KUNGL. VETENSKAPS-AKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

Stockholm June 26 2013 Dnr: KVA/2013/103/76

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European Commission

Response to EC Green Paper – A 2030 framework for climate and energy policies, Brussels 27-3-2013, COM (2013) 169

The Royal Swedish Academy of Sciences hereby answers the consultation EC Green Paper – A 2030 framework for climate and energy policies, as a registered organization with identification number in the transparency register 744827611137-47.

QUESTIONS AND *ANSWERS*

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?

It is doubtful if many different targets in the form of percentage figures should be defined as goals/directives. The problems to achieve the renewable (fuel) target 20% (10%) and the target of 20% improved energy efficiency by 2020 are examples. It appears that mainly one target is required, namely one on the reduction of CO_2 emissions. Not only the emissions during energy generation should be considered, but also the CO_2 foot prints of products to be consumed. A tax on the CO_2 embedment is one possibility to favour consumption of products made of non-fossil energy. In this way Europe's rigorous climate goals would serve also climate friendly European industry.

The policies to be designed should not too much depend on polls, but rather on advice from "independent" bodies such as national academies and EASAC, European Academies Science Advisory Council.

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

In principle, the EU climate-driven energy policy makes sense and it should be applied at all levels. But it has to be adapted to the national situations in different countries. This issue is developed in more detail in the section 4.4. Competitiveness and security of supply. The reduction of fossil-fuel use and the security of supply should be the over-arching guidelines for policy measures. The change-over from a fossil-fuel-dependent society to a sustainable-energy society is of vital importance for many reasons; depletion of fossil fuels and their impacts on climate, environment and health.

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

The most striking example on inconsistency is the original suggestion for an Energy Efficiency Directive, EED, to be based on gross inland energy consumption rather than on final energy consumption (end use of energy). Reducing the use of fossil fuels (F), which should be the over-arching objective can be accomplished by more efficient end-use of energy (U) or/and with increased supply of renewable (R) and/or nuclear (N) energy.

$$\boldsymbol{F = U + L - R - N}$$

The gross inland energy consumption G = U + L where L denotes losses and consumption by the energy sector itself. The fossil energy F will decrease with reduced energy end-use and increased energy supply R and N!

However, if for the EED, the gross inland consumption G is used rather than the end use (U), added solar thermal electricity (CSP), bio-power or nuclear power for replacement of fossil power may add larger "losses" L than those of the replaced fossil sources. This can occur if for a given amount of end-use electricity, the heat loss is smaller for the fossil power generation than for the non-fossil power substitution. Hence, by replacing fossil energy end-use by for example bio-power with a smaller electricity conversion factor (ratio of generated electricity U divided by the energy content of the fuel) than that for fossil energy, G will increase. The total loss L of the fossil, nuclear and renewable power generation increases despite the reduction of the fossil power. Since reduction of fossil energy sources is an over-arching objective of the EU energy policy, the use of the gross inland energy consumption instead of the final energy consumption counteracts EU's main objective namely the climate driven energy policy.

☐ 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 CO2 reductions for passenger cars and light commercial vehicles?

Only the emissions affecting climate change should be used as a target. And all sectors should be included without any subdivision between sectors. It is up to every EU country to decide on how to best reach the over-arching goal.

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

As stated above a policy should be adopted on taxation of the carbon foot prints of products and services consumed within the EU. If, for instance, a tax which is proportional to the CO_2 footprint is adopted, European industry should become more competitive provided Europe takes the lead on abatement of CO_2 emissions. Considerations should also be given to any depletion of forests and the associated loss of carbon sinks.

☐ 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 doubtful if large investments in piping for gas and oil, and infrastructure for coal should be pursued. Instead an extended European power grid should be prioritized with a proper

design for a market with increasing need of base-load regulating power for intermittent electrical energy. The need for investments in bio-power, bio-gas and bio-fuels needs urgent consideration. Especially the second generation bio-fuel and the associated infrastructure should be introduced into the market. The RSAS Energy Committee has already recommended that methanol production based on residues from forestry should be seriously considered.

4.3. Instruments

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

Targets for climate change should be set. Once these are set the linear reduction factors in the EU ETS should be adjusted to these targets in order to reach the EU 2050 target. In addition, subsidies to any kind of renewables should be phased out.

Three sectors need to interact: energy, industry and research. In the short term (2030), system aspects of the energy consumption needs serious consideration. Especially the intermittency of solar and wind and their accommodation into the energy system and the associated costs need to be researched. Basic energy research needs to be augmented for the longer term (2050) breakthrough possibilities. Electrical energy cannot, like other industrial goods, compete on a global market for obvious reasons; there is no power grid embracing the whole world. Moreover, the notion of marginal costs of economic theory cannot be applied fully because of the inherent differences between sources; renewable, nuclear, fossil.

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

The climate goals should be decided at the EU level. Market based instruments to help to reach these goals like the EU ETS which are technology neutral should be defined at the EU level. The individual countries should decide on technologies to reach the climate goals defined by the EU. For Sweden, decarbonising the transport sector by means of a mix of bio-fuels and electrical energy should be prioritized. But Sweden is currently increasing its fossil-free electricity supply beyond its own needs by means of subsidies. Other EU countries may take advantage of this situation by importing Swedish electricity especially for the balancing of intermittent solar and wind energy. But for Sweden and for the EU it might better serve the climate and the economy, if fossil-free Swedish electrical energy is used to produce Swedish products with a minimum of CO_2 footprints, rather than selling it to other EU countries.

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

Promote a well functioning energy market without subsidies and strengthen the European grid. Probably fragmentation can be avoided by defining long-range goals common to the EU. Since in the future there will be an increasing supply of electrical energy, its use should be particularly handled. Electrically-driven vehicles or hybrid vehicles, marine and air transports, which will require non-fossil fuels, are specific topics. The housing sector with heat pumps and super insulation is another sector where long-range guidelines will be required.

☐ Which measures could be envisaged to make further energy savings most costeffectively?

Without doubt any measure where combustion is replaced by electrical energy will in the long range be most cost-effective thanks to its quality (exergy) which makes electricity three times as efficient compared with combustion for generating mechanical energy (motion).

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

For the 2030 time horizon, it is necessary to bridge the gap between R&D and market for a specific product to help getting demonstration facilities so that market introduction is facilitated. One example is the introduction of second generation motor bio-fuels. For Sweden, the RSAS Energy Committee has recommended methanol from forest biomass as fuel for the transport sector. It is important in a Swedish context to preserve a portion of the carbon sink of Swedish forests.

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?

Even if the European countries presently have many cultural and political similarities there are nevertheless considerable national differences in geography, climate and vegetation zones as well as in geology. This has fundamental consequences for the industrial and commercial activities, and is a main reason why the European countries have different economies and different ways to produce energy to support its industry and its population. Energy systems have evolved over a longer period of time, successively adjusting to the national needs and requirements, such as the establishment of nationally integrated systems for the production of heat and electricity.

The issue can preferably be illustrated by comparing Sweden and Denmark. These two countries are culturally similar, but industrially and agriculturally very different and so are the systems for energy production and use. Denmark has no hydroelectricity and has over time developed an industrial and societal structure that is not energy demanding. The use of energy per person normalized by its GDP is actually some 37% less than that for Sweden. Sweden, for obvious reasons, is using significantly more electricity than Denmark (236 %/person) but at the same time Denmark is emitting 67% more CO_2 per person than Sweden. The reason for this is that the two countries are geographically and physically very different and as a consequence the industrial activity and the society over time have adjusted accordingly to such conditions. For this reason it seems obvious that each country must find its own way to both reduce the emission of greenhouse gases according to the targets defined by the EU, as well as finding more efficient ways of using energy.

To suggest some general percentage figures to be more or less equal for all EU countries simply does not make sense. Sweden could easily reduce its use of electricity by moving its steel production, e.g. to Asia, and its forest industry, e.g. to South America. We assume that this could hardly be the objective of the EU industrial policy. Neither will it be beneficial for Europe nor for reducing the global burden of greenhouse gas emission.

☐ 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?

As suggested previously, increased EU consumption of non-EU products with a larger CO_2 embedment than those from within the EU is a major leakage problem. This leakage problem could be reduced by means of a special CO_2 consumption tax for the purpose. Not only emissions need consideration, but also the absorption of CO_2 in the growing biomass. It is after all the net emission of CO_2 that counts.

☐ What are the specific drivers in observed trends in energy costs and to what extent can the EU influence them?

It is important to differentiate between energy costs and energy prices. Energy prices are of course a result of demand and supply in the market. Production costs are driven by fuel costs, increased balancing costs in the power systems due to introduction of weather dependent electricity generation etc. The overall supply is affected by subsidies to renewable power (increasing supply), permitting procedures/environmental legislation (on supply) etc.

When it comes to energy costs, the energy price is only one parameter. For households, network costs and taxes are of equal importance as the energy price. Regulated end-use prices of course have large impact on the energy bill. Swedish taxes have the same share as the energy price of the total energy cost.

It is important that the integration of European energy markets continues. Regulation which hinders efficient markets must be phased out, e.g. price regulation and different kinds of subsidies. In order to reach desirable goals, general economic and technology neutral instruments should be used, resulting in emission reductions at lowest cost.

☐ 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?

☐ 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 global agreement on reducing greenhouse gases is very important since EU emissions represent a very small proportion of global emissions. A global price on carbon is necessary so that companies in different countries face similar requirements in order to safeguard the competitiveness of European industry. The road to the climate-neutral economy in 2050, including climate targets for 2030 and 2040, must be clarified now to give stakeholders a clear signal about the policy direction. In the absence of global action the earlier mentioned CO_2 footprint tax must be implemented.

The EU ETS should be the main instrument that drives reduction of greenhouse gas emissions in the trading sector and it should be designed so that it is in line with the EU long-term climate change target. This will ensure that emissions are reduced in the most cost-effective way.

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

☐ 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?

☐ 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 increased share of intermittent power supply calls for more flexible base load generation. The renewable intermittent power providers should be responsible for the regulation cost which is an important factor for the market to work in a satisfactory way. This is not the case in all Member States today, but needs to be addressed in all countries.

The expansion of electricity transmission capacity between the different EU markets and within each country is essential as the physical conditions for investments in renewable power generation varies. Planning and implementation of grid expansion should be done from a regional / European perspective, and not a national one. Absence of grid expansion prevents market integration and the growth of intermittent renewable electricity in a cost effective manner.

Non-fossil energy, nuclear and renewable, is seen as an opportunity to break EU's dependence on fossil fuels, and thus imports from third countries. This can be accomplished by increased cost of using fossil energy through emissions trading and carbon taxes instead of subsidies for renewable energy.

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?

The burden distribution should be based on well founded rules and not on ad hoc solutions as in the case of the intended EED where Denmark had a suggested burden of 4% energy saving and Sweden 26% corresponding to the energy consumption of the whole Swedish transport sector, savings that would have had to be implemented by 2020. It was never explained how these figures were obtained! Probably each country should set up a percent reduction per year counted on its current emissions to reach a commonly agreed goal by 2050 perhaps defined as a common figure for emission per capita.

☐ 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?

Energy is just one means for a prospering country. European countries have a variety of assets that can be refined by means of energy. For example the combination of the clean Nordic electricity mix and the important forestry industry in Sweden/Finland can be further developed for replacing petrochemical products by forest products, for the benefit of the EU. Other countries have other assets. In particular a green food sector could be developed in continental Europe. A fair effort must see to the full assets of a country and not only to the

energy sector. Europe is challenged in particular by the BRICS economies and must optimise all individual countries' potential.

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

As has been discussed above arrangements should be implemented to integrate much more forcefully than at present the sectors R&D, demonstration facilities and manufacturing for the benefit of the European economy. Also with its ambitions on the climate-driven energy policy, a special tax/tarif on CO_2 embedment should protect European industry from countries neglecting the threat of climate change and producing goods with a large portion of fossil energy.

Decision in this case has been made by the permanent secretary following preparatory work of academy members Sven Kullander from the Energy Committee and Stefan Claesson from the Environmental Committee of the Royal Swedish Academy of Sciences.

Stockholm June 26 2013

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