UNLOCKING THE POWER OF COOPERATION

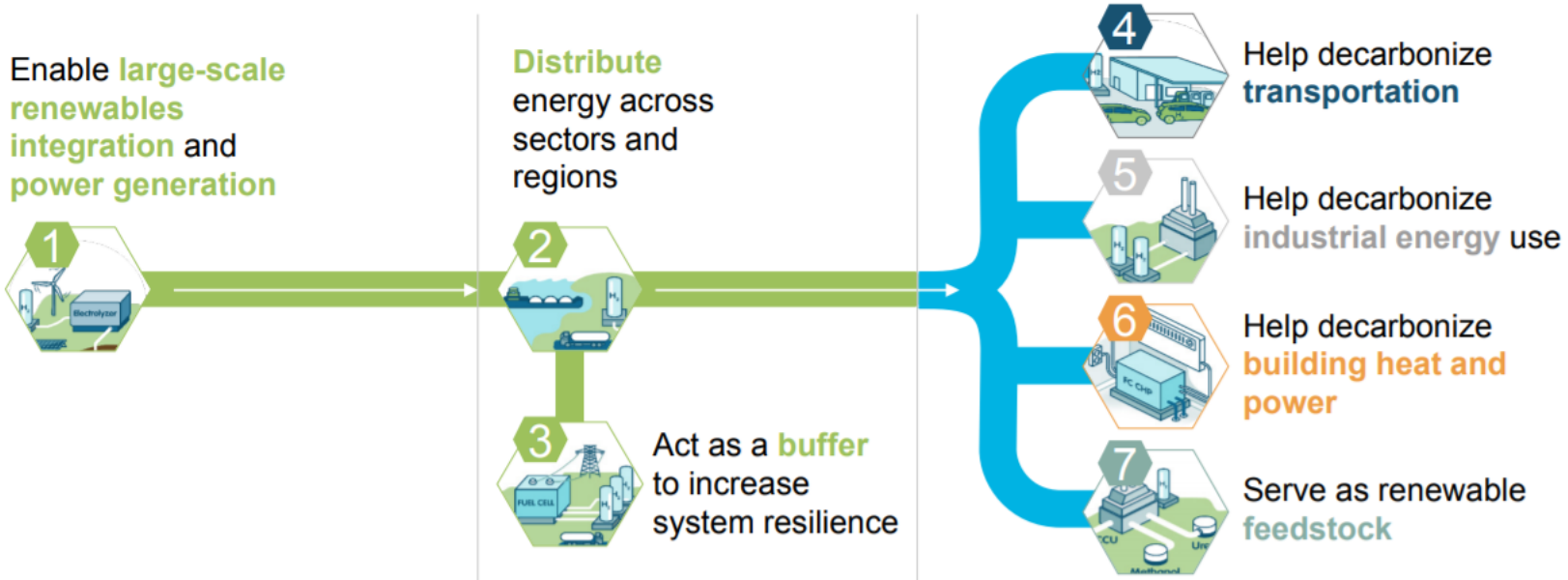
Franco German Conference on hydrogen | Lambert Florence

HYDROGEN A KEY DRIVER FOR ENERGY TRANSITION

World Vision 2050

Hydrogen Council

Enable the renewable energy system → Decarbonize end uses



FRANCE VISION IN 2050

~20 %
de la demande d'énergie finale[1]

~55 Mt
de réduction annuelle des émissions de CO_2[2]

~40 Md€
de chiffre d'affaires annuel (hydrogène et équipements)

~15 %
de réduction des émissions locales (CO, NO_x, particules)

~150 000
emplois (secteurs de l'hydrogène et des équipements et industries amont)[3]

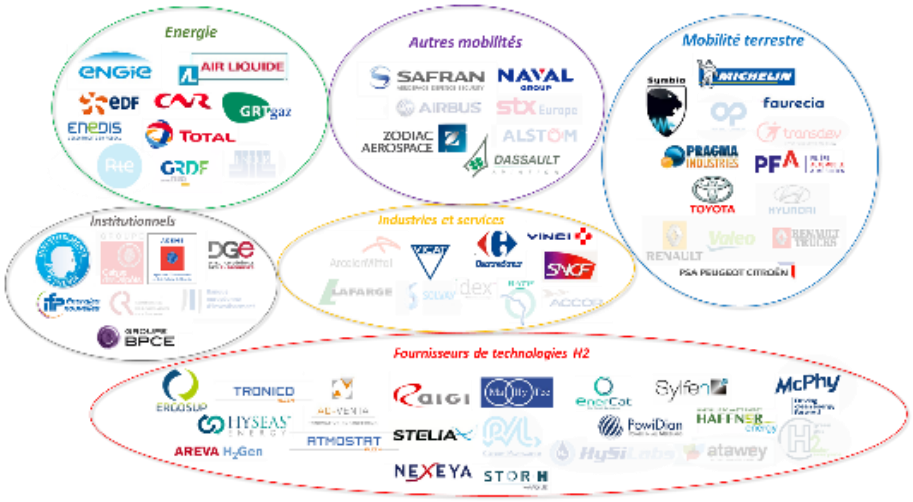
SOURCE : Hydrogen Council ; AIE : Perspectives technologiques de l'énergie - Hydrogène et piles à combustible - CBS ; National Energy Outlook 2016

LITEN CENTRAL ACTOR OF THE NATIONAL DYNAMICS ON THE H2

In charge of NFI Storage from 2014 to 2017 which conducted to a call fo projects in 2016 demonstrating a big potential in France

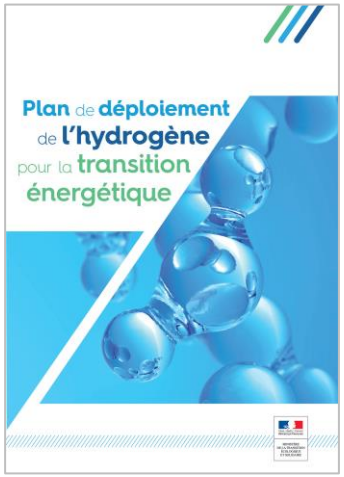
39 "H2 territories" labeled for nearly 100 candidate projects. A dozen projects funded by the State in 2017 (in addition, funding Europe or local authorities)

In 2018, the MTES launched a mission (DGEC-CEA) to propose a strategy for the deployment of renewable H2



About 50 actors solicited across the value chain and potential uses

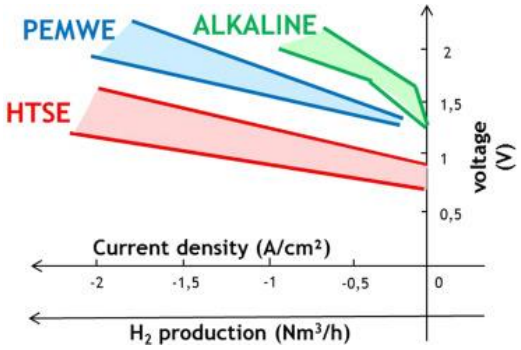
Hydrogen deployment plan announced on June 1, 2018 with 3 main axes



LITEN STRATEGY IN SUPPORT OF FRENCH NATIONAL REPORT ON HYDROGEN

Axe 1 : Production of hydrogen by electrolysis for industry

Advanced Electrolyze at High Temperature (HTSE) to further reduce the cost of hydrogen production ➔ 1 to 1,5 €/kg



Axe 2 : Stabilization element of energy networks in the medium term

Power to Gas : Interconnecting electricity and gas networks to store and transport energy in large quantities

Jupiter 1000 project coordinated by GRTgaz

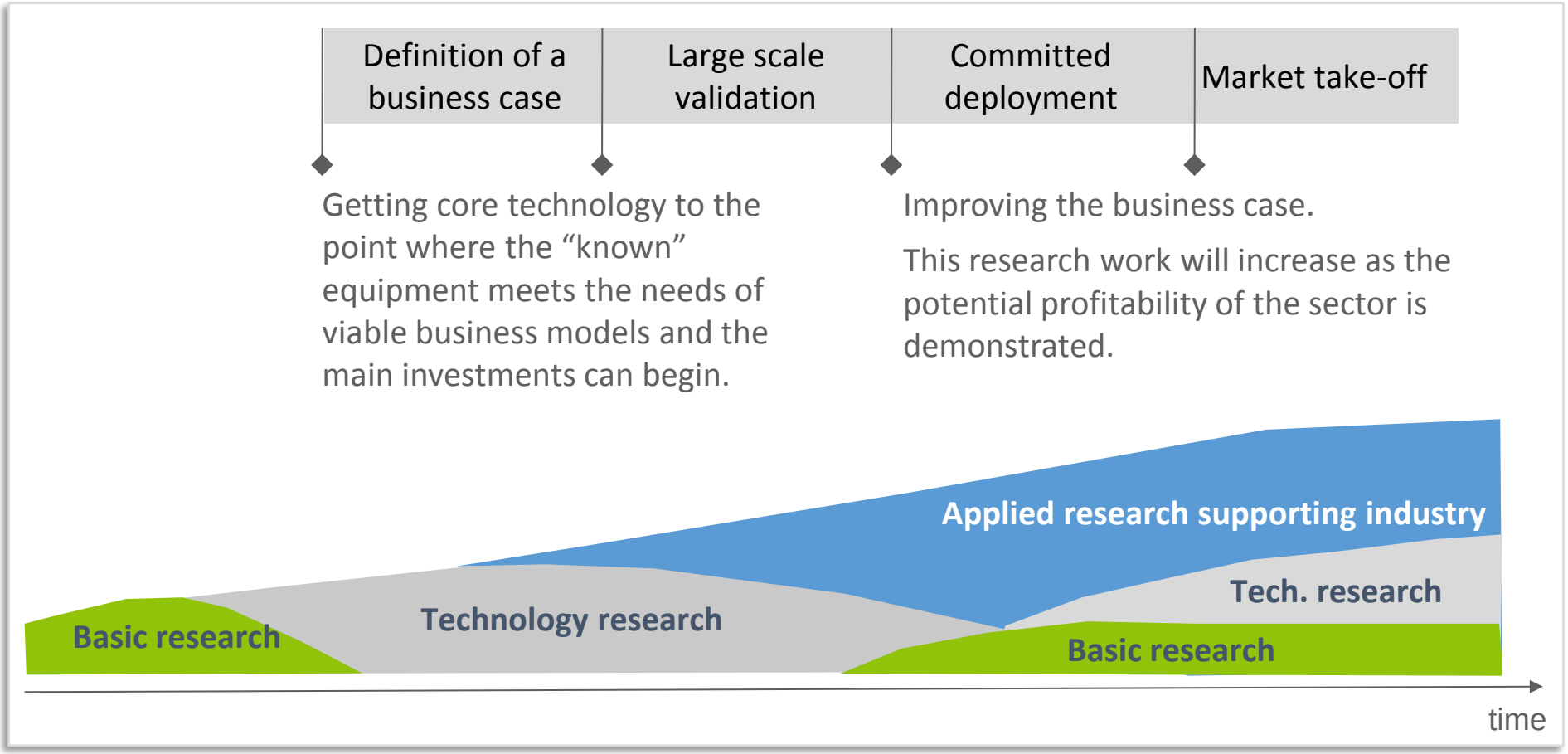
Axe 3 : Valorization through uses of mobility, in complementarity of 100% batteries

Fuel cells and embedded storage to develop a new offer of fleet vehicles

*Integration of CEA fuel cell system in the **HyKangoo** commercialized by SymbioFC*

Standardization & Regulation
CEA is involved in ISO, IEC (international) & AFNOR (France)

COLLABORATION BETWEEN RESEARCH AND INDUSTRY IS KEY TO MAKE IDEAS BECOME A REALITY



Research is needed all along the value chain

ROLE OF THE RESEARCH IN EUROPE

Europe can be a **major manufacturer of components and systems** in the global competition, mastering security and safety of products for Eu citizens in areas such as hydrogen and fuel cells.

To succeed, RTOs and universities have to:

- **Be positioned at the forefront of innovation**, combining technological and financial resources with the mission of safeguarding the welfare of EU citizens.
  - In France: ANR programs
  - In Europe: H2020, Horizon Europe
- Continue and even enhance the **close collaboration with the European industry**, in particular through collaborative projects in a strong and coordinated ecosystem.
  - In France: ADEME programs & PIA
  - In Europe: H2020 & Horizon Europe, CEF, EIB, IPCEI

EUROPEAN INDUSTRIAL COMPETITIVENESS

FCH JU

Make FCH technologies ready to commercialization

Create a strong Ecosystem with close collaboration between research and industry

IPCEI

European Council on Industrial Competitiveness.
Brussels, 20-21 March 2014.

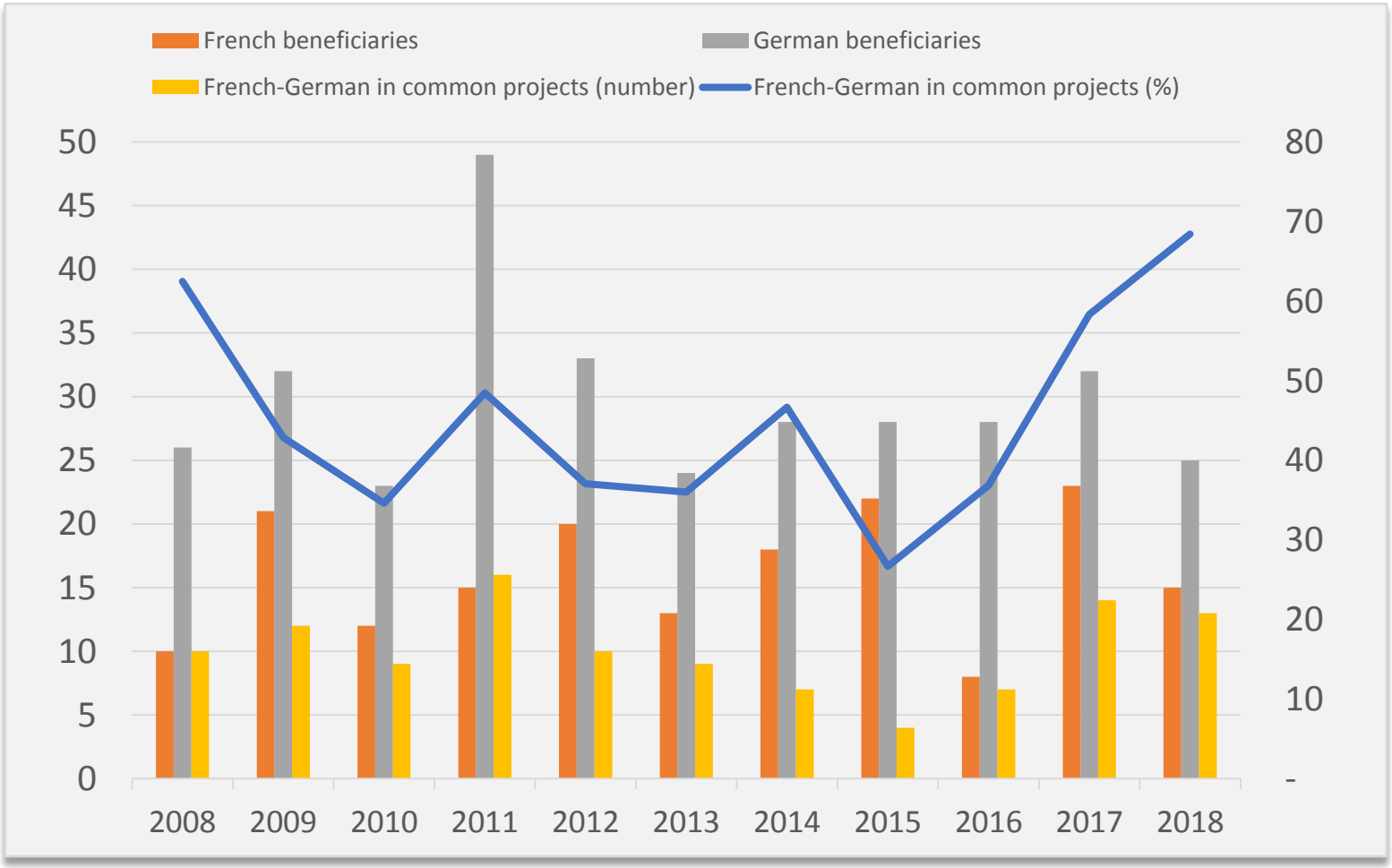
Paragraph 12:

"The European Council recalls that ***key enabling technologies are of crucial importance for industrial competitiveness. KETs of high industrial interest, such as batteries for electro-mobility, intelligent materials, high performance production and industrial bioprocesses, should be strengthened by swiftly identifying projects of European interest****".*

IPCEI a huge opportunity to boost industrialization of the promising and emerging market of H_2

➔ Mobilization to promote the 2 main projects dedicated to H_2 until March 2019

FCH-JU FOCUS : THE FRENCH-GERMAN COLLABORATION



Historical and strong collaborations between French-German companies and research organizations

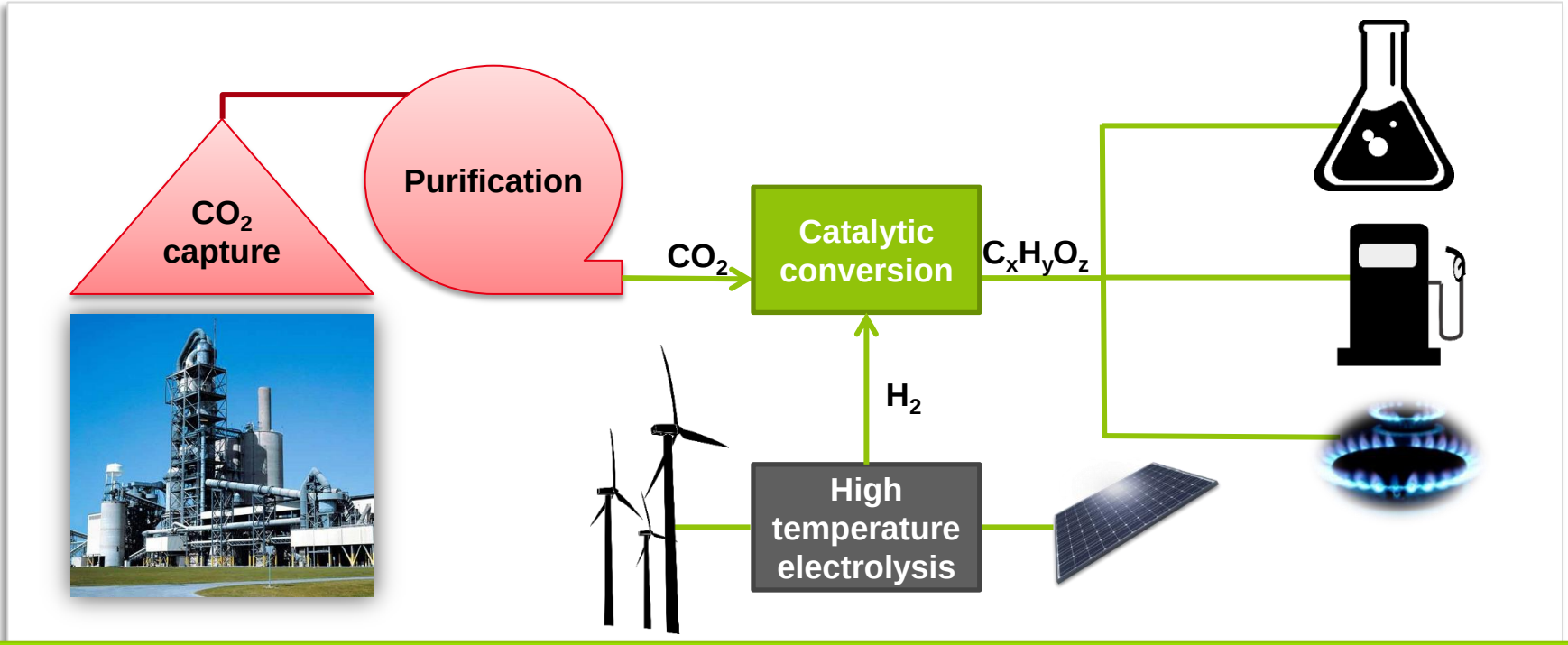
MAX PLANCK SOCIETY – CEA COLLABORATION ON POWER-TO-X

A common strategy on power-to-X and carbon capture and utilization has been established

The next step is to launch an ambitious French-German project on power-to-X

- Preliminary phase at the laboratory scale
- Demonstration phase at the pilot scale, on a French industrial site

A well-balanced French-German industrial consortium is being set up



The project will position Germany and France as role models for the energy transition in Europe

MAX PLANCK SOCIETY – CEA COLLABORATION ON POWER-TO-X

A high-potential partnership with complementary skills

MAX-PLANCK-GESELLSCHAFT

- ✓ Internationally recognized scientific expertise in catalysis and chemical energy conversion
- ✓ Hands-on experience in the Carbon2Chem large-scale demonstration project in Germany (160 M€ budget for the pilot phase)

- ✓ Internationally recognized scientific expertise in electrochemical conversions and heat management
- ✓ Strong technological expertise
  - high-temperature solid-oxide electrolysis
  - milli-structured catalytic reactors

Prof.Dr. Robert Schlögl,
Director of MPI-CEC

NEXT STEPS

Hydrogen is needed to achieved European objectives towards fighting climate change and developing carbon neutral cities with high air quality

Industrial leadership will be obtained by:

➔ Coordinated Support of Members States and in particular the French German Core team

- On a bilateral basis French German industrial & research cooperation on Power-to-X

➔ At the European level

- Excellence of European R&I : FCH in Horizon Europe
- Strong European industry : IPCEI

https://sciencebusiness.net/framework-programmes/news/eu-science-ministers-weigh-five-research-missions-ten-industry

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