The EU Approach for Coping with Global Environmental and Energy Challenges

Christian Egenhofer

Senior Fellow, Centre for European Policy Studies (CEPS), Brussels;
Senior Research Fellow, Centre for Energy, Petroleum and Mineral Law and Policy (CEPMLP), University of Dundee, Scotland/UK
&
Visiting Professor at the College of Europe (Bruges, Natolin/Warsaw), LUISS University (Rome) and Solvay Business School (Brussels)

Paper[1] presented at the Conference

Lessons from Europe
Climate Change Policy & the European Experience

Ruttgers Center for European Studies and Ruttgers School of Arts and Sciences

25 & 26 March, 2010

[1] Based on: Egenhofer, C (2009), 'The New EU Emissions Trading Scheme: A Blueprint for the Global Carbon Market?', Harris J and N Goodwin (eds), *21st Century Macroeconomics: Responding to the Climate Challenge*. Cheltenham UK and Northampton MA: Edward Elgar Publishing, 2009 (Chapter 11, pp. 246-263, and Egenhofer, C., A. Behrens and A. Georgiev (forthcoming), 'EU Strategies for Climate Change Policy Beyond 2012', in Brauch, Hans Günter Brauch; Oswald Spring, Úrsula; Grin, John; Mesjasz, Czeslaw; Kameri-Mbote, Patricia; Behera, Navnita Chadha; Chourou, Béchir; Krummenacher, Heinz (Eds.), *Facing Global Environmental Change -Environmental, Human, Energy, Food, Health and Water Security Concepts*. Berlin: Springer Hexagon Series on Human and Environmental Security and Peace, Volume 4

Contents

1. Introduction

The European Union has traditionally felt at home in multilateral negotiations. This is no different for the environment. The EU as well as its member states have been actively promoting Multilateral Environmental Agreements (MEAs). In the case of climate change the EU has found itself being catapulted into leadership after US President George W. Bush pulled out of the Kyoto Protocol. While few had bet at the time for the Kyoto Protocol to survive, active EU diplomacy ensured that Japan, Canada and Russia ratified the Protocol to enter into force in 2005. To prepare for this, the EU has adopted numerous laws to fulfil its commitments. Among them have been policies to support renewable energy, improve energy efficiency in buildings and transport. However, the centrepiece of EU climate change policy has been the EU Emissions Trading System (EU ETS), starting in 2005. While these and other policies have focused on implementation of the Kyoto Protocol commitments, in parallel the EU has been developing a new strategy to meet mid and longer-term climate change objectives. The EU has realised that in the absence of US engagement EU leadership is indispensible for reach a global agreement on climate change. At the same time, this leadership position offers the opportunity to shape this new regime to its liking alongside other benefits such as reducing energy import dependency and to gain leadership in low-carbon technologies.

2. The strategic approach: target setting and addressing energy security

EU climate change policy is based on the EU's long-term target to limit global temperature increase to a maximum of two degrees Celsius above pre-industrial levels. In order to achieve the medium-term GHG emissions reductions required of developed countries, the Council of the European Union formally adopted an integrated climate and energy package on 6 April 2009.[1] The package intends to operationalisze the overall binding targets to reduce GHG emissions and to increase the share of renewable energy sources in the EU's energy mix, which were adopted by the European heads of state and government at their 8-9 March 2007 spring summit (European Council 2007: 12-21). Principle elements of the 2007 spring summit's conclusions include a set of EU targets – generally referred to as '20 20 by 2020' – and accompanying policies.

1) A binding absolute emissions reduction commitment of 30 per cent by 2020 compared to 1990 conditional on a global agreement, and a 'firm independent commitment' to achieve at least a 20 per cent reduction;
2) A binding target to reach a 20 per cent share of renewable energy sources in primary energy consumption by 2020;
3) A binding minimum target of increasing the share of renewables in each member state's transport energy consumption to 10 per cent by 2020 (this

[1] For a press statement on the Council's adoption of the 'climate-energy legislative package' as well as links to all of its elements, see >http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/misc/107136.pdf>.

target initially focussed solely on biofuels but was later widened to include other forms of renewable energy sources);
4) A 20 per cent reduction of primary energy consumption by 2020 compared to projections (non-binding);
5) A commitment to enable the construction of up to 12 large-scale power plants using carbon capture and storage (CCS) technology.

With the aim to implement these general targets, the climate and energy package as adopted in April 2009 contains six elements, including a directive for the promotion of renewable energy sources, a revised EU ETS starting 2013, an 'effort sharing' decision setting binding emissions targets for EU member states in sectors not subject to the ETS, a regulation to reduce by 2015 average CO_2 emissions of new passenger cars to 120g/km, new environmental quality standards for fuels and biofuels (aimed at reducing by 2020 GHG emissions from fuels by 6 per cent over their whole life-cycle), and a regulatory framework for CCS. Prior to that, the EU had already published the so-called *Strategic Energy Technology* (SET)-Plan (European Commission 2007a) to strengthen research, development and demonstration of new technologies including those relevant for addressing climate change and that is currently being implemented. Finally, a review of the level and nature of allowed subsidies (or 'state aid') is ongoing.

Such an integrated approach to energy and climate change has been necessitated to a considerable extent by a changing energy situation; domestic resources are dwindling at the same time that government intervention in the energy industry is on the rise in precisely those countries that could potentially fill the gap.

While many supplier countries seem unable to increase production due to a lack of investments, the fact that supplies are tightly controlled by governments in exporting countries raises the fear of 'excessive' leverage of supplier countries such as Russia. Some supplier countries are hostile towards the West. Others are politically unstable. Many reserves will take years to develop due to problems of access, investments and physical conditions. A prolonged tight market might increase political tensions and possibly some sort of 'resource nationalism'. At last, the EU realized that success in integrating Russia into a strategic energy partnership is very unlikely. Despite an institutionalized energy dialogue (since 2000) and some recent foreign investments in the Russian energy sector, the strategy aimed at opening the Russian market to European and other western enterprises and thus to gain large scale access to Russian gas and oil reserves has largely failed and this is not expected to change in the foreseeable future.

In such a scenario, the EU and its member states have been examining domestic and external policy options to move to a more sustainable and secure energy supply. This includes, amongst others, investment in renewable energy sources, pushing CCS technology for fossil and other fuels and investment in nuclear energy in member states that wish to do so. To drive down costs for these technologies, there is a need for large-scale deployment. The *International Energy Agency* (IEA 2008: 373; 554) makes the case, for example, that renewables (except wind) experience significant cost reductions for each doubling of capacity, such as 15-20

per cent for *photovoltaics* (PV) and 20 per cent for solar water heaters. This justifies pro-active support policies for low-carbon technologies.

Additional advantages of the EU climate and energy package include (Jansen/Gialoglou/ Egenhofer 2005: 3-6):

- The renewable energy policy can provide for technological leadership in sunrise technologies;
- Renewable electricity can reduce long-term electricity prices and their volatility;
- Substitution of fossils combined with renewables may reduce pricing power by Russia (notably on gas); and
- The introduction of the EU ETS (*emission trading system*) led to the retention of some of the economic rent of energy producing and exporting countries, mainly but not only those exporting coal.

To off-set the higher prices both for industry and domestic consumers, energy efficiency is a central piece, certainly for the transition period until new technologies and new fuels become available on a large scale. With increasing prices, reducing consumption gives a reasonable prospect for keeping the energy bill constant.

There has been an additional aspect of the '20 20 by 2020' targets which is often overlooked. The first phase of the EU ETS has shown that setting a hard cap in GHG emissions in the EU is next to impossible without some sort of legally binding constraint. In a scenario of a post-2012 agreement *without* absolute caps – which is possible – it is indeed difficult to see how the EU ETS could continue to exist in a meaningful way. Member states and the European Commission would most likely not be able to impose an ambitious emissions ceiling on industry without a legally binding constraint. The '20 20' targets address this risk.

3. Implementation of the '20-20 by 2020' targets

The *climate and energy package* should be seen in its entirety, including its six elements as mentioned above, the SET-Plan and new state aid guidelines. However, at the heart of the agreement are the '20 20 by 2020' targets. In addition to the revised EU ETS which will allow for an 21 per cent emissions reduction compared to 2005 in sectors covered by the EU ETS (European Parliament/Council of the European Union 2009a: 63-64), the implementation of these targets has been operationalized by the introduction of legally binding national GHG emissions reduction targets (referred to as 'effort sharing', ranging from -20 per cent to +20 per cent) for all sectors not covered by the EU ETS (European Parliament/Council of the European Union 2009b) – such as buildings, transport, agriculture and waste – amounting to an overall reduction of 10 per cent below 2005 levels by 2020. In terms of the renewables target, differentiated national targets for the share of renewable energy sources in final energy consumption have been introduced (European Parliament/Council of the European Union 2009c). The different national targets are shown in table 1.

Table 1: National overall targets for the share of energy from renewable sources in gross final consumption of energy in 2020 and member state greenhouse gas emissions limits in non-ETS sectors for the period 2013 to 2020. **Source:** European Parliament, Council of the European Union 2009b: 147; European Parliament, Council of the European Union 2009c: 46.

Member state	Share of energy from renewable sources in gross final consumption of energy, 2005	Target for share of energy from renewable sources in gross final consumption of energy, 2020	Member state GHG emissions limits in 2020 compared to 2005 GHG emissions levels (from sources not covered by ETS)
Austria	23.3%	34%	-16%
Belgium	2.2%	13%	-15%
Bulgaria	9.4%	16%	20%
Czech Republic	6.1%	13%	9%
Cyprus	2.9%	13%	-5%
Denmark	17%	30%	-20%
Estonia	18.0%	25%	11%
Finland	28.5%	38%	-16%
France	10.3%	23%	-14%
Germany	5.8%	18%	-14%
Greece	6.9%	18%	-4%
Hungary	4.3%	13%	10%
Ireland	3.1%	16%	-20%
Italy	5.2%	17%	-13%
Latvia	32.6%	40%	17%
Lithuania	15.0%	23%	15%
Luxembourg	0.9%	11%	-20%
Malta	0%	10%	5%
The Netherlands	2.4%	14%	-16%
Poland	7.2%	15%	14%
Portugal	20.5%	31%	1%
Romania	17.8%	24%	19%
Slovak Republic	6.7%	14%	13%
Slovenia	16.0%	25%	4%
Spain	8.7%	20%	-10%
Sweden	39.8%	49%	-17%
UK	1.3%	15%	-16%

This approach raises the level of centralization, absent in other policy areas of shared competence like the environment. Such centralization, i.e. hard caps and binding renewable obligations has only been possible as a result of a complex burden sharing, which essentially has been based on a mixture of efficiency and equity considerations. Hard targets for the EU ETS and the non-ETS sectors as well as for renewables have been set on the basis of an 'efficiency approach', i.e. reflecting a least-cost approach for the EU as a whole, however, with some adjustment to ensure that costs for member states remain roughly similar in per-capita terms.

- *GHG reduction ('effort sharing') targets:* Countries with a low GDP per capita are allowed to emit more than they did in 2005 in non-EU ETS sectors, reflecting projected higher emissions due to higher economic growth. According to

European Commission modelling, this increases overall EU compliance costs for the 20 per cent GHG reduction target by 0.03 per cent of total EU GDP.

- *Renewables targets:* half calculated on a flat-rate increase in the share of renewable energy and the other half weighted by GDP, modulated to take account of national starting points and efforts already made.
- *In the EU ETS sector:* uniform cap across member states and allocation based on EU-wide allocation methodologies. 12 per cent of the overall auctioning rights will be re-distributed to economically weaker member states in Central and Eastern Europe. Another two per cent of the total auctioning rights will be distributed to eight countries which have already achieved significant reductions before 2005.

According to assessments by the European Commission (2008a: 22-25, 2008b: 159-163), the total direct costs of implementing the two binding 20 per cent targets could be as high as 0.6 per cent of the GDP in the year 2020, or some €90 billion[2]. However, through the access to the *Clean Development Mechanism* (CDM) and *Joint Implementation* (JI) costs are expected to be as low as 0.45 per cent of GDP in 2020 or roughly €70 billion (European Commission 2008b: 161). Rising oil prices would also contribute to lower costs. Annual GDP growth is estimated to decrease by approximately 0.04-0.06 per cent between 2013 and 2020, which would lead in 2020 to a GDP reduction of 0.5 per cent compared to the 'business-as-usual'. These calculations do not take into account possible macro-economic benefits (in the estimated magnitude of +0.15 per cent of GDP) from the reinjection of auctioning revenues back into the economy.

With expected costs of some €70-90 billion by 2020, the complete package has been one of the most important, if not the most important piece of legislation in the EU ever. Nevertheless, there have only been limited changes to the initial Commission proposal. The reason is that governments had already given their full political support to the key elements of the package at the 8-9 March 2007 European Council. Equally important, opening one of these key elements by one member states would almost certainly have lead to an unravelling of the full package, a price too high for any member state to pay, not least because of peer pressure in EU institutions but also due to the high public support that climate change policies enjoy.

Nevertheless, there have been intense debates within the Council of Ministers and the European Parliament on a number of issues. The most important has been about costs and their distribution across member states and between industrial sectors. Funding of the 12 demonstration projects for CCS has remained contentious until the very end. Although generally the renewables directive has seen little controversy, trading rules for renewable electricity quotas were a contentious matter. Some member states with very aggressive targets and electricity utilities argued for more flexibility in trade while other member states feared a rush to the cheapest source, thereby crowding out certain technologies.

[2] Note that these calculations have been undertaken prior to the economic crisis.

EU sustainability criteria for biofuels were another hot topic as they raise important trade issues.

The most contested issue of the package became the issue of whether industries would receive their emission allowances for free or whether they would have to buy them. The existing rules where allowances are given out for free, has led to power companies charging their consumers as if they were paying a carbon price, resulting in billions of windfall profits. Auctioning emission allowances would solve this problem, but is politically controversial as it would lead to high costs for greenhouse gas emitting industries. Another dominant issue has been about the distribution of costs between industries and member states. This was to be expected given that by creating the EU ETS, the EU has created allowances that can achieve a value of anything between €30-90 billion annually in case of a CO_2 price of €15 per ton or € 50, respectively. It is interesting to note that neither industry nor EU governments had at any time of the discussion contested the overall ETS emissions cap of 21 per cent by 2020 compared to 2005, as proposed by the European Commission.

Regarding GHG emissions reductions in non-ETS sectors (covering about 55-60 per cent of EU GHG emissions), the Commission proposal permitted member states to use offset credits in order to meet up to two-thirds of their emissions reductions, and the remaining part by domestic abatement measures. The December 2008 agreement additionally allows for 11 (mainly western European) countries – including Spain and Italy – to use additional offset credits to meet their non-ETS targets.

4. The new EU ETS and the development of international carbon markets

The EU ETS remains at the centre of EU climate change policy. Since the adoption of the original EU ETS Directive in 2003, a broad consensus has emerged in the EU to use carbon pricing in the form of emissions trading, i.e. a cap-and-trade scheme, as the foundation of its climate policy. If properly designed, the EU ETS cap-and-trade scheme will create incentives for companies to reduce emissions in the most cost-effective way, will reward carbon-efficiency and create incentives for new and innovative approaches to reduce emissions. The incentive for efficient abatement will arise from the 'opportunity costs' of using allowances. Passing through the costs of GHG emissions allowances to consumers will create incentives to reduce the demand for GHG-intensive goods. At the same time, this will increase producers' cash flows to invest in abatement technologies. In a situation whereby all competitors are subject to similar carbon constraints in well functioning markets, the EU ETS would be the most suitable tool to achieve EU and UN-based targets at the lowest possible costs. However, the original design of the system had several flaws.

Ellerman and Joskow (2008: iii), for example, argue that although "there have been plenty of rough edges", the EU ETS managed to deliver "a transparent and widely

accepted price for tradable CO_2 emissions allowances" as well as the necessary "infrastructure of market institutions, registries, monitoring, reporting and verification". The scheme covers somewhat less than 50 per cent of EU CO_2 emissions from power and industry, including process emissions. The pilot phase from 2005-2007 suffered from a number of teething problems such as significant delays of registries and *National Allocation Plans* (NAPs)[3], inconsistencies in the definitions of installations, as well as issues related to monitoring, reporting, verification, and data collection. However, the most severe deficiencies of the first phase of the EU ETS included over-allocation, distorting allocation between member states and windfall profits for the power sector.[4]

- Over-allocation has largely been the result of two factors: an excessive degree of de-centralization in the implementation of the EU ETS, and the absence of a hard constraint. In their NAPs, member states pitched their caps somewhere between "lesser than the business-as-usual" and moving towards a "path consistent with the Kyoto Protocol". Most NAPs foresaw modest caps and a high dependence on projections. However, it turned out that most if not all projections were largely inflated (AEA Technology Environment/Ecofys UK 2006). This combination of modest cuts and inflated projections has lead to over-allocation of as much as 97 Mt of CO_2 out of a total of about 2.2 billion annual EU allowances, i.e. almost 5 per cent of total annual allowances (Kettner/Köppl/Schleicher/ Thenius 2007).
- Allocation in the first phase of the EU ETS has lead to each member state developing its own rules, notably for allocation to new entrants and closures. These rules varied considerably between member states. This high degree of discretion for member states has increased complexity, administrative burdens and transaction costs while decreasing transparency. Moreover, industry has been able to put pressure on governments not to hand out fewer allowances than other governments.[5]
- In Europe's liberalized (regional) wholesale power market, prices are set by the marginal production costs, including the value of emissions in the allowance market. If the marginal producer is a (high-carbon) coal power generator, the power price can increase significantly as a result of the EU ETS. Low carbon electricity sources such as renewables and nuclear benefit substantially from higher power prices without incurring extra costs. This effect was intended. However, fossil-fuel generators were also able to receive considerable windfall profits. Power generators operating essentially in a domestic EU market can easily pass on additional CO_2 costs. The windfall effect occurred as a result of power generators passing on the full costs of CO_2, while having received the allowances for free. Windfall profits have been estimated to amount to as much as €13 billion annually (Martinez/Neuhoff 2005: 67).

[3] Some NAPs were late as much 1.5 years.

[4] See Matthes, Graichen, Repenning (2005); Swedish Energy Agency (2006); Ellerman, Buchner, Carraro (2007); Egenhofer (2007); Ellerman and Joskow (2008); Egenhofer (2009); Convery, Ellerman and de Perthuis (2010).

[5] See Zetterberg, Nilsson, Åhman, Kumlin, Birgersdotter (2004); Matthes, Graichen, Repenning (2005).

Over-allocation has been addressed for the second phase (2008-2012) where the European Commission could impose a formula[6] to assess member states' allocation plans. As a result, the European Commission could shave off 10 per cent of member states' proposed allocations, leaving the ETS sector short of around 5 per cent for the second period. While the expected price for allowances had been around €20-25, the economic downturn has made prices tumble.

Experiences from the initial phases and design flaws have greatly helped the European Commission to propose radical, one could even argue revolutionary changes to the EU ETS. The principal element of the new ETS is a single EU-wide cap which will decrease annually in a linear way, starting in 2013, to reach 1.720 million tonnes of CO_2 in 2020. This corresponds to an overall cap being 21 per cent lower than the verified emissions for 2005. This linear reduction continues beyond 2020 as there is no sun-set clause. In addition, there are EU-wide harmonized allocation rules, full auctioning to sectors that can pass through their costs (e.g. the power sector), partially free allocation to industry based on EU-wide harmonized benchmarks. Overall, this translates into 50 per cent auctioning, which could equal about €30 billion per annum at a price of €30 per tonne of CO_2.

Starting from 2013, power companies will have to buy all their emission allowances at an auction. Contrary to the original European Commission proposal, however, the EU government leaders agreed that for existing power generators in some (mainly Eastern European) countries the auctioning rate in 2013 will be at least 30 per cent and will be progressively raised to 100 per cent no later than 2020. This means that for instance existing coal-fired power plants in Poland still get their allowances for free, but that new power plants need to buy them.

These member states successfully made the case that their situation could not be compared to the one in 'old' member states. Full auctioning in 2013 would make many of the coal-based and often inefficient power plants uneconomic, resulting in a shut-down. This would lead in the short-term to significantly higher power prices and possibly to supply shortages as existing interconnections between these countries and their neighbours would not allow for compensation. In addition, full auctioning would withdraw necessary financial resources from sometimes under-capitalized power companies that would be required to build new, more efficient and low-carbon capacity.

For the industrial sectors under the ETS, the EU agreed that the auctioning rate will be set at 20 per cent in 2013, increasing to 70 per cent in 2020, with a view to reaching 100 per cent in 2027. The original European Commission proposal included 100 per cent auctioning already by 2020 rather than 2027. Industries exposed to significant non-EU competition, however, will receive 100 per cent of allowances free of charge up to 2020. Some three quarter of industry covered by the ETS will fall into this category.

[6] Verified 2005 ETS emissions x GDP growth rates for 2005-2010 based on the PRIMES model x carbon intensity improvements rate for 2005-2010 + adjustment for new entrants and other changes, for example in ETS coverage.

The original EU ETS directive allowed for linking the EU ETS with other emissions trading schemes by international agreement. The new directive goes a step further by providing for different types of linking arrangements, e.g. via a treaty, an international agreement as foreseen under EU law and through a reciprocal commitment applied through domestic systems. The latter provision is innovative both internally and internationally as schemes could be linked through administrative decisions. In essence, this could mean that over time non-EU emissions trading schemes could be linked to the EU ETS, the notion being the EU ETS as a docking station for the global carbon market. This could mean that the EU model becomes the blueprint for the yet to come global emissions trading scheme. The EU is also actively in dialogue with representatives from non-EU federal or sub-federal emissions trading schemes to ensure convergence and ultimately linkability.

5. Competitiveness of industry and carbon leakage

The EU ETS has triggered a debate on the 'competitiveness' of European industry and carbon leakage as EU climate change regulation may lead to a relocation of industry to regions where no carbon policies exist. This could actually lead to an increase in global GHG emissions and is well documented in a sizable body of literature.[7] There is an emerging EU consensus that a number of sectors could claim a risk of carbon leakage (as a combination of CO_2 being a significant factor in variable costs and being subject to international competition). The new EU ETS directive has further defined 'carbon leakage' to avoid ambiguity. It mandates the European Commission to draw up a list of sectors "significantly exposed to carbon leakage" by the end of 2009, which has been done. In addition, the Directive has identified a hierarchy of three possible measures:

1) Free allocation
2) A global sectoral agreement, i.e. a global sectoral policy for one or all of the vulnerable sectors;
3) Border-measures, e.g. imposing carbon costs on importers.

Free allocation of allowances in effect amounts to a subsidy, thereby undermining the ETS' objective to pass through full carbon costs. It can, however, be justified by the fact that carbon prices are distorted already because costs for GHG emissions cannot be passed through globally. In this case, the market structure, especially price elasticity of demand, inhibits globally-trading industries' ability to pass-through their additional costs in full or even partially. As a result (European and global) product prices will not reflect the 'opportunity costs' of allowances and therefore the EU cost of carbon. For example, if firms in a European industry cannot pass through the allowance price partly or fully, it is these firms that eventually end up 'paying' for the allowance price. Failure to pass through would erode benefits from CO_2 abatement as well as producers' competitiveness.

[7] See, for example, Carbon Trust (2004); Reinaud (2005, 2008); Hourcade et al (2007; Matthes and Neuhoff (2007).

Furthermore, it would transfer allowance value abroad and would ultimately lead to carbon leakage.

While the choice of option one (free allocation) is a pragmatic approach of 'taking the heat' out of a potentially poisonous debate, it allows only for compensation of direct effects, i.e. costs arising due to the fact that emissions need to be covered by an allowance. It does not address the vulnerabilities of those sectors that results from indirect effects, i.e. through higher input costs, notably higher power prices as a result of the ETS. Therefore, member states have been given the possibility to provide financial compensation to sectors on the Commission's lists. Currently the European Commission is adapting EU state aid guidelines to allow for this.

The European Commission under the leadership of Directorate-General Enterprise and Industry has launched a process involving industry, member states, research and stakeholders to assess as exactly as possible the vulnerability of sectors and sub-sectors. Industry has submitted very detailed data for the European Commission to assess the degree of vulnerability. There is a willingness not to hand out allowances for free to those sectors that in fact can pass through all or parts of the carbon costs. Thereby the European Commission wants to avoid another round of windfall profits, although this time *not* for the power sector but for industry. Politically this has been difficult and only partly successful.

Nevertheless, there are voices from some member states and some companies calling for the introduction of border measures. So far, these voices are few and there is an overwhelming consensus among EU industry that border measures for an export-dependent economy like the EU would be self-defeating. However, it is clear that border measures are seen by the EU as a possible legitimate means to put pressure on free-riders in the global effort to reduce GHG emissions (see also Gros and Egenhofer forthcoming). In addition, they could be used as a 'stick' during on-going post-2012 negotiations. There appears to be a consensus that a multi-lateral approach towards border measures in a post-2012 agreement is sensible or necessary to address free-riding.

6. Climate change and developing countries

According to the IEA 2007 World Energy Outlook (IEA, 2007), under a business-as-usual scenario – i.e. if governments stick with current policies – the world's primary energy needs would grow by 55% between 2005 and 2030, at an average annual rate of 1.8%. As fossil fuels are expected to remain the dominant source of primary energy, accounting for 84% of the overall demand increase, global energy-related CO_2 emissions between 2005 and 2030 are also projected to increase. Developing countries, whose economies and populations are the world's fastest growing; contribute 74% of the increase in global primary energy use in this scenario, while China and India alone account for 45%. Hence, any agreement that would not commit fast growing developing countries or at least China to reductions would be ineffectual.

However, relations between the EU and emerging economies such as Brazil, India, China, South Africa or Mexico remain largely bilateral. Increasingly co-operation in climate change and energy play a role in bi-lateral summits. Co-operation agreements are often detailed focussing on specific issues. In addition EU 'messages' are reinforced by cooperation of member states with emerging economies.

On the contrary, the relationship with other developing countries, notably least developed ones, forms part of EU development policy. Based on the rationale that climate change will significantly affect poverty reduction, the EU has implemented an Action Plan on Climate Change and Development (from 2004-2008) as an integral part of EU development cooperation activities. This Action Plan has essentially promoted mainstreaming and research.[8] Beyond 2008, renewed impetus to the Action Plan will be given through a Global Climate Change Alliance (GCCA) that will go beyond mainstreaming and research, targeting concrete adaptation, climate related disaster risk reduction, the CDM, and the halting of deforestation. It will also establish regional and national climate change Partnerships and put at their disposal resources for its implementation.

7. Conclusions

With the integrated climate and energy package, on the one hand, the EU attempted to prepare the ground for the crucial climate negotiations in Copenhagen in December 2009 and beyond. The assumption has been that EU leadership is one of the crucial elements to create momentum for these negotiations. To an extent this has been correct; without EU 'leadership' the agenda in Copenhagen would have looked differently. The EU has assumed that credible leadership starts at home, i.e. with an ambitious and credible domestic climate change policy. There has been the view that the integrated climate and energy policy allows the EU to shape a coming global climate change regime to its liking, notably though the EU ETS. In doing so, the EU furthermore has seen and still does see a potential to make Europe a global leader for new low-carbon technologies while at the same time gradually reducing its import dependency, primarily on Russian gas. The integrated climate and energy package cannot be explained by 'climate leadership' alone. The package was also meant to address long-term the EU's energy challenges, consisting of dwindling domestic reserves, increasing import dependence, especially on natural gas and long-term increasing energy prices. Such a policy comes at a price but to date the EU and EU member

[8] These activities encompass the integration of climate risk management into developing countries planning processes, the provision of help to develop research on impacts vulnerability and adaptation, supporting developing countries to integrate the pursuit of low greenhouse gas development paths into the planning process in order to benefit from the diffusion of environmentally sound technologies, encouraging the private sector to invest in mitigation and low greenhouse gas development, and promoting the development of human and institutional capacities for the implementation of the UNFCCC and the Kyoto Protocol.

states are (mostly) convinced that the price is worth paying. The litmus test will be if when whether the EU will move towards a unilateral 30% reduction target.

References

AEA Technology Environment; Ecofys UK (2006) *LETS Update: Decision Makers Summary* (Bristol: Environment Agency, April)

Carbon Trust (2004), *The European Emissions Trading Scheme: Implications for Industrial Competitiveness.* London: The Carbon Trust, June

Convery, F, D Ellerman and de Perthuis, C (2010), *Pricing Carbon: The European Union Emissions Trading Scheme*. Cambridge University Press

Egenhofer, C (2007) 'The Making of the EU Emissions Trading Scheme: Status, Prospects and Implications for Business', *European Management Journal, Vol. 25, No. 6, pp.453-463,* December

Egenhofer, C (2009), 'The New EU Emissions Trading Scheme: A Blueprint for the Global Carbon Market?', Harris J and N Goodwin (eds), *21st Century Macroeconomics: Responding to the Climate Challenge*. Cheltenham UK and Northampton MA: Edward Elgar Publishing, 2009 (Chapter 11, pp. 246-263)

Ellerman, D and P Joskow (2008), *The European Union's Emissions Trading System in perspective*. Pew Center on Global Climate Change, May

Ellerman, D, B K Buchner, C Carraro (2007) (eds), *Allocation in the European Emissions Trading Scheme. Rights, Rents and Fairness.* Cambridge University Press

European Commission (2008a), *Impact Assessment – Accompanying document for amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system*. Commission Staff Working Document. SEC (2008)52, 21.01.2008

European Commission (2008b), *Impact Assessment – Accompanying document for package of implementation measures for the EU's objective on climate change and renewable energy for 2020* Commission Staff Working Document, SEC(2008)85 VOL. II (Brussels: European Commission, February)

European Commission, (2007), *A European strategic energy technology plan (SET Plan) - Towards a low carbon future*. Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions of 22 November 2007, COM(2007)723 final (Brussels: European Commission, November)

European Council, 2007: Brussels European Council 8/9 March (2007), Presidency Conclusions*. 72241/1/07 REV 1 CONCL 1 (Brussels: Council of the European Union, May)*

European Parliament; Council of the European Union (2009), 'Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community', in: *Official Journal of the European Union*, OJ L 140/63, 5 June 2009 (Brussels: European Union, June): 63-87

European Parliament; Council of the European Union (2009), 'Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse

gas emission reduction commitments up to 2020', in: *Official Journal of the European Union*, OJ L 140/136, 5 June 2009 (Brussels: European Union, June): 136-148

European Parliament; Council of the European Union (2009c), 'Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC', in: *Official Journal of the European Union*, OJ L 140/16, 5 June 2009 (Brussels: European Union, June): 16-62

Gros, D and C Egenhofer (forthcoming), *Climate Change and Trade: Taxing carbon at the border?* Brussels: Centre for European Policy Studies (CEPS)

Hourcade, Jean-Charles; Demailly, Damien; Neuhoff, Karsten; Sato, Misato; with contributions by Grubb, Michael; Matthes, Felix; Graichen, Verna (2007), *Differentiation and dynamics of EU ETS industrial competitiveness impacts* (Cambridge: Climate Strategies, March)

IEA [International Energy Agency] (2007), 'Executive Summary' in: IEA: *World Energy Outlook 2007 – China and India Insights* (Paris: OECD/IEA): 41-52

IEA [International Energy Agency] (2008), *Energy Technology Perspectives 2008* (Paris: OECD/IEA)

Jansen, Jaap C.; Gialoglou, Kyriakos; Egenhofer, Christian (2005), *Market Stimulation of Renewable Electricity in the EU: What degree of harmonisation of support mechanisms is required?* CEPS Task Force Report (Brussels: CEPS, October)

Martinez, Kim K.; Neuhoff, Karsten (2005), 'Allocation of carbon emissions certificates in the power sector: how generators profit from grandfathered rights', in: *Climate Policy* (London: Earthscan), 5,1 (September): 61-78

Kettner, C, A Köppl, S Schleicher, G Thenius (2007), *Stringency and Distribution in the EU Emissions Trading Scheme – the 2005 Evidence.* Nota di Lavora 22.2007 Fondazione Eni Enrico Mattei

Matthes, F., V. Graichen and J. Repenning (2005), *The environmental effectiveness and economic efficiency of the European Union Emissions Trading Scheme: Structural aspects of allocation*, Report to the WWF, Öko-Institut, Freiburg.

Matthes, F and K Neuhoff (2007), *Auctioning in the European Union Emissions Trading Scheme.* Report commissioned by WWF

Reinaud, J (2005), *Industrial competitiveness under the European Union emissions trading scheme*, International Energy Agency Information Paper 2005

Swedish Energy Agency (2006), *The EU Emissions Trading Scheme after 2012.* A report from the Swedish Energy Agency and the Swedish Environmental Protection Agency.

Zetterberg, L., K. Nilsson, M. Åhman, A.-S. Kumlin and L. Birgersdotter (2004), *Analysis of National Allocation plans for the EU ETS*, IVL report B1591