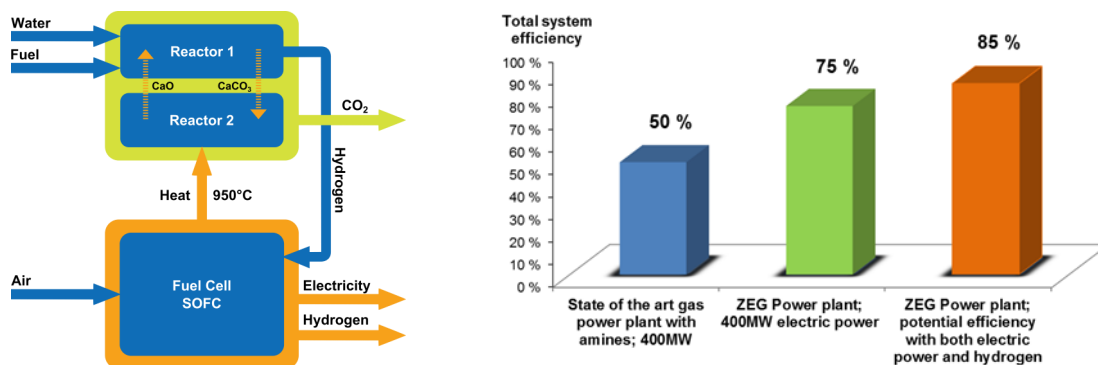


ZEG Power

More energy and less emissions!

ZEG Power AS

The **ZEG-technology** (**ZEG**[®] - Zero Emission Gas power) - an innovative, hybrid technology for high efficient co-production of electricity and hydrogen from hydrocarbon fuels, with integrated CO₂ capture.



- Electricity is produced by high temperature solid oxide fuel cells (**SOFC**)
- Hydrogen is produced in a modified reforming reaction where CO₂ is removed by a high temperature CaO-based sorbent in a carbonation reaction – Sorption Enhanced Reforming (**SER**)
- A close thermal integration between the **SOFC** and **SER** reactor system provides high overall system efficiency, more than 75%

The main strengths of **ZEG**[®] for energy production and market applications are:

- High overall efficiency (more than 75%), including ~ 100% CO₂ capture and compression of CO₂ to 110 bar
- All types of carbon based fuels can be used; natural gas, biogas, gasified biomass, coal, tar or oil
- Product composition can be varied (within design limits) depending on market demand and customer need of electricity, hydrogen and heat
- Possibility of standalone production
- Applications and scale from small scale distributed plants based on biogas to industrial scale power plants based on natural gas

ZEG Power AS

- A Norwegian energy technology development company
- Established in 2008 as a joint venture between the two Norwegian research institutes; Institute for Energy Technology (IFE) and Christian Michelsen Research (CMR)
- The objective is to design, build and verify the patented **ZEG**[®] technology for commercial power plants of increasing size and complexity. Main deliverables are concepts and detailed designs of **ZEG**[®] plants for selected applications of different sizes, and complete small scale plants

Milestones and ongoing activities

- Technology development since 2001 through a series of different projects with focus on key challenges, including:
 - SER process; reactor technology, process design and development of solid high temperature sorbents for CO₂ capture, high temperature heat exchange
 - SOFC; material performance, stack design, system design, operational conditions, cost, availability and durability of stacks and modules
 - Economic and feasibility studies
- A 50kW demonstration plant using biogas fuels (**BioZEG**) was constructed and commissioned during 2013-2014 and is operational for tests and optimization
- Pre-engineering of a 400kW plant
- Development of integrated industrial concepts for green energy production

Business potential

- **ZEG**[®] power plants provide stepwise market introduction and great opportunities for early realization of distributed, green energy production
- **ZEG**[®] covers a wide range of applications - from small scale distributed plants based on biogas to full scale natural gas power plants
- Superior overall energy efficiency
- A unique, patented technology
- A team of enthusiastic, highly skilled scientists and engineers
- Total investments exceed 120 million NOK in direct development of the technology. In addition, more than 65 million NOK has been invested in basic technologies and capacity building supporting **ZEG**[®]
- Strong partners and supporters; IFE, CMR, Statoil, The Research Council of Norway, Gassnova, Innovation Norway, SkatteFUNN

Strategic, industrial partners needed for

- Project collaboration:
 - General support for existing and new projects
 - Specific, tailor-made feasibility studies
- Technology supply
- Market introduction
- Direct investments

