



**GREEN EUROPEAN
FOUNDATION**

The European Green Collar Economy

Achievements so far – forecasts for the future
Paper 1/2009

A meta-study by Jan Seifert

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The European Green Collar Economy.
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A meta-study for the Green European Foundation by Jan Seifert.

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Foreword

Many Europeans strongly support the project of a “Green New Deal” in response to the triple ecological, social and economical crisis that our societies are confronted with. Numerous publications and most naturally the Manifesto of the European Green Party for the election of June 2009 present the Green New Deal’s principal orientations.

At a time when unemployment is dramatically rising everywhere in Europe, some people question the cost of the transition - particularly in terms of employment - from our current economies to a production pattern that is more efficient in its use of our common resources. The objective of this first paper published by the Green European Foundation is to gather the conclusions of existing studies on current and future employment opportunities in the eco industry. Other studies are underway, as for example at the German Wuppertal Institut.

We would like to thank Jan Seifert for this useful contribution and hope that this paper will convincingly show that restrictive ecological measures, such as the ones introduced in the energy sector at European level, will also be beneficial in the employment sector.

Heidi Hautala

Pierre Jonckheer

Co-Presidents of the Green European Foundation

Executive Summary

There is **no clear-cut definition** of “Green jobs” or “Green collar workers”. It should also be kept in mind that the term sounds good in English but cannot be easily translated into most European languages.

Most **categorisations** of green collar jobs or eco jobs are **broad** and drive up the numbers of people working in green industries. The majority of people do not work in high-profile technology-driven renewables development but in cleaning-up services.

The **skill level** of people required for an expanding Green collar economy is both high at the lower skilled end and for high-skilled labour. Traditionally mostly men work in the low-skilled area (waste management, manufacturing).

According to Commission figures, there are **3.4 million people working in “eco-industries”** in the EU.

Under most comprehensive renewables scenarios the **most jobs** (existing and) **generated will be in biomass and biofuels**.

In particular the EU Commission has sponsored a few studies that look into employment effects and scenarios of green policies. Some refer to specific measures such as organic farming. With an “advanced renewable strategy” there could be **2.5 million people working in renewable energies in 2020** within the EU-15. Another study suggests seven measures with a combined net effect of an **additional 580.000 people working in environmental jobs**.

The **key challenge** for proponents of increased **green investments** could be **timing**. After most industrialised countries, and first and foremost the USA, have passed massive stimulus plans, the scope for further green investments on such a scale is limited. It also needs to be seen how viable the green elements of these programmes are proving to be.

As with any stimulus money, the key is that funding goes into the economy straight away and **not all green measures** (in particular through complex and technology-dependent infrastructure development) **are best suited to act as immediate stimulus**. If the take-up of green investments coincides with the general economic recovery, it could even lead to increased competition for skilled labour between the green and the “ordinary” economy which might lead to frictions in the labour market.

By far the most value (>90%) created and money invested in renewables and the green economy stems from the **private sector**. Growing economies and functioning (i.e. lending) banks are therefore a prerequisite for an expanding green economy.

1. Defining Green Collar Jobs

a. Definitions

In the English language a white collar job typically describes an office job that requires more education, while a blue collar job portrays the typical factory worker. In most languages such a collar-picture is not used to describe the division between manual labour and skilled (office) jobs. The “green collar worker” is a very recent term which is not clearly defined but generally embraces the idea of workers of any skill level whose products or services are environmentally friendly.

There are a number of definitions:

“We define green jobs as work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution.” **UNEP**, 2008: 3.

“green collar jobs, which I define as blue-collar work force opportunities created by firms and organizations whose mission is to improve environmental quality”, **Raquel Pinderhughes**, San Francisco State University, 2007.

“It has to pay decent wages and benefits that can support a family. It has to be part of a real career path, with upward mobility. And it needs to reduce waste and pollution and benefit the environment.” Phil Angelides, chair Apollo Alliance [former contender of Schwarzenegger for governor of California] in **TIME**, 2008.

“A green-collar job is in essence a blue-collar job that has been upgraded to address the environmental challenges of our country.” Lucy Blake, chief executive of the Apollo Alliance
“A green job has to do something useful for people, and it has to be helpful to, or at least not

damaging to, the environment.” **Carl Pope**, executive director of the Sierra Club
Both New York Times, 2008.

Eurostat and the **OECD** have a rather broad definition of eco-industries which includes waste management and recycling: “activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes technologies, products and services that reduce environmental risk and minimize pollution and resources”. The sectors fall into two general categories, pollution management and resource management. There is no official/direct statistical measuring of eco-industries such as wind and solar producers.

For why classification is difficult see **OECD**, 2004a: 5.

b. Categorisation

Raquel Pinderhughes, San Francisco State University provides a practical list of Green-collar jobs in the San Francisco Bay area:

Bicycle repair and bike delivery services, Car and truck mechanic jobs, production jobs, and gas-station jobs related to biodiesel, Energy retrofits to increase energy efficiency and conservation, Green building, Green waste composting on a large scale, Hauling and reuse of construction materials and debris (C&D), Hazardous materials clean-up, Landscaping, Manufacturing jobs related to large scale production of appropriate technologies (i.e. solar panels, bike cargo systems, green waste bins, etc.), Materials reuse, Non-toxic household cleaning in residential and commercial buildings, Parks and open space expansion and maintenance, Printing with non-toxic inks and dyes, Public transit jobs related to driving, maintenance, and repair, Recycling and reuse, Small businesses producing products from recycled materials, Solar installation, Tree cutting and pruning, Peri-urban and urban agriculture, Water retrofits to increase water efficiency and conservation, Whole home performance, including attic insulation, weatherization. See <http://urbanhabitat.org/node/528> [2009-02-01].

Also the UNEP (2008: 42) provides a useful classification of Green collar jobs:

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

Source: UNEP 2008: 42

2. The wider European economy, employment and the impact of climate change

a. Basic figures on the European economy

The EU has a GDP of 12 581 billion Euro (or \$18 493 bn) in 2008 according to the IMF and accounts for almost a third of world economic output.

b. Employment in the EU

Unemployment in the EU-27 stood at 17.9 million in December 2008 (Eurostat, monthly figures) while the unemployment rate (EU-27) went down from 9.0% in 2004 to 7.0% in 2008 (Eurostat, annual figures). In total 17.9 million people were unemployed in the EU-27 in December 2008. Given the current economic situation these figures are likely to become far more negative.

The EU-27 employment rate was at 65.4% in 2007 (up from 60.7% in 1997). However, it still varies greatly between countries (57% in Poland and Italy and 77% in Denmark).

c. The costs of climate change

The Stern Review from October 2006 was the key document in moving the climate change debate towards the economics of climate change. He said that for a “stabilisation of greenhouse gases at levels of 500-550ppm CO₂ will cost, on average, around 1% of annual global GDP by 2050” (p. xiii). The Stern Review estimates that climate change could reduce global GDP by at least 5 percent, and perhaps as much as 20 percent, by 2050.

If 1% of EU-GDP were provided to fight climate change, this would amount to 126 billion Euro. – Such an amount equals the size of the annual EU budget (and is more than half of Germany’s federal budget).

But Stern also remarks that there are “distorting energy subsidies, on which governments around the world currently spend around \$250bn a year” (p. xvi).

However, there is also criticism on the Stern report. According to academics the Stern report was not living up to academic standards (no peer review and reproducibility), was produced in record-time, “Readers will find it difficult to understand or reproduce the line of reasoning that goes from background trends (such as population and technology) through emissions and impacts, to the finding about the 20 percent cut in consumption, now and forever” (Nordhaus, 2007).

Nordhaus’ main critique is on the rate of discounting (0.1%/near-zero) used. If a more realistic rate had been used, the devastating effects of climate change would be much lower. Most of the damage appears after year 2800 and it has been discounted backwards to present day.

“The Review’s unambiguous conclusions about the need for extreme immediate action will not survive the substitution of assumptions that are more consistent with today’s marketplace real interest rates and savings rates. Hence, the central questions about global-warming policy – how much, how fast, and how costly – remain open. The Review informs but does not answer these fundamental questions.” (Nordhaus, 2007: 34)

3. Employment impact of green policies

a. European political parties

PES manifesto 2009 “People first, a new direction for Europe”:

“A European strategy for Smart Green Growth and Jobs:

We propose a European strategy for smart green growth and jobs which will create 10 million **new jobs by 2020** – with two million in the renewable energies sector alone – and help make Europe a world leader in innovation, new green technologies and products.”

EPP draft manifesto for the European elections
Adopted by Bureau but to be finally voted by EPP Congress, 29-30 April in Warsaw

“The current economic recession also represents a golden opportunity to further increase our investments in “green technologies”. This will help us to boost our economic growth and employment chances, and to credibly position Europe as a world leader in this sector;” (p. 10)

“We have made far-reaching proposals for a more sustainable, efficient and safe energy supply in our Policy Document “Europe’s Energy Challenge” in March 2007.” (p. 17)

“Tackling climate change is the pro growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of developed or developing countries. ... Therefore, the EPP wants the European Union to be the frontrunner in carbon-free and low-carbon technologies. ... The EPP calls for a 30% reduction in greenhouse gas emissions until 2020 (compared to 1990 levels) according to the decisions adopted

in the European Council in March 2007.” (p. 18)
 “Renewable energy should have a share of at least 20% of the energy mix in the EU by 2020 but the aim should be to increase this share even further.” (p. 19)

“The EPP has always been a political reference when adopting and developing environmental policies. With this document, the EPP ratifies its commitment to environmentally sustainable policies, and establishes a new pact with the European citizens: the Environmental Preservation Pact (EPP).

With this pact, the EPP awakens the “Eco-logic” consciousness of the European citizens, and renews its commitment, as it has done on many occasions in the past, to continue working to develop policies for the global welfare of society.” (p. 22)
 The EPP has no specific figures for job creation within the green economy or as an impact of their “Environmental Preservation Pact”.

ELDR “Top 15 for EP elections”

“ELDR emphasises that in the EU climate package, business needs reduced administrative burdens and incentives to stimulate investment in techniques to enhance a strong low carbon economy. ELDR wants increased investments in technologies providing solutions, efficiency and increased security of energy supply.” (p. 2)

The common manifesto is only 3 pages long. There is **no specific reference to job creation** through a green economy or otherwise. It is also the manifesto that was adopted the earliest – in late October 2008.

European Left Party (EL)

Common electoral platform

“The following compromises represent the minimum requirements for the implementation of all climate protection commitments already signed:

- Reduce global emissions by 30% by 2020 on the exit level of 1990 and by at least 80% by 2050;
- Increase the use of renewable energy by at least 25% by 2020;
- Reduce total primary energy consumption by 25% by 2020 and increase energy efficiency by 2% per year, including a limit of per capita consumption;
- An efficiency obligation must be introduced for industry and producers of energy-intensive goods;
- The EU framework subsidies must be limited consequently to the sector of energy efficiency

and renewable energies.” (p. 4)

Out of the 8-page electoral platform only this very short part is about climate change. There are **no overall or green collar economy specific estimates of job effects or targets**. But the EL wants to change the system and create full employment: “we strive for a strategy based on the values of solidarity and cooperation, full employment, and a rational relationship with nature. This is possible only by changing the existing rules of the international economic and financial system.” (p. 3)

The **European Green Party (EGP)** has not yet presented its election manifesto.

Outlook: USA

Barack Obama promised (during his campaign) to **spend \$150 billion over 10 years** to create 5 million new green collar jobs. The first proposal (House) for the \$800+ billion stimulus package included 54 billion for clean, efficient energy as well as \$20.6 billion through tax changes (FT, 2009-01-23, p. 9). The **final stimulus package** (“American Recovery and Reinvestment Act”) accounts for 787 billion US Dollar. My more conservative estimate would estimate **76 billion US\$ for green investments**, this is less than 10% of the overall package. The final act is supposed to save or create 2 million jobs. A detailed overview of where the spending is going and which state is to profit by how many jobs can be found at **www.recovery.gov**. A specific 500 million US\$ go towards the Department for Labor for the “training of green-collar workers”.

b. Estimates for existing green jobs

A few words on statistics.

Even though global figures (OECD) for environmental jobs look promising on first sight, their “greenness” is probably debatable. Most jobs are in pollution management and resource management (i.e. if we create more waste, there will also be more “green” jobs to clean it up), 2-21% in cleaner technologies and products (OECD, 2004a: 17). A case study of Canada suggests that most employment is in medium-sized companies (OECD, 2004a: 19).

Employment rates for low-skilled workers in eco-industries (“providing equipment for pollution abatement”) and lesser so in waste management are higher than in the national average (OECD, 2004a, 21f). There are much more foreign workers in the whole sector but very few women (OECD, 2004a: 23). - These figures are all for

people directly employed in the industry.

There are a number of initiatives in Europe (bottom-up) combining environmental concerns and employment. The biggest focus of these initiatives is to create new jobs, followed by preservation of existing jobs and other measures for long-term unemployed and youth (OECD, 2004a: 36). The territorial focus as well as character varies strongly between old EU-15 and CEE.

The Commission (2007b) study makes a broader use of classifications and provides **concrete figures for who is working in the environmental sector** (by sector and country). Also the Commission (2007c) "Facts and Figures" notes that **3.4 million people work in "eco-industries" in the EU** which accounts for 1.7% of total paid employment. The pollution management sector alone accounts for 2.35 million jobs. These figures are based on the Commission/Ernst & Young (2006) study.

According to the European Renewable Energy Council ("New renewable energy target for 2020 – a Renewable Energy Roadmap for the EU") the EU has 300,000 people working in renewable technologies, with an annual turnover of €20 bn. The global **market volume for environmental products and services** currently runs to about \$1,370 billion (€1,000 billion), according to German-based Roland Berger Strategy Consultants, with a projected \$2,740 billion (€2,200 billion) by 2020 (UNEP 2008: 5).

The firm offers the following estimates for individual market segments:

- Energy efficiency technologies (appliances, industrial processes, electrical motors, insulation, etc.): \$617 billion (€450 billion) at present; \$1,233 billion (€900 billion) by 2020
- Waste management/recycling: \$41 billion (€30 billion); \$63 billion (€46 billion) by 2020
- Water supply/sanitation/water efficiency: \$253 billion (€185 billion); \$658 billion (€480 billion) by 2020
- Sustainable transport (more-efficient engines, hybrids, fuel cells, alternative fuels, etc.): \$247 billion (€180 billion); \$493 billion (€360 billion) by 2020. (UNEP, 2008: 54)

"Globally, some 300,000 workers are employed in wind power and perhaps 170,000 in solar photovoltaics (PV). More than 600,000 people are employed in the solar thermal sector—by far most of them in China. Almost 1.2 million workers are estimated to be employed in generating biomass-derived energy (mostly biofuels) in just four leading countries: Brazil, the United States, Germany, and China. Overall, the number of peo-

ple presently employed in the renewable energy sector runs to about 2.3 million (see Table ES-1, p. 7). Given the gaps in employment information, this is no doubt a conservative figure." (UNEP, 2008: 6f)

"Renewable energy sources are expanding rapidly. We estimate current employment at about 2.3 million jobs worldwide. Given incomplete data, this is in all likelihood a **conservative figure**". (UNEP, 2008: 295)

There are 108,000 jobs directly in **wind energy**, up from 48,000 in 2002. A better estimate is to say that there are **154,000 jobs** including indirect employment (wind turbine and component manufacturing). (EWEA, 2009: 7)

For the wind energy there is a **strong regional concentration** which is likely to remain in Nakskov and Esbjerg (Denmark), Schleswig-Holstein (Germany) and Navarre (Spain). (EWEA, 2009)

Over the 20 year lifetime of a wind park (of 1 MW) **100.000 Euro in local business tax** (Gewerbesteuer) are generated in Germany. (Bundesverband WindEnergie, 2006)

c. EU-wide scenarios

There are a few scenarios for employment effects of green policies. They mainly build on studies commissioned by DG Environment in the European Commission. There is no recorded critical assessment of these studies and contractors are undoubtedly influenced by their contractor's interests.

One interesting study is "**Links between the environment, economy and jobs**" (Commission, 2007b: 61f) which goes through a number of employment scenarios by sector:

it sees the following positive employment (direct + indirect) effects for the EU-27:

- Steel production: substitute 10% of value in primary raw materials with recycled materials (but increase in end-product costs), +3.600 jobs
- 10% of farming value is shifted to organic (but 15% higher end-consumer prices need to be passed on to consumers, or labour costs levelled out through different subsidy system): +44.000 jobs
- Reduce water consumption by 10% (through better technologies), reduction of 10% value of output from water sector, +5.500 jobs
- 10% less energy consumption in manufacturing sector (through more efficiency investments), +137.000 jobs

- same as previous but for energy intensive industries (not clear what extra costs to consumers/customers), higher costs would have to be passed on to consumers, +91.000 jobs
 - 10% of fuels from bio-fuels, +139.000 jobs
 - 10% more renewable energy instead of non-renewable, +58.000 jobs
 - Same as previous but with 10% higher electricity prices, 6% higher electricity prices, +59.000 jobs
- 1% reduction of carbon-intensity (CO₂ emissions per Euro output) over whole economy – energy price needs to be increased by 8% to achieve this goal, strong sector sensitivity, a 10% increase in price of motor spirits has highest reduction potential of all fuels
 - Extra 7 bn Euro per year in Structural Funds for environmental infrastructure (water, waste management), +149.000 jobs.

Employment-creating measures combined

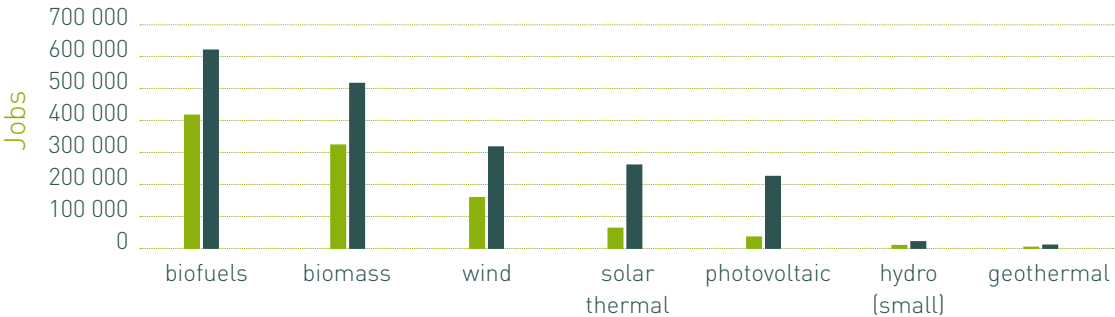
Source	Measure	Job effect EU-27
Steel production	substitute 10% of value in primary raw materials with recycled	+3.600
Water consumption	10% less	+5.500
Manufacturing*	10% less energy consumption	+137.000
Energy intensive industries*	10% less energy consumption	+91.000
Bio- fuels	10% more	+139.000
Renewable energy	10% more	+58.000
Structural Funds	7bn annually	+148.000 p.a. (=200.000 Eur/job)
	Total effect	+582.100

* These two are somehow the same

Another interesting estimate comes from an European Renewable Energy Council (EREC) study and is reviewed in the **Commission / Ernst & Young study (2006)**. Under baseline estimates,

EREC expects 900,000 new jobs in the renewables. But with more ambitious targets up to 2 million new jobs could be created until 2020. The picture by sector would look like this:

Net Employment growth (Jobs FTE*) 2010 2020



* Full Time Equivalent
Source: EREC p. XXXVI, quoted in European Commission, 2006: 197.

Net Employment growth (Jobs Full time equivalent)

	2010	2020	2010	2020
Biofuels	424 000	614 000	40 %	30 %
Biomass	338 000	528 000	32 %	26 %
Wind	184 000	318 000	17 %	16 %
Solar thermal	70 000	280 000	7 %	14 %
Photovoltaic	30 000	245 000	3 %	12 %
Hydro (small)	15 000	28 000	1 %	1 %
Geothermal	6 000	10 000	1 %	0 %
Total	1 067 000	2 023 000	100 %	100 %

Source: EREC p. XXXVI, quoted in European Commission, 2006: 197.

The (MITRE) model commissioned by DG TREN in the Commission (2004) has further figures for projected employment development:
“A modelling exercise supported by the EU found that under current policies, there would be about 950,000 direct and indirect full-time jobs by 2010 and **1.4 million by 2020**. These are “net” numbers - taking into account potential job losses in conventional energy and relating to renewables support mechanisms, which may result in lower spending elsewhere in the economy. Under an “**Advanced Renewable Strategy**,” there could be 1.7 million net jobs by 2010 and **2.5 million by 2020**. These results are actually quite **conservative** in the sense that they cover employment just within the smaller **EU-15** (i.e., before expansion), and exclude jobs supported by renewables exports to other countries. About 60–70 percent of the jobs would be in renewables industries (primarily biofuels and biomass processing and wind power), the remainder in agriculture.” (UNEP, 2008: 96)
The EWEA (2009: 9) expects that along the baseline scenario (i.e. no particular policy change) **329,000 people** will be working in **wind energy in 2020** and 377,000 by 2030 in the EU.

World

Given rapidly rising interest in energy alternatives, future years may well see worldwide employment soar—possibly as high as 2.1 million in wind energy and 6.3 million in solar PVs by 2030, and on the order of 12 million jobs in biofuels-related agriculture and industry. (UNEP 2008: 8)
“**Greening the building industry in the European Union and the United States** would create at least 2 million jobs (3.5 million jobs using the European Trade Union Confederation (ETUC) **goal of a 75 percent reduction of carbon emissions by 2030**).” (UNEP 2008: 12)
UNEP (2008: 301) offers a practical matrix for future employment opportunities in the green economy:

Green Job Progress To-Date and Future Potential

		Greening potential	Green job progress to-date	Long-term green job potential
Energy	Renewables	Excellent	Good	Excellent
	CCS	Fair	None	Unknown
Industry	Steel	Good	Fair	Fair
	Aluminium	Good	Fair	Fair
	Cement	Fair	Fair	Fair
	Pulp and Paper	Good	Fair	Good
	Recycling	Excellent	Good	Excellent
Transportation	Fuel-efficient Cars	Fair to Good	Limited	Good
	Mass transit	Excellent	Limited	Excellent
	Rail	Excellent	Negative	Excellent
	Aviation	Limited	Limited	Limited
Buildings	Green buildings	Excellent	Limited	Excellent
	Retrofitting	Excellent	Limited	Excellent
	Lighting	Excellent	Good	Excellent
	Efficient Equipment and Appliances	Excellent	Fair	Excellent
Agriculture	Small-Scale Sustainable Farming	Excellent	Negative	Excellent
	Organic Farming	Excellent	Limited	Good to Excellent
	Environmental Services	Good	Limited	Unknown
Forestry	Reforestation/ Afforestation	Good	Limited	Good
	Agroforestry	Good to Excellent	Limited	Good to Excellent
	Sustainable Forestry Management	Excellent	Good	Excellent

Source: UNEP, 2008: 301

d. National case studies

Germany

There are an estimated **170,000 people working in the renewable sector** with an industry turnover of €8.7 billion. (Stern, 2006: 367)
In 2004 there were **157,000 jobs in renewables** (64,000 wind, 57,000 bio energy) including suppliers. These figures are expected **to double to 300,000 until 2020**. (BMU, 2006: 6f)

Bundesverband erneuerbare Energien (BEEV, Germany) estimates 47% of energy production in Germany in 2020 by **renewables with jobs** in the industry rising from 250,000 to **500,000**.
From 2001–2006, through \$5.2 billion (€3.8 billion) in public investment and \$20.9 (€ 15.2 billion) in private investment, Germany’s **retrofitting program** resulted in 342,000 apartment retrofits and the creation of **145,000 additional FTE jobs** in 2006. (UNEP, 2008: 296)

1.8 million people work in the **ecological sector** in Germany in 2006. This is 4.5% of total employment. (BMU & Umweltbundesamt, 2009)

A study from A.T. Kearney suggests that with a **24 billion Euro investment** programme **500,000 new jobs** could be created in the current crisis. (Wirtschaftswoche, 4/2009)

“Tijdens de vorige roodgroene regering kwam de **Duitse Alliantie voor Werk en Milieu** tot stand: een samenwerkingsverband tussen vakbond, overheid en bouwsector om te zorgen voor de renovatie van 300.000 woningen per jaar : goed voor het behoud of de creatie van 200.000 jobs (waarvan naar schatting **140.000 nieuwe jobs**) en een CO₂ reductie van 2Mton per jaar. Tegelijk werd het probleem van de energiearmoede aangepakt. Via renteloze leningen worden voor 1 miljard publieke subsidies 5 miljard private middelen gemobiliseerd.” (Groen! resolution)

France

A WWF (2008) study has found that with a 30% CO₂ reduction by 2020, an additional 684.000 jobs could be created in France.

United Kingdom

Organic farming: “With sales reaching \$100 billion in 2006, organic farming is beginning to register an impact. ... A study of 1,144 organic farms in the United Kingdom and the Republic of Ireland showed that they employed one-third more full-time equivalent workers per farm than conventional farms. ... If 20 percent of farmland became organic in both countries, there would be an increase of 73,200 jobs in the United Kingdom and 9,200 in Ireland.” (UNEP, 2008: 298)

“A 2000 study by the U.K. government concluded that for every \$1.4 million (€1 million) invested in **residential energy efficiency**, 11.3 to 13.5 FTE (full-time equivalent) jobs were created.” (UNEP 2008: 296)

A very recent report by the Local Government Association (2009) makes recommendation supposedly leading to 150.000 new jobs being created through measures enacted by local governments.

USA

In 2006 **renewable energy and energy efficiency technologies** generated **8.5 million new jobs**, nearly \$970 billion in revenue, and more than \$100 billion in industry profits.

<http://www.greenforall.org/green-collar-jobs> (2009-02-01)

Academics have released lots of studies trumpeting the potential for green jobs — one report by the RAND Corporation and University of Tennessee found that if **25% of all American energy were produced from renewable sources by 2025**, they would generate at least **5 million new green jobs**.

<http://www.time.com/time/health/article/0,8599,1809506,00.html> (2009-02-01)

A very interesting and most recent study is the one from the **American Solar Energy Society** (ASES, 2008). According to their research published in December 2008 there are **9m jobs in Renewable Energy** (mostly biomass/ethanol) and **Energy Efficiency** (mostly recycling/reuse) by the end of 2007 with a combined revenue of \$1045 bn (but EE far higher share than RE). In their scenarios for 2030 there would be 16-37 million new jobs created, and revenues rising to \$1966-4294 bn.

Beware: by far the most job effects are in energy efficiency (EE) - up to 10x higher - and not in RE. UNEP (2008: 100) has some critical remarks on this study and the scenarios.

e. The critique

While in Europe there is little overall disagreement about the benefits of green investments, the main debate is about financial priorities. Obviously, all studies rely on assumptions and no one can foresee the future. Consequently, any study and projection cited in this meta-study should face its critics.

The Institute for Energy Research (<http://www.instituteforenergyresearch.org>) is a US think-tank which offers an interesting insight into the ideological counter arguments towards Green investment programmes. The Institute describes itself as “IER maintains that freely-functioning energy markets provide the most efficient and effective solutions to today’s global energy and environmental challenges and, as such, are critical to the well-being of individuals and society.”

The executive summary of their study published in January 2009 (<http://www.instituteforenergyresearch.org/green-jobs-fact-or-fiction/>) offers a good insight into their thinking as well as some valuable criticism that can be useful for designing future studies and projections.

4. The eco-eco debate

a. Ecological policies for better economic performance

"Opponents of strong environmental measures have time and again presented the argument that such policies would spell economic doom. Time and again, however, they have been shown to be wrong. On the contrary, three key truths are emerging:

- Economic activity and employment depend in fundamental ways on avoiding continued resource depletion and safeguarding ecosystems and ecological services.
- If action on urgent environmental problems, especially countering climate change, is not taken, many jobs could be lost to resource depletion, biodiversity loss, increasing disasters, and other disruptions.
- On the other hand, environmental policies not only protect existing jobs against these threats, but also stimulate new businesses and job creation." (UNEP, 2008: 86)

b. The economic rationale for Green growth and employment policies

In general economists prefer market signals (like taxes or prices on carbon) over standards and regulation. Such signals allow for the efficient allocation of labour, goods and services within market-based solutions. It is important to signal long-term frameworks to show what and how investments and risk taken at firm-level make sense.

For the broader macro-economic context Aghion & Howitt (2005: 35f) offer some valuable guidance: Recessions are bad for innovation, because short-term survival considerations prevail over long-term R&D funding. Policy should aim at keeping recessions short. The lower the financial development, the less likely it is to get credit to innovate.

Countries with lesser financial development bear higher yields for countercyclical intervention to firms.

Countercyclical public investments are highly growth-enhancing at low levels of financial development; coefficients for social security are insignificant.

A higher degree of product or labour market liberalization increases the positive growth impact of countercyclical budgetary policy. A plausible explanation for such complementarity is that

government support during a recession, is useful only to the extent that it helps firms maintain long-term innovative investments aimed at entering a new market or a new activity or at improving management methods

Besides general concerns and assumptions (under which most economists seem to prefer ecotaxation and prices on externalities) the current financial crisis is about healing two problems: a) making banks give credit (soon) and b) putting money into the economy quickly (Keynes).

A traditional Green approach would probably address mainly the b) option, e.g. through a Green New Deal that channels investment into green infrastructure and industries.

It would also be worthwhile to consider how ecological considerations could be implemented for problem a). Is it possible e.g. to tie bail-outs to stronger sustainability concerns for future lending and operations? Is it possible to bail-out particular securities and toxic assets that securitise(d) specific environmental concerns? Is it possible to tie bank guarantees to sustainable lending? Is it possible to secure further sustainable lending straight away (as is done in many countries e.g. for loan-programmes to install solar panels, energy-efficient buildings – or in student finance)?

c. Eco taxation

One of the earlier protagonists of the idea of ecotaxes is David Pearce (1991) who suggested already in 1991 that environmental taxation could lead to a "double dividend", as they would not only produce improvements in the environment, but also generate substantial amounts of revenue (OECD, 2004a: 45).

OECD (2004a: 46f): "In practise, environmental taxes can help reduce rather than entirely replace other taxes. This means that the interaction between environmentally related taxes and other taxes has to be considered"

"Goulder (1995) made a distinction between a "weak double dividend" and a "strong double dividend" hypothesis. The weak double dividend thesis simply says that it is better to recycle the revenues from environmentally related taxes through reduced rates in distortionary taxes than through lump-sum payments to citizens. Most economic analysts agree on this. The strong double dividend thesis, which is much more disputed, says that replacing some existing taxes with environmental taxes will reduce the distortionary costs of raising a given revenue level. Concerning an "employment dividend", the strong double dividend thesis

would imply that replacing some existing taxes with environmental taxes – in a way so that net public revenues remain unchanged – would lead to a net increase in overall employment.”

“If capital were inelastically supplied – meaning that capital supply does not vary with the return on capital – and capital incomes were currently taxed at less than 100%, and if the production of energy was particularly capital-intensive, a tax on energy could be seen as partly a tax on capital. In this case the imposition of an energy tax, which was used to finance a cut in labour taxes, shifts the burden of taxation away from labour and towards capital, thus potentially creating a strong double dividend.

If, however, capital is rather elastically supplied, perhaps because of the ease of moving it to countries with lower taxes on capital, an environmental tax reform could cause a considerable increase in the distortionary cost – in the form of capital moving abroad. In this case the benefits of the shift in terms of increased employment would be smaller. The desirable level of environmental taxation thus depends crucially on the elasticity of capital supply and the current rates of capital taxation.”

OECD (2004a: 57) “A double dividend can be reinforced with the introduction of new, less energy-intensive technologies. Moreover, the employment increase can be greater when payroll tax reductions are concentrated on unskilled workers. This impact on taxation can readily be extended to the case of tradable permits, when these are distributed by auction, provided all the revenue from these permits is redistributed in the form of reductions in the cost of labour.”

“These “optimistic” outcomes for the employment dividend must be treated with caution, for they are conditional on two mechanisms: the possibility of lowering labour costs, on one hand, and the elasticity of demand for labour on the other. The first point is disputed in literature on the labour market, and especially in wage negotiation models. Moreover, the Phillips curve, which determines wage growth in most econometric models, casts doubt on the possibility of a long-term reduction, which would render the second dividend temporary in all cases.”

OECD (2004a: 58f): “Several studies have looked at impacts for European countries of implementing the Kyoto Protocol with the help of economic instruments (see Capros et al, 1998; Fougeyrolles et al, 2001; Van Regemorter, 2002). The only case where a robust employment dividend was obtained is that where tax revenues are recycled

through a reduction in payroll taxes”

Capros and Kouvaritakis come to conclusion that by 2010 with fully employed Kyoto Protocol EU-15 GDP will shrink by 0.7%-0.4% but employment will rise by 1.46 mio jobs or 0.4% (besides all the positive environmental effects)

OECD (2004a: 63): “Bach et al. (2002) compared the effects of the German green tax, the proceeds of which are recycled through a reduction in pension contributions (paid by employers and employees) using two models: PANTA RHEI (econometric) and LEAN (general equilibrium), both of them highly detailed. In the short term, PANTA RHEI indicated an employment increase of 0.1% while LEAN found an increase of 0.6%. With a ten-year horizon, both models indicate an employment increase of about 250,000 persons.” But all this increase in employment is more short-run and things will stabilise in the long run. Variations among countries are existing, not everyone profits from the same policy.

OECD (2004a: 72f): “For Europe as a whole, the results suggest that among the five scenarios proposed, two show a net positive impact on employment: the scenario on a common European tax - with revenue recycling – (scenario 2), and the scenario with tradable permits for firms and taxation of households – with revenue recycling (scenario 5). The effect appears less transitory in the second scenario which seems more appropriate for Europe taken as a whole, since it incorporates the substitution effects favouring employment in the first scenario with the less inflationary effects of tradable permits policy.”

“Findings on individual countries indicate that countries that have baseline emissions in 2010 below their burden sharing commitments tend to achieve the best employment impacts through a tradable permits policy for households and firms, assuming that firms can reduce their costs by selling tradable permits, thus improving their competitiveness and increasing their employment relative to the baseline scenario. In the countries that have baseline emissions in 2010 above their burden sharing commitment, taxation with recycling (Scenario 2) is found to provide the best results from an employment point of view.”

The OECD (2004a) also estimated which model makes most sense for the EU in the implementation of Kyoto in the first decade of 2000 (without incorporating the ETS) – those with emphasis on taxes or one with tradable permits, or a mixed one. The result is that “Scenario 5: Tradable permits for firms, taxation of households – with revenue recycling” has the biggest employment effect

(mostly in production of consumption goods and in service-related sectors - except transports). In general, economists prefer taxes over carbon caps and these would probably be also more efficient in terms of carbon reduction. But for political economy reasons, the cap-and-trade system was apparently easier to implement than further or new "taxes".

5. Policy options for a Green New Deal

a. Spending policies in a Green New Deal

Besides the fact that probably any Green has ideas on how money is spent better for environmental concerns, there is hardly any literature about green spending policies. In particular in the context of an economic downturn and a more ambitious approach such as with a Green New Deal it is surprising to realise that apparently no research and thinking has been undertaken to understand what kind of (green) investments make most sense in such a situation. While it is crucial that in the current economic context investment is having real and immediate impact on the economy, most greening measures are naturally focusing on long-term effects and are often knowledge-driven or rely on complex technology, i.e. will need several years of implementation. The latest policy brief by Stern et al. (2009: 14f) however has some useful categorisations of spending and its "shovel-readiness", i.e. its immediate effectiveness (see table page 18).

It is therefore advisable to commission further research on the effectiveness of green spending policies within counter-cyclical measures to understand better which measures offer immediate value. This should also help in argumentation in future (smaller) downturns.

b. Suggestions with positive eco-eco effects

A very helpful guide for suggestions is the 2008 brochure "Ökologische Industriepolitik – Nachhaltige Politik für Innovation, Wachstum und Beschäftigung" [Ecological industrial policy – sustainable policy for innovation, growth and employment] by the German ministry of environment (BMU, 2008).

Further recommendations with regards to spending-driven innovation policies can be drawn from European Commission (2007a: 46f). Such measures include funding for:

Basic research, R&D subsidies in early stage innovation process, Public support should be for broad programmes, not too narrow, R&D support must be stable and strong, but on temporary and predictable basis, Support Green venture capital funds as access to commercial lending is limited, but following measures can increase private bank lending: Provision of investment guarantees in order to reduce financial exposure; Provision of technical expertise needed in order to assess dossier; Prospect of valorising R&D output in the form of start-up creation and incubator support; Clear demonstration of public commitment. Facilitate networking among fragmented research clusters on key developments, Subsidise eco-auditing (EMAS) on a company level, Training of decision-makers and raise their awareness for eco-eco effects, Promote clusters as PPPs, Passive housing with low-interest loans, PV installations with investment grants, Finance demonstration projects, Public information and awareness raising for Green technologies, energy-efficient behaviour.

The OECD (2008) provides general suggestions for climate change adaptation. The following activities require further investment in coming years:

Coastal protection, High cost-benefit: farm-level, water storage, treatment, desalination, subsidise introduction of insurance schemes (crop failure, snow coverage, freak weather events) – the most extremes end of risk – this can be successful over mid- and long-term when such schemes are made obligatory/universal (so that insurance makes more sense).

It should also be interesting to explore the US government's activities that are part of the stimulus package. The funding towards specific activities (and amounts) can be found through Wikipedia (http://en.wikipedia.org/wiki/American_Recovery_and_Reinvestment_Act_of_2009). However, it should not be forgotten that the US is way behind Europe in terms of energy efficiency and not all measures in Europe will bring the same yield as in the US.

c. Phasing out negative subsidies

"Huge sums continue to flow into fossil fuel extraction and conventional utility projects. Capital spending for just one project—tar sands extraction in Alberta, Canada—totalled \$55.3 billion from 1999–2006, and a further \$100 billion might be invested from 2006 to 2015.1080 The oil industry recorded revenues of \$1.6 trillion dollars

Assessing selected proposals to combat climate change

Scores (1= worst; 3 = best)

Mitigation target	Investment approach	Timeliness ('shovel-ready')	Long-term social return
Buildings and industry			
Residential energy efficiency (lofts etc.), either utility-driven or local-authority-driven	Mixed public/private	3	3
Energy efficiency measures for public buildings	Mixed public/private	3	3
Boiler replacement programme	Private with incentives	3	3
Lights and appliances e.g. utility- driven	Private with incentives	3	3
Renewable heat/ fuel switch (e.g. solar, biomass)	Private with incentives	3	3
Micro-generation (wind, biomass), e.g. through feed-in system	Private or mixed public/ private	2	3
'Smart' production (increase energy efficiency, monitor, meter and regulate delivery and consumption of energy and inputs	Private with incentives	2	2
'Smart' infrastructure and buildings – increase energy efficiency, monitor, meter, and regulate delivery and consumption of energy and water	Mixed public/private	2	3
Encouraging energy R&D (doubling percentage of GDP)	Mixed public/private	2	3
Industrial energy efficiency/ mitigation, e.g. combined heat and power	Private or mixed public/ private	2	3
Power generation			
Renewable energy promotion, e.g. through accelerated planning process	Private	2	3
Nuclear power, e.g. through accelerated planning process	Private	1	3
Carbon capture and storage demonstration projects	Mixed public/ private	1	2
Upgrade to 'smart' electricity grid	Public with some clawbacks via tariffs	1	3
Advanced battery development	Private with incentives	1	3
Transport			
Supply-side efficiency in new cars, van and HGVs (g/km)	Private with incentives	1	3
Switch to cleaner cars/ fleet renewal e.g. through stronger differentiation of vehicle excise duty	Private with incentives	3	3
Connected urban transportation including road traffic mangement systems and work patterns	Mixed public/private	1	3
Supply- side efficiency in rail (engines, rolling stock)	Private with incentives	1	3
Mass transit and rail freight	Mixed public/private	2	2
Car efficiency standards	Private with incentives	1	3
Type check	Private with incentives	3	2
Reducing emissions from deforestation and forest degradation			
Afforestation, expanding and developing parkland, wetlands and rural ecosystems	Private with incentives	3	2

Mitigation target	Positive 'lock-in' effects	Domestic multiplier/ job creation	Targeting areas with slack	Time- limited/ reversibility
Buildings and Industry				
Residential energy efficiency (lofts etc.), either utility-driven or local-authority-driven	2	3	3	3
Energy efficiency measures for public buildings	2	3	3	3
Boiler replacement programme	2	3	3	3
Lights and appliances e.g. Utility- driven	2	3	3	3
Renewable heat/ fuel switch (e.g. Solar, biomass)	2	2	3	2
Micro-generation (wind, biomass), e.g. through feed-in system	2	2	2	1
Smart' production (increase energy efficiency, monitor, meter and regulate delivery and consumption of energy and inputs	3	1	1	1
Smart infrastructure and buildings – increase energy efficiency, monitor, meter, and regulate delivery and consumption of energy and water	3	2	2	1
Encouraging energy R&D (doubling percentage of GDP)	3	2	1	1
Industrial energy efficiency/ mitigation, e.g. combined heat and power	3	2	1	3
Power generation				
Renewable energy promotion, e.g. Through accelerated planing process	3	3	1	3
Nuclear power, e.g. Through accelarated planning process	3	3	1	3
Carbon capture and storage demonstration projects	2	3	1	1
Upgrade to 'smart' electricity grid	3	3	1	3
Advanced battery development	3	2	1	1
Transport				
Supply-side efficiency in new cars, van and HGVs (g/km)	3	3	3	3
Switch to cleaner cars/ fleet renewal e.g. Through stronger differentiation of vehicle excise duty	2	2	3	1
Connected urban transportation including road traffic mangement systems and work patterns	3	2	2	1
Supply- side efficiency in rail (engines, rolling stock)	3	2	2	3
Mass transit and rail freight	3	3	3	1
Car efficiency standards	3	2	2	3
Type check	2	3	2	3
Reducing emissions from deforestation and forest degradation				
Afforestation, expanding and developing parland, wetlands and rural ecosystems	3	3	2	2

and profits of more than \$140 billion in 2005.¹⁰⁸¹ The problem is therefore not simply a shortage of capital, but more a matter of where capital is being invested and for what reasons.” (UNEP 2008: 306)

Fossil fuels and nuclear continue to be subsidised directly or indirectly in most EU member states. Cutting down on these expenditure should equally allow for a “double dividend”.

6. Issues for further research

Researchers might like to come up with clearer definitions of the “green collar economy”, “green collar jobs” or indeed the “eco-industry”.

The ASES (2008) study provides for a useful indication of what green policy-makers might like to have at hand to argue their case for the effectiveness of green investments. A similar study would surely be of help in the European context.

Moreover, further specific policy-field scenarios as in European Commission (2007b: 17f) are of great help to discuss the varying benefits of measures in different fields and sectors.

Thirdly, it seems as if for the first time a wide debate about counter-cyclical green spending has taken off. Further research is needed to give policy instruments to decision-makers to know better how to act in future downturns. Identifying efficient and immediately effective green investments is the key here. The Stern (2009) report can serve as a starting point with its qualification of “shovel-ready” measures.

7. Relevant networks, organisations and initiatives

Apollo Alliance, USA, <http://apolloalliance.org/>

“The Apollo Alliance is a coalition of labor, business, environmental, and community leaders working to catalyze a clean energy revolution that will put millions of Americans to work in a new generation of high-quality, green-collar

jobs. Inspired by the Apollo space program, we promote investments in energy efficiency, clean power, mass transit, next-generation vehicles, and emerging technology, as well as in education and training. Working together, we will reduce carbon emissions and oil imports, spur domestic job growth, and position America to thrive in the 21st century economy.”

Green for All, USA, <http://www.greenforall.org>

Co-founded by Van Jones, its mission statement reads:

“Green For All is a national organization dedicated to building an inclusive green economy strong enough to lift people out of poverty. By advocating for local, state and federal commitment to job creation, job training, and entrepreneurial opportunities in the emerging green economy – especially for people from disadvantaged communities – Green For All fights both poverty and pollution at the same time.”

8. Recommended reading

- **ASES study (2008)**

It has very good and useful scenarios for the US. For Europe something really similar to this would be very helpful.

- **Institute for Energy Research, Green Jobs Fact or Fiction?**

<http://www.instituteforenergyresearch.org/green-jobs-fact-or-fiction/>

The conservative answer to the debate about the viability of Green collar jobs. No surprising news but it has all the (ideological) counter arguments. Besides, it offers a useful critique of the four main US proposals (including the ASES 2008).

- **Van Jones (2008)**

The principle publication outlining the idea of a green collar economy with a lot of strategic thinking for new societal alliances between the environmental movement and other social actors.

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Reservations

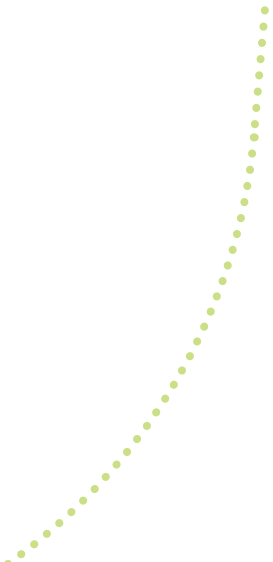
This study is a meta-study, i.e. it brings together and synthesises from existing material. No original research is undertaken here and no own scenarios or wider evaluations have been prepared. Most material has been drawn from public institutions and interest organisations and is freely available. Academic sources have mostly been neglected because they do not seem to offer employment scenarios. The author takes no responsibility for the accuracy and contents of the external literature, their continuing availability and their contents. All information and analysis in this study has been prepared in good faith and to the best of my knowledge.

Contact

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"We continue to think the EU's policymakers are putting Europe at the forefront of the investment in the low-carbon technologies of the future, and that this will ultimately prove to be a very sound industrial policy for the EU, as well as the appropriate environmental one."
[Deutsche Bank, 2008: 32]



Even if several studies about Green Collar Jobs have emerged during the past years, there is no clear-cut definition of the term. Most comprehensive categorisations are naturally broad and drive up the numbers of people working in Green industries. Though the potential of such jobs is estimated differently in the literature it seems clear that Green economy, especially the energy efficiency sector, can create millions of new jobs in Europe. To achieve this aim, most economists prefer eco-taxes and price signalling like emission trading schemes over regulation and public spending.

Jan Seifert's working paper for the Green European Foundation adds to the debate on a **Green New Deal** for Europe by giving a first overview of surveys on the potential of employment in the ecological sector. The meta-study emphasizes a need for further research in Europe as specific and broad-ranging organised alliances for a green collar economy seem to exist mainly in the USA at the moment.

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