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Comments on the Hydrogen and Gas Market Decarbonisation Package

EUTurbines, the European Association of Gas and Steam Turbine manufacturers, welcomes and supports the European Commission's initiative to prepare gas markets for the increased EU's climate ambition. A consistent EU-wide legal framework will be essential to drive the decarbonisation of European gas markets, namely by facilitating the emergence of a market for competitive renewable and low-carbon gases.

This paper outlines the input provided to the public consultation on the Hydrogen and Gas Market Decarbonisation Package.

The key messages for the gas turbine manufacturers are summarised below:

- The gas turbine manufacturers support the full decarbonisation of the gas grid – that is, replacing natural gas by biomethane, renewable and low-carbon hydrogen and other clean gases.
- Gas power plants are important players in the future energy system and will become key drivers for to renewable and low-carbon gases – their access to these gases should be ensured.
- The gas turbine manufacturers support the blending of renewable and low-carbon gases into the existing gas grid as an interim step on the way to full decarbonisation.
- Gas power plants can handle different gas qualities and can be progressively adapted and retrofitted to renewable and low-carbon gases
- Gas quality at the customer interface needs to be stable and predictable. For that, a clear pathway for the decarbonisation of gas will be essential.

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The role of gas in integrated energy systems

The transition towards a decarbonised energy system is not to be misunderstood with the development of an electricity-only system. Only by utilising all energy carriers and benefitting from the interactions of the electricity, gas and heat networks, sufficient climate-neutral energy will be made available to end-users in the most cost-effective way. A **co-ordinated and joint planning of the energy grid infrastructure for electricity and gas** is needed, aiming at the most cost-efficient decarbonisation.

In connection with such planning activities, the "energy efficiency first" principle should not be applied as a stand-alone principle. This principle should not overrule other EU policy considerations, such as the **contribution to the overall energy system**, especially when evaluating specific investment decisions and operation practices. In a similar way, national development plans should optimise the efficiency of the overall energy system, not limiting the efforts exclusively to the electricity network and recognising the value of existing infrastructures for gas and heat.

The gas infrastructure – including gas storage facilities – provides the **most suitable and cost-efficient seasonal storage**, which other storage solutions are not able to adequately provide. Combined with gas power generation and cogeneration, it offers an ideal complement to variable generation technologies, enabling the provision of flexible, reliable and cost-effective electricity and heat.

The review of the gas market rules and other legislation under the Fit for 55 Package (e.g. RED, EED) should therefore **refrain from limiting the use of renewable and low-carbon gases to certain sectors**. Hand-picking "hard-to-decarbonise sectors" as preferred users will not only interfere with a market-based approach and lead to inefficiencies but also endanger a competitive and export-oriented European industrial sector committed to global decarbonisation.

Gas power generation as consumers

While it is now widely recognised that excess energy from variable renewables can be stored as hydrogen for seasonal demand, the **conversion of the stored hydrogen with gas power plants to cover demand peaks** will also be needed. A secure and reliable energy system will need flexibility solutions to complement each other, and the conversion of hydrogen with gas power plants is an important source of flexibility.

As pointed out in the recently published IEA Report "Net Zero by 2050, A Roadmap for the Global Energy Sector" (p.76): *"After 2030, low-carbon hydrogen use expands rapidly in all sectors in the NZE. In the electricity sector, hydrogen and hydrogen-based fuels provide an important low-carbon source of electricity system flexibility, mainly through retrofitting existing gas-fired capacity to co-fire with hydrogen, together with some retrofitting of coal-fired power plants to co-fire with ammonia. Although these fuels provide only around 2% of overall electricity generation in 2050, this translates into very large volumes of hydrogen and **makes the electricity sector an important driver of hydrogen demand**."*

The **capability of gas power plants to switch to renewable and low-carbon gases ensures that there is no carbon lock-in** and will make them a key player in providing decarbonised and dispatchable renewable electricity and heat to the future energy system. In order to ensure that future investments are future-proof, requirements related to the capacity to operate with renewable and low-carbon gases could be considered. In that context, the gas turbine manufacturers are developing a H2-ready concept defining different levels of **H2-readiness for new gas power plants** based on the assumption of a hydrogen content of 10%, 25% or 100% in the grid. The work should be finalised soon.

Creating renewable and low-carbon gas markets

Today's main challenge is the lack of renewable and low-carbon gases. While there are gas quality considerations to be kept in mind (see below), ensuring the access of renewable and low-carbon gases to the existing gas networks will be essential to creating a market for such gases. In addition to more complex measures like preferential grid tariffs or priority dispatch, the supply of renewable and low-carbon gases should be incentivised through **a binding EU-wide GHG intensity reduction target for gas, complemented by a renewable gas target** set at European and national level. Only like this, the provision of sufficiently large amounts of renewable and low-carbon gases will be ensured to end-users such as power-only and cogeneration plants.

Natural gas will be replaced by renewable and low-carbon hydrogen, but also by biomethane and locally used biogas. The EU should, therefore, support the scaling-up of biomethane and biogas production from waste as well, which are usable in gas power plants without limitation. A dedicated sub-target for biomethane and biogas could help incentivise the market uptake.

A well-functioning **EU-wide certification system** and guarantees of origin would put renewable or low-carbon gas including hydrogen on an equal footing with renewable electricity and ensure tradability between countries. Like this, electricity and heat generated from gas power plants using renewable or low-carbon gas can be recognised as decarbonised energy. This requires a **classification of renewable and decarbonised gases**.

The decarbonisation of gas will require a transitional phase, ending in the full decarbonisation of the gas supply by 2050. Therefore, while clean hydrogen from renewable electricity should be the final goal, **low-carbon hydrogen** with the support of CCU/S for ramping up production and demand should not be excluded from the onset.

Getting the infrastructure right

The development of a cost-effective hydrogen infrastructure will only happen with the support of EU-wide rules, which should provide the general framework, ensure consistency, and provide predictability on the transformation of the gas network. The development of hydrogen valleys should be supported and allow certain regions to develop a hydrogen infrastructure, including related end-users. Such areas could be used as role models and share their experience with the rest of the EU. Essential learnings could be used to ramp up the rest of the EU in a fast, cost effective and secure way. Still, differences in EU regions or networks – especially at the distribution level – should also be allowed.

Until larger amounts of hydrogen become available, the initial **blending of hydrogen** into the natural gas network should be allowed, which, in our view, will be an essential step to help develop a hydrogen market.

Whenever possible, **preference should be given to the upgrading of existing grids** to allow hydrogen blends as an interim step leading to the full decarbonisation of gas networks. Ultimately, there should not be two different parallel networks, but grids that carry renewable gas and are "interoperable". Therefore, whenever possible, there should also not be two different regulatory regimes for hydrogen and methane networks. The same network access and consumer rights should apply to methane and to hydrogen.

The adaptation of the gas infrastructure to hydrogen should cover the entire chain, including end-users such as gas power plants. Given the importance of flexible gas power generation in the future energy system, these should continue to be connected to the gas network, also when it becomes decarbonised. In this sense, **retrofit options** to adapt gas power plant technologies to hydrogen are increasingly available – and should be considered when shaping

the future gas infrastructure. It is, therefore, of utmost importance that the manufacturers of end-user technologies are involved in the discussions leading to the transformation of the gas network. This ensures that the technology is ready for changes in the quality of gas and can continue to provide essential services to the energy system also in 2050.

Existing gas power plants have been built based on the specifications agreed between operator and technology provider and potential adaptions to the use of hydrogen should be assessed individually. The use of hydrogen-derived synthetic methane or biomethane typically does not require modifications. The technical capability of a plant to handle hydrogen may be higher than the contractually agreed capability – but needs careful assessment. In this sense, the gas turbine manufacturers are working on a checklist to assess the level of modifications potentially needed to adapt an installation to the use of a blend (up to 25%) or 100% hydrogen.

Gas Quality

As stated before, it is estimated by the industry that **most gas power plants today can be easily adapted to handle blends of up to 25% hydrogen or more**. It is, however, important to ensure a **certain stability of the gas quality** (e.g. avoiding "plug flows" or very large quality changes in very short timeframes) delivered to end-users (i.e. at exit point). Short-term variations at the connection point to the power plant must be kept within a reasonable range and the speed of the variation (rate of change) needs to be controlled. In order to optimise costs and harness economies of scale, TSOs and DSOs should be responsible for ensuring a stable gas quality within an agreed range and should communicate expected gas quality changes in a structured way and well ahead.

In addition, it should be ensured that future standards do not hamper the introduction and possibly the blending of renewable and low-carbon gases. Therefore, all efforts should be put in finding an equilibrium between the need to decarbonise the gas grid and the need to ensure a stable gas quality during a sufficiently long period of time.

Finally, in our view, **national or regional differences in gas quality can continue to exist** and should not pose a problem to the development of renewable and low-carbon gas markets. As stated before, what is important is that the gas quality is known and predictable over a certain timeframe in a certain area.

About EUTurbines:

EUTurbines is the only association of European gas and steam turbine manufacturers. Its members are Ansaldo Energia, Baker Hughes, Doosan Skoda Power, GE Power, MAN Energy Solutions, Mitsubishi Power Europe, Siemens Energy and Solar Turbines. EUTurbines advocates an economic and legislative environment for European turbine manufacturers to develop and grow R&I and manufacturing in Europe and promotes the role of turbine-based power generation in a sustainable, decarbonised European and global energy mix. For more information, please see www.euturbines.eu