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GasNaturally response to European Commission's consultation

An EU Strategy for Smart Sector Integration

1. **What would be the main features of a truly integrated energy system to enable a climate neutral future? Where do you see benefits or synergies? Where do you see the biggest energy efficiency and cost-efficiency potential through system integration?**
   A truly integrated energy system is one that fosters the interaction of energy vectors, notably gas, power and heat with end-user sectors, such as industry, residential, mobility and agriculture. A smart energy system exploits the strengths of each energy carriers reducing the environmental impact across sectors. In this context, gas plays a key role in contributing to:
   - **Decarbonising industry**: about one third of EU industry's energy consumption relies on gas due to its efficiency and affordability. Renewable and decarbonised gases have particularly strong advantages in enabling industry to decarbonise their energy-intensive power, heat and chemical processes, also off the grid.
   - **Decarbonising heating**: through the roll-out of efficient condensing boilers and a progressive penetration of hybrid solutions, gas appliances bring substantial energy savings while providing a concrete alternative for the renovation of EU's building stock in cities and rural areas.
   - **Decarbonising transport**: natural gas, LPG, decarbonised and renewable gases represent a quick and readily available way to complement efforts aimed at decarbonising the transport and logistics sector.

   A smart energy system guarantees an efficient integration of cleaner energy carriers: thanks to existing gas infrastructures it is possible to integrate renewable and decarbonised gases such as bio-methane and synthetic methane. As highlighted in the Gas for Climate study, maintaining gas infrastructure generates €217 billion in annual energy system cost savings.

   Another key element is to leverage the synergies and the complementarity between electricity and gas through a sector coupling approach, enabling the development of cutting-edge technologies such as hydrogen, crucial to decarbonise European industry.

   Lastly, a smart energy system is one based on innovation, allowing the scale-up of innovative technologies including power-to-gas, CCUS, anaerobic digestors, electrolysers and pyrolysis. Beyond driving decarbonisation, these solutions are also paramount for a sustainable post-COVID recovery creating jobs and boosting growth.

2. **What are the main barriers to energy system integration that would require to be addressed in your view?**
   An integrated energy system requires the development of fully integrated markets, allowing the development of renewable and decarbonised gases. To this end, harmonised rules for their integration are crucial to ensure their penetration across markets. An increased coordination and an improved exchange of information between power and gas

infrastructure operators will also be required to enable the interdependency of both sectors and better manage the balancing of supply and demand of energy. Lastly, it is key to support the scale-up of renewable and low carbon-based technologies which are crucial but not yet profitable. Many new technologies are evolving simultaneously to an unprecedented scale, and they all need to be screened, then tested to select the most relevant and effective. In order to find the technologies that will allow us to meet short-term and longer-term challenges, support beyond the private sector is needed. Such support schemes need to encourage the interaction of players from different sectors, including the gas sector, to an extent that has not happened in the past.

3. **More specifically:**

How could electricity drive increased decarbonisation in other sectors? In which other sectors do you see a key role for electricity use? What role should electrification play in the integrated energy system?

Adopting a sector coupling approach exploiting the complementarity between gas and electricity would facilitate a cost-optimal development of the electricity system, avoiding burdensome and unnecessary investments in the expansion of the electricity grid, in particular as applied to the so-called "hard-to-electrify" sectors (transport and industrial thermal uses). When making regulatory decisions, it is paramount to recognise that both molecules and electrons will keep playing a key role for the creation of a future-proof decarbonised and integrated energy system. Furthermore, in some regions across the EU, coal-to-gas switch and gas-to-power can provide quick wins in decarbonisation of power generation in a cost-effective manner, while preparing at the same time the energy system for the transition to renewable and low-carbon gases in the next decades.

In the heating sector, the use of natural gas and LPG, in the future renewable and decarbonised gases, provides a cost-efficient heating solution for residential and commercial premises, while supporting efforts to improve air quality. Gas-based heating on and off the grid offers a means for energy efficiency gains and the introduction of renewables. For example, this is commonly done by using condensing boilers in combination with solar thermal panels, mainly for hot water production. The next generation of gas appliances on and off the grid will be even more efficient by using the energy from air, ground or water in gas heat pumps. Blending of renewable and decarbonised gas makes gas-fired condensing boilers the most cost-efficient and ecological heating technology for private households.

What role should renewable gases play in the integrated energy system?

While playing an important role in achieving European climate targets, renewable and decarbonized gases offer a spectrum of solutions to decarbonise the energy system reducing the emissions across industrial, residential and transport sectors. Renewable and decarbonized gases provide storage solutions needed to deal with intermittency and grid balancing as well as concrete options to exploit the potential of biomass from agriculture through the production of biogas. The transition to fully renewable gases is a long one, and

the use of hydrogen from reformed natural gas, alongside carbon capture enables early wins at scale for decarbonisation of difficult sectors such as heating and industry.

What measures should be taken to promote decarbonised gases?

Promoting renewable, decarbonised and low-carbon gases can be done by setting up research, development, innovation and pilot projects for the production and their injection in gas infrastructures. It is also key to facilitate investments in retrofitting of infrastructures and – when needed – the development of new ones to allow an increasing integration of renewables. This should be accompanied by the development of regulatory sandboxes which enable the testing of new market alignments which are necessary when multiple sectors need to work together. A great deal of importance is represented by the development of pilot projects and demonstration plants on a larger industrial scale, as well as the promotion of CCUS value chains.

Other potential measures can include:

- A common terminology for renewable and low-carbon gases
- An EU-wide credible documentation of the green value of renewable and low-carbon gases, such as Guarantees of Origin (GOs) compatible with the EU ETS
- The adjustment of levies, grid charges and taxes to reflect societal benefits provided by the gas infrastructure,
- ensuring gas systems remain interoperable to avoid market fragmentation.

Further measures will be developed and detailed below.

What role should hydrogen play and how its development and deployment could be supported by the EU?

Hydrogen has a great potential for the creation of a cleaner and more integrated energy system, and especially for the decarbonisation of European industry. In this regard, it is crucial to allow the integration of different types of hydrogen. For example, hydrogen coupled with CCUS provide innovative solutions to reduce the environmental footprint of energy-intensive industries. Once again, an initial promotion of pilot projects on industrial scale will be crucial to scale-up hydrogen technologies in the years to come.

Furthermore, a certification system, based on the guarantees of origin, for renewable and low-carbon gases, would help creating a European-wide hydrogen market. The technical standards for injection of hydrogen into the gas grid should also be harmonized at an EU level.

In order to support its deployment, a quantified target for the injection and supply of hydrogen, taking into consideration the specificities of each country regarding the development of those technologies, should be set.

Finally, investments in hydrogen infrastructure will be necessary to make large scale P2G-facilities economical. The financial risk linked to the uncertainty in terms of future supply and demand of hydrogen can be mitigated through regulation and incentives at the EU level.

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The retrofit of existing gas infrastructure networks to enable blending of hydrogen and conversion of existing gas pipelines into pure hydrogen pipelines can help scale up P2G.

How could circular economy and the use of waste heat and other waste resources play a greater role in the integrated energy system? What concrete actions would you suggest achieving this?

Renewable gases such as biogas and bioLPG obtained from agricultural biomass waste, and other wastes from the food value chain, concretely contribute to more circular economy. Waste process gases can be captured and reused through CCU can be also used to produce renewable gases. CCU is an opportunity for increasing resource efficiency by creating a new, more economic and sustainable outlet for gaseous waste streams.
In integrated industrial clusters with large-scale electrolysers, oxygen from electrolysis can be utilised in other industries and provide additional revenue streams.
In addition, gas can help avoid methane emissions in sectors in agriculture thanks to improved manure management for biogas production.

Unlike gas, heat cannot be transported over long distances. Using waste heat in district heating systems cannot be a promising solution for areas where renewable sources are unavailable (Gas for Climate, 2020). As electrolysis to produce hydrogen and synthesis to produce e-fuels create waste heat, it is important to find applications for this waste resource. District heating is not the only potential application to be assessed. Excesss heat is an important value stream and further potential, for instance in the case of biogas plants, lies with various forms of drying or cooling.

Particular attention should be given to differences between Member States as a “one-size-fits-all” solution may constitute a detrimental or unrealistic approach.

How can energy markets contribute to a more integrated energy system?
Integrated markets are a precondition for a more integrated energy system. Avoiding market fragmentation ensuring gas systems remain interoperable is essential for the development and scale-up of renewable and decarbonised gases. To this end, harmonised gas quality specifications and technical standards should be encouraged to the extent possible, with sufficient flexibility to cater for an increasingly decentralized system of production, also on the gas side. Functioning markets are also needed for the seize the benefits and nurture the interdependency of power and gas sectors.

An EU-wide credible documentation of the green value of renewable and low-carbon gases is essential for the correct valuation and trading of these value products in the EU ETS. It is therefore crucial to implement a common terminology for new gases and a trustworthy system to document the green value of renewable and low-carbon gases such as Guarantees of Origin (GOs). The EU ETS should enable market participants to use the green value of all renewable and low-carbon gases certified by Guarantees of Origins (GOs) for compliance with their emission reduction obligations. This will create a demand for the GOs, thereby

providing market participants an additional efficient instrument to cover their emissions limits and obligations, along with the purchase of emission allowances and long-term investment in abatement technologies. To further facilitate this, renewable and low-carbon gases to be produced from renewable electricity should be able to receive GOs and such green renewable and low-carbon gases should be allowed to be stored without losing their GOs.

How can cost-efficient use and development of energy infrastructure and digitalisation enable an integration of the energy system?

Infrastructures are the backbone of an integrated and smart energy system, exploiting the synergies between the different energy carriers. In this context, gas infrastructures play a crucial role: its use allows the integration of renewable and decarbonized sources while avoiding costly investments in the expansion of the electricity grid, also at a considerable distance from the power plants.

Refurbishment, upgrading and needed developments of gas infrastructure should be part of the TEN-E regulation and when these investments are made 'fit for the future', these costs should be eligible and accounted for as 'sustainable' under the Taxonomy Regulation.

In some cases, new gas infrastructure should be built to connect, for instance, industrial consumers with blended natural gas or pure renewable and low-carbon gases. Furthermore, in some areas, investments in natural gas infrastructure are necessary to support the switch from coal to gas or to manage evolving supply-demand patterns.

The benefits of infrastructure are even maximised thanks to technological innovation, data and digitalisation which enable the blending of new gases and contributes to sector coupling between gas and electricity enhancing the efficiency of the energy system on and off the grid.

Digitalisation will be a key driver in the development of a cost-efficient integration of the energy system, increase energy efficiency in infrastructure companies and improve asset management. Whilst other private actors should be the drivers of digital innovation, regulated subjects should also be encouraged and incentivised to facilitate data flows and innovation and ensure that the strongest and best solutions can be implemented. For instance, gas TSOs will have to digitalise to cope with the increased challenges in terms of gas quality management (of different types of gases) and conversion (e.g. from methane to hydrogen) in order to maintain current levels of interoperability.

1. **Are there any best practices or concrete projects for an integrated energy system you would like to highlight?**

   Synergies between renewable production patways: SkyNRG, SHV Energy and KLM are partnering to launch in the Netherlands a new production plant dedicated to sustainable aviation fuel. This facility, running on sustainable hydrogen and using waste and residue streams as feedstock, will deliver 15,000 tonnes of bioLPG as by-product.

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Relevant projects are taking place also at the infrastructures' level:
Austria: Underground Sun Storage by RAG Austria.
Belgium: Eoly / Fluxys: P2G by Eoly and Fluxys, Hydrogen transport and storage by Fluxys and Engie and others, Hy Off Wind by Fluxys and others
Denmark: M/R Helle by Energinet and others, HyBalance by Energinet and others
France: Jupiter 1000 by GRTgaz, HyGreen Provence by Engie, Azola by Storengy
Germany: Bad Lauchstädt Energy Park by Uniper, VNG and ONTRAS; Membrane filter technology by ONTRAS and GRTgaz.
Hungary: Hydrogen storage in depleted fields by Hungarian Gas Storage.
Ireland: The Causeway Study and the Green Connect project (CNG)
Italy: Blending Hydrogen for Decarbonisation by SNAM: injection of a hydrogen and natural gas mix in the high-pressure transmission network.
The Netherlands: North Sea Wind Power Hub by Energinet and Gasunie; NortH2 by Gasunie and others
Poland and Denmark: the Baltic Pipe project
UK: Hydeploy (blending of hydrogen to 20% in distribution networks), Hynet (development of industrial clusters for hydrogen), H100, H21, Hy4Heat, Industrial Energy Transformation Fund, HyNTS (Hydrogen Injection into the NTS and Hydrogen Deblending by National Grid)

2. **What policy actions and legislative measures could the Commission take to foster an integration of the energy system?**
A consistent regulatory framework is needed to drive the integration of renewable and decarbonised gases as well as to support sector coupling.
Given its potential, it is also necessary to lift barriers for the upscale of CCUS, a technology which plays a vital role in reducing emissions from energy intensive industries and facilitating the production of renewable and decarbonised gases.
To help develop large-scale P2G facilities, the investments in hydrogen infrastructure, both pure hydrogen and blended hydrogen, should be fostered through regulation and incentives at the EU level. The revision of the TEN-E regulation should, in this regard, be oriented toward this objective.