

# H2ero Net Zero

**Different energy  
carriers require  
separate systems of  
guarantees of origin**

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Hydrogen  
Europe

## Different energy carriers require separate systems of guarantees of origin

### Key recommendations

1. Create a distinct hydrogen GO, separate from electricity and gas.
2. Encourage the use of GOs in addition to PPAs to prove the renewable character and CO<sub>2</sub> intensity of the electricity procured for the production of renewable hydrogen.
3. Initiate the development of a global system for Hydrogen Guarantees of Origin (HGOs), with track-and-trace and auditing functionality.
4. Set clear ground rules that avoid false or misleading claims. Enable the cancellation of H<sub>2</sub> GOs, and the issuance of a natural gas GO when physical volumes are blended.

Hydrogen has seen unprecedented momentum and is fast becoming a systemic element in the EU's transition towards a climate-neutral society in 2050. It will become the other leg of the energy transition – alongside renewable electricity – by replacing unabated fossil fuels and ensuring greater systemic synergies. Clean hydrogen[1] is not the backdoor to the continued use of unabated fossil fuels, nor is it the trojan horse of the natural gas industry greenwashing its way towards competitive markets.

Clean hydrogen is needed alongside renewable electricity to ensure renewable power producers can tap into hard-to-electrify sectors and reduce emissions where electrification is impossible, impractical, prohibitively expensive or difficult to scale up. Clean hydrogen is not a choice but a need for large-scale, seasonal storage, addressing electricity grid constraints that cost taxpayers 1.5 bn euros in curtailment costs and an additional 30 bn euro in grid flexibility services in Germany alone. Clean hydrogen is central to a robust energy system that can adapt to price and demand and supply shocks.

Hydrogen Europe considers the imminent review of the Renewable Energy Directive should focus on renewable energy only. It should also focus on accountability and transparency. As such, the revision must address the shortcomings of the existing Guarantees of Origin (GO) system and redesign it along with the following five key principles:

- **T**raceability and **T**rackability – the book and claim system should allow the product attribute to be tracked from the point of production to the point of consumption.

[1] Hydrogen Europe. [H2 Act paper \(2021\)](#). Renewable hydrogen and low carbon hydrogen produced via state-of-the-art technologies that offer high performance and the ability to abate 90% greenhouse gas emissions and above will have a role to play as “clean hydrogen”.

- **Tradability** – Guarantees of Origin should be tradeable across all EU Member States, creating a liquid market with full cross-border trading.
- **Transparency** – Guarantees of Origin should accurately demonstrate to final customers the share or quantity of energy from renewable sources in an energy supplier's energy mix and the energy supplied to consumers. The system needs to avoid false or misleading claims.
- **Trustworthiness** – Once the above principles are implemented, final consumers will actively use GOs as a market instrument building clean hydrogen consumption and decarbonising economic activities.

## The revision of the RED II must build on lessons learnt and design a trustworthy system of GOs

### 1. Traceability and Trackability.

GOs use the book and claim system, which decorrelates the certificates from the physical flows of the underlying commodity, allowing the separate trading of certificates. At the same time, the system does not ensure the quantities produced and claimed are balanced.

To put this into perspective, today's GO system would, theoretically, allow for biomethane volumes to be used to 'green' grey hydrogen consumption. This would be possible if there would be one harmonised system of GOs for all gases, which would also include hydrogen within the same system boundaries. However, whilst many argue this approach may come with benefits avoiding market fragmentation and greater uptake of biomethane and hydrogen, the reality is that it would defy the very principle of GO guarantees that the production capacity exists and that the production took place.

### Hydrogen Europe Policy Recommendation

Hydrogen is a distinct energy carrier, and it requires a distinct certification system, separate from electricity and gas. Energy carrier conversion (from H<sub>2</sub> to electricity, from H<sub>2</sub> to methane or methane to H<sub>2</sub>) should also require conversion of GO's, with adequate and correct accounting of the energy inputs and outputs.

### What makes H<sub>2</sub> different from CH<sub>4</sub>?

- Hydrogen is the only energy carrier (alongside electricity) that can have a zero-carbon footprint or as low a carbon footprint as the feedstock and carbon abatement technology used (e.g., electrolysis using renewable or low-carbon electricity or from other energy carriers combined with carbon capture and/or utilisation).

- Irrespective of life-cycle emissions, CH<sub>4</sub> releases CO<sub>2</sub> at use, while H<sub>2</sub> does not.
- Hydrogen and methane (irrespective of whether it is renewable or not) are not interchangeable. Methane cannot be used as a substitute for hydrogen in most applications, e.g., transport fuel cells or feedstock in energy-intensive industries. Hydrogen consumers want hydrogen. When they receive a GO, they deserve the guarantee that an equivalent amount of hydrogen with those characteristics was produced and not a completely different gas. Deep decarbonisation also needs clean hydrogen.

## 2. Tradability

The EU Member States should ensure the tradability of Hydrogen Guarantees of Origin across borders. Different approaches of national issuing bodies to Guarantees of Origin can lead to fragmentation and hamper broader trading-related activities of hydrogen.

Additionally, the European Commission should mandate Member States to issue hydrogen GOs from all energy sources, allowing end-users to clearly identify the origin of the hydrogen, the used production pathway and the GHG footprint, et cetera. This will empower consumers with the right information when choosing which molecules to incentivise by purchasing certificates.

An additional element to consider is international governance for imports and exports of hydrogen. Europe will increasingly rely on imports of hydrogen and hydrogen derivatives, necessitating a globally functional system of assessing the carbon content of the molecules and sustainability criteria. GOs can serve to certify the quality of imported hydrogen or hydrogen products such as renewable ammonia.

### Hydrogen Europe Policy Recommendation

To ensure a harmonised approach to GOs across all EU members states, the European Commission should propose guidelines to national issuing bodies to encourage common practices and standards.

Hydrogen Europe considers that the Renewable Energy Directive should promote renewable energy only. Nevertheless, the option to issue GOs for energy from non-renewable sources should become mandatory to provide consumers with the right information on all energy purchased. Furthermore, regulation related to Guarantees of Origin for Hydrogen and associated rules should be treated as part of a dedicated hydrogen regulation in the upcoming hydrogen and gas decarbonisation package.

The revised RED should encourage the use of GOs in addition to PPAs to prove the renewable character and CO<sub>2</sub> intensity of the electricity procured for the production of renewable hydrogen. This will contribute to sector coupling and sectoral integration through new flexibility resources to integrate more renewables in the power system.

Hydrogen Europe also proposes that the European Union initiates the development of a global system for Hydrogen Guarantees of Origin (HGOs), with track-and-trace and auditing functionality. Companies or countries that want to export their hydrogen to the EU need to be able to redeem HGOs that are approved and validated by an EU body at the EU point of entry.

### 3. Transparency

The Guarantees of Origin system is designed to serve the final consumers, and as such, it should accurately indicate the share or quantity of energy from renewable or low-carbon sources in an energy supplier's energy mix and in the energy supplied to consumers. The GO should, at minimum, include the primary energy sources, GHG footprint, production pathway and other attributes relevant for consumers.

Hydrogen Europe raises concerns about the existing design of the GO system as regards transparency. By decorrelating the certificates from the physical flows of the underlying commodity, multiple issues may arise. These can be solved by creating a distinct GO system for hydrogen and establishing clear rules on energy carrier conversion (triggering a need for GO conversion).

To put this into perspective: renewable hydrogen can be blended in the natural gas grid and combusted as a blend of CH<sub>4</sub>. At the same time, the H<sub>2</sub> GO (the certificate being separate from the underlying molecule) can be used against grey hydrogen consumption.

Without clear rules on energy carrier conversion, a major issue arises:

The physical renewable hydrogen accounted for 1 MWh (the standard GO size) of energy in the natural gas system. Yet this GO can be used to 'green' 1 MWh of grey h<sub>2</sub> consumption. At the same time, ~1,4 MWh of natural gas is needed to produce h<sub>2</sub>. Therefore, the GO system allows 'greening' ~1,4 MWh of natural gas. This is a clearly unintended consequence of the book and claim system.

This happened because hydrogen and methane are different energy carriers and are not interchangeable. The same applies to electricity and H<sub>2</sub> or electricity and natural gas. In other words, the H<sub>2</sub> GOs needed to be cancelled, and a new natural gas GO should have been issued, ensuring that the use of GOs across energy carriers cannot take place without taking into account the actual energy input and output.

Indeed, once hydrogen is injected into the gas network, all consumers physically connected to the network consume a mix. The energy content of hydrogen injected into the network can be allocated to specific consumers with supply contracts, and its renewable attributes can be allocated to specific consumers with the underlying GO. The presented above problem does not stem from the gas consumers connected to the gas grid using that underlying GO, but from the fact that hydrogen consumers not connected to the gas grid consuming grey hydrogen could use that H2 GO to green their consumption. Therefore, H2 GOs associated with H2 physically injected into the gas grid and blended with natural gas cannot be made available against the consumption of grey hydrogen consumption. This is the reason why H2 GOs need to be cancelled once physical volumes are blended.

### **Hydrogen Europe Policy Recommendation**

Hydrogen Europe considers it imperative to ensure that the GO system is transparent and benefits the end consumer with full disclosure of information. We also believe it is important that the system is accountable and transparent by setting clear ground rules that avoid false or misleading claims.

The revision of the RED II should mandate the cancellation of the H2 GO, and the issuance of a natural gas GO once physical volumes are blended.




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