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Leaked Taxonomy Proposal: Fossil gas "Sustainable" label relies on promises in bad faith – still risks wasting all our renewable energy

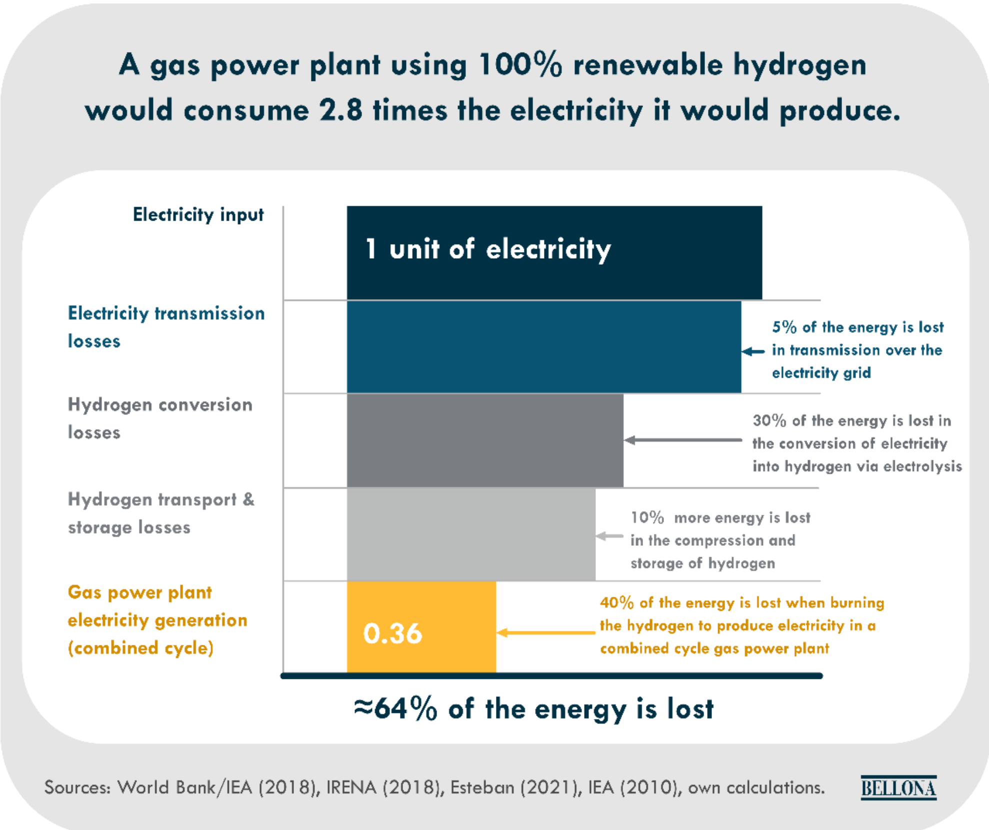
The leaked EU Sustainable Finance Taxonomy proposal for a complementary Delegated Act sets out the role of fossil gas, two devastating scenarios emerge – both a far cry from net-zero by 2050.

Either, fossil gas investments today will divert hydrogen from where it is most needed, industry and harder-to-abate sectors, while cannibalising vast amounts of renewable electricity better used directly. Or, "sustainable investments" will go to gas power plants with lofty plans and commitments for future conversion into undefined renewable and low-carbon gases, never to be realized. The latter seems the most likely, given the vast efficiency loss present at conversion: a taxonomy compliant gas power plant using 100% renewable hydrogen would consume 2.8 times the electricity it would produce.

This is the result of the leaked proposal introducing several exemptions to the 100g CO_2 e/kWh threshold, in contrast to the recommendations of the European Commission's own expert group. This 100g threshold is the 2020 to 2050 average value of power generation emissions enabling the EU to reach climate neutrality by 2050 in line with the 2018 IPCC report recommendations.

As a justification for introduced loopholes for gas, and gas-specific exemptions to the technology neutrality principle, the Commission heavily relies on proposed shifts to renewable and low-carbon gases. Neither defined in the proposal[1]. Making it possible for gas power plants, replacing an existing high emitting facility, built until 2030 to claim net-zero compliance if they can in the future be fuelled by renewable gas (such as green hydrogen) or low-carbon gases.

This is the recipe for a greenwashing disaster, and as shown by Bellona Europa's own calculations, would incentivize inefficient use of a valuable resource: renewables. In fact, **the proposal risks gas power plants becoming a black hole for renewable energy, more efficiently used elsewhere.** A far cry from the Taxonomy's intended role: setting the gold standard for sustainability.



Additionally, **the proposal does not introduce claw-back mechanisms or consequences for lofty plans or commitments for shifts to low-carbon or renewable gases not realized** – leaving investors in the dark. If approved, this would be a massive blow to the credibility of the Taxonomy, made worse by the **European Commission's failure to launch a public consultation taking into consideration feedback from markets, civil society and stakeholders.**

The potential consequences of these planned shifts to renewable gases, if they indeed take place, is in itself concerning. **With an average efficiency loss of 64% when converting electricity to green hydrogen, a gas power plant using 100% renewable hydrogen would consume 2.8 times the electricity it would produce.** This is an efficiency loss we simply cannot afford.

If approved, the leaked proposal would use a promised and improbable future fuel shift as a justification to allow fossil gas investments today. **If such a fuel switch did materialise it would result in huge wasted amounts of renewable electricity. If the shift does not materialise, which seems likely, fossil gas will continue to increase the concentration of CO_2 in the atmosphere.** Neither scenario is acceptable, unabated fossil gas remains not in line with the path to climate neutrality by 2050. **The current proposal turns the Taxonomy into a tool for greenwashing, rather than its solution.**

Explainer: How a gas power plant using 100% renewable hydrogen would consume 2.8 times the electricity it would produce

A gas power plant fuelled by renewable fuel requires a renewable fuel to be produced and transported to the gas power plant. In this example, the renewable fuel is green hydrogen, produced from electricity. In this way, the process goes from electricity to hydrogen and then back to electricity when the hydrogen is burned in a gas power plant. Each step in the conversion has efficiency losses, resulting in less electricity out than is put in.

- Renewable electricity is transported to the hydrogen electrolyser via the electricity grid. A conservative estimate is that 5% of the electrical energy is lost in transport. [2]
- Converting the electricity to hydrogen is assumed to be 70% efficient, this means 30% more of the original renewable electricity is lost.[3]
- The hydrogen must now be transported to the gas power plant. Compressing hydrogen requires significant energy. We assume that 10% of the energy of the hydrogen is lost in compression and transport.[4]
- Finally, the hydrogen is converted back into electricity in as gas power plant. Combined cycle gas power plants have an efficiency of around 60%. This means that again 40% of the energy is lost when burring the hydrogen to produce electricity.[5]
- Adding these energy losses together we can see that the majority of the original renewable electricity has been lost in transport and conversion. The round-trip efficiency from start to finish is only 36%. This means that 64% of the original renewable electricity has been lost, and that for every unit of electricity the gas power plant produces, 2.8 units of electricity must be consumed.

[1] Briefing: Defining Low Carbon and Renewable Gas - Bellona.org

[2] https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?locations=EU 6.217% in 2014 according to World Bank Data

[3] Conversion efficiency of $P2H_2$ systems is in the range of 50–70% (IRENA (2018) "Hydrogen from Renewable Power: Technology Outlook for the Energy Transition" https://www.irena.org/-/media/files/irena/agency/publication/2018/sep/irena_hydrogen_from_renewable_power_2018.pdf

[4] Compression energy requirements from on-site production range from approximately 5 - 20% of LHV. Esteban, Romeo (2021) Techno-Economics Optimization of H2 and CO2 Compression for Renewable Energy Storage and Power-to-Gas Applications. https://www.mdpi.com/2076-3417/11/22/10741/pdf

[5] IEA ETSAP (2010) Technology Brief E02 Gas-Fired Power https://iea-etsap.org/E-TechDS/HIGHLIGHTS%20PDF/E02-gas_fired_power-GS-AD-gct%201.pdf

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