

theLisbonCouncil
making Europe fit for the future

The 2008 Robert Schuman Lecture

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Residence Palace, Brussels
22 May 2008



***The New World Energy Order:
Implications for Climate Change***



**Dr. Fatih Birol
Chief Economist
International Energy Agency**



Reference Scenario





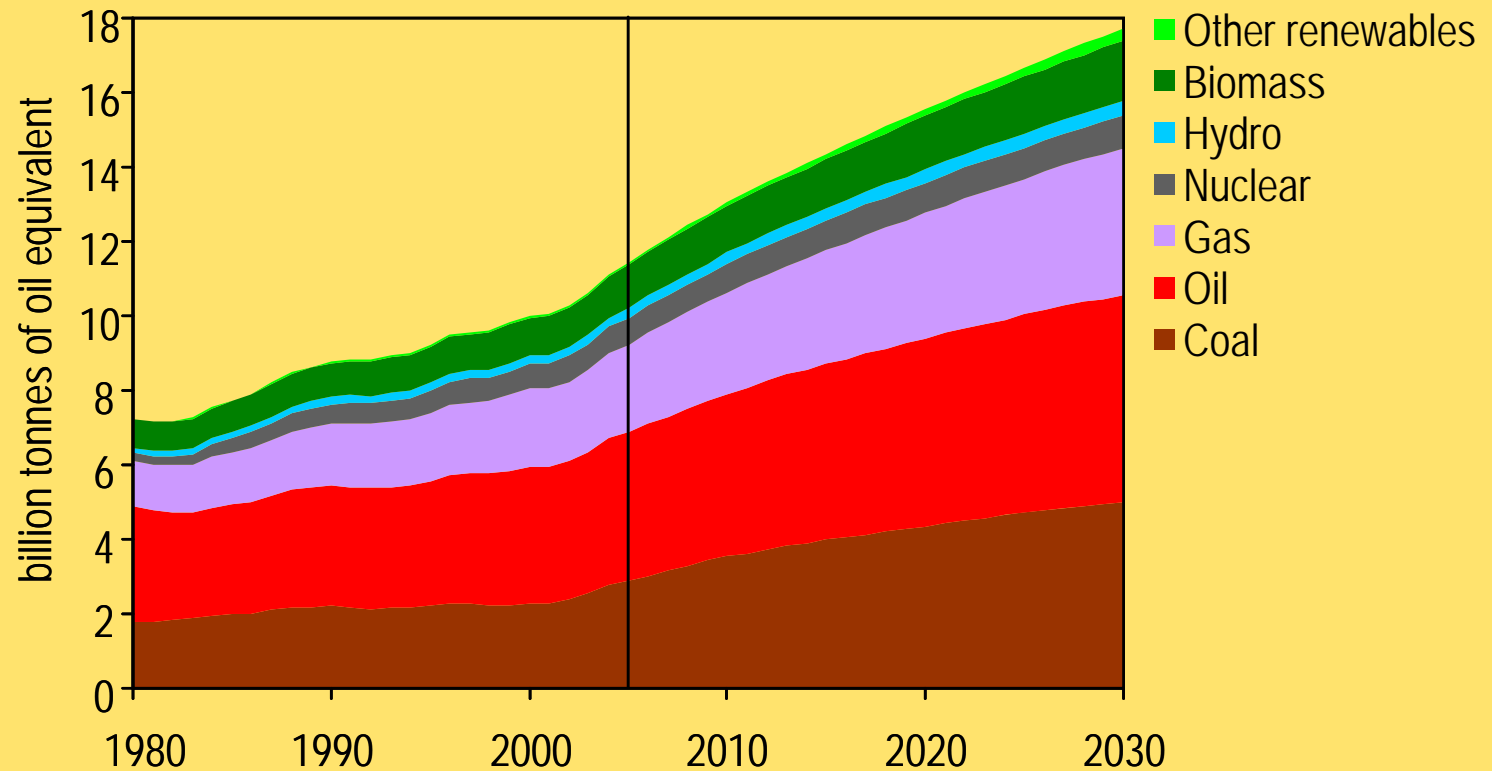
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Reference Scenario: World Primary Energy Demand



Global demand grows by more than half over the next quarter of a century, with coal use rising most in absolute terms



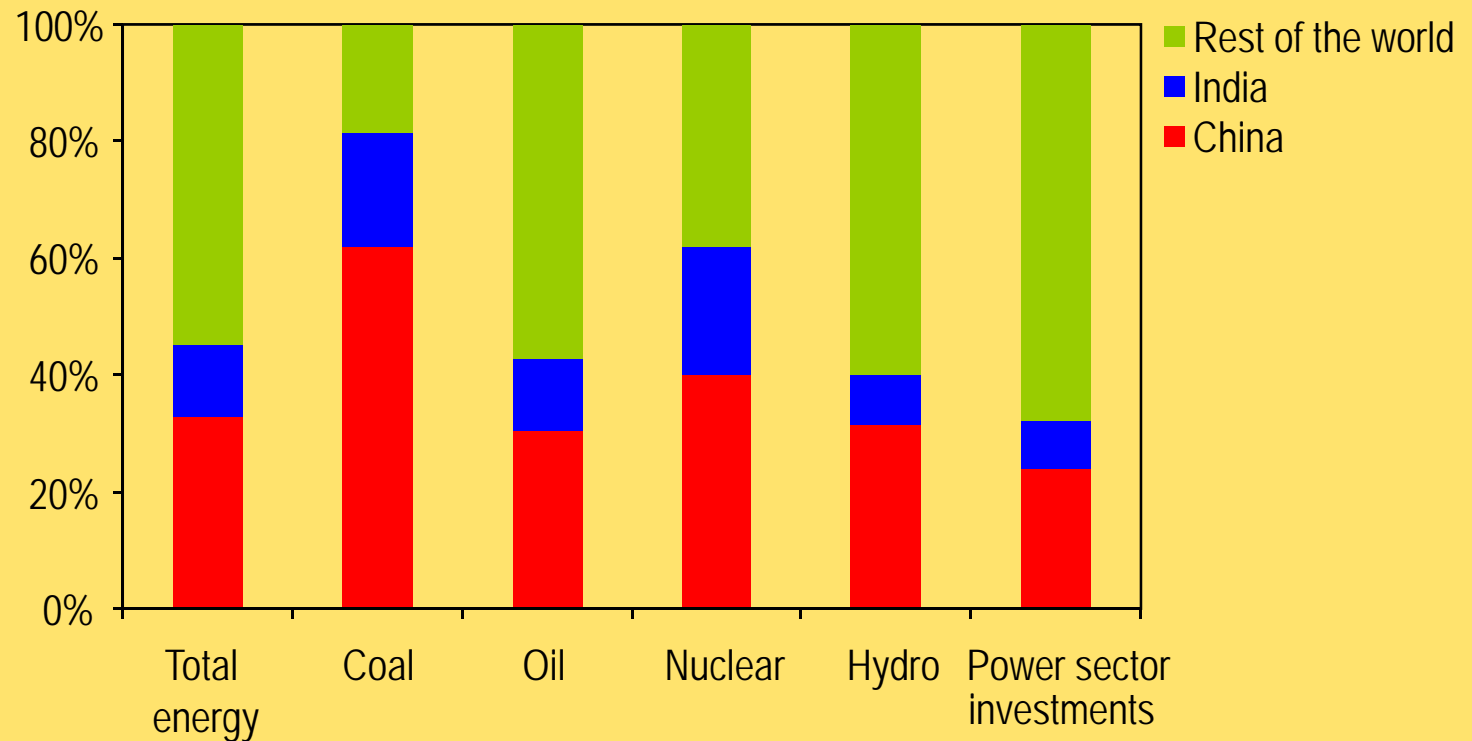
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The Emerging Giants of World Energy

Increase in Primary Energy Demand & Investment
Between 2005 & 2030 as Share of World Total



China & India will contribute more than 40% of the increase in global energy demand to 2030 on current trends

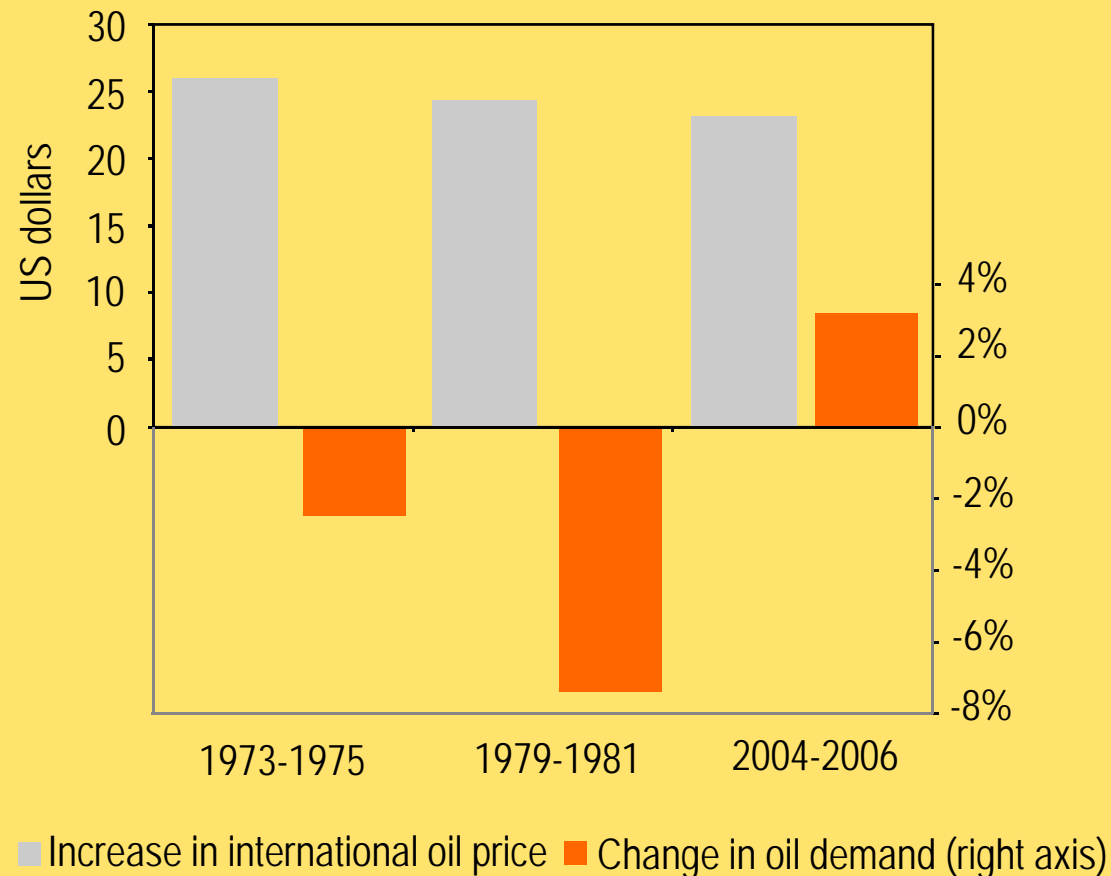


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Change in international oil price & global oil demand



Oil demand is much less responsive to higher crude prices than in the past – and supply capacity too so far



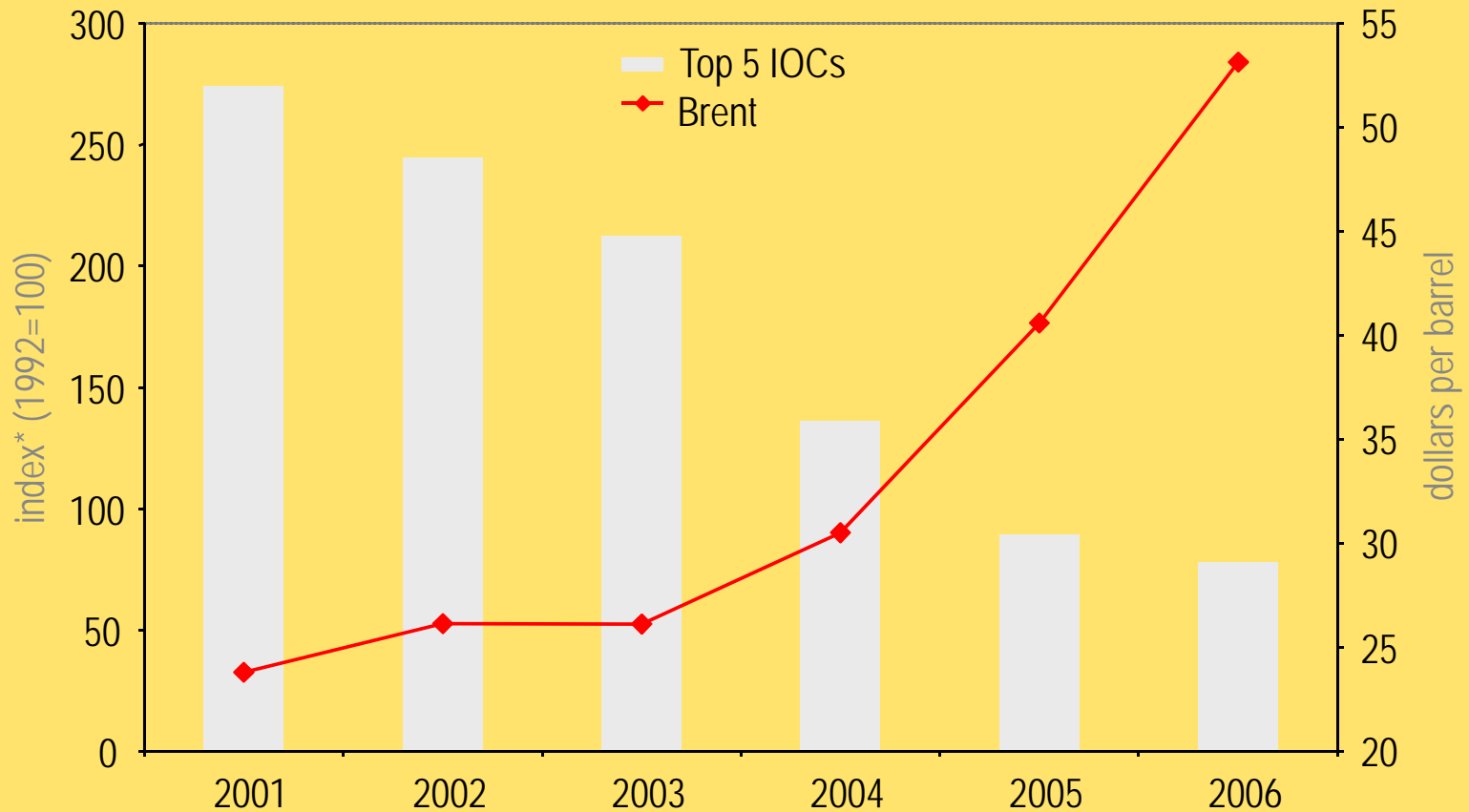
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Index of average of Top 5 IOCs' Reserves Replacement Ratio

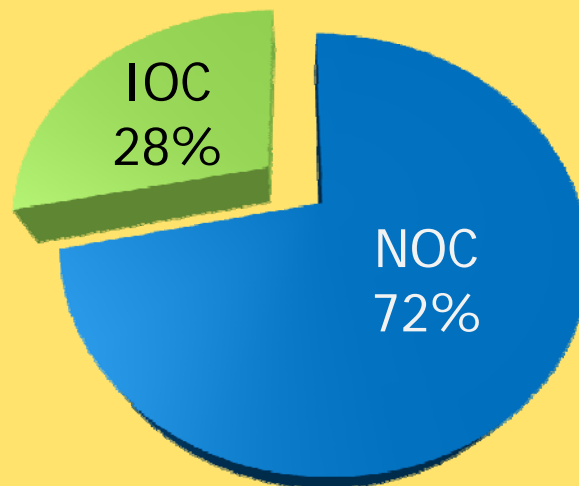


The current reserve replacement ratio of top 5 IOCs has fallen, and its becoming more difficult to replace reserves despite rising oil prices

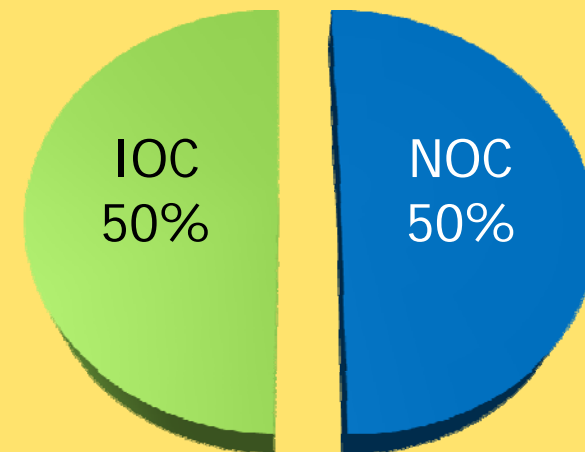


World oil reserves & production

Oil Reserves, end-2006



Oil Production, 2006



The national companies' control over most of the world's remaining reserves suggests that their share of production is set to rise in the future



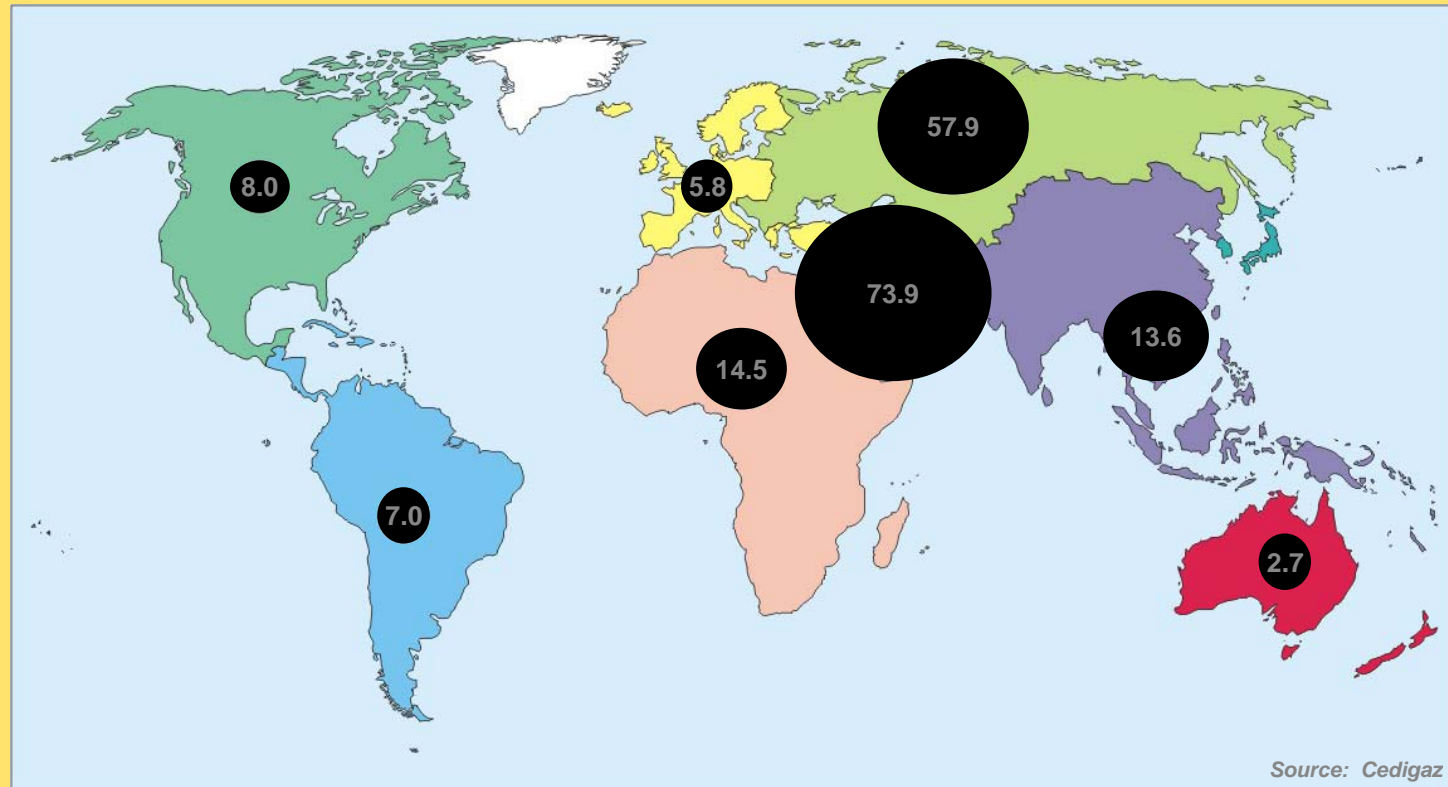
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Proven Natural Gas Reserves



World total: 183 tcm as of 1 January 2007

Gas reserves are also concentrated – Russia and Iran together account for almost half of global gas reserves

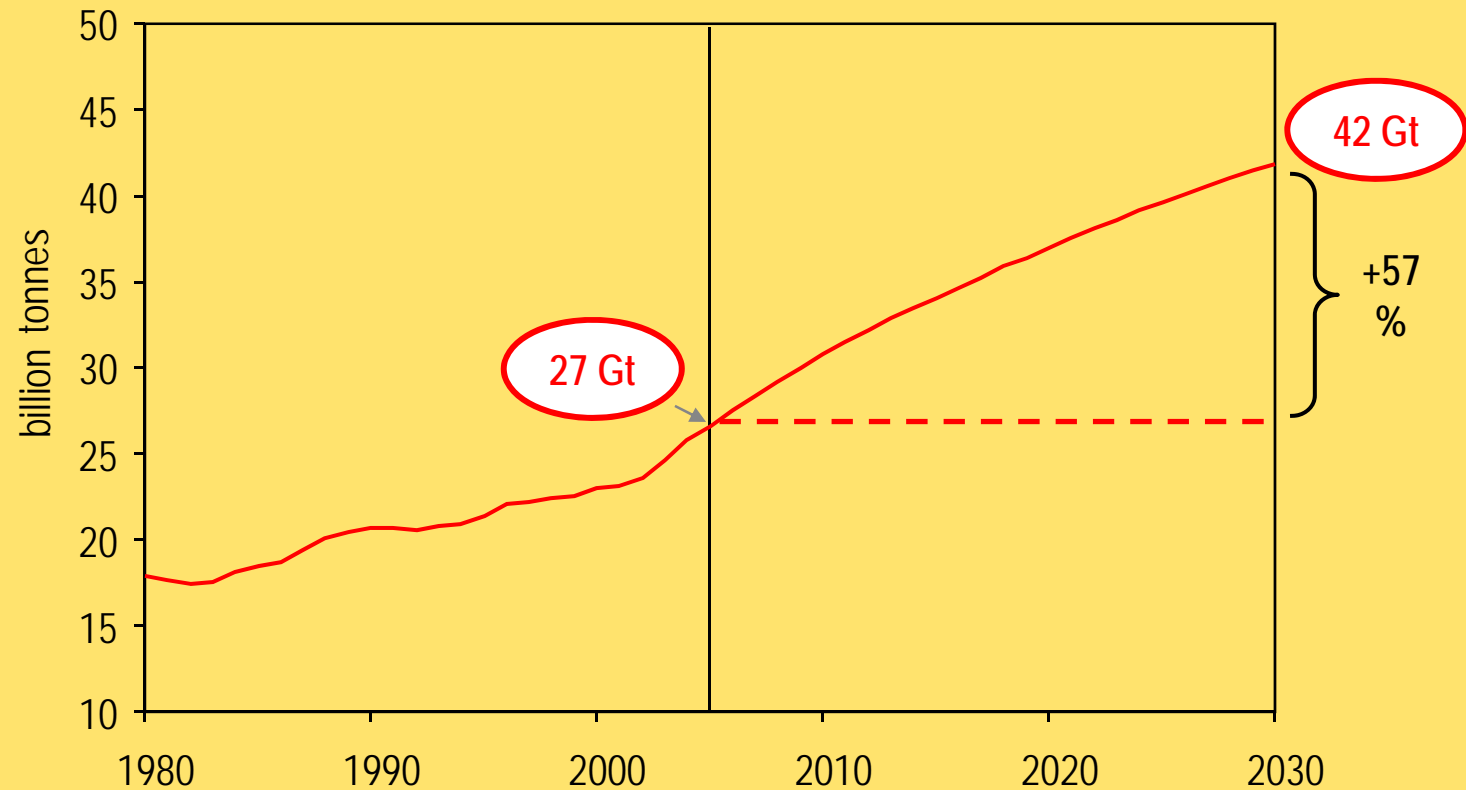


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Global CO₂ Emissions and Climate Change



Global CO₂ emissions rise to 42 gigatonnes in 2030, 57% above current levels and double the 1990 level

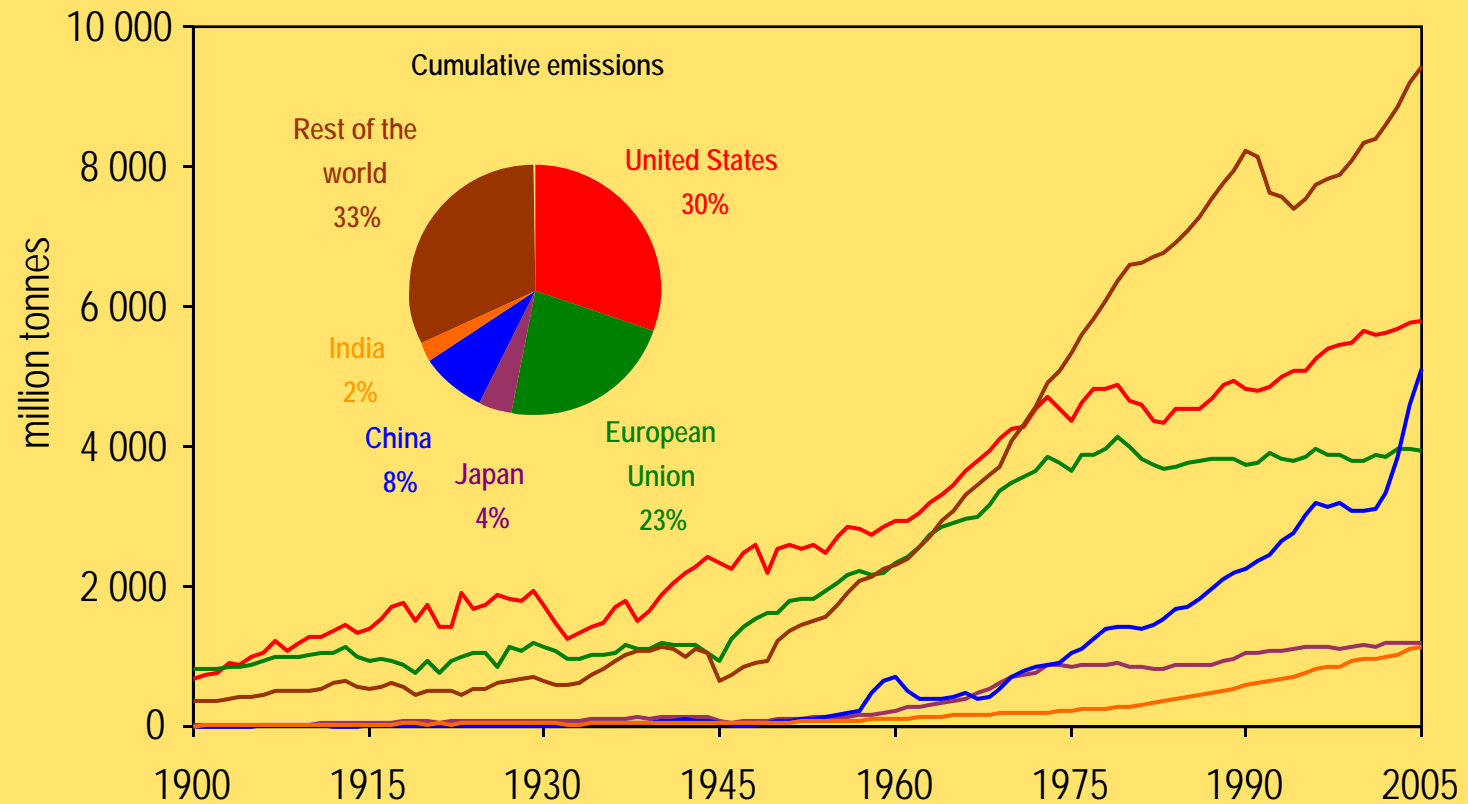


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Energy-Related CO₂ Emissions by Region, 1900-2005



Over the last century, China has contributed only 8% of global emissions & India 2%



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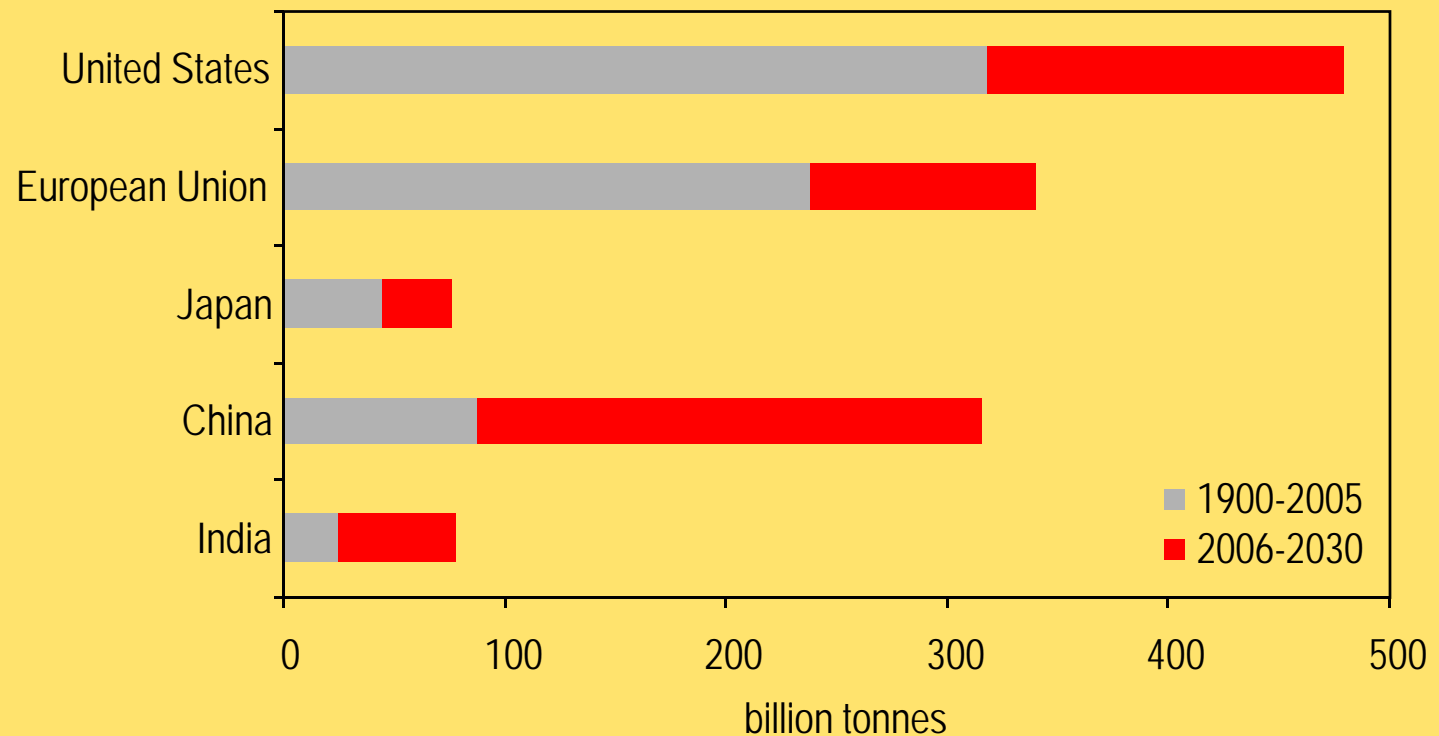
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China & India in Global CO₂ Emissions

Cumulative Energy-Related CO₂ Emissions



Around 60% of the global increase in emissions in 2005-2030 comes from China & India



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World's Top Five CO₂ Emitters

	2005		2015		2030	
	Gt	rank	Gt	rank	Gt	rank
US	5.8	1	6.4	2	6.9	2
China	5.1	2	8.6	1	11.4	1
Russia	1.5	3	1.8	4	2.0	4
Japan	1.2	4	1.3	5	1.2	5
India	1.1	5	1.8	3	3.3	3

*China becomes the largest emitter in 2007 & India the
3rd largest by 2015*



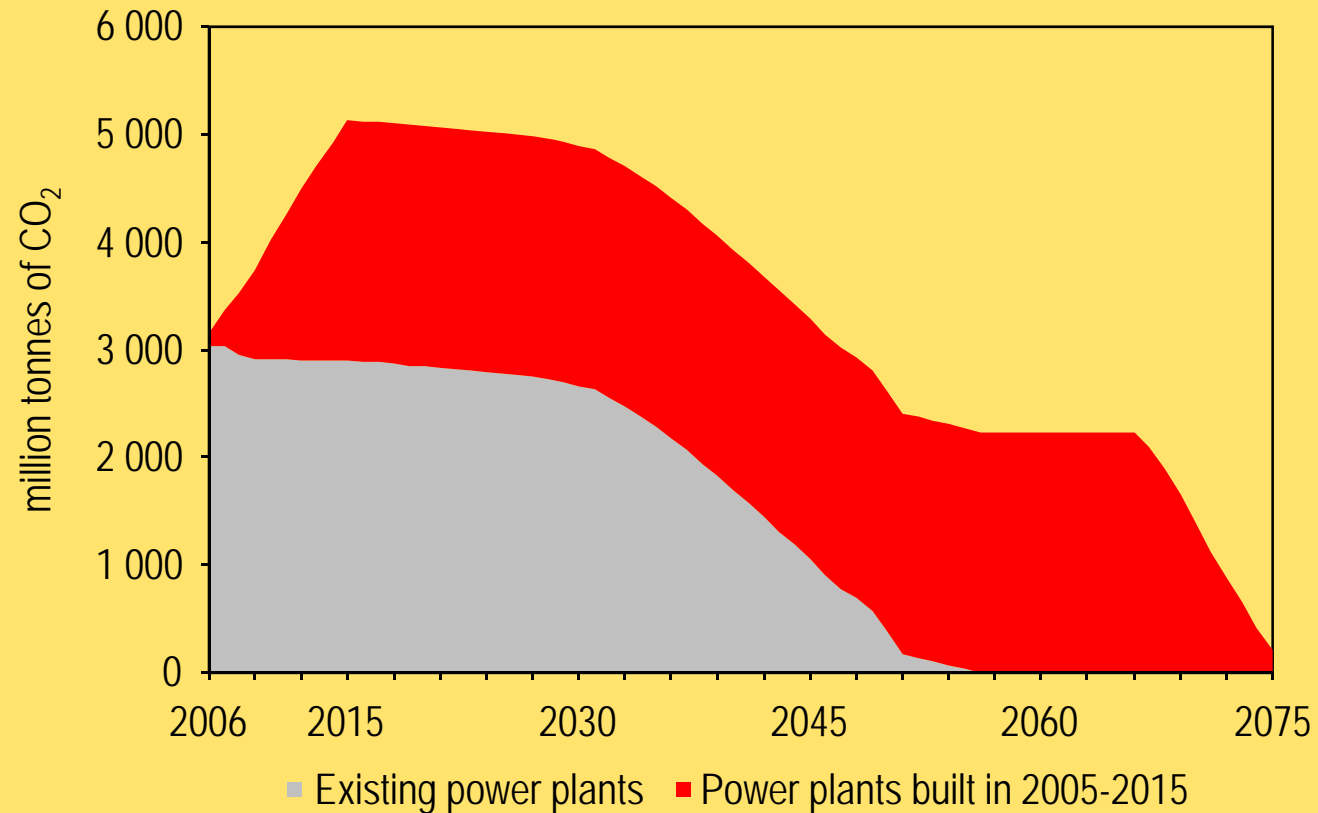
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CO₂ Emissions from Coal-Fired Power Stations built prior to 2015 in China & India



Capacity additions in the next decade will lock-in technology & largely determine emissions through 2050 & beyond



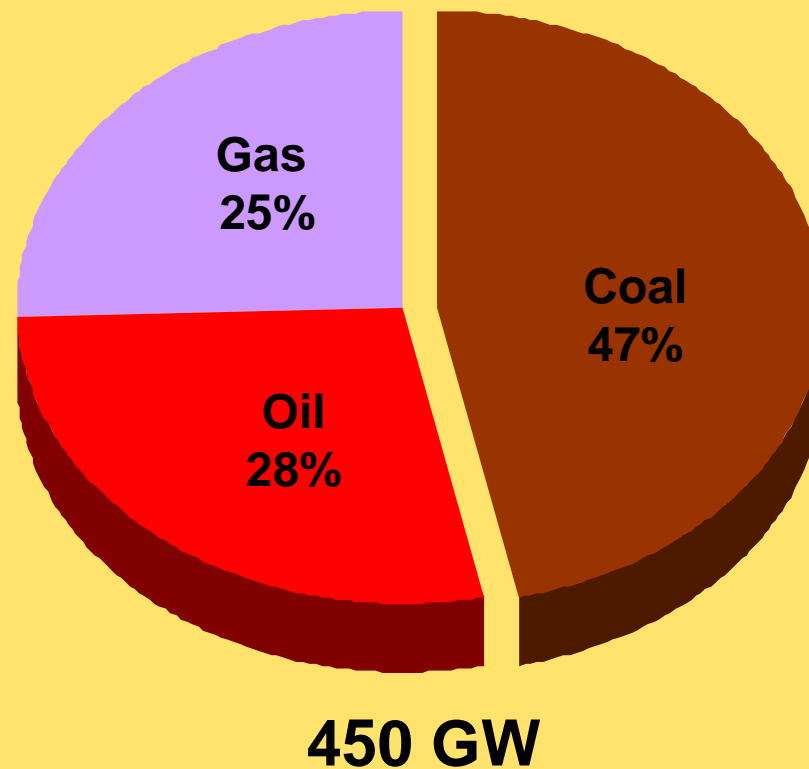
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OECD Power Plant Retirements



Between 2012 and 2022, some 450 GW of generation capacity will be retired in the OECD – over 1/3 in Europe



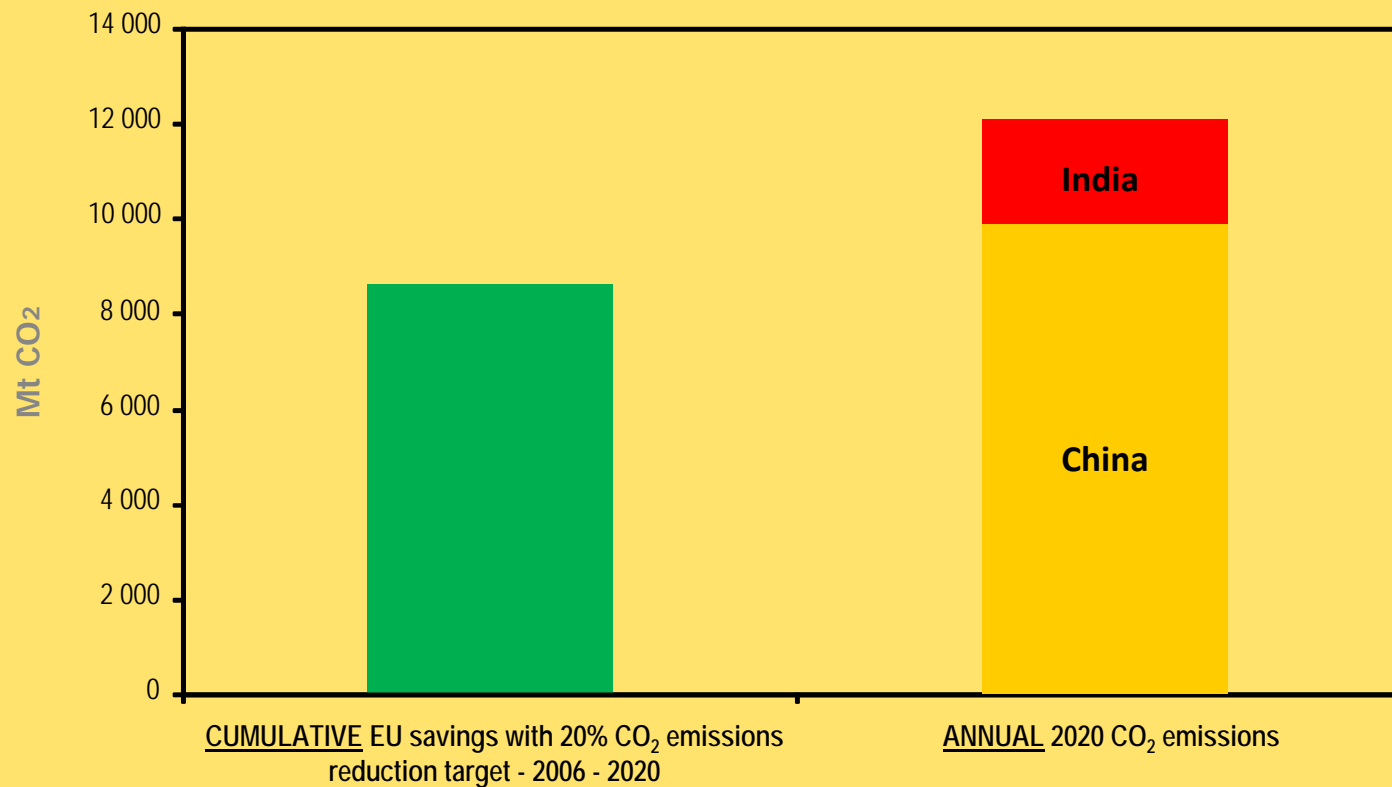
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Cumulative European emissions savings with 20% reduction target in 2020



***EU cumulative savings over 2006-2020 would represent 70%
of China and India's annual emissions in 2020***



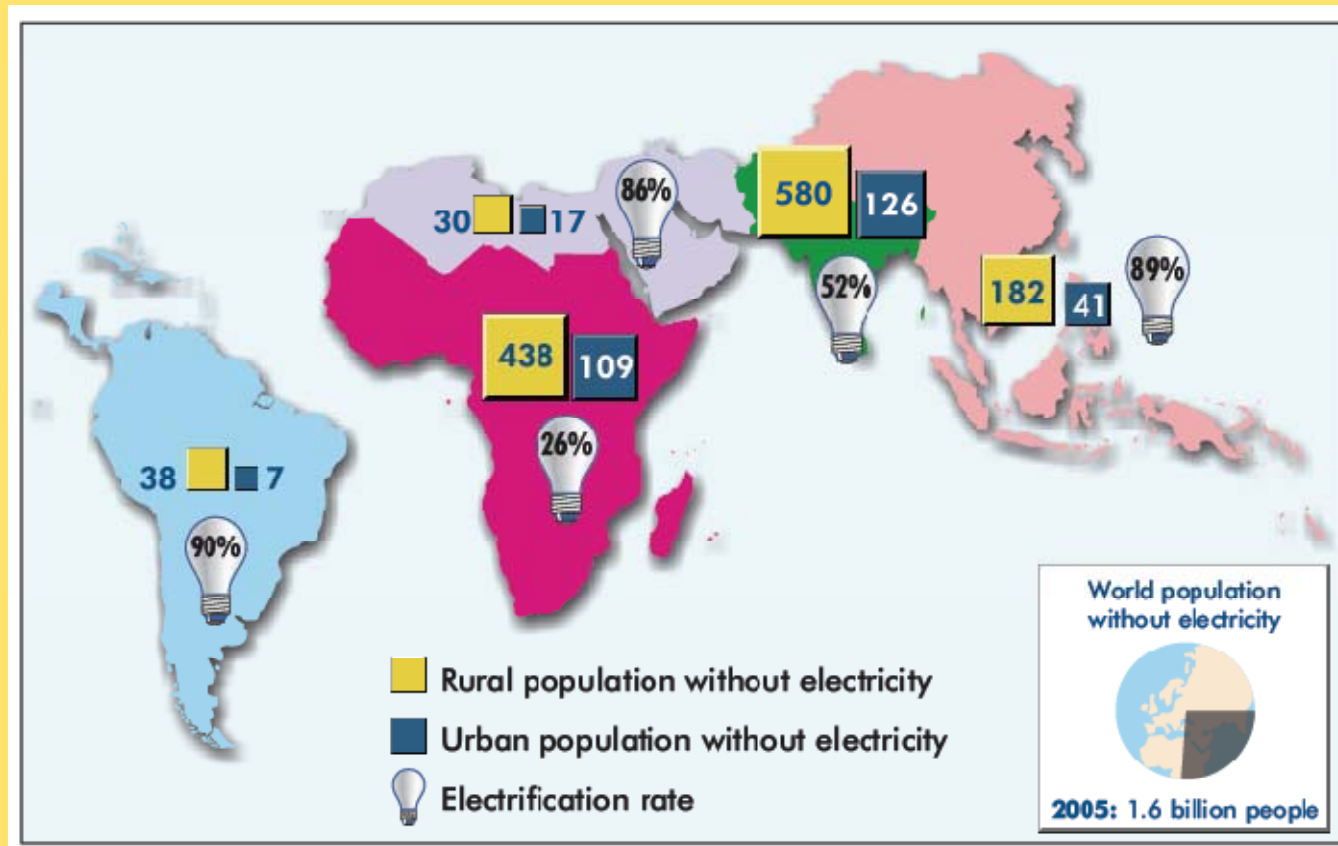
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Population without electricity, 2006



In 2030, if no major new policies are implemented, there will still be 1.4 billion people without electricity.

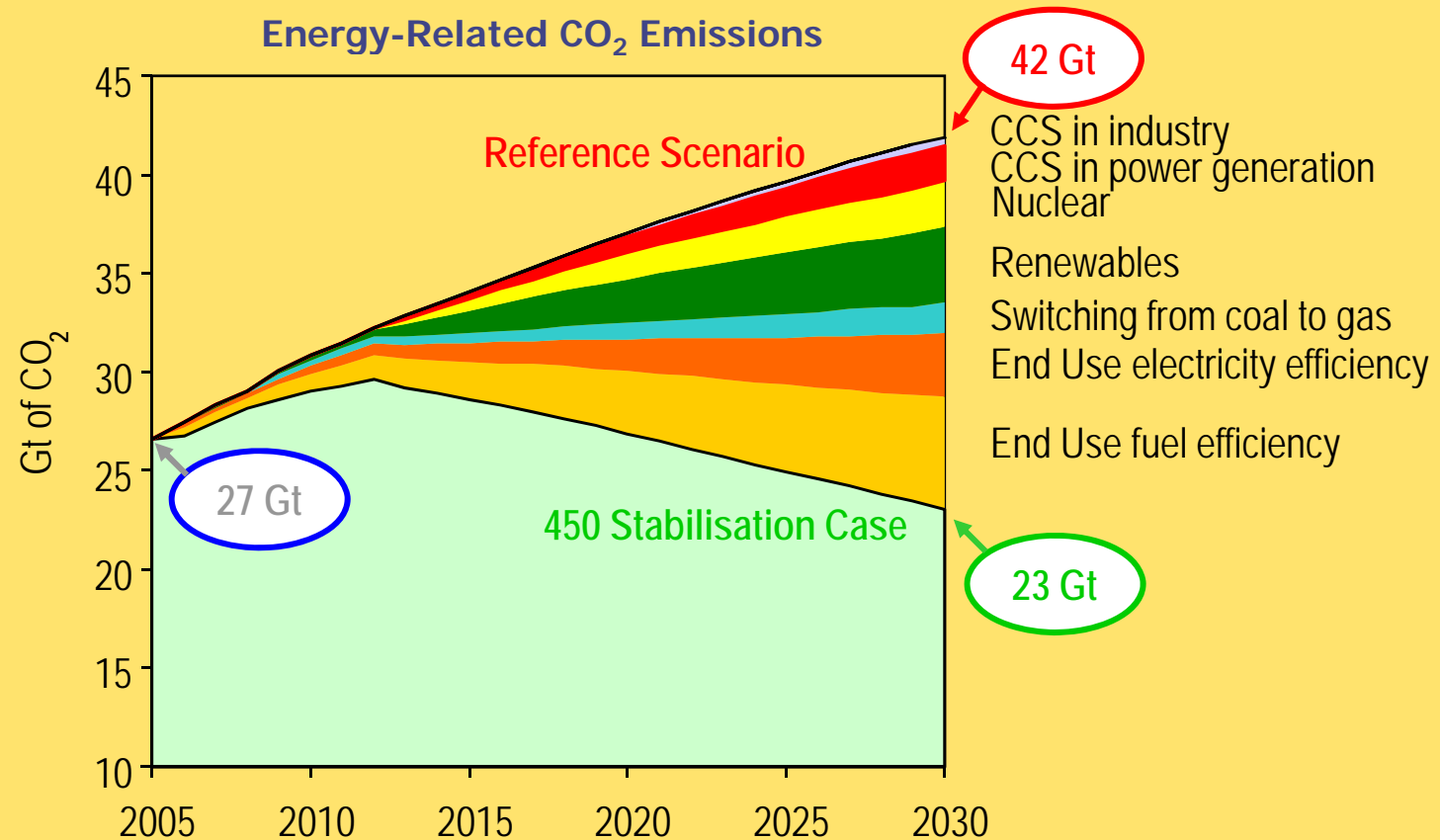


How to go beyond?





CO₂ Emissions - 450 Stabilisation Case



In line with G-8 appeal in Heiligendamm, by 2030 emissions are reduced to some 23 Gt



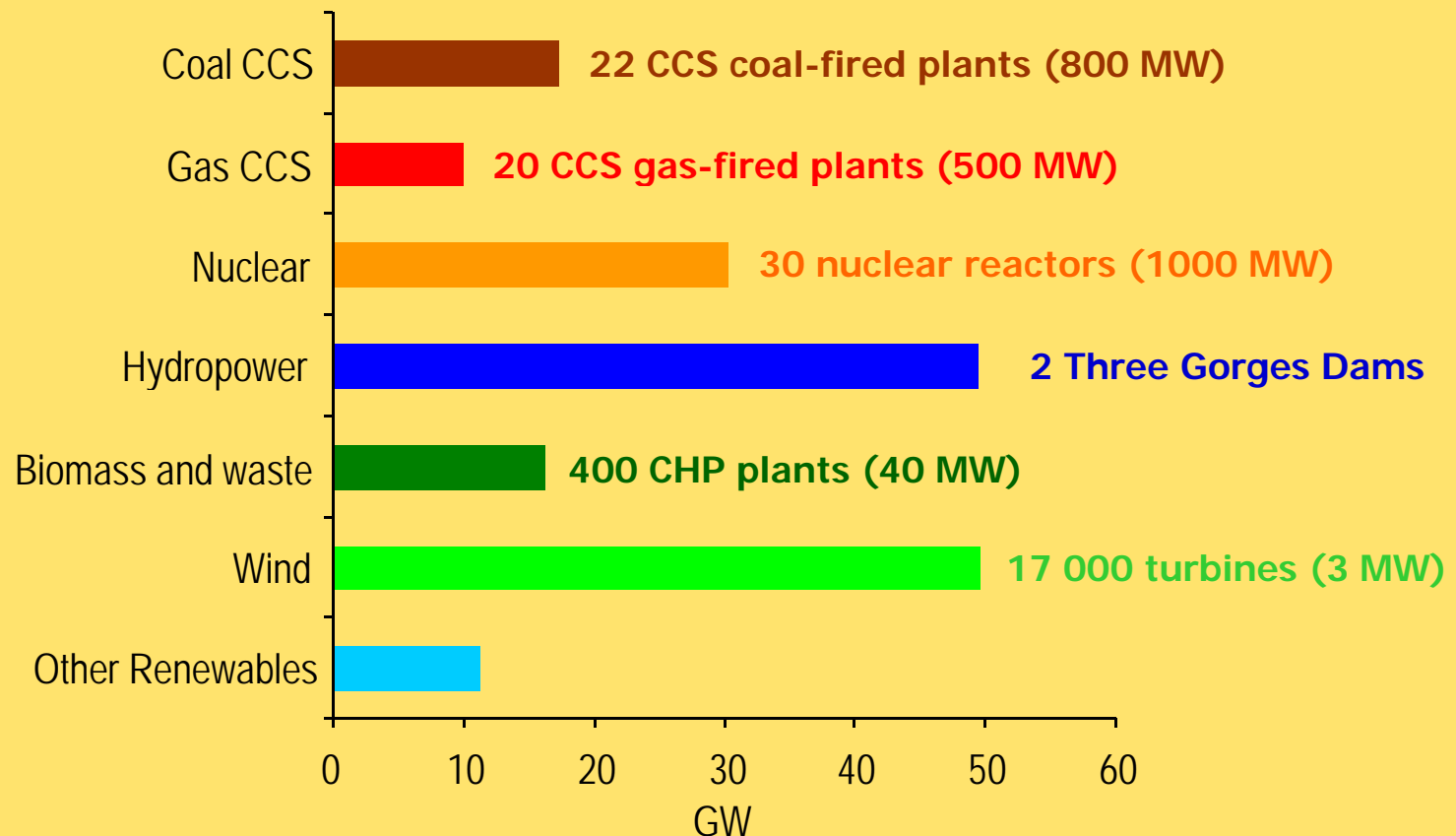
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Average Annual Power Generation Capacity Additions in the 450 Stabilisation Case, 2013-2030



So what would the '450ppm Stabilisation Case' mean in practice?



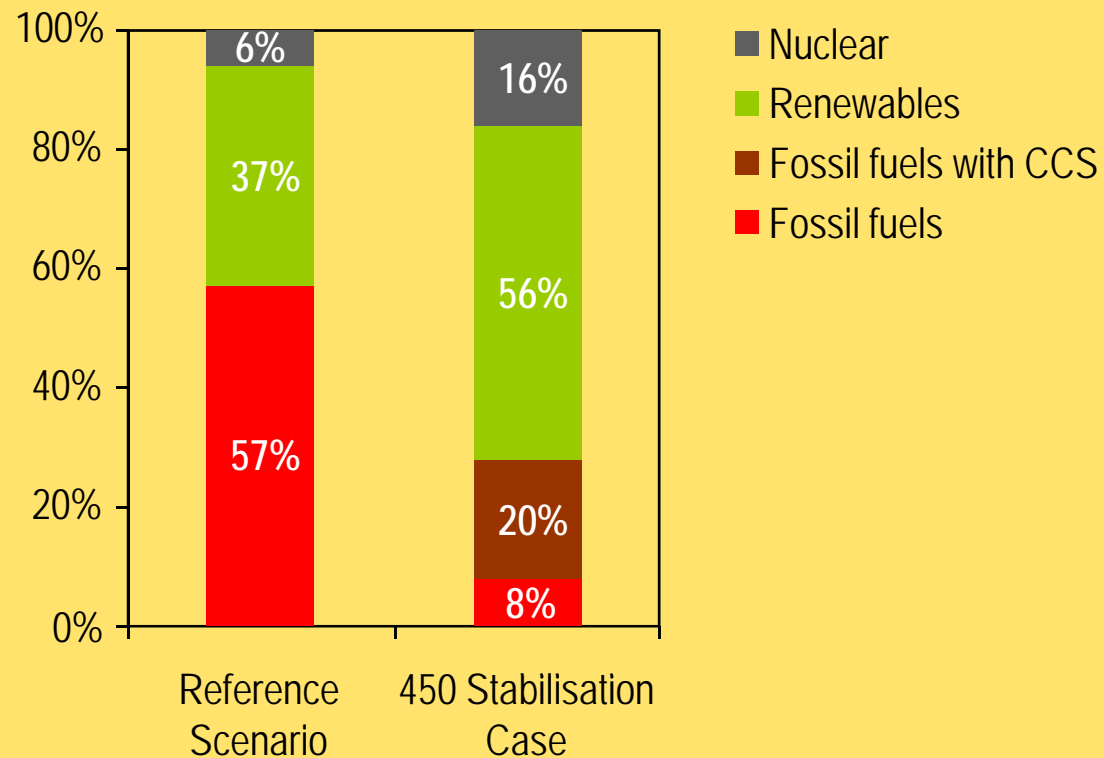
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450 Stabilisation Case: Share of Cumulative Power-Generation Investment by Technology, 2006-2030



The power generation investment are \$7.5 trillion (and \$1 trillion for early retirement) – an increase of more than 30% compared to RS

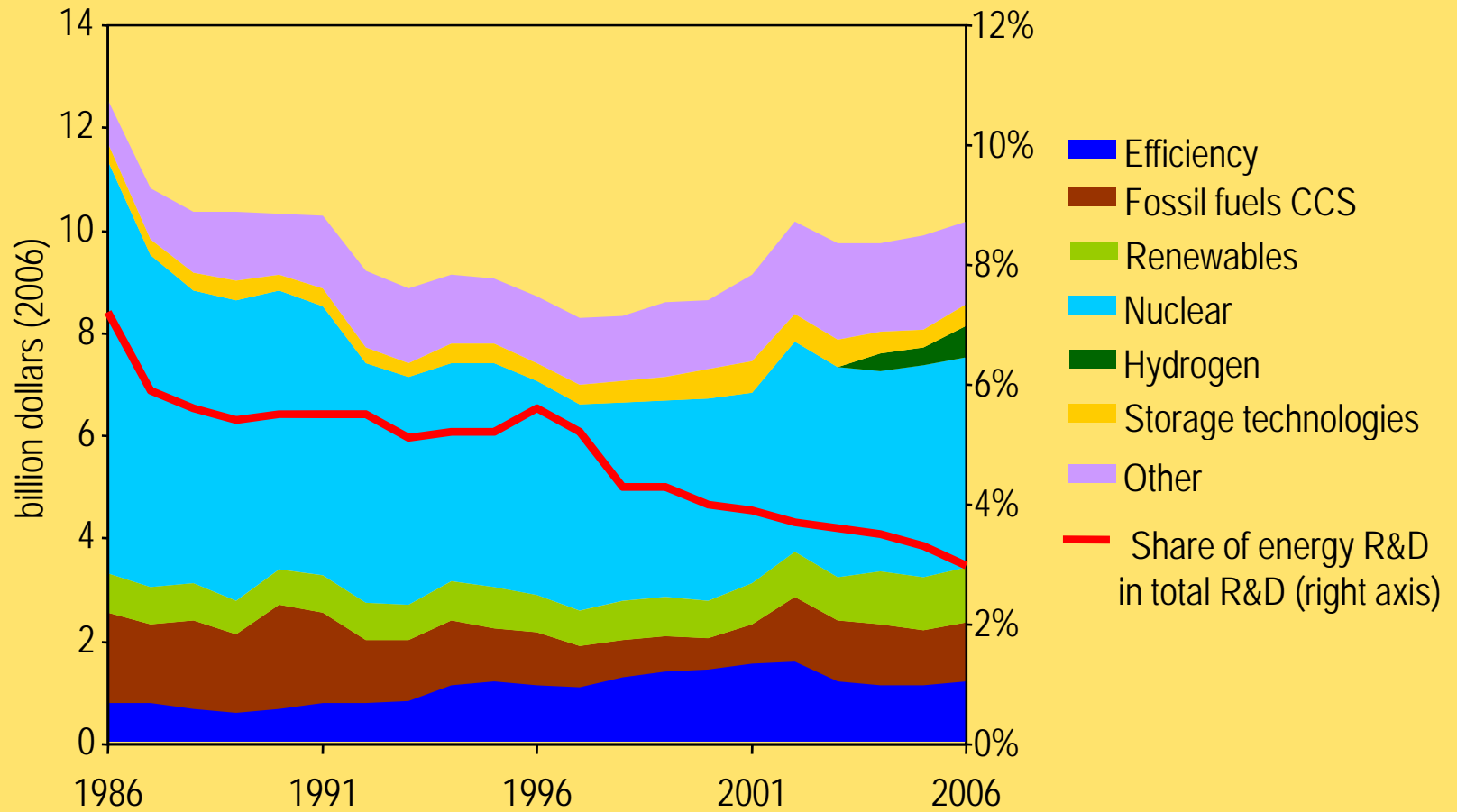


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Public Energy Research and Development Funding in IEA Countries



**Share of public budgets for energy R&D in total R&D
fell over 50% in the last two decades**



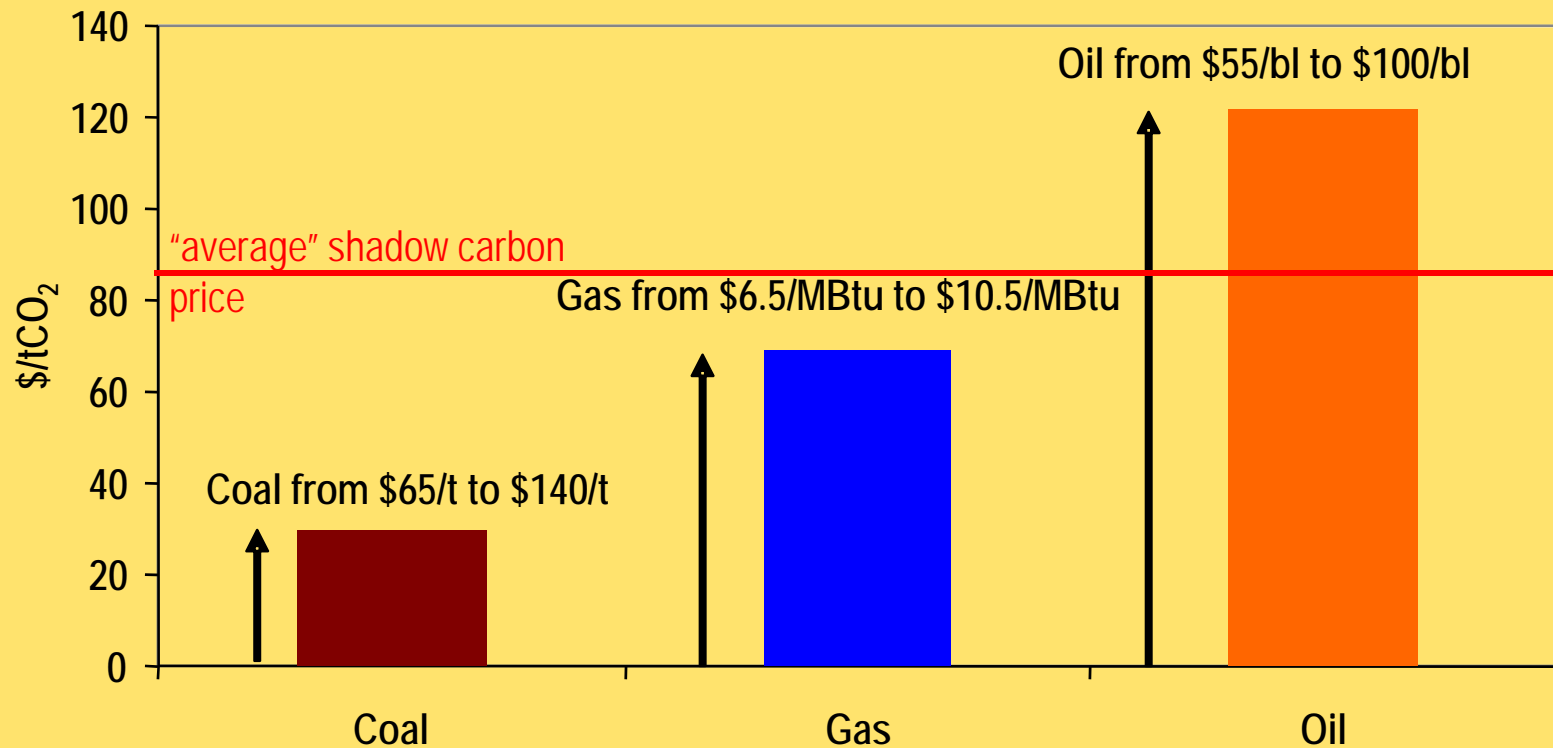
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EU "shadow carbon price" implied from the increase of energy prices



Despite the increase in energy prices over 2005-2007, there has been little impact on CO₂ emissions trends.



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Where do we go from here?

- Stronger policies for efficiency, renewables and nuclear
- Support for carbon capture and storage (CCS) is the “litmus test”
- Engage with China on constructive post-2012 dialogue
- Design effective financing mechanisms to spur large-scale clean technology use in developing countries
- No time to lose: we must be prepared for effective and successful negotiations in Copenhagen
- Urgent and decisive government action is needed to implement goals

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