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RES-FC MARKET

Need heat & power?

Partners in the project:

- Aalborg University (DK)
- Baltic Baltic Industries and Consulting (PL)
- National Renewable Energy Centre (ES)
- Dantherm Power (DK)
- DONG Energy (DK)
- Energy Research Centre of the Netherlands (NL)
- Hydrogen Innovation & Research Centre (DK)
- International Biogas and Bioenergy Centre of Competence (GE)
- IRD Fuel Cell Technology (DK)
- The Institute of Systems and Robotics (PT)
- Das Kompetenz- und Innovationszentrum Brennstoffzelle der Region (GE)
- University of Iceland (IS)



Target groups:

- The suppliers of RES-FCHS
- The regional and national authorities
- The RES industry
- End-users
- EC

Key actors:

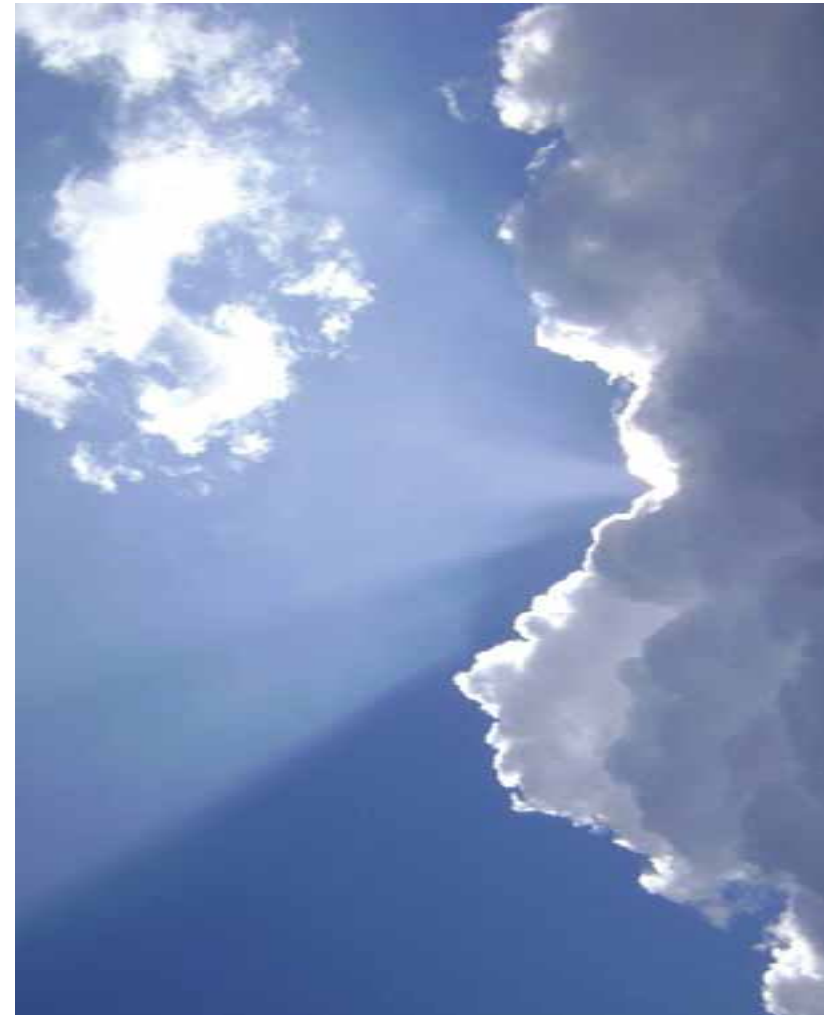
- The households buying the RES-FCHS
- The suppliers of the FCHS
- The regional and national authorities
- The RES industry
- EC



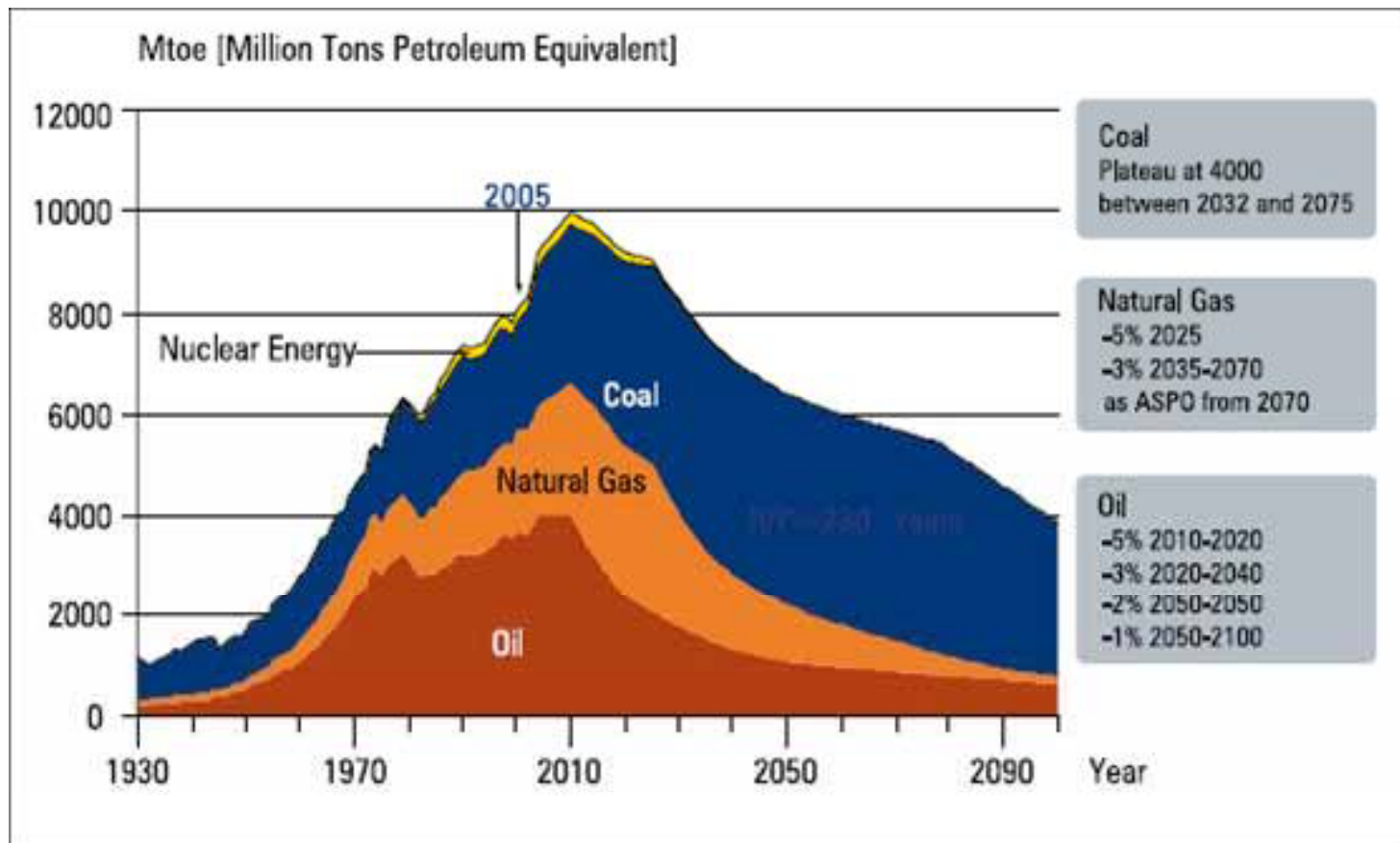
What is RES-FC Market?

A study on market development of renewable energy sources (RES) fuel cell household systems (FCHS).

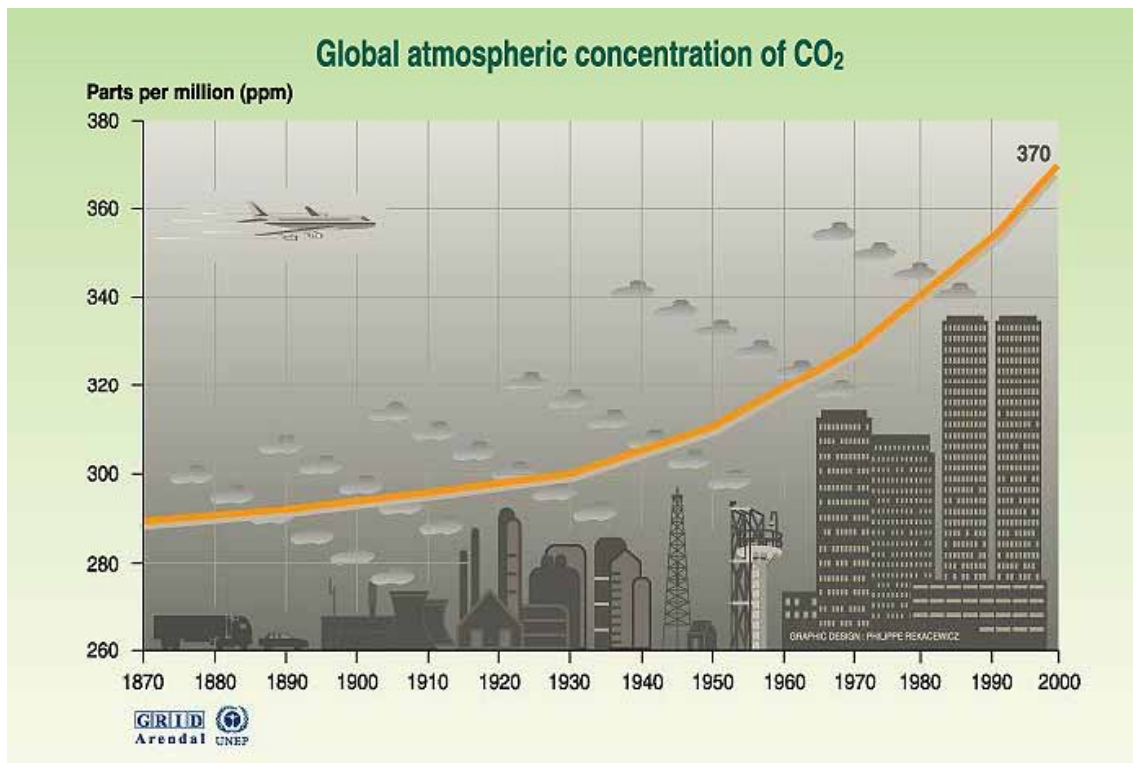
- Catalogue of regional markets for RES-FCHS
- Identification of 3,000 units to be realized in the nearest future
- Driving down the costs of RES-FCHS by "pooling" the units into one order.



Why renewable energy?



Why renewable energy?



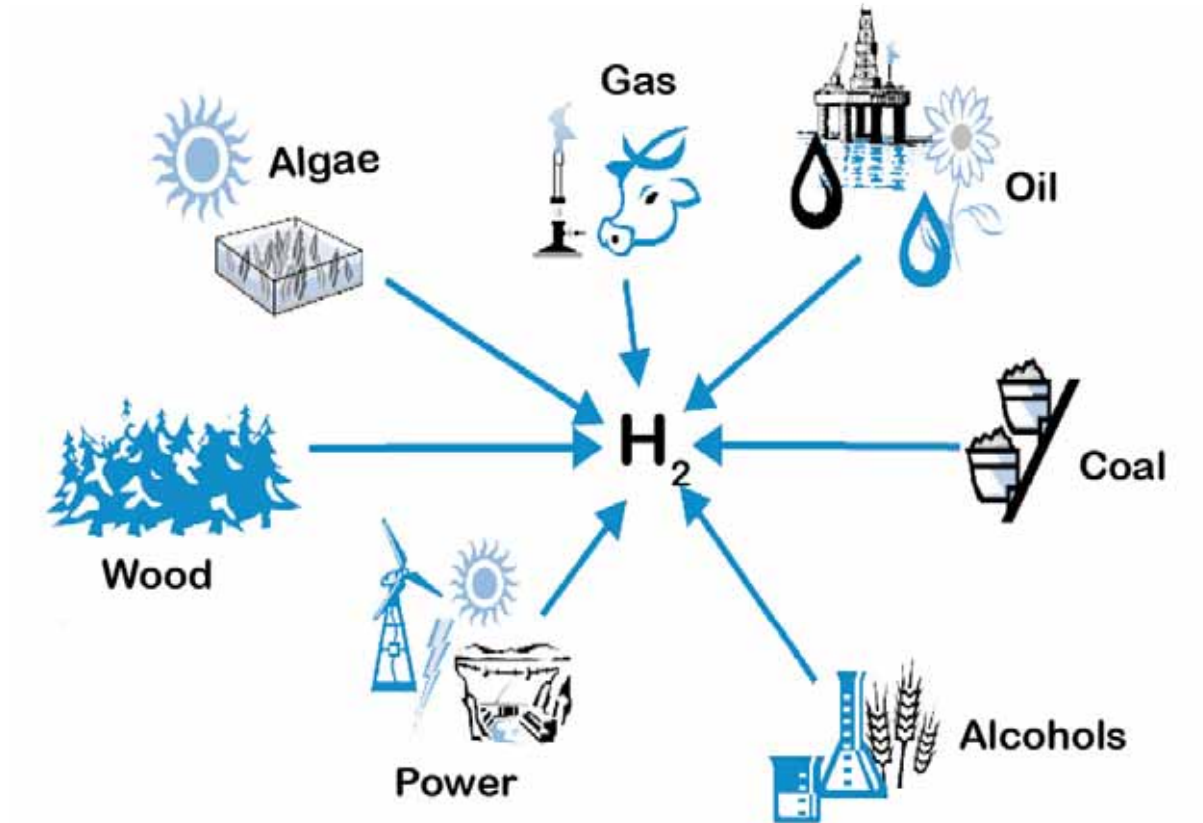
Sources: TP Whorf Scripps, Mauna Loa Observatory, Hawaii, institution of oceanography (SID), university of California La Jolla, California, United States, 1999

Why fuel cells household systems (FCHS)?

- A way to integrate more renewable energy into the energy system
- Reduction of CO₂-emissions
- Grid balancing
- The fuel cell technology has today reached a reasonable level of maturity for commercial sales on a few early markets and for demonstration projects on larger mass markets.



Hydrogen



The project

3 primary energy sources

- Biogas
- Biomass in general
- Wind energy, especially "excess wind"

3 standardised processes

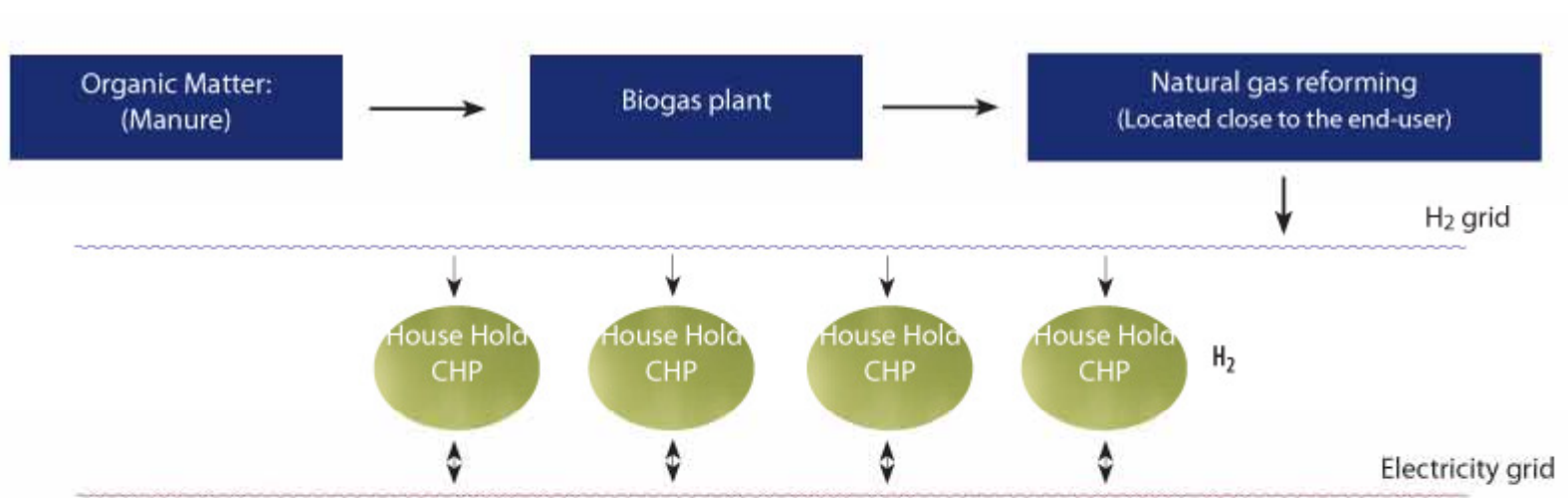
- Case 1: biogas to hydrogen to CHP
- Case 2: Biomass and Wind to hydrogen to CHP
- Case 3: Only wind to hydrogen to CHP

1 MCHP (micro combined heat and power plant)

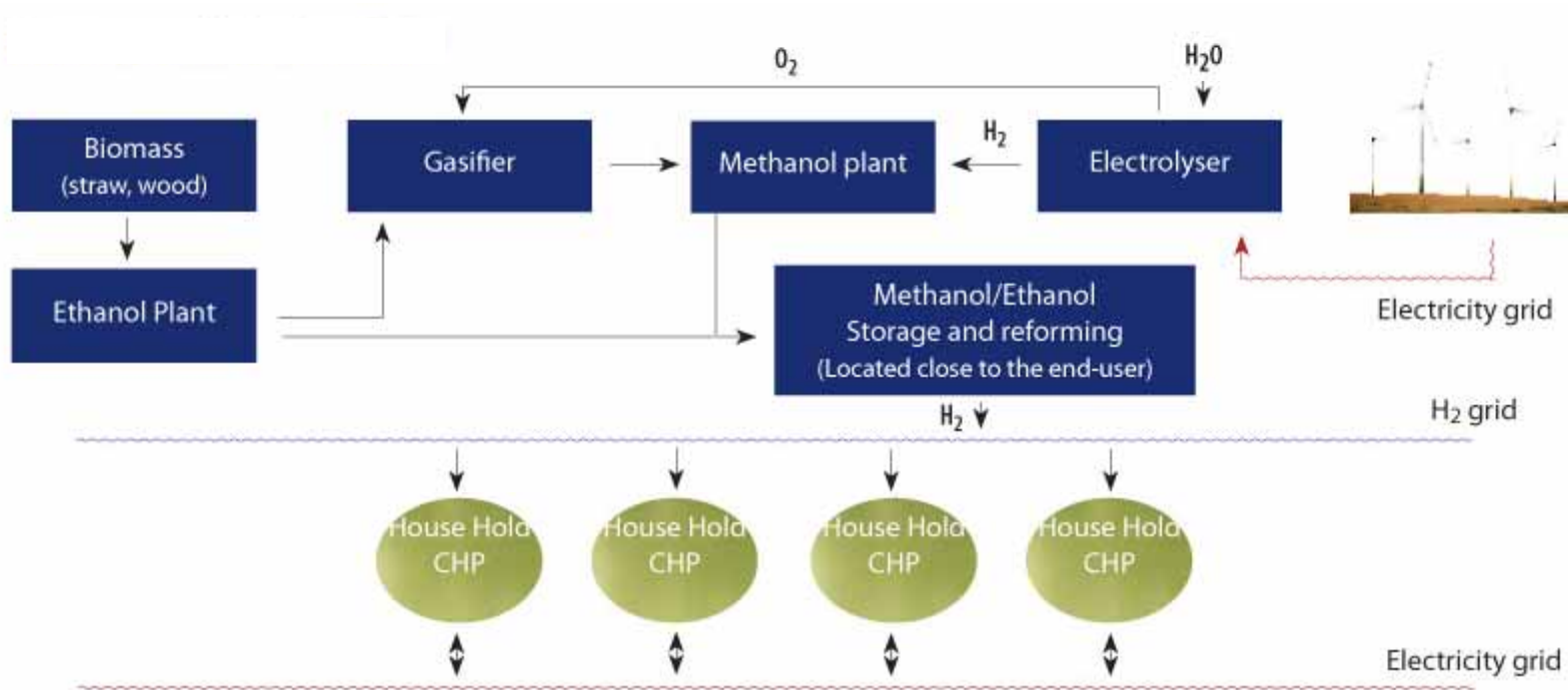
- PEMFC – 0.5-1 kWe,



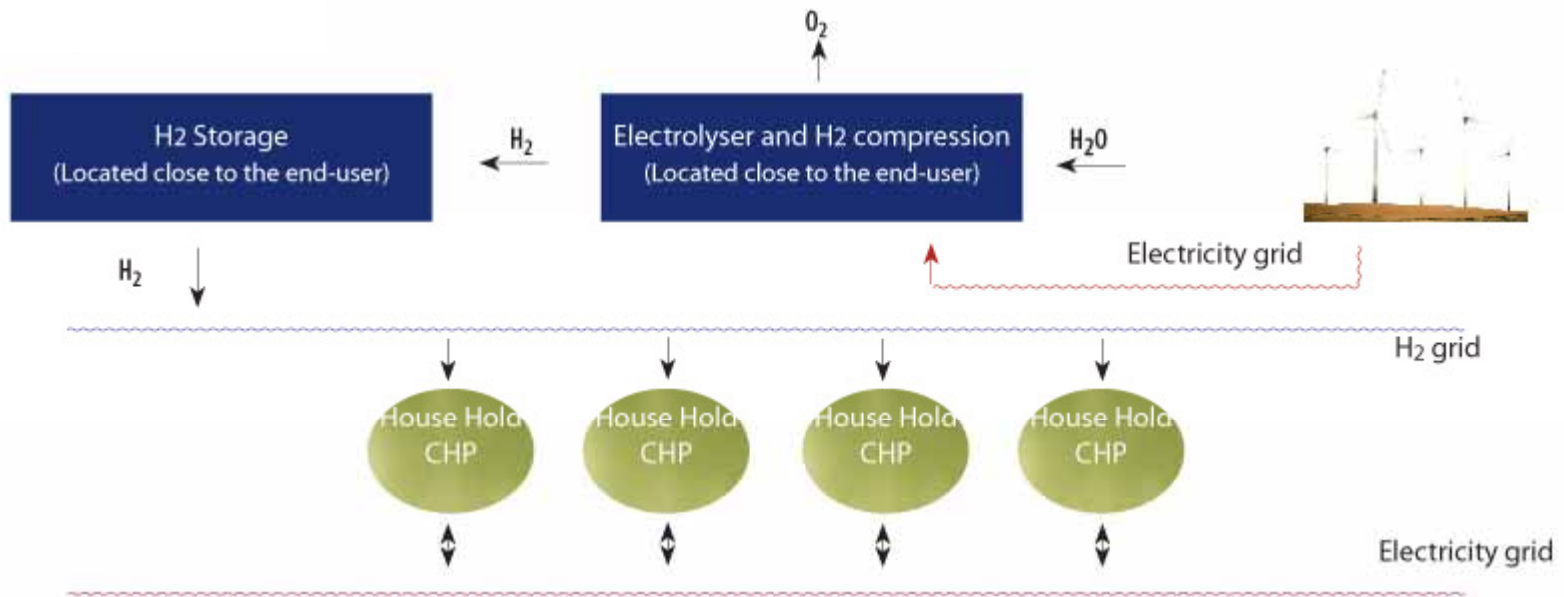
Biogas to CHP (combined heat and power)



Biomass in general



Wind energy, especially "excess wind"



Market perspectives

What will further market penetration of MCHPs?

- Cost reductions
- Environmental benefits
- Improvement of technology
- Access to the technology
- End user interest
- Manufacturer interest
- Political awareness and subsidies
- Demonstration activities



Case H2College: A regional demonstration market



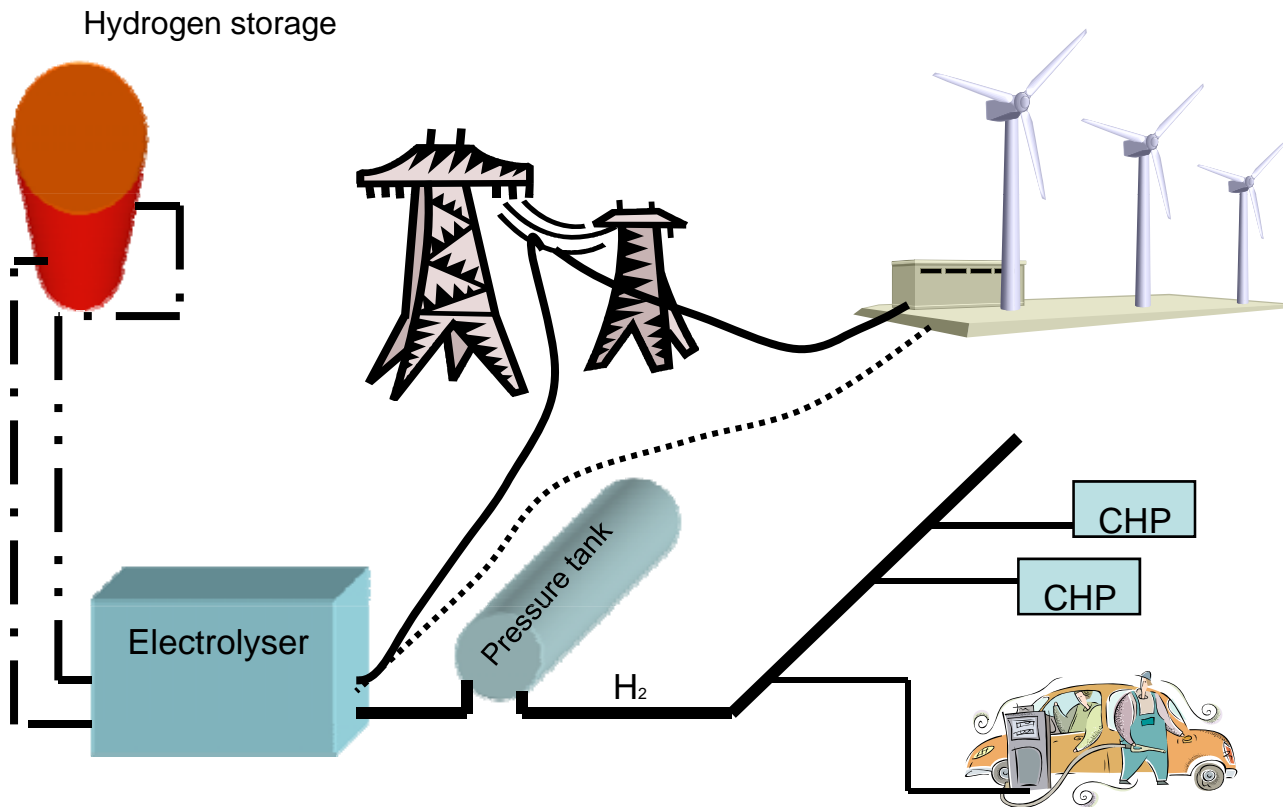
Case H2College: Construction elements

66 apartments for students based on:

- Wind power
- MCHPs
- Passiv house building standard
- Alkaline electrolyser from GreenHydrogen.dk



Case H2College: The energy system



Case H2College: Reaching out...

- Monitoring group of national politicians
- Monitoring group of regional politicians
- Opponents
- Monitoring group of residents
- Conferences
- Brochures and website



Case H2College: GreenHydrogen.dk as a spin-off company

- Develops products of the alkaline electrolyser technology and compete on price and performance with the dominant competitors.
- Develop new technology in dialogue with universities and research centres.



Recommendations for the promotion of MCHPs:

- National and EU policies – subsidies for the introduction of the technology
- Lower costs - coupled with set minimum tariffs for delivery of electricity to the grid
- Higher efficiency – gained by the testing of the technology
- Demonstration activities – to show and test the technology and the new way of living
- Public awareness through dissemination activities– people are looking for more environmentally friendly ways to live
- Learning from other energy sectors such as the windmill industry
- Cooperation between different nationalities – sharing knowledge on best practice





RES-FC MARKET

Thank you