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Directed by **Elvire Fabry,** Notre Europe

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– Connie Hedegaard said she was determined to ensure that one of the EU's CCS demonstration plants should be in Denmark.

After Denmark comes Cyprus, which has no clear interest in CCS (its electricity comes from oil. CCS could and should be used at oil refineries and oil power stations, but the Cypriot government sees other issues as being more important). So in the second half of 2012, progress on CCS will be largely down to the Commission and Council President Herman van Rompuy.

Money for CCS will be hard to protect, given the economic circumstances and the high-level political arguments about the EU budget. The most sensible way to get more money available for CCS would be to stop giving public money to dirty coal. Member States should transfer all remaining subsidies to the coal sector to CCS programmes and the loan that the EIB has given Slovenia to build a new coal power station, without CCS, should be cancelled.

SMART AND SUSTAINABLE GROWTH

Policy Options to Improve the Security of European Energy Supplies: Results from the SECURE Project[1]

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The SECURE context

The SECURE project (Security of Energy Considering its Uncertainty, Risk and Economic implications)[2] analysed the risks associated with the supply of various energy sources in the European Union (EU) in order to come up with concrete policy proposals for their mitigation. It was funded by the European Commission under the Seventh Framework Programme. A key conclusion of the project was that security of supply and climate change cannot be considered separately and that there are clear synergies between strong climate action and energy security policies.

Oil

The functioning of markets is a key determinant of energy security. While geopolitical and other threats to physical supply may cause price shocks, they are – based on historical experience — unlikely to cause any significant physical shortage. Price volatility is in many ways more important and more devastating than potential threats to physical supplies because related costs are much higher than the potential costs of supply disruptions. The root cause of price volatility is the rigidity of demand and supply in the short-term. Unfortunately,

1. This paper presents research results from all members of the SECURE consortium, including Obervatoire Méditerranéen de l'Energie (OME), Fondazione Eni Enrico Mattei (FEEM), Romboll Oil & Gas, Lithuanian Energy Institute (LEI), Fraunhofer Institute for System and Innovation Research, Joint Research Centre (JRC), Technische Universität Dresden (TUD), Paul Scherrer Institut (PSI), Ricerca sul Sistema Energetico (RSE), Energy Research Institute of Russian Academy of Sciences (ERI RAS), University of Bath, Gulf Research Centre Foundation (GRCF), Centre for European Policy Studies (CEPS), Vienna University of Technology (TU-Wien), and Centre National de la Recherche Scientifique (LEPII).
2. See also: www.secure-ec.eu

however, this phenomenon cannot be easily addressed. The SECURE project has reviewed several approaches:

- Freer trade of major crude oil streams, notably those from the Gulf.
- Accumulation of larger (industry) stocks, by establishing a public agency to invest in larger storage facilities (to be used by oil producers at low cost), for example.
- Improved price finding mechanisms (forward pricing rather than spot, flexible and adjustable price band, increased trading in real oil barrels rather than future paper contracts, etc.).
- Increased demand security through take-or-pay contracts.
- Vertical integration with direct access of producing companies to the final costumer.

None of these approaches is sufficient to stabilise prices, but collectively they may succeed in reducing the extreme volatility observed since 2004.

Another key SECURE recommendation is related to climate policies. Ambitious targets aimed at decarbonisation and energy efficiency may lead oil (and gas) producing countries to reduce investments in expanding or maintaining capacity for fears of demand destruction. This can pose a risk to long-term EU supplies in case climate and energy targets are not met. Hence, it is recommended not to pursue policy objectives that cannot realistically be reached, but to emphasise cooperation with exporters and pragmatism.

In addition, the EU should aim at mitigating the danger of closure of critical sea lanes, first and foremost of the Strait of Hormuz. Although such a closure is not easily accomplished, the recommendation (mainly for producing countries) is to maintain readiness to reorient oil flows as required. At the same time, the EU should aim at mitigating the danger of closure of other critical sea lanes, which might be caused by navigation accidents through congested passages, the most critical situation being that of the Turkish Straits. An option would be to seek a revision of the Montreux Convention of 1936, to allow for the imposition of size limitations and passage charges on tankers, to discourage free riding and create conditions for the commercial development of pipeline by-passes. The EU should aim to facilitate investment in infrastructure adapted to reduce the danger of accidents and vulnerability, by offering financial incentives and promoting even more stringent regulations for oil and chemical tankers.

Natural gas

Security of demand and security of supply are complementary issues in ensuring an overall balance in the security of natural gas supply in the EU. Security of demand requires the EU to provide clearer signals regarding future gas demand to avoid underinverstment in exporting countries. Therefore, the EU should develop gas demand forecasts based on the amalgamation of energy policies and individual national plans.

National and regional differences imply that overall EU security of supply policy will need to allow for adjustments of measures and policies to specific regional circumstances. The Baltic Energy Market Interconnection Plan (BEMIP) could serve as a role model for such a regional focus.

The importance of a functioning internal market cannot be overstressed in terms of security of supply. However, markets alone will not solve the current issues of low security of supply in some countries, especially where markets are poorly developed (in Baltic countries, for example). Thus increasing security of gas supplies in these regions is likely to be dependent on government intervention and / or EU regulation. Further regional diversification can be ensured by reverse flow and interconnections, as well as new supply routes, both pipelines and Liquefied Natural Gas (LNG). Demand flexibility should be studied further regarding its ability to mitigate security of supply issues in the EU. The development and strengthening of early warning and crisis prevention mechanisms at the EU level, as well as the implementation of regional emergency plans, should be encouraged.

Regarding transit risks, the possibility of an independent transmissions operator in the Ukraine composed of Ukrainian, EU and Russian operators should be evaluated. Such cooperation would reduce the chances of bilateral disputes affecting gas supply and ensure the much needed investments in Ukrainian transmission infrastructure.

As regards unconventional gas, an accurate survey of recoverable resources in Europe should be produced in order to evaluate its potential impact on supply security. In addition, legislation should be streamlined and reviewed in order to close legislative gaps and to accompany any potential future development in this area.

With the relevance of traditional suppliers, such as Norway and Algeria, about to decline in the medium term, Europe needs to commit to robust policies with those export partners that are expected to play a more important role in European gas supply after 2030 (i.e. Russia, the Caspian region and the Middle East), focusing on pragmatism, partnership and commitment.

Coal

Due to the fact that virtually all major exporters of coal can be considered reliable in the long-term, the real issue for European steam coal supply security is the absence of an economically and politically sustainable use of coal due to obstacles in the implementation of Carbon Capture, Transport and Storage (CCTS) technologies. The SECURE project concluded that there is a risk that coal will no longer be an essential element of European energy supply in the future because there is justified concern that CCTS roll-out will be delayed or never carried out. In Europe, the economic use of coal in the power sector and in industry could be

threatened and its substitution may pose considerable challenges, especially in industrial processes. In the light of recent developments, SECURE came up with the following policy recommendations:

- The potential contribution of CCTS to decarbonising the European electricity sector should be reconsidered given new data on CCTS costs, a better understanding of the complexity of the process chain and the lowered CO_2 storage potential.
- The EU should keep technology options open and avoid premature intellectual property appropriation. EU co-funded projects should make new knowledge widely available and promote competition between projects in order to facilitate technical progress.
- The huge and readily available funds for CCTS should be rapidly deployed. Where industry does not respond, the legal and regulatory framework should be readjusted and the level of incentives should be raised [for example, through a credible carbon dioxide (CO_2) price path].
- The strong focus on implementing CCTS in the power sector should be extended to industry, which can be highly vulnerable to an abandonment of coal.
- Early planning of transport routes (along existing networks, for example) is essential, should large-scale CCTS deployment ever become reality.
- Future regulation should specify the allocation and financing principles, as well as access for third parties. Sufficient incentives for the private sector to manage the network development are unlikely, given the political, regulatory, technical, and economic uncertainties.
- If Europe fails to become a CCTS pioneer, new strategies for the global roll-out of CCTS are needed (for example, via the inclusion of CCTS in the Clean Development Mechanism).

Nuclear

The sensitive issues for nuclear energy include risk aversion towards very low probability accidents with very severe consequences, the necessity to assure safe storage of relatively small volumes of radioactive waste over an extremely long period of time and the possibility of nuclear proliferation. These aspects strongly influence the public opinion and consequently also the social acceptability of nuclear power.

In the EU, the often announced nuclear renaissance is having a difficult birth. According to International Energy Agency (IEA) and European Commission energy scenarios, EU nuclear share may halve between now and 2030. Because nuclear is presently providing almost two thirds of all low-carbon electricity in the EU, this will make the achievement of EU climate objectives more difficult.

Nuclear energy is a divisive issue in the EU, but those countries that wish to proceed with it will need to address the following points:

- Promote public debates on nuclear safety, energy security of supply and climate change issues thus providing a balanced perspective on nuclear and other energy supply options.
- Assure that legal, regulatory conditions for nuclear energy are clear and stable.
- Promote human capital building.
- Implement the planned waste repositories to demonstrate practically their feasibility.
- Explore regional centres for high-level waste disposal.
- Create a level playing field for low-carbon technologies via an effective EU-wide emission trading system and/or carbon tax.

The highest safety standards must be strictly applied to nuclear reactors and all other elements of the associated infrastructure: conversion, enrichment, fuel fabrication, spent fuel storage and reprocessing. The EU should use all its geopolitical weight to make sure that these rules are respected everywhere and to promote non-proliferation. In fact, as proven by recent incidents in Japan, a major nuclear accident anywhere in the world can have dramatic consequences on nuclear development in Europe.

Renewable energy sources

A high share of Renewable Energy Sources (RES) in the mid- to long-term cannot be reached without strong increases in all three sectors: renewable electricity (RES-E), heat (RES-H) and biofuels. While an extensive set of supporting mechanisms for RES-E, and to some extent for biofuels, exists, the currently limited and dispersed support for RES-H needs to be addressed in the future. Concerning biofuels, efforts should be directed to develop second generation biofuels, which have a better GHG emissions performance and reduce competition with food supplies and biodiversity.

The general approach should be to keep a level playing field among different technologies, so that most efficient solutions can emerge from market forces rather than being selected by policy makers. Present technological uncertainties suggests the need to maintain some public support to a wide range of technologies, at least until the relative merits of different solutions emerge on the basis of experience. Consequently, any future policy framework should consider providing technology-specific support to the various RES options. However, this policy should entail periodic reviews of the incentive schemes, in the light of a possible future phasing out.

The uneven distribution of RES potentials and costs emphasises the need for intensified cooperation between Member States. Suitable accompanying flexibility mechanisms can assist the achievement of national RES targets in an efficient and effective manner.

RES policies should be supported by strong energy efficiency policies to reduce energy demand and hence the amount of RES required, as well as associated costs to achieve the 20% RES target by 2020.

To face the challenges resulting from an increased share of variable wind electricity, several potential remedies may be applied:

- Improvement of the tools to forecast the variations of wind power outputs.
- Trading at the intra-day market platform would correct all imbalances (contrary to imbalance payments, which only apply for the net system imbalances).
- Although not all storage systems are yet economically competitive, they can facilitate the integration of fluctuating generation (for example: pumped-storage hydropower plants, hydro reservoirs, compressed air storage, flywheels, or batteries).
- By enabling intelligent monitoring and an improved control of supply and demand, smart grids can improve system reliability and the security of supply.
- Finally, the reinforcement and extension of the electricity grid represents a key option to integrate large amounts of fluctuating electricity into the electricity system.

Looking at the longer term, a beneficial political and regulatory framework promoting solar energy imports from North Africa should be created, including options for granting these projects priority status under EU infrastructure projects, as well as promoting the development and operation of European and trans-Mediterranean super-grids. Such super-grids would need a high level of redundancy or resilience, otherwise they may be easy targets for terrorist attacks.

Electricity

Regulatory certainty is key to ensuring (capital intensive) investments in the electricity sector. It is thus fundamental to guarantee investors some basic conditions under which they will have to operate, in order to let them correctly assess their risks.

In terms of electricity *generation*, meeting and monitoring an adequate level of capacity is essential. To this end, Transmission System Operators (TSOs) should determine how much cost-effective new generation capacity of the different types (base load, mid-merit, peak, for example) may be needed to meet the security standards, and also when and where it is needed. In case public authorities were to identify significant security problems, they could set up incentive / obligation schemes (through instruments such as tendering procedures, capacity payments, capacity markets, etc.) to induce investors to pursue the "optimal" development of the generation set outlined by TSOs. This process should best be coordinated and harmonised at the EU level (by the European Network of Transmission System Operators for Electricity – ENTSO-E and the Agency for Cooperation of Energy Regulators – ACER) to increase its effectiveness and to avoid market distortions.

As regards *transmission* of electricity, a significant increase of cross-border transmission capacity is highly desirable. To this aim (but also for developing national transmission lines), it is necessary:

- To pursue a more stable and harmonised regulatory framework at the European level under the control of ACER.
- To pursue more harmonised, efficient, clear and time-limited authorisation procedures at all administrative levels requiring the compliance with general framework guidelines.
- To gain social acceptance by clearly stating and quantifying the public benefits of the projects, especially from security of supply, sustainability and economic points of view.

In order to achieve more efficient system operation in the short-term and more optimised siting of new generators and loads in the long-term, regulation should also be designed to provide "locational signals", i.e. providing spatial (zonal / nodal) differentiation of electricity prices (related to maximum transfer capability constraints and losses along the lines) and of transmission charges (calculated on the basis of how much each agent uses the network).

As to the progressive transformation of *distribution* networks from "passive" to "active" and "intelligent" networks, cooperation among international, European and national standardisation bodies, regulatory authorities, grid operators, and manufacturers should be encouraged to further improve open communication protocols and standards for information management and data exchange, to achieve interoperability of smart grid devices and systems, and to get rid of technical barriers to their deployment. From a regulatory point of view, a key issue is how to support investments of distribution network companies in such innovative technologies in order to ensure that their deployment provides a cost-effective solution to the needs of network users. From this perspective, both incentive and minimum requirements regulation should be based on the quantification of the effects and benefits of such investments through appropriate indicators.

The demand dimension of energy security

In general, the promotion of greater end-use energy efficiency should be the priority of any energy policy. Since most actions in this field incur "negative" costs, they are more efficient than actions to support RES development and to reduce CO_2 emissions (such as CCTS). Demand response programmes should be encouraged, with a rapid and extensive deployment of enabling technologies, such as smart metering. Moreover, they should provide strong economic signals while being simple and userfriendly.

Although significant improvements in energy efficiency have been achieved in Western Europe, more fine-tuning and coordination among Member States is required in order to reap the potential benefits also in terms of energy security. This suggests that EU measures should have a binding character wherever effective. In this process, differences in the responsiveness of energy consuming sectors to efficiency policies should be taken into account: SECURE's analysis has highlighted, for instance, that mandatory standards for electrical

appliances seem to work better for the residential sector, whereas measures supporting information, education and training are more effective in the industrial sector.

Cross cutting measures, in particular those related to marked-based instruments, have the strongest influence both on energy security and energy efficiency. From this perspective, it is recommended to consider the development of white certificate market models at the EU-level.

The role of a public intervention aimed at curbing structural inefficiencies should be evaluated, not only in terms of financial support, but also in terms of creating a market with a clear and stable regulatory framework, in which Europe-wide standardisation will reduce the costs of adaptation to national markets.

Conclusions

The importance of energy security for Europe will need to be reflected in the upcoming Trio Presidency's agenda. This paper has given an overview of key strategies to increase the security of European energy systems. On the European level, the Trio Presidency should work closely with the European Commission to speed up progress on key issues. Those measures that remain in the hands of Member States can still be influenced by the Trio Presidency by means of discussing, coordinating and streamlining them.

Key issues to be addressed include the completion of the internal market, which – inter alia — requires regulatory policies to enhance interconnections in gas and electricity in order to foster competition. With regard to renewables, the Trio should facilitate the Europeanisation of technology neutral support schemes, while aiming for policies that can increase the share of RES in heating. Renewables and energy efficiency can only unfold their potential with the development of super grids and smart grids. Policies to support the modernisation of European electricity grids should thus be designed soon. As regards external energy policy, the Trio should continue to enhance cooperation with resource exporting countries, balancing security of supply with security of demand concerns in order to ensure an appropriate level of investments in production and transport facilities. It should also use its influence internationally to advocate measures to reduce the volatility of global oil markets. Finally, the slow implementation of CCTS needs to be addressed by setting the right incentives, including a credible CO_2 price path.

DEMOGRAPHIC CHALLENGES

Demographic Shock and Implicit Public Debt: Closing the Sustainability Gap

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The implicit public debt: General context and specific challenges

Implicit public debt (or liabilities, IPL) refers to uncovered future government expenditures grounded in promises to pay pensions, offer medical treatment to the insured, and to provide long-term care to the elderly. What if a nation's current and future spending on health, pensions and care for the elderly is not covered by the revenues of the health care, pension and long-term care insurance? There will be a revenue-expenditure gap, a sustainability gap. Adding up all gaps to infinity yields the total IPL. A consequence of this phenomenon is that the longer the debt service is postponed the higher the macroeconomic cost – the present value of the scheduled amortisation will decline, meaning that a larger amount of money (at present value) will be required. IPL also implies an intergenerational overlapping, which calls for intergenerational justice: a timid response to the IPL causes the burden to shift to the disadvantage of future generations.

Table 1 | Implicit public liabilities (IPL) as a percentage of 2009 GDP

Country	IPL	Country	IPL	Country	IPL
Luxembourg	860	Finland	300	France	120
Greece	575	Slovakia	290	Sweden	107
Slovenia	553	Spain	285	Italy	100
Cyprus	490	United Kingdom	240	Denmark	93
Romania	380	Germany	220	Latvia	50
Malta	370	Austria	207	Estonia	-10
Czech Republic	335	Lithuania	160	Poland	-120
Ireland	285	Bulgaria	150	EU-27	211
Netherlands	333	Hungary	150	€-Area	232
Belgium	320	Portugal	127		

Own calculations. Source: EU Commission; DG Research