stereotypes

The results show that the renewable energy sector has a highly masculine image, which deters women. Moreover, it is reported that there is a stereotypical view that women are not technologists and that they are not capable (even when provided with appropriate support) of building, operating and maintaining sophisticated technologies. Social partners should play an active role in erasing these stereotypical views by means of information, training, mentoring and coaching, including psychological support services.

References

- Adapt. 2010. *WiRES – Women in Renewable Energy Sector*. Final report, available at <http://www.bollettinoadapt.it/acm-on-line/Home/Progetti/WiRES/articolo1507.html>, [accessed 12 Apr. 2012].
- Confindustria; Cgil; Cisl; Uil. 2011. *Avviso comune. Efficienza energetica, opportunità di crescita per il paese*, available at <http://www.efficienzaenergetica.enea.it/doc/Avviso%20Comune%20Confindustria%20e%20OOSS.pdf>.
- D’Orazio, A. 2009. *Prospettive e sviluppo delle tecnologie rinnovabili per la produzione di energia elettrica. Opportunità per il sistema industriale nazionale*, GSE, IEFE Bocconi.
- EC (European Commission). 2008. *Citizens’ summary EU climate and energy package*, available at http://ec.europa.eu/clima/summary/docs/climate_package_en.pdf.
- . 2010a. “Strategy for equality between women and men 2010–2015”, COM (2010) 491 final.
- . 2010b. *Commission staff working documents on the functioning and potential of European sectoral social dialogue*, SEC (2010) 964 final.
- . 2011. *Industrial relations in Europe 2010*, Luxembourg, Publications Office of the European Union, 22 March.
- Ecorys. 2008. *Environment and labour force skills. Overview of the links between the skills profile of the labour force and environmental factors*. Final report, Rotterdam, December. Available at http://ec.europa.eu/environment/enveco/industry_employment/pdf/labor_force.pdf.
- EESC (European Economic and Social Committee). 2011. Opinion of the EESC on “Green jobs” (2011/C/48/04).
- EMCEF; Eurelectric; EPSU. 2007. *Equal opportunities and diversity toolkit. Best practices guide*. Dublin, March. Available at <http://www.eurelectric.org/media/43093/20070320eqdivtoolkitfinalversion-2007-030-0476-2-.pdf>.
- Eurelectric. 2009. *Power choices: Pathways to carbon-neutral electricity in Europe by 2050*, Brussels.
- . 2010. *Environment and sustainable development report*, Brussels.
- Eurofound. 2009. *Greening the European economy: Responses and initiatives by Member States and social partners*. Dublin. Available at <http://www.eurofound.europa.eu/docs/eiro/tn0908019s/tn0908019s.pdf>.
- Eurogas. 2008. *Position paper on the role of natural gas in a sustainable energy market*, available at http://www.eurogas.org/publications_positionPapers.aspx.
- European Parliament. 2010a. Resolution of 7 September 2010 on developing the job potential of a new sustainable economy (2010/2010(INI)).
- . 2010b. Resolution of 17 June 2010 on gender aspects of the economic downturn and financial crisis (2009/2204(INI)).
- ; Council of the European Union. 2009. Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.
- Eurostat. 2010. *Labour Market Statistics*, Luxembourg, Publications Office of the European Union.

- Fazio, F.; Gnesi, C.; Rustico, L.; Sperotti, F. (eds). 2010. "Promoting Green Employment", *Adapt Special Bulletin*, No. 31.
- Gospodinova, R.; Hajdú, J.; Rustico, L. 2010. *Green jobs: New opportunities or new risks*, Adapt Dossier, No. 4.
- Ires, Filctem Cgil. 2010. *Lotta ai cambiamenti climatici e fonti rinnovabili: Gli investimenti, le ricadute occupazionali, le nuove professionalità*. Available at http://www.ires.it/files/Rapp_IRESFONTI RINNOVABILI_23mar2010.pdf.
- Mattioli, F. (ed.). 2010. "Green economy and female employment: More and better jobs?", *Adapt Special Bulletin*, No. 3.
- OECD. 2008. *Gender and sustainable development: Maximising the economic, social, environmental role of women*, Paris.
- Pinderhuges, R. 2007. *Green collar jobs – An analysis of the capacity of green businesses to provide high quality jobs for men and women with barriers to employment*, available at <http://www.community-wealth.org/content/green-collar-jobs-analysis-capacity-green-businesses-provide-high-quality-jobs-men-and-women>.
- Rab, A.; Rustico, L.; Terzimehic, S. (eds). 2010. *Women in green economy. A human capital perspective*, Adapt Dossier, No. 12.
- Rossi, G. 2010. *The economic and occupational impact of green economy*, Adapt Dossier, No. 2.
- ; Terzimehic, S. 2010. *Social dialogue, renewable energy, female employment*, Adapt Dossier, No. 9.
- Rustico, L.; Sperotti, F. (eds). 2010. "Are green jobs pink jobs? The role of social dialogue", *Adapt Special Bulletin*, No. 35.
- ; —. (eds). 2011. "A green (or blue?) economy that works for social progress", *Adapt Special Bulletin*, No. 58.
- Sperotti, F.; Tomassetti, P. (eds). 2010. "WiRES: The gate to social dialogue for women in the renewable energy sector", *Adapt Special Bulletin*, No. 43.
- Sustainlabour. 2010. *Desarrollando las renovables, Renovando el desarrollo*, Cátedra Universidad-Empresa-Sindicato: Trabajo, Salud y Medio Ambiente, de la Universidad Politécnica de Madrid.
- Tomassetti, P. 2011. "Il ruolo delle parti sociali nella transizione verso la green economy", *Prisma*, No. 3.
- . 2012. *Linking incentive pay to green targets*, presented at the 16th World Congress of ILERA – Study Group on Pay Systems.
- UNEP; ILO; IOE; ITUC. 2008. *Green jobs: Towards decent work in a sustainable, low-carbon world*, Nairobi, Kenya.
- WiRES. 2010. *Final Report Wires*.
- WiRES References, available at <http://moodle.adapt.it/course/view.php?id=7>.

Annex 1

Initiatives by the social partners at European level in the field of vocational training and retraining in the green economy

Country	Practices
Austria	<p>National and local governments have launched a joint initiative, known as Masterplan Environmental Technology, which aims to set up a joint strategy for policy-makers, business and relevant research institutions to improve the competitiveness of the Austrian environmental technology industry.</p> <p>The government is looking at reforming the country's vocational training scheme, in order to meet increasing business demand for skilled workers in the environmental technology sector.</p> <p>On the employer side, courses are being run by the Austrian Federal Economic Chamber to help members reduce energy consumption.</p>
Belgium	<p>Regional plans: research and training in green technologies.</p> <p>National social dialogue structures – namely, the National Labour Council and the Central Economic Council – are currently active in environmental issues, and are preparing a joint statement on green jobs.</p> <p>An innovative scheme exists in Belgium, whereby long-term jobseekers are trained to carry out energy assessments and help with advice on energy-saving measures. These people are called “energy trimmers” and help to implement energy-saving measures in buildings through “energy trimming companies”, which are not-for-profit organisations. The schemes exist in all regions of the country.</p>
Denmark	<p>Environmental Economic Council – economic advisory body, established by law in 2007: 24 members representing trade unions, employers, non-governmental organisations (NGOs), independent experts and the Danish government.</p>
Estonia	<p>Much effort has been invested in raising public and consumer awareness of green issues through a variety of means – including the development of a network of local environmental education centres, the provision of training days and seminars, and the holding of national and international conferences.</p>
Finland	<p>The National Commission on Sustainable Development acts as an important tripartite forum where different stakeholders can present their ideas, goals and programmes, and also engage in a broad debate about ecological sustainability.</p> <p>The employer organization EK has published a guide on corporate responsibility, which contains tools for self-evaluation and development for companies.</p> <p>The construction industry branch and the biotechnology industry association Finnish Bioindustries have also published their own principles on corporate social responsibility, business ethics and sustainable development.</p>
Germany	<p>The Confederation of German Trade Unions and affiliates participate in two working groups – one on energy and the other on the environment – within the country's tripartite “Alliance for jobs, training and competitiveness” initiative.</p> <p>A joint body has been established to provide information and training to works councils on environmental protection issues.</p> <p>The trade union confederation, the DGB, in cooperation with the educational institution DGB Bildungswerk and the German Ministry for the Environment, Nature Conservation and Nuclear Safety, runs a project entitled “Resource efficiency in firms”. The project trains works council members and employees in detecting and implementing ways to improve energy efficiency. The training is part of a programme that leads to a certified degree as an “efficiency expert”. The metalworking trade union, IG Metall, cooperates with the employer association of the aluminium industry in implementing this project at workplace level.</p>
Hungary	<p>Regional operational programmes, provisions for setting up regional crisis-management funds to help in cases of company restructuring and to support vulnerable enterprises by providing exemptions from payroll taxes to enable companies to maintain their workforce.</p>

Country	Practices
Ireland	The employers' confederation, IBEC, provides environmental training for members; this includes a Foundation Course in Environmental Management for managers wishing to get up to speed on current environmental performance trends, standards legislation and solutions.
Italy	<p>The government has set up a fund to finance research projects on energy efficiency and the use of renewable energy sources in urban areas.</p> <p>The trade fair SolarExpo and the employment agency Adecco have developed training and retraining courses for technicians in the solar panel and wind farm industry. Under this scheme, skills that are particularly relevant to these industries are taught.</p> <p>The Association of Energy Producers from Renewable Sources organises company training and information courses on European and national regulations in the energy and environment sector.</p>
Luxembourg	A conference to debate climate protection and economic and employment prospects was organized by government ministries and the Chamber of Employees in February 2009.
Norway	<p>The Norwegian Association of Local and Regional Authorities, along with the Confederation of Unions for Professionals and the Norwegian Union of Municipal and General Employees, have organized a conference for safety representatives and trade union representatives, in order to develop their knowledge and expertise in relation to green issues.</p> <p>The trade union confederation, LO, and its member unions have set up courses on climate change for shop stewards.</p>
Poland	<p>The celebration of Earth Day, 22 April 2009, included information campaigns, educational initiatives and workshops.</p> <p>Government training courses are offered, in order to train technicians in environmental management, as well as in health, safety and the environment at the workplace.</p>
Portugal	The General Workers' Union is preparing to introduce environmental issues into its training activities for collective agreement negotiators.
Slovenia	Seminars have been held for business representatives to help them prepare for legislative changes related to the green economy.
Spain	Social dialogue on green issues is carried out within the framework of the country's standard tripartite social dialogue structures and is linked to the debate on the modernisation of the economy.
United Kingdom	<p>The employer organization, the Confederation of British Industry (CBI), highlights that skills are needed in areas such as science, technology, engineering and maths, technical competencies and a range of new business skills. The CBI makes a range of recommendations on how to increase the number of workers with these skills: these include encouraging a greater focus on such skills in schools and proposing ways to encourage education providers to work with business to meet the demand for these types of skills.</p> <p>The CBI has been running regular events on issues related to climate change for its members. For example, in 2009, it ran a series of three breakfast seminars on the subject of environmental legislation for people involved in property management and leasing.</p> <p>The TUC operates a range of courses for trade union representatives, helping them to address the following issues: identify environmental changes that affect the workplace; research and identify appropriate environmental legislation, policies and information; and identify environmental problems and opportunities for trade union action.</p>

Annex 2

Variable pay and ecological conversion of working environments

Energy saving and energy efficiency targets have become a subject matter of collective bargaining as they can be linked to the variable part of the salary. The *green salary* represents a strategic solution as it enables, on the one hand, businesses to involve their workforce in fulfilling energy saving and energy efficiency targets in an effective way; on the other hand, it enables employees to gain economic advantage by adopting sustainable practices (Tomassetti, 2011, 2012).

The potential of this solution, for which company-level bargaining plays a key role, has been pointed out also by an Opinion of the European Economic and Social Committee, stating: “New awareness of the need for more restrained consumption will free up resources, which can then be used for other things. Trade union agreements on measurable targets and distribution of profits among businesses and workers could be a useful way of raising widespread awareness of the importance of saving energy” (EESC, 2011).

A benchmarking research on performance pay in collective bargaining over a sample of 200 company collective agreements in Italy points out that 10 per cent of the agreements subordinate the performance bonus to the fulfilment or confirmation of environmental certifications (of products or production processes), such as ISO14000¹⁵ and Ecolabel.¹⁶ In general, all indicators that refer to environmental sustainability targets can be integrated in the performance bonus or in other of variable pay schemes (box 1). In Italy, a bilateral agreement on energy efficiency signed in November 2011 by the major employers’ association of industry and the three main trade union confederations, expresses hopes that variable pay linked to environmental targets and workers’ performance to achieve them will be included in decentralised level collective bargaining agreements (Confindustria, Cgil, Cisl, Uil, 2011).

Together with traditional indicators of performance pay schemes (such as profits, productivity and quality of work), an incentive salary system linked to the energy saving targets has been recently introduced in the company agreement of Heineken in Spain, covering more than 2,000 employees. The achievement of foreseen eco-targets, including the reduction of water consumption and waste, and limiting greenhouse gas emissions produced by plants and administrative offices, awards 20 per cent of the performance bonus.

15. ISO14000 is a rule issued by the International Organization for Standardization which provides the standards requirements for the implementation of an environmental management system and for the attainment of the respective certification.

16. Ecolabel is the European mark for ecological quality which awards those products and services that respect the ecological criteria established at a European level and which have a low environmental impact during their entire life cycle, from their production to their use and final disposal.

**Box 1. Sample review of the indicators
of the results bonus connected to
environmental sustainability targets**

- Level of water, electric energy and gas consumption
- Ability of a specific plant unit to differentiate waste
- Level of “riffraff” generated during the whole production cycle
- Level of use of those products with high environmental impact
- Level of sound pollution
- Ranking level in the Dow Jones Sustainability Index
- Attainment of ISO certification
- Attainment of Ecolabel mark
- Number of emissions quotas produced within the ETS system

Among other international experiences, it is possible to observe some cases of companies that, in order to determine the performance bonus or the managerial bonus, use independent indicators – such as the Dow Jones Sustainability Index (DJSI)¹⁷ – for measuring the environmental sustainability targets. This is the case of AkzoNobel, a Dutch multinational company specialized in the production of paints and other chemical products, which links 50 per cent of its senior managers’ bonuses to the ranking of the company in the first three positions of the DJSI list of the relevant sector.

17. Independent index including 342 businesses in the world, selected among 2,500 for their sustainability. Thirty per cent of the index refers to environmental sustainability. www.sustainability-index.com.

Climate jobs and manufacturing in South Africa

Woodrajh Aroun

Parliamentary Officer,
National Union of Metalworkers of South Africa

South Africa has a high rate of unemployment. Using the narrow and broad definitions for unemployment,¹ the Department of National Planning in the office of the Presidency claims that according to the narrow – official – definition, unemployment stands at 25.3 per cent, while according to the broad – unofficial – definition, it stands at 35.9 per cent (Presidency, 2010, p. 21). Drawing from an analysis of Statistics South Africa Income and Expenditure Survey (IES), the Department of National Planning says that South Africa has a Gini coefficient² of 0.679 making it one of the most unequal countries in the world (idem, p. 25).

In 2011, the Alternate Information and Development Centre (AIDC) facilitated the launch of the Campaign for One Million Climate Jobs in South Africa. This campaign is a collective effort to address the issue of poverty, unemployment and inequality in the context of climate change, and the country's commitment to reduce its carbon emissions. It is supported by the largest South African trade union federation, the Congress of South African Trade Unions (COSATU), and endorsed by some 40 organizations representing a broad range of civil society formations. On 17 November 2011, representatives of the South African Government, organized labour and the business community signed a Green Accord as part of their commitment to grow the green economy and create 300,000 jobs by 2020 (Economic Development Department, 2011, p. 8). The Campaign for One Million Climate Jobs forms the basis of this paper.

Drawing on the literature, this article examines some of the constraints and opportunities that exist for manufacturing in the context of a growing debate on the use of renewable energy (RE). Policy direction of the South African Government in support of its Copenhagen commitments has some bearing on whether the country can shift to a low carbon economy and offset some of the job losses “in the coal mining and electricity generation sectors” (ERC, 2007, p. 15). A short case study on the solar water heater (SWH) industry in the City of Cape Town is included in the discussion to shed some light on working conditions in what many perceive to be a growing segment of the RE sector.

While the Green Economy Accord represents a significant step forward and embodies the principle of social dialogue, it is up to the social partners to engage one another to make the Accord a reality. Over the last few months, the National Union of Metalworkers of South Africa (NUMSA) has persistently engaged government and business as part of a broader strategy to consolidate

1. Narrow (official): number of people who were without work in the week preceding the interview, have taken active steps to look for work and were available for work. Broad (unofficial): number of people who were without work in the week preceding the interview and were available for work (Stats SA LFS and QLFS, cited in Presidency, 2010, p. 21).

2. The Gini coefficient shows the level of income inequality. It can range from 0 (no inequality) to 1 (complete inequality).

its position on energy policy and empower its shop stewards to deal with matters of energy efficiency and renewable energy. NUMSA convened its first International Energy Conference in February 2012, a Solar Water Heaters Summit in March 2012, and established two Research and Development Groups (RDGs) to coordinate its work in energy efficiency and renewal energy.

The paper outlines the role that trade unions can play in the transition to a low-carbon economy, the need to strengthen the engagements with community-based organizations and the importance of promoting international cooperation and solidarity amongst trade unions and global union federations, progressive non-governmental organizations and social movements, in order to accelerate social and economic transformation and to build a clean, safe environment for everyone.

Employment potential of the use of renewable energy

The South African Government agrees that the country will have to play its part in reducing greenhouse gas (GHG) emissions and has committed itself to keeping the temperature increase below 2° C and reducing its emissions by 34 per cent by 2020 and by 42 per cent by 2025 (Department of Environmental Affairs, 2011).

Overall, South Africa ranks 13th in the world as a carbon emitter and produced some “446 million tons of CO₂-equivalent (Mt CO₂-eq) in 2003” (ERC, 2007, p. 3). According to the Energy Research Centre, this figure is expected to quadruple (1,640 Mt CO₂-eq) by 2050 “if our economy grows without constraints over the next few decades” (ibid.). Following the release of the White Paper on the Energy Policy of the Republic of South Africa in 1998, the South African Government has released several documents outlining its energy policy and commitment to increasing the use of RE in its energy mix:

- Integrated Energy Plan for the RSA 2003 (Department of Minerals and Energy)
- White Paper on the Renewable Energy Policy RSA 2003 (Department of Minerals and Energy)
- Long Term Mitigation Scenarios (LTMS) 2007 (Department of Environmental Affairs and Tourism)
- Integrated Resource Plan 2010 (IRP 2010) (Department of Energy)
- National Climate Change Response White Paper October 2011 (Department of Environmental Affairs)
- Industrial Policy Action Plan (IPAP) (Department of Trade and Industry)
- The New Growth Path (NGP) (Department of Economic Development)
- National Development Plan Vision 2030 (Planning Commission Office of the Presidency)

Table 1. Balanced scenario country electrical energy mix by 2030 (percentages)

Baseload coal	48
Baseload nuclear	14
Renewable energy	16
Peaking OCGT	9
Peaking pump storage	6
Mid-merit gas	5
Baseload import-hydro	2
Total	100

Source: IMC (2010, p. 3).

Table 2. Employment potential conventional vs renewable energy (number of jobs per GW)

Conventional energy		Renewable energy	
Coal (now)	0.3	Solar thermal	10.4
Coal (future)	0.7	Solar panels (PV)	62.0
Nuclear	0.1	Wind	12.6
Pebble bed	0.2		
Gas	0.1	Biomass	5.6
Liquid fuel	0.1	Landfill gas	23.0
Hydro	1.0	Ocean energy	1.0

Source: AGAMA (2003), cited in Ward and Walsh (2010, p. 26).

Table 3. Employment projection renewable energy sector

Technology	AGAMA Energy Study 2003 Based on target of 15% RE by 2020		South African Renewables Initiative (SARi): Update briefing December 2010 Based on 20 GW by 2020
	Direct jobs	Indirect jobs	
Solar thermal	8288	24864	Policy supports “critical mass of renewables” to facilitate SA’s economic growth and promote job creation (p. 4). Deliver 20–23 GWs of RE, or about 15% of the grid by 2020–25. Generate 35,000–50,000 jobs, mainly for skilled and semi-skilled workers in the manufacturing and engineering industries. Decrease up to 1.2bn tonnes of CO ₂ emissions by 2045. This would secure up to 22% of the emission reductions needed for SA to transform towards an emissions pathway that peaks, plateaus and declines by 2020–25 (SARi, 2010, p. 32).
Solar PV	2475	7425	
Wind	22400	67200	
Biomass	1308	3924	
Landfill	1902	5706	
Biogas	1150	2850	
SWH	118400	236800	
Biofuels	350000	350000	
Jobs	505923	698769	
Total	1 204 692	35 000–50 000	

Source: AGAMA Energy (2003); SARi (2010).

The IRP 2010 serves to address the country’s energy requirements over the next 20 years:

The plan supports a gross domestic product (GDP) growth trajectory averaging 4.5 per cent over the next 20 years. It requires 41,346 MW of new capacity (excluding capacity required to replace decommissioned plant), in order to meet the projected demand and provide adequate reserves. (IRP, 2011, p. vi)

The document includes detailed technical modelling and, according to a statement released by the Inter-Ministerial Committee on Energy (IMC) on 5 October 2010, a “balanced scenario” option outlines the country’s energy mix by 2030 (table 1).

Apart from the official state documents, there are several case studies that quantify the number of jobs that can be created through the use of RE. Some of these initiatives are illustrated in the following tables.

According to the Agama study (cited in Ward and Walsh, 2010, p. 26), the RE industry generates more jobs than conventional energy (number of jobs per GWh) (table 2).

The widely quoted AGAMA study prepared for the Sustainable Energy and Climate Change Partnership (SECCP) argues that a “government commitment to a target of 15 per cent of total electricity generation capacity by 2020” in RE will lead to the creation of just over 500,000 direct jobs and around 700,000 indirect jobs (AGAMA, 2003, p. x). The South African Renewables Initiative³ (SARi) believes that 35,000–50,000 jobs could be created in the manufacturing and engineering industries if South Africa delivered 20–23 GW of RE by 2020.

South Africa’s Industrial Policy Action Plan (IPAP) expects a rapid growth of the country’s biofuels industry provided the regulatory environment is amended to permit a blending target of 2–10 per cent. IPAP also anticipates significant employment growth in the sector of between 100,000 and 150,000 direct jobs over the next ten years, with investments of about R10 billion over the same period (Department of Trade and Industry, 2010, p. 70).

It is clear that projections for employment vary from one source to another: the AGAMA study includes detailed modelling on the use of renewable energy technologies (RETs) while SARi looks at the employment potential of RE in specific industrial sectors like manufacturing and engineering. However, a report produced by the United Nations Environment Programme (UNEP) says that job estimates in an emerging sector like RE can be derived from a number of sources (industry surveys, employment estimates based on jobs per unit of production/production capacity and jobs per level of investment), but “even where such data are available they tend to be snapshots rather than time series, and to be estimates and projections more than firm figures” (UNEP/ILO/IOE/ITUC, 2008, p. 36).

3. SARi is a South African Government initiative developed by the Ministers of Trade and Industry and Public Enterprises to develop a funding mechanism to speed up the use of RE and fast-track its integration in the country’s industrial strategy (SARi, 2010, p. 12).

Local industries: Potential capacity to contribute

A study by Camco (a climate change development consultancy) in collaboration with the Trade and Industrial Policy Strategies (TIPS) argues that apart from the imminent regulatory environment that will require the manufacturing sector to reduce its carbon emissions, a “number of industries in South Africa could receive added impetus and support through climate change mitigation efforts” (Camco/TIPS, 2010, pp. 33–34). Industries that stand to benefit include:

- transport equipment: e.g. buses linked to the demands for an improved and cleaner public transport system;
- production of zero emission passenger vehicles (South Africa’s *Joule*);
- development of the chemical and plastic industries to produce: fuel cells, light emitting diode (LED) lighting, wind turbine technologies, building insulation materials, solar photovoltaic (PV) cells;
- electrical machinery and apparatus (energy efficient machinery and motors);
- wind power;
- domestic solar water heater manufacture.

IPAP maintains that the manufacturing sector has the potential to stimulate economic growth and job creation provided instruments such as procurement and local content are leveraged in a proper manner. Designated goods and services will also have to be sourced locally and this applies to the green economy as well.

Just Transition

The intention to move to RE is not a South African phenomenon. If we look at investments in energy over the last few years, we notice that a transition is under way. According to a UNEP/Bloomberg report (2011, pp. 11–12) on energy financing, global new investments in RE increased from US\$33 billion in 2004 to US\$211 billion in 2011 and investments in developing countries (US\$72 billion) overtook those of developed countries (US\$70 billion).

For trade unions in developing countries, the issue of a Just Transition from fossil fuels to RE poses a major challenge. To ease some of the fears associated with this transition, the architects of South Africa’s Long-Term Mitigation Scenarios argue that “output and employment losses in the coal mining and electricity generation sectors” are likely to be offset by gains in the RE sector (ERC, 2007, p. 15). Recently there has been a lot of talk from several state departments (Economic Development, Trade and Industry, Energy)

and supporting institutions like the Industrial Development Corporation (IDC) and SARI to substantially increase investments in RE. The Minister of Finance has set aside R4.7 billion to complete the roll-out of 1 million solar water heaters by 2014, and R600 million to municipalities to install low-energy lighting and equipment (Treasury Department, 2012).

The South African Municipal Workers Union (SAMWU) and NUMSA also believe that the transition from fossil fuels to RE will have implications in the way we interact with nature, produce and consume. In a written response to the National Climate Change Response Green Paper 2010 SAMWU argued that “[r]ackling Green House Gas (GHG) Emissions is not just a technical or technological problem. It requires a fundamental economic and social transformation to substantially change current patterns of production and consumption (SAMWU, 2011).

Discussion

The Campaign for One Million Climate Jobs is significant for many reasons: it seeks to address the problems of climate change, create a clean and carbon-free environment and transform some of the most fundamental institutions of South African society, in order to mitigate the effects of poverty, unemployment and inequality. The campaign maintains a sharp focus on the delivery of basic services (food security, water, energy, transport, health, and housing) and sees the development of the manufacturing industries as crucial in any programme that wants to speed up the delivery of RE and increase levels of employment.

According to Winkler and Marquard (2009, p. 1), South Africa’s development goals must be compatible with climate change mitigation and “new, climate-friendly industries will be needed to sustain employment and investment.” Social partners will have to pay attention to skills, strengthen capacity to retool and re-engineer the industries, so that they become less dependent on the use of fossil fuels and allocate the necessary financial resources to facilitate a shift to renewable energy.

Skills

Government acknowledges that the country is short on skills. The 2003 AGAMA study argues that various skills requirements depend on the support from the Sector Education and Training Authorities (SETAs) and that this support must accommodate the large pools of unskilled and semi-skilled workers in South Africa’s rural, undeveloped areas. A report by the ILO Skills and Employability Department provides an excellent analysis of the country’s skills shortage and argues that “current policy is found to be inconsistent”

Case study: Working conditions in the solar water heater industry in the City of Cape Town

This short case study on the solar water heater (SWH) industry in the City of Cape Town is included in the discussion in order to shed some light on working conditions in what many perceive to be a growing segment of the RE sector.

Location

Reasons for choosing the SWH industry in the City of Cape Town:

1. The manufacturing and construction industries in the city are covered by collective agreements administered by bargaining councils that have regional jurisdiction: Metal and Engineering Industries Bargaining Council (manufacturing) and the Building Industries Bargaining Council Cape of Good Hope (construction).
2. The government-subsidized SWH programme managed by Eskom (electricity utility) and the use of SWH in several low-cost housing development projects provide the impetus for the growth of the SWH industry in the city, e.g. Kuyasa Energy Efficient Low Cost Housing Project, Witsand Housing Development in Atlantis.

Size of the industry

According to a national survey commissioned by Eskom (2009), the SWH industry currently employs about 700 people (excluding independent installers) with an annual turnover of over R220m (2009 figures). The survey confirms that local manufacturers make up 60 per cent of the local market while imports have doubled since 2007. The Sustainable Energy Society of South Africa (SESSA) maintains a database that includes, amongst others, manufacturers, contractors/installers, distributors, importers, R&D and training. Some 43 manufacturers, contractors/installers and distributors are located in and around the Western Cape (SESSA).

Literature

There has been a growing interest in the use of SWHs for various reasons but current research tends to lean more on the need to reduce carbon emissions, increase capacity, create jobs and improve the quality of life of lower-income households. Apart from anecdotal evidence, data from bargaining councils, labour research institutes and international labour agencies provide some overview of employment conditions that are likely to impact on the SWH industry. The 2003 ILO case study of the building industry in South Africa provides a useful analysis of working conditions in the construction industry. Data from the Labour Research Service (2011) compare wage levels and, to some extent, benefits across various sectors of the South African economy. For the purpose of this case study, the focus will be on manufacturing and construction.

Working conditions

Using existing data, it is possible to get an overall sense of working conditions associated with the SWH industry, but the data is limited to collective agreements that apply to the industry as a whole and excludes plant level or in-house agreements, as well as workers in the informal economy. The Labour Research Service (LRS) argues that the minimum monthly wage in the construction industry in 2010 was around R2,613 compared with a minimum monthly wage of R3,636 in the manufacturing industry (LRS, 2011).

	Manufacturing	Construction
Bargaining Council	Metal and Engineering Industries Bargaining Council (MEIBC): Collective Agreement	Building Industries Bargaining Council (BIBC Cape of Good Hope): Collective Agreement.
Current wage tables/ Labour category	13 Grade Structure: Rate A\$ A1: R48.98h; Rate h: R26.24h Average Minimum Monthly Wage for 2010: R3,636 (LRS, 2011)	Labourer: R13.02h; Artisans: R44.59h. Average Minimum Monthly Minimum wage for 2010: R2,613 (LRS, 2011)
Unionized	Union and non-union	Union and non-union.
Employment tenure	Mixed: permanent; contractual – Limited Duration Contracts; use of temporary employment services (TES) labour brokers	Employment tenure characterized by fixed-term contracts and labour-only subcontracting (LOSC).
Benefits	Retirement Fund (Metal Industries Benefit Fund Administrators); sick pay fund; maternity; leave pay and leave enhancement pay; tool allowances; overtime; short time.	Retirement (labourers excluded); sick pay fund.

Source: MEIBC Main Agreement; Bargaining Council for the Building Industry (Cape of Good Hope); LRS (2011).

Drawing on LRS data, the following table represents a snapshot of conditions of employment:

Conditions of employment	
Hours of work and allowances	Median ordinary hours of employment increased from 44 to 45 hours per week; Housing allowances up but few
Leave	As determined by the BCEA (21 consecutive days); decrease in the number of days for shop steward training (from 9 to 8½ per annum).
Security of employment	Notice period 1–4 weeks depending on length of service – same as in BCEA; severance pay down from 2 weeks to one week.
Gendered conditions	Qualifying period for accessing maternity benefits 12 months; “a woman worker on maternity leave can only expect a third of her salary, no time for nursing, no contribution to child care arrangements later on and very little explicit guarantee of employment security” (p. 13).
Health	Medical insurance of some kind is found in 7.6 per cent of agreements; sexual and reproductive health issues are almost completely absent from collective agreements.
Family	Family Responsibility Leave – as per BCEA 3 days.
Workplace responses to HIV & AIDS	Conspicuously absent from most collective agreements.
Education and training	Little evidence to show support for education and training.

Source: LRS (2011).

Discussion on case study

Broadly speaking, the SWH industry in South Africa appears to overlap several sectors (manufacturing, retail, installation, maintenance and construction) and there is a strong possibility that the various occupational requirements for SWH (plumbers, electricians, general workers and labourers) could be found in any one, or all, of these sectors. According to the LRS, “actual conditions of employment tend to cluster around the legislated minimums”, vary across industrial sectors and have remained unchanged over the past few years (LRS, 2011, p. 12).

The ILO study argues that “the construction industry in South Africa has been characterized by precarious and short-term work arrangements”, and heavily dependent on a system of “specialist subcontractors” who in turn make use of smaller subcontractors from either the formal or informal sectors of the South African economy. Over the years industry restructuring has transformed the pattern of work arrangements in the industry, exposing workers to more “vulnerable and insecure employment”:

The industry restructuring has happened largely through the system of labour-only subcontracting (LOSC) ... In addition, LOSC work is generally not registered with bargaining councils and does not comply with other labour legislation ... the increased risks associated with this new form of subcontracting are highly likely to be passed on to workers in the form of lower wages, worse working conditions and less skill requirements or training facilities. (ILO, 2003, p. x)

The general impression is that little has changed in the construction industry since that ILO study and that forms of precarious work continue to characterize employment patterns in the industry. The LRS confirms that this trend continues to dominate the construction industry, which “is characterized by vulnerable work in the form of layer upon layer of contracting” (LRS, 2011, p. 4).

This does not mean that the manufacturing sector is any better off, even though by comparison the minimum monthly wage in manufacturing exceeds that of the construction industry by almost 40 per cent. The manufacturing sector also makes use of temporary employment services. Earlier this year, COSATU reaffirmed its opposition to labour brokers. In response the Department of Labour has tabled a number of amendments to the Labour Relations Act, in order to regulate the use of temporary employment and limit the abuse of vulnerable workers.

SWH: Green jobs and decent work

The UNEP report defines green jobs as jobs:

...that contribute substantially to preserving or restoring environmental quality ... this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste. (UNEP/ILO/IOE/ITUC, 2010, p. 3)

It is difficult to determine at this point whether jobs in the SWH industry are truly *green* jobs in so far as they relate to the definition of “green jobs” in the UNEP report. The industry is also in its infant stages, but an Inter-ministerial Programme Steering Committee (PSC), chaired by the Department of Economic Development (DED) to look into ways of improving the roll-out programme, has already indicated that some form of consolidation of the SWH industry is required so that “fewer and stronger players can guarantee certainty, job creation, quality, sustainability, after-sale maintenance and guarantees” (NUMSA, 2012a). Likewise, the extent to which these jobs meet the requirements of decent work as advocated by the ILO requires a deeper understanding of the RE sector as it acclimatizes to the labour market. Nevertheless, existing data and research make it possible to draw certain conclusions:

The development of a strong, vibrant SWH industry in South Africa could go a long way towards meeting the UNEP definition and there are signs that the South African Government wants to accelerate the roll-out of 1 million SWHs by 2014. There is also some evidence that the principle of decent work exists, although benefits may vary amongst the different sectors. However, this applies to workers who are covered by collective agreements and excludes workers in the informal sector. Currently, workers in the informal (non-agricultural) sector make up about 17 per cent of the employed (Stats SA,

2011, p. vi), but the ILO puts the figure down to 36 per cent of total employment (ILO, 2010b, p. 10).

A working paper published by the ILO argues that the concept of a green job is not something that is fixed, but rather one that will develop over time:

The notion of a green job is thus not absolute, but there are “shades” of green and the notion will evolve over time. Moreover, the evidence shows that green jobs do not automatically constitute Decent Work. Many of these jobs are dirty, dangerous and difficult. Employment in industries such as recycling and waste management, biomass energy and construction tends to be precarious and low income. If green jobs are to be a bridge to a truly sustainable future, this needs to change. Green jobs therefore need to comprise Decent Work. (ILO, 2010a, p. ii)

NUMSA's role in the SWH industry

There is a need for more quantitative and qualitative research that links the SWH industry directly to green jobs and decent work. The ILO Decent Work Country Programme (ILO, 2010b, p. 4) provides a useful starting point to take the research further, but trade unions like NUMSA have already established the basis for such an engagement. In March 2012, the union convened a three-day SWH Summit and invited some of the key stakeholders from government and business to participate in a workshop so that the union could get a better sense of the SWH industry and government's programme to install 1 million SWHs by 2014. Amongst others, the Summit sought to:

- review existing SWH installation programmes, in order to obtain an understanding of the key constraints and opportunities that exist in the sector;
- assess the effectiveness of key institutions involved in the sector, as well as the efficacy of the present policies;
- explore ways and means through which the 1 million target can be reached by 2014, and that there is a take-up of SWHs by industry and up to 12 million households by 2025;
- find ways through which the SWH roll-out can create a local sector and create decent jobs;
- develop and organize strategy for the SWH sector, ensure that work in the sector is secure and that employers comply with basic labour laws and provisions of the sector's Main Agreements;
- investigate and assess opportunities of how sustainable co-ops can be part of the sector;
- determine training and skills development requirements of the sector;
- develop a programme of action (PoA) the aim of which is the realization of NUMSA's objectives.

The union has established a SWH working group to implement some of the recommendations from the Summit, including a proposal for stakeholder representation on the Inter-ministerial Programme Steering Committee (PSC) that has been tasked with developing strategies to improve the roll-out programme. In March, NUMSA presented a labour perspective on SWH to the Solar Water Heating Advisory Committee (made up of employer organizations, large manufacturers and other interested parties associated with the SWH industry) and through such engagements the union is confident that it could play a positive role in areas of policy development and advocacy.

NUMSA also occupies a strategic position in the manufacturing sector and through its shop steward committees the union is able to generate a wealth of information and knowledge that could be used to profile emerging industries associated with the RE sector. This would help bridge some of the gaps that currently exist, e.g. identifying the scope of the sector, working conditions, skills requirements, job creation and ownership.

and skills development driven by market demand. The report recommends that “... a cohesive approach is taken to green skills anticipation at a national level which will ensure correct identification of needs, and strong implementation of the pre-existing skills framework” (ILO, 2010c, p. ix).

Financing renewable energy technologies

The White Paper on RE (2003, p. 27) makes reference to a broad range of financial instruments to kick start the process towards promoting renewable energy technologies (RETs). These include:

- donor funding;
- public/private sector funding;
- government funding, which will be sourced through government financial and fiscal measures, e.g. budgetary allocation, subsidies, levies, tax rebates or other incentives.

To encourage private sector involvement in RE the State, through the National Energy Regulator of South Africa (NERSA), introduced the idea of a renewable energy feed-in tariff (REFIT).⁴ According to Creamer (2011) there is some uncertainty about the future of the feed-in tariffs, given that the Department of Energy has opted to invite tenders/bids from Independent Power Producers (IPPs) to provide RE. At its International Energy Conference (February 2012), NUMSA expressed reservations about the government’s intention to outsource RE. In August 2011, the union’s Central Committee called for a publicly owned and community-controlled renewable energy sector made up of parastatals, cooperatives and municipal wind farms.

Private sector

According to Du Toit (2010, p. 146), the private sector has not responded positively to the finance needs of low-income consumers wanting to purchase SWH, presumably because of the “perceived high risk of payment defaults in low-income markets”. Du Toit suggests that the State should step in to finance the roll-out of SWH in low income households. This would put it in a position to meet some of its service delivery targets “by giving low-income households the opportunity to enjoy the benefits of modern renewable energy services whilst wider objectives of reducing electricity demand ... and greenhouse gas emissions can be achieved”.

4. According to the South African Alternative Energy Association (SAAEA), REFITs are used to “supplement the price paid for generating green electricity” (SAAEA, 2011).

The role of the State

Towards the latter part of 2010, COSATU released a draft discussion document called *A Growth Path towards Full Employment*. Briefly, the paper sets out the federation's vision to transform the economy of the country so that people will have access to decent work, housing, quality education, quality health, comprehensive social security, and to water, energy and sanitation (COSATU, 2010). Further, the document outlines the federation's call for a sustainable environment in order to limit GHG emissions, stop the pollution of South Africa's streams and water supply and protect its natural resources. To realize this vision, the federation (idem, pp. 30–31) argued that “[t]he state must decisively intervene in the economy to redistribute resources in order to address: divisions resulting from South Africa's apartheid past; unemployment, inequality and poverty; and rural-urban development divide”.

The role of trade unions

COSATU's 2010 *A Growth Path towards Full Employment* provides a space to integrate the Campaign for One Million Climate Jobs, while the campaign itself offers a platform to engage the State on issues of policy and an opportunity to challenge the liberal economic policies that underpin the South African developmental agenda. There is also a tendency to see the campaign as part of a pressure group that is opposed to the exploitation of South Africa's natural resources for profit. Such a challenge requires reciprocal action by trade unions and social movements, but such action has been slow in the making and this illustrates the lack of the very coordination that is needed to drive the campaign. In spite of such weaknesses the trade unions have an important role to play in the transition to a low-carbon economy. This would require the allocation of resources and the capacity to engage South African social partners on an equal footing to achieve desirable outcomes.

NUMSA's engagement with social partners personifies the role that trade unions can play in RE:

Numsa, of all the Congress of South African Trade Unions affiliates, has been most active with respect to green economy issues and renewables. The trade union also has active shop stewards involved in green economy issues in different sectors. Numsa's coordinated approach is impressive. (Fakir, 2012)

NUMSA has undertaken a number of initiatives to strengthen its participation on issues such as climate change, energy policy and the use of RE. Apart from engaging the services of the Energy Research Centre (ERC) at the University of Cape Town to strengthen the capacity of union educators and leadership

on matters of climate change and energy, the union has directly engaged government on matters of policy including, but not limited to, the country's Integrated Resource Plan (IRP, 2010), the Green Paper on Climate Change and the Department of Energy's proposal to outsource the provision of RE to Independent Power Producers. In February 2012, the union convened an International Energy Conference and brought together a number of energy experts, environmental activists, academics and trade unionists from Europe, Latin America, the United States, Asia and the continent to share experiences and exchange ideas about RE and models of social ownership. As a result of such initiatives the union has submitted proposals to its National Executive Committee to consider the issue of collective ownership in the context of government's policy to increase the supply of renewables in the South African energy system:

As NUMSA, we do not believe that a socially and ecologically desirable transition to a new energy system in which renewable energy plays the dominant role is actually possible within the constraints imposed by capitalist relations.

But it is not only government that is moving on the question of increasing the amount of renewables in our energy system. Private companies – local and foreign – have been positioning themselves for such an introduction and move. Capital as is always the case, views the introduction of renewables as a new site of accumulation. Unfortunately, government and other policymakers see the new renewable energy sector as being privately owned. (NUMSA, 2012b, p. 4)

In its policy document, NUMSA has reaffirmed its call for democratic control of the emerging RE sector and argues that collective ownership in the form of energy parastatals, cooperatives, municipal-owned entities and other forms of community energy enterprises should be encouraged.

A further policy proposal from the union seeks to establish what it calls a "RE – bid Watch" – a network of experts (progressive land rights experts, commercial lawyers, project developers, engineers, energy specialists, experts on contracts, environmentalists, economists, bankers and experts on Black Economic Empowerment) to manage the technical work on "local and international make-up of different consortia; the stages through which each RE project will go through, how projects will be financed; and the rights of people residing in sites with sources of renewable energy" (NUMSA, 2012c, p. 3).

In March 2012, the union held a successful SWH Summit by bringing representatives of government and business together to discuss government's SWH roll-out programme. In addition to these initiatives the union has established Research and Development Groups (RDGs) to coordinate and monitor its work in energy efficiency and RE.

Mainstreaming environmental issues in the workplace is an absolute necessity and trade unions have an obligation to create a safe and healthy environment for their members, the community and for society as a whole.

There is also the added obligation to ensure that a clean environment must go hand in hand with the creation of decent work. Collective bargaining must be extended to include issues such as energy efficiency and RE, and how these could be used to improve working conditions and create employment. In South Africa, the National Economic Development and Labour Council (NEDLAC) provides a forum for constituencies (government, business, labour and community) to engage on a broad range of socio-economic issues. Constituencies like labour and the community are in a strong position to use this space to negotiate on matters such as environmental policy and link the Green Accord to some of the key action programmes of the Industrial Policy Action Plan (IPAP). However, it is up to the constituencies to make sure that there is popular support for these initiatives, and that policy-making is not left in the hands of a few individuals and technical experts.

Community-based initiatives

Du Toit (2010, p. 3) refers to the roll-out of SWH in several low-income communities, and the social and economic impact of such initiatives “in households where hot water was a scarce necessity”. Apart from improving the quality of life in these households the projects offered opportunities for job creation and reduced dependence on expensive grid electricity. In the city of Cape Town, the Lwandle SWH project, Kuyasa Energy Efficient Low-Cost Housing Project and the Witsand Housing Development in Atlantis are often quoted as examples of community driven initiatives, but there is no mention of trade union involvement in these projects.

In a recent study of the biofuels industry in the Eastern Cape, several of the unions interviewed said that they were not involved in the biofuels discussions and were not invited to participate in meetings by the Industrial Development Corporation (IDC), one of the leading investors in the area (Pressend, forthcoming).

Clearly, there is a need to strengthen trade union engagement with community-based organizations – this has happened in the past and there is no reason why it should not happen now.

Conclusion

At an International Seminar on Energy, Work, Crisis and Resistance: Experiences from the South, held 22–24 January 2010 in Graz, Austria, the President of NUMSA, Cedric Sabelo Gina, told delegates:

We are fully cognizant of the fact that any energy system that will have the interests of the poor as its core objective will be bitterly fought. We must

therefore recognize that the struggle for this alternative global energy system will lead to multiple initiatives amongst the oppressed and dominated strata. It is therefore our responsibility that these multiple initiatives do not cancel but reinforce each other. (Gina, 2010, p. 3)

This calls for more international cooperation and solidarity amongst trade unions and global union federations, progressive non-governmental organizations and social movements. Ultimately, the ambition to save the planet will be put to the test and unless we are well organized and resourceful, the role of trade unions runs the risk of being weak and its interventions marginal.

References

- AGAMA Energy. 2003. "Employment Potential for Renewable Energy in South Africa", SECCP, viewed 2 May 2011, available at <http://projects.gibb.co.za/LinkClick.aspx?fileticket=S6HB67wKzQU%3D&tabid=174&mid=797>.
- BIBC (Bargaining Council for the Building Industry) (Cape of Good Hope). 2010. "Extension of Collective Agreement to Non-Parties", *Government Gazette* (No. 33874, 17 December 2010), available at <http://www.bibc.co.za/news/Collective%20Agreement%201per cent20Novemberper cent202010.pdf> (accessed 11 Oct. 2011).
- Camco/TIPS. 2010. "Climate Change: Risks and Opportunities for the South African Economy – An Assessment of Mitigation Response Measures", May, available at http://www.climateriskandopportunity.co.za/downloads/Full%20report%20&%20exec%20summary/Climate_Change_&_SA_Economy_201005.pdf (accessed 26 July 2011).
- COSATU. 2010. *A Growth Path towards Full Employment – Policy Perspectives of the Congress of South African Trade Unions*, draft discussion document, 11 Sep.
- Creamer, T. 2011. "Glitches and pleasant surprises as renewables tender gets under way", *Engineering News*, 03 Aug. Available at <http://www.engineeringnews.co.za/article/glitches-and-pleasant-surprises-as-renewables-tender-gets-under-way-2011-08-03> (accessed 15 Aug. 2011).
- Department of Environmental Affairs, Republic of South Africa (RSA). 2011. "National Climate Change Response White Paper". Available at http://www.environment.gov.za/PolLeg/WhitePapers/national_climatechange_response_whitepaper.pdf (accessed 9 Apr. 2012).
- Department of Labour, RSA. 2011. "Metal and Engineering Industries Bargaining Council: Extension to Non-Parties of the Main Collective Reenacting and Amending Agreement", *Government Gazette* (Vol. 555, No. 34613). Available at http://www.seifsa.co.za/resources/uploaddocs/1-Alg%20R%2034613%2023-9_fb38.pdf (accessed 11 Oct. 2011).
- Department of Trade and Industry, RSA. 2010. "Industrial Policy Action Plan". Available at <http://www.info.gov.za/view/DownloadFileAction?id=117330> (accessed 3 May 2011).

- Du Toit, H.J. 2010. "A value chain analysis of the solar water heater industry in the Western Cape: investigating opportunities for local economic development, poverty alleviation and energy conservation", M. Phil. thesis, University of Stellenbosch. Available at http://www.sustainabilityinstitute.net/component/docman/cat_view/7-mphil-a-phd-research?limit=10&order=date&dir=DESC (accessed 11 Oct. 2011).
- Economic Development Department, RSA. 2011. "Green Economy Accord", New Growth Path: Accord 4.
- ERC (Energy Research Centre). 2007. *Long Term Mitigation Scenarios: Technical Summary*, Department of Environment Affairs and Tourism, Oct. Available at <http://www.environment.gov.za/HotIssues/2009/LTMS2/LTMSTechnicalSummary.pdf> (accessed 10 May 2011).
- Eskom Distribution. 2009. "The South African Solar Water Heater Industry", Aug. Available at <http://www.solarthermalworld.org/files/South%20Africa%20survey%20ESKOM%202009.pdf?download> (accessed 11 Oct. 2011).
- Fakir, S. 2012. "Alternative renewables ownership models come under the spotlight at Numsa conference", in *Engineering News*, 2 Mar. Available at <http://www.engineeringnews.co.za/article/alternative-renewables-ownership-models-come-under-the-spotlight-at-numsa-conference-2012-03-02> (accessed 11 Apr. 2012).
- Gina, C.S. 2010. "Experiences from the South", address: at the International Seminar on Energy, Work, Crisis and Resistance: 22–24 Jan., Graz, Austria.
- ILO. 2003. *Organizing in the informal economy: A case study of the building industry in South Africa*, Geneva. Available at http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_093977.pdf (accessed 11 Oct. 2011).
- . 2010a. "Green jobs creation through sustainable refurbishment in developing countries", WP275, Sectoral Activities Department, Geneva. Available at http://www.ilo.org/wcmsp5/groups/public/---ed_dialogue/---sector/documents/publication/wcms_160787.pdf (accessed 11 Apr. 2012).
- . 2010b. "RSA Decent Work Country Programme 2010–2014", Geneva. Available at http://www.ilo.org/wcmsp5/groups/public/---dgreports/---integration/documents/genericdocument/wcms_145432.pdf
- . 2010c. "Skills for green jobs in South Africa: unedited background country study", Skills and Employability Department, Geneva. Available at http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_142475.pdf (accessed 2 Oct. 2011).
- IMC (Inter-Ministerial Committee). 2010. Statement of the Inter-Ministerial Committee on Energy Regarding the Release of the Country's Electricity Plan 05 October 2010. Available at http://www.energy.gov.za/files/media/pr/IMC_draft_press_release.pdf (accessed 19 Sep. 2011).
- IRP (Integrated Resource Plan for Electricity). 2010. Revision 2 Draft Version 8, 8 Oct. Available at http://www.doeirp.co.za/content/INTEGRATED_RESOURCE_PLAN_ELECTRICITY_2010_v8.pdf (accessed 19 Sep. 2011).
- LRS (Labour Research Services). 2011. Bargaining Indicators for 2011. Available at <http://www.lrs.org.za/docs/Bargaining%20Indicators%20for%202011.pdf> (accessed 11 Oct. 2011).

- NUMSA (National Union of Metallurgists of South Africa). 2012a. "Government devises new strategy for solar water heater rollout".
- . 2012b. "Towards a Socially-Owned Renewable Energy Sector in South Africa".
- . 2012c. "RE – bid Watch".
- Presidency of South Africa. 2010. *South Africa Development Indicators 2010*. Available at <http://www.thepresidency.gov.za/MediaLib/Downloads/Home/Publications/NationalPlanningCommission4/Development%20Indicators2010.pdf> (accessed 1 May 2011).
- Pressend, M. Forthcoming. *Trade union's engagement in the biofuels industry: Debating issues of labour, production and rural development*, Research paper, Friedrich Ebert Stiftung South Africa Office.
- SAAEA (South African Alternate Energy Association). 2011. "Renewable tariff cuts refit South Africa", 29 March. Available at <http://saaea.blogspot.com/2011/03/renewable-tariff-cutsrefit-south-africa.html> (accessed 25 July 2011).
- SAMWU (South African Municipal Workers Union). 2011. Response to: The National Climate Change Response Green Paper (NCCRG), 9 February. Available at <http://www.pmg.org.za/report/20110309-climate-change-green-paper-2010-public-hearings>
- SARi (South African Renewables initiative). 2010. "Unlocking South Africa's Green Growth Potential". Update Briefing December 2010. Available at http://www.zadek.net/wp-content/uploads/2011/04/SARI_Unlocking-South-Africas-Green-Growth-Potential_011210.pdf (accessed 2 May 2011).
- Statistics South Africa. 2011. *Quarterly Labour Force Survey*, Second Quarter, Statistical Release P0211, SSA, Pretoria.
- Sustainable Energy Society of South Africa. 2011. Available at <http://www.sessa.org.za/> (accessed 11 Oct. 2011).
- Treasury Department, SA. 2012. Budget Speech. Available at <http://www.treasury.gov.za/documents/national%20budget/2012/speech/speech.pdf> (accessed 12 Apr. 2012).
- UNEP/Bloomberg. 2011. *Global trends in Renewable Energy Investment 2011*.
- UNEP/ILO/IOE/ITUC. 2008. *Green jobs: Towards decent work in a sustainable, low-carbon world*. Available at http://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/@webdev/documents/publication/wcms_098488.pdf (accessed 08 Oct. 2011).
- Ward, S.; Walsh, V. 2010. "Cape Town Energy Case Study – City of Cape Town: Energy for Large Cities Report. World Energy Congress 2010. Available at http://www.worldenergy.org/documents/annex_1_cape_town_1.pdf (accessed 16 Sep. 2011).
- Winkler, H.; Marquard, A. 2009. "Changing development paths: From an energy-intensive to low-carbon economy in South Africa", in *Climate and Development* 1, pp. 47–65. Available at http://www.erc.uct.ac.za/Research/publications/09Winkler-Marquard_Changing_devt_paths.pdf (accessed 26 Apr. 2011).