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## **Green Paper: A 2030 framework for climate and energy policies**

TVO responses to public consultation

**Teollisuuden Voima Oyj (TVO) welcomes the opportunity to respond to the European Union consultation on the climate and energy strategy for 2030. TVO sees that a well-functioning internal energy market and only one target are needed in 2030: Reduction of CO<sub>2</sub> emissions. A clear and consistent energy and climate policy supports EU's competitiveness.**

Nuclear energy has an important role in reducing CO<sub>2</sub> emissions, and it is the most cost-efficient alternative. It represents today two thirds of low carbon electricity in the EU.

The role of nuclear in energy generation is increasing as electricity consumption is growing. In order to secure electricity supply, the nuclear share in generation should be kept at least at the level of today, which is almost one third of EU's electricity.

The EU member states have to keep the right of choosing their own energy mix and its measures to reduce greenhouse gas emissions. Level playing field and equal opportunities for different energy sources should be ensured.

EU policy should support the ETS (Emissions Trading System) as the main driver to low carbon transition.

EU energy strategy for 2030 should be built in a way that the future energy investments are made with market based mechanisms, not with costly support mechanisms which prevent creating the level playing field of different energy technologies.

### **Energy strategy for 2030**

The electricity demand is forecasted to grow, even if the energy demand growth would slow, because it becomes an increasingly used energy vector. The role of low carbon power technologies is increasing in the long term in case the CO<sub>2</sub> emission targets are kept in the EU. This creates an opportunity to develop nuclear power plants which are producing CO<sub>2</sub> free electricity in a competitive way.

Europe should target a balanced achievement of the three objectives:

1. Security of supply
2. Decarbonised energy sector
3. Competitiveness.

To balance these three EU energy policy objectives, there is a need of a balanced energy mix.



## **The value of secure electricity supply**

Decarbonising scenarios in Energy Roadmap 2050 would achieve a level of import dependency limited to 55% in 2030 and lower than 40% in 2050. Nuclear power has an important role to play in securing electricity supply in the EU. Nuclear energy is reliable and in most cases the least cost option for base-load generation.

The nuclear fuel price has a minor effect on total production costs. The fuel reserves at nuclear power plant sites typically are for many years.

The role of nuclear energy in the European energy mix is crucial for achieving decarbonised and secure power supply in Europe.

## **Decarbonising: possible but not at any cost**

In the EU Energy Roadmap 2050 it appears that scenarios with a significant share of nuclear (20% to 30%) are less costly and more robust than those relying on a very high share of renewable energies.

Setting a target of GHG (Green House Gas) emissions in 2030 is only needed target to orient the electricity market towards the decarbonising path. Then the member states have the necessary freedom to choose their own decarbonising strategy.

Decarbonising the energy sector is achievable in the scenarios described by the EC Communication on Energy Roadmap 2050. The common features of those scenarios are the strong increase of electricity share in total energy consumption and the strong decrease of oil and coal consumption. In the electricity sector, that means the energy mix would include renewable energies, nuclear energy and gas mainly.

## **Competitiveness and favourable investment conditions**

Increasing share of intermittent energies in power generation raises new issues. The rest of the supply system is requested to adapt to their expansion, implying more extensive grid connections, added back-up capacities, storage capacities, demand side flexibilities, wider variation range of frequency and voltage. As a result, higher system costs are necessary to obtain the same level of reliability.

EU should not put at risk its competitiveness through a singular climate policy: the extra costs induced by the deployment of low carbon generation should be kept moderate. The system costs e.g. back-up and storage capacities should be analysed in 2030 strategy.

No new binding EU-level target on share of renewable energies in 2030 should be set. EU policy should support the ETS as the main driver to low carbon transition. The market should find by itself the most appropriate mix to reach the decarbonisation target.



Low carbon technologies such as nuclear power are characterised by a high upfront cost of investment followed by low cost of operation, as opposed to gas plants. Financing such high investments is difficult on a market with many uncertainties, like regulation changes, wide support schemes and volatile electricity prices. Therefore, stable and predictable regulatory framework and a level playing field are needed in order to create favourable conditions for new power investments.

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## Background

### European energy policy pillars

The European energy policy is based on three pillars: security of energy supply, reduction of CO<sub>2</sub> emissions and competitiveness. Moreover, EU has committed itself to completing the internal energy market by 2015 and reaching the three 20% targets - CO<sub>2</sub> emission reduction, share of renewable energies and energy efficiency by 2020.

In its Energy Roadmap 2050 the European Commission studied possible paths towards a decarbonised energy system by 2050. The Energy Roadmap 2050 has five climate scenarios which explore routes towards decarbonisation of the energy system. The share of nuclear power in power generation mix varies from 3 to 19 %. The highest shares of nuclear power lead to lowest costs<sup>1</sup>. The highest figure 19% is lower than the projections by industry<sup>2</sup>. This share of 19% or less means that some 100 new power plants should be built by 2050 in order to keep this level of nuclear power in the EU.

### Nuclear energy now in EU

Nuclear energy - with a total capacity of 122 GWe - currently generates approximately one third of the overall electricity consumed in the EU and two thirds of its low-carbon electricity. Many Member States see nuclear energy as a secure, reliable and affordable source of low-carbon electricity generation.

Together with renewable energies nuclear energy makes a significant contribution in reducing CO<sub>2</sub> emissions from the energy sector in the EU and worldwide.

Nuclear energy has an important role to play in reducing cost-efficiently greenhouse gas emissions, representing today two thirds of low carbon electricity in the EU.

Nuclear energy is in most cases the least cost option, providing security of electricity supply with stable and predictable electricity prices and therefore it contributes to competitiveness of European industries.

From 27 EU members states 13 have nuclear power plants and most of them are continuing their commitment on nuclear energy - by either extending the lifetimes of the power plants or building new ones, or both. In those countries the public acceptance is very high. For example 61 per cent of Finnish citizens agree<sup>3</sup> that Finland has had good experiences with nuclear power, only 15 per cent disagree. And as new nuclear country, Poland is planning its first nuclear power plant.

Low carbon energy future by 2050 is not possible without nuclear energy.

### TVO in brief

Teollisuuden Voima Oyj (TVO) is a non-listed public company founded in 1969 to produce electricity for its shareholders at cost price. **TVO's mission is to produce electricity for the shareholders safely and economically, without carbon dioxide emissions.**

The company owns and operates two nuclear power plant units, Olkiluoto 1 and Olkiluoto 2 (OL1 and OL2) at Olkiluoto in Eurajoki. A third nuclear power plant unit (OL3) is under construction and a favourable decision in

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<sup>1</sup> The average annual energy system costs 2011-2050 are 2,525 bn € for Delayed CCS Scenario and 2,535 bn € for diversified supply technologies while the costs of other decarbonisation scenarios vary between 2,552-2,615 bn €.

<sup>2</sup> Eurelectric Power Choices Scenario 2010 leading to 28% of nuclear electricity in 2050

<sup>3</sup> Finnish Energy Industries (ET)



principle of a fourth unit (OL4) was given by the government in May 2010 and ratified by the parliament in July 2010.

The Olkiluoto power plant has been running for more than 30 years with high degree of reliability and safety. The capacity factors for both units have been at the top internationally for nearly the entire history of the power plant. In 2010 OL1-2 reached the capacity factor over 93% despite of the largest ever maintenance outage. OL1 and OL2 have now a net output of 880 MW after being upgraded during the modernization outages in 2010 and 2011. Together they produce slightly more than one sixth of all the electricity consumed in Finland.

TVO delivers electricity in accordance with the "Mankala principle" which means delivering the electricity produced to its shareholders at cost in proportion to their shareholdings. Each of the shareholders bears their share of the variable and fixed annual costs. This "at cost" model gives the smaller players/companies a possibility to enjoy the benefits of a large scale power production with high investment costs, but low operation costs, and in a sustainable way with practically no CO<sub>2</sub> emissions.

TVO has excellent experiences in operating nuclear power plants, a new nuclear power plant under construction, a new nuclear power plant in planning and bidding phase and the nuclear waste management well established.

TVO has secured its fuel supply with stable supplier countries for many years ahead.



## Green Paper: A 2030 framework for climate and energy policies – TVO answers to the questions of the public consultation

### 4.1 General

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

When decisions on the 2020 targets were made economical situation of the EU were very different than today. From the three energy pillars of EU energy policy the competitiveness part was mainly forgotten, and energy policy was led by climate issues. Today **cost-effectiveness** of energy and climate policy measures have become of utmost importance, as competitiveness and growth are in the center of the future of the EU.

Majority of new investments have been motivated by the **heavy subsidies** to renewable technologies, and not by market signals, resulting in increasing prices for the end consumer in spite of low wholesale electricity prices and a low CO<sub>2</sub> price. EU needs **technology neutral approach** and **level playing field** for all energy sources. Market based energy investments should be favored instead of heavy subsidies.

Total **energy system costs** should be analyzed - e.g. taking into account subsidies, new transmission system investments due to massive amounts of intermittent renewable energies coming into the grid.

**Only CO<sub>2</sub> reduction target is needed.** This would give member states more flexibility to their own measures to decarbonize their energy system.

### 4.2. Targets

***Q. 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 EU should aim for **ambitious, but one and only target on GHG emissions reduction for 2030**. Such a target should be at an EU level and be legally binding. A one and only CO<sub>2</sub> target would give **the most flexibility to Member States** to choose their measures in obtaining a low-carbon energy mix and keep the EU on track to meeting the 2050 objective.

The future emphasis should be put on the role of a well-functioning energy market. In order to create a level playing field any investments should be made based on market signals and not on heavy subsidies.

**Energy efficiency and renewable energies (RES)** should **not have binding targets** but instead be considered as instruments contributing to achieving the objectives of emissions reduction, security of supply and competitiveness.

If any RES target is developed by the EU it should only be indicative and take into account the potential of individual Member States to exploit such technologies. Any binding RES target could potentially sky-rocket system costs.



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

Yes, targets and implementation measures overlap, especially the impact of non-market-based renewable energy subsidies on market-based EU ETS which lead to a high cost per tonne of CO<sub>2</sub> avoided and contributing to the collapse of ETS price.

The EU should propose just one target for 2030: a reduction in GHG emissions. Multiple binding targets are not desirable.

***Q. 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<sub>2</sub> reductions for passenger cars and light commercial vehicles?***

No, a single overall target and universal instruments to drive a reduction in CO<sub>2</sub> would be the most effective policy.

Emphasis should be put on the technology-neutral measures to promote CO<sub>2</sub> reductions, e.g. via electrification of transport.

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

The EU should not have any binding renewable energy targets. Technology-neutral and market based schemes would automatically reflect the changing degree of maturity.

***Q. 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?***

EU should concentrate on the EU level security of supply and on implementing the internal energy market as agreed. Well functioning internal energy market will then take care of national security of supply.

#### **4.3. Instruments**

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

Changes are needed. Overlapping targets and various implementation measures can water down the effectiveness of each other.

Focus should be placed on increasing cost-efficiency and improving the functioning of the internal market through eliminating market distortions.

The current ETS price is too low to support longer-term EU decarbonisation in the power sector and is not sufficient to discourage fossil fuel generation. Until the ETS acts as an effective stimulus to low-



carbon investments, the EU should support Member State governments' introduction of technology neutral ways of CO<sub>2</sub> emissions reduction.

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

The EU should only have one policy target - reduction of CO<sub>2</sub> emissions.

The EU should not impose instruments to reach the targets; rather the EU should ensure proper market functioning as a competitive market will ensure the greatest cost-efficiency.

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

The proper implementation of the internal energy market is vital. The EU should encourage competition in the market and ensure the Third Energy Package is fully implemented.

If working as envisaged, the ETS is the instrument which is best-placed to ensure avoiding market fragmentation.

The 2030 framework should promote a level-playing field for low-carbon investments.

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

Transparency of costs for consumers at all levels is most likely to drive energy saving measures.

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

It is extremely important that R&D for nuclear fission technologies be retained and EU support ensured in the long-term. Such investment helps drive innovation in the sector and helps maintain the industry's competitiveness in a global market.

Innovative and non-mature renewable energies should be supported via R&D rather than production subsidies, in order to ensure proper market functioning.

#### **4.4. Competitiveness and security of supply**

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

The EU framework for 2030 should take a technology neutral approach, but also a whole energy system approach.





Consistency and cost-efficiency of policies and the proper implementation through internal market would be the best to promote competitiveness.

The EU should seek to ensure that current market failures and bottlenecks for investment in the EU are identified, that existing financing instruments are reinforced and that new ones are allowed to be established.

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

Renewable energy subsidies and various and increasing tax and charge burdens are the main reasons for increased prices.

The total system costs are not fully addressed as they should in order to have more transparency in energy prices. There is significant uncertainty over system costs for renewable technologies such as large scale deployment of wind and photovoltaic. Current feed in tariff models are also costly on such a large scale.

There is currently a pressure on the availability of capital needed for low-carbon generation projects. Both national governments and the EU will need to continue to develop frameworks for investment, regulatory streamlining and mechanisms to help increase access to capital through risk mitigation.

***Q. 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 EU should ensure energy and climate policy measures come at a reasonable cost in order to remain competitive.

***Q. 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)?***

Clarity over the 2030 framework at EU level and over the pathway to 2050 decarbonisation is needed. Also the role of nuclear power should be acknowledged.

Long-term political support and a stable and predictable legal and regulatory framework coupled with clear national energy policy can give a solid foundation for any energy investment, also for nuclear power.

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

The EU should reconsider the current exclusion of nuclear energy from the NER 300<sup>4</sup> programme.

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<sup>4</sup> "NER300" is a financing instrument managed jointly by the European Commission, European Investment Bank and Member States



The use of Structural Funds for the construction of Member State-based research facilities approved under the SET-Plan could also be considered.

***Q. 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?***

If they are competitive then the market will champion them.

There is an issue of public acceptance that needs to be addressed.

There needs to be a clear regulatory framework for their exploitation.

***Q. 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?***

Diversity of energy sources and their origin, with a diversity of technologies and domestic industrial know-how and capacity, are the main contributors to security of supply.

The EU should limit the share of intermittent sources, which are bringing instability across the EU electricity grid. Likewise, the EU should not be encouraged in promoting costly counter-measures, for example energy storage.

As concerns grid infrastructure, the EU should give priority to interconnections in order to facilitate cross border trade.

#### **4.5. Capacity and distributional aspects**

***Q. 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?***

EU should increase cost- efficiency of its energy and climate policies.

***Q. Are new financing instruments or arrangements required supporting the new 2030 framework?***

To support the 2030 framework, clarity of future political framework is needed. Market based investments require clarity and stability of the regulatory framework for a long period of time. Most of today's investments are based in subsidies, and this is not sustainable.

The role of EU ETS is as a driver for low carbon investment in the future is unclear.

Lending institutions in Europe, such as the European Investment Bank should give preference to investments in low-carbon energy projects, as a facilitator to other investors.