

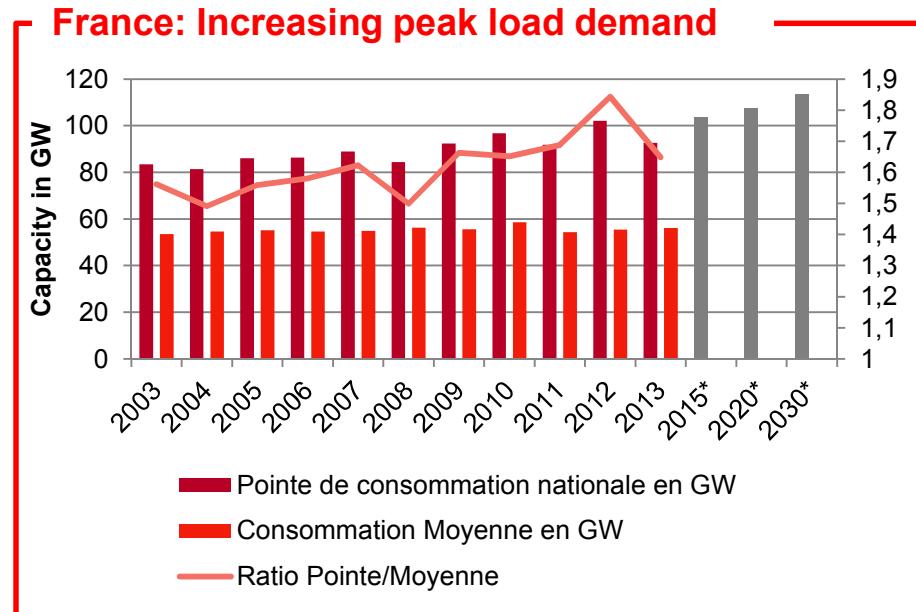
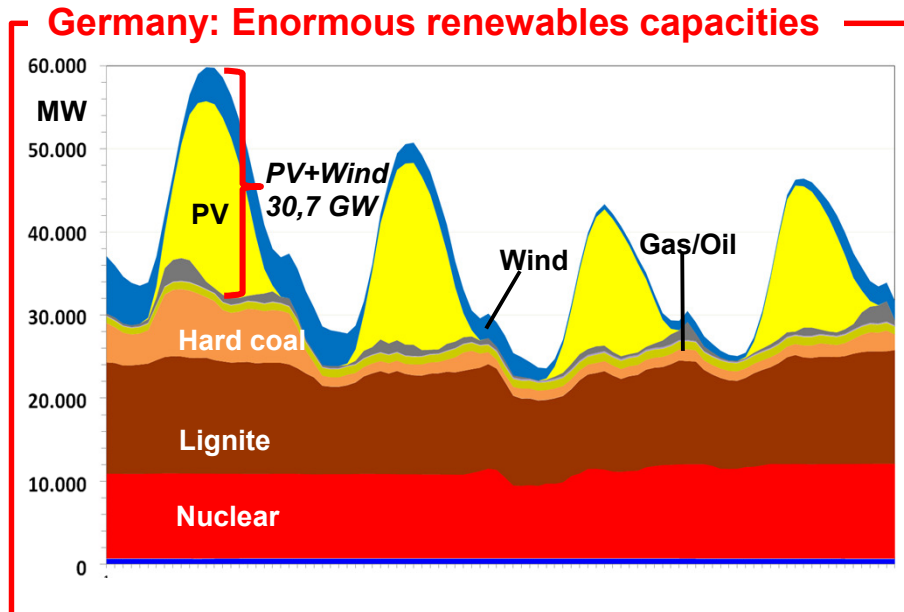


"Power to Gas" – Important partner for renewables with big impact potential

Conference Deutsch-französisches Büro für erneuerbare Energie,
Berlin, 24 June 2014

Günther Schneider, E.ON France

Challenges in the German and the French power systems



In both power systems significant and growing need for flexibility



Flexibility from ...

...Generation



Wind/Solar-to-Power



Gas-to-Power/Heat



Coal-to-Power/Heat

...Grids

Power

Gas

Heat

...Storage



Power-to-Power



Power-to-Gas

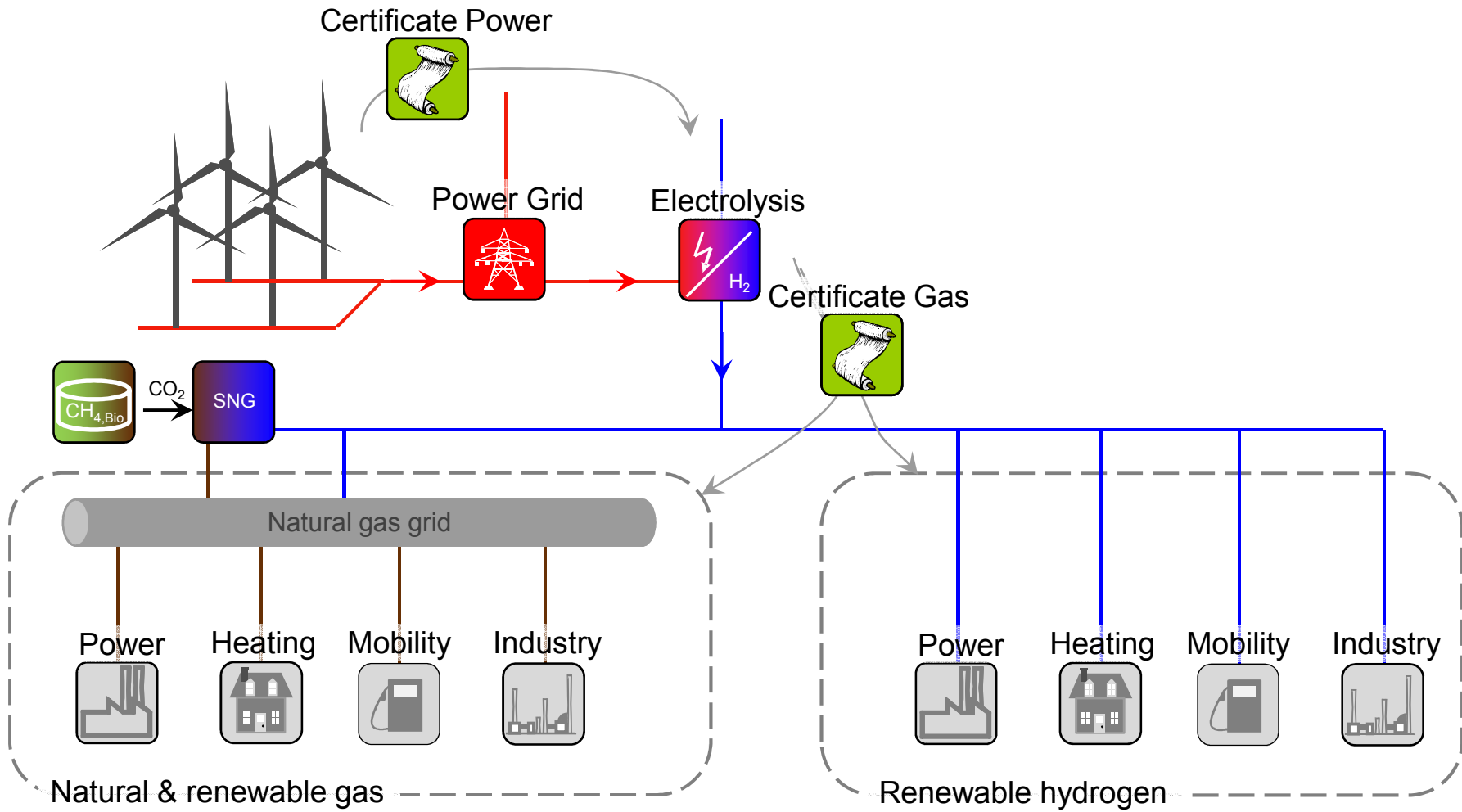


Power-to-Heat

...Demand

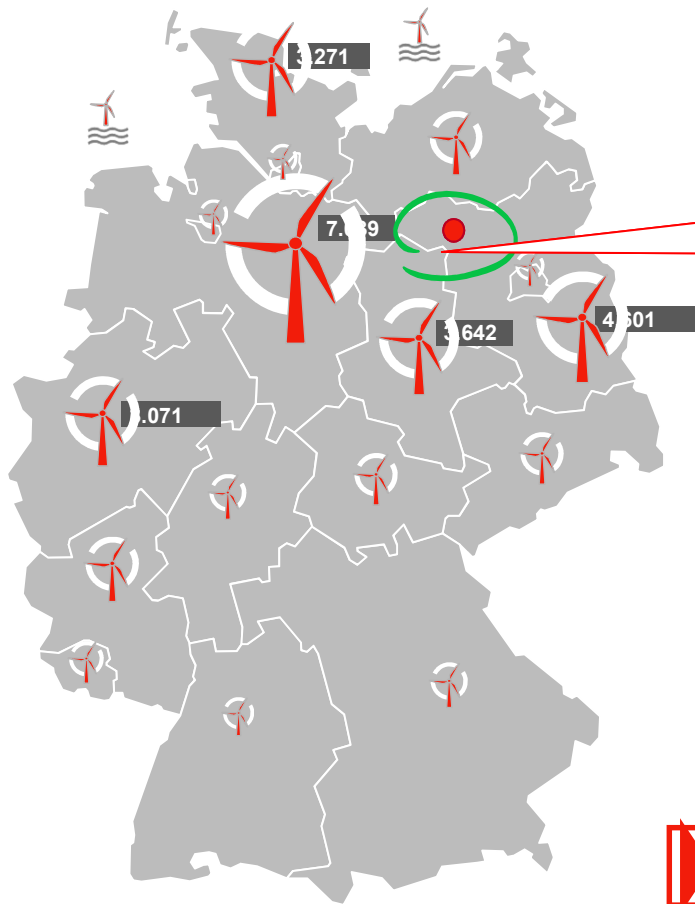


Why Power-to-Gas? Connecting markets



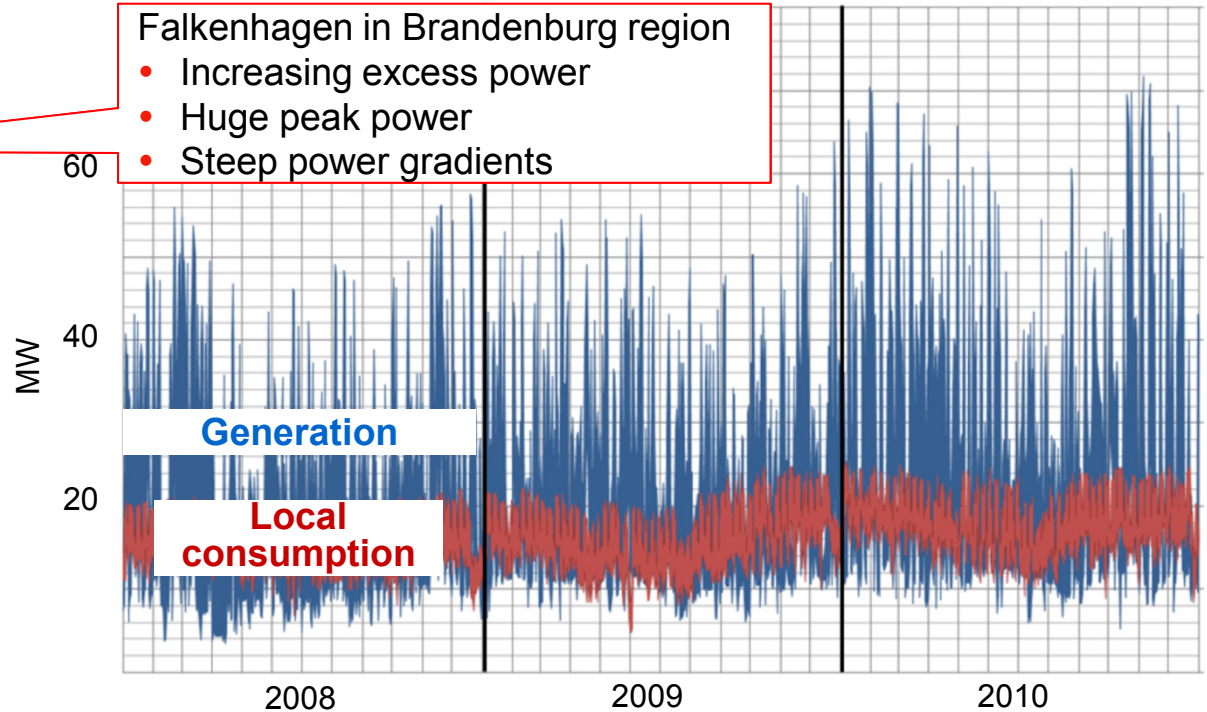
Example Falkenhagen PtG pilot project

Regional oversupply by onshore wind capacities



Falkenhagen in Brandenburg region

- Increasing excess power
- Huge peak power
- Steep power gradients



▶ Solution: Storage of excess wind power instead of curtailment



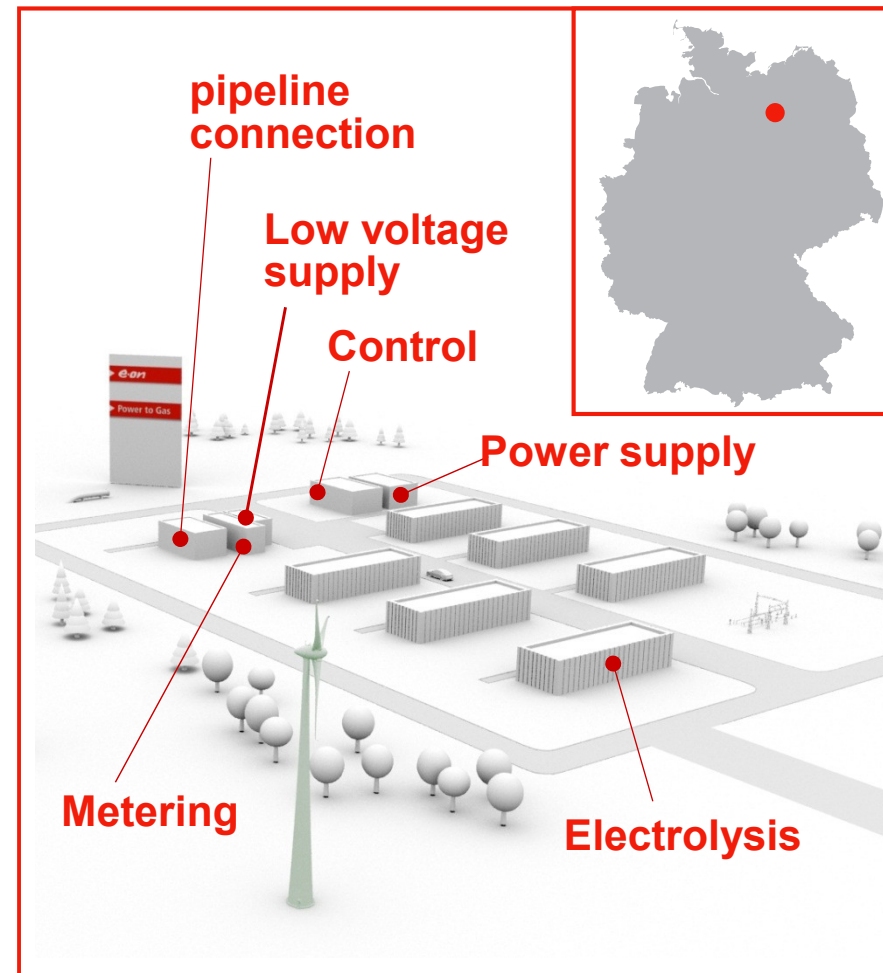
Falkenhagen: From planning to operations in 12 months in cooperation with Swissgas

Key Parameters

- Power: 2 MW_{el}
- Hydrogen production: 360 m³/h
- Feed into the local gas grid (ONTRAS)
- Start of operation 28 Aug. 2013
- Concentration H₂ : max 2%
- In partnership with Swissgas AG

Goals

- Demonstration of the process chain
- Optimize operational concept (fluctuating power from wind vs. changing gas feed)
- Gain experience in technology, costs, consenting
- Establish a new WindGas product



SWISSGAS 



Falkenhagen: In operation since 28th of Aug. 2013

What we will learn is about

- availability
- efficiency
- dynamics
- acceptance
- market for H₂
- cost structure
- power procurement
- potential for improvement



Mal weht der Wind, mal nicht. Gibt's 'nen Akku für grünen Strom?

E.ON WindGas
Innovatives Gas aus Windenergie

SWISSGAS 

e-on

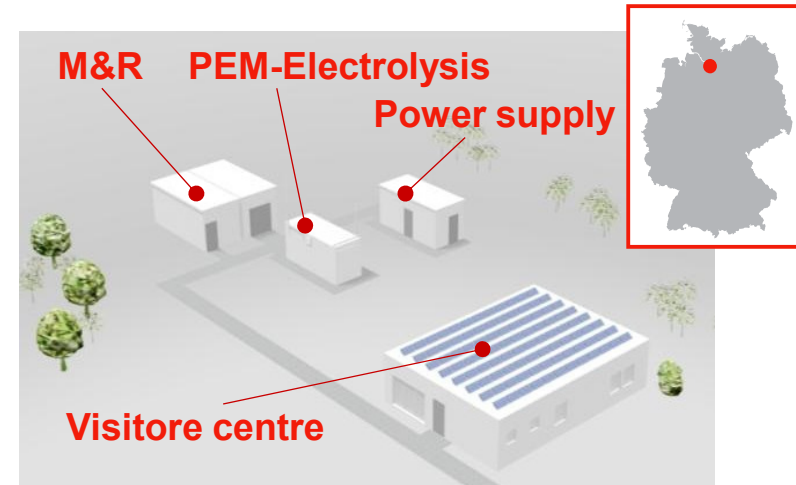
Example: „WindGas Hamburg“



Demonstration of advanced power to gas technology

Key Parameters

- Power: 1 MW_{el}, 265 m³/h hydrogen
- Public funding from BMVI
- Partners: Hydrogenics, SolviCore, DLR, Fraunhofer ISE
- Fed into the local gas grid of Hamburg
- Planned start of operation Q4/2014

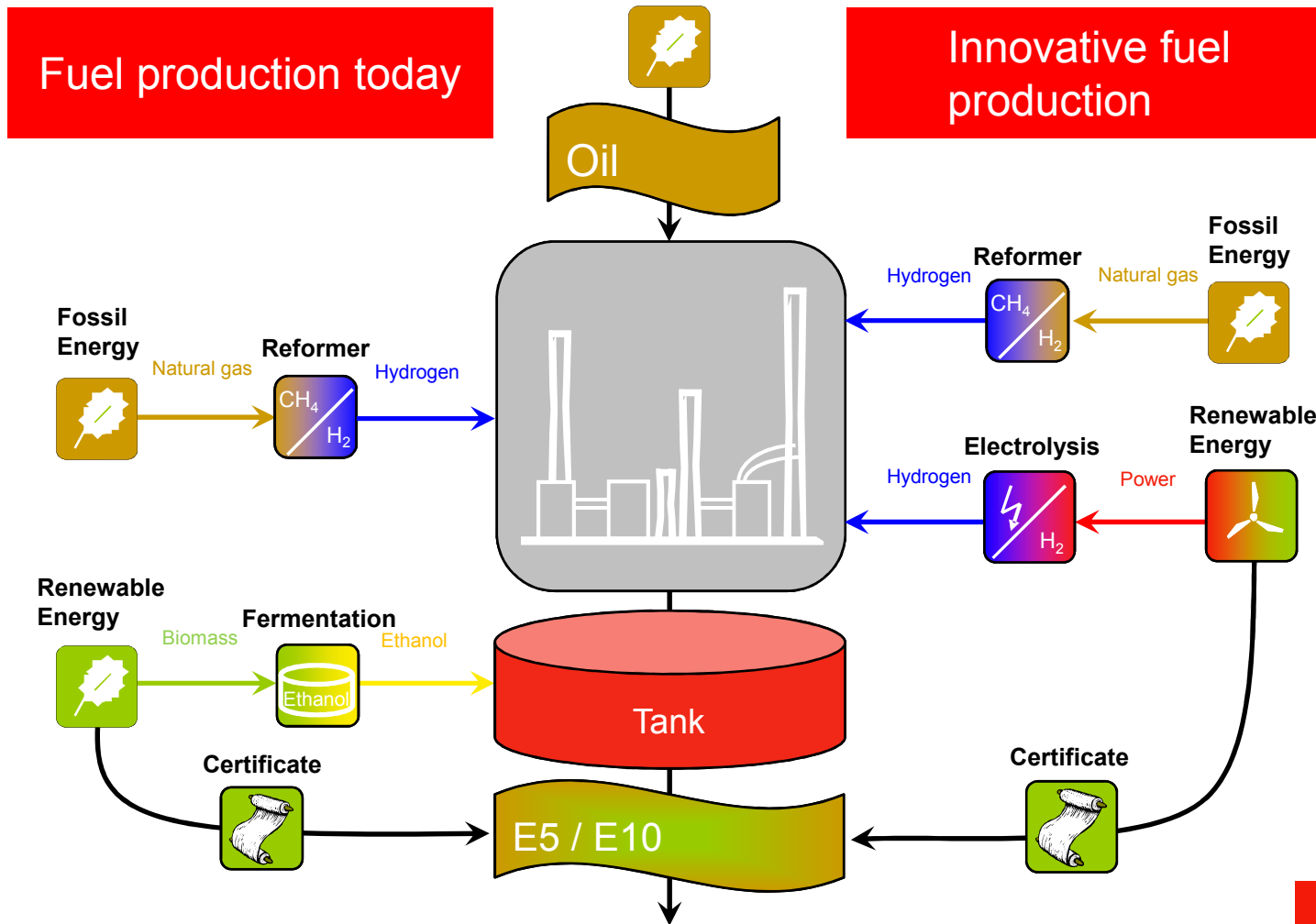


Idea

- Development of high efficient Proton exchange membrane electrolysis (PEM with 80% eff.)
- Demonstration within E.ON infrastructure
- Business development



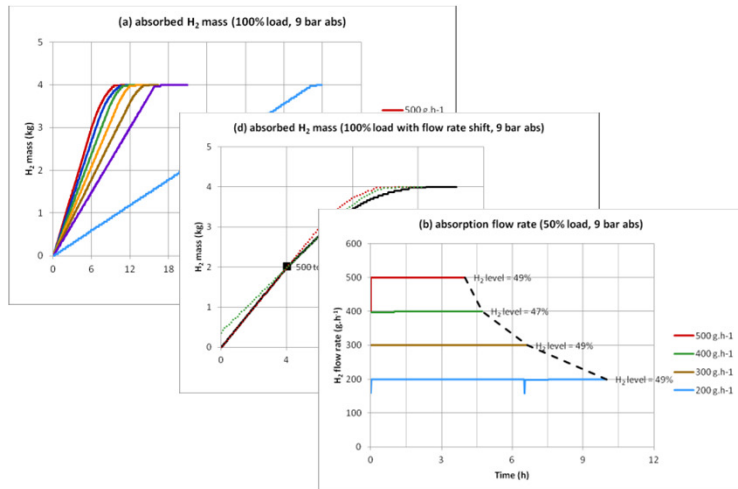
Example: Power to Gas for Refineries



Example Project Hydor: Demonstrator for solid storage of hydrogen in France

The project

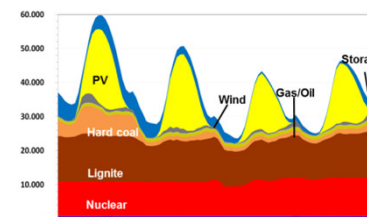
- Location: E.ON France thermal power plant site Emile Huchet in Lorraine region
- Demonstration: Evaluation of performance and flexibility for solid storage of hydrogen (McPhy) in an industrial environment
- Storage capacity 5kg H₂
- Project duration: 6 months



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Summary

- Increasing need to integrate renewable energy leads to the interconnection between power, gas and heat system.
- Power to Gas can provide both, storage services for the power market and the integration of renewable power into mobility, industry and heating.
- Today, the major levers to push the development are
 - Reduction of technology costs
 - Exemption from end consumer fees
 - Favorable regulation for green hydrogen



The E.ON logo, consisting of the lowercase letters 'e-on' in white, italicized font, set against a red rectangular background.

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