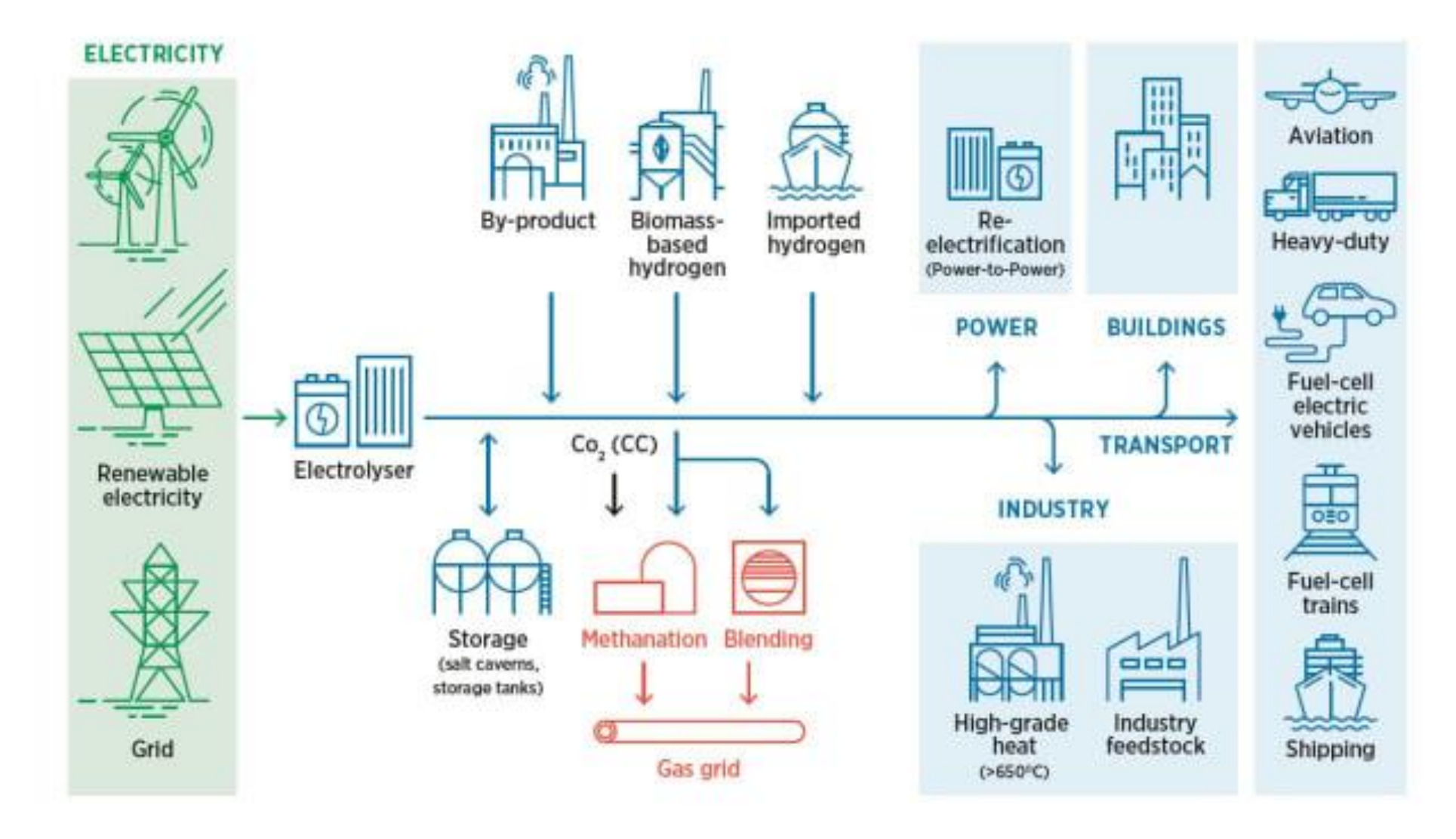


A stylized illustration of a green energy landscape. It features wind turbines, a factory with smokestacks, solar panels, and power lines under a sun. The scene is set on a grassy hill. In the foreground, there are large, stylized green leaves. The background is a light green gradient with various circular patterns in shades of green and teal.

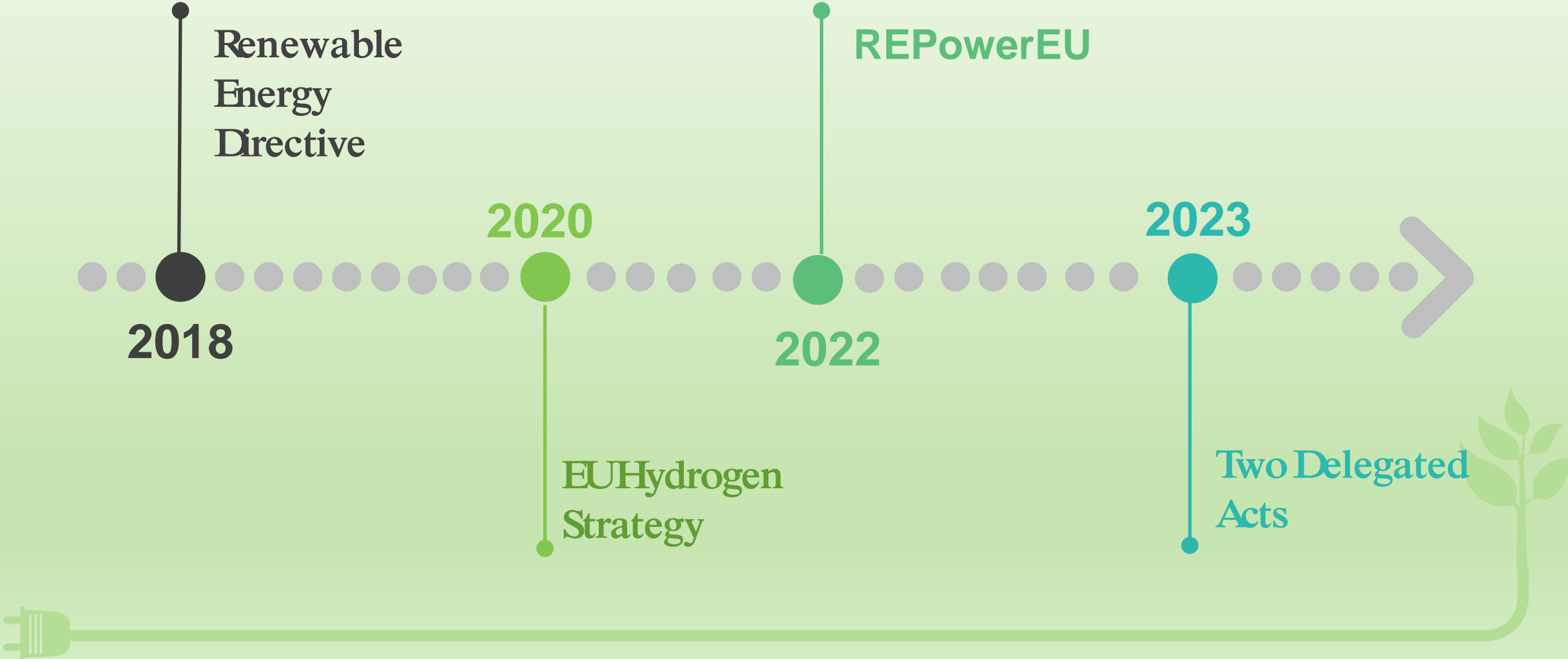
Green Hydrogen Regulation in EU

By Hanna Tsymbalishyna
Luneburg 2023

Production and Usage of Green Hydrogen



Legal framework development



EU Hydrogen Strategy

EU Hydrogen Strategy for a climate-neutral Europe in 2020 recommended policy action in five sectors:

support for investments,

encouragement of demand and production,

development of a market and infrastructure for hydrogen,

collaboration in research and development, and

global cooperation.



EU Hydrogen Strategy

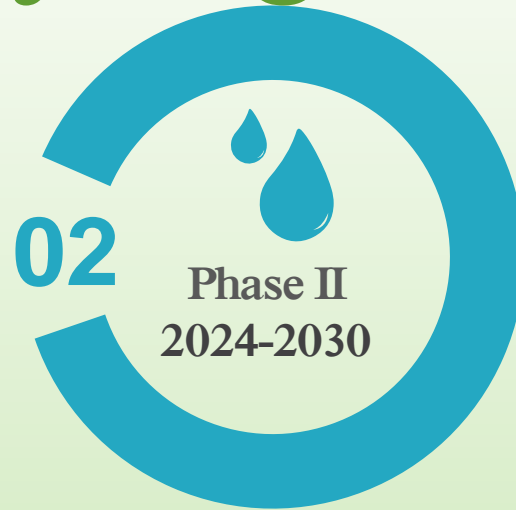


install 6 GW of renewable hydrogen electrolyzers in the EU;

scale production up to 1 million tonnes of renewable hydrogen;

decarbonise existing hydrogen production, e.g., in the chemical sector; and

facilitate hydrogen consumption in new end-use applications

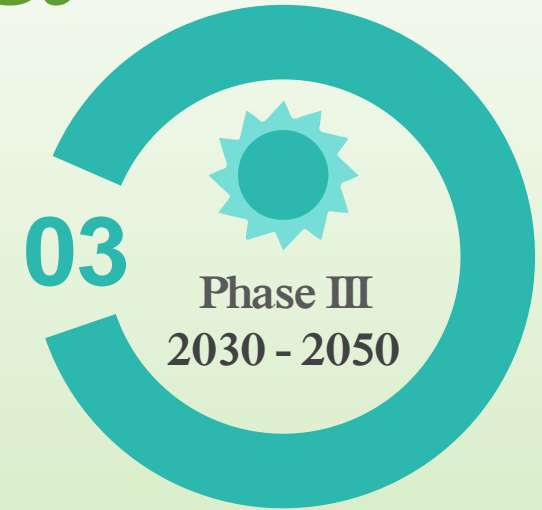


install at least 40 GW of renewable hydrogen electrolyzers by 2030;

reach production of up to 10 million tonnes of renewable hydrogen in the EU;

expand hydrogen into new sectors

retrofit the existing fossil-based hydrogen production with carbon capture



ultimate step towards renewable hydrogen technologies' maturity and deployment at large scale to reach all hard-to-decarbonize sectors

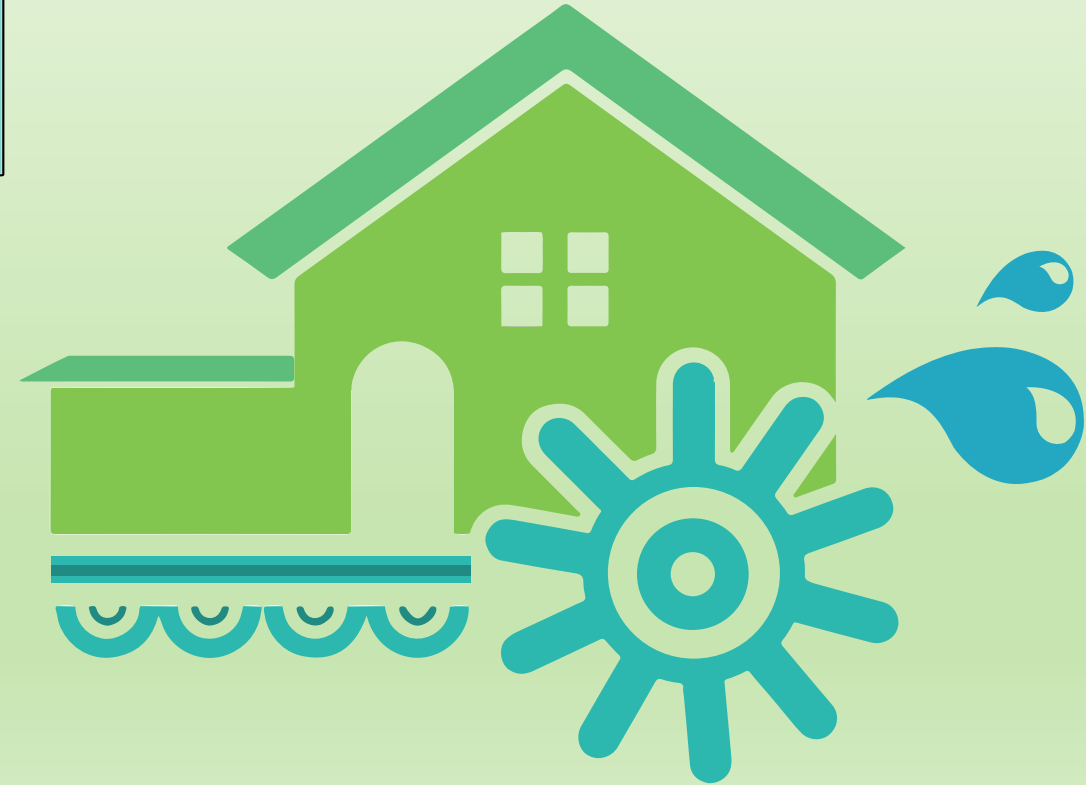


REPowerEU

Was adopted in 2022 as reaction to the global energy crises

Aims for the EU to produce 10 million tonnes and import 10 million tonnes of renewable hydrogen by 2030

Introduced 'Hydrogen Accelerator' to scale up the deployment of renewable hydrogen

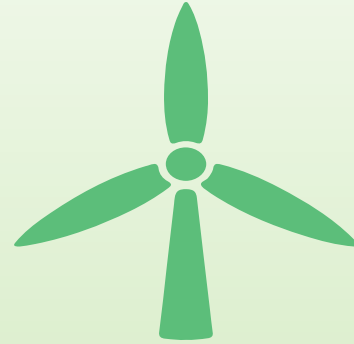


Fit for 55 Package



Goal

To adapt existing climate and energy legislation to meet the new EU objective of a minimum 55% reduction in GHG emissions by 2030



Proposal

To revise and update EU legislation to gradually replace fossil gas in the EU with renewable and low-carbon gases, including hydrogen



Solutions

Proposals to revise the gas regulation and gas directive adopted in 2009 and amend the security of gas supply regulation from 2017





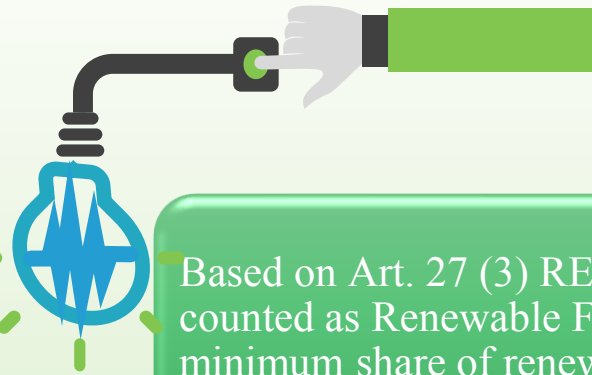
Delegated Acts

Entered into force on 10 July 2023

**Implemented the requirements of Art. 27 (3)
and Art. 25 (2), 28 (5) of the Renewable Energy
Directive 2018/2001 (REDII)**

**The first DA defines renewable hydrogen
for all consumption sectors**

**The second DA regulates the
calculation of greenhouse gas
emissions**



First delegated Act

Based on Art. 27 (3) RED II, defines the requirements for the production of hydrogen, and fuels based on these, so they can be counted as Renewable Fuels of Non-Biological Origin (**RFNBOs**) within the meaning of Art. 2 no. 36, 25 (2) RED II towards the minimum share of renewable energies in the transport sector.

Therefore, in addition to hydrogen, the definition also refers, in particular, to derivatives such as ammonia, methanol, paraffin and other hydrogen-based e-fuels.

Commission has proposed in the context of RED III that RFNBOs can count towards the renewable energy targets regardless of the sector in which they are consumed

The requirements apply both to production in the EU and to third countries, which explains the global interest in the Commission's proposals.

In order to prove the sustainability criteria, a system of voluntary certification has been proposed in accordance with Art. 9 of the first DA.

The Member States are to be required to recognise the certificates if the Commission has approved the certification scheme in question in accordance with Art. 30 (4) RED II.

Additionality for renewable electricity used in RE/NBO production

Option 1 – Direct connection to the RE plant

electrolysis must take place in the same plant as the renewable production in accordance with Art. 3 of the first DA, or

there must be a direct line between the two

if the RE plant is connected to the electricity grid, it must be proven via smart meters that no electricity was taken from the electricity grid for the electrolysis.

In addition, the RE plant must have been put into operation no earlier than 36 months before the electrolyser.

If electricity is taken from the grid, it will be considered renewable if it meets the requirements of option 2.

Additionality for renewable electricity used in RE_{NBO} production

Option 2 – Drawing power from the grid: green power grid

The electrolyser must be located in the same bidding zone as the RE plant, according to Art. 4 of the first DA.

Either the average renewable energy share in the bidding zone has exceeded 90% in the previous year or the emission intensity in the grid is below 18 gCO₂-eq/MJ, in which case the temporal and geographical correlation described in option 3 must also be met.

The electricity used will also be deemed renewable if it has been consumed during an imbalance settlement period interval and thereby the redispatch requirement has been reduced accordingly.

Additionality for renewable electricity used in RFNBO production

Option 3 – Drawing power from the grid: PPA or own power

Principle of Additionality:

- RE plant not older than 36 months before the electrolyser.
- No subsidies received for plant construction and operation.
- Transitional provision: Electrolysers by 1 Jan 2028 exempt until 1 Jan 2038 (except capacity expansions).

Principle of Temporal Correlation:

- From 2030: RFNBOs must match be produced from the renewable electricity within the hour after production, with the possibility of usage of electricity storage downstream of same grid.
- Transitional provision until 31 Dec 2029: Generation within the same month.
- RFNBO production within hour with clearing price \leq EUR 20 per MWh or $<$ 0.36 times the price of an emission allowance.

Principle of Geographical Correlation:

- Electrolyser and RE plant in same bidding zone at operation.
- Adjacent zones allowed if day-ahead price in RE plant's zone \geq electrolyser's zone.
- Adjacent offshore bidding zone also permissible.

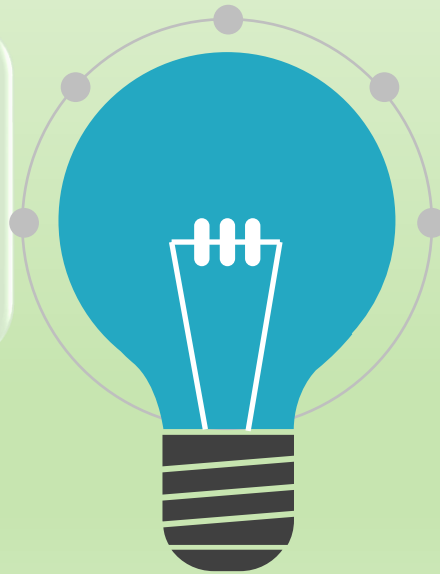
Second Delegated Act

Defines Methodology for Life-Cycle GHG Emissions

- Outlines a structured approach for calculating emissions.
- Focuses on renewable fuels of non-biological origin.

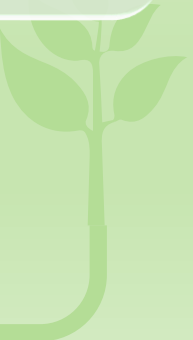
Introduces Comprehensive Lifecycle Assessment:

- Encompasses the entire fuel lifecycle.
- Includes upstream emissions, processing-related emissions, power grid emissions, and delivery emissions.



Hydrogen-Specific Emphasis:

- Methodology tailored to evaluate renewable hydrogen's GHG emissions.



Second Delegated Act

Classification of CO2 in RFNBO Production

CO2 from industrial processes under emissions trading scheme (only until 2036 for electricity production, and 2041 for other cases)

Captured CO2 from air

CO2 from biofuels/biomass combustion meeting sustainability criteria without emission saving credits

CO2 from combustion of RFNBOs meeting second DA criteria

CO2 from geological sources



The UK standard requires hydrogen producers to:

meet a GHG emissions intensity of 20g CO₂e/MJLHV of produced hydrogen or less for the hydrogen to be considered low carbon



calculate their greenhouse gas (GHG) emissions up to the 'point of production'



set out a risk mitigation plan for fugitive hydrogen emissions



meet additional requirements for the use of biogenic inputs, where relevant and as appropriate for the feedstock source and classification



The US standard target of:

4.0 kgCO₂e/kgH₂ for life cycle
(defined here as "well-to-gate") greenhouse emissions
associated with hydrogen
production, accounting for
multiple requirements within
the BIL provision.





Thank You