INTERNATIONAL ENERGY AGENCY

World Energy Outlook 2008

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

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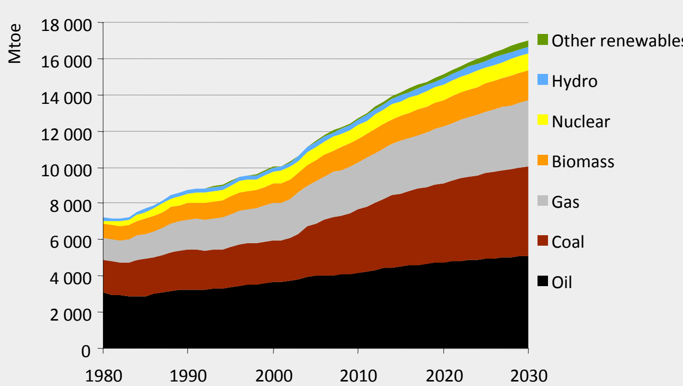

World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise

The continuing importance of coal in world primary energy demand

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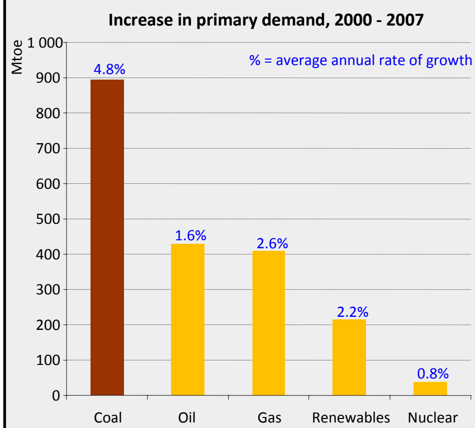

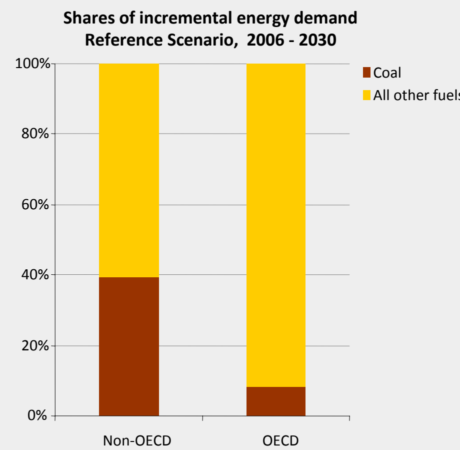

Demand for coal has been growing faster than any other energy source & is projected to account for more than a third of incremental global energy demand to 2030

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

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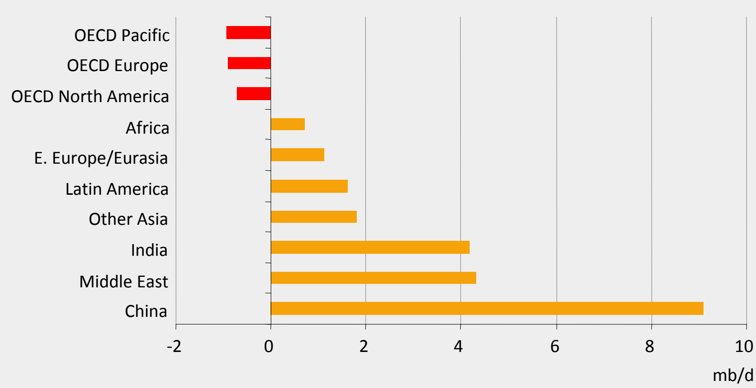

All of the growth in oil demand comes from non-OECD, with China contributing 43%, the Middle East & India each about 20% & other emerging Asian economies most of the rest

EU natural gas market outlook

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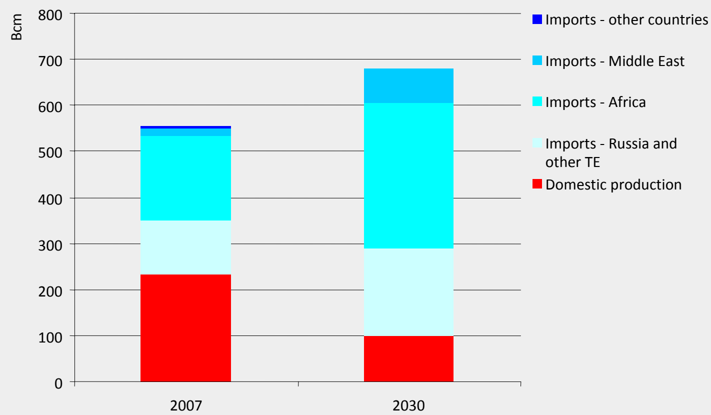

EU import dependency rises from 58% today to 86% in 2030 as a result of declining domestic production and increasing demand

World natural gas reserves and Gas Exporting Countries Forum (GECF)

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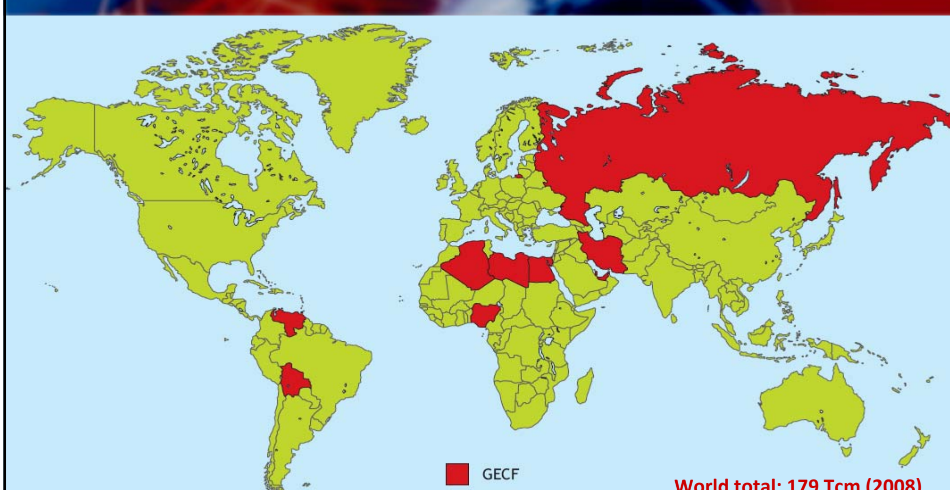

The 11 members of GECF account for 2/3 of global gas reserves, while just 2 of them – Russia & Iran – account for over 40% .

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

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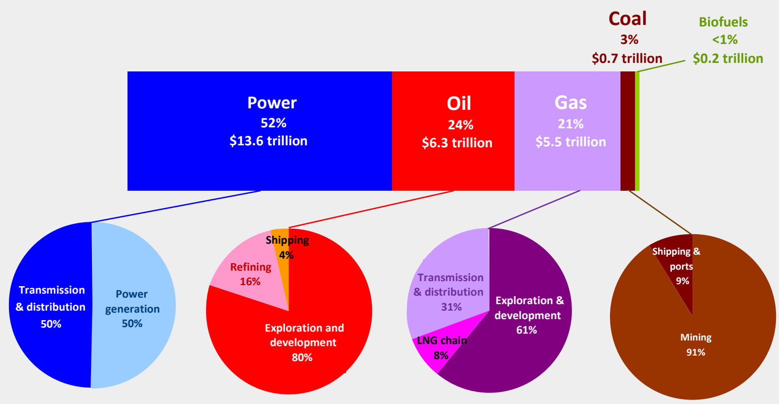

Investment of $26 trillion, or over $1 trillion/year, is needed, but the credit squeeze could delay spending, potentially setting up a supply-crunch once the economy recovers

World oil production by OPEC/non-OPEC in the Reference Scenario

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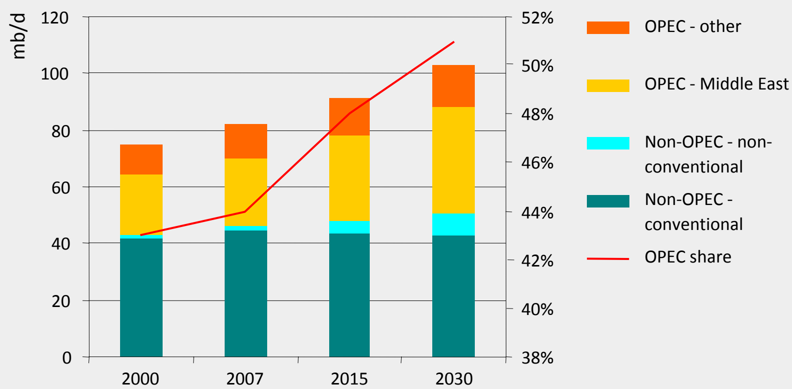

Production rises to 104 mb/d in 2030, with Middle East OPEC taking the lion's share of oil market growth as conventional non-OPEC production declines

World oil production by source in the Reference Scenario

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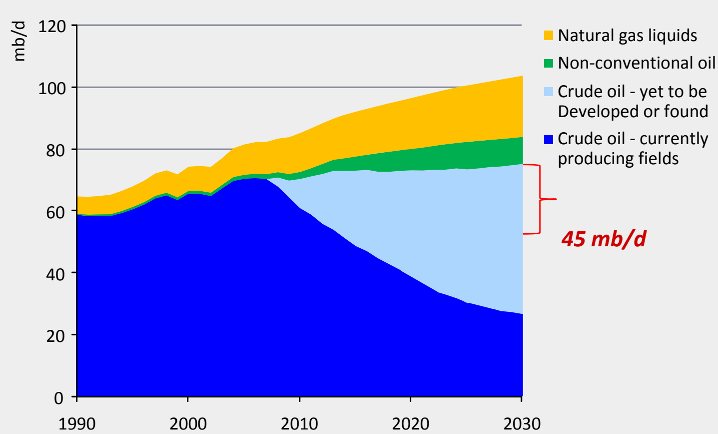

Even if oil demand was to remain flat to 2030, 45 mb/d of gross capacity – roughly four times the capacity of Saudi Arabia – would ne needed just to offset decline from existing fields.

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

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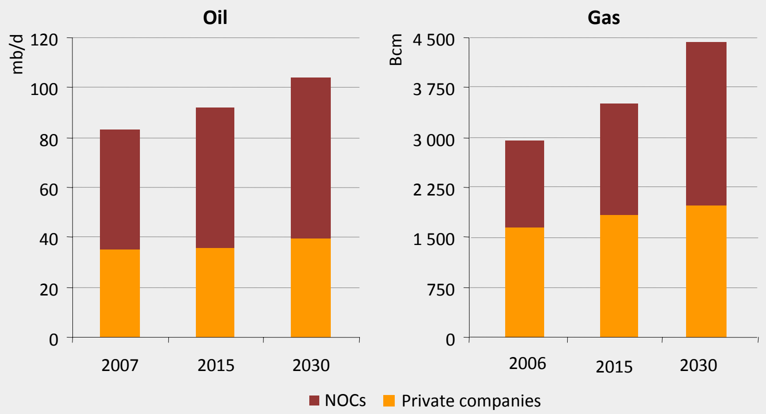

Almost 80% of the projected increase in output of both oil & gas comes from national companies – on the assumption that investment is forthcoming

Reductions in energy-related CO_2 emissions in the climate-policy scenarios

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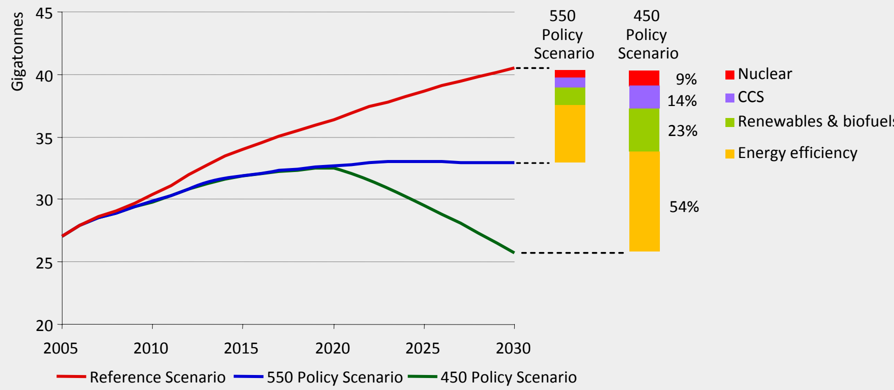

While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy accounts for most of the savings

Total power generation capacity today and in 2030 by scenario

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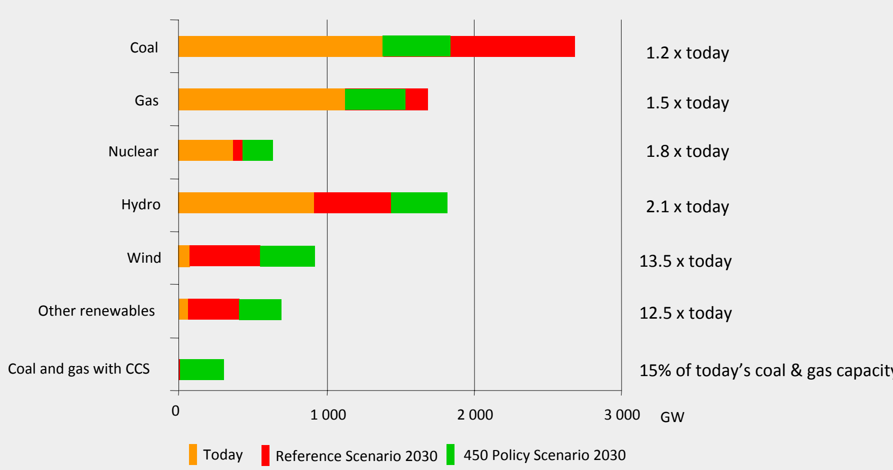

In the 450 Policy Scenario, the power sector undergoes a dramatic change – with CCS, renewables and nuclear each playing a crucial role

Cumulative European Union CO_2 savings with 20% reduction target in 2020

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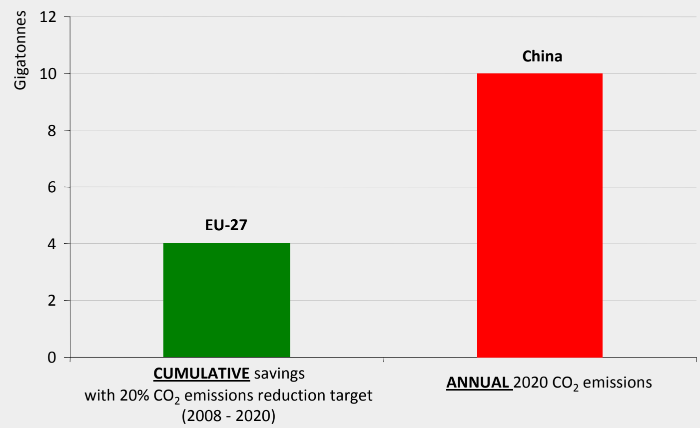

EU cumulative savings over 2008-2020 would represent only 40% of China's annual CO_2 emissions in 2020

Total oil production in 2030 by scenario

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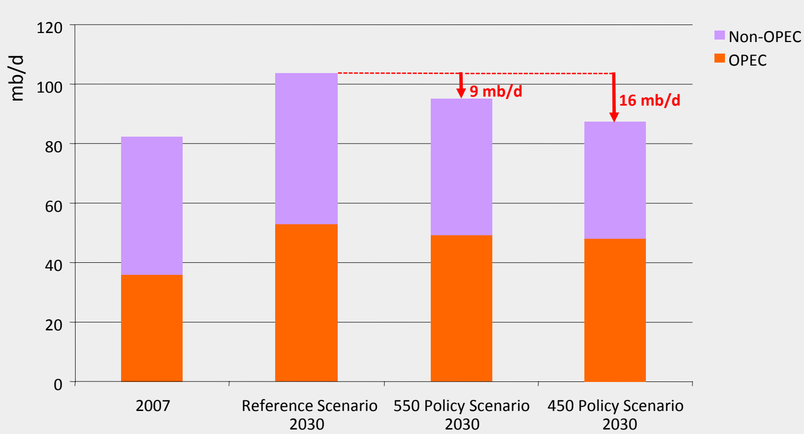

Curbing CO_2 emissions would improve energy security by cutting demand for fossil fuels, but even in the 450 Policy Scenario, OPEC production increases by 12 mb/d from now to 2030

How is the financial & economic crisis affecting energy investment?

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- Difficulties in obtaining credit & higher cost of capital
  - > *Increased aversion to risk*
  - > *Paralysed credit markets*
  - > *Plunging share values have increased debt-equity ratios*
- Lower prices & cash flows have made new investments less attractive
- Falling demand caused by economic recession has reduced urgency & appetite for suppliers to invest

Impact of financial crisis on global investment in renewable energy

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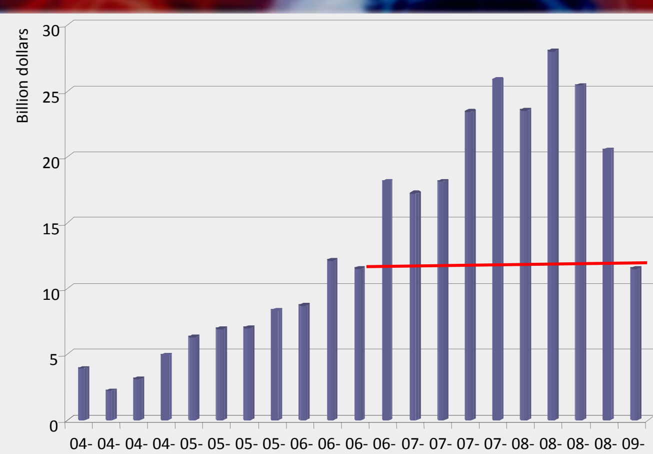

Investment in renewables has been hit by the rising cost of credit and the fall in oil & gas prices which has reduced the economic incentive for "clean" energy...

... since Q2 2008 investment has come down to 2006 levels

Source: NEF

Summary & conclusions

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- Current energy trends are patently unsustainable — socially, environmentally, economically
- Energy and geopolitics will be increasingly interconnected
- We need a major decarbonisation of the world's energy system -- Copenhagen is crucial
- Addressing environmental issues will substantially improve energy security
- Financial crisis can plant the seeds for an "energy investment crisis"