

International Conference on Mobility Challenges

The role of European and national funding bodies in the development of the first large-scale hydrogen mobility projects

December 9th, 2021

elementenergy
an ERM Group company

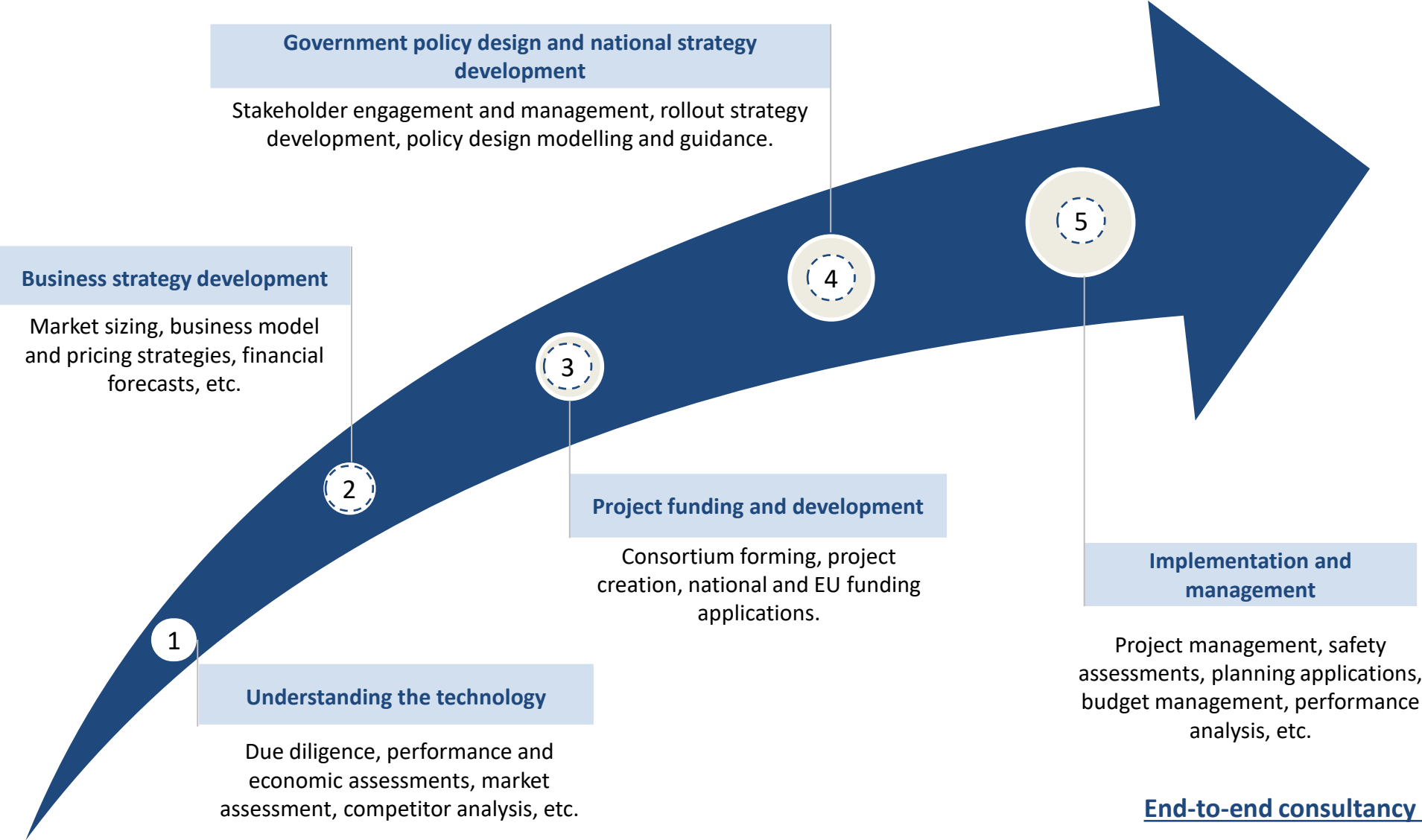
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Introduction

Overview of European and national funding bodies

Two flagship hydrogen mobility projects

Element Energy have been providing consultancy and management services at all points along the hydrogen technology value chain since formation in 2003



Element Energy (EE) has initiated or is involved in the flagship hydrogen mobility deployment projects to date in Europe

Hydrogen mobility projects initiated by Element Energy

Project

Target



180 high use fleet vehicles in
Paris, London and Copenhagen



1 400 cars and vans
45 HRS



306 buses
18 cities and regions



16 long haul heavy duty trucks
4 locations



600 fuel cell buses
3 locations

Other H₂ mobility projects supported by EE

Project

Target



16 refuse trucks
4 locations



EU wide roll-out of H₂
trucks and infrastructure



Support for H₂ mobility
industry groupings

+ others and more in development...

EE has been acquired by ERM the world's largest pure play environmental, health and safety, risk and sustainability consultancy

Introduction to ERM



History

Leading sustainability consultancy providing environment, social and governance services for 40+ years to global corporate clients and the financial services industry



People

Unique blend of 5,500 staff i.e. technical, strategy, commercial and financial experience, in over 160 offices in 40 countries



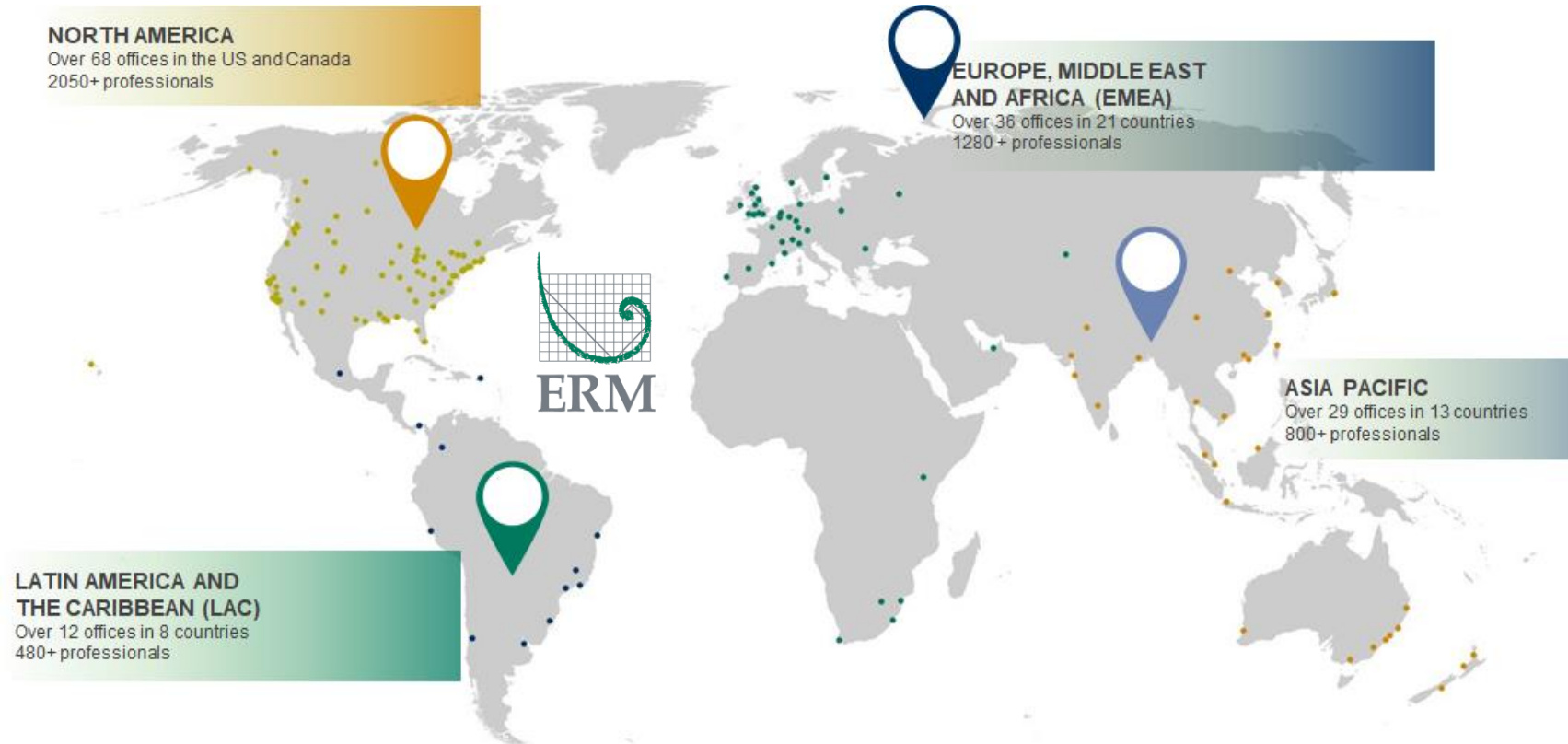
Sustainability Services

We understand business and provide transaction and financing environmental and social risk management support, at the assessment and implementation stages



Thought Leader

Based on over 10 years of climate change scenario analysis, we supported the Taskforce on Climate-related Financial Disclosure to develop its recommendations for applying scenarios



With EE and ERM's combined skills, experience and expertise we are now supporting hydrogen project development globally

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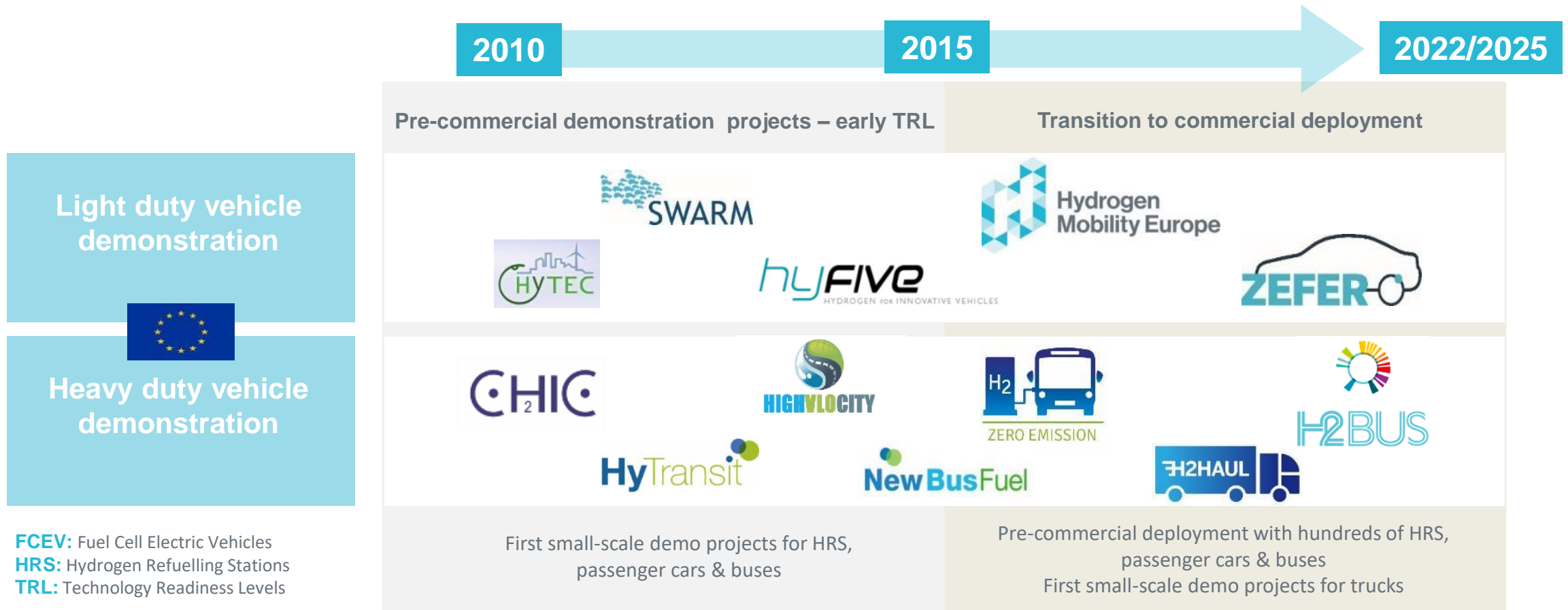
European public funding bodies

National public funding bodies

Two flagship hydrogen mobility projects

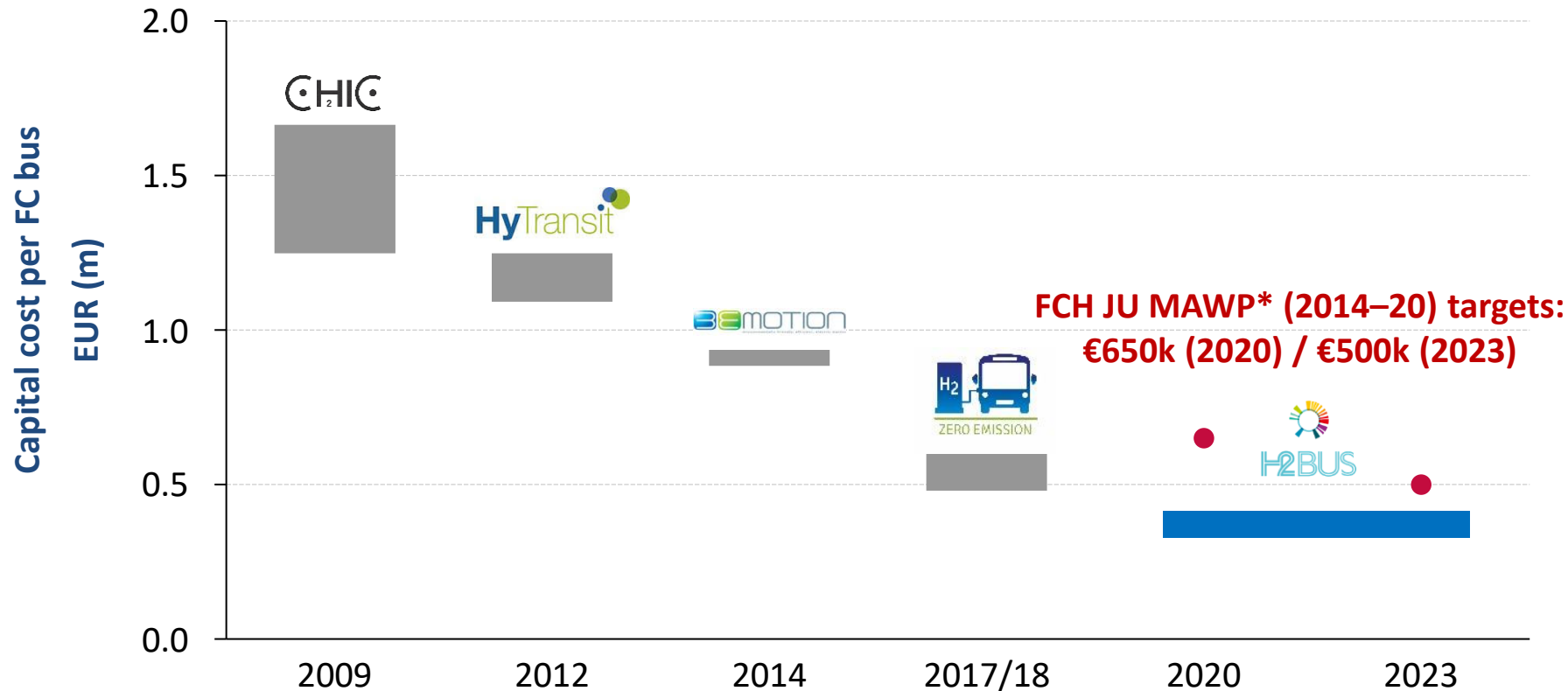
To date, the FCH JU has funded the majority of R&D and demonstration projects for light duty and heavy-duty vehicles

- To date, the **Fuel Cells and Hydrogen Joint Undertaking** (FCH JU) has funded most of **the R&D and demonstration projects**.
- The **successive projects** have progressed **towards pre-commercialisation levels**.



A quick focus on buses helps us to understand the impact of these demonstration projects on the industry : they enable a significant acceleration of the market

Capital costs of fuel cell buses ordered in different years (non-articulated single deck buses)



*Post-2020: Some OEMs considering commercial rollout indicate capital costs of <€375k/bus are possible, assuming orders of 100 buses per year and continuity of demand.

Between 2010 and 2020 capital costs of fuel cell buses **fell by more than 300%**, further reductions are needed for commercially viable offers and large-scale deployments in France, and in Europe

As the hydrogen industry matures, European funding bodies are adapting their support schemes, with a greater focus on production and HRS at the European level

First European support schemes were designed to support complete hydrogen ecosystems



Funding scopes used to include different parts of the value chain, sometimes from production to vehicles, in order to enable the development of complete hydrogen ecosystem



Recently released European Calls suggest a greater focus on developing H₂ production and the infrastructure network



Although some European Calls still support vehicles for specific applications (e.g. port vehicles in the new CEF), the focus seems to be increasingly on infrastructure support

Introduction

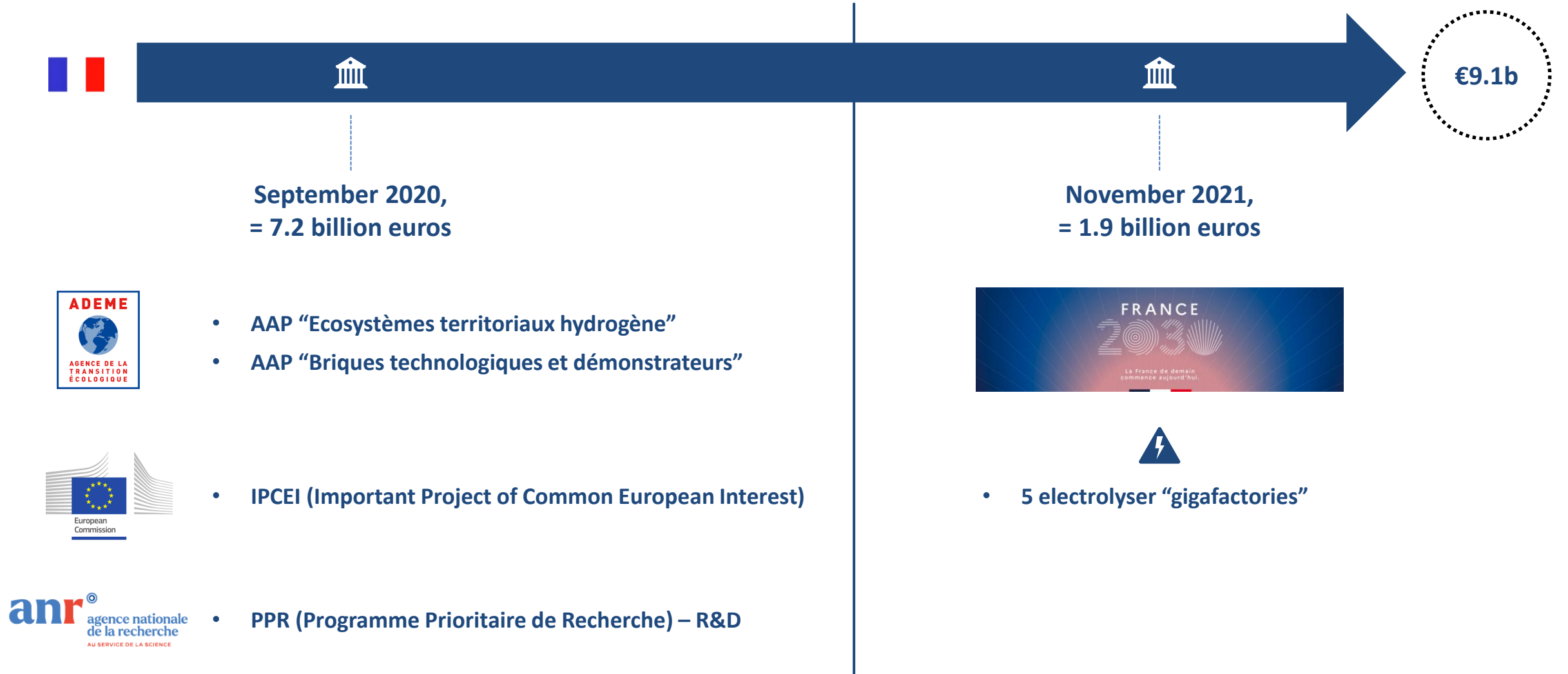
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European public funding bodies

National public funding bodies

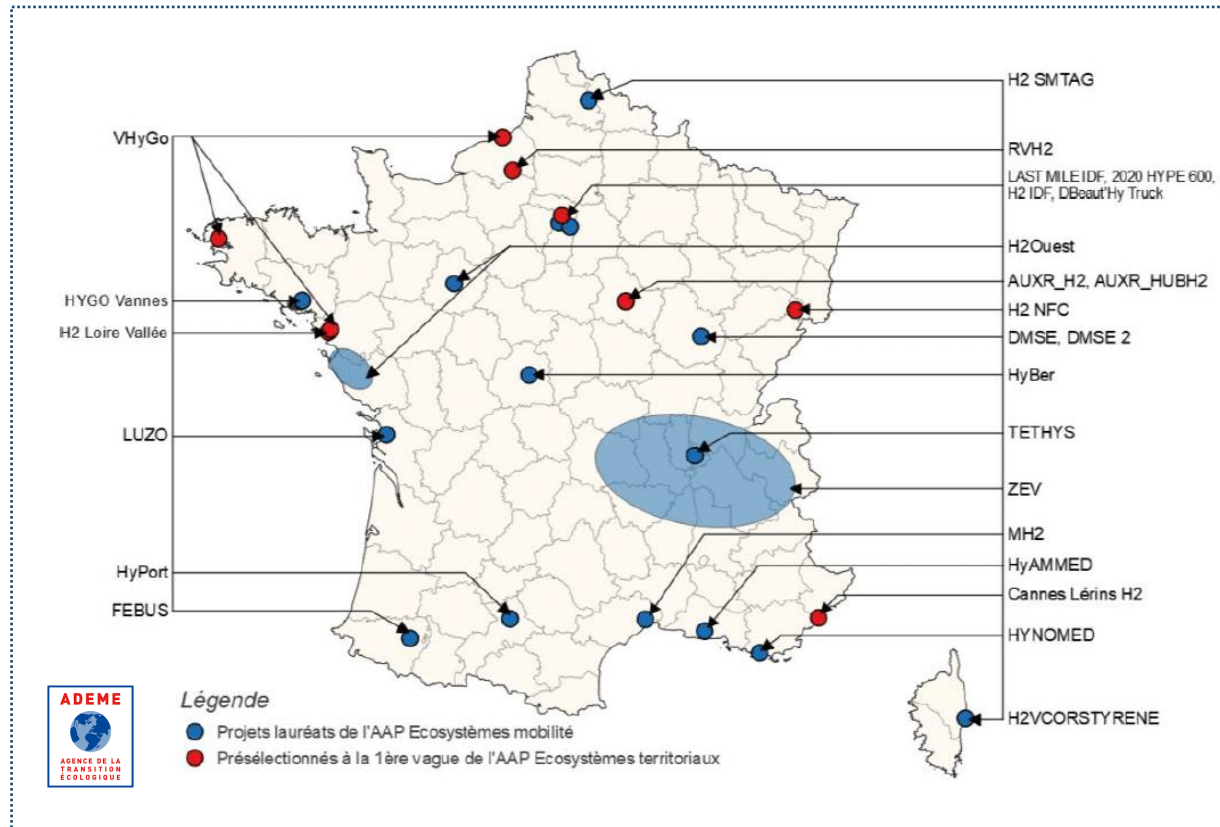
Two flagship hydrogen mobility projects

France has one of the most ambitious strategies at the European level regarding the development of renewable hydrogen



The ADEME Call for proposals “Ecosystèmes territoriaux hydrogène” supports the development of complete hydrogen ecosystem, from production to all applications

Hydrogen projects supported by ADEME



- ADEME calls are designed to support complete hydrogen ecosystems at the local level. The ambition is to create the conditions to develop a viable market.
- All the components of the value chain can be funded with the scheme (with the exception of renewable electricity generation¹):
 - ☐ Production (electrolysers);
 - ☐ Distribution (HRS, trailers, etc.);
 - ☐ Applications (vehicles, stationary equipment, etc.).
- Combination with European fundings possible, subject to state-aid limits.

(1) Renewable electricity generation can be funded in areas that are not connected to the national grid

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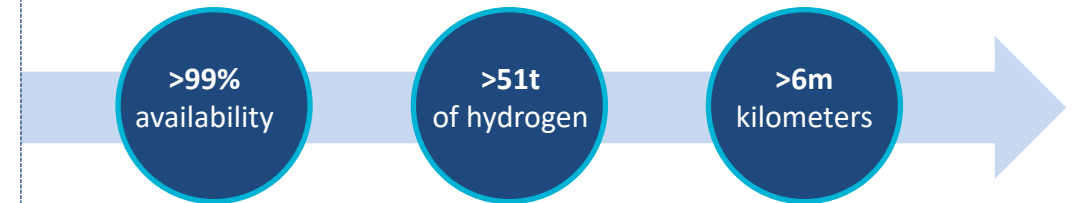
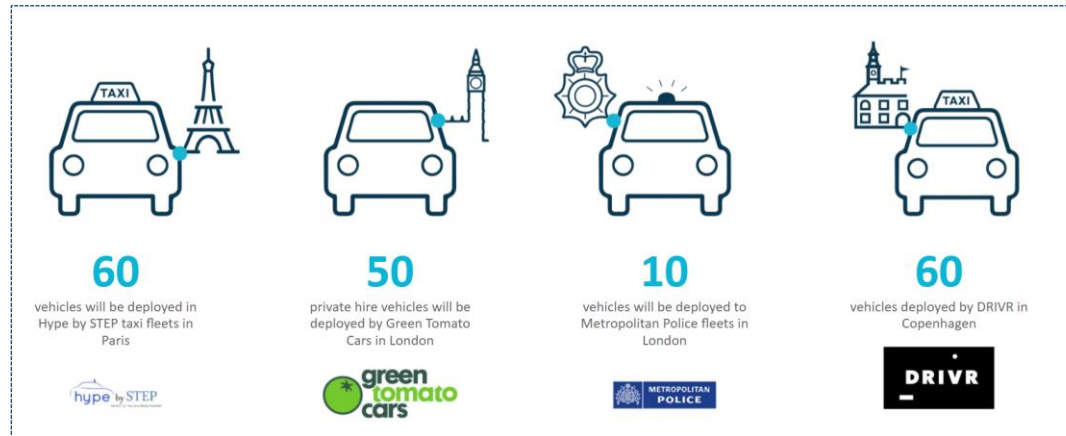
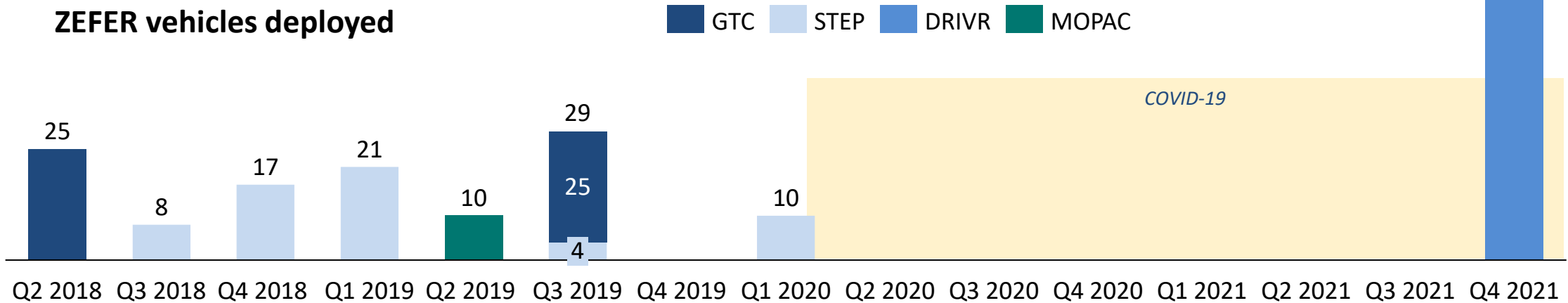
ZEFER and HYPE

Corridor H2

ZEFER aims to demonstrate viable business cases for captive fleets of FCEVs with 180 cars deployed in 3 countries



ZEFER vehicles deployed



Even with decreasing vehicle costs, national and regional grants are needed to further reduce the cost premium of the FCEVs

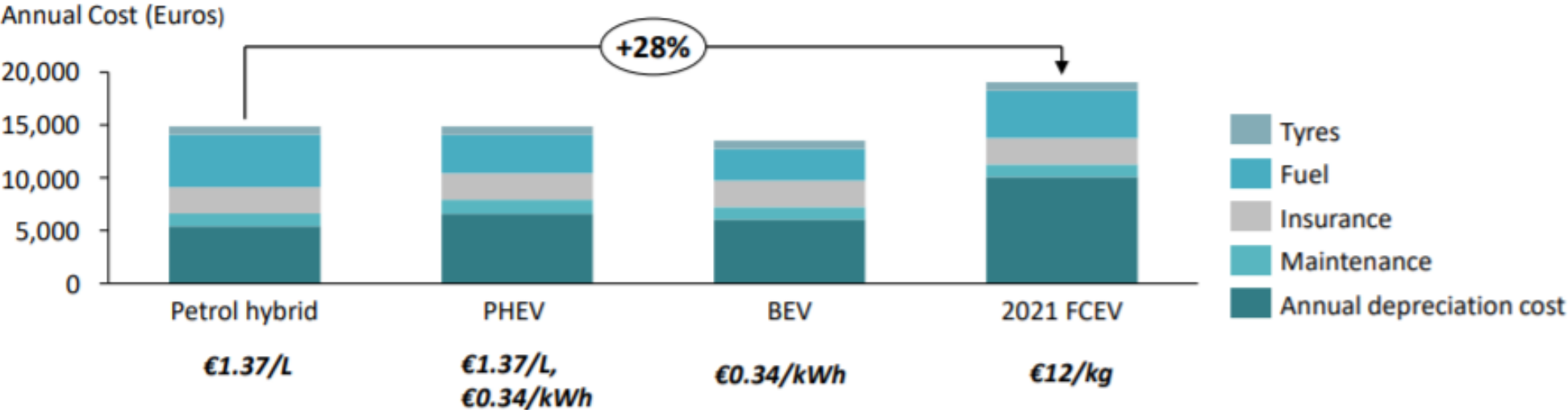


Mirai 1st generation
from €79K



Mirai 2nd generation
from €68K

Taxi TCO compared to alternatives (€/year)
45 000 km annual mileage, 3 year ownership beginning in 2021



In France, HYPE successfully mobilised European and national fundings to accelerate the deployment of the biggest FCEVs taxi fleet in Paris



~150 vehicles
deployed in Paris

>8,2 million
kilometers

>1,2 million
passengers

French and European public support



Large scale follow-on projects are emerging across Europe in taxi applications

Jan 26, 2021 - 09:48 pm

HysetCo moves to run 600 hydrogen cabs in Paris

AIR LIQUIDE FCEV FRANCE HYPE HYSETCO PARIS SLOTA STEP TOYOTA



Paris will eventually see 600 fuel cell taxis. The long-running project, which just acquired the cab operator Slota and plans to replace its fleet with the Toyota Mirai gradually. They also plan to build refueling stations this year.

The company has been on the scene. We first reported on the project when Air Liquide, Idex, Société du Taxi Électrique and Toyota launched the joint venture. Back then, they committed to

Madrid to replace 1,000 cabs with hydrogen fuel cell taxis

09/07/2021

The taxi association Federación Profesional del Taxi de Madrid (FPTM) wants to replace at least 1,000 internal combustion vehicles with fuel-cell-electric taxis in the Spanish capital by 2026 and build the corresponding hydrogen infrastructure including production.

Madrid is to see the first FCEVs for hire hitting the road in 2022. FPTM is joined in the effort by Toyota, Madrileña Red de Gas, Fotowatio Renewable Ventures (FRV), Grupo Ruiz and PwC, which involves 100 million euros. The investment includes fleet vehicles and charging infrastructure, known as “hidrogeneras.”

Hydrogen retail stations in Copenhagen

- enabling ZE transport for FC Taxis

Copenhagen has a clear ambition to be a leader within Carbon neutral cities. It is a privilege for Everfuel to support the ZE ambition of Copenhagen. Everfuel currently services a FCEV's taxi fleet with green hydrogen at the current two retail Hydrogen Stations. The solution is so successful and demand for FCEV taxis so big, that Everfuel is currently constructing a high-capacity station in Copenhagen to meet the demand. This station can support +150 FCEV taxis and as all Copenhagen taxis turn to ZE, the station will soon be followed by more stations to make the choice for taxi drivers easy.

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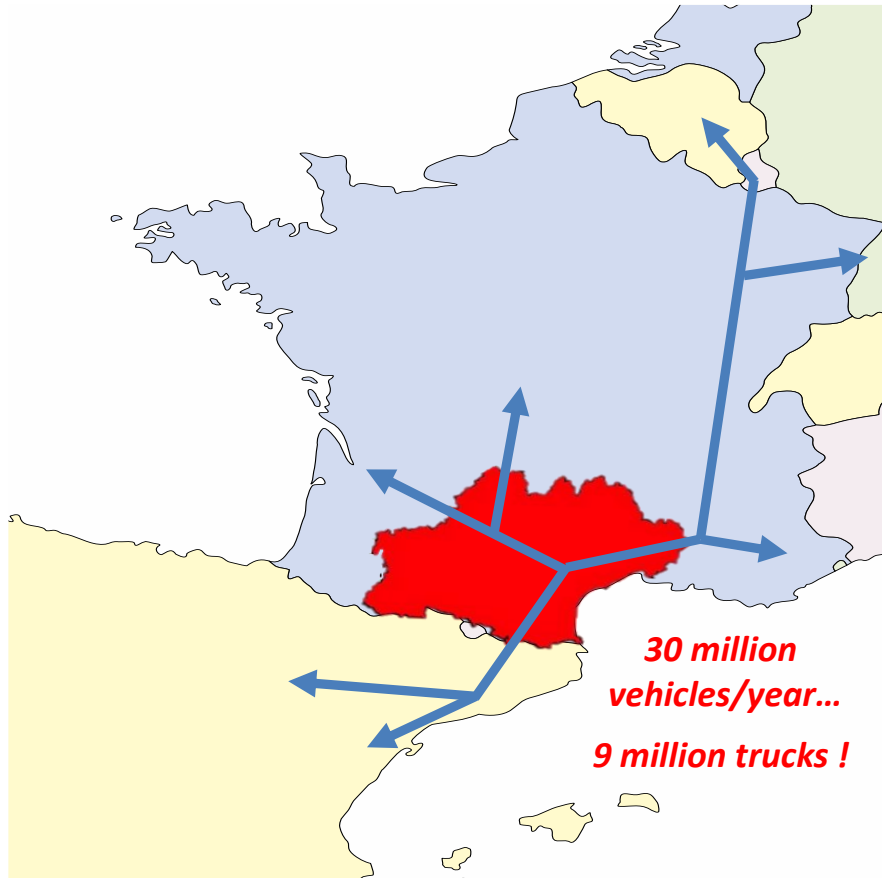
Corridor H2

The Corridor H2 project is successfully driven by the public sector since day one

- Project developed and financed by Occitanie Region as part of their hydrogen strategy
- Project dates: **beginning 2021 – end 2023**
- Total project budget (private & public) : **109 M€**
- EIB funding : **40 M€**
- CEF funding : **14,5 M€**
- Partners: **Public entities / H2 Producers / H2 distributors / H2 trucks – refrigerated trailer and coach suppliers / Logistic operators**



The Corridor H2 project aims to decarbonize heavy-duty mobility in the Occitanie region but also on major European corridors



Project anchor : **Occitanie**

First Cluster of a
wider European network

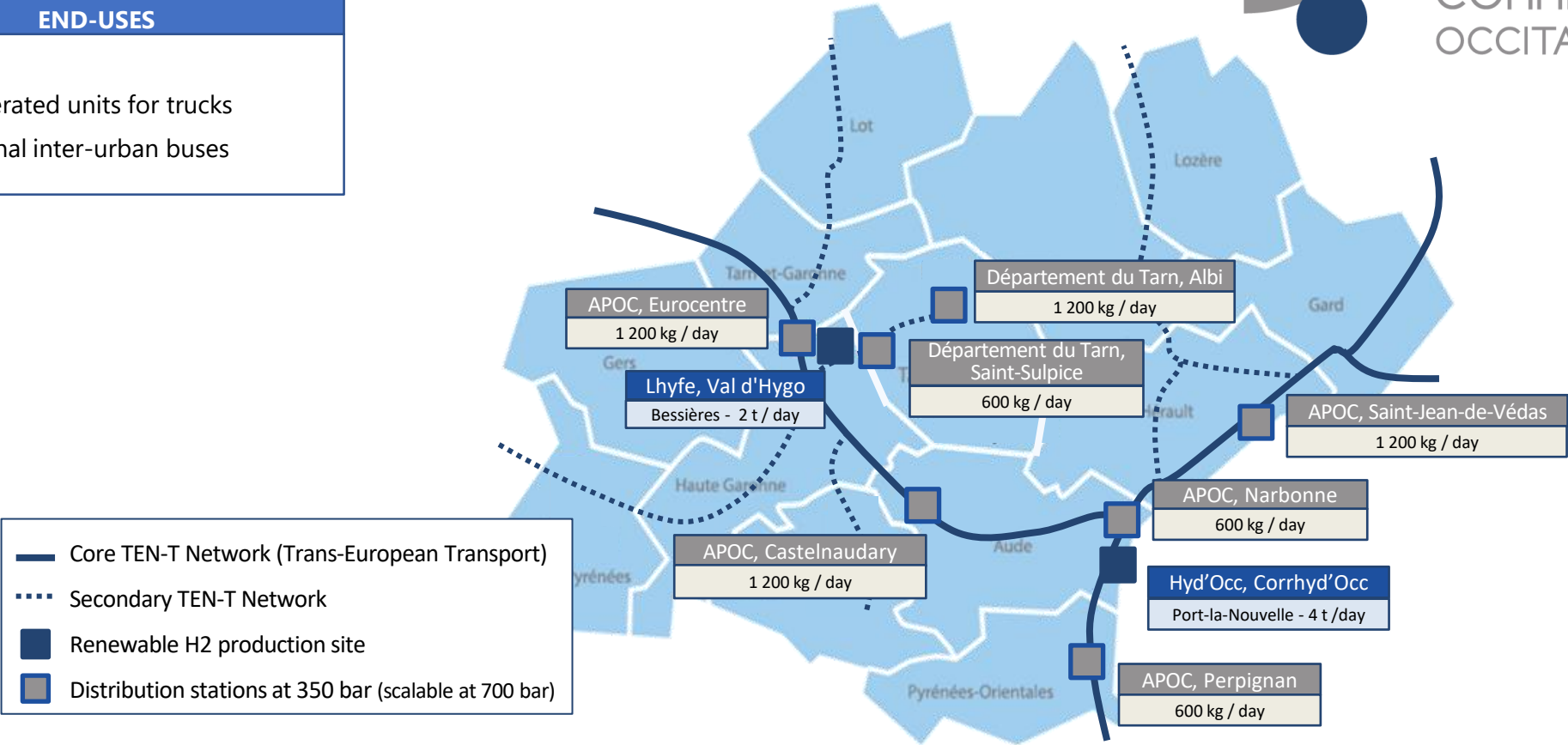


Next targeted connecting regions

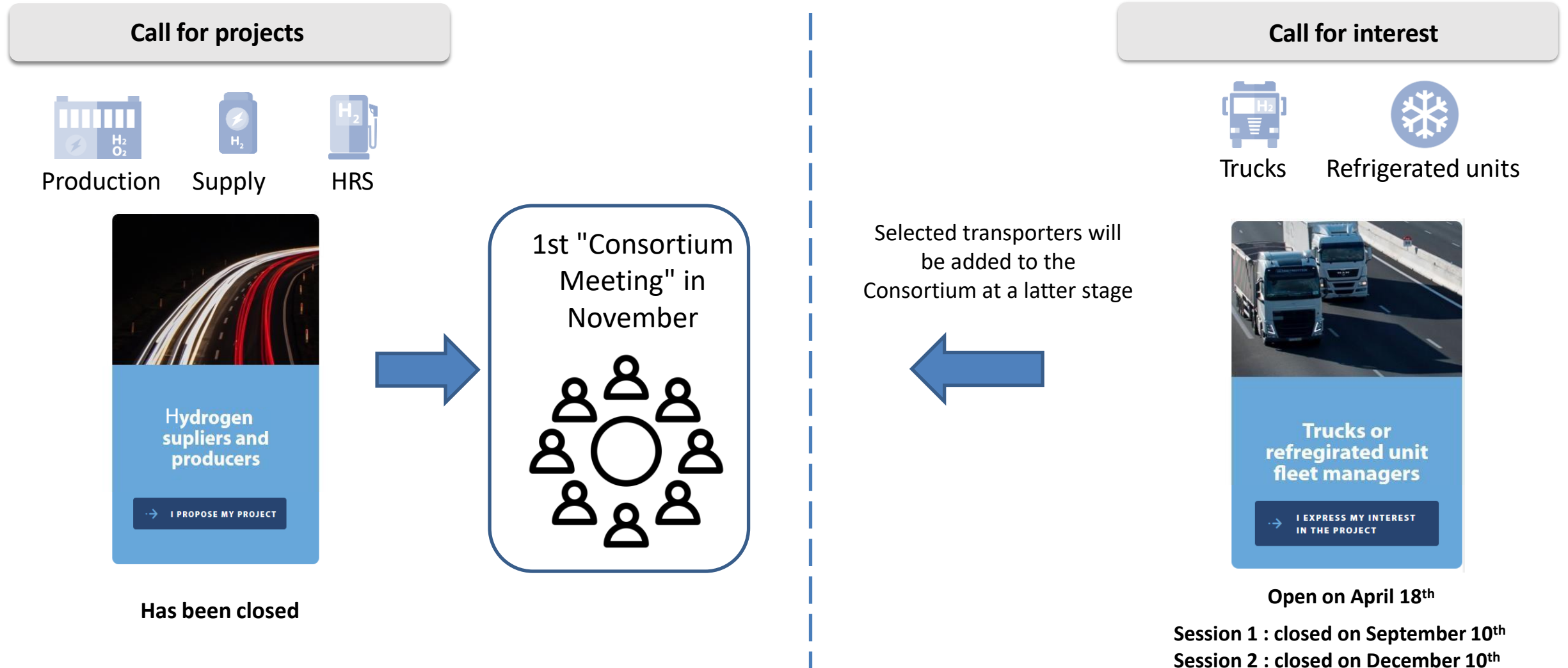
The Occitanie Region will bolster the development of the local hydrogen market, creating the conditions to attract stakeholders along the entire value chain



END-USES
<ul style="list-style-type: none">• 40 trucks• 62 refrigerated units for trucks• 15 regional inter-urban buses



The Occitanie Region participates actively in the development of the ecosystem



Thank you for your attention

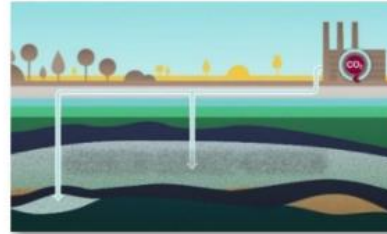
Sectors

The sectors in which we operate:

elementenergy
an ERM Group company



Built Environment



**CCUS and Industrial
Decarbonisation**



Energy Networks



Hydrogen and Fuel Cells



Low Carbon Transport



Smart Energy Systems