Global Climate Network

Low-Carbon Jobs in an Inter-Connected World

Global Climate Network discussion paper no. 3

December 2009

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SUMMARY

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Low-Carbon Jobs in an Interconnected World: Summary

Government action on climate change promises economic opportunity. The language of climate change policy has hitherto been largely negative, with wide use of such words as 'limitation', 'constraint' and 'reduction'. However, investing in new technology, stimulating new economic activity around a re-engineering of energy systems and growing new markets – all necessary to avoid climate catastrophe – will stimulate growth and offer new, skilled employment to workers.

This paper focuses on the emerging debate concerning the creation of 'low-carbon' jobs. What perhaps began as rhetoric generated for the purpose of counteracting climate negativity is now developing into an area of study that offers extraordinarily promising benefits. Not only can a low-carbon technology revolution help achieve climate change goals, it can also create new jobs, boost economic growth and help improve the lives of those currently deprived of access to energy.

The Global Climate Network set itself three tasks:

- To review domestic and international work to date on low-carbon job creation
- To assess government policies in member countries that might have an impact on low-carbon jobs
- To provide estimates of the potential for the creation of jobs in important low-carbon energy sectors in member countries.

Our approach is driven by domestic priorities, hence we look at a very wide range of energy-related sectors, from hydro, wind and solar in China to Smart Grids in the United States.

This paper – the product of eight separate national studies conducted over recent months by each of the GCN's member institutes – provides a major fillip for climate optimism and positivism. It shows that:

- Not only will the development and wide use of low-carbon technology create jobs, but globally these will be measured not in thousands but in millions.
- New low-carbon jobs are likely to outnumber job losses in carbon-intensive sectors.
- The jobs created will on the whole attract above-average salaries.

The GCN's exhaustive survey of existing literature on low-carbon jobs and its own estimates – while uncertain in some cases due to a shortage of source data on jobs and low-carbon technology markets – consistently support these conclusions. Policymakers should aim to fill some of the gaps in data identified in this paper and to come to their own conclusions about precise numbers, but it is the firm, collective view of GCN members that the economic promise from bold, clear and decisive low-carbon policies is very significant indeed.

1. Low-carbon employment in an interconnected world

In this paper, we define low-carbon jobs as those that are created either directly as a result of the expansion of the low-carbon energy economy or indirectly through supplying sectors within that economy with goods and services. In some of the national studies, we also estimate the likely creation of 'induced' jobs as a result of low-carbon economic development. These include new businesses that are enabled through access to energy they did not have before or as a result of efficiency savings in the economy that are invested in jobs.

The United Nations Environment Programme in a 2008 study estimates that in 2006 2.3 million people were employed in renewable energy industries[1]. The same UNEP study also anticipates a substantial increase in employment in these industries by 2030, by which time it suggests approximately 2.1 million people will be employed in wind energy, 6.3 million in solar PV and 12 million in bio-fuel-related industry and agriculture.

An alternative approach outlined in the literature is to measure the employment opportunities provided by clean energy compared with carbon-intensive industries. This approach suggests

1. Although, by the authors' own admission this is a conservative estimate, since it does not take into account a number of countries for which there is lack of systematic data (UNEP 2008).

renewable-energy programmes will generate more jobs per dollar and more jobs per megawatt of installed power than fossil fuel plants (UNEP/SEF Alliance 2009, Kammen *et al* 2004).

Job creation will also be shaped by interconnected global markets. There has in recent weeks been much controversy surrounding the creation of jobs in China as a result of investment by the US government in renewable energy. But as this paper shows, this is both threat and opportunity. For while an increased demand for renewable energy in one country will create opportunities for another, so is the reverse true. For instance, our US study shows that the creation of Smart Grids in Europe, Japan, China and elsewhere could create 138,000 US jobs.

Comparative advantage in the era of globalisation is seemingly neither innate nor fixed. Our German study shows how Germany stands poised to capture a significant global share of the solar thermal market, even though Germany itself is not a good location in which to use the technology. Experiences in others sectors, such as IT, shows that while early on industrialised countries were the developers and owners of the technology, over time developing countries moved up the value chain (Ernst 2003).

Most studies support the view that active government policy to trigger the wholesale expansion of clean-energy industries is a key driver of low-carbon employment opportunities. Important policies include setting ambitious renewable energy targets, increasing funding for R&D, creating technology testing facilities and centres of excellence, introducing economic support mechanisms such as feed-in tariffs, phasing out subsidies for carbon-intensive industries, and putting a price on carbon emissions (UNEP 2008).

2. Findings from the Global Climate Network

GCN members have focused explicitly on job creation at the national level in order to generate data that is anchored in national policy objectives. As a result, national rather than GCN-wide assumptions have been used in each study, making jobs numbers hard to compare. Nevertheless, across the wide range of sectors covered in members' studies and taking into account a huge variance in existing national conditions and policies (and availability of data), this paper identifies as many as 19.7 million[2] energy-related job opportunities that could be created in member countries between now and 2020 as a result of policies to reduce carbon emissions.

Each GCN member set out to fulfil four research tasks: to review existing low-carbon employment literature at the national level; review existing government policies and proposals to expand low-carbon energy markets; choose priority low-carbon energy sectors; and make estimates of the number of jobs that might be created as a result. In addition, some GCN members have made estimates of the likely numbers of jobs that could be created from the expansion of low-carbon energy markets in other countries.

Their findings can be summarised as follows:

Australia

Australia has passed legislation mandating that renewable energy account for 20 per cent of national electricity production by 2020. If this renewable energy target were combined with a binding commitment to reduce emissions by 25 per cent, the electricity sector would expand to directly support over 10,000 new jobs annually by 2020. This includes a net increase of close to 3,000 new permanent jobs and more than 7,000 construction jobs, above current levels. According to the government's own analysis, 1.7 million new jobs could be created throughout the economy from 2008 to 2020, with an additional 4.7 million out to 2050, even while national emissions are cut by 60 per cent by 2050.

China

Government wind, solar and hydro power targets could lead to the creation of 6.79 million direct and indirect jobs. The shift in the Chinese economy towards services sectors and away from basic industry could create a further 20 million. The economy is likely to expand at around 8 per cent per year and so while up to 17.38 million fewer jobs might be created if energy efficiency is increased by 60 per cent, the focus on low carbon and services sectors could outstrip these losses by almost 10 million.

2. This figure is the sum of the *gross* direct, indirect and – in the case of India and Nigeria – induced job creation estimates in each of the national studies. Australia 10,000; China 6.79 million; Germany 360,600; India 10.5 million; Nigeria 670,000; South Africa 845,500; UK 70,000; US 416,600.

Germany

The German government has already adopted emissions and renewable energy targets and, by virtue of being an early mover in renewables, already has a relatively mature industry. Consequently, 278,000 workers are already employed in renewable energy, more than in conventional energy. By 2020, this number could increase to between 353,500 and 400,000. Export markets could add significantly to this, supporting up to 238,600 jobs in the manufacture of solar thermal components alone by 2050.

India

Implementation of the Indian government's National Action Plan on Climate Change could create an additional 10.5 million direct jobs in wind, solar and biofuel energy production. As India is already a world leader in wind technology, ambitious global expansion of wind power could see 288,500 Indian jobs created if Indian firms were able to command 10 per cent of the global market.

Nigeria

The Nigerian government's Renewable Energy Master Plan pinpoints solar, small hydropower, wind and biomass energy. In addition, the government has stated its commitment to using lower carbon natural and associated gas to displace diesel, currently widely used for local power generation. If all untapped small-scale hydro power potential were captured and 37,000 megawatts of gas power were installed, just under 670,000 jobs could be created.

South Africa

The South African government's policy is guided by a range of long-term mitigation scenarios, the most stringent of which, *inter alia* suggests that around 50 per cent of South Africa's energy would have to come from renewable sources in 2050. Assuming this equates with a target of 15 per cent of electricity from renewables in 2020, 36,400 new direct jobs and 109,100 indirect jobs could be created. In addition, as many as 700,000 people could be employed in biofuels.

United Kingdom

The UK government has already adopted economy-wide emissions reduction and renewable energy targets and has recently published a Low Carbon Industrial Strategy. Nevertheless, the UK is not in general a leader in low-carbon industries and although offshore wind is a major resource, strong government policy will be needed to attract to the UK the jobs this will create. However, if it is successful in attracting manufacturers and suppliers, this could lead to up to 70,000 UK jobs being created. The UK is also well-placed to capture up to half of all jobs worldwide in offshore wind financial and legal services.

United States

Estimates of the impacts of the recent US stimulus package and the American Clean Energy and Security Act passed last summer suggest that up to 1.7 million net new jobs will be created as a result. Other estimates of the impact of the currently pending Senate legislation is that it would increase that number to 1.9 million jobs. To pick out just one sector of an already allocated revenue stream, the US stimulus focus on Smart Grids could create 278,600 new jobs during installation (of which 139,700 jobs would be ongoing) and establish the US as a leader in Smart Grid technology. If other countries then installed Smart Grid technologies, a further 138,000 US jobs might be created to serve the export market.

Conclusions and recommendations

Job creation will result from the expansion of demand for low-carbon energy. But this expansion will not happen accidentally: it will be driven by government policy. The GCN therefore concludes that to create the opportunities identified in this paper, governments must focus on the following four conclusions and recommendations.

1. Clear, consistent and targeted government policy will help boost jobs numbers

Policy approaches will include economy-wide emissions reduction or efficiency targets, renewable energy targets, feed-in tariffs and other renewable energy market incentives, subsidies – such as recent stimulus packages – regulation and taxes.

GCN recommendation: Develop national, low-carbon industrial strategies

While many governments are beginning to adopt low-carbon policy frameworks to an encouraging degree, to capitalise on emerging markets in renewable energy and related technologies and establish their place in new global value and supply chains and create jobs they will need a cohesive, multi-dimensional, strategy.

2. Finance is critical to the creation of low-carbon economic opportunities.

The low-carbon economy, and the job opportunities it promises, should not whither due to lack of access to capital. In the current economic climate with finance still constrained, this is a real danger that only governments can address.

GCN recommendation: Governments must pull all available financial levers

Governments must develop what some contributors to this study have called 'a robust pipeline of financing from government, the financial markets and international institutions' to ensure that low-carbon technologies are not starved of investment.

3. Training is critical to the development of low-carbon sectors.

Each of our national studies concludes that – among other factors – equipping new workforces with the required skills is of high importance. In among the numerical projections, there are also important arguments to be made about the 'quality' of the jobs created.

GCN recommendation: Identify skills gaps and develop a training strategy

A first step towards a low-carbon skills and training strategy should be the identification by national governments or appropriate agencies of the likely skills gaps that might develop if wider low-carbon industrial strategies are pursued.

4. Adjustment policies should also form part of the strategy.

While the shift to a low-carbon economy promises to create a net job gain, at least in the transition phase, there will be losers and their loss will be costly at the household, economic and political levels.

GCN recommendation: Identify likely job losses and ensure these are minimised

Retraining staff and helping firms to orientate their business towards greater efficiency will be as essential in low-carbon industrial strategy as enabling the low-carbon economy.

The Global Climate Network

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The Global Climate Network is a collaboration of independent, influential and progressive research and policy organisations in countries key to tackling climate change. Together, members of the Network are committed to addressing the constraints faced by sovereign governments in agreeing international action.

The Network aims to help governments clear a pathway towards an effective and fair international agreement for avoiding dangerous climate change by proposing bold low-carbon policies and using data and analysis to persuade policymakers that climate change mitigation is in their interest.

The Network is working to:

- Address the political (economic, social and cultural) constraints barring the way to action by bridging the divide between domestic and international policy
- Promote equitable solutions that take into account the huge development, financial and energy challenges countries face
- Champion ideas and innovations to help construct a new political narrative that links action on climate change with enhanced economic and social well-being.

Alone, each Global Climate Network member has significant credibility and influence. By producing joint research, staging events together and seeking to influence policy, the Network can help bridge the dangerous divide that exists and is currently widening between international negotiations and national politics.

The Network's members are:

- **Institute for Public Policy Research (ippr),** London, also acting as the secretariat for the Network: The UK's leading progressive think tank with a strong track record on research and policy.
- **Center for American Progress,** USA: Founded by John Podesta, former Chief of Staff to President Clinton.
- **Research Centre for Sustainable Development,** China: An institute of the Chinese Academy of Social Sciences. Dr Jiahua Pan, its director, is one of 12 members of the Chinese Experts Committee for Climate Change.
- **The Energy and Resources Institute,** India: The country's leading climate and energy research institute whose director, Dr Rajendra Pachauri, chairs the UN's Intergovernmental Panel on Climate Change and is a close adviser to the Indian government.
- **Wuppertal Institute for Climate, Environment and Energy,** Germany. The Wuppertal Institute is renowned for its ground-breaking climate change work.
- **Vitae Civilis,** Brazil. Dr Rubens Born, Vitae Civilis's director, has had significant input into the Brazilian government's recent climate change plan.
- **International Centre for Energy, Environment and Development,** Nigeria. ICEED has expertise in climate change and energy policy.
- **The Climate Institute,** Australia. Set up in 2005, the Institute is a leading Australian voice in climate research and advocacy, pioneering clean technology and investment solutions with government and business.
- **IMBEWU Sustainability Legal Specialists Pty Ltd,** South Africa. An influential Johannesburg-based legal consultancy specialising in sustainability law with a strong climate change focus.

Dr Rajendra Pachauri, John Podesta (see above) and Lord Chris Patten of Barnes, former European Commissioner for External Affairs, are the Network's first patrons.

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