



**Global Climate
Network**

Creating Opportunity

Low-carbon jobs in an interconnected world

Interim findings

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The Global Climate Network

The Global Climate Network is an alliance of nine influential, progressive think tanks located in countries where taking action on climate change really matters. We bring together some of the world's brightest brains to figure out and propose progressive solutions to climate change that will also help lay the foundations for a new era of prosperity.

Our focus is on policy. We will work with decision makers on innovations that help clear space for progressive action on climate change. Each of us enjoys international renown, but understands that domestic transformation is the key to successful global action.

ippur UK (also 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 and run by John Podesta, former Chief of Staff to President Clinton, who recently ran President Obama's transition team.

The Energy and Resources Institute India: Its director is Dr Rajendra Pachauri, chair of the UN's Intergovernmental Panel on Climate Change and a close adviser to the Indian government.

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.

Wuppertal Institute for Climate, Energy and Environment Germany: Wuppertal Institute's ground-breaking climate change work is highly regarded both within and outside Germany.

Vitae Civilis Institute Brazil: Dr Rubens Born, Vitae Civilis's director, is one of Brazil's foremost commentators on climate change policy and has had significant input into the government's recent climate change plan.

International Centre for Energy, Environment and Development Nigeria: ICEED has expertise in climate change and energy policy. Dr Ewah Eleri, its director, is the author of Nigeria's renewable energy strategy.

The Climate Institute Australia: Set up in 2005, the Institute is a leading voice in climate research and advocacy, pioneering clean technology and investment solutions with government and business.

IMBEWU Sustainability Legal Specialists South Africa: An influential Johannesburg-based legal consultancy specialising in climate change law, whose director is Andrew Gilder.

Our patrons are Dr Rajendra Pachauri, chair of the Intergovernmental Panel on Climate Change and The Energy and Resources Institute's director general, John Podesta, director of Center for American Progress and Lord Chris Patten of Barnes, former European Commissioner for External Affairs.

Introduction

If governments are bold and ambitious in developing markets for low-carbon technologies, then they will maximise the economic benefits and stand a greater chance of creating more jobs. That is the simple message from a new Global Climate Network (GCN) study currently underway in nine member countries and due to be completed and published in October 2009.

Early findings from the study suggest that creating markets for low-carbon technologies will in turn create new job opportunities and that these will be greater than the number of jobs lost in carbon-intensive sectors. For instance, the creation of renewable electricity generation markets in China as well as the prioritisation of sectors such as services that are not carbon intensive could lead to 30 million additional jobs being created by 2020.

The study also finds that the creation of markets for low-carbon technologies in one country will lead to greater opportunities in others. Interconnectedness means policy coordination is required. For instance, ambitious wind energy development inside India could create more than 243,000 jobs in India in 2020 but with ambitious global wind energy development this figure could rise to more than 288,000 Indian jobs

Extensive reviews of literature and data analysis that are being carried out by the GCN's nine member think tanks point to the need for bold government policy. For instance, in Germany where market creation policies have been in place for some years, more people were employed in renewable electricity generation in 2008 than in conventional carbon-intensive electricity generation.

The GCN's analysis also suggests politicians should adopt a guarded approach to predictions of job numbers and targets and focus on measures to stimulate low-carbon technology markets. All such data is highly uncertain and is based on sets of assumptions that, as technologies and technology markets mature, may prove errant.

Experience from other technology sectors, such as information and communication technologies, teaches us that the dynamism of technology is inherently unpredictable and that numbers of jobs created by prioritising technology could be many times greater than current predictions are likely to suggest.

Creating low-carbon jobs in an interconnected world

The UN Environment Programme (UNEP) in a 2008 study estimates that in 2006 2.3 million people were employed in renewable energy industries¹. This includes 300,000 people employed in the wind industry, 170,000 in solar PV, 600,000 in solar thermal and 1.2 million in biomass-derived energy (mostly in growing and collecting feedstock, and processing industries). According to the report, the majority of these jobs are located in countries at the forefront of renewable technology innovation and development, namely Germany, Japan, China, Brazil and the United States.

The same UN 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. A very recent Climate Group report (2009) has suggested that 10 million additional jobs could be created in 2020 if developed countries reduce emissions by 30 per cent relative to 1990 and developing countries return to their 2010 levels.

An alternative approach outlined in the literature is to measure the employment opportunities provided by clean energy compared with carbon-intensive industries. According to UNEP and the SEF Alliance (2008), renewable-energy programmes will generate, per dollar, 'an order of magnitude more jobs than will expenditures for fossil fuel plants or tax cuts'.

Further to this, Daniel Kammen, Kamal Kapadia and Matthias Fripp (2004) claim that renewable energy not only generates more jobs per dollar of investment than fossil fuel energy, but also per megawatt of power installed and per unit of energy produced. Others have pointed out that mean deviations in such data are too great to enable a firm conclusion to be reached.

Creating markets for clean-energy technologies in one location will create employment opportunities not only there but also in other countries, precisely because supply and value chains are now global. This suggests that in implementing market creation policies in low-carbon technologies, governments must analyse and understand their likely comparative advantage in the global value chain.

In the global electronics market – which involves the manufacturing of components for circuit-boards and microprocessors in telecommunications, medical equipment, optical technologies, photonics and consumer electronics – China, with its low labour costs and high productivity, has benefited from job creation as a result of consumer electronics markets elsewhere. The number of jobs in the country's electronic information industry is reported to have grown from 3.01 million in 2001 to 4.08 million in 2003 and 7.61 million in 2005 (of whom 5.51 million are employed in manufacturing).

However, comparative advantage is not fixed. The electronics industry has witnessed a globalisation of upstream activities also, owing to increasing access to and exchange of knowledge, innovation strategies and sophisticated research capabilities. Taiwan, for example, is now one of many emerging centres of excellence in Asia for chip design.

India's Suzlon provides an example of a multi-national renewables firm that has developed comparative global advantage in wind turbine manufacturing and sales by

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).

acting early and decisively. In particular, it has established a business model which takes advantage of expansive 'international innovation networks' of subsidiaries (Lewis 2006). Today, according to the company itself, Suzlon operates in 21 countries worldwide, employing more than 14,000 workers, and accounts for 9 per cent of the world wind energy market.

Much of the international literature on low-carbon economic development suggests that the creation of jobs is largely dependent on the maturity of domestic and international markets and the existence of favourable policy environments to stimulate the growth of clean energy technology and industries.

UNEP (2008) suggests 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.

The GCN's review of the literature also reveals that there are significant gaps, for instance in the analysis of global supply and value chains and their impact on job creation, and uncertainties, especially surrounding predictions of the precise size of markets and therefore numbers of jobs created. It is worth remembering that predictions of information and communication technology markets, for instance that by McKinsey and Company for AT&T in the early 1980s², often wildly underestimate the eventual scale of market development and economic opportunity.

² In the early 1980s, consultants McKinsey and Company completed a study for AT&T predicting there would be fewer than one million wireless subscribers in the US by the turn of the century. Today, nearly 2.5 billion subscribers across the globe are using digital wireless technologies for voice, email, internet access, music and video services.

Interim findings from the GCN study

More jobs will be created than lost in the move to low-carbon.

The literature on low-carbon job creation is incomplete but there is strong evidence in the studies published so far – including in the GCN's own ongoing work – to suggest that creating markets for low-carbon technologies will lead to more jobs created than will be lost in carbon-intensive industries.

For instance, China's existing plans to decouple emissions from economic growth by 2020 and develop new sectors, such as renewable electricity generation, services and high tech industries (not all of which are 100 per cent low carbon), could lead to the creation of over 40 million new jobs. In the same time frame there may be 10 million fewer new jobs created (in a job market that is nevertheless growing rapidly) due to the closure of factories with inefficient technologies in the manufacturing, construction and transport sectors.

New markets for low-carbon technology will create new jobs.

In developing countries where unemployment is high and in developed countries where job losses are currently a major concern, developing markets for low-carbon technologies can provide an additional avenue for employment creation. For instance, this study estimates that in Nigeria an additional 273,500 jobs could be created in small-scale hydro and gas technologies with little impact on jobs in competing carbon-intensive sectors. In Australia, tens of thousands of new construction jobs are likely to be created, many of which will be in rural areas.

Markets created in one country will create jobs in others.

The globalisation of supply chains means that the job creation effects of low-carbon policies will not be restricted to the country in which the policies are implemented. For example, this study estimates that ambitious wind energy development in India could create more than 243,000 jobs in India in 2020, but with ambitious global wind energy development this figure could rise to more than 288,000 Indian jobs.

A stronger policy response makes net benefits more likely.

If governments are bold with policies aimed at creating markets for low-carbon technologies, then the likelihood of a net jobs gain is higher. In South Africa, for instance, the GCN study identifies potential net job losses (about 0.3 per cent) if the government aims at short-term efficiency to reduce greenhouse gas emissions by around 9,000 tonnes in 2050. However, if the aim is to reduce emissions by around 13,800 tonnes in 2050, policies will have to be stronger and there could be a net benefit in employment of around 1 per cent in 2015.

Jobs will, however, be lost as economies shift to low carbon.

It is therefore very important to ensure policies are in place to assist people who lose jobs, including financial and retraining support, and better still if job losses are minimised through a strong government policy response.

Jobs in carbon-intensive sectors are in some cases in decline already.

This is due to a range of factors including policies already in place to encourage the installation of renewable energy infrastructure to generate electricity. In Germany, where market creation policies have been in place for some years, more people were employed in renewable electricity generation in 2008 than in conventional carbon-intensive electricity generation. In Nigeria, general energy sector reform, rather than low-carbon policies, has led to a steep decline in jobs in electricity generation.

Low-carbon job creation has happened as a result of policies up until now.

Where jobs in low-carbon electricity generation have been created, this has largely been the result of government policies to create markets for certain technologies. In Germany and in the UK, subsidies to renewable electricity generation have created demand for the installation of new generating capacity. This suggests job creation could be magnified with more comprehensive market creation policies in a greater number of countries.

The issue of comparative advantage is of high importance.

Policies to create low-carbon employment might be unsuccessful or their success short-lived if they are focused on areas or sectors in which countries have no particular comparative advantage. For instance, although solar water heaters might be deployed widely in South Africa, the technology is already relatively mature and is likely to be imported rather than manufactured locally. Conversely, Germany may not be the best location for concentrating solar power on a large scale, but its manufacturers and service providers may be well placed to supply desert regions.

Policies will vary according to national circumstances.

While the mantra of international climate policy should be about government policies that help to create markets and thus jobs, the precise nature of policies will necessarily vary. For instance, in many developing countries (including China, India and South Africa in this study) the emphasis is likely to be on the creation of a high number of lower-skilled jobs; policies will be evaluated for their impact in this regard.

Many low-carbon jobs will be created outside of manufacturing sectors.

For instance, installing electricity generating capacity requires not only manufactured goods, but also financial and legal services and project management. The comparative advantage of some countries – the UK being one example – will lie in these parts of the value chain rather than in engineering.

Predictions of numbers of jobs created are highly uncertain.

They depend on a wide range of factors and – most critically – on the types of policies chosen by governments and how well these are implemented. For instance, wind energy job creation in India in 2020 could, according to a range of different scenarios, range from fewer than 7,000 (notably fewer jobs than already exist in the sector) to more than 288,000 depending on domestic policies and those in other countries.

The only certainty is that without government policies to create markets in a critical mass of countries – for instance in leading G20 economies – any projections for job creation in low-carbon sectors will be fanciful.

Methodology

The study is being carried out in all nine GCN member countries. It began with a review at the international level of literature on job creation in low-carbon electricity generation, which was accompanied by reviews of both literature and government policy in each member country. A previous GCN study – *Breaking Through on Technology*, in which the GCN examined the barriers to low-carbon technology – helped members select which low-carbon electricity generation technologies to focus on (that is, those that policymakers are already prioritising).

As a result of this process, GCN members have chosen to focus on analysis of employment data in sectors that, while part of the low-carbon electricity generation narrative, are nevertheless disparate (from wind and solar in India and China, to small-scale hydro in Nigeria and smart meters and grids in the US) and hard to compare. It is for this reason that we do not plan to have a single, definitive number for job creation potential in low-carbon electricity generation.

Currently, GCN members are interviewing stakeholders from government, business and other experts to determine attitudes to and experience of policies and approaches aimed at creating low-carbon jobs in our nine member countries. Final results from the study are expected in October 2009 and, in the meantime, some of the data presented in this paper may be revised.

A review of relevant literature including an extensive list of references is available on the GCN's website. For more details, please visit www.globalclimatenetwork.info/publicationsandreports/publication.asp?id=701

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