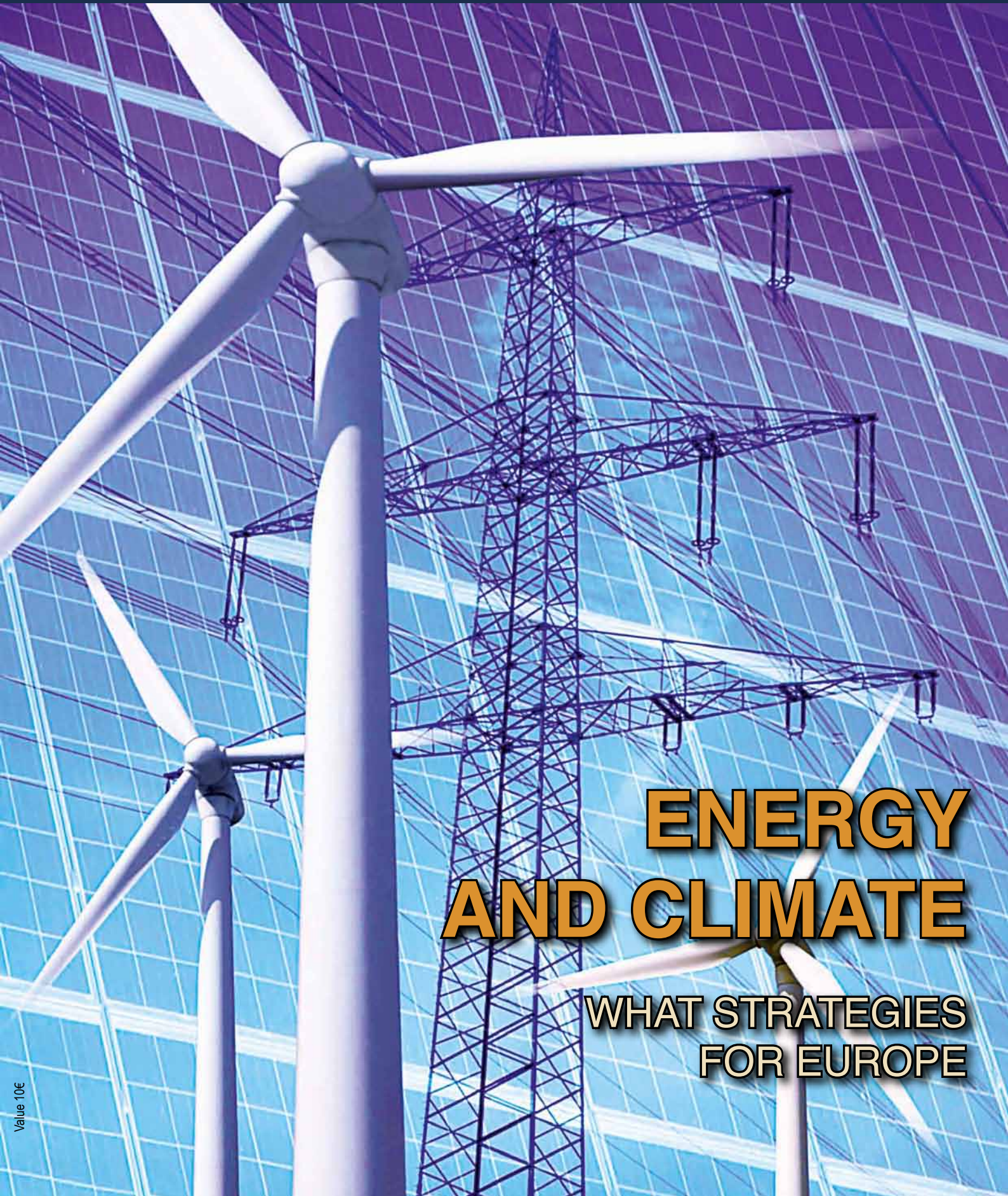




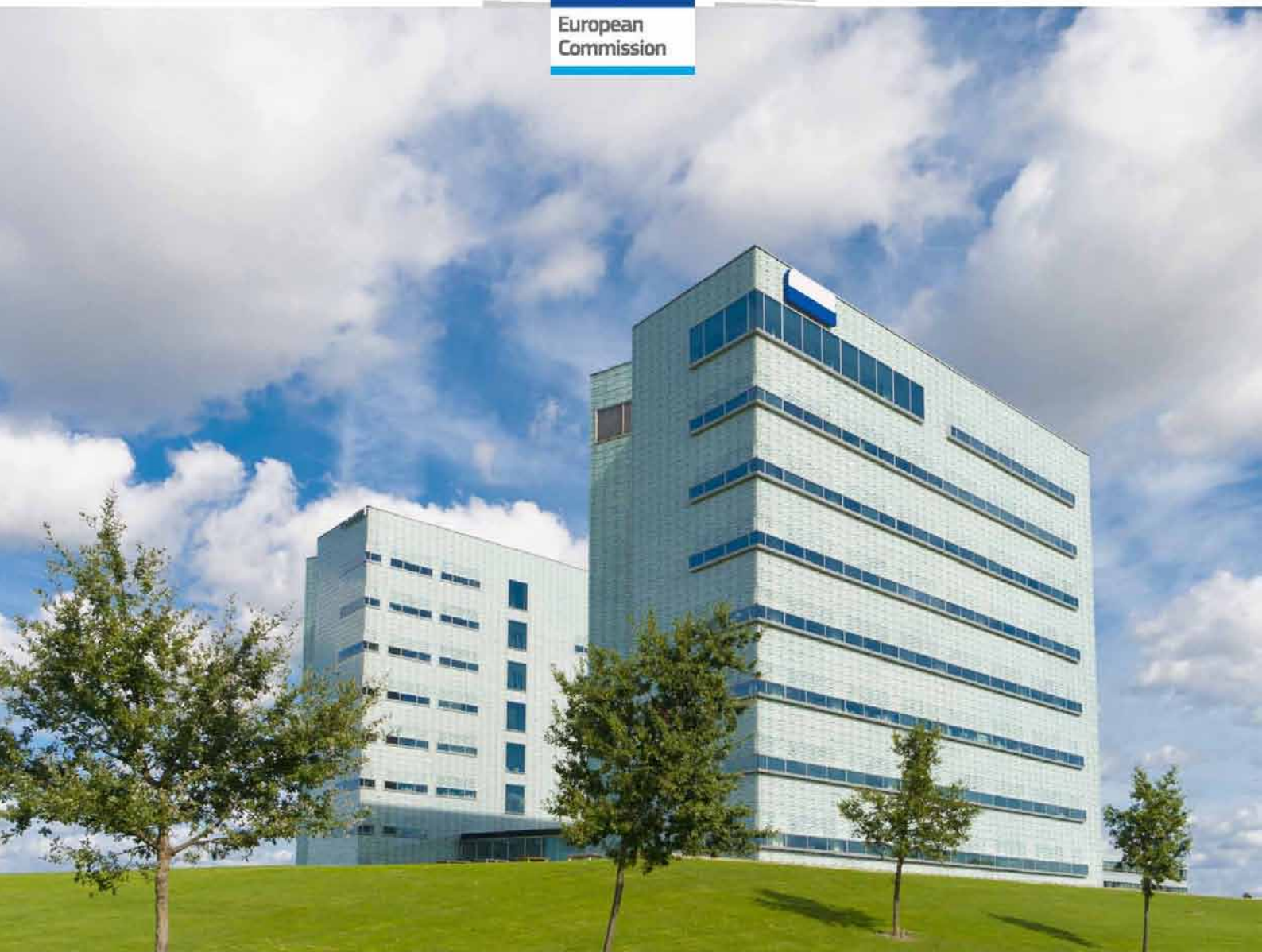
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ENERGY AND CLIMATE

WHAT STRATEGIES
FOR EUROPE



ENERGY-EFFICIENT BUILDINGS

*Multi-annual roadmap
for the contractual PPP
under Horizon 2020*

Prepared by



Policy
Research

EDITORIAL

Energy represents one of Europe's greatest issues. The future of European industry is dependent on a comprehensive and long-term solution regarding energy supply. Member States have realized the importance of low-carbon economies to fulfill their responsibilities in providing European citizens with sustainable economic growth, secure jobs, and a high standard of living. To achieve this, and in order to reduce emissions by 80-90% by 2050, the key challenges for EU energy policy are to combine the development of strategic renewable energy sources (RES), energy efficiency and clean coal technologies, with a greater integration of the European internal energy market, and a stable and adequate energy supply. These steps are paramount to secure a healthy industrial future for Europeans within a competitive global market for energy.

The European options concerning RES are diverse. However, the continued growth in the sectors of wind, solar, geothermal and biomass is based on reforming the infrastructure and policy framework in order to ease generation, transmission, distribution and storage of RES-electricity. Within the 2030 climate and energy framework policy, Member States are given more flexibility in promoting the RES that best works for their various local geographic characteristics. That being said, it is essential to keep in mind that half of our energy consumption is still coming from thermal generation.

It is therefore important to provide incentives throughout Europe to promote innovation in green energy technology. This can be achieved notably by revise the Emissions Trading System, a central tool to the reduction of greenhouse gas emissions (GHG). EU energy policy must incorporate the private sector and market forces to ensure a cost-efficient future for RES in Europe.

As energy prices continue to rise, Europe is best poised in delivering a cohesive internal energy market and to promote a greater Europeanization of energy policies and reduce the existing discrepancies between its member states and the world market. The modernization of energy networks across national boundaries in addition to the greater access to diversified energy sources is the only way to secure a stable supply for all EU citizens. Promoting trans-European energy networks and smart grids to cope with the decentralization of energy production due to RES development will allow the EU to present a stronger international energy positioning. Promotion on investment in all sectors of energy production will reinforce the EU's stature as a pioneer of competitive low-carbon economies.

Increased competitiveness and innovation have become pillars of European policy-making. Global issues, such as climate change, or the future of transportation, are opportunities for improved European cooperation in providing a more secure energy future. Europe can no longer solve this issue alone. It requires strong cooperation with its main international partners.

This edition explores what the EU is capable of and willing to do in providing competitive, secure and sustainable energy for itself and its partners.

Laurent ULMANN
Editor-in-chief

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EU energy policy achievements and the way forward



Günther OETTINGER

EU Commissioner for Energy

Energy is one of the biggest challenges confronting Europe today. Ensuring a reliable energy supply at an affordable price, while being at the forefront of the fight against climate change, is a key issue for the European Union. In 2008 the Union has set itself three targets to be attained by 2020: greenhouse gas emissions reductions (20%), share of renewable energy (20%), improvements in energy efficiency (20%). Five years after, we are well on our way and remain committed to achieving this goal: not only is the target achievable, but we may well exceed it as far as GHG emissions and renewables are concerned. The recently proposed 2030 Climate and Energy Framework indicates the path that Europe should follow to secure its future as a competitive low-carbon economy.

Greenhouse gas emissions in 2012 were 18% lower than 1990 levels. They are expected to be 24% lower by 2020 and 32% lower by 2030, on the basis of current policies. The share of renewable energy has increased to 14% in 2012 as a proportion of final energy consumed and is expected to rise further to 21% in 2020. As regards energy efficiency the latest projections seem to indicate that the European Union could arrive in 2020 with an energy savings of at least 17%.

Moreover, it is worth mentioning that the energy intensity of the EU economy has reduced by 24% between 1995 and 2011 whilst the improvement by industry was about 30%. The carbon intensity of the EU economy fell by 28% between 1995 and 2010.

Despite good progress achieved so far, important challenges remain: our twenty years of experience in opening up regulation-based

energy markets in Europe show us the way for the future.

Firstly, energy efficiency is essential to combine competitiveness with sustainability, being a driver of growth and economic strength. We are looking into how Member States are doing to reach their targets and we will assess and report on this by mid 2014.

Secondly, market mechanisms prove that prices are more likely to be competitive if supply and demand are in balance. A reinforced European internal energy market is a pre-condition for the price-signals that will allow investors to come up with the necessary solutions to our changing energy reality: our ambition is to have energy prices that fully reflect costs and a market that is allowed to work. To ensure a constant monitoring, the European Commission will update every two years its recently published Report on energy prices and costs, which assesses the key drivers for energy prices and costs and compares EU prices with those of its main trading partners.

Third, appropriate investments have proven crucial for changes to our power networks. Innovative, smart and efficient technologies are the places to invest – as well as superhighways that could transport wind power from the North Sea to the Alps, and take hydro stored in Norway to Belgium and the Netherlands, via the UK. To lever several times investments in new energy infrastructures, the EU will provide over the period 2014-2020 5.8 billion euros through the new Connecting Europe Facility, at least 23 billion euros through Structural Funds and 6 billion euros for research under the Horizon 2020 programme.

The fourth point leading us forward is the behavioural adjustment by market players. All Transmission and Distribution System Operators need to think European, and should bring innovative technology to individual households and businesses. To support this process, the European Commission will present a specific Retail initiative in 2014 which focuses on empowering the consumer to make him a real actor in the energy markets. This is why we

have set ambitious goals for the roll-out of smart meters of consumers. Electricity suppliers should also become responsible players, by helping consumers become more efficient. But new actors – such as urban planners - will play a key role, too: EU policies and technology platforms on smart cities go in exactly this direction.

The past shows us that markets cannot be restricted to the national level. In order to ensure the free movement of energy, we must now work to complete the internal electricity market in Europe by the end of this year. Common standards and norms, and network codes agreed with all Member States, will generate a more efficient, and more dynamic market.

Completing the EU Internal Energy Market also means stronger coordination of our energy policies. For this reason, the EU is fully committed to ensure transparent and market-based energy taxes, CO2 prices and energy subsidies. A better coordination and consistency in government intervention in the energy market will ensure a fair distribution of prices, whilst at the same time sustaining the innovative drive necessary to bring more and more competitive technologies online. The new energy governance system proposed in the 2030 Framework will ensure further Europeanization of our policies, stronger investor certainty and greater transparency.

The only way forward is a long term strategy, and this is exactly what the Commission has proposed in its new energy and climate framework for 2030: the tool to drive continued progress towards a low-carbon economy and an affordable, competitive and secure energy system. We need to create an environment that provides certainty for investors, and put the EU in a position to play a key role in international negotiations. By looking beyond 2020, we want Europe to be able to enjoy sustainable growth and secure energy supplies. We can only achieve this through a stronger framework and a suitable level of ambition combined with a cost-effective approach.

Setting the course for low-carbon growth



Connie HEDEGAARD

EU Commissioner for Climate Action

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When leading economist Jeffrey Sachs gives three cheers for the new EU climate and energy policy for 2030, there are reasons for us to be proud.

Or when in Davos UN Secretary-General Ban Ki-moon said the “ambitious proposals are the standard to follow”; World Bank President Jim Yong Kim praised Europe’s “climate leadership and ambition” and UN climate chief Christiana Figueres called them a “positive signal for a meaningful 2015 agreement”, there are reasons for us to believe that not only have we moved first, but we have also moved with ambition.

And when some environmental groups label our proposals “unambitious”, while some industry sectors call them “too ambitious”, one could think that we have found the right balance.

The European Commission outlined its proposals for climate and energy policies up to 2030 very recently. These include a binding emissions reduction target of 40% from 1990 levels and an EU-wide binding target of at least 27% of energy coming from renewable sources. And on energy efficiency, the Energy Commissioner will first review the current legislation before proposing the next steps. But they will come.

Overall, these proposals seemed to have had a timid reception here in Europe compared to the more positive comments coming from international leaders. But these give us reasons to believe that the real ambition of our proposals and what they mean to the fight against climate change have been recognised.

Firstly, because our 40% is in line with science as it put us right on track to meet our 2050 goal of cutting emissions by 80%-95%. This is what developed countries will need to reduce by 2050 according to the Intergovernmental Panel on Climate Change (IPCC) to keep global warming below 2°C.

Secondly, because 40% is an ambitious emissions target as it can only be met by reducing emissions in the EU. This is unlike the 20% emissions target for 2020, which could be partially met by financing projects outside the EU to compensate for our emissions. And as we cut more here in Europe, we will attract the investments and technology.

And finally, because the 40% target is doable and cost effective. Our economic analyses show that 40% target can be achieved with manageable short term investments and in a way that unleashes significant long term benefits.

Just like the 2020 target, the 40% emissions target will be binding at both European level and national level as it will be broken down into binding national targets.

We will of course continue a strong focus on renewable energy. And here the Commission proposed a renewables target binding at

European level but not a national level through national obligations.

While the practical details must be worked out and agreed, the bottom line is that Europe must continue expanding renewables while allowing flexibility to transform the European energy system in a way that every member state contributes to meet our common climate goals.

True, an ambitious 40% emission reduction target will itself stimulate investments in renewables across the EU. But having a binding renewables target will boost even more investment in clean energy – something which a target for emissions alone would not achieve.

Cleantech business leaders such as Vestas CEO Anders Runevad and Climate Group CEO Mark Kenber agree that our proposals are a real driver for clean economic growth.

With these proposals, the Commission has set the course for a low-carbon future. If EU leaders endorse them, Europe will be the first one out of the gate with such an ambitious climate target that takes account of our global responsibility.

And hopefully our ambition will be seen by many countries as a benchmark and an important driver in securing ambition for the domestic preparations of other countries and, as a result, for the 2015 agreement.

So now it is up to the European leaders to take it forward, and keep the EU’s leadership in the international climate talks and the low-carbon technology race.



Green growth, the circular economy, and how we can make it happen



Janez POTOČNIK

EU Environment Commissioner

Nearly six years on from the great crash of 2008, Europe is still facing a multitude of challenges. Unemployment remains high, energy and resource prices are volatile and rising, competition from outside the EU is increasing, and demand is well below the levels we saw in the early part of the century. Environmental threats loom large – climate change, loss of biodiversity and ecosystem services and a limited supply of natural resources all risk putting a brake on our future economic development.

To be sustainable in the long-term, our exit strategy from the crisis needs to take full account of the environment. This means factoring real-world conditions into our economic modelling, and acknowledging that there are real limits where resources are concerned. It also implies rethinking the way we produce and consume. We can't pretend that economic recovery is just about stimulating growth. It has to be about far more than that. It needs to be about building the basis for a different kind of growth.

There is every reason to be optimistic. Human creativity and innovation have successfully exploited resources in the past, bringing unparalleled health and prosperity. I believe that this can be extended to billions more people, in ways that entail using fewer resources. But it requires moving away from our current linear economic model, where we extract, produce, use and throw away, embracing instead a circular economy model, where the waste of one industry or process becomes the input material for another.

It's going to be a massive transformation, requiring action across a wide range of policy domains: from energy, transport, construction and greening agriculture to combating climate

change, preserving biodiversity and ecosystem services, eliminating environmentally harmful subsidies, shifting taxes from labour to pollution and resource use, and encouraging industry to take a longer-term view and to invest in technologies that will reduce environmental impacts and resource needs.

It won't happen overnight, although it could happen far more swiftly than many detractors would imagine. Once there is widespread understanding of the scale of the threats we face, minds will focus more sharply on these global challenges. Not a question of if – simply a question of when.

Many countries and regions are already looking to a greener future, and vying for the title of global green leader. The EU already has a head start in sectors like waste management, water quality, waste water management and recycling materials. Back in 2008, European eco-industry already had an annual turnover of EUR 319 billion (2.5% of GDP), with an annual growth rate of 6% to 8%. Direct employment in eco-industries was estimated to be around 3.4 million, with 7.0% annual growth.

EU engineers remain at the cutting edge of environmental technology in areas where China recognises that it has pressing needs. Chinese manufacturers can indeed manufacture solar panels a lot cheaper than Europe, the US and Japan, because the whole supply chain is available in situ. But the overall picture is more nuanced: offshore wind power is still in the developmental stages in China, while Europe has the highest number offshore wind power plants in the world, with Denmark, Sweden and the UK leading.

European SMEs in particular need to consolidate their comparative advantage in a number of areas. The EU still leads the way in cleaner conventional energy technologies, such as carbon capture and storage. Renewable energies like biomass are an area of EU expertise, as are energy efficiency services, technology upgrades and materials processing. In the water

sector too, Europe is a front-runner, especially when it comes to water treatment equipment, technology and expertise. The EU is also at the cutting edge of solid waste management, with world class consulting services for solid waste treatment operations, mechanical and biological pre-treatment of waste, and waste tyre recovery.

One of the Commission's tasks is to put in place the enabling conditions that will ease the transition to a more circular economy. A small but significant initiative in this area is the European Environmental Technology Verification pilot programme, which helps small companies to increase the credibility and recognition of breakthrough technologies, through independent verification of their actual performance. Eight Member States now have verification bodies in place, and more are on the way.

More generally, when making policy, the Commission often keeps an eye on the "silent majority": the entrepreneurs and experts generating the high-end technologies and new production methods that will deliver the required solutions. This was certainly the case with our recently adopted clean air package, which reinforces the policy framework while simultaneously looking to ensure that the clean air investments made by car manufacturers, farmers, as well as the energy and industrial sectors, and many others along the supply chain, will deliver tangible results, using the most cost-effective solutions.

New technologies need funding, and here too the EU can help. Our funds do have remarkably high success rates. One recent study on eco-innovative projects funded by the Competitiveness and Innovation Programme (CIP) showed that 30% of SMEs are already reaping commercial benefits. An average total revenue of EUR 20 billion was predicted 5 years after the projects' ended, representing a replication factor of 30. The number of full-time jobs created after 5 years has doubled, while part-timer jobs have quadrupled.

LIFE – the EU funding instrument for environment – and the CIP are relatively small,

although they do leverage significant further funding. We can expect far more from Horizon 2020, the new research and innovation programme, which is worth around EUR 79 billion over the period 2014-2020. At least 60% of its budget should be related to sustainable development, while climate-related expenditure should exceed 35%.

Horizon 2020 addresses a wide variety of societal challenges with strong environmental components. The “secure, clean and efficient energy” challenge attracts a budget of EUR 6

billion, and the “climate action, environment, resource efficiency and raw materials” has a budget of some EUR 3 billion – both of them particularly targeted to help build towards a circular economy. Horizon 2020 will help us to remove barriers to innovation by specifically supporting SMEs, and it will support initiatives such as the European Innovation Partnerships on Water, and Raw Materials.

Structural change is a must. We need to progress towards a prosperous circular economy that respects the limits of nature, makes the most

of natural resources, creates jobs in local communities, and ensures our long-term well-being. This is not a vision – it’s a genuine and inescapable necessity for the future. And EU technologies need to play a key role in making it happen.



Germany's energy transition: a strategy for mitigating climate change and boosting growth



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Sigmar GABRIEL

German Vice-Chancellor, Minister for Economy and Energy

When I am travelling abroad, many people ask me about the energy reforms taking place in Germany. And of course about the related challenges. After all, for the foreseeable future our energy reforms will be one of Germany's most important projects in the field of economic policy. There are several good reasons to undertake the reforms: Firstly, we are an industrial country which wants to get out of nuclear power and to boost the proportion of renewables. Secondly, we want to reduce our dependency on imports of oil and gas from around the world. Thirdly, the measures will help us meet our climate targets. Fourthly, the changes will result in the development of new technologies and thus new high-growth sectors with new jobs. And lastly, Germany wants to serve as a model for other countries and show that a sustainable energy policy can be economically successful. After all, the more countries on board, the more successful our efforts to mitigate climate change and to protect our resources will be. Furthermore, we need to further strengthen the central role played by energy efficiency as the second pillar of the reforms.

What becomes very clear in my discussions, however, is the high level of interest in finding common solutions. Here, it is very important for us to "think European" in our energy reforms and to remember the cross-border and international perspective in all our measures. Given its central location in Europe, Germany is linked in many ways in terms of the energy sector and energy policy with its neighbours, via the internal energy market and our cross-border interconnectors. We do not intend to - indeed, we cannot - manage the energy reforms on our own. We are therefore constantly co-ordinating our energy policies with our neighbours, discussing them in the EU, and have embarked on a number of joint projects in the

field of energy policy with neighbouring countries. I would like to build up this co-operation even more.

The EU is already putting important policies in place for the energy sector. The European level also has a major influence on the goals of energy policy themselves. This is reflected not least in the current debate about the climate and energy framework for 2030 and the related target-setting in the field of greenhouse gas reduction, the expansion of renewables and the increase in energy efficiency. It is therefore important for Europe to pursue an ambitious climate and energy strategy. So I am delighted that 13 EU member states issued a joint declaration for the Energy Council at the beginning of March, clearly stating their agreement on a binding EU target of at least 27% for renewables.

The German Renewable Energy Sources Act has been a success: it has helped renewables to emerge from a niche to become one of the mainstays of Germany's power supply, generating 25% of our electricity. In the near future, they will become the dominant source of energy for our power supply. However, if the roll-out of renewables is to continue successfully, the Renewable Energy Sources Act will now need to be revised and made more market-oriented. The German government decided on the principles of a fundamental reform of the Act on 22 January. The revision will mainly aim to significantly slow the ongoing rise in costs, to distribute the costs more fairly, to control the expansion of renewables so that people can plan, and to push ahead with the market integration of renewables. This is also an important aspect if the current high level of public acceptance enjoyed by the energy reforms is not to be endangered.

Whilst all of this is true, it is also necessary to remember the following: we will continue to need scope to partially exempt energy-intensive companies from the renewables surcharge, particularly in view of the very high energy costs which our German companies have to pay compared with their international rivals. This relief in the context of the Renewable Energy Sources Act is very important if we are to maintain the competitiveness of our industry and thus our jobs. However, we want to restrict such exemptions from the surcharge to those companies which really

need it if they are to remain competitive. After all, the higher the number of companies enjoying partial exemptions, the more the other consumers will have to pay.

As we implement our energy reforms, equal importance is being given to the goals of security of supply, economic viability, and environmental compatibility/mitigating climate change. This is our "triad of energy-policy goals", which continues to provide our orientation.

Let me add a few words about energy research: we regard it as an important strategic element of energy policy and are therefore targeting it clearly at the needs of our energy reforms, which will require progress on energy efficiency and renewable energies. The German government's energy research programme is being continued with great intensity and addresses overarching and systemic research themes in fields which are of particular relevance to our reforms. Our energy research aims to accelerate the development of innovative technologies and thus to rapidly open up the potential for cost-cutting and improving our energy security in order to facilitate our reforms.

Our energy reforms are generating substantial opportunities not only for Germany, but also for Europe and the entire world. We have succeeded in developing new, internationally competitive technologies, particularly in the fields of renewables and of energy efficiency. This has created new fields of business, resulting in more than 300,000 jobs in the field of renewables alone. Also, we are making ourselves less vulnerable to the volatile world market prices for fossil fuels. Renewables are on track to become the dominant technologies for power generation in Germany.

We need to make a success of the energy reforms and at the same time to boost the security of supply and the competitiveness of our companies. Because it is clear that the energy reforms inevitably come with a price tag attached, economic viability must be a central criterion as we implement them. If we master this challenge, there is every likelihood that our "Energiewende" will serve as a model for other countries around the world.

Looking ahead to 2030: perspectives for a renewed European energy project



Thierry REPENTIN

French Minister in charge of European Affairs

More than sixty years ago, the six founding nations proved that energy could be a driver of political integration by creating the European Coal and Steel Community. Ever since, the European energy project has been at the core of the development of the European Union itself. It has experienced its own successes and fallbacks, whilst setting the path for a more integrated energy community. Today, as the EU faces the greatest economic crisis since its inception, it appears clearly that we need to reinvigorate our aim towards a more competitive, sustainable and secure functioning of our energy market. This is why I believe that we should use the year 2014 as a stepping stone and voice bold targets to be reached by 2030.

To live up to the expectations of the 21st century, our longstanding energy venture must tackle internal hindrances, external pressures and new global challenges. Yet, if we succeed, we could shift towards a more sustainable model of development, which bears perspectives of both growth and increased solidarity, thanks to energy.

Firstly, 2014 will remind us that we face two first-hand obstacles, which were re-stated by our heads of state and government in May 2013. Indeed, the completion of the internal energy market and the end of energy islands remain key hurdles which we need to overcome. Targeted investments, together with stronger policy coordination, can enable us to move forward. This is all the more necessary at a time when countries like France and Germany are engaging in ambitious energy transitions. The next European Council meeting, on March 20th and 21st, which will be partly dedicated to energy and climate, is an important opportunity to look back at the

progress which has been made and to set out further priorities in this respect.

Second, beyond obstacles within the EU, external factors exert additional pressure on our common project. As such, we need to be pragmatic in dealing with our dependency on energy imports and with international developments which lead to favoring coal to cleaner raw material. In its January 2014 report on energy prices and costs, the European Commission highlighted that electricity costs are likely to increase in the EU until 2020, partly due to rising fossil fuel costs. Closer coordination of our policies can only lead to a more strategic and efficient impact of the EU at an international level.

High electricity costs threaten both our industry and the poorest European citizens. Indeed, guiding energy principles defined at the European level have direct social and economic consequences in our communities. As energy bills carry on taking up an important share of companies' and households' budgets, we need to show solidarity and to send clear signals to all the actors of the energy market to make sure that the right investments are being made.

Third, this year will be crucial in the run up to major international negotiations on global warming. Indeed, at the end of 2015, Paris will host the 21st conference of the parties on climate change (COP21). This international event is a tremendous opportunity for the EU, together with the rest of the world, to get a firmer grip on our future and to initiate the necessary transition towards a less carbon-dependent world economy. This is an obligation if we are to limit the global temperature increase to 2 degrees above current levels. This global challenge can only be undertaken thanks to an agreement at the European level. It is an essential first step towards a binding and universal agreement by 2015.

In this perspective and in order to further the targets we had set ourselves for 2020, the Commission has made sound propositions, amongst which the reduction of 40 %

of greenhouse gas emissions and the increase of the share of renewable energy in the final consumption of the EU to 27 % by 2030. France has welcomed this proposal. It makes up for an excellent base for the Council and the European Parliament to work together to make the most out of 2014 and to ensure that we engage on a common path with all of our international partners.

Lastly, 2014 could also enable us to reconcile ambitious climatic targets with a strong vision for European industry. The March European council meeting will highlight the need for the industry share of GDP to reach 20 % by 2020, whilst initiating discussions on the 2030 energy and climate framework. Forward-looking energy choices can carry concrete technological and industrial developments at the European level. Research in the fields of hydrogen or carbon capture and storage for instance, are promising both in terms of employment prospects and of efficiency improvements. We have both the resources and the knowledge to make use of this potential to boost our competitiveness in the coming decades. We have increased the EU budget for research, which can support the generation of more sustainable activities.

For all these reasons discussions between Member States in the coming weeks will be critical. Whilst taking into account the specificities of each national energy mix, we have the valuable opportunity to define a different European horizon for 2030, which can improve the life of European citizens and benefit the EU as a whole.

The Lack of a real internal energy market and its impact on the european industry competitiveness



Alberto NADAL BELDA

Spanish Secretary of State for Energy, Ministry of Industry, Energy and Tourism

According to Commissioner Antonio Tajani, Vice-President of the European Commission, "Industry is at the heart of Europe and indispensable for finding solutions to the challenges of our society, today and in the future. Europe needs industry and industry needs Europe."

The 2020 EU's growth strategy for the coming decade had, as a main goal, the EU become a smart, sustainable and inclusive economy. In this sense the Union set five ambitious objectives, on employment, innovation, education, social inclusion and climate/energy, to be reached by 2020. As a consequence, each Member State has been adopting its own national targets in each of these areas. In fact, in order to underpin the strategy, the European Commission has set up a yearly cycle of economic policy coordination called the European Semester. Each year the European Commission undertakes a detailed analysis of EU Member States' programmes of economic and structural reforms and provides them with recommendations for the next 12-18 months.

In the framework of its medium and long term strategies, Europe must place industry center stage to remain a global economic leader. In fact, the European Commission firmly committed to develop a sustainable and strong industrial sector. As a logical consequence, that commitment should have been appropriately reflected in the current 2030 strategy. Reality shows, for instance, a drop of the industrial sector contribution to the EU's GDP in 2012. Thus, the way the economic crisis has spread rapidly from country to country underpins the need of EU industrial policy targets based on competitiveness

and financial sustainability to guarantee both, economic growth and job creation.

Unfortunately, in spite of the fact that industry competitiveness requires urgent action, the EU's 2030 goals do not include specific and clear measures. Among other actions, it would be imperative to reduce energy costs, which constitute the main input of the industry. It would also be imperative that a real European energy market be developed to guarantee affordable and stable access to energy for industry consumers, to reduce market distortion and to strength competitiveness of the European industry in a global market. Moreover, adequate and reasonable support schemes for renewables should be implemented in order to reduce their impact on energy costs.

In this sense, the completion of the Internal Energy Market, which would imply achieving by 2014 the full integration of Europe's energy networks and systems and opening up energy markets further, is essential in making the

transition to a low-carbon economy and maintaining secure supplies at the lowest possible cost. Being understood that this internal market should not be considered as an end in itself, it is a key instrument in delivering what EU citizens aspire to most: economic growth, jobs, secure coverage of their basic needs at an affordable and competitive price, and sustainable use of limited resources.

Nevertheless, it is not possible to talk about an Internal Energy Market without considering the need of ensuring adequate electricity interconnections, whose benefits should be clearly taken into account, given that international interconnections generate several advantages, not only at a national level in those countries that are directly connected, but also at a regional and European level.

Interconnections allow national electricity systems to achieve a greater reliability in covering the demand and a greater stability and security of supply. They also facilitate commercial energy



exchanges, increasing competition by exploiting the differences in energy prices between inter-connected electricity systems. Therefore, electricity is finally generated using the most efficient technologies and transported from where it is cheaper to where it is more expensive. As a result, interconnections are crucial for the Internal Energy Market and a true added value for the interests of the EU's industry sector.

In its recommendation on Spain's 2013 national reform programme the European Council determined that Spain should take action within the period 2013-2014 to, among others, tackle the electricity tariff deficit by adopting and implementing a structural reform of the electricity sector and intensify efforts to complete the electricity and gas interconnections with neighbouring countries.

As for the electricity tariff deficit and the implementation of structural reforms, the new Law of the Spanish power system is fully into force since the end of 2013, after consultation process with

sector agents and supervision of independent agencies. Through this reform, the Government aims at ensuring a sustainable energy system from the environmental, economic and financial perspectives as well as at achieving a competitive sector in terms of both, consumer prices and industry costs.

Moreover, the new Electricity Act provides for a stable electricity system and a stable regulatory framework, allowing the system's financial stability and further development of renewable energies.

Concerning the Spanish electricity and gas interconnections with the European system important efforts have already been carried out. These interconnections will play a key role in the completion of the Internal Energy Market fostering at the same time a greater integration of renewable energies into the European electricity system. In particular, the increased proportion of intermittent renewables needed to meet the EU targets will mean greater fluctuations in supply

and demand and the Spanish interconnection allows other EU countries to increase their renewable energy consumption taking advantage of the enormous potential of renewables in Spain.

However, the Spanish electricity system does not reach yet the minimum level foreseen by the European authorities as their commercial exchange capacity with the European system is still far below the recommendations of at least 10% for interconnection capacity between national electricity systems.

The implementation of the EU targets has implied important efforts and even painful sacrifices that are being assumed by the Spanish public administration but also by the industry sector and all consumers. In this sense, there are relevant differences among EU Member States as long as the level of demand and the level of commitment regarding their respective national objectives do not seem to be balanced enough. Thus, Spain has to face higher costs than other Member States to accomplish the EU objectives.

The lack of specific targets concerning the Spanish interconnections as well as the limited references to the need to ensure adequate mechanisms to improve industry competitiveness in the EU's 2030 road map jeopardize the completion of a real Internal Energy Market, which is, in the end, the main element to reduce energy costs.

Within this context Spain will not be able to commit additional energy policy targets unless its interconnection capacity between the country and the European infrastructures can be guaranteed and unless a better distribution of the respective EU Member States obligations is implemented, in such a way that the Internal Energy Market becomes a reality.



The investment in nuclear power in Poland



Janusz PIECHOCIŃSKI

Polish Deputy Prime Minister, Minister of Economy

The energy policy should embrace various economic conditions and adapt to the rapid evolution of the sector. One of our priorities is to ensure that Poland and Poles have their own, cheap energy that will serve as the foundation of our competitiveness. This approach will guarantee industrial growth. Growing economic needs enforce an increase of energy production. In addition to constructing new, highly effective coal-fired power plants, it is necessary to look for other sources of energy. Likewise, nuclear energy cannot be rejected in advance.

The Polish Nuclear Power Program (PNPP) adopted by the Government of the Republic of Poland on 28 January 2014, marks the opening of a new chapter. It is the first document that sets forth new provisions related to the Polish energy mix. It covers all –conventional energy, renewable energy sources, as well as nuclear power. In line with our proposal, nuclear energy will supply 10% of the country's electricity by 2030 at the latest. Our government's decision also results from the obligations imposed on Poland in connection with implementation of the EU climate and energy policy in terms of CO₂ reduction. In fact, we have to lower emissions caused by the power generation sector by 20 percent by 2020, and the European Commission is pushing for further radical decisions. This justifies the introduction of zero-emission source of energy, i.e. nuclear power. According to our estimates, investments in this area of a total capacity of 6,000 MW will produce savings of 35 million tonnes of CO₂ emissions per year.

Going back to the problem of meeting growing demand for electricity, it should be noted that according to the EUROSTAT (2011), Poland is ranked 24th among EU countries in terms of annual consumption of electricity per capita. The figure amounts to about 4,100 kWh, and is much below the average of the EU-15 (about

7,500 kWh). Experts predict that the demand for final electricity will go up by about 36 percent. On the other hand, the old power plants will have been shut down by 2020 which will bring about output loss up to 6 MW and yet another 6 MW by 2030. In total, 36 percent of the current power will have been shut down for technical reasons by 2030. In general, apart from adding new power sources of about 12 MW, we need to supplement the power balance by 12 MW by 2030. This means demand for power sources with a value of approximately 24 MW, which accounts for two-thirds of the existing power plants. Those numbers show the amount of the work which remains to be done.

Bearing this in mind, we have been consistently pursuing activities aimed at introducing nuclear power into the system. The Resolution of 13 January 2009 adopted by the Council of Ministers concerned, among other things, the cooperation between Polish Energy Group (PGE) and the Government's Plenipotentiary for Nuclear Power in drawing up and implementing the Polish Nuclear Power Program. Similar provisions regarding the leading role of PGE as the Investor of Poland's first nuclear power plant are included in the Regulation of the Council of Ministers of 12 May 2009 on the appointment of the Government's Plenipotentiary for Nuclear Power. Adopted in January 2014, the Program specifies the roles and scope of responsibility of institutions responsible for its implementation and covers the issues of ensuring nuclear safety and radiation protection. Introduction of nuclear energy is a long-term process, and in the Polish case, it is required to set up nearly the entire infrastructure supporting the development and operation of nuclear power, including among others legal regulations, research and industrial facilities and staff training system. The Program also sets out a detailed scope of measures and the schedule for the construction of two nuclear power plants and the preparation of regulatory and organizational framework. We should decide on the location and sign the contract for the selected technology by the end of 2016. The next stage involves the development of technical design of the power plant by 2018 and obtaining all required regulatory approvals. In the fourth stage, by the end

of 2024, the building permit should be obtained, construction and connection of the first unit of the first nuclear power plant should be completed and construction of subsequent units should start. The fifth and last phase envisages the continuation of work and launch of subsequent nuclear power units/plants, as well as completion of the construction of the first nuclear power plant in 2025 - 2030. A second nuclear power plant should be ready by 2035.

Let me emphasize that the Polish Nuclear Power Program has been subject to a broad-based domestic and cross-border consultation. Starting from 2011 the interested countries have received from us the draft document along with projected impact on the environment. Ten countries were invited to participate in the consultation process, namely Lithuania, Latvia, Estonia, Sweden, Denmark, Germany, Austria, Czech Republic, Slovakia and Finland. Lithuania, Latvia and Estonia withdrew from the consultation. Formally, the process ended with signing a protocol with Austria in May 2013.

The introduction of nuclear power does not only entail the construction of nuclear power plants and diversification of the Polish energy mix. It also provides a positive impetus for economic, social, technological and regional development. The highest nuclear requirements and standards will have a beneficial impact on the technical culture of the Polish energy sector and industry. The development of research and industrial infrastructure will contribute to creation of a new sector, offering employment opportunities to our top-notch experts. Let me remind you that our companies such as Elektrobudowa Katowice, Rafako-Raciborz, Rafamet SA, Fakop-Sosnowiec, ZT-B POLBAU sp. z o.o. and ENERGO MONTAZ-Polnoc Gdynia have been cooperating with the global nuclear sector for many years.

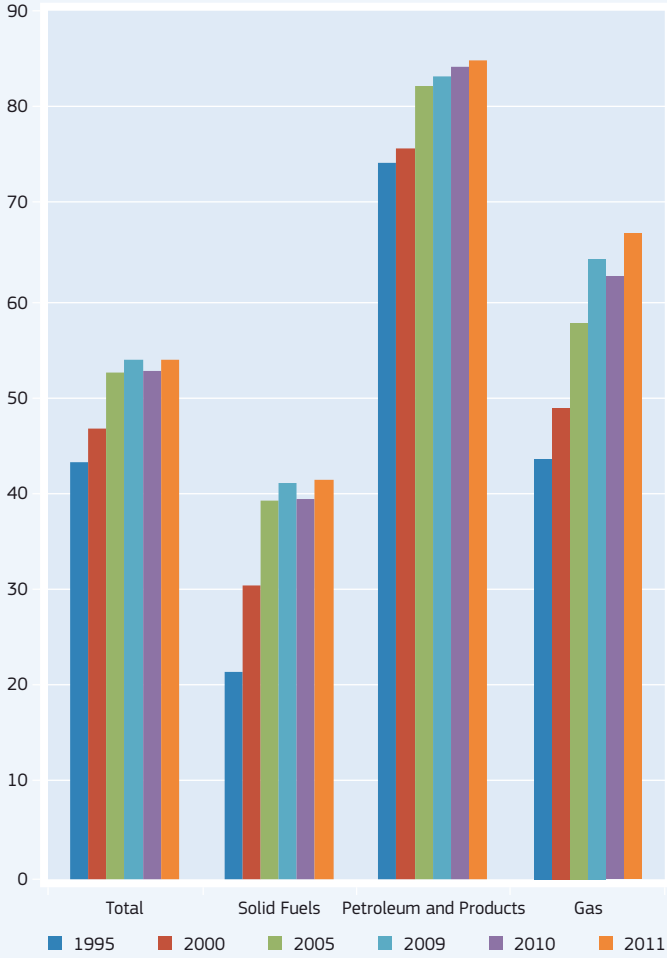
To sum up, I would like to emphasize once again, nuclear energy does not mean giving up coal and renewable sources. However, neither conventional energy nor renewable sources will be able to meet growing demand. Nuclear energy will complement Polish energy mix.

EU-27 Energy Import Dependency

By Fuel

Import Dependency (%)	1995	2000	2005	2009	2010	2011
Total	43.2%	46.7%	52.4%	53.8%	52.6%	53.8%
Solid Fuels	21.4%	30.5%	39.2%	41.1%	39.4%	41.4%
Petroleum and Products	74.3%	75.7%	82.2%	83.2%	84.1%	84.9%
Gas	43.5%	48.9%	57.7%	64.3%	62.4%	67.0%

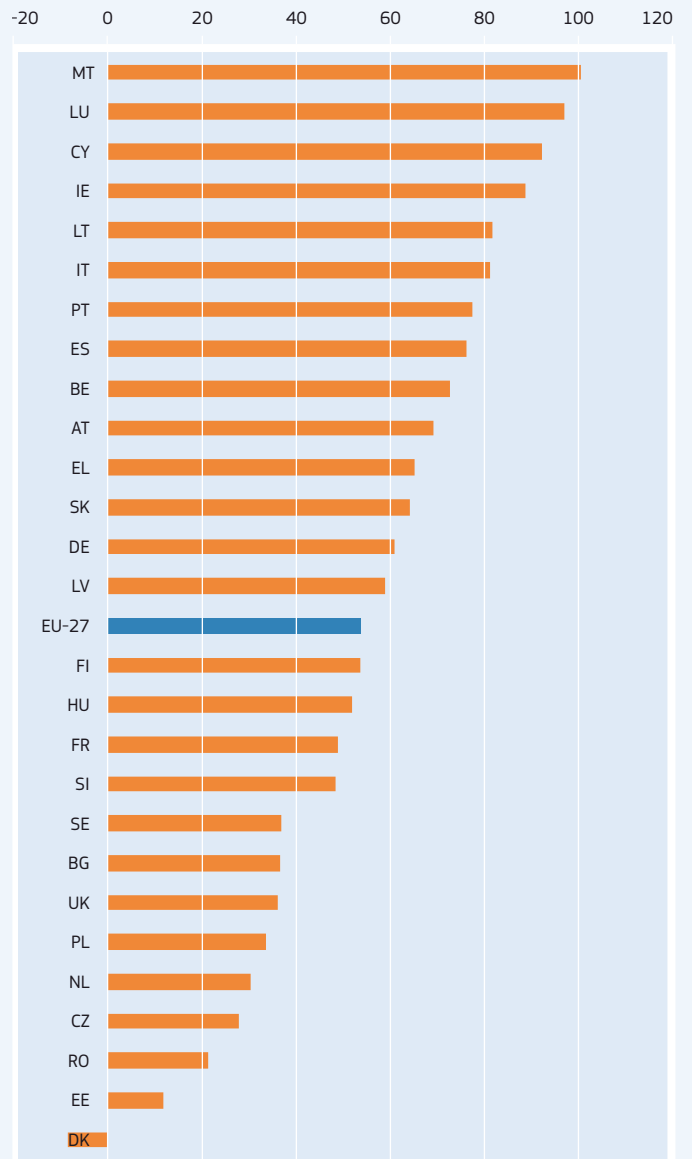
EU-27 Energy Import Dependency – By Fuel, 1995-2011 (%)



Source: Eurostat, April 2013
Methodology and Notes: See Appendix 13 – No 1

EU-27 Energy Import Dependency

In 2011 (%)



Source: Eurostat, April 2013
Methodology and Notes: See Appendix 13 – No 1



The European Union, champion of a competitive low carbon economy



Dominique RISTORI

General Director for DG Energy, European Commission

The European Union has embarked on a long-term strategy to develop a competitive low-carbon economy. In 2008, it agreed at an international level on targets which included the reduction of greenhouse gas (GHG) emissions by 20% by 2020. The EU was the first to bring proposals for an economy-wide target to international negotiations, and its leadership had a significant impact worldwide: following the 2009 Climate Conference in Copenhagen, more than 90 developed and developing countries made 2020 pledges. Seven years later, the EU is on track to meet its commitments and is a leading force in the international negotiations to agree on the post-2020 approach to GHG reductions.

On the 22 January of this year the European Commission presented a proposal for a Framework for climate and energy policies to ensure progress towards a competitive, secure and sustainable energy system by 2030. The proposal foresees a target for reduced GHG emissions by 40% below the 1990 level, an EU-binding target for the share of renewable energy consumed of at least 27%, and renewed ambitions for energy efficiency policies. These proposed targets are based on solid economic analysis.

The 40% GHG emissions reduction target is an ambitious but yet realistic objective that puts the EU on the cost-effective pathway to reach the Union's climate objective for 2050. Agreement on this target is expected to provide impetus to the international climate negotiations and encourage other countries to take on equally ambitious targets. Meeting this goal will necessitate strong efforts, even if the policies already agreed upon

– if fully implemented and fully effective – are expected to result in a 32% reduction relative to emissions in 1990.

As regards renewable energy, the EU has become the world's leader in terms of investment in the field, having installed 44% of renewable electricity capacity (excluding hydroelectricity) by the end of 2012 and driving technology developments and cost-reductions with regard to e.g. land wind and solar energy. A 2030 target for renewable energy of at least 27% at EU level is a positive signal to continue investments in renewable energies as a means of growth; but deployment must become more cost-effective and more market based. With an ambitious but achievable EU binding target, we will ensure legal certainty for investors while at the same time giving flexibility to Member States to choose policies best-matched to their national energy mix and main characteristics.

Energy efficiency remains at the top of the EU's priorities, and is key to the EU's industrial policy. It has the considerable advantage of facilitating at the same time the achievement of economic growth, a renewed and dynamic industrial competition, and the creation of jobs. It allows savings for consumers and promotes less dependence on energy imports. The European Commission will assess, by mid-2014, if Member States are collectively on track to reach the 2020 energy efficiency objective and, in this context, it will come forward with more detailed proposals on the role of energy efficiency in a 2030 perspective, including financial instruments.

The long-term approach to meeting climate and energy objectives requires the mobilization of all actors under a coordinated framework, while at the same time ensuring further market integration, and increased competition. This is why the European Commission is proposing a new energy governance system.

But this is not all. To ensure a radical change, several areas will have to be addressed simultaneously to facilitate this transition.

First, industry will need to focus not only on basic industry, but also on advanced value-added manufacturing, establishing a public-private partnership on projects like Eco Industries.

Second, key enabling technologies will play a crucial role too, targeting a number of areas ranging from intelligent materials to high performance production; facilitating the pan-European access of companies to technological infrastructure will also play an important role.

Third, it will be crucial to ensure access to sustainable raw materials at world market prices for the production of bio-based products.

Fourth, clean vehicles will also be at the core of the strategy, by means of the adoption and full implementation of the Commission's proposal on alternative fuels infrastructure. Clean and energy efficient transport, and common standards for electric cars will be a key point.

Fifth, buildings are responsible for almost 40% of energy consumption and about 36% of all greenhouse gas emissions in the EU. Focusing on building renovation in parallel to more efficient new buildings, as well as investing in sustainable construction will therefore be crucial.

Sixth, the EU must invest considerably in inter-connections and smart grids capable of handling multiple variable inputs, balancing power and delivering consistent supply to consumers, developing capacity mechanisms based on regional approaches will secure the market and facilitate integration of renewables.

The changing energy landscape is one of the greatest challenges in the coming decade, as well as a great opportunity for Europe to continue to take the lead. The new energy and climate framework will drive the EU towards competitiveness and innovation for the benefit of the whole society.

A new 2030 climate and energy framework for the EU



Anne DELVAUX

MEP, Group of the European People's Party (EPP),
ENVI rapporteur on the 2030 framework for climate and energy policies INI report

Following the publication on January 22nd of the European commission's green paper on a policy framework for climate and energy from 2020 to 2030, the European parliament decided to express its views on the issue - one that is vitally important for the future of Europe - in an own-initiative report.

As there were two committees looking into this issue, two rapporteurs were appointed. I had the honor of being appointed for parliament's environment, public health and food safety (ENVI) committee. It quickly became clear that the parliament was broadly divided into two opposing views: those that supported a framework with the single goal of reducing CO2 emissions and those who backed an approach with three targets, keeping the structure of the 20-20-20 framework.

As the commission and parliament diaries were particularly busy, it was impossible for the commission to wait for the results of a plenary vote on the own-initiative report before publishing its views. I would like to make several points about this issue:

Firstly the binding 40 per cent target for reducing CO2 emissions matches the target set by the parliament. This must help us reach our long-term target, as defined in the 2050 roadmap.

Second, the 27 per cent target for the renewable share in our energy mix, even though also binding, is clearly not ambitious enough. If we continue as we are, we will likely achieve a 24 per cent improvement by 2030. It is not exaggerated to say that the commission's approach is not very daring. I can understand it, considering the fact that national (and even regional) support schemes for renewables, in some Member States, have had a negative impact on energy bills for end-consumers. But would it be relevant to blame the EU target for measures taken at national level? Especially if lessons have been learnt and addressed. This is the reason why we insist on investing, in parallel, in the modernization of our infrastructures and grids, just like the 2050 roadmaps suggest, as they have both been recognized as "no regret options", if implemented together.

Third, the new governance model laid down by the commission is a real cause for concern for the parliament, as we get the feeling that the commission is trying to sideline us by only including member states and itself in the process. If the commission continues in this vein and confirms it in future legislative proposals, we will have to expect a reaction from MEPs, which certainly doesn't want to be relieved of its prerogative.

Fourth, regarding the reform of the emission trading scheme (ETS), if the commission correctly identifies the exact problem and solutions, forecast for 2021, it will be much too late. To save the ETS, there needs to be a reform as soon as

possible or the low price of carbon will never be able to fulfil its role.

Finally, I must mention the one thing that has not been touched on and that is energy efficiency. While I understand the need to wait for the review of the relevant directive before making an official announcement, the importance of energy efficiency, considering its numerous benefits on growth, on our energy dependency and on the reduction of our energy bills, should have been confirmed without delay!

It is important that parliament expresses its views clearly and forcefully on the framework that it would like. I am delighted that last week's plenary vote confirmed the pathway mapped out by the joint ENVI and industry, research and energy committee, defining a framework with three binding targets, including 40 per cent energy efficiency and upholding the plan to introduce structural reform to the ETS.

The parliament has clearly made these two measures - ETS reform and energy efficiency - the cornerstones of its vision for 2030. I would just like to remind that, as well as reducing our dependence on countries that do not always respect our European values and significantly cutting our spending on energy, successfully reaching the 40 per cent energy efficiency target would, without any additional measures, reduce our CO2 emissions by 50 per cent, as well as resulting in renewable energies representing 35 per cent of our energy mix! The cheapest energy will always be the energy that we don't use. I urge the council to listen to this common sense message from MEPs.



Binding targets will benefit Europe as a whole



Britta THOMSEN

MEP (S&D), ENVI Shadow rapporteur, on 2030 framework for climate and energy policies, INI report Group of the Progressive Alliance of Socialists and Democrats in the European Parliament

The European Parliament voted in favour of an ambitious approach to the 2030 framework for climate- and energy policy, continuing the architecture of three ambitious and binding targets on GHG reductions, renewable energy and energy efficiency. They did so with one objective in mind: improving Europe's energy situation.

Today, Europe is completely dependent on energy imports. In 2012 Europe spent more than 500 billion Euros on foreign coal, oil and gas. This money could be better spent in Europe.

Therefore, Europe needs to invest in energy efficiency, in order to use energy more efficiently, and in the creation of our own indigenous energy source: renewable energy.

This will greatly enhance European competitiveness in the future. It will optimise production, making it possible to produce the same output with a smaller amount of energy. And it will put

Europe on the forefront for green technologies, on which demand in the future will rise globally.

Finally, it will reduce the negative impacts of CO₂ on the climate, reducing the number of natural disasters that are very costly, both socially and economically.

In 2008 the European Parliament agreed on the 2020 framework for climate and energy policy. I have been shadow rapporteur for S&D on both reports, and one major difference is impossible not to notice. While the framework of three binding for 2020 was agreed upon by an overwhelming majority - and has been a tremendous success - it was not the case this time.

Strong opposition fought against a framework of three binding targets, especially specific goals for renewable energy and energy efficiency. The main argument for this is a fear that the costs will be too high. This fear was based on incorrect presumptions.

Because, while a transition to a greener future may demand investments now, those investments will create lasting European jobs and cheaper energy in the long run.

According to Commissionaire Hedegaard the current plans for improvements in our energy efficiency has the potential to create 500.000 jobs before 2020.

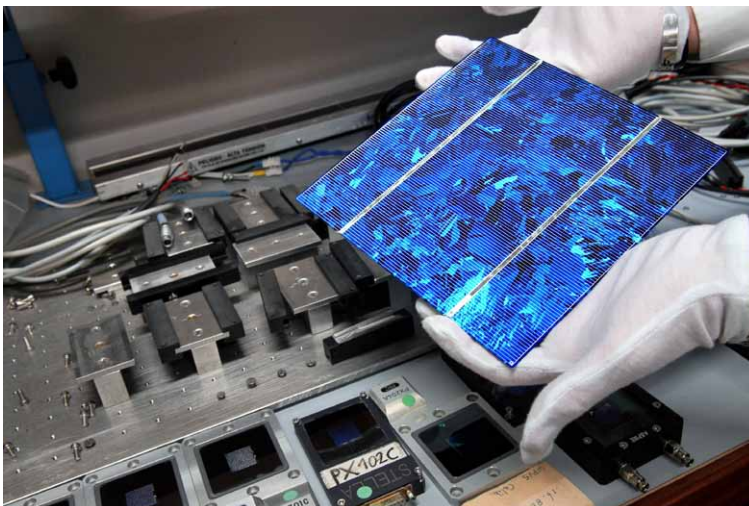
Moreover, studies show, that while the price on fossil fuels will rise in the future, the price on renewable energy will fall.

Binding targets is the only way to ensure, that Member states reach the targets, that have been agreed on and also the only way to attract investment

By agreeing on binding targets for all member states in the 2030 framework, the EU will send a clear message to the industry: investments in renewable energy and energy efficiency will happen in a stable and predictable situation.

We want businesses to know how the European energy situation is going to evolve up until 2030. Predictability will allow for investment in key energy sectors and thus create green possibilities and green jobs. I strongly urge the Commission and the member states to consider that need for predictability.

There is still plenty of work to be done in order to secure a greener and more energy independent Europe. My hope is that the heads of state and government have listened to the Parliament and remember this during the upcoming talks.



More EU in Energy



Amalia SARTORI

MEP, Chairman of Committee on Industry, Research and Energy (ITRE)
Group of the European People's Party (EPP)

It is well known that a nation's competitiveness depends on its productivity, underpinned by the value of a nation's products and services, measured by the prices they can command in open markets, and by the efficiency with which they can be produced. Productivity in turn, allows a nation to support high wages, attractive return to capital, social and technical progress, a strong currency and high standards of living. An affordable, secure and sustainable energy system is the key for maintaining high economic competitiveness, thus in recent years energy policy has moved to the centre of European politics.

The EU first climate and energy package has paved the road to achieve important results in terms of energy efficiency, greenhouse gases reduction and use of renewable energies: three key issues to change the way we fuel our economy. Nonetheless, a more pragmatic energy policy is necessary to support the shift to decarbonise our production system by 2050.

To maintain EU's competitiveness and leadership role as the second largest economy in the world much still needs to be done. The new policy framework for climate and energy from 2020 to 2030, is exposing the three most pressing energy issues that require further reinforced action: completing the internal market for reducing energy costs and prices, the need to increase the use and integration of renewable energy sources and the efficiency of the distribution system.

Energy is a key input in most production processes. For this reason, its cost and intensity of use represent a major competitiveness factor to be addressed. On top of the increasing fossil fuel prices trend determined in international markets,

in recent years the energy price gap between the EU and many major economic competitors has also been increasing. The US shale gas revolution has brought about greater price differentials - us Europeans now pay twice as much for energy compared to the US and also much more compared to China and Korea and we are heavily depended on foreign sources of energy, in particular from Russia. Furthermore, although member states have seen an overall steady increase in consumer prices for gas and electricity, the discrepancies of domestic prices between Member States remains substantial.

The full achievement of an internal energy market is the only existing key for reducing the price we pay for our energy needs. The challenge we have in front of us is not only the correct and full implementation of the legislative packages already in force to reach an effective liberalisation and harmonisation of the energy market. We have to clarify our approach to the objectives we want to have in our energy policy: not only new revised targets for emissions reduction by 2030, that must leave each member States the freedom to choose which means to put in place to reach them. But in order to calm down the energy prices pressure on our economy we must also act in two fundamental directions. The harmonisation of all the policies in favour of renewable energies, studying mechanisms more in line with a market economy to replace the so different feed-in tariffs existing in EU. And the smart innovation needed to develop still immature technologies and to bridge the gaps in the infrastructures sector.

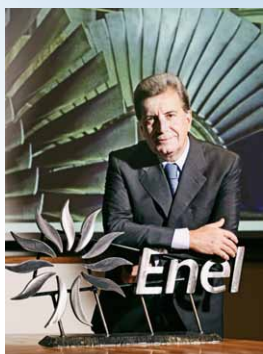
The EU's infrastructure for electricity, gas and oil are obsolete and not suited to meet the future



energy demands or to take up with the rapidly increasing amounts of renewable energy. The EU requires significant investments in Europe's grid and generation infrastructure. Accordingly to the Commissions estimates, energy systems costs are expected to rise from about 12.8% in 2010 to around 14% of GDP by 2030. The multi annual financial Framework (MFF) for the period of 2014-2020, has allocated 29 billion euros to the Connecting Europe facility (CEF), and of these only 5.1 Billion are allocated to energy infrastructures. These figures, due to austerity driven arguments have been halved from the original allocation of 9.1 billion: less than one twentieth than what European Commission estimates say!

Things could change through a modification in the Treaty, where Member States should agree in leaving more space to the EU action. Nowadays is still a dream mainly for the ones who believe in the necessary political essence the EU must have in the future. But it is so realistic and ever more necessary for our future that we must never forget it.

The EU Climate and Energy Package for 2030



Fulvio CONTI
Enel Group CEO

The recent presentation by the European Commission of a 2030 framework on one single target for the future of the fight against climate change is a sensible move that may give us certainty about future measures. However, there are some doubts about the effectiveness of some aspects of the framework, in particular regarding the effect it will have on the market and subsidies.

The Enel Group welcomes the proposal to adopt a single, mandatory CO₂ target to 2030 in Europe but efforts in the fight against climate change should be shared at global level. The current absence of energy efficiency targets is positive, however there might be a review of this decision as part of the 2014 Energy Efficiency Directive assessment. The binding EU-wide renewables target should be removed, because renewables technology post-2020 will need to be competitive and not require further outside support. The Market Stability Reserve mechanism provides an opportunity to enhance the European Trading System (ETS), especially if its introduction is implemented faster than the Commission currently suggests it will be. Given the present situation, the EU Commission seems to have made a pragmatic compromise between increasing certainty in the policy framework by maintaining environmental goals and not overburdening Member States in a time of economic hardship.

The proposal to adopt a single 2030 greenhouse gases reduction target as part of driving EU decarbonisation is positive as the legally binding nature of the target offers guidance to legislators and administrations. Nevertheless, this target should be linked to the

meeting of a global emission reduction target, in a worldwide approach to the fight against climate change. In fact, the EU is nearly standing alone in the global decarbonisation process. Currently Europe accounts for 12 percent of global carbon emissions and is expected to reduce this share to 7 percent in 2030. Without a global agreement, that we hope will come up at the 2015 UNFCCC Conference in Paris, we risk depressing the European economy whilst not bringing substantial relief to the Planet.

The proposal also guarantees framework stability for investors during a period of high economic uncertainty. Against this backdrop, the economic viability of low carbon technologies needed for the ambitious 2050 EU Roadmap should be taken carefully into account. A single CO₂ emissions target, supported by a proper carbon price signal set by the ETS market will help decarbonise the EU economy by promoting the most efficient technology, ensuring cost-effective emissions reduction and lowering the chance of market distortions. In the longer term, such a target will also provide a cross-sector incentive to cut emissions.

Fragmented subsidies are a potential danger for the whole industry as they distort market mechanisms. However having a number of different targets, individual

policies in each Member State and the wrong type of subsidy have been even more dangerous, as they have put us in the absurd situation of having the highest ever energy prices for both the retail and industrial consumers and the lowest ever margins for utilities.

Correcting the factors above makes a lot of sense to everybody and I believe that a single target will be an improvement. Europe could prove to be the place where you can increase efficiency through the right choice of technology. Some investment will be required, but if we do





not invest in improvements to technology it will be difficult to keep up with competition from emerging markets and the United States, which benefits of lower energy costs.

Not having a binding renewables target for Member States is another positive, but Europe-wide targets should also be removed. As such, the decision to extend renewables targets beyond 20 percent should be left to the industrial decision of companies based on the availability of grid parity technology and natural resources with no subsidies given. Maintaining renewables targets beyond 2020 is not necessary, and furthermore runs the risk of distorting carbon and energy markets as well as undermining the effectiveness of the single CO₂ target. It could also lead to excessive increases in energy system costs by new incentives distorting this decision, as well as undermine the energy sector by speeding up the rate of renewable technology penetration beyond the capabilities of the electricity infrastructure.

The absence of an energy efficiency target is welcome, and similar targets should not be the outcome of the 2014 Energy Efficiency Directive review. We strongly believe in the opportunities offered by energy efficiency in pursuing a sustainable future for the wider energy sector. However, specific energy efficiency targets should not be necessary because the CO₂ target should be sufficient in itself. Energy efficiency policy should focus on supporting smart grids, realising the significant potential of the distribution sector, ensuring a balanced approach across technologies and industries while focusing not only on electricity consumption but also on heating, and on removing the non-economic barriers that slow down the deployment of energy efficient technology.

A new EU governance framework for the development of national plans for competitive, secure and sustainable energy should bring positive results. A common platform facilitating the comparison of Member State's energy plans

could increase transparency and certainty for investors. However it is of paramount importance that the Commission's scrutiny of the plans does not result in a de-facto new burden sharing of the EU's renewable energy target. The Commission should only play a coordinating role in ensuring the exchange of best policy practices and encouraging continued progress toward market liberalisation and integration.

The market stability reserve mechanisms proposed by the Commission is also a positive development. This mechanism should increase the effectiveness of the EU ETS by making the scheme more resilient and able to tackle excessive variation in demand, as well as prevent detrimental levels of market surplus. While maintaining sustainable market balance, the reserve mechanisms should still ensure the effective price disclosure and predictability that are necessary for the proper functioning of the market. Changes in the annual auction profile will be based on automatic adjustments related to historical data, without affecting long-term supply. However, in contrast with the legislative proposal, the market stability reserve should be introduced before 2021 in order to strengthen its short-term effects, as well as the use of surplus emission rights backloaded to modify the auction profile in 2018. Starting the mechanism before 2020 would speed up a much needed rebalancing of the EU ETS market.

Commission report on EU energy prices

A preliminary assessment of the report appears to show a failure to address some of the most pressing issues surrounding sound price comparisons. In some cases, Eurostat data comes from assumptions made by Member States during their own data collection, which partly invalidates the conclusions of the Commission's analysis. The Commission needs to have a more active role in ensuring that national and European institutions adopt a uniform methodology that would avoid misleading price comparisons.

Europe is now taking fundamental decisions on its post-2020 energy and climate policy



Monica FRASSONI

President of the European Alliance to save Energy and Co-chair of the European Green Party

The first step was the communication on the package presented on 22 January: The Commission proposed a binding target for the reduction of CO₂ consumption by 40%; a EU wide 27% target of renewables; and nothing at all for energy efficiency, at least not before the review of the EE directive that will take place later this year. The package – if it remains unrevised – will have a serious impact on the future competitiveness and resilience of Europe's industry and society at large.

The staggering lack of courage and vision shown by the Commission risks greatly reduce investment in the companies that are developing and delivering energy-efficient technologies. They are putting companies that develop different solutions essential to the delivery of the transition to a low-carbon society, that manage energy costs, that wean us off our costly dependence on fossil fuel imports, that ensure the future prosperity of European citizens at risk. Shortly after, this Commission proposal was accompanied by a vote in the European Parliament which adopted a report asking for three binding targets, in continuity with the 2020 package. The EP target for energy efficiency (which the Parliament wants to see at 40%), that the Commission decided to leave behind, is now back on the table. The Parliament understands the role of energy efficiency as a driver of competitiveness, of the security of our energy supply and of sustainability. It also sees how, even though the three targets EE, RES and GHG are not related strictly to the same problems (EE is about improving the way we consume energy, RES is about boosting new clean sources of energy while CO₂ reduction target is about lowering the quantity of CO₂ in the atmosphere) they are equally important and will mutually support the achievement of

cost-effective and cost-efficient climate and energy policies. This is not just about climate protection. We know the positive economic consequences that giving priority to energy efficiency will lead to. According to the European Alliance to Save Energy (EU- ASE), even a modest binding target of at least 30% reduction in demand from investments in energy efficiency, would reduce energy costs and save almost €50 billion per year by 2030. It will also help create up to one and a half million new jobs. A reduction in energy consumption will also save up to €200 billion per year, and reduce our total emission of CO₂ by about a third. Support for energy efficiency could eventually see a 1% growth, in Europe's GDP by 2030. EUASE, as the majority of the EP, considers that 40% EE will represent the minimum acceptable target to orientate policies and finances in the right direction. Along with a EU binding energy saving target for 2030, energy efficiency technology and solutions must be supported by EU industrial research and innovation. These are the keys to guide our transition to a low-carbon economy and their policies must match the needs of the market. Already existing European initiatives, such as the Covenant of Majors, Smart Cities and Communities and the European Innovation Partnership, should play a role to concretely implement at the local level energy efficiency policies and to allocate resources better than in the past for research and innovation. Energy research funding under Horizon 2020 is another key part of how the EU must fund energy innovation in homes and business, smart grid transport and logistics, energy storage and the uptake of energy innovation for Europe's markets. Research into real building performance (the difference between designed and built performance) has to be prioritized. Europe needs to get serious about energy efficiency. It's the best remedy for rising energy prices, Europe's energy dependence and climate change. More importantly, it's one of the best opportunities for creating innovative, long term jobs for Europe's future. Our detractors often argue that EE investments are too expensive: a popular argument in time of economic crisis, but

yet, incorrect. Energy savings resulting from cost-effective EE measures reduce energy demand and thereby reduce: the net costs of the energy system, which leads to lower energy prices for all energy users, and the net energy cost for the individual who makes the energy savings. Ecofys has estimated for every €1 of direct energy cost savings, an additional €1 could be saved due to lower energy prices. Therefore, net additional annual cost savings of the order of €100 billion can be expected on top of the €107 billion that will result from implementing cost-effective energy savings measures. In addition, regardless of whether the EU chooses an ambitious EE pathway or not, between €800 and €1000 billion will be needed until 2020 for investments in the energy sector in Europe for new energy infrastructures. This has an impact on energy costs and, consequently, on energy prices. Thus, the incentive to reduce energy consumption and investments in energy generation and thereby also help ensure competitive, affordable energy prices for citizens and companies is very clear. It is these investments that must be prioritized. There is also, at last, a geopolitical aspect that needs to be mentioned: a concerted push on energy efficiency would be one of the best ways to shield Europe's private interests from crisis as the one that is now taking place in Ukraine. Many of the Member States who have the highest dependency on Russian gas, for example, are those with the greatest EE potential. Europe's heads of Government will discuss the 2030 targets at the next European Council meeting on 20 and 21 March. This is their opportunity to embrace the European Climate and Energy Package 2030 and use it as a tool to boost Europe's economy. But the short-sightedness of some politicians and lobbyists, who have strong ties to the fossil fuel industry threatens to stop Europe embracing a more efficient, sustainable and economically progressive future. European elections are now, therefore, an opportunity to bring the issues of energy efficiency in the spotlight of the electoral debates and let the citizens ask for bold decision on the EU energy policies for 2030.

Gas should enter a golden age in Europe



Jean-François CIRELLI

Vice Chairman and President GDF SUEZ

Gas is entering its “golden age”, this is one of my beliefs. But the reality is more contrasted. Let’s have a look at the success story of the United States: more gas (as well as renewable energy sources and energy efficiency), less coal, lower energy costs and lower emissions. So, around the globe, gas is seen as a good and balanced source of energy enabling the realisation of the efficiency, competitiveness and sustainable development objectives. Paradoxically, whilst the share of renewable energy sources has increased, so has the share of coal in some EU Member States, largely offsetting or even surpassing,

in the case of Germany, the volume of carbon dioxide emissions saved by energy efficiency and renewables. The cheap coal not consumed in the U.S., due to the surge in domestic shale gas production, has been readily absorbed by the EU market where climate policy has not been able to prevent this. At the same time, highly-efficient gas-fired power stations having become uneconomic, need to be mothballed or closed, and security of electricity supply is under threat.

The EU is lagging behind... Renewables are on the rise, which is laudable and we want to be part of it. But one has to recognize that gas and renewables are the ideal partners for the energy transition.

Why is that? Gas-fired power stations can be started up and ramped up and down rather quickly which makes them the ideal partner to compensate for the variability of some renewables. In addition, gas is the lowest emitter of carbon dioxide (and other emissions) amongst the fossil fuels. Moreover, combined-cycle gas

turbines are highly efficient. Their construction phase is short, costs are low, and public acceptance issues are rare.

The situation today is critical in Europe.

The current energy and climate policies are leading to major risks: energy security of supply is challenged; CO2 emissions are on the rise, investments in the energy sector are endangered and policy related energy costs are rising. The current framework for energy and climate policies in the EU should therefore be adapted as soon as possible in order to provide a predictable environment encouraging cost-efficient low-carbon investments, including in gas solutions.

This is why a group of key energy companies in Europe (named the “**Magritte Group**”) have gathered together to address the situation, to convey strong messages on the deficiencies of the current situation and to propose concrete solutions to revitalize Europe’s energy policy now. We believe that a decarbonisation pathway should be technology-neutral to ensure that, whatever the need, the most cost-efficient solution wins and new technology replaces outdated technology. A meaningful economy-wide greenhouse gas reduction target is necessary, as well as a robust emissions trading system in which the price of carbon dioxide influences the choice of low-carbon energy over higher carbon energy. Under such a system, new installation of mature renewable energy sources will be integrated into the market. A European appropriate capacity remuneration mechanism is also an effective mean to address security of electricity supply. Research, development and demonstration of low-carbon solutions should be strongly supported.

To sum up we recommend more Europe, more market, more competitiveness, stability and long-term visibility enabling the energy industry, once again, to accomplish its mission of supplying customers with clean, efficient and reliable energy. Time is playing against us and action is needed fast.



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Energiewende Made in Europe – RES Need to Make Giant Steps towards Community Level



Christian EHLER

MEP, Group of the European People's Party (EPP)

The current debate on a Climate and Energy Framework for 2030 indicates that a tripartite approach including binding goals for energy efficiency and renewable energy sources (RES) is at the very least controversial. Especially in the field of RES, Europe needs to readjust its course if it wants to avoid its transformation from a model student to a political misfit. This seems especially true for Germany and its often-discussed *Energiewende*.

First of all, it is important to state that in order to achieve the climate goals that the EU and Germany have set for themselves RES are a corner stone of any policy. Germany, the world's fourth largest economy, by any means has the innovative potential to successfully complete the challenge of transforming its energy base to RES; and of course national allocation systems at first have been the method of choice for creating Germany's leading role in the RES sector. However, as the *Energiewende* experiment has no historical predecessor, it is a simple necessity to regularly evaluate critically how German energy policies are pursued and whether or not they need to be structurally adapted to new scientific insights.

This is especially exemplified by energy prices which best indicate how excessive expansion targets for RES while not taking care of the necessary infrastructural, political and economic provisions lead to fatal redundancies and, after all, failure. Energy prices in Europe have been rising for years and have reached levels of up to 40% higher than in the United States. Industrial electricity prices in Germany doubled since 2000 and will continue rising as taxes and reallocation charges are expected to define 60% of the energy price in 2020.

My home constituency Brandenburg is the region in Germany with the highest share of RES. Not long ago companies like Odersun or

First Solar have been celebrated as job motors for a structurally rather weak region. However, expansive renewable energy subsidies and the concluding demand for solar modules have been incentivizing a latent system of underinvestment in efficiency research. According to the German Centre for Solar Market Research (ZSF) R&D-expenditures have not surpassed 2.7% of respective companies' turnover. Compared to significantly higher figures even in developed industries such as the car industry (6%) or the pharmaceutical industry (9%), this number is simply disastrous. Odersun or First Solar can still be celebrated though: their case will be remembered as a textbook example for the consolidation of an overheated market whose 200€ billion subsidies served as an altruistic investment in the world's learning curve for RES.

Two aspects are crucial to pursue a policy that really establishes competitive RES: On the one hand, we should focus on massive innovation funding; on the other hand, regulatory measures and energy supply need to be unified on a European level to finally achieve a real internal market for energy.

Firstly, while heavily increased innovation funding does not mean to subsidize the mere installation and production of green technologies, it involves funding without technology-specific targets. Energy research must not make the mistake to simply focus on certain technologies like solar modules or wind turbines. Smart metering technologies, grid technologies, storage technologies, new power sources, technologies to make conventional plants more flexible to adapt to volatile systems, even weather forecasts; all these are components that need to be addressed. Not for nothing, 7.7% (about 5.2€ billion) of the Horizon 2020 package have been devoted solely to energy research.

Secondly, the European Internal Energy Market finally needs to be completed. In 2013, the Commission has gone further steps into the right direction. Guidelines for renewable energies subsidies and energy efficiency as well as the list of projects of common interest for network infrastructures have been published. However, the internal energy market is still far from what could be called a coherent construction. TSOs

still complain about missing standardization for network management systems; authorization and judicial procedures for networks, power plants and RES are still widely regulated on a national basis; and conflicts about the politically and socially "right" energy mix should be debated openly on a supranational level to avoid dilemmas such as the failed German RES allocation system.

In my position as the Chair of the European Parliament's Delegation for Relations with the US I often come across best practice examples on the other side of the Atlantic. When it comes to making RES more competitive and therefore more successful, California represents one such example. The state of California focuses on certain geographic areas for RES in order to minimize costs and environmental impact, and increase the efficiency and production potential of technologies. The zones are defined in a three-year working phase in a large consensus-based stakeholder collaborative composed of 29 groups ranging from environmental NGOs, power buyers, transmission system operators, energy producers, state regulatory agencies, the military, native Americans, to consumer representatives and local planning groups. This procedure does not only save about 3 years of project time and ensures that the right technologies are used at the right places, its foundation on the consensus of a large stakeholder group of stakeholders agreed also backs any potential issues concerning public opposition.

If European states want to achieve an economically healthy energy transition to carbon neutral societies, we should take California as the example it is. We should learn our lessons from the advantages and disadvantages of the German model to avoid parallel structures with extensive public and private expenditure and very little ecological outcome. Increased efforts to integrate RES – especially through reduced costs, an adapted market design, market regulation at community level, and more efficiency when it comes to RES subsidies are the dictate of the moment if we want to avoid further fragmentation and state interventionism.

Wind turbines : the EU brand



Thomas BECKER

CEO of the European Wind Energy Association

Which company is more American than Apple? And yet what product is in reality more international than its iPhone – not just in terms of users worldwide, but also in terms of its components? South Korea, Taiwan, China, France, Italy and of course the US all play a part in making one handset. It is the possibility of sourcing the material and skills from the most cost-efficient supplier that keeps prices in line for consumers – and allows the owner to run his business and make a profit.

While they don't fit in one's pocket in quite the same way, wind turbines could be considered just as European as Apple products are American. In 2012, the EU wind energy industry had a positive export balance of €2.45 billion for wind turbine components alone, with European companies holding 55% of global wind energy patent applications (compared to 32.5% of patent applications across all economic sectors). European companies are world leaders: in 2012 EU turbine manufacturers had 87% of EU market, 75% of Indian market, around 7% of the Chinese¹ - far larger shares than those countries' manufacturers have in the EU. European developers and power producers are often leading the pack outside the EU too.

And yet the EU wind industry also relies on an efficient, global supply chain and competitively priced raw materials. In February, the WTO – supported by the EU and 12 other members - began talks on the complete elimination of tariff barriers on "green goods" including wind turbines and wind turbine components such as gearboxes and generators. These first talks could lead to

a discussion on services and non-tariff barriers including local content requirements. This is a major step forward in global trade and cooperation, and could open the way to a more cost efficient, competitive industry provided the EU can broaden the group – which includes the US, China, Australia, Canada, Japan and South Korea - to ensure other major trade partners such as India and Brazil come on board.

Despite this example of a forward-looking EU, willing to lead on the possible liberalisation of trade in green goods, the European Commission is currently considering raising already high import duties on glass fibre filaments from China, which are essential for blades and nacelles.

The amount Chinese producers had to pay to export fibreglass to Europe was already increased in 2011. Raising this duty further would force fibreglass producers to raise prices, which would impact the spending of the European wind industry, damaging cost-effectiveness and ultimately making it less competitive.

What is more, it would make European wind turbine manufacturers more reliant on a small number of European fibreglass producers, slowing down the supply chain and potentially leading to bottlenecks.

What will happen? The consequence of all this is likely to be European blade manufacturers moving overseas – taking their jobs with them. And it's no small number – there are 100,000 EU jobs in turbine and component manufacturing.

Not everyone would lose out, however. Chinese wind turbine manufacturers will



be clapping their hands, as they will become more competitive on the world market thanks to cheaper domestic fibreglass.

So if it wants to protect European leadership, competitiveness and jobs in a major home-grown industry, the European Commission must re-consider the extra import duties on Chinese glassfibre products. A key objective of EU trade policy should be to promote the competitiveness of its industries of the future, such as wind energy, EU competitiveness and the creation of green jobs.

Rather than pursue overly protectionist meddling which can actually damage world leading EU industries, the EU must help them make the most of the global market by working towards the removal of barriers to trade.



Globalisation and interdependency requires a strong offer by Europe



Edit HERCZOG

MEP, Group of the Progressive Alliance of Socialists and Democrats in the European Parliament (S&D)

In the last few decades energy has become a strong “weapon” of foreign policy. We have moved from the old days where oil was the main asset. Nowadays everybody buys from everywhere almost everything and the world became interdependent and more diversified.

The current common global energy challenges require single, effective and equitable actions from the European Union on the international stage, in particular by strengthening the external dimension of its energy policy, by increasing diversification and by enhancing security of supply in order to maintain the region’s competitiveness in today’s globalised world. The EU’s import dependency for resources is likely to increase during the next decade due to depletion of internal fossil fuel resources, and despite increasing importance of renewables, energy efficiency and research on energy technologies. The EU’s increasing dependency on imported fossil fuels may have significant effects on the independence of its decision-making in other policy areas, only interconnection, interdependence and solidarity among Member States can counterbalance this unfavourable phenomenon.

Actions for the diversification of suppliers, routes and sources of energy supply to the EU should be accelerated, especially those aimed at creating new transport corridors (Eastern Corridor, Southern Corridor and the Mediterranean Basin), and by creating real competition of gas supply sources by increasing the EU’s share of LNG and by reaching new, remote suppliers (Australia, Canada, United

States, Latin America, Sub-Saharan Africa, Central Asia, etc.), improving the interconnection of energy grids and completing the Euro-Mediterranean electricity and gas infrastructure rings, while also modernising and upgrading the existing fleet of electricity and gas power plants as well as infrastructure (grids and pipelines).

Concerning climate change the EU has a clear framework to steer its energy and climate policies up to 2020. This framework integrates different policy objectives such as reducing greenhouse gas emissions, securing energy supply and supporting growth, competitiveness and jobs through new technologies, and a cost effective, resource efficient approach. As we can see this issue leads the way for the actual policy making in the European Parliament.

These policy objectives are delivered by three headline targets for GHG emission reductions, renewable energy and energy savings. There are additional targets for energy used by the transport sector. In parallel, the EU has put in place a regulatory framework to drive the creation of an open, integrated and competitive single market for energy which promotes the security of energy supplies. While the EU is making good progress towards meeting the 2020 targets, creating the internal market for energy and meeting other objectives of energy policy, there is a need now to reflect on a new 2030 framework for climate and energy policies.

Early agreement on the 2030 framework is important for three reasons: First, long investment cycles mean that infrastructure funded in the near term will still be in place in 2030 and beyond and investors therefore need certainty and reduced regulatory risk. Second, clarifying the objectives for 2030 will support progress towards a competitive economy and a secure energy system by creating more demand for efficient and low carbon technologies and spurring

research, development and innovation, which can create new opportunities for jobs and growth. This in turn reduces both directly and indirectly the economic cost. Third, while negotiations for a legally binding international agreement on climate mitigation have been difficult, an international agreement is still expected by the end of 2015. The EU will have to agree on a series of issues, including its own ambition level, in advance of this date in order to engage actively with other countries. One thing should be taken into consideration though: the Commission rightly pointed out that the emphasis should be on the population and not on the green energy itself, as the latter cannot work without the former. Energy efficiency and security must continue to play a significant role in delivering the Union’s climate and energy objectives and this will be the subject of a review of progress in energy efficiency which the Commission will conclude later in 2014.

The EU can and should build on existing priority areas of engagement in external energy policies, in order to enhance consistency and coordination amongst the Commission, the Council, Member States and the industry. These areas include the question of large energy infrastructures, strategic dialogues and partnerships in international fora: the EU-Russia Dialogue, the Energy Charter, the Energy Community process and relations with other international bodies concerned with energy and climate.

Thus, energy trade will still remain a key factor of Europe’s role in globalisation in the near future. Research, innovation and development concerning green technologies, bio-based technologies, major improvements in energy efficiency, global standards, significant changes in energy consumptions and travel patterns that the EU offers to the world establishes a balance with the resource demand that the region has and makes it a competitive partner and globalised actor of the world market.



Renewable Energy targets: getting the policy right for investment, jobs and growth



Jerome PECRESSE,
President Alstom Renewable Power

We believe a sustainable Europe is a competitive Europe. We have all the elements that we need for a successful transition to a low-carbon and competitive economy, not least a strong industrial base in the manufacturing sector. Now we need to use them properly.

Alstom has committed to supporting the EU's transition to a low carbon economy by providing solutions for renewable and clean energy sources. We are the only power generation company with a presence in all energy sectors and we are actively developing our portfolio in renewable energy: hydro, onshore wind, offshore wind, tidal, solar CSP, solar CPV, biomass and geothermal. Some of these renewable energy sources, such as onshore wind and hydro are already competitive with fossil fuels in many regions of the world.

No single form of power generation will address the dual challenge of securing the supply of reliable, affordable energy and affecting the transformation to a sustainable economy. Therefore, we must give all of them the chance to become competitive by providing the right regulatory framework according to their level of maturity.

Having a clear target for the development of renewables approaches these challenges in an efficient way, compatible with the internal energy market. Alstom calls for the setting of a binding renewable energy target of at least 35% and is part of an industry coalition of over 150 industrial companies and associations advocating similar ambition.

Competitiveness of European industry is a key concern and needs to be addressed taking into account the development of domestic energy resources that not only generate investments and jobs but also contribute to lower energy costs.

Current energy prices are primarily determined by the global price of fossil fuels, which is arguably difficult to control and leaves the EU

in a price-taker role only. A strong renewables penetration, especially when combined with supply and demand side energy efficiency measures, helps containing the EU's external energy dependency and increases supply security. Thus, in the medium and long term renewables have the potential to hedge the energy price risks for EU society and industry. As proven by the sustained progress of the more mature renewable technologies over the last decade, industrialisation and economies of scale will continue to yield long-term cost reductions. We expect that post-2020 an increasing number of mature renewable energy technologies will be able to move away from support mechanisms into a fair and properly functioning energy market.

Against this background, we see carbon pricing as fundamental in driving investments in sustainable technologies. Yet, for various reasons, the Co2 price signal from the EU's ETS has been feeble and failed to incentivize investments into low-carbon technologies. We remain nevertheless convinced that a binding greenhouse gas (GHG) target is necessary to drive the required economy-wide emission reductions. However, the "market push" effect created by a robust carbon price will not be able to replace the "demand pull" effect of legally binding targets, which has proven to successfully drive investment decisions. Co2 reduction is more efficient with a GHG reduction target plus a Renewable energy target than with a GHG target alone.

The EU's 2020 energy and climate framework, and in particular the renewable energy target have contributed to making the renewable energy sector one of the most recession-resistant areas of European economy, even showing positive growth in the face of the crisis. Alstom's own activities on offshore wind energy are expected to create 5000 direct and indirect jobs in France alone.

The approach of setting binding national targets for share of renewable energy in gross final energy consumption has been successful (13% in 2011) and triggered a significant increase of renewable power generation and investments. We would like to see this successful policy continued in the EU's 2030 energy framework.

Some of the renewable technologies, namely wind and solar power, come with their own

characteristics, i.e. intermittency. Their deployment leads to a growing need for grid balancing services, back-up capacity and energy storage. Based on our expertise as a world leader on hydropower (and on advanced grid technologies) we think that hydropower and better cross-border interconnections and smarter grids hold the key to unlocking the full potential of wind and solar.

In particular, pumped storage hydro can be used to help integrate the rapidly growing amount of wind and solar electricity coming onto the grid. Although there are currently several energy storage technologies on the market, the only commercial one capable of storing electricity at GW scale is pumped storage hydropower. These conventional units can very efficiently regulate their power in generation mode; but they operate at fixed power in pumping mode. With governments looking to expand the use of renewables, utilities are seeking ways to provide even greater flexibility in the rest of their base load generating fleet, e.g. by increasing the flexibility of pump storage plants. A fairly recent development of pump storage is variable speed pump storage where the motor generator adjusts the turbine speed to provide power regulation in both production and pumping mode. The ability to adjust the pumping power makes pumped storage plants much more flexible, which can be attractive for operators in balancing the grid. This helps utilities operate their fleets more economically, while reducing CO₂ emissions.

Increased physical interconnection across Europe, incl. connecting neighbouring regions; demand side management through smart grids, as well as supply and demand side energy efficiency measures offer the opportunity to integrate greater proportions of renewable sources of electricity. Thereby they reduce electricity prices and help deliver a more competitive European energy system.

For the EU's 2030 energy and climate policy, we believe that a binding renewable energy target of at least 35%, incl. national targets, will drive economic growth, maintain and foster Europe's global leadership in renewable technologies and energy storage, provide the require visibility to secure creating new jobs in the coming years, and reduce Europe's fossil fuel imports.

How to best address the energy transition challenge in Europe?



Franck LACROIX

Chairman of Dalkia

Moving to a highly energy-efficient and low carbon economy for Europe is a key priority to achieve our climate and energy targets for 2030 and beyond. It is a transformational effort that can make or break the European economy for the next generations. It is therefore essential to manage that transition whilst enhancing the EU's competitiveness.

Hence, the European approach must rely on a set of three key elements:

- **Energy transition must not only focus on electricity.** The high stakes involved in the electricity transition effort should not hide the fact that our energy consumption is essentially thermal: 50% of total (70% in buildings). It is regrettable that the European vision does not take this fact sufficiently into account; we must develop a holistic strategy that covers all the relevant energy solutions available and prioritise the ways to reach our goals according to their efficacy and efficiency.

- **Energy efficiency must be the key priority in targeted sectors, buildings in particular.** With 40% of the total energy consumption and 36% of CO₂ emissions in Europe, buildings, whether residential, hospitals, offices, commercial or industrial sites represent the biggest potential for reducing both our energy intensity and carbon footprint. The massive source of savings from within this sector must be at the core of the European energy policy.

- **The Energy challenge must be met at regional and local level.** The role of local or regional authorities is fundamental to optimize the transition effort between the offer (energy mix) and the demand side (energy efficiency, thermal renovation), and to achieve the best impact on

a number of key goals: competitiveness, job creation, sustainability and security.

Means to reach these objectives are readily available and fully tested in most countries of the EU; the effort will consist in broadening their deployment by removing the brakes that limit their adoption and in putting in place the proper stimulation and support schemes.

These means are three-pronged:

1) Promoting District Heating Networks (DHN). This type of infrastructure has a key virtue: The substitution of thousands of inefficient and frequently improperly maintained individual boilers with a centralised, efficient energy production source – at city or block level – presupposes the existence or the construction of an underground distribution network supplying heat to the buildings. Moreover it enables the selection of the best energy mix for the territory, including renewable heat sources and cogeneration systems.

2) Fostering Renewable Energy. The energy generation devices connected to DHN can rely on local non-fossil sources such as biomass, waste incineration, solar or latent heat coming from a wastewater collection network, industrial processes or even data centres. It then becomes a strong contributor to the decarbonation of the local economy and territory.

3) Supporting Cogeneration. High efficiency simultaneous generation of heat and electricity is widely used to reach a much higher energy yield (as compared to those of stand-alone electricity or heat production plants), and to limit the impact on the electricity grid.

How can the EU support the transition to sustainable energy?

Proper signals should be sent in order to encourage investment in energy efficiency and renewable and to neutralize the impact of economic growth on emissions: ensuring an appropriate carbon price; making the 2030 objective binding; eliminating any distortion of

competition (linked to the size of a project or to the nature of the operator) are paramount.

Furthermore a stable long term oriented financial and regulatory framework is required as energy efficiency solutions often have a relatively long return on investment.

Energy transition must be supported by long term public funding. With more than 150 million Europeans affected by fuel poverty, funding of essential public services is also vital for strengthening social cohesion. Citizens are not always able to bear all the costs of public heating services: in some cities in Central Europe, households disconnect from heating networks and switch to more polluting and less efficient individual heating systems.

Supporting the development of DHN, cogeneration schemes and renewable sources of thermal energy appears essential. Public policy should favour the updating of aging DHN and cogeneration plants, the development of new ones, as well as the usage of biomass and other renewable sources of heat. In this respect, long term planning is an efficient tool for authorities to grow local employment, reduce their environmental footprint and enhance the quality of life of citizens.

Regional and local authorities should be able to assess all the positive externalities of such projects to be integrated in a cost benefit analysis. **Private sector should be encouraged to play a more important role in financing energy efficiency.** In order to attract private capital and multiply the effect of public spending, European and national authorities should develop appropriate public-private financing mechanisms; obstacles to PPPs have therefore to be removed.

Moreover, **public purchasers must be able to easily choose the “environmental best bid”** instead of following a logic based on «low cost» criteria to the detriment of the quality of services to the users and of infrastructure sustainability in the long term. This would also be in line with the Energy Efficiency Directive currently in its transposition phase.

Solidarity: key principle for the future of European energy policy



Sami ANDOURA¹

Professor at the College of Europe, where he is the Holder of the Chair of EU Energy Policy.

In a European energy context long marked by national independence and sovereignty, the principle of energy solidarity has become progressively a tangible reality, raised at the level of fundamental principle in European treaties.

Gradual but real increase in energy solidarity in Europe

It took the number of threats and failures, including gas crises between Russia and Ukraine, for the EU and its Member States advancing on the path of energy solidarity. The EU secured progress on the issue of energy solidarity by launching common initiatives in key areas such as: Internal security of supply for gas; progressive integration of national energy networks; diversification of energy sources and resources, etc. European institutions increasingly mention energy solidarity in their Strategies and Communications. Energy solidarity is also essentially based on key market mechanisms. It is the market and private industry, flanked by European rules, which often guarantee secure supply, preventing and managing potential crises, creating a *de facto* solidarity.

Missing elements of EU energy solidarity within the EU

While these progresses are beneficial, they mainly consist in individual initiatives, which cannot yet be regarded as an overall strategy. Energy solidarity has not been subject of any common European definition. Mostly identified with the issue of energy infrastructure, it is still often discussed incidentally to the general rules and developed at the technical level.

Significant gaps in the EU energy policy remain in terms of solidarity: Electricity supply security is the weakest element of the European

energy system; Solidarity is not sufficiently integrated in bi-or multilateral energy instruments with external supplier and transit countries; the required economic and financial solidarity for the impetus for major infrastructures of European interest remains limited; Energy poverty is a growing European phenomenon, etc.

There are political, economic and social factors which hinder a truly shared European approach to this multifaceted issue. Foremost are differences across the community of nations that is Europe, reinforced since 2004. Differences in culture, history and energy policy among Member States, where technical, industrial and technological conditions differ, still lead to conflicting outlooks from governments on its meaning and the mechanisms for its implementation. These different approaches perceive energy solidarity as: a bond of charity, financial transfers from the "rich" to the "poor", accountability of some "free riders", reciprocity, collective insurance against risks, pooling of strengths and weaknesses in the international arena, social and interpersonal approach to energy, etc.

Core principles and vectors of European energy solidarity in the future

When the EU will be able to move on its own initiative, anticipating the future, and make decisions driven by the benefit of a collective approach, based on interdependence and solidarity of all Member States? It is essential that EU energy solidarity consistently involves these major components:

- Completion of the internal gas and electricity markets, which create a *de facto* solidarity through the liquidity of energy flows in Europe.
- Security of supply through physical infrastructures based on the need to integrate national energy networks as well as to improve complementarities of national energy mixes, thus creating *de facto* solidarity.
- Optimising the use of energy resources in the EU in the context of energy transition(s), through promotion of low-carbon energy sources and the essential energy infrastructures for their development.

- Strong political will and collective leadership of Member States based on extensive cooperation in critical areas such as security of internal supply, external dimension of EU energy policy, resource optimization and innovation, access of all to affordable energy and the fight against fuel poverty, energy transition and its financing, etc.

- Reflecting different levels of development of Member States and their specific difficulties in delivering on European energy targets by 2020.

A necessary subtle and complex balance between these aspects is again at the heart of negotiations between the EU and its Member States over the European energy system post 2020.

Conclusion – Energy policy in the EU's positive agenda

EU energy policy cannot be limited to the issue of solidarity. European energy policy, like a European Energy Community, includes three major components: competition that stimulates, cooperation that reinforces and solidarity that unites. Its development must be based on these three pillars which are at the basis of the successful experience of establishing a single European market for goods services and so on.

In conclusion, the EU remains above all a political construction which should address its citizens' concerns. They are calling for a European energy project that meets their fears, aspirations and needs. European elections are scheduled for May 2014 and the EU should be able to promote a "positive agenda" that is based on a few concrete policies and projects. Energy should be on that agenda. Energy solidarity between people, countries, regions and operators in Europe is at the heart of this challenge.

¹ - Sami ANDOURA is Professor at the College of Europe, where he is the Holder of the Chair of EU Energy Policy. He is also Senior Research Fellow at Notre Europe – Jacques Delors Institute dealing with EU Energy Policy as well as EU External Actions.

Future Energy Policy for Europe: it is time to reflect and act holistically



Emmanuel HATON

Director European Government Affairs, BP

Energy is not a simple good that sits on the outset of our economies. Energy is at the centre of our economies and as such, any initiative that may have an impact on energy supply and cost will have far ranging consequences.

Economic activity is a series of transformations of natural resources, and this requires energy. When energy is cheap, the number of possible transformations increases. When energy is expensive the number of possible transformations decreases. Any public policy that could have a significant impact on energy prices effectively has an impact on economic growth.

Until recently, energy policy could simply focus on two main issues; namely reliable supply and price. Now that we have serious reasons to believe that manmade Greenhouse Gas emissions have an impact on the climate, we also have to consider CO2 emissions as one of the key constituents of an energy policy.

On the security of supply side there are over 50 years' worth of proven reserves of both oil and gas at today's consumption rate – in addition to renewables and other non-fossil fuels. We expect oil, gas and coal to converge, attaining equal shares of the energy market at 27% each by 2035 – with demand for oil growing slowest at 0.8% a year, gas the fastest at 1.9% and coal in between at 1.1%. Renewables are set to grow fastest of all, but from such a low base that we forecast they will still only contribute 7% to the total energy mix by 2035.

On the sustainability side we expect global carbon emissions to rise by 29% by 2035, with the increase coming from developing countries, and more specifically, from growth in coal use

within industry in China – where emissions are already 2.3 times those of the EU.

The EU emissions today represent less than 11% of the world total, and we expect that to decline to 7 or 8% by 2030 – by which time India alone will emit more CO2 than all 28 EU members combined. EU emissions are now at pre-1970 levels – down from their 2004 peak. The US' emissions are down to 2005 levels. Engaging other regions in the fight against climate change should remain the EU's main priority. Dialogues between two or three major groupings could potentially accelerate the process, paving the way for broader agreement and action.

There is a need to rebalance the focus of energy policy from sustainability to competitiveness. Europe leads the world in energy efficiency but lags behind most of the world in the cost of energy. It is time to address that deficit through competition and making European energy markets more efficient. In the current context, the priority should first be to maintain leadership in energy intensity, then to reduce the cost of that energy, and lastly to reduce carbon.

A well-functioning carbon trading market is also essential. The EU Commission's 2030 Communication represents progress here by providing a clear CO2 target. If the ETS is truly effective, then energy efficiency, renewable energy, gas for coal substitution and other means of reducing emissions will be harnessed as a means to the end – but they should not represent competing ends in themselves.

Completing the EU internal market for gas and electricity should be the EU Commission's first priority as it would favour the most effective and innovating operations.

To be more specific, there are two main and distinct usages of energy that coexist: Energy for transport and energy for heat and power.

The market for transport fuel is extremely efficient and global as it does not carry a serious risk of long lasting disruption. Energy policy for transport should mainly focus on cost and sustainability. Electrical vehicles have potential,

but, realistically, will only be deployed at scale when low-level pollution is addressed, the power grid is decarbonised, when battery technology has sufficiently progressed, and when there are demonstrable savings in total energy use over a significant distance. A pragmatic transport pathway is that of continued improvement in fuel economy through downsizing, boosting and hybridizing internal combustion engine and by increasing the use of competitive biofuels.

In comparison, the heat and power sector has faced greater difficulties which need to be addressed. Initially, the forced deployment of renewable energy sources was seen as an effective way to improve energy security and cost as well as addressing climate change. Yet, unfortunately it has seriously increased electricity prices and - in certain Member States - by giving renewable electricity priority access to the grid, it has effectively damaged supply security because of the threat it has created to conventional electricity generation including natural gas.

Today, large imports of cheap coal from the USA to the EU have offset all the emissions reductions that have been achieved by subsidised renewable energy. The lesson to learn from the USA is that switching from coal to gas can have at least as big an impact on emissions as extensive programmes to promote renewables. Europe is surrounded by competitive natural gas supplies – including those from Norway, Russia, the Caspian Sea, North Africa, the Middle East and potentially the Eastern Mediterranean. BP and others are already hard at work trying to increase and diversify Europe's supply of gas as a leading partner in the project to open up the southern gas corridor from the Caspian to Europe. It is important that Europe actively aims at seizing the benefits of its energy geography.

In summary, the EU has lived through a very important time: the time to experiment. It is now time to learn from that experience. Let's hope Europe will do so and play to its full strengths.

Climate and energy policy needs to be aligned with the Industrial Renaissance objective.



Fernand FELZINGER

President of IFIEC Europe

The EU's Climate and energy policy is based on three pillars: competitiveness, security of supply and sustainability. **International competitiveness** is obviously the one that has been left behind in recent years and **needs to be restored urgently**.

As clearly stated in the analysis of energy prices and costs in Europe issued by DG Energy on 22 January 2014, **EU industry does suffer from an important disadvantage in total energy and climate costs in comparison with competing regions of the world**. Such high energy price disparities like the one with the US (energy prices 2 to 3 times higher here) lead to significant changes in the economic structure and have far-reaching effects on investments, production and trade.

Obviously, the sectors for which energy is a major cost component are the most impacted ones. The manufacturing industry – which represents 30 million jobs in EU 28 – lost 3.5 million jobs since 2008.

Can we do something about it? For electricity, the answer is clearly “yes” since regulatory costs (subsidies for renewables, taxes, grid costs, etc.) are among the main reasons for this widening price gap. These are ever increasing surcharges resulting from public policy, not from market movements. They create an unprecedented burden for the manufacturing industries which cannot pass through these costs to their customers.

There is no other solution than allowing full offsetting of the cost consequences of the promotion of non-competitive energy generation technologies: this must be part of the new Environmental and Energy Aid Guidelines.

Sure enough, while the rapid implementation of the EU's internal energy market will enable to reduce the overall costs of adapting the EU energy system to the new generation mix, it cannot by itself resolve the lack of competitiveness caused by regulatory surcharges. Therefore, in the context of rising costs, hardship regimes and exemptions from inappropriate cost allocations become an absolute necessity for those power-intensive industries in Europe that are most vulnerable to international competition.

These measures must address the whole cost structure, from the power generated (easing restrictions on long-term contracts), to grid costs (need for a cost-reflective approach taking into account baseload consumption profiles) and government's contributions to multiple national support schemes.

Of course, starting by limiting the dramatic increase of system costs (including levies, grid costs and taxes) is essential, and applying the “Guidance to Member States on state intervention in electricity markets” (DG Energy, 5 November 2013) is key. But industry can be a cost-efficient solution provider as well: voluntary demand response is much cheaper than capacity mechanisms to tackle grid peaks but a stable regulatory framework with adequate visibility and remuneration is required.

Unfortunately, the situation for natural gas is more complex since the main solution stays in our external suppliers' hands. Therefore implementing the internal energy market and diversifying our supplies, including indigenous production is an absolute necessity: **ignoring the shale gas option would be a big mistake**.

The EU's emerging climate policy measures are the other root cause for increasing cost disadvantages with major competing regions. As highlighted in the analysis issued on 22 January 2014, **energy intensive industries in the EU are already energy efficient compared to global competitors**. Technical limitations and the need of significant resources and lead time for further improvement mean that the allocation of emission allowances under ETS must be based on realistic benchmarks and actual production.

Realistic benchmarks require a careful balance between an ambitious long-term goal and a continued adequate protection against carbon leakage. **Climate objectives must be set to keep a high performing industry in Europe**.

Unrealistic reduction factors applied to a frozen historical production volume will stop investments in carbon intensive industries in Europe and inevitably lead to accelerated carbon leakage while these sectors are an important part of the industrial process chain for greening the economy: lighter cars with reduced fossil fuel consumption, more efficient windmills, highly insulating windows, etc. are just a few examples taken from an almost infinite list, where recyclable materials contribute to Europe's aimed transition towards a circular economy. **Enabling the manufacturing industry to grow will not only stimulate innovation in technologies and products but consolidate EU's leadership in the reduction of carbon emissions**.

But these industries are confronted with a structural imbalance of climate and energy costs in comparison with their global competitors. In the absence of a global level playing field, there should be no direct or indirect climate policy costs for efficient industrial installations in sectors exposed to the risk of carbon leakage. But this is not the case: financial compensation for indirect emissions, for instance, is too restricted and only applied by a minority of Member States. Industry needs measures which provide long term visibility.

This is why these necessary measures should be decided and implemented within a clear political framework supporting industrial development. European institutions and Member States must confirm the Industrial Renaissance objective with a 20% target of industry's share in Europe's GDP by 2020, and propose concrete action: restoring global competitiveness should become a condition precedent to the upcoming decisions about energy, climate and industrial policy. To move Europe out of the crisis, **growth of already efficient industrial production must be welcomed within the EU**.

EU 2020 Targets

Renewable Energy*

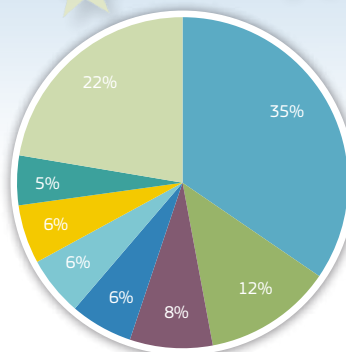
* in Gross Final Energy Consumption
 ** Preliminary data
 Source: Eurostat, April 2013
 Methodology and Notes: See Appendix 13 – No 1

%	2011 RES Share	2011/2012 RES Interim Target	2020 RES Target
EU-27	13.0%	10.7%	20.0%
BE**	4.1%	4.4%	13.0%
BG	13.8%	10.7%	16.0%
CZ	9.4%	7.5%	13.0%
DK	23.1%	19.6%	30.0%
DE	12.3%	8.2%	18.0%
EE	25.9%	19.4%	25.0%
IE	6.7%	5.7%	16.0%
EL	11.6%	9.1%	18.0%
ES	15.1%	10.9%	20.0%
FR	11.5%	12.8%	23.0%
IT	11.5%	7.6%	17.0%
CY	5.4%	4.9%	13.0%
LV	33.1%	34.0%	40.0%
LT	20.3%	16.6%	23.0%
LU	2.9%	2.9%	11.0%
HU**	8.1%	6.0%	13.0%
MT	0.4%	2.0%	10.0%
NL	4.3%	4.7%	14.0%
AT	30.9%	25.4%	34.0%
PL	10.4%	8.8%	15.0%
PT	24.9%	22.6%	31.0%
RO	21.4%	19.0%	24.0%
SI	18.8%	17.8%	25.0%
SK	9.7%	8.2%	14.0%
FI	31.8%	30.4%	38.0%
SE	46.8%	41.6%	49.0%
UK	3.8%	4.0%	15.0%

EU-27 Imports* by Country of Origin, 2011

Imports* of Crude Oil (kton)

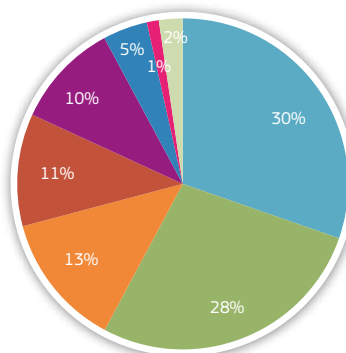
Total= 508 477



- Russia
- Norway
- Saudi Arabia
- Nigeria
- Iran
- Kazakhstan
- Azerbaijan
- Other

Imports* of Natural Gas (TJ – GCV)

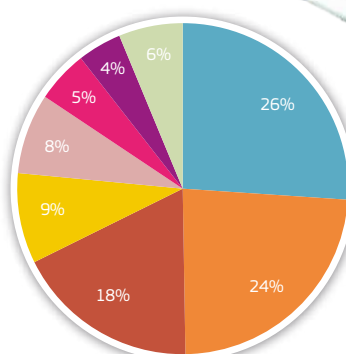
Total= 13 522 333



- Russia
- Norway
- Algeria
- Qatar
- Not specified
- Nigeria
- Egypt
- Other

Imports* of Solid Fuels (kton)

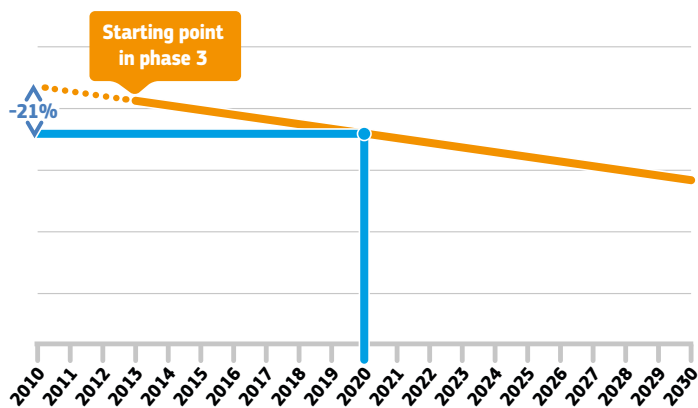
Total= 202 333



- Russia
- Colombia
- United States
- Australia
- South Africa
- Indonesia
- Not Specified
- Other

* From Extra-EU – Source: Eurostat, April 2013
 Methodology and Notes: See Appendix 13 – No 1

EU ETS: Declining EU-wide cap on greenhouse gas emissions



In 2020, emissions from sectors covered by the EU ETS will be 21% lower than in 2005.

By 2030, the Commission proposes, they would be 43% lower.

Note: Only an illustration, not accounting for changes in scope, e.g. due to new sectors in phase 3.

DG Climate Action, European Commission

The role of the EU Emissions Trading System in building a sustainable low-carbon economy



Jos DELBEKE

Director-General for Climate Action, European Commission

The European Union's long-term climate goal is to reduce our emissions of carbon dioxide (CO₂) and other greenhouse gases by 80-95% below 1990 levels by 2050. Science tells us that the developed world as a whole will need to make a cut of this order if we are to have a fair chance of averting dangerous climate change.

This target means we will have to 'decarbonise' our economy to a large extent by the middle of this century. The European Commission has set out a roadmap for moving to the competitive low-carbon economy we need by 2050 in the most cost-effective way.

The EU has taken an important first step in this direction with our climate and energy targets for 2020. Today we are well on track to meet or even over-achieve the goal of cutting greenhouse gas emissions by 20% below 1990 levels by the end of this decade.

Next milestone: 2030

And with 2020 approaching fast, we are planning for the next milestone on the road to 2050. In January the Commission put forward a framework for climate and energy policies up to 2030. We are proposing that the EU reduce its greenhouse gas emissions by 40% below the 1990 level by 2030 through domestic measures alone. This would put the Union on the most cost-effective path towards reaching our 2050 climate goal.

For almost a decade the EU Emissions Trading System (EU ETS) has been the cornerstone of our strategy for cutting greenhouse gas emissions from industry most cost-effectively. We believe it should remain a central tool as we move further towards the low-carbon economy. For the ETS to play its full role, however, we must make it more robust and more effective.

The system limits emissions from over 11,000

fixed installations - power stations and manufacturing plants - across the 28 member states of the EU (as well as in three neighbouring countries - Iceland, Liechtenstein and Norway - through the European Economic Area agreement). Emissions from airplane flights within and between these 31 countries are also covered. In total, the ETS addresses almost half of all EU greenhouse gas emissions.

Emissions cap guarantees climate result

An annual 'cap' limits overall emissions, thus ensuring the ETS makes a predictable contribution to the fight against climate change. Within this limit, companies can buy and sell emission allowances as needed, giving them flexibility to cut emissions in the most cost-effective way. After each year, installations and airlines must surrender enough allowances to cover their emissions, and these are taken out of the market.

Emissions covered by the ETS are being successfully cut. For example, emissions from fixed installations fell 2% in 2012, the latest year for which complete data are available. The annual reduction in the cap for fixed installations means that in 2020 their emissions will be 21% lower than they were in 2005.

The ETS is also helping to promote sustainable low-carbon development in poorer countries, by accepting credits from emissions-saving projects they host. Companies in the ETS are by far the biggest source of demand for credits from UN-endorsed projects in developing countries and countries in transition.

So far, so good, then.

But while the ETS is succeeding in its primary task of reducing emissions, the economic and financial crisis has weakened the system's ability to achieve its second objective: to drive, through the ETS carbon price, the innovation in clean technologies we need to build the low-carbon economy.

Crisis has cut demand

The carbon price has been, and remains, weighed down by a large surplus of allowances - standing today at some 2 billion or more - which

has built up largely because of the recession. The downturn reduced industrial emissions, cutting demand for allowances well below the expectations that had prevailed before the crisis. Consequently, the carbon price has fallen to levels that provide only a weak stimulus for innovation.

Without action the surplus is expected to persist for at least a decade. This could seriously undermine the ability of the ETS to meet our 2030 emissions target in a cost-effective manner. The Commission has therefore had to take the initiative.

As a short-term measure, we are postponing the auctioning of 900 million allowances until 2019-2020. This 'back-loading' initiative, which was recently approved by the European Parliament and Council after difficult discussions, buys some time to allow demand to pick up again. But it is only a temporary fix: it does not reduce the number of allowances to be auctioned up to 2020, only the distribution of auctions over the period.

Currently the ETS rules require the supply of allowances to be set in advance for many years ahead and permit no changes in response to major fluctuations in demand. The crisis has shown this to be a structural weakness in the system that needs to be corrected.

Market stability reserve would address surplus

That is why the Commission, in the context of the 2030 policy framework, is also proposing to create a market stability reserve. This would both address the surplus of emission allowances and improve the system's resilience to major shocks by automatically adjusting the supply of allowances to be auctioned.

The reserve would start at the beginning of the next ETS trading phase in 2021 and would operate entirely according to pre-defined rules. There would be no possibility for the Commission or Member States to intervene at will.

It is my hope that the Parliament and Council will now approve the creation of the reserve in timely fashion. That would be a strong signal of the Union's determination to put a more robust and more effective ETS at the heart of our transition to a sustainable low-carbon economy.

The Issue of Nuclear Energy: a Renewable Energy?



Alejo VIDAL-QUADRAS

MEP, Vice-President of European Parliament
Group of the European People's Party (EPP)

Whenever we discuss about the need for the European Union to encourage decarbonisation of its economy in the decades to come, it is almost always taken for granted that this can only be done with an increased use of renewable energy sources. In line with this were the intentions of the European Commission when they presented, back in 2007, their climate and energy package: a set of binding legislation which aimed to ensure the European Union met its ambitious climate and energy targets for 2020. In that package, you will all recall, binding targets for renewable energy sources were imposed on Member States. But that was back in 2007...

In 2011, we went through a second stage of re-thinking about our EU energy policy with the publication of the "Energy Roadmap 2050". There, the EC presented a series of scenarios looking into the possibilities available to us up to that year in order to continue fighting for the decarbonisation of our economy while preserving our energy security of supply and our industrial competitiveness. The third stage of our endless seek for the best way to go has seen the light less than a month ago with the EC Communication "A policy framework for climate and energy in the period from 2020 to 2030". Our institution, the European Parliament, despite the fact that the Chamber was largely divided on the subject, adopted a motion for a resolution, end of 2013, in response to the Green Paper that preceded the Communication on the 2030 framework.

All this is very good, but it is now time to seriously understand that we have to leave aside this simplistic approach of going 100% renewables. No single energy source is to be

considered the *silver bullet*. Member States should be encouraged and not hindered in using all sources available that can contribute to achieving the objectives of the EU's of energy policy, in line with the provisions set in article 194 of the TFEU¹ ("... 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..."). The objectives of the EU are, as mentioned previously, decarbonisation of the economy, that include the sometimes forgotten battle against climate change, coupled with ensuring security of supply and maintaining EU's competitive role of its industry.

Well, I truly believe that in this equation, nuclear has an important role to play and it should be said so. In fact, nuclear technology scores three out of three in the requirements to be met in the decades to come: nuclear energy is a well-established low carbon source of electricity, currently produced in 14 of the 28 EU Member States, and which provides over 1/3 of their electricity generation, and 29% overall EU electricity generation (the largest share, following the latest available figures published by Eurostat, the statistical office of the European Union, for domestic production of primary energy in the EU28 in 2012)². However, it is also true that more than 40% of the nuclear power generating capacity in the EU, representing almost 46GWe of net capacity, will reach 40 years of operation in the next 5 to 10 years. There are therefore some efforts to do to enable them to continue operating while also encouraging nuclear new build projects in the EU.

I am fortunate enough not to be the only one that plea for a rationalisation of the debate and for a demystification of the nuclear cause. Others like me try to change the tone of the debates,

¹ Consolidated version of the Treaty on the Functioning of the European Union (TFEU), OJEU of 9 May 2008 (art. 194)

² Eurostat Newsrelease 25/2014 - 17 February 2014 Energy 2012 Data

and Mark Lynas, an environmental writer and campaigner, and visiting research associate at Oxford University's School of Geography and the Environment, has published very recently a book entitled *Nuclear 2.0 Why a green future needs nuclear power*.³ In this book, Mark dismantles most of the theories from the anti-nuclear environmentalist movements (to which he belonged!) by providing a very comprehensive approach on how nuclear can really contribute in what he believes should be one of our main focuses: combating climate change. Likewise, four internationally recognized climate scientists⁴ issued a plea to fellow environmentalists that nuclear energy needs to be part of the global climate change solution. And I would dare to add that indeed nuclear together with other low-carbon technologies need to be considered for that.

Taken all this into account I would like to go back to my first sentence in the article: "whenever we discuss about the need for the EU to encourage decarbonisation of its economy in the decades to come, it is almost always taken for granted that this can only be done with an increased use of renewable energy sources." Yes, this is what I think; but only if nuclear is also considered as a renewable energy source!. Why not?



³ Mark Lynas, *Nuclear 2.0 Why a green future needs nuclear power*, UIT Cambridge Ltd, 2013.

⁴ Dr. Ken Caldeira, Senior Scientist, Department of Global Ecology, Carnegie Institution, Dr. Kerry Emanuel, Atmospheric Scientist, Massachusetts Institute of Technology, Dr. James Hansen, Climate Scientist, Columbia University Earth Institute, Dr. Tom Wigley, Climate Scientist, University of Adelaide and the National Center for Atmospheric Research

Relaunching Europe economy thanks to a real energy transition



Michèle RIVASI

MEP, Vice-Chair, Group of the Greens/European Free Alliance

Europe is a long term peace project which aims to benefit all the EU citizens and the next generations...and so is the energy transition. Meanwhile our continent is exposed to a deep economic crisis, we need to find solutions that will last long and will enable Europe to maintain its leadership regarding global challenges such as the peak of fossil fuel resources, climate change and the rise of energy prices.

For the Greens, the European commission proposals regarding the 2030 climate and energy goals are not sufficient to address both energy dependency and climate change challenges. A reduction in greenhouse gas (GHG) emissions by 40% below the 1990 level, an EU-wide binding target for renewable energy of at least 27%, renewed ambitions for energy efficiency policies, a new governance system and a set of new indicators to ensure a competitive and secure energy system are not enough. The best scenarios available confirm that Europe can realistically set a 40% energy efficiency goal and a 45% renewables for 2030. This would lead to a reduction in GHG by 55% below the 1990 level, what would keep us on track to avoid a catastrophic rise of global temperature. Most of all, our targets must be binding to give a clear signal for taxation to the Member states and for investment to the companies: this is the position of the European parliament, and the Council must hear it so that Europe will be able to show leadership for a fair, ambitious and binding global climate deal in 2015 for the COP 21 in Paris.

Europe is the biggest energy importer in the world, with a share of 20% of the world consumption. Europe's energy imports represent more than one billion euros bill every day, and

these figures have been multiplied by 6 over the last decade (from 84 billion euros in 1999 to 488 billion euros in 2011), showing our growing dependency to an energy system that impacts our economy and daily life. In the meantime, over 100 million European citizens are today suffering energy insecurity, not being able to pay their bills due to the poor energy efficiency of their housing. This is a reality, and it will be worst if we don't decide to have our future back in our hands, since our own indigenous resources are being progressively exhausted and that it has been proved we cannot seriously bet on shale gas as a change-maker. We also have to organise a European nuclear phase-out to definitely avoid the disastrous consequences of a potential accident, which costs would also affect non-nuclear EU countries: this is not my idea of European solidarity.

The European community was born after the creation of the European Coal and Steel Community: we then decided to stop being in a dangerous competition for the appropriation of fossil fuel resources to create a better energy security for all. Thanks to coal, we found a 20th century solution to a 20th century problem. Now we entered a new millennium and need to switch to a really sustainable and climate-friendly energy system based on renewable energies, energy efficiency and energy sobriety. While everyone agrees to say that we need to restart our industrial production, the ecologists have real solutions to propose: starting a third industrial revolution fuelled by technological innovation in the field of energy. The potential is huge and we have many major companies but also start-ups that can easily take up this challenge: we just need a real political vision, with incentives and sanctions.

First of all, the sanctions: if we want to achieve an efficient energy transition we must cease our financial support to fossil fuels to stop our addiction. While many EU countries try to moderate the rise of renewable energies by lowering their public support, saying they cost

too much...they still continue to largely subsidise fossil fuels. This is totally incoherent since the cost of pollution is not even integrated in the real price of energy: it's the taxpayers' money that pays for the health and environmental consequences, so the citizens finally pay twice their energy bill. This incoherence has been highlighted many times by the OECD which calls for a progressive phase-out of fossil fuel subsidies. We also need to address the energy waste challenge, bearing in mind that the cheapest energy is the one that we don't consume.

The money we will save by taxation and consumption reduction will enable the Member states to fund their energy efficiency programmes and renewable energy projects, but also to invest in energy R&D. Moreover, we will be then able to give financial incentives to the households in their investments in energy efficiency, by lowering the VAT in the building and public work sector, or tax credits for home energy conservation for instance.

The cost of our energy dependency equals the cost of the creation of 13 million sustainable jobs, which is half the number of unemployed people we have in Europe. What are we waiting for to turn a wasteful energy system into a clean and secured energy future? Why don't we transform our energy dependency into an economic opportunity? Anyway, the price of inaction will overpass the cost of action, this is why it is every day more urgent to *«act, react and impact»*.

The strategic role of electrical grids in the implementation of European Energy Policy



André MERLIN

Outgoing President of the International Council on Large Electric Systems (CIGRE) CEO of MEDGRID

In 2008 the European Union adopted an ambitious energy policy that pursues a three-fold objective:

- To minimize carbon dioxide emissions into the atmosphere in order to fight the risk of climate change.
- To increase the safety of the EU's energy supplies through limiting its dependence upon fossil fuels (oil, gas...) and enhancing solidarity between Member States, in particular in crisis situations.
- To complete the construction of the internal electricity and gas markets through their further integration at European level and connecting them with the neighbouring regions (Mediterranean, Russia).

In order to carry out such policy, electricity is taking an ever more prominent place within the European energy mix, and the electricity grids, that form the backbones of the electric power systems, are poised to play an increasingly strategic role.

Since that date, the global - and more particularly the European - energy context has changed significantly under the combined influence of three factors:

- The particularly severe economic and financial crisis in the Southern European countries.
- The energy revolution in the US through the development of non-conventional gas and oil resources.
- The nuclear accident at Fukushima and its market-related consequences on the worldwide civil nuclear industry.

The European Commission has just adopted, on 22 January 2014, a White Paper on Energy Policy until 2030 at the level of the 28 Member States.

The objectives proposed for 2030 tie in with the goals set for 2020, even though some adjustments have been made, in particular in terms of renewable energy sources. The target is to reach 27% share of renewable energies in the European energy mix without imposing a binding objective on each Member State, to the contrary of the 20% target set for 2020.

The underlying idea is to ensure that renewable energy is produced where it is the most profitable, that is to say where the sun shines with respect to solar power, and where the wind blows as regards wind power.

Such a development further strengthens the strategic role of the large electric grids in Europe for the three main reasons behind the European Energy Policy:

- To integrate large shares of renewable energies of an intermittent nature into the European electric system.
- To enhance energy solidarity within the EU through mutual assistance between Member States and the neighbouring countries and regions in the field of electricity.
- To complete the integration of the Internal electricity market at European level.

European managers of electric grids are now faced with the following first imperative: i.e. to significantly increase the interconnections within Europe, not only, as it has been repeatedly underscored by the European Commission, to promote a greater competition between the market participants, but also, as it was highlighted by the November 2006 great electricity blackout that touched the entire European power grid, in order to reduce the risks of blackout, such as those in Italy, the Northeast of the United States and Canada back in 2003. Greater interconnections are also essential to help balance at any given moment the electricity supply and demand due to the ever-increasing share of wind power in the grid, whose intermittent nature makes it necessary to be assisted in some instances by other means of production, i.e. when the wind is too weak or too strong. The same applies to solar energy.

As opposed to the occasionally widespread opinion according to which decentralised energy can result in savings in the development of transport networks, its intermittent nature, combined with the non-storable character of electricity, requires better-developed interconnection networks proportional to the quantity of intermittent energy injected into the European electricity system.

This interconnection will expand beyond the current boundaries of the European electric grid in two main directions: around the Mediterranean to support the Union's energy projects for the Mediterranean, and to the East with the Russian electricity system, in particular by developing electric exchanges between the Baltic States and their Scandinavian and Polish neighbours.

Finally, in order to respond to the growing complexity of electric systems, which results from both seeking to use existing installations closer to their limit and the evolution of the electric mix towards a more decentralised production of an intermittent nature, greater operating efficiency in the European electric grid has become crucial.

In this context, what kind of technological developments in electric grids are called for in order to address such challenges?

These developments do not only concern Europe and will most likely be carried out in different forms, depending on the parts of the world concerned and according to the energy policies implemented.

The two main orientations are as follows:

- Developing and strengthening the major interconnection grids at continental level, or even drafting intercontinental grids (Europe-Asia or Europe-Africa).
- Developing even more intelligent electrical grids (smart grids).

In conclusion, if the ambition of the European Union is to go towards a European Energy Community, a European community of energy grids should first and foremost be implemented in a timely manner for both the electricity and gas sectors.

Impact of the energy transition on the electric power grid



Klaus FRÖHLICH

President of CIGRE

Aiming for de-carbonization of the energy sector by many countries as well as demands of the electricity market have a significant impact on the electric power grid. A vast amount of electric energy needs to be transported into various directions according to the market situation which was not the case in the past. With a fast growth of new renewable bulk energy sources such as wind and photo voltaic (PV) there is a geographic shift of production sites in relation to the load location. A situation which is enforced especially in Germany by shutting down nuclear units sited in or close to load centers. As a consequence in many cases greater distance and/or higher capacity of the transmission corridors are required.

The most significant problem, however, is created by the intermittency of the new renewable sources. Electricity production depends on the wind or sunshine conditions respectively, thus it is stochastic with limited predictability and it normally does not match the load requirements. Transmission system operators (TSO) this way face an increasing challenge to maintain the system balanced and stable. As an example, though the installed capacity of wind and PV in a large German system is 65000 MW in 2013 the actual generation power was significantly less ranging between a peak of 35000 MW and a minimum of 148 MW. As a consequence a significant conventional reserve power have to be on standby to compensate for up to a major part of the load to deliver for a longer period of time, in case that the wind is not blowing for a week or more and/ or there is a lack of sunshine. Operating the system gets more and more complicated. Unfortunately this fact widely is not understood and the physical terms of energy and power frequently are mixed up in public discussions.

In some countries based on the regulatory framework of subsidized feed in tariffs the renewable sources have priority in case of

overproduction and create a market distortion due to the fact that TSOs have to market the RES at the power exchange even for negative prices. Thus conventional plants such as gas and hydro plants have to be shut down more frequently reducing their profitability. Investment for needed reserve capacities is hampered. Regulations need to be thought over urgently in the course of international cooperation. Switching off the renewable sources in case of overproduction may solve the problem to some extent but would be less environment friendly. Storing surplus of electric energy in pumped hydro plants in mountainous regions, e.g. in the Alps would compensate only to a small extent the planned growth of wind- and solar power in Europe - not taking into account the fact that in case of full exploration of pump storage the necessary transmission capacity is not there. The same applies when interconnecting countries or regions which might soften the problem. Regulations and rules how to operate system of quickly rising complexity are pending.

Speaking of Europe in any case the transmission capacity needs to be increased significantly. A strong overlay grid or strong backbones in particular from North to South are needed to solve the new allocation setting between generation and demand. Promising and quickly rising technology is High Voltage Direct Current (HVDC) transmission. As CIGRE's work bodies have shown, even multi terminal HVDC links or HVDC grids seem to be possible in the near future. However, the problem is not lack of technology. The real problem are the Rights of Way (ROW) for the transmission corridors. In this aspect, politics is challenged to provide faster processing of the legal aspects. In time mediation with objective and unbiased information on the pros and cons of underground cable or overhead solutions is required.

On the consumer side drastic changes happen as well. New types of consumers such as electric vehicles and heat pumps are appearing in increasing numbers. From an operational point of view, however, the big problem is the quick penetration by a vast and growing number of little dispersed renewable sources, mainly PV unfortunately with intermittent generation into the grid. Consumers became producers and

simultaneously they consume and produce quite often for a higher tariff with feed-in guaranteed. Regulations have to be thought over in particular for the case of overproduction. From an economical- and environmental point of view more dispersed electrical energy storage at the low voltage and/or on the medium voltage distribution level is desirable. It seems that growing research and development efforts are undertaken such as e.g. thermo electric storage and improved chemical batteries. Nevertheless, today's distribution system is not sufficiently armed. Congestion numbers will increase and grid control is becoming enormously complex. Architecture and control systems have to adapt. Solutions are demonstrated in pilot installations, such as distribution automation including voltage regulation or micro grids with local intelligence combining into clusters. Smart metering pushed with tremendous efforts in a number of countries is certainly a first step to enhance customer's consumption awareness but also to enable the necessary intelligence of the grid (smart grid).

Summing up it can be stated that the "energy transition" has a severe impact on the electric power system on all voltage levels. Degree and speed of implementation certainly depends on the needs and economical capability of the various countries. Questions arise not only whether a realization out of a "blue print" is actually affordable but also how to cope with different speed of implementation in the various countries. Both increase of international cooperation between countries as well as between TSOs, DSOs and industry is desirable. Solutions should aim for international consensus/standardization rather than on company standards. Engineers, scientists, economists and politics are challenged alike.

The International Council on Large Electric Systems (CIGRE), as a global, unbiased and objective institution, is well equipped to deal with all these matter. For the time being about 130 international CIGRE work bodies cover the scientific, technical, economic and environmental aspects.

Marine energies



Etienne BRIERE

Executive Vice President Program on Environment and Renewable, EDF R&D

EDF R&D plays a major impulse and technical expertise role pushing manufacturers to develop the technologies which are the most adapted to EDF Group needs : « The stakes are to put in place French and European export industries as the potential, except for offshore wind, is an international matter more than a French one. »

Among the few tens of subsea marine energy technologies under development worldwide (conversely to offshore wind that will be addressed in a second step) none has reached an industrial threshold as of today. They don't have the same technical maturity, not all of them will be competitive everywhere, at the same pace. The marine energy industry needs to demonstrate it can contribute in developing electric power beside the other renewable energies: this requires developing sea demonstrating sites first.

The EDF Group, alongside all the stakeholders, especially France Energies Marines or ETI in the United Kingdom, has initiated several experiments for which the technical validity has to be tested, the integration into power systems must be evaluated and their efficiency assessed before considering developing them on an industrial scale, as offshore wind or solar power. These long evaluation and test steps of various technologies are essential to acquire and formalize industrial feedback.

The most mature industry is currently the tidal energy industry for which the next step is to build a pilot farm enabling to test an industrial pilot based on some of the most advanced concepts.

EDF R&D « Marine Energy » program was initiated several years ago with the following objectives :

- **building an industry development roadmap** in order to determine what are the deadlines and in which conditions marine energies could be a viable growth driver for the Group as a developer and operator of marine power generation farms;
- **acquiring and formalizing an industrial feedback** based on pilot projects and prototypes already installed;
- **creating and supporting technology breakthroughs** to reduce marine energy costs in the power grid, by acting on all links of the developing operator's various businesses: capacity forecast, submarine connection to the power grid, operations and maintenance preparation...

For offshore wind, the EDF Group decided to invest gradually in this industry which European potential is significant. Even though this industry's development is considered in full swing, offshore wind is more expensive than onshore wind in terms of investment and grid connection, with more difficult operations and maintenance at sea for which operators lack feedback.

On the other hand, wind turbine unit capacity (3 to 6-8 MW) is greater, so is the potential capacity since winds are more regular and intense (1 MW installed yields 3 to 4 GWh). The industry has engaged in a learning process that aims at reducing costs. Shallow depth technologies with foundation (anchored to the sea floor) are closer

to maturity than floating technologies tested for deep waters but having a stronger development potential.

Offshore wind faces two major challenges : costs and risks related to marine environment. To back these developing projects and to address those challenges, EDF R&D launched the offshore wind project, driven by EDF Energy R&D UK Center in London.

In this context, R&D's three main objectives are crystal clear:

- **Reducing costs and physical, financial and technical risks** related to construction and farm operation beyond 20 km from the coast. Design, implementation strategy, operations and long term maintenance..., all these project life cycle phases are widely covered by EDF R&D;
- **Supporting reactively operations facing a wide variety of technical challenges** thanks to R&D's expertise in the fields of mechanics, hydraulics, atmosphere modeling, environment, maintenance..., and building an R&D program in line with a long term commitment;
- **Preparing for technology breakthroughs:** evaluating floating offshore technologies, supporting EDF Energies Nouvelles for the development of Provence Grand Large project, using a floating lidar to assess site wind potential, developing tools to measure environmental impact, researching original solutions for erosion protection, studying wake effect between wind turbines...

ref. 205798 - EDF, EDF tidal farm of Paimpol-Bréhat: lifting, assembly and launching of tidal turbine by OpenHydro and DCNS (© EDF, Philippe Eranian)



The European Supergrid and the Generation Mix



Ana AGUADO CORNAGO
CEO of Friends of the Supergrid (FOSG)



Energy security, lower electricity prices and greenhouse gas emissions reduction are the high priorities for the European Union (EU). Consensus to reach these targets requires the EU to achieve a “nearly zero-carbon power supply” in an integrated internal market with competitive and affordable prices to all consumers.

The EU faces a global challenge to increase its competitiveness and to compete with the growing economies of China and the USA. To deliver cheaper energy for European consumers and industry we need the single electricity market with much more interconnection.

Moreover, providing zero-carbon power to homes and businesses across the EU will require innovative technologies both in production and transmission networks. These new transmission networks will therefore need to support and balance variable sources of renewable energy generation and effectively use the existing energy mix to maintain security of supply and provide firm power across the EU. European companies are currently among the world leaders in advanced grid technologies, manufacturing and development.

Having such a transformed and integrated energy system imperatively needs a Supergrid. Building this network in time to meet the 2030 and 2050 challenges will require action now. But action has to be driven at European and not at national levels in order to reduce costs and increase efficiency. The current national policy of many Member States, to insulate themselves in individual capacity markets, where their consumers have to pay artificially high prices for what should be a common European good needs to be overcome.

Clear goals for interconnection and the delivery of an internal electricity market must therefore be the priority of the next EU Institutions. Today's

challenge for European policymakers is in fact to put in place a framework that will facilitate the deployment of the first legs of Supergrid before 2020.

Other measures such as storage and smart-grids will also be part of the package of measures to deliver Europe's three energy imperatives, but a range of recent studies have shown that the early development of a European Supergrid will have the most direct impact on achieving these goals at the lower cost.

Friends of the Supergrid - FOSG are a group of international companies sharing a mutual interest in promoting the concept of open markets, trans-national interconnection and exploiting the resulting business opportunities. FOSG members represent the entire supply chain that a project of this magnitude needs and firmly believe that it is technically and financially possible.

Our definition of Supergrid is the following: “a pan-European transmission network facilitating the integration of large-scale renewable energy and the balancing and transportation of electricity, with the aim of improving the European market”.

Supergrid is not just an extension of existing or planned point to point HVDC (High Voltage Direct Current) interconnectors between two Member States. The Supergrid will allow future generation to be built where resources are optimal and not constrained and transported to existing grids at key nodes at a pan-European level. Supergrid is a grid not a patchwork.

A new Regulation to speed up the permitting process of interconnections that will allow the 2020 objectives to be fulfilled has recently entered into force. However, the 2030 and 2050 objectives will require a new incentive European regulatory framework that goes beyond this Regulation and that allows for the first phase of the European Supergrid linking more than just two Member States at the time to start being built right after 2020¹.

¹ The challenge of evolving from a Member State planning methodology to the 1st Phase of a European Supergrid http://mainstream-downloads.opendebate.co.uk/downloads/111014_Evolution1stPhase_final_final.pdf

The Supergrid will be built out in phases. In the North or Baltic Seas this could happen by initially connecting the current crop of offshore wind generators to existing grids. SuperNodes will then be needed using existing technology to cluster offshore wind generation from different Member States for bulk delivery.

The Supergrid initial phases should at the same time provide a staging post for its expansion covering the entire European Union. The final design following a European planning methodology, will consider together the foreseen installed capacity on- and offshore, the enhancement of system flexibility (from market integration and management point of view), the global environment impact and the costs.

FOSG published in 2013 an update of the *Road-Map to Supergrid* illustrating what technology has never been, is not and will never be the bottleneck in the development of the new European transmission network². The Report concludes that the pace of development of “Supergrid” technology has surpassed the estimate given in its 2012 Report, giving confidence that the first legs of Supergrid can be delivered within the decade.

New control and protection techniques will be required to implement such a widespread HVDC grid. Two key technologies still under development, either at the research phase or at the prototype testing phase, are identified: fast acting DC circuit breakers and DC/DC converters.

Although further in depth analysis is necessary on all aspects that should regulate an integrated European network as the Supergrid, FOSG made some early recommendations on how to start developing a stable regulatory framework including financing aspects, technological developments and supply chain readiness³.

² Road-map to the Supergrid technology: http://mainstream-downloads.opendebate.co.uk/downloads/WG2_Roadmap_to_the_Supergrid_Technologies_2013_Final_v2.pdf

³ Supply chain challenges for the Supergrid development and employment opportunities http://mainstream-downloads.opendebate.co.uk/downloads/FOSG-Supply-chain-employment-opportunities--report_final_with-language-improvements-.pdf

The Built Environment and the 2030 Target



Emmanuel FOREST

Executive Vice President Public and European Affairs, Bouygues, Energy Efficient Buildings Association (E2BA President)

The concept of a built environment is relatively recent, originated by social scientists in 1976. Its composition and dynamic are very complex, but we can conceptually differentiate the *hard built infrastructure* (the fabric of buildings, networks of buildings and physical support systems, etc.), the *soft built infrastructure* (the institutions, rules, governance, knowledge values...) and the *community*. In a more physical approach, buildings, infrastructures and cultural landscapes constitute the built environment. They can be considered as a set of natural, physical, economic, human, social and cultural capitals. Built environments are also places of tightly interconnected private and public infrastructure.

This concept is called to take more and more importance in the near future for a lot of reasons. First of all, the built environment is our major living milieu; this is the place (homes, offices, transport infrastructures, cultural places, etc.) where we spent more than 80% of our time. The quality of the built environment therefore directly impacts the quality of our life. But the built environment also serves a lot of industries and services. It impacts therefore the performance of many sectors. Finally, paramount challenges such as energy, climate change, efficiency and more generally sustainability have become of utmost importance for the built environment and very often need to be tackled within an integrated approach.

The key role of the built environment concept has been recently recognized by the European innovation Partnership (EIP) on Smart Cities and Communities (SCC). As an initial output, the Partnership has agreed on a Strategic Implementation Plan (SIP), which was published

in October 2013. In order to focus energy and gain momentum, the plan concentrates on three specific, vertical priority areas for the time being: Sustainable Urban Mobility, Sustainable Districts and Built Environment, and Integrated Infrastructures and processes across energy, ICT and transport. The EIP claims that *Smart cities should be regarded as systems of people interacting with and using flows of energy, materials, services and financing to catalyse sustainable economic development, resilience, and high quality of life; these flows and interactions become smart through making strategic use of information and communication infrastructure and services in a process of transparent urban planning and management that is responsive to the social and economic needs of society*. Likewise, considering the introductory remarks above, the key role of the built environment to support this strategy is obvious.

The main challenge in the 'Districts and Built Environment' area is to *reduce energy use,*

environmental impact and carbon footprint, entail competitive industries for jobs and growth and at the same time ensure *societal and social development* and the *well-being of citizens*.

The investments needed to improve energy efficiency, generate low CO2 energy, modernise infrastructure and create high quality living environments are considerable. At the same time, cities have limited financial resources and therefore need to look into innovative financing like the activation of private capital combined with public investment.

Currently our *existing building stock* plays a major role in energy consumption (40% of EU final energy demand). This stresses the need for affordable and sustainable *buildings retrofitting* solutions tailored to different climatic patterns and that can be applied on a large scale throughout Europe.

Considering this major challenge, the European Commission and industry, represented by the Energy Efficient Buildings Association



(E2BA) signed, on December 17, 2013, a contractual Public-Private Partnership (PPP) on Energy-efficient Buildings (EeB) to continue in Horizon 2020 the joint efforts launched in 2008 towards developing affordable breakthrough technologies and solutions at building and district scale. A global public funding of € 600 million is foreseen in Horizon 2020 for this PPP.

The goal of the EeB PPP is to develop a high-tech building industry, which turns energy efficiency into a sustainable business.

The major challenges addressed by the EeB PPP will be to:

- Develop technologies and solutions enabling to speed up the reduction in energy use and GHG emissions in line with the 2020 and recently-proposed 2030 goals, e.g. through a higher renovation rate of the building stock at lower cost;
- Develop energy-efficient solutions in order to turn the building industry into a knowledge-driven sustainable business with higher productivity and higher-skilled employees;
- Develop innovative and smart systemic approaches for green buildings and districts, helping to improve the competitiveness of EU building industry by delivering cost effective, user-friendly, healthy and safe products for smart cities.

It is expected that the EeB PPP will significantly contribute to the European energy policy objective of reducing by 2050 the energy use of buildings by 50% compared to 2010 levels, promoting an adequate rate of renovation, ideally up to a yearly 4% of the foreseen 2020 building stock, leveraging additional investments (factor 4 or higher) in research, development and innovation activities of the whole construction sector in these issues.

A recent Commission's analysis shows that a *greenhouse gas emissions reduction target of 40% in 2030 would require an increased level of energy savings of approximately 25%. In sectors such as housing and others, there will be a need for a significant acceleration of current efforts to*

tap the significant unexploited potential. This will require large investments in the building sector (that lead to lower running costs), framework conditions and information that encourage consumers to take up innovative products and services and appropriate financial instruments to ensure that all energy consumers benefit from the resulting changes.

The construction sector which is a major player of the making and management of the built environment is well aware of its responsibilities towards a sustainable living and working environment. The EeB PPP will promote high standards of energy efficiency in line with wider employment, competitiveness and environmental objectives – and all European citizens potentially stand to benefit from its achievements.

As a conclusion, I would like to insist that E2BA strongly supports the European Union taking the lead at international level, showing the way with its ambitious targets for 2030 that are essential to respond to the twin challenges of Energy and Climate. Looking together in the same direction is the best way to make the 2015 Paris international Climate conference the historic success we all want it to be.



Meeting energy and climate challenges is a task for local authorities



Eckart WÜRZNER

Mayor of Heidelberg (Germany), President of Energy Cities

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None disputes the fact that any energy strategy needs to rely, in particular, on technology, as most of the articles in this publication show. Forty years after the first oil crisis that marked the beginning of the end of strong growth in Europe, almost everything has changed: we know how to build and retrofit buildings with low heating requirements; we can produce electricity from the sun, the wind and geothermal energy; it is possible to harness solid or liquid biomass to generate heat and power; we have the resources to regulate complex systems; our production systems can rely on high-performance processes. We also now have European legislation. Yet, we struggle to make use of all the above with the intensity required to meet the energy and climate challenges of our century, even though we know this is crucial to preserve global balances. Why is this so? Is it because we tend to overestimate what technology by itself can do and neglect citizenship and governance issues?

In Heidelberg, Germany, we are building the largest “passive standard” neighbourhood in Europe on 116 hectares right in the city centre, including over 3,000 housing units, office space, a university, schools, kindergartens and shops. All buildings are designed to use less than 15 kWh/m²/year for heating. The neighbourhood will be connected to a 100% renewable district heating system using biomass and sun power. The project also includes cycling and pedestrian lanes, a public transport system, a rainwater collection system and green roofs on two-thirds of the buildings.

Bo Frank, my colleague and Mayor of Växjö (Sweden), is close to supplying his city of 90,000

inhabitants with 100% biomass-derived energy, both for heating and electricity. He is making huge progress with biogas and is building zero-energy buildings.

Evelyne Huytebroeck, Brussels-Capital Minister, is radically changing construction and renovation in her region in collaboration with the whole building industry and the training institutions.

The same applies to my colleagues from Dijon, Pamplona, Bielsko Biala, Leicester, Helsinki, Riga, Delft and Bornova-Izmir, who are also on the *Energy Cities* Board. And to the over 5,500 local authorities engaged in the *Covenant of Mayors*¹ and voluntarily committed to achieving the EU’s 3x20 objectives. They are backed-up by hundreds of public, private and associative supporters as well as thousands of committed citizens. An unprecedented movement in Europe!

Energy Cities has published a series of *Proposals for the energy transition of cities and towns*² based on hundreds of practical examples throughout Europe. These proposals constitute a source of inspiration to think and act differently. They encourage local authorities to develop

their capacities, to become aware and make use of their territories’ resources. The range of initiatives proves that it is possible to revitalise local economies which desperately need regenerating.

Who other than local authorities can devise, design and implement the best techniques, methods and practices in their disparate territories in close collaboration with local stakeholders and citizens? No one! No successful energy transition towards a post-carbon society is possible without involving local stakeholders who make it their daily task to transform and regenerate cities, who listen to local people, take the political risks inherent to innovation and encourage the private sector.

What is at stake is the following question: why are local and regional authorities not mentioned in the European Commission’s strategic energy documents³ whereas 70% of energy is used in cities and most of the necessary measures have to be taken locally? Not a word in the *Green Paper* on the 2030 energy and climate strategy published in March 2013! And barely a mention in the January 2014 *White Paper*! It was so blatant that *Energy Cities* took the initiative of publishing a proposal for a *Communication* by the

1 www.eumayors.eu

2 www.energy-cities.eu/30proposals, available in 8 languages

3 Not to mention support programmes as part of the Cohesion and Research policies.



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European Commission in October 2013 entitled “Empowering local and regional authorities to deliver the EU climate and energy ambitions”⁴. A public consultation revealed a consensus among many economic, social and environmental partners. Strengthened by this support, *Energy Cities* convinced the Parliament of the merits of this request, shared by the Committee of the Regions in February 2014.

Only challenges that are sufficiently ambitious to mobilise people can be met with success. This implies a sort of chemistry in which a variety of stakeholders from all walks of life have their part to play. The EU must once again become attractive. Its institutions must rekindle the desire

for Europe. The Parliament and the Commission are about to be renewed, presenting a unique opportunity for citizens and their local and regional representatives to play an active part in European policies. As a universal issue of concern to us all, in all aspects of our lives, energy provides an excellent springboard for a multilevel and multi-player movement. Collectively, we cannot afford to miss this opportunity.

To increase the chances of an agreement being reached in Paris in 2015, Mr Ban Ki Moon has recently appointed former New York Mayor Mike Bloomberg to serve as UN special envoy for cities to the climate negotiations.

Truly a good idea.

4 www.energy-cities.eu/IMG/pdf/comm_2030_web.pdf



European Mayors « demonstrating » for energy transition at Energy Cities' annual Rendezvous in Växjö, 2013

What is the potential for Geo-thermal heat and power in Europe?



Vittorio PRODI

MEP, Group of the Progressive Alliance of Socialists and Democrats in the European Parliament (S&D),
Estrach from Bucarest Conference Speech.

The increasing demand for electricity in the 20th century led to considering alternative generating sources of power, among which geothermal power. The first geothermal power generator was tested in the beginning of the 20th century in Larderello, Tuscany, by Prince Piero Ginori Conti. Italy remained the world's only industrial producer of geothermal electricity until the opening of the Wairakei plant in New Zealand in 1958.

24 countries currently exploit geothermal steam to produce worldwide. In Europe, the production, standing at around 4,300 GWh/y, is concentrated almost exclusively in Italy, Iceland and Turkey. Though, the generation of the same amount of electricity from an average coal-fired plant would represent 5 million tons of carbon dioxide, 46 thousand tons of sulphur dioxide, 18 thousand tons of nitrogen oxides, and 25 thousand tons of particulate matter displaced into the atmosphere every year. *About 18,000 GWh/y of geothermal energy are also generated for direct heat uses such as heating, greenhouses, balneology and processing industries in European Countries. Another fifteen EU countries have direct heat uses while large infrastructure heating is mainly used in France, Germany and Italy.*

In an environment of high and unstable energy prices, this technology provides multiple benefits. It offers cost-effective, renewable and clean energy for industry and domestic applications, displacing oil, gas and electricity – thus ultimately reducing our external energy dependency and increasing security of supply. It is flexible, and can provide base load electricity thus complementing other variable renewables. Geothermal heat applications offer broad market opportunities too, both directly and indirectly, with electricity or gas compressors in ground-source heat

pump for example – the fastest-growing application of the geothermal energy technologies. New thermal fluids are allowing the exploitation of lower temperature heat sources.

What is, however, the long term potential of Geothermal heat and power in Europe and how does the EU go ahead and foster the applicability of these technologies?

Given the nature of the technology, the market, and long term EU policy objectives, answering these questions requires to adopt a multifaceted approach. On the one hand we need to create the right policy environment and economic conditions in the internal energy market, and on the other, promote investment in technology, all while relaying societal and environmental concerns. This is a major technological and economic challenge for the next 40 years but one which could benefit Europe immensely if successful.

Renewables are therefore going to be the centre of the energy mix in Europe which means our internal energy market will undertake a shift, from technology development to mass production and deployment, from small-scale to larger-scale, integrating local and more remote sources, from subsidised to competitive.

The growth of renewable energy in Europe depends, however, very much on private sector investment which in turn demands a stable renewable energy policy. Therefore we, as decision makers, are obliged to provide support mechanisms, enabling market actors to drive down the costs of renewable energy through improved research, industrialisation of the supply chain and more efficient policies and support schemes. Considering the amount of investment needed in our grids, and the dispersed nature of Member State policy on the matter, a fundamental shift in our infrastructure inevitably requires a consolidation of policy and renewed impulse at the EU level.

What I am alluding to, here, is the completion of an internal European energy market ensuring that it is competitive, integrated and flexible. This will require a real integration of Europe's energy networks and systems and opening up energy markets further and is an essential element in

ensuring the transition to a low-carbon society. There is a need to invest in generation, transmission, distribution and storage infrastructure, as well as modernising pre-existing systems. Given the geographic limitations faced by geothermal electricity generation, a European interconnected smart grid of this nature will be fundamental.

To encourage this evolution, the EU will be implementing major changes to the way the energy market functions, stimulating fairer competition. Specifically there are three elements proposed by the Commission last week targeted at ensuring enforcement at Member State level, empowering consumers, and tackling the transition challenge I already mentioned.

The good news is that the architecture for the internal energy market is already clear and laid out in the 'Third Energy Package' and in complementary legislation. The biggest stumbling block continues to be lack of implementation, which is having negative effects on all players. There is a serious risk that we will continue to stagnate in this area and be faced with a less reliable and more costly European energy system. At Member State level legacy advantages of historical operators act as a barrier to newcomers and an excuse for distorting supporting policy mechanisms such as the ETS. Energy regulators and competition authorities, at EU and national level, need to act decisively to ensure that all companies in the market are treated equally ensuring a level playing field. For the Geothermal sector this is especially important given the high financial risk involved in exploration. There needs to be a return on investment, and a guarantee to this is a receptive market.

I would like to emphasise though, that an 'open, integrated and flexible market' will mean that its dynamics will drive investments rather than subsidies. This is where a functioning ETS scheme is fundamental. This mechanism must ensure that fuel sources which produce negative externalities ultimately have them factored into price and that the level playing field functions to meet societal and environmental objectives.

There is a role for your sector to play here. Overcoming this policy gap will need encouragement from industry both to Member States and to EU Institutions. It is much easier for the Commission to mobilise Member States when there is pressure coming from both sides.

I would also like to touch briefly on two other elements which are currently limiting geothermal sector development in Europe. Financial incentives, and in particular RES-E (renewable energy sources for electricity) support schemes across different Member States are inconsistent. Currently 13 Member States offer geothermal electricity feed-in -tariffs, ranging from 25 - 300 Euros per Mega Watt Hour, which in some cases are inadequate and unattractive. Moreover complex permit and development legal frameworks and administrative procedures for geothermal exploitation are creating significant delays for obtaining the necessary permits and licenses. Since this falls under the jurisdiction of Member States, the Commission will only issue guidance on best practises and experience gained in renewable energy support schemes, and on support scheme reform. The aim here is greater consistency in national approaches, while protecting the principles of cost-efficiency and regular degressivity. For the Geothermal sector this is good news as uniformity across Member States will reduce some of the technical issues generating uncertainty for investors, ultimately hamstringing the sector as a whole.

These are market concerns, and as a policy maker I feel it fundamental to shed light on some of the social and environmental concerns.

As Europeans we are leading the world in Environmental legislation and ensuring a cleaner tomorrow for future generations, but if we are to remain at the forefront, we need to act accordingly.

Improving Research and Development

It is my hope that given the right policy environment, geothermal technology will be able to contribute significantly to our objectives, but there are other sector specific barriers to overcome. I am talking about Research and Development

to bring down establishing costs, making geothermal technologies more attractive.

The most pertinent remains the combination of high initial capital costs associated with resource development, specifically the high cost of drilling and a high risk that heat and electricity production does not reach the proposed generation rates. Success ratios for exploration wells may be between 20 - 60%, and even production wells fail to reach their target in around 30 - 40% of the cases. This could result from any number of factors, for example the failure of drilling wells, significant depth requirements, insufficient productivity and accessibility of the reservoirs all threatening to derail projects.

There is also the added dimension of inter-sector competition for drilling subcontractors with the oil and gas industry. This competition will continue to have an undesirable impact on exploration costs: so, when the price of oil and gas is high, the cost of drilling for geothermal projects increases as well. Given that best estimates demonstrate that these prices are only going up in the future this is a factor which will have a large impact on the sector. On the other side there should be no competition between geothermal exploration and shale gas, considering that the latter has unsustainable impacts on the environment and still remains quite controversial. I expect therefore the Commission to support the geothermal sector in a more robust manner.

Given that two thirds of the costs of geothermal plants are associated with the drilling of wells, advances in this area are urgently needed. The good news is that progress is being made with important advancements in logging tools for high temperature and pressure geothermal wells and smaller boreholes producing faster more reliable and accurate data, ultimately reducing logging costs. Also modern drill rigs, with better control equipment and drill bits are making it possible to drill more accurately and successfully, sometimes deeper and faster, but there remains room for improvement.

Moreover there is a need to explore the options EGS plants offer us with the potential coupling of flash or combined cycle technology. Since 2002

and the 6th Framework Programme the EU has funded around 10 projects with a total budget of more than EUR 20 million. I note in particular the flagship project EGS Pilot Plant, which culminated in the construction of a plant based on an Enhanced Geothermal System that was awarded EUR 5 million. EGS technology is an exciting development for the Geothermal sector as it allows for greater power generation using separated water from steam plants, Combined Heat and Power use of deep sedimentary fluids and potentially allows EGS power generation almost anywhere on earth. Under the current 7th Framework Programme research funding was also given for advancing knowledge in understanding and mitigating of induced seismicity associated with geothermal field development. I hope this line of research is going to be insured also in the framework of Horizon 2020 along with projects aiming at educating people on the advantages it offers, and at training for the next generation of scientists and technicians.

The Commission in April last year, based on the Strategic Energy Technology plan adopted in 2007, has proposed an agenda also with targets set at 2020, 2030 and 2050. While in the short term the goal is to construct power plants with direct use of heat and more efficient binary cycles for low temperature resources, in the long term we hope to be deploying these technologies also at large off-shore geothermal reservoirs.

As a final point today I would like to go back to the ongoing competition between RES and conventional energy sources. I have already noted that a lot of the high prices associated with exploratory drilling is linked to the oil and gas sector in Europe and the increased interest in shale gas production will make it a dire competitor with the geothermal sector, hampering its development. In the Parliament's discussion on Shale Gas Exploration and the Energy Roadmap 2050 I have tabled amendments calling for the Commission to produce an underground regional planning. I hope that this will be the start of a process enabling us to optimise resource allocation between geothermal energy and other possible underground usages.

EUROGIA2020, the EUREKA Cluster for the revolution of the energy transition



Gabriel MARQUETTE
EUROGIA General Manager

The world energy system is currently on a path that is not sustainable. Energy demand is forecasted to increase by 40% over the next 25 years as a result of demographic growth and improved living standards in developing countries.

But unbridled growth brings greenhouse gas emissions that threaten to dramatically alter the environment. For example the Current Policies Scenario of the International Energy Agency (IEA WEO 2012), leads to long-term CO2 concentration in the atmosphere consistent with a rise in the world's average surface temperature beyond 6°C.

Given the difficulties in reaching legally binding international agreements on Greenhouse Gas (GHG) emissions, public policies alone are unlikely to put the world energy system on a more sustainable path: a major technological transformation is needed.

The companies that form EUROGIA2020 are committed to the technological transformation of the world energy system into a sustainable, low-carbon, system, in which all consumers enjoy secure energy supply, and to ensure European industry plays a key role in this transformation.

In this transition to a sustainable energy system, more efficient use of energy and renewable energy sources will play the main role, but, due to the enormity of the world energy system, fossil fuels will continue to dominate for many years. This is why EUROGIA2020 addresses the full energy mix. Future energy sources will depend on many factors (technological progress, public acceptance, public policies ...). As an industry forum, EUROGIA2020 favours no one solution; every technology that reduces carbon footprint and increases energy supply security is positive.

EUROGIA2020, the EUREKA Cluster for Low Carbon Energy Technologies, is a transnational industry initiative. EUROGIA2020 addresses the

societal challenges that Europe and the world face:

- Climate change and environmental issues
- Economic crisis and job loss in Europe
- Competitiveness through optimized use of fossil fuels, renewable energy sources and energy efficiency

Our world is changing:

- Energy consumers are becoming energy producers (e.g. positive energy buildings)
- Public acceptance has become key for all industrial projects
- Citizen concerns for energy sustainability (environment, climate change, robustness and security of supply, cost effectiveness) are ever growing.

To respond to these challenges and achieve the necessary major transformation in the world energy system, new technologies are urgently needed. The whole energy sector must combine efforts and collaborate to provide affordable, clean, safe and sustainable energy. Expertise and competencies need to be coordinated on a large scale, as they are available in different countries and industry sectors. EUROGIA2020 is designed as THE tool to be used in this perspective.

Energy represents about 10% of world GDP. Annual investment in energy supply infrastructure alone represents more than 1 trillion dollars, and is poised to increase further, with an annual average of 1.6 trillion dollars expected between now and 2035, according to the IEA.

The period 2013-2020 will be particularly critical in putting Europe back on track to achieve its long term climate goal. The 20/20/20 objectives are likely to be achieved but require tapping only the low hanging fruits (and are being helped by a major economic slow-down).

As the only European programme covering the entire energy value chain, EUROGIA2020 is the instrument to turn the climate change challenge into an opportunity for job creation to help prevent the dire consequences of increasing GHG emissions.

We want EUROGIA2020 to be represent a programme for the full energy mix, without restriction, but with the fundamental principle of energy production and consumption that is respectful of the environment. This includes:

- Making renewable energy sources economic and robust, solving the intermittency issue with novel energy storage and conversion technologies
 - Reducing GHG emissions and exploiting the over 30 Gt of CO2 produced yearly worldwide for CCS (Carbon Capture and Storage) and CO2 valorization
 - Leveraging new gas resources, and the traditional coal ones, to ensure the transition required in the next 20-30 years is carried out with more efficient, less polluting processes
 - Improving energy efficiency and energy management (including positive energy buildings; distributed, coupled and hybrid systems) in all end uses
 - Developing energy management with intelligent network technologies, smart grids and cost effective energy storage on all scales
 - Ensuring security of supply by making shale gas more environmentally acceptable, for example, or providing mineral resources needed for energy technologies
 - Satisfying the continuously growing worldwide demand for energy while achieving long term decarbonisation of the energy chain (including hydrogen)
- EUROGIA2020 will bring its brick to the construction of this new world by easing access to funding for technology developments and demonstration projects.
- EUROGIA2020 is there to lead the way to a new energy revolution.

Quote from Pedro de Sampaio Nunes, Head of EUREKA Secretariat and former Portuguese Secretary of State for Research:

"Society is facing several challenges, with energy supply having a pivotal role:

- A potentially serious climate-change problem, where the precautionary principle makes swift action essential.
- The challenge of competitiveness in the industrial and services sector, where voluntaristic actions on climate are moving industry, with wealth and jobs, away from Europe.

Technology and sound policies are the solution - EUREKA is ready to play its part in helping to solve this problem."



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