

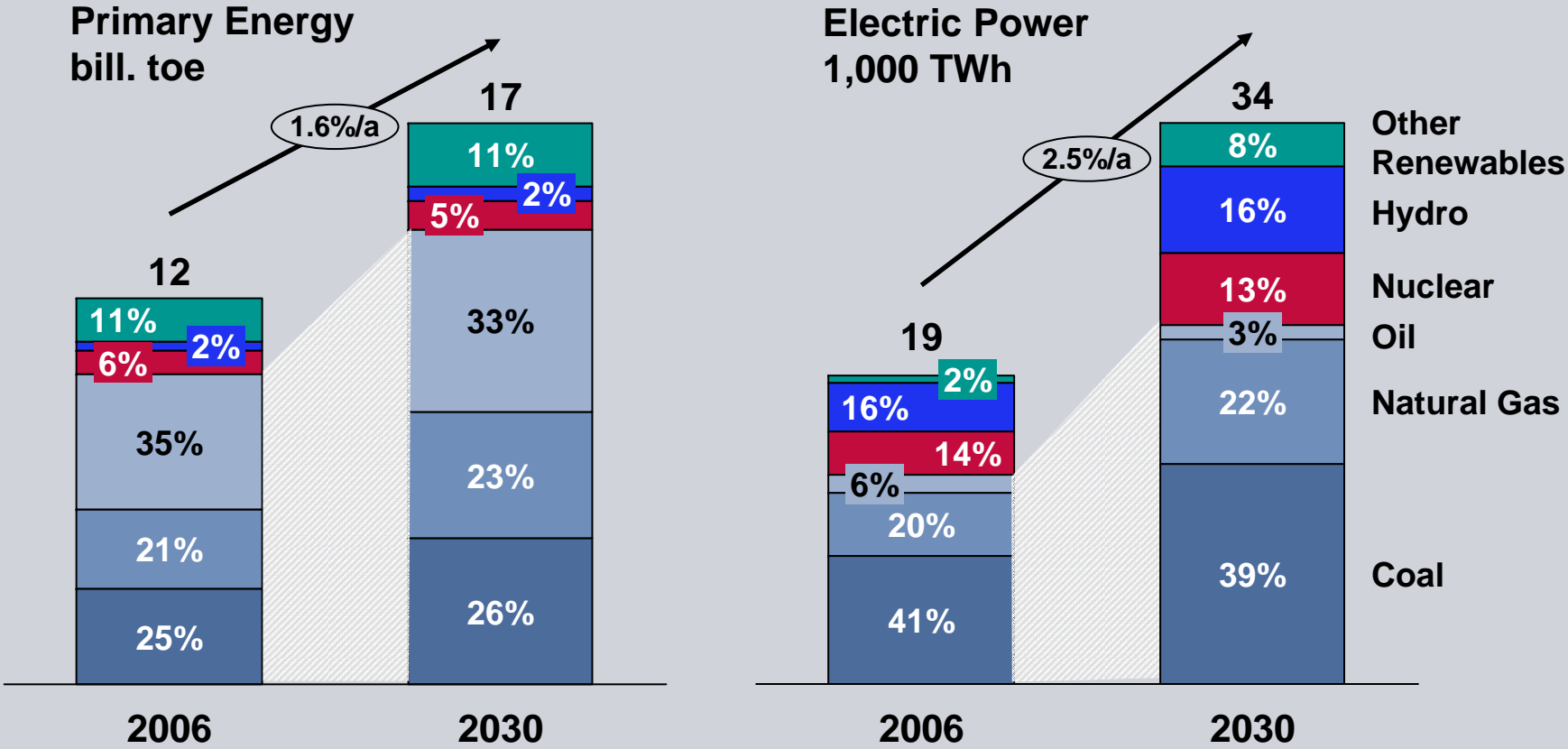
Innovations Towards CO₂-free Power Generation – An Equipment Supplier Perspective

UNECE Forum on Fostering Investment in Cleaner Electricity Production From Fossil Fuels
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Development of worldwide energy consumption



The growing demand for primary energy is basically covered by fossil fuels.

The demand for electric power is growing more rapidly than the demand for primary energy. Coal and natural gas dominate.

Sources: IEA WEO 2006; Siemens

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Clean energy: Technology options for tomorrow's low-emission power mix

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Privileged feed-in of renewables

- Renewables:
 - Wind power
 - Solar thermal power



Intermediate-load/peak-load for load leveling

- Gas-fired combined cycle power plants:
 - High efficiency
 - Low emissions
 - Fast startup



Low-emission base-load

- Coal-fired power plants:
 - Clean, high-efficiency STPP
 - IGCC pre-combustion capture
 - Post-combustion capture for retrofitting and new plants
- Nuclear power plants
- Hydro power plants

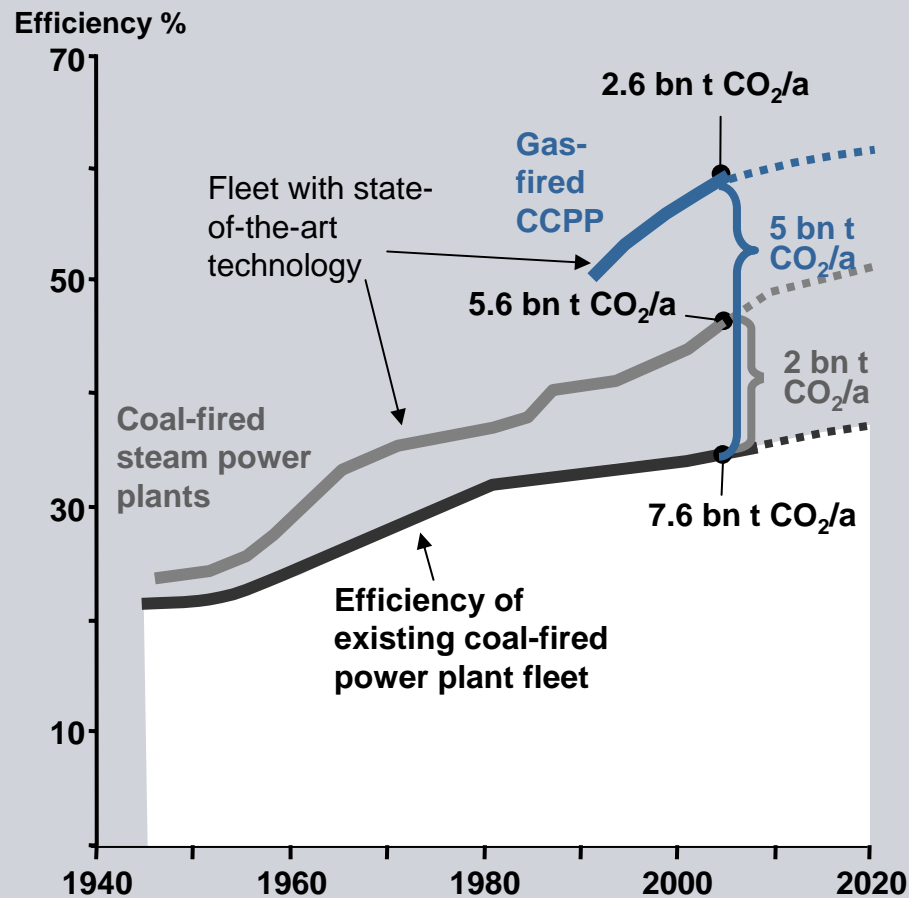


Comply with CO₂ abatement policies and ensure reliable power supply

Worldwide CO₂ emissions reduction potentials through high-efficient state-of-the-art power plants



Coal-fired power plants correspond to **28%** of the world's CO₂ emissions



- CO₂ reduction while maintaining competitiveness can be achieved by replacing old coal power plants with **state-of-the-art technology**:

- Coal-fired steam power plants:

-2.0 bn t CO₂/a

i.e. **-26%** of power generation from coal-fired steam power plants

- Gas-fired combined cycle power plants:

-5.0 bn t CO₂/a

i.e. **-66%** of power generation from coal-fired steam power plants

Sources: IEA WEO 2006; Siemens

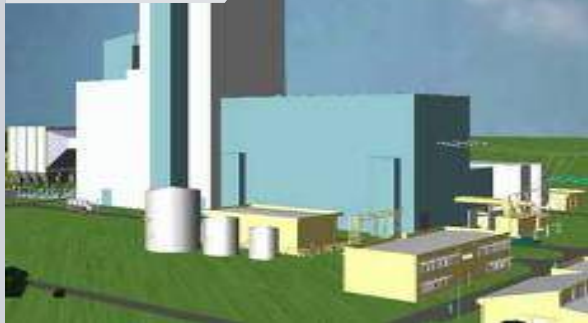
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Siemens Fossil Energy Solutions: Technology options for tomorrow



Hard coal-fired
steam power plant

47%



Reference STPP >600 MW

Combined cycle
power plant, H-class

>60%



Irsching 4 plant 530 MW

IGCC
with and without CO₂ capture

>43% w CO₂ capture



IGCC >400MW with CO₂ capture

	Efficiency	CO ₂ -emissions
1992:	42 %	Basis
2007:	47 %	-11%
2020 target:	>50 %	>-16%

	Efficiency	CO ₂ -emissions
1992:	52 %	Basis
2010:	>60 %	-13%
2020 target:	>62 %	>-16%

	Efficiency	CO ₂ -emissions
1992:	42 %	Basis
2006:	47 %	-11%
2020 target:	>50 %	>-16%
CO ₂ free IGCC	>43%	>-90%

New technologies are essential to meet economic low-emission power mix

Summary



Fossil fuels still play a dominant role in power generation in the next decades.

Increase of power plant efficiency is major lever avoiding CO₂-emissions.

CO₂ capture and storage is a coming solution for coal-fired power plants.

IGCC has the potential to be the most innovative and economical solution for CO₂-free power plants.

Planning reliability is an important pre-requisite for the market introduction of new power plant technologies.

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