

Climate change and sustainable development after the crisis

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Introduction

During the great recession of 2008-2009, short-term rescue operations (stimulus packages and specific labour market programmes) became the focus of policy making, with priority given to minimising social and human costs in order to preserve human resources for after the crisis. With the gradual easing of the severe and extraordinary pressures exerted by the crisis, medium-term sustainability came to the foreground. Restoring economic sustainability, in terms of restoring economic equilibrium through de-leveraging and debt consolidation, became the top priority for both national and European policy making.

Long-term social and economic sustainability remained in the background. This is the unfortunate reality, even if declarations and policy intentions may seem to reflect a more balanced approach. Although the Europe 2020 Strategy (CEC, 2010) strives for a longer term vision based on social and environmental sustainability, actual practices are subordinated to the dictate of economic, or more precisely fiscal, sustainability.

The long-term challenge for Europe and the world is undoubtedly the reversal of global climate change, a goal which calls for a fundamental restructuring of economic activity. The transition towards a low-carbon economy, also referred to as the 'green transition' or, by certain authors, as the 'third industrial revolution' (Jänicke and Klaus, 2009) will be the decisive process of the future.

The aim of this chapter is to show the inconsistency of European climate change policy, which lacks the instruments for managing a socially balanced green transformation process for the future. We will

argue that this is not a sustainable practice in the long term, and that a fundamental revision of the policy framework will be necessary.

In section 1, we will describe the basic context of climate change mitigation policies in the European Union, pointing to the contradiction between declared objectives and applied policy instruments. Section 2 will review European performance in fulfilling climate policy targets, showing that Europe, on the basis of the current policy framework, will fall short of its long term objectives.

Section 3 takes stock of the available estimates concerning the employment effects of the green transformation and will argue that most forecasts are not taking account of the full consequences of a properly-implemented climate policy agenda. In the concluding section we will make policy recommendations for a more comprehensive climate change policy, which also integrates elements of a socially balanced transformation process.

1. Policy background of climate change mitigation

The International Panel for Climate Change (IPCC, 2007) and the Stern Review (Stern, 2006) provide convincing evidence that the world is already experiencing global warming and that the human impact on climate has greatly exceeded the impact from natural factors since the onset of the industrial era. As a result, deep and significant cuts in anthropogenic greenhouse gas (ghg) emissions are urgently needed if we are to avoid dramatic, irreversible and self-reinforcing changes in the world's climate.

In order to set an appropriate policy agenda, an emission target should be agreed, and then, based on the current position, the trajectory for reaching this target can be calculated. The G8 group of nations agreed in 2009 that the increase in global temperatures should be no more than 2°C above pre-industrial levels. To achieve that, according to the models on which the IPCC bases its calculations, global emissions will have to be cut to half their 1990 levels by 2050. For industrialised countries this would mean an 80% cut in their emissions by that date, a reduction to two tonnes of CO₂ equivalent per head per year. At present,

emissions in America are around 24 tonnes per head; in Europe they are ten (Duncan, 2009).

According to the 'road map' drawn up at the UNFCCC conference in Bali, developing countries are not required to come up with numerical targets for cuts, but they are required to propose 'nationally appropriate mitigation and adaptation actions'.

The European Union is committed to a 20% cut of ghg emissions by 2020, rising to 30% if the rest of the world promises significant cuts. Japan's new government has promised a reduction of 25% on 1990, but has revealed little about how it might meet such a target. Australia's government struggled trying to get its legislation through parliament. Canada's emissions continue to grow. The US would offer a 17% cut in 2005 emissions by 2020 – the figure in the Waxman-Markey bill, which is around 4% below 1990 levels – well below the figure of 25-40% that is expected of developed countries. China has offered a 40-45% cut in the carbon intensity of its economy by 2020.

Developing a globally applied and binding strategy for mitigating the effects of climate poses an unprecedented governance challenge. This is what we saw at the failure of the Copenhagen COP-15 Summit in December 2009, while the relative success of the Cancun summit was merely due to the correspondingly diminished expectations. Still, it is important that the commitment to the 2°C limit for global temperature increase was confirmed by the fact that the basic framework of climate policy ambitions for developed economies (80% decrease of greenhouse gas emissions by 2050) still applies.

Disappointing past performance in global emissions

Past performance at a global level is rather alarming. CO₂ emissions from developed countries did not decrease in the period 1990-2008, while those of developing countries have substantially increased. The overall global balance is a 41% increase of emissions between 1990 and 2008 (IGBP, 2008).

On the other hand, it would be possible to meet the necessary emissions reductions target using current technology. Economic history also provides evidence to show that adjustments in economic performance of this magnitude have taken place in the past.

Grossmann and Krueger (1995) adapted the Kuznets curve (originally interpreted in the context of equity) for environmental pollution during different stages of economic development, by identifying phases, as 'clean and poor', 'rich and dirty' and 'rich and clean'. This inverted U-shape curve does not seem to apply to greenhouse gas emissions. The most developed country, the US, is the greatest emitter of greenhouse gases. Economic history also shows that while labour productivity in developed economies has grown rapidly since the Industrial Revolution, resource efficiency has not followed this trend. Compared to the huge increase of labour productivity during the industrial era, the current target of increasing resource efficiency by 20% does not sound extremely ambitious, or impossible to achieve.

The fundamental problem is that there are no inherent market economy incentives to raise resource efficiency. In order to correct this market failure, such incentives should come through regulatory intervention. The ultimate policy challenge is to integrate the (full) costs of resource and energy use into market prices, through proper regulatory measures.

The European policy framework

With all the uncertainties which exist concerning global implementation, Europe must remain committed to its targets and apply the necessary policy measures to meet its promised goals.

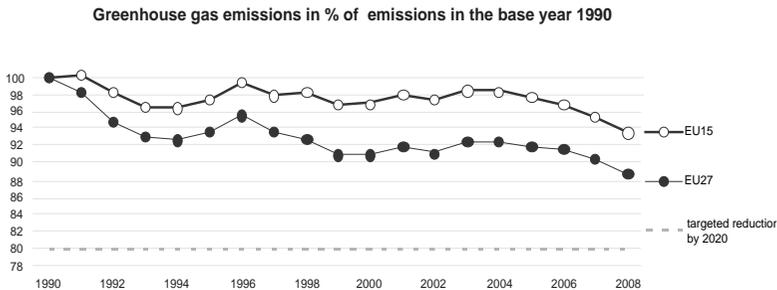
The Europe 2020 Strategy with its triple priorities 'smart, sustainable and inclusive growth' has formulated its headline targets as a 20% reduction of ghg emissions (rising to 30% if the rest of the world promises significant cuts), increasing the share of renewable energy to 20% of all energy generation and a 20% increase of energy efficiency. It has devoted one of its 'flagship initiatives' to 'resource efficient Europe'.

2. European performance since 1990 – crises have had a greater effect than has climate policy

Regarding the performance of the EU, while the EU is still among the few regions that has achieved a reduction in greenhouse gas (ghg) emissions compared to 1990, it is substantially lagging behind its long term commitments.

Whereas ghg emissions from developed countries (subject to the Kyoto Protocol) showed no decrease, the EU succeeded in significantly cutting its emissions during this period. However, the rate of reduction is too low and the EU is still lagging behind the proportional fulfilment of the 2020 targets, with EU15 ghg emissions down by 6.5% during the period 1990-2008 and EU27 emissions by 11.3% (Figure 1).

Figure 1 Reduction of greenhouse gas emissions in the EU15 and EU27, compared to 1990 levels (%)



Source: EEA dataservice.

A breakdown shows that a significant proportion of the cut in emissions was achieved during the first decade of the observation period, as in 1999 ghg emissions were 9.1% below the reference level of 1990 in the EU27 and 5.3% below this level in the EU15. The period 2000-2007 saw no more than a marginal decrease in emissions (0.4% in EU27 and 1.4% in the EU15). The single crisis year of 2008 contributed a larger decrease than the preceding eight years together, amounting to 1.8% in both the EU27 and the EU15. The good performance during the 1990s was mainly attributable to the collapse of the traditional industrial base of the Central and Eastern European countries (CEEC) and of eastern

Germany during the initial phase of the post-1989 transformation¹. The wider post-unification recession in Germany in the early 1990s also contributed to emission reductions of the EU15. Out of the EU27's total 11.3% reduction in emissions between 1990 and 2008, 7.3% had already been achieved in 1994 (at the lowest point of the transformation crisis in the CEE), showing clearly that the bulk of the emission cuts was attributable to output contraction and economic crisis.

Resource productivity² – a measure decoupling economic growth from resource use – shows only a marginal improvement. While labour productivity in the EU27 grew by 14.2% during the 1999-2007 period, resource productivity improved by just 7% (Eurostat, 2010). Resource efficiency has not yet become a driver of economic decisions.

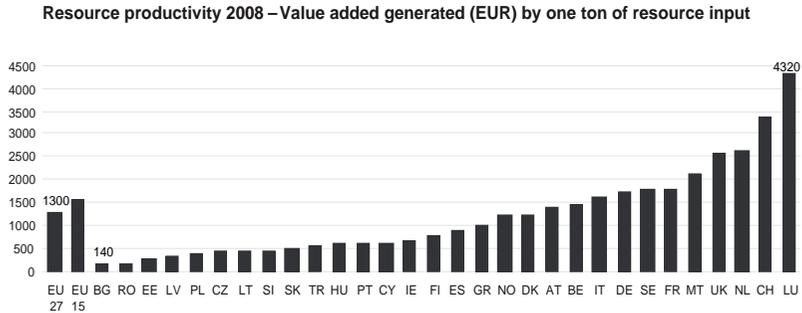
The differences in resource productivity characteristics displayed by individual Member States is frequently overlooked (Figure 2). The gaps are enormous as, for example, the level of resource productivity in Luxembourg is thirty-fold what it is in Bulgaria; this gap is thus far wider than corresponding gaps in GDP/capita or wages. Even if Europe, as a whole, is currently profiting from the huge 'emission drops' in the CEE new Member States, caused by the collapse of their traditional industrial base in the early nineties, these countries face particularly severe challenges when it comes to the need to increase resource productivity in the future. At the same time, it is important to note that it is not production alone that determines the resource efficiency – in a wider but more relevant sense – of a given country or region. What matters above all is consumption. A country might, after all, specialise in economic activities with low-resource use and emissions, while importing resource-intensive products.

One study conducted, using consumption-based CO₂ accounting, finds that Europe should add net imports of 4 tonnes CO₂ equivalent per person to its per capita production-based CO₂ emissions. The latter were 10 tonnes CO₂ equivalent in 2008, so this would mean 40%

1. The decline in the former GDR improved the German and thus EU15 performance also.
2. Resource Productivity (GDP/DMC) is defined as the ratio between gross domestic product (GDP) and domestic material consumption (DMC).

additional emissions (Davis and Caldeira, 2010)! This is also an important policy implication for the future.

Figure 2 Resource productivity in the EU by Member State



Source: Eurostat, 2010 online database.

The European Environment Agency (EEA) report tracking the European performance in meeting the Kyoto targets (EEA, 2010) reckons with a possible fulfilment of the EU Kyoto targets by 2020. However, this envisaged meeting of the ghg reduction target, even if achieved, will be predominantly due to one-off events associated with economic crises, and is not based on a sustainable implementation of measures aimed at achieving policy targets.

Even if Europe is performing better than the rest of the world, it is not on sustainable track towards fulfilment of the ambitious 2050 targets. The target of an 80% cut in emissions for the industrialised economies by 2050 means a cut in emissions to two tonnes of CO₂ equivalent per head per year. In 2008, emissions in Europe were ten tonnes, with an extra 4 tonnes CO₂ equivalent of imports. There is thus a long way to go to meet this long-term objective.

Implementation and economic instruments

Implementation is however the cornerstone of achieving climate policy targets. What we have now at European level, are mostly declared objectives, without a concrete roadmap or instruments of implementation. While economic actors are becoming aware that the costs of using

environmental resources will be increasingly important in their business operations, they are unable, in the absence of a concrete policy framework, to plan any necessary adjustments.

The central issue is how to achieve the right 'carbon price'. Economic policy instruments determining the effective carbon price include 'cap and trade' policies (such as emissions trading), a variety of carbon-related taxes (Cottrell *et al.*, 2010) and the direct involvement of the state through steering mechanisms (e.g. emission standards, levies on carbon-based energy generation and use, while providing subsidies for environmental innovation). These instruments, taken on their own, would be incapable of translating policy targets into business reality. What is needed is a co-ordinated policy mix of these instruments, with a clear implementation agenda at European level, and this is largely missing.

The European Emission Trading System (ETS) clearly demonstrates the uncertainties and distortions of implemented policy instruments. The current form of the EU ETS has been criticised in several respects, as it fails to give proper incentives to economic actors to reduce CO₂ intensity (Le Cacheux, 2010). It has been also subject to wide-scale manipulation and fraud and has thus become a source of uncertainty for economic actors (cf. ETUC, 2010).

Generally speaking, the potential exposure level of industries or sectors to EU ETS can be assessed through three major factors: the CO₂ intensity of production, the opportunity to abate carbon within the sector, and the ability to pass along carbon cost increases to output prices. The economic impact of the EU ETS scheme hinges to a certain extent on whether carbon costs are reflected in output prices, while the overall emission cap is of greatest importance in achieving lower emissions.

The Commission is currently finalising the design of the third trading phase of the ETS, which will begin in January 2013 and last until 2020. The Commission's stated objective is to increase the share of emission permits that are auctioned rather than allocated for free to installations covered by the ETS. A key concern will be the potentially negative impact of the next phase of the ETS on the competitiveness of affected businesses. Evidence from interviews with almost 800 managers in

Europe shows that most industry sectors that will still be entitled to free emission permits would not face an increased risk of closure or relocation outside of the EU if they had to pay for permits (CEP, 2010). Another study on the potential effects of the EU ETS for industrial branches, carried out by the ZEW Institute, concludes that some of the sectors analysed have the ability to pass through a portion of their carbon costs to consumers. However, the results also indicate that sectors cannot achieve a complete pass-through of their costs into output prices, with the exception of ceramic goods. Moreover, although generally accepted as an important indicator for the competitiveness implications of EU ETS, the ability of sectors to pass on costs also has its limits. The longer term impacts, in particular, of sectors and firms attempting to passing through carbon costs, and the consequences for leakage remain uncertain (Oberndorfer, 2010).

The CEP paper argues that European governments should improve the design of the ETS by limiting existing exemptions and raising additional income of up to €7 billion annually. Rather than providing an unspecific subsidy for industry, this money could be earmarked to finance investments and R&D crucial for the transition to a low-carbon economy. It could equally be used to mitigate the possibly regressive effects of higher carbon prices on low-income groups.

There is thus substantial uncertainty about the third phase of EU ETS, with a hardly calculable increase in EU ETS costs driven by an assumed increase in the price of allowances. Capital intensive industries need time to plan investments and to respond to policies where they can.

According to a study by the WWA consultancy group, commissioned by the EIUG and the TUC, the forecasted increase in the total energy bill, taking electricity, gas and emissions reductions schemes together, is projected to be between 18% and 141% by 2020. These figures include the costs of EU ETS phase III and show an incredibly wide range (EIUG-TUC, 2010). Companies participating in this study reported increasing reluctance by their owners to commit to any investment, given not only the scale of climate change costs, but the ongoing uncertainty surrounding the climate change regime and its impact on energy prices.

Europe thus has a controversial emission trading system covering a fraction of economic activities, no carbon tax at European level and a number of sector-related policies at national level. This existing policy framework does not provide a sound foundation for achieving Europe's announced climate policy targets.

3. Employment effects

Under such circumstances, it is somewhat difficult to discuss the employment effects of European climate policy. We are attempting to do so here only in order to highlight the contradictions between targets, intentions, implementation and reality.

It is important, at the outset, to distinguish between discussing the expected effects of *intended* climate policies (i.e. those formulated in terms of promises and targets) and a climate policy that is actually being *implemented* by means of effective and binding policy instruments. The same inconsistency affects employment forecasts. Most of the literature assumes the fulfilment of declared climate policy targets when calculating positive employment effects, but tends to downplay employment risks, because it does not (or cannot) fully take into account the effects of measures that have not (yet) been implemented but would be required for the achievement of long-term targets.

With all the uncertainties of policy tools and the implementation of climate change mitigation policies, it is important to examine the potential effects of these developments on industrial activity and employment in Europe, both in quantitative and qualitative terms. If we look at the possible social consequences of a climate mitigation policy that is indeed being implemented, and where the assigned economic instruments are actually applied (not the case up to now), we can identify two major impacts. The one is the effect on employment, the other is the way in which a higher carbon price affects different income groups in society and has an influence on equity.

One thing is sure: with the implementation of climate targets, industry and industrial jobs will be genuinely transformed, in both quantitative and qualitative terms.

There is a broad consensus in the literature (e.g. CEDEFOP, 2010 and further studies cited in this section) that although climate policies would have no major aggregate impact on the number of jobs, a massive redistribution of jobs is to be expected:

- new jobs are being created;
- existing jobs will be transformed ('greened' jobs in existing industries);
- jobs will also disappear.

There will be huge differences between regions, branches and sections of the labour market.

There is also a clear consensus in the literature that jobs identified as 'green jobs' will be net beneficiaries of the process, although the contours of this category are not clearly defined (*often referred to as jobs that contribute to preserving or restoring environmental quality; jobs that reduce energy, materials, and water consumption; jobs that contribute to de-carbonising the economy and minimising all forms of waste and pollution*). High energy intensity and carbon emission activities are, on the other hand, expected to suffer a decline and substantial losses of employment. This might affect regions, countries and industries unevenly and the resulting tensions need to be addressed.

In general, there is too much focus on the positive side of the green restructuring process on employment ('green jobs') but less on employment risks and negative impacts involving a potential reduction in some activities. This is typically true for the Communication of the Commission, '7 measures for 2 million new EU jobs' (CEC, 2009b), which calculates the employment creation effect of the measures contained in the European Energy Efficiency Action Plan. The 'Employment in Europe 2009' report takes a more nuanced approach but puts green job creation in the foreground (CEC, 2009b). A study by the UNEP and ILO (UNEP, 2009) takes into account the job creation potential of the green economy, branch by branch. It draws an important distinction, by saying that jobs which are 'green' in terms of the end product are not always green in terms of procedure, because of the environmental damage caused by inappropriate practices (e.g. in

the recycling industry). The report also addresses the issue of job quality in the context of green jobs.

A discussion paper by the King Baudouin Foundation goes further, as it addresses the implication of individual climate change mitigation measures on social justice and employment (Schiellerup *et al.*, 2009).

Mapping branch-level employment effects

When examining branch-level employment effects of applied and planned climate policy measures, the uncertainty is even greater than for higher level economic activities. One key question concerning climate policy is how it aims to achieve emission cuts; whether by reducing activities that are energy intensive or by increasing the efficiency of these energy intensive activities.

Government policies often do not explicitly target energy inefficiency, but rather the amount of energy used. By doing so, they do not recognise that many energy-intensive products have a low life cycle carbon footprint, mainly due to their durability and recyclability. Energy-intensive sectors, such as steel, chemicals and ceramics, provide many of the materials and products that are essential for the transition to a low carbon economy (wind farms, for example, need steel, cement, carbon fibre and aluminium). These materials and industrial products may also help to reduce energy use by providing homes with energy efficient glass and insulation.

Energy intensity is not in itself bad for the environment, while energy inefficiency definitely is. Europe cannot produce low carbon energy or consume energy more efficiently without energy-intensive products.

Consequently there is a great difference between potential adaptation strategies: do we wish to downsize energy and resource intensive industrial activities (e.g. by concentrating on financial services instead of manufacturing), or to increase energy and resource efficiency while maintaining core industrial activities. These questions have remained open until now.

We need to bear in mind, however, that most manufacturing emissions originate in primary production while most value added is concentrated in downstream processing and application. According to a 2007 study by the UK based Carbon Trust, the impact of carbon costs on these higher value added manufacturing activities is small compared to differences in labour, energy and other input costs between EU and non-EU countries (Carbon Trust, 2007).

Significant impacts on international trade outside the EU need to be seriously examined only for a highly concentrated number of industries eg. the lime, cement, basic iron and steel sectors.

A study commissioned by the ETUC and prepared by the Syndex consultancy agency (Syndex, 2009) took stock of potential employment effects for existing industries, emerging industries and major infrastructure projects in Europe.

Energy generation plays a crucial role in climate policy, and the renewable energy sector will be a future source of employment growth. Developing, installing, operating and maintaining renewable energy systems will create a vast number of new jobs, which are both local in nature and not subject to relocation. According to the forecast made in the study, the 1.4 million jobs accounted for by the sector in Europe in 2005 are likely to increase by a further 760 thousand jobs by 2020. The Commission reckons on 2.3-2.8 million jobs in the renewable energy sector in Europe by 2020 (CEC, 2009b). The UNEP-ILO study on green jobs calculates a potential 20 million new jobs in the renewable energy sector worldwide by 2030 (UNEP, 2009).

The Syndex study warns, however, that the net job generation effect will be lower, as jobs in traditional forms of energy generation will be downscaled (e.g. by 80 thousand in coal mining and 20 thousand in related power plants).

There is great employment creation potential in reducing emissions in the **housing and construction sector**, as the operation of buildings accounts for 40% of all energy use. Jobs are mostly to be created in the construction sector and in the industries delivering the necessary technology overhaul. The Commission's Employment in Europe report estimates that the directive on Energy Performance of Buildings will

create between 280,000 and 450,000 new jobs in the mid-term. New jobs are linked to activities in retrofitting of buildings and energy management including related services (facility management, maintenance and control). Industries delivering domestic appliances, office equipment, air-conditioning, lighting and heating systems, as well as related ICT services, will also benefit from the programme. It is estimated that each 1 million euro invested in energy efficiency creates 12-16 new jobs. The proportion of stimulus packages spent on such projects has a high rate of return, not only in terms of lowering emissions but also in creating jobs. The only question is how long these public resources will remain available.

The **information-communication technology (ICT)** sector will play a key role in improving energy efficiency, with a potential 15% reduction in global CO₂ emissions by 2020. De-materialisation of products and production processes is a key element in increasing resource efficiency: software is replacing mechanical devices (embedded software), miniaturisation is driven by nanotechnology and fixed networks are exchanged for wireless networks. These processes will, however, also have employment consequences, as ICT manufacturing is being replaced by ICT services, with software specialists replacing hardware production workers.

Manufacturing industry as a whole is responsible for a third of global energy use and for 36% of global CO₂ emissions (International Energy Agency 2007).

Within manufacturing, the **steel industry** accounts for 30% of industrial CO₂ emissions and employs 550 thousand employees in Europe, now that excess capacities have been eliminated through decades of restructuring. The steel industry is also a key innovator and supplier of several products of the green economy (wind mills), with lightweight steel solutions contributing to long-lifetime buildings and better energy performance.

Over the past 40 years, the unit CO₂ and energy consumption of the European steel industry have decreased by 50% and 60% respectively. Almost all the steel from cars is being recycled, and by 2015 95% of all car materials must be completely recycled.

The proportion of electrical mills producing steel from scrap has grown to 41%.

Even though the steel industry is one of the most energy-intensive industrial activities, the lifecycle CO₂ footprint of its products has decreased dramatically and its energy efficiency has also improved. The industry's contribution to further emission reduction is expected to be made by further energy efficiency improvements and not by further downsizing. The post-2012 EU ETS regime will be crucial for the steel industry in Europe. In the current circumstances, future effects on employment in the industry can not be predicted.

For other energy-intensive sectors beside iron and steel, such as aluminium, cement and lime manufacture, pulp and paper making, basic inorganic chemicals, and nitrogen fertilisers there is even greater uncertainty. Many of these industries are based in regions of relatively high unemployment, and their continued operations are vital to the economies of these areas.

Transportation is a particularly critical industry both in terms of its climate effect and of its key role in the European economy. While efforts are being made to reduce the footprint of cars, public transport systems offer lower emissions and more green jobs.

Railways can generally be regarded as sources of green employment. In many countries, however, the trend over the last few decades has been away from rail, and towards cars, trucks, and planes, a trend which takes us further away from achieving a sustainable balance between modes of transport. Employment – both in the operation of railway lines and in the manufacture of locomotives and rolling stock – has fallen accordingly.

In the EU-25, a total of 8.2 million people were employed in all transport services combined in 2004. Railway transport accounted for just 11%, or 900,000 jobs. Rail employment has fallen in the last few decades: in just the short period of time between 2000 and 2004, the number of jobs was cut by 14%. Road passenger and freight transport, in contrast, account for some 4.3 million jobs, and air transport jobs number 400,000 (Syndex, 2009). According to the International Association of Public Transport (UITP), an estimated 900,000 people

are employed in urban public transport in the 25 Member States of the European Union.

The automotive industry and its supplying industries employ a total number of 12 million people in Europe, making it the backbone of the European manufacturing industry. 2.3 million employees are directly involved in the production of vehicles while the supplying industry has 10 million employees (ACEA, 2010). According to the already cited UNEP report, only some 250,000 jobs are directly involved in the manufacturing of fuel-efficient, low-pollution and low-emission cars and can be considered as green jobs within the European automotive industry (UNEP, 2009).

The automotive industry faces particularly high challenges over the next few years, in the course of the transformation to a low carbon economy. The key process of the next decades will be the restructuring of the industry through environmental modernisation. Greening of the automotive industry by low-emission cars and its integration into an all-inclusive mobility system are the decisive elements of this strategy. The aim is to promote innovation in products and services by deploying intelligent communications technologies, producing electric vehicles and exploring renewable energy sources (CLEPA and EUCAR, 2009).

There are two key objectives for the automotive industry in regard to lower CO₂ emissions: the reduction in CO₂ emitted by cars and commercial vehicles in operation, and the reduction of CO₂ emissions in the production process of vehicles. Overall CO₂ emissions resulting from the manufacture of passenger cars increased between 2005 and 2007 at a rate of 1.4%, due to the growing number of passenger cars produced. Efficiency rates, measured by the amount of CO₂ emitted per vehicle produced, fell by 5% to 0.83 tonnes CO₂ over the same period (Syndex, 2009).

The greater challenge for the industry is, however, to meet the binding CO₂ emission limits for passenger cars and light duty vehicles. The European regulation sets a binding limit for CO₂ emissions from an average new car fleet at 130g CO₂/km by 2012, with premium fees imposed if the average CO₂ emissions exceed the limit value in any year from 2012. The Commission's long-term target is 95g/km, specified for the year 2020.

It is worth mentioning that the binding regulation of 2009 was the result of 13 years of discussions on the reduction of CO₂ emissions from passenger cars. In 1995, the European executive body had indeed announced a 120g CO₂/km target for 2005. In following years, the target was postponed twice, once to 2010 and then to 2012. The automotive industry failed to meet its voluntary targets, hence the binding regulation.

Under these circumstances it is extremely difficult to give a forecast for the likely development of employment in the automotive industry in the next decade. The Syndex study calculated the employment effects of the conversion of car engines from conventional to electric engines. This calculation resulted in employment gains of between 80,000 and 160,000 jobs by 2010 (Syndex, 2009). The conversion of conventional to hybrid engines was found to be neutral for employment.

In the absence of a European concept for a sustainable balance of modes of transport, this calculation could not take into account possible shifts between modes of transport, whereby, for example, the share of road and individual transport would certainly lose out to rail and public transport, with corresponding consequences for employment.

The uncertainty surrounding potential employment effects of the green transformation applies to not only the automotive industry but to the entire manufacturing industry. Most available forecasts have assumed at least a neutral overall employment effect, while putting the creation of new jobs in the green industries in the foreground.

Still, a recent CEDEFOP study estimates a loss of nearly 2 million manufacturing jobs in Europe by 2020: 'although there might be expectations of an increasing share in manufacturing at national level, the total share of jobs in manufacturing and construction in EU-27 will decrease from 22.9% in 2010 to 21.3% in 2020' (CEDEFOP, 2010).

Conclusions

There is a consensus in Europe that reversing climate change is the overall policy priority of the next decade and that the transformation towards a resource-efficient and low-carbon economy will be the decisive trend of the future.

Even if Europe seems to be on track for formal fulfilment of some of its medium-term emission-cutting objectives, this is by no means the result of a thoroughgoing reorientation of economic activity, but rather of the one-off effects of crises. The paradigm shift is still to come. For it to take place we need a more comprehensive climate policy and one that is implemented effectively.

There are also fundamental gaps in the overall climate policy framework, as regards, for example, how it aims to achieve emission cuts – whether by reducing activities that are energy-intensive or by increasing the efficiency of such activities. The current track record shows that achievements have so far largely been a result of the former option. To the extent that this ‘success’ is based on carbon leakage – importing energy-intensive goods previously produced in Europe from outside the EU – it brings no real benefit at global level.

The process largely lacks specific economic tools and foundations. Examples of existing economic instruments (such as the EU ETS) clearly demonstrate this absence, which means that it is still not possible to calculate effective future carbon prices. We have ambitious targets and promises, but it is still uncertain by what means and at what price these objectives could be achieved.

When addressing the employment impact of this transition process, the focus is generally put on job creation and new green jobs. It is not enough to talk about green jobs only; the challenges of transforming existing industrial jobs need also to be addressed.

As we have shown in the case of the automotive industry, and with a view to energy-intensive industries, the current policy framework and implementation practice do not allow proper exploration of all potential risks and challenges. If there are 10 million jobs in the automotive industry in Europe, out of which some 240 thousand can currently be classified as ‘green jobs’, it is absolutely crucial to discuss how the transformation of the remaining jobs would proceed.

Sustainable achievement of the 2020 climate targets, and any possible achievement of the longer-term targets, will require tougher measures (including completion of the ETS, introduction of a European carbon tax and development of a sustainable European transport concept). The

effects of these measures would, however, have a more serious impact on employment than is assumed on the basis of current implementation practice.

In this scenario, the transition to a low-carbon economy will encompass a full-scale transformation of the whole European economy, with wide-ranging impacts on employment.

As is the case with major restructuring processes, managing the transformation with appropriate policy instruments, with the involvement of social partners, will be a decisive factor in its final success. One crucial question is how the costs of the transition will be shared among the various actors and within society.

This future restructuring process will also be unique, in that it will be directly induced and shaped by explicit policy targets to mitigate climate change, implemented by means of a policy mix. This is genuinely different from restructuring processes driven by market forces (e.g. globalisation), where policy making played a more indirect role, by promoting liberalisation and deregulation (without explicit policy targets). For this reason, changes relating to this new wave of restructuring can be more easily and clearly foreseen, so that responses to the challenges it brings (above all related to employment) can be planned and integrated into the policy framework right at the outset. Such planning would, above all, include the design of targeted labour market policies to ease necessary transitions, and matching education and training measures. The most urgent step would be a proper assessment of specific and planned climate mitigation policy measures for employment.

It is also crucial to determine how to manage this process in a socially sustainable way, the role to be played by trade unions and the strategies these should follow. One thing, however, is clear: the progress made in Central and Eastern Europe, and the UK, in emissions reduction, resulting from the collapse or downsizing of industrial activity, is not the path that Europe should follow.

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