Delegated act on low carbon hydrogen
Methodology for nuclear electricity supply

The use of clean hydrogen is essential to decarbonise sectors that are difficult to electrify, such as industry, maritime transport and aviation. In the current geopolitical context, this objective is also linked to energy security and industrial resilience. Recent instability in the Middle East has again highlighted the EU's exposure to external energy shocks and the need to reduce dependence on imported fossil fuels. In this context, low-carbon hydrogen produced in Europe is not only a decarbonisation tool, but also a domestic energy carrier that can strengthen Europe's energy sovereignty and resilience.

Low-carbon electrolytic hydrogen produced with a steady supply of nuclear electricity can complement renewable hydrogen, support greenhouse gas (GHG) emission reductions for derivative products such as green steel or e-fuels and improve competitiveness. A European hydrogen economy replacing 10% of current EU fossil hydrogen consumption would add around 40 TWh per year to electricity demand. Firm production can maximise electrolyser load factors, enable operation of up to around 8,000 hours per year, and improve the lifetime and payback of capital-intensive installations. It also supports a continuous and predictable supply of hydrogen for industrial end-users, while providing the wider system with a domestic, dispatchable and decarbonised source of hydrogen.

Current EU hydrogen strategies rely on definitions and certification schemes to distinguish low-carbon hydrogen from fossil-based alternatives. To date, these methodologies have largely focused on renewable electricity, without sufficiently reflecting other non-fossil, decarbonised sources of energy such as nuclear, despite its clear role in providing clean electricity.

Under Delegated Act C (2025) 4674, the Commission paves the way for acknowledging the positive role of nuclear electricity in producing hydrogen. Specifically, Article 3 provides that the Commission will assess whether low-carbon electricity from nuclear power plants can be recognised as a supply source for electrolysers producing low-carbon hydrogen. In the recently published AccelerateEU Communication, the European Commission confirmed that "*By 30 June 2026, the Commission will launch a public consultation on a draft methodology outlining criteria for the potential introduction of alternative approaches for recognising low-carbon electricity from nuclear power plants*".

The Commission itself has acknowledged that the hydrogen market is ramping up slower than expected and as a result is considering a targeted review of the renewable hydrogen production criteria. This underlines the need for a methodology for hydrogen produced from nuclear that does not introduce unnecessary constraints.

In line with the delegated act, the Commission's work will establish criteria considering the impact of nuclear PPAs on the energy system, the emissions reductions achieved (70% carbon reduction threshold), as well as maintaining a level-playing field with fully renewable electricity. These criteria would enable the use of a market-based approach to produce low-carbon hydrogen directly with nuclear electricity purchased through PPAs and assigned a specific emission factor.

Nucleareurope wishes to actively contribute to the development of this methodology and recommends the following to ensure a decarbonised, reliable, and competitive supply of low-carbon hydrogen.

Level playing field without replicating Renewable Fuels of Non-Biological Origin (RFNBO) rules

Maintaining a level playing field must not result in a strict replication of RFNBO rules, such as additionality and temporal or geographical correlation, for nuclear energy. Nuclear and renewable energy production indeed differ in some important aspects:

- Nuclear power plants are firm and dispatchable assets capable of operating in both baseload or load-following mode whereas Solar and wind farms produce variable intermittent energy
- The deployment of nuclear power plants is part of a medium and long-term strategy with longer lead time for construction, whereas solar and wind farms. and are quickly scalable.

Such differences should be taken into account in the drafting of the methodology.

Furthermore, the RED3 methodology for assessing GHG emissions only partially accounts for indirect life-cycle emissions and thus attributes an electricity GHG intensity of 0 gCO_2eq/MJ to fully renewable electricity, whereas nuclear electricity does not benefit from this advantage, even if studies show that the LCOE of nuclear new build is on a par with that of offshore wind[1]. The delegated act assumes a nuclear electricity GHG intensity of 1.5 gCO2eq/MJ or 5.4 gCO2eq/kWh, which reduces its attractiveness for end-users. These differences further justify developing different approaches.

Exemption for decarbonised grids

As under the RFNBO Delegated Act, in highly decarbonised grids with high availability of low-carbon electricity, such as Sweden and Finland, exemptions from the additionality requirements for new renewable electricity were granted. The same exemptions for decarbonised grids should apply under the Low-Carbon Hydrogen Delegated Act for hydrogen production from nuclear.

Value of continuous supply from nuclear PPAs

Any methodology under Article 3 must reflect hydrogen consumers' needs and the technical and economic constraints of electrolyser operation. Most industrial consumers require a continuous supply of hydrogen, essential for the profitability and reliability of their industrial processes. Sourcing electricity with nuclear PPAs can meet this need without compelling industries to invest additional CAPEX in above ground or underground hydrogen storage facilities. Furthermore, large-scale hydrogen production remains at an early stage of deployment and introducing drastic flexibility measures could complicate electrolyser operations and affect their economic models. Finally, the performance of electrolysers may be negatively impacted by flexible operating modes. Frequent shutdowns and load modulation prematurely affect performance and equipment

[1] Source: IEA 2020

lifespan, leading to degradation levels as high as 5% per year. The methodology should therefore recognise the value of continuous operation for electrolyser lifetime, efficiency and hydrogen output.

National operational consumption-reduction criteria

Operational consumption-reduction criteria for electrolysers should be defined at the national level. This ensures that consumption reductions are aligned with the specific needs of each bidding zone. Transmission System Operators (TSOs) should play a central role, as they bear direct responsibility for system security. Operationally, electrolyser operators sourcing part of their electricity through nuclear PPAs could implement targeted consumption reductions when requested by the TSO through established national mechanisms. Moreover, high prices already create a natural incentive to reduce or stop production when the system is under stress.

Direct connection between NPPs and electrolysers

Direct connection between a nuclear power plant and electrolysers can offer additional advantages for low-carbon hydrogen production. It can reduce exposure to grid constraints and short-term market volatility, improve predictability of electricity supply and costs, and strengthen the business case for continuous hydrogen production. Such configurations should therefore be recognised in the methodology as a robust way to ensure a stable, decarbonised and domestic supply of electricity for hydrogen production.

Recognising the role of heat

The role of nuclear energy in hydrogen production should not be limited to electricity supply alone. Nuclear reactors can also provide heat, improving the efficiency of hydrogen production pathways, particularly when high-temperature electrolysis is used. The methodology should remain open to production models that combine low-carbon electricity and heat, as these can improve overall system efficiency and strengthen the competitiveness of domestic hydrogen production.

SMRs and AMRs for industrial users

In the longer term, SMRs and AMRs will offer value for energy-intensive industrial users requiring reliable supplies of electricity, hydrogen and heat. Their smaller size, modularity and siting flexibility will enable closer integration with industrial sites, reducing transport needs and supporting more efficient local production of low-carbon hydrogen. This will be especially relevant for sectors with continuous demand, where integrated nuclear-based energy supply can provide both decarbonisation and greater security of supply.

Broad stakeholder consultation

The Commission should consult low-carbon hydrogen producers, nuclear stakeholders, and potential customers during the drafting of the methodology.