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China's Carbon Emissions: Theirs or ours?

Jim Watson and Tao Wang

Yours, Mine, Ours—China's Carbon Emissions in an Interdependent World
Woodrow Wilson International Center for Scholars, Washington DC, 17th July 2008

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Overview

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1 Energy and emissions trends in China

2 Who owns China's emissions?

3 Analysing future emissions: Tyndall scenarios

4 Policy implications

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Recent trends in China

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- Primary energy demand growing rapidly, particularly since 2000
- Recent energy demand growth rate has been higher than economic growth rate of around 10% per year
- Power sector additions frequently surprise Chinese government: 110GW in 2006; 90GW in 2007. Mostly use coal.
- Sharp increases in oil demand & imports driven by growth of private transport
- IEA projects that China and India will account for 45% of global energy demand growth to 2030; 80% of increase in coal demand

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Recent trends in China
Carbon emissions

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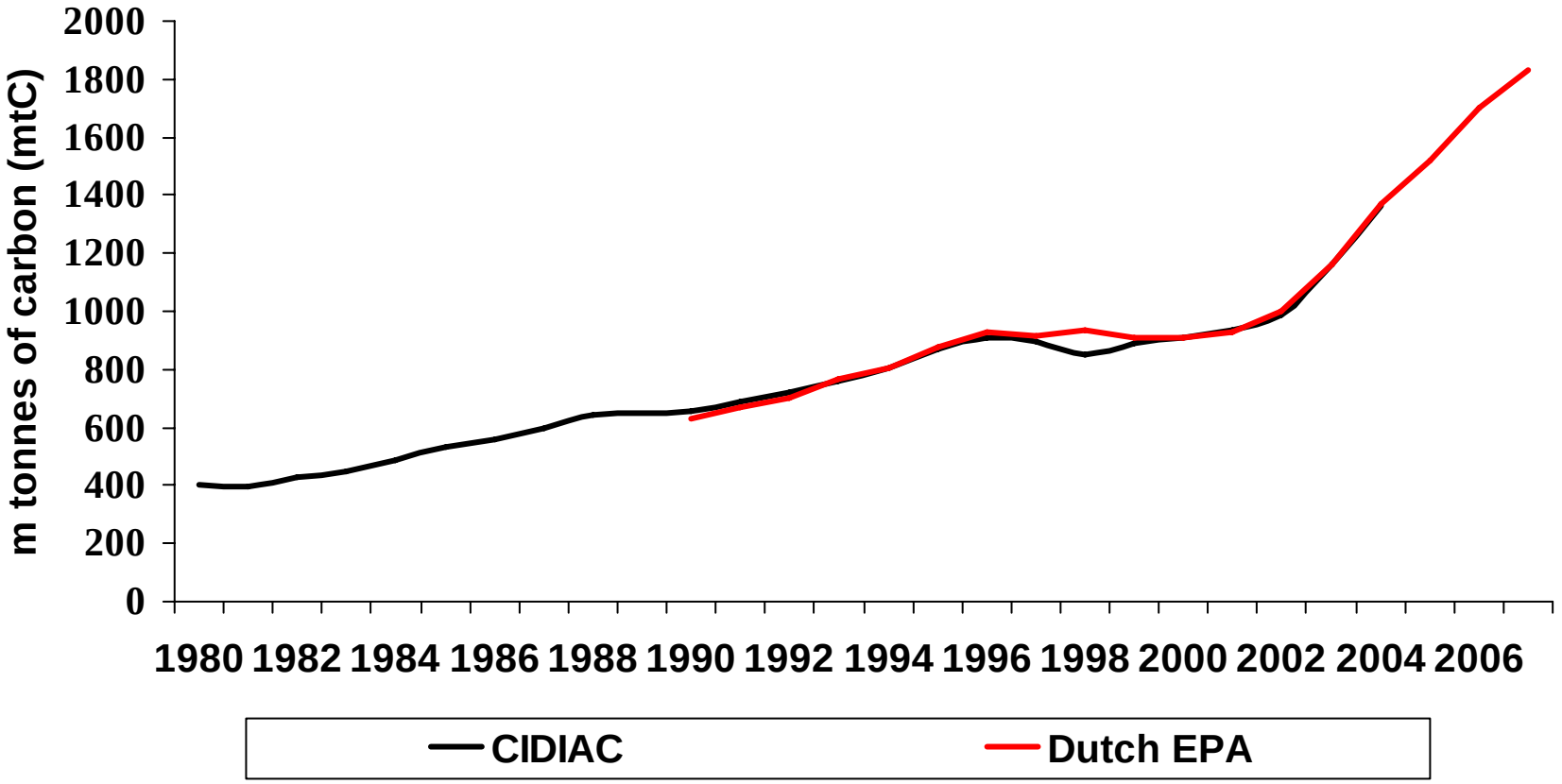

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National carbon emissions in 2007
Estimates (Dutch EPA)

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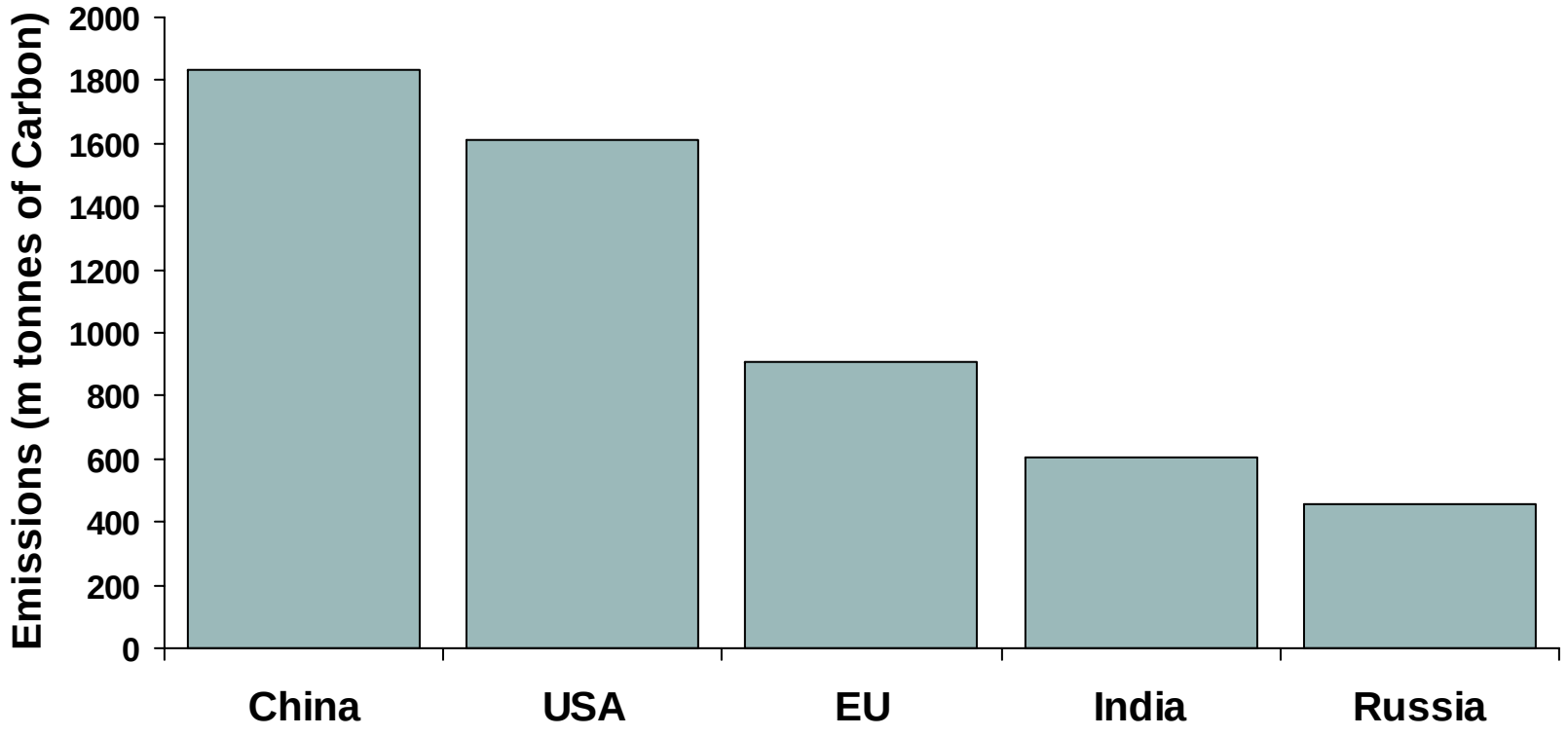

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Per capita emissions in 2007

Estimates (Dutch EPA)

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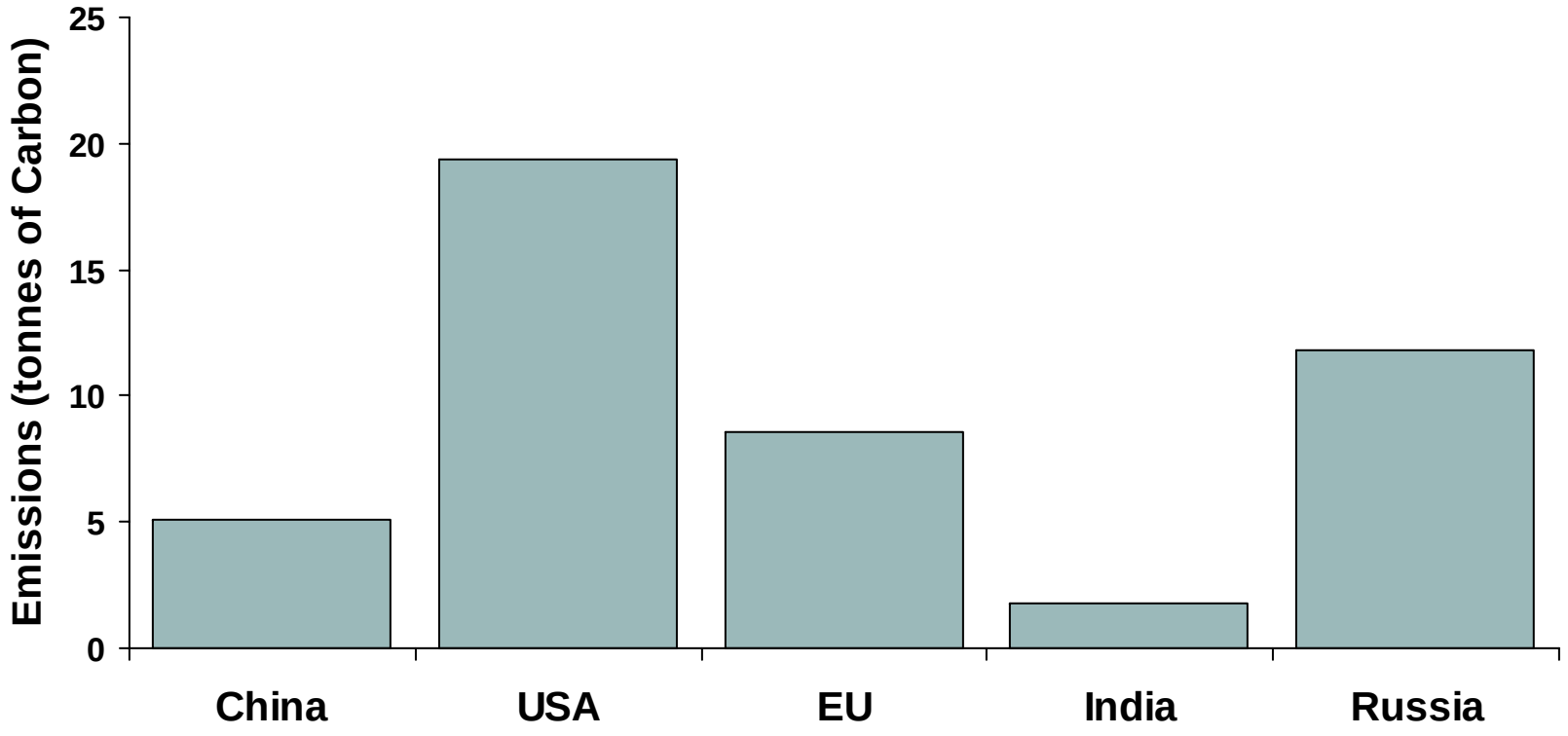

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China also faces serious climate change impacts

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- **Chinese studies project a range of impacts, e.g.**
  - Decreases in agricultural yields and increased costs of food production
  - Decreased run-off of rain water in northern China; increased run-off in Southern China. Adds to water imbalance that is already causing problems
  - Expected increases in storms; vulnerability of prosperous coastal zones (e.g. Shanghai) to small sea level rises
- **As a result, climate change taken increasingly seriously at national level – focus is reducing energy intensity**
- **Government has a climate change co-ordinating group and has produced a climate change strategy**

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Who owns China's emissions?

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The developed countries move a lot of manufacturing industry into China … A lot of the things you wear, you use, you eat are produced in China. On the one hand, you shall increase the production in China, on the other hand you criticize China on the emission reduction issue

Qin Gang, Chinese Foreign Ministry Spokesman, June 2007

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Who owns China's emissions?

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- China has emerged as a major trading economy – with a rapidly growing trade surplus with the developed world
- How much of China's carbon footprint is due to its exports?

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Who owns China's emissions?

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- **Headline results:**
  - Emissions from exports in 2004 :1490 million tonnes of CO_2
  - Emissions avoided due to imports: 381 million tonnes of CO_2
  - Combining these, **23%** of China's emissions due to net exports
- **Two reasons for this:**
  - Large, growing trade surplus: tripled between 2004 and 2005 to $102bn, rose again to $177 bn in 2006, and over $250bn in 2007
  - High carbon intensity of Chinese economy. In 2000, US intensity was 0.5 kg CO_2 per dollar of GDP; China's was 2.76kg per dollar
- **Result challenges production-based emissions accounting, but would a consumption-based approach be better?**

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Who owns China's emissions?

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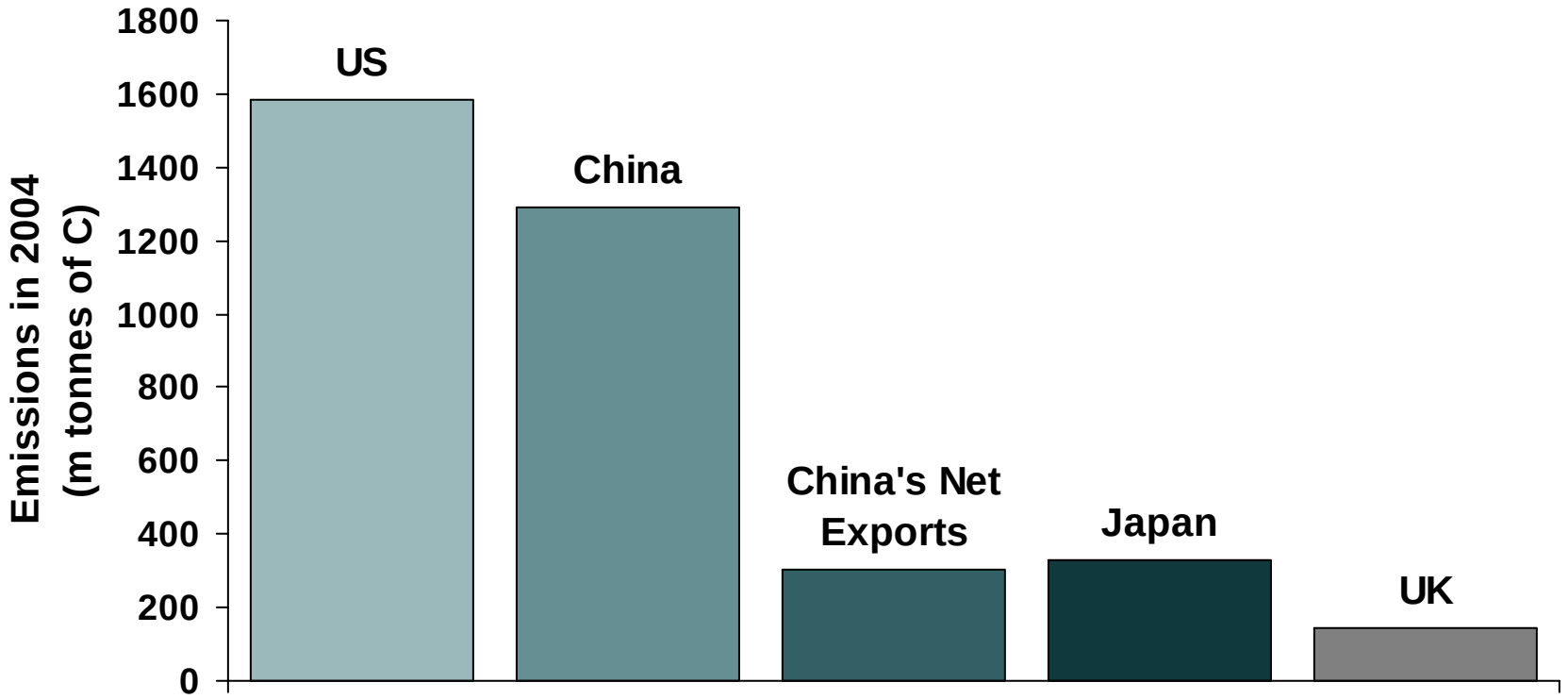

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Who owns China's emissions?

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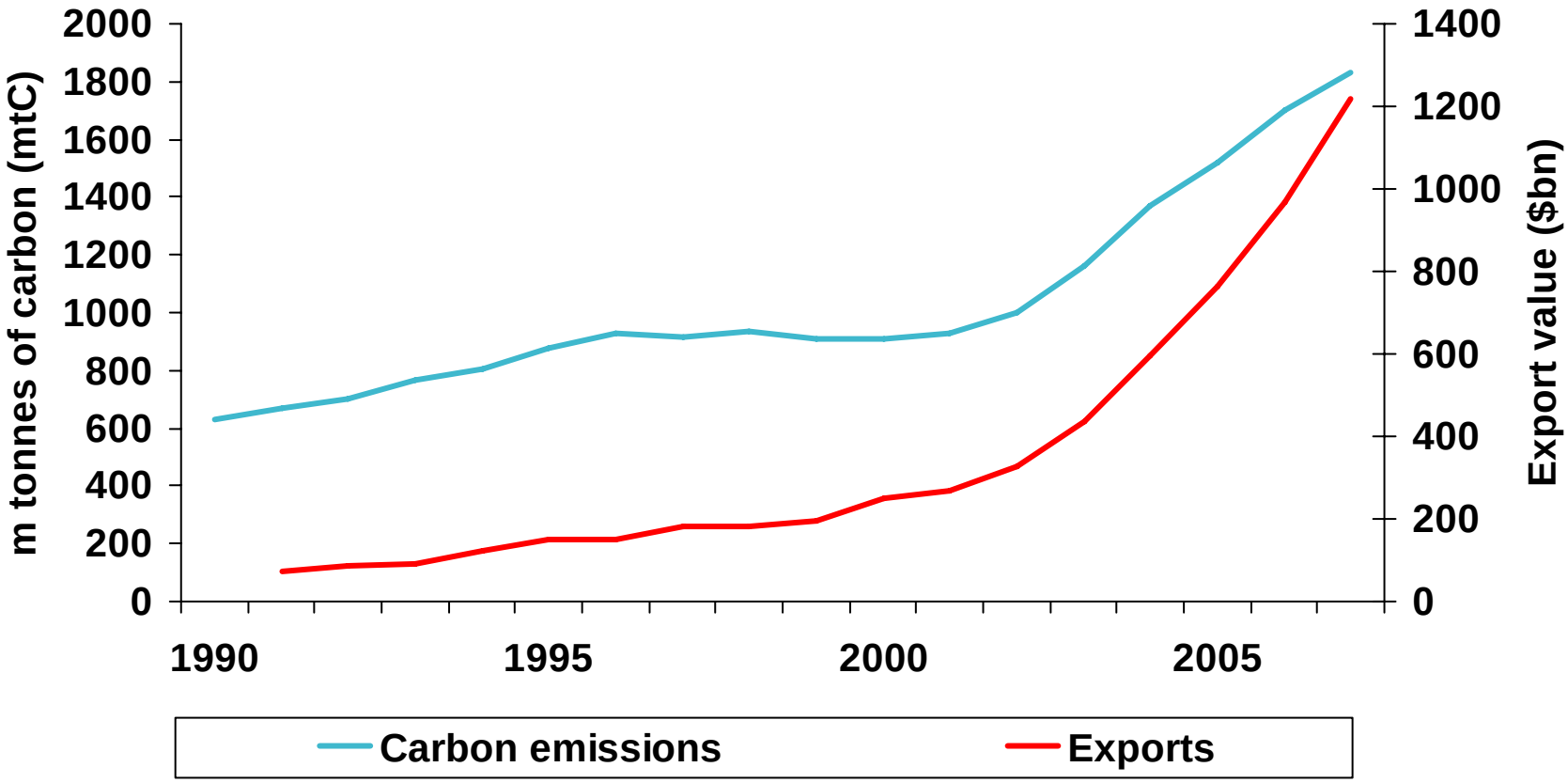

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Analysing future emissions
A carbon budget approach

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- There are a number of scenario methods to analyse future Chinese emissions – e.g. exploratory or more goal-driven
- We are using a **cumulative emissions** method so scenarios meet a specific target; used previously by Tyndall for the UK
- Tyndall's scenario tool enables us to quantify possible trends in different Chinese sectors (e.g. transport & households)
- Collaborating with organisations in the UK & China, including workshops in Beijing and London to discuss key features

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Analysing future emissions
A carbon budget approach

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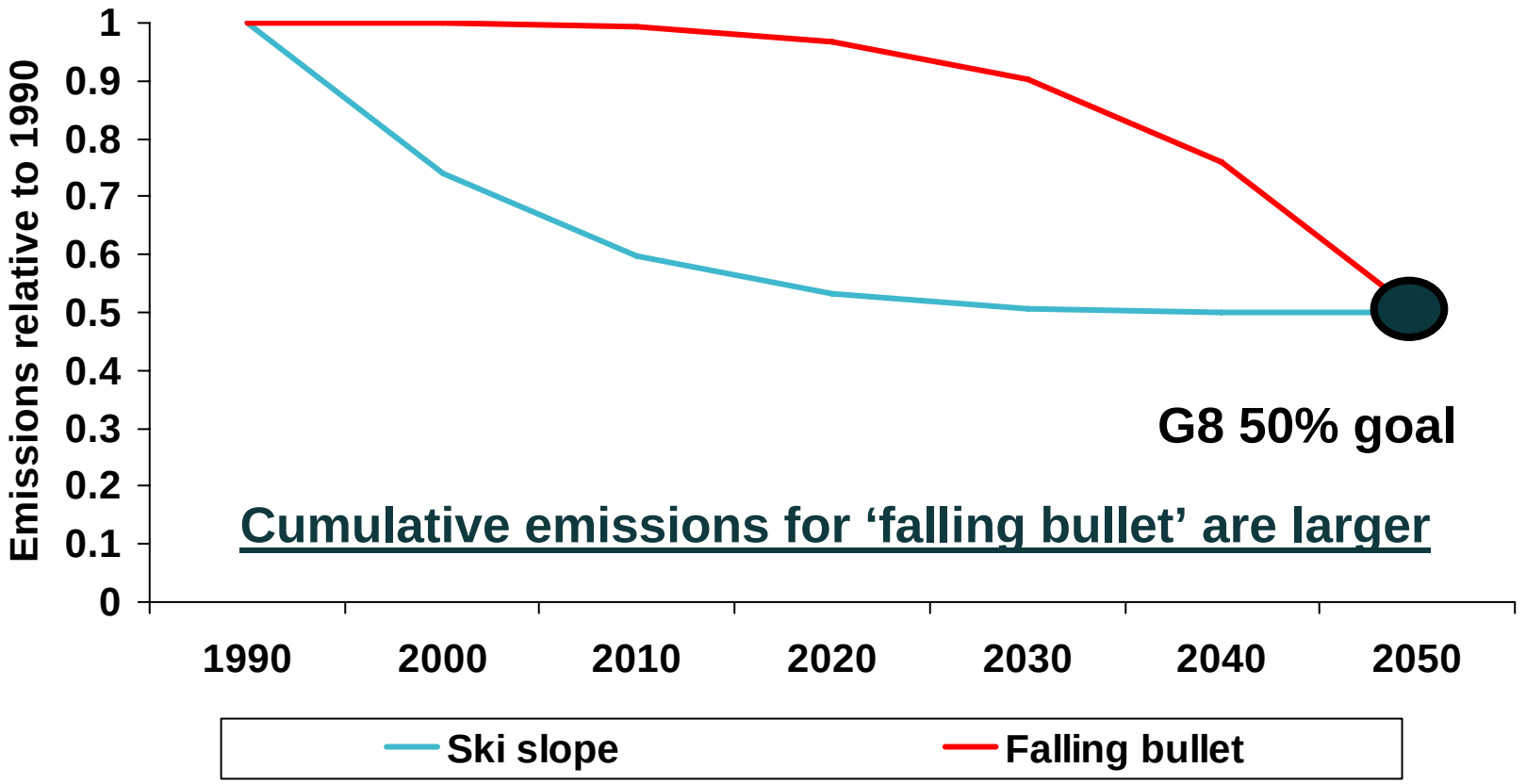

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Analysing future emissions
A carbon budget approach

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- **We have used IPCC Assessment Report 4 global budget**
  - **490GtC** for 21st century
  - Stabilise at 450 ppm CO_2
  - Likely range of 1.9-4.4°C temperature rise
- **Two different approaches to deciding China's cumulative emission budget for this period:**
  - Equal carbon emissions per capita (gives **70GtC**)
  - Equal carbon emissions intensity of GDP (gives **111GtC**)
- **We are using medium-term pathways from Chinese govt agency and IEA to connect these budgets to current policy analysis**

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Analysing future emissions
A carbon budget approach

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- **Critical issues for Chinese policy include change in industrial structure & innovation**
- **Challenge for China is 'rebalancing growth'**
  - Away from energy intensive investment …
  - Away from export-led growth …
  - … towards domestic consumption; value added; innovation
- **Our scenarios include this rebalancing at different speeds and to different extents**

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Analysing future emissions
Medium term pathways

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We will … promote the shift from the pattern of economic growth that relies mainly on investment and exports to one that relies on a balanced combination of consumption, investment and exports.

Haphazard investment and unneeded development projects in energy intensive and highly polluting industries and industries with excess production capacity will be resolutely stopped.

Wen Jiabao, March 2008

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Analysing future emissions
From medium to long-term

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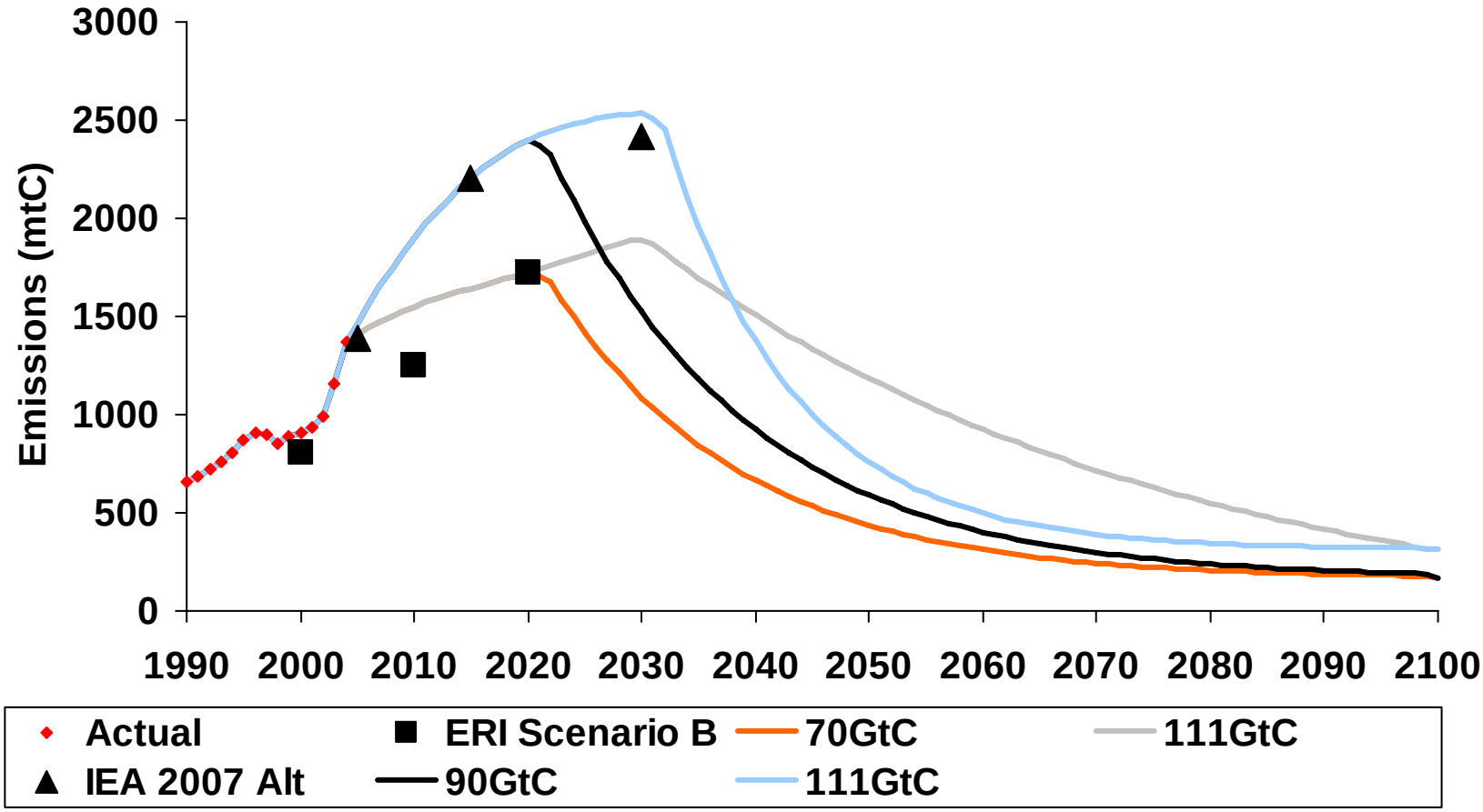

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Policy implications

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- **Extent of exported emissions from China calls into question traditional accounting of national emissions**
- **Alternative 'consumption based' emissions accounting is complex and contentious**
- **Could be used as a 'shadow measure' to inform policy responses:**
  - Reinforces need for industrialised countries to commit to binding emissions cuts and take the lead
  - Further rationale for technology transfer and low carbon finance for developing countries - crucial to global deal
  - Sectoral approaches where there are genuine competitiveness impacts – but these need to be tangible and enforceable

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Policy implications

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In case of need, I think we should also be ready to continue to give the energy intensive industries their [EU emissions trading scheme] allowances free of charge, or to require importers to obtain allowances alongside European competitors, as long as such a system is compatible with WTO requirements.

Jose Manuel Barroso, European Commission President, January 2008

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Policy implications

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- Our future scenarios emphasise importance of cumulative emissions – sometimes gets lost in reporting of science
- Early action and short to medium term policies required. Long term targets such as G8 agreement are not enough
- China analysis shows how challenging 450ppm CO_2 is. For some, this is too high. Reinforces need to adapt and mitigate

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