Hydrogen Europe

EU Legislative framework for implementation of Hydrogen in different applications

May 2018

Hydrogen Europe

Hydrogen Europe represents the European hydrogen and fuel cell sector with more than 115 companies, 65 research organisations and 10 national associations as members.

We partner with the European Commission in the innovation programme Fuel Cells and Hydrogen Joint Undertaking (FCH JU).

We promote hydrogen as the enabler of a zero-emission society.

Hydrogen Europe is a supporting organisation of the
Hydrogen Council

Hydrogen Europe >185 Companies Research institutes and Associations

EU Legislative framework for Hydrogen

A positive regulatory framework for hydrogen requires 2 elements

1. Positive legislation which acknowledges and supports the role of hydrogen
   - ➡ Hydrogen Europe's advocacy work

2. Removing barriers that will hinder the deployment
   - ➡ HyLAW project

EU Legislative framework for Hydrogen

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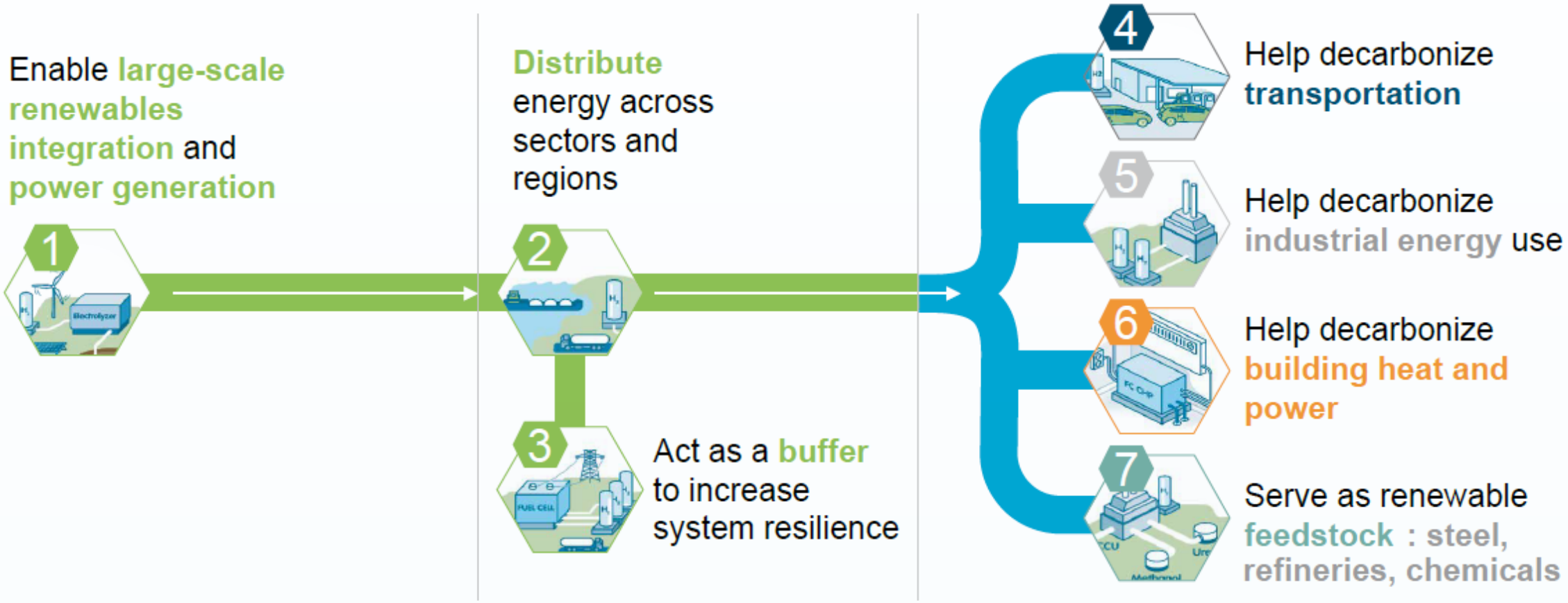
7 roles of hydrogen need to be acknowledged

Hydrogen Europe

Enable the renewable energy system → Decarbonize end uses



SOURCE: Hydrogen Council

EU framework

Sector	Requirement	Legislative Tools	Financial Tools	Hydrogen's role
Transport	-CO_2 -$PM/NO_X/SO_X$ reduction -integration of RES	1. Fuel Quality Directive 2. Renewable Energy Directive (RED2) 3. CO_2 emission standards 4. Clean vehicle Directive 5. Alternative Fuel Infrastructure Directive		-H2 as a fuel -H2 made fuels -green hydrogen for refineries
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EU framework – Renewable Energy Directive

A. Integrating renewables in transport:
   1. **Obligation of fuel suppliers to integrate a percentage of renewables**
   2. Link with Hydrogen
   3. In which conditions
   4. Equality of treatment with renewable electricity

- B Guarantees of Origin

EU framework – Renewable Energy Directive

1. Obligation of fuel suppliers to integrate a percentage of renewables

RED 2 is the instrument to reach the objective of having 27% (or more) of renewable as primary energy in Europe

Article 25 sets a specific objective to integrate renewables in transport with an obligation for fuel suppliers to integrate a fraction of renewables in the fuels they sell

1. General percentage
   - Commission : 6.8%
   - Parliament EP: 12%... but multipliers
   - Council: 14% …. but multipliers

2. Different minimum/maximum/flexible percentages for different categories of fuels

EU framework – Renewable Energy Directive

2. Link with H2: RFNBIO

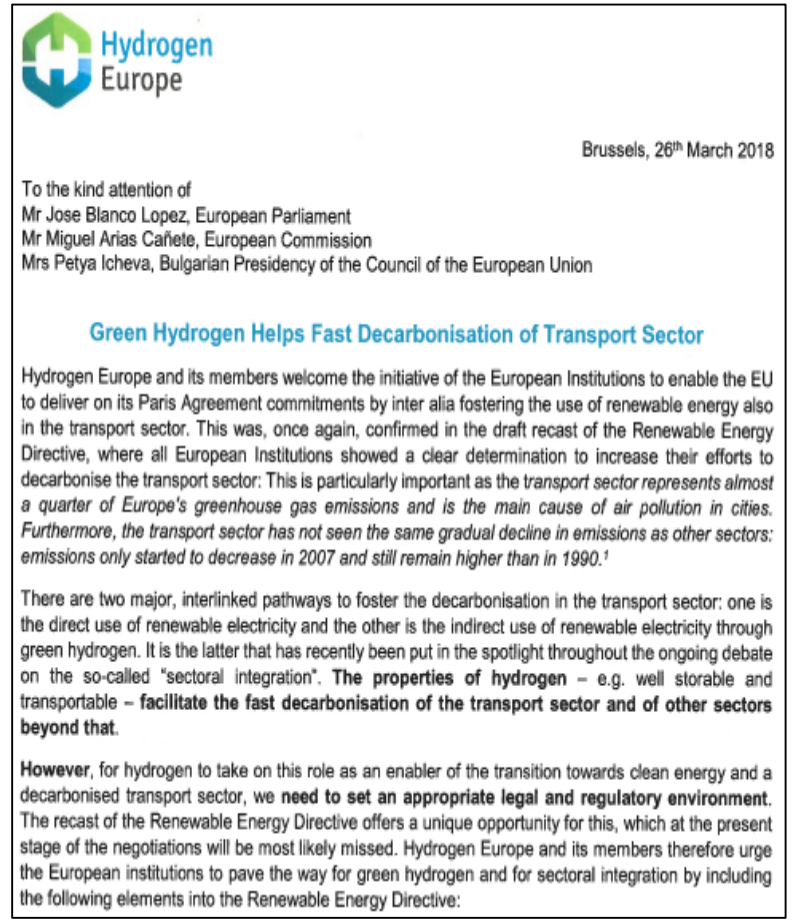
a) Renewable H2 as a fuel: YES
b) Renewable H2 made fuel : YES
c) Renewable H2 in refineries: ?

Article 25: Mainstreaming RES in transport -> RFNBO or Refunobio

"When electricity is used for the production of renewable liquid and gaseous transport fuels of non-biological origin, either directly or for the production of intermediate products, […]"

Text is not questioned in trilogue but **legal clarity on interpretation remains unclear**

=> Hydrogen Europe letter to Bulgarian Presidency, EC, EP.



Hydrogen Europe

Brussels, 26th March 2018

To the kind attention of
Mr Jose Blanco Lopez, European Parliament
Mr Miguel Arias Cañete, European Commission
Mrs Petya Icheva, Bulgarian Presidency of the Council of the European Union

Green Hydrogen Helps Fast Decarbonisation of Transport Sector

Hydrogen Europe and its members welcome the initiative of the European Institutions to enable the EU to deliver on its Paris Agreement commitments by inter alia fostering the use of renewable energy also in the transport sector. This was, once again, confirmed in the draft recast of the Renewable Energy Directive, where all European Institutions showed a clear determination to increase their efforts to decarbonise the transport sector: This is particularly important as the *transport sector represents almost a quarter of Europe's greenhouse gas emissions and is the main cause of air pollution in cities. Furthermore, the transport sector has not seen the same gradual decline in emissions as other sectors: emissions only started to decrease in 2007 and still remain higher than in 1990.*[1]

There are two major, interlinked pathways to foster the decarbonisation in the transport sector: one is the direct use of renewable electricity and the other is the indirect use of renewable electricity through green hydrogen. It is the latter that has recently been put in the spotlight throughout the ongoing debate on the so-called "sectoral integration". **The properties of hydrogen** – e.g. well storable and transportable – **facilitate the fast decarbonisation of the transport sector and of other sectors beyond that.**

However, for hydrogen to take on this role as an enabler of the transition towards clean energy and a decarbonised transport sector, we **need to set an appropriate legal and regulatory environment.** The recast of the Renewable Energy Directive offers a unique opportunity for this, which at the present stage of the negotiations will be most likely missed. Hydrogen Europe and its members therefore urge the European institutions to pave the way for green hydrogen and for sectoral integration by including the following elements into the Renewable Energy Directive:

EU framework – Renewable Energy Directive

3. In which conditions can H2 count for compliance with the target

- Restrictive conditions
- Intense discussion on the text
- Current trilogue finalisation: 17 May

Commission proposal	Council position	Hydrogen Europe position

Determination of the renewable share of RFNBIO
 	
• Average share of electricity from RE sources in the Union
or
• The share of electricity from renewable energy sources in the Member State two years before
 	
• **Fully counted only if**
  • **no grid connection**
  • **And comes into operation after or at the same time as the installation producing**
	Electricity for fuel production can be fully counted as renewable, if connected to the grid, but:
	
	• Can provide evidence that the respective electricity has been provided without importing electricity from the grid. If electricity has been imported from the grid:
	
	• Renewable electricity generation would have been curtailed if not consumed by the plant
	
	Or renewable properties have been demonstrated
	
	-> Implementing act to establish common methodology
		Electricity for fuel production can be fully counted as renewable, if connected to the grid, but:
		
		• Can provide evidence that the respective electricity has been provided without importing electricity from the grid. If electricity has been imported from the grid:
		
		• Renewable electricity generation would have been curtailed if not consumed by the plant or
		• Renewable properties have been demonstrated ***through the use of guarantees of origin or power purchase agreements***
		
		-> Implementing act to establish common methodology

EU framework – Renewable Energy Directive

4. Equality of treatment with renewable electricity? NO

- Different conditions for renewable electricity and renewable hydrogen
- “Multipliers”

Parliament proposal	Council position	Hydrogen Europe position
The contribution of renewable electricity supplied to road vehicles shall be considered to be ***2.5 times its energy content***.	Within this total share, the contribution of renewable electricity shall be considered to be ***5 times its energy content when supplied to road vehicles and 2 times the energy content when supplied to rail transport***.	“Within this total share, ***the direct contribution of renewable electricity or indirect contribution through renewable liquid and gaseous transport fuels of non-biological origin of renewable electricity shall be considered to be 2.5 times its energy content when supplied to road vehicles and 2 times the energy content when supplied to rail transport***.”

EU framework – Renewable Energy Directive

B. **Guarantee of origin on Hydrogen for consumer choice**

Article 19: Inclusion of hydrogen guarantees of origin

European Commission Proposal	European Parliament position	Council position
A guarantee of origin shall specify at least: (a) the energy source from which the energy was produced and the start and end dates of production; (b) whether it relates to: (i) electricity; or (ii) gas, or (iii) heating or cooling;	A guarantee of origin shall specify at least: (a) the energy source from which the energy was produced and the start and end dates of production; (b) whether it relates to: (i) electricity; or (ii) gas, ***including hydrogen*** or (iv) heating or cooling;	A guarantee of origin shall specify at least: (a) the energy source from which the energy was produced and the start and end dates of production; (b) whether it relates to: (i) electricity; or (ii) gas, or (iii) heating or cooling;

EU framework

Sector	Requirement	Legislative Tools	Financial Tools	Hydrogen's role
Transport	-CO_2 -$PM/NO_X/SO_X$ reduction -integration of RES	1. Fuel Quality Directive 2. Renewable Energy Directive (RED2) **3. CO_2 emission standards** 4. Clean vehicle Directive 5. Alternative Fuel Infrastructure Directive		-H2 as a fuel -H2 made fuels -green hydrogen for refineries
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Power	Storage / ancillary services	Electricity Market Design Directive / Regulation		Rapid response electrolysers + Sectoral Integration

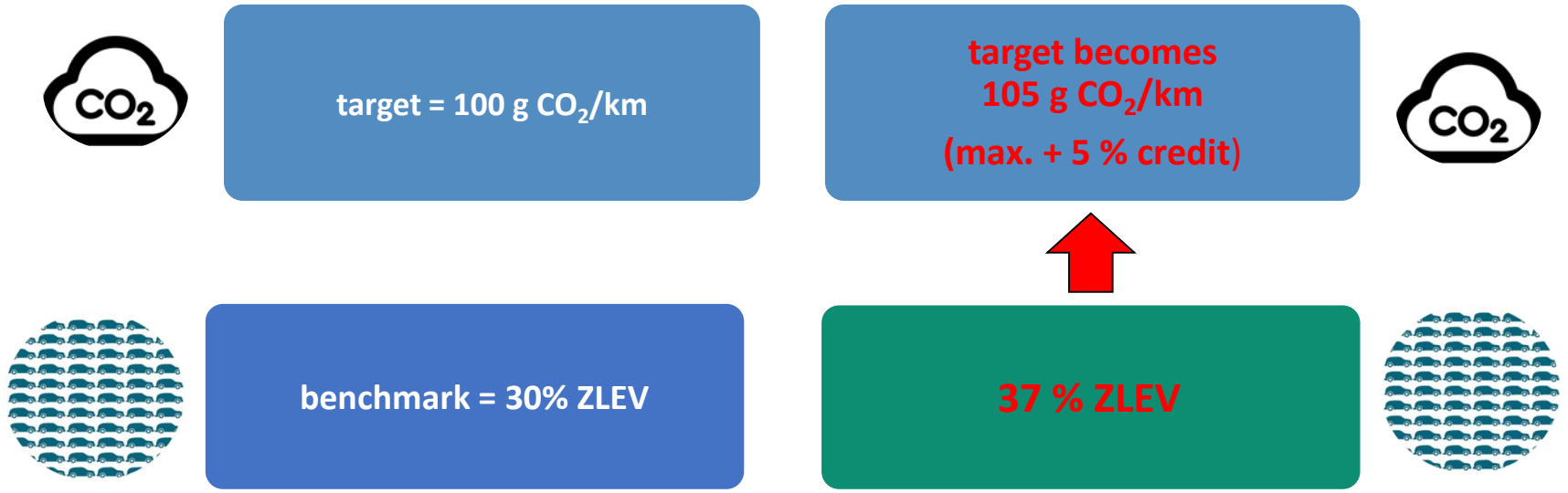
EU framework – CO_2 emission standards

- Presented in November 2017 by the European Commission
- Philosophy: Technology neutral and rewarding best performers
- **2 Key elements**
  1. **CO2 standards**: 15% reduction in 2025 and 30% reduction in 2030 (compared with 2021)
  2. **Reward for introduction of ZEV/LEV**
     - Which vehicles: CO_2 tailpipe emissions between 0 - 50 g CO_2/km

       => plug-in hybrid, BEV, FCEV
     - Mechanism:
       - Benchmark objective: 15% in 2025 and 30%
       - Reward if OEM achieves more: a less stringent CO_2 target
         - "exchange rate" of 1% / 1% with maximum 5% increase of CO_2target
         - ZEV counted as one; LEV counted according to CO_2 emissions
       - No sanction if OEM achieves less

EU framework – CO_2 emission standards

- Illustration of the mechanism



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EU framework – Clean Vehicle Directive

Presented in November 2017 by the European Commission:

- **public procurement-based fleet deployment** across Europe
- **First it defines clean vehicles** based on emission thresholds (EC proposal)
  - For cars: de facto electric powered vehicles
  - For vans: de facto electric powered vehicles
  - For bus: accepts also natural gas
- **Second, it sets a minimum procurement target** per Member states and per vehicle segment (next slide)

Table 2: Emission-thresholds for light-duty vehicles

Vehicle categories	2025		2030	
	gCO2/km	*RDE air pollutant emissions conformity factor**	*gCO2/km*	*RDE air pollutant emissions conformity factor**
M1 vehicles	25	0.8	0	n.a.
M2 vehicles	25	0.8	0	n.a.
N1 vehicles	40	0.8	0	n.a.

* Emissions of ultrafine particles (PN), nitrogen oxides (NO and NO2, when measured combined, they are referred to as NOx) according to Regulation 2017/1151, as amended.

Table 3: Alternative fuel requirements for heavy-duty vehicles

Vehicle categories	Alternative fuels
M3, N2, N3 vehicles	Electricity*, hydrogen, natural gas including biomethane, in gaseous form (compressed natural gas (CNG)) and liquefied form (liquefied natural gas (LNG)

Minimum procurement target per Member states and per vehicle segment

Light duty vehicles		
Member State	**2025**	**2030**
Luxembourg	35%	35%
Sweden	35%	35%
Denmark	34%	34%
Finland	35%	35%
Germany	35%	35%
France	34%	34%
United Kingdom	35%	35%
Netherlands	35%	35%
Austria	35%	35%
Belgium	35%	35%
Italy	35%	35%
Ireland	35%	35%
Spain	33%	33%
Cyprus	29%	29%
Malta	35%	35%
Portugal	27%	27%
Greece	23%	23%
Slovenia	20%	20%
Czech Republic	27%	27%
Estonia	21%	21%
Slovakia	20%	20%
Lithuania	19%	19%
Poland	20%	20%
Croatia	17%	17%
Hungary	21%	21%
Latvia	20%	20%
Romania	17%	17%
Bulgaria	16%	16%

Buses		
Member State	**2025**	**2030**
Luxembourg	50%	75%
Sweden	50%	75%
Denmark	50%	75%
Finland	46%	69%
Germany	50%	75%
France	48%	71%
United Kingdom	50%	75%
Netherlands	50%	75%
Austria	50%	75%
Belgium	50%	75%
Italy	50%	75%
Ireland	50%	75%
Spain	50%	75%
Cyprus	50%	75%
Malta	50%	75%
Portugal	40%	61%
Greece	38%	57%
Slovenia	33%	50%
Czech Republic	46%	70%
Estonia	36%	53%
Slovakia	39%	58%
Lithuania	47%	70%
Poland	37%	56%
Croatia	32%	48%
Hungary	42%	63%
Latvia	40%	60%
Romania	29%	43%
Bulgaria	39%	58%

EU framework

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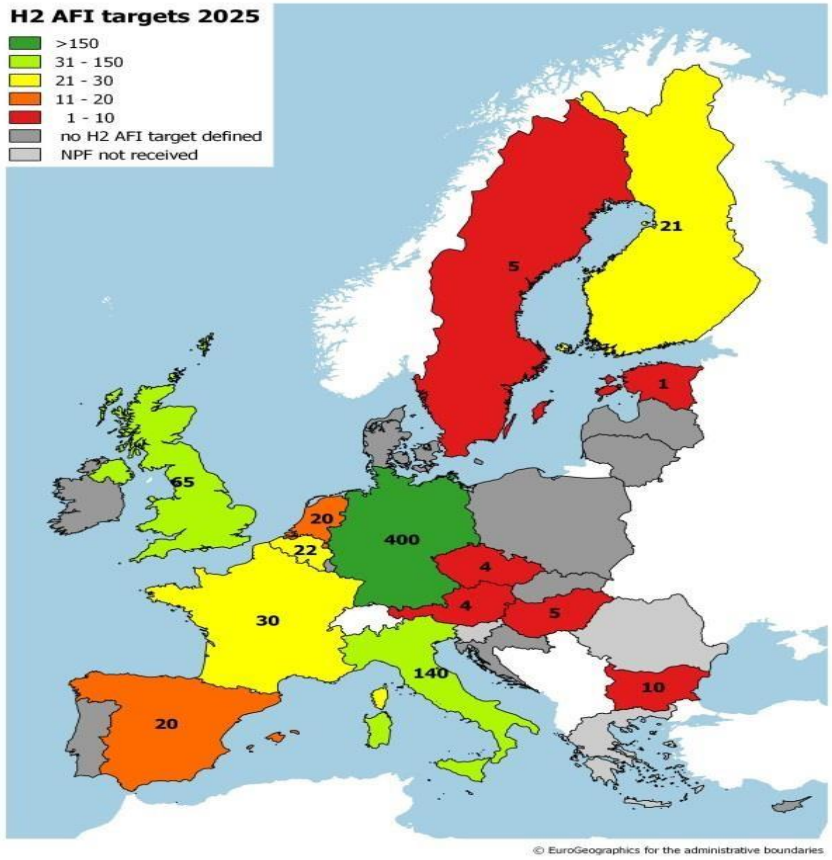
EU framework – Alternative Fuel Infrastructure Directive

Presented in November 2017 by the European Commission:

- Seen as key directive to unlock potential for hydrogen-based fuels along TEN-T core network.

- National plans on deployment of alternative infrastructure (electricity, gas, … hydrogen).
- **Hydrogen is included in 14 NPFs** (Austria, Belgium, Bulgaria, Czech Republic, Germany, Estonia, Spain, Finland, France, Hungary, Italy, Netherlands, Sweden, and UK)
- There will be more money available via TEN-T, (especially in Core Network Corridors also for hydrogen), NER300 and some regional funds
- Special mentioning of the Cleaner Transport Facility (CTF) of the EIB

Mandatory ?	Fuels	Objectives/distance requirement
Yes	Electricity for vehicles	One recharging point per estimated ten electric vehicles (and for information purposes: at least every 60 km on TEN-T Core Network)
Yes	CNG	At least every 150 km on TEN-T Core Network and one CNG refuelling point per estimated 600 CNG vehicles
Yes	LNG for vehicles	At least every 400 km on TEN-T Core Network
Yes	LNG for maritime vessels	Coverage of maritime ports with mobile or fix installations to enable the circulation on TEN-T Core Network
Yes	LNG for inland waterway vessels	Coverage of inland ports with mobile or fix installations to enable the circulation on the TEN-T Core Network
No	Hydrogen	At least every 300 km on TEN-T Core Network



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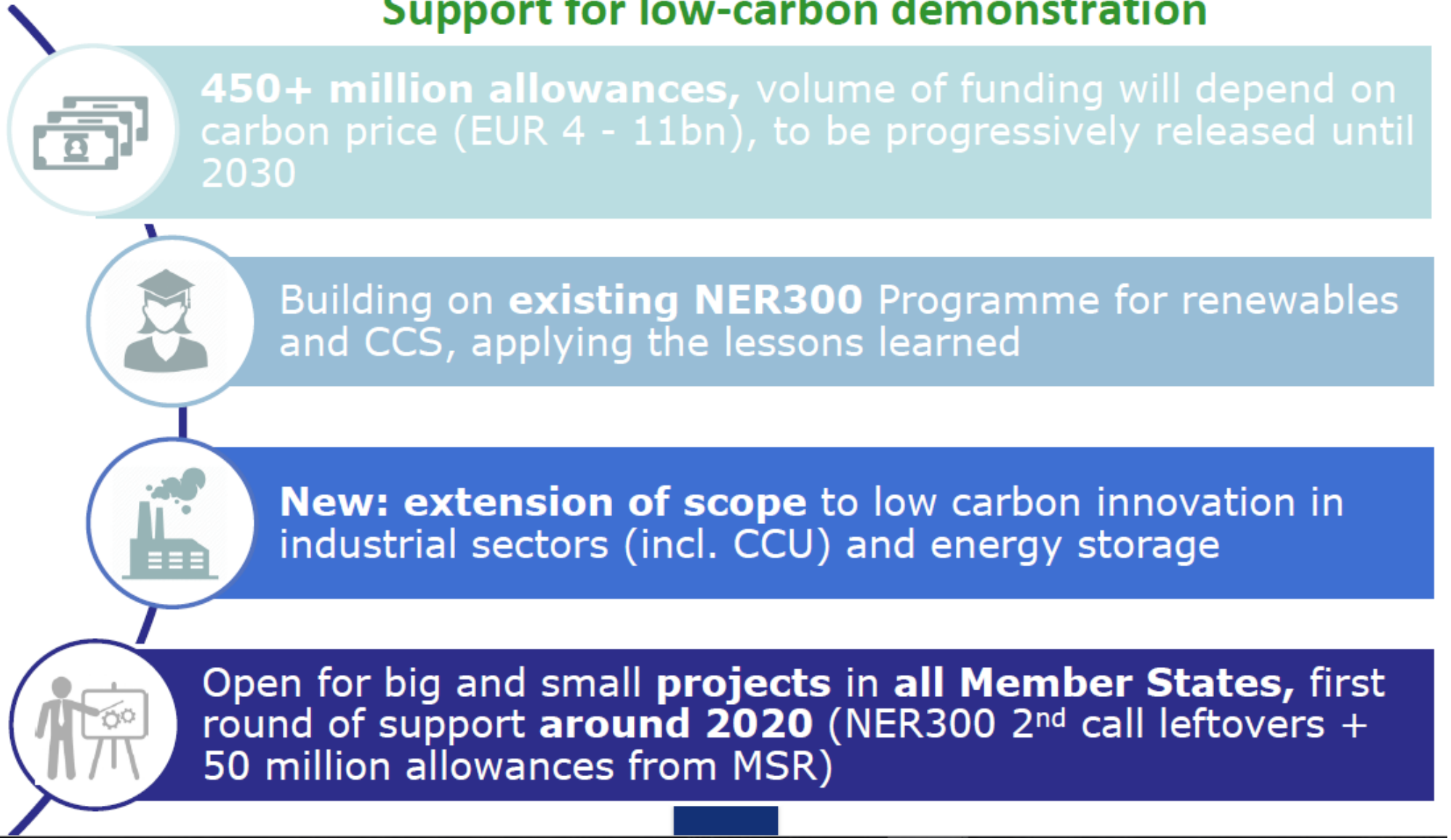
EU framework – EU ETS / Innovation Fund

Support for low-carbon demonstration



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Power	Storage / ancillary services	**Electricity Market Design Directive & Regulation**		Rapid response electrolysers + Sectoral Integration

EU framework – Electricity Market Design

Seen as key directive to unlock potential for Sectoral Integration (SI) including electricity and hydrogen

2 key aspects:

- Definition of energy storage
- Ownership of storage

Energy storage	Ownership of storage
means, in the electricity system, deferring an amount of the electricity that was generated to the moment of use, **either** as final energy **or** converted into another energy carrier.	TSO/DSO shall not be allowed to own, develop, manage or operate unless: a) No other party has come forward b) Necessity to fulfil duty under said directive c) Regulatory authority has approved

EU framework

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EU framework – Gas Market Regulation (next battlefield)

- Prepared now but presented end of 2019/beginning 2020
- It will be a Regulation and not a Directive
- **Content**:
  1. One part of the package will be mirroring the electricity market (retail).
  2. Another part of the package will mostly cover the future **content of the gas grids** => Hydrogen
- The Commission seems neutral when it comes to green or blue hydrogen. It's important that it is decarbonised

Objectives

Hydrogen Europe: Gas Grid WG -> Welcome to join!

- Acknowledgement of hydrogen production from the grid or storage as a value-adding component for the energy infrastructure
  = Remuneration mechanism for market players
- Legislation needs to harmonise fragmented regulation to introduce hydrogen into the natural gas network.

EU Legislative framework for Hydrogen

A positive regulatory framework for hydrogen requires 2 elements

2. Removing barriers that will hinder the deployment

→ HyLAW project

HyLaw - tackle barriers and inform the market

- HyLAW stands for Hydrogen Law and **removal of legal barriers** to the deployment of fuel cells and hydrogen applications
- The project started in January 2017 and is scheduled to end in December 2018
- The main objectives of HyLAW are twofold:

Policy	Market
Identify regulatory barriers (and best practices) and advocate for better regulation to support the uptake of fuel cell and hydrogen technologies	Document legal and administrative processes which apply when deploying key Hydrogen technologies (coherent, user friendly, online database)

HyLaw – Examples of barriers identified

Who: Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control

What: The Directive, with the aim to reduce harmful emissions, imposes a series of obligations on operators

Consequences: The Directive applies to the production of hydrogen (Annex I, point 4.2), irrespective of quantity or method (e.g. electrolysis) severely limiting the potential of HRS with on-site production (among other things)

Who: Lack of legislation (Regulatory Gap)

What: Despite national / private initiatives (DE, DK, BE) to certify “green” hydrogen. There is no binding or uniform guarantee certification system at European level

Consequences: The lack of a green hydrogen definition across the EU can be a barrier that will slow down the implementation of hydrogen if divergent approaches jeopardize the free movement of (green) Hydrogen across the EU.

HyLaw - inform the market (1)

- Work started on web portal and online database: www.hylaw.eu

Hydrogen Europe HyLAW Online Database

Start | Production | Localized | Permission Process | All countries | Search

STEP 1: SELECT CATEGORY | STEP 2: SELECT APPLICATION | STEP 3: SELECT LAP

Please select a category and application.

- PRODUCTION
- STATIONARY STORAGE
- LONG TERM STORAGE
- TRANSPORT
- INFRASTRUCTURE
- VEHICLES
- ELECTRICITY GRID ISSUES
- GAS GRID ISSUES
- STATIONERY POWER
- INDUSTRY

You can also select a country (optional)

HyLaw - inform the market (2)

Hydrogen Europe HyLAW Online Database

Start | Production | Localized | Permission Process | All countries | Search

STEP 1: SELECT CATEGORY | STEP 2: SELECT APPLICATION | STEP 3: SELECT LAP

Please select a category and application.

- PRODUCTION
- STATIONARY STORAGE
- LONG TERM STORAGE
- TRANSPORT
  - Road transport

    Road planning
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    Restriction of road transport
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    Permission process / requirements
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    Quantity and Pressure limitation
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  - H2 pipelines
- INFRASTRUCTURE

You can also select a country (optional)

HyLaw - inform the market (1)

STEP 4: PRODUCTION > LOCALIZED > PERMISSION PROCESS (2 COUNTRIES)

Permission Process

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	Belgium	Germany
What are the main regulations/requirements regarding land use plans for building a hydrogen production facility (e.g. Permission regime, agreement)?	One of the prerequisites is that the land is declared as land where such facilities can be constructed and further on – if all permissions requirements haven been fulfilled- operated.	Land use plans exist in Flanders on different levels: i.e. the region, province, municipality (GRUP, PRUP..). In principle, there are no general exclusions for hydrogen installations in the regional land use plans, they can be built in industrial or living area.
Are there specific requirements or zone prohibitions for building a hydrogen production facility in the land use plans?	Yes but there is no hydrogen facilities specific regulation. According to the Law of Environmental Protection and the municipal regulations industrial production facilities are allowed to be built only in industrial and commercial areas.	Yes but there is no hydrogen facilities specific regulation. According to the Law of Environmental Protection and the municipal regulations industrial production facilities are allowed to be built only in industrial and commercial areas.
Severity	severe	light
	Legislation Table	Legislation Table

Thank you! Questions?

Shift happens!

Hydrogen enables you.

Contacts

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