

Why renewable policy must fully account for renewable gas incl. P2G

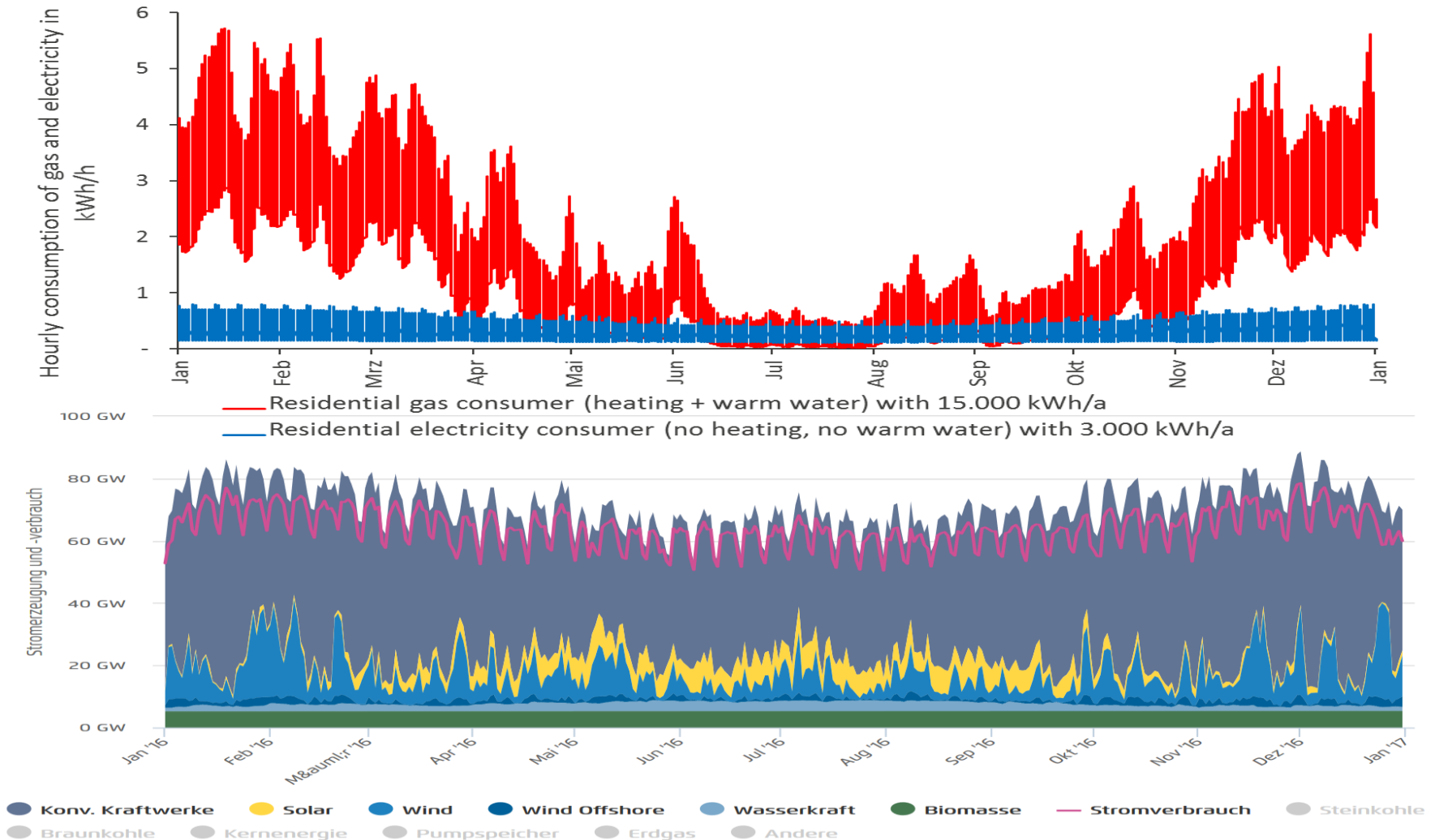
TYNDP 2018 Gas Supply Potentials, ENTSOG

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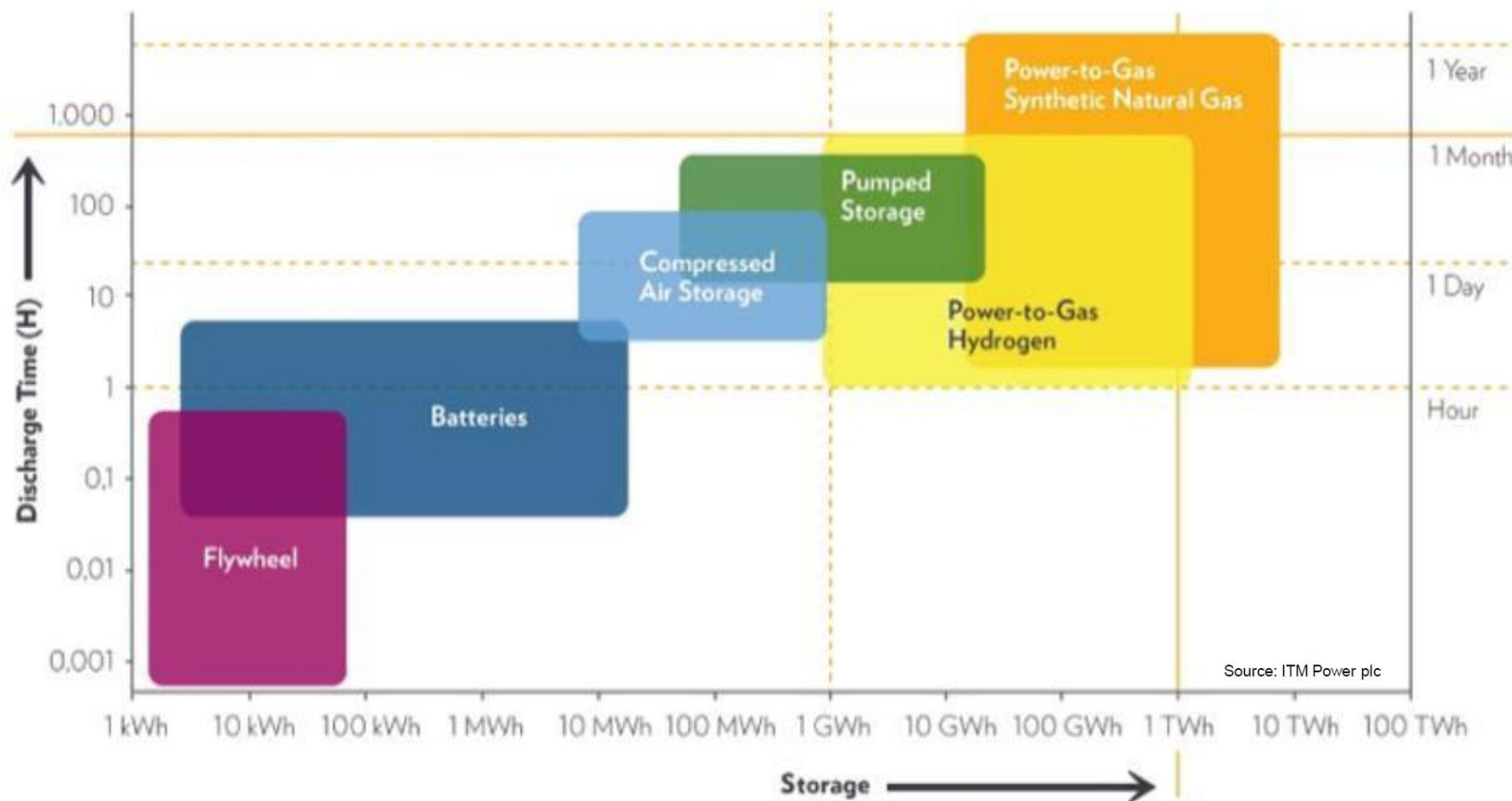
Why is R-Gas an important part of the future?

A comparison of load and production profiles shows the large “challenges” of a heat electrification



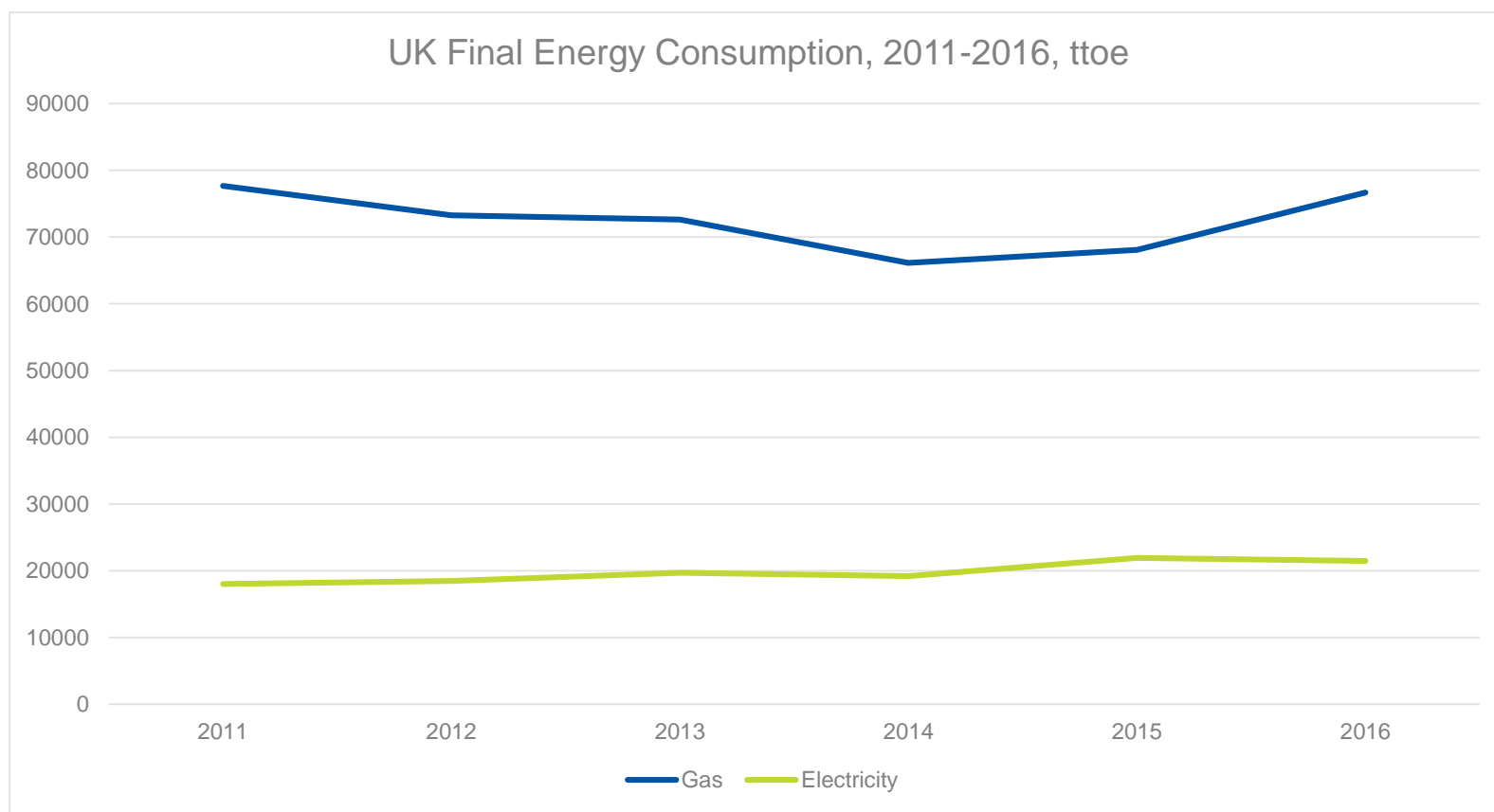
Storage options according to size of capacity and discharge time duration

Many innovative storage technologies are published every month, but the size, time frame and location make the gas grid the largest storage available



A reality check in UK has shown that a shift to electric heating is not feasible in the near future

Energy efficiency measures take time. A fast electrification of the heating market has to be backed with a steep increase of power production and grid expansion





How does Primes see an alternative future with R-Gas?

Our approach: show gas' contribution to meeting EU climate targets by using same assumptions as COM

- Eurogas Scenario study – main results to be published early 2018
- Our model: PRIMES model (E3M Lab, Athens U.) explores 'what-if' questions. It is a modelling system that simulates a market equilibrium solution for each form of energy supply and demand.
- The Eurogas Scenario Study uses the modelling used by the **Commission for its Reference Scenario Reporting** Assumption: 80% GHG reduction

Methodology

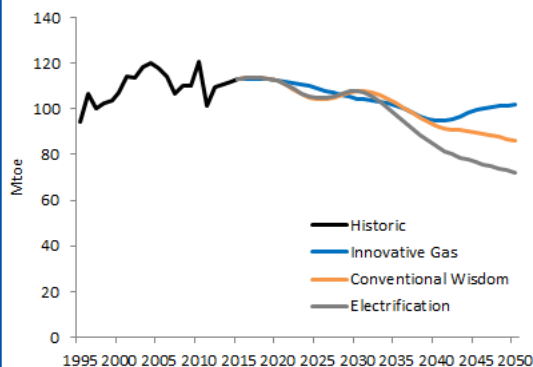
- Market equilibrium is achieved for each 5-year interval and is dynamic over time. Market equilibrium solution means a scenario where demand and supply are equalised, taking into account consumer choice. Prices produced from this cocktail are linked by feedback loops with behaviour.
- Variability is modelled by 120 typical days of high/low wind and/or sunlight, affecting the operation of the power plants in the model for which fast ramp rates for flexible operation are included. Curtailment of renewable energy production is captured in the updated model.

Primes used 3 different scenarios: conventional wisdom, electrification, innovative gas

Sectors difficult to decarbonise, such as residential, transport and industry, illustrate the versatile role of gas to reduce emissions.

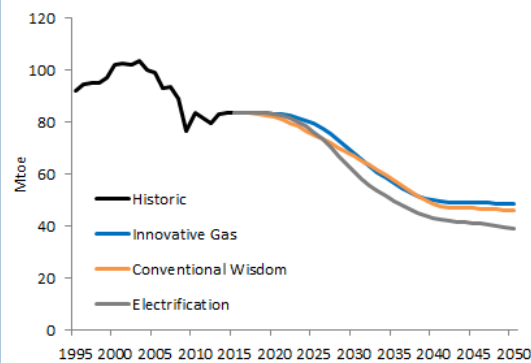
Focus on: Residential

- 76% of current houses in 2050; stable gas demand to 2030
- Increasing shares of renewable gas to maintain relevance
- Renovation rate of 2-3%



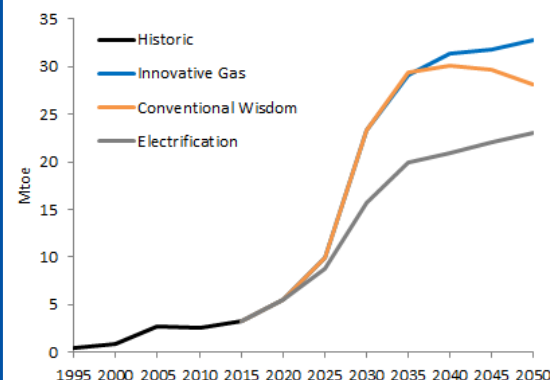
Focus on: Industry

- Short-term energy demand rise in industry could occur, despite weak economic outlook
- Efficiency is key, and so is natural gas

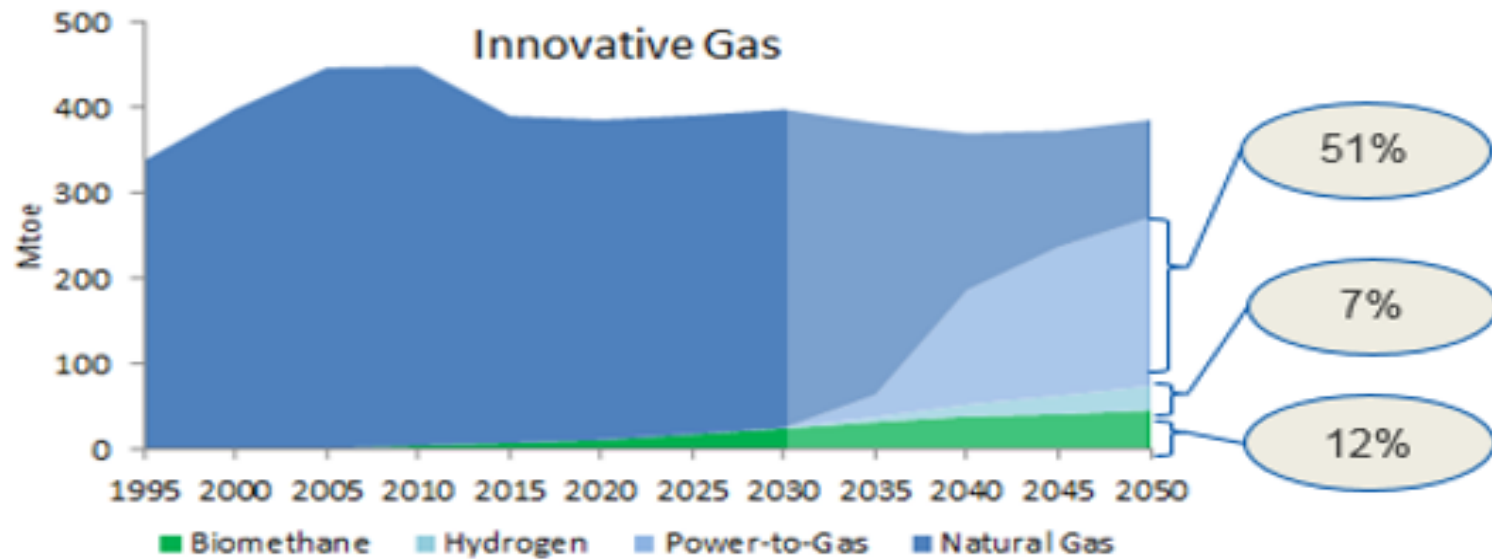


Focus on: Transport

Gas contributes to decarbonising the transport sector and to clean air while maintaining travel distance and load



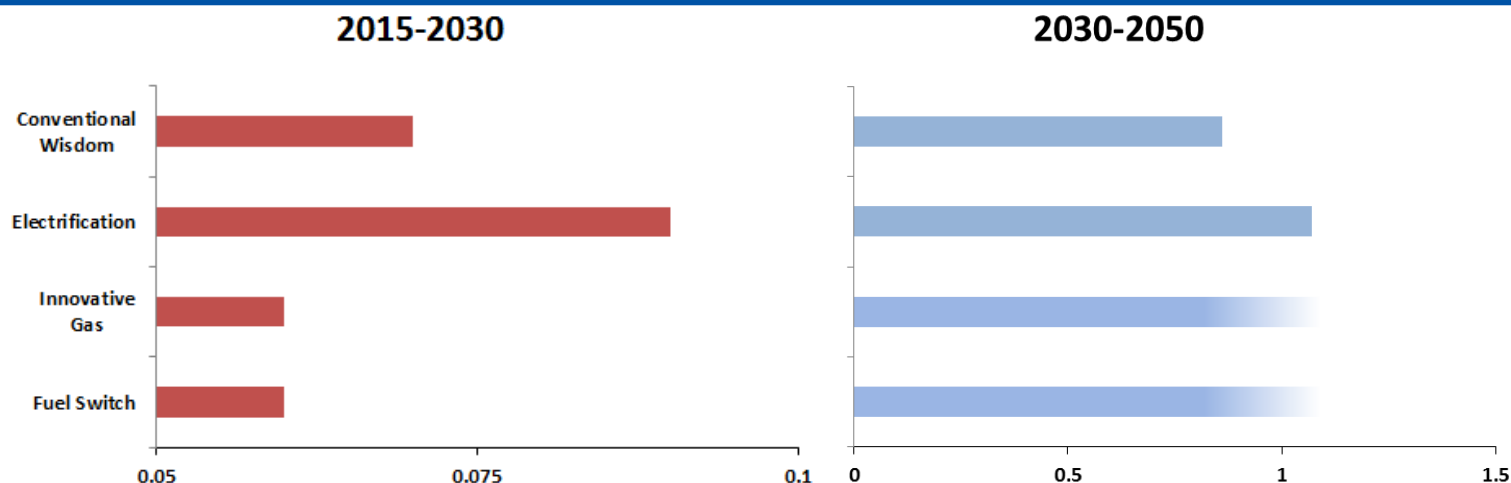
Composition of gaseous energy in the European gas mix



A strong push for electrification would result quickly in system limitations and in high overall costs.

This study envisions a future in which the EU's agreed climate targets are met. It demonstrates that considerable progress can be made early by tapping the vast potential that gas (natural and renewable) offers in delivering a sustainable future.

Total additional system cost for decarbonisation (% of GDP)



Grids

Investments in gas infrastructure are equal in all scenarios; for power grids, the electrification sensitivity is **€ 335 billion** more expensive than the Innovative Gas scenario.

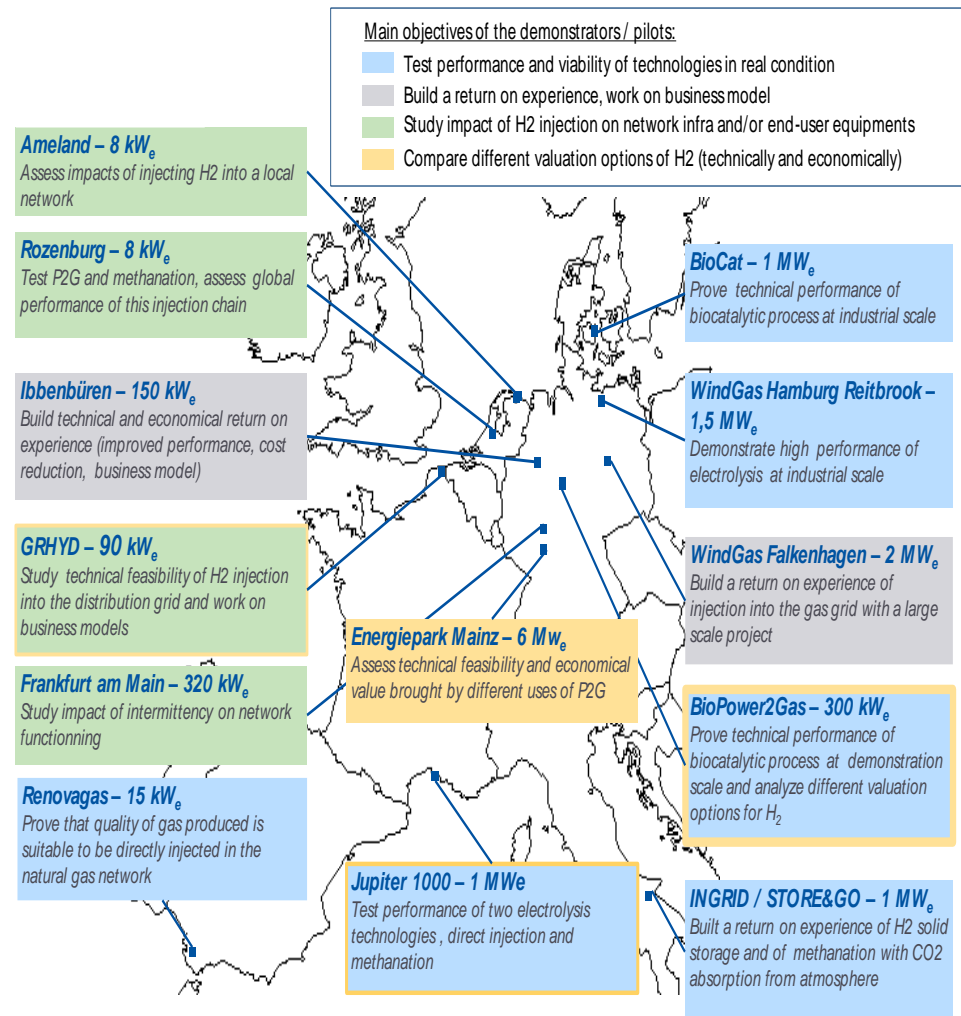


Is there enough R-Gas in Europe?

Various projects started in the last years to test P2G on an industrial level

In addition really large scale hydrogen and decarbonized gas projects are discussed in UK (Leeds) or in the North sea (Energy Hub, Statoil,...). They open a new field of technology with decarbonized gases.

Future outlooks e.g.
Germany: 2023 9 % of RES Electricity shall be curtailed for 2,6 Mrd.€



German regulator flexibility planning 2030

- The German regulator passed, last month, the following indicative planning for the increase in flexibility options to ensure stability in the overall energy system

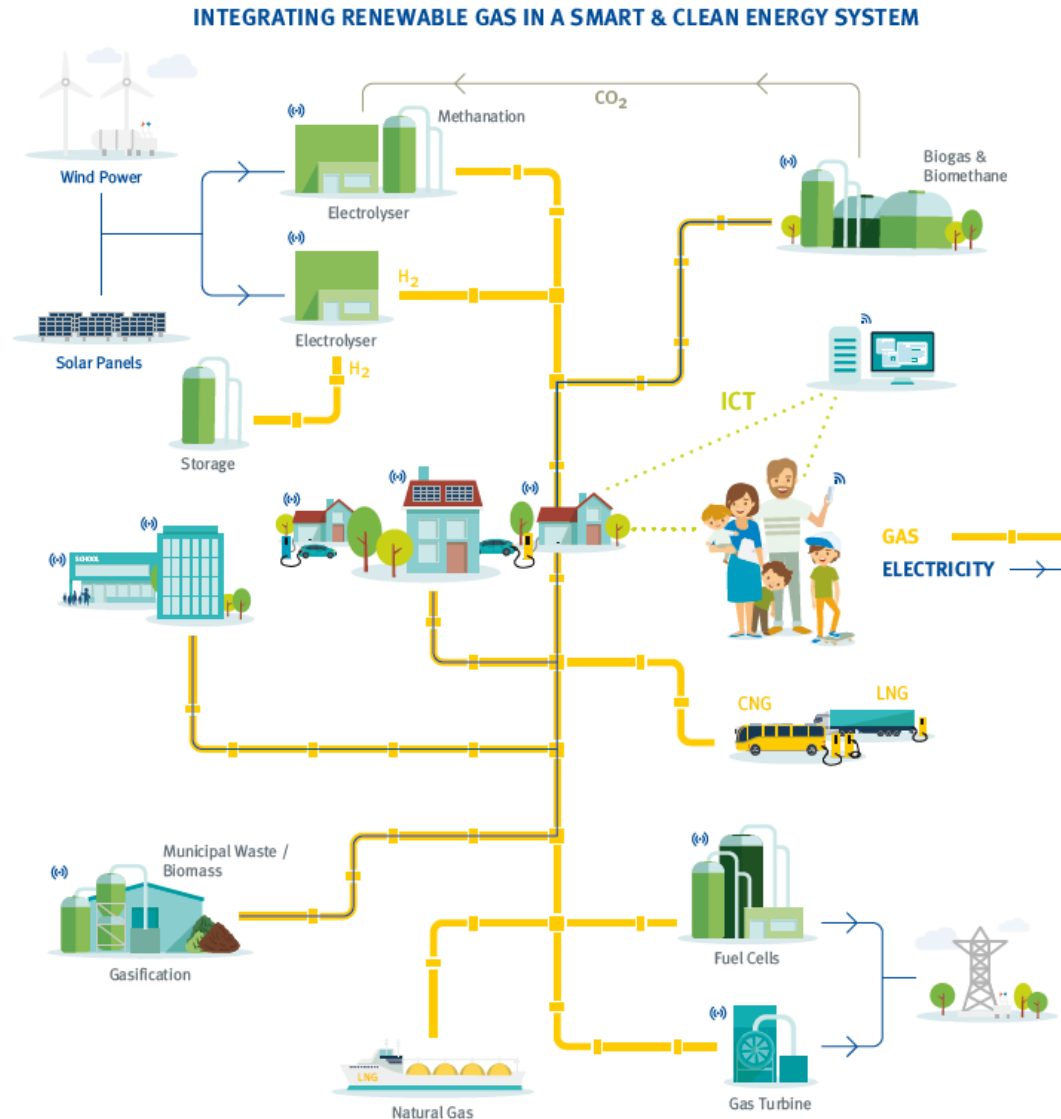
Flexibilitätsoptionen und Speicher [GW]					
Power-to-Gas	---	1,0	1,5	2,0	2,0
PV-Batteriespeicher	---	3,0	4,5	5,0	6,0
DSM (Industrie und GHD)	---	2,0	4,0	5,0	6,0

- This planning foresees between 1 and 2 GW of installed power-to-gas capacity at a 2030 horizon

Policy must be broad in scope to account for full energy system and effectuate optimal change

- R-Gas is key in achieving a long-term sustainable energy system and will help **solving the trilemma** of realizing an energy system which is sustainable, secure, and affordable.
- Already today a strong shift in paradigms and activities of the gas sector can be seen, but this movement must be backed by new legislation.
- We very much welcome the EC's announcement to start the work on a gas package. Closer cooperation between the infrastructures electricity, gas and district heating will benefit the system
- The recognition of R-Gas as a renewable energy and P2G as energy storage in the winter package is very important but more needs to be done.

Acceptance by citizens is decisive for a successful energy transition. Offering cost efficient choices is key.



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