TYNDP 2020

SCENARIO REPORT HIGHLIGHTS

1) To comply with the 1.5°C targets of the Paris Agreement, carbon neutrality must be achieved by 2040 in the electricity sector and by 2050 in all sectors together. Additional measures to reach net negative emissions after 2050 are necessary.

2) To achieve net-zero emissions, innovation in new and existing technologies is required to:
   - reduce the levelised cost of energy from renewable energy sources
   - increase the efficiency and type of end user appliances
   - support renewable and decarbonised gas[4]
   - develop technologies that will support negative emissions

3) "Quick wins" are essential to reduce global temperature warming. A coal to gas switch in the power sector can save at least 85 $MtCO_2$ by 2025.

4) To optimise conversions, the direct use of electricity is an important option – resulting in progressive electrification throughout all scenarios. Gas will continue to play an important role in sectors such as feedstock in non-energy uses, high-temperature processes, transport or in hybrid heating solutions to make optimal use of both infrastructures.

5) To move towards a low carbon energy system, significant investment in gas and electricity renewable technologies is required. Further expansion of cross border transfer capacity between markets will contribute to ensuring renewable resources are efficiently distributed and dispatched in the European electricity market.

6) Wind and solar energy will play an important role in the European energy system, however, the scenarios point out that the decarbonisation of gas will have a significant part to play as well. The scenarios show that the decarbonisation of the gas carrier is necessary, employing technologies to increase the share of renewable gases, such as bio-methane and Power-to-Gas, and decarbonised gases associated with Carbon Capture and Storage (CCS).

7) At present gas as an energy carrier is mainly based on methane, as the main component of natural gas. However, in the longer-term hydrogen could become an equally important energy carrier towards full decarbonisation of the gas carriers in 2050.

8) Sector Coupling enables a link between energy carriers and sectors, thus it becomes key in contributing to achieve the decarbonisation target. In the long-term, Power-to-Gas and Power-to-Liquid will play a key role in both the integration of electricity from variable renewables and decarbonising the supply of gas and liquid fuels. This would require close to 800 GW of dedicated wind and solar[5] in 2050. Gas-fired power plants will continue to provide peak power flexibility to support an energy mix based on increasingly variable electricity generation.

9) Today, the EU28 imports most of its primary energy (ca. 55 %[6]). Decarbonisation will also change this pattern. In a way, the "insourcing" of energy production will reduce the import dependency to ca. 20 % to 36 %. However, imports remain an important vector in the future energy supply making use of competitive natural resources outside the EU territory. For gas in particular, import shares increase in all scenarios until 2030 due to the declining natural gas production in the EU.

4 Decarbonised gas is natural gas for which the carbon dioxide is removed by pre- or post-combustion carbon capture and storage (CCS) technology. Renewable gas on the other hand originates from renewable sources. For example, biomethane produced from organic material or hydrogen/synthetic methane from electrolysis (P2G). More information definitions can be found in the glossary or in the methodology report.

5 According to the P2G and P2L modelling approach, the dedicated wind and solar is simulated outside the integrated electricity system.

6 See EUROSTAT (link)