



# Green Jobs:

Towards decent work in a sustainable, low-carbon world

**Policy messages and main findings for decision makers**



## Cover Photos

© Wolfgang Steche / VISUM / Still Pictures

*Solar panels being installed at a former mining site in Germany.*

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*E-recycling of old mobile phones: employee is repairing mobile phone for re-usage.*

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*Construction of a wind engine by workers.*

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Towards decent work in a sustainable, low-carbon world

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**Note by the editors:**

The present overview draws on evidence and findings presented in the report **“Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World”**. While the overview is consistent with the report, it also includes reflections emerging from the exchanges among the partners of the Green Jobs Initiative not contained in the original report.

The original report is commissioned and funded by the United Nations Environment Programme (UNEP), as part of the Green Jobs Initiative jointly mounted by UNEP, the International Labour Organization (ILO), the International Organisation of Employers (IOE) and the International Trade Union Confederation (ITUC). It is produced by the Worldwatch Institute, with technical assistance from the Cornell University Global Labour Institute, for UNEP.

**Copies of the report:**

The report has been published in electronic format, in English only. It is available for downloading at the UNEP and ILO websites:

[www.unep.org/civil\\_society/Publications/index.asp](http://www.unep.org/civil_society/Publications/index.asp)

[www.unep.org/labour\\_environment/features/greenjobs.asp](http://www.unep.org/labour_environment/features/greenjobs.asp)

[www.ilo.org](http://www.ilo.org)

Copies of the overview are available in English, French and Spanish from:

United Nations Environment Programme (UNEP)

P. O. Box. 30552 Nairobi, Kenya

Email: [civil.society@unep.org](mailto:civil.society@unep.org)

Website: [www.unep.org/civil\\_society](http://www.unep.org/civil_society)

**Design, layout and printing:**

Publishing Services Section

United Nations Office at Nairobi (UNON)

UNEP, ILO, IOE, ITUC

Green Jobs Initiative



United Nations  
Environment  
Programme



International  
Labour  
Organization



International  
Organisation  
of Employers

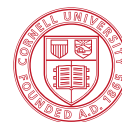


International  
Trade Union  
Confederation

Report produced by



with technical assistance from



Cornell University  
ILR School  
Global Labor Institute

## Acknowledgments

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UNEP acknowledges the contributions made by the International Labour Organization (ILO), the International Organisation of Employers (IOE), the International Trade Union Confederation (ITUC), the Worldwatch Institute, and the Cornell University Global Labor Institute in the preparation and publication of the present report.

## Explanatory notes

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In this document all units are metric unless otherwise indicated. Currency values are reported in US dollars throughout the report. Original currency values other than dollars are reported in parentheses and are translated into US dollars using the following 2007 average exchange rates: €1 (euro) = \$1.37; £1 (British pound) = \$2.00 (Federal Reserve Bank of New York "Foreign Exchange Rates Historical Search," at [www.ny.frb.org/markets/fxrates/historical/home.cfm](http://www.ny.frb.org/markets/fxrates/historical/home.cfm)).

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*Chimneys billowing out industrial pollution into the air. Many industrial processes have led to the pollution of virtually every aspect of the biosphere: land, rivers, seas and the atmosphere. Romania.*

# I. Global Challenges and Pressing Questions

## Facing up to the dual challenge

**T**he notion of “green jobs” has become something of an emblem of a more sustainable economy and society, that aims to preserve the environment for both present and future generations and to be more equitable and inclusive of all people and all countries.

Green jobs hold the promise that humankind will be able to face up to the following two defining challenges of the twenty-first century:

- ❑ Averting dangerous and potentially unmanageable climate change and protecting the natural environment which supports life on earth
- ❑ Providing decent work and thus the prospect of well-being and dignity for all in the face of rapid population growth worldwide and the current exclusion of over a billion people from economic and social development

The above challenges are closely linked and cannot therefore be addressed separately. Green jobs are key to meeting both simultaneously.

**Environmental degradation**, including the pollution of water, land and air, the irreversible loss of biodiversity, the deterioration and exhaustion of natural resources like water, fertile agricultural land, and fish, is one of the most serious threats facing economic and broader sustainable development. The environmental and health costs already often outweigh the gains from the economic activity causing the damage.

Such degradation will, in the future, be exacerbated by the impacts of climate change, which are already felt in many developing countries. In the medium-to-long term, projected climate change will lead to the serious disruption of economic and social activity in many sectors worldwide. Scientific scenarios for avoiding dangerous and possibly unmanageable climate change require global emissions of greenhouse gases to peak over the next 10-15 years and then to decline by half until the middle of the century. Stabilizing the climate will require a rapid shift to a low-carbon world economy.

**The social challenge** looms just as large: a staggering 1.3 billion people, over 40 per cent of the global workforce, and their dependants are condemned to a life in poverty and insecurity because their earnings are too low and they are relegated to the informal economy. There are 190 million unemployed and tens of millions of young job seekers cannot find a place in society.

Labour markets are vital not only for the production and generation of wealth, but equally for its distribution. Income from work plays a prime role in poverty reduction and in sharing the benefits of economic growth. Beyond its fundamental economic role for countries, enterprises, families and individuals, work enables individuals to build identities, to participate in and to contribute to society. Gainful employment and decent work are therefore also critical for social cohesion and stability.

### Box 1: Decent work

Decent work is defined as opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity.

Decent work sums up the aspirations of people in their working lives – their aspirations for opportunity and income; rights, voice and recognition; for family stability and personal development; for fairness and gender equality. Ultimately these various dimensions of decent work underpin peace in communities and society. Decent work is central to efforts to reduce poverty, and is a means for achieving equitable, inclusive and sustainable development.

(ILO definition)

Source: [http://www.ilo.org/global/About\\_the\\_ILO/Mainpillars/WhatIsDecentWork/index.htm](http://www.ilo.org/global/About_the_ILO/Mainpillars/WhatIsDecentWork/index.htm)

**Dual challenge:** Climate change itself, adaptation to it and efforts to arrest it by reducing emissions have far-reaching implications for economic and social development, for production and consumption patterns and thus for employment, incomes and poverty reduction. These implications harbour both major risks and opportunities for working people in all countries, but particularly for the most vulnerable in the least developed countries and in small island States.

Making economic growth and development compatible with stabilizing the climate and with a sustainable environmental footprint will require a drastic shift towards clean development and green, low-carbon economies worldwide. This will require a second great transformation of economies and societies, as far-reaching as the first transformation brought about by the Industrial Revolution. The rationale for green growth and clean development has mostly been presented as a win-win situation for the environment and for economic development. Relatively little and superficial attention has been paid to the social dimension of sustainable development, in particular to the implications for employment and for decent work.

### **Box 2: The dual challenge in numbers**

#### **Environmental challenge**

- ❑ Climate-related disasters: 262 million people affected annually over the period 2000-2004
- ❑ Water shortages: 1.8 billion expected to suffer from fresh water scarcity by 2025, mostly in Asia and Africa
- ❑ Environmental refugees: 50 million people potentially forced to become environmental refugees by climate change over the next few years
- ❑ Displacement by flooding: 330 million people increasingly exposed to flooding in coastal areas, flood plains of rivers and small island States
- ❑ Food shortages and malnutrition: currently affect 180 million people and threaten to affect 600 million people by 2080
- ❑ Pollution: 2 million premature deaths globally each year due to indoor and outdoor air pollution
- ❑ Loss of biodiversity: the great majority of well-studied species are declining in distribution, abundance or both. Biological products and processes make up 40 per cent of the global economy. Poor people, especially those living in areas of low agricultural productivity, depend heavily on the genetic diversity of the environment

#### **Decent work challenge**

- ❑ Working poor: 1.3 billion in the world with earnings too low to lift them and their dependants above the poverty threshold of \$2 per day (more than 43 per cent of the global workforce)
- ❑ Unemployed: 190 million globally
- ❑ Young job seekers: over 500 million additional job-seekers over the next 10 years
- ❑ Insecurity: 5.3 billion people without access to any social security coverage
- ❑ Access to energy: 1.6 billion people without access to modern energy (almost 1 in 4 humans living today)
- ❑ Adequate housing: 1 billion slum dwellers in poor housing lacking essential facilities such as clean water and sanitation

## Green Jobs report: answers to pressing questions

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The Green Jobs report was funded and commissioned by UNEP under the joint UNEP, ILO, IOE and ITUC Green Jobs Initiative, in order to shed light on the impact that transformation to a green economy will have on work, on enterprise and on the way people earn a living.

The report has been produced by the Worldwatch Institute with technical assistance from the Cornell University Global Labor Institute. It is the first study which provides a global overview drawing on available information from around the world. It provides an initial answer to the following pressing questions:

- ❑ How many green jobs have already been created in the early stages of the transformation to a green economy?
- ❑ How many can be expected in the future?
- ❑ Where are these jobs being created and who is likely to have access to them? Will developing countries benefit as much as industrialized ones?
- ❑ What kind of jobs are they? Are they decent and if not what can be done to remedy this?
- ❑ Which jobs are at risk because of the transformation? Will there be more winners than losers? What actions are required to help the losers achieve a just transition?
- ❑ What are the obstacles to be overcome on the road to a more sustainable future?
- ❑ What are the pathways and policies leading to a sustainable economy and society?

This overview presents the key findings of the report.

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*Initiatives for energy efficiency and renewable energy have had priority in Denmark for over 25 years. The Danish plans and initiatives have resulted in development of new technologies and of successful use of energy efficiency and renewable energy. Aarhus, Denmark.*



# II. Key Findings of the Report

## What are “green jobs”?

**G**reen jobs reduce the environmental impact of enterprises and economic sectors, ultimately to levels that are sustainable. The report defines “green jobs” as work in agriculture, industry, services and administration that contributes to preserving or restoring the quality of the environment.

Green jobs are found in many sectors of the economy from energy supply to recycling and from agriculture and construction to transportation. They help to cut the consumption of energy, raw materials and water through high-efficiency strategies, to de-carbonize the economy and reduce greenhouse-gas emissions, to minimize or avoid altogether all forms of waste and pollution, to protect and restore ecosystems and biodiversity.

Green jobs play a crucial role in reducing the environmental footprint of economic activity. This reduction is gradual and the different jobs contribute to different degrees. Workers manufacturing fuel-efficient or hybrid cars, for example, contribute less to reducing emissions from transport than those working in public transport systems. Moreover, what is considered fuel-efficient today will no longer qualify in ten years’ time. The notion of a green job is thus not absolute, but there are ‘shades’ of green and the notion will evolve over time (see table 1).

## Green jobs and decent work

The report finds that many jobs which are green in principle are not green in practice because of the environmental damage caused by inappropriate practices. Moreover, the evidence shows that green jobs do not automatically constitute decent work. Many current recycling jobs, for instance, recover raw material and thus help to alleviate pressure on natural resources, but apply a process which is often dirty, dangerous and difficult, causing significant damage to the environment and to human health. Employment in this industry tends to be precarious and incomes are low. If green jobs are to be a bridge to a truly sustainable future, this needs to change.

A sustainable economy can no longer externalize environmental and social costs. The price that society pays for the consequences of pollution, such as that of ill-health, must be reflected in the prices paid in the marketplace. Green jobs therefore need to comprise decent work (see box 1 for definition). Decent, green jobs effectively link Millennium Development Goal 1 (poverty reduction) and Millennium Development Goal 7 (protecting the environment) and make them mutually supportive rather than conflicting.

## Millions of green jobs already in existence

The analysis focused on the following six economic sectors that are particularly important in terms of greenhouse-gas emission and use of natural resources for raw material, as well as their contribution to the economy and as sources of employment and income: energy supply, in particular renewable energy, building and construction, transportation, basic industry, agriculture and forestry.

Notwithstanding major gaps in data availability, particularly in developing countries, the report finds that millions of green jobs already exist in industrialized countries, emerging economies and developing countries alike:

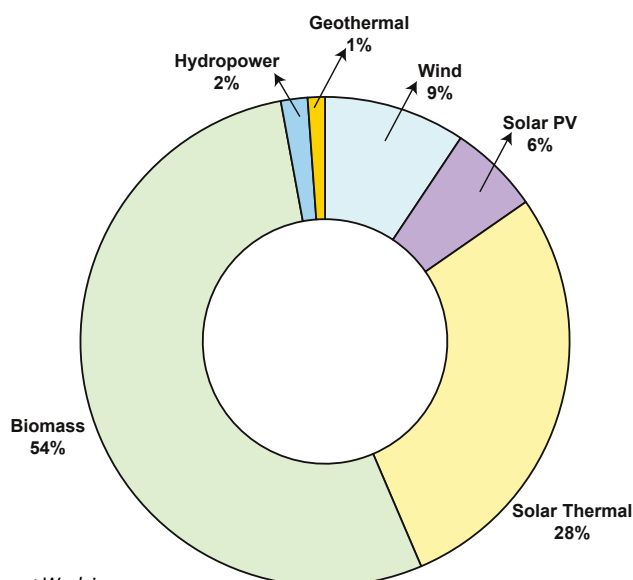
- ❑ **Energy supply – renewable sources of energy:** more than 2.3 million green jobs have been created in recent years in this sector; however, these only supply 2 per cent of the world’s energy. The wind power industry employs some 300,000 people, the solar PV sector an estimated 170,000, and the solar thermal industry more than 600,000, a large proportion of these in China. Countries with active policies to promote renewable energy have seen employment surge in this sector. In Germany, for example, the number of jobs almost quadrupled to 260,000 in less than 10 years (see table 3). Data are only available for seven countries and the estimate is almost certainly conservative. Half of the reported jobs are in emerging and developing economies (see figure 1 and table 2).

**Table 1. Shades of green: pro-environmental measures in major segments of the economy**

<b>Energy supply</b>	
	Integrated gasification/ carbon sequestration
	Co-generation (combined heat and power)
	Renewables (wind, solar, biofuels, geothermal, small-scale hydro); fuel cells
<b>Transport</b>	
	More fuel-efficient vehicles
	Hybrid-electric, electric, and fuel-cell vehicles
	Car-sharing
	Public transport
	Non-motorized transport (biking, walking), and changes in land-use policies and settlement patterns (reducing distance and dependence on motorized transport)
<b>Manufacturing</b>	
	Pollution control (scrubbers and other tailpipe technologies)
	Energy and materials efficiency
	Clean production techniques (toxics avoidance)
	Cradle-to-cradle (closed-loop systems)
<b>Buildings</b>	
	Lighting, energy-efficient appliances and office equipment
	Solar heating and cooling, solar panels
	Retrofitting
	Green buildings (energy-efficient windows, insulation, building materials, heating, ventilation and air-conditioning)
	Passive-solar houses, zero-emissions buildings
<b>Materials Management</b>	
	Recycling
	Extended producer responsibility, product take-back and remanufacturing
	De-materialization
	Durability and reparability of products
<b>Retail</b>	
	Promotion of efficient products and use of eco-labels
	Store locations closer to residential areas
	Minimization of shipping distances (from origin of products to store location)
	New service economy (selling services, not products)
<b>Agriculture</b>	
	Soil conservation
	Water efficiency
	Organic growing methods
	Reducing farm-to-market distance
<b>Forestry</b>	
	Reforestation and afforestation projects
	Agroforestry
	Sustainable forestry management and certification schemes
	Halting deforestation

Source: Green Jobs - Towards Decent Work in a Sustainable, Low-Carbon World, UNEP/ILO/IOE/ITUC, September 2008

Figure 1. Global estimated employment in the renewable energy sector, selected countries and world, 2006



Source: Green Jobs - Towards Decent Work in a Sustainable, Low-Carbon World, UNEP/ILO/IOE/ITUC, September 2008

Table 2. Estimated employment in the renewable energy sector, selected countries and world, 2006

Renewable energy source	World*	Selected Countries	
Wind	300,000	Germany	82,100
		United States	36,800
		Spain	35,000
		China	22,200
		Denmark	21,000
		India	10,000
Solar PV	170,000**	China	55,000
		Germany	35,000
		Spain	26,449
		United States	15,700
Solar thermal	624,000-plus	China	600,000
		Germany	13,300
		Spain	9,142
		United States	1,900
Biomass	1,174,000	Brazil	500,000
		United States	312,200
		China	266,000
		Germany	95,400
		Spain	10,349
Hydropower	39,000-plus	Europe	20,000
		United States	19,000
Geothermal	25,000	United States	21,000
		Germany	4,200
Renewables, combined	2,332,000-plus		

\*Countries for which information is available.

\*\*Under the assumption that Japan's PV industry employs roughly as many people as Germany's.

Source: Green Jobs - Towards Decent Work in a Sustainable, Low-Carbon World, UNEP/ILO/IOE/ITUC, September 2008

Bioenergy has a particularly high potential to create employment and accounts for half the reported jobs. The environmental and social merits of bioenergy as an alternative fuel for transportation vary greatly. Under favourable conditions, they can contribute substantially to reducing greenhouse-gas emissions from transportation. The quality of jobs in the biofuels industry also varies significantly with the availability of high income and generally decent jobs on the one hand, and on the other those with conditions that actually violate fundamental human and labour rights.

### Box 3: Solar women entrepreneurs in Bangladesh

Some 70 per cent of the population of Bangladesh, mostly in rural areas, do not have access to electricity. Improving their livelihoods and income opportunities requires an economically viable alternative to the current grid system. Grameen Shakti (GS), a not-for-profit company, has helped more than 100,000 rural households to install solar home systems. This has been one of the fastest-growing photovoltaic programmes in the world, expected to install 1 million systems by 2015.



© Grameen Shakti

GS operates a small loans scheme which enables even very poor rural households to buy a system without subsidies. The scheme also creates local jobs and income opportunities. Some 660 local youngsters and women have already been trained as certified technicians in the repair and maintenance of PV systems. Another 5,000 are planned.

Many more jobs are created indirectly as solar systems enable local entrepreneurs to start up new businesses such as community TV shops, solar-charged mobile phone centres and electronic repair shops. GS is aiming to create 100,000 jobs in renewable energy and related businesses.

Source: Grameen Shakti – <http://www.gshakti.org/> and

Dipal C. Barua (2008) – <http://www.ilo.org/public/english/region/asro/bangkok/events/greenjobs/papers/index.htm>

Table 3. Employment in Germany's renewables sector, 1998, 2004 and 2006\*

	1998	2004	2006	Expected growth, 2006–2010† (per cent)
Wind power	16,600	63,900	82,100	6.8
Solar energy	5,400	25,100	40,200‡	49
Hydropower	8,600	9,500	9,400	n/a
Geothermal energy	1,600	1,800	4,200	74
Biomass	25,400	56,800	95,400	37
Services	10,000	n/a	n/a	n/a
Subtotal	66,600	157,100	231,300§	n/a
Research, public information, export and other marketing promotion, administration	n/a	3,400	4,300	n/a
Expansion of production capacities for renewable energy equipment	n/a	5,800	23,500	n/a
Total	66,600	166,300	259,100	n/a

\*Data include direct and indirect jobs, based on an input-output analysis. The data for the three years presented are not strictly comparable, as the underlying data collection for these estimates varies.

†According to a poll of businesses.

‡26,900 jobs in solar PV and 13,300 in solar thermal.

§Of this total, 139,300 jobs were in manufacturing and installations (including export sales), 41,800 in operations and maintenance, and another 50,200 in supplies of biofuels.

Source: Marlene Kratzat et al., "Erneuerbare Energien: Bruttobeschäftigung 2006" (Stuttgart, Berlin, and Osnabrück: Zentrum für Sonnenenergie und Wasserstoff-Forschung Baden-Württemberg, Deutsches Institut für Wirtschaftsforschung, Deutsches Zentrum für Luft- und Raumfahrt, and Gesellschaft für wirtschaftliche Strukturforschung, September 2007).

- **Energy efficiency, particularly in buildings and construction:** this is one of the areas with the highest potential to reduce greenhouse-gas emissions and to create jobs in the process. Some 4 million direct green jobs based on improving energy efficiency already exist across the economy in the United States and in certain European countries. Buildings currently account for less than one million of this total but could represent a future source of many more green jobs.

Buildings are responsible for 30–40 per cent of all energy use, greenhouse-gas emissions and waste generation. The construction and renovation of buildings also represents the sector with the highest technical and economic potential for reducing emissions. This conclusion is supported by the Intergovernmental Panel on Climate Change, and also by the McKinsey Global Research Institute. Using current technology, high-performance buildings have the potential to cut energy costs by at least 80 per cent compared with traditional building construction. Jobs in this sector are likely to be performed by people who already work in the building sector, but will be redefined in terms of new skills, training and certification requirements.

The great majority of efficiency measures, especially in the building sector, show positive employment and economic effects. A study undertaken in 2000 by the British Government concluded that, for every \$1.4 million (€1 million) invested in residential energy efficiency, 11.3–13.5 full-time equivalent (FTE) jobs were created. Half the economic potential for efficiency gains in buildings is located in developing countries, but no data on existing or potential jobs are available for that part of the world.

❑ **Transportation** is the lifeblood of the globalized economy. While efforts are being made to reduce the footprint of cars, public transport systems offer lower emissions and more green jobs. Only some 250,000 jobs in the manufacture of fuel-efficient, low-pollution and low-emissions cars can be considered green, in comparison to over 5 million jobs in the railways in China, India and the European Union alone, and millions more in public transport worldwide.

Railways can generally be regarded as sources of green employment. Unfortunately, in many countries, the trend over the last few decades has been away from this mode of transport, and towards cars, trucks, and planes. Employment—both in the operation of railway lines and in the manufacture of locomotives and rolling stock—has fallen accordingly.

Employment statistics for urban public transport are incomplete and trends vary considerably by city and country. Statistics do show, however, that some 1.3 million people work in public transport in the European Union and the United States alone. Public transport is a growth sector in a low-carbon world, particularly in the mega-cities of the developing world. Bus rapid transit systems are being put in place in more and more cities around the world, providing affordable and reliable public transport options. There are also substantial green employment opportunities in retrofitting diesel buses to reduce air pollutants, and in substituting cleaner compressed natural gas (CNG) or hybrid-electric buses. In New Delhi, the introduction of 6,100 CNG buses by 2009 is expected to lead to the creation of 18,000 new jobs.



© Martin Bond / Still Pictures

*A hydrogen fuel cell-powered electric bus in service crossing Tower Bridge in London. Part of the Clean Urban Transport Europe (CUTE) demonstration project testing 27 such pollution-free buses in nine European cities.*



© Bubsaba Kajejit – UNEP / Still Pictures

*Traffic congestion on Paholyotin Road, Chatuchak, Bangkok.*

#### Box 4: Green upgrading of low income urban housing in South Africa

Approximately 1 billion people worldwide live in urban slums, mostly in precarious dwellings lacking essential facilities. Improving living standards while reducing energy costs and the need for extra power generation can be achieved by upgrading these buildings. The work involved can create jobs for unemployed or underemployed people in these communities.

An example of such a scheme is the Kuyasa Low-Income Housing Upgrade in Cape Town, South Africa. Local artisans and unemployed youngsters from the township are trained to carry out the following three standard operations that improve the quality of housing and of life, yet reduce energy demand and emissions: insulate the roof to avoid the need for heating in winter, install solar thermal water-heating equipment and replace incandescent light bulbs with energy-efficient ones. The scheme contributes additional electricity in a country experiencing severe power shortages and blackouts. A household will save over 600 rand per year on energy.



© SouthSouthNorth

Thanks to support by SouthSouthNorth, a non-governmental organization, the scheme qualifies for support through the Clean Development Mechanism created under the Kyoto Protocol.

The scheme is being scaled up in 2008 to benefit 2,300 households with funding from the central Government and in close consultation with the Urban Renewal Programme of the city of Cape Town. A Community Trust model will see the creation of a sustainable community-owned energy services business, creating ongoing permanent employment and providing for the maintenance and monitoring of emissions reductions.

Income from the sale of carbon emission reduction certificates, together with contributions from beneficiaries, will finance the operations of the Trust, providing long-term opportunities for locally based small and micro enterprises. The Trust will be directly accountable to Kuyasa residents and will use its surplus income to support future community development initiatives. In spite of their benefits, such schemes are still exceedingly rare.

Source: SouthSouthNorth - South Africa - <http://www.southsouthnorth.org/>

- ❑ **Basic industries and recycling:** industrial sectors such as those of iron and steel, aluminium, cement, pulp and paper account for a large proportion of the use of energy and raw materials, along with greenhouse-gas emissions, but a relatively small proportion of global employment. Greening basic industries is difficult and fewer than 300,000 jobs in iron, steel and aluminium can be considered to have any “shade” of green.

The best option for reducing the impact of these industries is through recycling. Secondary steel production, based on recycled scrap, requires 40–75 per cent less energy than primary production and can therefore be seen as a proxy for greener production. Worldwide, 42 per cent of output was based on scrap in 2006. It is estimated that more than 200,000 jobs across the world are involved in secondary steel production.

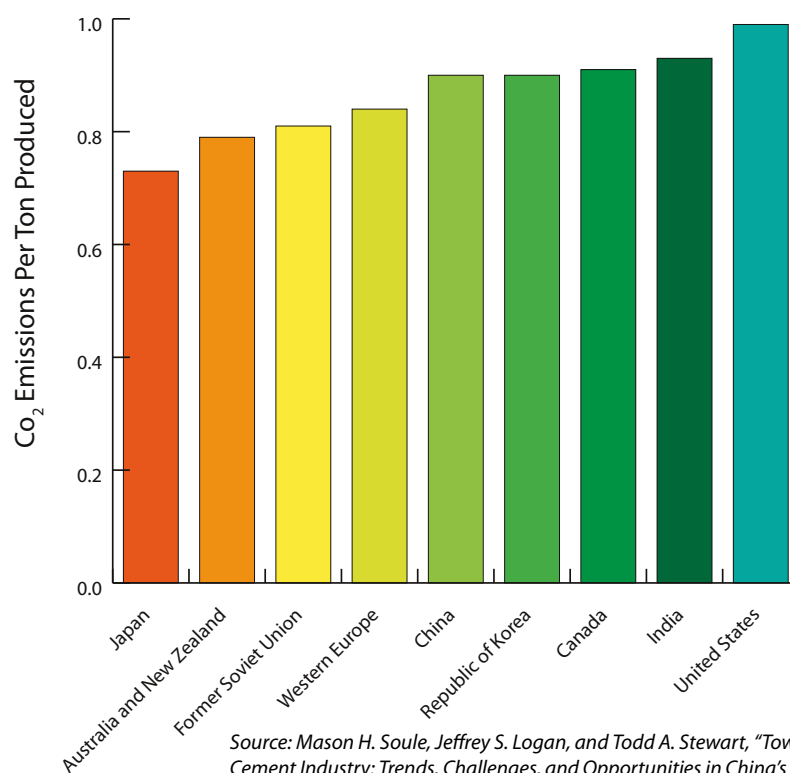
The Bureau of International Recycling in Belgium estimates that its members in 60 countries employ more than 1.5 million people. This is, however, a serious undercount. Recent reports put the number of recycling and remanufacturing jobs in the United States alone at more than 1 million. Jobs in this sector in Western Europe and Japan can be assumed to be even more numerous, as these regions have achieved higher rates of recycling than the United States. In China, an estimated 10 million people are employed in all forms of recycling, with 700,000 in electronics recycling alone. Brazil is thought to have some 500,000 recycling jobs. In addition, communal recycling and composting efforts are likely to account for many more jobs.

Recycling in all its forms provides 12 million jobs in the three countries for which data could be found (Brazil, China, United States). The report cautions, however, that many existing recycling jobs cannot be considered green because they cause both pollution and health hazards and are not examples of decent work.



© Joerg Boethling / Still Pictures  
Shipbreaking yard in Mumbai, India.

Figure 2: CO<sub>2</sub> emissions per ton of cement produced, selected countries, 2000



Source: Mason H. Soule, Jeffrey S. Logan, and Todd A. Stewart, "Towards a Sustainable Cement Industry: Trends, Challenges, and Opportunities in China's Cement Industry," Report Commissioned by the WBCSD (Columbus, OH: Battelle Memorial Institute, March 2002).

□ **Agriculture** is still the single largest employer in the world, with 1.3 billion farmers and agricultural workers in total. Decades of neglect and deteriorating farm-gate prices have led to unsustainable land-use practices and to bad jobs and low incomes, turning farmers and agricultural workers into the largest contingent of poor people in the world. Agriculture is both extremely vulnerable to climate change and a major contributor to it. It is also a major user and polluter of water, a driver of deforestation and of loss of biodiversity. While it is not possible with current statistics to quantify green jobs in the sector, the report finds that there is considerable potential in this area as evidenced by sustainable practices on productive family farms, organic production and successful adaptation to climate change.

Small farms are more labour-intensive. With adequate technical and infrastructural support, yields from small farms using crop rotation, manuring, natural pesticides, and other sustainable methods can match larger but often more environmentally damaging facilities. A policy-driven conversion to this type of farming will perhaps take decades, but the potential for green and decent work is considerable and the environmental benefits could be enormous.

With sales reaching \$100 billion in 2006, organic farming is beginning to register an impact. More labour-intensive than industrialized agriculture, the conversion of farmland for organic production could provide a good source of green employment in the future. A study of 1,144 organic farms in the United Kingdom and Ireland showed that they employed one third more full-time equivalent workers per farm than conventional farms. Organic agricultural land amounts to 4.3 per cent and 1 per cent of the total farm area in these two countries, respectively. If 20 per cent of farmland became organic in both countries, there would be an additional 73,200 jobs in the United Kingdom and 9,200 in Ireland.

Employing rural dwellers to repair and protect the natural environment could generate a large number of jobs. In South Africa, a public “Working for Water” programme has provided work for 25,000 previously unemployed people. Terracing or contouring land, building irrigation structures, conserving water and other related activities are labour-intensive and will therefore provide employment, as will the rehabilitation of dams, barrages, and embankments.

- ❑ **Forests** play a major role in maintaining the world’s natural life-support systems. As is the case with agriculture, data are scarce and it is impossible to establish which proportion of the some 40 million jobs and 60 million livelihoods of indigenous peoples can be considered sustainable and green. Given the current hope pinned on forests as carbon sinks and considering their role as providers of renewable raw material, pools of biodiversity, regulators of water flows and other environmental services, it is clear that green jobs in forests will play an increasingly important role in the future.



© ILO  
*Forests are major carbon sinks and providers of environmental services which are currently not paid for. Payment of such services can make many forms of forest conservation and sustainable forest management viable and provide stable employment and income for local populations.*  
Source: ILO

## What kinds of green jobs are being created?

## How can they contribute to decent work for all?

Green jobs span a wide array of occupational profiles, of skills and of educational backgrounds. Some constitute entirely new types of jobs, but most build on traditional professions and occupations, albeit with more or less modified job contents and competencies. This is true for direct green jobs as well as for indirect ones in upstream supplier industries. Even in the case of new industries and technologies, such as wind and solar power generation, the supply chains consist largely of traditional industries like iron and steel and the manufacture of machine parts.

There is evidence of the viability and potential for green jobs across the entire workforce, from manual labourers through skilled workers, craftsmen and entrepreneurs to highly qualified technicians, engineers and managers. Green jobs currently exist and can develop further in many economic sectors both in urban and rural economies.

## Will green jobs benefit developing countries as much as industrialized ones?

Existing and reported green jobs tend to be concentrated in certain countries and regions. This, however, is a reflection of proactive policy initiatives and current investment patterns, rather than inherent to the concept. There are numerous case examples and pilot projects that demonstrate the scope and the potential for green jobs in developing countries albeit so far only on a limited scale. Where more data exist, such as on renewable energy, half the reported jobs are found in developing countries. Green jobs in emerging economies and developing countries include opportunities for managers, scientists and technicians, but primarily benefit a broad cross-section of the population that needs them most: young people, women, farmers, rural populations and slum dwellers.

The contribution that green jobs will make to clean economic growth, development and poverty reduction will ultimately depend on the quality of these jobs. The report finds that many existing green jobs are of poor quality and those in recycling, construction or biofuels for example, are often informal in nature. Employment in recycling is often precarious—it involves serious occupational and also public safety and health hazards and generates wages and incomes below the cost of living. Serious labour and human rights violations have been recorded in relation to feedstock production for biofuels. While there are clearly constraints and obstacles, however, the potential for green jobs is still enormous.

## Tremendous potential for future green jobs

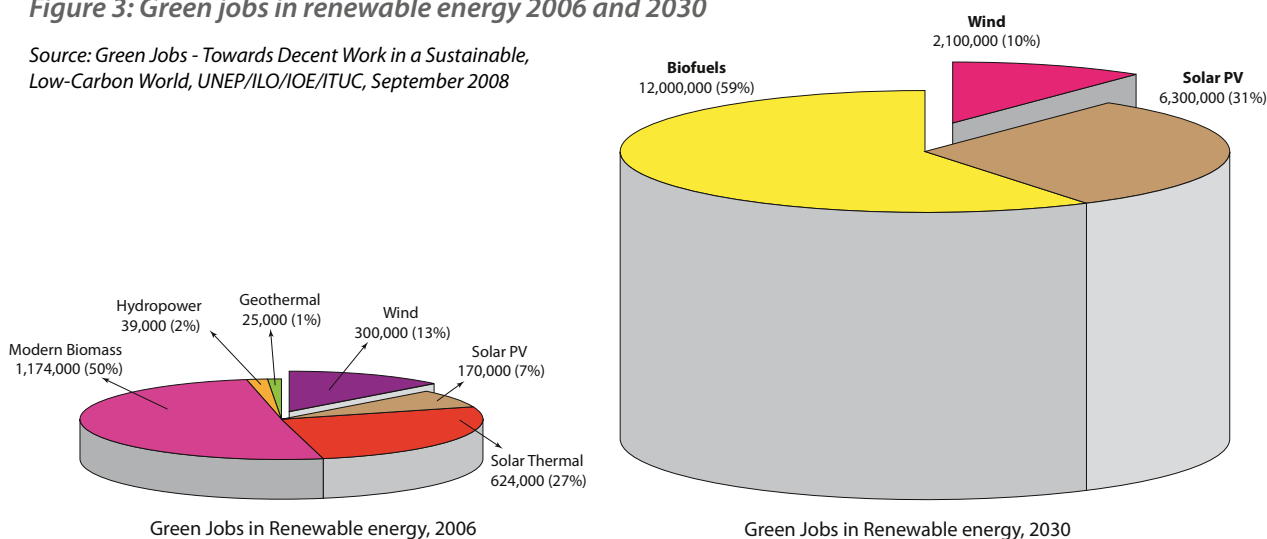
Encouragingly, the business case for greening both the economy and the job market has been growing increasingly powerful. Energy and commodity prices are surging and customers and policy makers are exerting growing pressure on businesses to adopt greener practices and production methods in order to avert dangerous climate change. The greening of the economy presents a major opportunity to start new businesses, develop new markets and lower energy costs. Last but not least it can strengthen a business' licence to operate, generating positive attitudes of both the activities and investments of firms among customers and local communities alike.

Observed trends in markets and investments confirm this assessment. The global market for environmental products and services is projected to double from \$1,370 billion per year at present to \$2,740 billion by 2020, according to Roland-Berger Strategy Consultants. Half of this market is based in energy efficiency and the balance in sustainable transport, water supply, sanitation and waste management. In Germany, for example, environmental technology is to grow fourfold to 16 per cent of industrial output by 2030, with employment in this sector surpassing that of the country's major industries in the machine tools and automotive sectors. Investments in improved energy efficiency in buildings could generate an additional 2–3.5 million green jobs in Europe and the United States alone. The potential is much higher in developing countries.

A reliable early indicator of this shift is the surge in the flow of venture capital into clean technologies. In the United States this currently constitutes the third largest sector after information and biotechnology. The United States clean-tech start-ups alone might generate 400,000–500,000 jobs in the coming years. Similarly, green venture capital in China has more than doubled and now represents 19 per cent of total investment.

**Figure 3: Green jobs in renewable energy 2006 and 2030**

Source: *Green Jobs - Towards Decent Work in a Sustainable, Low-Carbon World*, UNEP/ILO/IOE/ITUC, September 2008



Another sector where forecasts of green jobs are possible is renewable energy. Investment in renewable energy is booming, surging from \$10 billion in 1998 to at least \$66 billion in 2007, equivalent to 18 per cent of all energy investment. It is expected to reach \$343 billion in 2020 and to almost double again by 2030 to \$630 billion. It may be noted that in the past even optimistic predictions concerning the development of renewables have consistently been exceeded. Projected investments would translate into at least 20 million additional jobs in the sector, making it a much larger source of employment than today's fossil energy industry (mining, petroleum extraction, refining and fossil power generation), which, in spite of rising production, has been shedding jobs through technological advances.

While quantitative estimates of the number of green jobs that could be generated in different sectors are not possible with current data, table 4 offers a broad overview of the potential. Clearly, a future with many more green jobs is possible in all parts of the world.

**Table 4. Green jobs progress to-date and future potential**

		Greening potential	Green job progress to-date	Long-term green job potential
<b>Energy</b>	Renewable energy	Excellent	Good	Excellent
	Carbon capture and sequestration	Fair	None	Unknown
<b>Industry</b>	Steel	Good	Fair	Fair
	Aluminium	Good	Fair	Fair
	Cement	Fair	Fair	Fair
	Pulp and paper	Good	Fair	Good
	Recycling	Excellent	Good	Excellent
<b>Transportation</b>	Fuel-efficient cars	Fair to Good	Limited	Good
	Public transport	Excellent	Limited	Excellent
	Rail	Excellent	Negative	Excellent
	Aviation	Limited	Limited	Limited
<b>Buildings</b>	Green buildings	Excellent	Limited	Excellent
	Retrofitting	Excellent	Limited	Excellent
	Lighting	Excellent	Good	Excellent
	Efficient equipment and appliances	Excellent	Fair	Excellent
<b>Agriculture</b>	Small-scale sustainable farming	Excellent	Negative	Excellent
	Organic farming	Excellent	Limited	Good to Excellent
	Environmental services	Good	Limited	Unknown
<b>Forestry</b>	Reforestation and afforestation	Good	Limited	Good
	Agroforestry	Good to Excellent	Limited	Good to Excellent
	Sustainable forestry management	Excellent	Good	Excellent

Source: *Green Jobs - Towards Decent Work in a Sustainable, Low-Carbon World*, UNEP/ILO/IOE/ITUC, September 2008

## Green jobs and development

Numerous examples in the report demonstrate the major contribution that green jobs can make to clean economic growth in developing countries, to poverty reduction and to a broad-based improvement of the standards of living of large parts of the population. They create both high-tech and high-skilled jobs but can also create opportunities for many millions of young people, women, slum dwellers and members of poor rural communities (see boxes in this brochure).

This is evidenced by the success of many projects and local initiatives reflected in the report:

- ❑ Renewable energy provided for the poor in Bangladesh (see box 3), India, Sri Lanka (see box 5), Kenya (see box 6) and Mali
- ❑ Energy efficiency boosted and air pollution reduced by two-stroke engines in the Philippines
- ❑ Energy savings achieved by improved cooking stoves, with a reduction in indoor air pollution that affects women and children in India
- ❑ Clean public transport creating jobs in India
- ❑ Better jobs created and a cleaner environment attained through revamped recycling methods in Brazil (see box 7)
- ❑ Improved living conditions and youth employment provided through energy efficiency and use of renewable energy in townships in South Africa (see box 4)

### **Box 5: Renewable energy against poverty – decentralized power generation**

The provision of power in areas that are not reached by the grid is a very effective way to generate green growth and jobs, often in areas with widespread and persistent poverty. Productive and gainful employment is a key priority in these communities.



Renewable energy and greening of value-added chains provide opportunities to create the much-needed jobs. Local materials such as unused agricultural residues and other biomass can be used to provide clean electricity for homes, schools, health centres, street lights, telephones, internet connections and small enterprises. The systems and power generation units can be scaled from small villages to rural towns as demonstrated in India, Sri Lanka and other countries.



Successful applications exist in many developing countries but investment is woefully low. Along with more appropriate regulatory systems, innovative finance mechanisms are needed to step up decentralized power generation.

© TERI

TERI biomass based power plant in Sri Lanka (2 X 150 kWe)

Source: Ibrahim Hafeez Rehman (TERI, 2008) - <http://www.ilo.org/public/english/region/asro/bangkok/events/greenjobs/download/paper21.pdf>

## **More than meets the eye**

Millions of green jobs are already in existence and in areas like renewable energy their numbers are growing fast. While identifiable green jobs look set to be a growing source of employment and clean development into the future, an exclusive focus on the number of direct green jobs is misplaced. The number of green jobs already reported and expected to be created is substantial, but modest in relation to the total size of the global labour force of over 3 billion. In addition, not all of these jobs are additional jobs, as major gains and losses can take place in other parts of the economy. The significance of green jobs therefore can only be appreciated by taking a broader look at the transformation to a green economy.

**The greening of enterprise and redefinition of many jobs:** the most sweeping and pervasive change from the greening of an economy will be the redefinition of many jobs across the board. From cleaners and maintenance staff to facilities and logistics managers, from electricians to IT experts, from bricklayers to architects, from credit clerks to investment managers – people in jobs at all levels will see the content of those jobs change, with new performance and skills requirements. This incremental but broad shift to the greening of most workplaces can make a substantial contribution to reducing the environmental impact and to preventing dangerous climate change. These gains are often quick, are low-cost or even profitable and do not require any major investment in new technology. This potential has barely been tapped. Green jobs and green enterprises are sustainable and therefore provide more stable and secure employment and incomes.

**Radiating out and greening downstream economic sectors:** green technologies and green jobs also have major impacts through forward linkages to sections of the economy and to jobs that are neither particularly “brown” – i.e., polluting – or green. Jobs in renewable energy, for example, substantially lower the environmental footprint of the sectors which they supply. The information technology sector, for instance, is a still modest but rapidly growing contributor to greenhouse gas emissions. If renewable energy powered the internet, computers in offices, mobile phones and media players, this large and growing economic sector would be transformed into a low-impact activity and both present and future IT employment would become more sustainable.

**Dynamic changes in labour markets:** to some extent newly created green jobs take the place of existing jobs and net gains in employment are smaller than the overall numbers of direct green jobs suggest. This is the case, for example, when jobs in renewable energy replace those depending on fossil fuels. Other jobs are likely to be eliminated because of the slowing demand for products and services with a high environmental impact, such as sports utility vehicles.

The overall balance of available jobs will depend on those created and lost in the sector concerned, such as energy, transport or buildings, the balance of jobs in sectors contributing inputs to these sectors and on employment gained or lost throughout the economy from higher or lower consumer spending.

Renewable energy, for example, creates more jobs per dollar invested, per unit of installed capacity and per unit of power generated than conventional power generation. Public transport generates more employment than reliance on individual cars and trucks.

Energy and raw material efficiency, and also renewable energy, can have an induced employment effect. Money saved on the energy bill is spent on other goods and services instead. The latter almost invariably generate more employment than the conventional energy sector, which is very capital-intensive. Domestic induced job creation is particularly strong where energy imports can be avoided. This offers a valuable solution to the problem of escalating bills for imported energy affecting many developing countries.

**On balance:** available studies of these labour market dynamics for both sectors and entire economies suggest that, on balance, there will be more jobs in green economies. Not everybody will gain from such a change, however. The typically positive job balance from greening an economy is the result of major shifts often within sectors. While some groups and regions are gaining significantly, others incur substantial losses. These losses raise questions of equity, which if not addressed, can make green economy policies difficult to sustain.

## Shortcomings and impediments for green jobs

A first set of shortcomings identified relates to the pace of progress, to access to green jobs and to job quality. Generally the creation of green jobs is advancing too slowly to contribute substantially to the reduction of unemployment and underemployment in the world. Moreover, too few of the green jobs that are being created go to those who need them most: young people, women, poor segments of society in developing countries and those who suffer from climate change. Finally, creating good-quality, decent work is difficult in the face of rising informality and inequality in the global economy.

A second issue on which specific and quantitative information is urgently needed but remains unavailable, is the transition for enterprises and workers who will be adversely affected by the transformation to a green economy and those who will have to adapt their jobs and income-generating activities to climate change.

A major impediment to greening economies and jobs is that unsustainable business practices are still prevalent and often remain more profitable. Early adopters of green technologies and business practices among enterprises have to contend with pressures from financial markets for quick returns and with competing firms luring customers with low prices, albeit on the back of externalized environmental and social costs.

**Box 6: Solar jobs for urban youth: the PV Assembly in Kibera, Nairobi**

The Kibera Community Youth Programme (KCYB) operates in one of the largest slums in sub-Saharan Africa. It provides employment to local youth in an assembly line for small and affordable solar panels. The panels power radios and charge mobile phones in Kibera, but their use has spread to all parts of Kenya. Numerous groups from neighbouring countries have requested similar projects.

Kenya has one of the largest and most dynamic solar markets in the developing world. Some ten major companies import solar PV and there are an estimated 1,000–2,000 solar technicians. In spite of the uneven quality of the imported components, more than 200,000 systems have been sold in Kenya since the mid-1980s, three quarters of them to private households.

Source: <http://www.kcyp.kabissa.org/>



© KCYB



# III. Pathways to a Sustainable Future

## Policy recommendations: pathways to a sustainable future

**T**urning the vision of a sustainable economy and the green jobs that it would provide into a reality will require a strong, coherent and stable policy framework and government leadership. The report finds many encouraging trends and examples but green economies and jobs are by no means a foregone conclusion. There is a need to speed up the attainment of gains in energy efficiency and in the share of sustainable sources of energy. Progress in key sectors like transport, basic industries, recycling and agriculture has been slow and patchy. Investment is rising fast in some sectors, but from a low base.

A transformation on the scale and at the speed that is required will need to take the following deliberate steps. The first three steps could be termed the “low-hanging fruit”. They identify very effective but low-cost measures that should be taken immediately. Although necessary, these steps will not be sufficient without the creation of a conducive policy framework and sustained increases in investment as highlighted below.

### Assessing the potential for green jobs and monitoring progress

The evidence gathered in the report shows that the potential of green jobs is universally significant. Furthermore, it shows that opportunities vary from country to country, between sectors, regions and communities, and also between urban and rural areas. Detailed assessments and monitoring of progress represent an important stepping stone and provide a road-map for policy and investment, directing them towards the “low-hanging fruit”. There are many effective and economically viable measures beneficial for both employment and social development, a fact demonstrated by several of the countries at the forefront of the promotion of a green economy and green jobs.

The assessment and monitoring of the evolution of green jobs and of the transformation and shifts in the labour market should include indirect and induced employment, alongside displacement effects. Particular attention should be paid to gender dimensions and to the social inclusion of disadvantaged groups and regions.

### Closing the skills gap

Skills gaps and shortages have emerged as a binding constraint on the greening of economies in industrial and developing countries alike. They are reported in the biofuels industry in Brazil, in the renewable energy and environmental industry in Bangladesh, Germany and the United States and in the construction sector in Australia, China, Europe and South Africa.

The majority of architects and engineers worldwide are unaware of the materials, designs and construction techniques available for energy efficient buildings and are therefore unable to put them to use in their projects. Ambitious standards for zero or negative energy houses adopted in the United Kingdom cannot be met because construction enterprises and workers do not have the capacity to build to these standards. In China, the best technology available for new buildings cannot be used because of the existing low qualification levels of construction workers.

While much of the attention focuses on technology, experience demonstrates that the weakest link in the production chain will determine the level of performance that can be attained. Without qualified entrepreneurs and skilled workers, the available technology and resources for investments cannot be used or cannot deliver the expected environmental benefits and economic returns. Endeavours to close the current skills gap and anticipate future needs are essential for a transition to a green and low carbon economy. An emphasis on the high end of skills and education would be misplaced. Training what might be termed “green-collar” workers is just as important.



© Peter Duddek / VISUM / Still Pictures  
Young woman trainee.

Examples cited in the report demonstrate that skills upgrading is both fundamental and possible. This is evident both in industrialized continents and countries, including Australia, the United States and Europe, and also in developing countries and emerging economies, such as Bangladesh, Brazil, China and Kenya. Entrepreneurial skills can be as important as technical know-how. The training of young people, women and members of poor urban and rural communities can pay particularly high dividends.

Creating a map of skill requirements is a vital first step as it can inform ad hoc programs for potential skills upgrading. Assessments of the potential of green jobs and the monitoring of such jobs, as described above, would constitute an ideal basis for ad hoc measures and for the adaptation of national vocational training and education systems over the medium term. This would allow skills development to tie in directly with policies and investments.

### **Greening of work places – mobilizing a dormant resource**

Greener enterprises and green jobs form an indispensable part of the solution to environmental problems, including that of climate change. Citing initiatives taken by the British Trades Union Congress and cooperation between unions and the government in California as examples, the report points out that economic sectors and individual enterprises can make a major contribution to reducing both emissions of greenhouse gases and the environmental footprint in general through labour-management initiatives resulting in greener workplaces. These contributions can be significant when compared to reduction targets under the Kyoto Protocol or national targets to improve energy efficiency. Gains are often quickly achieved, at a very low cost and without the need for major capital investment.

### **Political resolve: stable policy frameworks, prices and incentives**

It is clearly essential to correct market failures and to ensure that prices are right, in particular that of carbon, but also that of other externalized environmental and social costs. Market signals and the parameters for investments need to be clear and stable. This imperative notwithstanding, purely market-driven processes will not deliver at the scale and the speed required.

The report finds that markets have thrived and transformation has advanced most where there has been strong and consistent political support. Policies designed to ensure effective support for and to drive the private sector include targets, penalties and incentives such as feed-in laws and efficiency standards for buildings and appliances, as well as proactive research and development.

Stable political resolve will depend on a transformation that is equitable between and within countries, where benefits are shared broadly and fairly and where those losing out in the transformation are supported in finding alternative, more sustainable livelihoods.

### Box 7: Recycling in Brazil – lessons from a world leader on an industry of the future

Recycling can make a major contribution to reducing the environmental footprint of energy and material intensive economic sectors. Figures for Brazil—the global leader in aluminium can recycling—indicate that some 10.3 billion cans were collected in Brazil in 2006. Recycling saves the country 1,976 GWh per year of electricity that would normally have been required to produce new aluminium—an amount of surplus electricity sufficient to supply a city of over 1 million inhabitants for one year.

Aluminium can recycling provides employment for close to 170,000 people in Brazil. According to a 2005 survey, Brazil has close to 2,400 companies and cooperatives involved in recycling and scrap trading, most of them small or micro-sized. The country achieved a recycling rate of 94 per cent, climbing sharply from 46 per cent in 1990. By comparison, Japan reached a rate of 91 per cent, the Scandinavian countries 88 per cent, and Western Europe as a whole about 58 per cent.

Brazil also has high recycling rates for other products. According to the non-profit associations Brazilian Micro and Small Business Support Service (SEBRAE) and Entrepreneurial Commitment for Recycling (CEMPRE), in 2004 the country recycled 96 per cent of its aluminium cans, 49 per cent of its steel cans, 48 per cent of its PET plastics, 46 per cent of its glass packaging, 39 per cent of its tyres, and 33 per cent of its waste paper. SEBRAE and CEMPRE estimate that the recycling sector employs some 500,000 people in Brazil.

The country has also pioneered ways to improve recycling jobs. While recycling is of great value in terms of resource conservation, it can entail dirty, undesirable and even dangerous and unhealthy work, and it is often poorly paid. In many developing countries, recycling work is performed by an informal network of scrap collectors, sometimes known as “waste pickers” or “scavengers”, who collect the recycled materials for revenue. Efforts to form cooperatives have raised the pay levels and standards in many countries. In Brazil, 90 per cent of recyclable material is collected by scrap collectors - catadores de lixo, who have organized themselves into a national cooperative movement with 500 cooperatives and 60,000 collectors in total. In 2005, Belo Horizonte, one of Brazil’s largest cities, inaugurated the first recycling plant to be run by associations of independent catadores de lixo. The plant is intended to avoid unscrupulous middlemen and provide an increase of about 30 per cent to the incomes of the collectors.



© Sean Sprague / Still Pictures

Registered scavengers picking out recyclable garbage from a conveyor belt at the Rio de Janeiro city dump, Brazil.

Source: <http://www.cidades.gov.br/conselho-das-cidades/conferencias-das-cidades/2a-conferencia-das-cidades/>

## Scaling up investment

Investment in clean development and in green jobs has been growing fast in recent years; such investment creates employment. Global investment in clean technology expanded by 60 per cent from \$92.6 billion in 2006 to \$148.4 billion in 2007 and currently, many major companies worldwide are talking about investing in climate solutions.

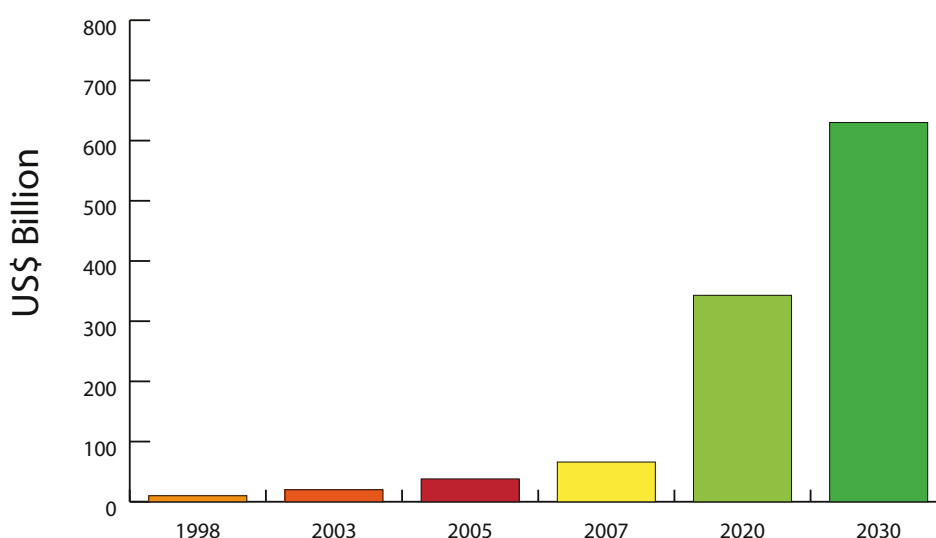
Increasingly, green employment creation is the consequence of conscious decisions of companies to adopt more sustainable business practices, and the recognition by venture capital firms that clean technology development offers significant business opportunities. Many of the companies driving renewable energy solutions prize employees who are skilled, take individual initiative, and are oriented toward problem-solving. The majority of the pioneers consist of small and medium-sized companies, but larger, more established companies are currently joining the effort.

For example, in February 2008, nearly 50 leading investors from the United States and Europe, representing assets worth more than \$8 trillion, met at the United Nations to lay out a timetable for their commitments to global climate change. They pledged \$10 billion for green investments over the period 2008–2010. More, however, is still needed.

Resources of national Governments and from official development assistance (ODA) can play a major role in crowding in private sector capital. Prices, technology and access to capital are clearly necessary, but many pioneering entrepreneurs point out that they are not sufficient and that other hurdles are harder to surmount: the lack of infrastructure and of institutional capacity in Governments and in the private sector, skills shortages, high up-front capital costs, barriers to market entry and entrenched habits.

Government funding and ODA can help to overcome some of these barriers that hold back investments and slow progress. Much government funding continues to work against, rather than for, the green economy and green jobs. Subsidies for fossil fuels (\$150 billion–\$250 billion per year) and unsustainable agriculture, for example, are still massive.

**Figure 4: Global investment in renewable energy (1998-2030)**



Source: *Green Jobs - Towards Decent Work in a Sustainable, Low-Carbon World*, UNEP/ILO/IOE/ITUC, September 2008

## Financing green jobs

The continued development, adaptation and dissemination of technology will play a key role in transforming economies. Nonetheless, funding for research and development has actually declined by as much as 50 per cent, as highlighted by the Stern Review on the cost of climate change. The International Energy Agency observes that government spending on research and development in energy in order to address the climate crisis has in fact fallen, while the private sector is focused on projects with short-term payoffs.

Official development assistance still favours fossil fuels and large-scale hydro-electricity schemes rather than renewable energy. To date, multilateral funding for adaptation to climate change has been very limited, yet this funding is crucial for the protection of existing jobs and livelihoods and has major potential to generate additional employment. Some \$86 billion is required annually, equivalent to 0.2 per cent of GDP of industrialized countries.

Similarly, little progress is being made in generating sufficient investment in those developing countries where the benefits of clean development are most needed and where employment losses from not tackling the environmental crises are likely to be very serious.

These needs could be met from such sources as the reallocation of often perverse subsidies, the proceeds from eco-taxes or the auctioning of carbon credits. These measures would create large streams of resources of hundreds of billions of dollars in the United States and Europe alone.

Finance and resource allocation is not only an issue between but also within countries. Experience in Bangladesh, China, Nepal and other countries demonstrates the significant returns from investing in small enterprises and communities. Vast numbers of individuals and enterprises are still excluded, however, and they need access to small loan and micro-finance schemes and to payments for environmental services. South-South cooperation can play a major role in transferring proven technology and know-how about implementation.

The Clean Development Mechanism under the Kyoto Protocol was meant to facilitate resource transfers from industrialized to developing countries. In its current form it is falling far short of its potential. The high transaction costs and a piecemeal approach through projects that favour large scale investments have resulted in a distorted portfolio of large projects concentrated in only a few countries. For the Clean Development Mechanism to play its role, it needs to become accessible to more countries, communities and small enterprises by adopting a programme approach that bundles small-scale initiative and reduces transaction costs.

#### **Box 8: Retrofitting buildings for energy efficiency in Germany**

According to the Intergovernmental Panel on Climate Change (IPCC), retrofitting and replacing obsolete equipment in buildings has the largest potential for reducing emissions of greenhouse gases by 2030. Many retrofitting measures can pay for themselves through energy savings and government support for such measures is largely offset by higher tax revenue and lower government contributions to social security.

The most ambitious such programme to date is the initiative by the German Alliance for Work and the Environment, a partnership between the Government, building employers, trade unions and non-governmental organizations launched during a recession in the building sector in 2001. The programme helped to retrofit 342,000 apartments with improved insulation of roofs, windows and walls, along with advanced heating and ventilation systems and installation of renewable energy equipment.

Over the period 2001–2006, \$5.2 billion of public subsidies stimulated a total investment of \$20.9 billion, creating or maintaining about 140,000 jobs. The scheme reduced the annual emissions from buildings by 2 per cent. About \$4 billion of the government input was recovered through tax and the need for unemployment benefits was averted. In 2005, the Government increased funding for the programme to almost \$2 billion annually. This led to an estimated 145,000 additional full-time-equivalent jobs in 2006. Retrofitting of buildings has become one of the key elements of the strategy by the German Government to reduce emissions by 40 per cent by 2020.



© BSM Werner Klein

Source: <http://www.bsm-wernerklein.de/thermographie/index.html>

## Just transitions

The greening of economies and provision of decent work for just a few will not suffice to meet the environmental and social challenges currently faced worldwide. Such a piecemeal approach will generate neither the consensus nor the momentum needed to avert climate change and will be hardly conducive to the creation of stable societies.

Just transitions are needed both for those affected by the transformation to a green economy and also for those having to adapt to climate change. Industries concentrated in particular regions are often hard hit by transitions, particularly those as swift and pervasive ones as the ones needed to avert dangerous climate change. The industries hardest hit by climate change and those most in need of adaptation are those in developing countries that have historically contributed least to the emissions causing global warming.

The business sector accepts and recognizes the need and shares the responsibility for a fair transition. Government assistance to both workers and enterprises will be a necessary complement in many cases. Meaningful social dialogue will be essential to ease tensions and to arrive at effective cost-sharing and resource allocations.

Workers and trade unions emphasize that far too little is known about both the risks and opportunities in a transition to a greener economy. Future research in this regard is a priority. The affected workers and communities need adequate social protection, along with access to new opportunities.

The International Labour Organization provides a framework for just transitions. This includes, among other things, guidance on sustainable enterprise, on multinational enterprise and on fair globalization. This framework and extensive experience can be applied to such areas as: active labour market policies, income protection, retraining, awareness-raising and capacity-building for employers' and workers' organizations, entrepreneurship development, assistance for reintegration into the labour market and investments to diversify the local economy and to create alternative income opportunities.

## Towards coherent policies

A transformation involving the creation of large numbers of green jobs and major development benefits is possible. The approaches that work are known but success is not automatic. It is contingent on the adoption and implementation of coherent policies which integrate the three pillars of sustainable development: economy, environment and society.

Coherent environmental, economic and social policies are critical and will require commitment at the highest political level. This needs to be articulated more clearly and the social dimension needs to feature more prominently in environmental policy debates, in particular the climate talks, where relative prices and industrial policies are being set and key decisions adopted about technology transfer, financial flows and investments. The task is complex but can be tackled by involving the main stakeholders: employers, workers and Governments.

## Involving the social partners: the benefits of social dialogue

Social dialogue among those most affected by these transitions—workers, employers and Governments—with a view to working towards fair policies that are efficient and balanced in their costs and benefits is essential because that is the way to make such transitions sustainable.

Examples of effective dialogue designed to guide the transformation and to facilitate the transition in both enterprises and labour markets include national sectoral round tables established in Spain for the implementation of the Kyoto commitments, the consultations of social partners on projects to be funded through the Clean Development Mechanism in Brazil and in Belgium and the Framework Agreement on the Environment concluded between unions and the Government of Argentina.

The report highlights the large untapped potential for social dialogue and alliances at national, sectoral, company and workplace levels, to mobilize economic actors and to facilitate the formation of better informed and more integrated policy responses.

### **Green Jobs Initiative**

The Green Jobs Initiative is a partnership established in 2007 between the United Nations Environment Programme (UNEP), the International Labour Organization (ILO), and the International Trade Union Confederation (ITUC). The International Organization of Employers (IOE) joined the Initiative in 2008.

The Initiative was launched in order to promote opportunity, equity and just transitions and to mobilize Governments, employers and workers to engage in dialogue on coherent policies and effective programmes leading to a green economy with green jobs and decent work for all.

#### **The partners:**

- UNEP is the voice for the environment in the United Nations system. It is an advocate, educator, catalyst and facilitator, promoting the wise use of the planet's natural assets for sustainable development.
- ILO is a tripartite agency of the United Nations that brings together the Governments, employers and workers of its member States in common action to promote decent work throughout the world.
- ITUC is the International Trade Union Confederation. Its primary mission is the promotion and defence of workers' rights and interests, through international cooperation between trade unions, global campaigning and advocacy within the major global institutions. ITUC represents 168 million workers in 155 countries and territories and has 311 national affiliates.
- IOE is recognized as the only organization at the international level that represents the interests of business in the labour and social policy fields. Today, it consists of 146 national employer organizations from 138 countries from all over the world.





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