Hydrogen Europe

Hydrogen Europe Position Paper

Industrial Emissions Directive revision

April 2023

Crucial to exclude electrolysers from the Industrial Emissions Directive

POSITION PAPER

Key messages

- **The current IED framework puts an unjustified and unnecessary burden on the electrolyser industry, undermining many other EU policies that promote or even require the fast ramping up of the sector**
- **Electrolysis technologies must be excluded from the scope of the Industrial Emissions Directive, as they have no direct industrial emissions and negligible environmental footprint**
- **The exemption should not have a hydrogen production threshold, as large electrolyser plants still do not have relevant direct emissions.**

Context

The European Union is reviewing the EU rules on industrial emissions to ensure industry limits its environmental impact and contributes to reaching the Union's long-term Green Deal goals.
Hydrogen Europe welcomes the proposal to align existing emissions legislation with the bloc's ambitious climate and energy goals.

The current climate and geopolitical context require the EU to act with even more urgency in decreasing greenhouse gas (GHG) emissions and fossil fuels while supporting a strong EU industrial base and preserving the EU's competitive edge in crucial clean technologies like clean hydrogen. This is well reflected by the ambition of the REPowerEU strategy and the Net Zero Industry Act, that seek the deployment of 130 GW electrolysis capacity by 2030. The revision of permitting rules for renewables under the Renewable Energy Directive aims at accelerating that process. In the declaration of the Electrolyser Summit in 2022, the Commission emphasised that the simplification and shortening of permitting procedures for renewable energy projects is of paramount importance. Additionally, the Net Zero Industry Act states that clean technologies essential for industrial decarbonisation should not be hindered by excessive permitting rules.

In this context, the revised Industrial Emissions Directive (IED) should be aligned to reduce unnecessarily long permitting processes that would hinder the quick deployment of renewable and low-carbon hydrogen facilities.
The following sections explain why we believe that electrolysis-based hydrogen production should be excluded from the general inclusion of hydrogen production under the IED.

1. An outdated classification not fit for purpose

The IED currently in force since 2011 already applies to the production of hydrogen. This directive was adopted in a context where most hydrogen production was done on a very large scale, by steam reforming of natural gas, and where hydrogen was used as an "industrial gas" (i.e., as feedstock for the chemical industry or as an intermediary product in the production of conventional fuels). However, the strong decarbonisation agenda foresees a much larger role for hydrogen, with production done at both at large centralised as well as small and decentralised scale; and with the largest share expected to be produced from water electrolysis, which generates no direct emissions, and to be used in large part as a clean energy vector further facilitating the integration of renewable energy.[1]

The IED, designed to regulate polluting industrial processes, includes the production of hydrogen irrespective of the production method (with or without industrial emissions production), and without clear consideration of the size of the production. A hydrogen production facility is considered a traditional chemical production facility, without factoring for the type of hydrogen production (electrolysis, biogas reforming, natural gas reforming, etc.) or the possibility of emissions or leakages. As a result, the production of hydrogen via electrolysis, which has no direct emissions and has little environmental footprint, is subject to the same requirements as industrial processes with measurably more environmental impact.[2]

2. Water and land use

The concerns that electrolytic hydrogen production consumes vast amounts of freshwater and puts strain on water-scarce regions have already been debunked. Regarding the consumption, it is useful to note that 8.9 litres of ultrapure water is needed for 1 kg of hydrogen due to atomic properties, which can be made of 12.5 litres of groundwater or 13.4 litres of treated wastewater or surface water.[3] This means that for the 10 million tonnes of hydrogen production target in the EU, between 124.6-133.5 million tonnes of water would be needed, which represents around 0.0069% of the annual freshwater resources in the EU.[4] Regarding the possible strain on water-scarce regions, desalination plants can be added to the production cycle for a relatively low cost, solving the issue and providing added value to regions.[5]

Regarding land use of electrolyser plants, current designs allow for a 1 GW electrolyser plant to fit within 14-17 ha, while advanced designs can reach as few as 10 ha of needed land for a 1 GW electrolyser by 2030.[6] Such a 1 GW electrolyser could produce 150 kt of green hydrogen in a year,[7] which could abate around 1.5 Mt on CO2 a year in ammonia production.[8]

It is therefore essential to adjust the IED to account for clean hydrogen production technologies and exempt electrolysis-based hydrogen production from the IED, without crippling scale-up initiatives by setting production-specific thresholds.

[1] The electrolytic process of hydrogen production does not have direct emissions. However, there are negligible amount of hydrogen and nitrogen emissions during maintenance works.
[2] Ibid.
[3] Henrik Taekker Madsen, *Water treatment for green hydrogen*, p.4
[4] Numbers only refer to the ultrapure water to be electrolysed in the plants. This does not consider any cooling water needs.
[5] The use of desalinated water would raise the water need from 1.4-1.5 litres to 3.3 litres per 1 litre of ultrapure water. Ibid. 3
[6] Hydrohub Innovation Program public report, 2022, p.14
[7] Based on a 90% utilisation factor and 19 t/h nominal hydrogen output: 19*8760*0.9
[8] Based on an abatement factor of 10 kgCO2 per 1 kgH2 if green hydrogen is used in ammonia production instead of grey hydrogen: 150 000t *10

3. Lack of a level playing field

Currently, the industrial emissions legislative framework in the EU allows for slightly differing regulation of electrolysers' environmental permitting amongst the Member States. Certain national legislatures put water electrolysis in the category that subjects the electrolysis plants to the most stringent permitting rules, alongside large industrial plants with extensive emissions. Concretely, this means that it takes around 12 to 18 months for an electrolyser plant to be granted the necessary permits. By removing electrolysis technologies from the remit of the IED, the national permitting systems can be adjusted, thereby creating a level playing field across countries and halving the time needed for these plants to come into operation (6-9 months). Yet, other Member States placed electrolysis plants in less strict categories with regards to environmental emissions permitting rules. This creates an uneven level playing field amongst Member States due to the delays and financial burden that these permitting rules raise for electrolyser deployment.

Today, electrolysis-based hydrogen production projects are overburdened with IED-related permitting procedures for no legitimate reason. This not only constrains individual companies, but also delays the necessary upscaling of electrolysis capacities in the European Union. Time is crucial to ensure the rapid and continuous upscaling of this nascent industry to preserve its competitiveness vis-à-vis competing markets and support the decarbonisation of the energy system.

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