


INTERNATIONAL ENERGY AGENCY 


World Energy Outlook 2006

Les Défis Energétiques

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World Energy Outlook 2006 

The Context

- The world is facing **twin energy threats**
 - *Inadequate and insecure supplies*
 - *Environmental damage, including climate change*
- There is an urgent need to curb the growth in fossil-fuel demand & related emissions
- *WEO-2006* is a direct response to G8 request for advice on alternative energy scenarios
- It confirms that the global energy system is on an unsustainable path...
- ...but measures now being considered would curb the growth of fossil-fuel demand & emissions

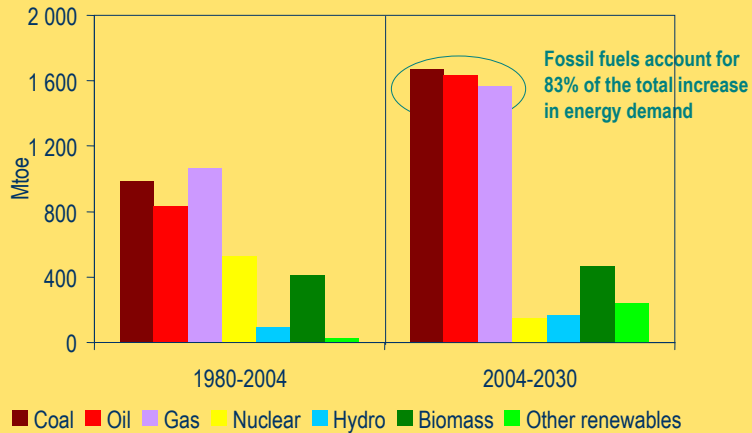
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- Two scenarios depict markedly different energy futures to 2030
 - **Reference Scenario:** *No new government policies are adopted*
 - **Alternative Policy Scenario:** *Energy-security & climate-change policies now under consideration are adopted*



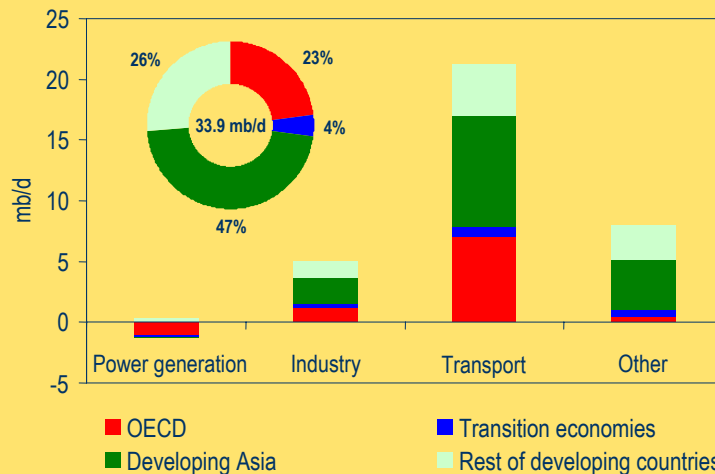
Global demand for each primary energy source grows inexorably driven by population & economic growth

Reference Scenario: Incremental World Primary Energy Demand



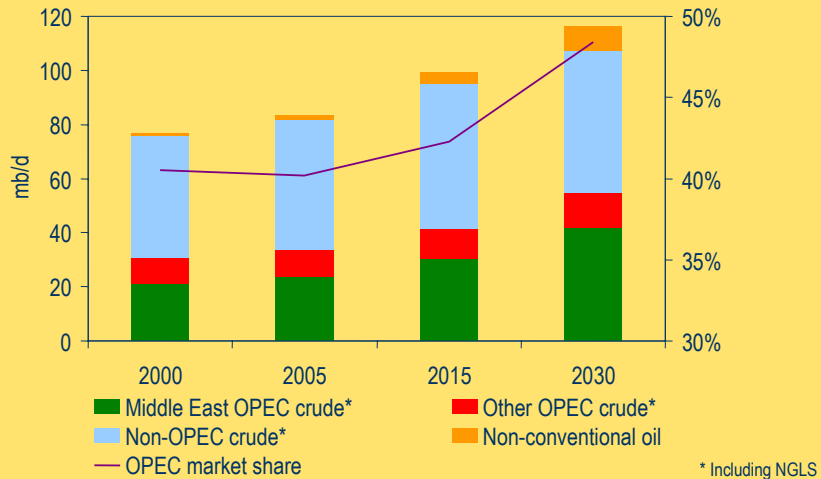
Fossil fuels account for most of the increase in global energy demand between now & 2030, though non-hydro renewables grows fastest

Reference Scenario: Incremental Oil Demand, 2004-2030



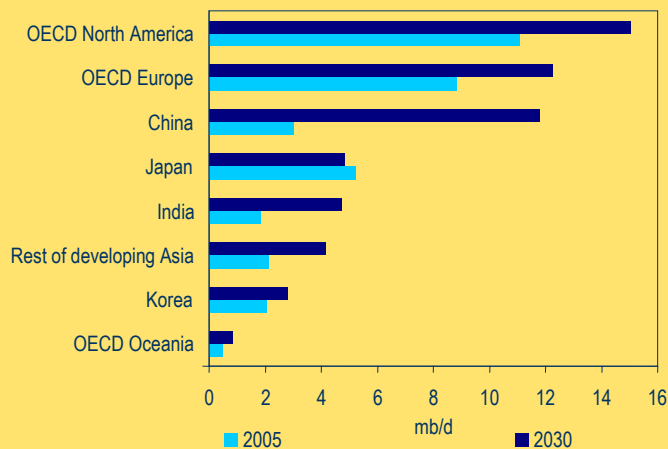
Most of the increase in oil demand comes from developing countries, where economic growth – the main driver of oil demand – is most rapid

Reference Scenario: World Primary Oil Supply



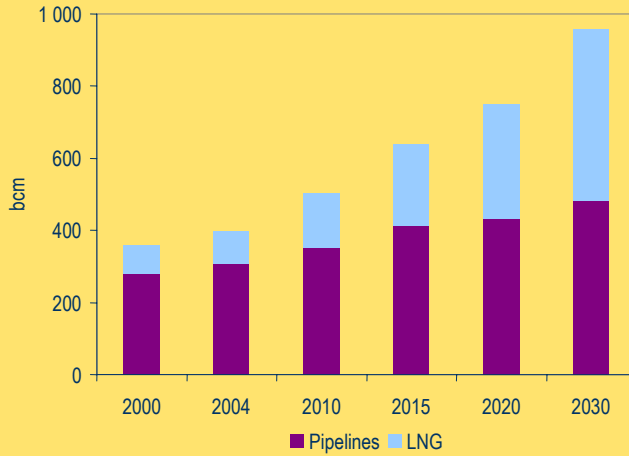
OPEC takes the lion's share of oil market growth as conventional non-OPEC production peaks, but non-conventional oil plays a growing role

Reference Scenario: Net Oil Imports



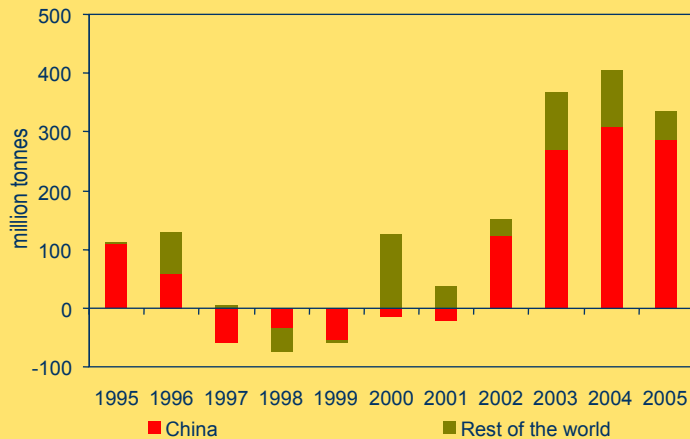
China sees the biggest jump in oil imports in absolute terms, but North America remains the largest importer

Reference Scenario:
World Inter-regional Natural Gas Trade



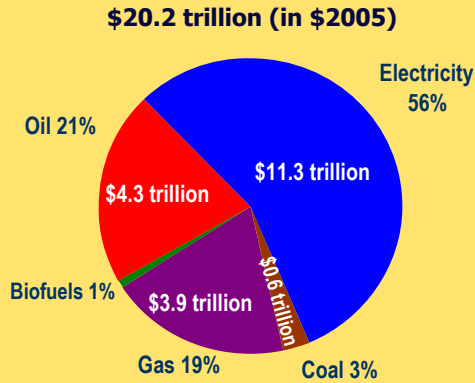
Global gas trade expands by 1.5 times, with two-thirds of the increase coming from Russia, the Middle East & North Africa – mostly as LNG

Annual Increase in Coal Demand



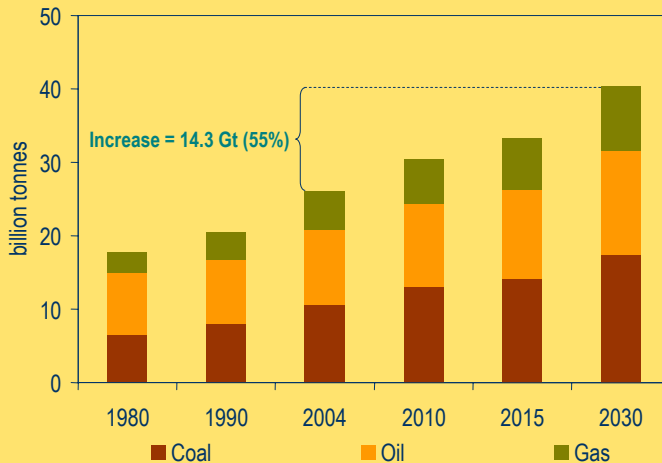
Global coal demand in the recent years has grown much faster than previously – mainly driven by China

Reference Scenario: Cumulative Investment, 2005-2030



Investment needs exceed \$20 trillion – \$3 trillion more than previously projected, mainly because of higher unit costs

Reference Scenario: Implications for CO₂ Emissions



Half of the projected increase in emissions comes from new power stations, mainly using coal & mainly located in China & India

- Security of oil supply is threatened
 - *Oil production in non-OECD countries is set to peak*
 - *Production will be increasingly concentrated in a small number of countries*
- Gas security is also a growing concern
 - *US gas production will peak by 2015*
 - *Europe's has peaked already*
 - *Import dependence in both regions will grow absent new policies*
- Investment over the next 10 years will lock in technology that will remain in use for up to 60 years
- Delaying action by ten years would reduce impact on emissions in 2030 by three-quarters



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Alternative Policy Scenario

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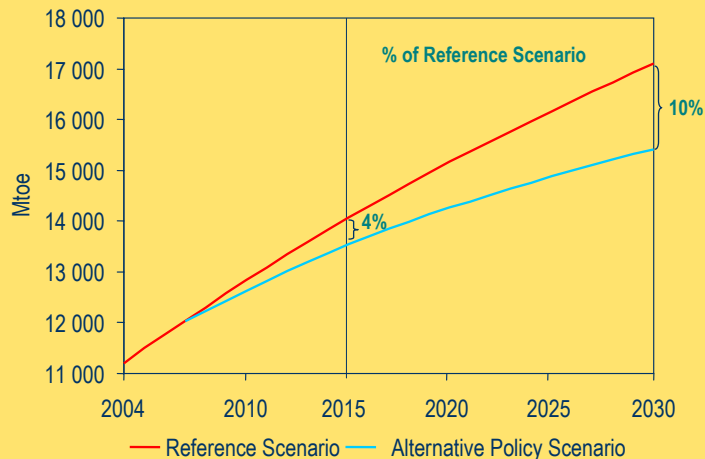
Alternative Policy Scenario: Mapping a Better Energy Future



- Analyses impact of government policies under consideration to enhance security & curb emissions
 - 1 400+ different policies worldwide analysed to
 - ▣ *Improve efficiency in energy production & use*
 - ▣ *Increase reliance on non-fossil fuels*
 - ▣ *Bolster output of oil & gas in net importing countries*

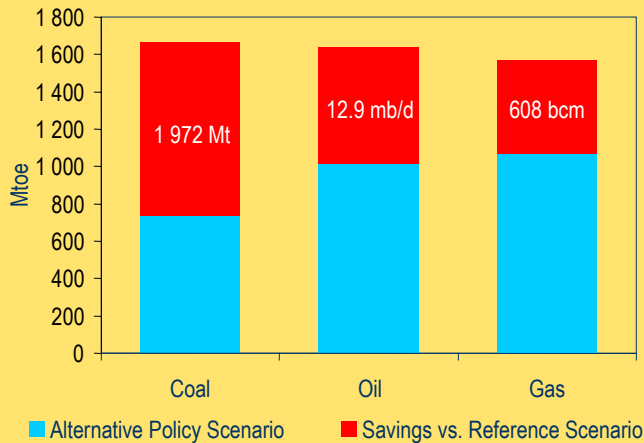
- Demonstrates that we can significantly reduce growth in energy demand & emissions and stimulate alternative energy production
 - ▣ *Oil demand is reduced by 13 mb/d in 2030 - equivalent to current output of Saudi Arabia & Iran*
 - ▣ *Oil savings in 2015 savings reach 5 mb/d*
 - ▣ *CO₂ emissions are 6.3 Gt (16%) lower in 2030 – equivalent to the current emissions of US and Canada*

Alternative Policy Scenario: World Primary Energy Demand



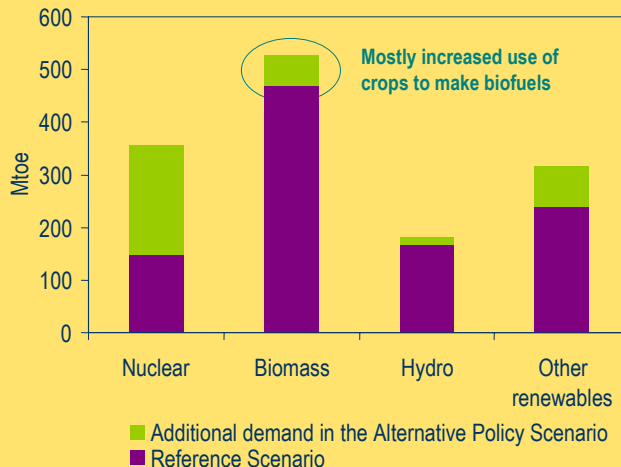
The impact of new policies – though far from negligible – is less marked in the period to 2015 because of the slow pace of capital stock turnover

Alternative Policy Scenario: Incremental World Primary Fuel Demand & Savings, 2004-2030



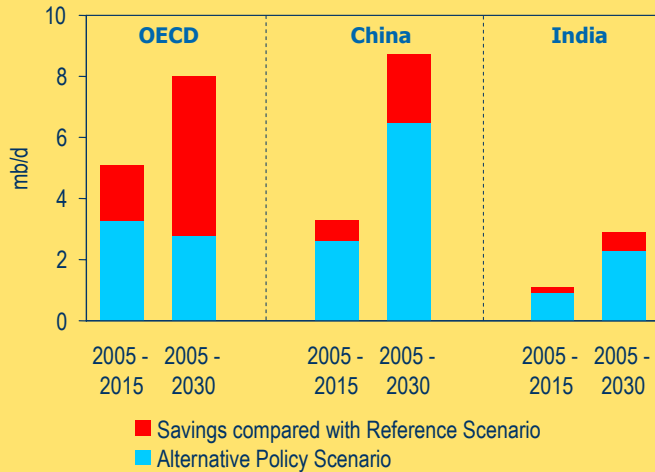
Coal demand falls most relative to the Reference Scenario, but demand for each fossil fuel still increases between 2004 & 2030

Alternative Policy Scenario: Incremental World Non-Fossil Primary Energy Demand, 2004-2030



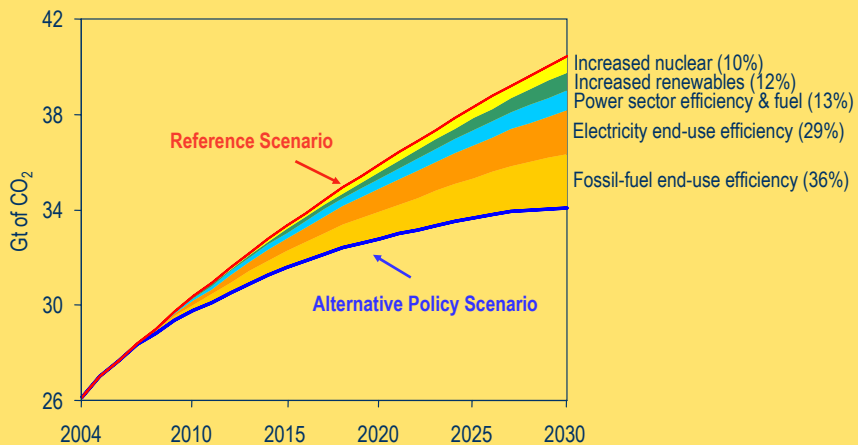
Demand for non-fossil energy – nuclear power & renewables – is 11% higher in 2030 than in the Reference Scenario thanks to stronger policies

Alternative Policy Scenario: Incremental Net Oil Imports



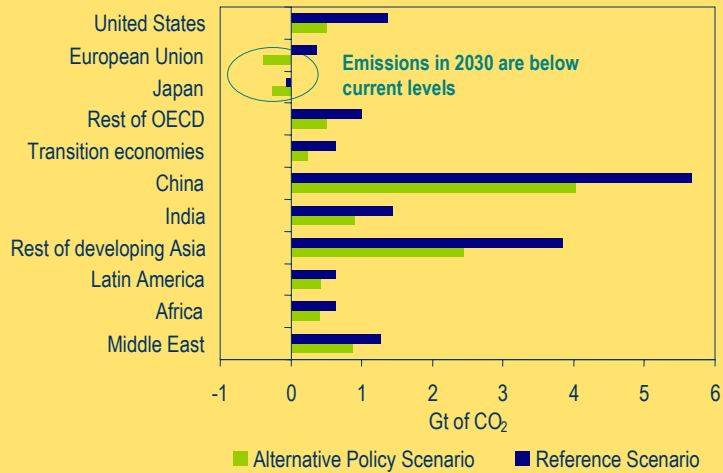
In contrast to the Reference Scenario, OECD oil imports peak & then decline before 2030

Alternative Policy Scenario: Global Savings in Energy-Related CO₂ Emissions



Improved end-use efficiency of electricity & fossil fuels accounts for two-thirds of avoided emissions in 2030

Alternative Policy Scenario: Change in Energy-Related CO₂ Emissions, 2004-2030

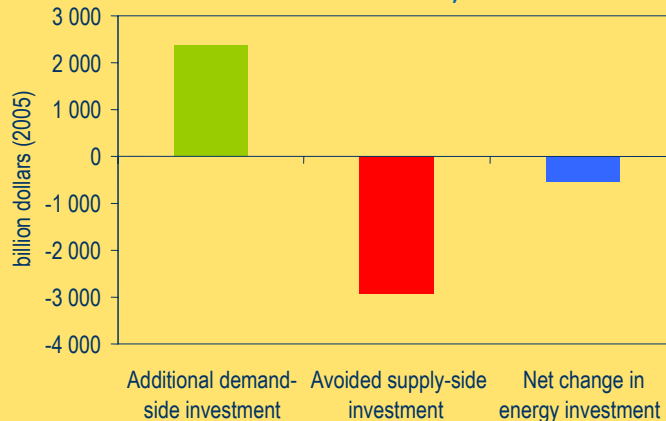


OECD emissions also peak & then decline before 2030, falling below 2004 levels in Europe and Japan

Alternative Policy Scenario: Energy Investment





Change in Cumulative Energy-Related Investment vs. Reference Scenario, 2005-2030



Avoided supply-side investment more than outweighs the additional investment by consumers in more expensive end-use capital stock

- The need to diversify energy sources & mitigate emissions is more urgent than ever
- Global energy system is on an unsustainable path
- Strong new policies could sharply reduce the rate of increase in demand & emissions
- Economic cost of these policies would be more than outweighed by the economic benefits alone
- In the longer term, technology *development* will be critical to a sustainable energy system
- Governments also need to tackle market barriers to ensure investment is forthcoming
- Rich countries need to help developing countries address energy poverty



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Thank you

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