INTERNATIONAL ENERGY AGENCY

International Energy Cooperation and Sustainable Economic Growth

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Global Korea 2009 - Korea in a Reshaping World

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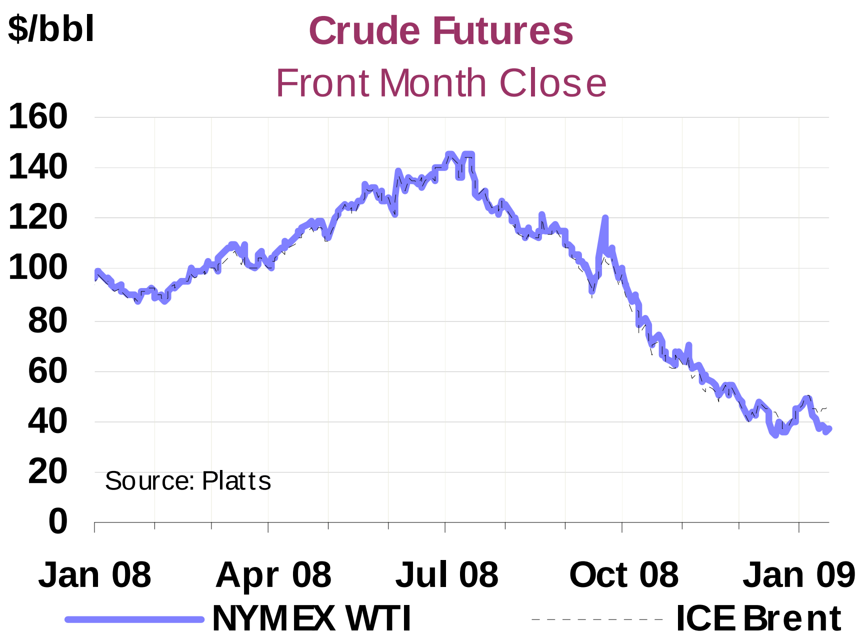
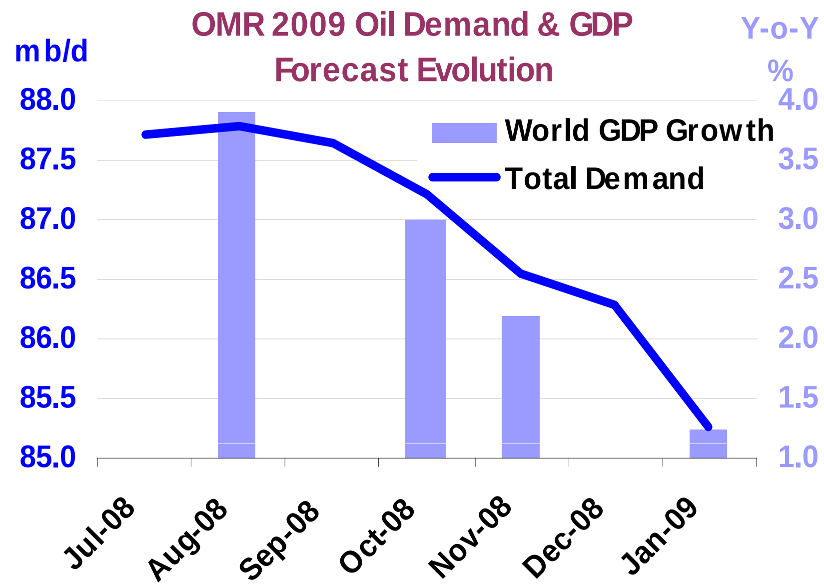
Worsening economic outlook underpins market weakening





- ***Two year demand contraction in 08/09 first since early-1980s***
- ***OECD hit hard, but clear signs that non-OECD is slowing now too***
- ***Prices bottoming-out in face of OPEC supply cuts?***

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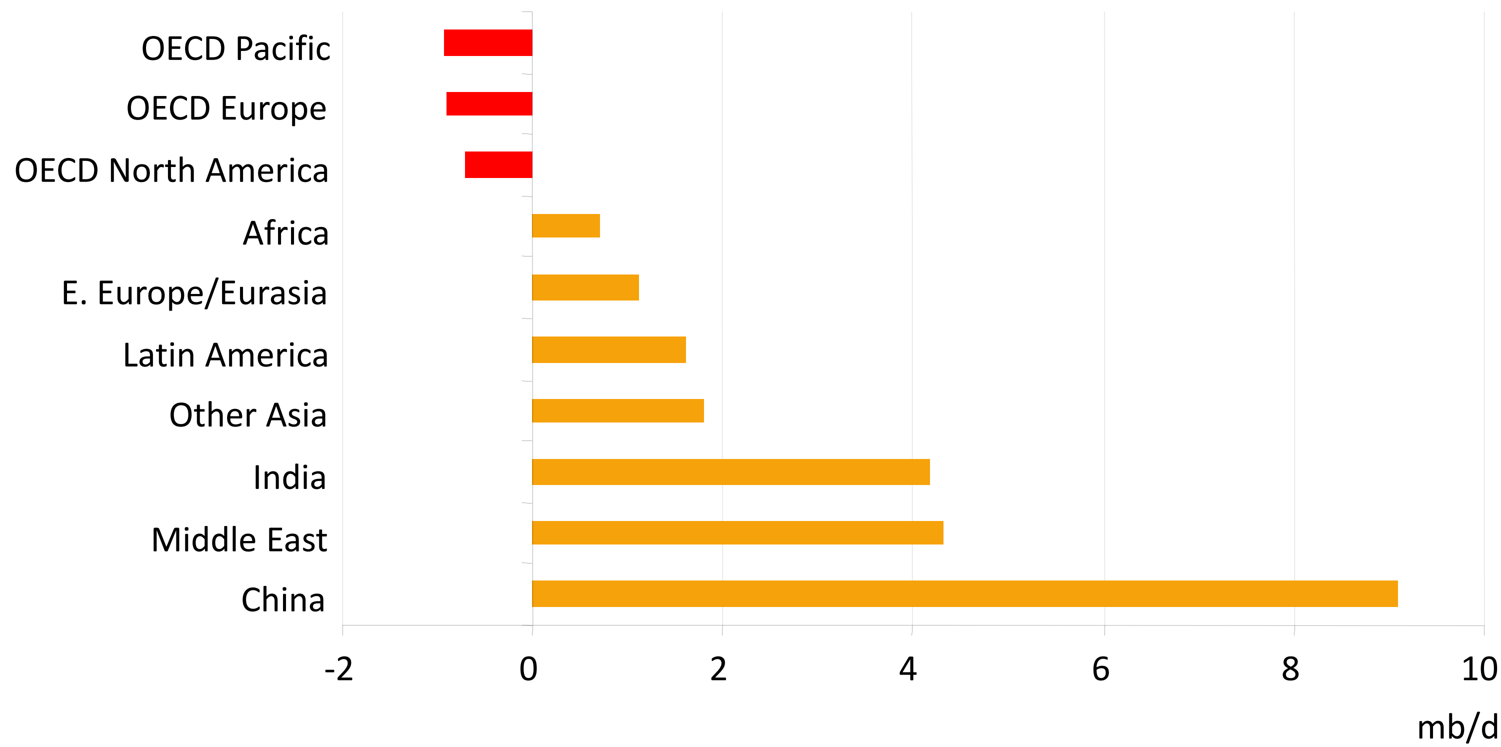
Change in oil demand by region in the Reference Scenario, 2007-2030



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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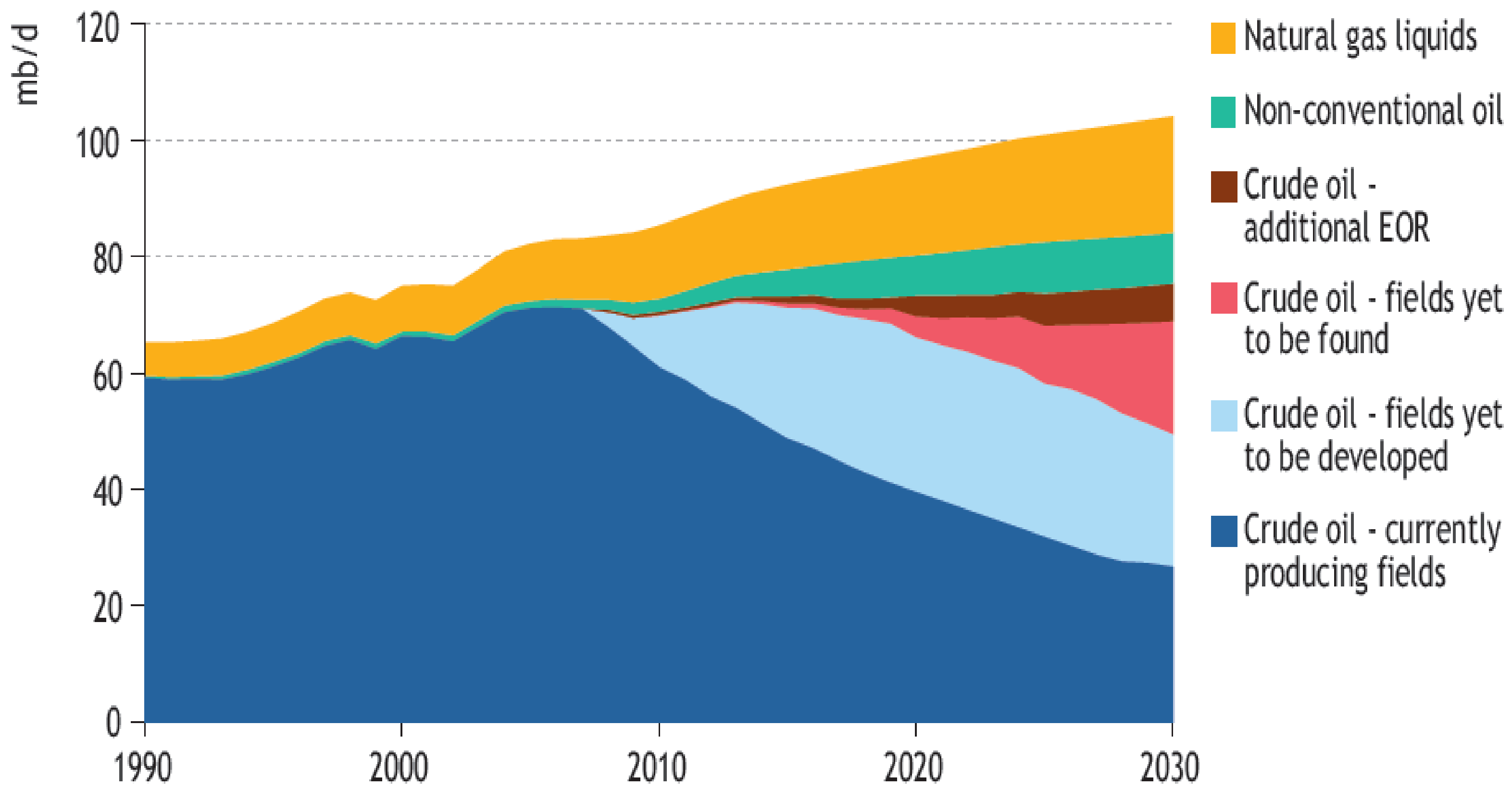
World oil production by source in the Reference Scenario



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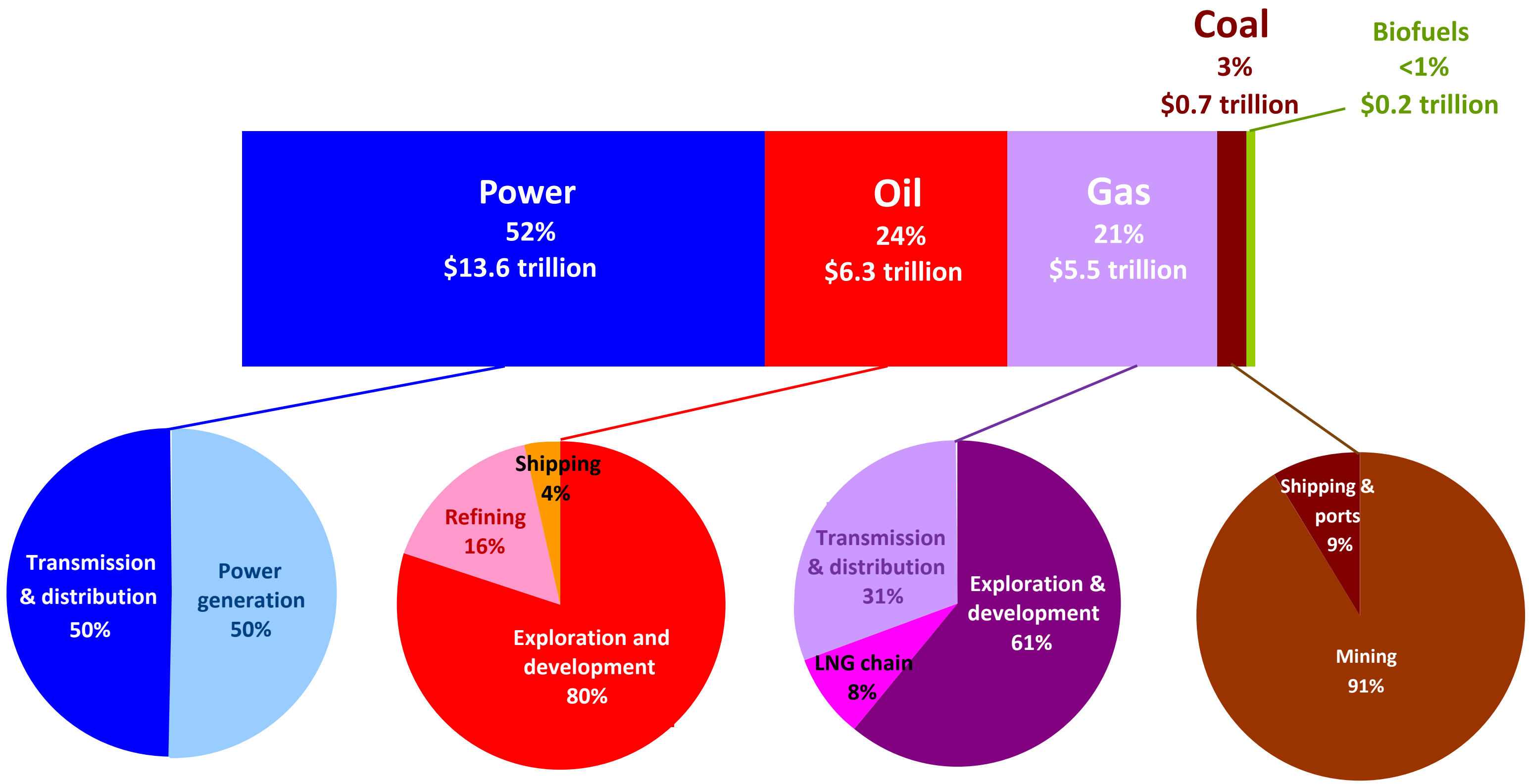
Cumulative energy supply investment in the Reference Scenario, 2007-2030



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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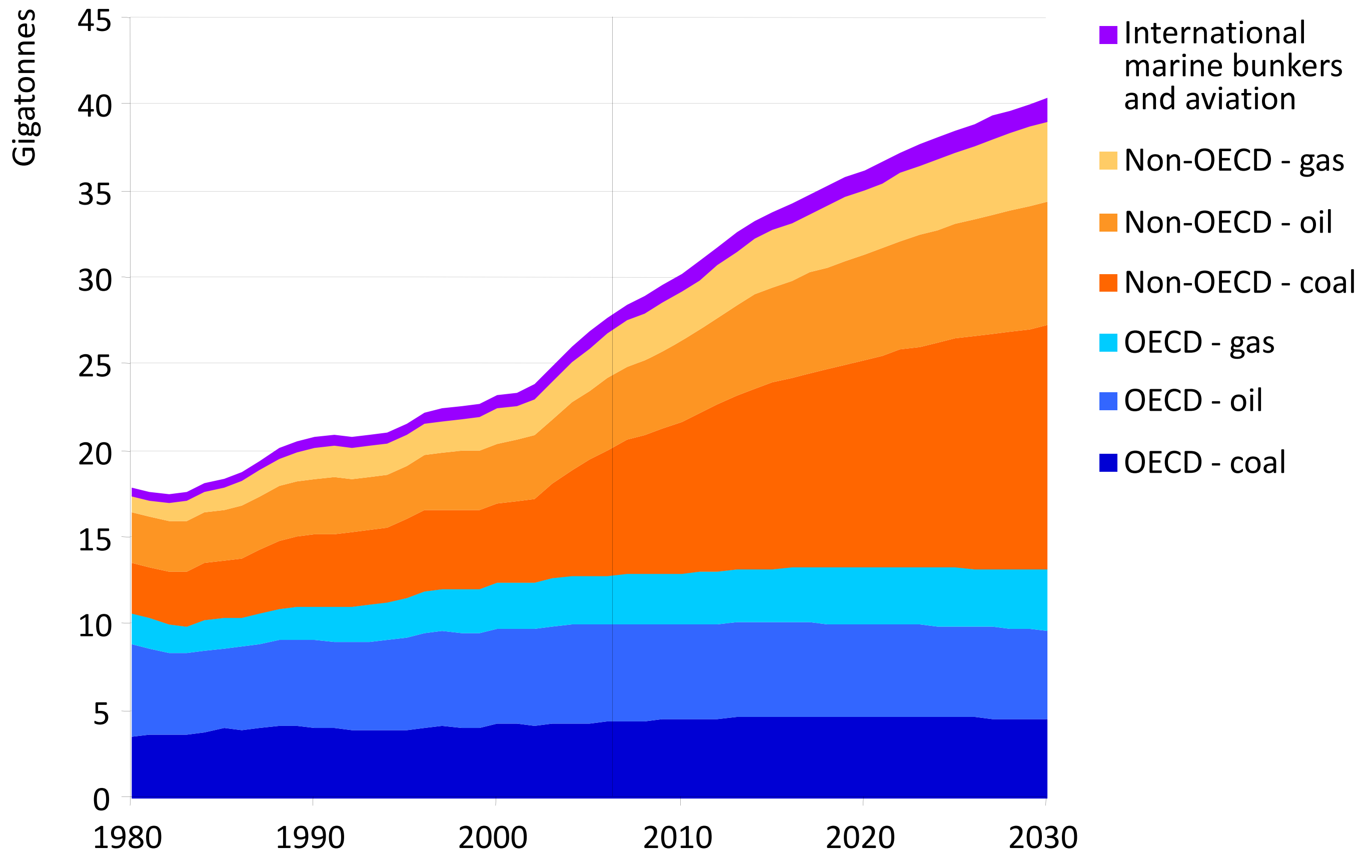
Energy-related C02 emissions
World Energy Outlook 2008 - Reference Scenario



97% of the projected increase in emissions between now & 2030 comes from non-OECD countries – three-quarters from China, India & the Middle East alone

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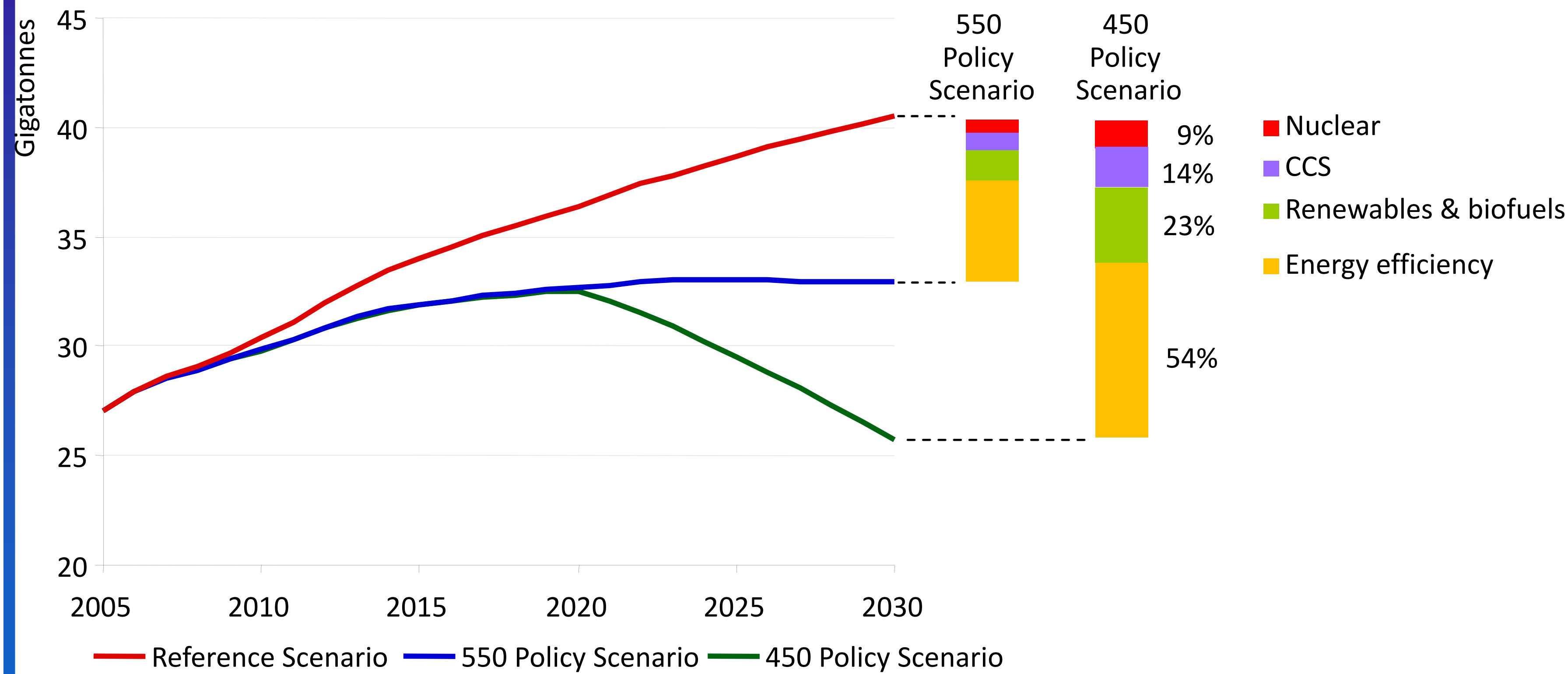
Reductions in energy-related CO_2 emissions in the climate-policy scenarios



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.

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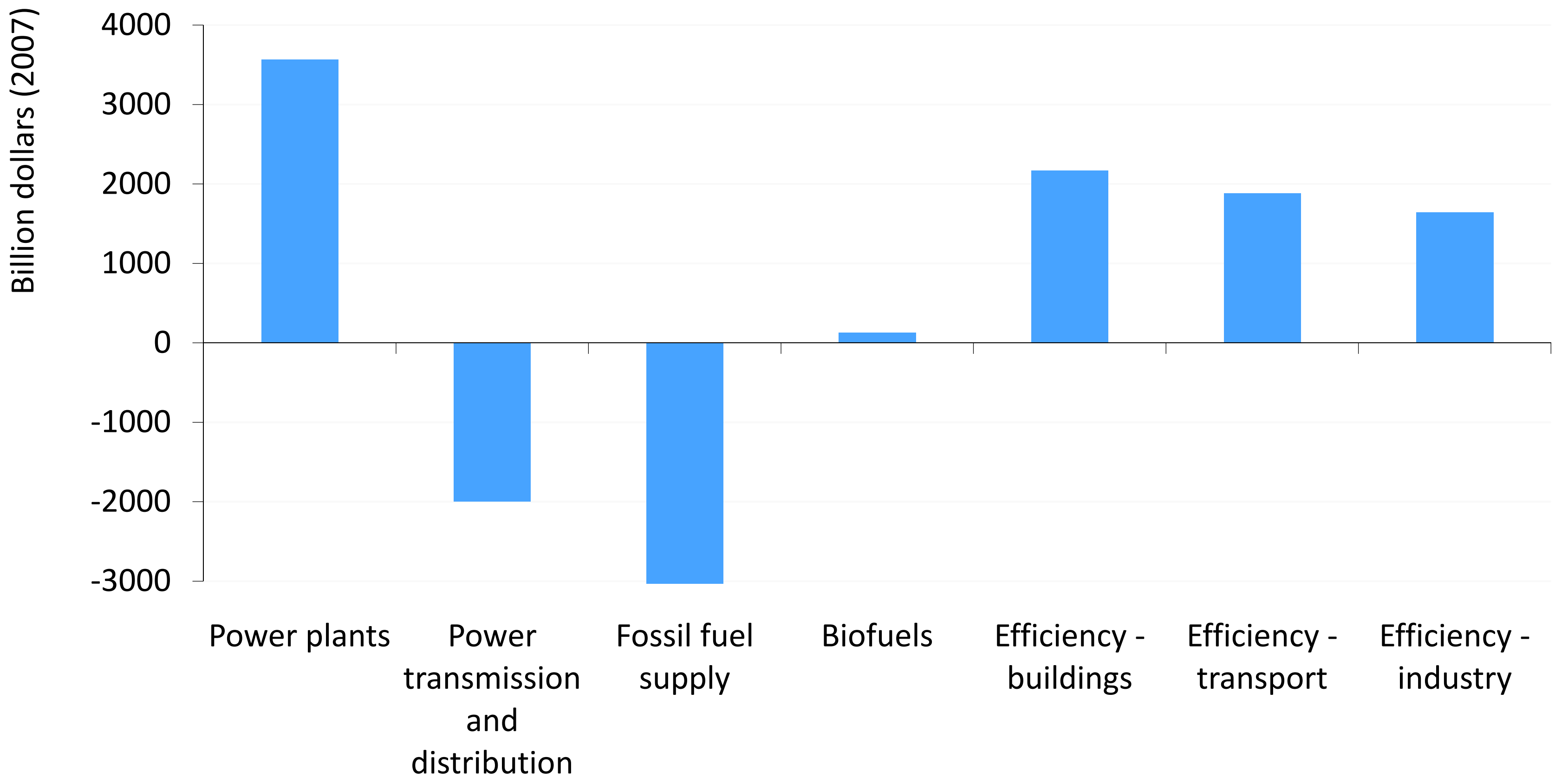
Change in world energy investment in the 450 Policy relative to the Reference Scenario, 2010-2030



Huge investment in power plants and energy efficiency will be required if we are to shift the world onto a 450-ppm trajectory

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Clean energy technologies – 17 key technologies

- **Supply side**
  - CCS power generation
  - Nuclear III + IV
  - Wind
  - Biomass
    – IGCC & co-combustion
  - Solar – PV
  - Solar – CSP
  - Coal – IGCC
  - Coal – USCSC
  - 2nd generation biofuels

- **Demand side**
  - Energy efficiency in buildings
  - Heat pumps
  - Solar space and water heating
  - Energy efficiency in transport
  - Electric and plug-in vehicles
  - Fuel cell vehicles
  - CCS in industry
  - Industrial motor systems

Energy Technology Perspective (ETP) 2008 provides roadmaps of 17 key technologies which provide 87% of CO2 savings to halve the energy related CO2 emission by 2050.

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IEA 25 energy efficiency policy recommendations across 7 priority areas

1. Across sectors

1.1 Measures for increasing investment in energy efficiency;
1.2 National energy efficiency strategies and goals;
1.3 Compliance, monitoring, enforcement and evaluation of energy efficiency measures;
1.4 Energy efficiency indicators;
1.5 Monitoring and reporting progress with the IEA energy efficiency recommendations themselves.

2. Buildings

2.1 Building codes for new buildings;
2.2 Passive Energy Houses and Zero Energy Buildings;
2.3 Policy packages to promote energy efficiency in existing buildings;
2.4 Building certification schemes;
2.5 Energy efficiency improvements in glazed areas.

3. Appliances

3.1 Mandatory energy performance requirements or labels;
3.2 Low-power modes, including standby power, for electronic and networked equipment;
3.3 Televisions and "set-top" boxes;
3.4 Energy performance test standards and measurement protocols.

4. Lighting

4.1 Best practice lighting and the phase-out of incandescent bulbs;
4.2 Ensuring least-cost lighting in non-residential buildings and the phase-out of inefficient fuel-based lighting.

5. Transport

5.1 Fuel-efficient tyres;
5.2 Mandatory fuel efficiency standards for light-duty vehicles;
5.3 Fuel economy of heavy-duty vehicles;
5.4 Eco-driving.

6. Industry

6.1 Collection of high quality energy efficiency data for industry;
6.2 Energy performance of electric motors;
6.3 Assistance in developing energy management capability;
6.4 Policy packages to promote energy efficiency in small and medium-sized enterprises.

7. Utilities

7.1 Utility end-use energy efficiency schemes

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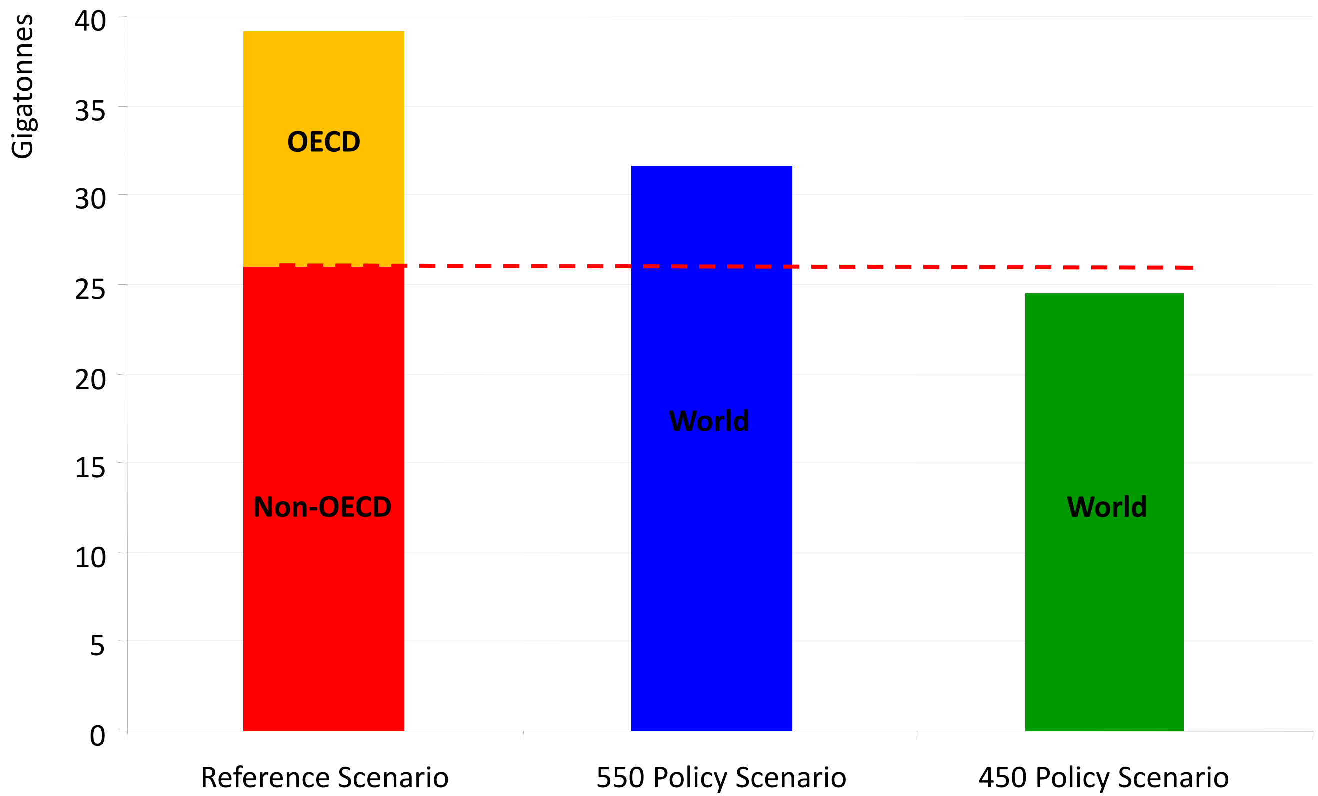
World energy-related CO_2 emissions in 2030 by scenario



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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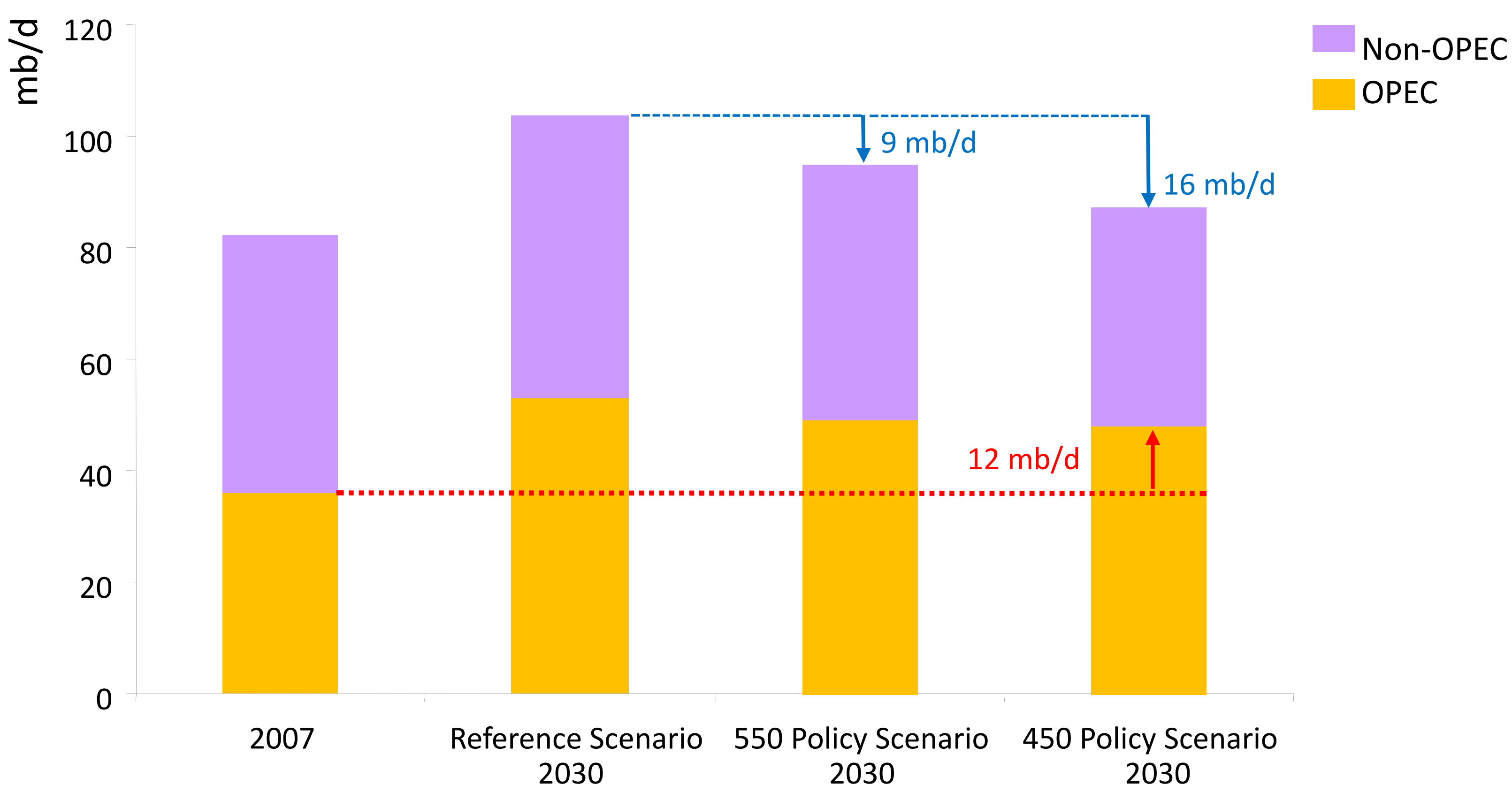
Total oil production in 2030 by scenario



Curbing CO2 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

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Conclusions: A Clean Energy New Deal

- **Current energy trends are patently unsustainable — socially, environmentally, economically**
- **To avoid "abrupt and irreversible" climate change we need a major decarbonisation of the world's energy system through significant emission reductions in all regions & technological breakthroughs**
- **Mitigating climate change will substantially improve energy security**
- **The present economic crises could have two important mid-long term implication on the energy sector;**
  - **a serious shortage of supply capacity when economy recovers**
  - **lower investment in clean energy technologies**
- **We can change crisis to opportunity – <u>Clean Energy New Deal</u>**
- **Economic stimulus packages provide an excellent opportunity for a cleaner and more secure energy future**

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