



# Financial Crisis – Situation and outlook for the Energy Sector

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# Increasing power consumption even with slow global economic growth

## Demographic dynamics



- **Population growth:**  
7.5 bn in 2020 (+1.1 bn)
- **Megacities** (>10 million inhabitants): 27 megacities in 2025

Source: UNO

**Increasing power consumption**

## Resource scarcity



- **Geopolitics:**  
70% of world oil and gas supplies only in a few countries
- **Oil price fluctuations**

**Need for efficiency:  
Increasing electrification  
of society**

## Climate change

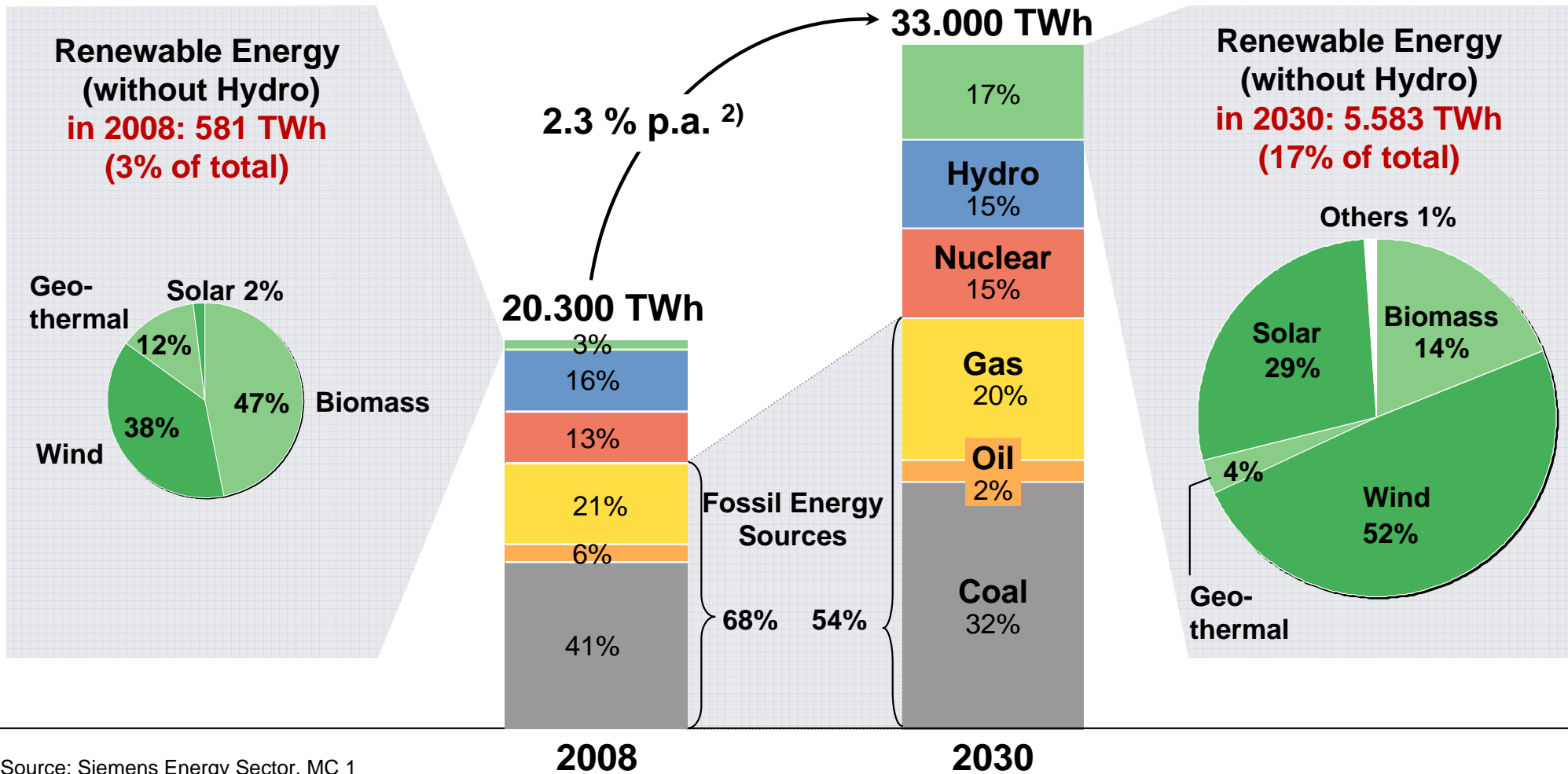


- **Climate targets:**  
Political programs for long-term reduction of CO<sub>2</sub> emissions

**Growing demand for  
“clean” power**

# Basics are appropriate: Long-term perspective is remaining

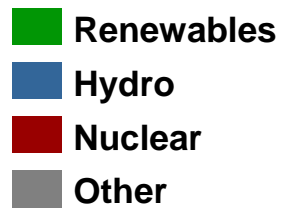
## Power Generation (in TWh<sup>1</sup>)



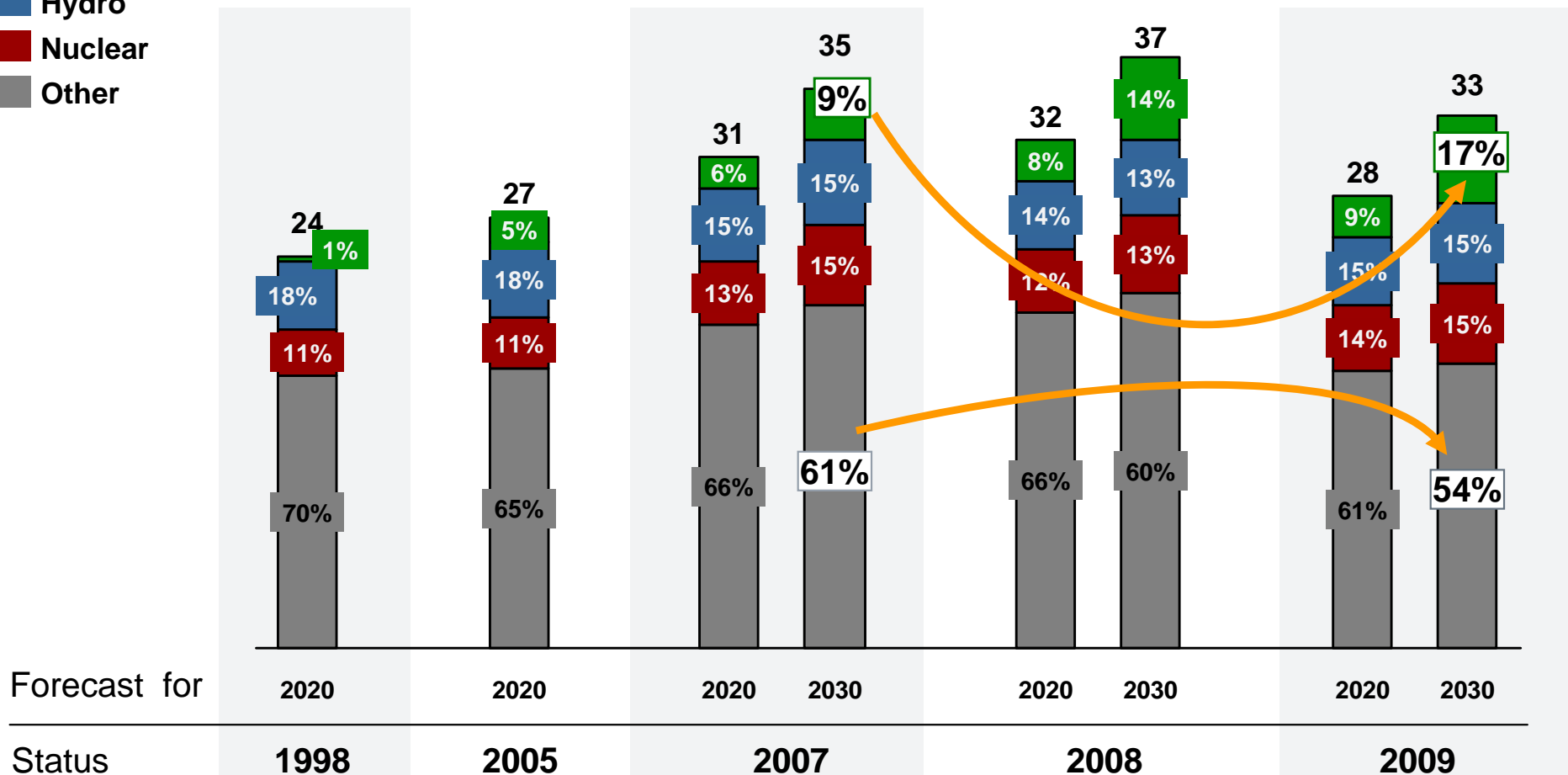
Source: Siemens Energy Sector, MC 1

1) Terawatt hours 2) Primary energy demand increases 1,6% p.a.)

# Renewables are gaining in importance – but fossil fuels will continue to be the mainstay



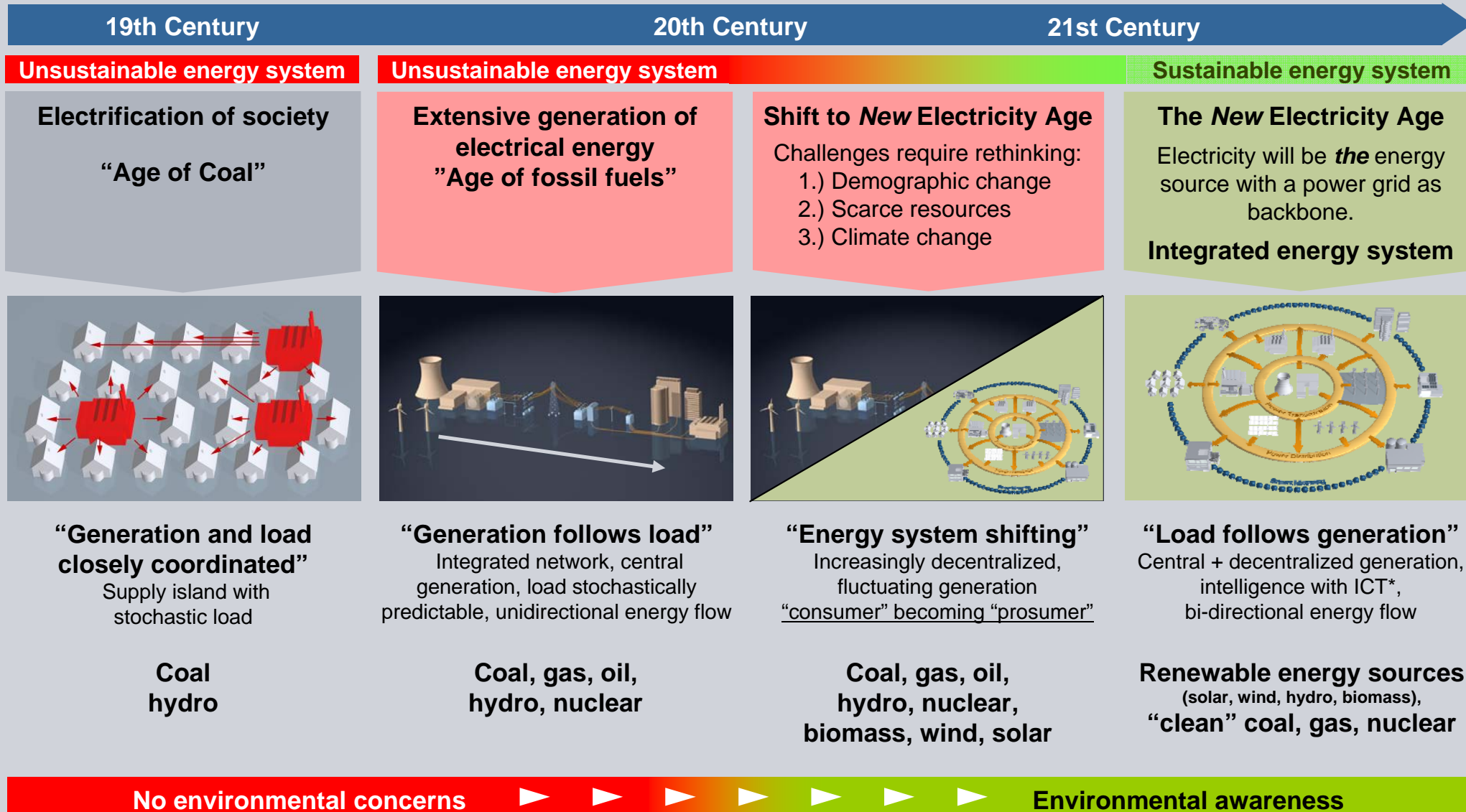
Power Generation by energy carriers 1998-2009 (1000 TWh)



Source: Siemens Energy



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# Paradigm shift in power grids: The *New Electricity Age*



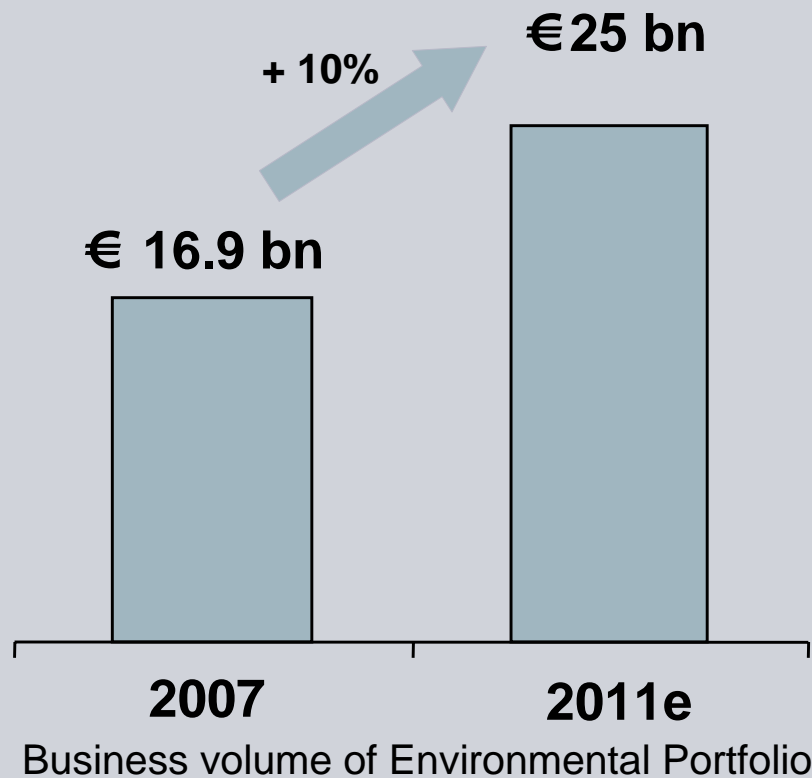
\*) ICT = Information and Communication Technologies

## Renewables, environmental technologies and energy efficient products: Our Environmental Portfolio

<b>Fossil Power Generation</b> 	<b>Renewable Power Generation</b> 	<b>Power Transmission</b> 	<b>Power Distribution</b> 	<b>Environmental Technologies</b> 
<b>Healthcare</b>  <b>IT Solutions and Services</b> 	<b>Mobility</b> 	<b>Solutions for Industry</b> 	<b>Lighting (Osram)</b> 	<b>Building Technologies</b> 

**We expect our Environmental Portfolio to grow by at least 10% percent per year**

Revenues in 2009: €23bn with the environmental portfolio (+11% compare to 2008)



**Our goal: Growth**

- Our Environmental Portfolio accounts for € 16,9 bn. (2007) (or 23%) of our total revenues
- We expect it to grow to € 25 bn. by 2011, equaling an annual growth of 10%
- An independent review of PricewaterhouseCoopers confirmed Siemens data

**Revenues of the Environmental Portfolio grow stronger than conventional business**

# Siemens preferred solutions for CO<sub>2</sub> capture

## IGCC / Pre-combustion carbon capture

Gasification technology with multi-fuel capability for new power plants

- Technology “ready for implementation”
- Alternative route for chemical / fuel production, hydrogen economy
- Mastering higher technological and contractual complexity with “Siemens phased project execution offer”.

## Post-combustion carbon capture

Scalable market introduction, Demo-plants with slipstreams, minimize upgrade risk in process trains

- Enhancement potential for solvents, scrubbing process and for integration into the power plants
- For retrofit and new fossil fired power plants
- Siemens develops process based on amino acid salt formulations and has established partnership for aqueous ammonia process.



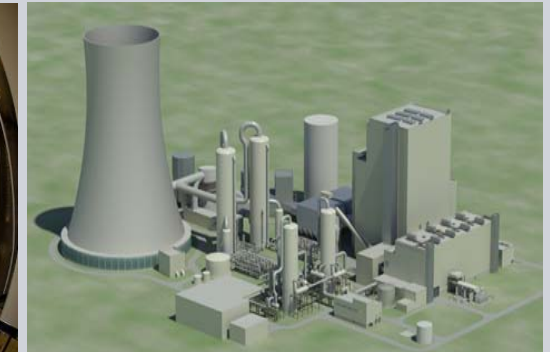
Siemens Fuel Gasifier



Siemens IGCC technology applied in Puertollano (E)



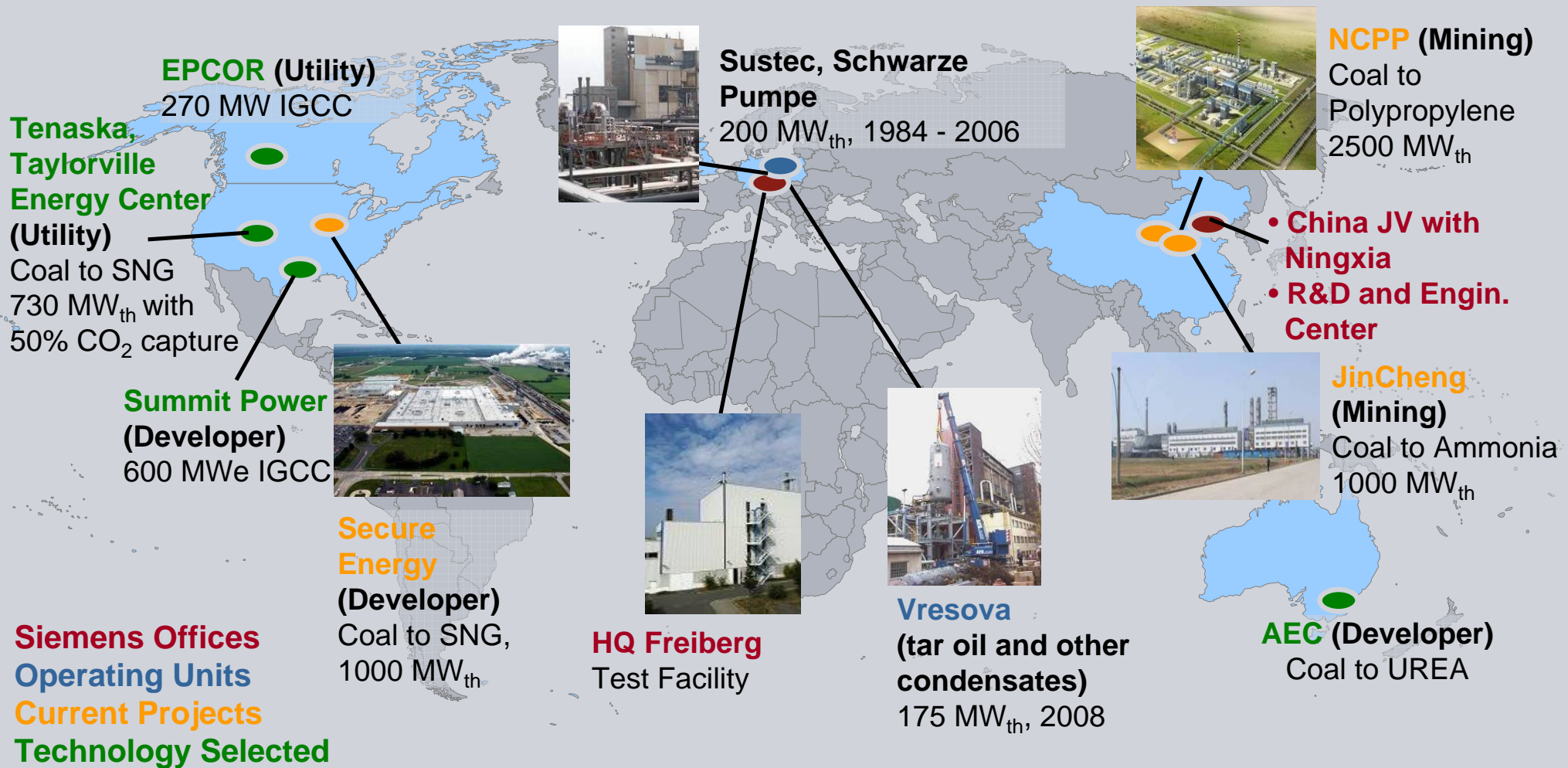
Siemens scrubbing process test lab



Post-Combustion carbon capture plant design

Siemens solutions will be ready for the implementation in the upcoming CCS demonstration projects.

# Siemens Main Gasifier Activity Landscape



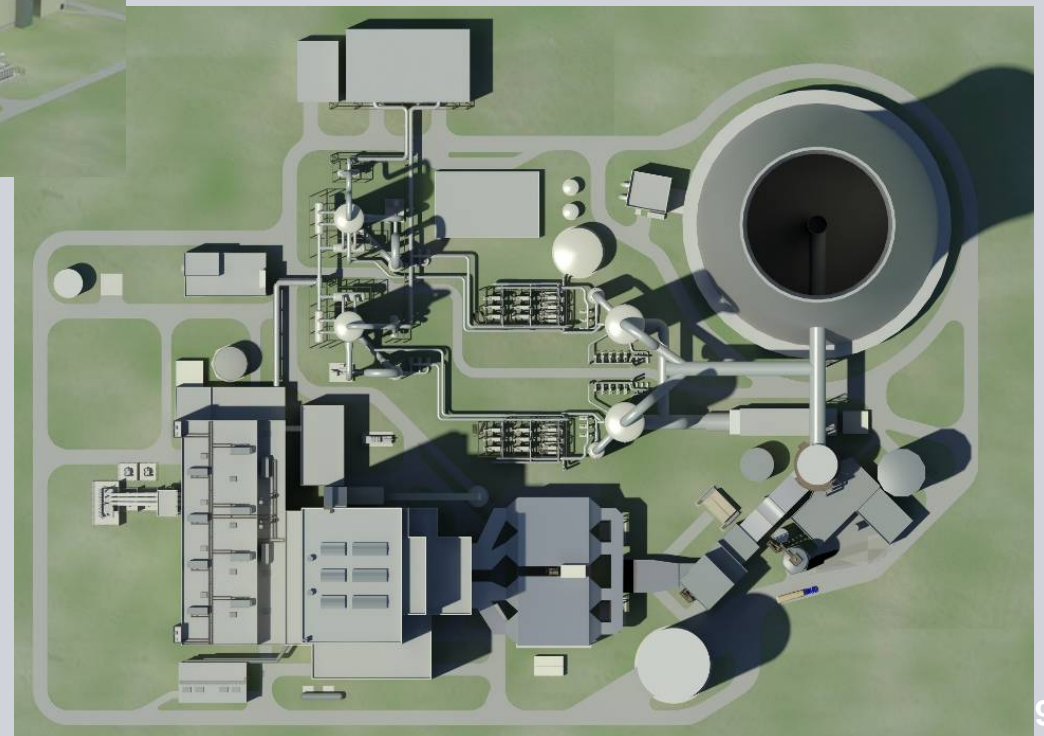
9 SFG-500 Gasifiers erected or shipped  
 Technology selected and pre-selection in further projects

# Siemens Post-Combustion Carbon Capture Technology for Steam Power Plants



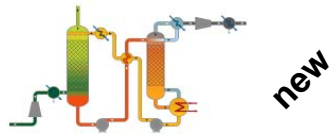
**Siemens Post-Combustion Technology Development**

**Basis: Amino Acid Salt Formulations**

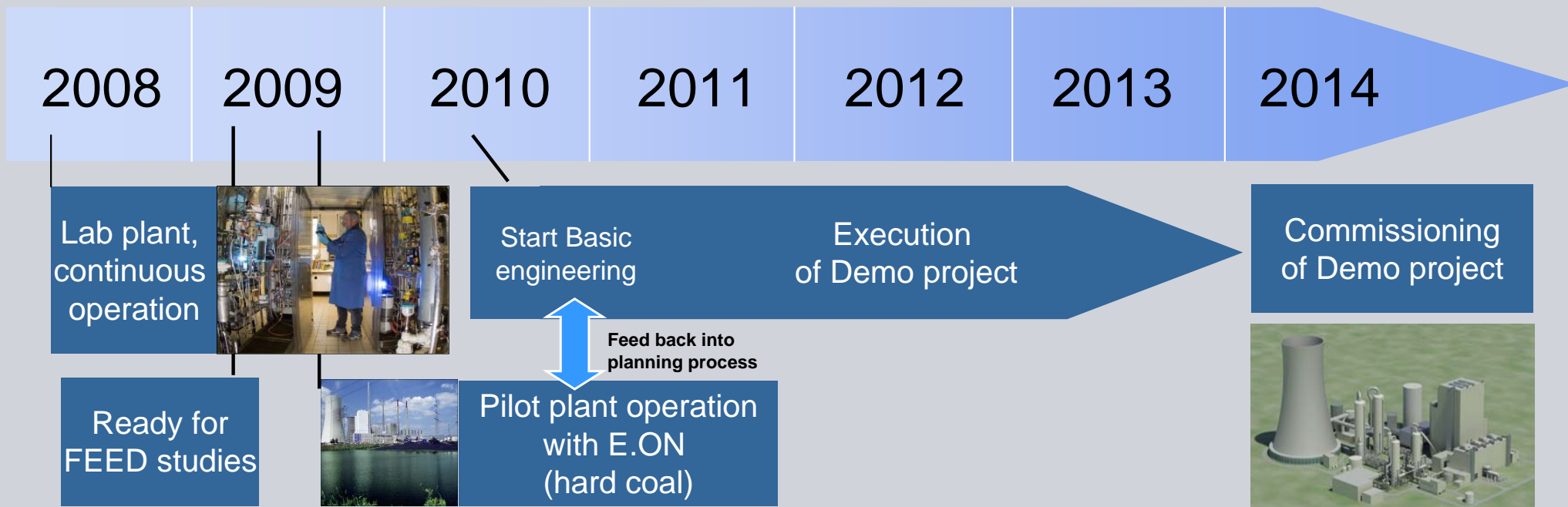


# Major next steps on the way to a full scale post-combustion demo plant

Improved process layout:  
9.2%-pts efficiency drop



- **Post-Combustion Capture is preferred solution for retrofits of coal fired power plants, application for CCPP's under development.**
- **Scalable market introduction with „slipstream demo projects” one train 100 to 150 MW (absorber diameter 10 to 12 m).**
- **Multi train concepts for full scale Post-Combustion Capture plants.**



**Siemens Post-Combustion Technology ready for the implementation in demonstration projects.**

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