

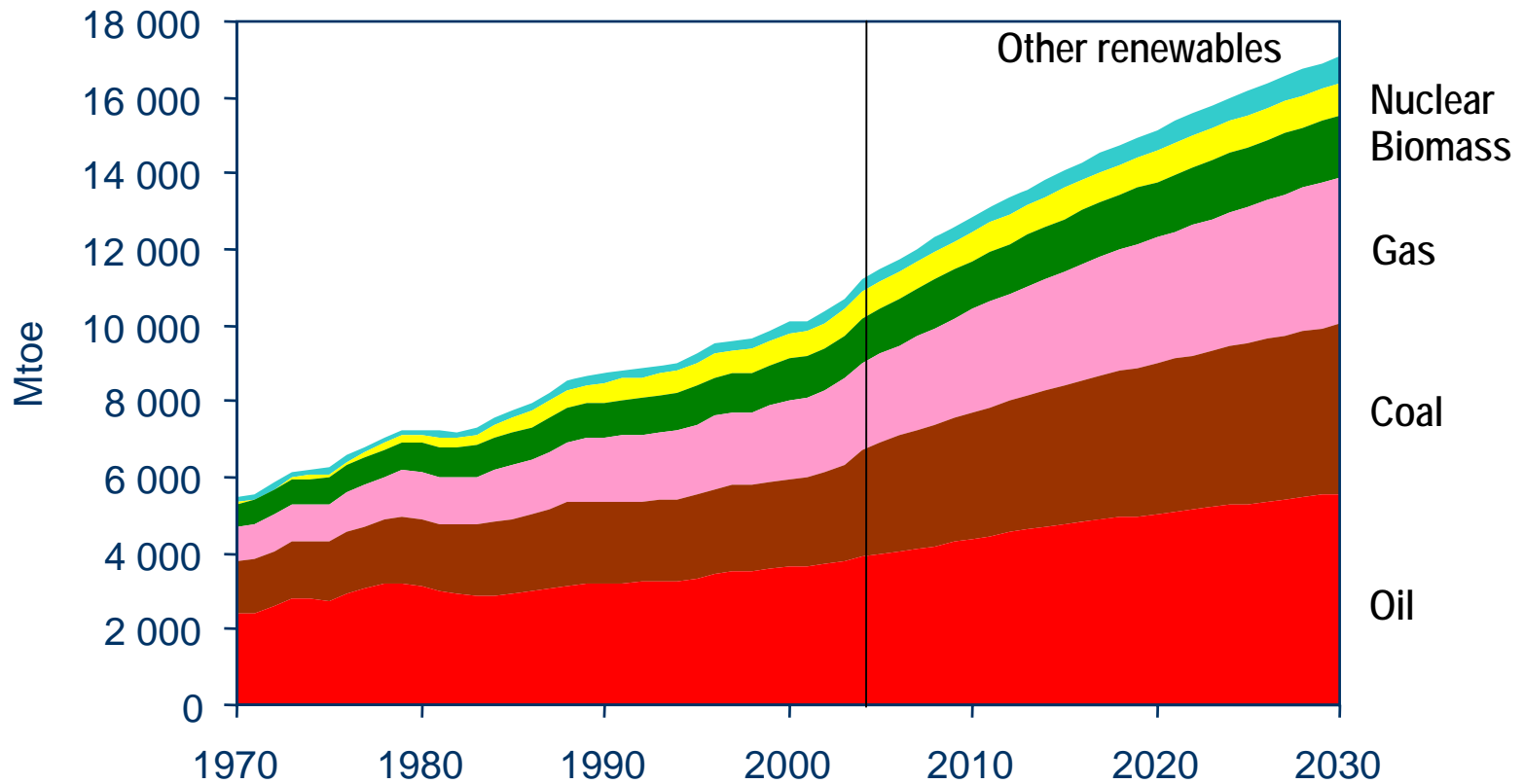


The Unsustainability of Current Energy Trends

**Claude Mandil
Executive Director
International Energy Agency**

**60th Anniversary of the UNECE
Geneva, 27 April 2007**

Reference Scenario: World Primary Energy Demand

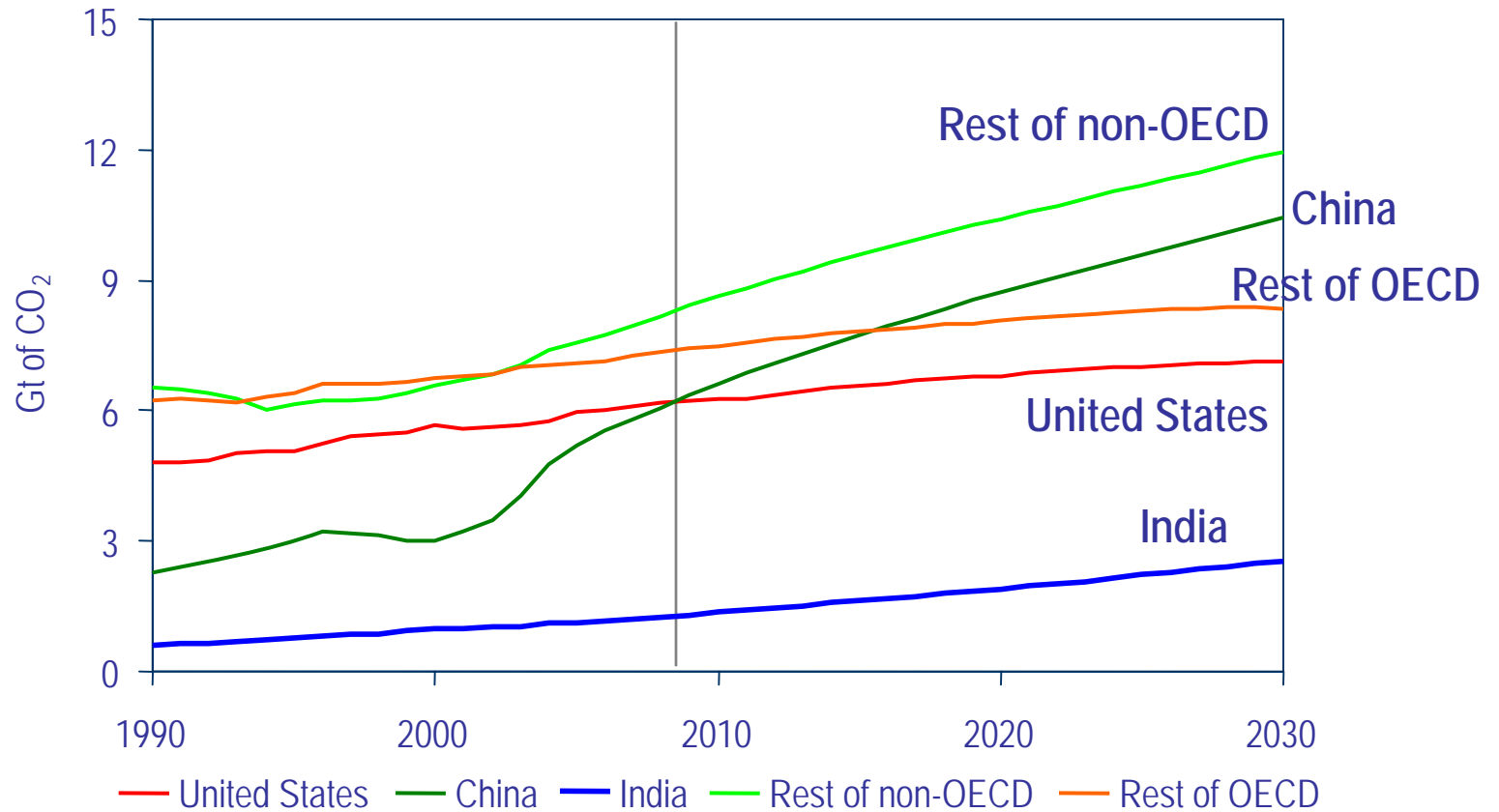


Global demand grows by more than half over the next quarter of a century, with coal use rising most in absolute terms



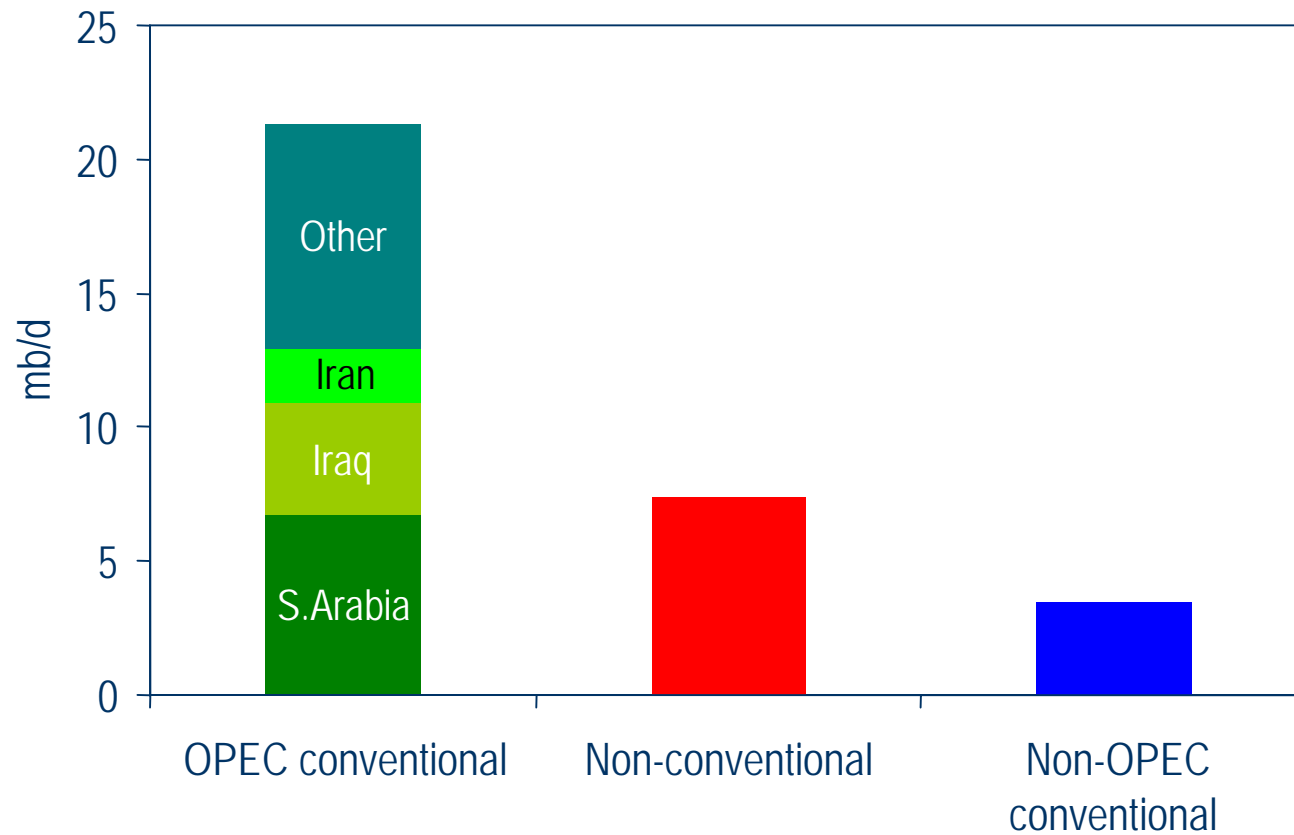
This is Not Sustainable!

Energy-Related CO₂ Emissions



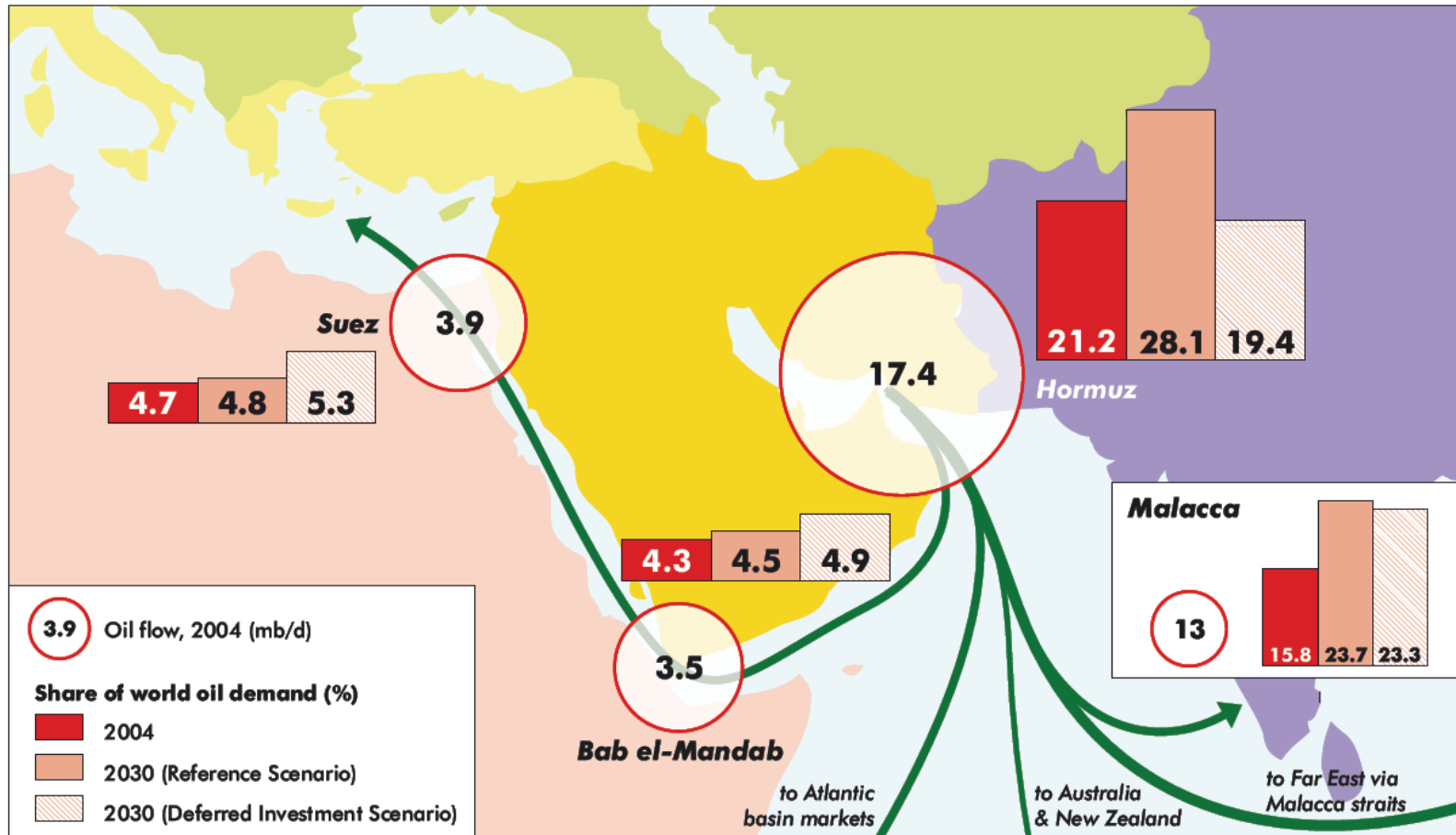
Developing countries account for over three-quarters of the increase in emissions to 2030 however their per-capita emissions still remain well below those of the OECD.

Reference Scenario: Increase in World Oil Supply, 2004-2030



The share of OPEC in world oil supply increases sharply as conventional non-OPEC production peaks towards the middle of next decade

Exports through the "Dire Straits"

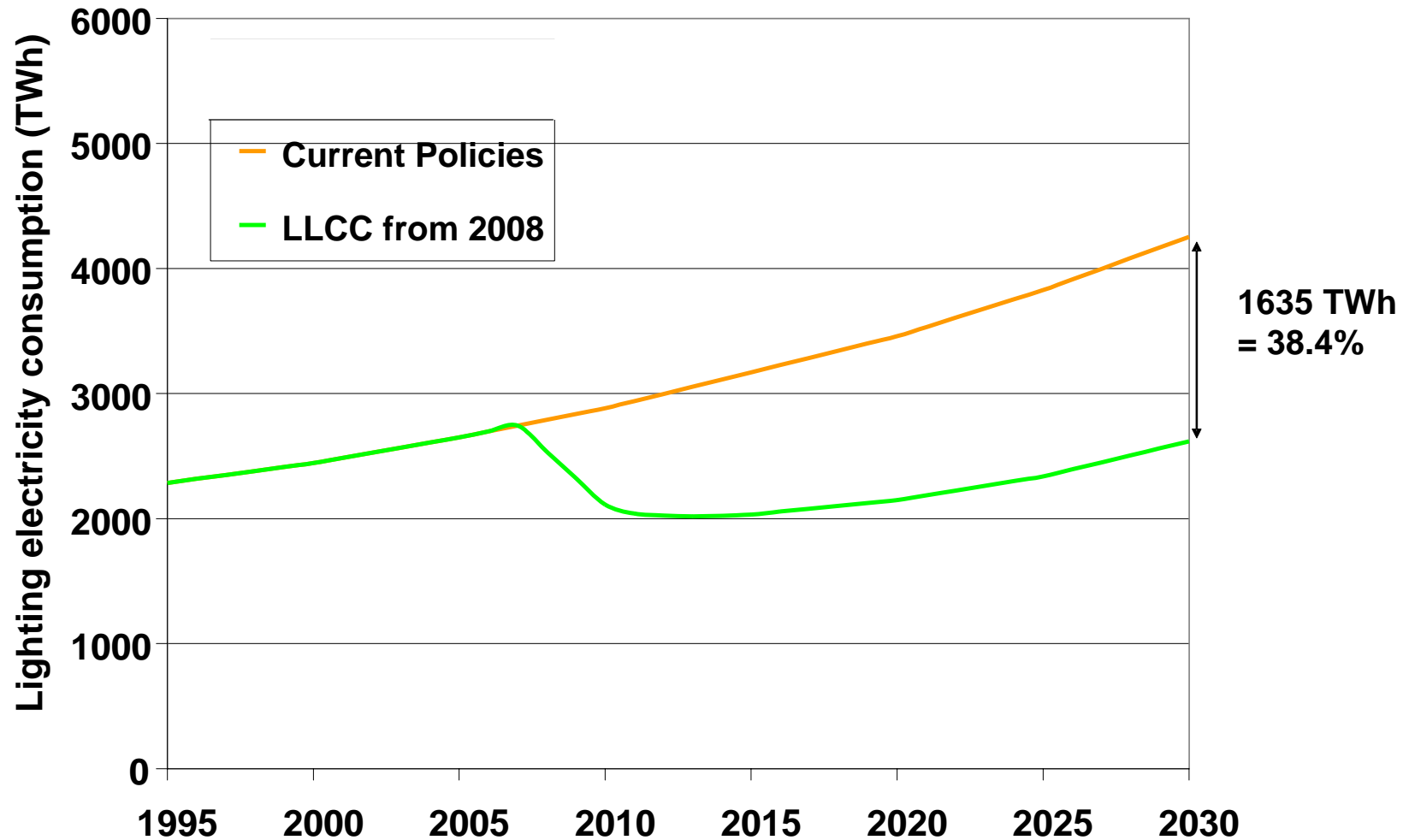


Much of the additional oil and natural gas exports from the Middle East will be shipped through just three maritime routes



**But the future is not
predetermined...**

Energy Efficiency: Lighting, An Example of Cost-Effective Savings



Global cost of lighting could be reduced by US\$ 2.6 trillion

16 billion tons of CO2 could be saved

Avoiding 1 Billion Tons of CO₂ per Year

Coal

Replace 300 conventional, 500-MW coal power plants with “zero-emission” power plants, which means.....

CO₂ Sequestration

Install 1000 Sleipner CO₂ sequestration plants

Wind

Install 200 x current US wind generation

solar electricity

Install 1300 x current US solar generation

Nuclear

Build 150 1-GW power plants

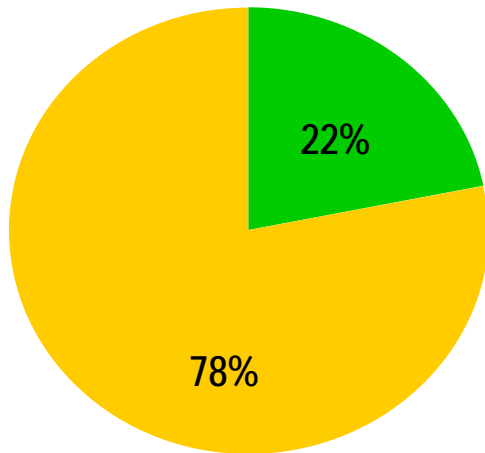
Efficient Lighting

Replace ~95% of incandescence lighting (i.e. phase out)

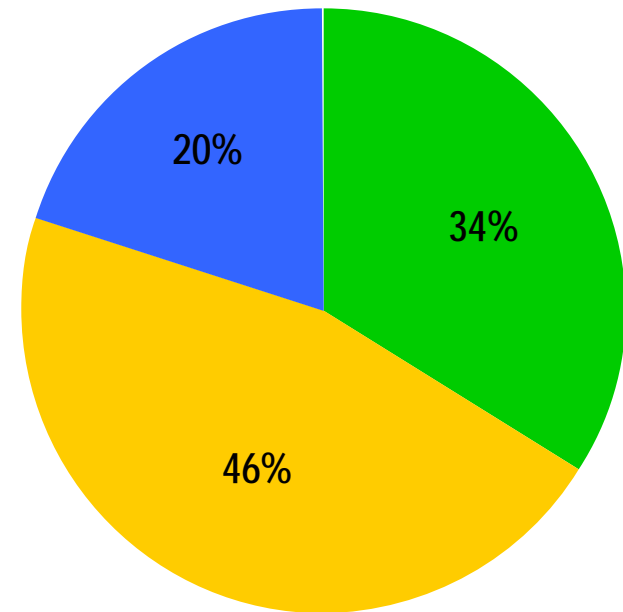
Adapted from Pacala & Socolow, *Science* 2004

Technology - Scenarios for CO₂ Emissions

**6 Gt reduction
of CO₂ in 2030**



**32 Gt reduction
of CO₂ in 2050**



■ Cleaner energy mix
 ■ Efficiency improvements
 ■ CCS

Improved efficiency and a portfolio of new energy technologies could substantially reduce the growth in CO₂ emissions relative to the reference scenario

Key Messages

- **The world is facing serious energy security and sustainability challenges:**
 - An unrelenting growth in CO₂ emissions
 - A growing reliance on oil and gas imports from a limited number of producers via susceptible transit routes

- **A long-term sustainable energy future is possible with known technologies and at a cost that is not out of reach**

- **A broad portfolio approach will be needed but some features are clear:**
 - Energy Efficiency ... available now at low or no cost !
 - Natural Gas, Coal ... with CO₂ capture & storage
 - Biofuels, Renewables ... with lower costs
 - Nuclear.... with safe waste management
 - H₂ & Fuel Cells ... with lower cost
 - Fusion ... maybe, in the very long term

