

# Natural gas in a 450 ppm energy system



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Energy Agency



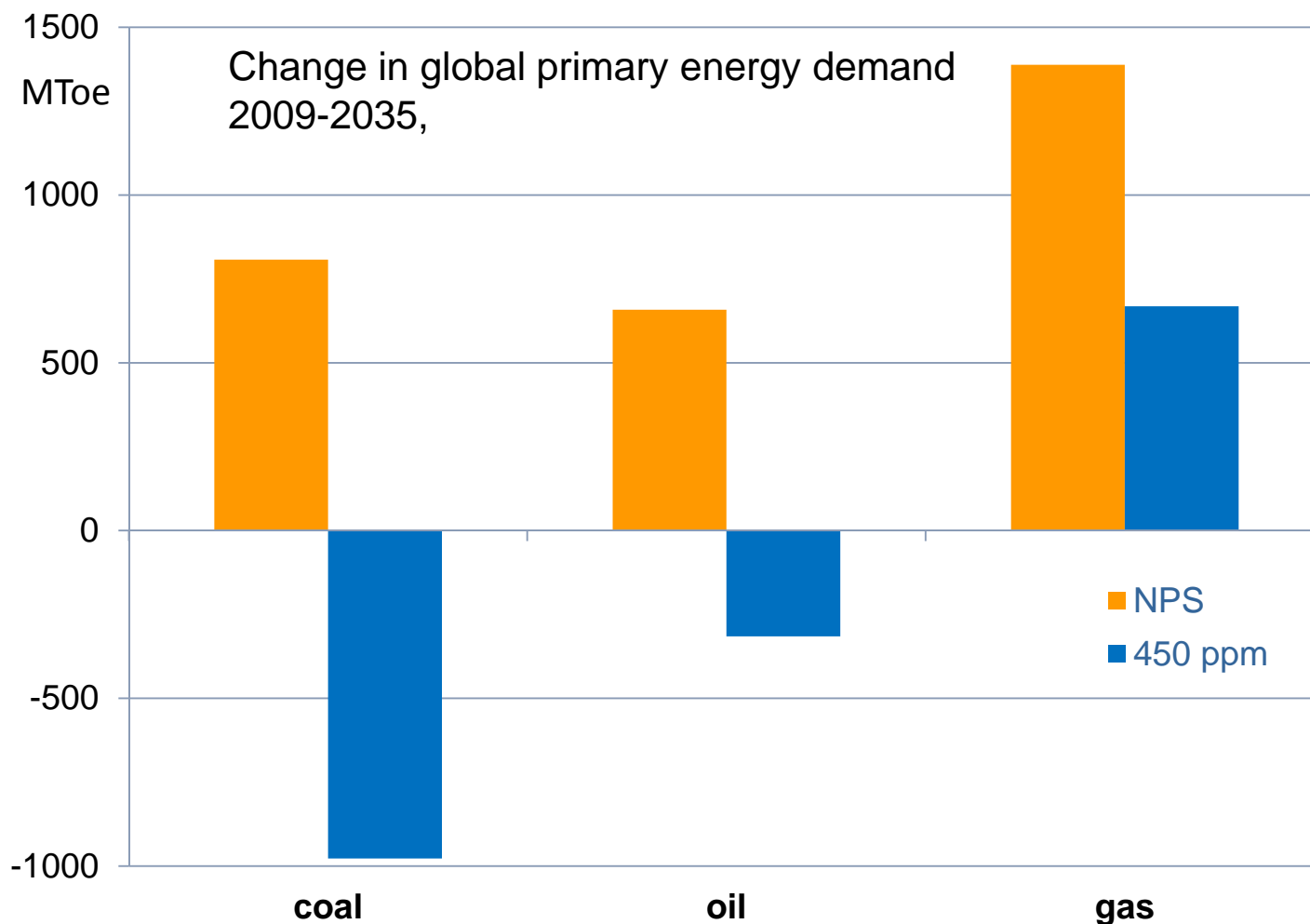
# Between Scylla and Charybdis

**„Natural gas is a fossil fuel, only a bridge, a dash for gas risks locking renewables out”**



**„Gas is clean, a destination fuel, it should be a backbone of a sustainable energy system”**

# First, the good news: The future of gas is bright in any scenario



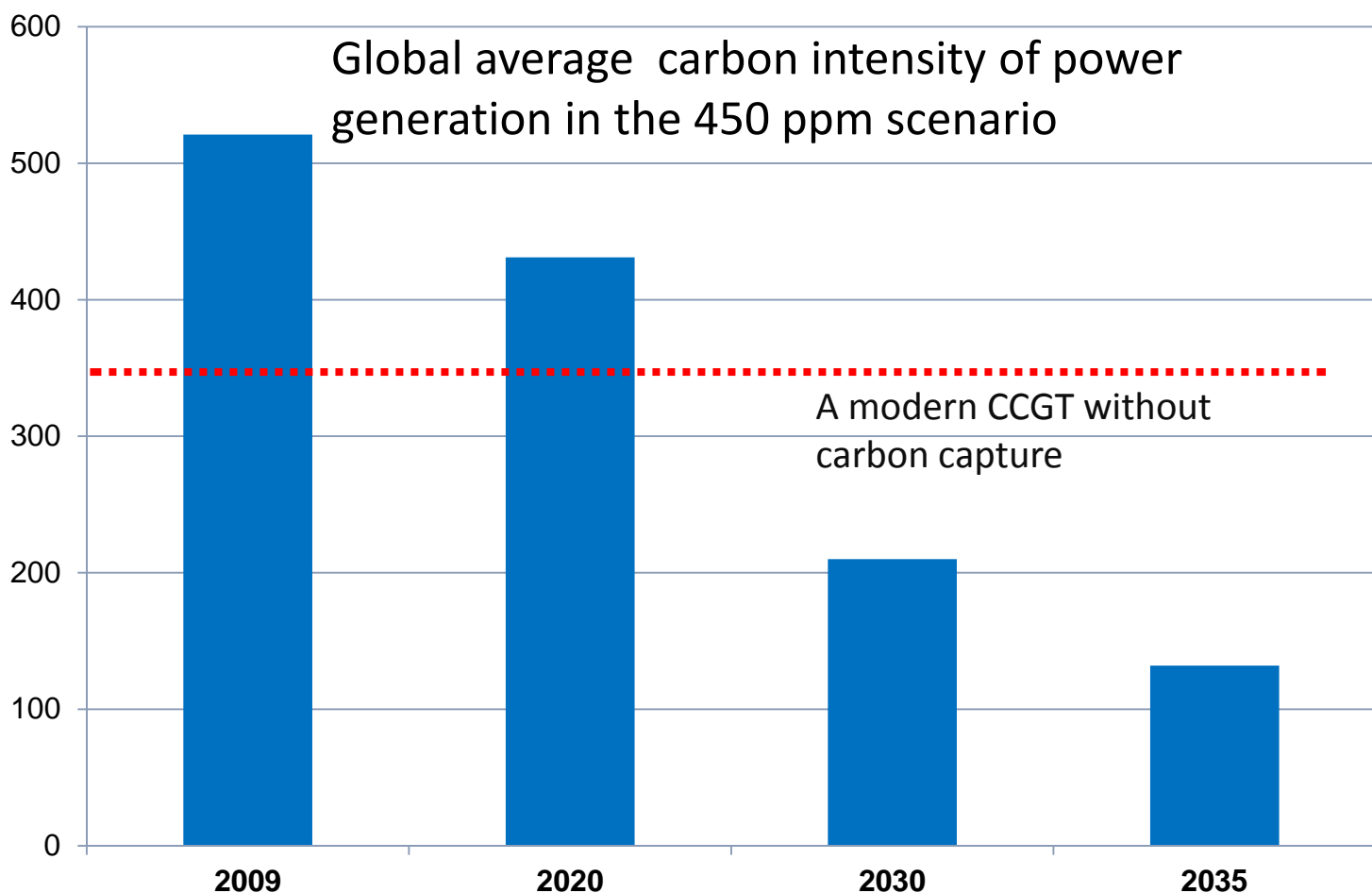
*The growth of gas in 450 ppm is more than oil in NPS*

Source: World Energy Outlook 2011



# We need a much deeper decarbonization than what could be achieved with gas only

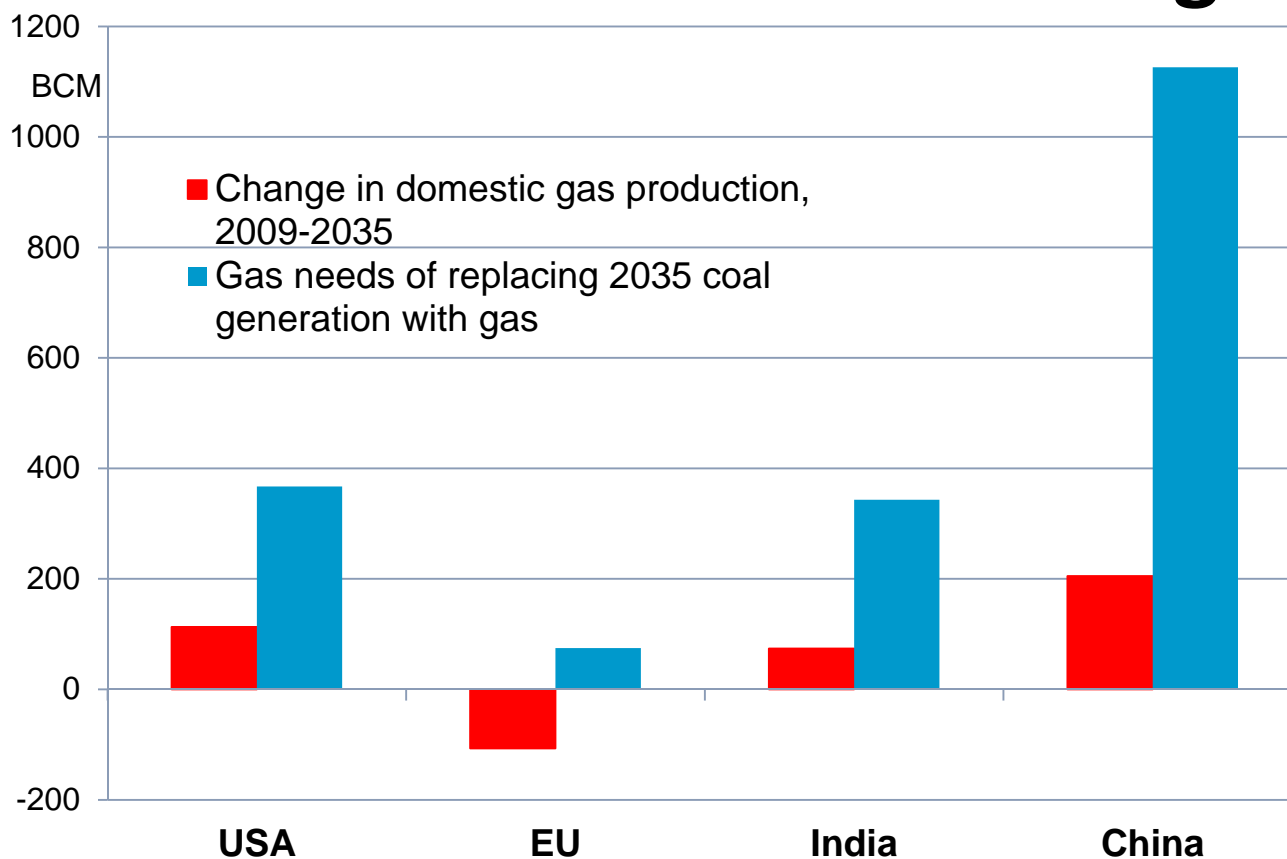
g/kwh



*Large scale deployment of low carbon power generation is essential*

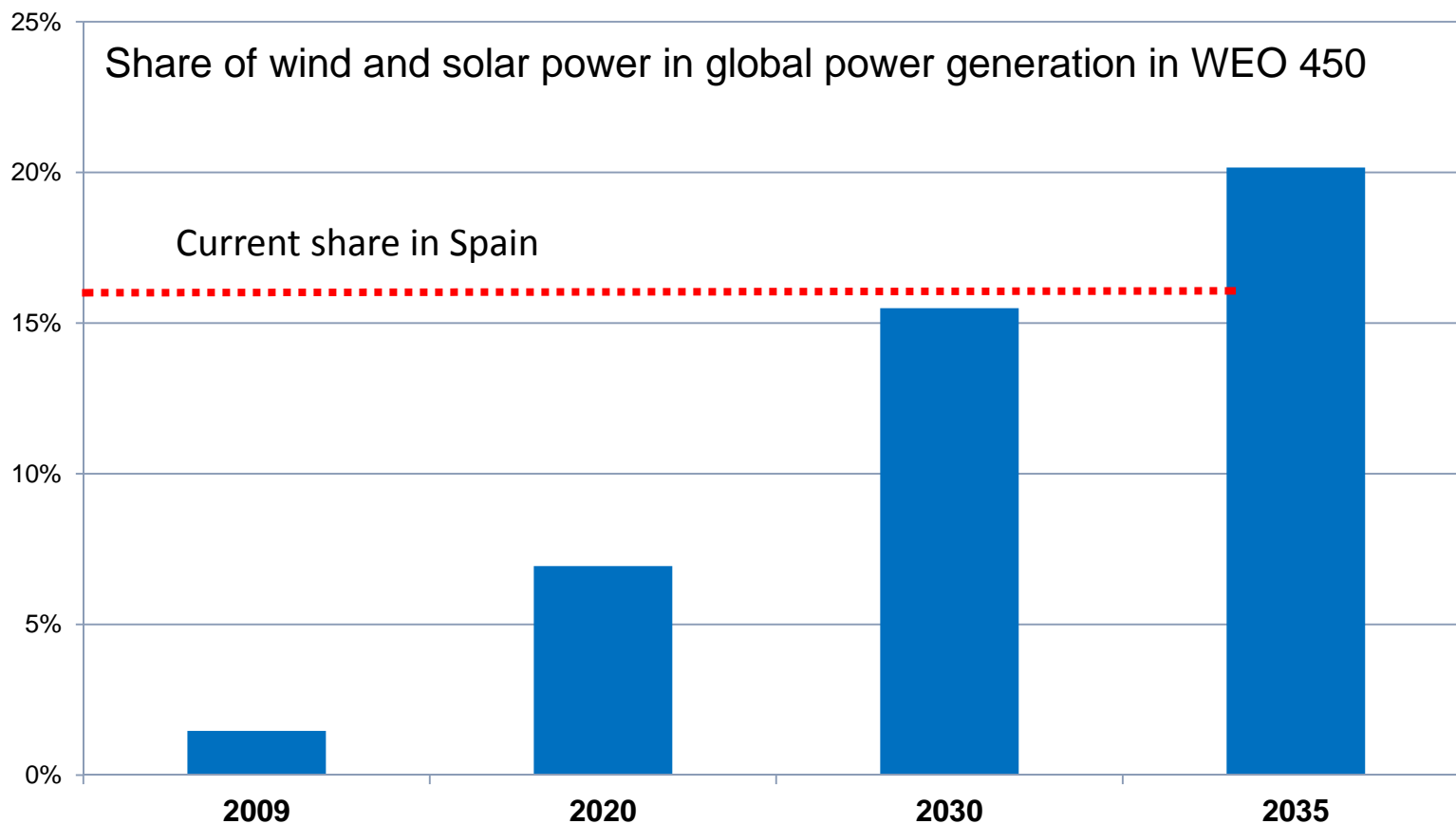
Source: World Energy Outlook 2011

# Energy security implications of a wholesale switch from coal to gas



*The additional import needs of major consumers would be 4 times the global LNG market today*

# Variable renewables grow very rapidly in 450 ppm



*Flexible gas plants will play a major role in balancing renewables in a sustainable energy system*

Source: World Energy Outlook 2011



## **Gas retains its advantages with CCS**

- **Gas plants will still have a lower capital cost**
- **And a higher operational flexibility**
- **Less CO<sub>2</sub> to deal with – limited storage will last longer**
- **Ease of transport: A major gas pipeline is a freight train of coal every 20 minutes**

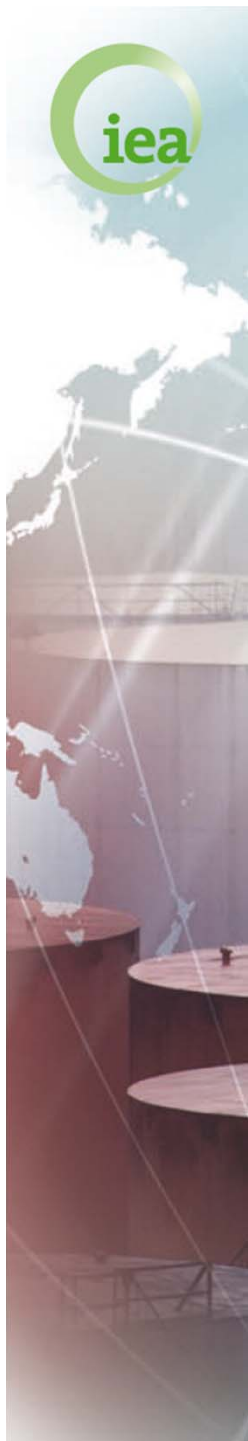
## **CCS needs strong policy support**

- **a sectoral agreement**
- **measurable carbon prices**
- **funding for demonstrations etc.**



## Conclusions

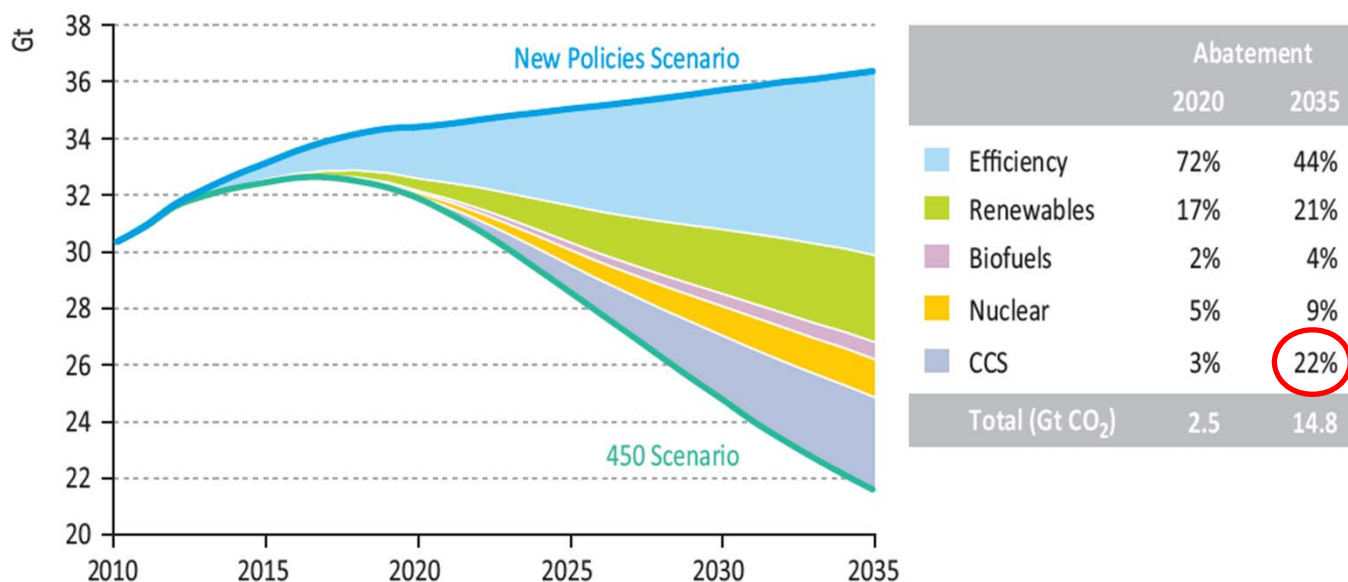
- Gas has a bright future, with strong growth even in the 450 ppm scenario
- Running gas power plants at high load factors instead of coal plants will help cut emissions in the medium term
- Gas plants will be an important source of flexibility for power systems integrating high renewable shares
- Gas alone is not a long-term solution due to the need for deeper decarbonization and energy security concerns
- CCS could help gas maintain its long term role in a sustainable energy system



# Back-up slides on CCS

# Role of CCS in the future (1)

- Without strong policy, CCS will play a very limited role in the future...
  - WEO-2011: only 1% of global power production from CCS-coal by 2035 under New Policies Scenario
- ...but it will have a **CRITICAL ROLE** to play in reaching any ambitious outcome (e.g. a 450-scenario)
  - CCS could deliver 22%, or 3Gt, of total required abatement by 2035 under WEO-2011 450-scenario

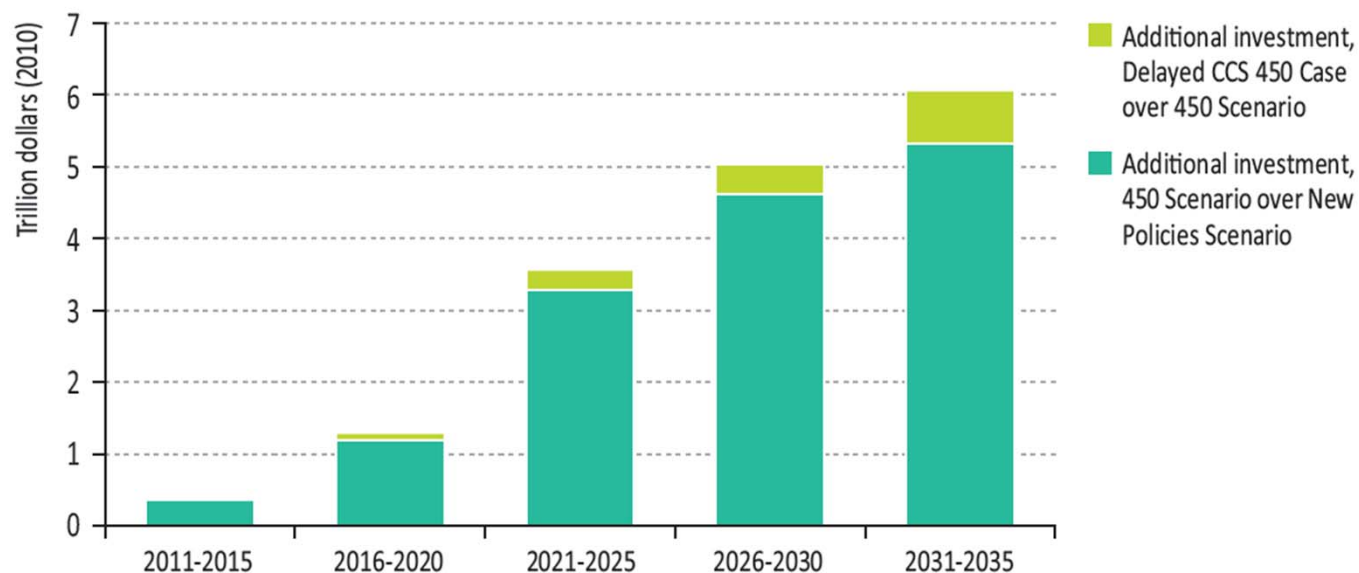


Source: "New Policies Scenario", IEA World Energy Outlook 2011

# Role of CCS in the future (2)

## ■ Delaying CCS is a costly option

- Delaying deployment of CCS until after 2030 would require over 1,1 trillion USD additional investment between 2011-2035 to reach 450-scenario (WEO-2011)



Source: "New Policies Scenario", IEA World Energy Outlook 2011

## ■ CCS IS PART OF A LEAST-COST PATHWAY TO REACHING ANY AMBITIOUS CLIMATE GOAL!