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Mitigation potentials in post-2012 climate scenarios

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IEA scenarios

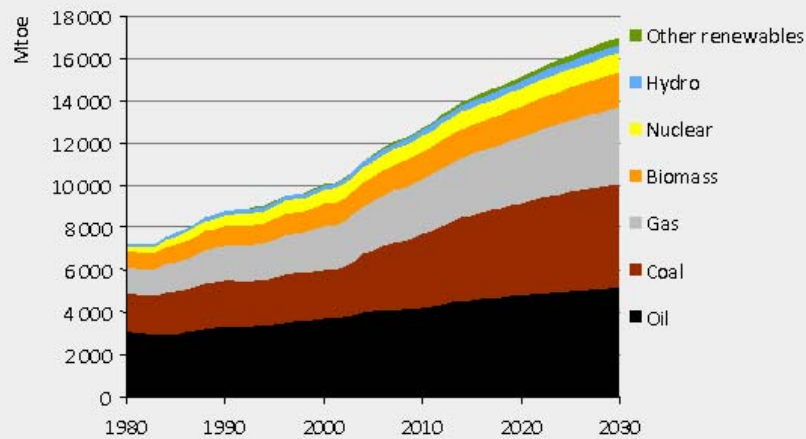
- **Reference scenario (WEO 2008)**
 - ◆ Government policies / measures that were enacted or adopted by mid-2008
 - ◆ World population growth: 1% annual avg rate
 - ◆ World GDP growth: 3.3% annual avg rate
 - ◆ Crude oil import price: 2008-15: \$100/bbl , then increase to over \$120/bbl
 - ◆ Natural gas prices: rise then slight fall, rise after 2015
 - ◆ Coal prices: 2010-15: \$120/t, 2030: \$110/t
 - ◆ Progressive improvement of avg energy efficiency of equipment , but at varying rates
- **550 ppm CO₂-eq Policy Scenario**
- **450 ppm CO₂-eq Policy Scenario (BLUE)**
- **Stabilization at 2005 emission levels (ACT)**

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Sources: IEA, World Energy Outlook, 2008
IEA, Energy Technology Perspectives, 2008

World primary energy demand in the Reference Scenario: an unsustainable path

World Energy Outlook 2008

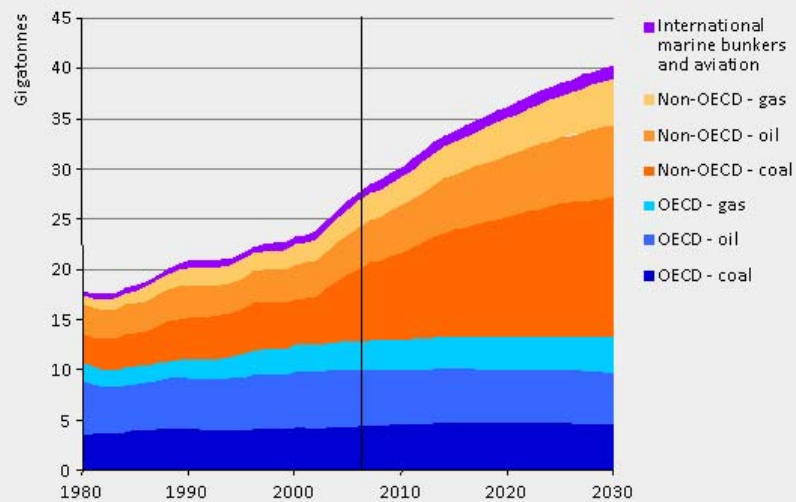


World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise

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Energy-related CO₂ emissions in the Reference Scenario

World Energy Outlook 2008



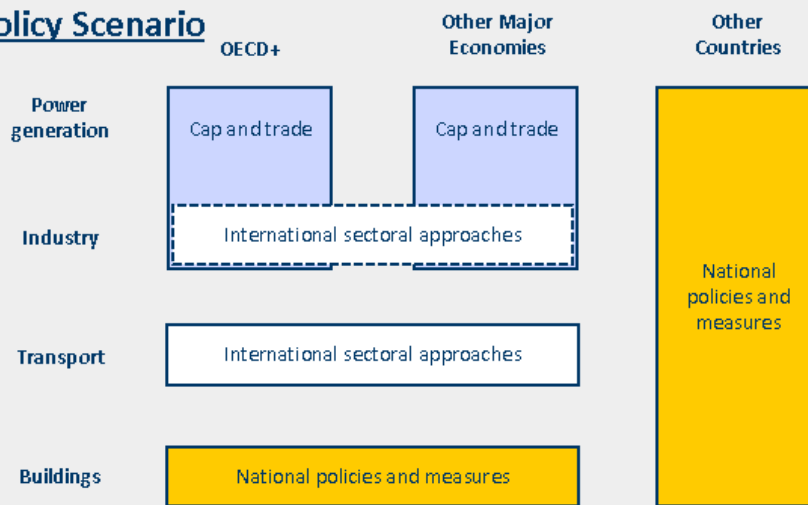
97% of the projected increase in emissions between now & 2030 comes from non-OECD countries – three-quarters from China, India & the Middle East alone

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

World Energy Outlook 2008

The 450 Policy Scenario

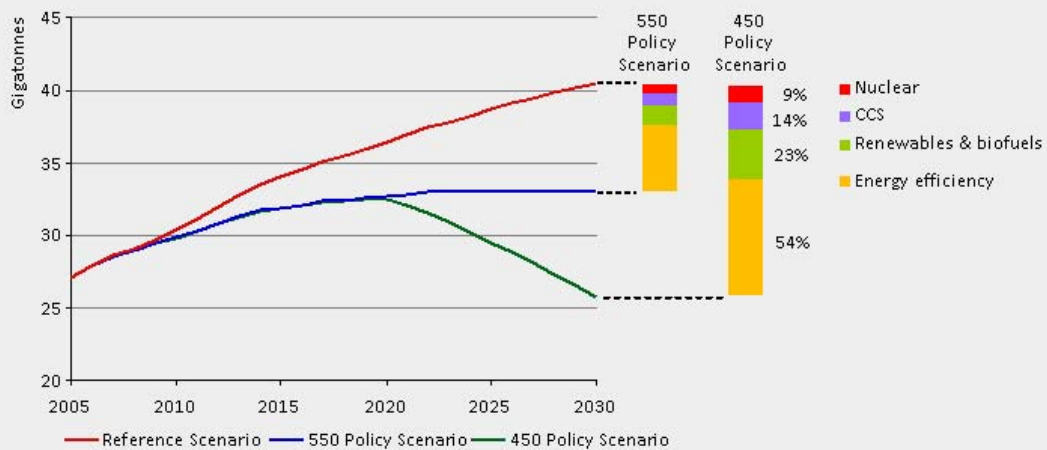


A combination of policy approaches – reflecting nations' varied circumstances as reflected in current negotiating positions – appears like a realistic outcome for the Copenhagen COP

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Reductions in energy-related CO₂ emissions in the climate-policy scenarios

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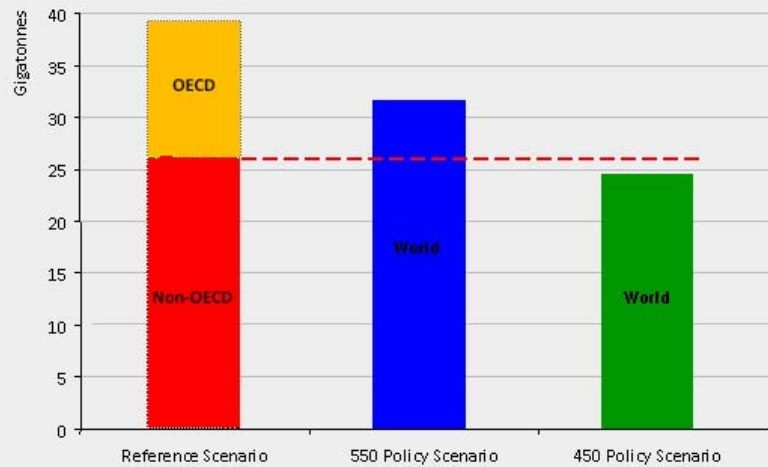


While technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy technology accounts for most of the savings

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World energy-related CO₂ emissions in 2030 by scenario

World Energy Outlook 2008



Effects by OECD countries alone are not sufficient to put the world onto an IPCC 450-ppm trajectory, even if they were to reduce their emissions to zero in 2030

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Key results of the post-2012 climate-policy analysis

World Energy Outlook 2008

550 Policy Scenario

- Corresponds to a c.3°C global temperature rise
- Energy demand continues to expand, but fuel mix is markedly different
- CO₂ price in OECD countries reaches \$90/tonne in 2030
- Additional investment equal to 0.25% of GDP

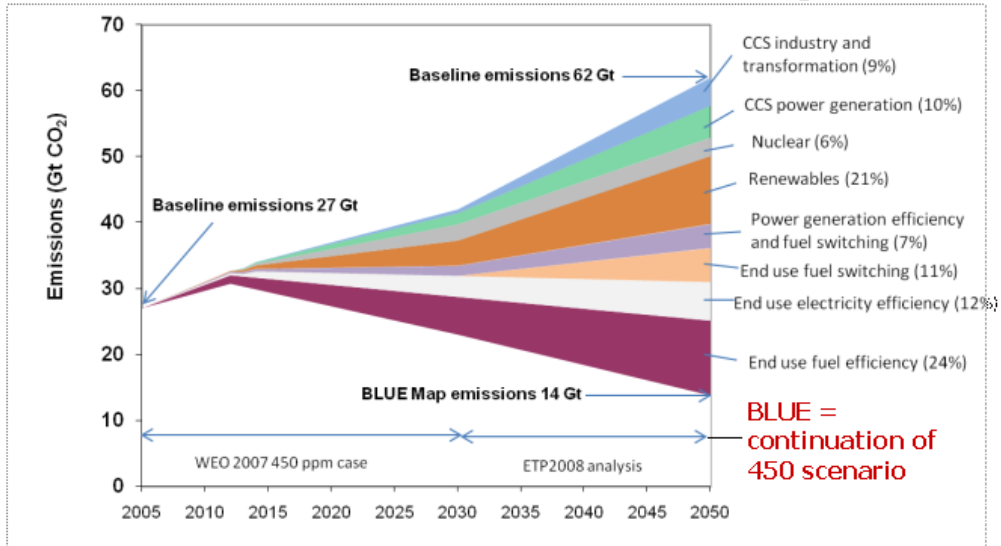
450 Policy Scenario

- 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
- Noticeable deviation from BAU in non-OECD emissions
- CO₂ price in 2030 reaches \$180/tonne
- Additional investment equal to 0.6% of GDP

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A New Energy Revolution... needed emission reductions by 2050



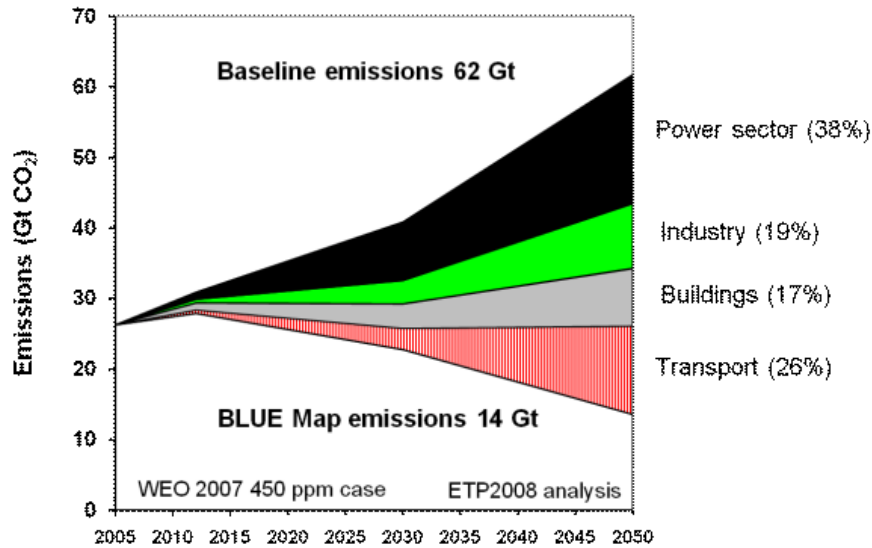
*Improved efficiency and decarbonising the power sector could bring emissions back to current levels by 2050.
A 50% cut we would require revolutionising the transport sector.*

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IEA, Energy Technology Perspectives, 2008



Where is the mitigation potential?



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IEA, Energy Technology Perspectives, 2008



Key Technology Options (Roadmaps)

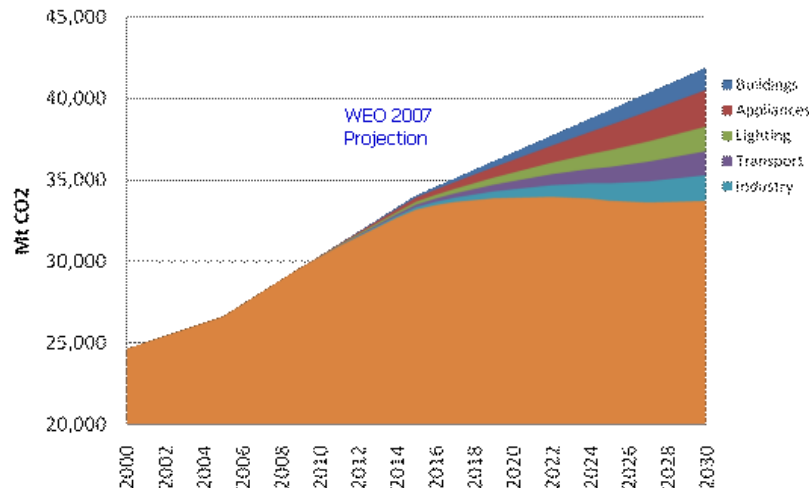
- **Supply side**
 - ◆ CCS power generation
 - ◆ Coal – IGCC
 - ◆ Coal – USCSC
 - ◆ Nuclear III + IV
 - ◆ Solar – PV
 - ◆ Solar – CSP
 - ◆ Wind
 - ◆ Biomass – IGCC & co-combustion
 - ◆ 2nd generation biofuels
- **Demand side**
 - ◆ Energy efficiency in buildings
 - ◆ Energy efficient motor systems
 - ◆ Efficient ICEs
 - ◆ Heat pumps
 - ◆ Plug-ins and electric vehicles
 - ◆ Fuel cell vehicles
 - ◆ Industrial CCS
 - ◆ Solar heating

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IEA, Energy Technology Perspectives, 2008
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The IEA's 25 Energy Efficiency recommendations to the G8 offer huge mitigation potential



Global implementation of recommendations could save around 8.2 GtCO₂/yr by 2030. Equivalent to 20% of global reference scenario energy related CO₂ emissions in 2030.

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Bottom line

- **Current energy trends are unsustainable; to avoid "abrupt and irreversible" climate change:**
 - ➔ significant emission reductions in *all* regions
 - ➔ technological breakthroughs
- **A portfolio of clean & efficient technologies offers mitigation potential**
 - ➔ critical: energy efficiency, power sector; transport and industry
 - ➔ key: price signal to internalize costs of CO₂
- **Significant change in policies needed:**
 - ➔ targeted policy interventions
 - ➔ closer international collaboration
 - ➔ investments

➔ *Next 10 years are critical*