The 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.
The share of OPEC in world oil supply increases sharply as conventional non-OPEC production peaks towards the middle of next decade.
China overtakes the US as the world’s biggest emitter before 2010, though its per capita emissions reach just 60% of those of the OECD in 2030.
Investment needs exceed $20 trillion – $3 trillion more than previously projected, mainly because of higher unit costs.
The Next Ten Years Will Determine Our Energy Future

- Investment over the next decade will lock in technology for up to 60 years.
  - **China and India** - growing at breakneck speed fueled by energy
  - **OECD power plants** – significant portion reaching to retirement

- Security of supply is under threat because the balance of power is shifting.
  - **Oil production** in non-OPEC countries is set to peak,
  - **Gas production** to peak in OECD
Alternative Policy Scenario
Alternative Policy Scenario: Mapping a Better Energy Future

- Analyses impact of government policies under consideration to enhance security & curb emissions
- 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
- Delaying action by 10 years would reduce the impact on emissions in 2030 by three-quarters
The Alternative Policy Scenario: Key Policies for CO₂ Reduction

Improved end-use efficiency accounts for over two-thirds of avoided emissions in 2030 in the APS
### The Alternative Policy Scenario:
**Key policies that Make a Global Difference**

<table>
<thead>
<tr>
<th></th>
<th>Energy efficiency</th>
<th>Power generation</th>
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<tbody>
<tr>
<td><strong>US</strong></td>
<td>• Tighter CAFE standards</td>
<td>• Increased use of renewables</td>
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<tr>
<td></td>
<td>• Improved efficiency in residential &amp; commercial sectors</td>
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<tr>
<td><strong>EU</strong></td>
<td>• Increased vehicle fuel economy</td>
<td>• Increased use of renewables</td>
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<td>• Improved efficiency in electricity use in the commercial sector</td>
<td>• Nuclear plant lifetime extensions</td>
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<tr>
<td><strong>China</strong></td>
<td>• Improved efficiency in electricity use in the industrial &amp; residential sectors</td>
<td>• Increased efficiency of coal-fired plants</td>
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<td></td>
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<td>• Increased use of renewables</td>
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<td>• Increased reliance on nuclear</td>
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</tbody>
</table>

A dozen policies in the US, EU & China account for around 40% of the global emissions reduction in 2030 in the Alternative Policy Scenario
Alternative Policy Scenario: The economics of energy efficiency measures

- Investment in the energy sector (demand and supply side) are lower in APS than in the RS
- Consumers spend $2.4 trillion *more* in 2005-2030 in more efficient cars, refrigerators etc
- ..but producers need to spend almost $3 trillion *less*
  - *Each $1 invested in more efficient electrical appliances saves $2.2 in investment in power plants & networks*
  - *Each $1 invested in more efficient oil-consuming equipments (mainly cars) saves $2.4 in oil imports to 2030*
- The higher initial investments by consumers are more than outweighed by fuel-cost savings
Going Beyond the Alternative Policy Scenario: BAPS CO₂ Emissions Savings

- CCS in power generation
- CCS and efficiency in industry
- Efficiency of electricity use
- Biofuels and hybrids
- Efficiency of power plants
- Nuclear power-plants
- Renewables-based generation

BAPS additional reduction goal of 8 Gt of CO₂
In BAPS CO2 intensity of electricity generation is 50% the current level, due to increasing reliance on “carbon free” fuels and technology improvements.
The Reference Scenario trends would lead to long term concentration far above 550 ppm CO₂ eq (cat C).

The Alternative Policy Scenario trends are consistent with median values of scenario heading to 550 ppm CO₂ eq, provided right policy incentives and technology development dramatically reduce emissions post 2030 (cat B).

The Beyond Alternative Policy Scenario could head to 510 ppm CO₂ eq, but would have to be followed by sharp reduction post 2030 (cat AB).

Source: Nakicenovic, Paper for IEA, 2006

Source: Sir Houghton, Global Warming, Climate Change and Sustainable Energy, 2006
The Reference Scenario projects a vulnerable, dirty and expensive global energy system.

The Alternative Policy Scenario maps out a cleaner, cleverer and more competitive energy future based on new policies - mainly on energy efficiency, renewables and nuclear.

Strong political will and urgent government action is needed to change existing investment patterns and move Beyond the Alternative Policy Scenario.
Next steps – WEO 2007 & WEO 2008

**WEO-2007** China and India insights
- In addition to RS and APS, high growth scenario is also explored
- Implications for energy markets and global emissions
- Co-operation with TERI, ERI and indian/chinese authorities
- Release: 7 November 2007

**WEO-2008**
- In-depth analysis of climate change scenarios – understanding energy implications of different post kyoto international architectures
- In-depth field by field analysis of top 200 oil producing fields