



# **China's Plan in Energy Efficiency Improvement Progress and Opportunities**

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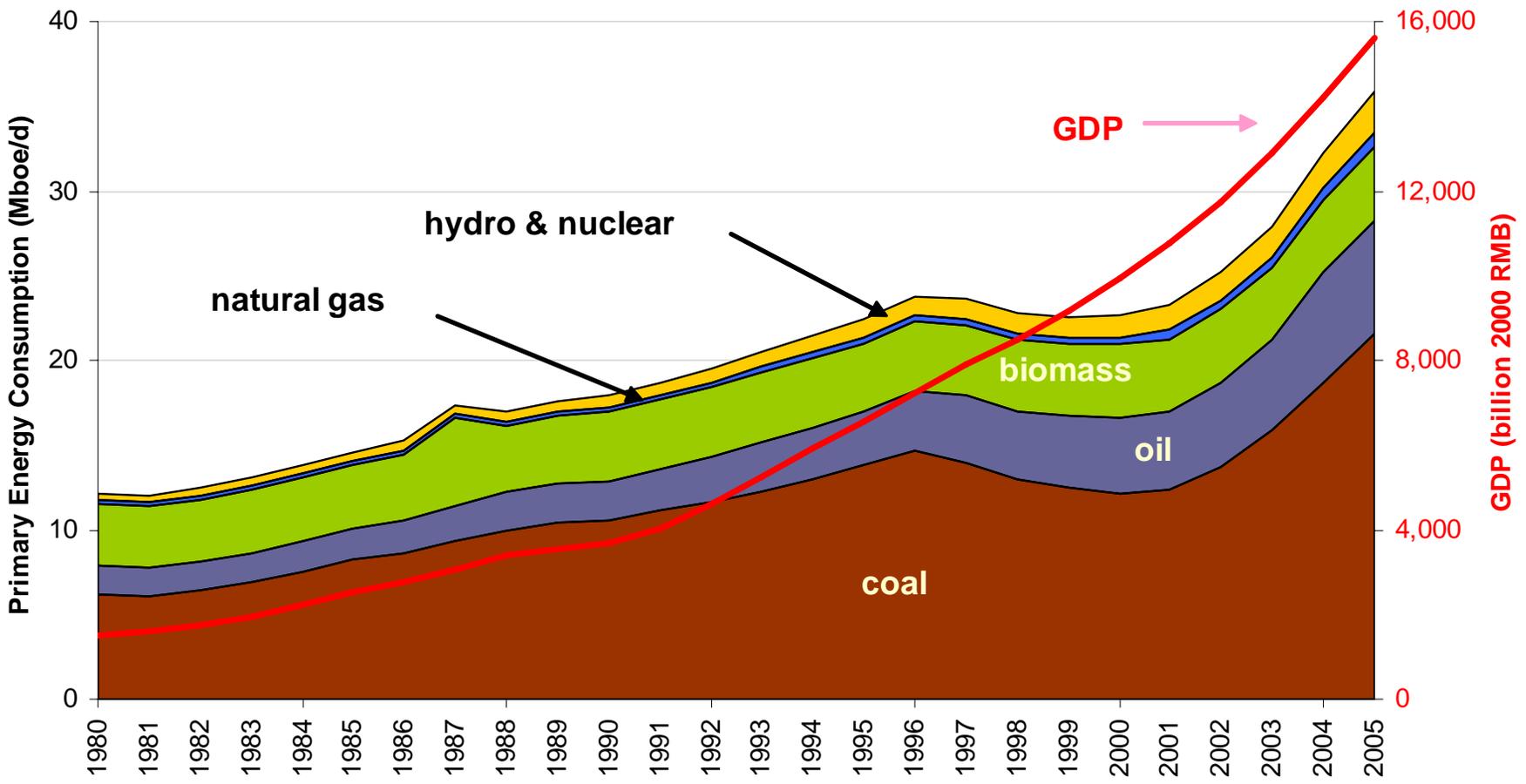
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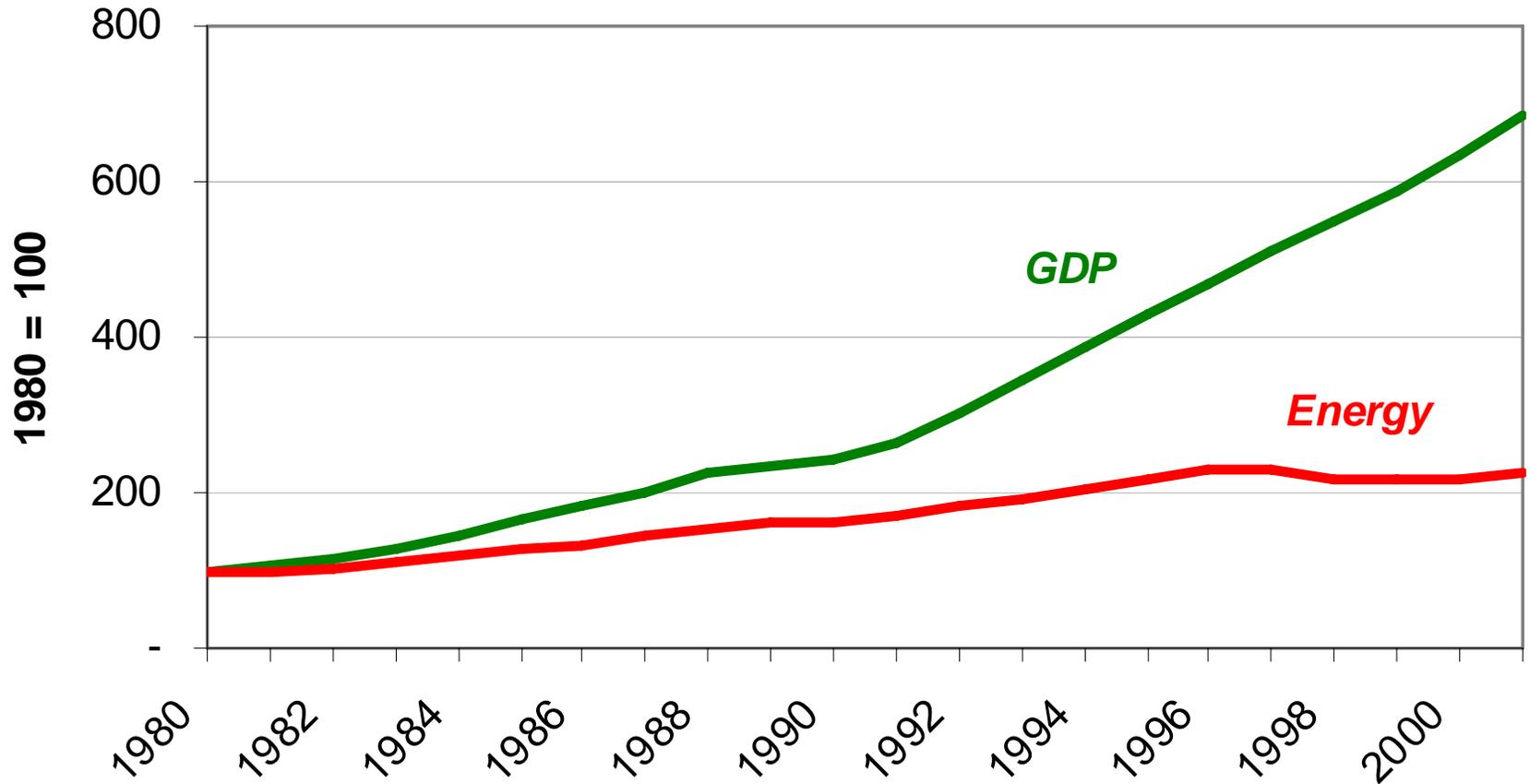
# Overview

- What is going on with energy consumption?
- What happened to energy intensity over the last decade?
- What can be done?
- Current energy efficiency policies and programs
- Bottom line is industry
- Remarks

# China's current energy picture looks in many ways like its past, but larger

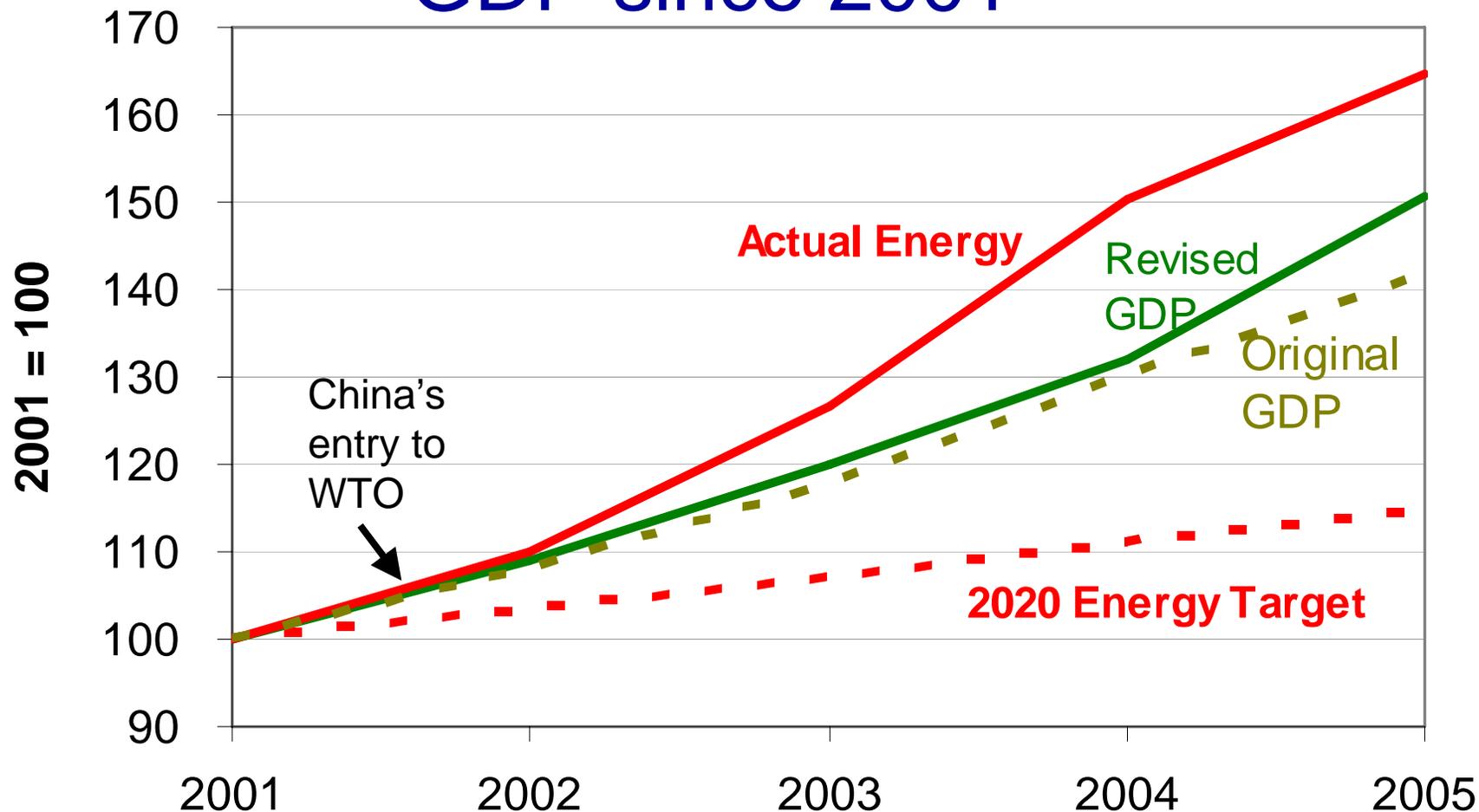


# For two decades, energy and GDP were decoupled



Source: NBS, China Statistical Yearbook, various years.

# Energy use has grown much faster than GDP since 2001



Source: NBS, China Statistical Yearbook, various years; China Statistical Abstract 2006.

# The Coal Boom in China

## *Boom in power plant construction*

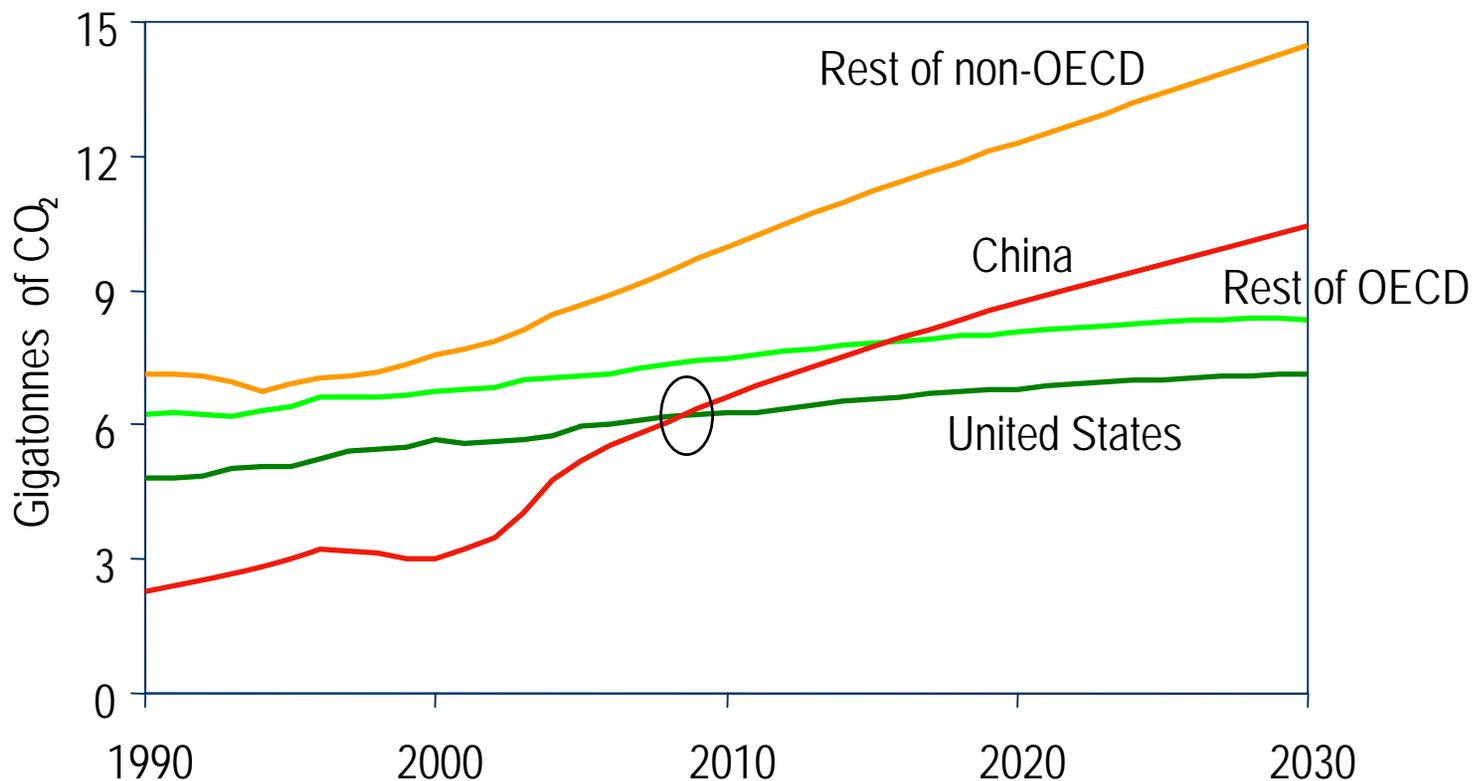
- **101 GW added in 2006, twice as much as California's generating capacity**
- **92 GW coal-fired**
- **589 million tons of CO<sub>2</sub>/year**



# Reference Scenario 参考情景

## Energy-Related CO<sub>2</sub> emissions by Region

不同地区和能源相关的二氧化碳排放

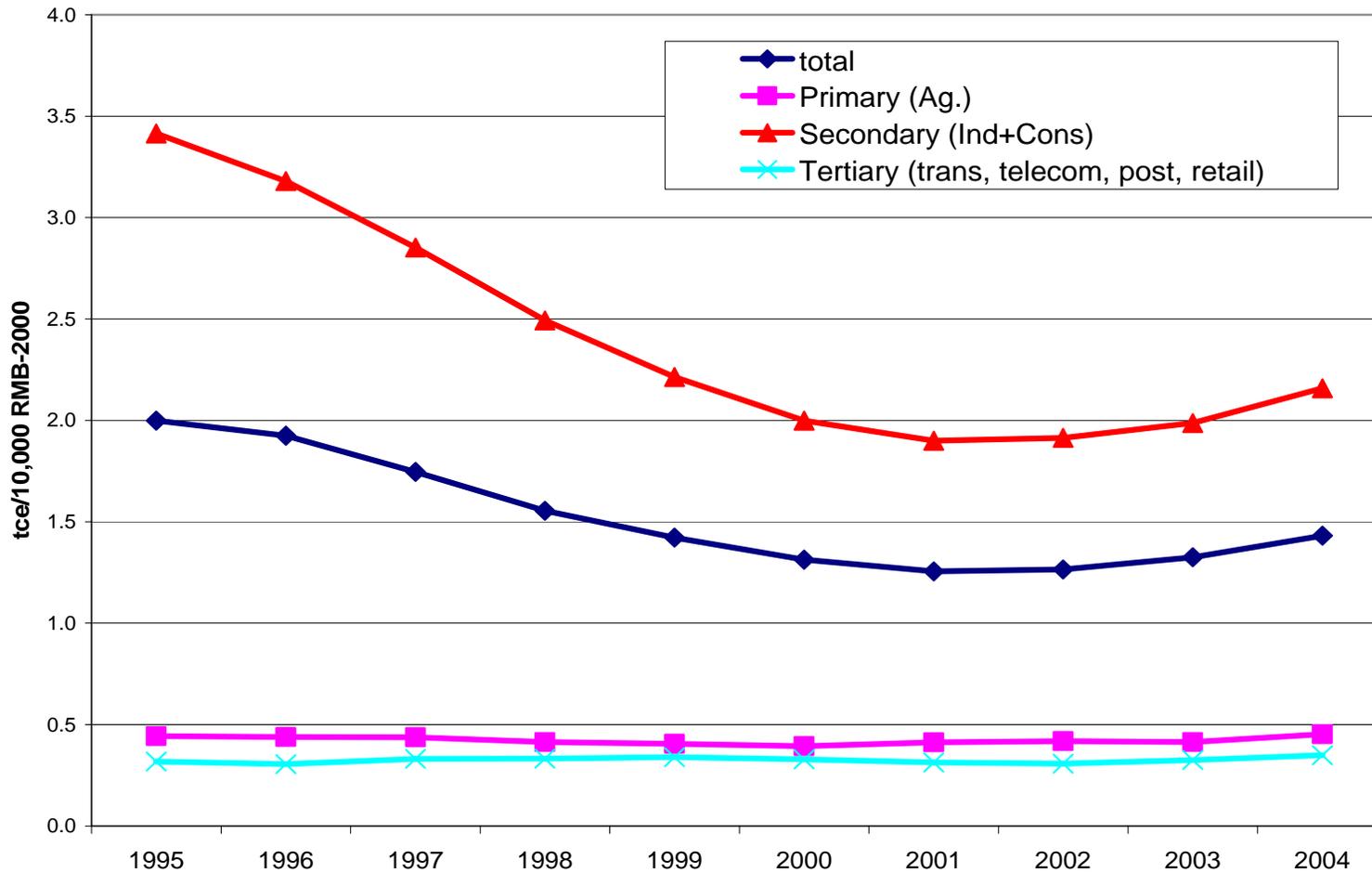


***China overtakes the US as the world's biggest emitter before 2010, though its per capita emissions reach just 60% of those of the OECD in 2030***

# China's 2010 Energy Savings Goals

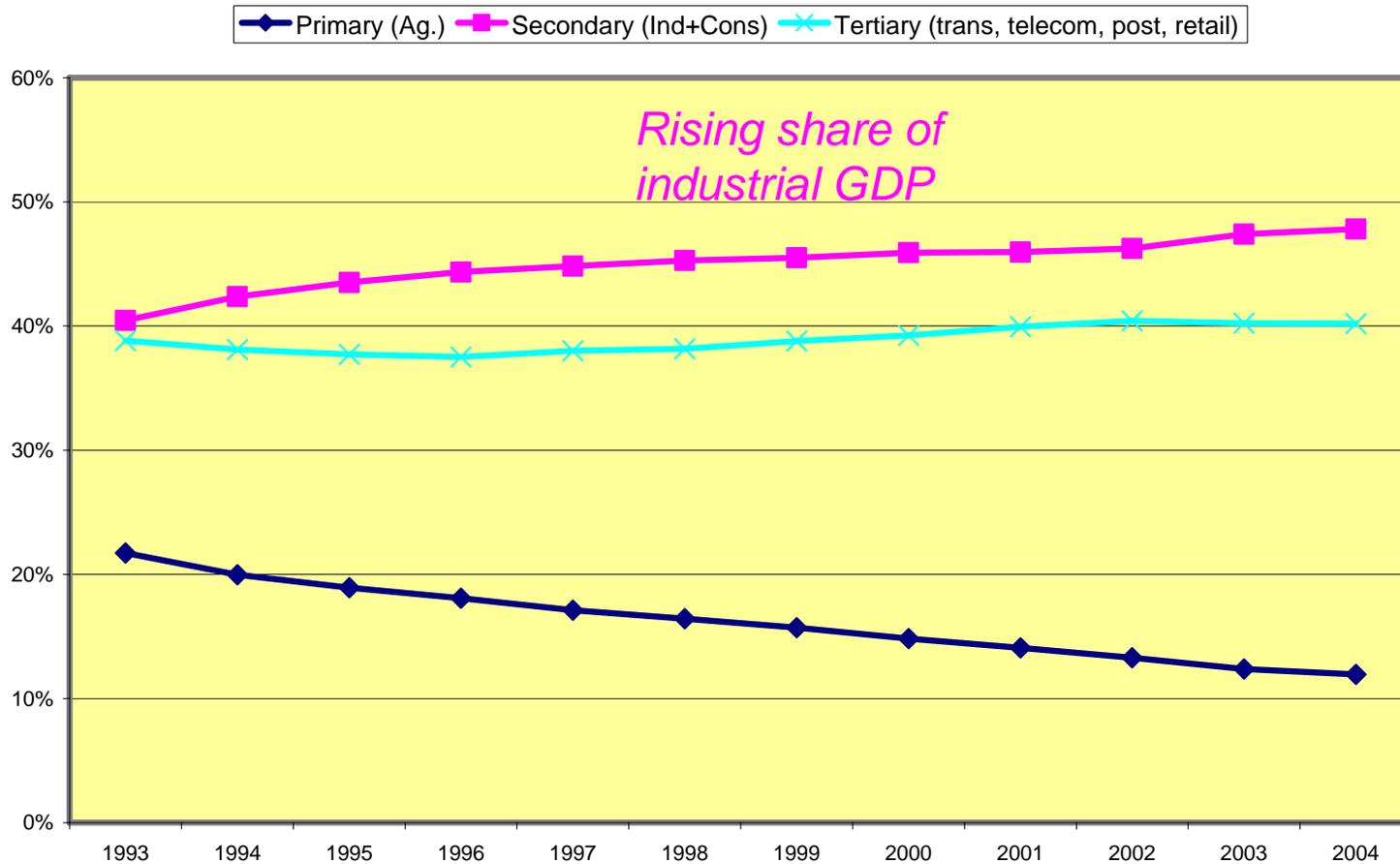
- October 2005 - China's 11th Five-Year Plan sets an ambitious target for energy efficiency improvement: Energy intensity of the country's GDP, expressed as energy consumption/GDP, should be reduced by 20% from 2005 to 2010
- Signals a major shift in China's strategic thinking about its long-term economic and energy development
- The energy intensity indicator – energy consumption/GDP – is considered a sustainable development indicator because it allows for growth while calling for improved energy efficiency

# Trends in Energy Intensity of GDP

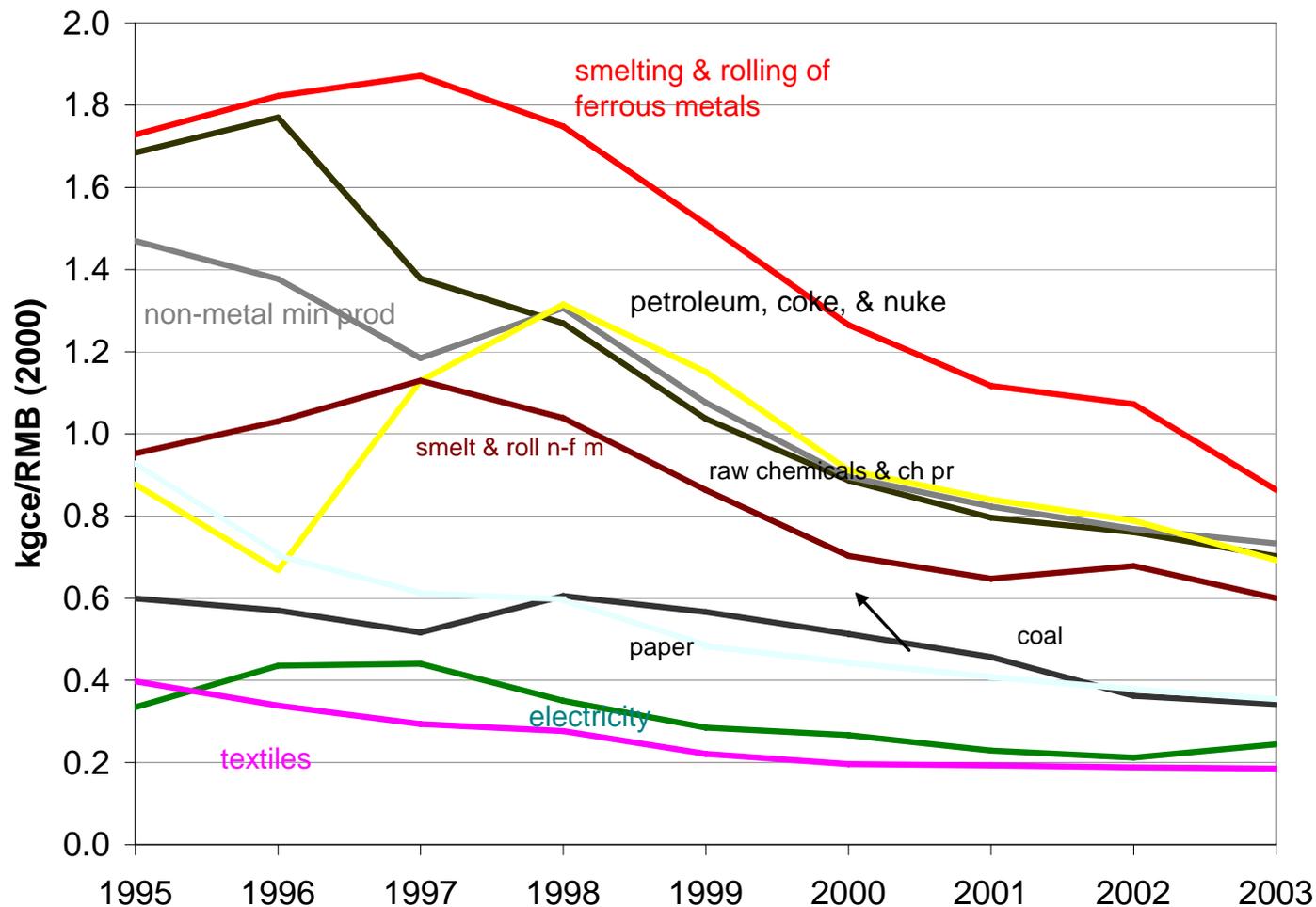


# “Heavy Industrialization”?

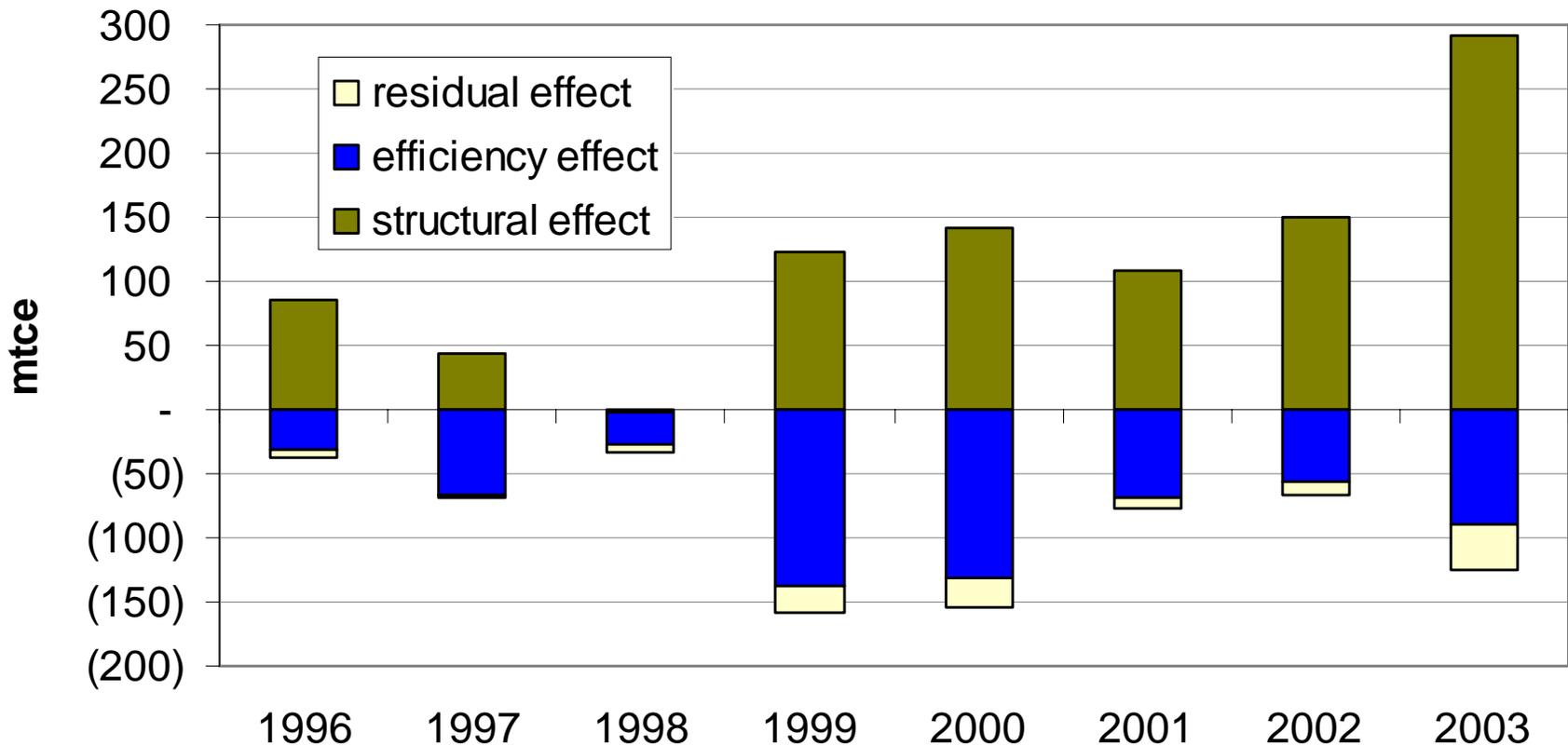
China's GDP Structure



# Energy intensities within industrial sub-sectors are actually declining



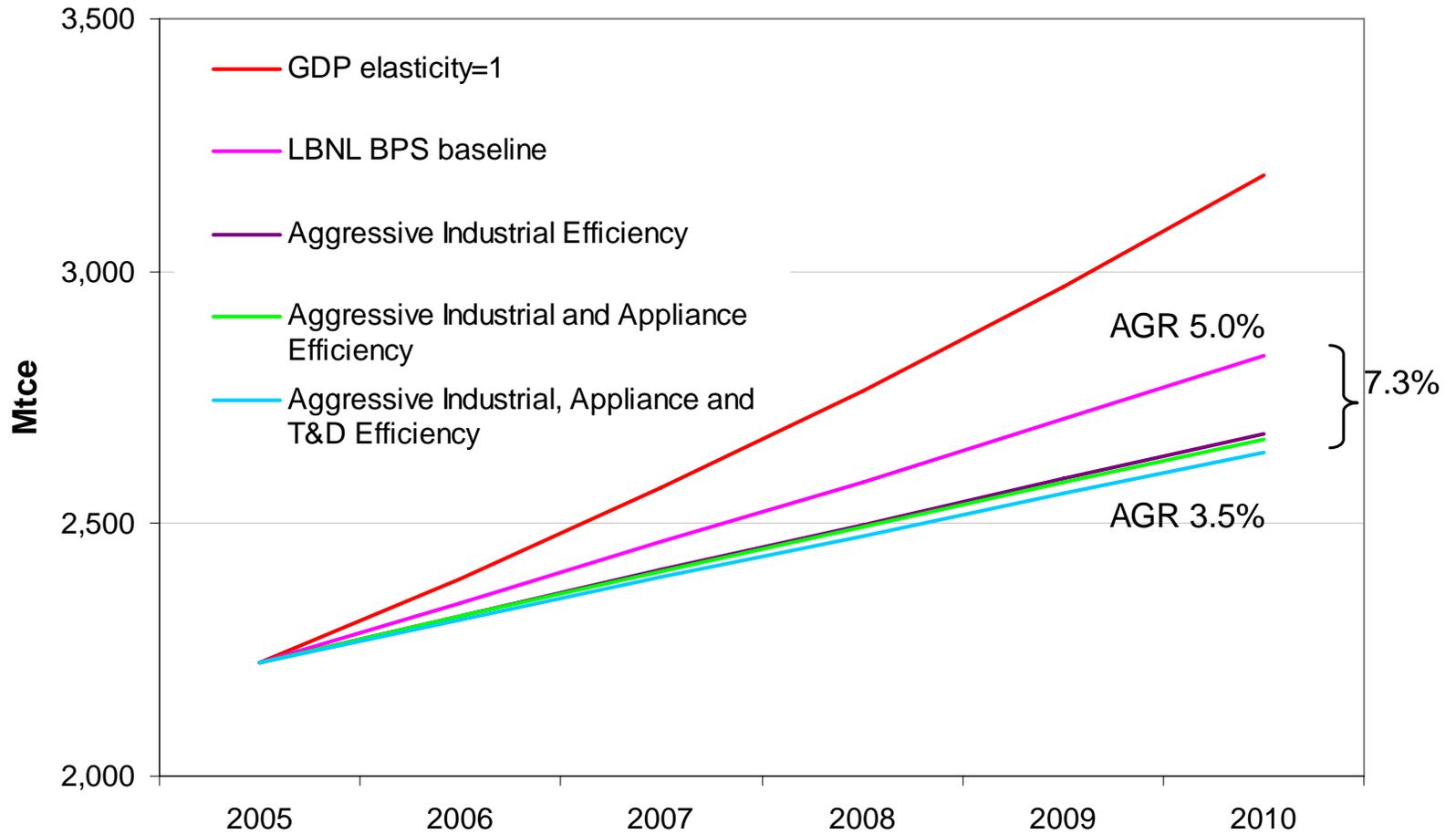
# *Changes in the relative output of industrial sub-sectors are driving overall intensity higher*



## ***Summary: what happened to energy intensity***

1. The largest factor in intensity growth is due to rapid growth in heavy industries (Iron and Steel, Chemicals, Cement)
2. The second largest factor is the overall growth of industries, relative to services and agriculture
3. Thirdly, this is partially offset by continuing energy efficiency gains
  - However, since 2001 efficiency gains alone have not been nearly sufficient

# LBNL Energy Consumption Scenarios

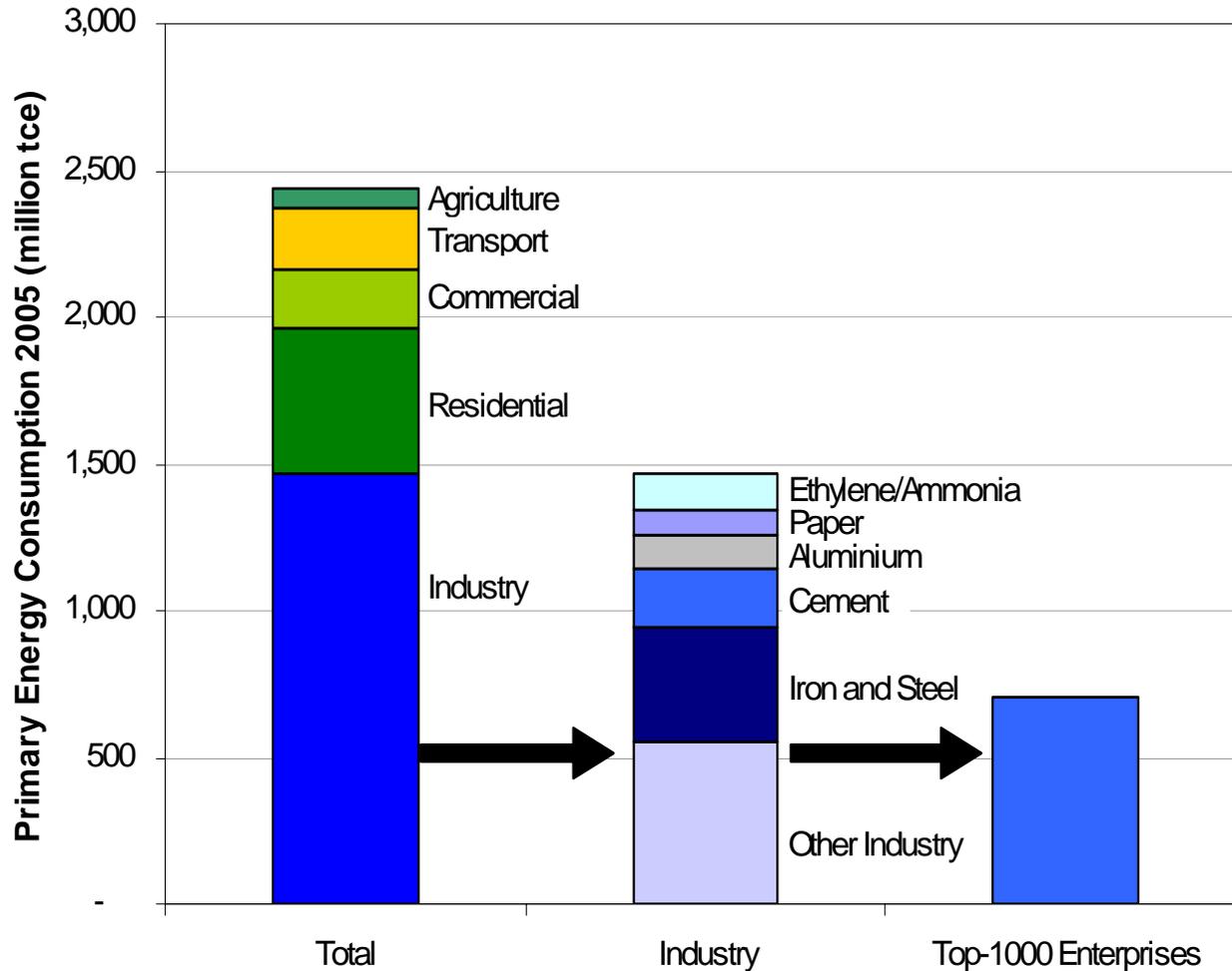


# Top-1000 Energy-Consuming Enterprise Program

- Launched by China's central government in April 2006 in support of the 2010 energy/GDP reduction target
- Goal is to improve industrial energy efficiency by targeting China's 1000 highest energy-consuming enterprises
- On July 27, 2006, Premier Wen Jiabao kicked off the program
  - Signed energy-saving agreements with 15 of China's largest enterprises
  - Announced a new National Energy Conservation Center
- Energy-saving agreements were signed with remaining enterprises during the summer of 2006



# Top-1000 Enterprises Represent a Significant Share of China's Energy Use



*30% of total energy consumption*

*48% of industrial energy consumption*

# Top-1000 Energy-Consuming Enterprise Program

- Top-1000 enterprises are from nine sectors:
  - Iron and steel
  - Petroleum and petrochemicals
  - Chemicals
  - Electric power
  - Non-ferrous metals
  - Coal mining
  - Construction materials
  - Textiles
  - Paper
- Estimated 2004 final energy use was 673 Mtce (18.7 Quads)
- Energy reduction goal for these enterprises after five years is 100 Mtce (2.8 Quads)



# Top-1000 Program - Players



- National Development and Reform Commission (lead agency)
  - Office of the National Energy Leading Group
  - National Bureau of Statistics
  - State Owned Assets Supervision and Administration Commission
  - General Administration of Quality Supervision, Inspection and Quarantine
  - Provincial DRCs (or Economic and Trade Commissions)
  - Industrial Associations
  - Enterprises in the iron/steel, non-ferrous metal, chemicals, petroleum/petrochemicals, construction materials, textiles, paper, coal mining, and power industries
-

# 22 and more mandatory equipment efficiency standards

## Minimum Efficiency Standards

	1990	1999	2000	2001	2002	2003	2004	2005	2006
Domestic refrigerators/freezers*	◆	◆				◆			
Room air conditioners*	◆		◆					◆	
Clothes washers	◆					◆			
Electric irons	◆								
Automatic rice cookers	◆								
Televisions	◆								◆
Radio receivers and recorders	◆								
Electric fans	◆								
Fluorescent lamp ballasts			◆						
Small electric motors						◆			○
Compact fluorescent lamps						◆			
Linear fluorescent lamps						◆			
HPS lamps							◆		
HPS lamp ballasts							◆		
Instantaneous gas water Heaters									○
External power supplies									○
Commercial packaged AC								◆	

# Voluntary energy efficiency labeling has expanded the coverage to over 40 products

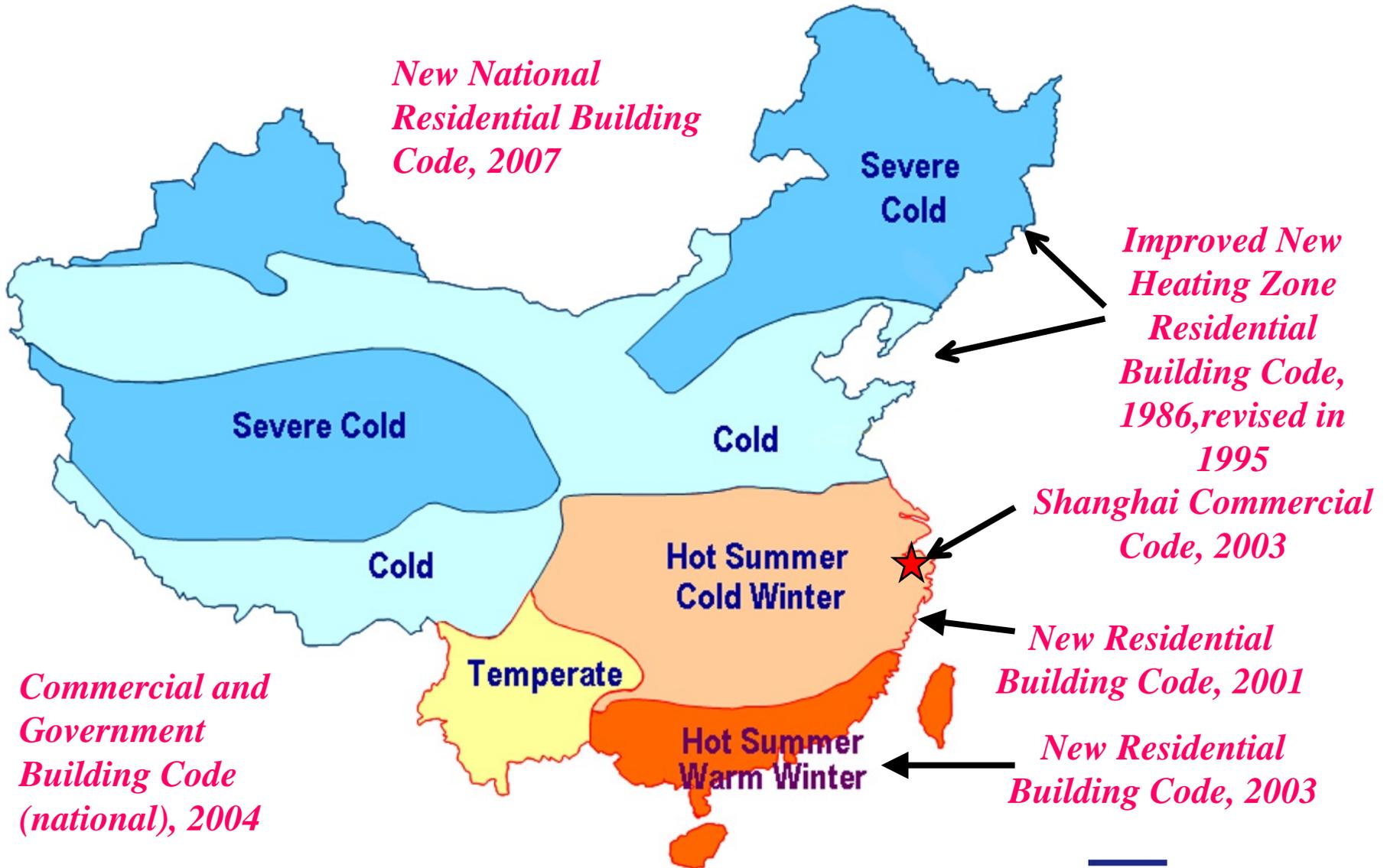
## Endorsement Labeling

	1990	1993	1999	2000	2001	2002	2003	2004	2005	2006
Domestic refrigerators/freezers*			◆				◆			
Room air conditioners*				◆					◆	
Fluorescent lamp ballasts				◆						
Automatic rice cookers					◆					
Hot water bottle					◆					
Small electric motors					◆					
Microwave ovens					◆					
Electric water heaters					◆					
Televisions						◆				◆
Compact Fluorescent lamps							◆			
Linear Fluorescent lamps							◆			
Clothes washers							◆			
Printers							◆			
Computers								◆		
Monitors								◆		
Fax machines								◆		
DVD players								◆		
Copiers								◆		
External power supplies									◆	
Set-Top-Box										◆

◆ Implementation of standard/label or of standard/label revision  
○ Currently under revision, development, or awaiting implementation



# Buildings: New Building Codes



# Government Procurement

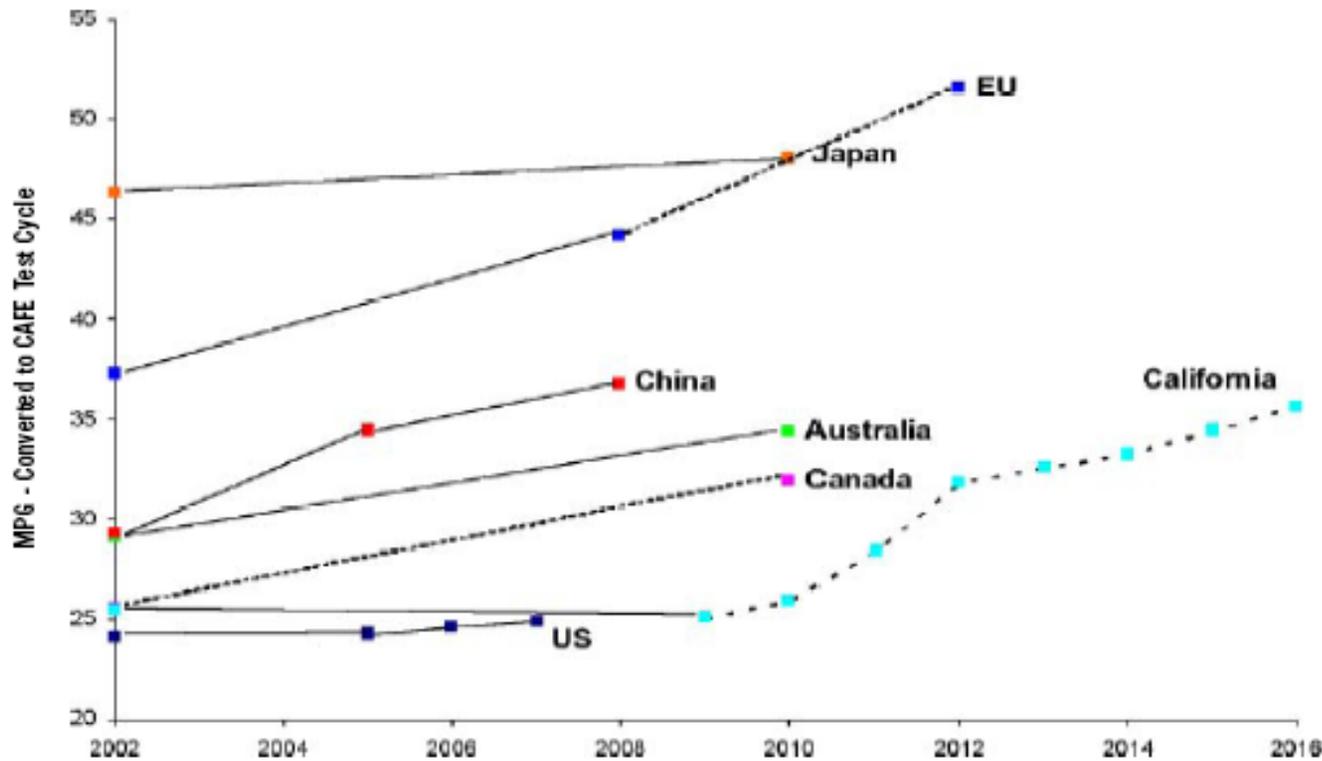
- The program was first launched at central government organs in Beijing and the provincial capitals; in 2006 it was extended to other provincial cities; and in 2007 it will be expanded nationwide. In 2006, the catalog of products subject to mandatory procurement was expanded to 19 in total.
- The first round of products covered include:
  - refrigerators
  - room AC
  - computers
  - printers
  - televisions
  - double-capped fluorescents
  - CFLs
  - toilets
  - faucets.

# Fuel Economy Standards

- *Fuel Consumption Limits for Passenger* in 2004, in which it sets the fuel consumption limit for passenger vehicles.
- The limits are divided into 16 categories based on vehicle weight, and are subjected to two phases of enforcement.
- For newly certified vehicle model, Phase 1 starts on July 1, 2005, and the second Phase 2 takes effects on January 1, 2008.
- For continued vehicle model, the Phase 1 starts on July 1, 2006, and Phase 2 will take effect on January 1, 2009.

# China's fuel economy standards are much stringent than those in U.S.

Comparison of fuel economy and GHG emission standards normalized by CAFE-converted mpg

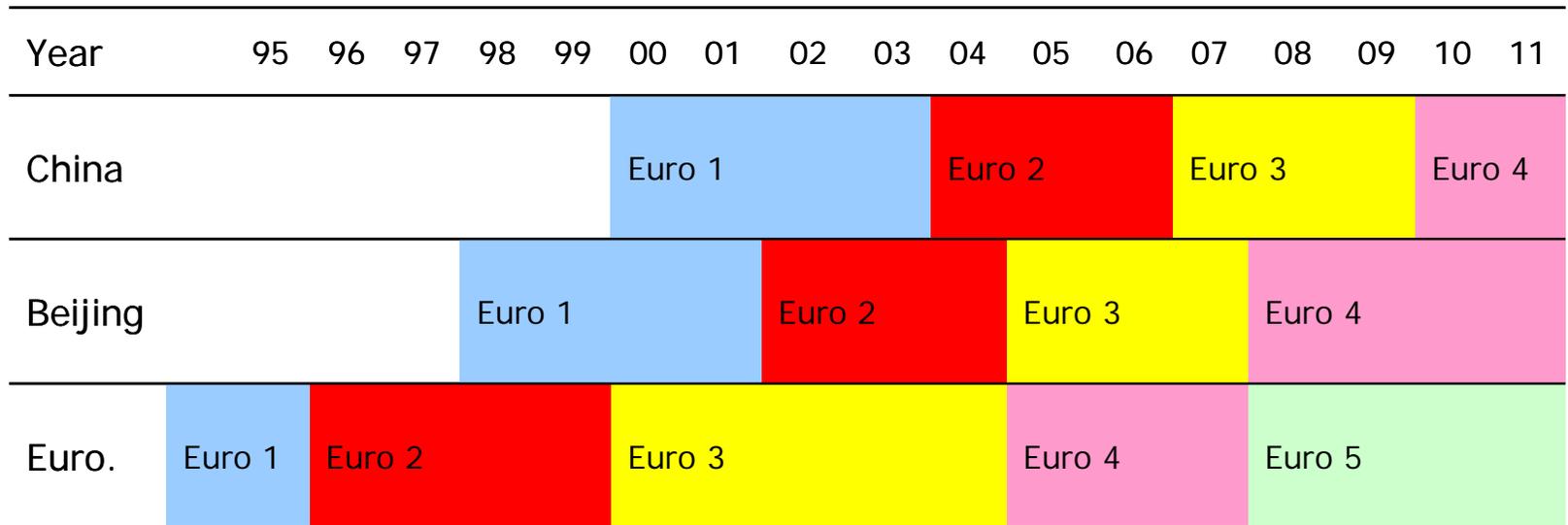


Notes: (1) dotted lines denote proposed standards

(2) MPG = miles per gallon

Source: An, 2004

# Vehicle Emission Standards



Source: He Kebin, Tsinghua University

- China will start to implement the national phase III (equivalent to Euro III standards) auto vehicle emission standards in 2007. The Euro IV emission requirements will be implemented starting July 1, 2010.**

# Ten key projects

- Coal-fired industrial boiler renovation
- District CHP (Combined Heat and Power) project
- Waste heat and pressure utilization
- Oil conservation and substitution
- Motor systems energy conservation
- Energy systems optimization
- Building energy conservation
- Green lighting
- Energy conservation in governmental agencies (procurement)
- Energy conservation monitoring and technical service system

# Other New Policies and Programs

- **Revision of Energy Conservation Law** (under review)
- **China Renewable Energy Law** (effective on 1 January 2006)
- **The Formulation of Energy Law** (to be completed by the end of 2007)
- **Establishment of National Energy Conservation Center** (timeline unclear)
- **Building Energy Conservation Regulation Ordinance** (under review, will be taken effect by the end of 2007)

# Remarks

- The Chinese government is seriously taking steps to improve its energy efficiency, and made strong commitment in achieving the targets.
- It is the important for U.S. government and companies to contribute in these areas and help China to achieve their goals.
- Such involvement will not only result in tremendous environmental and energy sector benefits to China and the world, but also enormous opportunity for US suppliers of energy efficient products and technologies.

# For Further Information

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