



FAQs for MEDIA

EU's Hydrogen and Energy System Integration Strategies

8 July 2020

Why does Europe need hydrogen to reach climate neutrality by 2050?

To be in line with the 1.5°C objective of the Paris Agreement, Europe needs to reach climate neutrality by 2040, a decade earlier than the current target. A full decarbonisation of the economy will require the EU to significantly reduce energy demand and multiply renewable energy supply, in particular by integrating significant amounts of renewable energy sources into all sectors (industry, buildings, transport). This presupposes also the inclusion of a circular economy approach. Even after implementing important circularity and resource efficiency efforts, a part of the remaining energy demand cannot be satisfied by direct electrification.

Renewable hydrogen and its derived products such as renewable ammonia, synthetic liquid fuels and synthetic methane must be produced and used only for specific sectors that cannot be directly electrified. These sectors will need policy framing and support to access renewable hydrogen and to adapt their infrastructure for transport, storage, and production processes. However, as renewable hydrogen demands considerable renewable electricity generation, we can consider it being a limited resource, needing reflection on its development and use.

What kind of hydrogen should we invest in to secure limiting temperature rise to 1.5°C?

Decarbonising the economy in line with the 1.5°C objective leaves **no room for fossil based hydrogen** coupled to Carbon Capture and Storage (so-called "blue hydrogen") or not (so-called "grey hydrogen"). Neither should hydrogen be produced from nuclear power. Fossil gas based hydrogen is made by splitting gas molecules, which results in CO₂ escaping into the atmosphere. That's how more than 95% of the 8 million tonnes of hydrogen produced in the EU every year is made today, emitting between 60 million and 70 million tonnes of CO₂. The use of fossil gas across the supply chain does not only emit carbon dioxide, but also **methane**, a short lived and very potent greenhouse gas emitted during extraction, transport and use. Methane causes 25% of global warming experienced today with the gas and oil sector being one of the leading emitters.

Only renewable hydrogen that is produced through electrolysis with renewable electricity will bring the needed climate benefits.

Is there a risk of greenwashing with this newly proposed Hydrogen Strategy that allows for the use of fossil gas?

The strategy states that "the end goal is clear: climate-neutral energy system integration with renewable hydrogen and renewable electricity at its core".

But if the Commission, despite green talk, keeps the door open to fossil (but also nuclear) industries arguing that it is a transition fuel, we see there is a risk of greenwashing. Europe does not need new gas infrastructure and this hydrogen strategy should not serve as an excuse to push fossil gas, an energy source of the past. More, not one single cent should go to fossil hydrogen from any EU funding sources. The available and additional resources, including recovery money, should be used to systematically develop renewables based hydrogen for hard to decarbonise sectors only (steel, chemicals, aviation, shipping, heavy freight) while aiming as a priority for maximum direct electrification across the economy.

Furthermore, there is a risk of conflict of interest and fossil gas lock-in if we look at the proposed composition of the Clean Hydrogen Alliance, a sort of steering committee playing a key role in implementing the strategy and taking investment decisions. Six energy companies have been invited to the launch, five of them clearly stem from the oil and gas (or nuclear) world: Gasunie, SNAM, PKN Orlen, EDF, Hydrogen Europe.

Will Europe import hydrogen?

The electricity demand of electrolyzers for producing renewable hydrogen needs to come from **additional renewable electricity generation capacities** and **excess renewable electricity** that otherwise risks to be curtailed. It needs to come **on top** of the renewable energy needs for direct electrification and heating in the other sectors of the economy. Europe has important potential in terms of onshore and offshore wind, as well as solar which can be mobilised quickly and cost-efficiently with high local value added.

Where should green hydrogen be employed? Why not having a broader use instead of limiting it to some sectors?

In a few sub-sectors direct electrification with renewable energy sources is technically difficult or highly inefficient. Even after having massively reduced the energy demand of these sub-sectors, they still require energy carriers with high energy density. Already during this decade, first relevant shares of renewable hydrogen have to be introduced to accompany the phase-out of coal and fossil gas in energy-intensive industries.

Certain **energy intensive industrial sectors currently using high temperatures and carbon-intensive processes or hydrogen as a feedstock** like steel and chemicals will require gaseous fuels such as hydrogen if they want to phase out fossil fuels, in particular coal, fossil oil products and fossil gas. Therefore, there is an additional need to replace high temperature processes as much as possible with ones that can be powered directly by renewables.

As hydrogen demands considerable renewable electricity generation, we consider it a limited resource, needing reflection on its development and use.

What infrastructure will be needed to implement this Hydrogen Strategy?

To assess hydrogen infrastructure needs, the European network planning process has to look into a number of questions such as availability, point of production and point of consumption or the nature of the sector to guide decisions about a refit of the current gas network and/or investing in new hydrogen infrastructure. The future hydrogen infrastructure planning must be very much **demand driven** in terms of the needs of the identified priority sectors such as physical properties of the energy carrier

(hydrogen/gas or its derivatives/fuels), geographical location of production, possibility to use existing infrastructure, the need for specific infrastructure elements.

Blending renewable hydrogen up to a certain percentage into existing (or new) gas pipelines, resulting in a mix of fossil gas and renewable hydrogen, is not an option as it leaves the door open for continued use of fossil gas. Industries' and transport's demand for pure hydrogen anyway would not be satisfied with fossil gas that contains a limited share of hydrogen.

An EU strategy for energy system integration (ESI)

What is energy system integration?

Energy system integration aims at combining energy needs of sectors in terms of energy carriers (electricity, heat, gas) and in terms of coupling them between each other.

This means that buildings could be coupled to mobility by using batteries of electric vehicles for storage and use of home grown produced energy (roof top panels). More generally, buildings as producers and consumers of renewable energy and heat can play a balancing and storage role and ease strain on the grid.

Similarly industry and buildings could be combined and integrated through waste heat, a by-product from industries that could be fed into district heating networks delivering heat to residential homes or tertiary offices.

ESI should build on a strong reduction in energy demand which can be halved by 2050 in order to limit temperature rise to 1.5°C and be in line with the Paris Agreement, while phasing out all fossil fuels including gas. For the latter this should be by 2035 at the latest.

What impact will this strategy have on achieving the Paris Agreement target?

If it puts energy demand reduction and electrification from renewables at its core it will significantly change the energy system by adapting it to fossil free energy sources and thereby decarbonising it to reach climate neutrality. This includes shifting from a highly centralised energy system to a much more decentralised system based on large scale and small scale renewable energy production units. Storage and demand side response measures will integrate variable renewable energy sources into the system.

What role for fossil fuels?

Fossil gas has no role in the future energy system and needs to be phased out in the coming 15 years. There is no room for expanding fossil gas (or any other fossil fuel) infrastructure in the coming years. Despite the Commission's Green Deal and the climate neutrality objective, the ESI draft states that "the share of natural gas is estimated to reduce to 20% by 2050". This is not enough to reach the Paris Agreement target.

Instead of qualifying fossil gas as a "transition" fuel the Commission should become vocal about the need to phase out gas and set a clear timeline for decommissioning gas infrastructure, reducing and banning gas imports while on the other hand introducing a phase-in of renewable energy and energy demand reduction.