GREEN PAPER
A 2030 framework for climate and energy policies
(Public consultation)

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Introduction

In March 2013, the European Commission opened the public debate on a 2030 policy framework for Energy and Climate. CEA welcomes the Public Consultation on the Green Paper and the possibility to comment on it.

According to the International Energy Agency (IEA), world energy needs will increase by 50% in 2030.

Based on its expertise in low carbon energy technologies including key enabling technologies[1] and its understanding of complementarities between nuclear and renewable sources, CEA has been strengthening research and development in support to the transition towards a decarbonized energy mix.

CEA stresses that the genuine challenge is to substitute fossil fuels by renewable energies, under the condition that independence and economic competitiveness is strongly improved. Therefore, CEA welcomes the cost-competitive approach proposed in the Green Paper.

CEA acknowledges that to cope with energy and climate challenges, technological developments, research and innovation are key to meet the objectives set in the green paper. A strong emphasis is needed on both research and innovation in energy efficiency, nuclear and renewable energy sources. In support to this policy, a particular attention has to be paid to the development of smart grids and storage capacities.

CEA answers to the questionnaire

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?*

As far as GHG emissions objectives are concerned, energy needs have to be taken into account as a whole which means not only electricity generation but also heat generation, fuel production for transportation and housing. The assessment of GHG emissions in the EU shows that GHG emissions have decreased over the period 1990-2012 (even though an increase is observed in a few MS in 2012) for the electricity generation sector, the heat production, the manufacturing industry and the housing; future policies must emphasize these good trends. Two sectors, the transportation and the consumption of halocarbons have seen their GHG emissions increasing over the same period. They should specifically be addressed by future policies.

In all Member States (MS), the electricity generation sector has seen the share of RES[2] increase in the production whereas in some countries this share is even greater than 20%. The priority insertion of

[1] Jean Therme, Director of CEA Tech is chairing the High level expert group on Key Enabling Technologies http://ec.europa.eu/enterprise/sectors/ict/key_technologies/kets_high_level_group_en.htm
[2] RES : Renewable Energy Sources

a significant part of RES generates some difficulties to be solved. The policies supporting RES should be reviewed keeping in mind the necessity to preserve the viability of the whole electricity generation system. The grid at the European scale should be reinforced to accommodate the insertion of intermittent sources. An effort should be made to develop economically mature low carbon back-up and storage capacities. In addition, the current CO_2 price and electricity price for individuals are giving bad signals in regards with EU objectives. Moreover, low price observed on electricity market could raise some concern regarding investments in new capacities (notably for nuclear) that could endanger security of supply in the long run.

One of the major challenges to meet the 2050 objectives is to decarbonize transportation (sea, road and air). The 1st generation of biofuels being in competition with food production, efforts should be focused on cost reduction of 2nd generation biofuels and research and development for the 3rd generation of biofuels. Another approach relies on the use of other energy vectors as Hydrogen and electricity. This approach would have the advantage to enable energy storage.

Improving the energy efficiency whatever the sector (housing, transportation, manufacturing industry) is a major source of energy saving and limitation of the GHG emissions through the reduction of the energy demand. It is a way to reduce the energy bill and increase independence. The share of RES in the heat generation sector has increased but progresses remain needed.

Energy storage will be the third great challenge. It is strongly related with energy mixes including a high share of RES and the security of supply. Challenges are cost reduction, efficient management, minimization of critical material use (for electrochemical storage) and recycling.

Shale gas exploitation in the US has led to a decrease of gas and coal prices. As fossil fuels are one of the main sources of GHG emissions, an effective ETS[3] system would avoid the increase of their use. An effective support to the production of biogas and the deployment of infrastructures for electrical and H_2 vehicles would allow meeting the GHG emission targets provided they are close enough from an economic maturity.

The 2050 energy roadmap aims to decarbonise the European energy within this time frame. Intermediate targets for 2030 are essential especially because targets set for 2020 will not be all met. Energy policy is primarily designed to ensure the production of energy at affordable cost to preserve the competitiveness of European industry and provide even for the poorest citizens, access to energy, without neglecting the aspects of security of supply and energy independence. However, in the context of economic globalization, the objectives and measures (possibly binding) should not penalize European industries.

The energy transition engaged by Europe is also a social issue which will require, in the future, a deep modification of individual behaviors (consumption, lifestyle, financial effort...) and an adaptation to a new social organization (infrastructures, cities...). This change will be much more effective if it is well socially accepted. Thus, transparency and information are essential to help engaging the whole society. In particular, the education of younger generations who will be greatly concerned is a major issue; it can be done at school, but also in other contexts.

The main objective to progress towards the decarbonization of the EU energy will be to imagine new policies to support the technical developments as well as to attract investors for technology demonstrators and pilot lines.

[3] ETS : Emissions Trading System

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 sectoral), and to what extent should they be legally binding?*

The first objective should be the improvement of the energy efficiency concerning mainly building, industrial processes and mobility, which acts directly on energy consumption. This target should be determined by each Member State (MS), taking into account efforts already made. The EU could ensure the sharing of the feedback experience from countries which have already implemented the most effective policies.

The second objective that concerns the insertion of RES in the mix, should be set accordingly with the efforts already made by each MS and taking into account the national potentialities. Support to the RES should be defined at the European level considering technical and economical maturity in which should be taken into account the necessary backup and storage capacities. Consistent policies at both European and national levels should be setup to develop smart grids and their associated new business models for storage, back-up capacities, and demand side aggregation that are needed to introduce the necessary flexibility to the grid facing both RES intermittency and new demands with electrical transportation.

The transport sector being the 1st CO_2 producer, EU should also propose targets for the maximum consumption of thermal vehicles (cars and lorries), as well as objectives for the introduction of electrical and hydrogen cars in the mix of transport means, and for biofuels production and use. These have to be set in accordance with the availability of solutions that are close enough to a technical and economical maturity.

- *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?*

The EU could set global targets for CO_2 reduction in the economy and in particular for the energy sector as a whole, in allowing the MS decide for each sub–sector, thus avoiding any conflict or inconsistency between global and sectoral targets. A genuine industrial policy at European level is a pre requisite to set targets in sub-sectors. Besides, for 2030 the challenge remains in harmonizing regulations, building infrastructures, interconnexions and standards at European level and setting clear and stable framework for investment in technology deployment.

Transportation is a specific case: the development of charging infrastructures for EV and hydrogen vehicles should be a binding policy for all Europe, supported by clear normalization and standardization of the equipments.

In the setup of its climate and energy policy, the EU has to consider the impact on the competitiveness of its industry.

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

In order to ensure an energy production at affordable cost, both technological and economical maturities have to be considered when dealing with new technologies. In that regards, States Aids have to be introduced and to evolve taking into consideration both criteria. These aids should be subsequently oriented to new priorities such as smart energy grid development and to ensure their consistency technologically and economically all over Europe. In that regards, a particular attention has to be paid to the early harmonization of standards. Moreover, a pragmatic approach to ensure a

minimal return on investment for the long term investors could lead to develop specific tools (such as CFD[4] proposed by UK).

- *How should progress be assessed for other aspects of EU energy policy, such as security of supply, which may not be captured by the headline targets?*

It is true that some aspects of energy policy should be better measured, for example:

  - Energy efficiency: number and area of the renovated buildings, energy efficiency achieved in the renovated buildings ...
  - Penetration of RES in the energy mix: installed capacity, average production, availability, associated storage...
  - Energy grids evolution (smarter, coordinated, coherent business model…,).
  - Provided that provisions will be setup in order that expenses related to the RES development will be shared by all individuals using them, auto consumption could be encouraged because it allows limiting energy transmission over long distances.

Security of supply (which remains ultimately the responsibility of MS) is certainly more difficult to assess because it corresponds to complex criteria including:

  - The dependence (or independence) on imports and the number of supplier countries.
  - The geopolitical situation of the supplier countries (stability or instability).
  - The purchase price of fuels (fossil, U ...) or raw materials, the risk of monopoly ...
  - The national energy resources, which are rather different throughout the various MS.

3. Instruments

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

EU and MS have to take into consideration the readiness and the social acceptance of the technical solutions they encourage to meet climate and energy objectives in order to avoid that envisaged solutions are unacceptable for the population.

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

Working for a single energy market, integrated at European level, in which the ETS fully plays its role should be the main approach. Building infrastructure connections between MS also helps fight against the fragmentation. Obviously, a stable regulatory framework is also needed to mobilize investment.

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

Energy saving relies on energy efficiency for both buildings and industrial processes. Improving energy efficiency requires large amounts of investment from both households and industries. A part of the taxes on energy consumption could be used to help people and industries to improve energy efficiency (for example creating a dedicated fund to finance loans at low interest rates). Moreover, implementing a carbon tax for the sectors not subject to the ETS could be considered.

The development of new technologies (RES, smart grid…,) should be accompanied by specific training for professionals and also communication effort towards end users (smart meters). This additional effort requires anticipation and a structured organization at both European and national levels.

Transparency in the structure of energy costs for the end users will provide them with a complete knowledge of the energy costs and make them aware of the challenges and help them to make the most relevant choices.

[4] CFD : Contract For Difference

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

Very likely, the European energy mix, by 2050, will be a balanced mix using various energy sources. According to the 2050 roadmap, this mix will integrate more renewable energy, less fossil fuels of which share will be linked to the possible implementation of CCS devices and a substantial contribution of nuclear depending on MS and the societal acceptance, not to forget improving energy efficiency to reduce energy consumption. Research will be needed to bring these energies at a technological readiness level consistent with the 2030 targets. It is an essential step for the success of the European energy policy. The EU should support, with appropriate tools, basic research (away from the market) and more applied technological research as well as the construction of specific experimental facilities, technology demonstrators and pilot lines. This EU supported research must be carried out in consistency with the Strategic Research Agenda of the SET Plan or European industrial initiatives and contribute to developments allowing progress towards the 2030 targets.

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?*

First, the 2030 framework envisaged by the EU must be open to all low carbon sources and must allow financial support for the construction of technological demonstrators and pilot lines. This stage must be carried out in close contact with European industrials to ensure an added value in Europe. EU should pay a particular attention to establish European standards that will ensure a large market (EU) level. Finally, UE must work for the respect of the International trade rules and encourage the reciprocity in the access to international markets.

- *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?*

The very low price of CO_2 implies that carbon leakage should be limited in the current context. Industry competitiveness could be a major source of carbon leakage. Energy price being part of this competitiveness, the EU climate and Energy policy has to preserve an affordable energy supply for industry or to have in place efficient compensation measures to take into account discrepancies in CO_2 emissions, in international trading, If the CO_2 price was to increase, EU should of course have in place efficient measures that preserve industry competitiveness compared with industries located outside EU.

- *What are the specific drivers in observed trends in energy costs and to what extent can the EU influence them?*
    - The difficult predictability of the cost of fossil fuels should lead the EU to reduce its dependence on them.
    - The cost of carbon, currently very low, does not allow it to play its incentive role to move towards a low-carbon energy. The ETS should certainly be reviewed for this purpose, but in taking into account the attitude of other non UE countries in order to preserve the competitiveness of European companies.
    - The development of non-conventional gas in the U.S. has led to a deep evolution of the gas market, a decreasing cost of fossil fuels (gas and coal) and an increase in their use in Europe (at the expense of the carbon footprint).
    - The aid given to renewable energy (priority call, guaranteed price…), allowed a fast deployment but needs now to be adjusted to the maturity of the technologies. This aid must also now be oriented to support the evolution of the grids to more flexibility.
    - Implementation (ongoing in UK) of "contracts for difference" to ensure a minimal return to investment (for low carbon energies, which require large and long term investments).

- The EU must continue to develop a framework for low-carbon investments and energy efficiency, focusing on limiting associated risks.

CEA strongly supports that to cope with energy and climate challenges, a strong emphasis on technological developments, and innovation is absolutely needed. Such effort should concern both nuclear and renewable energy sources and would allow delivering sustainable growth, creating added-value jobs and solving societal challenges. CEA acknowledges the Commission's effort to boost KETs and calls to improve the deployment of KETs for energy and climate at European level.

- *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?*

It is absolutely inefficient for climate change if Europe struggles alone while China and the U.S. go on emitting huge CO_2 amounts. The EU cannot continue to develop an aggressive policy to fight against climate change without attaching a high priority to safeguard the competitiveness of its companies. This competitiveness is related to the energy price and to innovations. For that purpose, a particular attention has to be paid to research, development and deployment of innovations. Nuclear energy which enables the production of affordable power could contribute to this approach.

- *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)?*

Implement a stable long-term regulation associated with a clearly defined energy policy. In particular, it would be useful to develop consistent and harmonized procedures at European level for licensing (construction and operation of infrastructures). Specific measures such as CFD can help to ensure a stability needed for investments.

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

The current low price of CO_2 does not argue in favor of a significant income from auction of emission allowances. Nevertheless, in a context when the ETS would be fully operational (i.e. the CO_2 price would be high enough to incent the investors towards low carbon sources), using the revenues from the auctioning of allowances to fund research and innovation including technological demonstrators and pilot lines would be an approach that makes sense and that could be crucial to carry out the R & D necessary for the success of the European energy policy. The increase of the innovation capacity will require, beyond the financial aspects, to provide stable long-term outlooks for investors. Funding the construction of research infrastructures in the framework of the SET Plan, thanks to the EU structural funds could be considered.

An increase of innovations could be achieved through a closer connection between research and industries. Bridges between these two sectors would ease the dialog and increase industrial investments in R&D and innovation. CEA is working in that sense including through the development of innovation platforms in regions.

- *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?*

The use of local resources is in line with the reduction of energy costs and security of supply. However, particularly in the case of non-conventional sources, transparency should be enhanced in order to provide the citizens with complete information about the associated risks and to associate them to the energy choices. Unconventional sources will most likely be economically competitive but a clear and stable regulatory framework will need to be implemented for both exploration and operation,

to ensure adequate protection of people and the environment. CCS and preferably valorization of CO_2 must also be developed and encouraged.

- *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?*

The diversification of the energy supply routes is clearly a major objective. It must be correlated to the development of smart-grids, of interconnections between electrical grids all over Europe, but also of interconnections between electrical and gas grids to be able to switch from one energy vector to the other thus bringing more flexibility in the overall energy demand/response. Of course, these developments must benefit to all EU members taking into account their own security of supply.

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?*

- *What mechanisms can be envisaged to promote cooperation and a fair effort sharing between Member States whilst seeking the most cost-effective delivery of new climate and energy objectives?*

- *Are new financing instruments or arrangements required to support the new 2030 framework?*

[Globally for section #5]

- Efforts to be carried out, should take into account the situation of each MS with respect to the composition of its energy mix and its emissions of CO_2, i.e. in accounting for efforts already made.
- The ETS together with other kind of energy efficiency incentives-should be revised to make it effective.
- The EIB shall maintain a priority, in its choices, to low-carbon and energy efficiency investments.
- Low incentives for energy investment exist today at EU level. Arrangements and framework that encourages investment are required in the 2030 new framework.
- State aid in the field of environment should be reinforced to cover the innovation value chain.
- The scope of Projects of common interest for energy networks could be extended.

Conclusion

To meet the 2050 objectives implies, in addition with deep modifications of the citizen behaviors, the massive deployment of new technologies, in assuming they will be available. For this purpose, overcoming numerous major technological breakthroughs is needed that can be achieved only through a significant R&D effort coordinated at both European and national levels, requiring important human and funding resources without which innovations will not be reached in Europe but will be imported from outside Europe, thus threatening the future of European industries and employment. The timescale of the use of new technologies differ according to their nature so they can play a significant role only from 2025.

The three challenge targets for 2050 concerning the energy efficiency, the integration of RES and the reduction of GHG emissions require, from now, a consequent support in basic research and technological research in order to implement as soon as possible the smart integration of technological solutions. These targets and intermediate 2030 targets have of course to be adapted over time according to technological progress and economical maturity of technologies and with

consideration to the international context. In order to meet the potential intermediate 2030 targets, policies and research priorities to be supported are the following:

- Low carbon mobility (road, sea, air) including development concerning electricity, Hydrogen and 3rd generation biofuels.
- Energy efficiency for mobility, building and industrial processes.
- Storage (chemical, H_2, heat) and smarter grids.
- Research and development to support the European industry should focus on energy cost reduction, integration of technologies through a systemic approach, reduction of the use of critical material, and recycling.

Progressing towards the deployment of these technologies, at affordable price, within a realistic approach implying an effective strengthened support to research and development, will enable EU to meet the 2050 targets as well as reinforcing its competitiveness and its energy independence.

Therefore, CEA urges policy makers to reinforce the research and technological innovation dimension in the design of the 2030 framework for climate and energy policies, including financing instruments and arrangements adapted over time with consideration to the international context. The definition and set up of incentives for energy investments in the 2030 framework are required.