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NOTE

From: General Secretariat of the Council
To: Permanent Representatives Committee/Council
Subject: Smart sector integration: Promoting clean energy
- Policy debate

1. On 25 June 2019 the Council (TTE Energy) adopted conclusions on 'the future of energy systems in the Energy Union to ensure the energy transition and the achievement of energy and climate objectives towards 2030 and beyond'. In its conclusions the Council called upon the European Commission to 'undertake an analysis of sector coupling and sector integration technologies, including the production of hydrogen, in particular with regards to regulatory and market barriers and based on this analysis explore possible initiatives regarding the efficient integration and deployment of such technologies and energy carriers'.
2. The ministerial policy debate on 4 December 2019 shall provide the Commission with political guidance for upcoming initiatives in the field of sector integration. In order to guide this ministerial policy debate, the Presidency prepared a background paper and questions in the Annex to this Note.

Smart sector integration: Promoting clean energy
Background paper for the policy debate at the TTE Energy Council
on 4 December 2019

Deploying clean energy across the economy

Achieving climate neutrality requires clean energy use across the economy. Smart sector integration is a prerequisite for cost-efficient decarbonisation and for ensuring the stability and flexibility of the energy systems. It links sectors, energy carriers, infrastructures and technologies. Smart sector integration enables using growing volumes of clean energy for various purposes, for example heating, transport and industry. It also helps to save energy and reduce the costs of the energy transition.

The Commission, in its November 2018 Communication 'A Clean Planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy (LTS)'¹ analysed a wide range of technology options to decarbonise the EU by 2050. According to the vision, the future energy system will need to integrate energy systems and markets, with smart networks placing citizens at the centre.

In its June 2019 assessment of the draft National Energy and Climate Plans (NECPs),² the Commission highlighted that the NECPs are an opportunity for the Member States to include more forward-looking concepts of energy system integration.

The EU needs to take a holistic approach to energy policy to succeed in the transition towards climate neutrality. To foster the full potential of smart sector integration, it is essential to remove regulatory and other barriers.

¹ The Commission Communication: https://ec.europa.eu/clima/policies/strategies/2050_en

² Formally the Communication on 'United in delivering the Energy Union and Climate Action - Setting the foundations for a successful clean energy transition. Link to the Communication: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52019DC0285>

Smart sector integration enables decarbonisation

Smart sector integration goes together with electrification – using clean electricity in different energy systems and industrial processes. It also enables the further use of decarbonised gaseous and liquid fuels, mainly in areas where further electrification is not feasible or cost-efficient. This means, for example, the use of electricity in heating, production of e-gases, such as hydrogen, and clean mobility. In the future, electricity will be used in industry also to produce non-energy products, such as synthetic chemicals.

Smart sector integration also means a better use of waste resources for energy production, such as waste heat from industry or data centres used in district heating, and the upward integration of energy supply at the local level, e.g. vehicle-to-grid use of electric car batteries.

Smart sector integration options are additional to the direct deployment of renewable energy sources in the sectors, as both will be required in parallel to reach long-term decarbonisation goals. Examples include solar-thermal in the heating sector or renewable gases, such as biomethane.

The overall decarbonisation of our economies and the growing demand for electricity will require significant investments in clean electricity production. A rapidly increasing share of variable renewable electricity means more system flexibility is needed. In the LTS scenarios, final demand for electricity will grow between 30% and 75% by 2050. The EU energy market framework should enable sufficient investments in clean electricity production. Also by 2050, clean gases could constitute between 30% and almost 70% of total gas use, depending on the scenario.

Smart grids and new digital solutions enable smart sector integration to increase the flexibility of the electricity systems. This development must be widened to cover also other sectors and uses of energy. For example, producing synthetic fuels from carbon dioxide and electricity offers a solution for seasonal energy storage. Smart sector integration enables efficient and flexible use of clean energy and increases also security of supply.

One important component of sector integration is the coupling of electricity and gas production, meaning power-to-gas and gas-to-power conversions. This will allow better management of energy storage and faster integration of renewable energy. As electricity starts dominating the energy landscape in heating, transport and industry, gas will increasingly act as a back-up to electricity. This will lead to the coupling of energy production with the energy-consuming sectors and ultimately to reduced energy consumption.

Existing energy infrastructure offers untapped flexibility potential

Major sectors to be decarbonised are heating and cooling in buildings and industry. According to the Commission and Eurostat, they account for half of the EU's energy consumption, and around 75% of their energy use is fossil fuels, mostly natural gas.

The existing energy infrastructure should be widely utilised to optimise cost-efficiency of the emissions reductions in heating and cooling and to improve the flexibility of the energy systems. For example, gas and district heating and cooling (DHC) networks offer major potential for further electrification and improved system flexibility e.g. in the form of e-gases and gas storage as well through the use of large heat pumps and heat storage in DHC networks. To fully use these opportunities, more coordinated planning of electricity, gas and heating networks should be considered.

Clear price signals are needed to stimulate smart sector integration

Smart sector integration will mean more energy conversions across the energy systems. Yet, the structures of energy prices, tariffs and taxation in different energy systems vary nationally and across the Member States, which can constrain smart sector integration by e.g. removing incentives from certain energy conversions. There can also be limitations in consumers' right to choose the energy solutions they want to use.

Clear price signals are key to efficient operations. In the electricity markets, price signals give efficient incentives to producers and consumers to react when it is most profitable for them and for the whole system. Making dynamic pricing more common in different energy markets is an opportunity to develop smart sector integration further. The energy markets should be designed so that lock-ins to certain energy forms or carriers could be avoided.

The Council has called on the Commission to analyse sector integration

The June Energy Council highlighted the importance of sector integration to ensure the achievement of energy and climate objectives towards 2030 and beyond³. The Council called on the European Commission to undertake an analysis of possible regulatory and market barriers to sector integration and sector coupling and explore possible initiatives regarding the efficient integration and deployment of sector integration technologies.

To provide guidance on future policy planning, the Presidency invites Ministers to discuss smart sector integration and to consider the following questions:

- 1) What is the role of the EU in enabling smart sector integration?*
- 2) Which regulatory and other barriers should be removed to accelerate smart sector integration?*

³ Link to the Conclusions: <https://www.consilium.europa.eu/media/40028/st10592-en19.pdf>