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Climate Security: Opportunities and Challenges for the UK and India

Nick Mabey, E3G

CSM-E3G Seminar, Cochin, 6 March 2006



- Introduction to E3G
- Context: Countdown to a Global Climate Deal
- Elements of Climate Security
 - Understanding Energy and Climate Security
 - The Economics of Transformation
 - Equity and Justice
- India: Challenges and Opportunities



My background – typical of E3G

- Mechanical Engineer – GEC-Alsthlm
- Energy System Analysis – PowerGen and MIT Energy Lab
- Climate Change Research – London Business School
- Environmental Campaigning – WWF
- Environmental Diplomacy – UK Foreign Office
- Strategic Policy Advice – UK Prime Minister's Strategy Unit
- Policy/Diplomatic Entrepreneur? – E3G

E3G – Third Generation Environmentalism



E3G

- Mission: “To accelerate the transition to sustainable development”
- Build on success of 2nd Generation (advocacy) organisations to mobilise networks of aligned insiders in mainstream institutions in order to generate action
- Founded 2004 by three “outsider-insiders”:
 - **Tom Burke** - ex-Head FoE, environment special advisor;
 - **John Ashton**, 25 years in FCO;
 - **Nick Mabey**, ex-WWF, FCO and Prime Minister’s Strategy Unit.
- European organisation based in London, Berlin and soon Paris working globally. Focus on EU relations with China, India and USA.

E3G Works in Three Ways



- **Political Change and Coalition Building**
 - Russian Kyoto Protocol ratification
 - EU-China Zero Emissions Coal Plant
 - Europe Energy and Climate Security Coalition
- **Strategic Advice**
 - Advisors to German Chancellor 2007
 - Advisors to UK Foreign Office 2006 onwards
 - Advisors to WWF-International
- **Organisational Change**
 - Climate Change Investment Tools – UK DFID
 - Climate Security Institutions – UK DFID/FCO/MOD
 - Strategic Review – global REEEP network (www.reeep.org)



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Countdown to a Global Climate Deal



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- Kyoto Protocol sets international framework until 2012; multi-billion dollar carbon markets based on this agreement.
- Main impact of Kyoto on EU and Japan, but will drive \$20 billion of low carbon investment in developing countries; India perhaps has 30% of this Clean Development Mechanism funding.
- After 2012 no agreed targets to guide investment or markets; fear of Kyoto “cliff edge”.

Aim for agreement in 2009 to a new global framework going beyond 2012; G8 2007 first step in process.

Key References



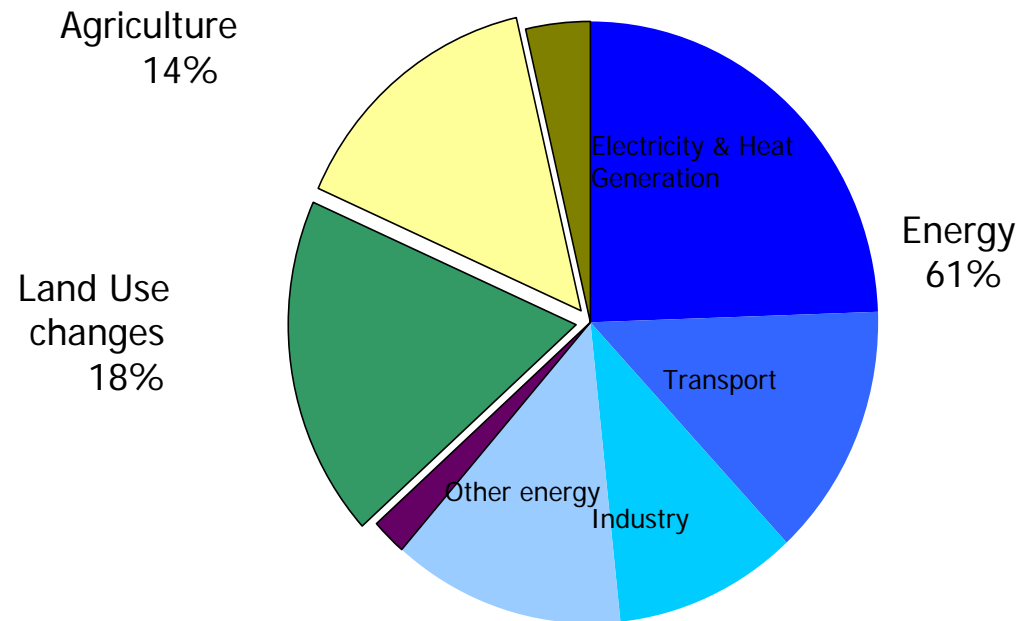
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- IPCC Third Assessment Report (2001) and Fourth Assessment report (2007)
- Stern Review on the Economics of Climate Change (2006)
- IEA World Energy Outlook (2006); Vattenfall Scenarios (2007)

Emissions from Energy Use are the main source of Climate Change

- IPCC AR4 confirms that human activity associated with energy use is inducing climate change.
- This means that the energy policy choices we make determine the design of our climate policy.

Sources of GHG

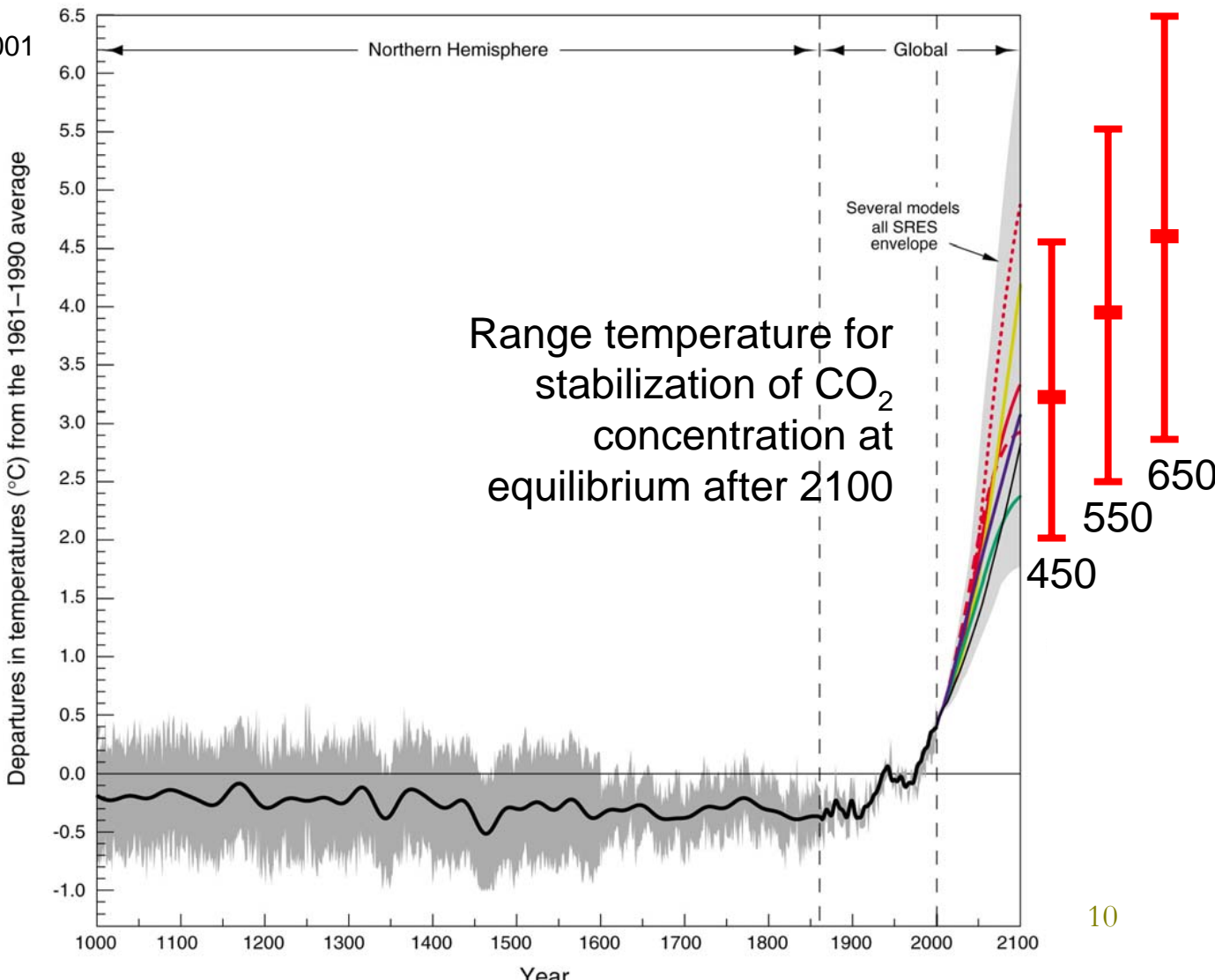




Stabilized temperatures at different CO₂ concentrations

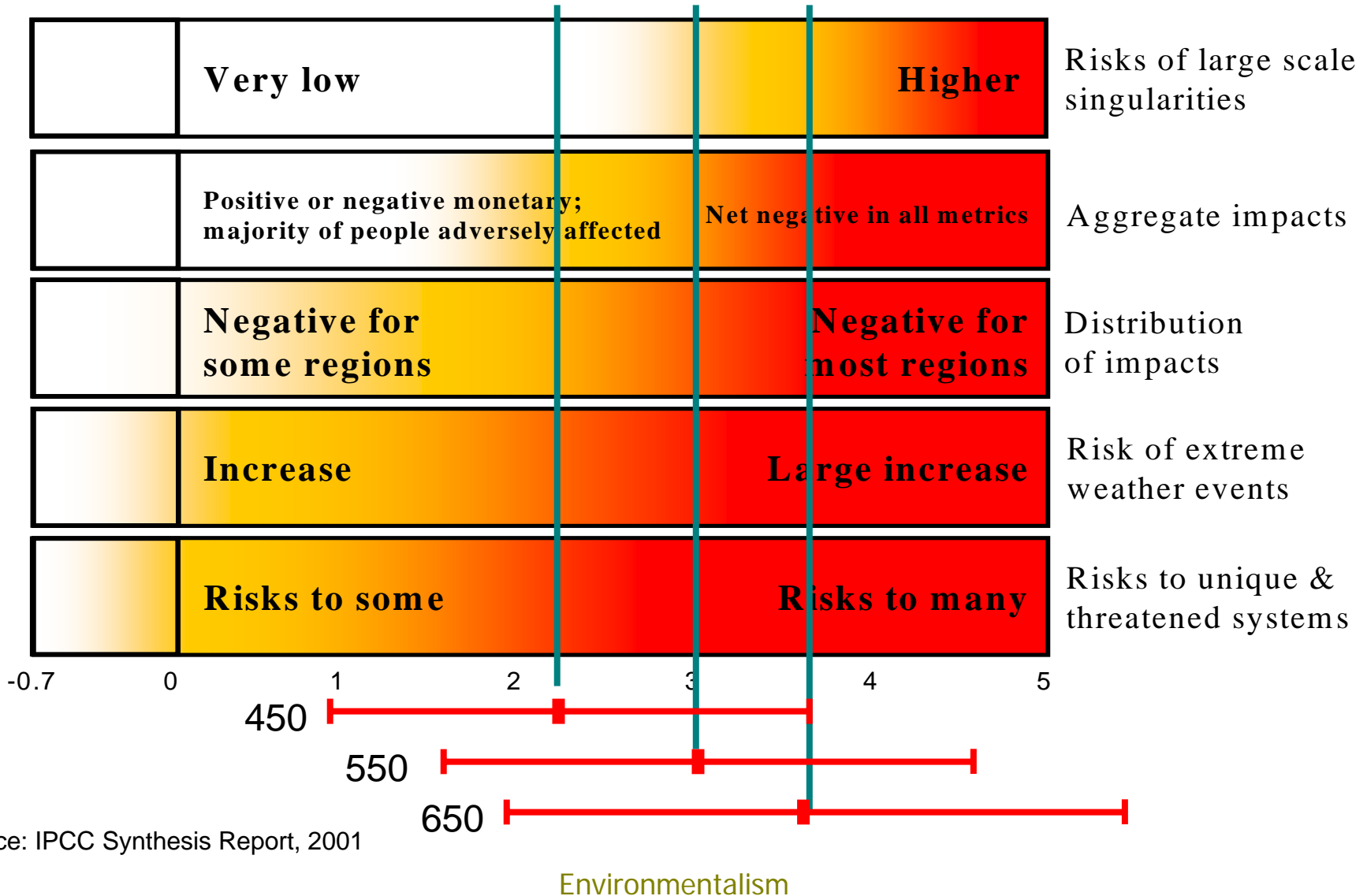
Source: IPCC Synthesis Report, 2001

- 1000 to 1861, N. Hemisphere, proxy data;
- 1861 to 2000 Global, Instrumental;
- 2000 to 2100, SRES projections



Range temperature for stabilization of CO₂ concentration at equilibrium after 2100

Preventing dangerous irreversible impacts means staying below 2 degrees Centigrade rise; 50% chance at 450ppmCO2 concentrations



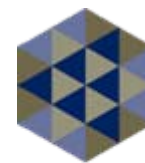
Source: IPCC Synthesis Report, 2001

“Climate Uncertainty” has only been going one way since 2001 IPCC report



- Significant uncertainties still exist over the scale, timing and distribution of climate impacts
- However, all the new research over the last 5 years has shown impacts to be happening quicker than previously expected e.g. ice sheet melting; glacier retreat
- Previous “safe level” of 550ppm now seen as too high – 400-450ppm needed to stop “dangerous” change
- Many scientists fear we have already passed the “tipping point” where positive feedbacks inevitably move the earth to a new climate equilibrium

Lag in climate system means investment in polluting technologies must change in the next two decades



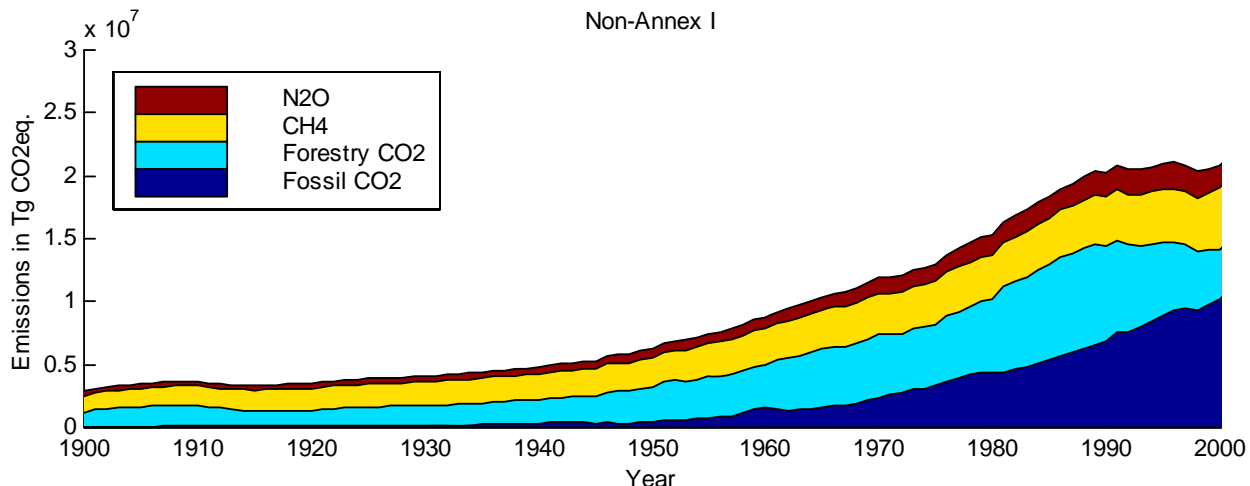
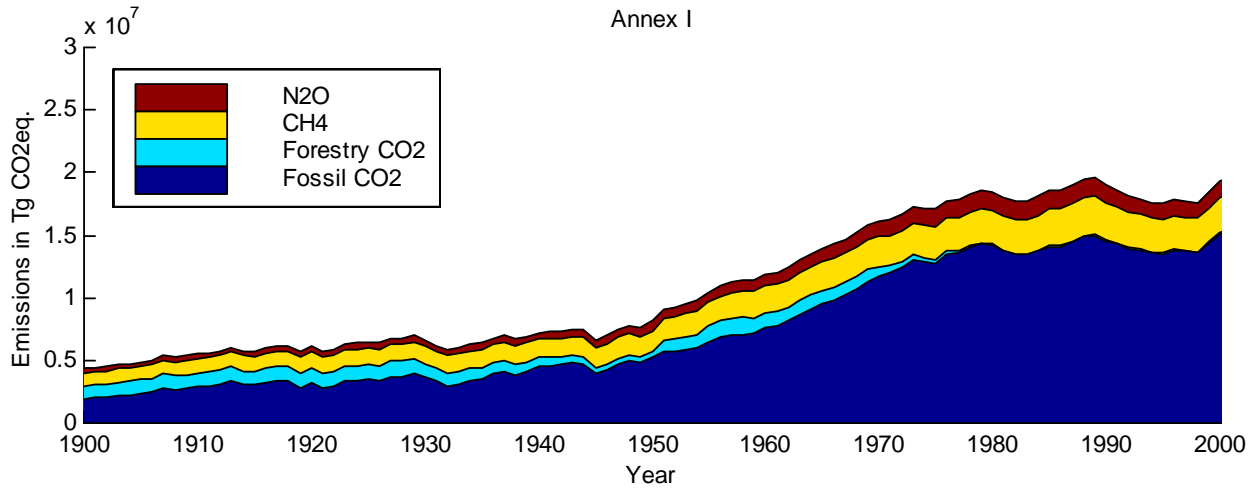
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WRE CO₂ Stabilisation profiles	Year in which global emissions peak
450	2005 – 2015
550	2020 – 2030
650	2030 – 2045
750	2040 – 2060
1000	2065 – 2090

Historic emissions show developed country responsibility for fossil CO2...



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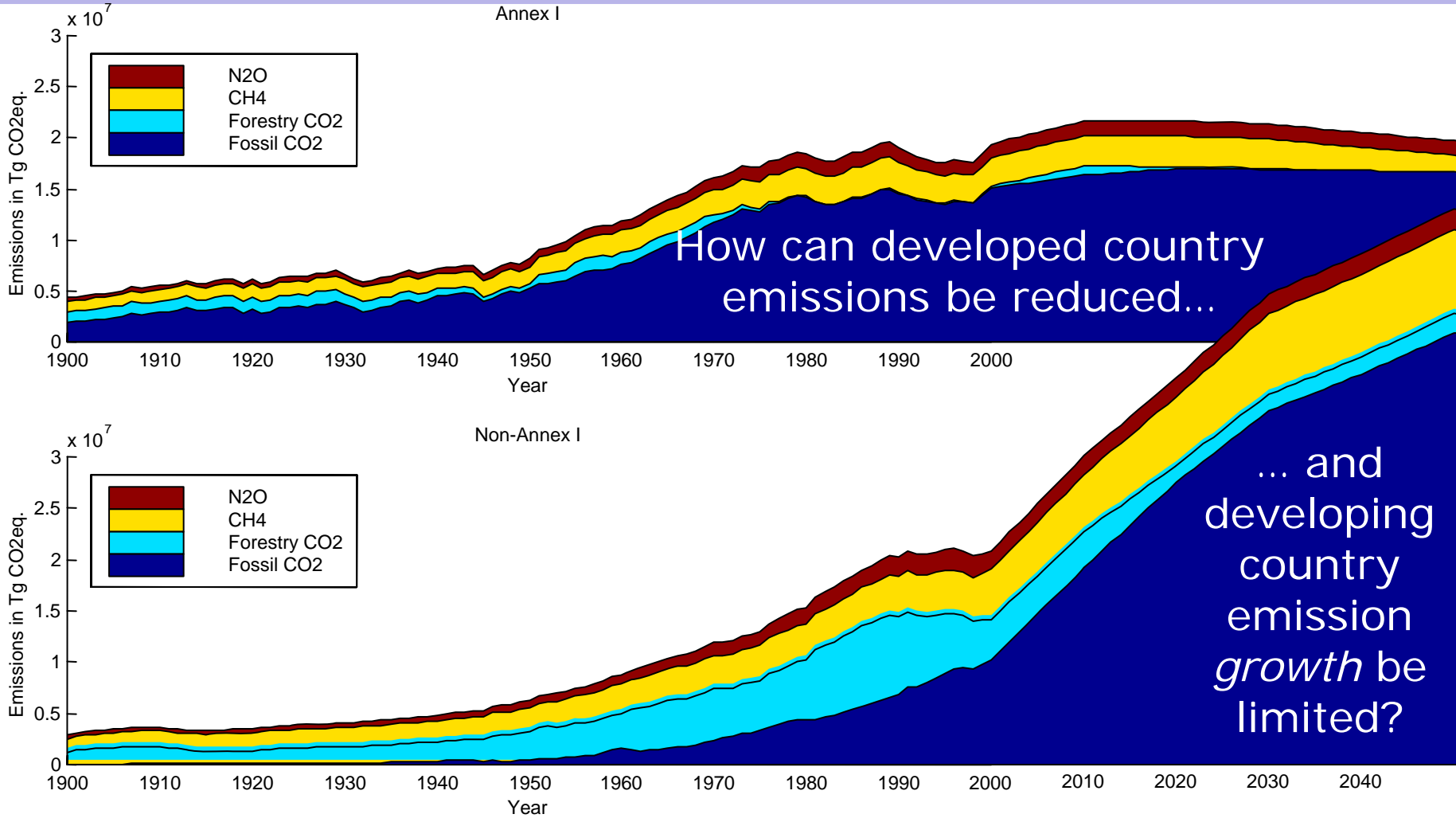


Source: Marland et al. / Houghton et al. / EDGAR 3.2

But future emissions growth is expected to be in developing countries

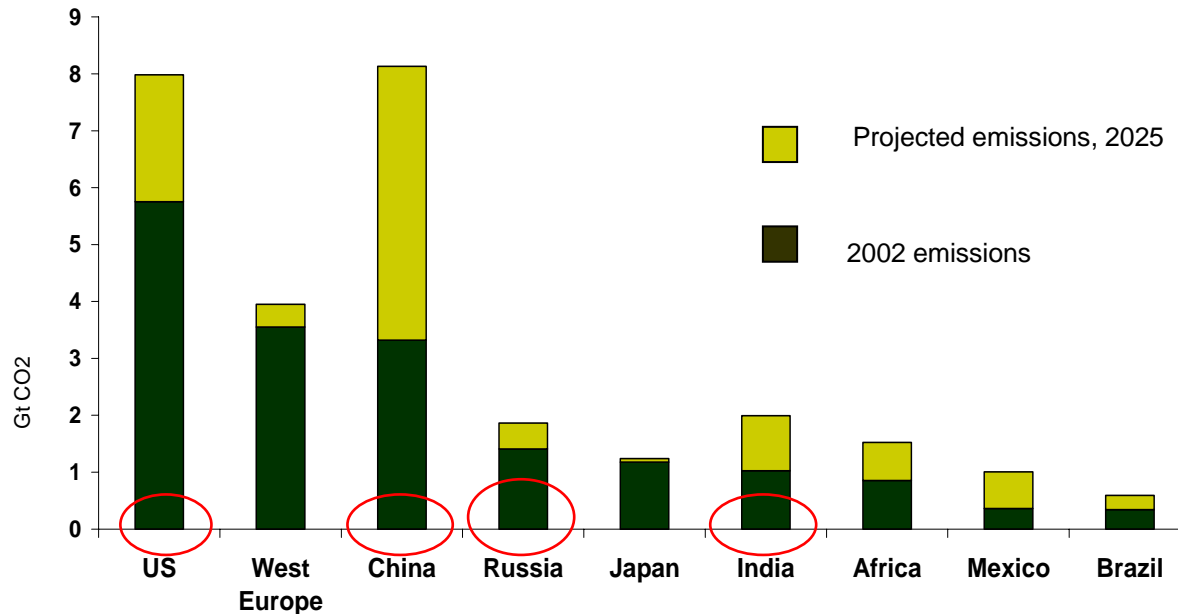


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IPCC SRES A1B scenario

Global cooperation is critical to address the energy and climate challenge



- International action is required to maintain the conditions for energy and climate security that underpin prosperity and stability
- A common European foreign energy (/climate) policy needs to engage with key countries: US, China, India and Russia

Source: World Resources Institute CAIT Energy Information Administration Reference Scenario, Energy emissions only

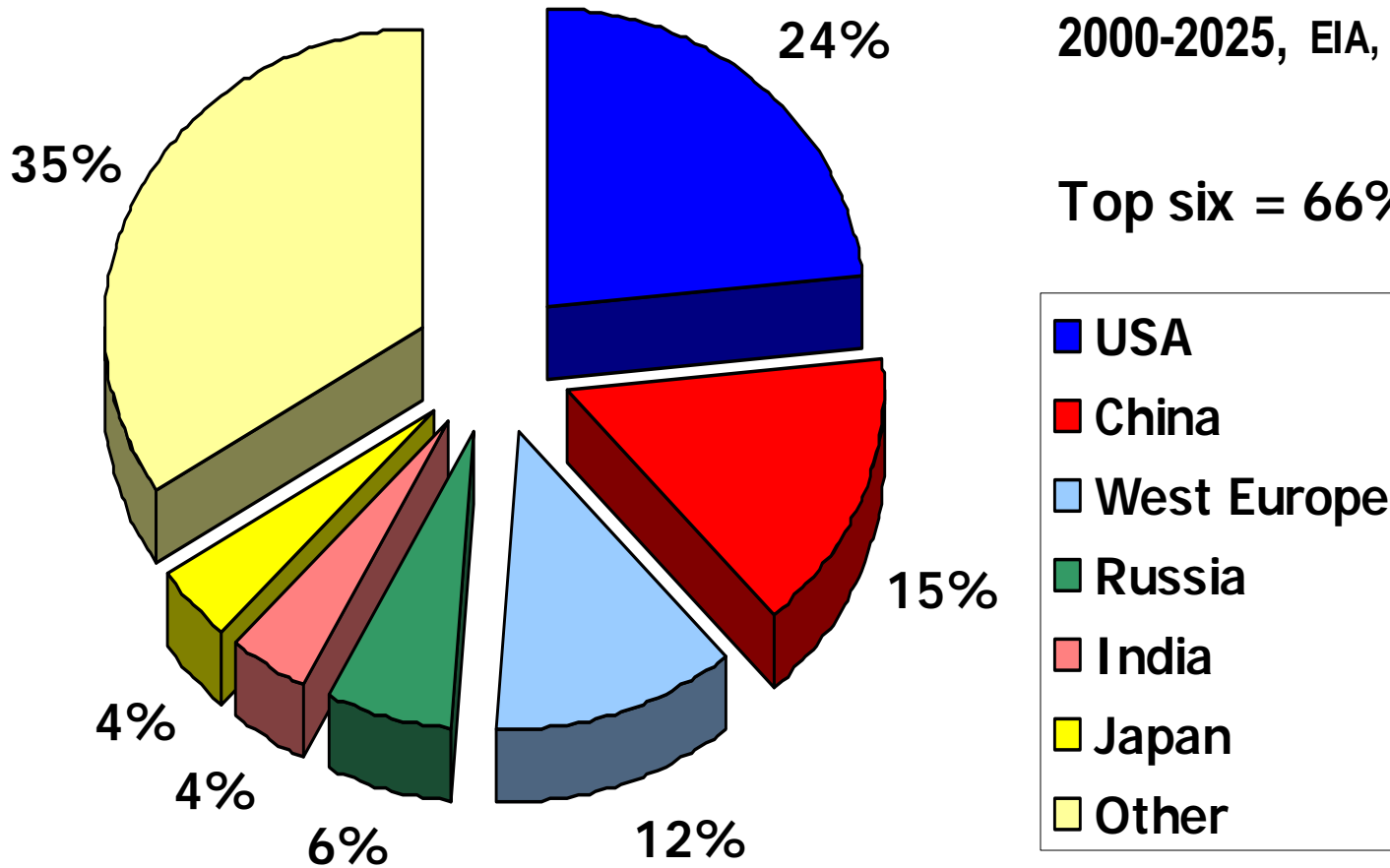
No simple North and South split in total future emission growth



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**Cumulative CO2 Emissions
2000-2025, EIA, IEA 2002**

Top six = 66%



Moving to low carbon energy system is affordable – especially if oil prices rise



- Stern Review estimates total additional cost of reaching 550ppm as 1% GDP in 2050- falling to 0.1% GDP with \$80bbl oil price;
- IEA “Alternative Scenario” consistent with 550ppm breaks even at \$60bbl and \$20 t carbon
- IEA scenarios reduce investment needed in energy supply sector by \$7-11 trillion over 25 years; much of this in lower pipeline and transmission investment.

Outline of a Global Deal



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- Needs to aim for stabilisation at 450-550ppm CO₂e
- Will require large shifts to low carbon investment in **all** industrialising countries in next 2 decades
- Failing to redirect new investment now will massively raise costs in the future; likely to result in very high stabilisation levels
- OECD countries will need to be effectively zero-carbon by 2050; richer industrialising countries soon afterwards.



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Climate Security



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- Climate Change has usually been dealt with as an environmental and economic issue
- Radical Action unlikely unless seen as a core security issue
 - Human security
 - Economic security
 - Internal stability
 - International peace and security

Understanding Energy and Climate Security - impacts on development



- Stern Review estimates cost of climate change to be between 5-20% of global GDP from 2050
- Recent oil price rises have annual cost to developing countries \$137 billion – compared to \$85 billion in net aid
- 2005 saw the highest global financial losses due to weather-related disorders with costs to be borne by the world's economies exceeding US\$185bn
- Weather disasters could cost as much as a trillion dollars in a single year by 2040
- Humanitarian costs could rise by 200% by 2015 under higher climate change scenarios

Security/stability impacts may be first strong climate signal



Evidence demonstrates that environmental stress can exacerbate tensions (e.g. poor grain harvest in Rwanda linked to genocide of early 90s)

- Climate change will cause gradual change in temperature, water availability and sea levels over long term. There will also be increased climatic variability and extreme weather events – and there is already some evidence for this.
- When coupled with demographic changes there are likely to be big increases in resource scarcity over next 20 years – has been estimated that by 2025, 63% of global population will be living in countries of significant water stress
- Implications for stability:
 - Increased tensions over land use (e.g. between agrarians and pastoralists)
 - Horizontal inequalities caused by climate shifts, internal and external migration
 - Failure (real or perceived) of government
 - External shock (drought, flood etc) precipitating economic crisis in CRI
 - Extreme weather events steadily degrading government and country capability and resilience

Climate Change – Regional Impacts



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- Impacts of sea level rise and flooding of major cities, industrial zones and fertile land in **Bangladesh, India, Egypt, West Africa** and **China**
- Freshwater shortages particularly acute in **North Africa/Sahel, the Middle East** and **Central Asia**
- **Sub-Saharan Africa** may suffer some of the worst impacts of climate change – with societies that are already vulnerable and have many of the risk factors associated with instability
- **Small Island States** are highly vulnerable to sea level rise and disruption to local economies based on tourism, fisheries and agriculture. As legitimate economy declines, organised crime might increasingly become the only economic activity available

Environmental stress



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- **Access to water:** Under Business as Usual assumptions, 2 out of 3 persons will live in water-stressed conditions by the year 2025. Himalayan watersheds already under threat.
- **Food security:** Studies suggest that temperature rises of just 2-3 degrees will see crop yields in Africa, the Middle East and South Asia fall by as much as 30 to 40 per cent. China estimates falls of 20 to 35% by 2030.
- **Energy security:** an increase in the frequency and severity of extreme weather events will threaten port and energy infrastructures across the world. Danger of increased instability in key producing regions like the Middle East.

Conflicts, Erosion of Human Rights & Democracy (1)



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- Rwanda - the conflict originally began as Hutu on Hutu violence over shortage of viable agricultural land (an issue which will be exacerbated by climate change), but political and ethnic differences took over (Pons-Vignon & Lecomte, 2004).
- Sudan - long periods of drought that resulted in increased and widespread poverty have been identified among the various drivers of the events in Sudan's Northern Darfur State. These ecological changes (an extended period of drought) compelled the nomads to immigrate southwards in search of water and herding ground, which resulted in conflict with sedentary tribes (PCRUI, 2006). *N.B however there is a risk that climate change might be used as an excuse for this conflict when in fact poor governance and other issues are clearly key exacerbating factors.
- In Haiti, loss of forests and subsequent soil erosion has led the rural population to flee to cities. Dispossessed agricultural workers were the main instigators of violence when the Duvalier regime collapsed (Homer-Dixon, 1994).
- In Bangladesh, flooding in 1974 killed 300,000 and caused social upheaval leading to the overthrow of the President. This occurred even though government knew of the threat (flooding occurs annually) and had contingency plans (Myers, 1996).

Migratory stress



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- Climate change may create up to 50 million 'environmental' refugees by the end of the decade, mainly in Sub-Saharan Africa but also in Asia and India.
- One study suggests that a sea-level rise of just 50 centimeters – half the most optimistic estimates – will displace two million people from the Nile Delta. A one meter rise will displace 25 million in Bangladesh.
- Environmental degradation is already driving economic migration out of sub-Saharan Africa and onto Europe's shores.

Reframing the Security Debate



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- Climate change is a key security problem in many countries
- Needs to be given same prominence as energy security
- as both need changes in energy system
- Unless countries understand the security implications of climate change it is unlikely to be prioritised in policy making



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Transformation to low carbon energy system is affordable, but requires huge investment shifts



- IEA scenarios see \$12-21 trillion investment in global energy system to 2030
 - Cost of making this low carbon is around \$1-2 trillion
 - But this will involve reducing investment needed in energy supply sector by \$7-11 trillion over 25 years; much of this in lower pipeline and transmission investment.
 - Much of the remaining investment will shift between companies and power sources
- All estimates require increased efficiency to be responsible for 70% of emission reductions from business as usual

Potential Technological Options



- **Efficient production and use of energy:** re-powering inefficient thermal coal-fired plants; developing IGCC; hybrid and fuel cell cars; reduced use of vehicles; more efficient buildings and industries
- **Fuel shift: coal to gas**
- **CO2 Capture and Storage:** Capture CO2 in the production of electricity followed by geological storage (e.g., IGCC – CCS)
- **Renewable Energy and Fuels:** Wind power; solar PV and solar thermal; small and large-scale hydropower; bio-energy (2nd generation)
- **Nuclear fission:** Nuclear power
- **Forests and Agricultural Soils:** Reduced deforestation; reforestation; afforestation; and conservation tillage
- **Other GHGs:** Methane, nitrous oxide, halocarbons (HFC-23), etc

Energy and Climate Security are public goods; markets will not automatically give right signals to shift major investment



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- Equilibrium carbon price in Stern Review \$100 t/C – current oil price rise equivalent to \$350-450t/C – but not leading to carbon-free economy
- Price rises and energy security are driving investment in climate instability:
 - rapid rise in coal power investment
 - coal to liquids investment in US and China
 - Large increase in carbon inefficient biofuels
- Impact on energy efficiency of high energy prices has been very slow, even in transport sector

Need coherent, clear and effective policy signals to drive investment to deliver energy and climate security together

The Case for Clean Coal



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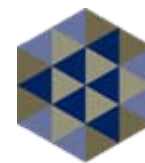
- Even with higher efficiency, the USA, India and China all plan to build more coal power stations
- Current investment plans mean that coal plants built by 2030 will have lifetime emissions equal to 2/3rds of global emissions between 1970-1990
- Cannot keep below 2C warming unless carbon sequestered from these coal power stations

China's rapid economic growth is placing constraints on its ability to produce the clean energy it needs for continued economic growth

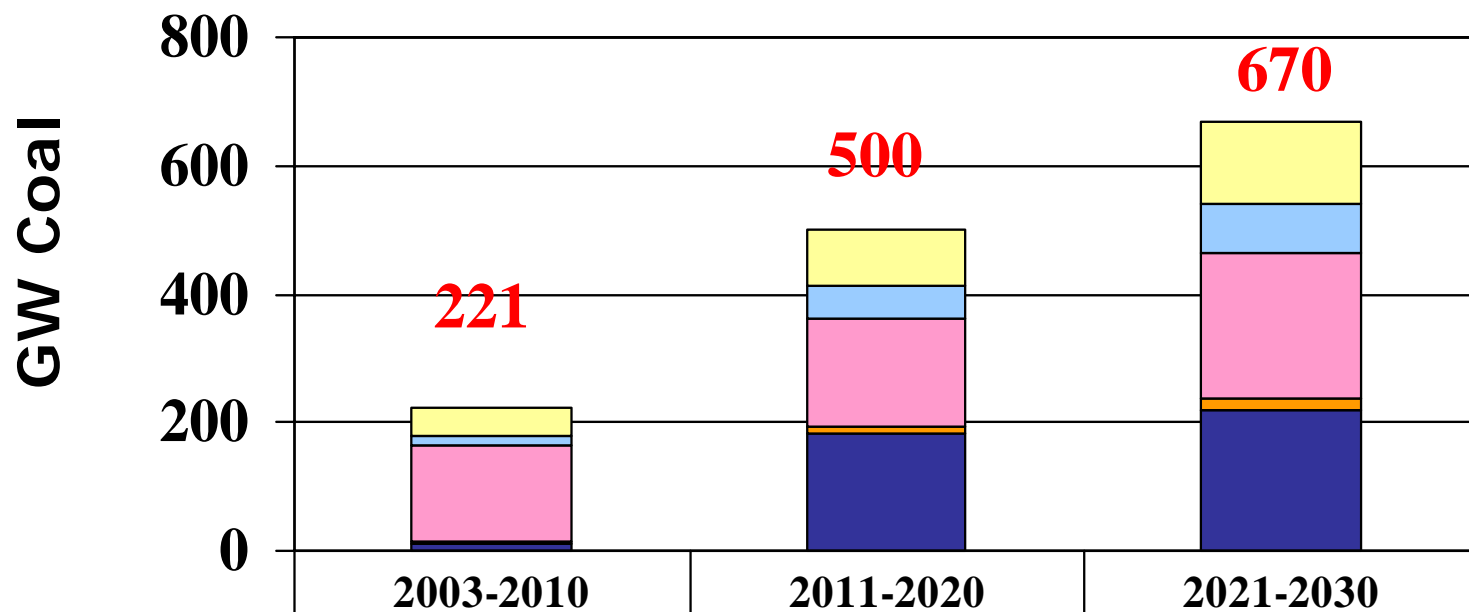


- In 2005, China commissioned 66 GW of new power plants, of which 48 GW was coal-fired. It is expected to be the largest GHG emitter by 2025
- China is forecast to experience 590,000 premature deaths per year from 2001-2020 due to urban air pollution primarily arising from the transportation and power sectors, nearly 30 times that of market economies
- However, Chinese officials are conscious of these threats and willing to move towards cleaner energy sources:
 - China's Renewable Law which came into force on 1 January 2006 seeks to increase the share of renewable energy in China's energy mix to 15% by 2020.
 - The current five year plan aims to improve the country's energy efficiency by 20%. At the end of the five years plan the energy consumption per unit of GDP should be about 20% less.

China is building 1GW new coal every 4 days – need to avoid lock-in to coal



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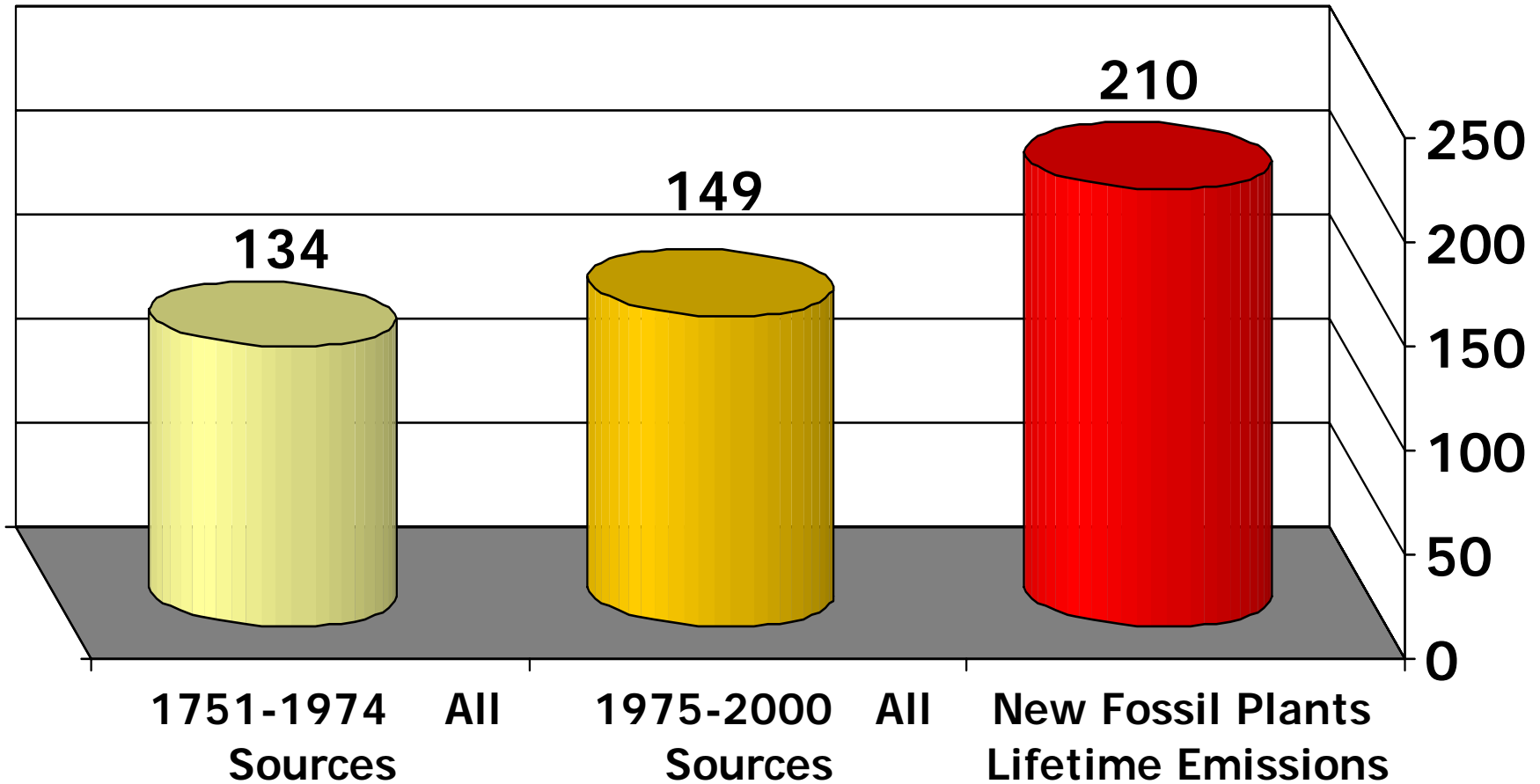
	2003-2010	2011-2020	2021-2030
Other Developing	43	90	128
India	16	48	79
China	150	168	226
Transition	1	11	19
OECD	12	184	218

Source:
IEA,
WEO 2004

Lifetime Emissions from New Fossil Plant Rival Historic Totals



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Billion tonnes Carbon

Source: ORNL, CDIAC; IEA, WEO 2004

Economics of Transformation



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- Need massive shifts of investment over the next two decades to ensure climate security
- Energy security concerns are currently working against this goal by increasing coal use
- Need mechanisms to redirect investment – global carbon markets will be part of this – but are not sufficient
- Will need global agreements on technical standards and direct financing; for example, Worlds Bank Clean Investment Framework



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Justice does not equal Equity



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- Arguments in climate change debate have focused on Equity issues of who should reduce emissions and by how much
- Essentially a discussion between the 30 countries who emit 85% of global emissions
- Failure of USA to act has lead to a stalemate with India, China and Brazil

Climate Geopolitics has rising importance but poisonous power dynamics



- Climate change is now a top geopolitical issue along with terrorism, WMD, trade and energy security.
- Collective Action Dilemmas:
 - **First mover disadvantage**: waiting to act gives a better deal
 - **North-South Chicken**: if the rich won't act – then the poor won't act; except poorer countries suffer first and most
 - **Paying the polluter**: biggest polluters with lowest damages can demand “payment” to join agreement; China and India pay USA to reduce emissions?
- Leadership and justice core to effective global deal; EU only credible world leader? US post-2008 elections?

Justice would focus on climate impacts on the poorest



- Arguments over who acts are resolved by lowering the ambition of global reductions
- This directly impacts the livelihoods and survival of the poorest – who are not at the negotiating table and do not contribute to the problem. Whether in Africa, India or China
- Justice is mainly provided by agreeing a strict emissions target – 450ppm CO₂

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India's Role



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- What are the climate security implications for India?
- How can India shift investment to a low carbon path, and be compensated for this?
- How can Indian businesses benefit from the shift in global power investment e.g. wind; nuclear; biomass etc
- How can the interests of the poorest Indians be included in the climate change debate?