



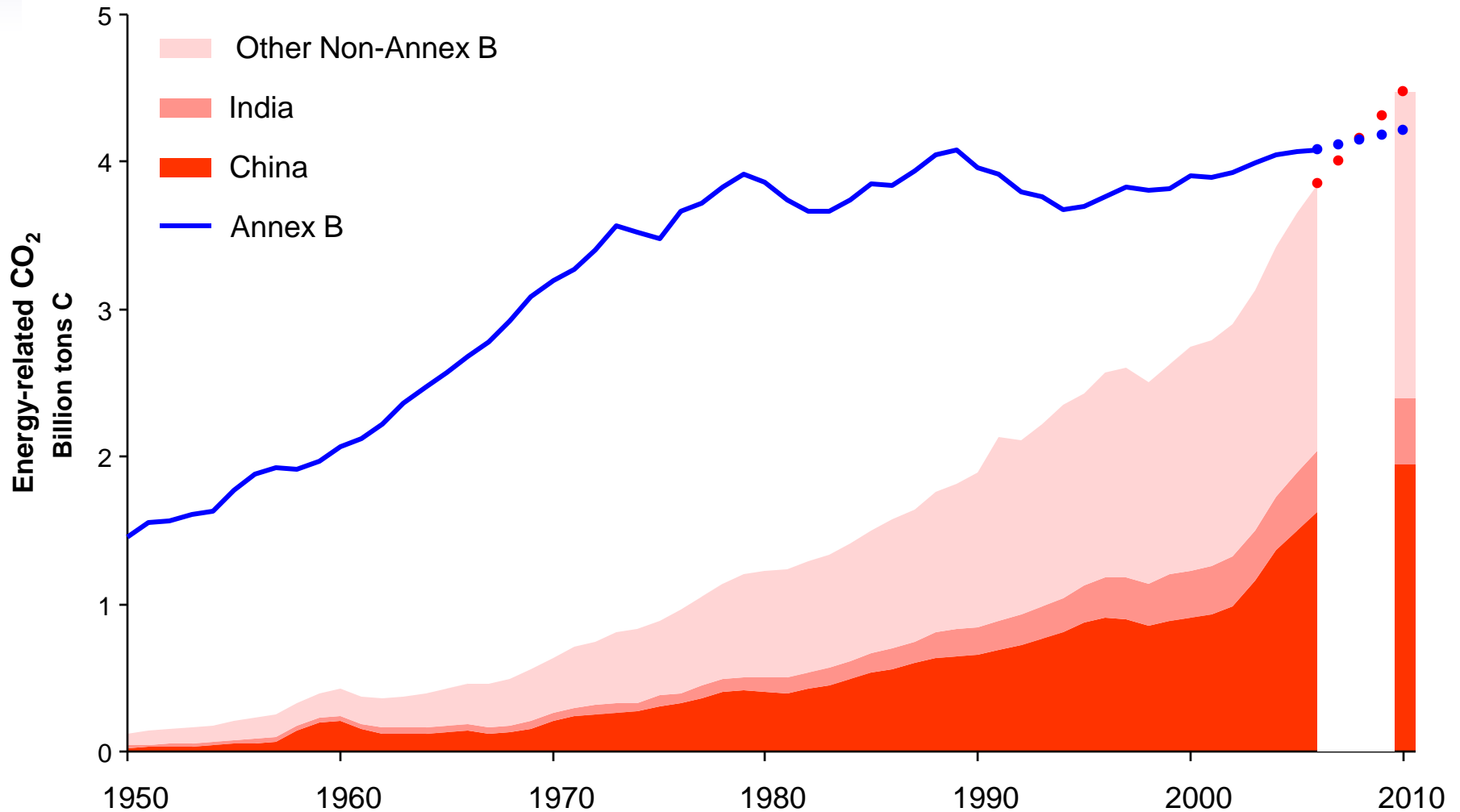
ELECTRIC POWER  
RESEARCH INSTITUTE

# Modeling Growth in Developing Country Emissions

Geoffrey J. Blanford, EPRI  
International Energy Workshop

July 1, 2008  
IEA, Paris, France

# Non-Annex B Emissions will surpass Annex B before 2010



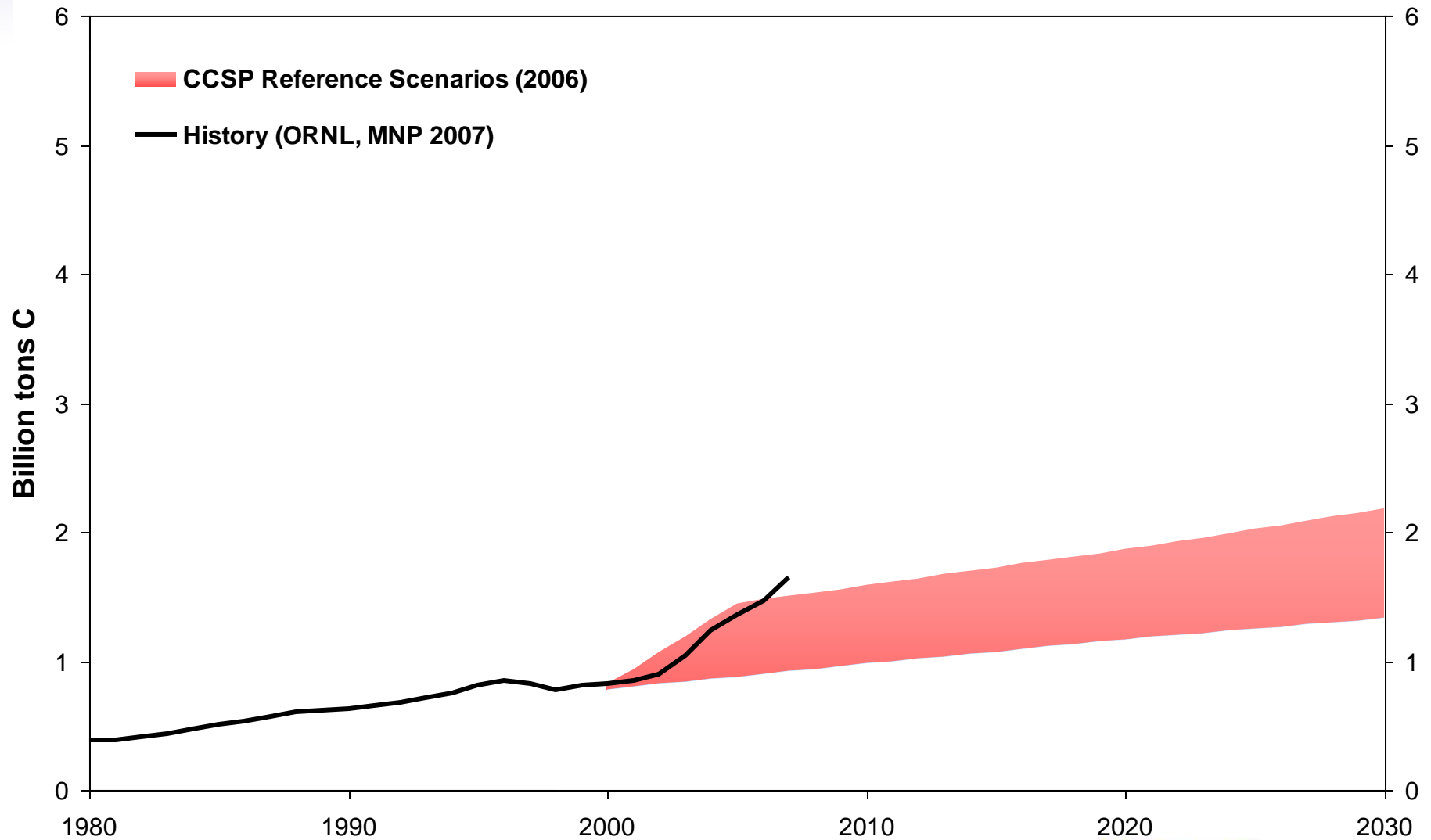
# Reading the Data on Developing Countries

- Rapid growth in energy use and emissions
- China is the major player, both in rate and scale:
  - 618 GW installed capacity in 2006
  - 106 GW newly installed

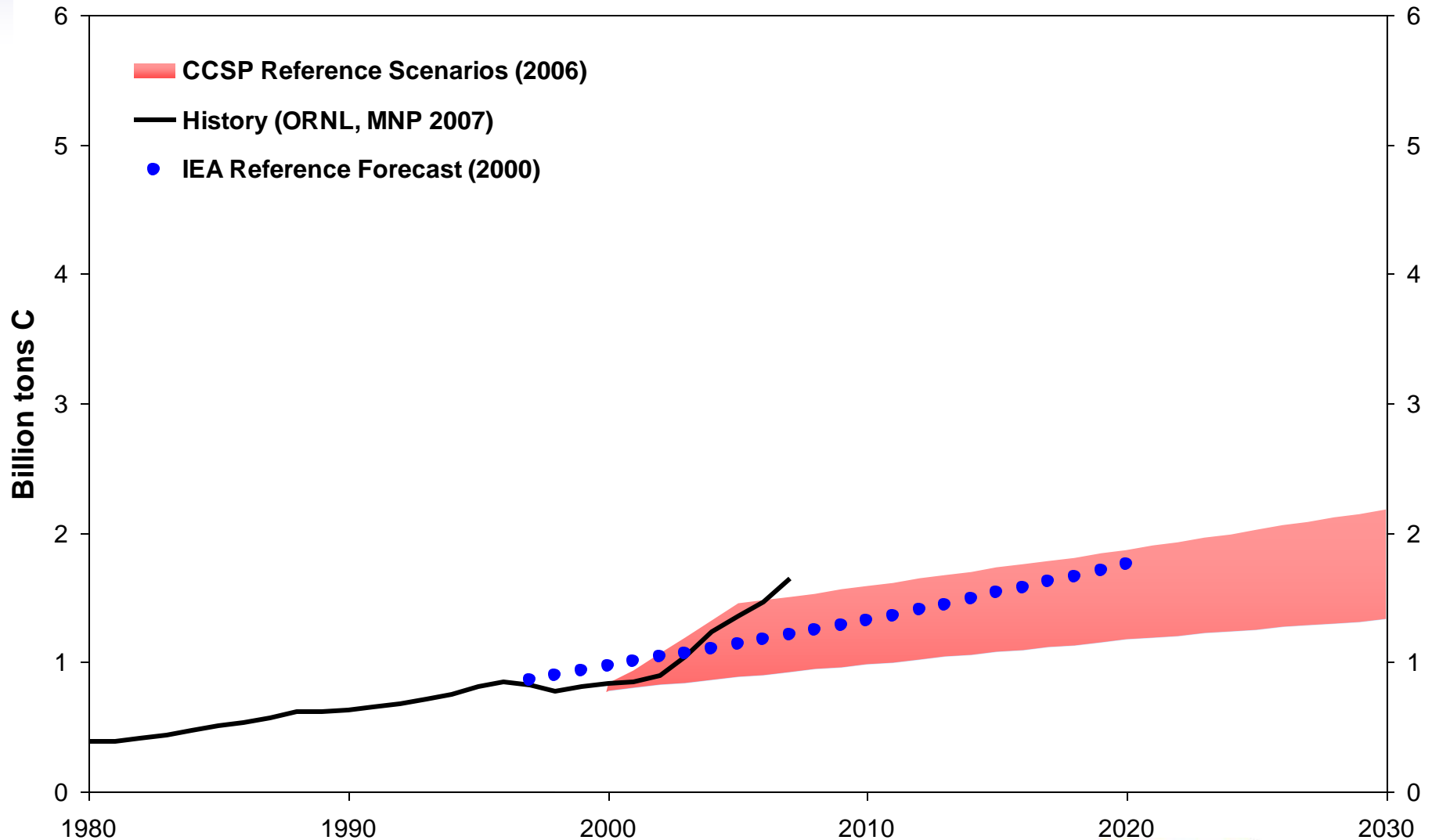
source: J. Kejun (2007), IEA (2007)

- Have modeling scenarios caught up?
- What are the implications for global stabilization goals?

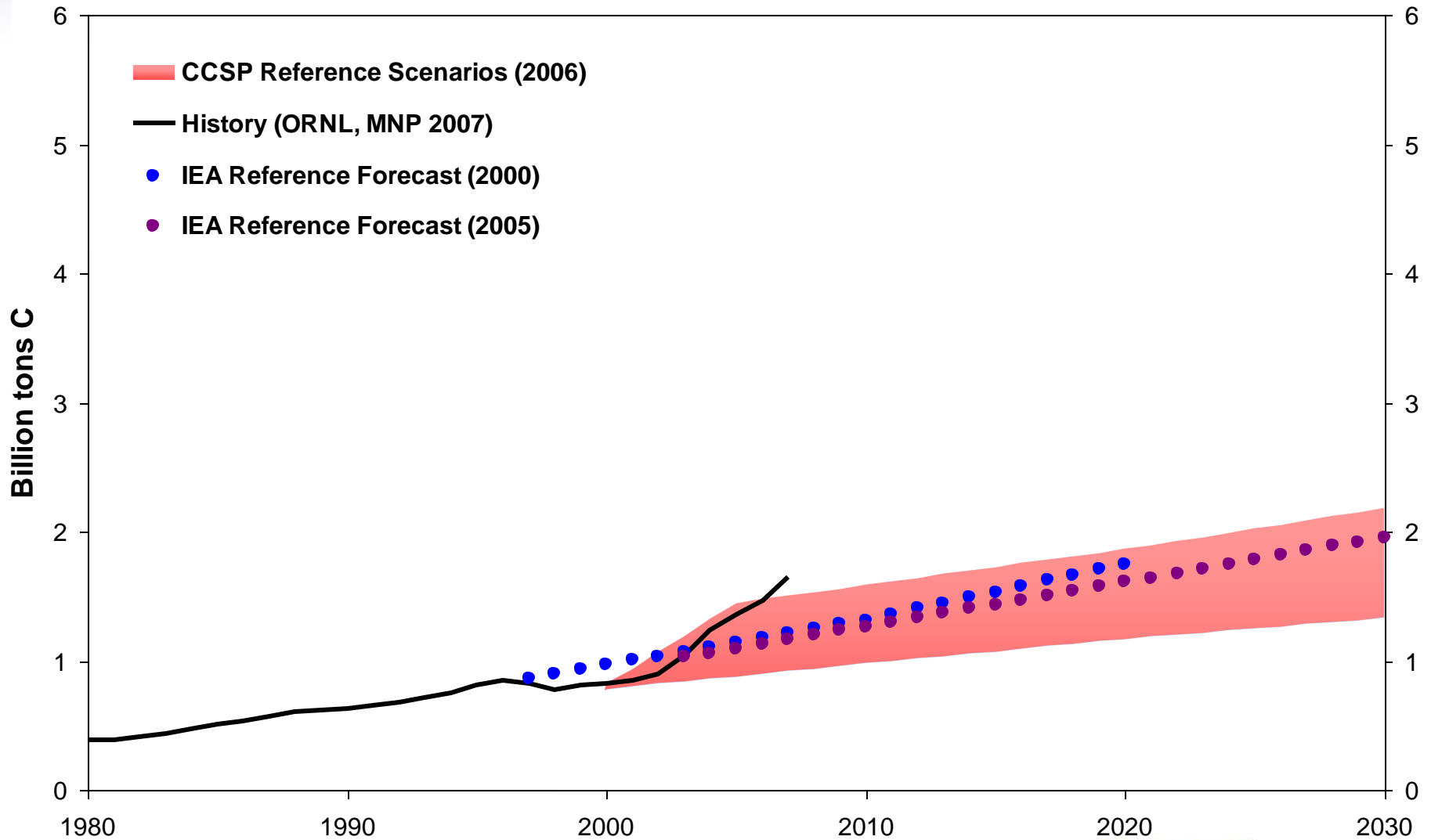
# Energy-related CO<sub>2</sub> emissions in China



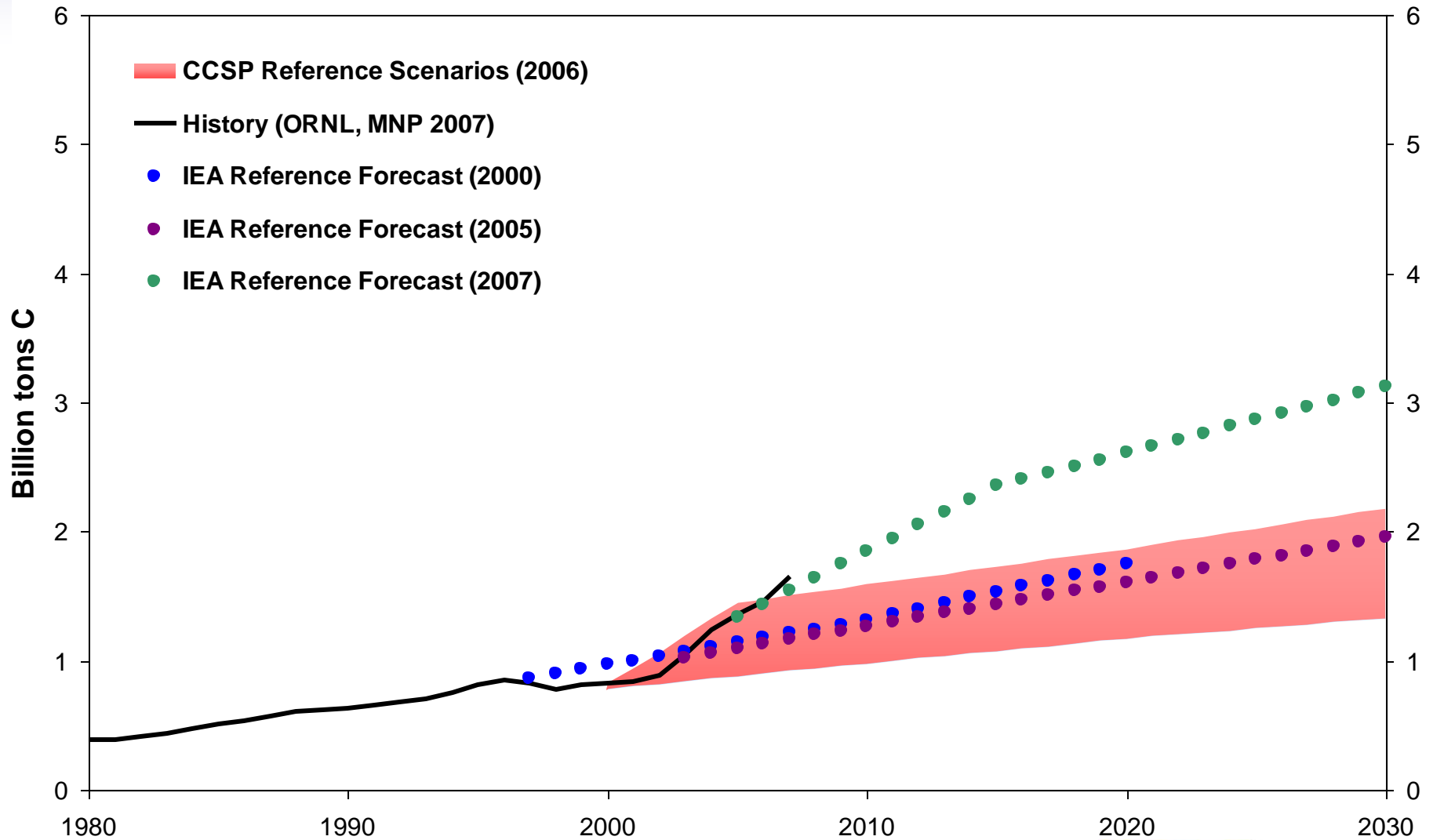
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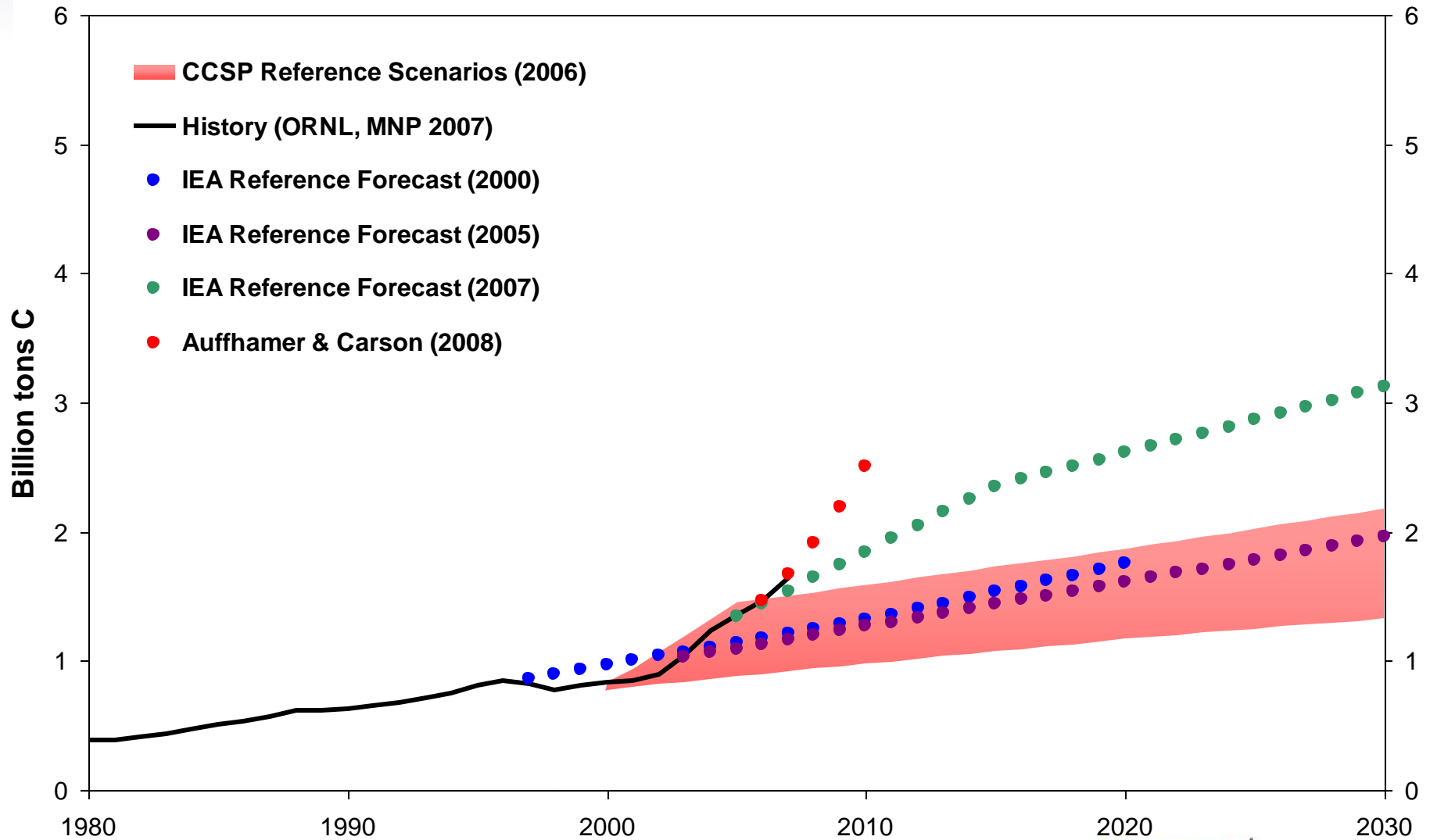
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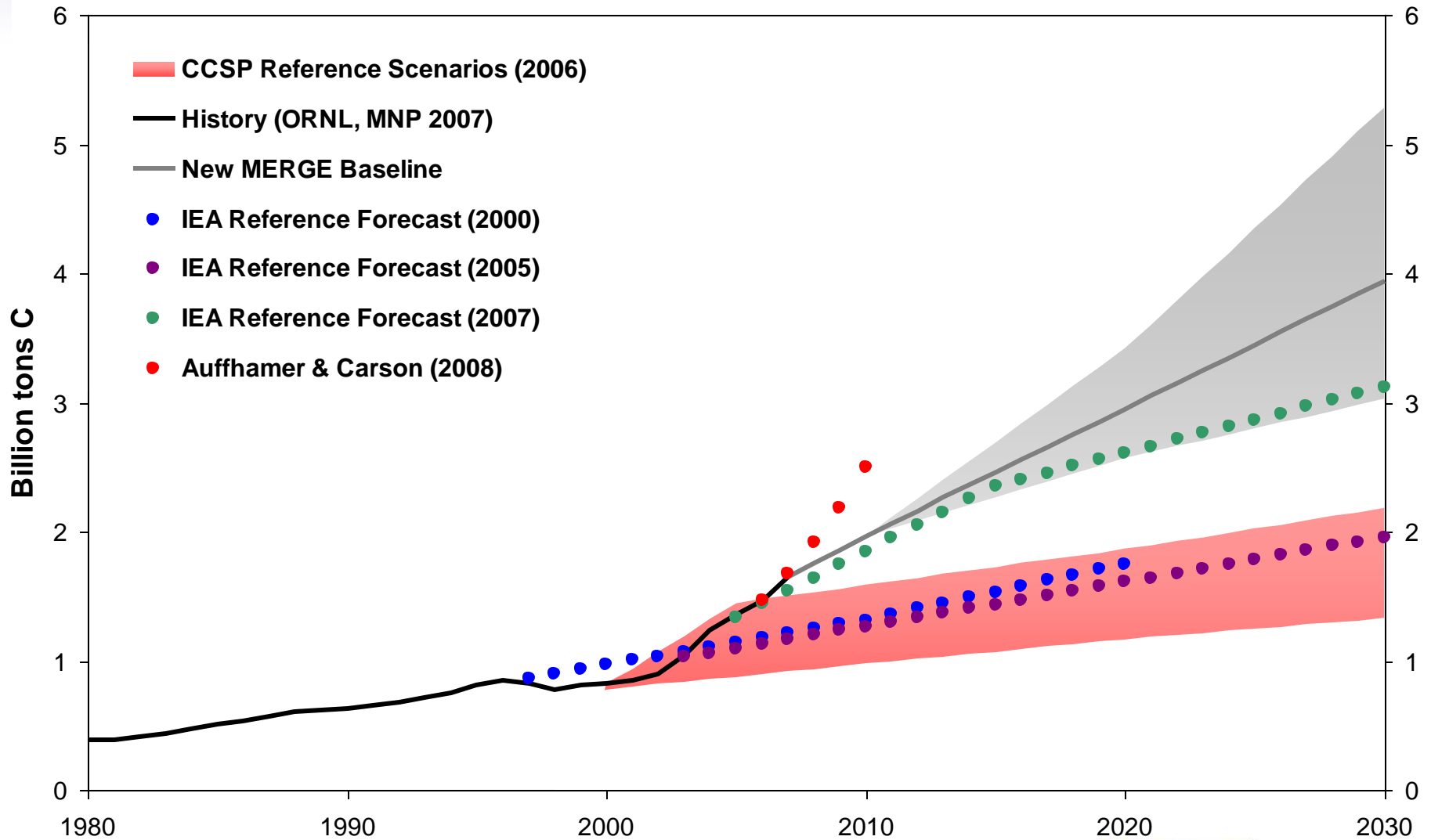
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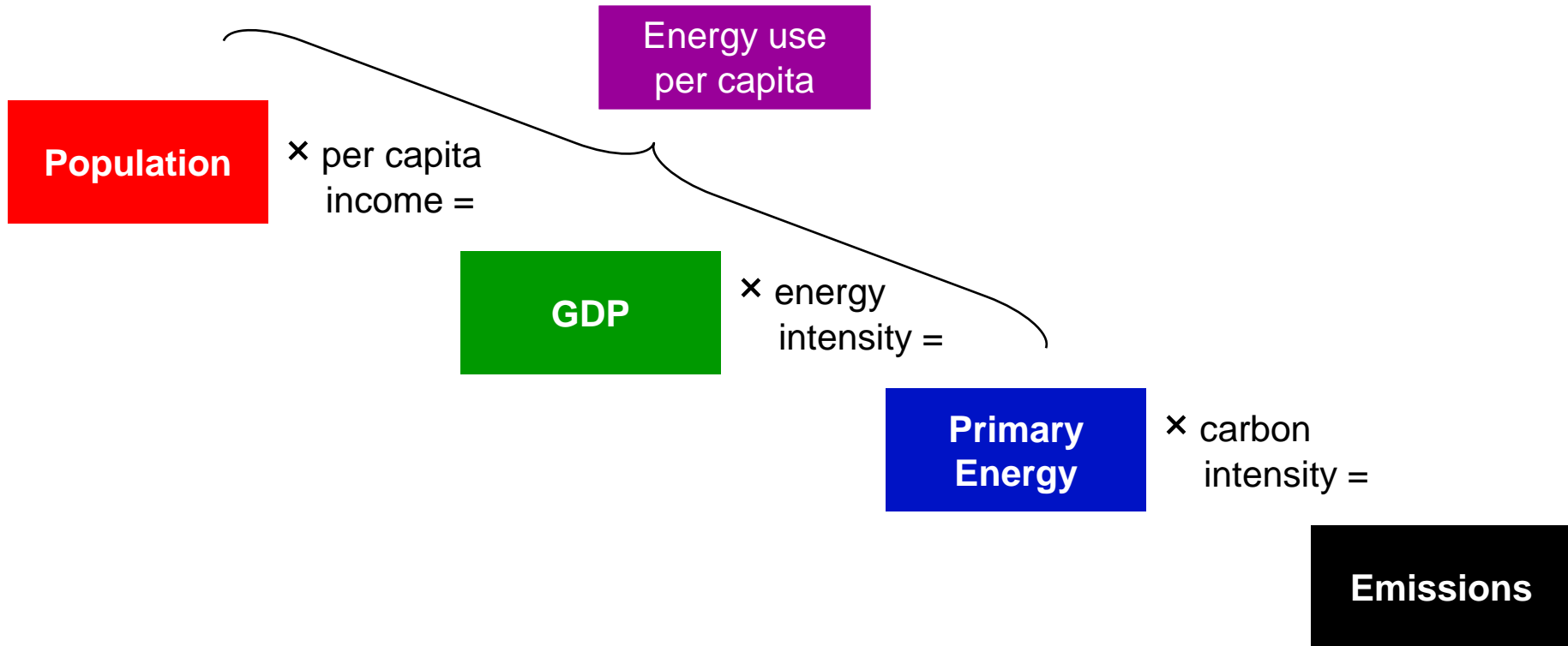
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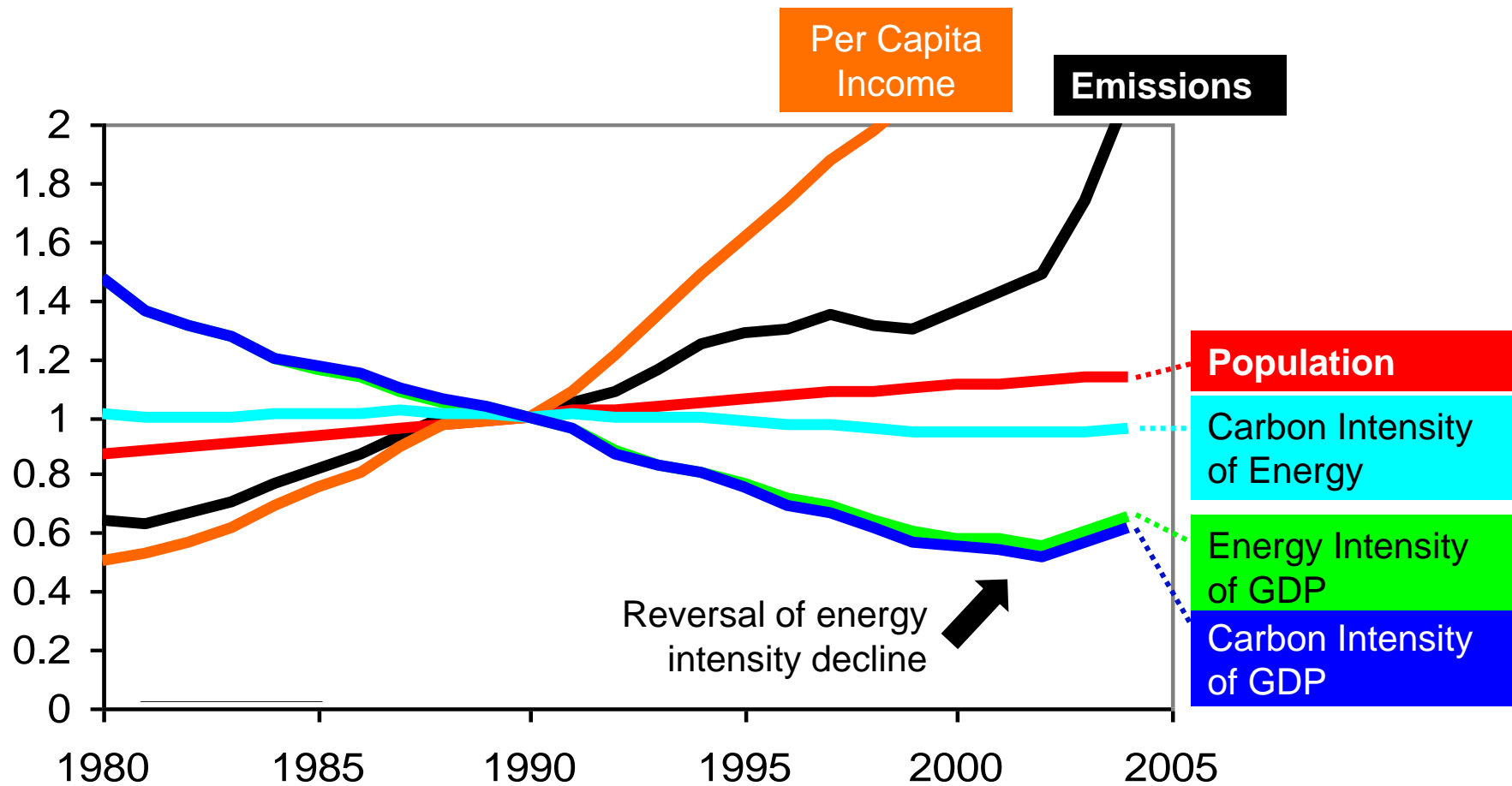


# Modeling the Kaya Identity

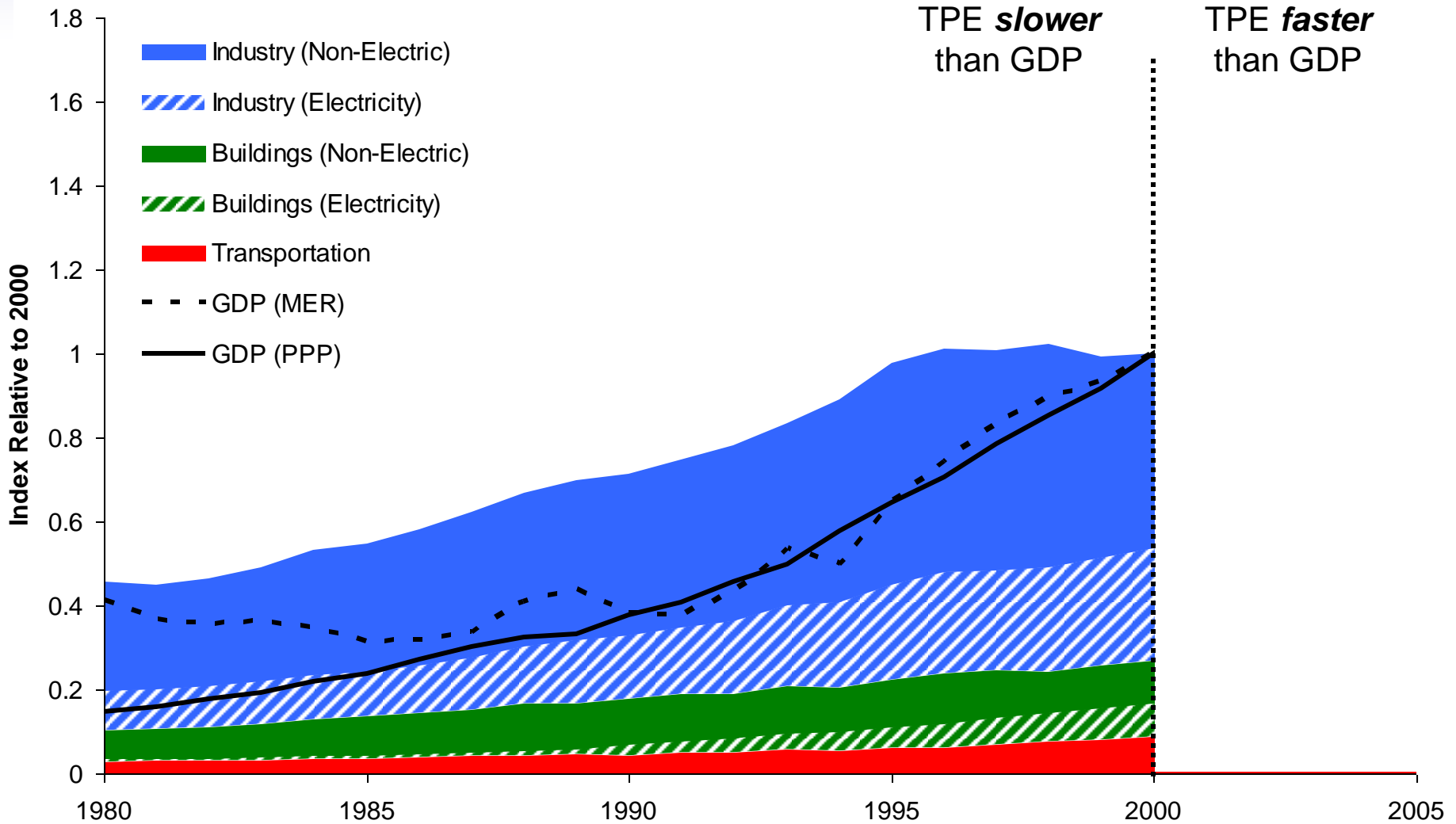


# The Kaya Identity in China

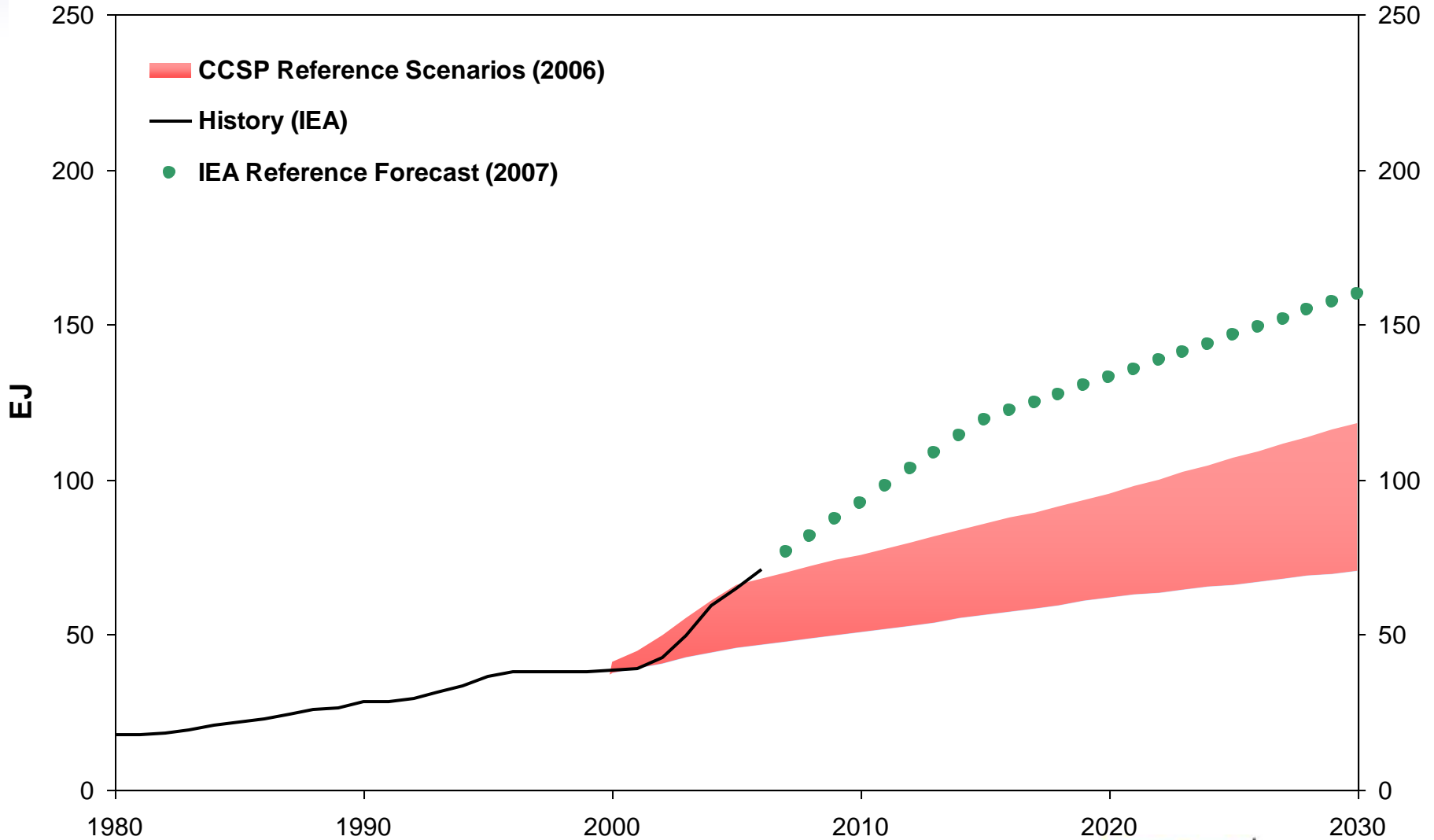
source: Raupach, Marland, et al. (2007)



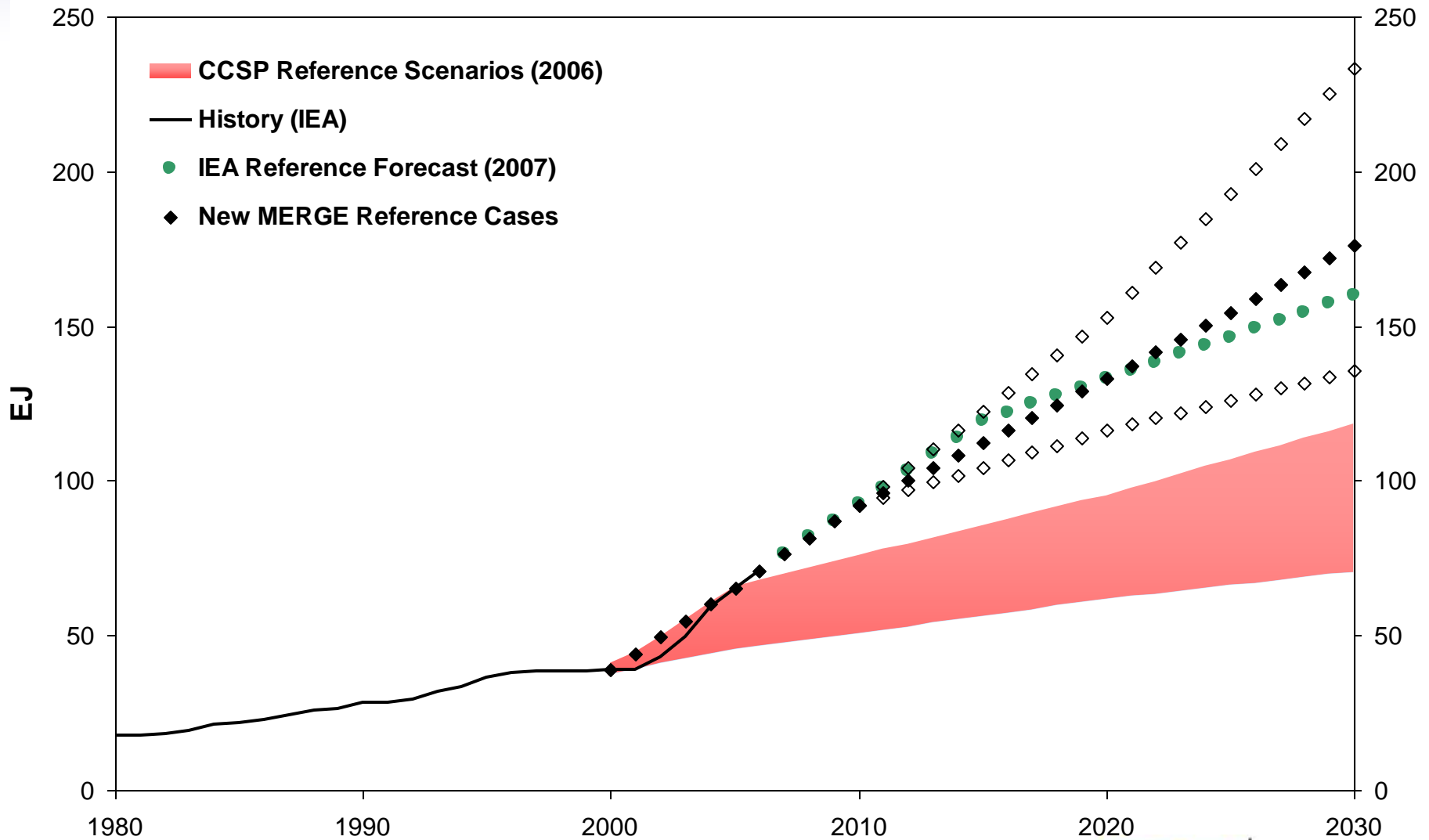
# Primary Energy vs. Economic Growth in China



# Total Primary Energy in China



# Total Primary Energy in China



# Comparison to Asian Experience

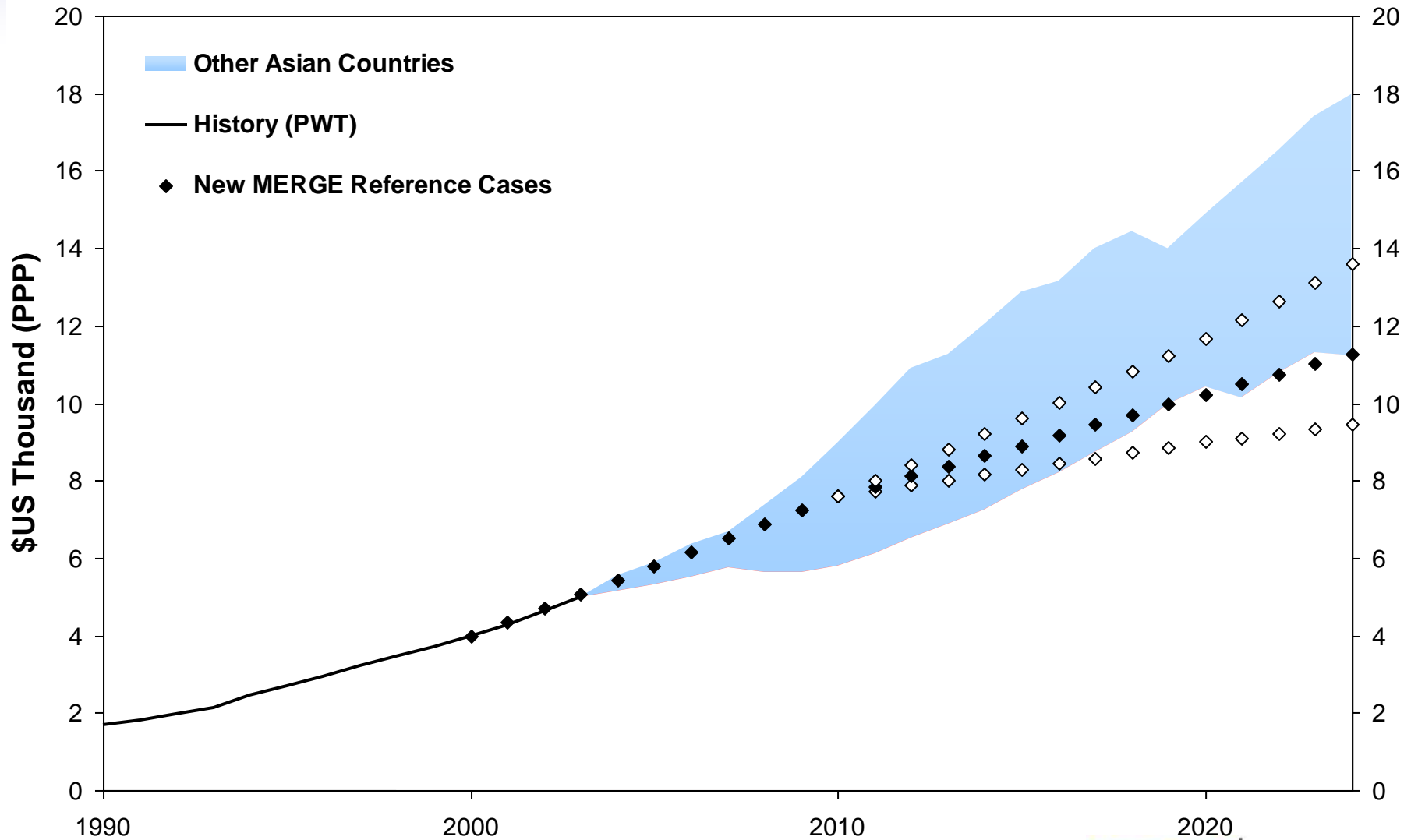
- China's per capita income in 2003:

\$5,000 (year 2000 \$US PPP)

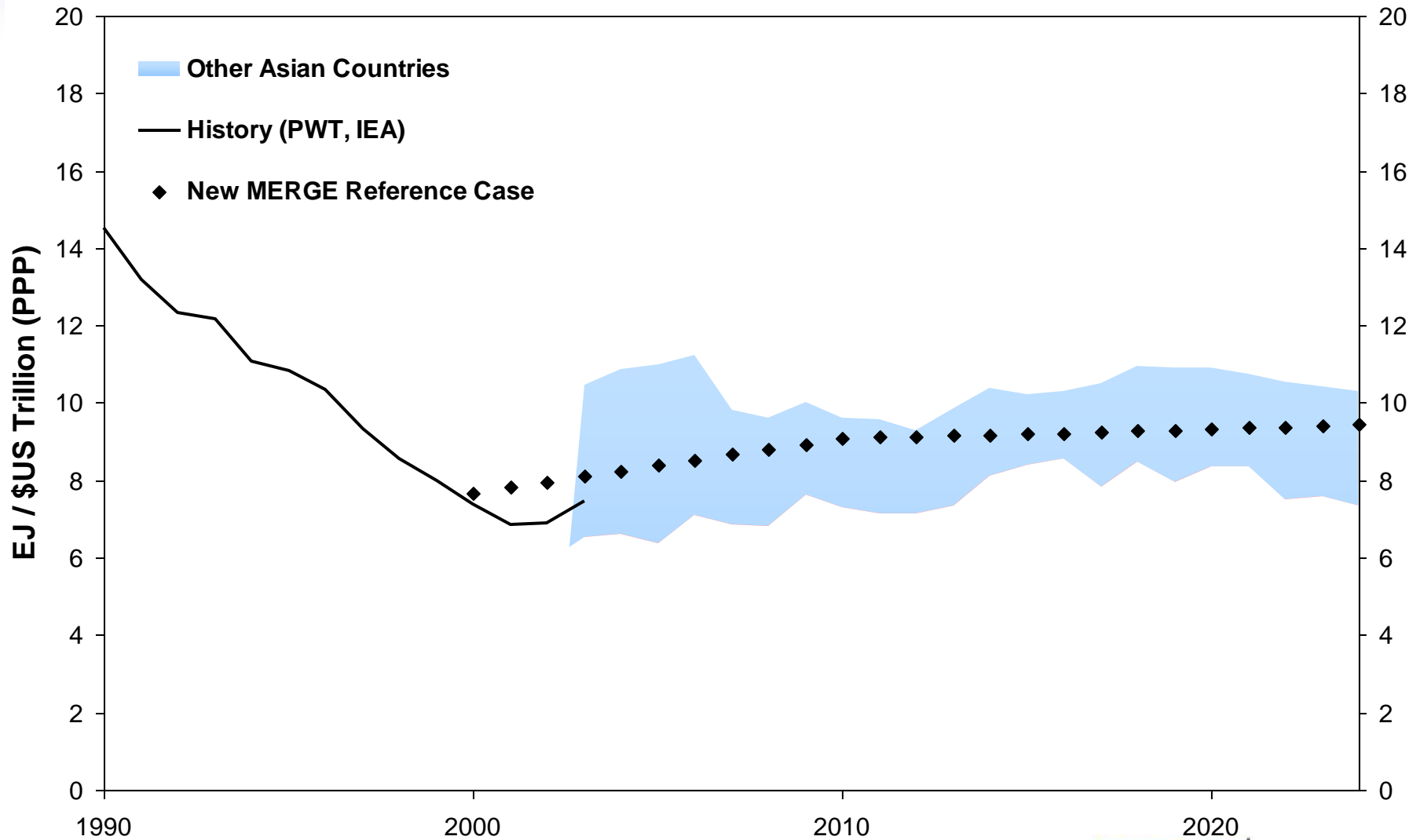
- 7 Asian countries are wealthier than China:

	Year of \$5,000 income level	2003 Income
Hong Kong	1978	\$29,600
Singapore	1967	\$27,000
Japan	1961	\$24,000
Taiwan	1977	\$19,900
Korea	1982	\$17,600
Malaysia	1980	\$12,100
Thailand	1992	\$7,700

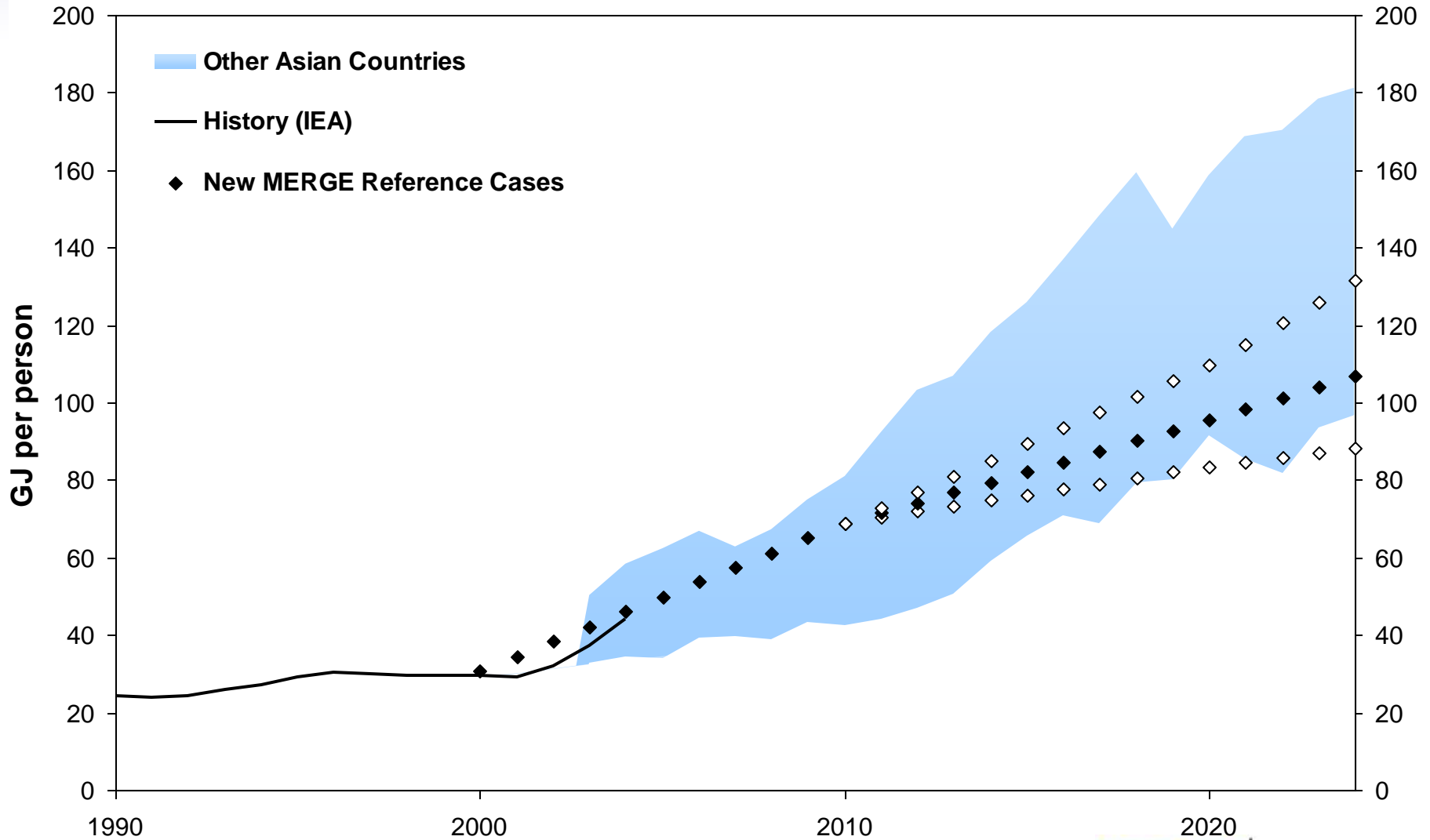
# Per Capita Income Projection for China



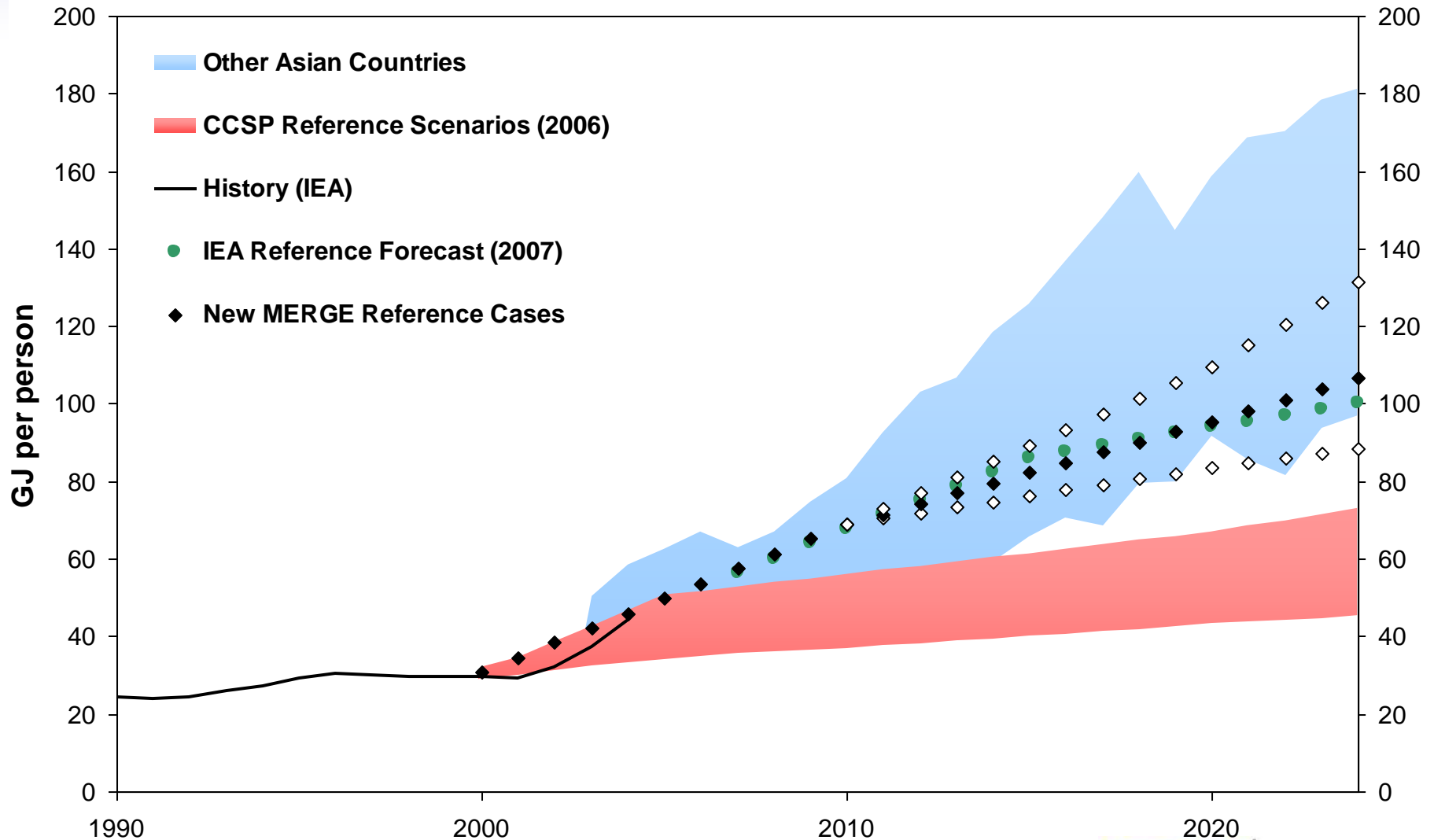
# Energy Intensity Projections for China



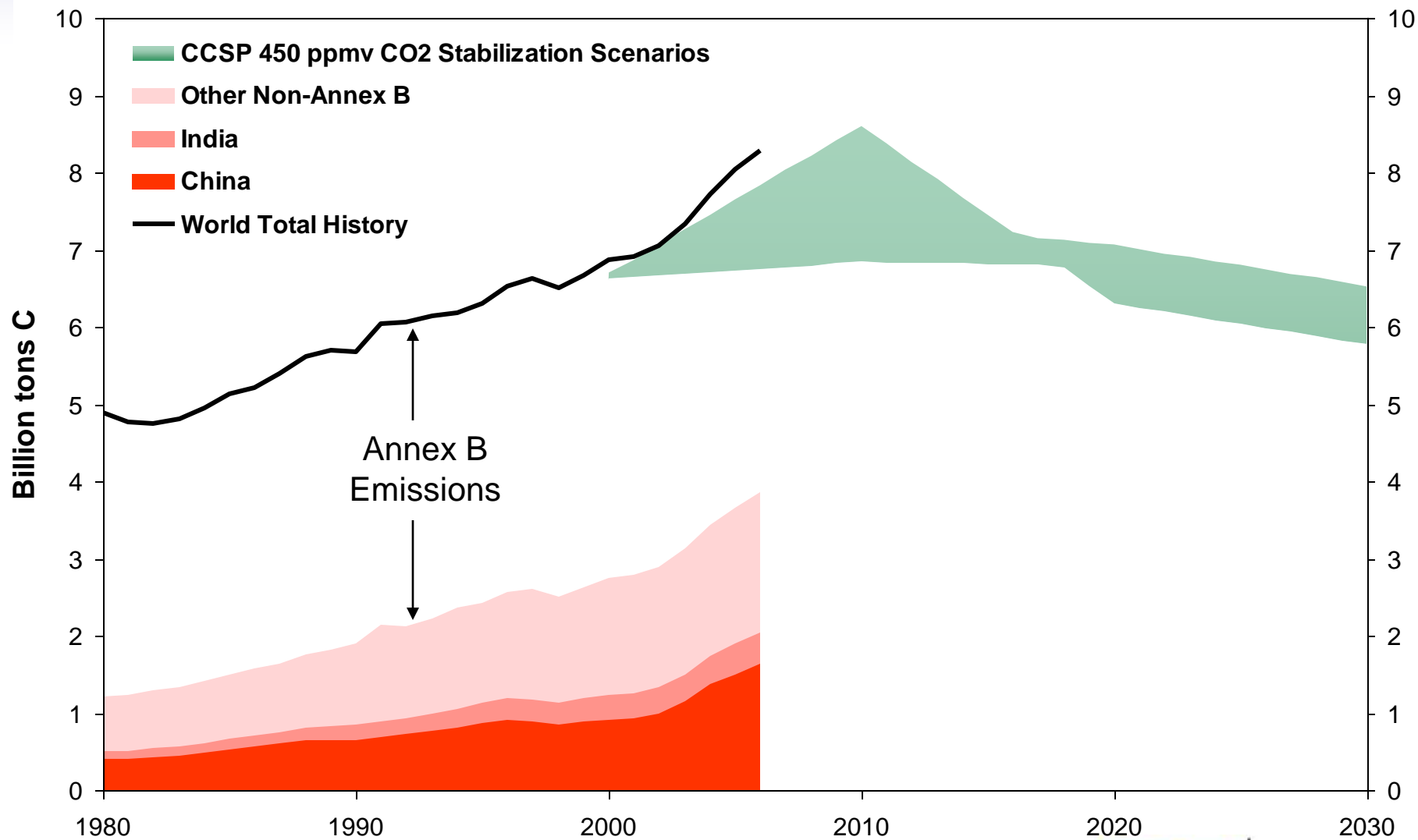
# Per Capita Energy Use Projections for China



# Per Capita Energy Use Projections for China

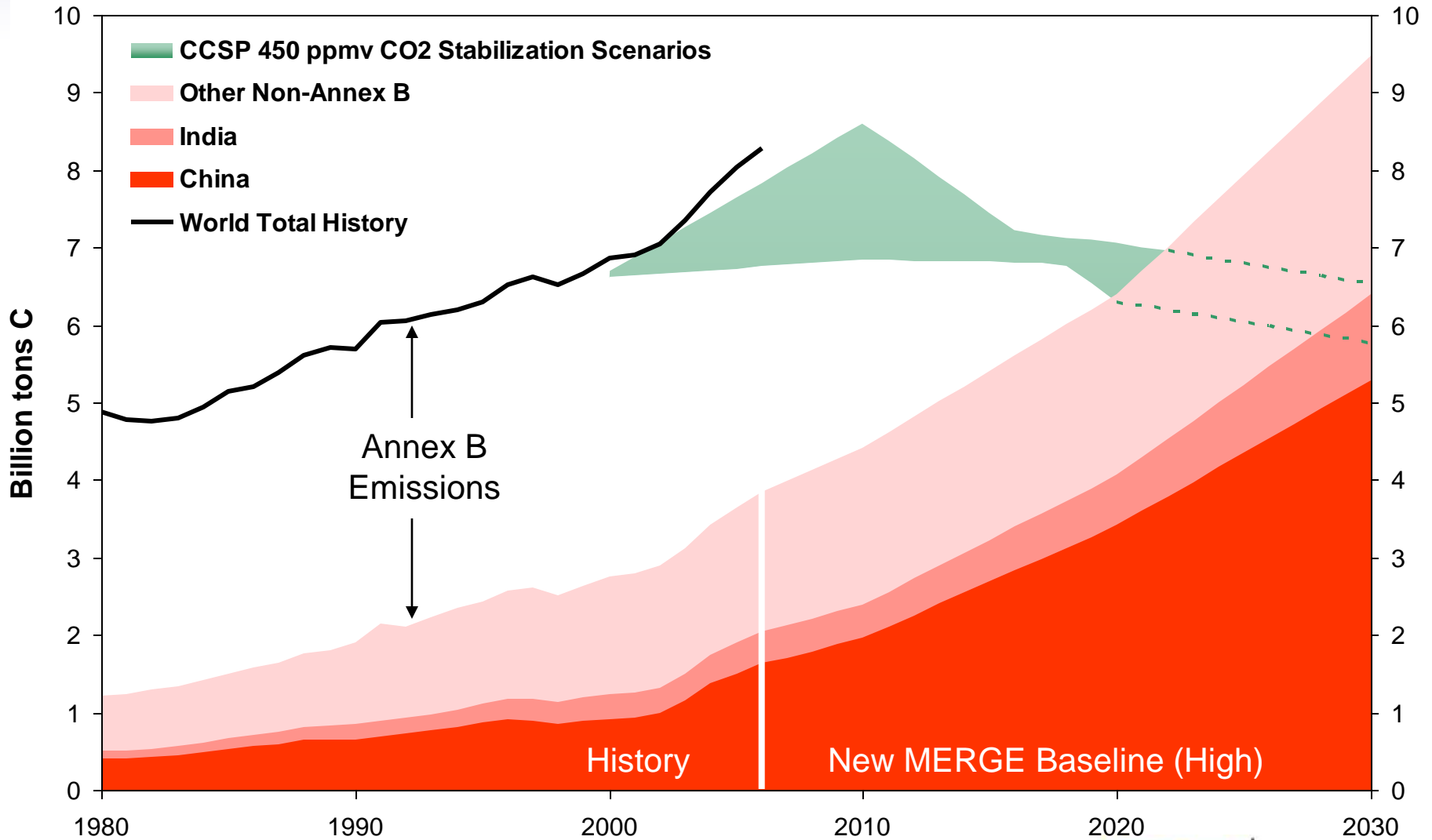


# Is 450 (CO<sub>2</sub> only) Feasible?

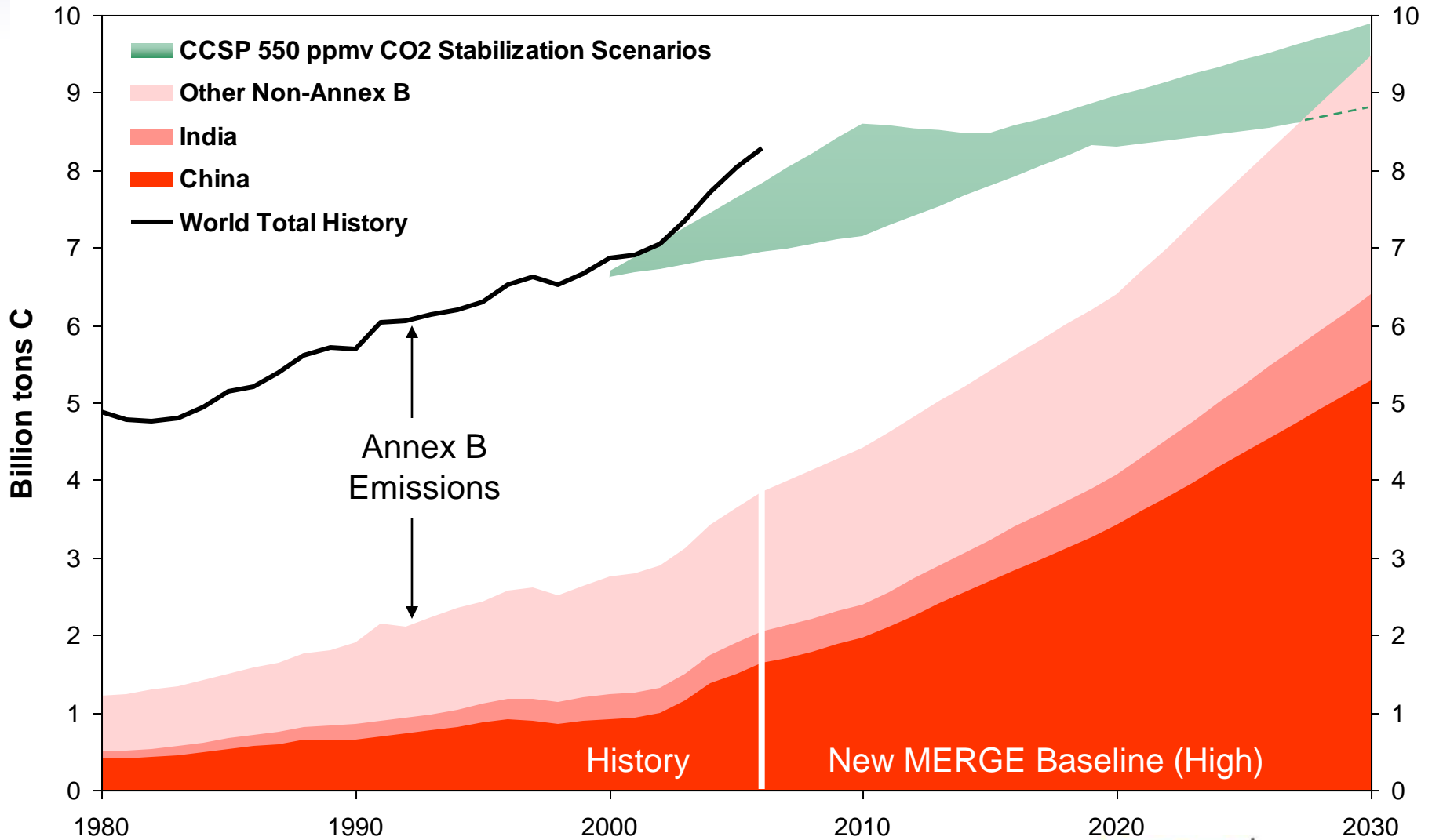




# Is 450 (CO<sub>2</sub> only) Feasible?



# Is 550 (CO<sub>2</sub> only) Feasible?



# Conclusions

- There is considerable uncertainty about future growth...
- ... but, the scenarios shown here are plausible, consistent with current observations and historical experience
- If developing countries continue to grow along this baseline path, aggressive stabilization targets quickly become impossible to meet (without overshoot)
- Annex B countries must find a way to engage China