HyLaw Project - EU-level activities

Hydrogen, the enabler of a virtuous circle for deep decarbonisation

Jorgo Chatzimarkakis

Secretary General

September 2018

HyLaw National Workshop – Budapest, Hungary

The HyLAW project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 737977. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation programme, Hydrogen Europe and Hydrogen Europe Research

Grant Agreement No 737977

Hydrogen Europe and the Fuel Cell & Hydrogen Joint Undertaking

Hydrogen Europe
Industry

European Union represented by the European Commission

Hydrogen Europe
Research

A portfolio of clean, efficient and competitive solutions based on fuel cells and hydrogen technologies in **energy** and **transport**

The Hydrogen Initiative: Energy Ministers open new chapter

We, the signatories of this initiative, gathered in Linz, Austria, on the 17th and 18th of September 2018, collectively aim to maximise the great potentials of sustainable hydrogen technology for the decarbonisation of multiple sectors, the energy system and for the long-term energy security of the EU.
Linz, Austria 18 September 2018

Suddenly in the news all over the globe

World premiere: Alstom's hydrogen trains enter passenger service in Lower Saxony

„This is a revolution for @Alstom and for the #FutureOfMobility.

The world's first #hydrogen #fuelcell train is entering passenger service and is ready for serial production"

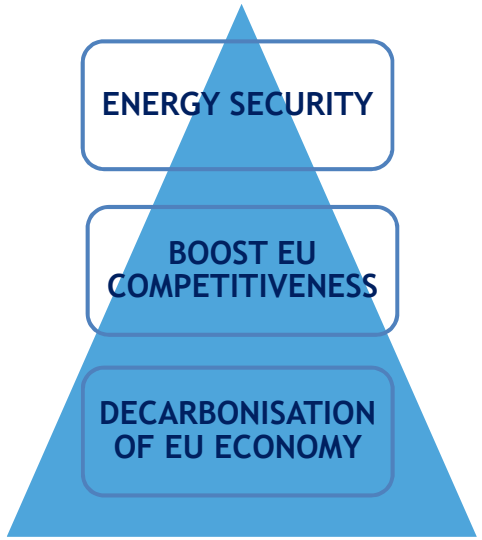
Henri Poupart-Lafarge, Chairman & CEO of Alstom

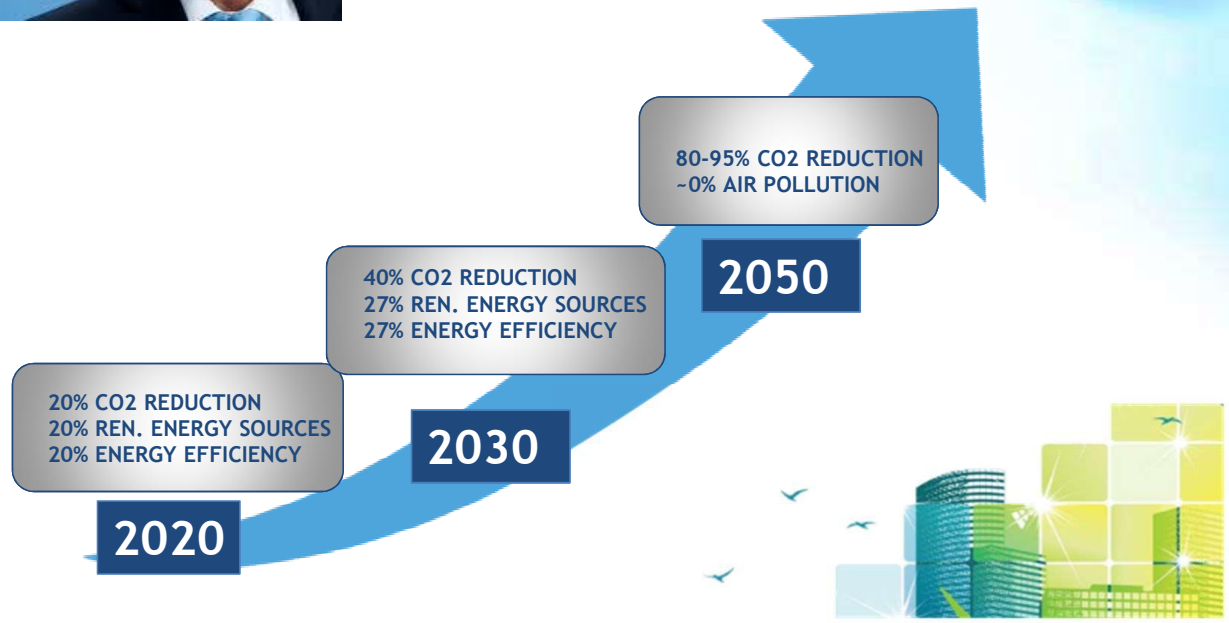
16 September 2018

The Challenge

EU CLIMATE AND ENERGY FRAMEWORK

"I want to reform and reorganise Europe's energy policy in a new European Energy Union."

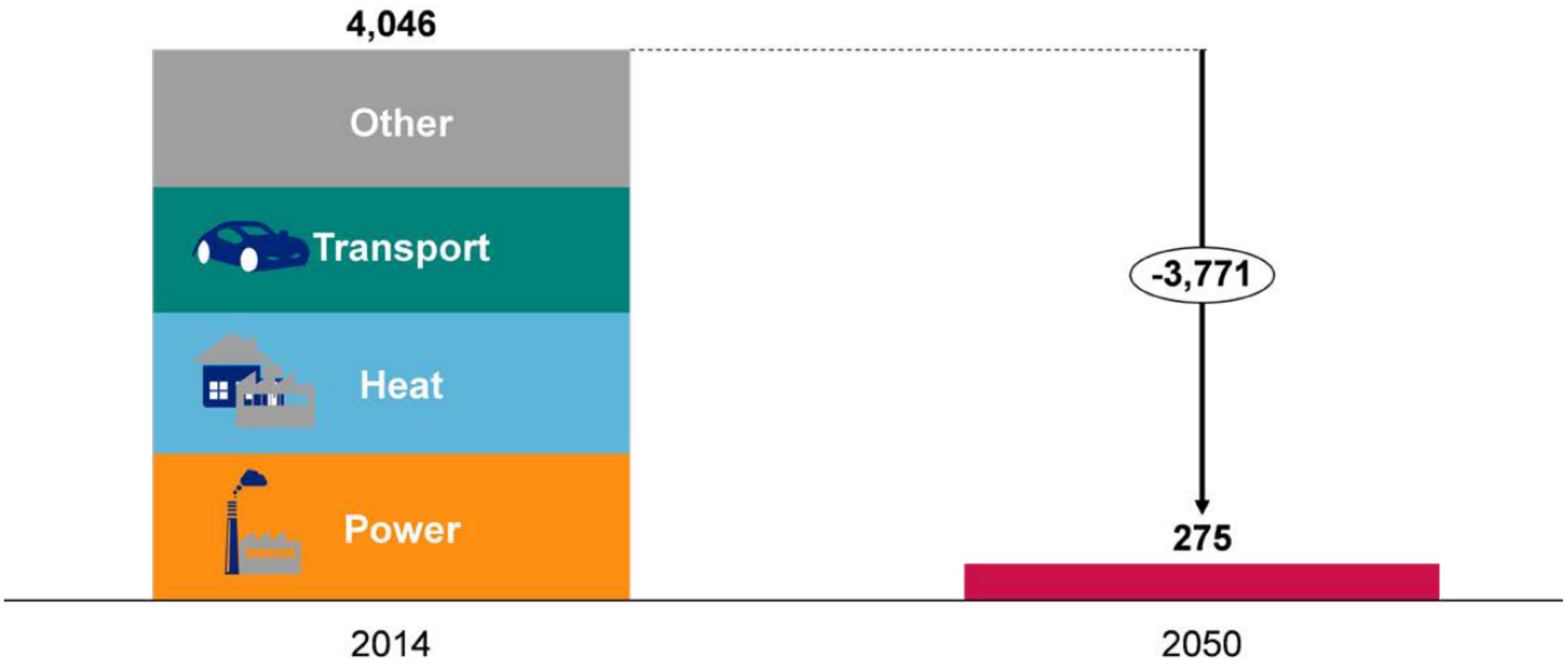




Source: European Commission

The Problem

FIGURE 1 – THE SCALE OF EUROPE'S DECARBONISATION PROBLEM ($MtCO_2e$)



Source: 2016 National Inventory Submissions (Common Reporting Format) for EU, Norway and Switzerland.

Source: Poyry point of view, fully decarbonising europe's energy system by 2050, May 2018

The Solution

Enable the renewable energy system → Decarbonize end uses

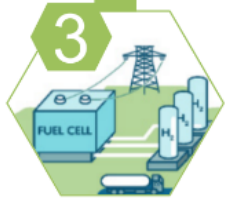
Enable **large-scale renewables integration** and **power generation**

1

Distribute energy across sectors and regions

2

3



Act as a **buffer** to increase system resilience

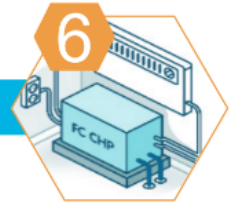
4

Help decarbonize **transportation**

5

Help decarbonize **industrial energy** use

6



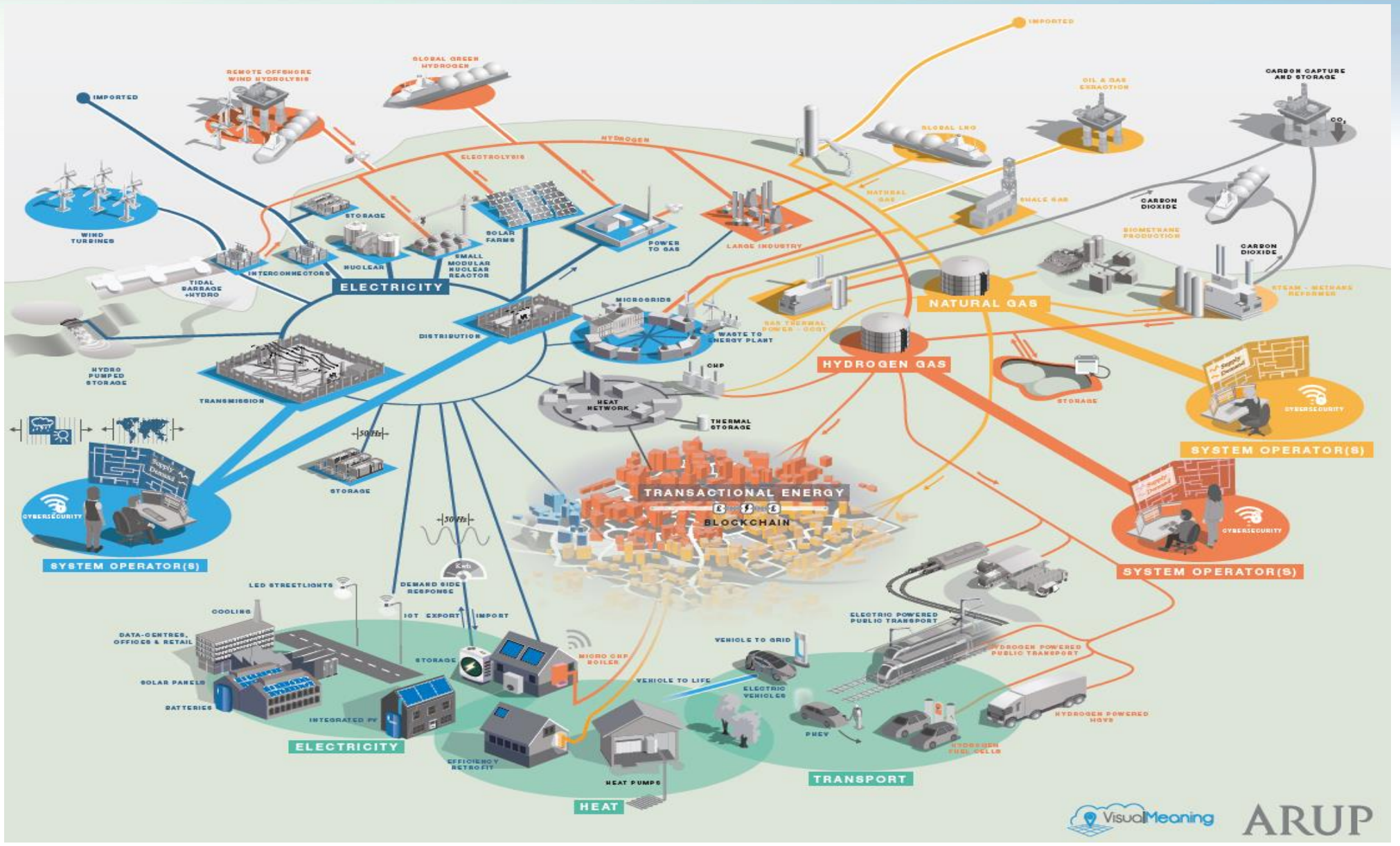
Help decarbonize **building heat and power**

7

Serve as renewable **feedstock**

Source: Hydrogen Council

Sector coupling & sectoral integration



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

Hydrogen in European Policies

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	CEF Transport	-H2 as a fuel -H2 made fuels -green hydrogen for refineries
Energy-intensive industries	Decarbonisation	EU ETS	Modernisation Fund / Innovation Fund	Green/Decarbonised hydrogen as feedstock switch
Gas/Heating	Decarbonisation (to remain a player)	(1. RED (2)) 2. Upcoming Gas Regulation (2019/2020)	Possibly CEF Energy	1. Green/Decarbonised hydrogen as feedstock 2. Fuel cell as energy converter
Power	Storage / ancillary services	Electricity Market Design Directive / Regulation		Rapid response electrolysers + Sectoral Integration

Market through legislation – Example:

Renewable Energy Directive 2021-2030:

"Renewable liquid and gaseous transport fuels of non-biological origin shall also be taken into account when these are used as ***intermediate product*** *for the production of conventional fuels."*

Shell's Rhineland Refinery, REFHYNE project

$\Rightarrow$ 10 GW of electrolysis (8760 h) ~27 GW (3000 h)

Sources: Morgan Stanley, Global Hydrogen – A US$2.5 trillion industry? (July 2018)
LBST/Hinico, Short term and long term opportunities to leverage synergies between the electricity and transport sectors through power-to-hydrogen (2016).

Legal & administrative processes hamper the uptake of FCH technologies

Today: Increasing deployment and appetite for fuel cells and hydrogen technologies across Europe:

more products better performance, reduced cost.

BUT :

Existing regulatory legal framework e.g. planning, safety, installation, operation – often only reflect conventional technology and is therefore insufficient

Non adapted measures - additional costs and time, resource intensive… For ex. lengthy and costly permitting requirements to install a hydrogen refuelling station in most European countries

This represents a barrier to scale up fuel cell and hydrogen deployment

Identify 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

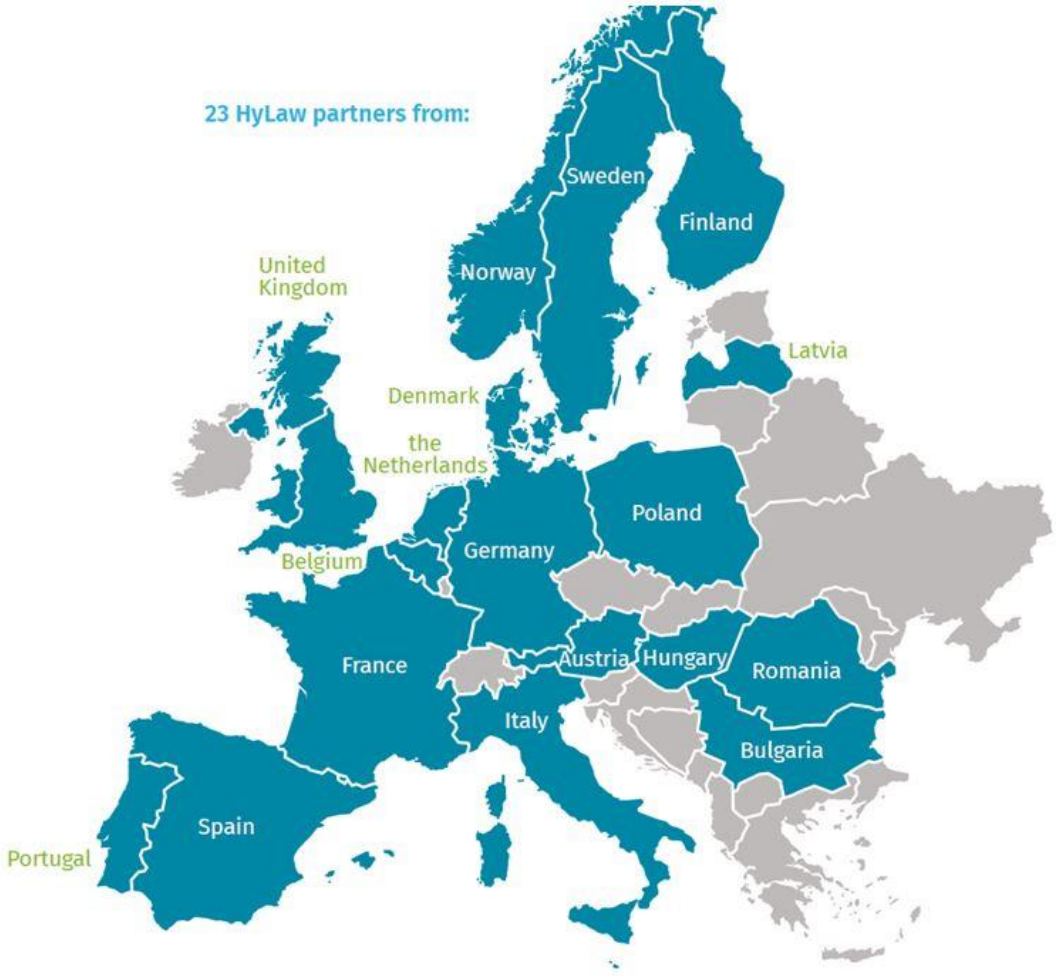
The main objectives of HyLAW are twofold:

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)

Geographical coverage

HyLaw's covered 17 EU Countries + Norway.

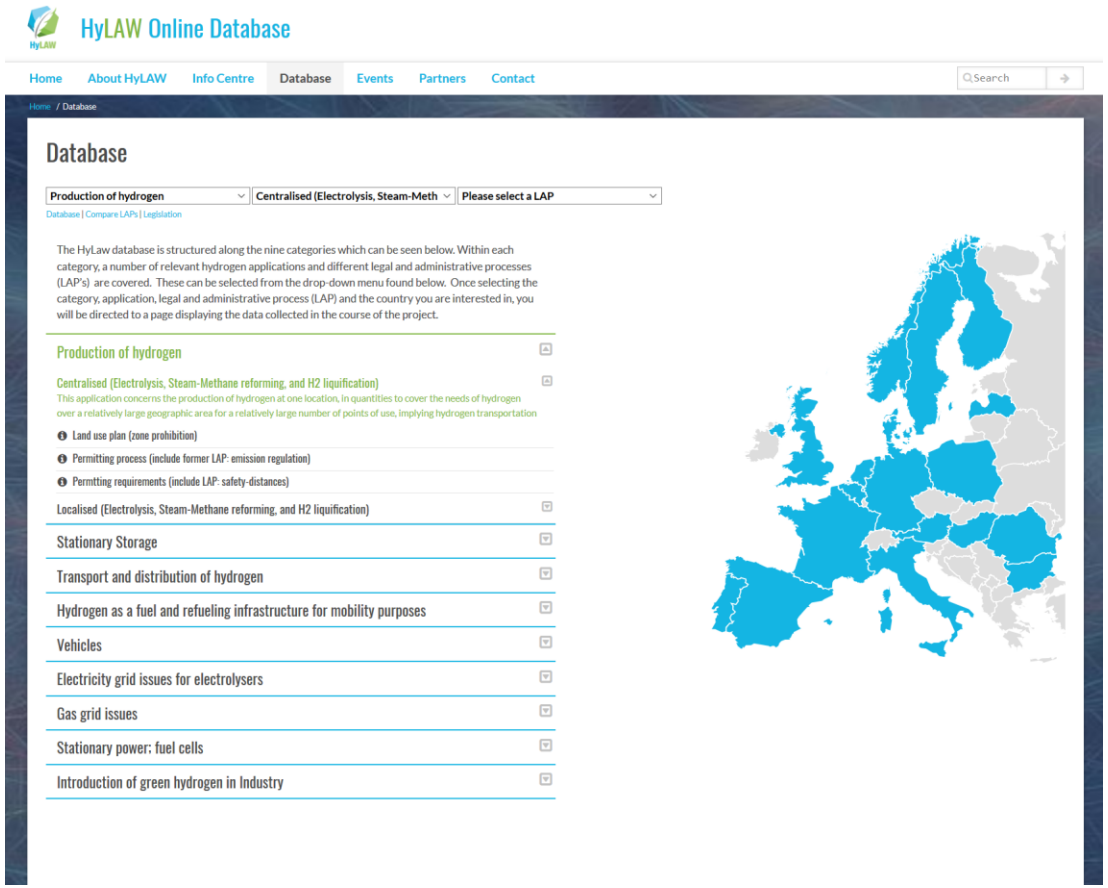
23 Partners contributed to the work, providing details on the legal and administrative processes applicable in their countries

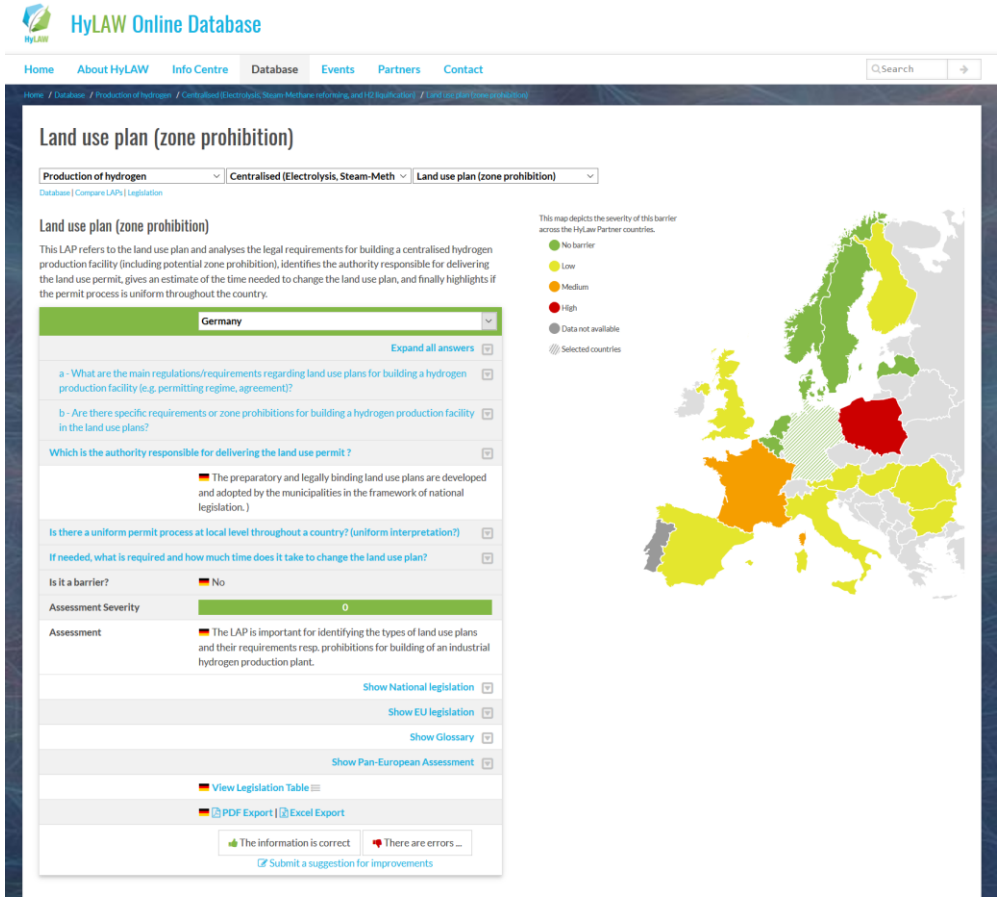


Online Database Preview

Website ready: **www.Hylaw.eu**

Database is online on www.hylaw.eu/database and contains information and comparative assessments across various European Countries





In addition to the database

A detailed **cross-country analysis** of all legal and administrative barriers identified by the project

For each process covered by the study:

- Presentation of the problem
- Assessment of root causes
- Recommendations

A **list of legal barriers**, prioritized by degree of severity (Estimated Mid-October)

A List of the **most relevant EU legislation applicable** to hydrogen technology deployment (available now: www.hylaw.eu/info-centre)

Additionally:

Policy papers (condensed and refined key messages and recommendations to policy makers)

- National Policy Papers for each country (Estimated September – October)
- Horizontal (for each application) policy papers (estimated Mid-October)
- EU Policy paper (Estimated End-October)

Dissemination and Recommendations

All planned events: www.Hylaw.eu/events

Contact organizer if interested in participating, you are welcome!

EU Workshop

A HyLaw EU workshop is scheduled to take place in Brussels on the **6th of December 2018** – for details, contact Alexandru Floristean: a.floristean@hydrogeneurope.eu.

Country	City	Location	Date	Contact Person	Contact Email
EU	Brussels	Hydrogen Europe, Avenue de la Toison d' Or 56- 60	06/12/2018	Alexandru Floristean	a.floristean@hydrogeneurope.eu

National Workshops

A key national workshop will be organised in each country to present the results of the HyLaw project . Please check below for a schedule of events.

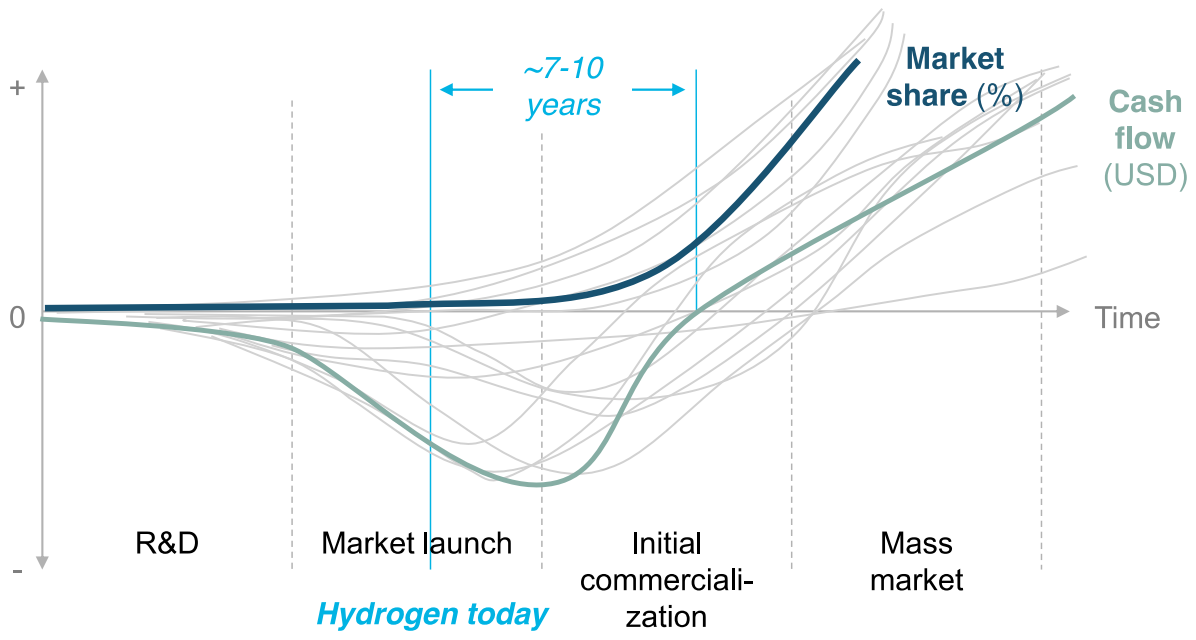
Country	City	Location	Date	Contact Person	Contact Email
AT	Vienna	AEA Executive Committee	06/11/2018	Alfred Schuch	Alfred.Schuch@energyagency.at
BE	Brussels	Avenue de la Toison d' Or 56- 60	23/10/2018	Isabel Francois	isabel.francois@waterstofnet.eu
BG	Sofia	Sofia	06/11/2018	Daria Vladikova	d.vladikova@bas.bg
DK	Copenhagen	Danish Energy Association	25/09/2018	Chris Holst Preuss	TLJ@brintbranchen.dk
FI	Espoo	Dedicated Hydrogen Seminar	07/11/2018	Mikko Kotisaari	mikko.kotisaari@vtt.fi
FR	Paris	To be announced	06/11/2018	Christelle Werquin	Christelle.werquin@afhypac.org
DE	Berlin	Dedicated Workshop	08/11/2018	Dennitsa Nozharova	dennitsa.nozharova@encon-europe.de
HU	Budapest	MTA TTK building, XI.district Budapest, Magyar Tudósok krt. 2.	27/09/2018	Mayer Zoltan	mayer.zoltan@hfc-hungary.org
IT	Milan	National Forum on FC&H technologies, 2018	25/10/2018	Viviana Cigolotti	viviana.cigolotti@enea.it
LV	Riga	The Environment and Energy trade fair	19-21/10/2018	Dainis Boss	dainis@h2lv.eu
NL	The Hague	Dedicated HyLaw Workshop	09/11/2018	Remco Perotti	remco.perotti@nen.nl
NO	Oslo	To be announced	16/10/2018	Heidi Bull-Berg	Heidi.bull-berg@sintef.no
PL	Warshaw	HyLaw National Workshop	21/11/2018	Marcin Blesznowski	marcin.blesznowski@ien.com.pl
PT	Lisbon	To be announced	01/10/2018	Ana Andre	Anaandre@sti-tec.net
RO	Băile Govora, Vâlcea	Energy Storage Symposium	24-26/10/2018	Ioan Iordache	office@h2romania.ro
ES	Madrid	CDTI (Centro para el Desarrollo Tecnológico Industrial)	18/09/2018	Miguel Zarzuela	mzarzuela@hidrogenoaragon.org
SE	Stockholm	Hydrogen Sweden | Vätgas Sverige	15/11/2018	Bjorn Aronsson	bjorn.aronsson@vatgas.se
UK	London	London City Hall	08/11/2018	Emma Fenton	Emma.Fenton@london.gov.uk

How to enhance market development?

In order to reach this target investments are needed now

PRELIMINARY
ILLUSTRATIVE

Hydrogen technologies are ready to be launched and scaled up…



…requiring significant investments in manufacturing facilities and infrastructure

USD billion, 2018-2030

240 bn — **Infrastructure investments (project finance, corporate debt..)**
Hydrogen production, hydrogen refueling stations, distribution (liquefaction plants, shipping, trucks, pipelines)

215 bn — **Scaling up manufacturing (corporate debt..)**
Scaling up manufacturing for fuel cell and components, new R&D for components and new models

20+ bn — **New business (venture capital/equity)**
Investments in end-use applications, e.g., FCEV taxi and truck fleets, financing of CHPs in buildings, …

SOURCE: Hydrogen Council

Why we need to continue R&D?

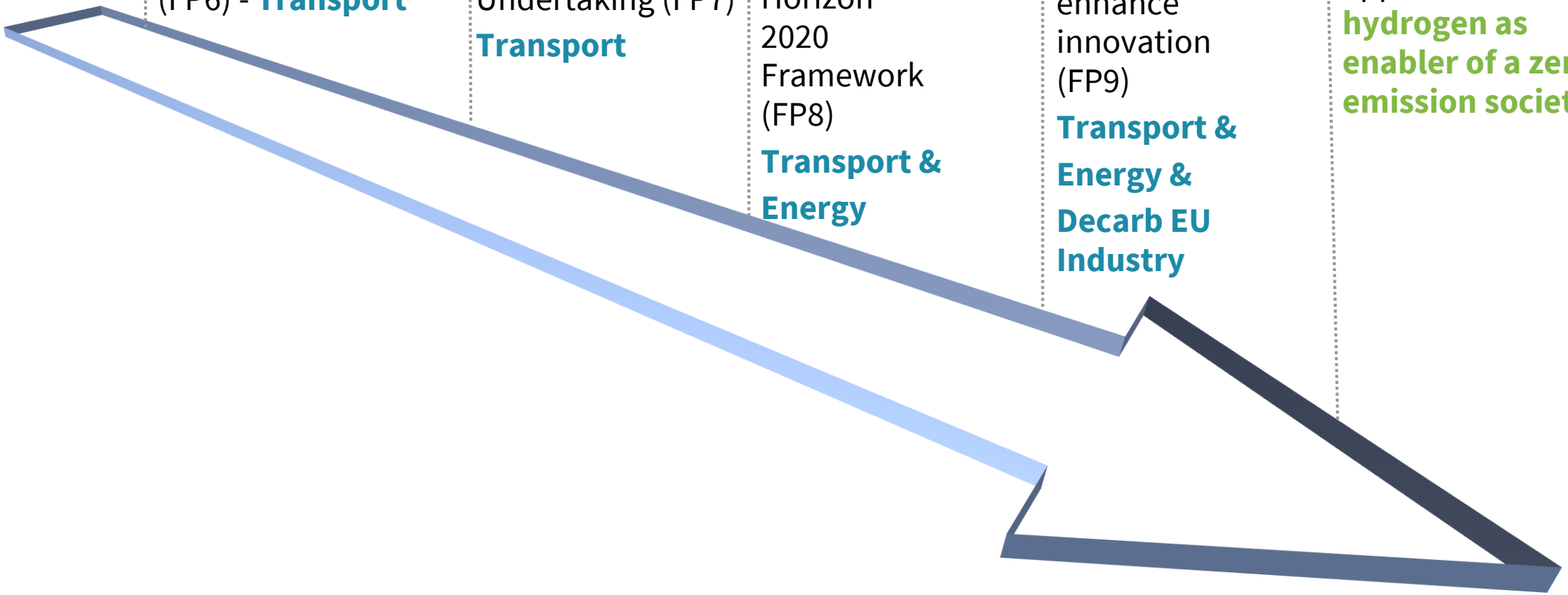
2006
European Hydrogen and Fuel Cell Technology Platform (FP6) - **Transport**

2008
Establishment of the Fuel Cell and Hydrogen Joint Undertaking (FP7)
Transport

2014
Continue the FCH JU under Horizon 2020 Framework (FP8)
Transport & Energy

2018
EU to decide about future of tools to enhance innovation (FP9)
Transport & Energy & Decarb EU Industry

2020
Start of a new approach to use **hydrogen as enabler of a zero-emission society**



Why we need to continue R&D?

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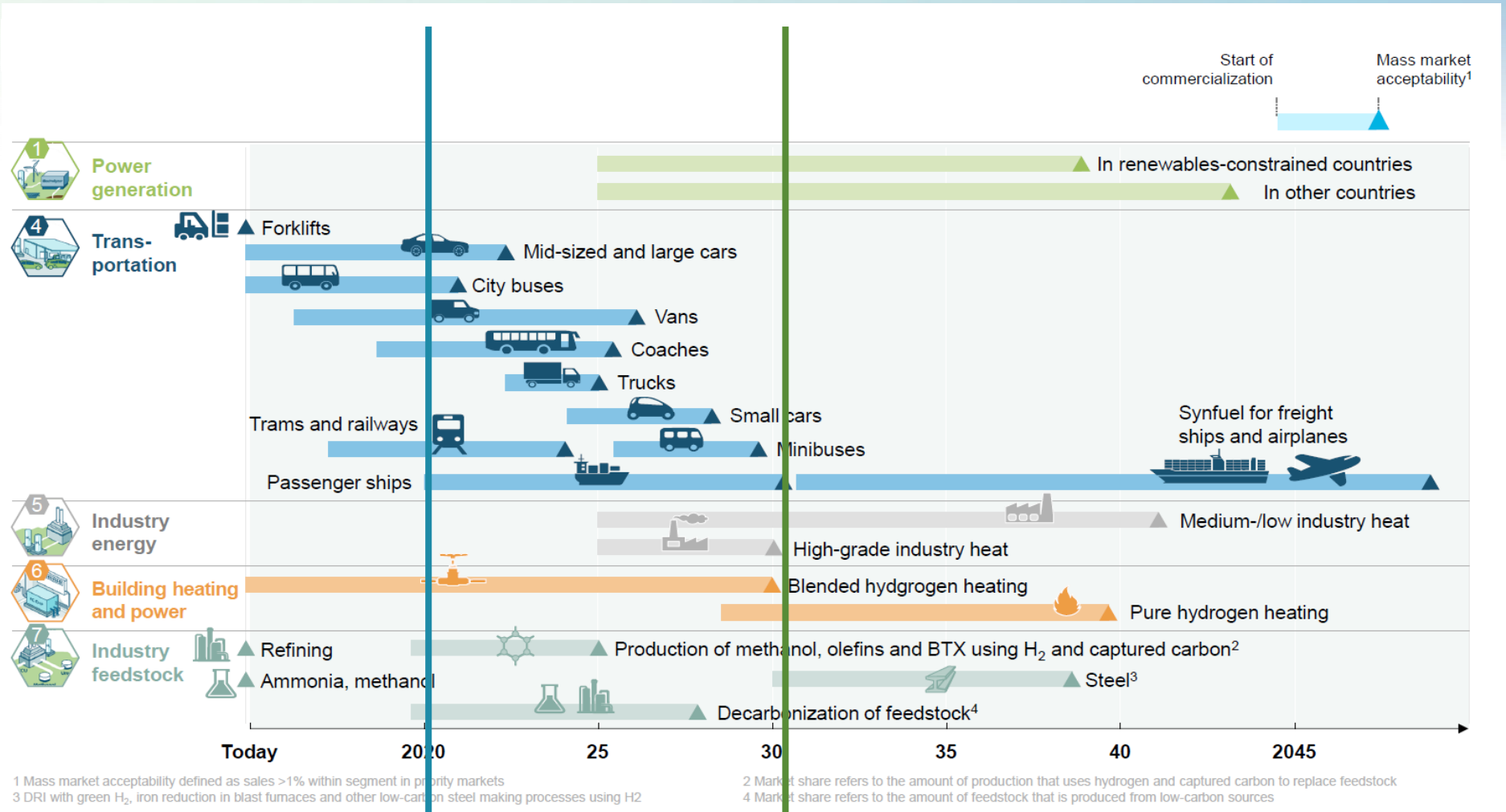

Achievements of FCH 2

Ambitions for Horizon Europe

THANK YOU!

Questions?

Contacts

Hydrogen Europe

Av. de la Toison d'Or 56-60, BE-1060 Brussels

Twitter: @H2Europe

Jorgo Chatzimarkakis

Secretary General

E-mail: j.chatzimarkakis@hydrogeneurope.eu

Tel.: +32 2 540 87 75

www.hydrogeneurope.eu

Alexandru Floristean

Project and Legal Officer

E-mail: a.floristean@hydrogeneurope.eu

Tel.: +32 2 540 87 75

www.hydrogeneurope.eu

HyLAW

Hydrogen law

Grant Agreement No 737977