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States Representatives Group

Update on Hydrogen and Fuel Cells developments in France

A Wealth of New Projects

The image displays a map of France with several project-related images overlaid. At the top center is the **GRHYD** logo. To its right is a diagram titled "Ecart" showing a hydrogen production process. Below the logo are images of wind turbines, hydrogen storage tanks, and a boat. A large inset shows a hydrogen production process: "La production de biogaz à partir des déchets ménagers du Bioréacteur de Trilly" and "La production d'hydrogène par reformage de biogaz (ou de biométhane)". Other images include a yellow car, a white van, a yellow tractor, a power tower, a sailboat, and a coastal town. A "SOLVAY" logo is also visible on the right side.



Power to Gaz: Synergies between electric network and gas network

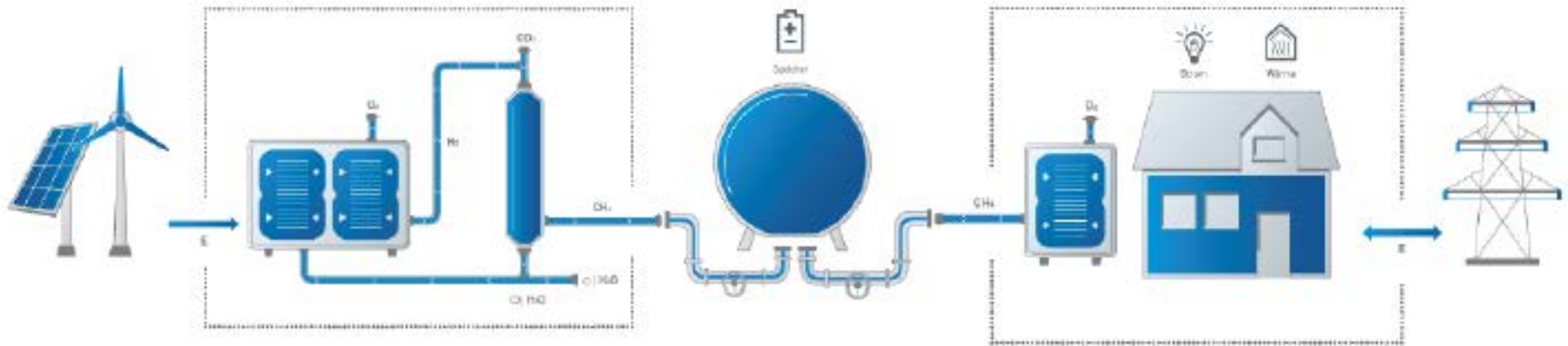
Renewable Electricity

Power-to-Gas process

Natural gas infrastructure

Gas-to-Power combined heat and power

Electrical Grid



McPhy: electrolysers and storage

McPhy

Offices: France Germany Italy Japan (rep.)

Industrial H₂ market



- Flexible on-site H₂ production solutions dedicated to industrial market
- >1000 clients base
- >3000 electrolysis solutions installed

Major projects (energy & mobility)



- Engineering & Project management capabilities
- Projects examples:
 - INGRID (green hydrogen production, solid storage, and electricity generation with fuel cell)
 - GRHYD (power to gas project)
- Partners examples:



Production



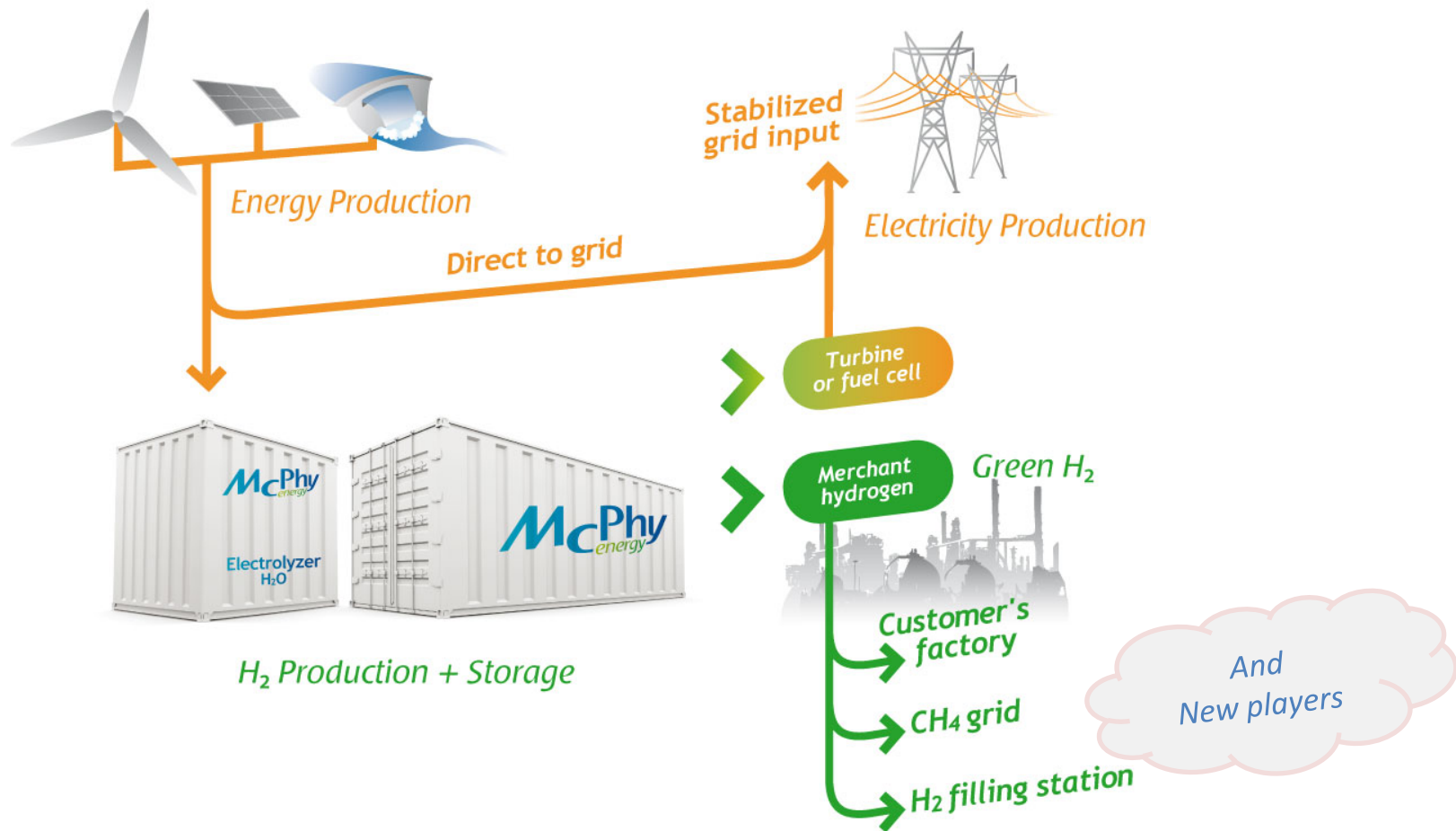
- 1 plant in La Motte Fanjas (France)
- 1 plant in Ponsacco (Italy)
- 1 plant in Wildau (Germany)

R&D



- 1 R&D center in La Motte Fanjas (France)
- Focus on next generation products (improved kinetics, increased sizing, transportability, ...)

Storage enables the “New” H₂ value chain



Power to Gas

Injection into the natural gas network

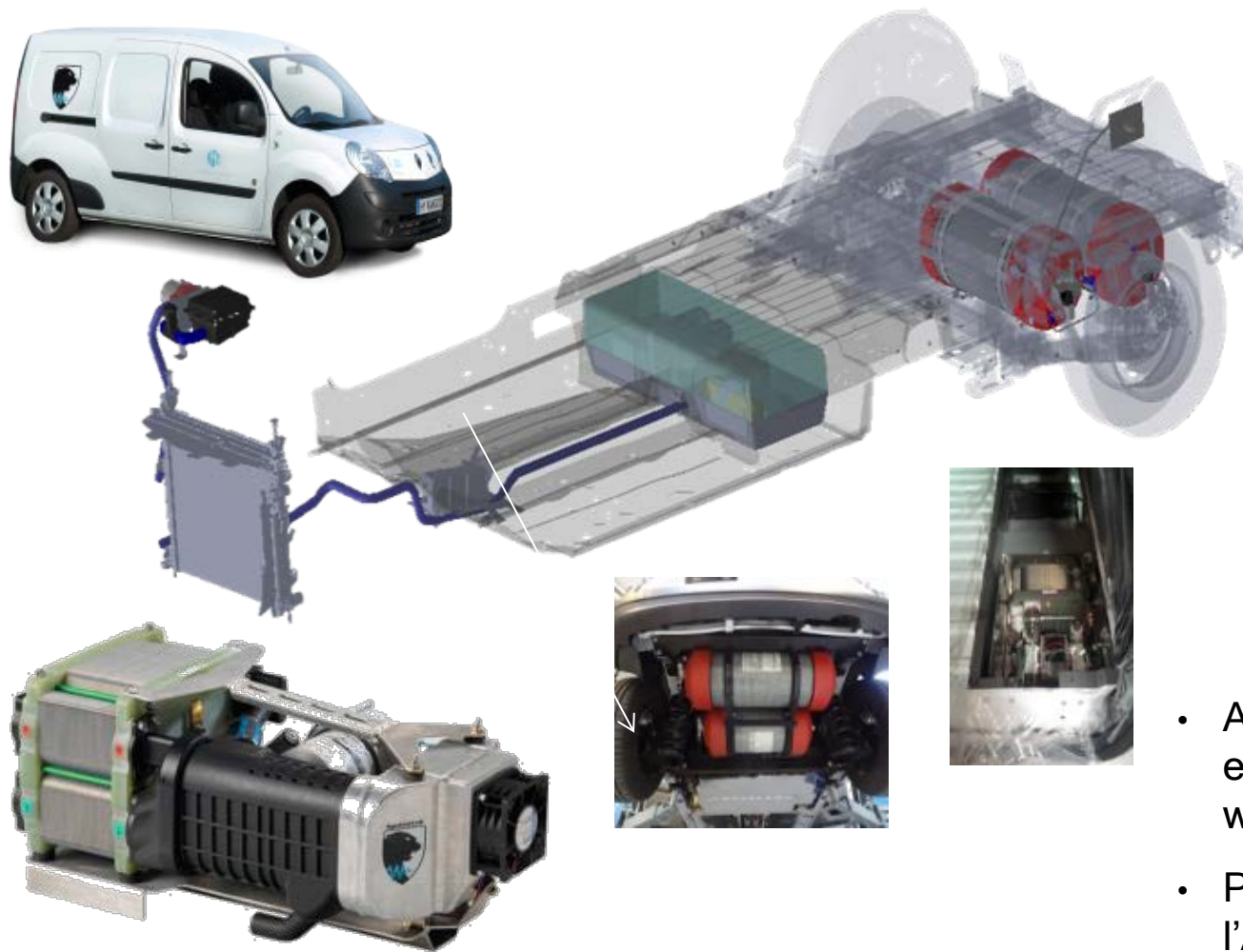
- Stored energy is **not restricted to the site of generation**
- Connection of energy networks **increase flexibility**
- Improvement of overall **efficiency**
- No modification on existing devices **up to 6% of H₂ in CH₄ grid**



AIRCRAFT INDUSTRIES



19/11/2013



- A standard, mass-produced electric vehicle equipped with H₂ range extender
- Presented @ Mondial de l'Auto Paris
- First customer deployments (Solvay Group, in Tavaux, France)

5 kW Fuel Cell System

Contact: Fabio Ferrari

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La Poste: a captive fleet business case



- Going to BEV is strategic for them
- La Poste committed to buy 10 000 Kangoo ZE and planned 40 000 ZEV
- To deploy more ZE, they need to increase driving range
- Kangoo ZE + Hydrogen Range Extenders kit is the preferred solution



**RENAULT
TECH**



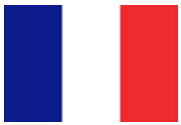
Symbio FCell



Objectives

1. **Harmonising** roll-out of Hydrogen Refueling Stations (HRS) in Europe
2. National roll-out plans for Denmark, France, the Netherlands and Sweden
3. **Learning** from Germany (CEP, H2 Mobility, NOW GmbH), UK mobility, the London Hydrogen Partnership & other H₂ initiatives
4. **Linking** national hydrogen corridors to international TEN-T transport corridors
5. EU wide dissemination to key decision makers and coordinators of TEN-T corridors





France evaluates a new Market Model to de-risk and accelerate HRS deployment

Captive fleets HRS deployments – evolve to public HRS
Urban Commercial Vehicles: Customers require no pollutant & no CO2



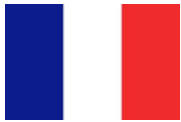
Today:
First Evs & Hybrid



2020-2025 ?
Full power
H₂ private cars
& Nationwide H₂
refilling station



Consumer Market PHEV (Electric + Fossil)
with more and more electrification



- French Government departments and public entities



- Vehicle OEMs



+ 2

- Hydrogen providers/ producers and utilities



- Technology & equipment providers



- Regional representatives



Phase 1 is finished. Phase 2 expected to be completed mid-March

- Enthusiatic Groups
- Top down approach difficult in France in the present context
- Captive fleets and use of « range extender » to be studied in Phase 2.