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GREEN PAPER

A 2030 framework for climate and energy policies

Contributions from the Advisory Council for the Sustainable Development of Catalonia

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1. INTRODUCTION

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 (GHG) emissions, securing energy supply and supporting growth, competitiveness and jobs through a high technology, cost effective and resource efficient approach. 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.

This framework for 2030 must be sufficiently ambitious to ensure that the EU is on track to meet longer term climate objectives. But it must also reflect a number of important changes that have taken place since the original framework was agreed in 2008/9:

the consequences of the on-going economic crisis;

the budgetary problems of Member States and businesses who have difficulty mobilising funds for long term investments;

– developments on EU and global energy markets, including in relation to renewables, unconventional gas and oil, and nuclear;

concerns of households about the affordability of energy and of businesses with respect to competitiveness;

and the varying levels of commitment and ambition of international partners in reducing GHG emissions.

The 2030 framework must draw on the lessons from the current framework: what has worked, what has not worked and what can be improved. It should take into account international developments and spur stronger international climate action. And it must identify how best to maximise synergies and deal with trade-offs between the objectives of competitiveness, security of energy supply and sustainability.

The framework should also take into account the longer term perspective which the Commission laid out in 2011 in the Roadmap for moving to a competitive low carbon economy in 2050, the Energy Roadmap 2050, and the Transport White Paper. The European Parliament has adopted resolutions on each of the Roadmaps[1]. These Roadmaps were developed in line with the objective of reducing GHG emissions by 80 to 95% by 2050 compared to 1990 levels as part of necessary efforts by developed countries as a group. The scenarios in these Roadmaps suggested the following key findings:

By 2030 GHG emissions would need to be reduced by 40% in the EU to be on track to reach a GHG reduction of between 80-95% by 2050, consistent with the internationally agreed target to limit atmospheric warming to below 2°C.

Higher shares of renewable energy, energy efficiency improvements and better and smarter energy infrastructure are "no regrets" options for transforming the EU's energy system.

For renewables, the policy scenarios in the Energy Roadmap 2050 indicate a share of around 30% in 2030.

Significant investments are needed to modernise the energy system, with or without decarbonisation, which will impact the energy prices in the period up to 2030.

The aim of this Green Paper is to consult stakeholders to obtain evidence and views to support the development of the 2030 framework. It begins with an overview of the current framework and what has been achieved and then presents the issues where stakeholder input is sought. In parallel, the Commission is consulting on issues relating to the international negotiations of a new legally binding agreement for climate action as well its policy to enable the demonstration of the carbon capture and storage technology.

2. THE CURRENT EU POLICY FRAMEWORK AND WHAT HAS BEEN ACHIEVED

Central to the current policy framework are the three headline targets to be achieved by 2020: (1) an EU based target for GHG emission reductions of 20% relative to emissions in 1990; (2) a 20% share for renewable energy sources in the energy consumed in the EU with specific target for the Member States; (3) 20% savings in energy consumption compared to projections. In addition, there are specific 2020 targets for renewable energy for the transport sector (10%) and decarbonisation of transport fuels (6%). The framework also recognises Member States' different energy mixes, economic wealth and capacity to act, and therefore includes mechanisms to ensure a fair distribution of effort between them. It includes measures to address the risk of carbon leakage and its impacts on energy-intensive industry sectors. It is

[1] Links to the European Parliament Resolutions and to the Roadmaps are provided in the Annex in the section on Key Reference Documents.

supported by a broad set of Union financial instruments and a Strategic Energy Technology plan (the SET-Plan). Furthermore the Commission has proposed revising the EU legislation on taxation of energy products and electricity[2] to remove overlaps between existing fiscal instruments. The framework for 2020 is complemented by the Energy 2020 Strategy[3] which assesses the challenges and measures to ensure a competitive, sustainable and secure energy system.

2.1. The 20% GHG reduction target and implementing measures

The 20% GHG reduction target for 2020 compared to 1990 is implemented through the EU Emissions Trading System (EU ETS) and the Effort Sharing Decision which defines reduction targets for the non-ETS sectors, and its achievement is supported through EU and national policies to reduce emissions. In 2011 GHG emissions as covered by the climate and energy package were estimated at 16% below 1990 levels.

The ETS delivers a uniform carbon price for large industrial installations, the power sector and in the aviation sector. It covers more than 10.000 installations and nearly 50% of all EU GHG emissions. This uniform price ensures that climate goals are met cost-effectively and that business across the EU has a level playing field. The carbon price is now part of EU businesses' operational and investment decisions and has contributed to substantial emissions reductions. But it has not succeeded in being a major driver towards long term low carbon investments. Despite the fact that the ETS emission cap decreases to around -21% by 2020 compared to 2005 and continues to decrease after 2020, in principle giving a legal guarantee that major low carbon investments will be needed, the current large surplus of allowances, caused in part by the economic crisis, prevents this from being reflected in the carbon price. The low carbon price is not providing investors with sufficient incentive to invest and increases the risk of "carbon lock-in". Some Member States are concerned with this evolution and have taken, or are considering taking national measures, such as taxes for carbon intensive fuels in ETS sectors. There is an increasing risk of policy fragmentation threatening the Single Market, with national and sectoral policies undermining the role of the ETS and level playing field it was meant to create. The Carbon Market Report assesses in more detail the functioning of the ETS[4].

The Effort Sharing Decision (ESD) sets national targets for GHG emissions in the sectors not covered by the ETS. The aggregate target is a 10% emission reduction at EU level in 2020 compared to 2005. Many EU policies, including sector specific legislation and initiatives, have contributed to reducing emissions in these sectors. They range from policies that improve CO_2 and energy efficiency for cars, the residential sector and energy consuming equipment, to specific waste, environmental, agricultural and land use policies (see annex). The implementation of policies to achieve the renewables and energy efficiency target also contributes to emissions reductions. National targets are distributed between Member States according to economic capacity. Some need to reduce emissions compared to 2005 whilst others are permitted a limited growth in emissions. In aggregate the EU is on track to achieve the 10% reduction target, but significant differences exist between Member States. Half of them still need to take additional measures. Additionally the ESD enables Member States to

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2 COM(2011) 169 final.

3 COM(2010) 639 final.

4 Report State of the European carbon market in 2012 (COM(2012) 652). The report consults on possible ways of addressing the surplus of allowances in the ETS including a widening of the sectors it covers.

meet their targets flexibly, be it through the acquisition of international credits or through trade with Member States outperforming their targets.

2.2. The renewable energy target and implementing measures

The EU is making progress towards meeting the 2020 target of 20% renewable energy in gross final energy consumption. In 2010, the renewables share in the EU was 12.7% compared to 8.5% in 2005. In the period 1995-2000 when there was no regulatory framework, the share of renewable energy grew by 1.9% a year. Following the introduction of indicative targets (2001-2010), the share of renewable energy grew by 4.5% per annum. With legally binding national targets growth has increased but needs to average 6.3% per year to meet the overall 2020 target. The share of renewables in transport reached 4.7% in 2010 compared to only 1.2% in 2005. In the heating and cooling sector, renewable energy continues to grow and its share should nearly double by 2020. However, new measures will be needed for most Member States to achieve their 2020 targets reflecting the scaling back of support schemes and more difficult access to finance in the context of the economic crisis.

The Commission provided a state of play on renewable energy in the EU in 2012[5]. An updated progress report is published alongside this Green Paper. Investments in research and development, innovation and large scale deployment in the sector have contributed to significant reductions in the cost of renewable energy technologies. There are key challenges associated with large scale deployment such as the full integration of renewables into the EU's electricity system in a way that deals with intermittency, and improving co-operation among Member States in meeting targets. The coupling of the EU's wholesale electricity markets will help to integrate renewable energy into the electricity system as will the roll-out of smart grids which provide opportunities to adapt generation, grid control, storage and consumption to the changing situation on markets. However, massive investments in transmission and distribution grids, including through cross-border infrastructure, to complete the internal energy market will also be needed to accommodate renewable energy. Another important challenge is to ensure over time that renewable energy sources become more cost-efficient so as to limit the use of support schemes only to those technologies and areas that still need it. Such schemes should be designed to avoid overcompensation, improve cost efficiency, encourage high GHG reduction, strengthen innovation, ensure sustainable use of raw materials, to be adaptable to cost developments to avoid subsidy dependence, be consistent across Member States and, in particular with regard to biofuels, ensure WTO compatibility.

2.3. The energy savings target and implementing measures

The 2020 target of saving 20% of the EU's primary energy consumption (compared to projections made in 2007) is not legally binding for Member States, but significant progress has nevertheless been made. After years of growth, primary energy consumption peaked in 2005/2006 (around 1825 Mtoe) and has been slightly decreasing since 2007 (to reach 1730 Mtoe in 2011). This trend is partly due to the economic crisis and partly due to the effectiveness of existing policies. It is also due to reduced energy intensity of EU industry which was 149 toe per million euro in 2010, down from 174 in 2000 and 167 in 2005.

With the adoption of the Energy Efficiency Directive (EED) in 2012 there is now a comprehensive legislative framework at EU level. This needs to be fully implemented by

[5] Communication Renewable Energy: a major player in the European energy market COM(2012) 271.

Member States. The EED will help to drive progress in this area, although the Commission's preliminary analysis suggests that with current policies the 2020 target will not be met.[6] The lack of appropriate tools for monitoring progress and measuring impacts on the Member State level is part of the problem. Another major challenge is to mobilise the funds needed to ensure continued progress.

Since 2009-2010, implementing measures have been adopted under the Ecodesign and Energy Labelling Directives on energy related products. These measures reduce the energy demand of industrial and household products leading to savings for end-users. Measures have been adopted for a number of electronic appliances, including domestic dishwashers, refrigerators, washing machines, televisions and tyres as well as industrial products such as motors, fans and pumps. The estimated impact of the adopted ecodesign and labelling measures are energy savings in the range of 90 Mtoe in 2020.

To address the energy consumed in the building stock, in particular for heating and cooling purposes, the EU adopted a revised Energy Performance of Buildings Directive (EPBD) in 2010. Besides the obligation for Member States to apply minimum energy performance requirements for new and existing buildings, the Directive requires them to ensure that by 2021 all new buildings are "nearly zero-energy buildings." However, delays and incomplete national measures to implement this directive risk undermining the necessary contribution of the buildings sector towards lower GHG emissions and reduced energy consumption. The cost-effective savings potential in the building sector is estimated to be 65 Mtoe by 2020. The EU has supported the development of energy efficient technologies, including through public partnerships on energy efficient buildings, green cars and sustainable manufacturing.

In the transport sector, the Regulations establishing performance standards for light duty vehicles have led to substantial reductions in GHG emissions reflected in the fleet average CO_2 emission of new cars from 172 g per kilometre in 2000 to 135.7 g per kilometre in 2011.

2.4. Security of supply and affordability of energy in the internal energy market

The 2009 climate and energy package is not the only work stream in this area. In 2009 and 2010, the EU adopted comprehensive legislation on the internal energy market for electricity and natural gas and, in the wake of two gas supply crises, the Regulation on security of gas supplies. As none of the energy policy objectives can be reached without adequate grid connections, the Commission has also proposed a Regulation on Trans-European Energy Infrastructure Guidelines on which political agreement has been reached by the European Parliament and by Council. It addresses infrastructure challenges to ensure true interconnection in the internal market, integration of energy from variable renewable sources and enhanced security of supply.[7]

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[6] The implementation of measures in the Transport White Paper, further ecodesign measures, smart metering roll-out and smart grid deployment with the resulting demand response should contribute to closing the gap.

[7] For projects identified as projects of common interest (PCIs), the Regulation introduces measures to accelerate permitting procedures, including through a maximum time-limit and streamlining of environmental assessment procedures. The Regulation also provides better incentives to investors through enhanced regulatory provisions, and it sets the conditions for EU financial assistance under the proposed Connecting Europe Facility.

Other EU measures, such as the European Strategic Energy Technology plan are in place to encourage a technological shift through development and demonstration projects for new and innovative technologies: e.g. second generation biofuels, smart grids, smart cities and intelligent networks, electricity storage and electro-mobility, carbon capture and storage technologies and next generation nuclear and renewable heating and cooling. In early 2013, the Commission also proposed a directive on the deployment of alternative fuels infrastructure which will be supported by the proposed revision of the TEN-T Guidelines.

A number of challenges were not addressed at the time of the 2009 climate and energy package. For example, the necessary transmission and distribution infrastructure were not defined. The management challenges linked to the introduction of renewables, including dealing with the variable supply of certain renewables (e.g. wind and solar) were also not fully considered and the impact of a large number of national support schemes for renewables on market integration was underestimated.

The Third Energy package addressed the issue of how to stimulate competition on the market, but did not address the issue of whether the market offered the necessary incentives to invest in generation, distribution and transmission, and storage capacity in a system with greater shares of renewables. Until renewable energy sources become cost-competitive, the objective of a more sustainable energy system must go hand in hand with the need for a fully liberalised and integrated energy market capable of mobilising and allocating investment efficiently.

Important developments and trends taking place inside and outside the EU include the growing energy import dependency of the EU and the technological progress of our main competitors, the new supply routes, as well as the rise of new energy producers in Africa and Latin America. This will all have an impact on the energy cost and security of supply in the EU.

3. KEY ISSUES FOR THIS CONSULTATION

The 2030 framework for climate and energy policies will build on the significant progress already made in this area. It must draw on the lessons from the current framework and identify where improvements can be made. The experience and views of stakeholders, backed up where possible with sound evidence, are essential on four broad issues: targets; other policy instruments; competiveness; and the different capacity of Member States to act.

3.1. Targets

Fundamental issues for a new 2030 framework for climate and energy policies relate to the types, nature and level of targets and how they interact. Should the targets be at EU, national or sectoral level and be legally binding? There are diverging views on the need for targets and types of targets. While experience with the current framework shows that targets provide political momentum, a long term vision for investment, and a benchmark for measuring progress, some stakeholders argue that the existing targets and policies to reach them are not necessarily coherent or cost efficient, or that they do not take competitiveness and the economic viability and maturity of technologies sufficiently into account. The 2030 framework should recognise the evolution of technology over time and promote research and innovation. There is a need, therefore, to assess which targets can best, and most simply and cost effectively, drive energy and climate policies up to 2030, and whether the current approach can be streamlined particularly with reference to the need for various sub-targets such as those in the transport sector. This analysis should also address the issue of whether

having only a GHG emissions target for 2030 would be appropriate, taking into account other objectives such as security of supply and competitiveness.

The current climate and energy targets for GHG reduction, the share of renewable energy sources and energy savings were designed to be mutually supporting and there are indeed interactions between them. Higher shares of renewable energy can deliver GHG reductions so long as these do not substitute other low-carbon energy sources while improved energy efficiency can help reduce GHG emissions and facilitate attainment of the renewables target. There are obvious synergies but there are also potential trade-offs. For example, more than anticipated energy savings and greater than expected renewable energy production can lower the carbon price by weakening the demand for emission allowances in the ETS. This in turn can weaken the price signal of the ETS for innovation and investments in efficiency and the deployment of low-carbon technologies whilst not affecting attainment of the overall GHG reduction target.

A 2030 framework with multiple targets will have to recognise these interactions explicitly. It should also recognise that higher shares of renewable energy sources and greater energy savings will not alone ensure greater competitiveness or security of supply. Dedicated policies will remain necessary and there may also be a need for additional indicators that more directly capture these objectives.

There is a broad consensus that interim targets for GHG emissions reductions will be necessary to reach the aspiration of an 80-95% reduction by 2050. The key issue is deciding on the most appropriate level for such an intermediate target. The 2050 Low carbon Economy Roadmap suggests that a 40% reduction in emissions by 2030 compared to 1990 would be cost-effective. A reduction of less than 40% would increase the costs of decarbonising the economy over the longer term. While the roadmaps suggest that GHG reductions of 40% by 2030 can be achieved without unduly increasing the costs for our energy system, mobilising the funds necessary to cover the capital costs for significant up-front investments will, however, be a challenge.

The Energy Roadmap for 2050 has shown that the share of renewables in the energy system must continue to increase after 2020. A 2030 target for renewables would have to be carefully considered as many renewables sources of energy in this time frame will no longer be in their infancy and will be competing increasingly with other low-carbon technologies. Consideration should also be given to whether an increased renewable share at EU level could be achieved without a specific target but by the ETS and regulatory measures to create the right market conditions. The shape of a possible renewables target will depend on (i) whether a target is considered necessary to ensure increased shares in renewables post 2020 and thereby contribute to more indigenous energy sources, reduced energy import dependence and jobs and growth; and (ii) if and how this can be achieved without undesirable impacts of renewables support schemes on energy markets and energy prices and public budgets. It must be established whether objectives on renewable energy can be best met with a new headline target with or without sub-targets for sectors such as transport, industry and agriculture, and/or other specific measures. Any target or policy for renewables will have to take into account the growing evidence-base on sustainability, costs, the state of maturity of technologies and its innovation potential.

The EU framework for energy efficiency policy has just been updated through the adoption of the EED and a review will be carried out in 2014 with respect to the 2020 target. Discussions on a 2030 energy savings target must be seen in this context. There are a number of issues to

consider. First, energy efficiency, and the resulting energy savings, are acknowledged in the Energy Roadmap 2050 as a "no-regrets" option for the energy system. While evidence on how the current system is performing will not be fully available until 2014 or later, ensuring consistency of a possible energy savings target with any other targets will be essential. Consideration will also have to be given to whether progress on energy efficiency would best be driven by targets for Member States or by sector specific targets.

It will also be necessary to consider if the metric for such a target should continue to be absolute energy consumption levels or whether a relative target related to energy intensity would be more appropriate (e.g. energy consumption relative to GDP or gross value added). While an absolute target might better ensure the overall savings objective, a relative target might better take into account the dynamics of the EU economy and the reality of economic development.

Unlike for GHG emissions reductions and renewables, the current approach to energy efficiency is based on a combination of aspirational targets and binding measures. The need for EU legislation (e.g. ecodesign framework, the EED, the EPBD) under the 2020 framework is linked, at least partially, to the absence of legally binding energy savings targets for Member States. Any legally binding target for energy savings/intensity would need to leave room for manoeuvre for Member States for meeting the target with possibly fewer binding measures at EU level. However, such an approach would have to take into account that much of the EU legislation which contributes to reduced energy consumption also plays a fundamental role in creating the internal market for these products (e.g. the ecodesign framework). If targets remain aspirational, consideration will have to be given to whether current concrete measures are sufficient or whether new measures would be necessary. A key issue will be to what extent energy markets, through the price signal and demand response, will themselves sufficiently incentivise energy efficiency improvements, including behavioural change of consumers, and whether the ETS and its impact on electricity prices will provide incentives for energy savings also in the absence of specific targets or measures. The relatively low price elasticity of energy demand in many important sectors of the economy and projected future levels as well as the variability of the ETS price will have to be taken into account.

3.2. Coherence of policy instruments

The 2020 targets are implemented through policy instruments at EU level which are closely related to the internal market. Member States have larger room for manoeuvre when implementing EU legislation for renewable energy and energy efficiency, and GHG emissions outside the ETS such as in the road transport sector. This has resulted in different national approaches for renewables support schemes, energy and CO_2 taxation, energy performance standards for buildings and other energy efficiency policies.

A combination of instruments is likely to be needed to address the different policy goals and market barriers. These instruments will interact with one another as described above. Some stakeholders have criticised the lack of overall consistency between policies because of such interactions and have pointed to the need to improve the cost-efficiency of various climate and energy measures, considering technological feasibility. In addition, national measures should not lead to fragmentation of the internal market. A strong accent should be put on investments in infrastructure, in particular in networks, that will deepen EU market integration and ensure sustainability, competitiveness and security of supply.

The 2030 policy framework should, therefore, strike a balance between concrete implementing measures at EU level and Member States' flexibility to meet targets in ways which are most appropriate to national circumstances, while being consistent with the internal market. The current balance of the approach between EU level instruments and Member States targets/national instruments will have to be assessed in more detail, including the impacts of fossil fuels subsidies. As before, the distribution of efforts will need to be considered as well.

Beyond regulatory instruments, the EU also provides significant financial support linked to climate change and sustainable energy, in particular through Cohesion Policy, the EU Research Programmes, and in the future the Connecting Europe Facility. Climate action objectives will represent at least 20% of EU spending in the period 2014-2020 and therefore be reflected in the appropriate instruments to ensure that they contribute to strengthen energy security, building a low-carbon, resource efficient and climate resilient economy that will enhance Europe's competitiveness and create more and greener jobs[8].

Future access to international credits after 2020 will need to be assessed. The use of international credits can limit costs but they also contribute to uncertainty on what is required domestically, and have contributed to the surplus of allowances in the ETS. Furthermore, EU industry and governments via the Clean Development Mechanism have subsidised competing sectors especially in emerging economies such as in China, India and Brazil. Shifting away from project-based offsets towards emission trading and other market mechanisms might better incorporate the different capacities of countries to act on climate change and support progress towards developing a more global carbon market with wide international participation.

For sectors like shipping and aviation, the policy efforts also include a coordinated push for globally agreed standards and policies to effectively deliver global emission reductions. As a first step, the Energy Efficiency Design Index agreed at the International Maritime Organization entered into force in 2013 and is expected to slow the increase of GHG emissions from global shipping.

3.3. Fostering the competitiveness of the EU economy

One of the fundamental objectives of EU energy policy is to ensure that the energy system contributes to the competitiveness of the EU economy by ensuring competitive domestic and international energy markets and prices which are internationally competitive and represent affordable energy for final consumers. This is especially important for vulnerable households and industry sectors that are exposed to international competition and for which energy is an important production factor. As the role of electricity is expected to increase during the transition of the energy system, electricity costs are of particular importance in a 2030 perspective.

Energy and climate policies can drive demand and growth in the low carbon economy. The EU is a frontrunner in clean and more energy-efficient technologies, products and services and eco-technologies which together are expected to generate some 5 million jobs in the period up to 2020[9]. Moreover, many of these policies contribute to reduced air pollution and

[8] As decided by the European Council at its meeting 7-8 February 2013 on the Multiannual Financial Framework.

[9] Communication Towards a job-rich recovery (COM(2012) 173 final).

health improvements. At the same time, the policies have been criticised for having a negative impact on energy prices, adversely impacting affordability of energy for vulnerable households and the competitiveness of energy intensive sectors even though they may reduce industry's exposure to energy costs and improve resilience to energy price peaks.

While wholesale energy prices have increased moderately in the EU, there is evidence that end-user prices of electricity for many business and households have increased more significantly in real terms over the last decade. The Energy Roadmap 2050 suggests that this trend will continue in the future. Developments in international markets and exploitation of unconventional hydrocarbons may lead to an increasing divergence of prices in the EU compared to those in other major industrial economies such as the USA where shale gas is now an increasing energy source. In 2012, industry gas prices were more than four times lower in the USA than in Europe[10]. It is clear that this trend is driven by many factors other than the EU's climate and energy policies and that EU wholesale electricity prices are still determined to a large extent by the price of fossil fuels. Member State decisions on tariffs, levies and taxes also have a significant impact on end user prices. These factors must be taken into account when designing new policies. The various drivers of national energy costs including taxation need to be analysed in a differentiated manner as their impact on overall energy production costs appears to differ greatly. A number of issues need to be addressed in this context.

First, full implementation of the internal market legislation is critical to keep prices in check and help meet targets cost-effectively, both by means of increased competition in the market and by more efficient use of energy infrastructure (by means of the Network codes).

Second, there is a need to enable the future exploitation of indigenous oil and gas resources, both conventional and unconventional in an environmentally safe manner, as they could contribute to reducing the EU's energy prices and import dependence.

Third, further diversification of energy supply routes could improve competition on energy markets and significant long-term savings can be achieved by investments in energy efficiency. Further deployment of renewable power generation must be accompanied by improved management of grids, reduced costs and improved performance of technologies and continued support for innovation.

Fourth, concerns have been expressed that the EU's commitment to tackling climate change is not fully reciprocated elsewhere, and that this has an impact on competitiveness. At the same time, the Union's commitment to reduce GHG emissions by 20% by 2020 contributed to the progress made since the 2009 Copenhagen Climate Conference. More than 90 countries have now adopted pledges with varying degrees of ambition. The international community has also endorsed the objective to limit global warming to below 2°C. In addition, several countries are implementing or developing legislation for their own emissions trading system (Switzerland, Australia, New Zealand, South Korea, China and several US states). Notwithstanding these developments, the EU's offer of a conditional target of 30% GHG reductions has not mobilised pledges and actions that would ensure that aggregate efforts by 2020 are in line with the 2°C objective. Hence, the crucial need to engage further with third

[10] According to IEA data, real electricity prices for industry in Europe (OECD) increased on average by 38% between 2005 and 2012 while they decreased by 4% in the USA. For households, from 2005 to 2012 real electricity prices went up by 21.8% in Europe (OECD) and by 8.4% in the USA. IEA "Energy Prices & Taxes, 4th Quarter 2012".

countries, and for the Durban Platform to deliver an agreement by 2015 on post 2020. This is all the more important given that the EU represents only 11% of global GHG emissions and that this share is decreasing so that effective international action is required to tackle climate change[11].

Fifth, in aviation and maritime, EU efforts strongly pursue progress in the relevant international fora to ensure global participation and a level field.

Sixth, it is clear that higher ETS prices and policies to expand renewables generation capacity by providing support or preferential treatment to bring them to the market could increase electricity prices. At the same time, the ETS creates a level playing field in the EU and minimises GHG reduction costs in the covered sectors. The ETS also includes measures to limit impacts on the competitiveness of energy intensive sectors which are exposed to the risk of carbon leakage. These measures will continue until 2020. Given the build-up of free allowances in industrial sectors and the access to cheap international credits, the impact on these sectors is likely to be modest at least up to 2020. State aid rules related to the ETS allow Member States, as from 2013 to provide compensation for part of the indirect ETS costs for the most electricity intensive sectors. Furthermore, environmental state aid rules currently allow targeted exemptions for industry from energy related taxes. The 2030 framework will need to consider whether and how this approach should be continued.

Finally in designing a framework for 2030 consideration should be given to whether ETS related revenue could be used to further assist sectors to innovate. At present this option is mainly driven through Member States' use of auctioning revenues within the allowed boundaries of state aid provision, even though the existing framework does foresee innovative Union finance in the form of the NER300 limited to renewable energy and carbon capture and storage projects.

3.4. Acknowledging the differing capacity of Member States

Member States are very diverse in terms of comparative wealth, industrial structure, energy mix, building stocks, carbon and energy intensity, exploitable renewable resources, and social structure. Individual consumer groups have different capacities to invest and adapt. This diversity must be taken into account when developing a policy framework for 2030. Climate and energy targets impact each Member State and their citizens differently and options to enable effective cooperation and an equitable sharing of the required efforts will need to be assessed as part of the new framework.

The current energy and climate policy framework reflects the differing capacities of Member States by sharing the effort of reaching Union climate and energy targets amongst the Member States, with a lighter burden falling on lower income Member States. Auctioning revenues are also partially redistributed to compensate for cost differences. There are also cooperation mechanisms in the Renewable Energy Directive that enable renewable energy produced in one Member State to count towards the target of another. However, despite the potential economic benefits for both sides this scheme, with the exception of Sweden and Norway, has not been used so far. To take into account national circumstances, the Energy

[11] The prospects for a new global climate agreement are dealt with in a separate Consultative Communication *The 2015 International Climate Change Agreement: Shaping international climate policy beyond 2020*.

Efficiency Directive provides a "menu" of flexibilities that Member States can apply to their 1.5% yearly saving targets including a gradual phase-in of the 1.5% target, exclusion of the ETS sector, inclusion of the energy transformation and distribution sector and recognition of early action. These flexibilities can be used cumulatively but must not undermine the overall energy savings required by the Directive.

There is a need to consider whether for the 2030 framework, similar distribution tools should be maintained or whether, depending on the ambition level and nature of future targets and measures, alternative approaches are necessary. Whilst possibly working against the objectives of the internal energy market, differentiated targets per Member State can improve fairness, but can also increase the overall costs to meet the objectives if they are not coupled with sufficient flexibility in meeting them, such as trading mechanisms. Any 2030 framework will need to consider if sufficient flexibility exists between Member States to allow cost efficient achievement of differentiated targets. In this context, it should also be considered that those Member States where investments are most needed and with the most options available for cost-effective GHG emission reductions, renewables development, energy efficiency improvements etc. often have less economic capacity to take advantage of them. Moreover, some of these Member States face difficulties in obtaining sufficient support for changes of industrial processes and energy use that could impact jobs and reliance on domestic energy resources. Access to finance for investments, be it through direct funding or smart finance, is already part of the toolbox of EU policies[12] but may have to be enhanced in a 2030 perspective. Such measures could contribute to a fair and equitable sharing of effort, while at the same time facilitate public acceptance and engage all parties concerned in the transition to a sustainable, secure and competitive economy.

Member State-specific information will need to be prepared and presented as part of the new framework in order to inform discussions about the equitable distribution of effort and to ensure that an undue burden does not fall on any Member State.

4. QUESTIONS

4.1. General

Which lessons from the 2020 framework and the present state of the EU energy system are most important when designing policies for 2030?

- Energy and climate change must be core issues in the EU agenda. The European Union needs to design a more sustainable energy model at the short and medium term, based on energy savings, energy efficiency and RES. This is the only way of reducing external energy dependency (mainly based in fossil fuels, a non-renewable and environmental damaging energy source), increasing resilience of EU society and economy, reducing GHG, etc.

- This Green paper reinforces the links between energy and climate change policies and the necessity of maintaining a common approach in terms of EU policies and

[12] For instance the proposed European Regional Development Fund for 2014-2020 and the Connecting Europe Facility.

initiatives (this common approach started in 2008 with the 2020 Energy and Climate Change framework).

- EU should maintain a three-pillar approach consisting to separate targets for GHG mitigation, RES expansion and energy efficiency improvements. Providing different guideposts contributes to avoid technological lock-in that endangers achievement of the 2050 targets and/or sharply increasing abatements costs post 2030.

- As it will be commented on part 4.2 of this document, ambitious targets must be defined. These targets must contribute to achieve the targets proposed for 2050 in the Road Map for a Low-Carbon Economy at the EU level and the recommendations of IPPC.

- Ambitious climate policy targets will not do serious arm to Europe's competitiveness and security of energy supply. Instead of this, the adoption of this targets will trigger low-carbon innovation, boost its competitiveness in future-oriented industries, create sustainable jobs, reduce its dependence on imported fuels, attenuate its vulnerability to fossil fuel price volatility, and contribute to a reduction of the EU's trade deficit.

- Compulsory RES targets provide planning and investment stability, which is particularly important for expansion of grid and storage capacity.

- Energy efficiency targets should be made legally binding by 2030.

- Estimates of reduction potentials for primary energy consumption by 2030 amount up to 50%. Energy efficiency objectives must not fall short these widely cost effective energy saving opportunities.

- The design of energy and climate change policies for 2030 should take into account the current the financial and economic crisis that affects different EU Member States (especially in the South of EU). Targeting on carbon and energy without solving the base problems is bound to failure. The current lack of investment capacity highly reduces the possibility of new energy developments.

- The design of energy policies to be implemented at a EU level should take into account the existing differences between Member States, both in policies (in some cases they are not aligned neither among countries nor with UE policy), regulation and the energy system operation (in some cases public companies, in other cases private companies competing in a free market).

- The GHG targeting should not be influenced by lower international targets. The argued negative impacts on the EU economy should be overcome with the positive impacts of a more efficient and competitive low-carbon economy.

- The design of climate change policies at the EU level should incorporate subnational and local governments from the beginning, due to their direct responsibility on policies that contribute to GHG emissions (land and urban planning and management, transport, agriculture, etc.).

- In the design of climate change and energy policies, an especial focus must be put on transport, which is responsible for a high amount of the whole EU energy consumption.

- States should describe, in addition to their targets, the specific measures they commit to undertake, such as feed-in tariffs values through the years. Related to that point, some of the EU contributions to Member States should depend on the accomplishment of the stated commitments.

- Increase of RES targets highly depends on the deployment of smart grids across the EU territory. There is still a lack of technology confluence between IT and energy (smart grids). This lack of infrastructure can difficult the achievement of RES targets.

- Indicators should be improved in order to obtain a good picture of efficiency and RES achievements and facilitate energy accountability.

- From a social perspective, it is important to create a culture of Energy. The social impact of strategic energy infrastructures must be considered during their design in order to build better and more socially accepted infrastructures.

4.2. Targets

Which targets for 2030 would be most effective in driving the objectives of climate and energy policy? At what level should they apply (EU, Member States, or sectorial), and to what extent should they be legally binding?

- At different levels, EU, as political agreements meet international Member States, when they involve very different situations from economically and predictably very contrasted effects on social, by sector, especially for transport and residential. With few exceptions, they must be legally binding.

- It is not possible to apply the same policies in lower income countries such as Spain with high unemployment rates, because this can handicap even more the enterprises. By establishing more rules that are impossible to comply without investment capacity we will put at risk viability of companies, even more than what it is now.

- Minimum targets absolutely binding. Achievements beyond minimums will be rewarded very well (positive discrimination).

- Independent goals for each sectors of consumption must be established: residential, industry, tertiary, primary and mobility. It must take into account the starting point of each sector.

- From a regional level up to UE level: each region has to reach the minimum goals and potentially share their extra achievements with other regions across Europe under a market framework.

- Some energy consumptions in one country are related to other countries, such as international transport across the country. Also exports of intensive energy products (i.e. cement, glass) account for energy consumed in the country o fabrication but they will be used in other countries. That could encourage relocating some factories, but it will increase transport energy consumption. To avoid those effects maybe the transport sector should be considered not only in the State where the transport actually takes place but also in the States where the products are being used.

Have there been inconsistences in the current 2020 targets and if so how can the coherence of potential 2030 targets be better ensured?

- The barriers to get the 20-20-20 targets are not mainly technological. Maybe it was in the last 90s, but last years have shown the most important barriers are from the regulation and economy. Therefore, it would be necessary to address them in order to handle the pace to reach the goals.

- Energy savings goals and financial crisis. Is the reduction of the Spanish energy consumption related to the efficiency or just due to the financial crisis? There is the necessity of setting indicators that reflect the evolution of the economy (for instance "energy intensity" or "energy per employee") and qualify the achievements.

- There are not any economic indexes to boost the most efficiency technologies against the most expensive ones. There would be necessary some sort of economic index, such as a ratio of *€/MWh saved* and *€/MWh CO2-free generated*, promote the cost-benefit analysis for each technology and boost the most efficiency ones.

- There is not enough transparency neither in the costs of regulated activities, nor among the different technologies for electricity generation. It blinds the market and contributes a non-fair competition.

- Lack of (clear) financing schemes supervised by the UE to boost the renewables penetration. In Spain there was an extremely well-paid feed-in-tariff -especially for PV- which was applied to almost 10 times the power capacity that government had forecasted (with an important budgetary impact for the Public Sector). Afterwards, some retroactive laws have cut subsidies down, that means legal uncertainty for the investors and country risk jeopardizing the future development of the sector. For instance, there are not yet the "net metering" scheme to promote the prosumers activity.

- From Roadmaps, sectorial white papers and own Green Paper on climate and energy policies. Moreover, from a panel of experts or observatory climate and energy ad hoc.

Are targets for sub-sectors such as transport, agriculture, industry appropriate and, if so, which ones? For example, is a renewables target necessary for transport, given the targets for CO_2 reductions for passenger cars and light commercial vehicles?

- Goals must be established in different sectors, concurrent and consistent with the basic goals on renewable energy, energy efficiency and emission reduction. For example, agriculture is one of the most fossil-dependent-activities and, besides, it is a yearly

cycle and it is not an elastic goods, so that, is extremely exposed to the cost of fossil energy. It is urgent to fix specific targets to reduce this dependence, to introduce good low-carbon practices (organic farmers, reduce the use of plastics; promote local producers and high-quality products –labels, etc.). Potentially it could be co-financed together with the CAP (Common Agricultural Policy).

How can targets reflect better the economic viability and the changing degree of maturity of technologies in the 2030 framework?

- There is a concern regarding the electric and gas distribution activities are fundamental to go forward a smart grid overall Europe. It means that it is necessary to focus not only in cities, but also in the rural areas. Smart Rural has to be considered as a key part of the European energy network due to is where renewables can be caught. And to do so, a specific legal framework has to be considered by the Commission.

- Introducing more competence and information among different players (even those are related to regulated activities). To avoid black-outs, for instance, it is necessary to invest in distribution and storage and it has to be pushed.

- It would be also of strong interest to evaluate the global costs of the energy dependence of Europe and to allocate the financial resources saved to promote smart grids, energy efficiency and RES deployment. Reporting this economic data will allow the Commission and other stakeholders to monitor the progress of the achievements in energy security of supply.

- Targets for each member state should relate to feed-in tariffs (for electricity and biogas) considering that those tariffs already take into consideration the degree of maturity of technologies.

4.3. Instruments

Are changes necessary to other policy instruments and how they interact with one another, including between the EU and national levels?

- High level education, continuing education and vocational education in energy efficiency and renewables are essential. There is a great discrepancy among member States in both the quality and quantity of professional education on energy.

- Some training and educational standards should be made to be applied to each member state, considering the size of the state. Small States cannot provide all fields of education and training in energy. Collaboration between educationally advanced states and others not so advanced should be stimulated.

- Other changes in the transport sector could be limiting by design the maximum speed a car can run, efficient measures to control speed limits.

- Finally, presenting yearly energy reports to the state and/or regional parliaments (or congress) that would be made fully available in the web.

- Between EU and national levels it is important to harmonize the transposition of UE directives to the different state members in order to have an unique and common view (for instance, Energy Efficiency Directive, Interconnection networks, transport) overview of energy

How should specific measures at the EU and national level best be defined to optimise cost-efficiency of meeting climate and energy objectives?

- Improving (in terms of transparency and update) energy-cost statistics by region, segment of consumption and generation cost
- Putting the data from smart metering system as open as possible
- Boosting competition among different players and avoiding bad practices
- Reducing non-technological barriers, such as user acceptance, financial accessibility, legal and administrative permits, involve other stakeholders
- Carbon Budget. A sort of "annual carbon budget per citizen" that allows people to consume energy rationally (electricity, fuel, etc.) and being penalized or got credit according to the final consumption.

How can fragmentation of the internal energy market best be avoided particularly in relation to the need to encourage and mobilise investment?

Avoiding changes in policies or legal measures that discourage investment, particularly those with retrofitting effects.

Which measures could be envisaged to make further energy savings most cost-effectively?

- The cost of energy saving measures could get fiscal advantages (i.e., reduced added value tax, or reducing income of profit taxes).
- Measures based on consumer behaviour and education.
- Empower the consumers and citizens with their consumption data collected by the Smart Meter (according to the Directives).
- Tax Credit to promote private investment in energy efficiency and local energy production (renewables, retrofitting, etc.) .
- Including mandatory targets of efficiency and renewable generation to the utilities.
- Internalize the cost of different generation technologies (fossil, nuclear, renewables).

How can EU research and innovation policies best support the achievement of the 2030 framework?

- Promoting an ecosystem of innovation that boost the entrepreneurship and entrepreneurship as an effective way to put the research into the market

- Joining industry, basic research, education (technical and business) and entrepreneurs

4.4. Competitiveness and security of supply

Which elements of the framework for climate and energy policies could be strengthened to better promote job creation, growth and competitiveness?

- Support actions similar to the creation of Local Energy Agencies, that is, one experienced successful state or region helping one not so advanced

- Distributed generation of energy could create local employee (for instance net metering in urban areas)

What evidence is there for carbon leakage under the current framework and can this be quantified? How could this problem be addressed in the 2030 framework?

- Among member states, this problem could be addressed with mandatory and binding regional targets. Those regions with a strict climate policy must get some extra benefits (to be defined) due to the extra effort done and have the possibility to market the extra CO2 reductions in order to get benefits for the region.

- Another point could be to boost the *spill-over effect*s of those regions who are more strict in the CO2 reduction, for instance, promote local companies, R&D to become leader regions within Europe.

How should uncertainty about efforts and the level of commitments that other developed countries and economically important developing nations will make in the on-going international negotiations be taken into account?

- The key issue is not allowing frequent changes in energy and/or fiscal policies, or in legislation.

How to increase regulatory certainty for business while building in flexibility to adapt to changing circumstances (e.g. progress in international climate negotiations and changes in energy markets)?

- A minimum of stability is necessary to give enough certainty to industrial investments. It could be achieved with more information, transparency and regulation of lobbies.

How can the EU increase the innovation capacity of manufacturing industry? Is there a role for the revenues from the auctioning of allowances?

- With high quality of education and training and secure political rules

- Promoting low carbon technologies and processes

- High level and know-how in the technical and business universities

- Joining efforts with companies in the same sector (clusters) and in the same value chain (for instance industrial symbiosis)

How can the EU best exploit the development of indigenous conventional and unconventional energy sources within the EU to contribute to reduced energy prices and import dependency?

- Levelling the playing field

- Avoiding the externalization of costs

- Providing full accurate data and information to people and local communities on new energy projects and infrastructures

- Making local communities participate in energy projects (in the initial design, in its investment, in the supervision of the implementation and operation)

- Evaluation of indigenous resources done by public institutions

- Exploitation done by private and public partnerships

- Process under social control

- Use of these resources to power the energy transition not to increase the dependence of fossil fuels

How can the EU best improve security of energy supply internally by ensuring the full and effective functioning of the internal energy market (e.g. through the development of necessary interconnections), and externally by diversifying energy supply routes?

- Reducing dependences (deeply shift of energy consumption to low carbon resources and maximize local energy production)

- Diversifying routes and resources

- High penetration of distributed generation and smart grids at regional level to achieve as much autonomy as possible based on local resources and dynamic demand matching (bottom-up approach)

- External supplies: the recent experiences of Bolivia and Argentina makes necessary to have a business best practices to avoid such problems

  An example, Spain has no pipeline connection to France. The North East region of Spain has no gas connection to France. The lack of those interconnections results the area gets between C and D in the MOSES scale of the IEA.

4.5. Capacity and distributional aspects

How should the new framework ensure an equitable distribution of effort among Member States? What concrete steps can be taken to reflect their different abilities to implement climate and energy measures?

- A quantification of energy resources of each Member State is needed (both renewable and fossil). The EU economic support to member States should be related to accomplishment of the agreed energy targets (in a similar way –but much better- as present economic supports are related to policy, economic, fiscal and other measures)

- Targets must be mandatory and those Member States that do not comply should be penalized harshly.

- It is necessary to follow the state of the progress annually to feed back the process and take corrective decisions, if necessary.