



Hydrogen - The risk of stranded assets in EU27

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The Risk of Stranded Assets & Lock-in

According to the [European Green Deal](#), the EU aspires to become the first [climate neutral continent by 2050](#). In this context, several EU legislative proposals have been proposed promoting the use of renewable energy sources, energy efficiency measures and the phase-out of natural gas (interchangeably used with “gas”) via the use of [“low carbon gases”](#), such as hydrogen. Regarding the use of hydrogen, by 2050 the European Commission (EC) is aiming at deploying across all hard-to decarbonize sectors the so-called [green or renewable hydrogen](#) (produced via the electrolysis of water powered by renewables). In the meantime, the Commission recognizes [blue hydrogen](#) (produced via natural gas steam reforming with Carbon Capture and Storage) as a “low carbon gas”, to be used towards the achievement of the carbon neutrality goal.

In order to successfully decarbonize the EU gas sector via the use of green hydrogen, the existing gas infrastructure -including natural gas transmission networks, Liquefied Natural Gas (LNG) terminals and gas fired plants- should be gradually repurposed or decommissioned and any new gas infrastructure should be inherently compatible with hydrogen. Additionally, the repurposing of natural gas infrastructure and the investment in dedicated hydrogen-ready

assets should be realized by taking into consideration the future hydrogen production and consumption patterns across the EU. Moreover, as hydrogen is part of a much bigger energy transition picture, it is important to establish an integrated planning of hydrogen deployment on national and EU level involving both the electricity and gas sectors.

Hydrogen’s momentum is currently being built by the EC via the adoption of favorable policies and by making public funding available for hydrogen projects. However, policy and industry experts highlight that even though the EC promotes the use of green hydrogen, at the same time it supports blue hydrogen, and it does not phase-out natural gas at a pace that would allow the EU to be carbon neutral by 2050. Evidently, the deployment of blue hydrogen and the construction of new natural gas infrastructure is not 100% consistent with the EU’s carbon neutrality goal and could lead to [natural gas and even blue hydrogen stranding of assets](#) as well as a [European carbon lock-in](#) beyond 2050.

STRANDED ASSETS & CARBON LOCK-IN

“Stranded assets are physical assets whose investment value cannot be recouped and must be written off.”

“Carbon lock-in refers to the self-perpetuating inertia created by large fossil fuel-based energy systems that inhibits public and private efforts to introduce alternative energy technologies.”

The following sections elaborate on how the European Commission’s policies, the Member States’ initiatives, the allocation of public and private funds and the pipeline of new natural gas projects in the EU prolong the continent’s fossil fuel dependence and increase the risk for stranded assets and lock-in effects.

Hydrogen and Gas Market Decarbonization package

To begin with, in December 2021, the Commission proposed the new [“Hydrogen and Gas Market Decarbonization package” \(or Gas package\)](#) which includes dedicated provisions and policy reforms to support the deployment of low carbon gases in the EU, including hydrogen. However, critics note that the package exhibits [uncertainties](#), raises [controversial issues](#) and opens a backdoor for [fossil gas ‘greenwashing’](#). The main concerns are the following:

- ❖ The Commission did not elaborate on [specific EU-wide or national targets](#) for the production and consumption of hydrogen and the year-on-year

decommissioning or repurposing of gas infrastructure.

- ❖ The Commission considers as “**low carbon**”, gases which bring **greenhouse gas emission savings of at least 70%**, which allows the labelling of hydrogen produced from fossil or nuclear energy as “green”.
- ❖ The Commission allows the **cross-border transmission of natural gas blends containing up to 5% hydrogen**. This threshold is considered low and fossil gas lock-in effects may be observed.
- ❖ The process of finalizing the Gas package on EU level and of subsequently transposing it into national laws by the 27 MSs could take **at least two years**, thus jeopardizing the EU’s efforts in meeting its decarbonization targets on time.
- ❖ According to the Gas package, the long-term contracts to import gas into the EU will not be extended beyond 2049. This is **only one year before the EU is due to meet net zero emissions**, and thus, considered too late -by advocates of renewable gases- for carbon neutrality to be achieved by year 2050.
- ❖ The new **proposed rules on blending gases and on repurposing existing methane gas infrastructure are vague**. Billions of euros of natural gas assets could become stranded in the near future while in the longer term, a substantial part of repurposed infrastructure could also become stranded.

National Hydrogen Strategies

Moving on to the **National Hydrogen Strategies**, to this day 14 Member States have issued their national hydrogen plans and almost all EU countries mention green hydrogen in their 2030 National Energy and Climate Plan (NECPs). However, the hydrogen targets set by Member States **differ substantially**, in terms of **focus, concreteness** and **ambitiousness**. With regards to **focus areas**, different sectoral priorities for future hydrogen usage have been identified by MSs: 8 MS considered the use of hydrogen for heating, 22 for electricity, 16 to cover feedstock and energy needs in the industry, and almost all (26) MSs considered the use of hydrogen in the transport sector, but not for the same modes of transport. Regarding **concreteness**, only 12 out of the 27 EU countries have drafted quantitative targets for future installed capacity of electrolyzers for the production of green hydrogen. As for the overall

ambitiousness of targets, the envisaged hydrogen production is not always coherent when examined vis-à-vis the national hydrogen consumption potentials (based on climate targets, forecasted demand, RES potential, etc.). It is evident that the national hydrogen strategies within the EU should better reflect **country-specific characteristics**, include **concrete targets** and take into account **national hydrogen production and utilization potentials**, while at the same time promote **cross-country collaboration in planning a European hydrogen infrastructure**. Uncoordinated national initiatives may lead to **natural gas or blue hydrogen lock-in and also to natural gas, blue hydrogen and even green hydrogen stranded assets**. The latter, namely, the green hydrogen stranded assets may occur in the case of mismatches in hydrogen production and consumption and in the absence of concrete demand-side measures.

Public financing

As far as the allocation of **public financing** is concerned, renewable gas advocates state that the new gas infrastructure for the interconnection of Malta and Cyprus under the **5th PCI** (Projects of Common Interest) list will create a new fossil fuel lock-in due to the fact that **new gas infrastructure is designed to last at least 40 to 50 years** and in some cases even longer. Additionally, the whole project selection process for the fifth PCI list is considered **inherently flawed** as it was based on ‘National Trends’ scenario of the 2020 Ten-Year Network Development Plan (TYNDP), designed to reflect Member States’ NECPs. The NECPs were in turn drafted to reach now **outdated sustainability targets**, which are not in line with the Green Deal.

Regarding the **Important Projects of Common European Interest (IPCEIs)**, in December 2020, **22 EU countries and Norway** signed a manifesto committing to launch **IPCEIs in the hydrogen sector**. However, **five Member States** (Austria, Denmark, Luxembourg, Portugal and Spain) did not sign the manifesto and issued a **joint letter calling on the EU to clearly prioritize renewable energies**. They highlighted that the IPCEIs must respect the principle of the phasing out of environmentally harmful subsidies and suggesting that IPCEIs projects on hydrogen must **only be eligible when produced from renewable sources**.

Private financing

As regards private funds mobilized via the **EU Taxonomy**, the Commission proposed to include gas in the sustainability list. Germany and much of Central and Eastern Europe support the inclusion of gas in the EU Taxonomy, while Denmark, Sweden, Netherlands, Luxembourg and Austria **strongly oppose it and may even challenge it in courts**. Overall, organizations and MSs objecting to the categorization of gas as a “transitional fuel”, highlight that having gas in the EU Taxonomy list makes gas projects easier and cheaper to finance, locking in more fossil fuel use. This could in turn lead to **fossil fuel stranded assets** if the new gas plants fail to comply with the criterion of running 100% on renewable or low-carbon fuels by the end of 2035. There is also the risk of **low carbon gases (such as blue hydrogen) stranded assets**, if the new gas plants manage to comply with the above criterion but meanwhile green hydrogen technologies have proved more economically viable than the blue hydrogen ones. Actually, according to IRENA (International Renewable Energy Agency), **renewable hydrogen may be the cheaper option in most key markets by 2030**, or even sooner which means that investments in supply chains based on fossil fuels (blue or grey H₂) –especially assets planned to stay in operation for many years– may also end up stranded.

Also, even though the **new TEN-E (Trans-European Networks for Energy) Regulation** allows subsidies to convert fossil gas pipelines to carry a blend of hydrogen and fossil gas on the condition that they convert to transporting 100% hydrogen by the end of 2029, European energy regulators believe that **such projects are very unlikely to happen**, creating the risk that budget is wasted on gas pipelines that never convert to hydrogen.

Natural gas Projects

Lastly, according to a Global Energy Monitor (GEM) report the delivery of all proposed LNG import terminals and gas pipelines across the EU would essentially **increase the EU’s natural gas annual import capacity by 30% vs 2021 levels**. Also, completion of all the gas power plants in pre-construction and under construction would **increase the EU’s generating capacity by 22%**. However, the EU has excess gas infrastructure, that combined with the planned increase in import capacity may lead to either **fossil fuel lock-in or to gas assets becoming redundant**.

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