Nuclear power as a lever for decarbonised hydrogen

In the previous mandate, the EU set itself high ambitions with regard to producing hydrogen and to achieving the roadmap of the European Green Deal. It is now necessary to take full advantage of the opportunity that electricity from nuclear origin provides.

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The European Union consumes around 7 million tonnes of fossil hydrogen each year. Decarbonising these volumes and increasing hydrogen production is necessary to replace fossil fuels in the sectors that are difficult to electrify, such as industry, maritime transport and aviation.

To do so, the EU has opted for the development of renewable electrolytic hydrogen, meaning hydrogen produced from renewable electricity. This choice has been set out in the European Green Deal and in delegated acts specifying the thresholds and calculation methodologies for reducing greenhouse gas emissions, as well as the electricity supplies recognised for producing this hydrogen.

Three main cases have been recognised, when the electrolyser is either :

- connected to the electricity grid, with renewable energies accounting for more than 90% of the national mix;
- directly connected to a renewable installation;
- associated with renewable power purchase agreements (PPAs) that cover its electricity supply, based on strict criteria demonstrating a correlation between the production and the consumption of renewable electricity.

However, production costs of renewable hydrogen are still high compared to those of fossil hydrogen, hindering the development of a sector that could yield drastic reductions in CO_2 emissions.

In 2025, the Commission will publish a delegated act that will set out the methodologies to define low-carbon hydrogen, that is to say hydrogen produced by the electrolysis of water using electricity from low-carbon grids, such as the French electricity grid, as well as hydrogen produced from gas and combined with a CO_2 capture installation. Recognising the electricity of nuclear origin for the production of hydrogen would be a major factor to drive competitiveness without compromising ambitions for decarbonisation.

EDF, like other players, is campaigning for the recognition, alongside renewable hydrogen, of low-carbon hydrogen made from:

- electricity from the grid, on the condition that it is compliant with the - 70% greenhouse gas emission reduction threshold, just like renewable hydrogen ;
- electricity produced by a nuclear power plant, either through a direct connection or by means of a PPA with an emission factor attesting of the low-carbon intensity of nuclear electricity.

These two methods would enable an adequate base supply for electrolysers, in order to provide hydrogen at an optimised cost to industrial processes, which sometimes lack flexibility.

Unfortunately, while the Commission recognised the possibility of using electricity from the grid in the public consultation on the draft delegated act organised in October 2024, it postponed the definition of a methodology for nuclear PPAs until 2028, that is to say until the end of its mandate. This is a regrettable choice. Nuclear electricity is available, it is low carbon and it can therefore facilitate the development of many projects. In the lead-up to the publication, the industry supported by EdEn calls on the Commission to adapt its proposal and introduce a 'nuclear PPA' method without delay.

The aim is not to replace 'renewable' supplies with 'nuclear' or 'grid' supplies, but simply to combine those solutions in order to achieve optimised availability, cost and decarbonisation in order to produce low-carbon hydrogen and derivatives, such as steel or e-fuels, which play an essential part in the Union's decarbonisation despite being energy-intensive processes. ●