

ETN position on the public consultation “A EU hydrogen strategy”

ETN is a non-profit membership association, bringing together the entire value chain of turbomachinery technology worldwide: power generation and oil & gas companies, OEMs, R&D institutes and service providers. ETN believes a common strategy and research effort between all stakeholders, along with supportive energy and research policies, will enable the fast decarbonisation of the energy sector while still ensuring security of energy supply.

ETN welcomes the initiative by the European Commission to adopt a new dedicated strategy on hydrogen in Europe, leveraging on the synergy among the different sectors with the aim to support the deployment of clean hydrogen. The step approach envisioned by the European Commission is in line with the strategy of the ETN community highlighted in the [“ETN Hydrogen Report”](#), which considers a harmonised approach of all the stakeholders of both the power generation (both centralised and decentralised) and oil & gas industries to use clean hydrogen in all its forms.

Encompassing several industrial sectors and research organisations, the development and deployment of hydrogen gas turbines would be essential in the EU hydrogen strategy for the achievement of the EU 2030 and 2050 climate and energy goals. Hydrogen gas turbines would complement the intermittent nature of wind and solar power since they can be used as back-up power and enable seasonal storage application of power to gas technologies.

In January 2019, the gas turbine industry strongly committed to develop gas turbines operating with 100% hydrogen by 2030, thus supporting the transformation of the European gas grid into a decarbonised energy system by overcoming technical challenges and ensuring that this transformation takes place swiftly.

To fully unlock the potential of zero-emission hydrogen gas turbine technology in a future energy landscape, cooperation between hydrogen producers, transportation/distribution network operators, end-users, gas turbines manufacturers and academia will be essential in order to raise the Technology Readiness Level (TRL) up to demonstration level. Research and development activities for turbomachinery solutions are specifically needed to overcome combustion instabilities and to further develop (new) combustion technologies maintaining low NO_x emission for up to 100% H₂. Changes in the hot gas properties for hydrogen combustion also require development of new materials and cooling technologies for hot gas path components, as well as entail defining and implementing efficient and lifetime improving control, diagnostic and prognostic strategies.

The deployment of new technology in a real world environment will be another challenge to be overcome in the demonstration phase. Future gas turbines will have to deal with a wide range of variable hydrogen/natural gas mixtures during the transition period with limited H₂ production capacity while maintaining operational flexibility in order to compensate grid voltage and frequency excursions.

Appropriate demonstration projects are required throughout Europe in order to verify the feasibility of new system solutions faced with different local/regional boundary conditions. The retrofit of existing gas turbines needs to be evaluated on a case by case basis for given hydrogen levels in the public pipeline network, considering safety considerations and modifications in the fuel skid, and in the controls and combustion system.

Capital expenditures associated with retrofit solutions for gas turbines power plants have to be met by market conditions favourable for the wide-spread introduction of the technology. Regulatory measures should ensure a level playing field for all technology providers.