Climate Change and Sustainable Development: Challenges and Opportunities

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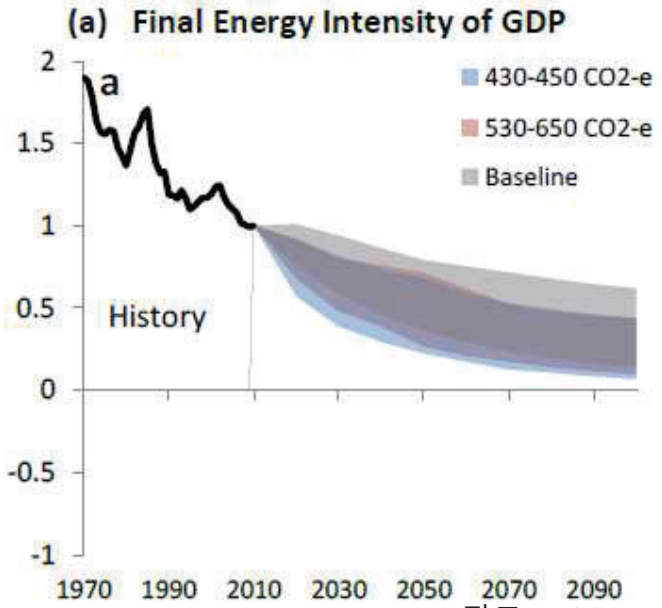
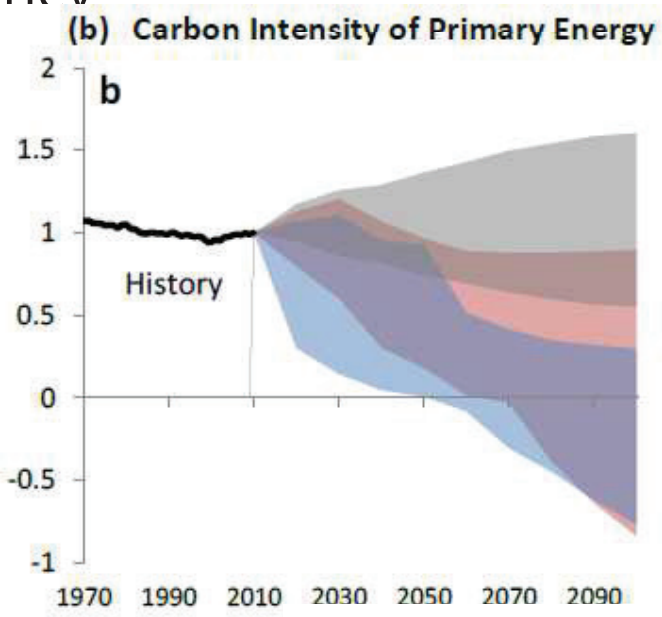
What is special about climate change and sustainable development?

- Climate change destroys irreplaceable natural capital and leads to unsustainable development path
- Global scale collaboration is required for solution of climate change
- Mitigation and adaptation in developing countries is development policies

Energy future compatible with stabilized climate

- Early retirement of fossil energy (2030년 50 GtCO2; 2100년 0 GtCO2)
- Zero carbon energy system (2035년 RE60%PE, LC100%EL)
- Revolution in energy efficiency





자료: IPCC AR5 WGIII Ch6, Fig 6.16

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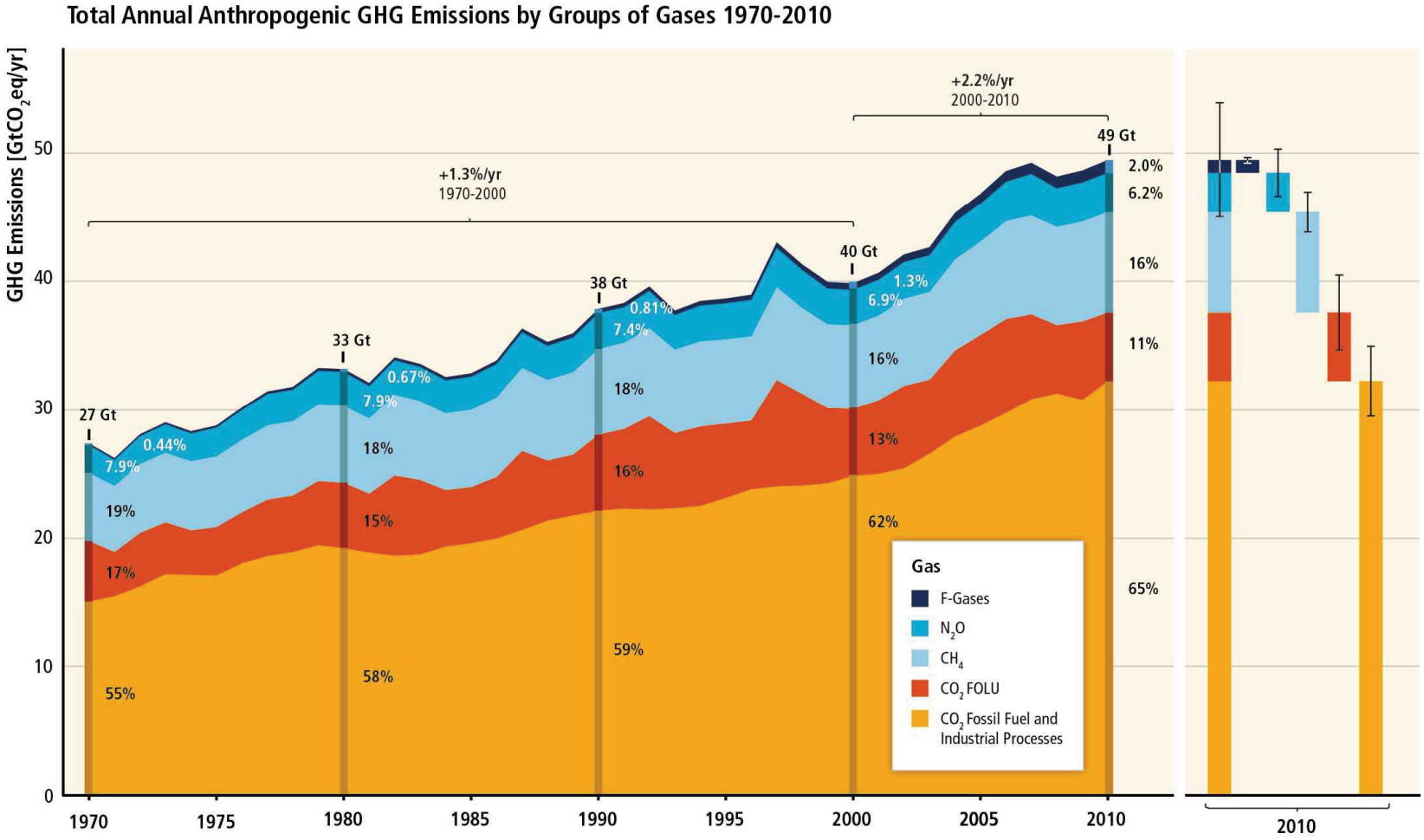
Reality I: rate of CO2 growth in the last decade = 2 X trend rate



자료: IPCC AR5 SYR

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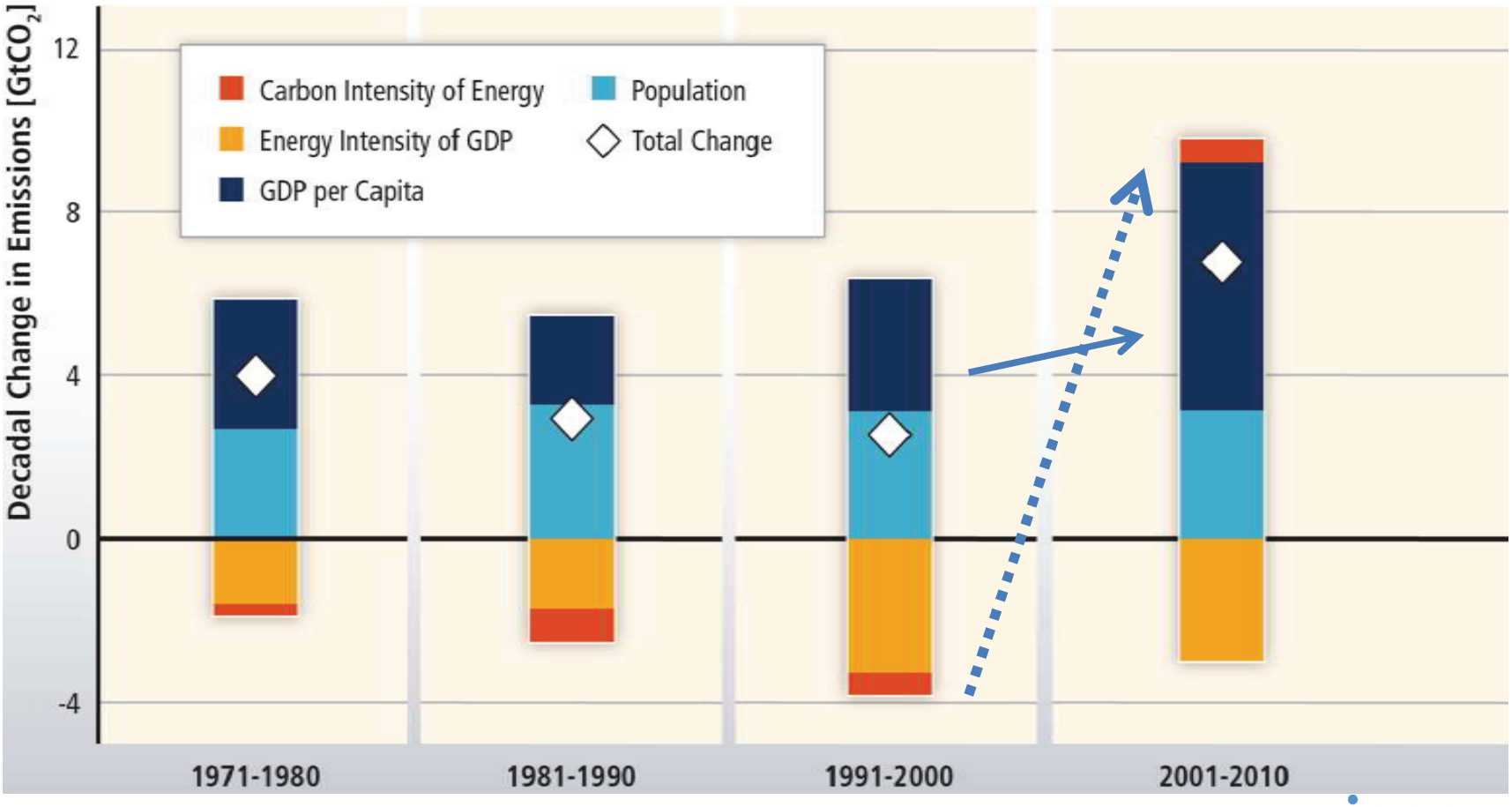
Reality II: economic growth and reduced coal prices led to CO2 growth



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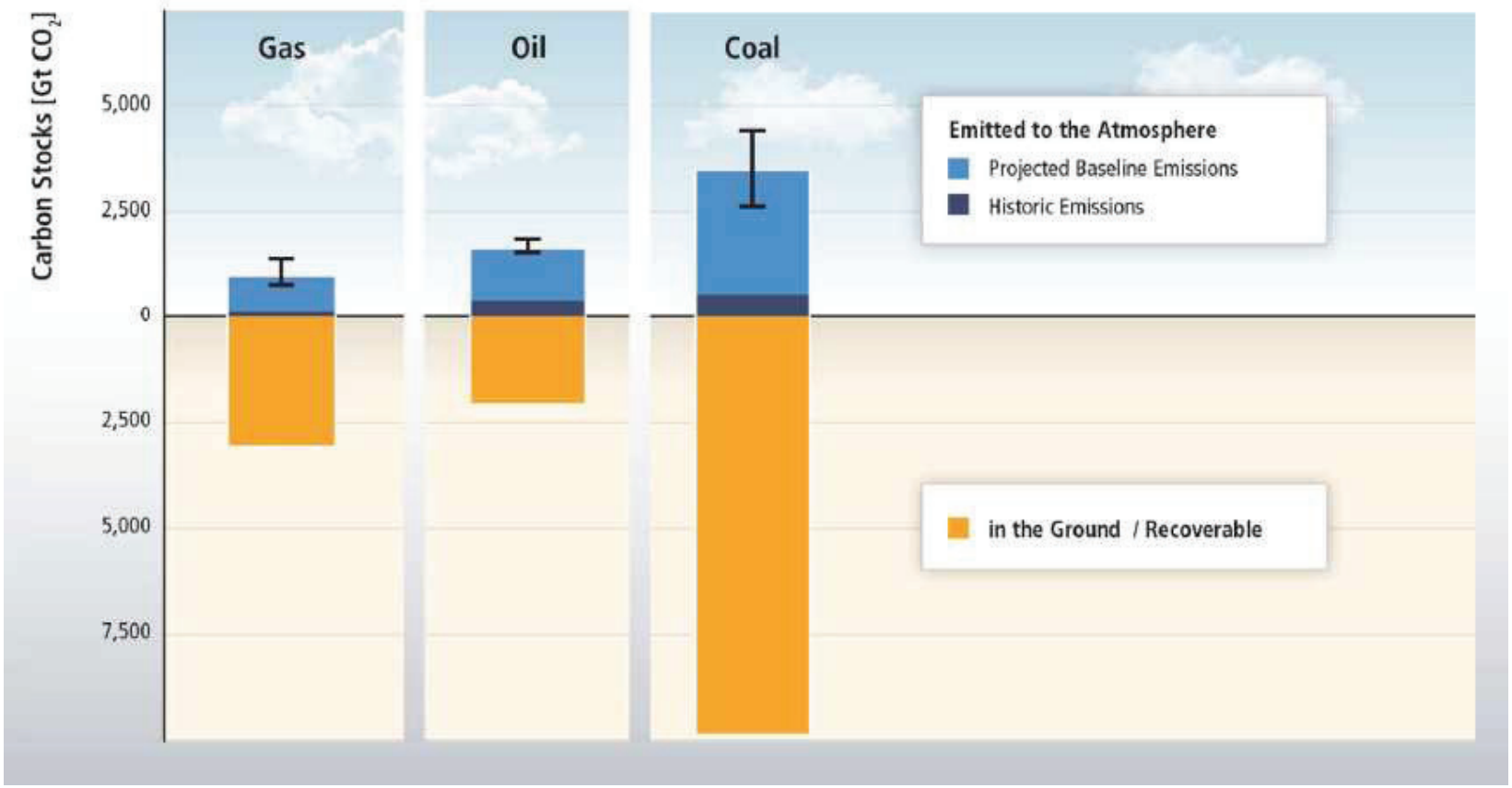
Reality III: supply capacity of fossil energy > potential demand for fossil energy



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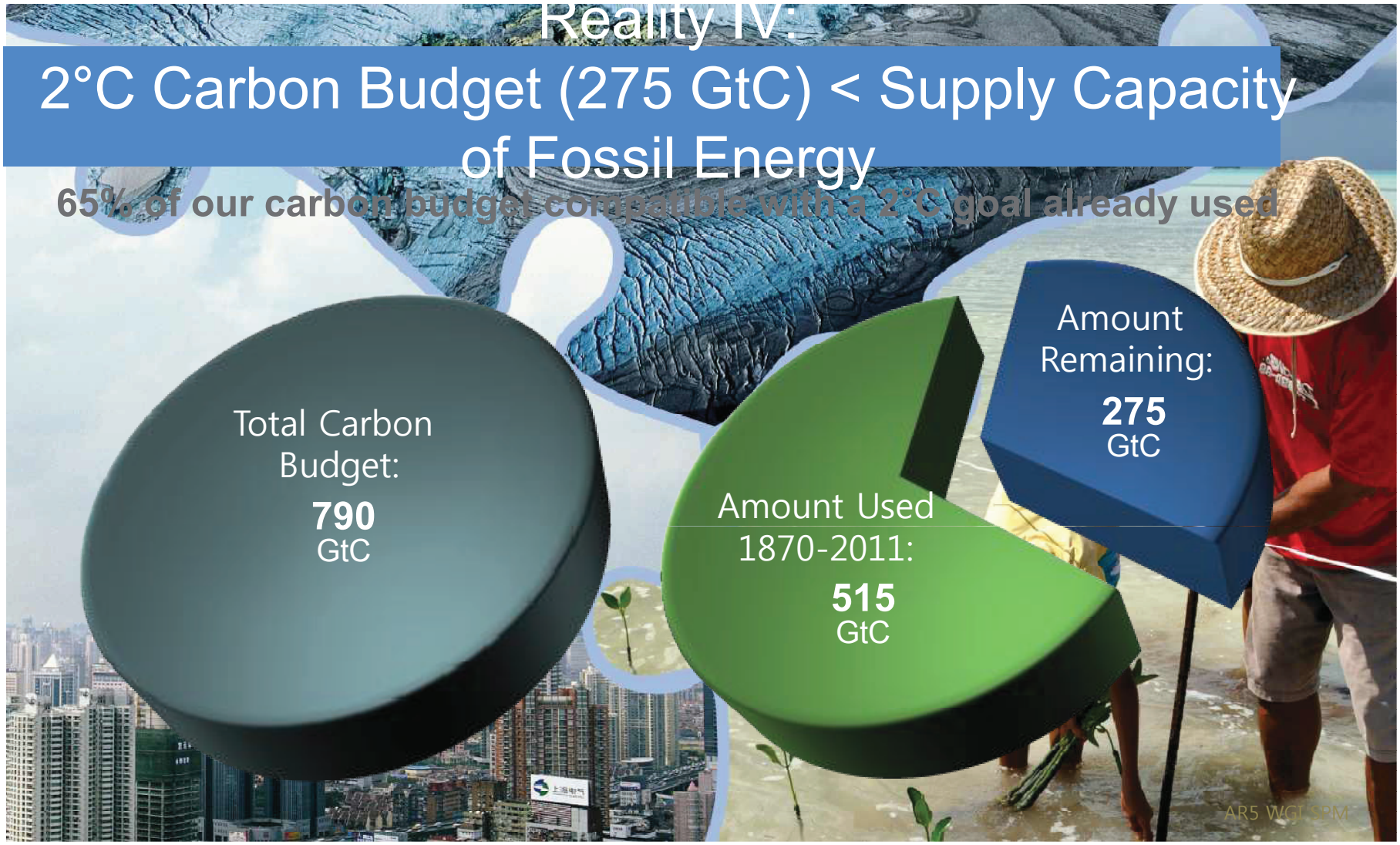
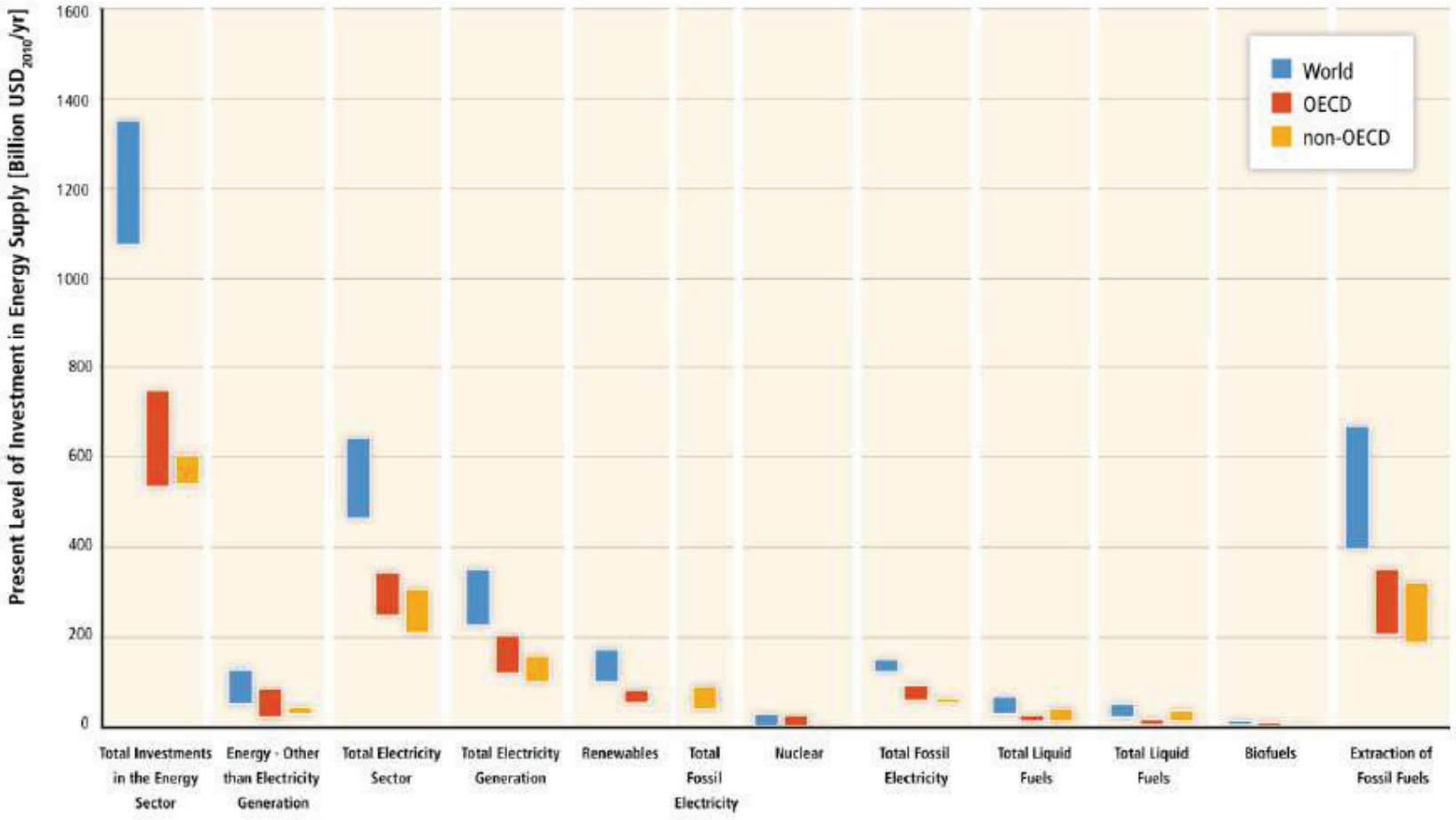
Reality IV:

2°C Carbon Budget (275 GtC) < Supply Capacity of Fossil Energy

65% of our carbon budget compatible with a 2°C goal already used



Energy Investment Reality: US$ 1.1 ~ 1.3 trillion per year (fossil energy extraction 50%; power plant construction 50%)



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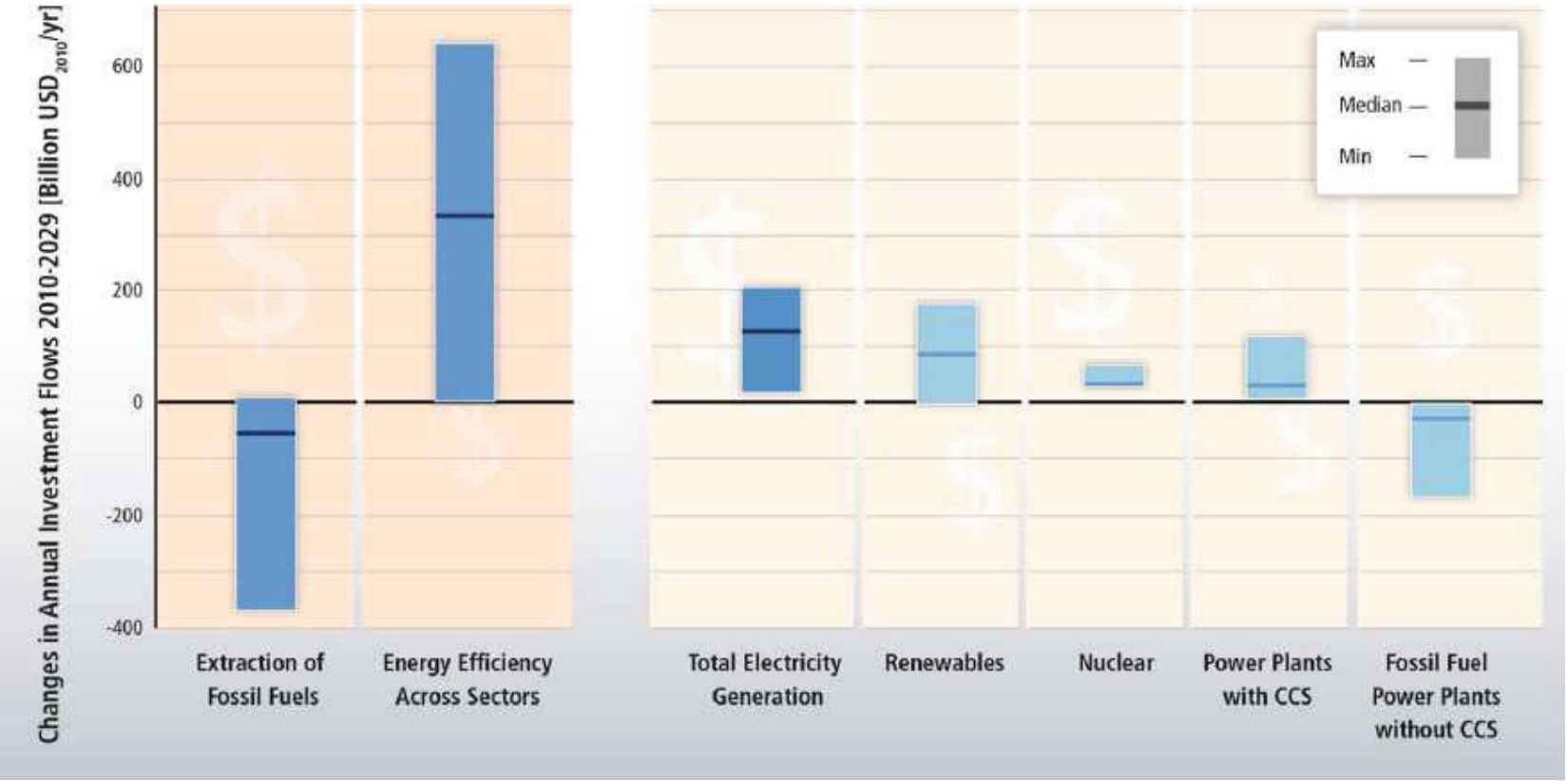
Energy investment compatible with 2°C carbon budget: within next 15 years, 50% of current energy investment must shift to non-fossil energy investment ($336 T for energy efficiency, $147 T for low-carbon energy development)



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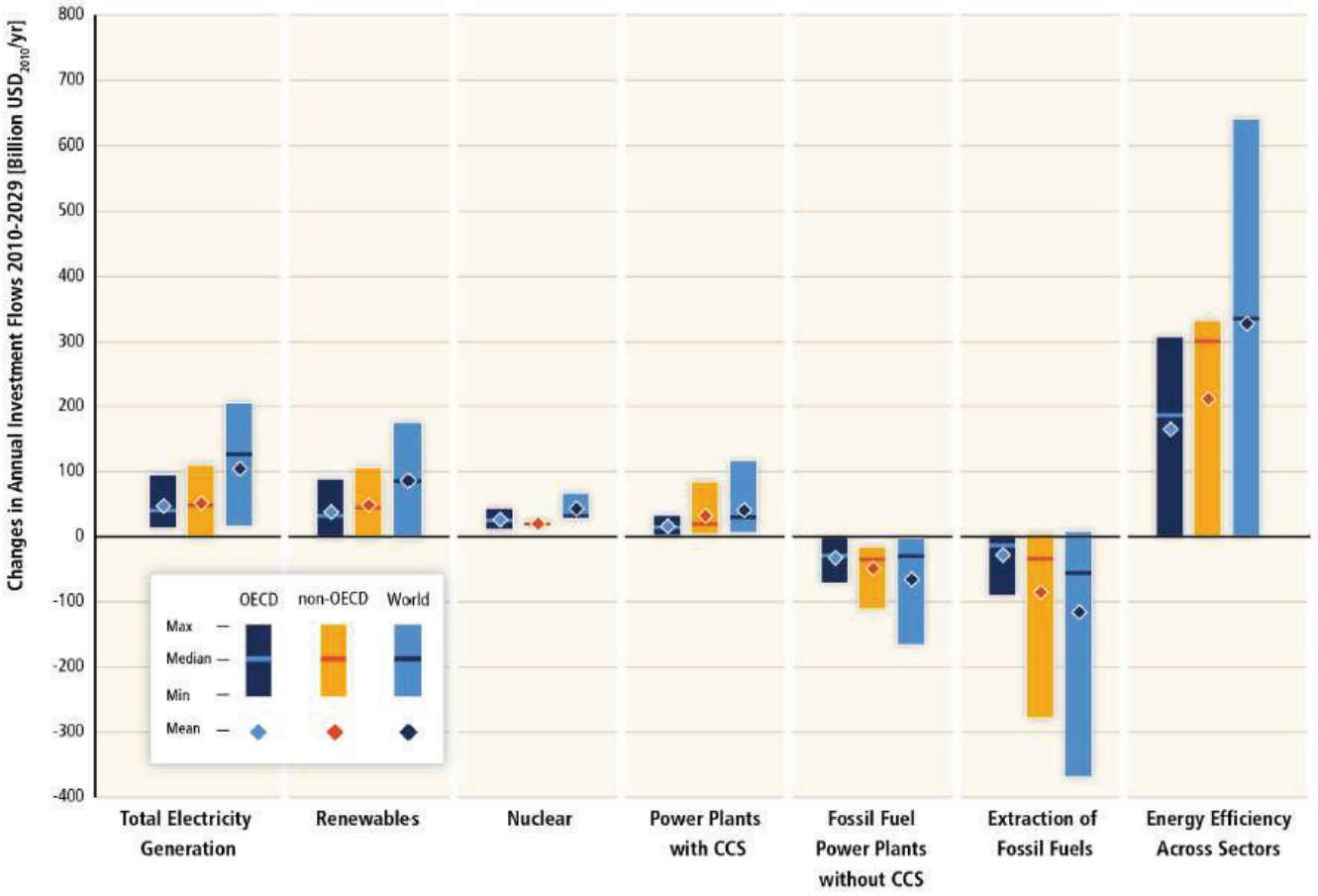
Energy Investment compatible with 2°C Carbon Budget II: Developing countries account for majority of investment shift



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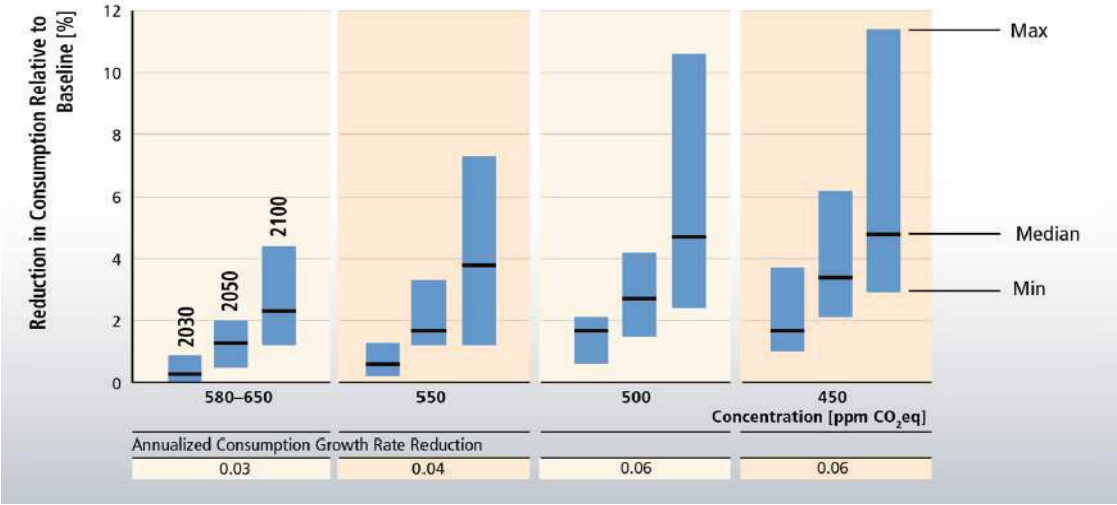
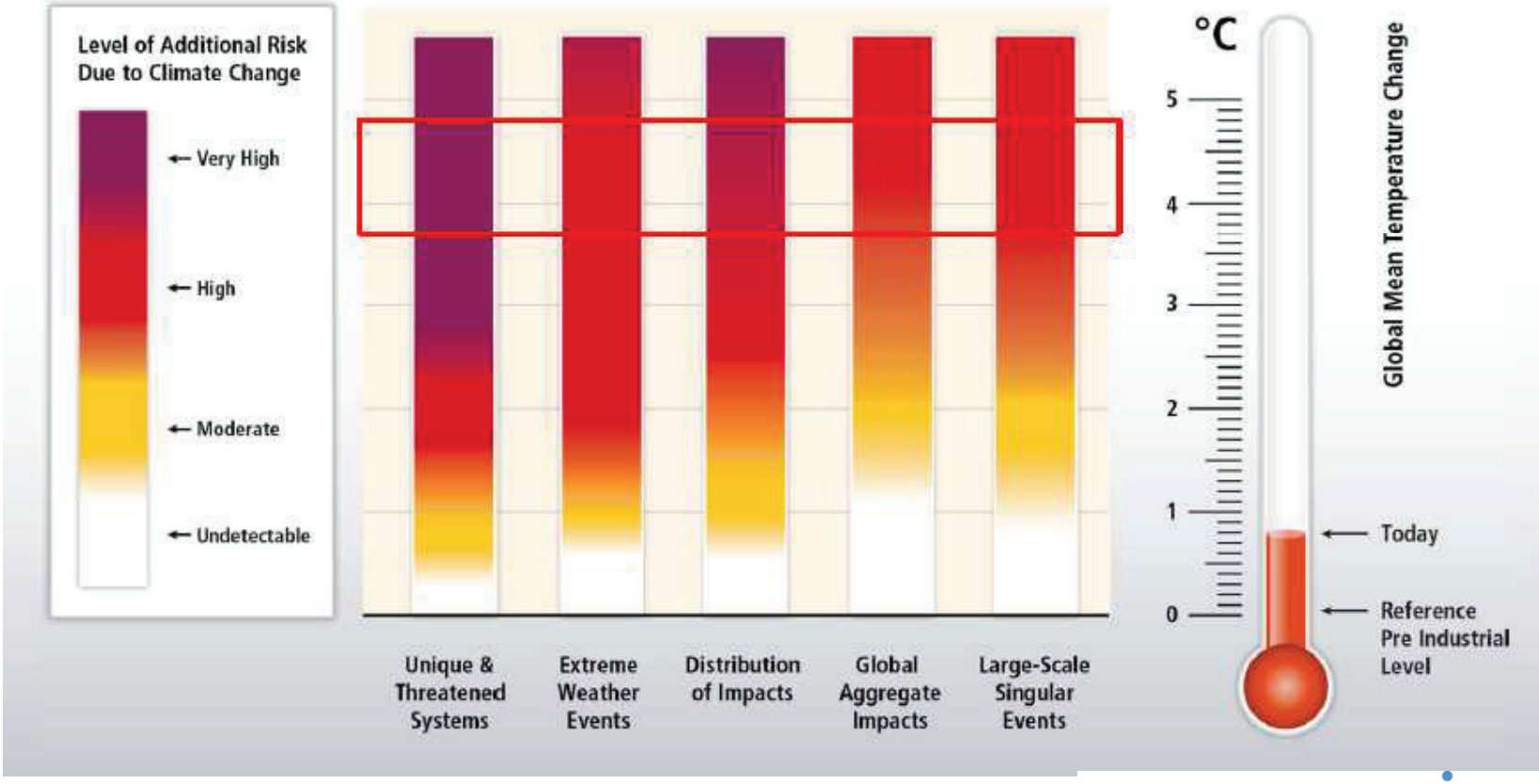
Mitigation cost depends on policy and technology

- 4% of Global GDP in 2100, with immediate universal m itigation action and with no limit on technology access
- Delay in mitigation results in cost increase beyond 4%
- Without CCS, mitigation cost increases to 12% of global GDP



자료: IPCC AR5 WGIII

Mitigation action for 2°C is appropriate : Mitigation Risk < Climate Change Risk



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Conclusions

- Sustainability dilemma: decoupling of carbon and economic development would produce global public benefit, but its cost is local and private.
- Climate dilemma: climate action requires long-term commitment, but markets run on short-term time frame.
- Climate policy objective should be to answer these dilemma.