

## **The context**

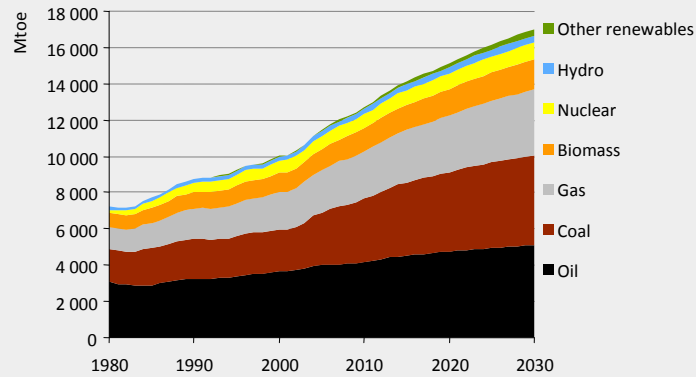
**World Energy Outlook 2008**

- Soaring energy prices to mid-2008, followed by a collapse – what will it mean for demand?
- How will the financial crisis & economic slowdown affect energy demand & investment?
- Will economic worries divert attention from strategic energy-security & environmental challenges?
- Are we setting ourselves up for a supply-crunch once the economy is back on its feet?
- Will negotiators at COP-15 in Copenhagen in 2009 have the political support needed to succeed?

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## World primary energy demand in the Reference Scenario: this is unsustainable!

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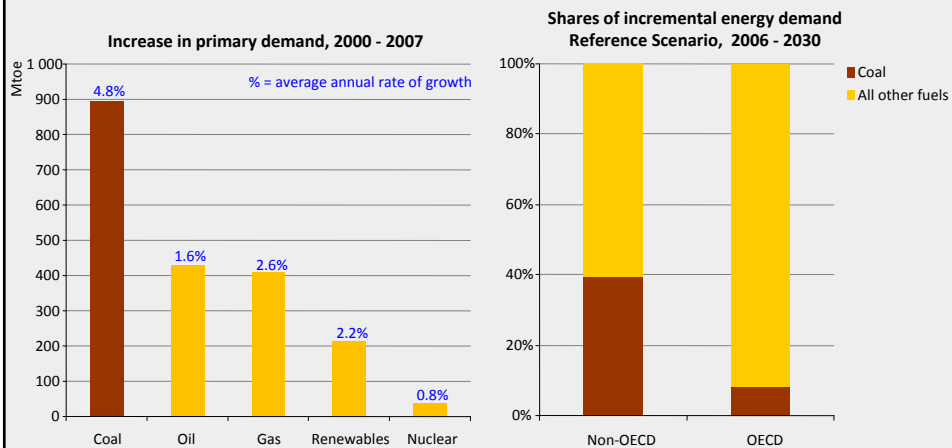


World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise

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## The continuing importance of coal in world primary energy demand

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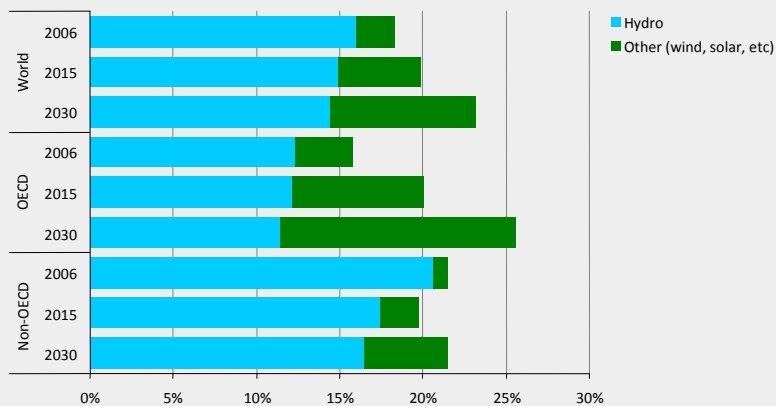


Demand for coal has been growing faster than any other energy source & is projected to account for more than a third of incremental global energy demand to 2030

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## Share of renewables in electricity generation in the Reference Scenario

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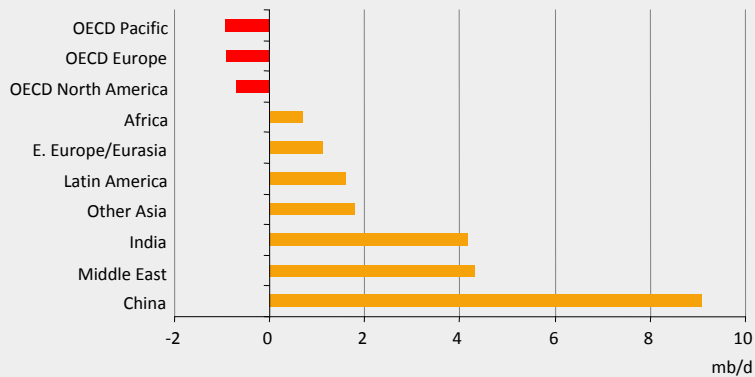


*Soon after 2010, renewables become the 2<sup>nd</sup>-largest source of electricity behind coal, thanks to government support, prospects for higher fossil-fuel prices & declining investment costs*

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## Change in oil demand by region in the Reference Scenario, 2007-2030

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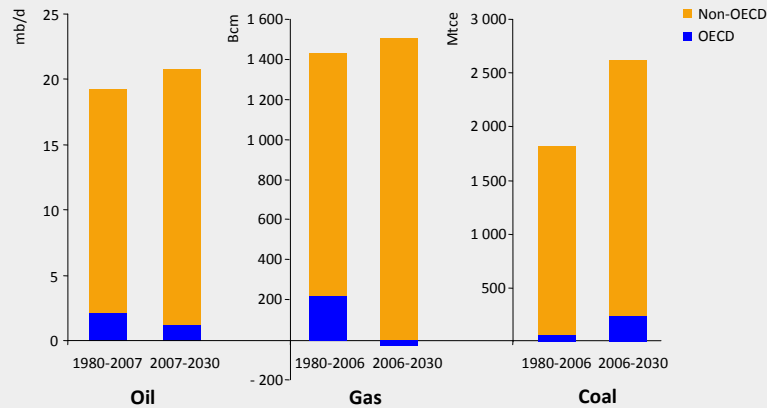


*All of the growth in oil demand comes from non-OECD, with China contributing 43%, the Middle East & India each about 20% & other emerging Asian economies most of the rest*

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# Incremental world fossil-fuel production in the Reference Scenario

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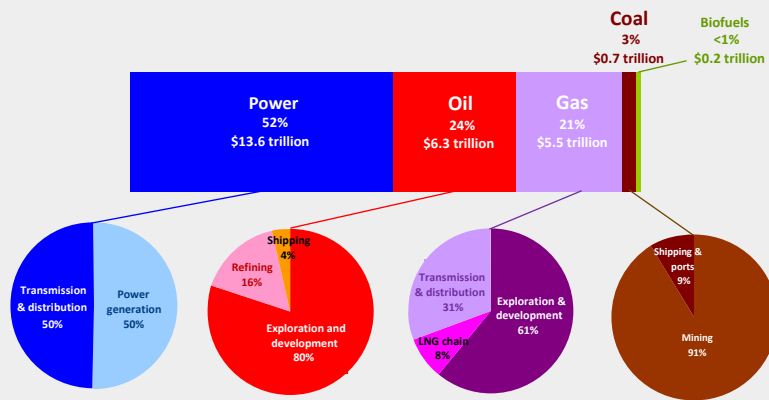


Almost all incremental oil & gas comes from non-OECD regions, resulting in major structural changes to the industry with implications for global energy markets

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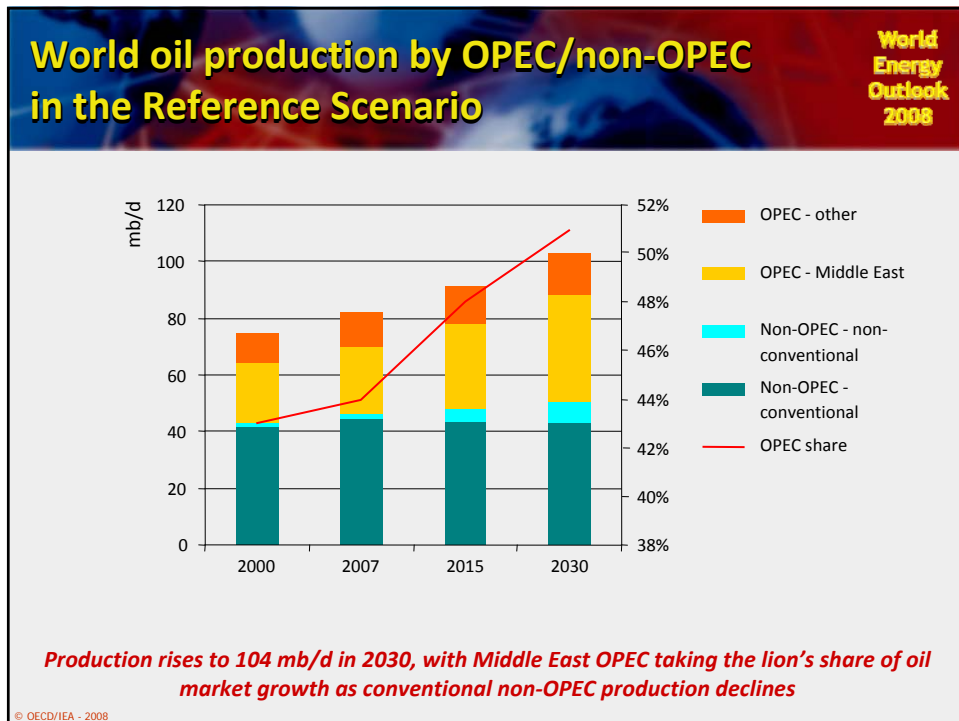
# Cumulative energy-supply investment in the Reference Scenario, 2007-2030

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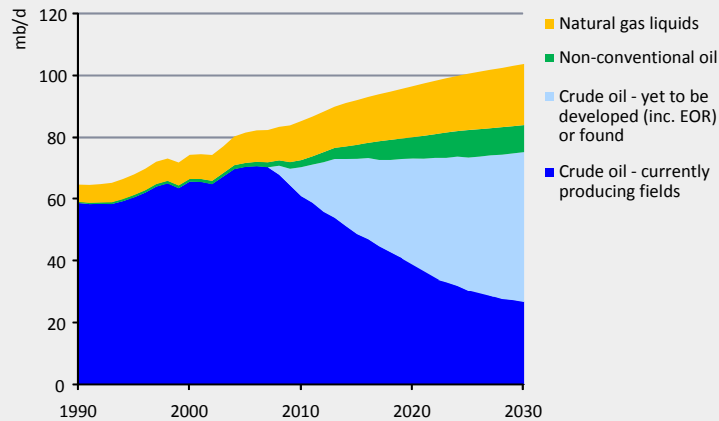
Investment of \$26 trillion, or over \$1 trillion/year, is needed, but the credit squeeze could delay spending, potentially setting up a supply-crunch once the economy recovers

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## World oil production by source in the Reference Scenario

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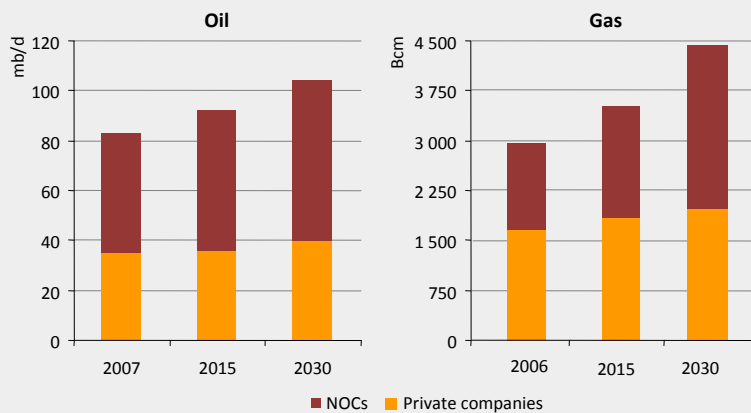


**64 mb/d of gross capacity needs to be installed between 2007 & 2030 – six times the current capacity of Saudi Arabia – to meet demand growth & offset decline**

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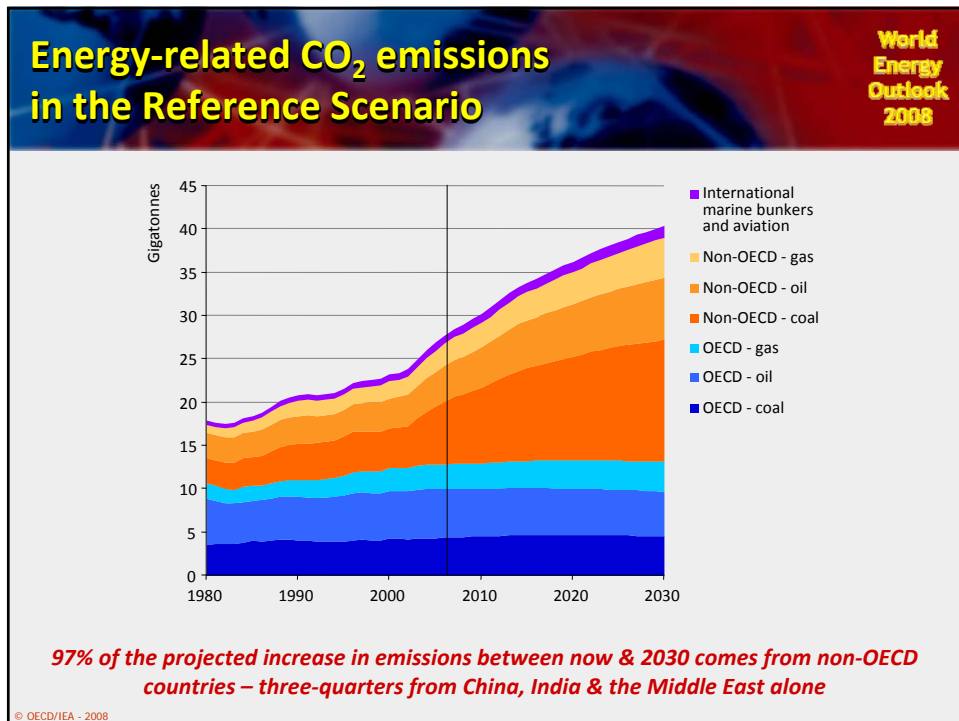
## A sea change: world oil & gas production by company type in the Reference Scenario

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**Almost 80% of the projected increase in output of both oil & gas comes from national companies – on the assumption that investment is forthcoming**

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# Copenhagen: a plausible post-2012 global climate-change policy regime

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## The 450 Policy Scenario

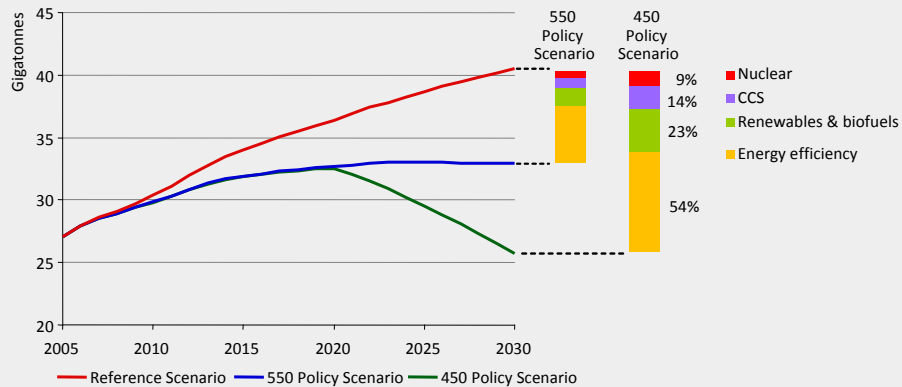


*A combination of policy mechanisms – reflecting nations' varied circumstances & current negotiating positions – is a realistic outcome at the Copenhagen COP at end-2009*

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# Reductions in energy-related CO<sub>2</sub> emissions in the climate-policy scenarios

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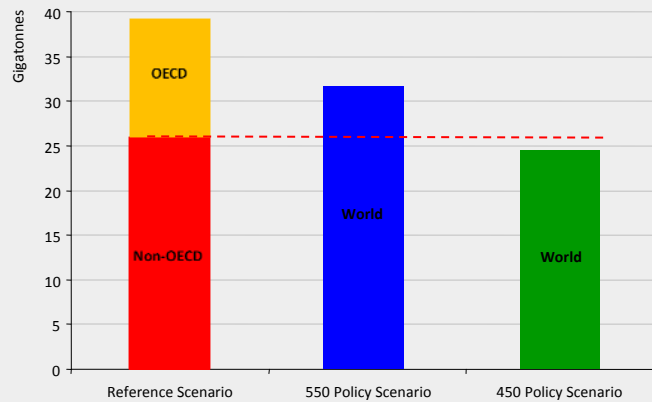


*While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy account for most of the savings*

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## World energy-related CO<sub>2</sub> emissions in 2030 by scenario

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*OECD countries alone cannot put the world onto a 450-ppm trajectory, even if they were to reduce their emissions to zero*

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## Key results of the post-2012 climate-policy analysis

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### 550 Policy Scenario

- Corresponds to a c.3°C global temperature rise
- Energy demand continues to expand, but fuel mix is markedly different
- CO<sub>2</sub> price in OECD countries reaches \$90/tonne in 2030
- Additional investment equal to 0.25% of GDP

### 450 Policy Scenario

- Corresponds to a c.2°C global temperature rise
- Energy demand grows, but half as fast as in Reference Scenario
- Rapid deployment of low-carbon technologies – particularly CCS
- Big fall in non-OECD emissions
- CO<sub>2</sub> price in 2030 reaches \$180/tonne
- OPEC production still 12mb/d higher in 2030 than today
- Additional investment equal to 0.6% of GDP

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**Summary & conclusions**

**World Energy Outlook 2008**

- **Current energy trends are patently unsustainable — socially, environmentally, economically**
- **Oil will remain the leading energy source but...**
  - > *The era of cheap oil is over, although price volatility will remain*
  - > *Oilfield decline is the key determinant of investment needs*
  - > *The oil market is undergoing major and lasting structural change, with national companies in the ascendancy*
- **To avoid "abrupt and irreversible" climate change we need a major decarbonisation of the world's energy system**
  - > *Copenhagen must deliver a credible post-2012 climate regime*
  - > *Limiting temperature rise to 2 °C will require significant emission reductions in all regions & technological breakthroughs*
  - > *Mitigating climate change will substantially improve energy security*
- **The present economic worries do not excuse back-tracking or delays in taking action to address energy challenges**

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