

A Smart EU Energy Policy

Milan, September 28-29, 2009

Brainstorming Workshop

*Energy security of supply versus economic competitiveness and climate change:
The Strategic Energy Review and its consequences for
the Internal Energy Market design and the Green Package policies.*

Workshop organized by the Fondazione Eni Enrico Mattei in collaboration with the Clingendael International Energy Programme, the Loyola de Palacio Chair of the Robert Schuman Center for Advanced Studies – European University Institute, and Wilton Park Conferences.

Summary and Conclusions

by

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The Smart EU Energy Policy project: a four workshops and a four tier project

The EU Energy Policy is based on a vision with three components. The policy is aiming for “markets, competition and efficiency”, for a “sustainable energy economy”, and for “secure energy supplies”.

The “Smart EU Energy Policy” workshops look at the European energy package from three angles, investigating possible inconsistencies and developing proposals to increase effectiveness.

The program consists of four workshops where academics will discuss the various interactions between the three policy objectives with stakeholders from governments, regulators and the industry. The objective of the program is to come with a set of “smart” conclusions and recommendations in order to contribute to the 2010 EU policy review.

The first workshop has been organized in April 2009 in Florence by the Loyola de Palacio Programme of the European University Institute and considered integration from the competition viewpoint. The second workshop was organized in June 2009 in The Hague by the Clingendael International Energy Programme and looked from sustainability to the other aims. The present workshop, organized by the Fondazione Eni Enrico Mattei, addresses the relationship of supply security towards the other two priorities. The final workshop will be organized in December 2009 in the UK by Wilton Park Conferences and will discuss the outcomes of the three previous workshops with policymakers and deliver input to the new Commission.

***The Third “Smart EU Energy” Workshop:
Energy security of supply versus economic competitiveness and climate change: The Strategic Energy Review and its
consequences for the Internal Energy Market design and the Green Package policies***

This Workshop focused on Security of Supply and its interactions with the other two EU policy priorities seems particularly timely. In fact, following the January 2009 Russia-Ukraine gas crisis, the security of energy supply agenda has gained momentum in EU policy discussions and is now firmly focused on the diversity of supply issue. The energy prices of 2007 and 2008 have also placed consumer protection back on the European policy agenda. Moreover, the economic crisis is highlighting the tensions between the different energy policy objectives. Stretched public finances and pressures to keep energy bills low will reinforce some governments’ concerns about the cost of meeting 2020 Green targets. Finally, implementing the Green and Third Energy Package in parallel may reveal the underlying inconsistencies between them and with security of supply and consumer protection policies.

In fact, energy markets and companies face today huge uncertainties both for the short/mid as well as for the long term. Uncertainties relate to the length and impact of the present economic crisis as well as the type of recovery, to the huge energy price volatility and uncertainty over future relative energy prices and carbon prices, to the question about Europe’s ability to comply to its 20-20-20 targets, to the question on how seriously Europe (and the World) will pursue and implement climate policies. On the supply side, uncertainties refer to the long term supply of US unconventional gas and possible future availability of European unconventional gas, how steep the UK indigenous gas production decline will turn out to be? What will the future role the Caspian region be for European energy supplies be in the context of international competition for these resources? What will EU national nuclear policies be and what policies are needed for a nuclear revival after 2020? Could the introduction of CCS after 2020 boost coal again and thus provide for a secure and clean energy source? How quickly will CCS be available on a large scale and what policies are needed for its employment? Could the huge potential for renewable energy in the Southern Mediterranean region provide an opportunity to reduce EU’s dependence on Russian gas and contribute to the EU’s medium and long term climate targets ?

As far as the internal market is concerned, important issues refer to the question if long term contracts are still needed to assure infrastructure investment; What is the future of oil price indexation versus gas-to-gas competition? What are the policies needed to get gas and electricity intra-EU interconnections and gas storage (including cross-border gas storage) financed? What policies are needed to integrate renewable energy sources into electricity networks.

These and other issues, which often respond to different policy aims, were addressed in this workshop dealing with EU-policies.

Session 1: EU Energy scenarios – Security of supply and climate change, what are the EU future gas import requirements?

The first session discussed the energy security of supply and climate nexus by analysing mid- and long term energy scenarios for Europe. The fundamental question, as far as EU energy security of supply is concerned, of future gas demand and import requirements, has also been discussed.

During this century, humanity has to face a double problem: the growing scarcity for oil and gas (less so for coal), and the accumulation of greenhouse gases GHGs in the atmosphere. These two “bathtub problems” cannot be considered independently. In fact, hydrocarbon scarcity paves the way to coal, while, conversely, climate policies open the path to low carbon societies. Smart energy policies must thus deal with the two sides of the problem. In fact, current European and global trends of energy use are not sustainable in the long run both because of stresses in the long term availability of oil and gas, and because the energy-related emissions of GHG will rise inexorably, pushing up average temperature by more than 5°C...

In this session, long term (up to 2050) energy scenarios recently developed in the framework of the EC co-funded SECURE project, have been discussed:

The “Muddling Through” type of scenarios based on some low-profile and not-coordinated climate policies with relatively weak signals in terms of carbon price can significantly reduce the level of emissions (compared to a business-as-usual scenario) through reduced demand, accelerated development of non fossil energy and carbon capture and storage, but they fall short of meeting emission targets that are considered desirable by the IPCC, nor do they alter significantly the balance of demand and supply on the international energy markets, though they alleviate somehow the potential tensions.

On the other side, a “Global Regime” type of scenario with coordinated and ambitious climate policies at world level clearly allows to improving the situation of reducing both emissions and the level of tension on international hydrocarbon markets, through lower oil and gas production.

Finally a “Europe Alone” scenario which simulates the consequences of strong European climate policy in a world that is for the rest not engaged in strong and coordinated policies is not able to meet the climate target as the impact of ambitious policies in Europe are not sufficient to replace massive global emission reductions. However, in this scenario setting, imposing strong emission reduction domestically results in a thorough restructuring of the European energy system. While it is supposed in this scenario that other countries adopt a free-riding behaviour and do not trigger such a restructuring, it is probable that tensions on the oil and gas market will remain high, with risk of repeated shocks in the near and long term future. In that case, Europe will be largely protected from these external shocks by lower energy demand, higher contribution of domestic non-fossil fuels (renewable and nuclear) and a much lower level of fossil fuel imports. There seems thus to be a benefit for Europe to implement a virtuous climate change policy. The question which remained open, however, was if the reward of such an ambitious EU policy in the “Europe Alone” scenario would fully compensate for the extra costs of the EU energy system restructuring.

The second issue addressed in this session relates to the evolution of gas demand in Europe and future import requirements. The present economic crises has provided an unexpected and dramatic impact on EU gas demand. 2009 is the first year of major European gas demand declines after three decades of largely unbroken growth. Year-to-year temperature corrected figures by mid-2009 showed a 15% demand decrease across Europe, representing some 6 years of lost growth. With the present severe crisis with widespread closures of factories across Europe, might in the next years observe not only a European “demand reduction” but also a “demand destruction” due to possible heavy delocalization of industries when the global economy takes off again. According to the shape of the economic recovery, 2008 gas demand levels will probably be reached somewhere between 2015 and 2020. This is well below previous industry forecasts of +30% between 2005 and 2020 but still well above the EC New Energy Policy (NEP) - published in November 2008 in the Second Strategic Energy Review for 2020 - and which assumes by 2020 a -10% to -20% EU gas demand compared to 2005.

The discussion addressed the question on how realistically achievable the NEP scenarios are given that huge additional gas fired capacities are presently coming on the market, that a nuclear revival – should it materialize – will not provide any impact before 2020, and that carbon capture and storage (CCS) will not be available large-scale before 2025 at the earliest. Moreover, the question if the energy efficiency and RES targets will be met, is still open. Also, if gas is to act as back-up or an “enabler” for RES, it means that supplies have to be readily available and that the supply load curve will develop in a different way: more flexible and therefore potentially less predictable. Gas might indeed no longer be a fuel of choice but a fuel of consequence, being called upon after some other options have not materialized.

There is thus the risk that European policy is sending mixed messages to gas producers. On the one hand, the EU is asking producers to make the necessary longer-term investments in gas, and on the other hand the 20-20-20 EC targets attempt to reduce demand as the NEP scenarios illustrate. The concern is that supply-side investments will not be made, scared off by the 2020 targets, and that those targets will also not be met, creating a supply crunch. As a conclusion it seems therefore important for the EU to assess credible scenarios using different underlying assumptions which will provide market participants with the best available knowledge of future gas outlooks.

Session 2: The External energy dimension – The role of Russia and the Caspian for EU gas supply (security of supply and security of demand versus market diversification)

Session 2 discussed the External dimension of EU energy security of supply. If in the US the external dimension of energy security of security relates mainly to oil and thus the US relationship with the Middle East, in Europe the policy debate is mainly associated to gas and the EU relationship with Russia. Though the EU is more dependent on foreign oil than the US, its vulnerability to gas, due to fixed links, causes apparently more concern.

Indeed, whatever “realistic” scenario one envisages, the EU will continue to rely heavily on Russian natural gas. Diversification of energy sources and of gas sources might attenuate slightly this reliance, but fundamentally it is not possible to replace Russia’s role as the major oil and gas supplier to Europe. This dependence is compensated by Russia’s need to assure its socio-economic development. Russian hydrocarbon supplies to the EU are as necessary for Russia as Russian hydrocarbon imports are for Europe. Both partners don’t have any serious alternative to each other.

At the same time the EU-Russia dialogue stalls with misunderstandings, suspicions, mistrust, contradictions and offensive actions multiplying, disregarding the strong investment needs. The EU 3rd liberalization package, pressure on long-term contracts, barriers for Gazprom to move downstream, the green package with its 20-20-20 targets, the New Energy Policy gas scenarios, diversification of supply talk are examples of actions which are often perceived in Russia as a direct affront to their interest. On the other side, the de-jure Gazprom export monopoly, the perceived difficult investment climate for foreign energy companies in Russia, Russia’s withdrawal from the Energy Charter, diversification efforts for export markets, control over Central Asian gas, the creation of the “reinforced” Forum of Gas Exporting Countries, postponing investment at home and entering the upstream sector of other oil and gas producing countries, are all examples which are often perceived in Europe as a confirmation that it should decrease its energy dependency from Russia. Never mind that many of these policies are not necessarily directed to the other country but are based, at least partially, on a different agenda. It seems that we are in the typical security dilemma spiral where A distrusts B and acquires power for defence, B interprets A’s action as offensive and acquires power for its own defence, A interprets B’s action as a confirmation of its initial basis for mistrust, and so on. A smart EU energy policy would thus imply to properly and honestly re-launch the EU-Russia energy dialogue.

The disruption of Russian gas supply (in February 2004, January 2006, January 2009) have increased the apprehension in the EU and especially in the New Member States of central and eastern Europe as these countries dramatically lack supply diversification and are thus extremely dependent on Russian gas. In particular the 2009 gas crisis has highlighted the lack of inadequate interconnections inside the EU, limited possibilities for reverse flow and limited capability of fuel switching. It is clear that a well functioning, well interconnected and more transparent internal EU gas market would allow to much better absorbing possible supply interruptions. The EU should thus develop and strengthen early warning and crisis prevention mechanisms at the EU level as well as implement regional emergency plans. There is also a need for long term planning and investments geared towards addressing EU security of supply issues in an integrated way, this includes diversification of supply, storage, LNG terminals and interconnections. In this respect, the new draft EC regulation proposal on Gas Supply Security including the N-1 security standard should be encouraged. The proposed regulation would moreover give the Commission powers to control and coordinate international solidarity mechanisms to support EU countries in trouble during a recognized supply emergency.

This session also discussed the importance of the Caspian region and the fourth or southern corridor for EU energy security of supply. The Caspian region holds important hydrocarbon resources and it is important to create a direct supply route for Caspian gas to reach European markets. In fact, Europe’s concern is also with diversification of supply routes, supply sources and commercial counterparts. For the diversification of supply sources, Europe needs to encourage the new sources of gas to invest and to give these countries a long-term stable commitment to receive their gas. A commitment to produce considerable volumes of gas should be met with a commitment to accept that gas into our internal market. Europe must be a credible actor, and the Caspian Development Corporation is part of that. The fourth corridor is very complex not only because of the many players, both political and commercial, which number seems to continuously increase, but also because after many years being promoted it still has no firm gas commitments and consequently no financing. The policymaking universe of

the Fourth or Southern Corridor has indeed increased in complexity and we observe today important levels of regulatory and political risks on top of financial and technical project specific risk. They also include the resolution of the Caspian Sea maritime boundary issue.

Smart external EU policies in this context are the ones which are efficient, effect-full and lead to concrete results. They therefore need to pragmatically and realistically account for the energy realities facing them and acknowledge the real concerns of the industry, its very key economic principles, and how the industry seeks to balance risks and rewards. Smart energy policies should thus: i- be producer focused acknowledging that maturity of reserves is at the base of any hydrocarbon value chain, access to acreage/resources is a key concern and challenge; ii- provide an adaptive market based competitive framework for commercialization of gas and thus allowing for managing the interface between producer countries' resource management mechanisms and the rule of Europe's internal energy market; and iii- provide an incentive based framework for phased transit and transportation solutions, project independent and focused on timely delivery of transparent and economically and efficient solutions. It was also concluded that the EU needs to improve not only in its effort to define a common external energy policy and to communicate on it with a single voice, but also in its ability to act in the framework of this external energy policy and the related infrastructure projects which are considered priority for the EU.

Session 3: Internal gas and electricity market design - security of supply versus competition

The official argument of the Commission stresses that more competition favors greater supply and hence enhances energy security. This position has clear merits, although one should consider that market opening may increase risks for a (dominant) individual supplier while increasing the security of the system.

One important problem with the European internal market is that the European electricity system is still fragmented; many member states do not reach the minimum interconnection level agreed in the Barcelona Council, which was to be attained by 2005. Despite a common agreement, the pace of new interconnection development is very slow.

One negative aspect that needs to be overcome is the persistence of local markets. National boundaries prevail over the attempts to build a EU single market, which is clearly still to come. The protection of national champions by some governments remains a serious obstacle both to the development of fair competition within national markets and to the integration process. An effort to harmonize solutions for providing incentives for emission reductions and to promote common solutions for electricity-intensive industries is also desirable.

Something similar applies to the gas network, which however has different features and raises even more critical issues. The January 2009 crisis has shown that despite an attempt of market players to cooperate, sharing storage facilities is still a problem, and that there is a clear lack of reverse flow capacity in the European gas grid.

The problem of reverse flows is considered particularly urgent. In particular, the GTE study illustrates 45 proposals, and stresses that 50% of their cost has no adequate funding. Although ACER is expected to help when operational, a positive signal could be provided by an immediate decision on a mechanism for funding recovery and a EC programme of implementation and monitoring of the existing proposals. The applicability of general principles of third party access should be seriously considered as for extra-EU pipelines.

As for gas storage, it is unclear whether full liberalisation and competition policy can apply, but full liberalisation and competition in gas storage is a policy target and steps to implement it should be designed and monitored. This actually requires a major preliminary act on the characterization of strategic gas reserves, which are now defined at national level, but actually have a clear European relevance.

The priority to develop interconnections to share flexibility tools among neighbouring countries has emerged. Given the significant probability that episodes of shortages will reappear, this entails combining preventive action plans and emergency plans. These actions require strong coordination among member states, especially as they might require the funding of investments in one country to benefit another one. This brings about major institutional challenges in the definition of the roles of Member states, regulators, the Commission and the industry.

However, competition can work side-by-side with regulation in several market segment. The first one is the wholesale market, where the development of gas exchanges is desirable, but deserves positive action by EU authorities. More generally, competition policy may help if some fallacies are removed from recent policies. The

first one is that competitive prices are not necessarily low prices, also in that they must provide appropriate incentives to invest. The second one is that long-term contracts, although probably anti-competitive in the wholesale market, may prove useful in the retail market or to fund new infrastructures. However, long-term, take-or-pay contracts should leave enough room for a liquid market.

As for funding of these infrastructures, there is a basic issue as to measuring the actual benefit of greater security. Although normally the principle is that, only users of the assets should pay its cost, it is not clear who really benefits from a given infrastructure, in that security problems may be asymmetric.

This makes the financing problems more acute. The usual alternatives between covering these investments through regulation and tariffs, merchant projects or specific EU subsidies are all open, depending on specific situations. In particular, merchant projects should be encouraged, subject only to a “use it or lose it” rule, while regulated projects should be subject to transparent cost-benefit tests. While a common European frame is necessary, central planning is considered unnecessary and possibly negative, as competition may lead to some overcapacity, which is a pre-condition for competition to develop.

These efforts require somehow a common regulatory basis. There is a strong hope that ACER will soon become a real regulator; although its current status is different, its actual powers are substantial, and strongly needed by the development of a single energy market.

Section 4: The role of North Africa in terms of solar electricity supply to Europe

The vast potential for renewable energy in the Southern Mediterranean region has in recent years promoted two important projects. The Mediterranean Solar Plan of the Union for the Mediterranean launched by French President Nicolas Sarkozy in July 2008 and the Desertec project of a group of European (mainly German) companies launched in July 2009. These projects aim to provide an opportunity to reduce EU’s dependence on Russian gas, integrate more countries into the EU power market and contribute to the EU’s medium and long term climate targets. It is also a way to develop neighbouring country’s economies and promote EU policies on energy and climate change.

The EC Second Strategic Energy Review of November 2008 identified building the infrastructure needed to complete a Mediterranean gas and power ring as a priority and one of the more controversial elements of the new EU renewables law, agreed in December 2008, was allowing imported renewable power to count toward EU countries’ binding 2020 national renewables targets. From the EU perspective, these projects can contribute to enhance energy security (though some participants expressed a divergent view) and provide a boost for green electricity trade and encourage the development of a Euro-Mediterranean green electricity market.

According to the promoters, the Mediterranean Solar Plan aims to develop 20 GW of new renewable energy plants by 2020 in the Southern Mediterranean region, and aim for 20% energy savings compared with business as usual by 2020. As this project has run into a deadlock due, among others, to political conflict in the Near East, a new private initiative has been launched recently.

In fact, in July 2009 a group of European (mainly German) blue chip companies signed a memorandum of understanding to develop the so-called Desertec project, which involves concentrating solar power (CSP) systems over 17000 square kilometres of the Sahara desert (in fact a tiny fraction of the desert) to generate electricity that would be distributed to Europe and North Africa through a high voltage super grid. The project has EU backing and its proponents say it could meet 15% of EU electricity demand. The details of the project are not known, but the promoters have said that they started the fund raising task for a sum of some 400 billion Euro, which illustrates the pharaonic dimension of this project. The huge interest by major German companies could be explained by the fact that CSP power plants could become the third German 'export hit' in the field of eco-energy, behind wind and solar photovoltaic power with the creation of large numbers of new green jobs. Desertec states that one 250 MW parabolic trough power plant requires 1,000 workers and engineers for a period of two to three years. Of course, turning North Africa into a solar (and green employment) hub is hardly a one-nation job or responsibility. On top of the actual solar plants, the project requires quick establishment of expensive low-loss, long-distance high-voltage direct current (HVDC) transmission lines to export the power across the Mediterranean and into Europe. The technology seems to be ready, but deploying it will require cooperation, financing and favorable new laws and

regulations from all the relevant EU countries and host African countries. In any case, it is more likely that these projects will move step by step and not as one big project.

Both the Solar Plan and Desertec, which could well eventually join their efforts as they are in fact complementary, should be encouraged because i- the initiatives promote strategic partnership between the EU and the Mediterranean Partner countries, ii- the focus is promoting renewable energy in countries where there is a huge potential and at the immediate EU's neighbourhood, iii- the initiatives would create employment both in the Southern Mediterranean countries and in the EU in a field (renewables) with a huge future potential worldwide and where the two involved regions could gain important comparative technological advantages, iv- the initiatives would promote socio-economic development in Mediterranean partner countries which is also a strategic goal of the EU; v- such a programme would help Europe to fulfil its climate policy targets.

Identified "Smart EU Energy" policies include i- to join the two initiatives which would combine political support (Union for the Mediterranean) with private business initiatives (which should, however, be much more geographically diversified), ii- to create a beneficial political and regulatory framework for the initiatives and consider the possibility to grant this type of projects with priority status among the EU infrastructural projects, iii- to open European feed-in regulations to power from the deserts, iv- to check the possibility of public-private partnerships for these projects, v- to promote the operation of a European and trans-Mediterranean super-grid.

An issue which was, however, raised during the discussions, is that i- as the Southern Mediterranean countries are in strong need of socio-economic development and this requires important additions in domestic electricity supply, ii- that presently most of North Africa's power generation is gas based and that additions are expected to be gas based, and iii- that transporting gas over long distances is economically cheaper and from a public acceptability point of view easier as pipelines have a lower environmental impact than overhead lines, it might make more sense to start in a first phase the development of solar and other renewable energy by European players in North Africa for the domestic market which would thus liberate gas which would otherwise be used for domestic power generation. The gas which has so far been made available could then be exported to Europe and help finance the renewable power. Economically (from a macro economic point of view) this seems to be a much sounder scheme than direct renewable electricity exports to Europe. Also, for security of supply reasons, importing gas is better than importing electricity. The already planned additional gas transport infrastructure (pipeline and LNG) between North Africa and Europe would indeed be able to absorb these additional quantities. In a second phase, additional possibilities for direct green electricity exports to Europe could be envisaged. The main difficulty of swapping renewable electricity for the domestic gas consumption which could thus be exported is that presently domestic energy prices are much lower than the export price to European markets. As at the same time it is politically and socially difficult to align domestic energy prices to international prices, a compensation fund would have to be created to remunerate renewable electricity producers which sell the electricity on subsidized domestic markets thanks to sales of gas which is no longer sold on the low priced domestic market but on the high priced international markets.

Section 5: What are the needed policies to promote CCS and Nuclear ?

Electricity is the key to a low carbon world. It has so far delivered carbon reductions through energy efficiency and fuel switching. In the future major reductions could be delivered through new technologies, such as CCC, nuclear and large-scale renewables, and also through higher energy efficiency. In fact, all long term climate policy based energy scenarios demonstrate that without an important contribution of all these four instruments, it seems impossible to attain the climate targets. As policies related to energy efficiency and renewables had already been discussed at the Clingendael workshop, we have focused this session on CCS and nuclear.

The first part of this session dealt thus with CCS:

As worldwide energy demand is accelerating, while easy oil and gas supply will struggle to keep pace, and the fight into coal causes climate stress, dealing with CO₂ becomes imperative. Long term modeling assessments demonstrate that the needed CO₂ reduction by 50% to stabilize global warming cannot be met without a strong penetration of CCS. Moreover, as coal allows to decrease Europe's increasing dependence on imported gas, coal

plays an important role in EU's energy security of supply considerations. European coal fired power plants have, however, only a future if they become less CO₂ emitting and CCS can offer this perspective.

However, CCS technology still has to prove itself to be commercially viable at industrial level. This implies the need to refocus and expand R&D for CO₂ recycling infrastructure and to provide public help for the demonstration phase and purchase incentives and/or a relevant CO₂ price during the deployment phase. The aim is for CCS to become commercially competitive by 2020-2025 which means that by that time it will no longer need subsidies but that the cost difference will be covered by a global CO₂ price. The discussions have highlighted that technological risks are well known and can be handled, and that the risk of not succeeding with CCS has to be compared with the risk of not building CCS and thus remaining on an unsustainable business as usual scenario.

Two key sources of European funding now exist for the emergent CCS industry in addition to national funds. The first agreed in December 2008, is the allocation of 300 million Emissions Allowances from the EU's ETS. The second, agreed in 2009 is 1 billion allocated to CCS as part of the EU's Economic Recovery Plan. These instruments should allow to finance pilot projects which will test different CCS configurations. It is hoped that these demonstration projects will provide sufficient experience at industrial scale to achieve the necessary cost reductions for the deployment of commercially viable CCS from 2020.

In order to successfully cross the deployment phase, the discussions in this session have identified the following smart EU policies: i- that all or most countries set targets for a CO₂ reduction, ii- that CCS is regarded under ETS and that ETS is made in such a way that a stable price with big trading volumes is secured. CCS becomes commercial when this price can be matched by CCS; iii- that legislation and regulation favouring CO₂ storage and approvals are put in place; iv- that all rules are secured in the long run.

The second part of the session dealt with Nuclear:

As mentioned above, in order to respect climate policy goals, also nuclear needs to play an increasingly important role in worldwide and EU long term energy balances. However, according to IEA and EC energy scenarios, the EU nuclear share is expected to reduce by half between now and 2030. As nuclear is presently providing two thirds of all low carbon electricity in the EU, this will create an even larger strain on fulfilling CO₂ targets. In fact, the so often announced nuclear renaissance is having a difficult birth: With 148 aging reactors in operation in 15 member states, there are presently just 4 reactors under construction in the EU (Finland 1, France 1, Bulgaria 2). It would need lifetime extensions up to 50 years to stabilize the share of nuclear in the electricity mix until 2020. The problem is similar worldwide: with 436 nuclear reactors in service worldwide, nine less than in peak 2002, and 53 reactors under construction, and assuming that all the reactors presently under construction will be built by 2015, the world would still need an additional 42 reactors to maintain current generating capacity (and by 2025, a further 192 would be required).

There are several reasons why the nuclear renaissance stalls in particular in Europe (but not only): i- social acceptability (political opposition) for a technology which is perceived as dangerous and for which the permanent waste disposal issue has still not been solved, ii- lack of human capacity (Europe's industrial capacity of building nuclear power plants is said to be limited to maximum 4 per year, other regions seem to have the same problem of aging workforce) which is expected to worsen over the next years as specialists retire; iii- strongly increasing investment cost for nuclear power due to, among others, improved safety and environmental standards. And contrary to the general energy capital cost index which has fallen by 20-30% since its peak in 2008, nuclear costs do not seem to have fallen over the last year ; iv- technical problems with the new 3rd generation designs of all major manufacturers resulting in huge cost-overruns for the first realizations of the new designs; v- the difficulty to finance hugely capital intensive plants in a market environment; vi- the financial crisis which has made highly capital intensive new nuclear power plant construction harder; vii – the increasing uncertainty on construction costs raise some doubts on the ability of nuclear power to foster a decrease in prices.

In this context it is argued by many that the government action is essential. This relates both to the promotion of public nuclear debates on safety, energy security of supply and climate change issues, and to the promotion of human capital building. There might also be a case for more public money and government guarantees, justified on the grounds that nuclear is a low carbon energy and increases security of supply.

The discussions of this session identified the following smart EU policies to facilitate a level playing field for nuclear power: i- supporting further integration of electricity markets; ii-levelling the playing field for low carbon technologies via ETS; iii- guiding investor assurances in licensing procedures; iv- exploring regional centres for high level waste disposal; v- clearing the position of decommissioning funds. But, as member states retain sovereignty over energy mixes, local political/public consent and support seems to be vital.

More generally, the session concluded that the most efficient way for the EU to develop cost-effective low carbon power sources is to have a viable EU-wide emission trading system capable of delivering standardized carbon prices and/or an effective EU-wide carbon tax.