



Re:new

“PES Council, Warsaw 02-03.12.2010”

PES DEBATE ON PROGRESSIVE SOCIETIES

Making Green Growth become a reality

PES Policy Paper adopted by the PES Council in Warsaw on 3 December 2010

In the aftermath of the financial and economic crisis, the wellbeing of Europe's citizens depends on whether European countries will be able to recover sustainable growth levels, create enough new and high quality jobs, overcome social inequalities and preserve an intact nature. We live in an era when the consequences of climate change become increasingly threatening, the environment we are living in is still degrading and the energy dependency of the European Union is rising constantly. The energy and resource efficiency of our production methods increasingly determines the competitiveness of Europe's economy, the markets for renewable energy as well as other "green" products grow rapidly and millions of jobs will be created in these sectors. The answer to these challenges is to promote and to invest in green growth.

The United Nations Environment Program (UNEP) defines green growth as "the process of reconfiguring businesses and infrastructure to deliver better returns on natural, human and economic capital investments, while at the same time reducing greenhouse gas emissions, extracting and using less natural resources, creating less waste and reducing social disparities."¹ While other parties support green growth mainly for economic and environmental reasons, we as social democrats and socialist must primarily fight for green growth which contributes to a good life of the European citizen, quality jobs and sustainable and fair growth. We must ensure just transition towards a carbon-free economy.

Climate change is a huge challenge for the welfare of our citizens, the environment and our economy

Climate change is one of the biggest challenges Europe is faced with. There is overwhelming scientific evidence of the intensification of climate change.² It is no longer doubted that global warming will have devastating consequences, not only for the environment, but also for the economy, for employment and for the welfare of European citizens. The European Union should lead by example and adopt ambitious greenhouse gas (GHG) reduction targets and assume leadership of global climate negotiations, this must include unilaterally increasing our emission reduction target from -20% to -30% for 2020. If green house gas emissions are not reduced swiftly, the rise in global temperature will lead to increased desertification, more flooding, a decline in agricultural production, rising sea levels with devastating consequences for coastal regions, the spread of malaria and other tropical diseases in Europe as well as the extinction of numerous species. The Stern report estimated the annual global loss in GDP to be in the region of -4% GDP if emissions are not reduced.³ Not fighting climate change could therefore result in suffering from a permanent economic crisis similar to the one we have just experienced (in 2009 the GDP decreased by -4.2%)⁴. Compared to the costs that are likely to result from climate change, the costs to prevent climate change are rather small. The STERN report estimates costs for unavoidable infrastructure adaptations such as flood protection measures or the relocation of settlements and industrial parks alone to exceed €100 billion annually if global temperatures are allowed to rise by 3°C.⁵ Additionally, every year in which there is no progress in reducing emissions, these costs increase by approximately \$500 billion (€400 billion)⁶. The later we manage to stop climate change, the higher will be the adaptation costs in infrastructure

reconstruction, agriculture, energy, health, transport, tourism and many other sectors, and the more expensive will be the transformation of Europe's traditional fossil fuel based economy to a carbon free economy.

Climate change could also be an opportunity

As much as climate change is a threat, it could also be an enormous opportunity for Europe. Fighting climate change by investing in green growth provides enormous economic potential and can help to overcome the financial and economic crisis. New, often high quality green jobs can be created, the competitiveness of Europe's economy increased and new markets can be opened up. According to the UNEP and ILO definition, all jobs which promote sustainable development are considered green jobs. This definition includes, 1) jobs which directly reduce consumption of energy and resources, protect ecosystems and biodiversity and minimise waste production and air pollution and 2) all jobs which reduce the environmental footprint.⁷ Other institutions, amongst them the European Commission, also use broader definitions that include indirect green jobs and induced green jobs.⁸ Due to this inconsistency in definition, the green job potential cannot be precisely determined, but ranges from 2.4 million (narrow) to 36 million (broad). New, often high quality jobs can be created, the competitiveness of Europe's economy increased and new markets can be opened up. Ensuring that growth does not have negative effects on the environment will not only be to the benefit of our nature and improve our living quality, but it will also avoid long-term economic consequences, which are caused for example by pollution. While most industrial sectors experienced a sharp decline in demand as a result of the crisis, the green technology sector, including amongst others renewable energy, energy efficiency, recycling and water management, only saw a brief slowdown in its growth but has already recovered with well above average growth rates.⁹ By 2020, the global turnover in the green technology sector is expected to double to €3,100 billion.¹⁰ In Germany, the contribution of this sector to GDP is expected to rise to 14% by 2020.¹¹ Already today, there are approximately 8.6 million green jobs in the EU.¹² Creating ten million new green jobs by 2020, one of the principle demands of our social democratic election manifesto for the elections in 2009, is within reach if the necessary political measures are implemented.

The potential of green growth goes well beyond specific green technologies. Highly fuel-efficient and low-emission cars have an enormous market potential and most European companies are far from being market leaders in this sector. Decarbonising transport by strengthening and extending public transportation, which is more labour intensive than individual transport, is another path to follow. However, the biggest opportunity to increase the competitiveness of Europe's economy lies in reducing the use of energy and other resources, not only in industry, but also in services and agriculture. Considering that the use of energy and other raw materials constitute around 40% of the cost of European products, increased efficiency can result in cheaper and more competitive products without having to decrease labour costs (which constitute only around 25% of the product costs).¹³ Decreasing the energy consumption of private households and the use of fossil fuels in transport will reduce our energy dependency and it will allow citizens to spend their money on other, more labour intensive products and services, therefore increasing domestic demand.

Green growth requires sufficient support measures

Green growth is neither a natural process, nor will it come for free. Reaching sustainable growth and making our economy carbon-free requires a fundamental transformation of our production, consumption and transport patterns. A comprehensive political strategy comprising of legislation on the European, national and regional level, legal and financial incentives for the economy and consumers, information and awareness raising for citizens and the conclusion of international agreements is needed. This strategy should cover a wide range of interlinked policies such as economic, industrial, regional, employment, social, environment, trade and foreign policies (for a comprehensive list of measures to be implemented, see the Annex). While the European climate change and energy package offers some first solutions, more measures on all levels of governance must be implemented. Much more must be done to ensure just transition: more attention must be paid to the impact of the green transition on the life of all groups in society. Those who have to face negative consequences, need to receive specific support, for example by fighting energy poverty.

Even though investing in green growth will pay back in the mid-term and reduce the costs of climate change and environmental degradation, substantial up-front investments will be needed. A large proportion of these investments must come from the private sector. Providing the right incentives for

such measures, for example through feed-in-tariffs for renewable energy, is one of the major challenges for European policy makers in the coming years. In order to generate additional public resources to be spent on green growth, new financial tools need to be considered, such as a European Financial Transaction Tax, green bonds and carbon taxes.

We as European social democrats and socialists will continue being at the forefront of promoting green growth and put forward ambitious green growth strategies for the European Union and for all Member States. Offering the most convincing proposals to overcome climate change and environmental degradation while achieving sustainable and fair growth and employment will also help us to regain trust from our constituencies and attract new voters. There is a clear difference between the left and the right in this debate: while the conservatives and liberals promote business interests and often hinder green growth, we put the interests of citizens first. We are the only party who fights for a just transition towards a sustainable and fair economy. We believe that it must be ensured that green growth results in new high quality jobs, that those people temporarily losing jobs receive support to find new employment and especially that low income households profit from the process.

1. Sustainable, independent and affordable energy

Access to stable, secure and affordable energy supplies is crucial for Europe's economy as well as for the well-being of Europe's citizens. Climate change, rising energy prices, increasing dependence on energy imports, often from unstable regions, the scarcity of fossil energy resources and the need to replace obsolete power stations and grids, require enormous reforms and investments in the energy sector. An ambitious transformation of our energy networks is needed, in order to allow all Europeans and all companies to profit from affordable, secure and carbon free energy. In an economically largely integrated European Union, these challenges cannot be answered by the national level alone.

While the choice of the specific energy mix will remain controversial and in the competence of the Member States, a strong consensus is emerging, that in order to stop climate change and reduce the energy dependency of the EU, the use of fossil fuels must be phased out in the mid- to long-term. In 2008, the fossil energy imports of the European Union had a value of approximately 350 billion €. This amount is set to increase even further: in 2030 the EU will import 59% of its coal, 84% of its gas and 94% of its oil, if no counteractions are taken¹⁴. Reducing the costs of energy imports would free enormous resources for investments into new technologies, to support fair growth and to improve living standards of all Europeans.

On nuclear energy there are differing views: while some underline that this technology is carbon free and can help to stop climate change, others stress the potential risk of nuclear power, the unsolved problem of nuclear waste storage, the large costs of installing nuclear power capacities and the fact that uranium is not a renewable resource as such. A European consensus in favour or against the use of nuclear energy is not likely to emerge in the near future. However, in order to ensure that the use of nuclear energy in Europe is safe, European criteria for the safety of this technology and the storing of nuclear waste should be further developed.

Europe can reach the 100% renewable energy target

There is broad agreement that the principle solution to replace fossil fuels is increasing production and use of renewable energy. Already in 2008, more new renewable power capacity was installed than fossil energy power capacity.¹⁵ In accordance with EU decisions, the PES pleads for the EU to increase the amount of renewable energy in its energy mix to at least 95% in 2050. Recent studies have proven that even the target of 100% renewable energy can be reached by 2050, if the right political measures are implemented.¹⁶

Enormous progress has been made in recent years on installing new renewable energy production capacity in many Member States. The legally binding target of at least 20% renewable energy, as enshrined in the European Directive on the promotion of renewable energy source, is likely to be reached under a business as usual scenario. Therefore, the EU should raise its ambitions and increase the target to a share of 30% renewable energy by 2020. Also for the next decades, concrete targets should be set, for example 45% for 2030, 70% for 2040 and 95% for 2050. Investments and smart regulation in order to support renewable energy with a view to increase security of supply, more environmental protection, competitiveness and industrial leadership on the part of the European Union are

necessary, on the European level, in all Member States and on the regional and local level.

Reaching such high proportions of renewable energy production requires targeted support and enhanced interconnections. The sun, wind, biomass, geothermal and hydro energy potential is a multiple of Europe's energy needs. In the past years, a lot of progress has been made in reaping this potential in an economical way. Although renewable energy potential differs across the EU, with wind playing a strong role at the coasts, sun in the south and biomass in agricultural regions, every region has a large renewable energy potential. However, renewable energy sources are continuous sources. It is therefore essential to develop cross border transmission capacities at EU level, paying special attention to the most isolated countries and regions in the Union's energy market. Those European countries which have made a lot of progress in installing renewable energy facilities have relied on a combination of technological progress and supportive measures, which make renewable energy more competitive. The major challenges for those countries lacking behind in the use of renewable energy is the establishment of a strong legal framework and support measures, such as feed-in-tariffs combined with targeted support for R&D, deployment and grid development. For example, using the enormous potential of off-shore wind production is now feasible technically and economically and will strongly contribute to reducing fossil fuel dependency of coastal Member States. Other ocean energy potentials, such as wave and tidal power, need to be further investigated and demonstration projects need to be supported. Using sun power in southern countries needs to receive additional support, for example by subsidising thermal heating and solar panels. Second and third generation biomass, which is not in competition with food production, will also play an essential role within the future energy mix, especially in balancing periods with little wind and sunshine.

Increasing energy efficiency is essential

Increasing the share of renewable energy is not possible without paying attention to energy consumption. In order to reach the objective of generating at least 95% from renewable sources by 2050, energy efficiency must be increased. The final demand for energy in Europe should be reduced by 40% compared to today's demand until 2050, by combining several policy measures. In electricity production and distribution, large energy efficiency gains can be achieved. Modernising the energy grid and therefore reducing the amount of energy lost in production will be an important contribution to cost saving. The average efficiency for electricity generation is currently around 40%. A new generation of energy capacity can reach efficiency levels close to 60%. Losses in the transmission and distribution of electricity should also be reduced. Power stations should be upgraded in order to increase their efficiency, electricity waste in energy distribution should be reduced and smart grids should be developed, allowing producers and consumers of electricity to use less electricity and use it at the moment when enough energy is available.¹⁷ Supporting district heating will not only increase the efficiency of electricity production, but also reduce electricity and heat costs for the citizens. The increase in wind power and solar power, two important energy sources that provide varying amounts of energy throughout the day and over the year, require increased efforts to build a European electricity grid, distributing all electricity available to those who need it. Furthermore, energy storage technologies, such as hydro-pumped plants or electric vehicle batteries, must be further developed and their deployment supported. In addition, decentralised energy production, for example in buildings and in the agricultural sector, should be supported.

Measures to support renewable energy should not remain restricted to electricity production. The heating and cooling sector is the biggest green house gas emitter in Europe. Its renewable energy potential is huge. Solarthermal and geothermal heating and cooling, as well as biomass have the potential to replace large amounts of fossil fuel.¹⁸

For us, as the Party of European Socialists, it is essential that a just transition is ensured in the transformation of the European energy sector, sustained by a binding European Charter on the Rights of Energy Consumers. Energy prices must remain affordable, especially for low-income groups. Making use of renewable energy should not be a privilege for the rich, but should be possible for all Europeans. Furthermore, the effects on the labour market, which will result from the energy transformation, must be anticipated. Reskilling and training must be offered to workers in carbon intensive energy production, allowing them to find new employment in the renewable energy sector.

It is true that enormous investments will be needed to implement such an energy transformation: around €963 billion by 2020, €1,620 billion by 2030 and €2,800 billion by 2050¹⁹. However, these figures must be compared to the costs of continuing to use non-renewable energy sources.²⁰ Due to

the ageing of existing power plants, 42% of the EU's current electricity production capacity (330 GW) will need to be replaced by 2020.²¹ Replacing them with new fossil power plants or nuclear power plants will not be much cheaper than installing renewable energy power plants. If renewable energy would receive the same level of subventions as fossil and nuclear energy, it would even be cheaper, especially when considering the costs of pollution caused by fossil-fuelled power plants. With the renewable energy installed by 2009, emission reduction benefits of €51 billion (based on carbon price of €15 per ton of CO₂) have been realised since 1990. Renewable energy can avoid fossil fuel costs of about €158 billion in 2020, €325 billion in 2030 and about €1,090 billion in 2050.²²

While most industrial sectors felt a painful decline in production and exports during the crisis, the renewable energy industry only experienced a short slowdown in growth and continues to extend its production at a fast pace. In 2008, a €35 billion turnover was generated in the European market for renewables alone, for 2010 this figure is projected to double.²³ If the right policy measures are implemented, the global volume is likely to increase to €615 billion by 2020.²⁴ Furthermore, the renewable energy industry is one of the most stable sectors. The growth of the wind sector decreased from 25% before the crisis to 9% during the crisis, which is considerable higher than most other economic sectors.²⁵ Europe remains a market leader in many of the renewable energy sectors. However, in order to remain competitive with companies and products from China, the US and other countries, which have seen enormous growth rates in previous years, the European renewable energy industry needs further support (see Annex).

Reforming our energy production will create millions of new jobs

Strengthening renewable energy will also contribute to overcoming the large-scale unemployment in Europe, which is one of the most visible effects of the economic and financial crisis. The renewable energy sector is more labour intensive than other energy sectors. With every \$1 million investment, 2.9 jobs are created in the nuclear field, 3.4 in oil, 4.8 in coal, 10.1 in smart grid, 10.4 in wind and solar, 12.3 in biomass, 12.8 in retrofitting houses and 15.4 in mass transit.²⁶ Between 2002 and 2007, direct employment in the wind energy sector increased by 125%.²⁷ It is expected that wind energy employment in the EU will more than double to almost 330,000 in 2020.²⁸ Also photovoltaic energy (PV), solar heating and cooling as well as biomass use have an employment potential of more than one million jobs by 2020 and of more than 4.5 million jobs by 2050.²⁹ In 2010, the renewable energy industry in the EU already provides 550,000 jobs, and two million new jobs can be created by 2020.³⁰ More new jobs will be created in the renewable energy industry than will be lost in the fossil fuel and nuclear energy sector. However, political measures such as investments in targeted education and training programmes will be needed in order to ensure a smooth transition for the workers concerned and to ensure that no region has to suffer from transforming our energy production. While many of the newly created jobs are decent and high quality jobs, further attention must be paid to ensure that the transformation to renewable energy also entails a development to decent and high quality work for men and women.

2. Transforming production

Climate change, scarce resources and increasing global competition require a fundamental transformation of our production patterns. Energy and resource intensive production methods must be replaced by much more efficient processes. Reducing the use of energy and raw materials will considerably relieve the environment, decrease production costs, make Europe less dependent on the countries exporting resources and it will make European products more competitive on the global market, thus supporting fair economic growth and employment. The potential for increasing resource efficiency throughout Europe is considerable, particularly in the new EU-Member States and requires special attention and support.

The green technology sector is important for fair, green and smart growth

Europe's efforts to reduce the use of resources in production processes have generated a new industrial sector, called green technology, consisting of:

- Environmentally friendly power generation and storage
- Energy efficiency
- Material efficiency
- Waste management and recycling

- Sustainable water management
- Sustainable land management
- Sustainable mobility³¹

Similar to transforming our energy production, renewing and greening our industrial base would result in up-front costs but would generate enormous profits in the mid-term to long-term. Despite the economic and financial crisis, revenues from green technologies are expected to double between 2007 and 2020, reaching €3,100 billion in 2020. European companies are marked leaders in many fields.³²

Increasing the use of electricity and heat from renewable energy has a high potential for reducing production costs. Most of the 51 million jobs in the manufacturing sector in Europe³³ will only be secure for the next decades if the use of raw material as well as the use of energy and therefore the price of the products can be decreased. Secondary steel production, based on recycled scrap, requires 40–75% less energy than primary production, recycling aluminium scrap uses only 5–10% the amount of energy it takes to make aluminium from scratch.³⁴ If European production would be more energy and raw material efficient, laying off workers with all the negative economic and social effects could be avoided in many cases. Furthermore, energy and raw material efficiency technologies are becoming a strong export sector on their own, contributing to economic growth. Additionally, the installation of local renewable energy units (for example solar panels on store houses) would decrease the dependency on greatly fluctuating energy prices and once fossil energy prices reach new peaks, such measures will reduce energy costs for enterprises considerably.

The waste management sector provides increasing green growth and job potential. Reusing and recycling resources will decrease the amount of raw material, which needs to be imported from often unstable regions, with considerable positive effects on Europe's foreign trade deficit. More than one million jobs are estimated to already exist in the European recycling industry,³⁵ but the potential is even higher: the amount of waste produced in Europe is increasing, recycling technology is constantly improving and raw material prices are picking up again after the crisis. While living standards in emerging countries increase and environmental concerns become more important, exporting recycling technologies is an increasingly profitable undertaking for Europe.

Water management is another sector, where additional green jobs will be created in the near future. While water is getting scarcer due to climate change, the management of water will become increasingly important. The use of modern desalination technologies, powered with renewable energies, offers new opportunities for agriculture in southern Europe but also for exporting European know-how to other countries with water scarcity.

Not only industrial production, but also agricultural production should be transformed. It is responsible for approximately 9.2 % of EU emissions and has a large reduction potential³⁶. Inefficiency and the use of energy related to the transportation and use of machines linked to agriculture could be reduced. As far as possible, agricultural processes as such should be made more efficient and environmental degradation must be prevented. Especially farming on moorland, swamps and marshes, which produces considerably higher emissions than agriculture on other soils, should be adapted and if necessary reduced. Farmers should furthermore adapt to changing foodstuff demand and increase the production of organic food, which is not only more environmentally friendly, but also much more labour intensive than existing agriculture.³⁷ Enormous potential can also be found in the use of agricultural by-products for the production of biomass. Not only can emissions be reduced this way (e.g. instead of leaving manure outside to rot, it will be used to produce biogas), but technologies can be developed and deployed in this process, which have a large export potential. In order to increase incentives for the agriculture sector to contribute stronger to green growth, a binding emission reduction target, supplemented by a number of other measures could be introduced (see annex).

Sustainable forestry management is another field where green jobs can be created. There is a growing demand for products from sustainably farmed forests, requiring a transformation of the forestry sector. Creating new jobs in forest ecosystem management will help to reduce the impact of climate change. Already increasing number of fires and gradual desertification in the south of Europe display the need for job creation in sustainable forestry.³⁸ In addition, the European fishing industry, which causes the decrease of fishing stocks worldwide, needs to be overhauled. The reform of the fishery policy needs

to be accompanied by support for education and training, since some jobs in the fishery sector will be lost. Nevertheless, new and greener jobs can be created in sustainable fishing and fish farming, which are more labour intensive than factorised fishing on the sea. Improved information about the consequences of unsustainable fishing can help to create new markets for more environmental friendly products.

The green transformation of our economy is essential for overcoming the crisis

Transforming Europe's traditional economies to carbon-free economies will have effects on all sectors, but the "stress" caused for the labour market will be limited. Although reforming European economies would result in the loss of some jobs in traditional energy production and mining, the net impact on employment would be very positive. The International Labour Organization (ILO) projects that up to 14.3 million jobs – many of them in Europe - can be created through green policies worldwide within the next 5 years (net +1.1% compared to jobs lost through structural change).³⁹ The redistribution of jobs that will result from the implementation of climate policies will occur within rather than between sectors. It is considered easier for workers to change companies within the same sector than to find work in a different sector.⁴⁰ New jobs will rather be created in companies that can take advantage of opportunities created by climate policies and jobs will only be lost in companies that cannot adapt.

Green growth will be very beneficial in the mid-and long term for the entire society. However, in a transition period, some citizens could suffer from increased prices and a loss of jobs. Public policies need to pay careful attention to ensure a just transition. Comprehensive training programmes need to be introduced, providing those workers who lost their jobs in fossil intensive industries with the skills to find new employment. Increased costs, resulting from the transformation of energy production, transportation and industrial processes, should be distributed fairly, while ensuring that disadvantaged groups in society do not bare additional hardship. Only if just transition is guaranteed, consumers will be ready to change their behaviour, to use less resources, to consume more green products and therefore to make the transformation towards a carbon-free economy become reality.

3. Ensuring more sustainable consumption

Transforming production without changing consumption patterns will have limited impacts. Energy production can be reduced and fewer power stations will be needed, if energy consumers make greater efforts to consume less. The production of renewable energy can be increased considerably, if more people change their electricity and gas providers to those providing 100% renewable energy products. Choosing "green" products instead of those with a large ecological footprint will help the green growth sector to prosper.

An enormous potential for transforming consumption patterns in Europe exists in the service sector. Out of the 270 million employees in Europe, 212 million work in the service sector. The potential for "green" jobs in this sector is naturally much higher than in manufacturing, mining and agriculture. Nearly all of those jobs can be "greened" and the competitiveness of service products will increase by reducing the energy input. A large impact on energy efficiency can be reached by insulating office buildings and installing decentralised renewable energy devices, especially solar panels. Additionally, the replacement of inefficient office equipment (computers, lighting, etc) with new products pays off quickly, due to reduced energy bills. Stronger incentives should be given to employees to make use of public transport and non-motorised transport when commuting to work. In the framework for lifelong learning, a ninth key-competence should be introduced, related to environment, climate change and sustainable development. Such measures would not only reduce costs for the employees, but would accelerate the introduction of innovative technology in Europe, which in turn would strengthen the export industry. Considering the change in consumer behaviour, those companies who can claim that they reduce their environmental footprint will have a competitive advantage over those offering "dirty" products.

Green job creation will not be limited to energy and resource efficiency and the use of renewable energy. While consumers become more aware of their combined power to promote green economic transformation by buying products with less environmental impact, all sectors will have to put a stronger focus on green growth. One of many examples is the new trend to buy "organic" clothes, which are based on sustainably produced and processed wool. While mainly small and medium enterprises profited from this development in the beginning, major companies included organic

clothes in their assortments, which led to an increase of jobs in this sector. Also in the tourism sector, sustainability plays an increasing role. Ecological tourism does not only leave the environment intact, but is as well more labour intensive than traditional tourism and provides higher quality jobs. In order to support green jobs and green growth, more awareness raising campaigns for consumers and better labelling of the carbon footprint of products should be introduced. Consuming local food products instead of imported ones will not only reduce emissions and decrease environmental degradation, it will also support the agricultural sector in Europe.

The largest challenge and opportunity for transforming energy consumption in Europe represents the housing sector. In modern, high-performance buildings at least 80 percent of the energy can be saved compared to traditional building constructions.⁴¹ The energy saving potential is especially high in the new Member States.⁴² Investments into more energy efficient buildings would materialise relatively quickly - not only in emissions saved, but also from an employment, economic and social perspective - and would therefore be counter-cyclical. The construction of “green buildings”, retrofitting of existing houses, installing decentralised renewable energy devices (mainly solar panels, solar heating and geothermal heating), installing more efficient lighting systems and the introduction of more efficient electronic equipment and appliances all have an excellent job creation potential.⁴³

Especially the construction sector, which employs around 19.5 million workers in Europe⁴⁴ and which has been hit very hard of the crisis, would be able to recover, if large-scale investments in retrofitting houses will be made. More than 2.5 million people could be employed in the “green” housing sector until 2030.⁴⁵ Some of the new jobs created by retrofitting houses will require lower qualification levels, enabling many of those losing employment during the crises to re-qualify for these jobs.⁴⁶ Another important advantage of investing in the retrofitting of houses is that most of the jobs created cannot be delocalised, but will remain in Europe.⁴⁷ Such measures would have very positive social effects. Especially poor households will be able to profit from lower energy prices and unlike in high-income groups; these profits are likely to lead directly to increased consumption.

In theory, the up-front investments which would be required for a major retrofitting of Europe’s houses (around 137 billion €)⁴⁸ would amortise quickly, due to reduced energy bills. However, the problem of converging interests of house owners (who have to provide for investments in energy efficiency) and tenants (who will profit from reduced energy prices) must be overcome.

4. Transforming mobility

On the one hand, our mobility patterns are one of the biggest obstacles to fight climate change; on the other hand, they are one of the biggest opportunities for green growth and green jobs. While the emissions in energy production, industrial processes and consumption in buildings have decreased over the past years, emissions from transport have increased strongly. In 2007 greenhouse gas (GHG) emissions from transport had risen 28 % compared to the year 1990, amounting to nearly 20% of total emissions released into the atmosphere in Europe.⁴⁹ Both, the demand for freight and passenger transport has seen a sharp increase. Between 1997 and 2007, road freight transport in the EU increased by 43%, airfreight by 35%.⁵⁰ Within the same time air travel grew by 48% and cars remained the main mode of transport while eco-friendly alternatives e.g. trains or coach travel stagnated or even lost ground.⁵¹ If this trend of increasing demand for fossil fuels in transport cannot be stopped, progress in reducing green house gas emissions in other sectors will be partly neutralised. Furthermore, it is mainly the transport sector, which causes the energy dependency of the European Union to increase.⁵²

We need a new mobility concept

What is needed is nothing less than a mobility revolution. The transport patterns in the EU must be reformed fundamentally. Freight transport must be reduced and taken off the road and out of the planes, individual transport increasingly replaced by public transport, non-motorised transport must grow in importance, cities must be built in a different way, the remaining cars and trucks must become more energy efficient and the fuel used must be decarbonised.

The ideology behind transport should change: since the fifties, owning a car was seen as prime expression of wealth, driving a car as expression of freedom. This concept needs to be replaced with the “freedom to not own a car, and to still have a high quality of life”. Allowing everyone a high degree of mobility without owning a car will not only unburden our environment, but increase social cohesion.

Strengthening public transport is a precondition for this. In urban as well as in rural areas, everyone should have access to high quality and affordable public transportation. The trend of decreasing investments in public transport must be reversed. The EU must accept that local authorities have a strong role to play here and that in many cases the urge to liberalise and privatise public services did not lead to improved quality and accessibility. Since most emissions in transport are caused by people commuting between home and work, taking cars off the road and replacing them by trains, metros, trams and buses, preferably powered by renewable energy, has a tremendous emission reduction potential. Furthermore, such a step would reduce health problems caused by exhaust fumes, and reduce noise levels in cities and villages, thus improving quality of life.

Reducing the use of cars can also be achieved by promoting non-motorised transport. Car rides over less than five kilometres can easily be replaced by walking or using bikes. This must be respected by transport policies. More and safer bike lanes should be built in urban areas and the awareness for cyclists amongst car users must increase. Additionally, green corridors, shared by pedestrians as well as cyclists, should be created. Urban planning should also focus on limiting urban sprawl and reduce transport needs by designing denser but greener cities and mixing commercial and residential districts.

Freight transport must be transformed

A major challenge is the transformation of freight transport. Rail transport is increasingly replaced by road transport, leading to a steep increase in emissions, higher maintenance costs for roads and more noise pollution. We should strive for a real level playing field between transport modes by internalising external costs and thus applying the polluter pays principle (Eurovignette). As an effect of globalisation, a large amount of preliminary products and final products are transported over large distances, before they reach the consumer. Ambitious measures to redirect freight transport from the roads onto rails are needed, including European and national financial support to trans-European rail links, a European Carbon Tax and tax breaks for carbon-free transport. More incentives should be given for the consumption of local products (especially foodstuffs), this will not only benefit the climate but also vitalise our economy.

Emissions from cars must be reduced

Even though cars will continue to play a major role in our transport systems, their environmental footprint must be decreased. Change in consumer behaviour in the past years underlines that consumers are aware of their responsibility and are ready to switch to low-emission cars and electric vehicles. Unfortunately, many European car producers have failed to understand the urgency to construct more environmentally friendly cars in the past years and have lost market shares to American and Asian companies, especially for hybrid cars. Therefore, it is now even more important for European manufacturers to step up their efforts in developing “green” vehicles and bringing them to the market. Such an initiative would not only drive down emissions from transport, but also ensure competitiveness in the future global market and thus safeguard jobs in a key industry.

European companies must remain and become the market leaders for eco-innovation in the mobility sector. Car manufacturers should continue to develop better and more efficient combustion engines that require less fossil fuel and emit less CO₂. Especially the development of electric cars and possibly hydrogen cars needs to be promoted, including the development and production of more efficient and cheaper car batteries. Attention must be paid to the availability of the necessary resources for electric cars and batteries, to avoid new dependencies. Efforts must also be increased to phase-out old, inefficient cars that no longer meet today’s environmental standards. This can be achieved by pricing all externalities, such as emissions, road construction and maintenance as well as health costs into the system. The best tool to reach this aim is the introduction of a European Carbon Tax, which could be supplemented by other measures, including for instance toll zones in cities. To quickly reduce transport emissions, obligatory emission reduction targets should be gradually tightened and incentives for consumers to purchase environmentally friendly cars should be introduced. In order to completely decarbonise the transport sector, biofuels of the second and third generation need to be further developed and their use supported.

The potential for green job creation in the transport sector is huge. Around 15 million jobs relate directly and indirectly to transport in the EU, i.e. more than 7% of European employment. In comparison, the car industry provides around two million direct jobs. “Greening” a large proportion of

the transport jobs is not only an environmental, but also an economic obligation. Although the overall demand for cars has plummeted during the crisis, the demand for energy efficient cars has increased. This trend is likely to continue in the future. The production of more fuel efficient cars which emit less CO₂ and developing hybrid and electric cars will be a precondition for the survival of the European car industry and therefore a key component for Europe's overall competitiveness and employment.

Public transport needs to be strengthened

An enormous job creation potential also exists in public transportation and rail transport in Europe.⁵³ Despite the intensification of climate change, direct employment has been going down in this sector in the past decades and is around 1.5 million workers today.⁵⁴ According to a study by the European Trade Union Confederation (ETUC), the number of direct and indirect jobs in rail and public transport (tramway, bus, underground, bicycles) would be multiplied fourfold, in case of increased support for public and rail transport.⁵⁵ Although some jobs would be lost in the automobile sector in this case, overall employment would increase and economically dangerous overproduction in the car industry could be reduced. However, a just transition in the process of transforming the transport sector must be guaranteed, especially by providing workers with training and education and supporting the fast placement of those losing jobs in carbon intensive production in another job of at least the same quality.

5. Financing green growth⁵⁶

Green growth will only become reality if sufficient finances will be made available. While transforming our production, consumption and mobility patterns will have enormous economic advantages, considerable up-front costs need to be financed. For this, not only existing financial resources need to be used better, also new financial mechanisms and instruments need to be introduced and hurdles for private investments need to be overcome.

The European structural and cohesion funds, but also the EU globalisation adjustment fund should be increasingly dedicated to support green growth. National and regional financial support must be stepped up, for example for research, development and deployment of renewable energies and for retrofitting and isolating buildings. Public private partnerships, an effective tool to mobilise private resources, should be supported, for example for the strengthening of public transport.

Even when investors want to include green investments in their financial portfolio, they face uncertainties on which financial mechanism to invest through, what kind of green investments to focus on and how to make sure that the money is effectively deployed and actually supports green growth. There is a lack of established funding mechanisms for green investments. Another problem is that individuals and financial institutions both work on the basis of historical data and favour investments familiar to them. Coal fired plants, for instance, have been around for decades and clear data sets exist for their operating lifetime, costs of construction and maintenance. Most project financing mechanisms and investors find it easy to project past data into the future to calculate cash flows, and the expected costs and benefits associated with such investments. This means that new green technologies and untried investments without sufficient historical records are penalized vis à vis existing dirty technologies. That is why the green sector is almost always underfunded.

Therefore, direct and indirect public intervention is needed to help bridge the funding gap. Its role will be critical in facilitating larger scale private investment. Important instruments are the introduction of a European Carbon Tax as well as feed-in-tariffs or quota systems for renewable energy. A two-tier European Carbon Tax on those European emissions which are not covered by the ETS and on carbon-intensive products from third countries should be introduced. The European tax will not only contribute to reducing emissions but also to redirect tax burdens from labour towards pollution. The tax on carbon-intensive imports will prevent carbon leakage and give third countries further incentives to reduce emissions. Low income groups should receive a compensation or exemptions from the European Carbon Tax. Feed-in-tariffs or quota systems should be introduced and strengthened in all member states. This would reduce the prices of renewable energy in comparison to those of fossil energy and attract additional private investments. Furthermore, direct public financial support will be needed. Using public banks such as the World Bank, the European Investment Bank as well as national banks will help attract private funding. Following the British example, specific green investment banks could be set up for this purpose. If all companies were obliged to disclose their

environmental footprint, private and public sector investors could better channel their investments towards green growth. Studies have also proven that investments using ethical and environmental benchmarks significantly improve the risk/return profile of portfolios.⁵⁷

Disturbingly, there is growing evidence that financial markets, which are supposed to send signals to the real economy encouraging long-term productive and profitable investments, are doing the exact opposite. Banks as well as capital markets continue to provide cheap finance, for example, for coal fired power plants. Financial markets continue to reward energy intensive companies that are currently profitable but exposed to serious downside risks from higher carbon prices in the long-term. Short-term profitability is being rewarded often at the cost of long-term profits and sustainability. A European Financial Transaction Tax, which would penalize excessively short-term oriented behaviour in the financial markets, as well as differentiated voting rights for long-term shareholders and new rules on CEO and senior employee compensations, are useful measures that would help tackle the problems highlighted. The introduction of a European Financial Transaction Tax is likely to generate up to €200 billion annually. If only a small proportion of this revenue was invested in green growth, Europe's economy could make a huge step forward towards leaving behind the crisis.

Enormous green growth investments can be made by public pension funds, sovereign wealth funds and government-controlled investors. They are less inflicted by financial market short-termism and are in a superior position to make 'green' investments, which are expected to be very profitable in the long run. Given how exposed many of the world's top sovereign wealth funds are to oil and the energy sector, dedicated investments targeted towards the green sector would help them diversify their risks. Additionally, European green bonds could be introduced to channel private funds towards green growth.

The European Emission Trading Scheme is another financial source for green investments. While currently only few Member States auction their emission permits, they will be obliged to do so under the phase of the EU-ETS by 2013. The power sector will have to buy 100% of its emission permits through auctions while the quotas for other sectors, taking into consideration their competitiveness, will be as low as 20%, and as high as 70%. Assuming that by 2020 half of the total EU-ETS allowances were auctioned off, total annual revenues could amount to €25.8 billion in 2020⁵⁸, other calculations foresee revenues of up to €63 billion⁵⁹. The Member States committed themselves to reinvest at least 50% of these revenues in fighting climate change⁶⁰, including investments in green growth. Introducing a European Carbon Tax for emissions inside and outside of Europe could generate further revenues of several billion Euros. Fighting tax evasion could increase the funds available for green growth further: additional tax revenues from both reducing tax flight as well as repatriating some of the money held offshore can easily generate additional annual tax revenues for EU Member States running into the hundreds of billions of Euros.

Conclusions

Europe is faced with the enormous challenge to ensure sustainable growth. While climate change will cause huge economic and social costs, fighting climate change by reforming our production, consumption and transport patterns is a precondition for fair, green and smart growth and for overcoming mass unemployment in Europe. If the right political and financial measures are introduced, Europe will be able to come out of the economic and financial crisis stronger than before, will be able to uphold its economic and social model, increase living standards and decrease its environmental footprint.

Such a transformation process requires nothing less than a new industrial revolution. The energy, which powers our economy and society, will have to be generated from renewable resources, such as wind, sun, the oceans, the earth's heat and biomass. Traditional coal, oil and gas power stations need to be replaced by renewable energy power parks and decentralised clean energy production. Energy grids need to be upgraded and energy storage facilities introduced. At the same time, the consumption of energy and raw materials must be reduced. The insulation of buildings has the highest saving potential in this regard and needs to be tackled quickly. Reducing the use of energy and raw material in industrial processes will not only increase the resource independence of the EU but also reduce the prices of European products, make them more competitive globally, and thus relieve the pressure on wages and working conditions in Europe. Green technologies have emerged

as a new industrial sector with an enormous growth potential, in which Europe must remain the market leader. Mobility needs to be transformed by strengthening public transportation, taking freight transport of the roads, constructing high-speed rail links, reducing the need for transport through modern urban planning, promoting walking, the use of bikes as well as constructing cleaner and more efficient cars.

Supporting such a revolution will not only have benefits for our environment, but will be a huge growth and employment engine. By implementing ambitious green growth policies, up to ten million new jobs can be created by 2020, overcompensating the seven million jobs which were lost during the crisis. The biggest green job potential exists in the construction sector, in greening industry and mobility and in generating renewable energy. Supporting green technologies, reducing resource consumption of our production process, developing products with a reduced carbon footprint and modernising our building stock can generate enormous economic growth and will be a precondition for overcoming the sluggish growth period in the EU.

For green growth to become reality, a number of political and financial measures have to be implemented. Long-term private and public funding for research, development and deployment of renewable energy, smart energy super grids and green technologies is crucial. Direct support for green job creation needs to be given, for example for programmes aimed at retrofitting buildings. Regulations on European and national level have to be implemented in order to introduce minimum standards for emissions and energy efficiency. The costs of emitting green house gases should be paid by the emitters, for example by the introduction of carbon taxes and strengthening the European Emission Trading Scheme. Instead of supporting emissions (which is the effect of subsidies for non-renewable energies), the consumption of renewable energies and energy efficiency have to be directly supported, for example by tax breaks. Informing and communicating about the advantages of green products and services is important for raising awareness amongst consumers. New financial instruments must be considered to finance green growth, such as introducing a European Financial Transaction Tax, a European internal and external carbon tax and European green bonds, setting up a European Green Investment Bank. Investments of public pension funds, sovereign wealth funds and government-controlled investors should be redirected towards green growth initiatives, more ETS emission permits should be auctioned off, green taxes should be introduced and measured aimed at fighting tax evasion should be extended.

Such measures will only be successful if they are designed and implemented on the European, national and regional level. The emergence of green growth and green jobs in the past decades goes back to visionary and ambitious policies of social democrats and socialists throughout Europe. While advocating green growth has become mainstream in recent years, we must continue being at the forefront of this movement. However, we should not make the same mistake as other parties and focus only on the needs of the environment or of the economy. We promote green growth because it is the best choice for the well-being of the people. Therefore, we must pay careful attention to ensure a just transition towards a carbon free economy. It is essential that the number of newly created jobs is higher than the number of jobs lost, new employment must be of higher quality, those losing employment must receive training and need to be reintegrated quickly into the labour market. The low-income groups should not be the ones paying for the additional costs in the transition period, instead the mid-term and long-term profits of green growth must be shared equally amongst society and not only benefit the rich.

Annex I: Political measures to make green growth become a reality

	European level	National, regional and local level
1. Sustainable, independent and affordable energy		
Emission reduction targets	<ul style="list-style-type: none"> - ambitious greenhouse gas (GHG) reduction targets, such as increasing the unilateral EU emission reduction target from -20% to -30% for 2020 should be adopted. 	<ul style="list-style-type: none"> - implement targets agreed on the European level
Research and development	<ul style="list-style-type: none"> - funding for renewable energy R+D needs to be increased, especially in the frame of the European Framework Programme for Research and Technological Development, including R+D for energy storage technologies 	<ul style="list-style-type: none"> - more private funds need to be available for renewable energy R+D, either by cooperative agreements with the business sector or by means of regulation - public support for R+D needs to increase
Deployment and installation of renewable energy	<ul style="list-style-type: none"> - the European climate and energy package must be tightened and the obligatory percentage of renewable energy in the EU energy mix increased to 30% in 2020; 45% in 2030; 70% in 2040 and 95% in 2050 - the implementation of the EU legislation on the use of renewable energy in new and modernized buildings needs to be monitored closely - the regulatory framework at EU level should prioritise the development of cross border transmission capacities within a reasonable timeframe so as enhance the integration of renewable energies in the internal market. - a common European fund should be established by banks, private corporations and public authorities to support the development and installation of renewable energies - funds from the European Investment Bank should be used increasingly to support the deployment of renewable energy 	<ul style="list-style-type: none"> - the completion of pilot projects and the construction of renewable energy power plants needs to be supported (ranging from large scale off-shore wind parks to micro-financing for solar panels on roofs and including combined power and district heating plants) - planning legislation for the construction of renewable energy (e.g. wind parks) needs to be simplified - public procurement rules need to be modified, increasing the amount of renewable energy used and produced (e.g. on roof-top solar panels) in the public sector - favourable loans for renewable energy installations need to be provided - tax reductions and other financial tools to support the installation of renewable energy sources need to be provided - a large proportion of the profits from the ETS should be used to support the deployment of renewable energy - the completion of national electricity networks in order to support enhanced inter-connections between MS.

Access to markets and to consumers	<ul style="list-style-type: none"> - support the construction of cross-border smart super grids, for example the North Sea Ring, the Baltic Energy Ring and a Mediterranean energy ring, e.g. by allocating funds from the Trans-European Networks programme - it should be obligatory for utilities and energy producers to inform consumers about their energy mix - support the endorsement of a binding European Charter on the Rights of Energy Consumer 	<ul style="list-style-type: none"> - implement legislation to guarantee preferential access of renewable energy to the energy grids - encourage utilities to adapt their energy grids to the feed-in of increasing amounts of renewable energy
Reducing prices of renewable energy respective to fossil energy	<ul style="list-style-type: none"> - the European Emission Trading Scheme should be tightened by reducing free emissions rights; this will increase the carbon price; the introducing of a floor for the carbon price in the ETS should be considered - fossil fuel subsidies should be gradually phased out - the development and deployment of more enhanced and cheaper renewable energy technologies should be supported through European funds 	<ul style="list-style-type: none"> - feed-in-tariffs or quota systems for energy producers should be introduced - fossil fuel externalities, such as emissions, should be included in energy prices (e.g. by carbon taxes) - fossil fuel subsidies should be gradually phased out - financial support should be given to the low-income groups, who suffer most from increasing energy prices - smart grids and the installation of smart meters should be subsidised or regulations should be introduced which make their use obligatory for utilities
Education and skilling of the work force	<ul style="list-style-type: none"> - the structural funds, the social fund and the globalization fund should be used to educate and skill workers for jobs in the renewable energy sector - In the framework for lifelong learning, a ninth key-competence should be introduced, related to environment, climate change and sustainable development 	<ul style="list-style-type: none"> - education and training for the renewable energy sector needs to be improved, curricula need to be adapted
Information to energy consumers	<ul style="list-style-type: none"> - binding European rules should be introduced, obliging energy companies to inform consumers about their energy mix 	<ul style="list-style-type: none"> - information campaigns which communicate the advantages of renewable energy need to be supported
2. Transforming production		

<p>Strengthening the green technologies</p>	<ul style="list-style-type: none"> - the funds of the European Framework Programme for Research and Technological Development for research in green technologies should be increased - the structural funds, the social fund and the globalization fund should be used to educate and skill workers for jobs in the green technology sector - technological standards for this sector should be harmonised in the EU, e.g. a European standards for battery chargers of electricity cars - EU state aid rules should be revised in order to allow for targeted support to green technologies, including green public procurement rules - European legislation on the reuse and recycling of resources should be tightened 	<ul style="list-style-type: none"> - R+D and financial support for deployment of green technologies should be increased - export subsidies to strengthen green technologies could be introduced - entrepreneurs should be better informed about the potential of green technologies and how they can profit from them - replace landfills with modern waste incineration which also serve the purpose of renewable energy production - introduce prices (or increase costs) of water, to ensure a more efficient use and directly support the spread of water management technologies
<p>Greening the industrial production</p>	<ul style="list-style-type: none"> - binding European minimum criteria for the energy and resource efficiency of production processes should be introduced, e.g. for the steel sector, supporting the process of phasing out older and less efficient carbon-intensive ways of manufacturing whilst replacing them by more sustainable technologies and processes - EU structural funds and EIB loans should be used to modernise production processes and therefore reduce the use of energy and resources - in the most energy intensive sectors, measures should be implemented to avoid carbon leakage; these measures should however not lead to artificially low carbon prices, which would have a negative effect on other sectors 	<ul style="list-style-type: none"> - financial support to modernise industrial processes and make them more sustainable should be provided
<p>Ensuring just transition</p>	<ul style="list-style-type: none"> - make use of the Europe 2020 Strategy to define common guidelines for industrial and agricultural transformation - regions hit hardest from the restructuring process need to receive sufficient support, especially through the structural and regional funds as well as the globalisation adjustment fund - EU legislation on information and consultation should be strengthened, allowing employees to participate in the process of green growth 	<ul style="list-style-type: none"> - education and training programmes must be provided to those losing jobs in the traditional industries - specific support should be given to small and medium enterprises

<p>Increasing sustainability of agriculture</p>	<ul style="list-style-type: none"> - support for R+D and deployment of more climate friendly agricultural processes should be increased - binding emissions reduction targets could be defined for the agricultural sector, for example through incorporation in the ETS - within the Common Agricultural Policy (CAP), a stronger pillar to fund low emission and climate related activities as well as organic farming could be introduced - European standards for the use of agricultural waste, e.g. manure, for biomass production could be introduced - transport related to agriculture should be included in mobility measures, such as a carbon tax - consumers should be better informed about the climate effects of their consumption behaviour, e.g. meat and dairy products - adapt farming processes in areas which cause unproportional emissions (moorland, swamps and marshes) - European certification schemes for wood from sustainably managed forests should be introduced 	<p>[agriculture is an exclusive competence of the EU]</p>
<p>3. Ensuring more sustainable consumption</p>		
<p>Reduce energy use</p>	<ul style="list-style-type: none"> - minimum standards for the efficiency of electronic office equipment should be introduced - labels for office and household items should be introduced, clearly indicating the energy intensity and the carbon footprint; non-compliance should be sanctioned - Europe-wide guidelines for ecologic urban development should be introduced, with the aim of reducing energy use - Europe's final demand for energy should be reduced by 40% compared to today's demand until 2050 	<ul style="list-style-type: none"> - tax advantages or subsidies could be given to replace old electronic equipment with more energy efficient models (similar to the cash for car clunkers programmes) - public procurement rules should be adapted to ensure that only the most energy efficient products are purchased - consumers need to be better informed about options to reduce energy use and switch to renewable

Retrofit buildings	<ul style="list-style-type: none"> - the European standards on energy efficiency in new buildings and for retrofitting should be implemented tightly - structural funds should be used to co-finance retrofitting of residential houses, social houses, public buildings and schools, especially in new Member States - EU funds such as structural funds should be used increasingly for retrofitting buildings - EIB loans should be dedicated to retrofit buildings - R+D and deployment of new materials which decrease energy use should be supported with European funds - the European Social Fund and the Globalisation Fund should be used to retrain workers in the construction sector for retrofitting houses - to ensure a high standard of technological knowledge on retrofitting buildings in all countries, a European platform for technology transfer should be build up 	<ul style="list-style-type: none"> - subsidies for improving energy efficiency - with a special focus on buildings - should be given to low income groups - favourable loans for retrofitting houses should be given - in cooperation with banks and insurances, programmes for retrofitting houses should be designed, which allows house owners and tenants at the same time - public and private investments in energy efficiency related R+D and deployment must be increased - training and education for construction workers in new processes to isolate buildings should be offered
4. Transforming mobility		
Support non-motorised transport	<ul style="list-style-type: none"> - a best practise exchange on strengthening pedestrians and bike use should be facilitated 	<ul style="list-style-type: none"> - spatial planning should be used in order to reduce the distance between home and work place, reducing transport needs - tolls could be introduced in inner cities to reduce the number of cars - broaden pavements and construct bike lanes - support public bike hire stations
Strengthen public transport and rail freight transport	<ul style="list-style-type: none"> - speed up the construction of trans-European high-speed rail lines for passengers and freight - tightening the Eurovignette regulation to gradually replace road freight transport with rail transport - R+D for efficient and high quality public transport should be promoted - structural funds should be available for strengthening public transport networks - adapt European legislation for the internal market, state aid and services, to allow public support for public transportation 	<ul style="list-style-type: none"> - introduce tax reductions for "carbon-free" transport - increase investments in public transport to ensure better quality and lower prices - ensure high quality public transport access in newly constructed districts - information campaign on the benefits of public transportation should be launched

Promoting clean cars	<ul style="list-style-type: none"> - R+D of low-emission and emission free cars as well as new batteries for electric cars should be supported - the European emission standards for vehicles should be consistently tightened and strictly implemented, non-compliance must be sanctioned - European standards for the maximum emissions of older cars should be introduced (following the example of green vignettes introduced in many cities) - second and third generation biofuel R+D and deployment should be supported, partly through adapting the CAP - guidelines or minimum standards for reducing energy and raw material use for the construction of vehicles should be introduced 	<ul style="list-style-type: none"> - R+D should be supported - the use of low consumption, hybrid and electric cars should be supported by means of tax reduction or direct subsidies - incentives should be given to replace old emission cars with newer ones - tax advantages for carbon intensive company cars should be reduced - public procurement should be adapted: only low emission cars should be purchased and public vehicles with high emissions replaced
Decarbonise air transport and maritime transport	<ul style="list-style-type: none"> - air transport and maritime transport should be included in the ETS as soon as possible; the amount of free emission permits should be limited, in order to give real incentives to reduce emissions - emission standards for ships and planes should be introduced, similar to vehicles 	<ul style="list-style-type: none"> - support for R+D for increased energy efficiency in this sector should be given and pilot projects supported
5. Financing green growth		
Generating private and public green investments	<ul style="list-style-type: none"> - a European Green Investment Bank could be set up - European green bonds could be set up - a European Financial Transaction Tax of 0,05% on all financial transactions could be introduced - a two-tire European Carbon Tax on those European emissions which are not covered by the ETS and on carbon-intensive products from third countries could be introduced 	<ul style="list-style-type: none"> - public pension funds, sovereign wealth funds and government-controlled investors should be encouraged to invest in green growth - the number of free emission rights should be reduced, therefore increasing ETS revenues - ETS revenues should be reinvested into green growth - tax evasion needs to be actively tackled and tax havens dried out - green taxes should be introduced or strengthened and revenues invested in green growth

Annex II: References

¹ The United Nations Environment Program (UNEP), see <http://www.unep.org/greeneconomy/AboutGEI/tabid/1370/Default.aspx>

²² IPCC (2007): IPCC Fourth Assessment Report (AR4), p.24.

³ N.Stern (2007): The economics of climate change: the Stern review, p.241.

⁴ DG for Economics and Financial Affairs (2010): European Economic Forecast Spring 2010, p.182.

⁵ European Commission (2008): EU action against climate change p.17.

⁶ International Energy Agency (2009): World Energy Outlook 2009 – Executive Summary, p.14.

-
- ⁷ UNEP, ILO et al. (2008) Green Jobs : Towards decent work in a sustainable, low carbon world, p.5, see: http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---webdev/documents/ublication/wcms_098487.pdf
- ⁸ GHK et al. (2009) The economic benefits of environmental policy, p.62, see: http://ec.europa.eu/environment/enveco/economics_policy/pdf/report_economic_benefits.pdf
- ⁹ The sector grew at 8% in 2009. See Institute for Environmental Studies (2009): The economic benefits of environmental policy, p.6.
- ¹⁰ German Environment Ministry (2009): GreenTech made in Germany 2.0 – Environmental technology Atlas for Germany, p.2.
- ¹¹ German Environment Ministry (2009): GreenTech made in Germany 2.0 – Environmental technology Atlas for Germany, p.2.
- ¹² There are different definitions of ‘green jobs’. Using a narrow definition of eco-industries, there are around 2.3 million green jobs. A definition which also includes activities closely dependent on good quality environment gives a figure of 4.4 million jobs. The figure of 8,6 million green jobs furthermore includes ‘knock-on’ or ‘multiplier’ effects of green jobs. Applying the widest definition of ‘green jobs’, including all activities dependent on the environment, there are 21 million ‘green jobs’ in Europe. See ETUI (2010): Benchmarking Working Europe 2010, p.104.
- ¹³ German Environment Ministry (2009): Umweltwirtschaftsbericht 2009, p.12.
- ¹⁴ European Renewable Energy Council (2010): RE-thinking 2050, p.6.
- ¹⁵ Of the newly installed power capacity, 39% was wind power, 26% gas, 16% photovoltaic, 9% coal, 2% fuel oil, 2% biomass and 1% hydro. European Wind Energy Association (2010): Wind in power – 2009 European statistics, p.6.
- ¹⁶ European Renewable Energy Council (2010): RE-thinking 2050, p.6 and European Climate Foundation (2010): Roadmap 2050, p.7.
- ¹⁷ Energy use varies largely over the course of one day. By reducing the energy use in peak hours, for example by using less electricity during the day and instead more over night, less power stations are needed. Since this also leads to huge variations in the energy prices, smart grids can contribute to reducing energy prices.
- ¹⁸ By 2030 solar thermal will make up a share of about 20% of total renewable energy sources heat contribution while geothermal will increase to about 10%. See: European Renewable Energy Council (2010): RE-thinking 2050, p.27.
- ¹⁹ European Renewable Energy Council (2010): RE-thinking 2050, p.50.
- ²⁰ N. Stern (2007): The economics of climate change: the Stern review, p.405.
- ²¹ European Wind and Energy Association (2009): Pure Power, p.6.
- ²² European Renewable Energy Council (2010): RE-thinking 2050, p.36.
- ²³ European Renewable Energy Council (2010): RE-thinking 2050, p.12.
- ²⁴ German Environment Ministry (2009): GreenTech made in Germany 2.0 – Environmental technology Atlas for Germany, p.3.
- ²⁵ European Wind Energy Association (EWEA): Presentation during PES Climate Change Network, 16.04.2009.
- ²⁶ U.S. Department of Commerce Industrial Survey, in: R.Pollin (2008): Green Growth and Good Jobs, Presentation during IPED Conference, 08.08.2008, Chicago, IL.
- ²⁷ European Wind Energy Association (2009): Wind at Work, p.7.
- ²⁸ European Wind Energy Association (2009): Wind at Work, p.9.
- ²⁹ European Renewable Energy Council (2010): RE-thinking 2050, p.43.
- ³⁰ European Commission, Director General for Energy and Transport: MITRE-Report - Meeting the Targets & Putting Renewables back to work, p. 13.
- ³¹ The categorisation follows broadly the publication „ GreenTech made in Germany 2.0 – Environmental technology Atlas for Germany” by the German Environment Ministry (2009). We have added sustainable land management to the ministries list.
- ³² German Environment Ministry (2009): GreenTech made in Germany 2.0 – Environmental technology Atlas for Germany, p.2.
- ³³ EU KLEMS Project (2008): Productivity in the European Union: A Comparative Industry Approach. See: <http://www.euklems.net/>.
- ³⁴ UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, p.297.
- ³⁵ UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, p.300.

-
- ³⁶ The study “Cooking up a Storm” quotes UK figures that emission reduction of up to 30% in the livestock sector would be possible with the right measures. In: Tara Garnett (2008): Cooking up a storm. See: http://www.fcrn.org.uk/frcnPubs/publications/PDFs/CuaS_web.pdf.
- ³⁷ 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. See: UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, pp.298-301.
- ³⁸ UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, pp.301-302.
- ³⁹ ILO (2009): Green policies and jobs: A double dividend?, p.8.
- ⁴⁰ ETUC (2005): Climate Change and Employment: Impact on Employment in the European Union-25 of climate change and CO2 emission reduction measures by 2030, p.185.
- ⁴¹ UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, p.137.
- ⁴² ECOFYS (2007): Making Energy Efficiency Happen: From Potential to Reality. An assessment of policies and measures in G8 plus 5 countries, with recommendations for decision makers at national and international level. 2007, p.73.
- ⁴³ UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, p.131.
- ⁴⁴ EU KLEMS Project (2008): Productivity in the European Union: A Comparative Industry Approach. See: <http://www.euklems.net/>.
- ⁴⁵ ETUC (2005): Climate Change and Employment: Impact on Employment in the European Union-25 of climate change and CO2 emission reduction measures by 2030, p. 149.
- ⁴⁶ Ibid.
- ⁴⁷ Ibid.
- ⁴⁸ 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. See: UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, p.134.
- ⁴⁹ European Environment Agency (2010): *Towards a resource-efficient transport system*, EEA Report No.2/2010, Copenhagen, p.14.
- ⁵⁰ Ibid, p.10.
- ⁵¹ Ibid, p.12.
- ⁵² Considering that the transport sector is responsible for more than 60% of the EU’s oil imports and considering that the EU already imports 75% of its oil, a number which is going to increase.
- ⁵³ UNEP (2008): Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World, p.169.
- ⁵⁴ ECOFYS (2007): Making Energy Efficiency Happen: From Potential to Reality. An assessment of policies and measures in G8 plus 5 countries, with recommendations for decision makers at national and international level. 2007.
- ⁵⁵ ETUC (2005): Climate Change and Employment: Impact on Employment in the European Union-25 of climate change and CO2 emission reduction measures by 2030, p.169.
- ⁵⁶ For more detailed proposals on financing green growth see: Foundation for European Progressive Studies (FEPS) (2010): Tackling climate change – tools to fund adaptation and mitigation initiatives, conducted by Re-define.
- ⁵⁷ FEPS (2010): Tackling climate change – tools to fund adaptation and mitigation initiatives, p.10.
- ⁵⁸ European Commission (2010): Commission Staff Working Document SEC (2010) 650/SEC, p.46.
- ⁵⁹ Foundation for European Progressive Studies (FEPS) (2010). Tackling climate change – tools to fund adaptation and mitigation initiatives, conducted by Redefine, p. 23.
- ⁶⁰ European Commission (2009): Investing in the Development of Low Carbon Technologies (SET-Plan) 519/final, p.11.