ENERGY POLICY FOR EUROPE

IDENTIFYING THE EUROPEAN ADDED-VALUE

CEPS TASK FORCE REPORT

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3. THE EUROPEAN ADDED-VALUE

A European energy policy should be placed in the overall context of the EU, which is based on an internal market and the principles of a competitive market economy, free from distortions of restrictive agreements, the abuse of dominant positions or state aid. At the same time, the EU's treaties list other important objectives, including notably sustainability, which are sometimes mutually reinforcing while at other times necessitating trade-offs. EU energy policy equally needs to be seen in the context that – up to now – member states have granted only very limited energy *policy* competencies to the EU while at the same time ceding significant powers in other policy areas such as the internal market, competition policy, the environment or research. A principal objective of this emerging EU energy policy framework therefore is to identify the *European added-value* to national energy policy-making, not to mention the legal basis. The principle of subsidiarity dictates that an EU role is warranted where EU action genuinely has benefits. Otherwise, action should be retained at member state or international level (e.g. the IEA, UN or G8).

3.1 The internal energy market

The further development of the EU's internal energy market for gas and electricity is often mentioned as one of the principal advantages of a European energy policy. It provides a stable and predictable regulatory framework designed to ensure equal opportunities and equal treatment of all market participants. In this context, on 19 September 2007, the European Commission made another attempt at completing the process towards an internal energy market in the EU by proposing a number of measures to complement the existing rules. Proposals contained in the 'third package of legislative proposals' include the separation (unbundling) of production

and supply from transmission networks (this would also apply to companies from third countries), the establishment of an agency for the cooperation of National Energy Regulators, improved market transparency and increased solidarity between member states. While a pan-European energy market is under development – reinforced by new and additional competencies included in the Treaty of Lisbon – member states will likely continue to implement national policies suited for their specific market situation. It is vitally important that member state measures do not delay or hinder cross-border markets from emerging, in order not to undermine the potential efficiency gains from a functioning pan-European market, and avoiding a further re-nationalisation of energy policy.

Box 1. Provisions of the Treaty of Lisbon

Energy issues are referred to on several occasions in the Treaty of Lisbon signed on 13 December 2007 by the EU Heads of State or Government. According to the final text still to be ratified by member states, energy policy will be a shared competence between the Union and its member states in the amended Treaty on European Union (Art. 2 C). In comparison to the previous proposal for a Draft Constitution, it includes additional reference to new challenges, such as climate change and energy solidarity between the member states in case of difficulties in supply (Art. 100). The latter takes into account concerns by certain member states about high energy dependence on one supplier country and the effects of possible disruptions of supply. A specific chapter devoted to energy (Title XX, Art. 176 A) highlights the importance of a functioning internal energy market in line with the need to preserve and improve the environment. Security of supply is the central focus, alongside the promotion of energy efficiency and energy saving and the development of new and renewable forms of energy. Based on this article, the Union shall aim at promoting the interconnection of energy networks. However, any measures to that effect "shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply", thus leaving member states' flexibility largely untouched.

Source: Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community, signed at Lisbon, 13 December 2007.

3.2 Beyond the market

In addition to a fully integrated and competitive market, government action will be needed especially for long-term policy objectives. Examples include R&D or the development of new and breakthrough technologies to cope with climate change. Moreover, the EU is dependent on imports from areas where market rules do not apply and economic decisions on whether to explore, produce or sell energy is largely linked to political considerations.

This Task Force has identified a number of areas where European added-value is given in terms of government intervention:

1. On the **demand side**, the promotion of ambitious energy saving and energy efficiency policies could reduce dependence on politically unstable or unreliable countries. Another area is investment in energy efficiency programmes by utilities with a focus on networks upgrade and smart metering systems to give the customers awareness of their consumption through a real time measure. A particular objective should be to limit the use of oil to essential areas such as transport and petrochemical, or a reflection on how to make best use of natural gas.
2. On **the supply side**, support should be given to near-zero carbon technologies such as renewables and carbon capture and storage. This would include especially temporary support mechanisms for renewables electricity or second-generation biofuels[15] to help bring down costs, creating the regulatory framework for carbon capture and storage as well as facilitating pilot and demonstration projects in the area. Ultimately, it should be **up to the markets to choose the appropriate technologies** (be they renewables, carbon capture and storage or nuclear) based on the political objectives of the EU and/or its member states. Choices will most likely be different across member states depending on political preferences, political acceptability and resource endowment.
3. On **R&D, efforts should focus on all energy** technologies, including both demand and supply, with the objective of maintaining or increasing diversification and flexibility of EU and global energy markets but also to reduce GHG emissions from fossil fuels.

[15] Second-generation biofuels here mean biofuels made from wastes, residues, non-food cellulosic material, and ligno-cellulosic material like ligno-cellulose based bioethanols, Fischer-Tropsch diesel and bio-dimethylether. Although conventional biofuels such as pure vegetable oil, biodiesel and ethanol are cheaper, as CO_2 reduction of second-generation biofuels are about the double of those of conventional ones, second-generation fuels have a far better cost-benefit ratio (see Jansen & Bakker, 2006).

Attention will be needed to ensure the **deployment**[16] of technologies to bring down costs – once these have come close to being competitive – while minimising the environmental impact.

Box 2. A European Strategic Energy Technology Plan (SET-Plan)

The SET-Plan was tabled by the European Commission on 22 November 2007. It aims at boosting a clean technology sector, currently characterised by high costs, market barriers and underinvestment. Its purpose is to accelerate the availability of energy technologies and at the same time to engage European industry in the process to help it gain world leadership in this sector. The aim of the SET-Plan is thus to turn technology opportunities into business realities by delivering a new joint strategic planning, a more effective implementation, an increase in resources and a new and reinforced approach to international cooperation. It focuses on key technologies to meet the 2020 targets but ventures beyond available technologies to achieve the 2050 vision towards complete decarbonisation. However, to maintain flexibility in technology development, targets contained in the plan are not binding. Also, the plan does not mention how the targets can be reached and how much it will cost to achieve them.

Source: COM(2007) 723: A European strategic energy technology plan (SET-Plan), 'Towards a low carbon future'.

4. For **oil**, the objective should be to maintain or increase market flexibility both in the EU and globally (e.g. by increasing spare oil production capacity), liquidity (e.g. by preventing oil resources to be excluded from the global market) and diversity (e.g. develop unconventional oil), essentially to reduce transaction costs by improving the functioning of markets.
5. For **natural gas**, the objective should be to improve the functioning of the internal gas market, notably by increasing liquidity both for piped gas and LNG. Liquidity of the market presupposes that it remains attractive for producers to deliver sufficient volumes to the EU and the right incentives for infrastructure investment are in place. In addition, existing bodies such as the Gas Coordination Group could be used to identify possible measures to cope with possible supply

[16] See the presentation of A. Stouge at the CEPS Task Force meeting on 8 November 2006 (Stouge, 2006).

disruptions, including better coordination or harmonisation of national regulations on gas supply and on gas stocks.

6. For the **electricity** sector, continuity and reliability will be enhanced by a more harmonised or even unified management of the European grid, more investment in generation and grids and improved cooperation between transmission system operators (TSOs). These measures, in particular, are a key to foster the regional markets and ultimately European energy markets integration.

The above measures constitute the existing 'EU consensus' of no-regret options to address EU energy policy objectives. Too often, however, such no-regret options fail due to policy inertia, expediency or simply lack of interest. To avoid such failure in the future, the European Commission in its role as Guardian of the Treaties could be given special responsibility for tracking member states and EU progress towards the implementation of these measures.

Röller et al. (2006) show that member states' energy policies remain largely determined by exogenous factors such as availability of domestic resources and geography. Member states have very different starting points, facing different energy challenges. Against such a background of heterogeneity, identifying the 'European added-value' beyond the above consensus will be difficult. On the other hand, if an energy policy for Europe attempts to go beyond the 'lowest common denominator', i.e. the policies and measures that all member states agree with, such a policy will need to submit member states to the test on whether domestic energy policies meet "agreed EU policy objectives".

There are additional possible measures at EU or member state level available to further increase the robustness of the EU energy sector and have a generally positive cost-benefit ratio from an overall social perspective, including cost-efficiency, climate change, other environmental impacts and security of supply. They include public financial support for electricity interconnectors or gas pipelines,[17] common approaches to LNG or gas storage taking into account security of supply, investment in additional supply including renewables, biofuels or nuclear and EU-wide crisis or solidarity measures in case of supply disruption.[18]

3.3 Policy integration

Solving the triple challenge of securing energy supplies, sustainability and competitiveness requires more than just pasting together a number of largely isolated sector-specific policies. Lumping together disconnected policies risks producing a sub-optimal outcome that overlooks the interaction between policies. The recent energy and climate change package of the European Commission, tabled on 23 January 2008, marks a first step to develop an integrated approach towards an EU energy policy.

To date, there are various instruments available to ensure coherence. At the level of the European Commission, they include notably inter-service consultations and integrated impact assessments (IIAs) for all major policy initiatives. Also at Council level, there is a drive towards more policy coherence. As to the effectiveness of these tools, much depends on how they are applied. Efforts are made in both the European Commission and by the Council Secretariat, but initiatives for better coherence have not been without difficulties (e.g. see Renda, 2006; Egenhofer et al., 2006).

There have been examples for integrated approaches. These include the Auto-Oil programme, the European Climate Change Programme and the recent European Commission proposal to tackle CO_2 emissions from cars. Each of these initiatives has constituted considerable effort in terms of scientific input and stakeholder contribution. The Strategic EU Energy Review should draw lessons as to the importance of data, analysis and stakeholder involvement.

Equally important is coherence between EU and member state actions. Given the limited EU competencies on energy policy, member

[17] The provisions of the Lisbon Treaty add an extra aim "to promote the interconnection of energy networks" as well as stating that energy policy should be carried out in a "spirit of solidarity" among member states.

[18] For example, the CPB (2004) has identified the following measures with a positive cost-benefit ratio: extending the size of strategic oil stocks, subsidising biomass in the transport and chemicals sectors, conserving the Groningen gas field, encouraging investments in wind turbines, coal-fired plants or nuclear power replacing gas-fired plants, better incentives for power generation reserve capacity and changes in the regulator of electricity networks. The recent CEPS/ECN study (Egenhofer et al., 2006) has identified, among others, CHP, IGCC, second-generation biomass and technology support as measures with a positive cost-benefit ratio.

states enjoy considerable discretion in this area and it is far from evident that national energy policy initiatives, notably in the area of security of supply are beneficial to the EU as a whole. Examples include the planned 'Nord Stream' and 'South Stream' gas pipelines, some recent equity investment of Gazprom in member states, the lack of a credible renewables strategy or the phasing out of nuclear power without a credible policy to substitute for it. This raises the question of whether future Strategic EU Energy Reviews should include a systematic assessment of EU impacts of national energy policies and measures.

4. THE CONCEPT OF ROBUSTNESS OF EU ENERGY POLICY

If we follow the European Commission's and the IEA's analysis that energy supplies may become more risky than in the past, the EU would be well advised to put in place a robust domestic system to 'insure' against supply and other energy policy risks. The idea therefore would be to develop an EU policy framework that is both **effective** in achieving EU long-term objectives and sufficiently **robust** to deal with risks. Such a framework would best stress predictability, flexibility, coherence and cost-efficiency, in addition to – if warranted – built-in solidarity or crisis mechanisms. The CEPS Task Force attempted to develop a number of EU energy policy indicators to express robustness of member state and EU energy policies.

Röller et al. (2007) have developed a relatively simple so-called 'energy policy index' (EPI) to assess the performance of member states against the EU's energy policy objectives of competitiveness, security of supply and sustainability (see Table 1). The initial finding is that heterogeneity prevails, mainly due to different exogenous factors, such as geographical location, availability of domestic resources and political preferences. The study finds five different groups of countries, suggesting that there are no clear correlations between scores of the three different energy policy objectives. Hence, member states start at very different starting points, facing different energy challenges.

Table 1. Energy policy index (EPI)

Country		Competitiveness	Security of supply	Environment sustainability
Austria	AT	2.7	3.0	3.7
Belgium	BE	2.0	1.2	1.8
Cyprus	CY	0.5	0.0	2.0
Czech Republic	CZ	2.8	3.1	2.8
Germany	DE	1.9	2.5	3.0
Denmark	DK	3.6	4.0	3.4
Estonia	EE	1.2	3.2	3.3
Spain	ES	1.9	1.9	2.4
Finland	FI	1.5	2.0	4.8
France	FR	0.8	2.6	3.8
Greece	GR	0.8	2.5	2.8
Hungary	HU	2.9	2.1	3.2
Ireland	IE	1.1	0.8	2.4
Italy	IT	2.4	1.9	2.7
Lithuania	LT	3.5	2.4	4.1
Luxembourg	LU	3.9	3.0	2.5
Latvia	LV	2.6	1.5	5.3
Malta	MT	0.0	0.0	1.3
Netherlands	NL	2.6	2.7	3.2
Poland	PL	1.8	4.6	2.6
Portugal	PT	2.3	1.5	3.3
Sweden	SE	2.3	2.7	5.0
Slovenia	SI	4.1	1.9	3.9
Slovakia	SK	2.5	1.7	3.0
United Kingdom	UK	2.9	3.5	3.1

Note: The higher the value of a specific indicator (0 to 6), the better the performance in terms of the criteria defined in the EPI.

Source: Röller et al. (2007).

4.1 Principal EU energy policy risks

There is a long literature on security of supply risks. Based on the International Energy Agency (IEA, 1995), the literature traditionally distinguishes between short-term and long-term risks (see Stern, 2002 and

Luciani, 2004). Short-term risks are generally associated with supply shortages because of accidents, terrorist attacks, extreme weather conditions or technical failure of the grid. This is sometimes described as 'operational security' or 'systems security'. Long-term security is associated with the long-term adequacy of supply, the infrastructure for delivering this supply to markets and a framework to create strategic security against major risks (such as non-delivery for political, economic, *force majeure* or other reasons). The European Commission's 2000 Green Paper on security of supply has identified four risk categories: technical, economic, political and environmental risks.[19]

By thus expanding the narrow concept of security of supply, we can develop a number of EU energy policy indicators to be used as a basis for assessing robustness of member state and EU energy policies. The starting point is the identification of relevant risks. We have identified six:

1. *Import dependence* on producer and transit countries;
2. *Investment risk*, including investments within the EU internal market (e.g. in infrastructure or reserve capacity) and beyond (e.g. in non-EU transportation infrastructure or upstream investment in supplier countries);
3. *Environmental risks* from climate change, regional/local pollution or contamination due to accidents;
4. *Regulatory and political risks* due to inefficient or failed regulation or local market disruptions due to pressure group actions (e.g. opposition against new investment, fuel price protests, etc.);
5. *Risks* associated mainly with *market failure* (e.g. excessive concentration of market power or failure of financial markets); and
6. *Excessive energy prices*, which can originate from any of the above risks or a combination thereof.

[19] *Technical risks* include systems failure due to weather, lack of capital investment or generally bad conditions of the energy system. *Economic risks* cover mainly imbalances between demand and supply due to a lack of investment or insufficient contracting. *Political risks* outline potential government policies to suspend deliveries due to deliberate policies or war or civil strife or as a result of failed regulation, which is referred to as regulatory risk. *Environmental risks* describe the potential damage from accidents (oil spills, nuclear accidents) or pollution, including pollution whose effects are less tangible or predictable (e.g. greenhouse gas emissions).

Risks can be further distinguished and grouped in sub-categories as shown in Annex 1. For the purposes of this report, a general categorisation will suffice (e.g. Egenhofer, 2007a).

4.2 Robustness indicators

The assumption is that in order to cope with the risks associated with EU energy policy objectives – competitiveness, security of supply and climate change – both member state and EU energy policies need to match a number of 'robustness indicators'. The CEPS Task Force has identified the following 10 robustness indicators:

1. Share of biggest irreplaceable single *import* source (taking substitution possibilities into account);
2. Share of biggest irreplaceable single *energy* source (taking substitution possibilities into account);
3. Progress towards different EU and national policy targets (e.g. GHG emissions reductions, renewables, energy efficiency and conservation targets);
4. Energy intensity in absolute terms (corrected by climate and other factors) and improvement over time for the economy/domestic sectors;
5. Reserve and excess capacity in generation, interconnections, transportation of natural gas, gasification terminals, gas storage, etc.;
6. Internal market indicators (e.g. relative competition for final consumers, choice of transportation or competition between fuels);
7. A degree of protection of vulnerable consumers against supply disruptions;
8. A set (i.e. reasonable) degree of solidarity measures (excluding for example structural imports);
9. Public and private energy R&D spending; and
10. Tolerable impact of EU-induced energy price increases for EU industry subject to global competition.

While the above-mentioned 'robustness indicators' will need considerable methodological refinement as well as suitable data to become useful, they could become a valuable tool for the European Commission to track performance of individual member states and the EU as a whole or to evaluate the degree to which energy policy objectives are integrated. Such an assessment of member state and EU progress is politically very

sensitive, as it will affect member state autonomy. However, a meaningful EU energy policy beyond the status quo – especially in the light of the Lisbon Treaty – will require member states to accept some sort of benchmarking.

4.3 Data requirements

The development of European energy indicators requires considerable improvement in the collection and interpretation of data and information, both at EU and member state level. There are economies of scale for collection and interpretation of information and data at the European level, as testified to by the existence of EU bodies such as the EEA, Eurostat or the proposed Office of the Energy Observatory. While ample energy and climate data on energy demand, supply or investment needs are available within the EU, the International Energy Agency or other international institutions, such data are not necessarily geared towards EU-level policy-making. The collection of key economic data, e.g. on future investment or infrastructure such as grids, pipelines and LNG or storage facilities, will not only facilitate decision-making but also increase transparency.

5. Speaking with One Voice: The Role of the EU's External Policy

One of the recurring themes of the EU integrated climate and energy package is the alleged need for Europe to speak with one voice. Implicitly, this includes coherence between internal and external policies. As early as March 2006, the Green Paper (European Commission, 2006a) identified a "coherent external energy policy" as one of the six EU energy policy pillars.[20] The Green Paper has taken a procedural approach and is putting its faith in the Strategic EU Energy Review to serve as the basis for establishing a common EU vision, which will gradually become a common external voice. In addition, the European Commission had listed an ambitious catalogue of themes for this "common external policy" including amongst others, a *clear policy on securing and diversifying energy supplies* and *reacting effectively to external crisis situations*, in addition to more predictable suggestions such as entering into energy partnerships with producers, transit countries and other international actors, integrating energy into other policies with an external dimension, and using energy to promote development. An important step has been the June 2006 European Council decision to adopt the proposed legal framework for the external energy policy on the basis of the joint paper by the European Commission and the High Representative. Amongst others, this decision foresees the creation of a network of energy correspondents (consisting of representatives by member states and the General Secretariats of both the Commission and the Council) to set up an early-warning system and to

[20] The energy challenges facing Europe need a coherent external policy to enable Europe to play a more effective international role in tackling common problems with energy partners worldwide (European Commission, 2006a).

improve the reaction in case of a crisis. The 2007 Spring European Council finally agreed on an action plan for international energy policy,[21] essentially aiming at better coordination and coherence. A further politicisation of energy issues has also been suggested in a recent report adopted by the European Parliament (2007), which proposes the creation of a post for a High Official of Foreign Energy Policy. Other measures to increase security of supply include the Energy Charter Treaty to be the cornerstone of a common European foreign policy on energy, the creation of a solidarity mechanism to deal with disruptions of supply or infrastructure damage, as well as diversification and increased energy efficiency.

5.1 Preconditions

Although the concept of 'speaking with one voice' expresses the potential *added-value* of the EU presenting a harmonised external position, it faces the dilemma that EU member states pursue different national policies and interests stemming from their heterogeneity and the different starting

[21] The focus is on speeding-up the development of a common approach to external energy policy, involving consumer-to-producer as well as consumer-to-consumer and consumer-to-transit countries, dialogues and partnerships, involving organisations such as OPEC. More concretely, the European Council has formulated the following objectives: i) negotiating and finalising a post-partnership and cooperation agreement with Russia in particular relating to energy issues; ii) intensifying the EU relationship with Central Asia, the Caspian and the Black Sea regions, with a view to further diversifying sources and routes; iii) strengthening partnership and cooperation, building on the bilateral energy dialogues with the US as well as with China, India, Brazil and other emerging economies, focusing on the reduction of GHG emissions, energy efficiency, renewables and low-emissions energy technologies, notably carbon capture and storage (CCS); iv) ensuring the implementation of the Energy Community Treaty, with a view to its further development and possible extension to Norway, Turkey, Ukraine and Moldova; v) making full use of the instruments available under the European Neighbourhood Policy; vi) enhancing energy relationships with Algeria, Egypt and other producing countries in the Mashreq/Maghreb region; vii) building a special dialogue with African countries on energy and using Community instruments to enhance in particular decentralised renewable energies and generally energy accessibility and sustainability in this region, as well as energy infrastructure of common interest; and xiii) promoting access to energy in the context of the UN Commission on Sustainable Development (UNCSD).

points discussed above, such as the degree of energy market liberalisation, differences in the energy mix or levels of diversification, geographical location or even differences in foreign policy objectives.[22]

As a result, the *added-value* for the EU external energy policy has yet to be convincingly defined based on economic and political realities. Nevertheless, there seems to be a consensus on two broad strategies: i) the widening of EU energy markets combined with the reinforcement of energy partnerships with a view to improving the functioning of world markets in energy, and ii) the diversification of energy supplies by source, geographical origin and transit route.[23] The principal EU role therefore will be to improve the basic conditions under which companies and member state policies operate.[24] The European Commission's announcement of its intention to include "major energy chapters in its relations with neighbouring countries" as well as to put energy issues on the agenda of every summit with third countries is an important step towards an increasingly common external energy policy. From an EU perspective, key issues will be energy efficiency (as this reduces global demand and GHG emissions), investment in production and infrastructure (to increase competition and ensure adequate supply), market access (for European and international energy companies) and climate change policies (to reduce global greenhouse gas emissions) as well as other environmental and safety issues, especially in regard to nuclear energy.

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22 For example, there are very different views across the EU on how to deal with Russia.

23 See Paper by the European Commission and the Council Secretary General/High Representative in the summer 2006, and the European Commission's contribution to the Lahti European Council (European Commission, 2006f).

24 Promotion of principles of the internal energy market in bilateral and multilateral fora, combined with improved interconnections are likely to work as long as the EU's partners see benefits from this. This can be expected to work within the context of relations within the EEA, the EU neighbourhood countries, other associated countries and within international organisations such as IEA or the Energy Charter Treaty. It will be more difficult to influence the behaviour of some key supplier countries where EU leverage is limited. It would be an illusion to believe that the EU can induce them to change their behaviour – often against their interests. Trying to force Russia to sign the Energy Charter Treaty is just such an example.

As a first step, an EU-wide consensus will need to be found, followed by the integration of external energy policy into other policies. Again, the onus will be mainly on the European Commission to ensure coherence and continuity, although Council cooperation in coherence matters has been found important but difficult to obtain (Egenhofer et al., 2006). This will however mean that only those issues on which a consensus exists will be brought to the agenda of summits with third countries. This will probably fall considerably short of assisting oil and gas companies operating in Europe to obtain access to reserves by lending diplomatic weight to EU investors. Such support is likely to be continued by member state governments to companies of national parentage in the absence of a truly integrated EU-wide internal market and a common foreign policy.

5.2 Outlook

There has been institutional progress through the creation of the network of energy correspondents to strengthen the early-warning capacity and coordination to an extent. Further impacts can be expected of the Lisbon Treaty, which retains the article on energy policy introduced by the draft Constitutional Treaty (see Box 1). It can be expected that the 'solidarity clause' will lead to some more concrete measures. In addition, the creation of an EU energy policy competence will offer the possibility to better coordinate action within the Council Secretariat.

If EU member states agreed that 'speaking with one voice' is an objective to pursue, the EU – possibly through the European Commission – should be given some mechanism to assess potential impacts of national *external* energy and security of supply policies for the EU, its internal market and other member states. This could increase transparency of and awareness for the impact of member state policies on the EU and its member states.

The added-value of a High Official for Foreign Energy Policy ('Mr Energy'), as recently proposed by the European Parliament (2007) and some member states, is doubtful. Responsible for coordinating all policies under the scope of the common European foreign policy on energy, such an EU representative would merely duplicate available capacity to represent European interests (or future common positions) to third parties through the Commission or the EU Presidency. Improved coordination can be achieved within the current institutional set-up or at least after the Lisbon Treaty is in place. Improving the current structure would also avoid creating a new bureaucracy and the potential fighting for competence.

6. WHAT PRICE TO PAY FOR ENERGY SECURITY AND SUSTAINABILITY?

In recent decades, energy was abundantly available and at low prices. This situation has changed. Various trends have transformed the global energy market from one favourable to consumers to a sellers' market. With EU domestic reserves rapidly decreasing and tight production capacity, future energy security may require paying a premium. This would also square with analysis by the International Energy Agency (IEA), showing that there are sufficient - but more costly - recoverable resources of fossil fuels, such as deep-water, super-deep and arctic oil, enhanced oil recovery, heavy oil bitumen, oil-shale, and gas or coal to liquids - to cover global demand at or below current oil prices, even if CO_2 costs are included (Pflüger, 2006; IEA, 2006b). At present levels of production and demand, proven reserves far exceed annual demand.[25] In addition, there are renewable, nuclear and clean coal options. IEA analysis also indicates that price increases affect demand; the oil price shocks in the 1970s and 1980s triggered a major demand effect in the form of considerable energy efficiency improvements, the effect stretching over a decade. Similar developments can be observed since the latest oil price rises (Gros et al., 2006). In terms of sustainability, the main challenge will be to deal with considerable costs related to the mitigation of and adaptation to climate change.[26]

[25] For instance, the IEA (2006c) estimates that the world reserve base of coal will last for close to 170 years, if the total 2004 proved recoverable reserves are divided by the total production of coal in 2005.

[26] UNFCCC (2007) estimates that an additional $248-381 billion (2005 USD) would be required in the year 2030 to return global GHG emissions to the level of 2004.

Theoretically, achieving both energy policy and climate change objectives could be achieved by true internalisation of external costs. However internalisation of externalities is not a straightforward matter and is fraught with methodological and data issues. In addition, internalisation is not an automatic guarantee for environmental sustainability or security of supply due to market and non-market barriers.

6.1 The cost of security of supply

It is generally assumed that the market price reflects the security premium, assuming that energy supply companies internalise security of supply concerns to a large extent with government regulation doing the rest. Market prices would then reflect all relevant information; at least concerning the public-domain.[27] This view, however, is not shared universally. Market participants tend to give more weight to short-term rather than long-term aspects. Short-term aspects in the oil and gas market are interrelated boom-bust upstream and downstream investment cycles on the one hand and strongly bullish and bearish price expectations on the other. It has therefore been argued that *long-term* energy security risks from a societal point of view may not be adequately factored in prevailing gas and oil prices. The principal reasons are the increasing market power of key oil and gas exporting countries and their possibility to exert windfall rents, political instability and political risks but also uncertainty about the actual rate of depletion of ultimately recoverable oil and gas reserves throughout the world.

Various approaches have been used to assess the external costs of security of supply. Some studies (see Constantini & Gracceva, 2004 for an overview), e.g. by DRI and the US Department of Energy (DoE), have concentrated on GDP losses in the event of a supply crisis, which usually translates into higher oil prices.[28] However, there is no clear correlation

[27] It is argued that currently high oil prices reflect a 'risk premium' expressing the political risks associated with a number of key supplier countries.

[28] Constantini & Gracceva (2004) find that the estimates of price increases per barrel due to supply disruptions range from $1.50-$2 for the DRI model to $3.50-$4 for the DoE model, in the event of a sudden cut of oil production of 1mb/d within about three months, assuming oil prices in the $15-20 range. They also find that in 2002, the European Commission estimated that an increase of $10 per barrel of oil is likely to reduce economic growth in industrialised countries by 0.5%. Ogden et

between initial losses and resulting oil price increases because during past supply disruptions, losses were in most cases offset by production increases elsewhere. Other studies, mainly concerned with electricity supply disruptions have attempted to identify the social costs of an electricity supply disruption. Analysis has shown that this value is highly dependent on the quality and composition of various factors, such as population density, duration and continuity, the time of the disruption, the season or the availability and timing of advance warning (Constantini & Gracceva, 2004). ECN have used risk premiums to express security of supply risks (see Jansen & Bakker, 2006). OXERA (2003) has assessed the non-market value of generation technologies such as wind and nuclear, to identify the security of supply premium for different technologies. Finally, a study by the CPB Netherlands Bureau for Economic Policy Analysis (2004) has found that measures to reduce the costs of disturbances on energy markets are generally smaller than costs of measures directed at preventing or mitigating consequences of those disturbances.

6.2 Climate change: More than just a carbon price

Two market failures are generally referred to in the context of climate change.[29] First and foremost, the cost of global warming is not borne directly by GHG emitters, leading to fossil-fuel prices that are 'too cheap' and, as a consequence, to excessive levels of GHG emissions. Second, there are market deficiencies related to the development and adoption of new technologies.[30] Due to *'knowledge spillovers'*, innovating firms cannot keep other firms from benefiting from new knowledge and, therefore, cannot capture all the benefits of innovation for themselves. Also, there are *'adoption spillovers'*, which describe the fact that the cost or value of a new technology to one user may depend on how many other users have adopted the technology. Furthermore, market shortcomings arise due to

al. (2004) argue that military expenses to safeguard access to Middle East oil can be used to make a conservative estimate of energy security external cost. They come to $15-$44 per barrel for the US.

[29] This section draws on the summary in de Coninck et al. (2007).

[30] These technology market problems are not as relevant for environmental problems addressed over the course of years as they are for climate policy developing over decades or centuries and requiring much more dramatic changes in technology (see Jaffe et al., 2005, for an overview).

incomplete information. While all investment is characterised by uncertainty, the uncertainty associated with the returns to investment in innovation is often particularly large. Finally, *incomplete information* can be a barrier, for example, when a builder or landlord chooses the level of investment in energy efficiency in a building but the energy bills are paid by a successive owner or a tenant. Hence, the economist's policy prescription to 'put a price' on GHG emissions, thereby forcing individuals and firms to internalise the cost that they are placing on everyone else when they emit GHGs, does not always work.

In all likelihood, the price mechanism will need to be complemented by other measures, such as:

- **Supporting the introduction of new, promising energy-production technologies.** For example, in the case of wind energy, the IEA estimates that each doubling of capacity can lower the costs by 18-20%.[31] Such 'learning curves' differ for different technologies, mainly depending on their maturity. Nevertheless, learning curves have a considerable impact in reducing the cost of GHG mitigation policies in the future. Although present emissions reductions may be relatively modest, certain technologies may contribute significantly to GHG emissions reduction in the future. However, technologies that are far from being competitive should be supported by traditional R&D funding.
- Similarly important is support of long-term **R&D for yet unknown breakthrough technologies.** Markets generally do not provide sufficient incentives for R&D for technologies with a very long time horizon and/or uncertain outcome. Public support will be needed.
- **Investments in energy efficiency** tend to yield benefits in terms of security of supply, climate change and competitiveness, whether they improve insulation or make the choice of efficient appliances or fuels more enticing.[32] Yet, such investments are often not made because of numerous market and non-market barriers, especially in the domestic and small business sectors. Energy efficiency investments have the

[31] See Pflüger (2006).

[32] For example, a recent CEPS/ECN study on a cost-benefit analysis of different climate change options suggests that the level of household expenditure for energy efficiency is lower than justified by net private and social benefits (Egenhofer et al., 2006).

additional value of reducing the total energy bill of households or firms. The latter is particularly important as new energy technologies or policies to combat climate change are expected to increase both wholesale and retail energy prices. More efficient use of energy will be critical as a possible compensation for higher-unit energy costs to keep overall energy expenditure stable.

7. MARKET-BASED POLICY INSTRUMENTS AND TARGETS: HOW, WHY AND WHEN?

A central part of the integrated EU climate and energy policy is to push climate-friendly technologies both to reduce GHG and to foster technological development. At the same time, the EU's commitment to a unilateral approach has increased fears of reduced global competitiveness. The EU emissions trading scheme (ETS) and targets are thus in the focus of the debate, which is also reflected in this Task Force Report.

7.1 The EU ETS

Although the EU ETS has principally been implemented as an instrument to achieve climate change objectives, it can also be seen as a first major attempt at the EU level to internalise an environmental externality (i.e. CO_2 emissions). In theory, under the ETS, the market price of carbon is driven by a combination of the marginal abatement costs of all controlled sources and the emissions cap, thereby ensuring that the environmental objective is achieved at the least cost, thereby minimising the impact on competitiveness. The resulting market price was expected to create long-term predictability, which is critical for spurring investment, while offering flexibility to companies to choose the most cost-effective compliance strategy.

The basic idea of the ETS, i.e. the introduction of a tradable permit system for major fixed installations and the power sector, is generally accepted by most stakeholders in the EU. Stakeholders also agree that the