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European Climate Change Policy Beyond 2012

Executive Summary

World Energy Council 2009

Promoting sustainable energy for the greatest benefit of all

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No matter how great a contribution Europe can make in reducing its own GHG emissions, there can be no real climate change solution for Europe unless there is a real solution for the entire world.

Introduction

With the Kyoto Protocol set to expire in 2012, the international community is urgently looking to develop a comprehensive and effective strategy to deal with global warming and climate change in the post-Kyoto world.

Thanks to a combination of lofty abatement goals, relatively low greenhouse gas (GHG) emissions, and the world's most developed carbon market, the European Union is currently poised to be a global leader in fighting climate change. Europe is also a driving force in the development of clean energy technologies and energy supply diversification. In short, Europe is an important climate change and energy model for the rest of the world.

An assessment of Europe's environmental record and its success toward meeting its emissions targets since the implementation of the Kyoto Protocol is cautiously optimistic. Relative to some other world regions, Europe's total GHG emissions are limited, and its total proportion of global emissions is declining. Admittedly, this reduction is partially the result of substantial emissions increases in other regions, but the EU-27's aggressive abatement goals are also showing signs of success.

Because European emissions represent only a fraction of the global total, Europe has recognized that its efforts to combat climate change must extend beyond the abatement of its own emissions. To that end, the EU has invested significant resources towards the development of new technologies to reduce or offset current emissions. Importantly, Europe has also showed a sustained commitment to distributing these technologies to other regions of the world.

In order for Europe to continue its successes in this area, investment into the research and testing of clean and efficient technologies and into the development of alternative fuel sources must be prioritized.

Governments and the private sector must collaborate to ensure that sufficient incentives for investment exist, especially with regards to replacing old and carbon-intensive processes with more efficient, low-carbon options.

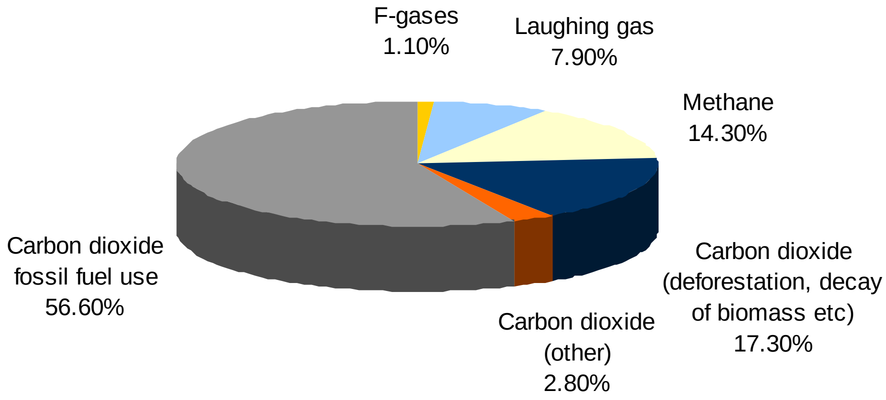
As a major contributor to global GHG emissions, the energy sector naturally has a strong motivation to influence the development of new technologies, to create strategies for emissions reductions, and to promote sustainable, long-term investment in new technologies. Because the energy industry investment cycle can last for many years, there is a strong need for a reliable and predictable long-term investment framework.

The challenges of global climate change will take decades, if not longer, to fully resolve. The long-term nature of this problem, poses several obstacles for both Europe and the greater global community. While the global community has reached a general consensus on the need to reduce GHG emissions, the fact remains that the available methods for doing this are a financial

Figure 1

The six "Kyoto-gases" and their share of the global anthropogenic GHG emissions 2004 (data measured in CO_2-equivalents). In total, carbon dioxide is responsible for slightly more than three quarters of the global emissions.

Source: IPCC[5], 4th Assessment Report



burden on society. The costs of aggressive abatement are high in the short-term, and the payoff for acting will likely not be seen for at least another generation. However, in the long run, the sooner aggressive actions are taken to offset the effects of climate change, the less the overall cost to society will be. The fallout from the current economic recession only compounds the difficult decisions facing policymakers. In particular, it is pushing them to consider the cheapest options to combat climate change, even if such solutions are not the most effective in the long run.

In spite of the economic crisis and the difficulties in balancing short-term costs against long-term benefits, the EU has managed to define some key cornerstones of its climate change policy between now and 2020. However, the EU's objectives beyond 2020 are poorly defined.

Although Europe is leading the way in environmental responsibility, climate change is a global problem, and Europe is only one part of what must ultimately be a global solution.

No matter how great a contribution Europe can make in reducing its own GHG emissions, there can be no real climate change solution for Europe unless there is a real solution for the entire world.

Greenhouse Gases: A General Overview

Of all the human activities that produce greenhouse gases, energy-related activities are by far the most significant contributor to global emissions. In total, energy use accounts for roughly 60% of all anthropogenic greenhouse gases, and these emissions come from all facets of the energy cycle, from production and transformation of fuels to energy handling and consumption. Carbon dioxide (CO_2) is the primary GHG produced by the energy cycle.

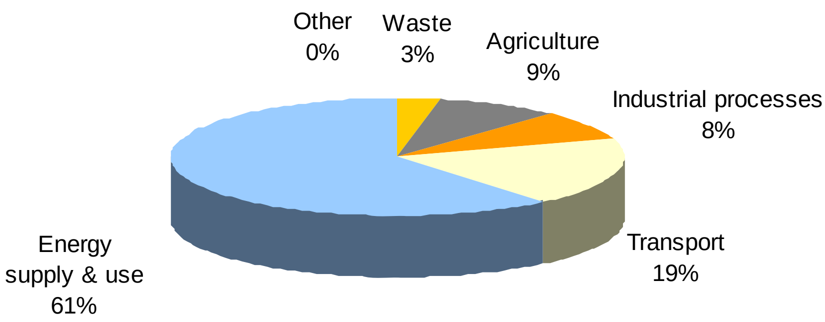
Smaller shares of GHG emissions come from agriculture, specifically from the methane (CH_4) and nitrous oxide (N_2O) produced by domestic livestock production, enteric fermentation, manure management, rice cultivation, and non-energy related industrial processes. Agricultural waste disposal and wastewater handling also produce notable volumes of methane.

In total, carbon dioxide makes up roughly 75% of all GHG emissions. Methane is a distant second, making up about 15% of total emissions. Because CO_2 is the dominant force in climate change, and the most long-lived, initiatives to offset global warming often strongly emphasize carbon dioxide emissions abatement. This is not to say that climate change efforts focus exclusively on CO_2, but it is an acknowledgement of the fact that any

Figure 2

Sector contributions to EU-27 CO_2-emissions in 2006: the electricity and heat sector is the main contributor.

Source: EEA, Annual European Community greenhouse gas inventory 1990-2006 and Inventory Report 2008



policy that does not have a strong CO_2-abatement component will not effectively address the core of the climate change problem (See Figure 1).

Trends in Global GHG Emissions

Between 1990 and 2005, CO_2 emissions in the OECD countries rose by 16%. In the same time period, carbon emissions in developing and newly industrialized countries doubled. Because of the dramatic increase in emissions from these countries, the OECD's total share of global carbon emissions actually dropped from 53% in 1990 to 48% in 2005. Meanwhile, in Russia and in other non-OECD countries in Eastern Europe, total emissions levels actually declined by about one third during this 15 year time period. This was due to structural changes in the Eastern European economies at the end of the Cold War and also to the modernisation of some Eastern European power plants.

Largely because of these structural changes in Eastern Europe, the EU-27 saw its total CO_2 emissions (excluding emissions from LULUCF[1]) fall from 5.6 billion tons per year in 1990 to 5.1 billion tons per year in 2006 (Source: EEA, Annual European Community greenhouse gas inventory, 2008).

By 2006, energy supply related activities were responsible for about 61% of the EU-27's total GHG emissions. The transport sector was the second biggest contributor with 19% of total European emissions (See Figure 2). A combination of other sectors made up the final 20%.

Although the EU-27 and OECD countries are major emitters, the most dominant trend in recent years has been the rapidly increasing emissions of developing and newly industrialized countries.

For example, in 2007 China alone emitted one billion more tons of carbon dioxide than it had in 2005. Overall, China's carbon emissions have nearly tripled over the past two decades, going from 2.2 billion tons of emissions in 1990 to 6.1 billion tons in 2007. By comparison, US carbon emissions rose by just one billion tons during the same period. Although China's emissions have increased dramatically in a short period of time, it is also important to note that 2007 per capita CO_2 emissions in the China were 4.7 tons (t). In the United States, the per capita emissions levels were 20.5t, four times higher than Chinese levels. Thus, while China's pace of emissions is increasing rapidly, its per capita emissions levels are notably lower than the levels in more developed countries. In fact, when China reached 4.7t of emissions per capita in 2007, it was the first time on record that China even slightly exceeded the global average of per capita emissions.

[1] LULUCF = land use, land use change, forestry

Table 1

The electricity consumption per capita is shown for some countries, together with the specific emissions to produce electricity, the absolute emissions connected with electricity consumption per capita and the absolute emissions connected with electricity consumption for a country or region

Source: IEA, 2007, CO_2 Emissions from Fuel Combustion

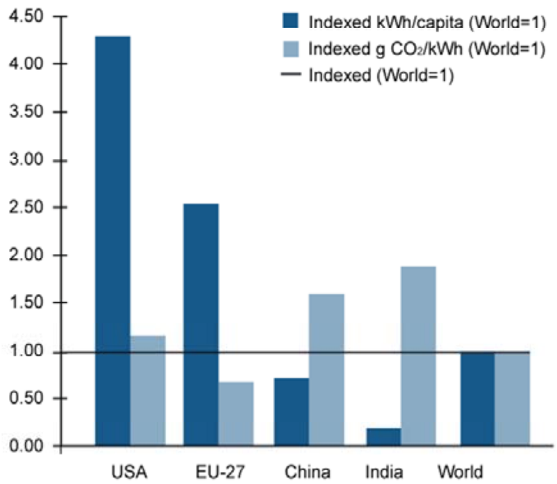
	kWh / capita	g CO_2 / kWh	t CO_2 / capita	Population	Million t CO_2
USA	14,606	573	8,37	305 million	2,553
EU-27	8,547	341	2,91	497 million	1,449
China	2,420	788	1,91	1,332 million	2,540
India	638	943	0,60	1,149 million	691
World	3,411	502	1,71	6,705 million	11,481

One of the main contributors to increasing carbon emissions in the developing world is electricity production. Table 1 and Figure 3 show the electricity consumption per capita in certain countries or regions and the specific emissions connected with each area's production.

Figure 3

Index of power generation per capita and CO_2 emissions per produced kWh for the year 2005 (Data are indexed to the world average of 1). Interestingly, the high electricity consumption in industrialised areas corresponds to lower specific emissions. In contrast, growing economies show above-average specific emissions: here technological improvements are essential for GHG reduction.

Source: IEA, 2007, CO_2 Emissions from Fuel Combustion



In the emerging economies, the amount of electricity-related emissions is quite high relative to the amount of electricity produced. This is especially true in comparison to the levels of emissions and electricity output in industrialized countries. The low level of electricity consumption in India or China however leads to a low value of electricity-related emissions per capita. But the energy consumption in India and in China will change in the years to come and consequently also the emissions per capita.

The Future of GHG Emissions

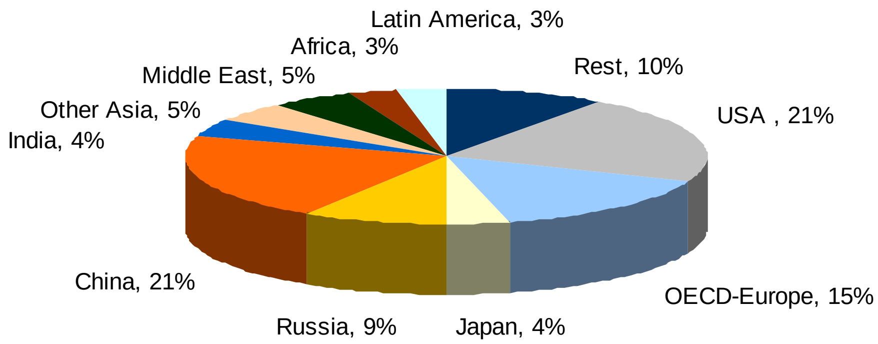
Currently, the world population is more than six billion people, and it is projected to increase to nine billion people by 2050. As the world's population expands and increasing numbers of people demand higher standards of living and more modern amenities like cars, air conditioning, and refrigerators, the world's energy demands and GHG emissions will continue to grow.

Given the dramatic increases in global emissions that are projected to happen as a result of these growing populations and higher standards of living, it is imperative that the global community find ways to offset or minimize the effects of these emissions on global climate change.

New technology development and the establishment of carbon markets are two important steps in this endeavour, and the EU is poised to be a leader on both fronts.

With regards to technology, it is crucial to develop clean energy technologies as well as technologies that can help reduce the amount of GHG already in the atmosphere. Europe is already establishing itself as an innovation centre in these areas, and it

Figure 4
Energy-related CO_2-emissions in the year 2006. The European Union's contribution is 14%.
Source: IEA, World Energy Outlook 2008



must now work to distribute these technologies to developing countries. Indeed, while Europe may be a leader in technology research and development, Figure 4 clearly shows that Europe cannot combat climate change on its own.

Cooperation, collaboration, and technology transfer between developed and developing regions is imperative.

Europe's Emission Trading Scheme (EU-ETS) has also been a trendsetter in the establishment and development of carbon markets. This is a significant achievement, for if the world is going to effectively limit carbon emissions, there is wide consensus that it will be necessary to establish the global price of these emissions. Without this established carbon price, it will be nearly impossible to create sustainable economic incentives for reducing emissions.

Although the challenge of climate change is a global one, the use of market mechanisms to control emissions has so far been overwhelmingly local in nature. As the EU-ETS indicates, many countries and regions are attempting to launch carbon markets in order to fulfil their Kyoto commitments or their own national emissions reduction targets.

The set-up of these markets generally meets a few common criteria. First, a cap is imposed on total emissions, then emissions permits are granted (often by free allocations), and finally the permits can be traded. This structure can apply to both state and industrial emission trading systems.

Although the EU's ETS is one of the world's most evolved carbon markets, promising initiatives are also underway in the United States, where the implementation of a federal emissions trading system in the coming year could potentially enlarge the impact of the United States' earlier initiatives. If implemented, the US system could cover about 5 billion tons of emissions at the beginning.

Despite this potential, much more needs to be done. Currently, the EU carbon market is the world's largest and most established. However, the EU-27 is only responsible for 15% of total global emissions, a small segment that is only going to decrease in the next decades as Asian countries emit more and more.

On existing carbon markets, the price of the ton of CO_2 has so far been relatively modest, hovering around US-$10, except on the European market where the price skyrocketed up to €30 at the beginning of 2006. This price volatility was e.g. due to concerns that there would be shortages on the market because of new limits on free allocations in National Allocation Plans in Europe and because of the potential increase in allowances that would come from the Kyoto Protocol Mechanisms. The present framework determining permits and allocations is still evolving, and how these issues are ultimately resolved will have a notable impact on the carbon price equilibrium during the Kyoto period and beyond. In the long term, the price of carbon emissions is likely to be heavily influenced

Climate change is admittedly a serious issue and a key consideration in any energy policy, but ensuring diversity of energy supply and providing affordable energy options are also important issues. Climate change must therefore be viewed in the context of a more comprehensive and multi-faceted energy policy.

by the success of Carbon Capture and Storage technology.

One of the key challenges in developing carbon markets and in establishing a global price for carbon is the question of how to link existing regional carbon markets with a more integrated global one. A more universal emission trading system would help improve the economic efficiency of GHG abatement, and a global price of GHG emissions would better incentivize technology transfers between regions.

Since the EU-ETS is the centrepiece of the EU climate change policy, the EU has a strong interest in ensuring that newer emission trading schemes are compatible with the EU one. However, even if the EU-ETS serves as the model for other carbon markets, it is still quite likely that there will be significant differences between schemes. Thus, the question becomes whether these differences will be significant enough to prevent the different schemes from linking together. Two key elements of market design that may affect the potential for linkage are the management of price levels and price volatility and the provisions for offsetting through reductions outside of the market.

Another issue with carbon markets is whether WTO rules related to emission trading need to be changed. In a recent WEC-study entitled “Trade and Investment Rules for Energy,” WEC argued that it is not yet necessary to modify WTO policy. Instead, WEC argues that to the greatest extent possible, governments should follow existing guidelines and prevent carbon-related taxes from interfering with or inhibiting the trans-border movement of energy, goods, services, capital, and people. Such taxes or border measures would generally violate the obligations and guidelines set out in by the GATT and the subsequent WTO agreement. Thus, WEC maintains that while urgent international action is needed on climate change, national GHG reduction policies must be fully GATT-consistent and should disrupt energy or energy product markets. Furthermore, any national carbon emission reduction scheme should be careful not discriminate against foreign energy investments.

Balancing Emissions Reductions with Other Energy Challenges

As the players in the energy industry are well aware, climate change is only one of the many energy-related challenges facing public and private sector leaders. Climate change is admittedly a serious issue and a key consideration in any energy policy, but ensuring diversity of energy supply and providing affordable energy options are also important issues. Climate change must therefore be viewed in the context of a more comprehensive and multi-faceted energy policy.

A recent WEC-study highlighted some of the key energy challenges that are specifically facing Europe. The vulnerability of Europe’s energy supply, especially during potential energy crises, was a key area of concern. In order for Europe to reduce its energy supply vulnerability, it is essential to have a broader mix of energy resources as well as affordable prices for customers. With these priorities in mind, WEC recommended that Europe increase its reliance on climate-friendly technologies such as nuclear, clean coal, and renewables. These goals not only improve Europe's energy supply situation, they are also in line with GHG reduction goals. Moreover, the technological diversity of a bigger energy mix would also create competition between different energy technologies, a crucial part of ensuring affordable prices for the end-user.

Electricity production and transportation are two major sources of anthropogenic GHG emissions in Europe and around the world. This report will now look at the best ways for Europe to handle these issues in ways that address both climate change and other energy-related challenges.

Roadmap for Electricity

There are several studies that look at future investment strategies and the possible ways to restructure Europe's energy system. One study conducted by the group EURELECTRIC examines several potential adjustments to existing energy policies that would help solve multiple energy challenges, including the development of a more climate friendly Europe. The study is based on a comparison of various long-term scenarios, each of which visualise the potential outcomes of different energy policies. EURELECTRIC's scenarios are described with common economic indicators and fuel prices but with varying the political measures and incentives. In total, the EURELECTRIC study considered four different scenarios: the Baseline Scenario and three alternative scenarios (Efficiency and RES, Supply Scenario, and the Role of Electricity). Each scenario produces unique projections related to the future of Europe's climate, energy security, fuel imports, etc.

With regards to fuel imports, the "Baseline Scenario" depicts a dramatic increase in Europe's dependence on energy imports. By contrast, the alternative scenarios indicate that with decreased energy usage and shifts towards low-carbon and carbon-free energy resources, Europe can actually decrease its energy imports in the future. These declines are particularly notable with regards to oil imports, where, in spite of the projected decline in Europe's own production of oil, the alternative scenarios predict that Europe's net oil imports will still decrease over time. Importantly, two of the three alternative scenarios ("Role of Electricity" and "Efficiency and RES") indicate that Europe's oil imports in 2030 will actually be lower they were in 2005. Europe's incremental needs for gas imports in the alternative scenarios are also lower than in the Baseline Scenario. That said, European gas imports are generally very stable and will continue to be important. This is largely because of the fact that emission reduction is the main driver of change.

While all of EURELECTRIC's alternative scenarios show reduced dependence on energy imports compared to the "Baseline Scenario," the "Role of Electricity," a scenario that emphasizes changes in electricity consumption, shows the most significant reduction. Of all four proposed scenarios, the "Role of Electricity" scenario performs the best in absolute terms in reducing Europe's incremental needs for net gas and oil imports compared to 2005.

The “Role of Electricity” scenario projects cost-effective emission reduction that come as a result of greater use of efficient electric appliances, electric vehicles, lighting, etc. as well the transformation of the power sector into a low-carbon energy conversion system. The “Role of Electricity” scenario captures the benefits of advanced electro-technologies and assumes a significant degree of market acceptance for these new technologies. The role of these electro-technologies would mean increased energy efficiency in specific end uses as well as the greater use of electricity in thermal and transport sectors.

The other scenarios presented by EURELECTRIC outline other energy options. For example, under the “Efficiency and RES” scenario, power generation would rely increasingly on renewable forms of energy, and it would involve greater integration of natural gas into Europe’s fuel mix in order to reduce emissions. Compared to the Baseline Scenario, “Efficiency and RES” also projects a greater reliance on nuclear energy, anticipating that some countries will devote more investment into the expansion of nuclear power.

Under the “Supply” scenario, power generation would rely mostly on nuclear energy and less on renewable energy resources. This scenario also projects that carbon capture and storage (CCS) technology will play an increasingly large role in reducing emissions levels. Changes in Europe’s fossil-fuel mix (i.e. a shift to gas) play less of a role in this scenario, partly because the CCS technology would allow for cleaner coal consumption and partly because of a greater emphasis on nuclear development.

Overall, the “Role of Electricity” scenario follows a more balanced approach and uses a wider variety of tools to reduce carbon emissions. The scenario uses not only nuclear power and CCS but also pushes renewable energy resources in substantially higher amounts in 2030 than the “Supply” or “Baseline” Scenarios. In short, the “Role of Electricity’s” portfolio approach to energy makes it the superior performer in terms of economic cost and carbon value. This scenario uses every means of reducing carbon at its cost-related optimal level while also addressing other European energy challenges. Excluding an option for carbon-reduction creates the difficulty that, in order to achieve the same overall amount of CO_2 emissions reductions, some other means will have to be used at non-optimal cost levels.

Roadmap for Transport

Transportation is another major source of anthropogenic emissions, and current estimates predict a significant increase in demand for both passenger and freight transport over the next few decades. Such projections are based on extrapolation of previous growth rates and assume in particular that the European countries in transition will rapidly increase both their GDP and transport demand. Assuming the continuation of existing trends in energy efficiency, which increases modestly each year in transport, transport energy demand can be expected to grow, but at a rate lower than transport demand. This in turn implies similar growth in CO_2 emissions and petroleum use.

Vehicle technologies can be divided into three broad categories: conventional engines, alternative fuels, and advanced technologies. It is currently impossible to predict which of these technologies will dominate by 2050, nor can the precise date of widespread implementation be predicted. Any one, two, or combination of these technologies could become dominant, and the adaptation of technologies will, in each case, take time according to technical viability, investment requirement, and cost. The time frames are thus intentionally left indeterminate.

Transportation also involves demand management. This encompasses a number of potential policies and measures that aim to make the transport system as a whole more efficient and sustainable. These include advances in intelligent transport systems, improved road infrastructure, improved public transport and, for the long term, new mobility concepts such as personal rapid transit. It should not be the intention of such systems to enforce the shift from individual transportation to mass transit but simply to ensure that demand for each type of transport can be met in the most effective and efficient manner, enhancing sustainability over the long-term.

Effective transportation policy measures will encourage all stakeholders to contribute to meeting the stated objectives of reducing GHG emissions and increasing energy security while also providing reliable and appropriate transport for those who demand it. In this context, some policy recommendations include:

- Technology neutrality – policy makers should not mandate or incentivize specific technologies;
- Mobilise all stakeholders (integrated approach);
- Each gram of CO_2 has the same value regardless of the source;
- In policy, target the final result, allowing the means to be determined by market and social forces.

While emissions reductions is a top priority for the transportation industry, the most successful policies will balance concerns over climate change with other industry priorities such as reduction of cost and providing more equal access.

Conclusions

Globally, greenhouse gas emissions are rising; however, the EU-27 is poised to continue reducing its own share of emissions. Fossil fuel consumption, especially for electricity and transportation are major contributors to the problem, and they need to be urgently addressed. Although technological solutions to GHG emissions exist, they still need more time before they can have a large-scale impact on carbon reduction. Unfortunately, the ongoing economic crisis makes financing these new technologies increasingly difficult. Going forward, Europe will play a large role in clean

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technology development, but in order to truly address the climate change problem, a global solution is needed. Europe can show the way and lead by example, but other regions also need to take action. A global value of GHG emissions would be an excellent first step in jumpstarting this process by incentivizing investment and the necessary technology transfer between rich and poor countries.

The following recommendations and conclusions reflect the point of view of the European countries in the WEC.

General Policy

A Global Commitment

In order to combat climate change effectively, all major emitters must play a role, including all major developed and developing economies. Ambitious yet realistic goals to decrease global GHG emissions must be defined. Having clear, consistent, and enforceable goals for key emitters will prevent the transfer of carbon-intense production to countries with no carbon constraints – so called carbon leakage.

A Global Carbon Price Coordination Mechanism

The international community must coordinate to set a global pricing mechanism for carbon emissions. This is the most effective climate change mitigation policy measure available. A global price of carbon will maximise cost-effectiveness will minimise economic distortions. Additionally, a carbon price will provide an incentive to invest in climate-friendly technologies, and it will suppress any carbon leakage effects by guaranteeing a level playing field and avoiding protectionist tendencies in energy trade. For both environmental and competition reasons, it may also be necessary to discourage leakage through compensatory and/or punitive measures for the sectors most vulnerable to carbon leakage. While a global carbon price would be an important step in combating climate change, it is unclear when or whether a global carbon price can actually be established.

Long-term visibility and consistency of policies

Investments in abatement technologies are another central part of reducing GHG emissions, and any regulatory framework must provide sufficient incentives for the development and deployment of these technologies. However, it is important to note that such investments will only occur if the political framework is predictable.

Therefore, it is necessary to have long-term, stable, and transparent frameworks, i.e. long-term abatement goals. Moreover, climate change policies should be consistent with related pre-existing policies to the greatest extent possible.

Develop a low-carbon energy supply by using all options on the supply and demand side

All available technology options should be used in order to achieve a low carbon society in an economically efficient manner. Climate-friendly technologies that have strong potential to reduce emissions but that are not currently economically viable should receive temporary financial support in order to develop them into more competitive products. Other suggestions include developing large opportunities to save energy at the end-customer side and fostering synergies between low-carbon electricity and efficient electro-technologies.

Security of Supply and Affordability

Climate change policies also need to take into account the security of supplies, investments, and affordability of energy to consumers. This triple objective has the greatest chance of being met by allowing the market to develop the lowest-cost approach and by privileging certain technologies that also reduce the hydrocarbon dependency.

Increased prices of energy and energy-related goods are an inevitable consequence of any emissions reduction policy, regardless of which reduction instrument is chosen. This is because any carbon reduction policy necessitates investments in low-carbon technology, which are still more expensive than investments in business-as-usual technology. However, it should be remembered these energy price increases are also incentives for the end-customers to use energy more efficiently and to change to alternatives with lower emissions.

Policy Instruments

Use the market when possible, install market mechanisms where feasible and monitor market development

Markets are the most efficient tool to detect and encourage the lowest-cost solutions for climate change. A market price can give consumers the right signals to invest in low carbon technologies, provided that the market can develop without distortions.

In order to assess progress on this front, a regulatory system to monitor market mechanisms should be created. This regulatory structure would ensure that the desired objectives are reached.

Use Command and Control (mainly in the form of standards), where market mechanisms cannot deliver fast enough

In spite of substantial potential, technology diffusion might not happen quickly enough in areas outside the ETS. Therefore, it is necessary to have a whole range of policy measures, including education, information, sensitisation, incentive schemes, and standards. Efficiency standards could be adopted in areas that are not effectively influenced by economic steering in the short and medium term.

Support research and development, demonstration and technology diffusion

In order to invent and develop the needed technologies, it is essential to support R&D

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activities. With a functioning, non-distorted market, clean technology diffusion would be facilitated through the carbon price. However, existing market distortions mean that promising climate-friendly technologies may also require support in the demonstration phase. Technology diffusion may also be enhanced via the development of technology partnerships.

Promote free trading of energy and goods

The WTO rules governing free trade and trade liberalisation should be respected in climate policy, as the trading of climate-friendly technology and the protection of intellectual property will facilitate sustainable development towards a low-carbon economy. Border tax adjustments should be avoided.

Emissions Trading as Instrument

Achieve a consistent global framework

To facilitate a global carbon price setting mechanism and to encourage the most efficient low-carbon technologies, all markets should be linked to a single global carbon market. Efforts to implement this linkage should be intensified. As linkages improve, innovation will be accelerated by access to a larger market. Any distortions caused by differing national approaches must be avoided in order to prevent carbon leakage effects.

Have a long-term outlook

The energy sector needs long-term predictability for R&D and its investments. Ensuring this predictability will speed up decisions for investments in low-carbon technologies and is thus necessary in order to reach stated climate goals on schedule.

Strengthen JI and CDM

As long as emissions targets are tailored to the level of economic development in countries, the instruments of joint implementation (JI) and clean development mechanisms (CDM) should remain. JI and CDM have already led to substantial emission reductions in developing countries. The JI and CDM mechanisms should be improved and should include cost-efficient emission reduction measures without technology restriction e.g. large hydro, nuclear, and CCS. By broadening the participation to more regions, sectors, and gases, important steps will be taken as a gradual transition to a global carbon market.

Evolve to an economy-wide ET system

All major GHG emitting sectors need to take part in the emissions trading system, or, at the very least, must be equipped with other GHG reduction policy instruments. Key sectors in this context include the energy sector, transport, aviation, maritime emissions, manufacturing, construction, buildings, services, and agriculture.

Recommendations for the EU-ETS

The EU should seize the leading role

The EU should take the lead in developing a global carbon market while at the same time promoting the OECD-wide carbon market starting latest at 2015, with further extensions to include major emitting developing countries until 2020. Ideally, a global carbon market would be created by directly linking the ETS markets while also paying respect to national or regional specifics. Necessary changes should be signalled in advance in order to ensure stability and to allow market participants sufficient time to react and adapt. Policy measures including carbon markets must be cost-efficient globally, not just in Europe.

Keep regulatory stability

Emission trading is a market-based instrument. The government's role is to establish a regulatory framework. Regulatory stability is crucial for a well-functioning market.

Keep the system simple

A cost-effective emissions trading system tends to attract political attention, and politicians often try to use the development of the ETS as a way to address other issues that are directly or indirectly related to climate change (industrial competitiveness and social cohesion, for example). While these are legitimate policy goals, it is important to recognize that the more issues that the ETS tries to address, the more cumbersome, overregulated, and bureaucratic the system becomes. Other policy issues are important, but they should not necessarily be addressed in the context of ETS development. Other policy instruments exist which may be better suited to the task.

Long-term visibility and predictability

In order to achieve its objectives, the legislative framework for climate change has to be stable and predictable and must provide long-term transparency for investors. In the energy industry, investments are often capital intensive and subject to long permit application procedures that may last for more than a decade. In this context, it is crucial to have a clear understanding of what the regulatory conditions will be years into the future when the investments become fully operational.

Robustness of monitoring, reporting and verification systems

In order to avoid market distortions such as price shocks and to ensure the environmental integrity of climate change policies, it is crucial that a robust regulatory framework is in place for monitoring, reporting, and verifying of GHG emissions.

Coherency of the policy-framework

As noted, the EU-ETS is the main instrument in tackling climate change in Europe, but it is not the only one. Ensuring coherence between all policy instruments aimed at addressing climate change is fundamental.

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