



TAKING STOCK OF THE HYDROGEN POLICY & REGULATORY FRAMEWORK

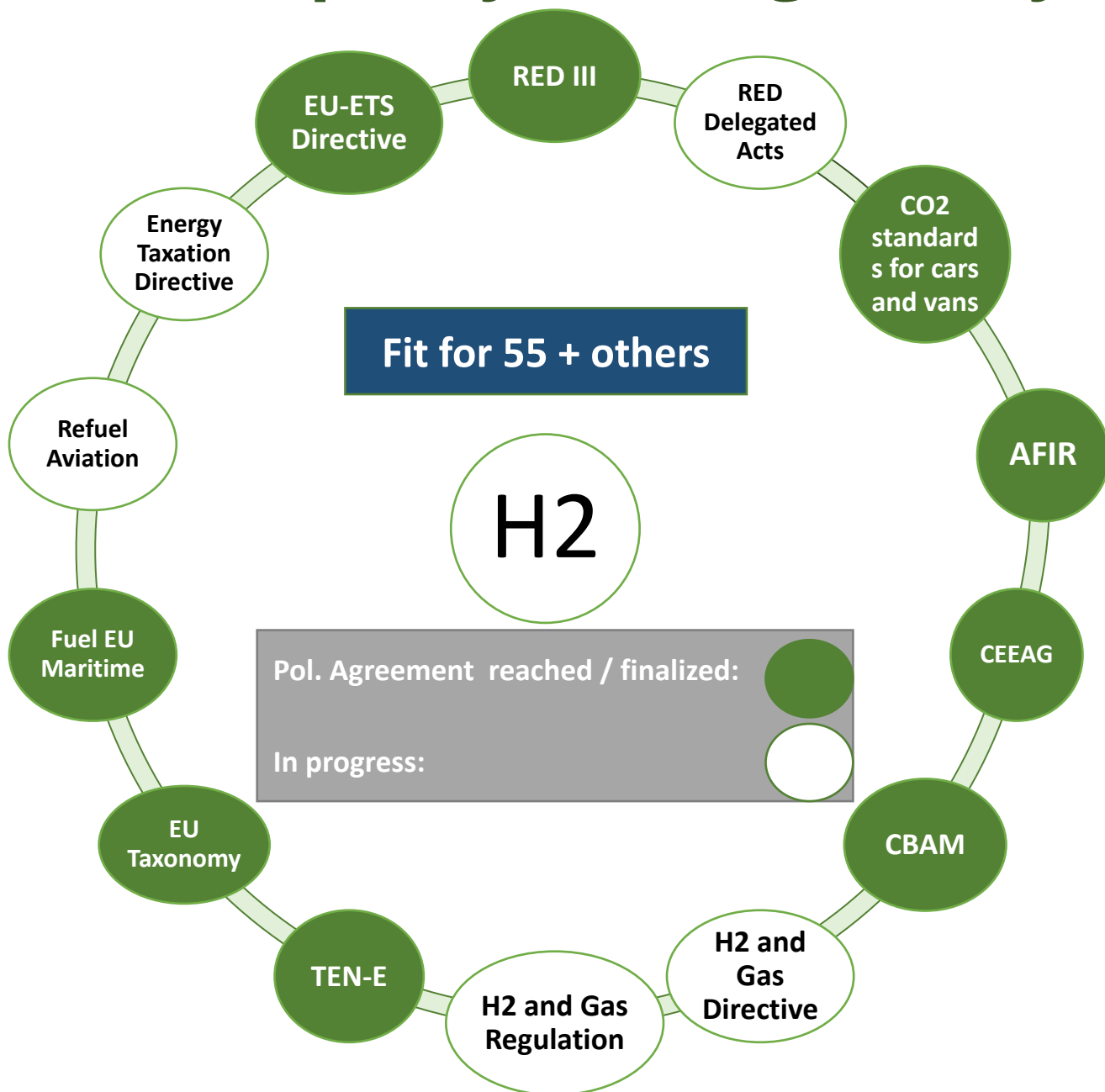
Brussels, March 30th, 2023

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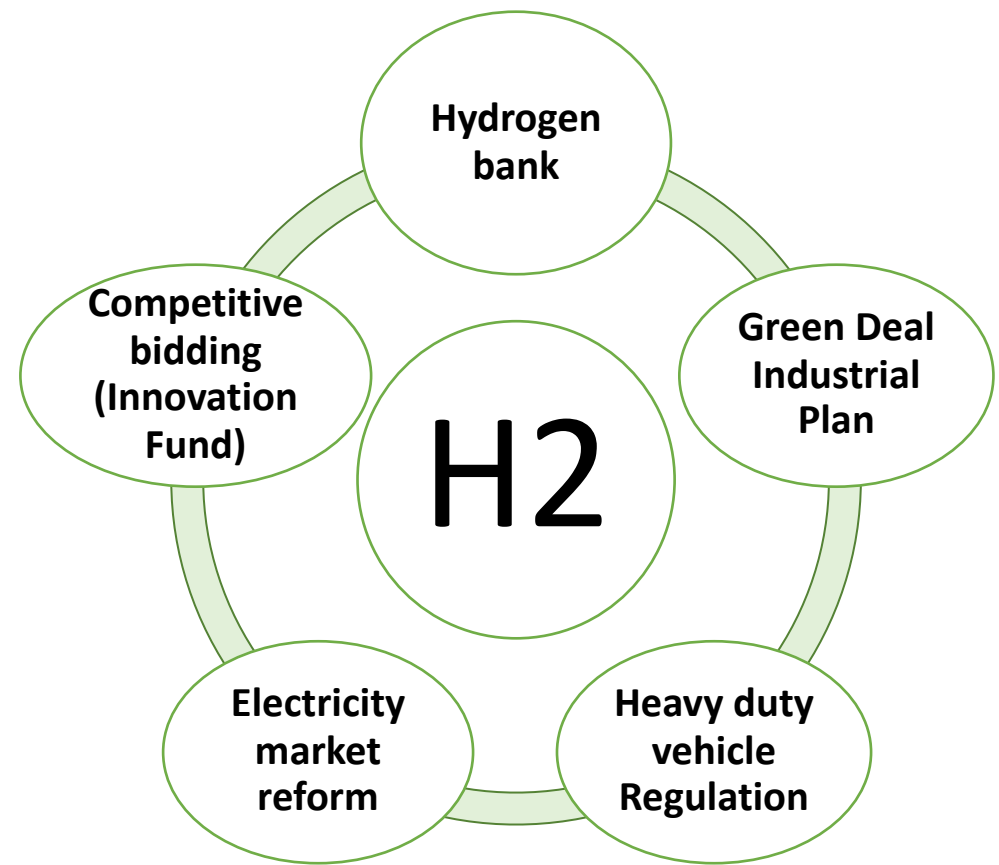
ERCST

Roundtable on
Climate Change and
Sustainable Transition

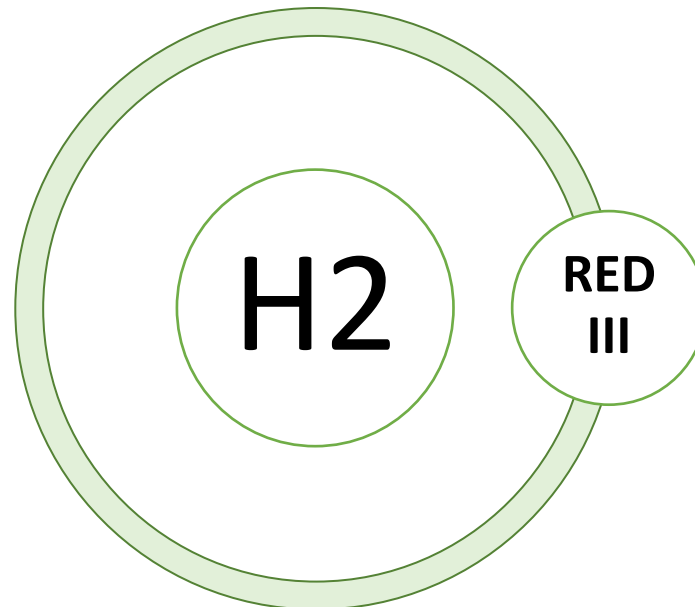
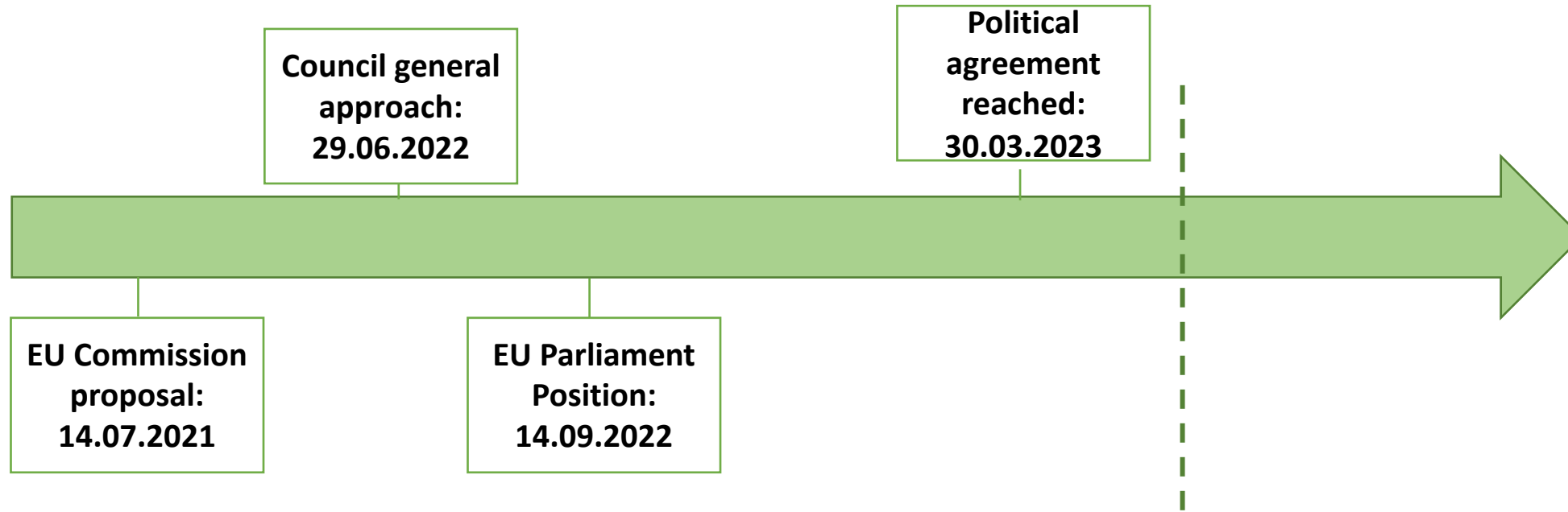
The H2 policy and regulatory landscape



New in 2023



RED revision



RED Revision before political agreement

RED III

European Commission

RFNBOs definition: Incomplete definition

Binding target for industry: 50% RES H2 by industry in 2030. (75% REPowerEU)

Binding Target for transport: Share of RFNBOs at least 2,6% by 2030. (5% REPowerEU)

REPowerEU: 20Mt, 10 own production and 10 imports

European Parliament

Binding Target for industry: 50% RES H2 in industry by 2030 and 75% by 2035

Binding Target for transport: Share of RFNBOs at least 5,7% including 1.2% in the hard to abate maritime sector

Additionality: Simplified and moved to the articles of the Directive

Council

Binding target for industry: 35% by 2030 and 50% by 2035 RFNBOs in industry

Non-binding target for transport: Share of RFNBOs at least 2,6% or 5,2% with multiplier by 2030.

DA on Additionality: Same as EC

RED Revision Political Agreement (30.03.2023)

Transport

MS can choose between:

- ❖ **Binding target of 14,5% reduction of GHG intensity** from the use of renewables by 2030

Or

- ❖ **Binding target of at least 29%** share of renewables within the final consumption of energy in the transport sector by 2030.

Binding Sub-target of 5,5% for advanced biofuels and RFNBO in the share of RES supplied to the transport sector.

+

1% of RFNBOs in the share of RES energies supplied to the transport sector.

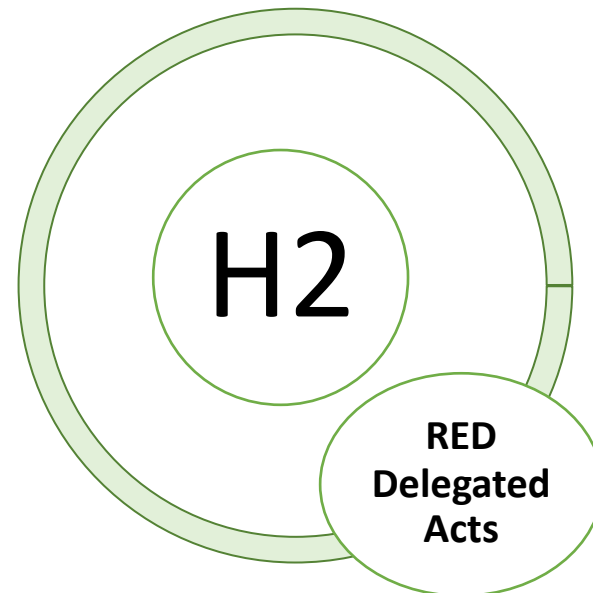
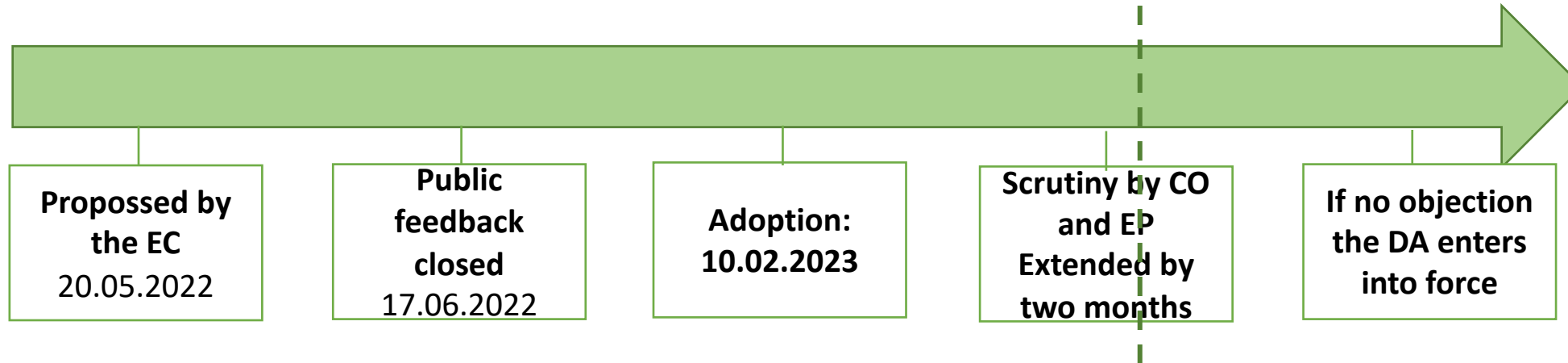
Industry

42% of the hydrogen used in industry should come from RFNBOs by 2030 and 60% by 2035.

The agreement introduces the possibility for member states to discount the contribution of RFNBOs in industry use by 20% under two conditions:

- ❖ If the member states' national contribution to the binding overall EU target meets their expected contribution
- ❖ the share of hydrogen from fossil fuels consumed in the member state is not more 23% in 2030 and 20% in 2035

RED Delegated Acts



RFNBO definition and RED Delegated Acts

First Delegated Act:

Hydrogen-based fuels or carriers can be considered renewable by ensuring they are produced with additional renewable electricity, in the same time and in the same area of production (with some exceptions).

From renewable sources excluding biomass. Also ammonia, methanol or e-fuels when produced from RES H2.

Second Delegated Act:

Sets the methodology to calculate GHG emissions savings from RFNBOs and recycled carbon fuels. It takes into account the full lifecycle of the fuels.

What? 70 % of emissions reduction

Where? Art. 25 RED II

What? Fossil Fuel Comparator: 94 gCO₂eq/MJ

Where? DA on methodology and Annex V of RED

3.384 tCO₂e/tH₂

RFNBOs definition

What? Requirements to qualify electricity as fully renewable

Where? DA on additionality

What? Accounting methodology for the production of RFNBOs and RCFs

Where? DA on methodology

First Delegated Act

Additionality:

- ✓ RES Installation coming into operation not earlier than **36 months** before the installation producing RFNBOs
- ✓ Additional capacity considered part of the initial installation if added at the same site and no later than 36 months.
- ✓ Installation has **not received support** in the form of operating or investment aid.
- ✓ **Applies in 2028.** Installations coming into operation before 2028 **exempted until 2038.**

Temporal correlation: Until **2030 monthly** matching between RES electricity and RFNBO production. **2030 onwards: hourly.**

Geographical correlation: Complied if the installation producing RES and the electrolyzer are located in: **same bidding zone, interconnected bidding zone** where prices are lower or equal, interconnected offshore bidding zone.

DIRECT CONNECTION

Electricity counted as fully renewable if:

Additionality



Direct line or within the same installation



Connected to the grid + smart metering system

GRID CONNECTION

Electricity counted as fully renewable if:

Bidding zone > 90 % Max. number of FLH matches the % of RES in a bidding zone. NO PPA, NO additionality, NO temporal and geographical correlation

Bidding zone where emission intensity < 18gCO₂e/MJ = 64,8g CO₂/KWh. PPA with existing facility (NO Additionality), temporal and geographical correlation

Consumed during an imbalance settlement period: downwards redispatchment or electricity reduces the need for redispatchment

Electricity taken from the grid + PPA + additionality + temporal correlation + geographical correlation.

Second Delegated Act

$$E = e_i + e_p + e_{td} + e_u - e_{ccs}$$

where:

E = total emissions from the use of the fuel (gCO₂eq / MJ fuel)

e_i = $e_{i\text{ elastic}}$ + $e_{i\text{ rigid}}$ - $e_{\text{ex-use}}$: emissions from supply of inputs (gCO₂eq / MJ fuel)

$e_{i\text{ elastic}}$ = emissions from elastic inputs (gCO₂eq / MJ fuel)

$e_{i\text{ rigid}}$ = emissions from rigid inputs (gCO₂eq / MJ fuel)

$e_{\text{ex-use}}$ = emissions from inputs' existing use or fate (gCO₂eq / MJ fuel)

e_p = emissions from processing (gCO₂eq / MJ fuel)

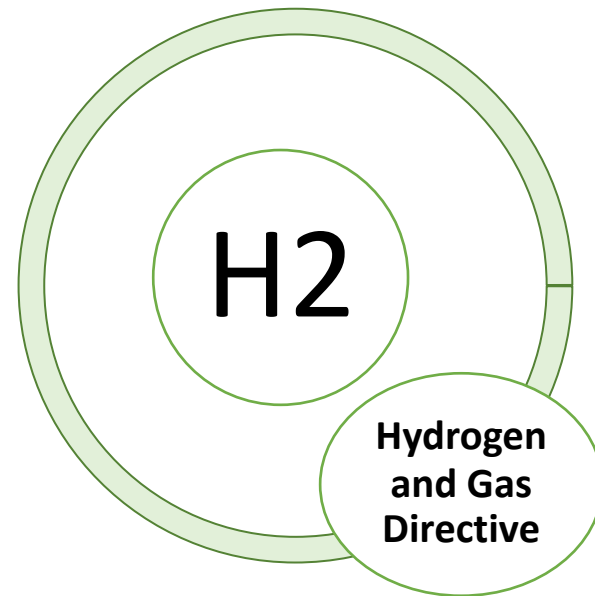
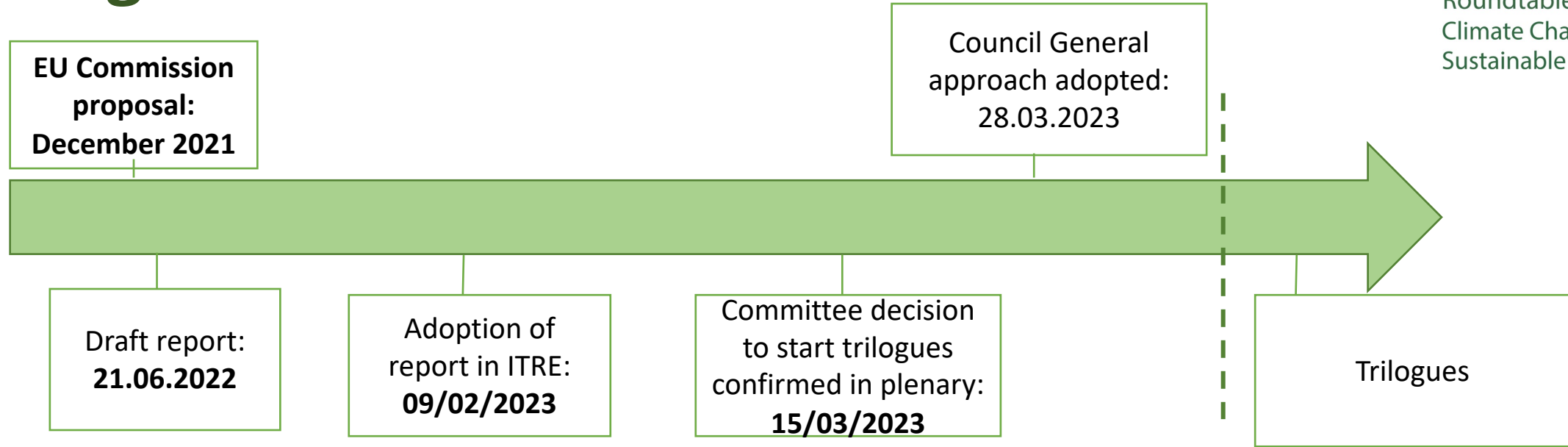
e_{td} = emissions from transport and distribution (gCO₂eq / MJ fuel)

e_u = emissions from combusting the fuel in its end-use (gCO₂eq / MJ fuel)

e_{ccs} = emission savings from carbon capture and geological storage (gCO₂eq / MJ fuel)

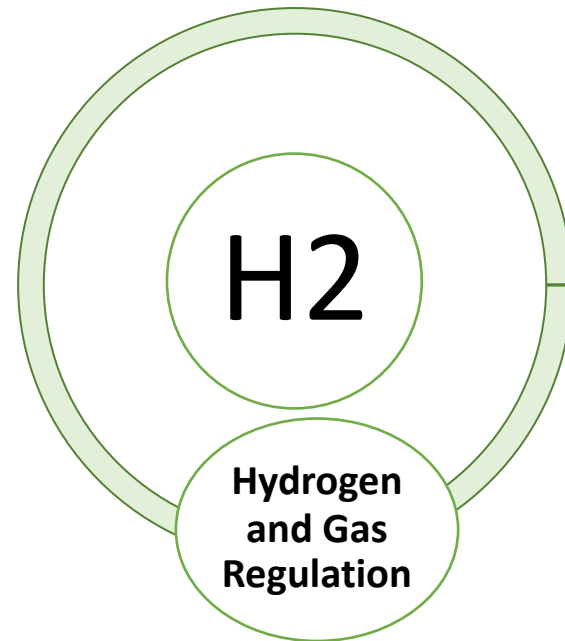
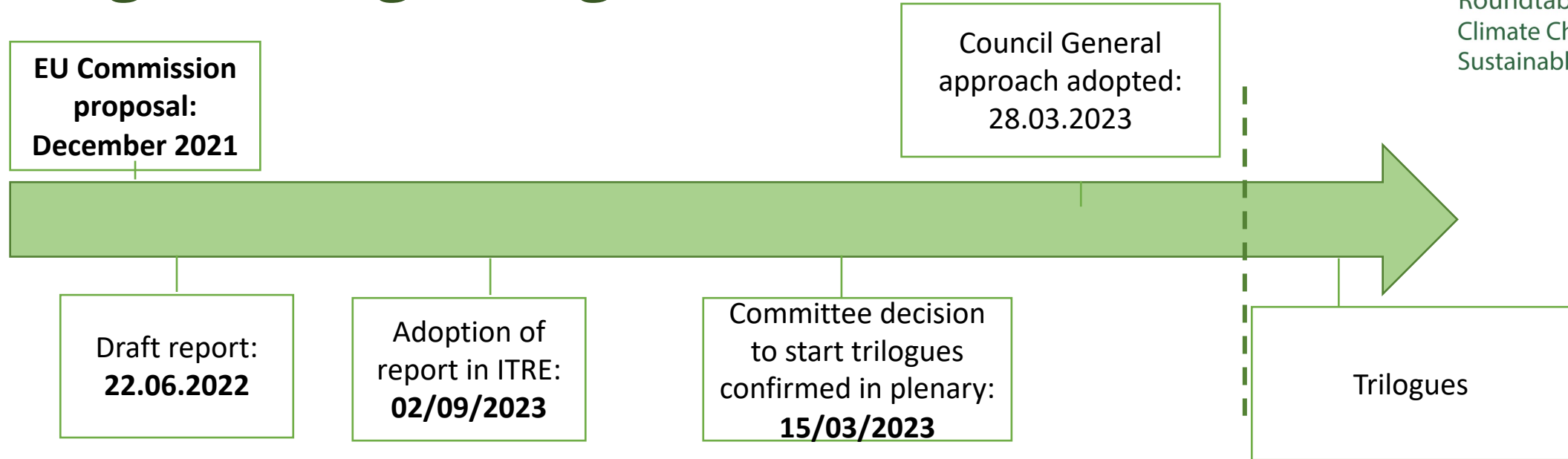
- Emissions from the manufacture of machinery and equipment shall not be taken into account
- Electricity qualifying as fully renewable according to Article 27(3) of Directive 2018/2001, shall be attributed zero greenhouse gas emissions

Hydrogen and Gas Directive



Issue	European Commission Prop.	European Parliament Position	Council General Approach
<ul style="list-style-type: none"> • Definition for low carbon-hydrogen 	<ul style="list-style-type: none"> • Hydrogen which meets a GHG emission reduction threshold of 70%. • Delegated act to complete de definition will be proposed in 2024 	<ul style="list-style-type: none"> • Introduction of a fossil fuel comparator of 94 gCO₂eq/MJ and a life-cycle assessment of emissions is introduced in the Directive (Art. 8) • DA with GHG methodology within 6 months of entry into force of this Directive. Based on their life-cycle emissions considering the RED Delegated Acts. 	<ul style="list-style-type: none"> • Art 8a which allowed MS to account low-carbon fuels in the calculation of different provisions for RFNBOs, is deleted. • Fossil fuel comparator of 94 gCO₂eq/MJ added in Art. 2 (10). • DAs with GHG methodology within 12 months of entry into force of this Directive.
<ul style="list-style-type: none"> • Vertical unbundling (Art. 62) 	<ul style="list-style-type: none"> • Hydrogen networks operators unbundled by 31.12.2024. If the network belongs to a vertically integrated company: OU, ISO or ITO (ITO not longer eligible after 2030) 	<ul style="list-style-type: none"> • All three models should be an option and ITO should be eligible after 2030. 	<ul style="list-style-type: none"> • All three models should be an option and ITO should be eligible after 2030.
<ul style="list-style-type: none"> • Horizontal unbundling (Art. 63) 	<ul style="list-style-type: none"> • It shall be independent at least in terms of its legal form 	<ul style="list-style-type: none"> • Deletes provisions on horizontal unbundling (more emphasis on repurposing) 	<ul style="list-style-type: none"> • Horizontal unbundling enshrined in Art. 63 + clarification of Recital 70
<ul style="list-style-type: none"> • Repurposing and energy system integration 	<ul style="list-style-type: none"> • Few references. 	<ul style="list-style-type: none"> • Several mentions to technical and economic synergies between the natural gas and hydrogen grids. (i.a. TYNDP, definition in Art. 2) 	
<ul style="list-style-type: none"> • Third party access (Art. 31) 	<ul style="list-style-type: none"> • Possibility of negotiated third party access until 2030 	<ul style="list-style-type: none"> • If there is less capacity than potential users, priority should be given to those that can demonstrate the highest potential for emission reduction. 	<ul style="list-style-type: none"> • Possibility of negotiated third party access until 2035 (transition period prologued until the end of 2035)
<ul style="list-style-type: none"> • Prioritization for industrial customers 		<ul style="list-style-type: none"> • Hydrogen should be prioritized for feedstock, raw material or energy purposes in hard-to-decarbonise industries such as steel or chemicals and hard-to-decarbonise maritime and aviation applications. (Rec 43) 	<ul style="list-style-type: none"> • The future use-cases for hydrogen are expected to primarily be in otherwise hard to decarbonise sectors. (Rec. 6a)
<ul style="list-style-type: none"> • Distribution network development plan 		<ul style="list-style-type: none"> • All DSOs or HDNOs shall submit a distribution network development plan at least every four for being considered in the the ten-year network development plans. (Art. 52b) 	
<ul style="list-style-type: none"> • Hydrogen network operator definition (Art. 2) 	<ul style="list-style-type: none"> • Includes both transmission and distribution 	<ul style="list-style-type: none"> • Distinguishes between H2 distribution and transmission system operators. Unbundling rules should also apply to distribution system operators. 	<ul style="list-style-type: none"> • The EC should review by 31 December 2030.
<ul style="list-style-type: none"> • H2 purity 		<ul style="list-style-type: none"> • More emphasis on H2 purity (i.e. refusal of access and connection) 	

Hydrogen and gas Regulation



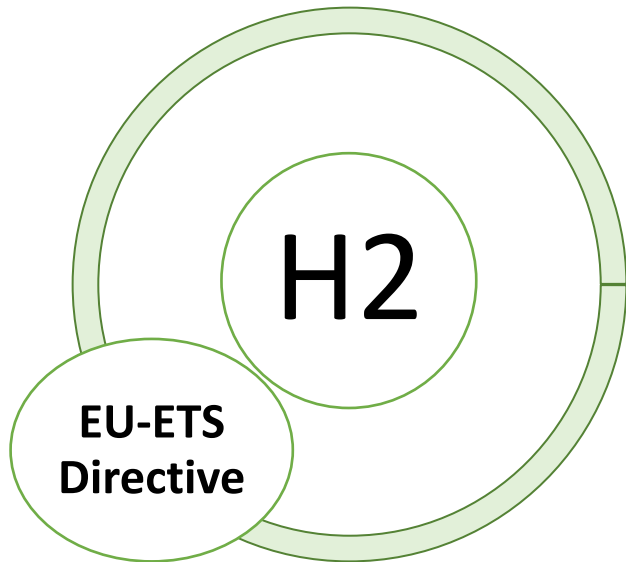
Hydrogen and gas Regulation

Issue	European Commission Prop	European Parliament Position	Council General Approach
<ul style="list-style-type: none"> Governance (Art. 40 to 47 Regulation) 	<ul style="list-style-type: none"> Creation of ENNOH using a similar approach to ENTSOE and ENTSOG. 	<ul style="list-style-type: none"> Art. 40 to 47 Deleted. ENTSOG renamed as ENTSOG&H. ENTSOG should incorporate hydrogen network operators and hydrogen activities. Tasked with i.a. development of network codes and the network development plan for gas and H2. 	<ul style="list-style-type: none"> Creation of ENNOH to among others oversee infrastructure planning and develop future network codes.
<ul style="list-style-type: none"> Blending (Art. 20 Regulation) 	<ul style="list-style-type: none"> EU-wide allowed limit of 5% at cross-border interconnection points. (TSO shall accept gas flows with a H2 content of up to 5%). 	<ul style="list-style-type: none"> This Regulation should promote the most efficient uses of hydrogen, but Member States should decide on whether to apply blending. The blending of hydrogen into the natural gas system should be a last resort solution. Transmission system operators shall only accept gas flows with a hydrogen content of up to 3% by volume at interconnections. 	<ul style="list-style-type: none"> Art. 20 is deleted and Article 19 mentions that TSOs shall cooperate to avoid restrictions to cross-border flows. This applies only to hydrogen blends where the hydrogen content blended into the natural gas system does not exceed 2 per cent by volume.
<ul style="list-style-type: none"> Uses of hydrogen and prioritization for industrial customers 	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> All efforts should be made to avoid the use of hydrogen for applications with regard to which more energy-efficient alternatives exist, such as the heating of buildings, and the production of hot water for sanitary use and of low-grade heat for industrial processes. Market rules shall prioritize the use of hydrogen for industrial customers in hard-to-decarbonize sectors, including in heavy-duty transport, with the highest greenhouse gas abatement potential, where more energy and cost-efficient options are not available; 	
<ul style="list-style-type: none"> Cross-subsidization and separated RAB (Art. 4) 	<ul style="list-style-type: none"> If a network operator provides regulated services for gas and hydrogen, it will need to have separate RAB. Financial transfers from one RAB to another may be allowed upon approval of the regulatory authority. 	<ul style="list-style-type: none"> Member State shall not allow financial transfers between regulated services that are separate within the meaning of paragraph 1. Member States may allow hydrogen network operators to spread network development costs over time, by ensuring that future users pay part of the initial costs. 	<ul style="list-style-type: none"> Same as EC

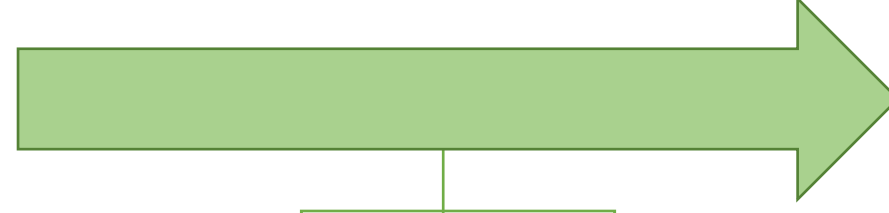
H2 & EU-ETS



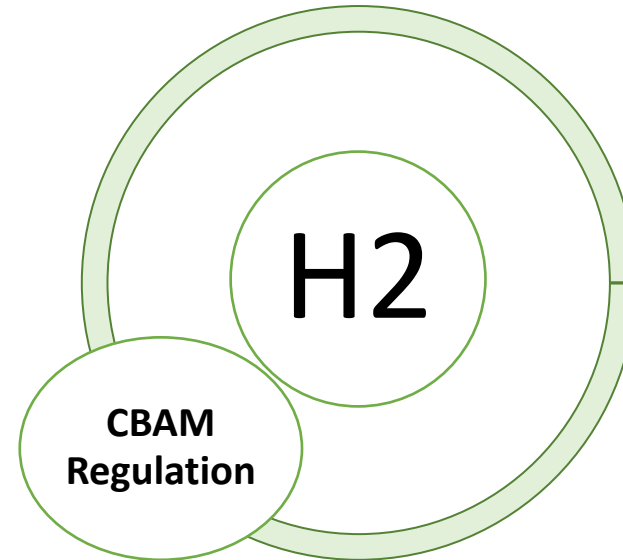
Political agreement
18.12.2022



H2 & CBAM



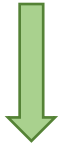
Political agreement
18.12.2022



H2 and EU-ETS Directive Revision

Scope: The scope of the EU-ETS Directive only includes processes based on fossil inputs, namely steam methane reforming and partial oxidation (grey hydrogen).

Free allocation: Under the current EU ETS Directive, only fossil-fuel based hydrogen is entitled to free allowances.



Free allocation and scope: The scope of the Directive and subsequently the scope for free allowances will be expanded to cover all production modes (de facto including electrolytic hydrogen).

Benchmarks for free allocation will be revised in 2026 with averages from 2021 and 2022. How?

Small installations: the production capacity threshold has been lowered from 25 to 5 tonnes per day, allowing smaller installations to also benefit.

H2 and CBAM Regulation

Product scope: Although not part of the initial proposal, H2 have been included together with Cement, Electricity, Fertilisers, Iron and Steel, Aluminium.

Scope of emissions: Indirect emissions should not be calculated initially for the goods that receive indirect cost compensation. Hydrogen is included in Annex 1a for which only direct emissions will be taken into account.

Free allocation: CBAM will replace the current free allowances regime for covered products in a gradual way.

Review clause: Before the end of the transition period the EC will assess the possibility of extending the CBAM scope to embedded indirect emissions (Annex 1a).

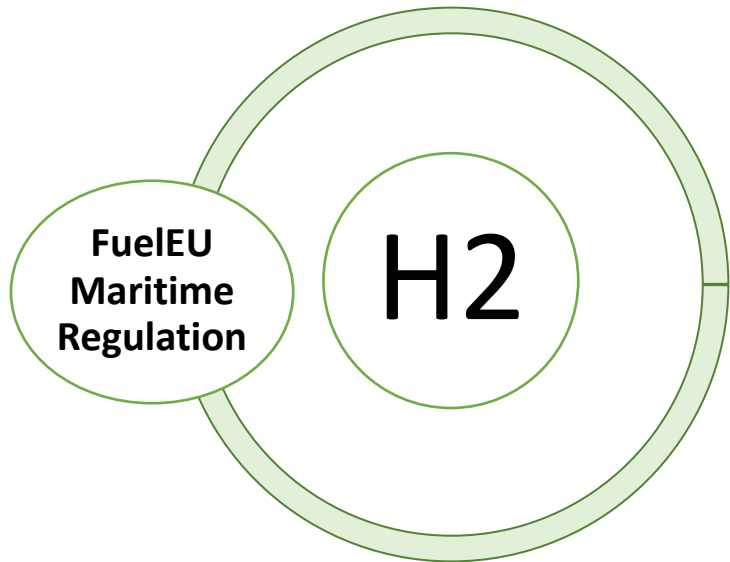
Trade flows: Imports only initially.

Next steps: Review clause + Delegated and Implementing acts.

FuelEU Maritime



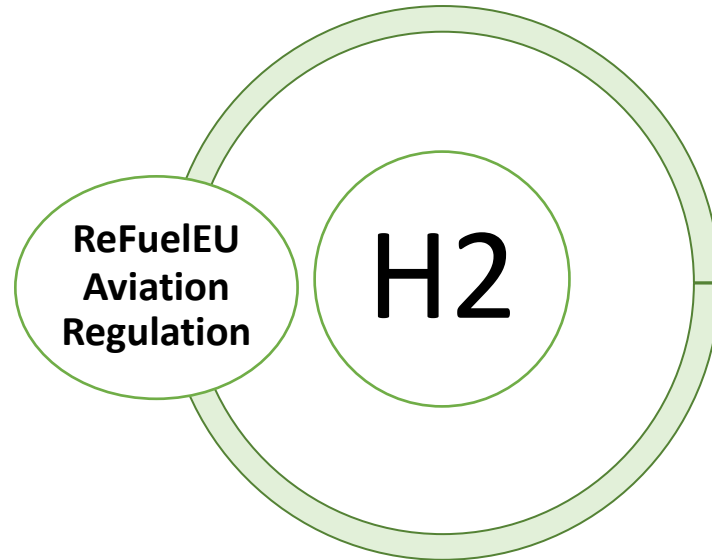
Political agreement reached:
23.03.2023



ReFuelEU Aviation



Trilogues ongoing



Political Agreement reached on: 23.03.23

FuelEU Maritime

- ❖ Intends that GHG intensity of fuels used by the shipping sector will gradually decrease.
- ❖ Starting by 2% by 2025 to 80% by 2050.
- ❖ **Technology neutral approach** by setting maximum limits on the yearly GHG intensity of fuels used by the shipping sector.
- ❖ A special incentive regime has been included to support the uptake of RFNBOs.

REfuelEU Aviation

Under trilogues negotiation

European Commission

Minimum share of SAF : (2025 2%,
2030 5%, 2050 63%)

**Sub target for synthetic aviation
fuels (RFNBOs) :** 2030 0,7%, 2035 5%,
2040 11%, 2045 11%, 2050 28%

European Parliament

Extended SAF definition, including H2
and electricity.

SAF increased targets: 2040 37%,
2050 85% taking into account H2 and
electricity

Creation of a Sustainable Aviation
Fund

Council

Synthetic low-carbon fuels definition

Synthetic low-carbon fuels including
low-carbon hydrogen should be
accounted towards the targets.

AFIR Regulation

Political Agreement:

- ❖ Alternative Fuels Infrastructure Regulation (AFIR) is a key piece of legislation for the uptake of hydrogen in the road transport sector.
- ❖ A Hydrogen Refuelling Station should be deployed:
 - ❖ 200 km on the TEN-T core network by the end of 2030.
 - ❖ In every urban node.
- ❖ Hydrogen Refuelling Stations should have a daily supply capacity of one ton of hydrogen.
- ❖ A Hydrogen Refuelling Station deployment plan should be prepared by MS by 2027.

European Commission proposal (14/07/2021)

By 31 December 2030 publicly accessible hydrogen refuelling stations with a minimum capacity of 2 t/day with a maximum distance of 150 km in-between them along the TEN-T core and the TEN-T comprehensive network.

Critical raw materials act

- ✓ In addition to an updated list of critical raw materials, the Act identifies a list of strategic raw materials linked to benchmarks for domestic capacities.
- ✓ 10 Mt of RES H2 will require approx. 100 GW of electrolyser capacity.
- ✓ **Platinum group metals, nickel and copper are considered strategic raw materials for hydrogen.**

Net-zero industry act

- ✓ Proposed on 16.03.2023 and first announced by P. VDL as part of the Green Deal Industrial Plan.
- ✓ The aim of the proposal is to scale up manufacturing of clean technologies in the EU.
- ✓ It aims that strategic net-zero technologies manufacturing reach at least 40% and will benefit from reinforced support.
- ✓ **Electrolysers and fuel cells are considered as strategic technologies.**

EU hydrogen bank

- ✓ Aim to unlock private investments in the EU and in third countries by connecting supply in the EU and outside with demand in the EU.
- ✓ The Bank will promote the production of renewable hydrogen domestically as well as imports.

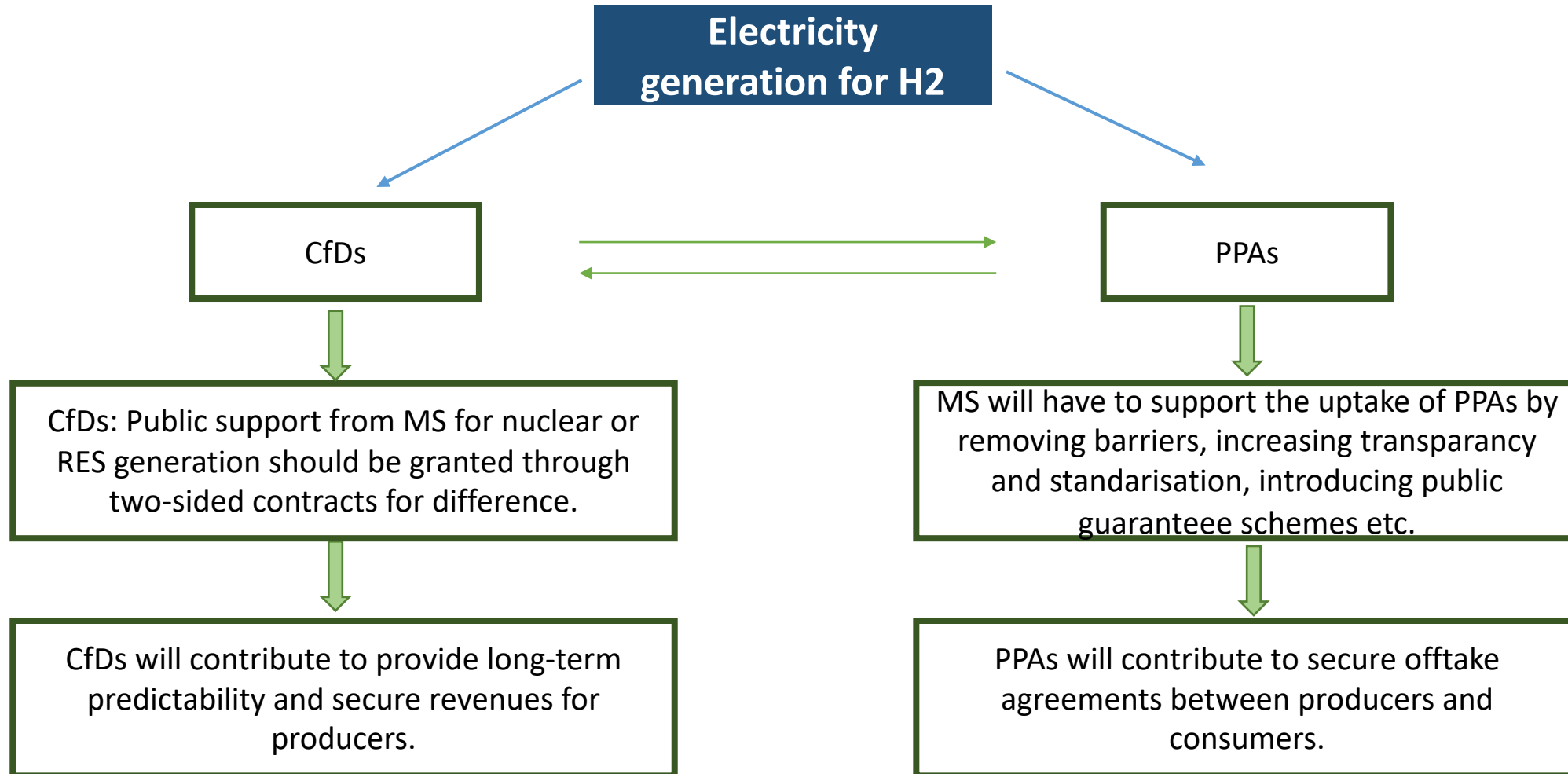
Domestic (DG Clima)

- ❖ Auctions under the EU innovation Fund: Fixed premium kg of H2 produced for a max of 10 years.
- ❖ Indicative budget for the first auction is EUR 800 M.

Imports (DG Ener)

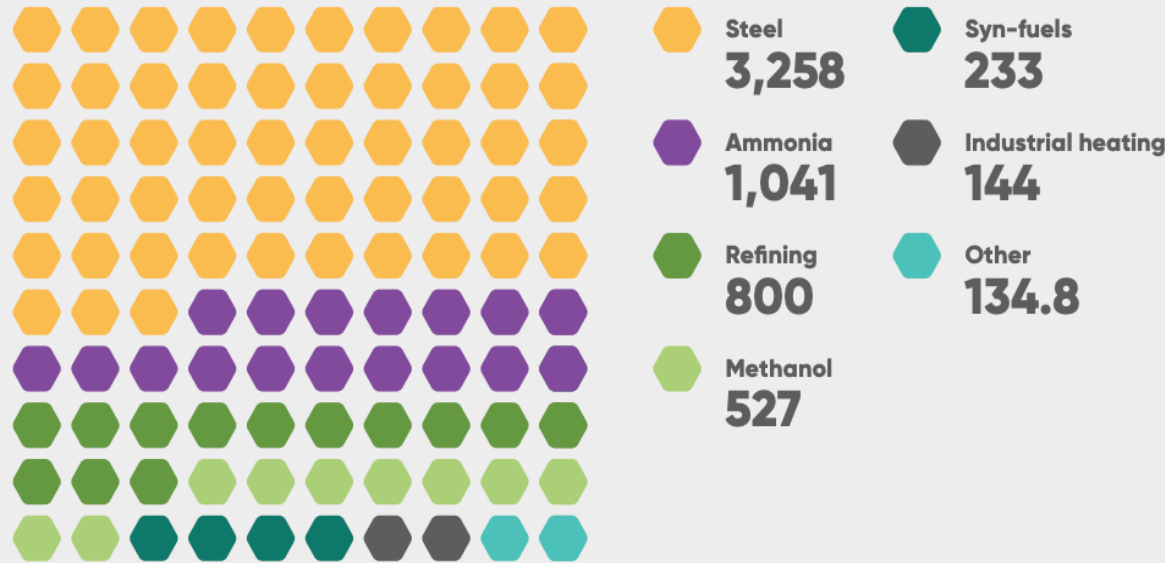
- ❖ REPowerEU ambition of 10 Mt of RES H2 imports.
- ❖ EC exploring how to design the international leg.
- ❖ Similar scheme of green premium?

Electricity market reform



Demand side perspective

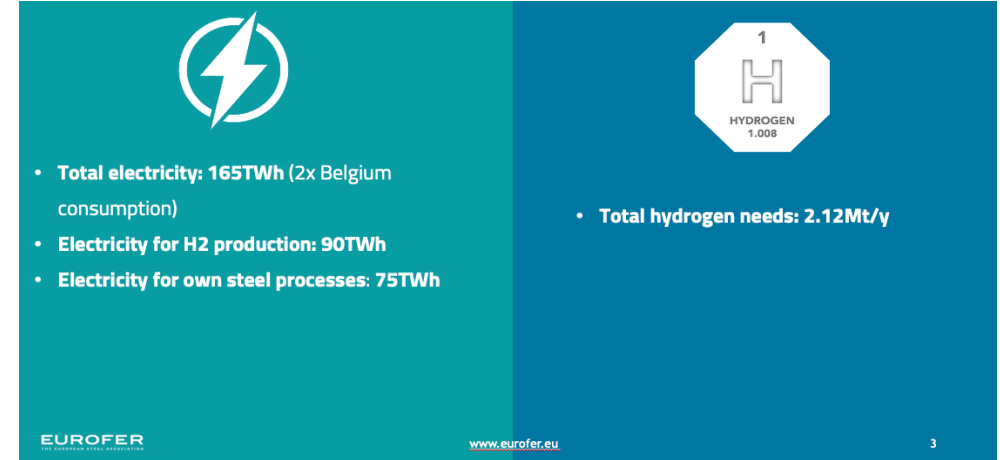
Clean hydrogen consumption planned by 2030 in kt H2/year for the different industrial sectors



Source: Hydrogen Europe, Clean Hydrogen Monitor 2022

* *Announced projects planning to use clean hydrogen in the EU, UK and EFTA. Restricted to announced plans that specifically intend to apply production in industrial processes with a clear industrial off-taker.*

Steel Sector



Chemical Sector

Scenario	H2 consumption (consumed as feedstock) (Mt)	H2 consumption (consumed as heat) (Mt)	Self-produced to be sold (predefined) (Mt)
Sustainable Biomass	0.565	0.5355	1.401
Fostering Circularity	0.533	0.533	1.401
High Electrification	0.6575	0.0025	1.401

Preliminary results provided by model iC2050 (This numbers do not represent an official CEFIC Position)

Questions for discussion

- Is the proposed regulatory framework ready to address disparate growth pathways and to adapt to the different ambition levels (EU hydrogen strategy, Fit for 55, Repower EU)?
- Have bottlenecks and hindering aspects been addressed throughout the different phases of the legislative process?
- What is coming next? Is there room for improvement?