

# Magnum as a superbattery

Challenges and perspectives for use of hydrogen for flexible CO<sub>2</sub>-neutral power generation

H2EM2019

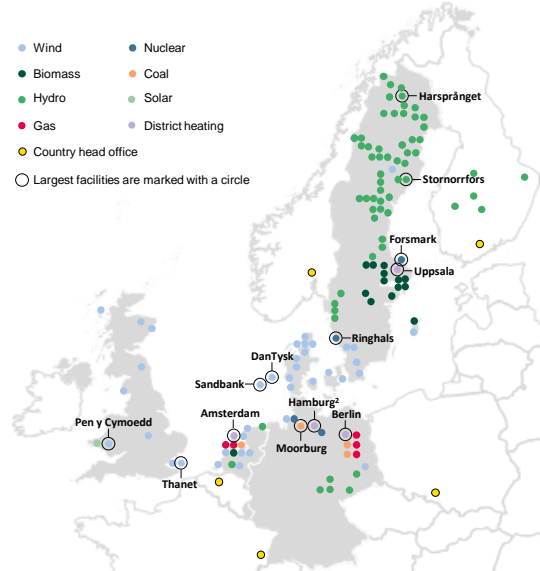
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# This is Vattenfall

We will help power our customers to live free from fossil fuels within one generation

- One of Europe's largest producers of electricity and heat
- 100% owned by the Swedish state
- Main products: electricity, heat, gas and energy services
- Main markets: Sweden, Germany, Netherlands, Denmark and the UK
- About 20,000 employees
- Net sales (2018): ca. ~14.5 billion EUR

## Location of our operations and major plants



# Vattenfall's engagement in sector integration projects: collaboration is key

Project for fossil-free steel



**HYBRIT**

▶▶ FOSIL-FREE STEEL

**LKAB** **SSAB**

VATTENFALL

CO<sub>2</sub> neutral flexible power generation



**equinor** **gasumte** - **MH**

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Large-scale electrolysis for Synthetic Natural Gas generation



**MAN Energy Solutions**  
Future in the making  
**ARGE NETZ**

VATTENFALL

Cooperation in large scale bio-diesel production



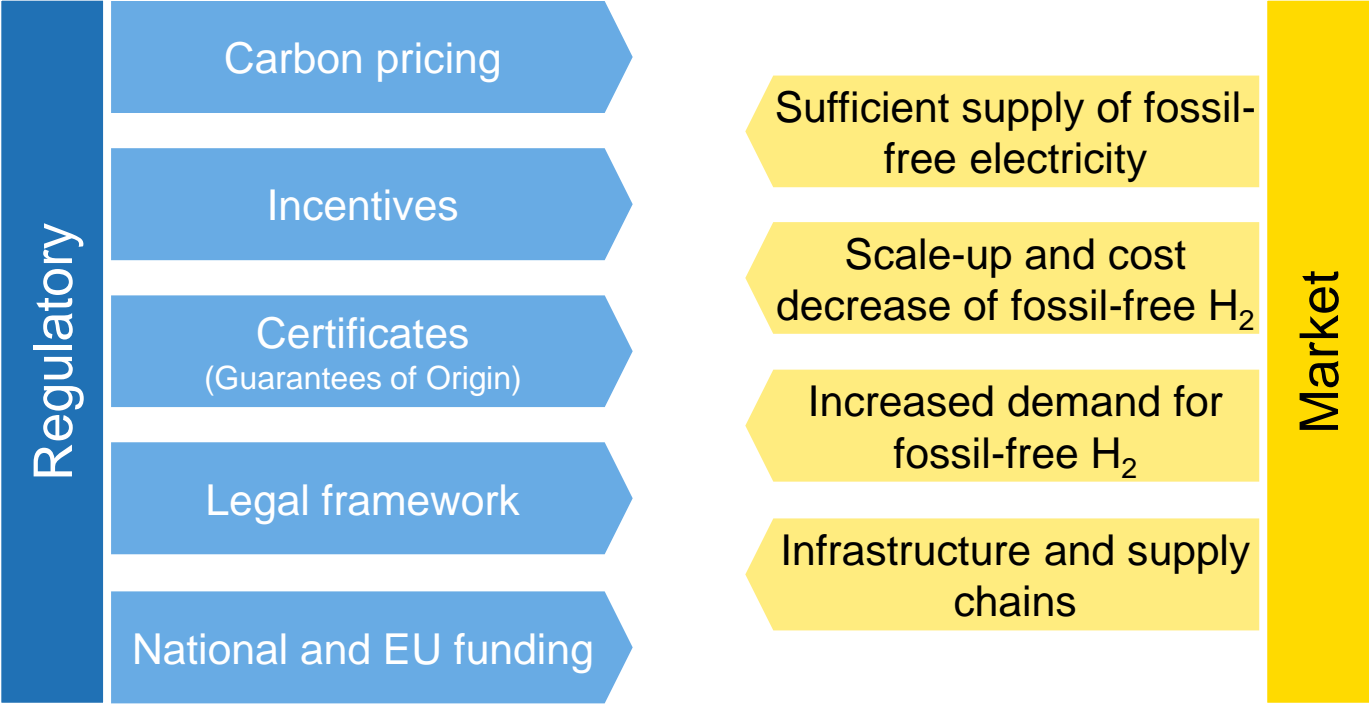
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Various green hydrogen applications for transportation



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# Hydrogen can play a key role in the energy transition, but key requirements will need to be established

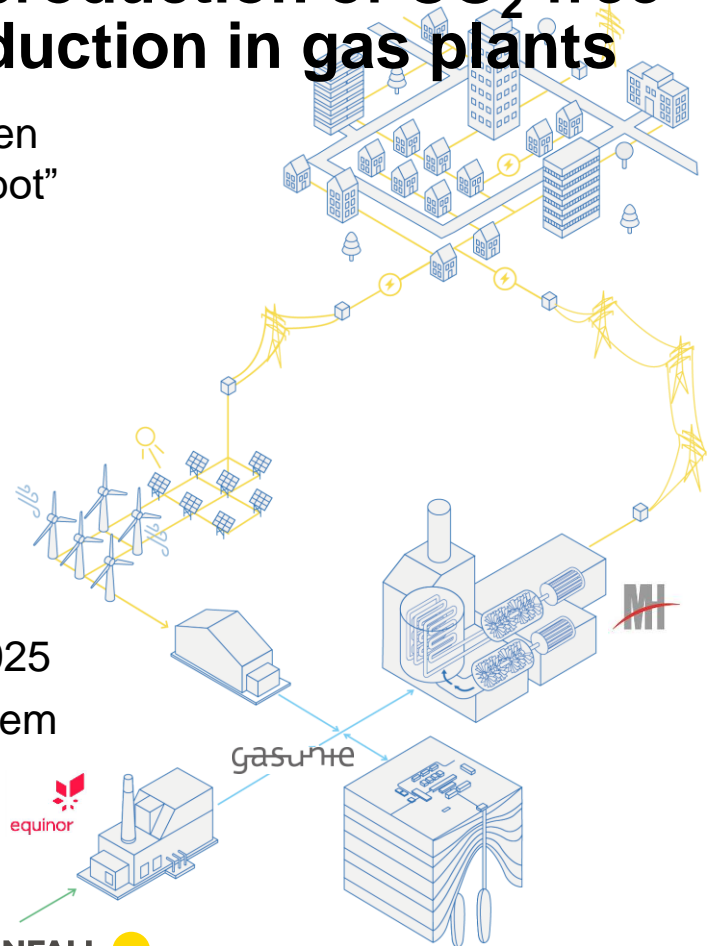


# Magnum: large-scale production of CO<sub>2</sub>-free flexible electricity production in gas plants



Groningen  
H<sub>2</sub> “hot spot”

- ✓ Kick-start H<sub>2</sub> economy from 2025
- ✓ End solution for electricity system
- ✓ Deep CO<sub>2</sub>-reduction



A large industrial facility, possibly a hydrogen production plant, is shown under a clear blue sky. The facility features several tall, cylindrical chimneys and a complex network of metal scaffolding and pipes. In the foreground, a vast field of blue solar panels is visible, suggesting a renewable energy source for the plant. A large white sign with the text "HYDROGEN READY" is prominently displayed in the middle ground, partially obscuring the industrial structure. The overall scene conveys a message of sustainable industrial production.

**HYDROGEN  
READY**