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HyVolution

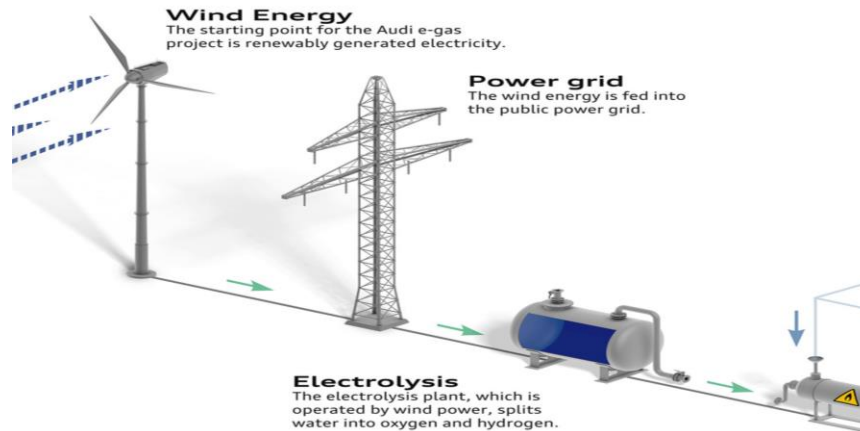
LES JOURNÉES DE L'ÉNERGIE HYDROGÈNE

4 & 5 Février 2016

Pavillon des Congrès - Parc Floral de Paris

www.hyvolution.fr

*PowerToGaz - McPhy Energy
New Business Models in Europe ?
4th of February, HyVolution, Paris*



PowerToGas : H2 and Gas just an « old » story ?

Energy Transition : trends and opportunities (reminder)

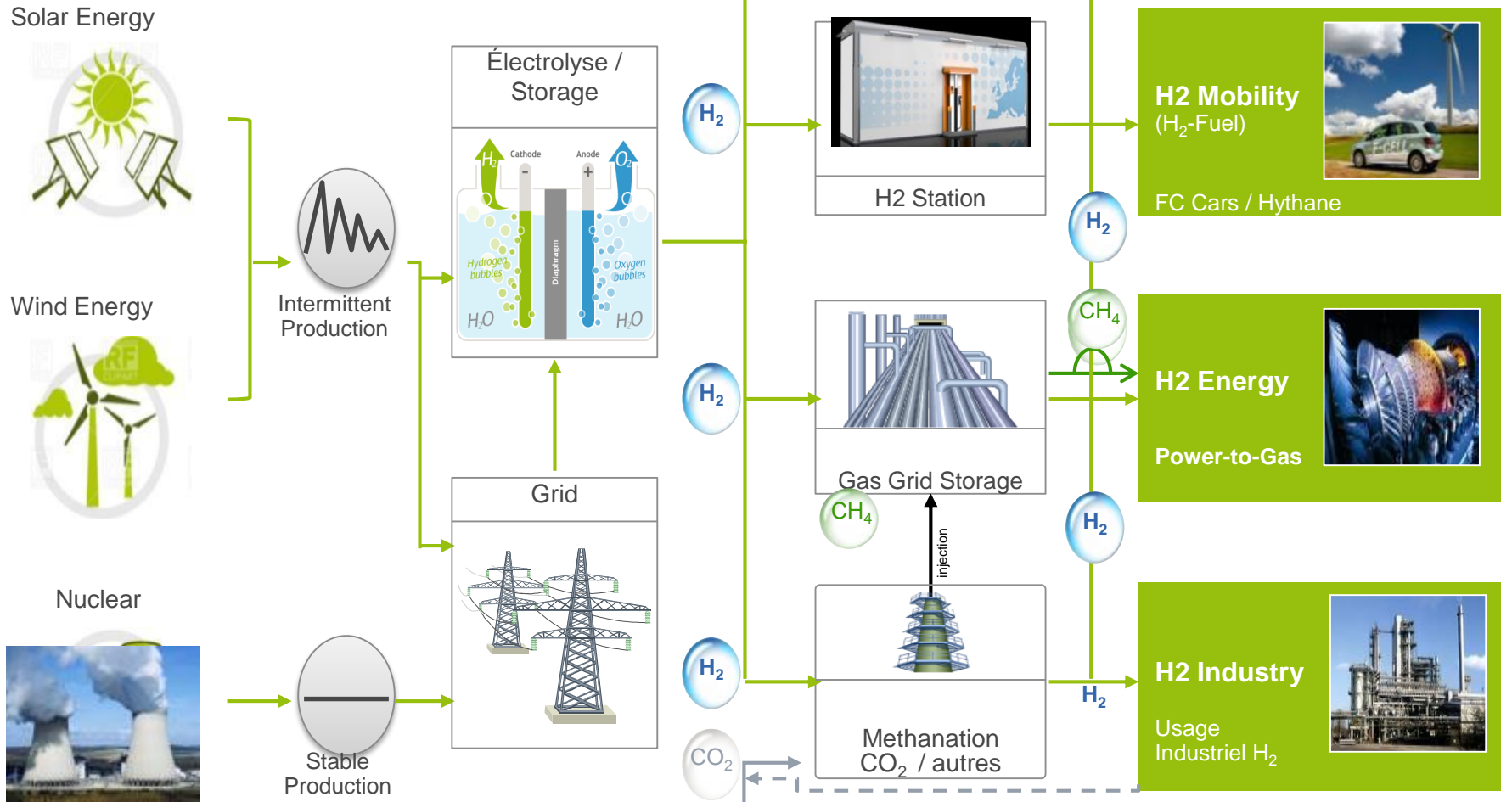
McPhy Energy : Who we are ?

PowerToGas :

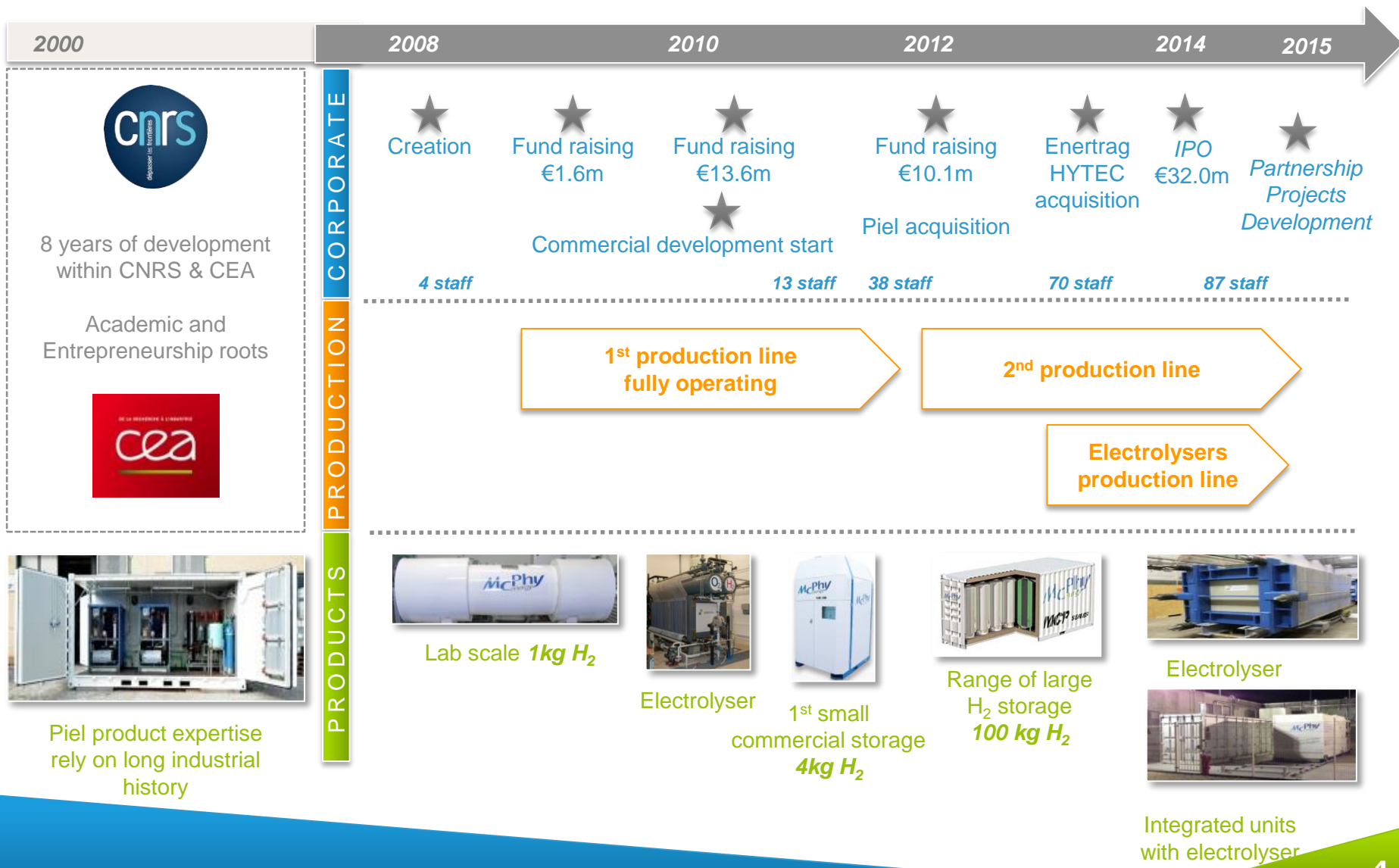
- Principles & Business Models
- Technological Examples in Europe

Key Learnings





Regulatory environment is evolving & new business models are under construction



A strong industrial and European footprint

France (La Motte-Fanjas & Grenoble)

- H₂ solid storage
- Test Platform & R&D center



Italy (San Miniato)

- <500KW electrolyzers



Germany (Wildau)

- >500KW electrolyzers



A Large Range of Solutions : H₂ generators & solid storage,

A portfolio of innovative products & Services



Small & mid Electrolyser
<500 kW
1/100 Nm³/h



Large Electrolyzers
>500 kW
100/500 (or more) Nm³/h



Disruptive H₂ solid storage technology



Integrated HRS for Mobility Project

Designed for P2G Projects

- > Engineering & system Maintenance and Technical Assistance
- > Energy Performance Contract

Development under way T2 2015

... addressing 2 main high-growth markets



INDUSTRIAL HYDROGEN



ENERGY & MOBILITY



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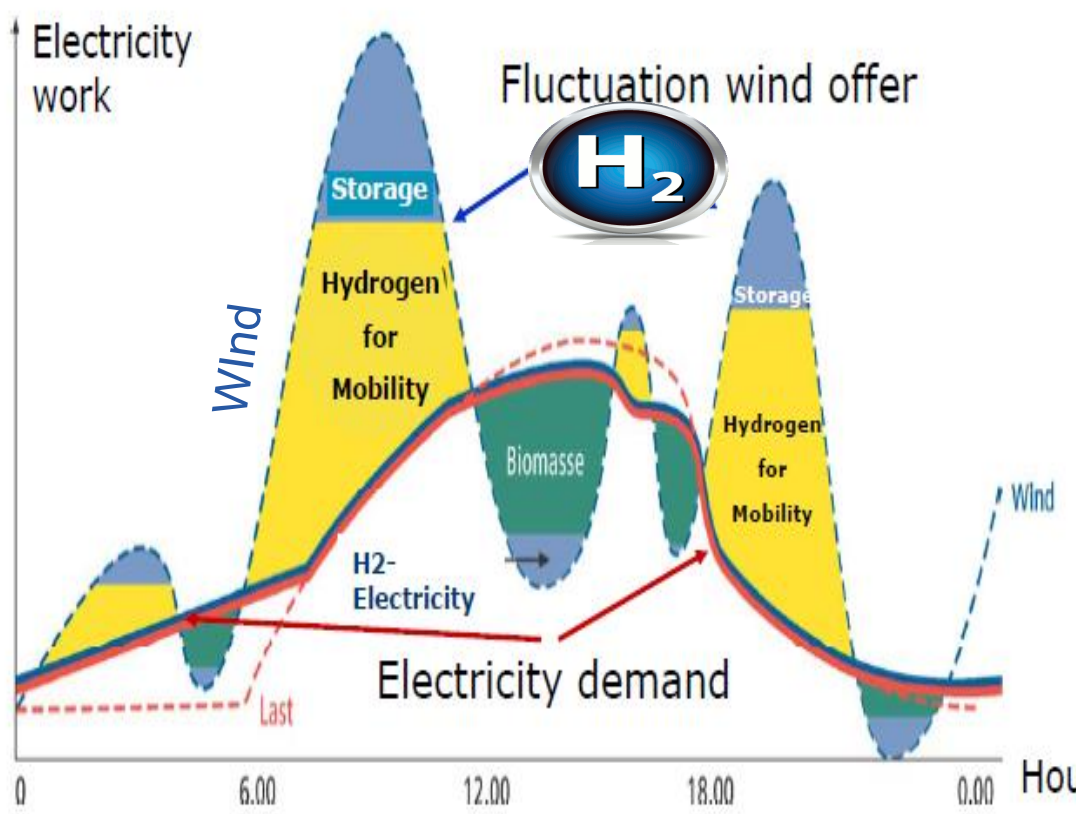
PowerToGas :

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Key Learnings



PowerToGaz : a global Business Model to leverage Electric Peak with production of H2 and development of new revenues : gaz injection, mobility, industry, grid services....



Surplus

Gaz Injection

Direct injection into the gas grid : sin Gas or direct H2 (from 2 to 6%)
1 à 10 MW

Mobility

H2 Used for HRS from 0,1 to 1 MW

Multi Usage

H2 Used for Energy, Mobility, Industry

Business Model	Ref.	E-source	Gaz Type	Gas Grid Injection	Grid Balance	Mobility	Industry
Gas Injection	Audi Werlte, JUPITER		SinGas (methan) and/or H2	✓✓	✓	✓	
Mobility & Service	Ingrid		H2		✓	✓	
Multi-Usage	Prenzlau, Mainz...		SinGas and/or H2	✓	✓	✓✓	✓✓

€/ kg or MWH



Different Business Case Exist
A Multi application approach can help maximize revenues

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PowerToGas :

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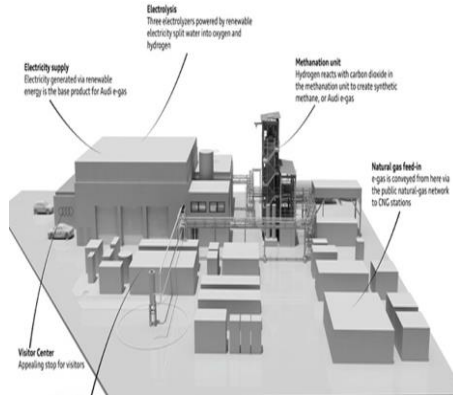

Key Learnings





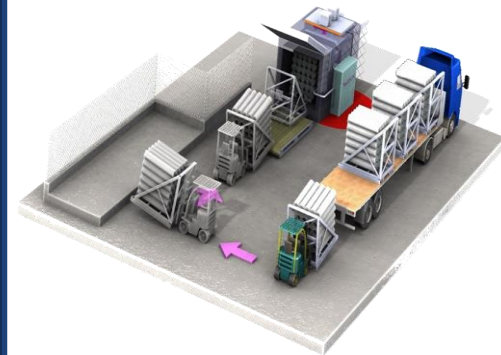

AudiWerlte (All)
Storage of Wind Gas
1.200 Nm³/h – 6 MW

Into Service since beg. 2014

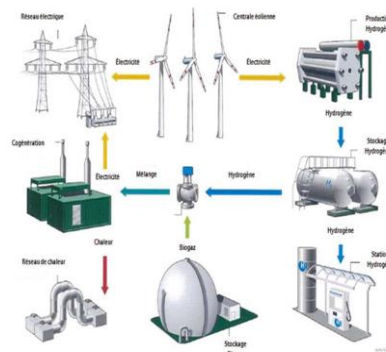

Bari (Italie)
Storage of Solar Gas

Delivery Phase

Prenzlau (All)
Storage of wind gas
100 Nm³/h – 0,5 MW

In Service since summer 2014





Jupiter (Fos)
Storage of Wind Gas
200 Nm³/h – 1MW

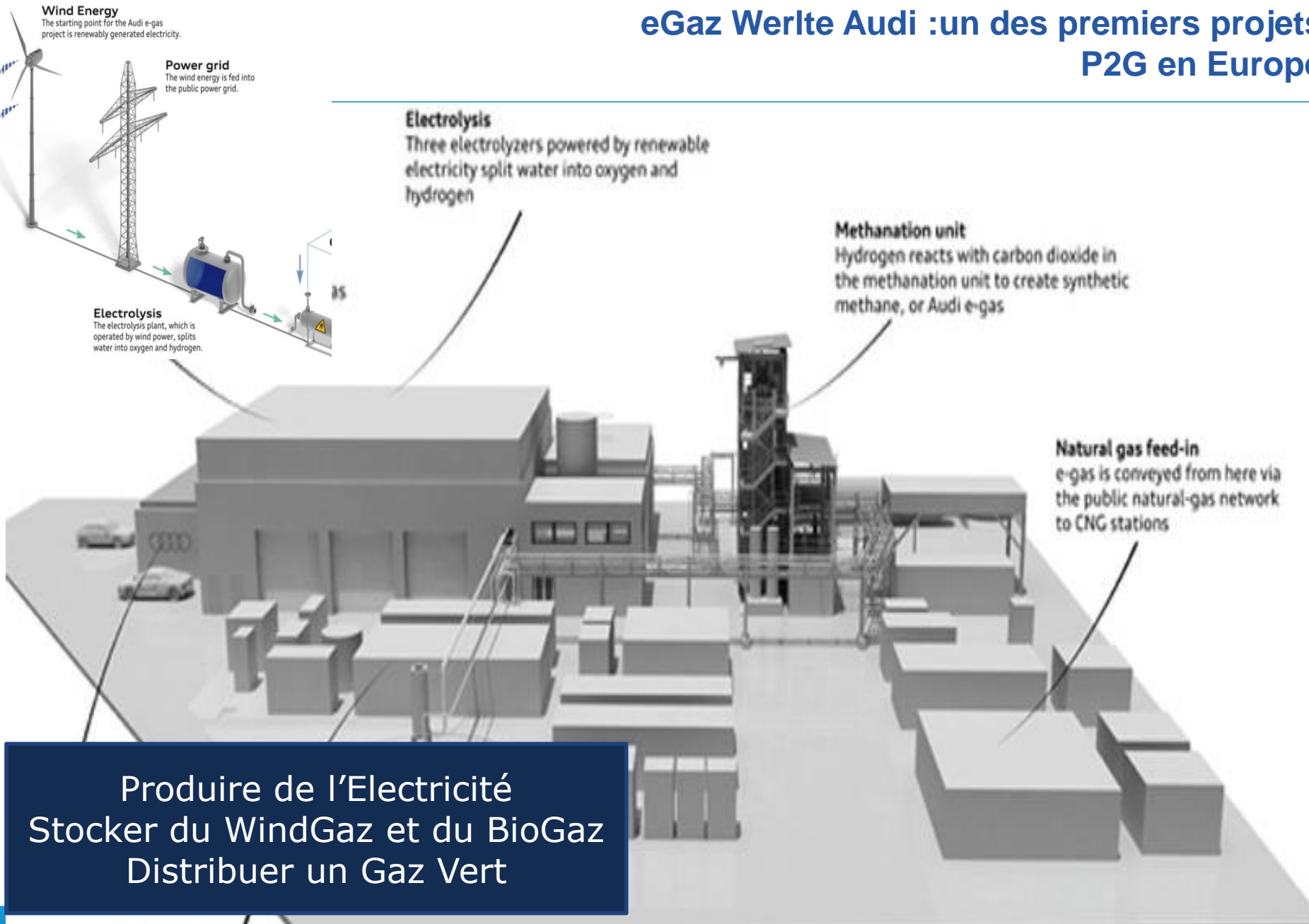
Engenering Phase



➔ Possibility to combine with H2 Mobility (option)



eGaz Werlte Audi : un des premiers projets P2G en Europe





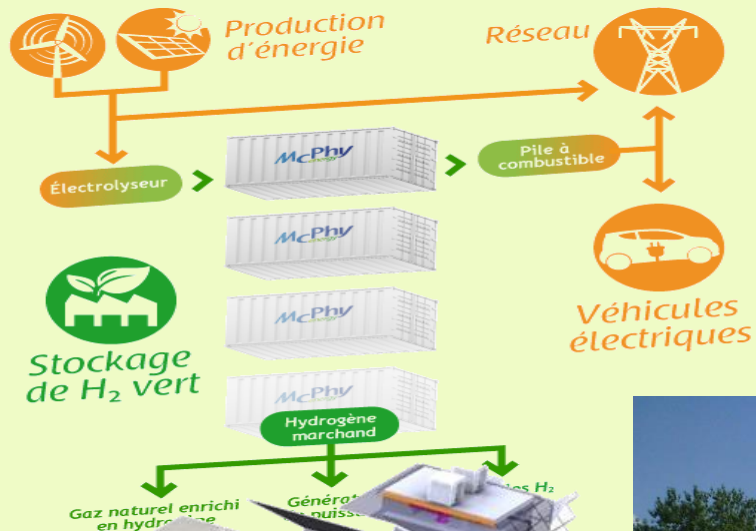


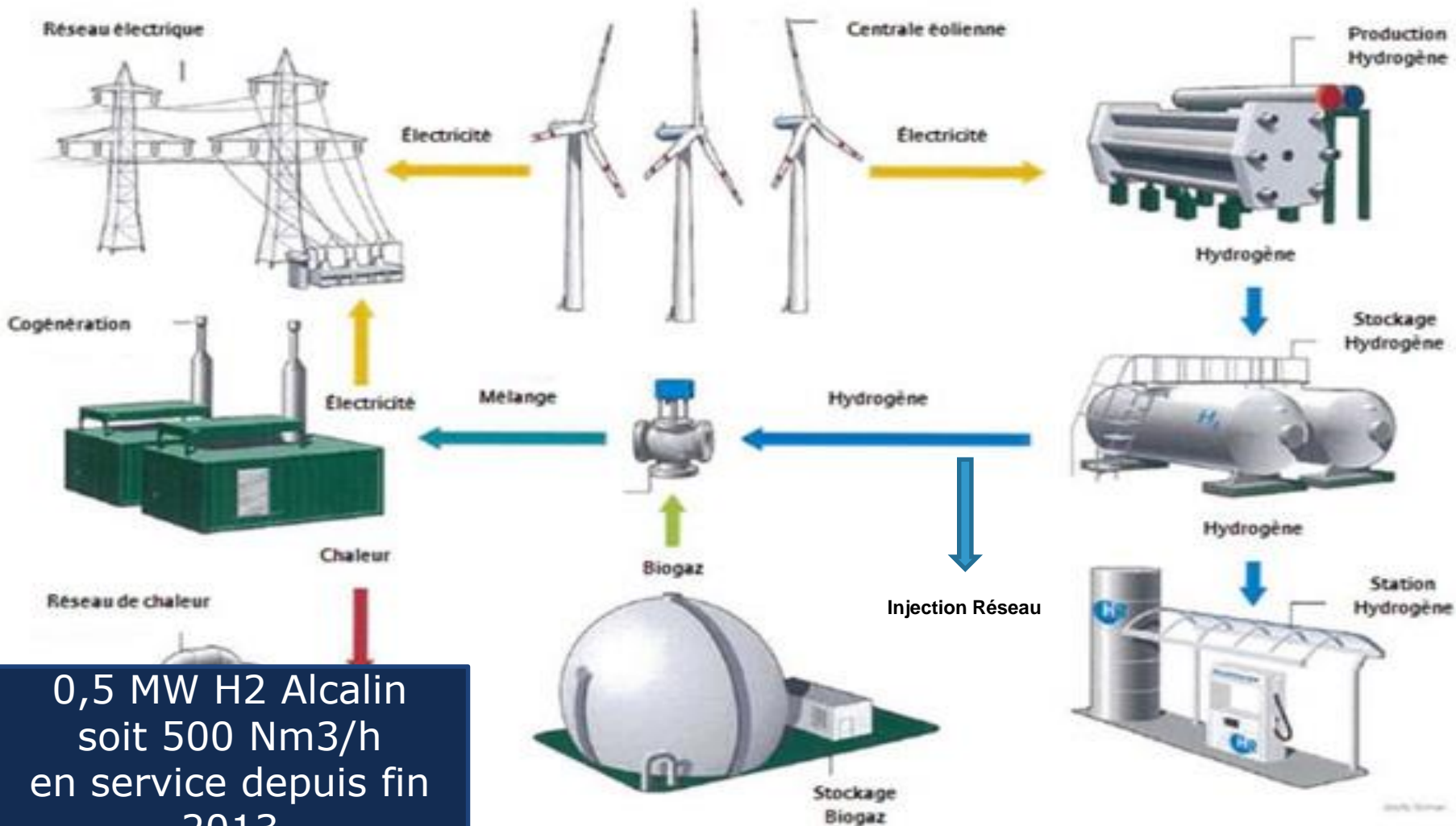


6 MW H₂ Alcalin
soit 1.200 Nm³/h
en service depuis fin 2013

INGRID PROJECT

- 1000 kg H₂
- 33.3 MWh
- PtG & green H₂ for industry/transport
- Italy
- 2014/2015





0,5 MW H2 Alcalin
soit 500 Nm³/h
en service depuis fin
2013

JUPITER 1000 – un projet innovant porté par un consortium solide coordonné par GRT Gaz



Consortium : 7 Partenaires Industriels, 1 Laboratoire R&D
Une plateforme innovante :
Capture de CO₂, Production d'H₂ (1 MW)
et de Méthane de synthèse

Give preference to a global approach vs. single usage

Work at territory Level, taking into account local opportunities / constraints,

Build the project with Local Partners, Stake Holders...

Upstream : Secure Electricity Supply

Downstream : analyze market potential and secure a « base line » of revenues on each market segment : Gas Injection x Grid Services x Industry x Mobility

Secure BP by “mixing” different source of revenues on a medium term period

Anticipate both regulation and permitting impact

Thank you for your attention ...

