

Following projects and further aspects and synergies

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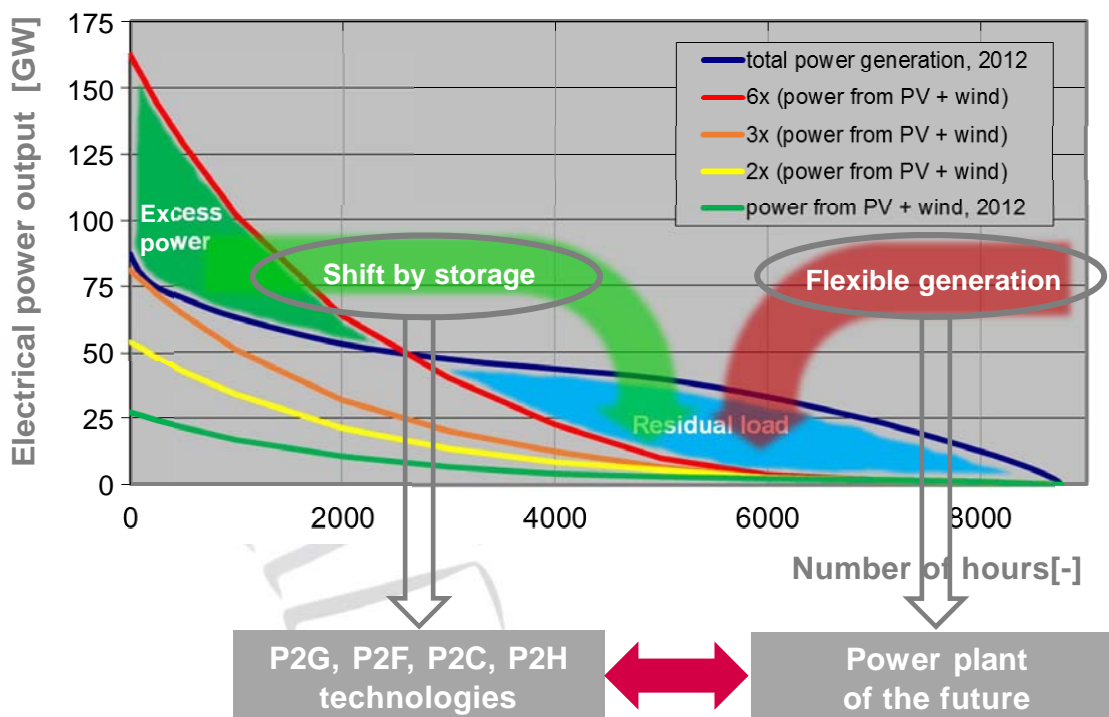
Flexible power plants for the Energiewende
5th March 2015, Brussels

www.rhein-ruhr-power.net

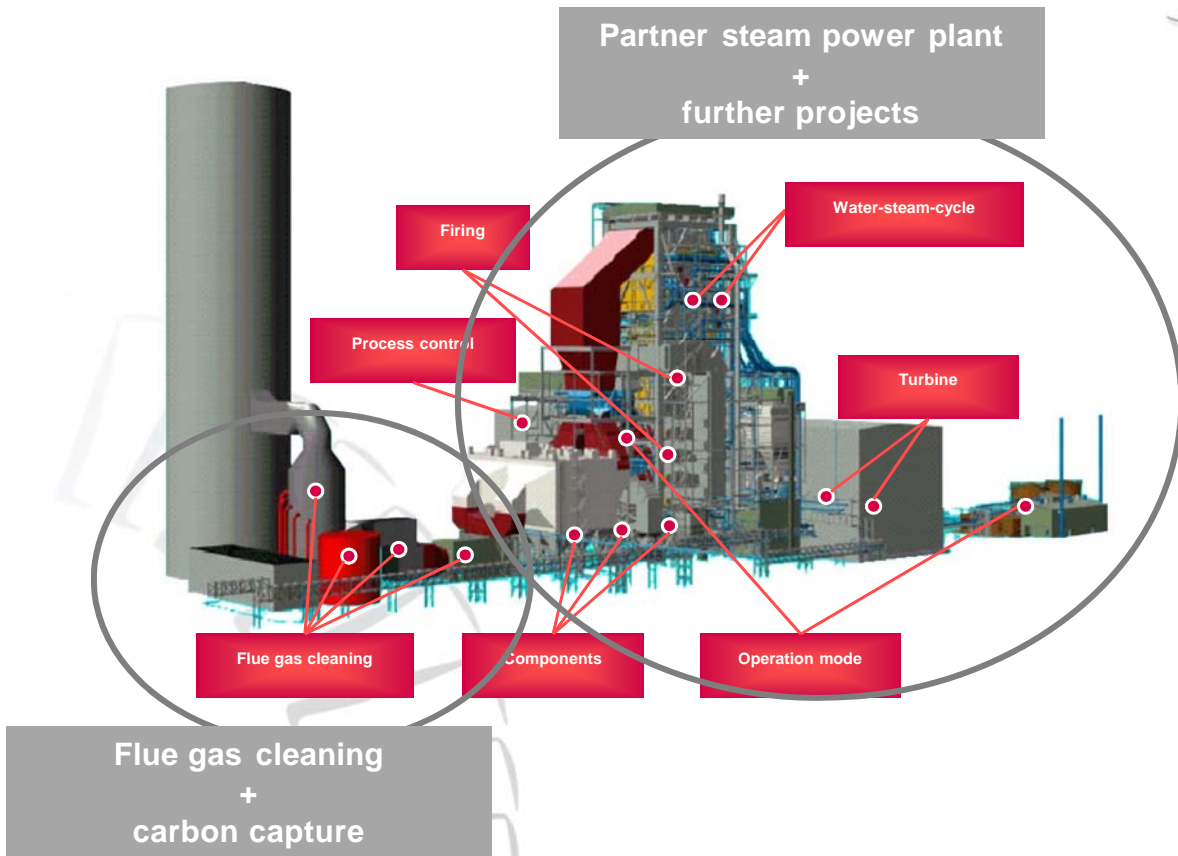
Power plant of the future



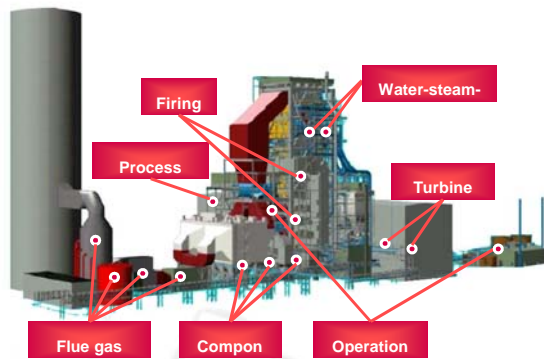
Total net load vs. power production by renewables



Starting points for power plant flexibilization



Concrete RRP projects



Phase 3 projects
Corrosion modell
Measuring technology
Corrosion protection
Temperature sensor technology for gas turbines
Flexible CHP-plants
Flexible coal firing
Flexible flue gas cleaning

Phase 2 projects
CAX process chain for weldement
Engineering processes in PP constructions
Hot cracks in thick-walled Ni-based components
FlexPowerPlantPumps

Phase 1 project
Partner steam power plant

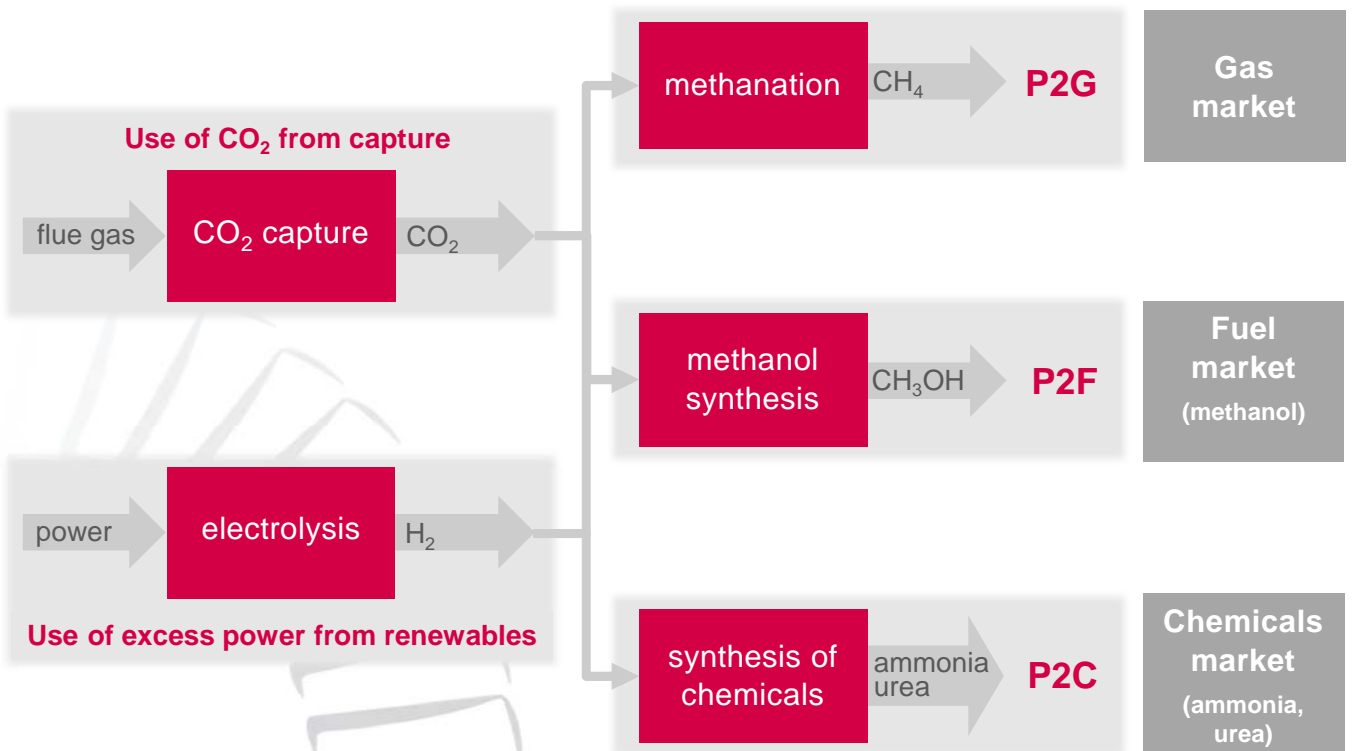


Power plant of the future is capture ready

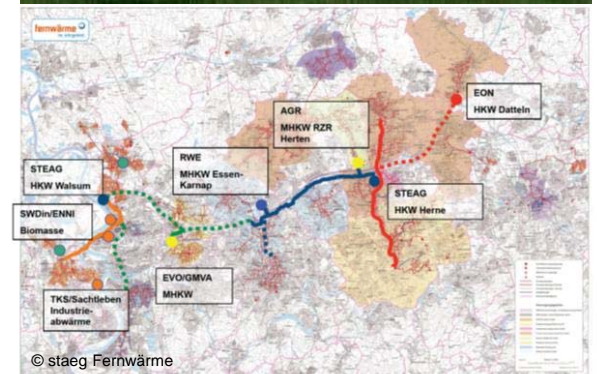
- **Capture readiness** of a power plant makes a today investment more attractive
- Opportunity to achieve high CO₂ reduction goals
- CO₂ capture is a **proven technology** and ready for the market
 - RWE plant in Niederaußem, NRW
 - Uni Duisburg-Essen plant in steag coal fired power plant in Lünen, NRW
 - E.ON coal fired PP in Maasvlakte, NL is capture ready
- CO₂ capture in combination with power plant gives additional **flexibility options** in operation
 - Capture rate can be varried between 0 and 90 %
- Excess power from power generation and captured CO₂ are the basis for **further products**
 - Power-to-Gas P2G
 - Power-to-Fuels P2F
 - Power-to-Chemicals P2C



CCU / P2X contribute to new markets



- Combined heat and power is a proven technology to **reduce CO₂** in relation to a separated generation of heat and power
- NRW is a concentrated urban and industrial area with a very dense **district heating infrastructure**
- This infrastructure will be enlarged and **interconnected in the Ruhr area.**
- New gas and steam power plants with heat extraction in **Düsseldorf** and **Cologne** contribute to the increase the power production by CHP in this area
- By these measures NRW becomes a **model region for CHP in Europe**



Challenges for future markets

- Flexible fossile based power plants are the **back bone** for a
 - stable
 - economic and
 - environmental friendly
 power supply
- New power plants are necessary for this task
- These must be prepared for future markets:
 - extremely flexible, very low partial load, high load transients
 - cheaper in the specific investment costs
 - smaller in the absolute capacity
 - capture ready
 - heat extraction possibility for CHP applications
- **The power plant of the future** – is able to be the reference for the global market



- Regional projects are one cornerstone for the future European energy system
- Products from NRW / Germany / Europe are able to contribute to reduce the CO₂ emissions significantly
- NRW - as one of the leading energy regions in Europe - has a very good basis for being the technology leader in this context
- RRP - Rhein Ruhr Power - concentrates necessary competences:
 - technological ones
 - economical ones
 - structural ones

to be successful in the future global market

Thank very much for your kind attention

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