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Combined Cycle Plants in Poland

Market requirements and challenges

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**The challenge –
Fluctuating power demand at raising fuel costs**



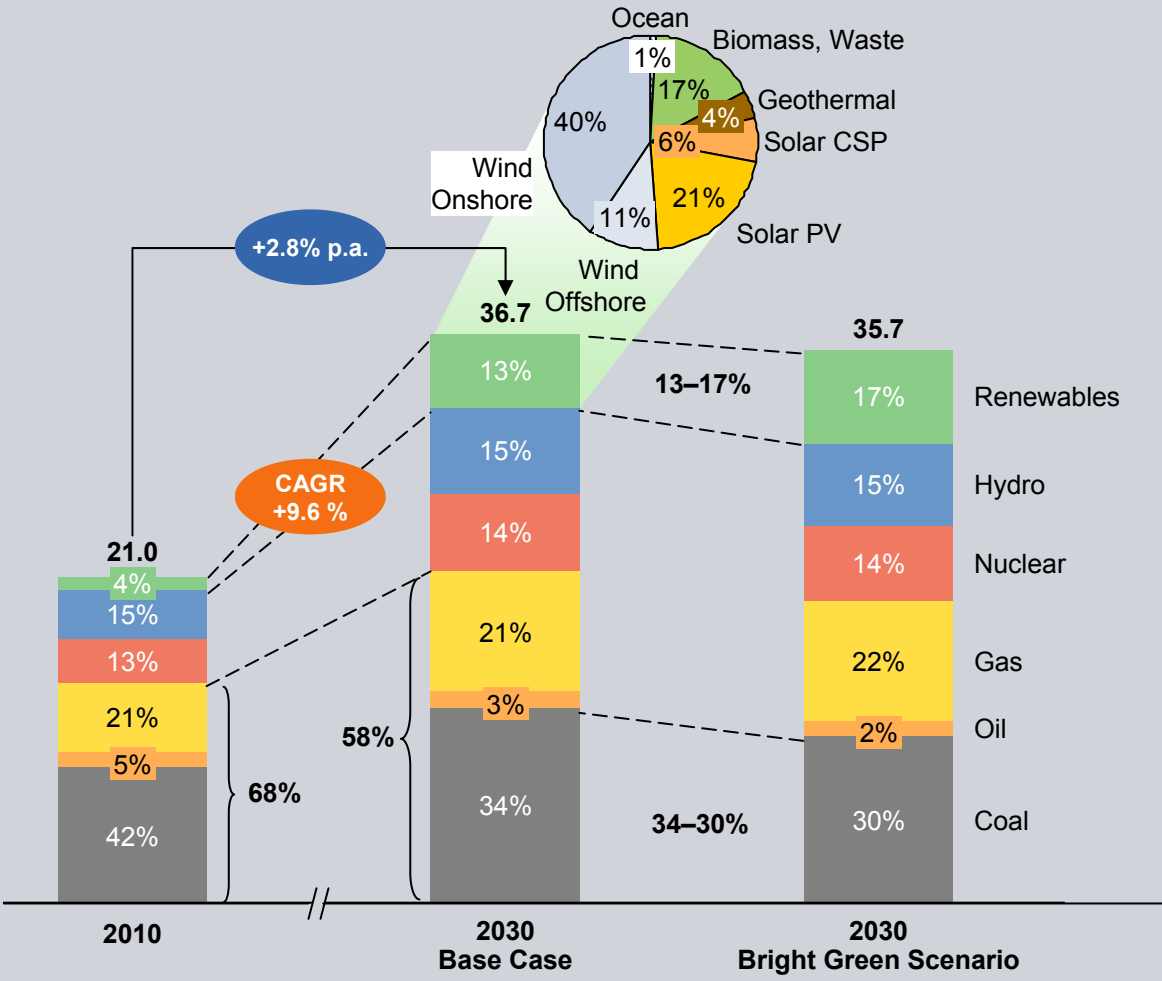
**The solution –
Siemens 8000H combined cycle power plants**



The proof

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Trends in power generation: Two possible scenarios
In each case gas will be playing an essential role



World power generation (in 1000 TWh)

Base Case Scenario assumptions:

- Gas is set to play a key role
- Renewables are entering the mainstream, but long-term support is needed

Bright Green Scenario assumptions:

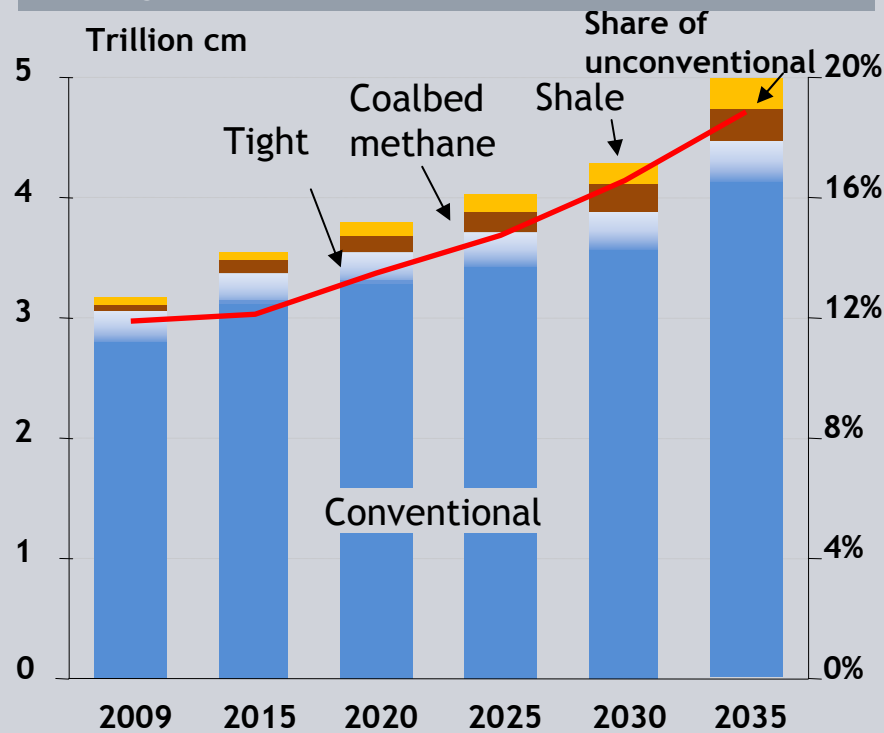
- Cost-cuts in renewables
- Energy storage available
- Expansion of transmission grids
- Gas to compensate for intermittency of renewables

Source: Siemens

The future is increasingly unconventional LNG trade grows most rapidly



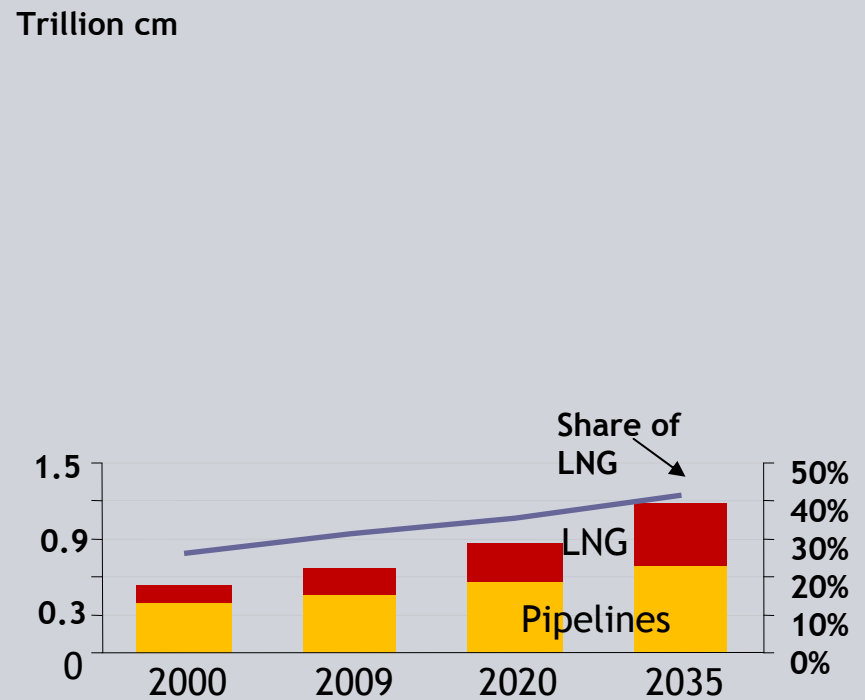
World natural gas production by type in the New Policies Scenario



Over a third of the increase in global gas production comes from unconventional sources, their combined share of production rising from 13% in 2009 to about 20% in 2035

Source: IEA, Factsheet 2011

World inter-regional natural gas trade by type in the New Policies Scenario



LNG accounts for over half of the projected growth in global gas trade, LNG trade more than doubling between 2009-35 to 500 bcm, or 11% of world demand

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Different challenges require cutting-edge technology



Region-specific challenges



Efficiency



Climate protection



Resource efficiency

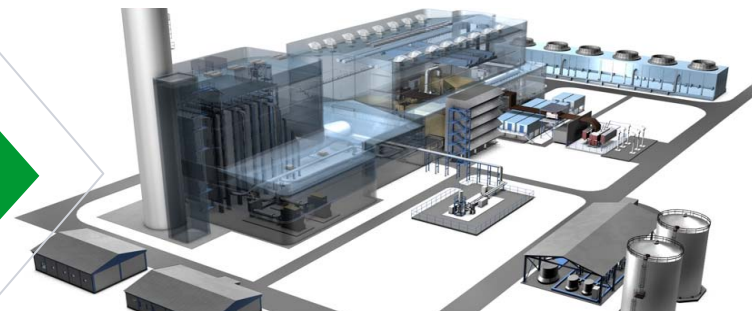


Reliable power supplies

Customer-specific solutions

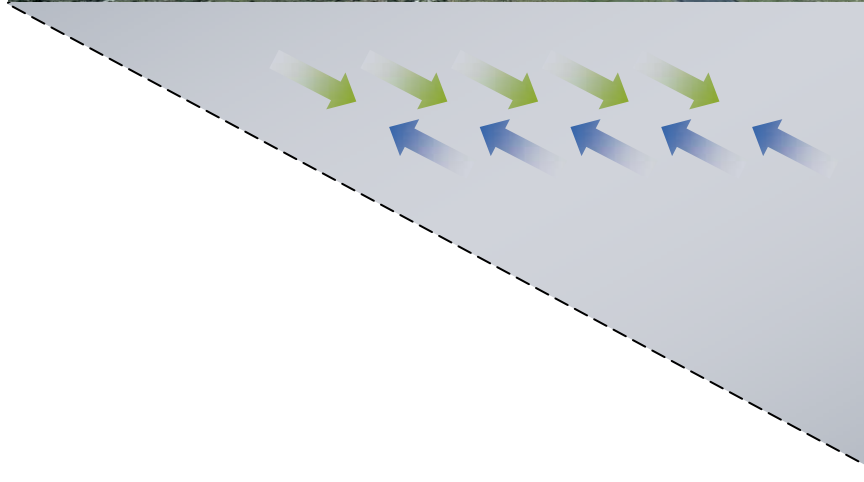
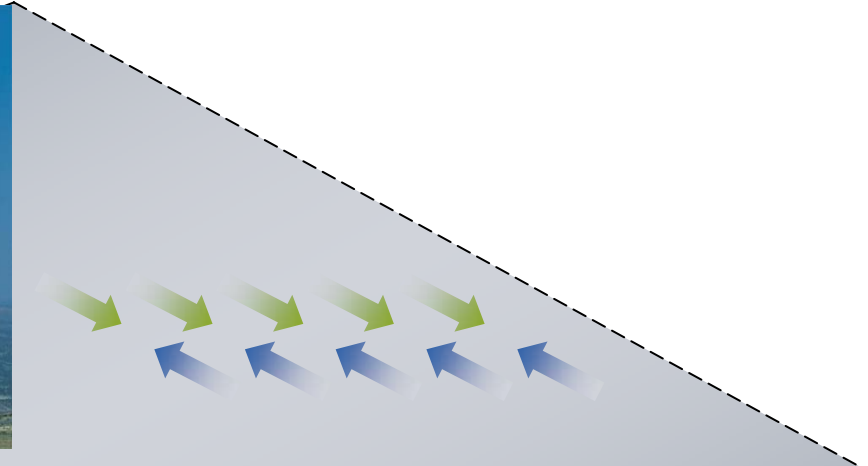
Innovative Combined Cycle Power Plants

SCC-8000H series



Reliable power generation at highest efficiency and outstanding flexibility, while designed for low life cycle costs.

The question is not if, but how to integrate renewables



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We need a sustainable and reliable answer, since the energy supply needs to be secure, reliable, ecofriendly and flexible.

Market challenges in Poland for Power Plant Investments

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- stable legal framework for investments is needed (10 years or longer)
- very long tendering phase (PPL) and construction time (5-6years together)
- market incentives needed to justify investments
 - CHP certificates
 - Capacity payments
 - EPC price incentives
- sustainable power which supports renewables, but operating hours reduced
- very flexible plants are needed
- reliable cost attractive gas supply is needed

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The Solution



The challenge –
Fluctuating power demand at raising fuel costs



The solution –
Siemens 8000H combined cycle power plants



SCC-8000H combined cycle power plants –
Cutting-edge design from the innovation pioneer



The proof

Key data SCC5-8000H 1S over 60% efficiency in combined cycle

- Gas turbine SGT5-8000H
- Steam turbine SST5-5000
- Generator SGen5-3000W
- Fuel nat. gas, #2
- GT / CC output 375 / 570 MW
- GT / CC efficiency 40% / 60 %
- Pressure ratio 19.2 : 1
- Exhaust mass flow 820 kg/s
- Exhaust temperature 625 °C
- Turn down 50%
- Emissions NOx <25 ppm
@100% Load CO <10 ppm
- HRSG/WS-Cycle 3Pr-RH, Benson
600°C / 170 bar

SGT5-8000H



SCC5-8000H 1S





The challenge –
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The solution –
Siemens 8000H combined cycle power plants



SCC-8000H combined cycle power plants –
Cutting-edge design from the innovation pioneer



The proof – Irsching 4 and the following projects

SGT-8000H References

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1x 5-8000H
>14.000 EOH



6x 6-8000H, USA
3x PAC 2013, 3x PAC2014



4 x 6-8000H, South Korea
PAC 2013 and 2014



14 units sold

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