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China's Initiatives for Sustainable Energy and Low Carbon Development

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Outlines

- The context of China's sustainable energy and low carbon development
- Low carbon development initiatives during the 11th FYP (2006-2010)
- New development in China's Sustainable energy and low carbon development
- Concluding remarks

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The Context of China's Sustainable Energy and Low Carbon Development

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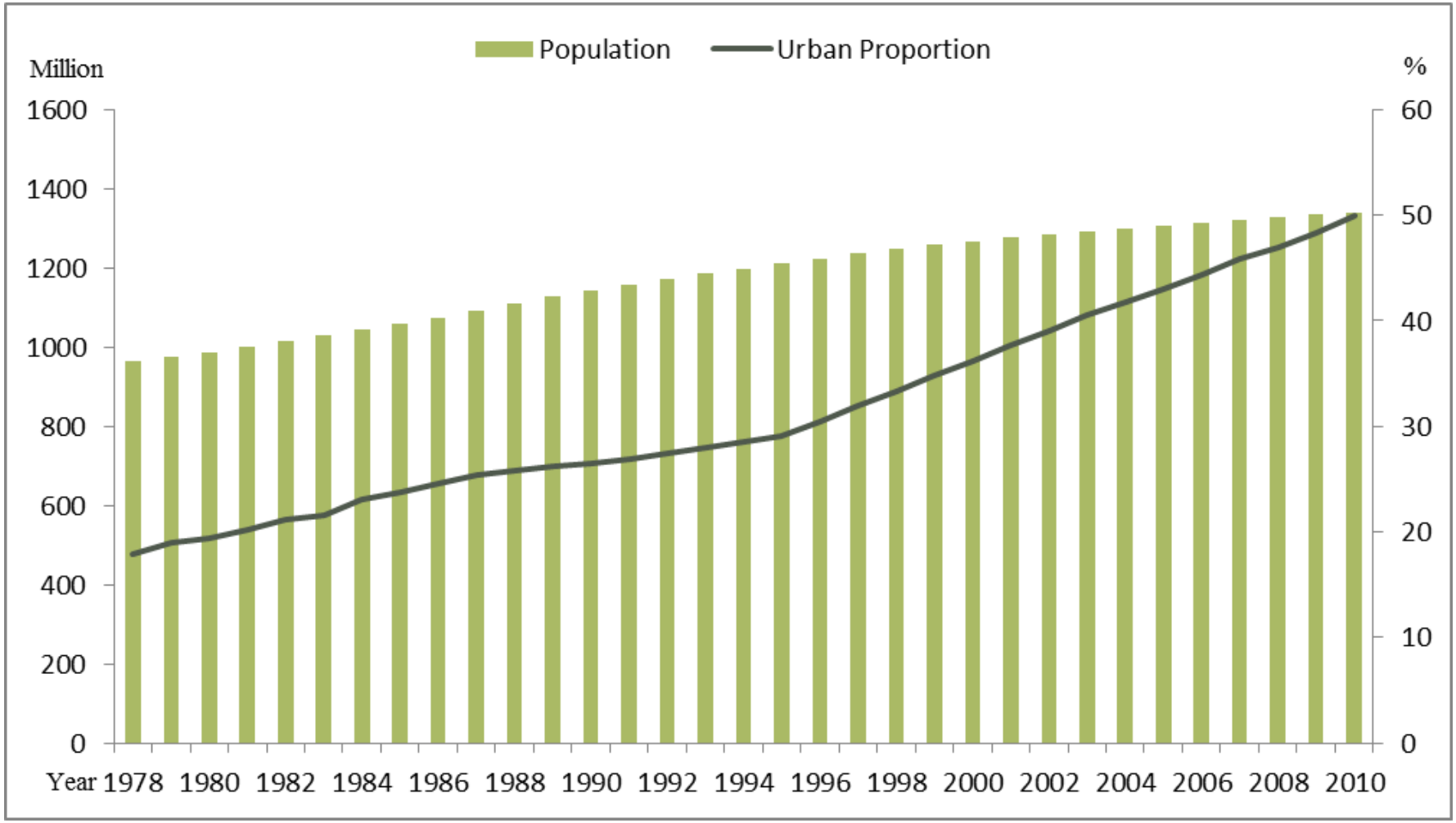
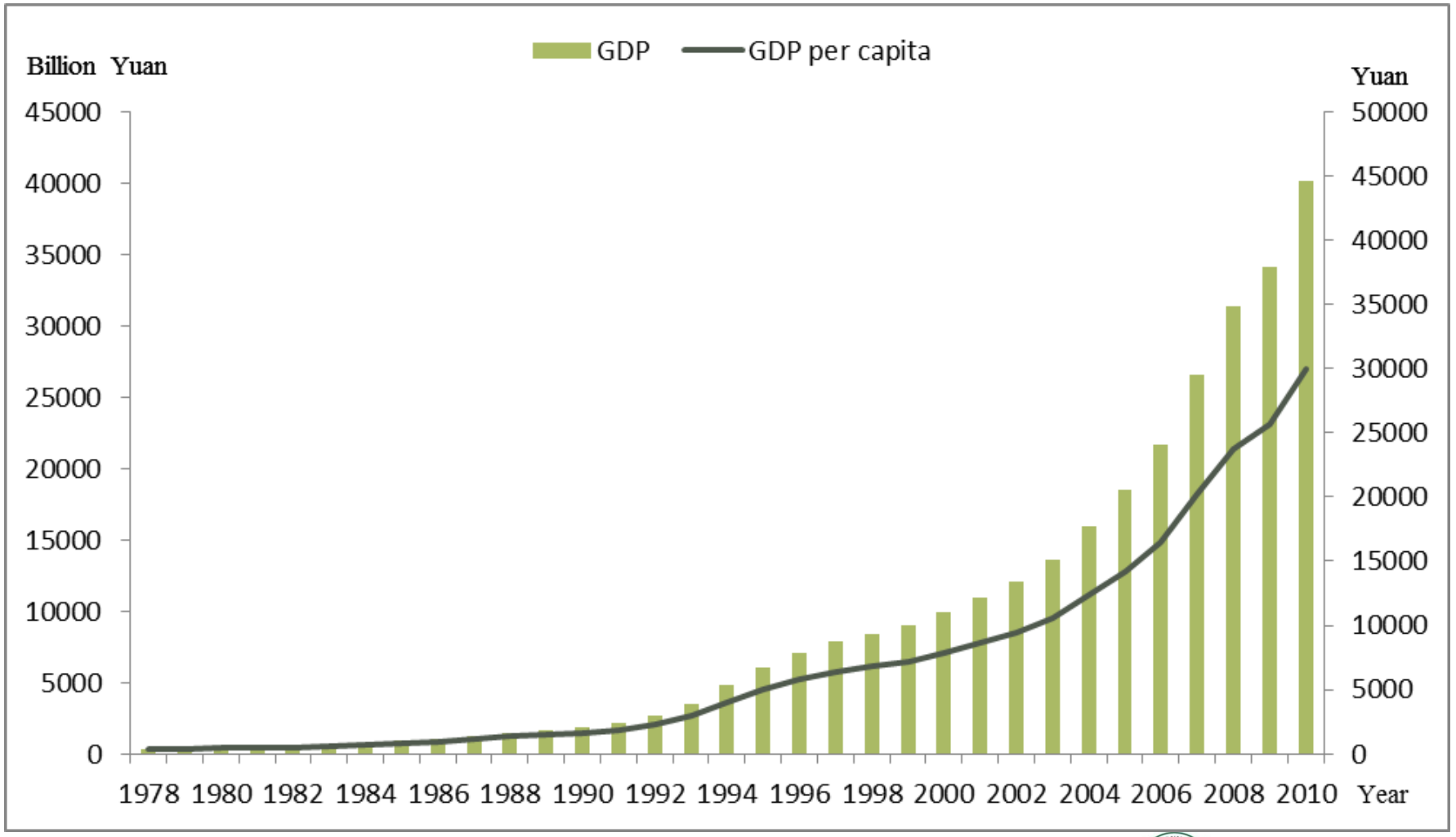
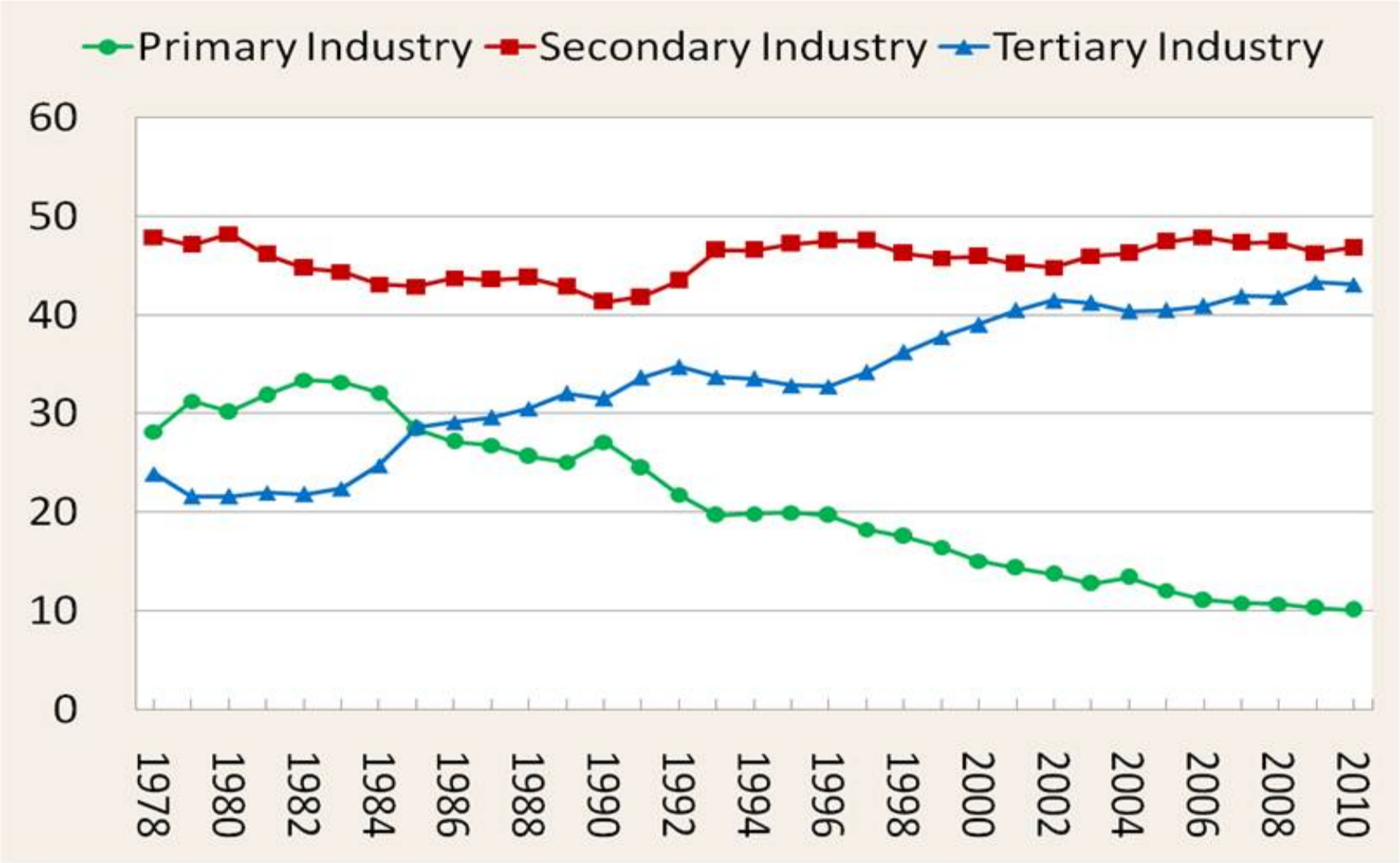
China's Population & Urbanization



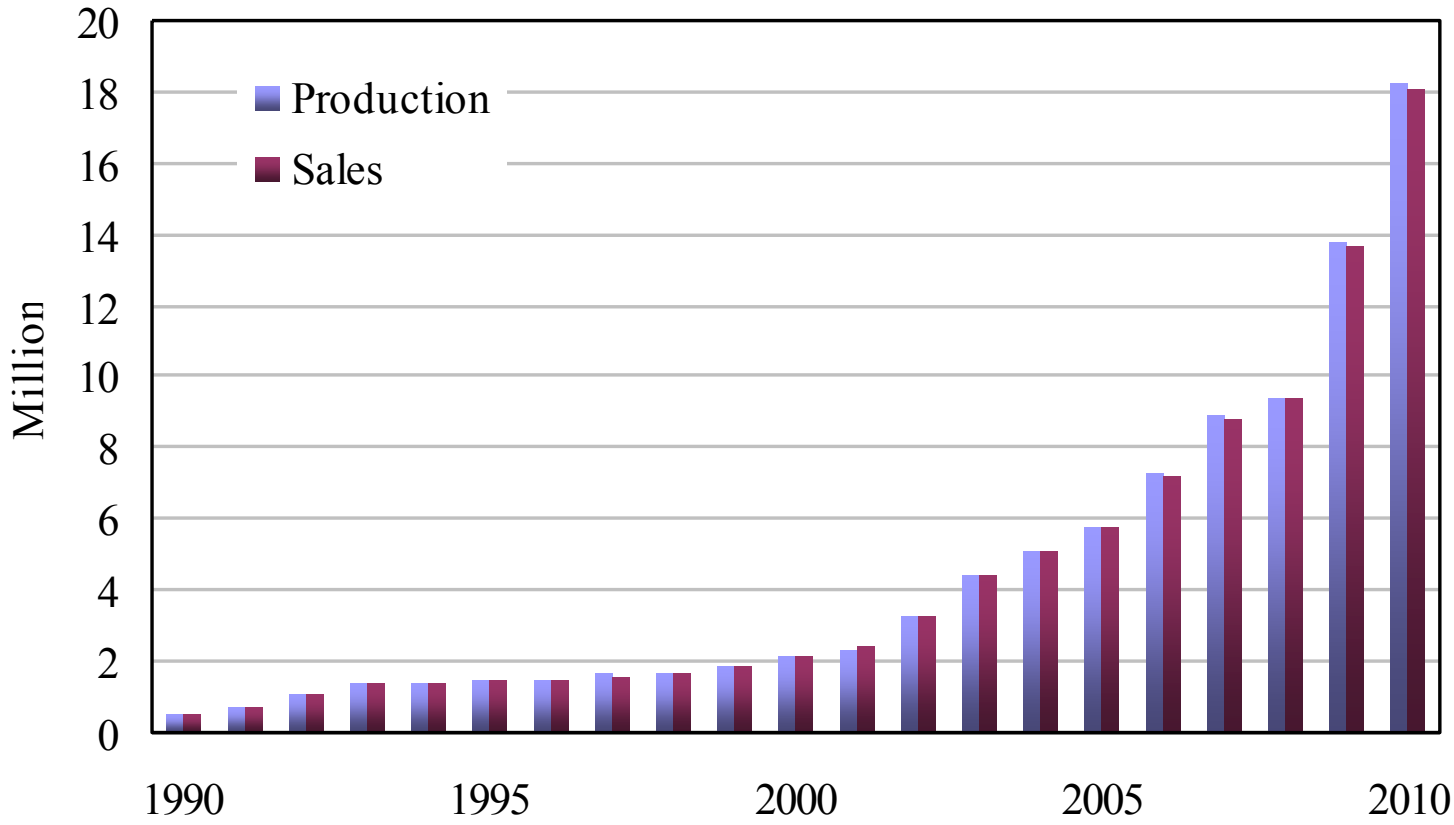
China’s GDP Growth



China's Economic Structure

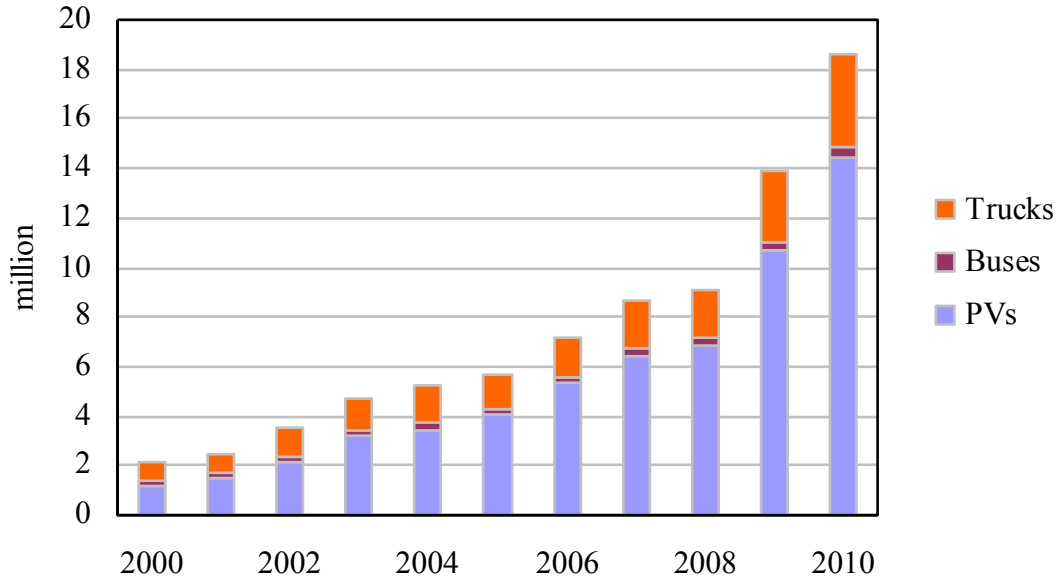


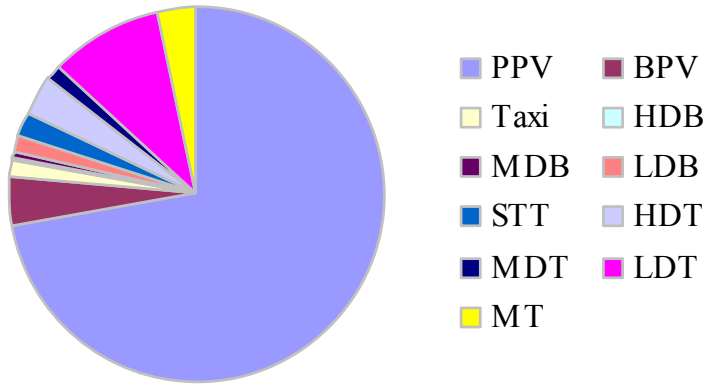
Vehicle production and sales in China



China's domestic vehicle production and sales reached 18.26 million and 18.06 million in 2010.

Number of newly registered vehicles in China





Abbreviations
PV: passenger vehicle; PPV: private passenger vehicle; BPV: business passenger vehicle; HDB: heavy duty bus; MDB: medium duty bus; LDB: light duty bus; STT: Semi-trailer towing truck; HDT: heavy duty truck; MDT: medium duty truck; LDT: light duty truck; MT: mini truck

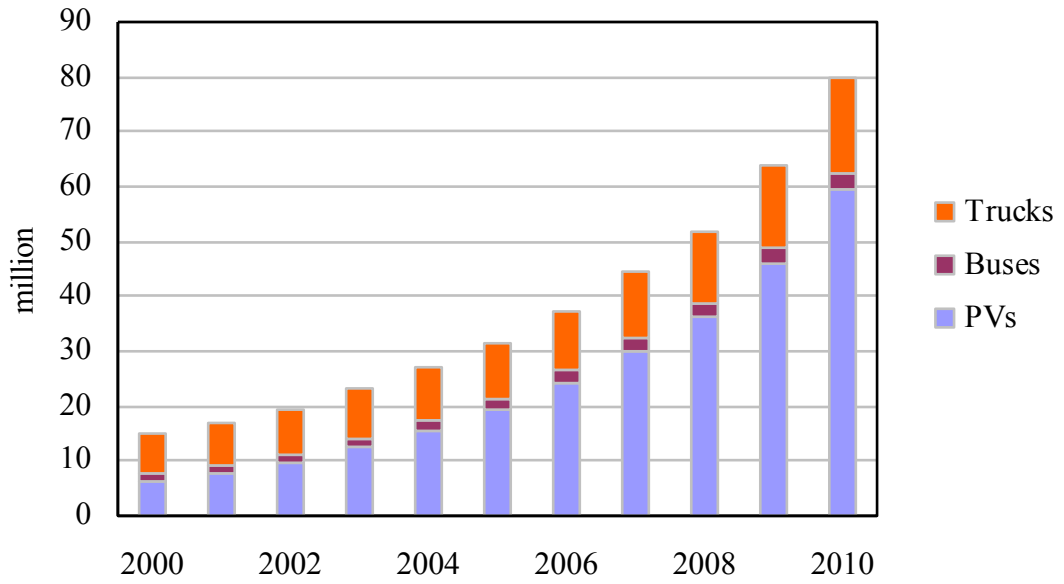
PV 14.44 million
Bus 0.42 million
Truck 3.71 million

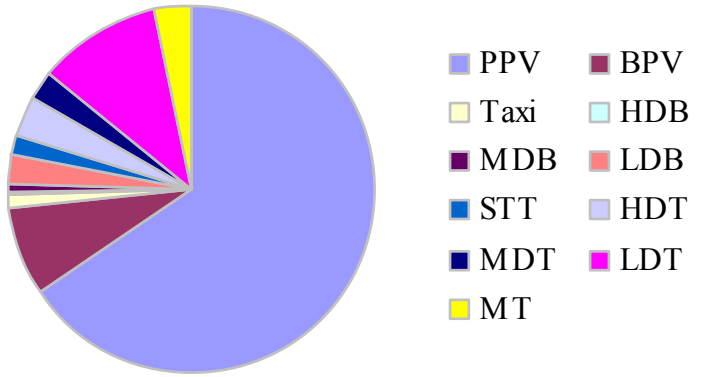
PPV 13.4 million
BPV 0.8 million
Taxis 0.25 million

HDB 0.06 million
MDB 0.09 million
LDB 0.27 million

STT 0.35 million
HDT 0.68 million
MDT 0.23 million
LDT 1.83 million
MT 0.62 million

Total vehicle registration in China





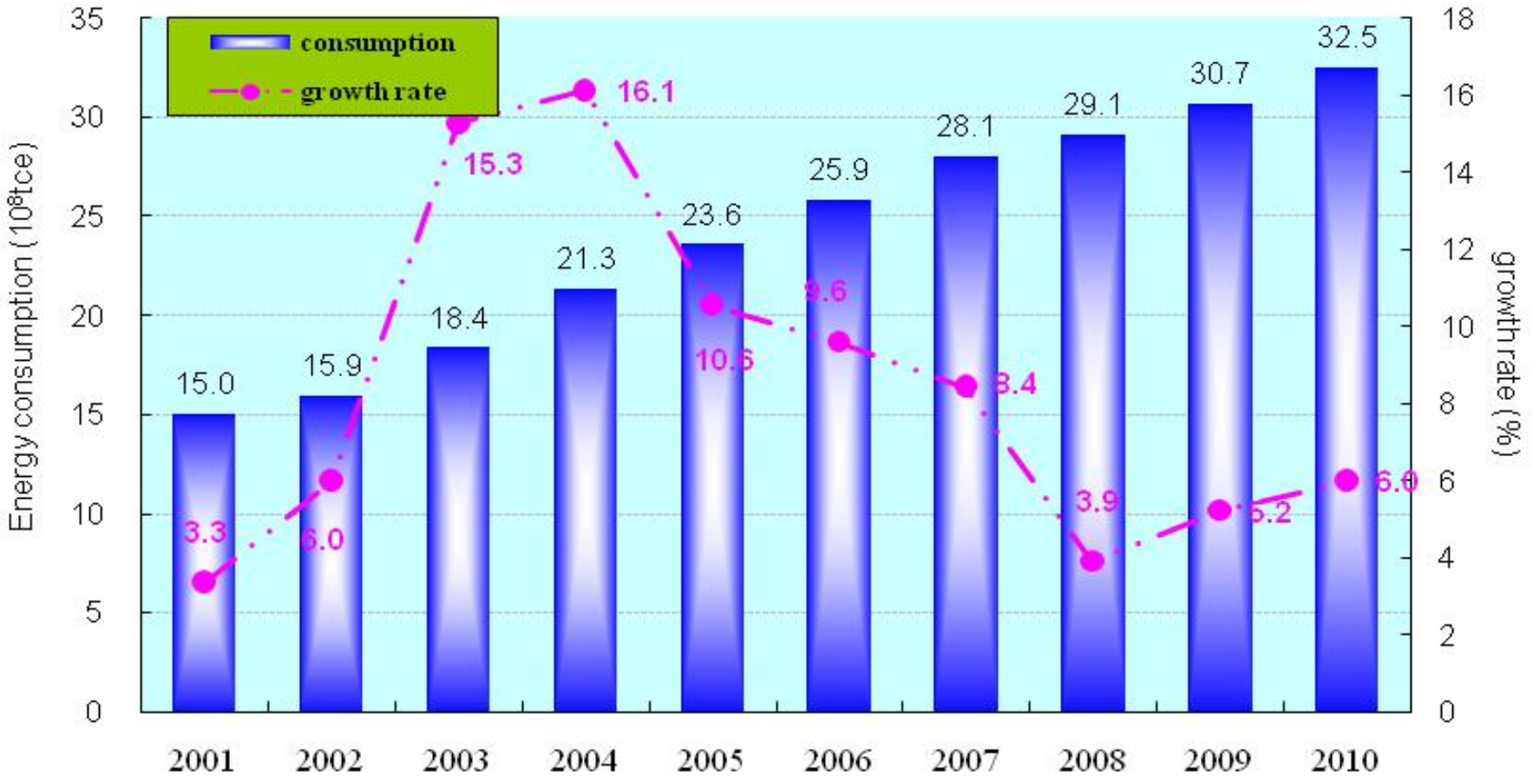
PV 59.57 million
- Bus 2.78 million
- Truck 17.62 million

PPV 52.42 million
- BPV 6.13 million
- Taxis 1.02 million

HDB 0.25 million
- MDB 0.55 million
- LDB 1.98 million

STT 1.32 million
- HDT 2.86 million
- MDT 2.08 million
- LDT 8.69 million
- MT 2.67 million

China's Primary Energy Consumption



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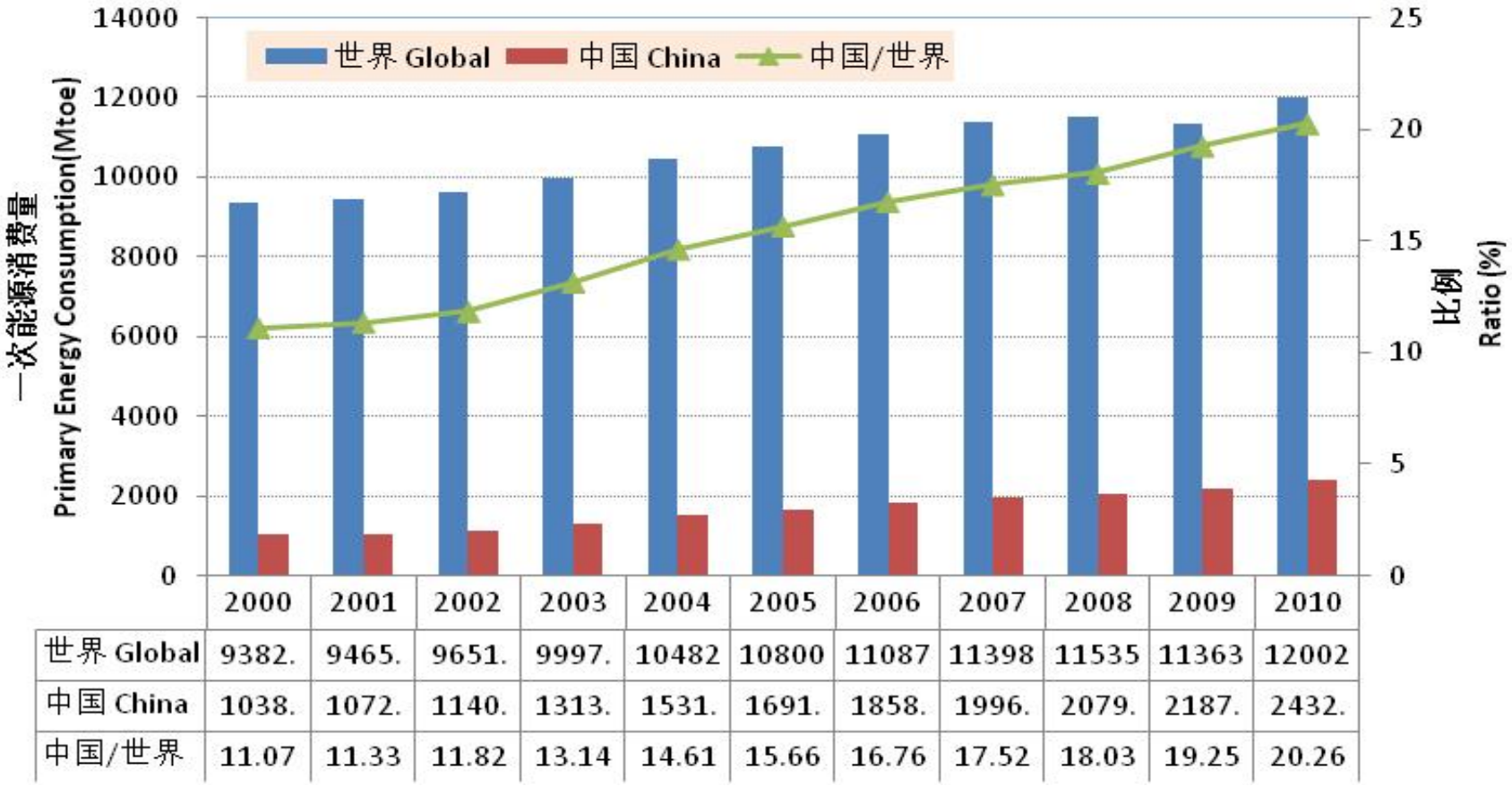
China in Global Primary Energy Consumption

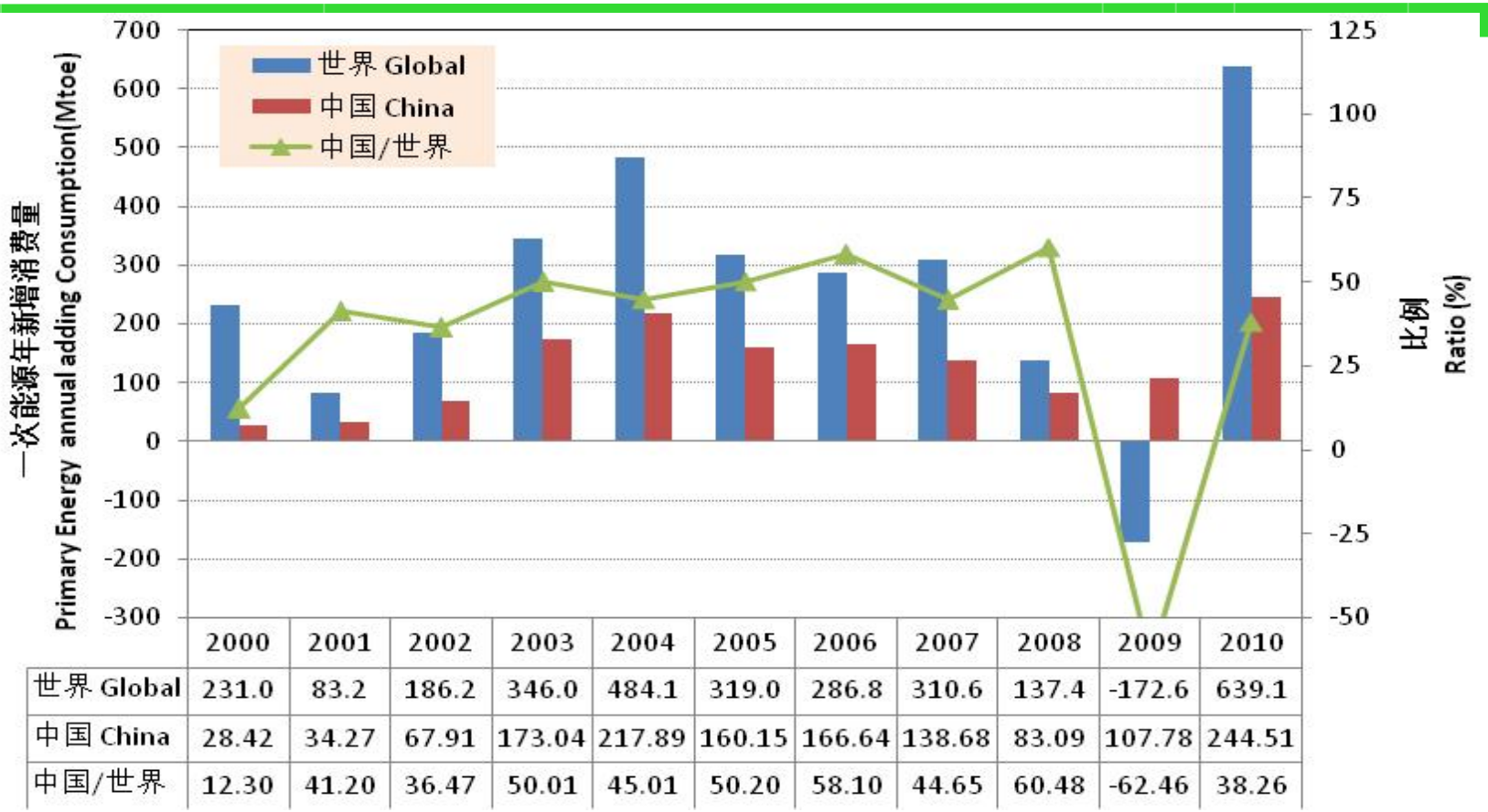


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
世界 Global	9382.	9465.	9651.	9997.	10482	10800	11087	11398	11535	11363	12002
中国 China	1038.	1072.	1140.	1313.	1531.	1691.	1858.	1996.	2079.	2187.	2432.
中国/世界	11.07	11.33	11.82	13.14	14.61	15.66	16.76	17.52	18.03	19.25	20.26

Source: BP statistical_review_of_world_energy_full_report_2011

Growth rate 2000~2010: Global 2.5% vs. China 8.89%

China in Global Increased Energy Consumption

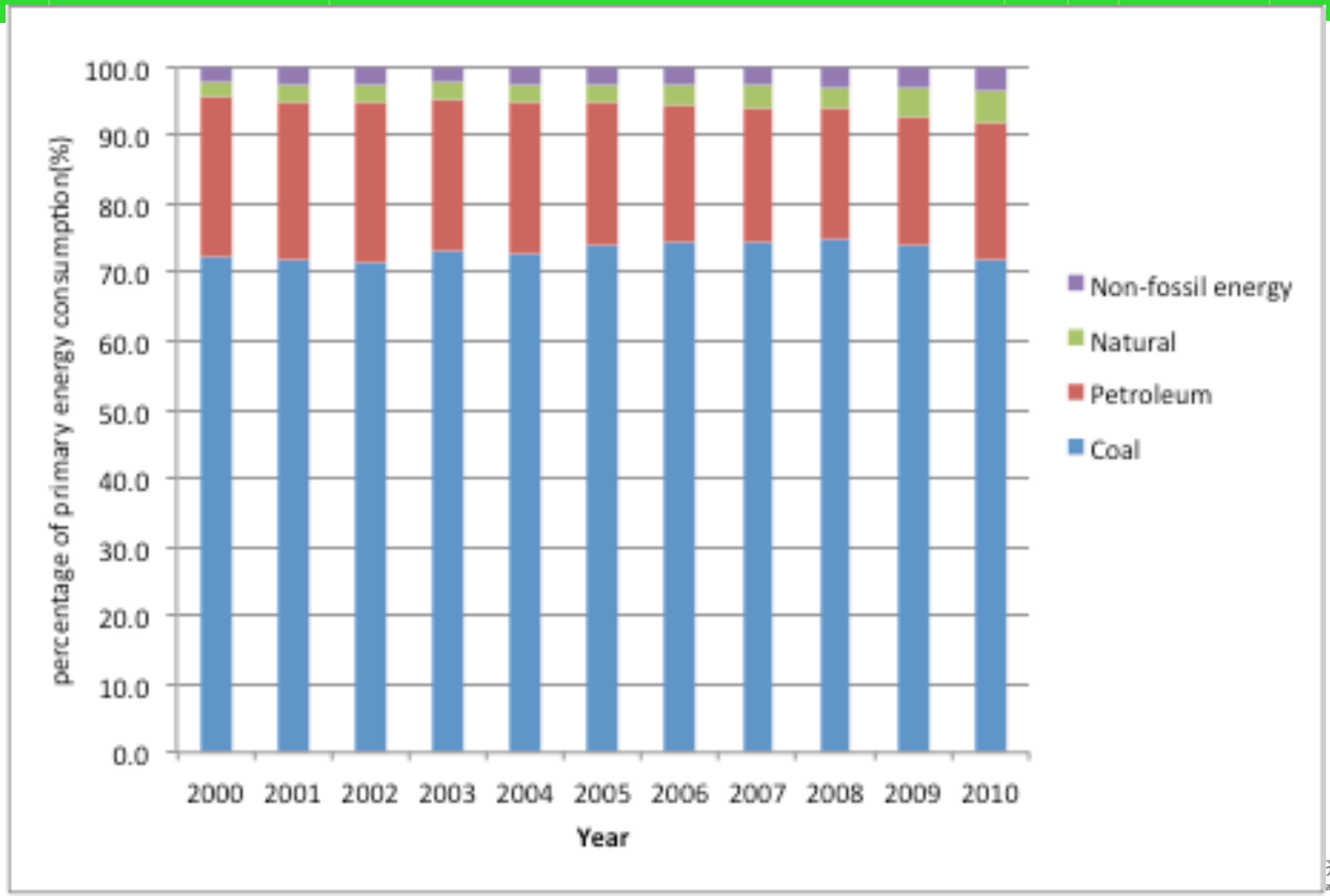


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
世界 Global	231.0	83.2	186.2	346.0	484.1	319.0	286.8	310.6	137.4	-172.6	639.1
中国 China	28.42	34.27	67.91	173.04	217.89	160.15	166.64	138.68	83.09	107.78	244.51
中国/世界	12.30	41.20	36.47	50.01	45.01	50.20	58.10	44.65	60.48	-62.46	38.26

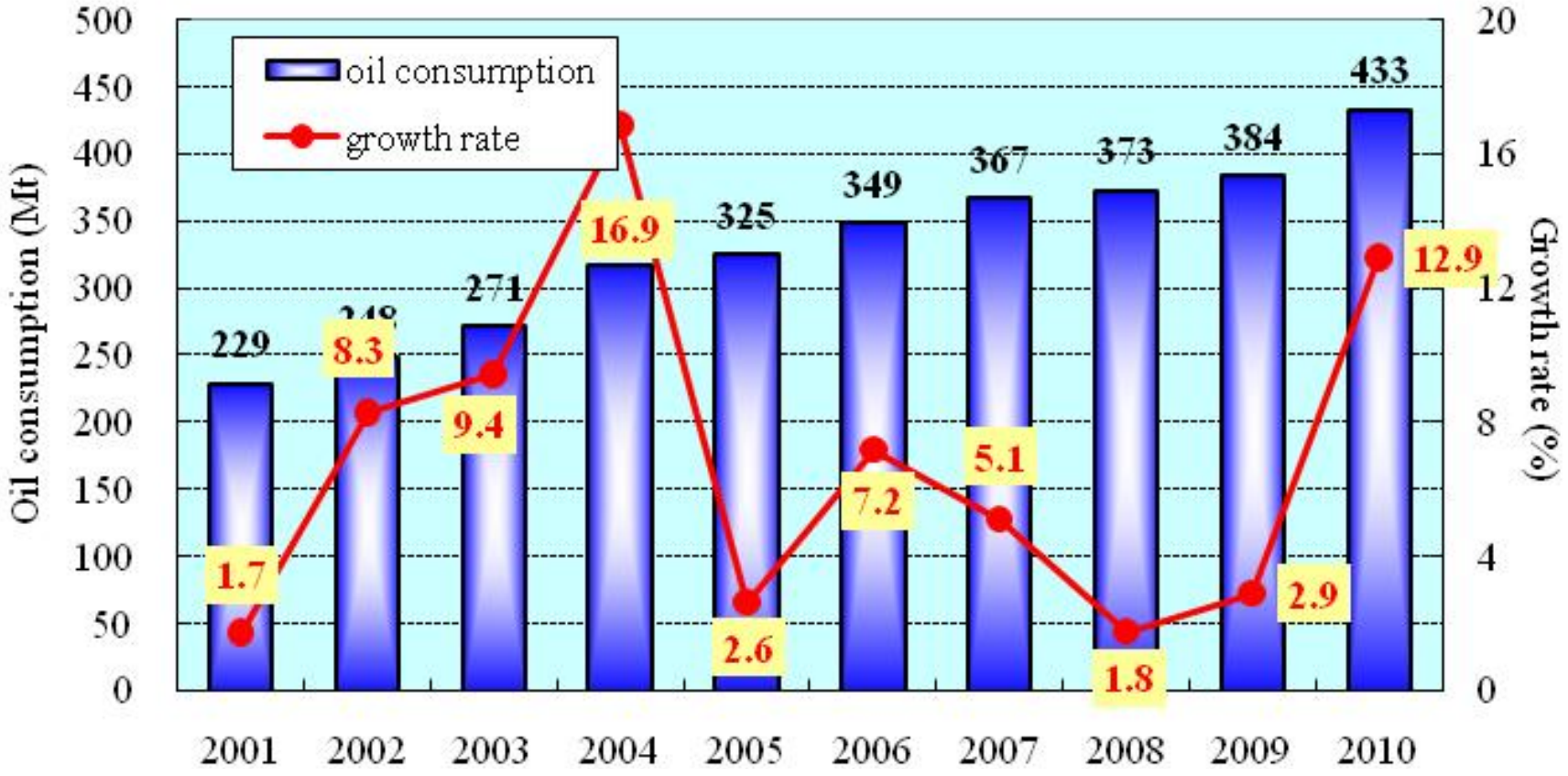
Source: BP statistical_review_of_world_energy_full_report_2011

Increased Energy Consumption 2000~2010: Global 2.62Btoe/ China 1.93Btoe (53.2%)

Energy Supply Mix in China



China's Oil Consumption



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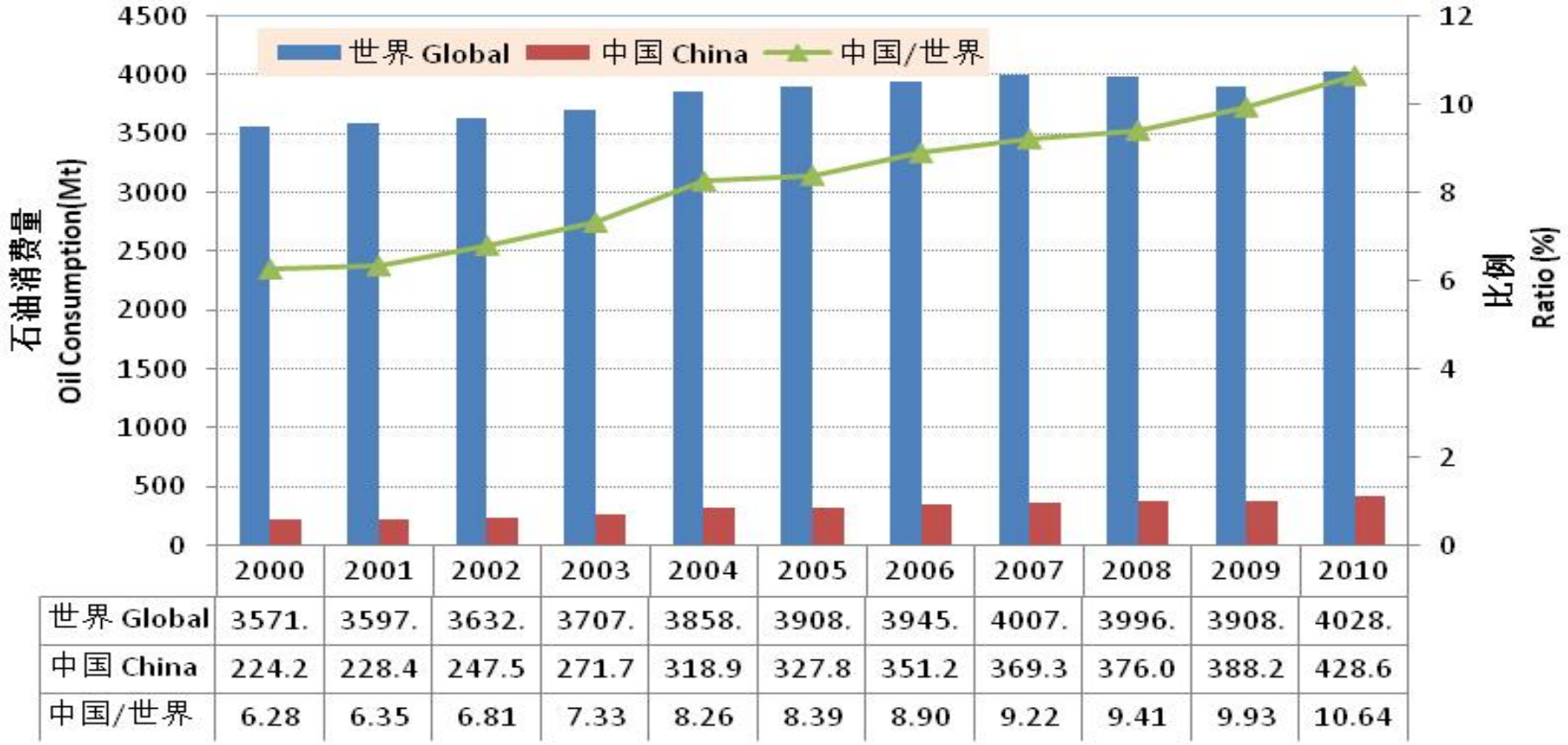
China in Global Oil Consumption

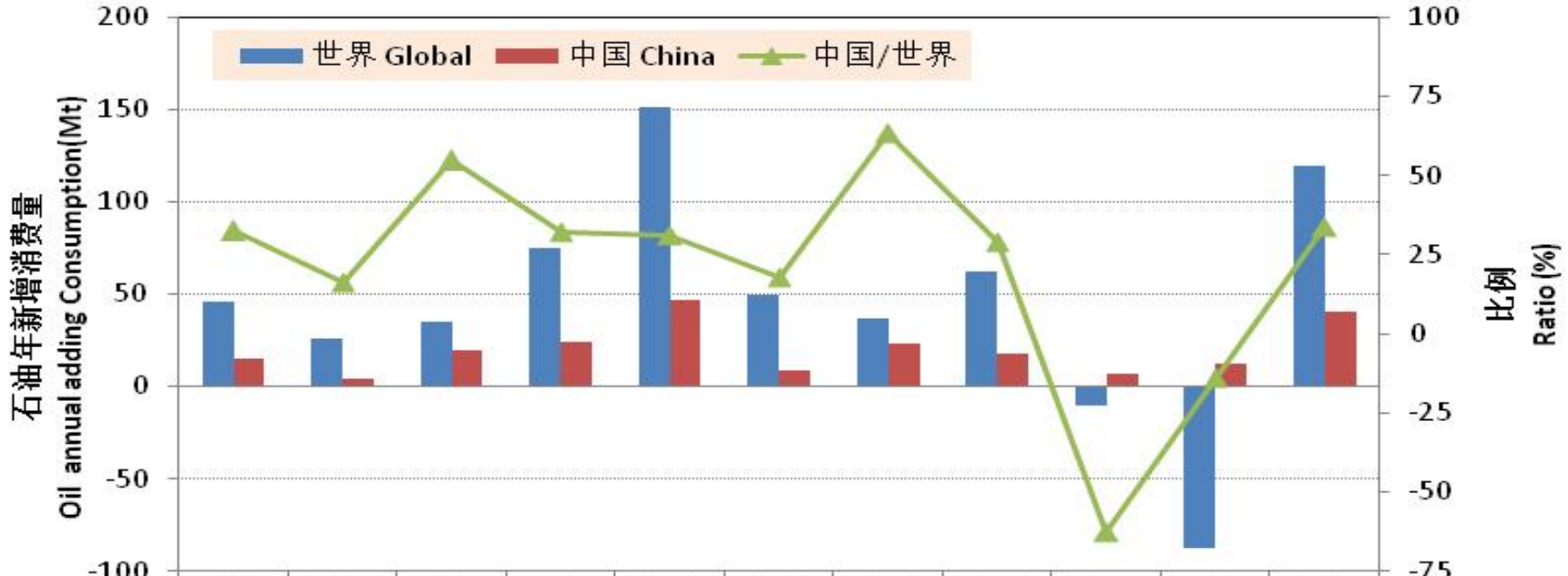


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
世界 Global	3571.	3597.	3632.	3707.	3858.	3908.	3945.	4007.	3996.	3908.	4028.
中国 China	224.2	228.4	247.5	271.7	318.9	327.8	351.2	369.3	376.0	388.2	428.6
中国/世界	6.28	6.35	6.81	7.33	8.26	8.39	8.90	9.22	9.41	9.93	10.64

Source: BP statistical_review_of_world_energy_full_report_2011

Growth rate 2000~2010: Global 1.2% vs. China 6.7%

China in Global Increased Oil Consumption

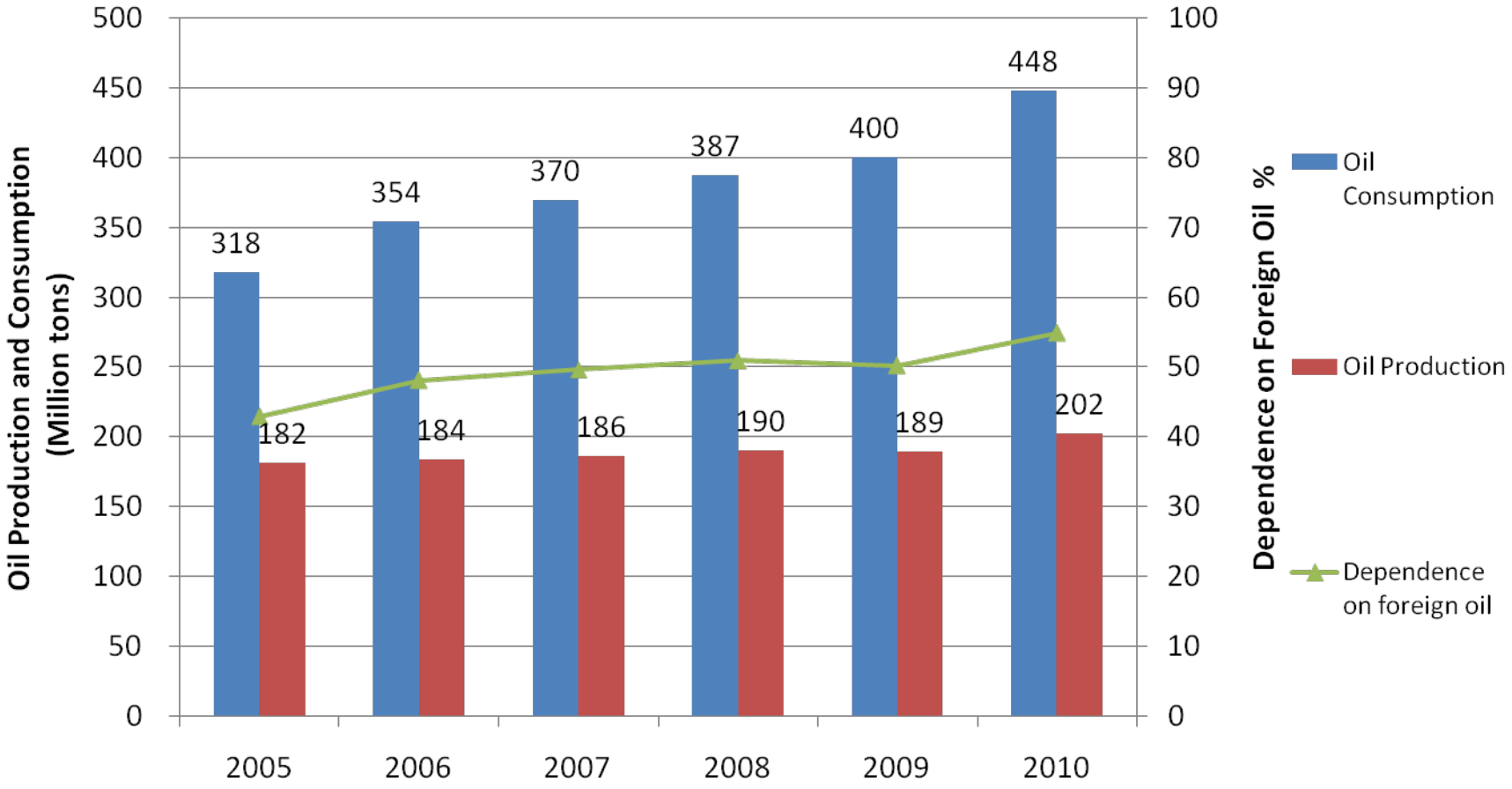


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
世界 Global	45.6	25.6	35.0	75.2	151.3	49.7	36.9	62.0	-10.8	-87.8	119.4
中国 China	14.89	4.19	19.12	24.20	47.16	8.95	23.41	18.03	6.75	12.14	40.39
中国/世界	32.62	16.33	54.62	32.19	31.17	18.00	63.51	29.10	-62.52	-13.82	33.82

Source: BP statistical_review_of_world_energy_full_report_2011

Increased Oil Consumption 2000~2010: Global 456Mt / China 204Mt (44.7%)

Oil Production and Consumption in China



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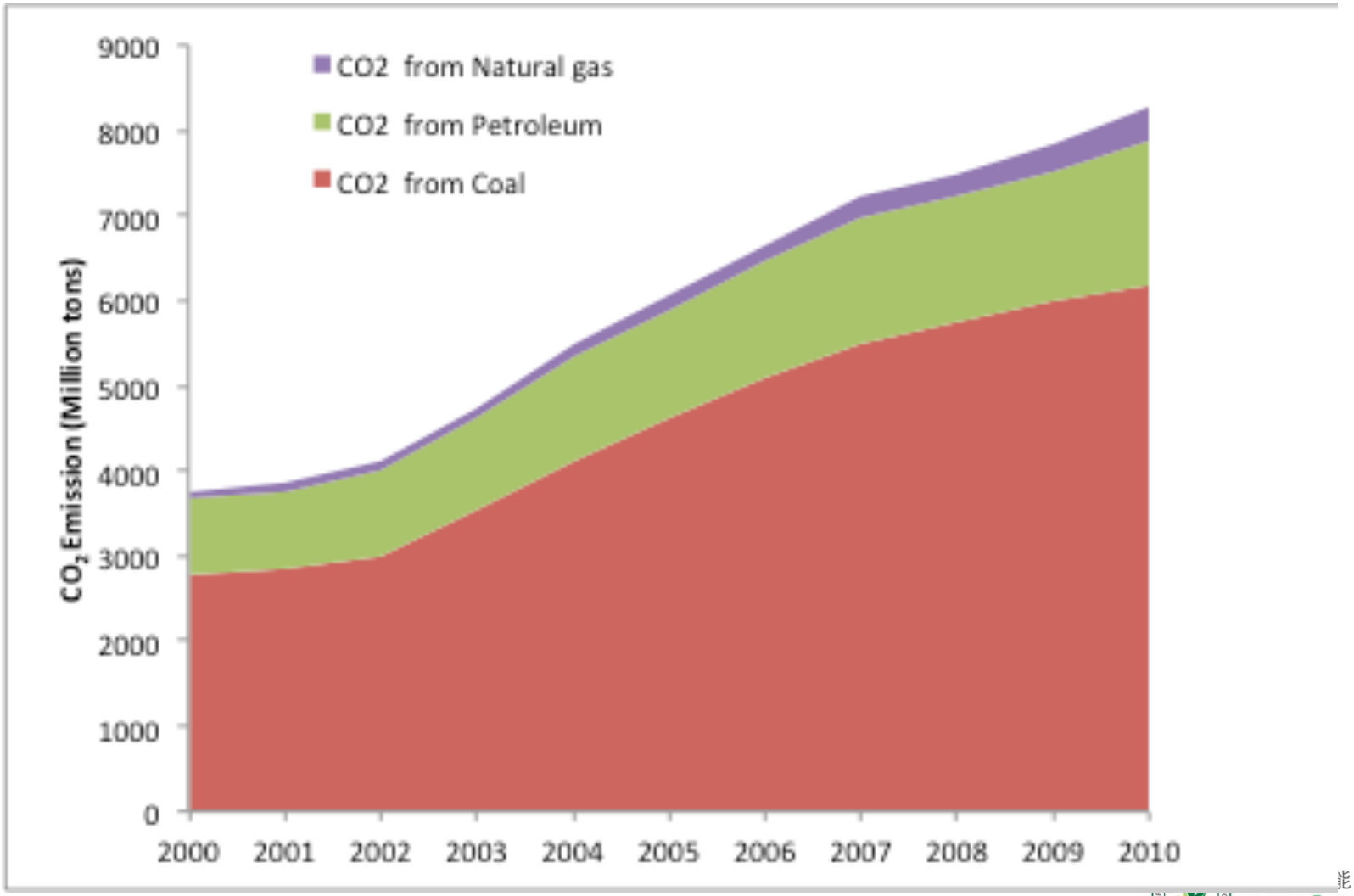
Air Quality Degradation in Beijing

CO2 Emission from Fossil Fuel Burning



Main Domestic Context

- A sustained high growth in energy consumption
  - Industrialization
  - Urbanization
  - Motorization
- Domestic energy supply constraints
  - Oil production capacity： 200Mtoe
  - Sustainable production capacity: 4 billion tons
- No cheap resources available for China
- Local and regional pollutions
- Vulnerability to climate change

Main International Contexts

- China has agreed on the international 2°C increase control target
- Increased pressure from international community
  - Largest CO2 emitter
  - Largest contributor to future CO2 emission
- China now is willing to play an active and leading role
- China's commitment to the world of 40-45% reduction in carbon intensity

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Rationale of China's Low Carbon Development

- Mitigating climate change has substantial co-benefits for China;
- There is a significant overlap of the measures for addressing climate mitigating and for sustainable energy and economic system transformation in China;
- "Low carbon development" well captures the virtue of sustainable transformation of the energy system and economy that China needs;
- Low carbon development is driven more by the China's strategic interests than international pressures.

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China's Sustainable Energy and Low Carbon Development during the 11th FYP (2006-2010)

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China's Energy Conservation Target for the 11th FYP

Reducing China's Energy intensity by 20 percent from 2005 to 2010!

- Proposed by the State Council and Ratified by National Peoples Congress in 2006

Institutional Innovations & Capacity Building

- Disaggregating the energy conservation target to provinces and major enterprisers
- Provincial Governors and managers of enterprises are primarily responsible for achieving the energy conservation targets
- Energy conservation agreements of enterprises with the government
- Energy Conservation Reporting and Verification Systems
- Evaluation system for energy conservation performance of provinces & enterprises

Command-and-Control Measures

- Enforced retirement of low energy efficiency production capacity during the 11th FYP

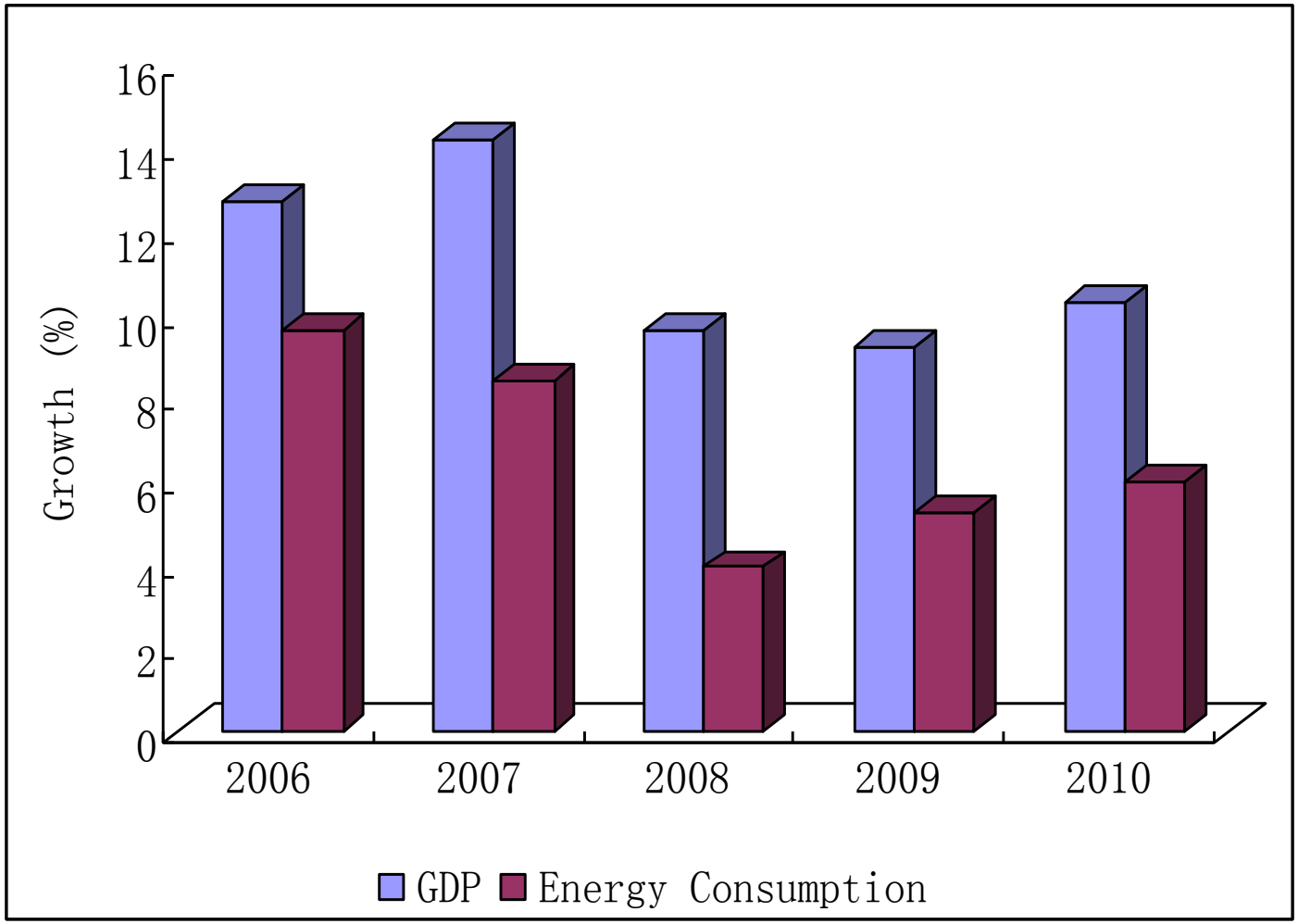
  - 70GW of coal-fired power plants
  - more than 100 million tons of iron & steel production capacities
  - 260 million tons of cement production capacities

- Energy efficiency requirements for new investment project approval & the market entrance of new products
- Energy efficiency requirements for new buildings
- Government purchase of energy efficiency products

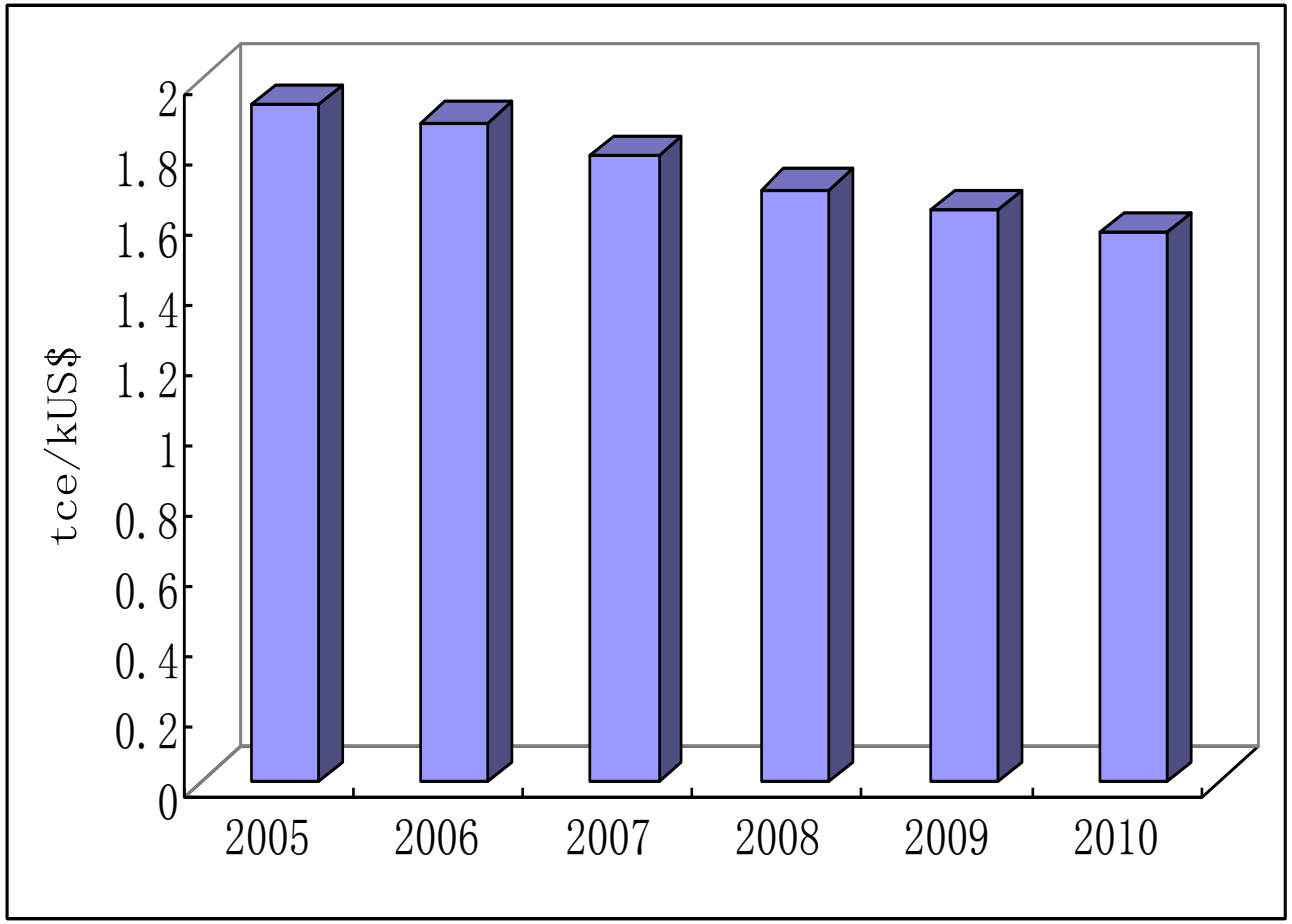
Economic Incentives

- Tax and levy
  - Surcharge of electricity for RE
  - Import & Export tax and tariff
- Subsidy & Bonus
  - Energy conservation projects (215 billion yuan)
  - Consumption of energy efficiency products (14 billion yuan)
- Policy loan
- Pricing
  - Differentiated electricity tariff
  - Feed-in tariffs for RE electricity

Decoupling Economy Growth and Energy Consumption

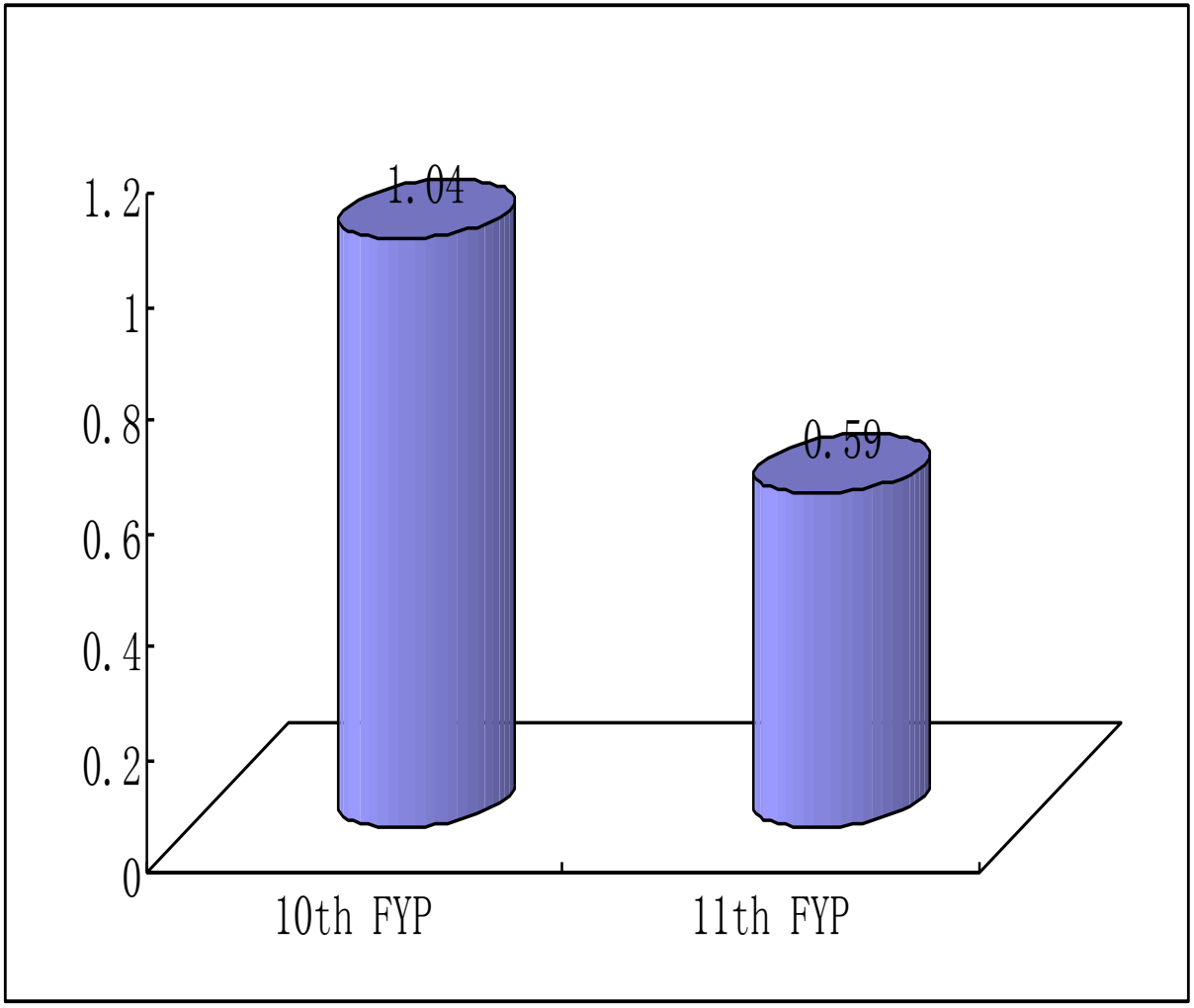


Energy Intensity of GDP during the 11th FYP



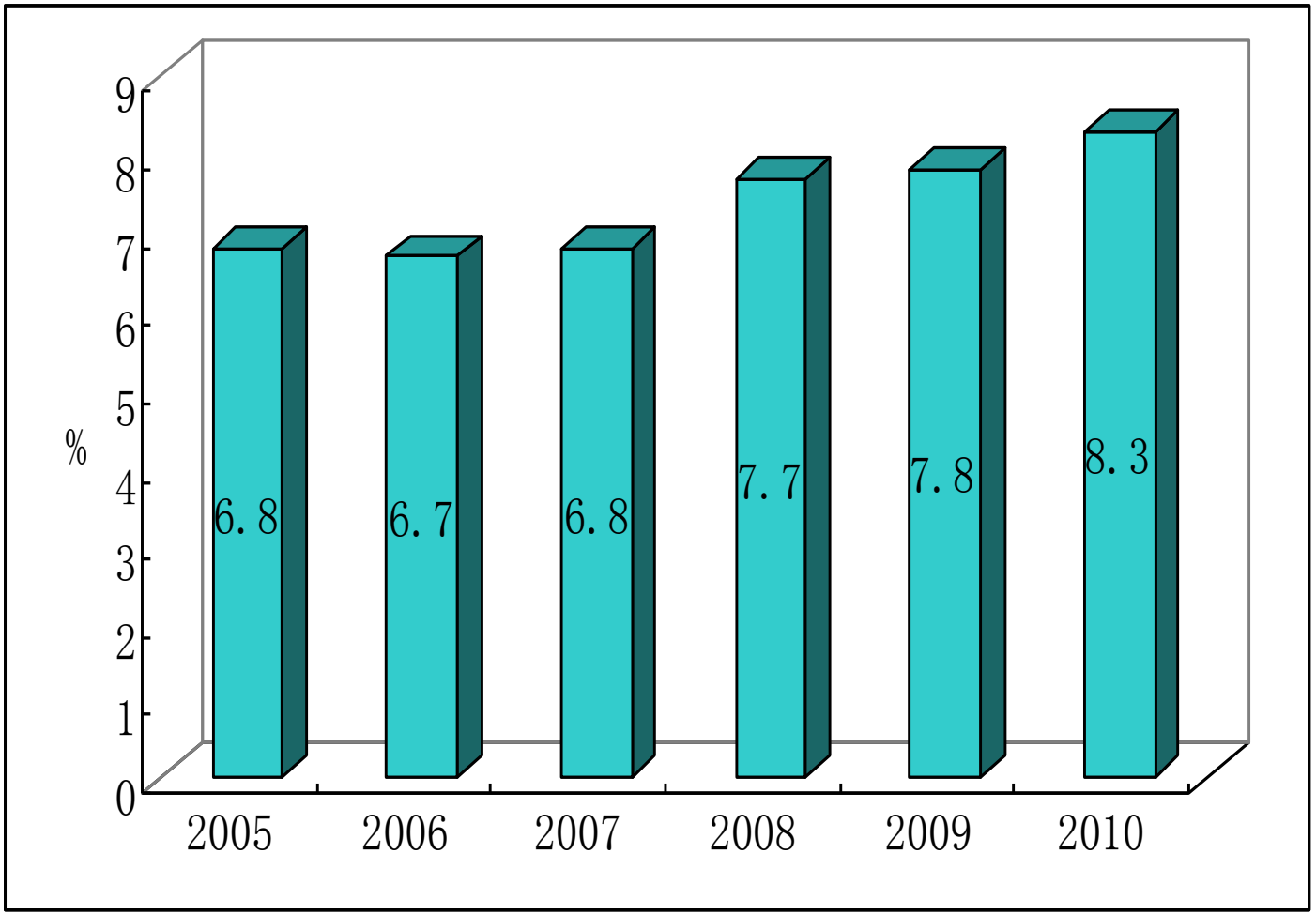
Approximately 19.1% reduced during 11th FYP

Energy Consumption Elasticity of GDP

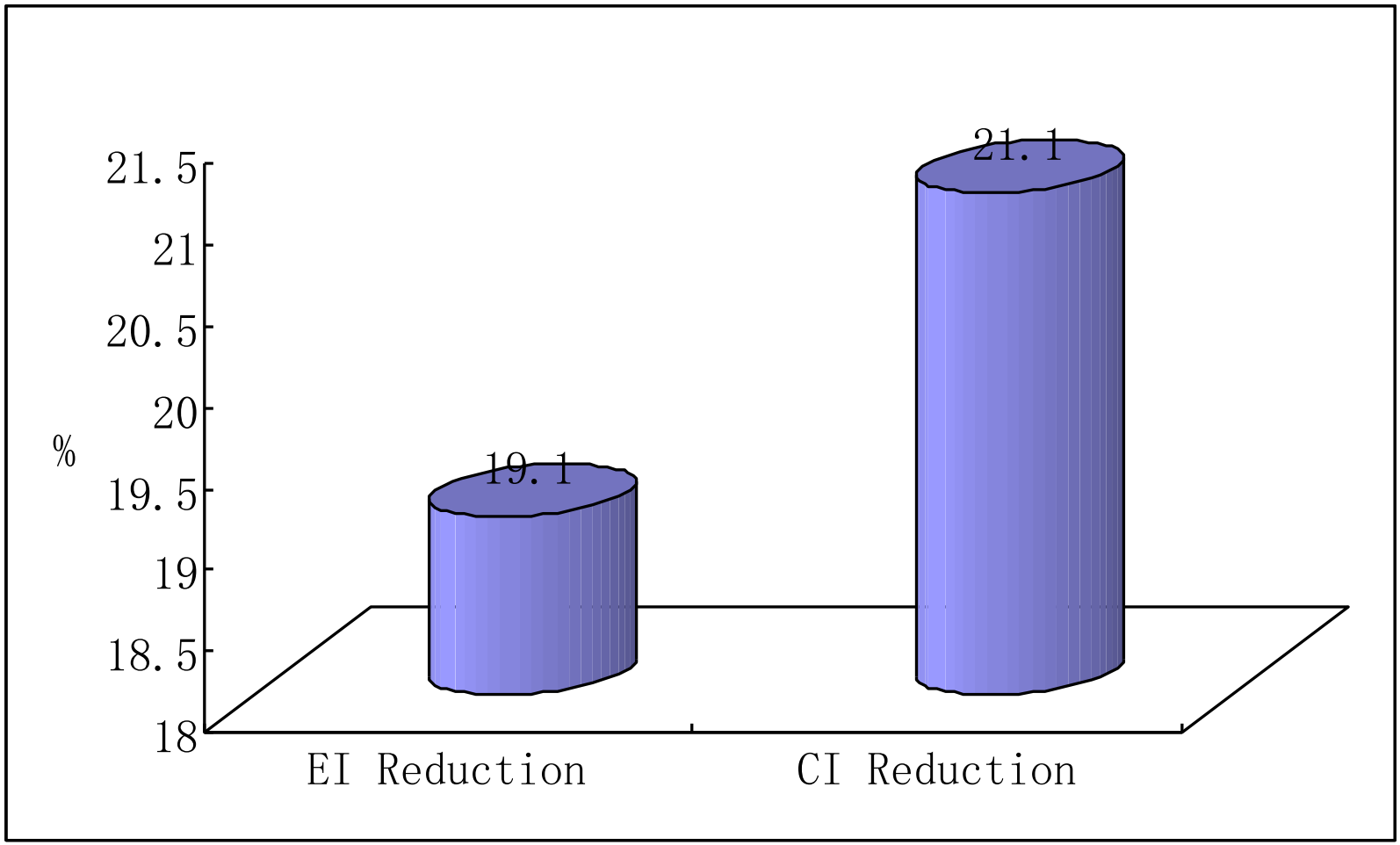


Achieving 11.1% of GDP growth with 6.6% of energy consumption growth during 11th FYP

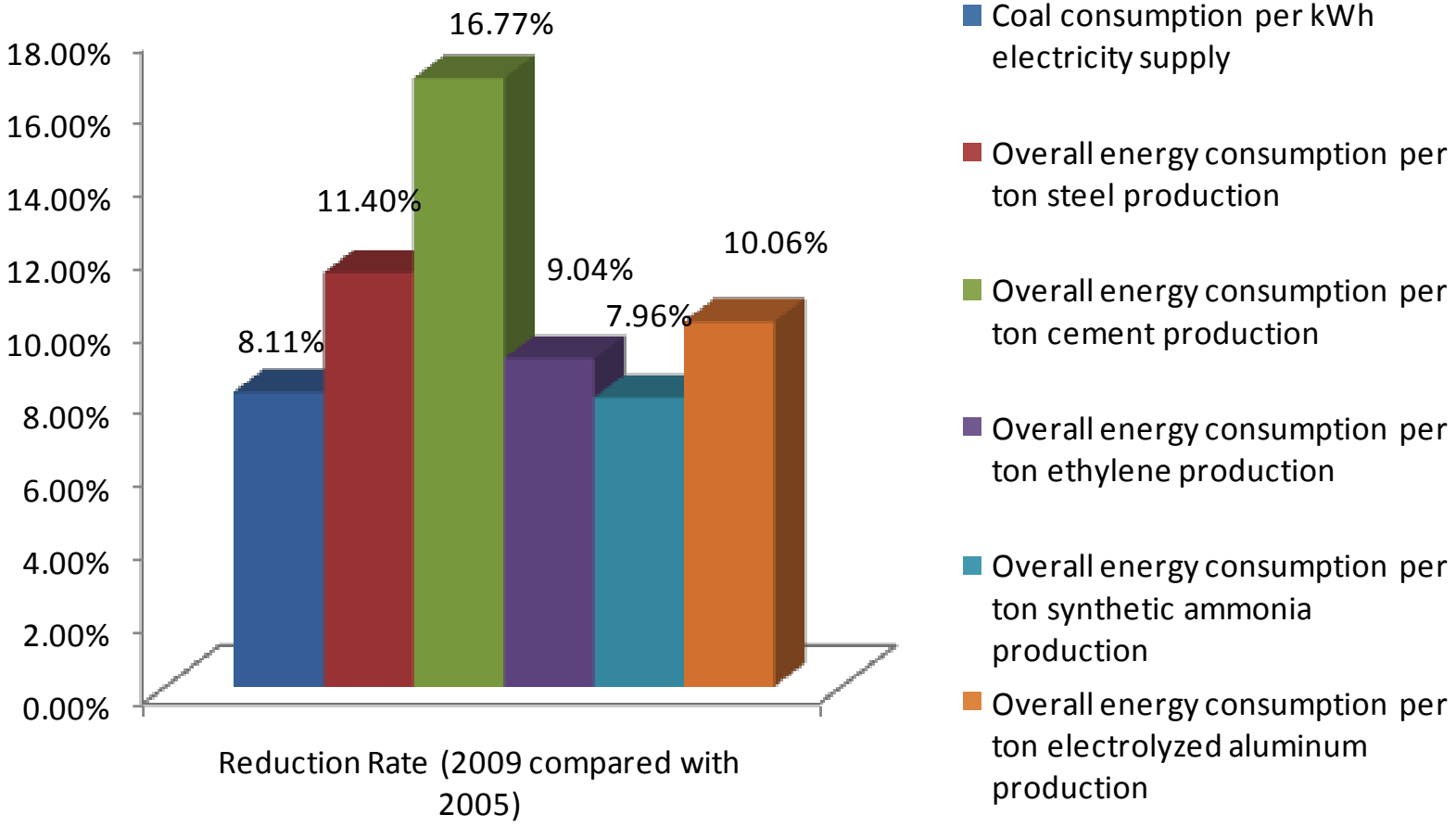
Contribution of Non-Fossil Fuels to Primary Energy Supply



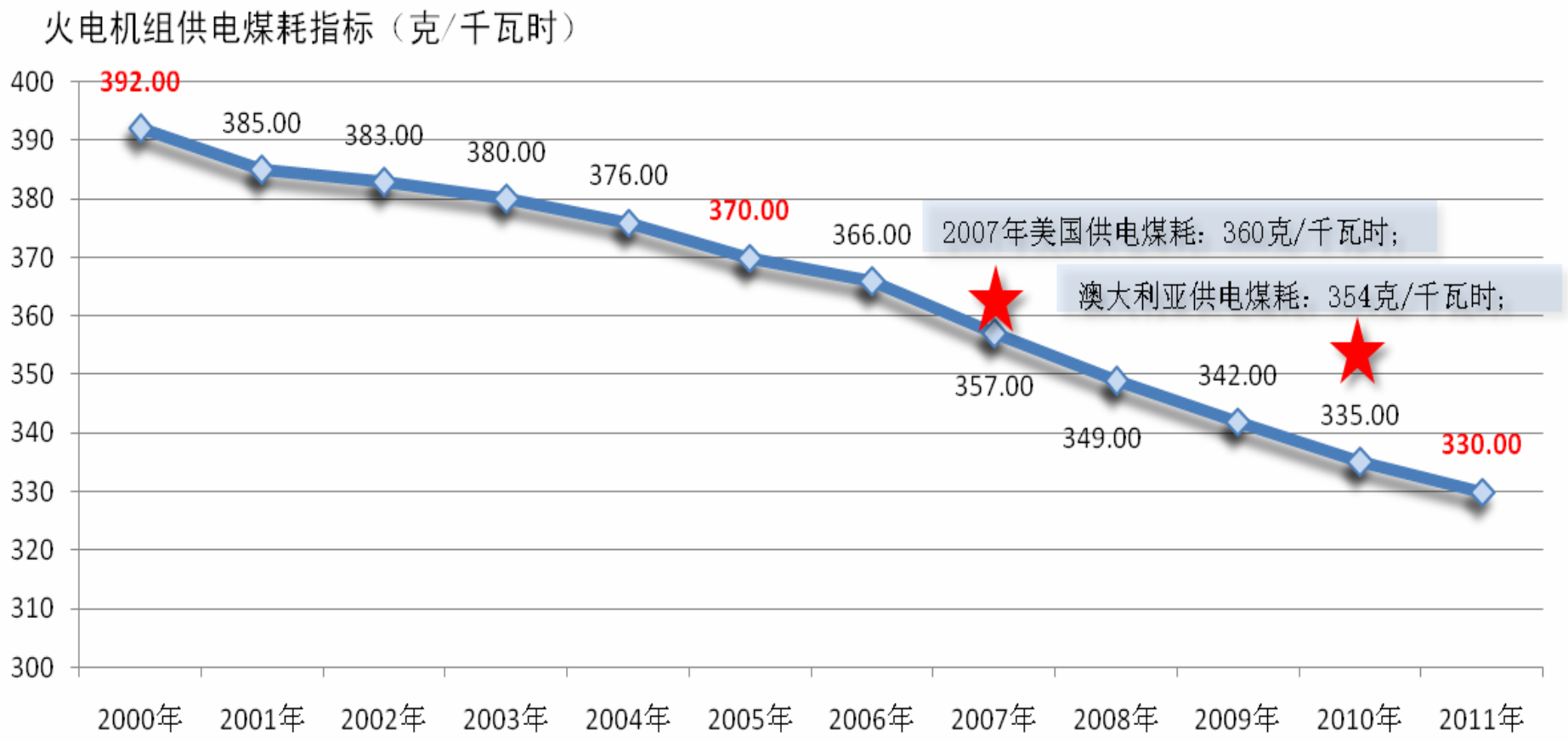
Reductions in Energy Intensity and Carbon Intensity during the 11th FYP



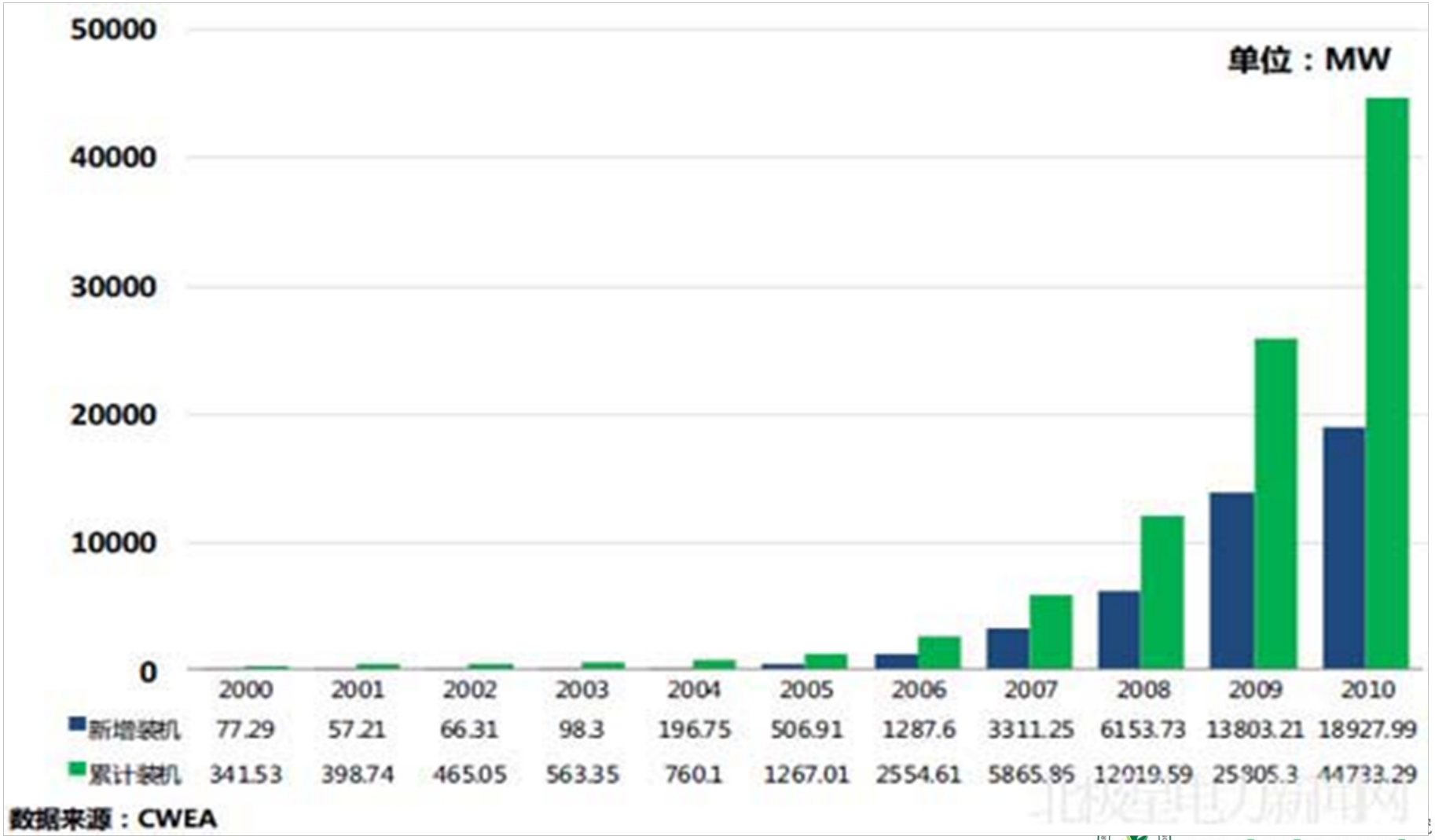
Reduction in Energy Consumption per Unit Product of the Major Energy Intensive Industries during the 11th FYP



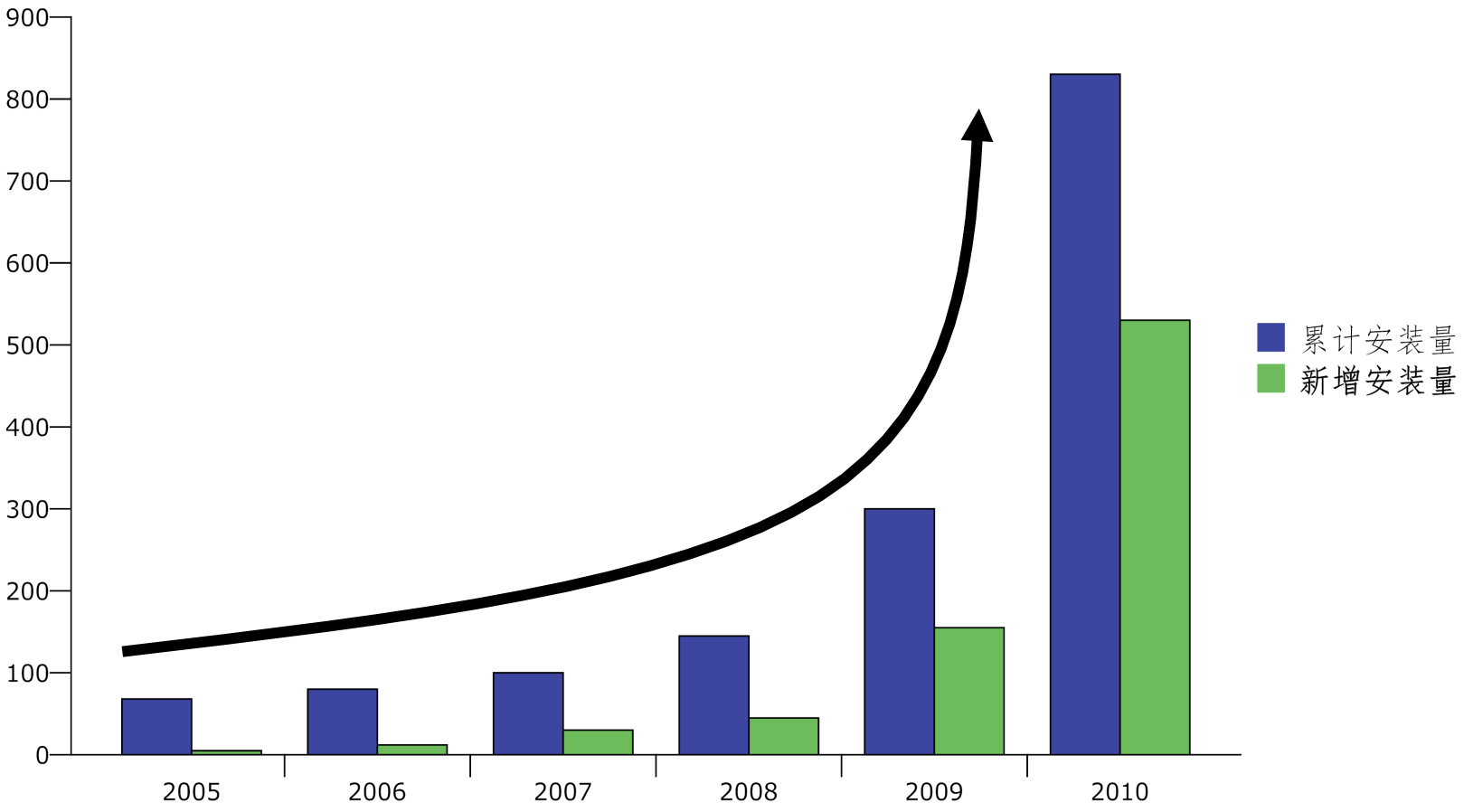
Improvements in Energy Efficiency of Thermal Power Plants



Installations of Wind Turbines in China



Solar PV Installations (MW)



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Deficiencies & Challenges

- China's energy consumption kept growing associated with economic growth in spite of significant reduction in energy intensity;
- China's energy intensity is still much higher than that of developed countries;
- There is also a larger potential for technological efficiency improvement in China compared to developed countries
- The contribution of renewable energies to primary energy supply is small in spite of high growth rate during the 11th FYP

New Development in Sustainable Energy and Low Carbon Development

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Legally Binding Targets for the 12th FYP

- Reducing China's energy intensity by 16 percent from 2010 to 2015.
- Reducing China's carbon intensity by 17 percent from 2010 to 2015.
- The contribution of non-fossil fuels to primary energy supply should be reaching 11.4% by 2015.

Challenges in Achieving National Energy & Climate Target during 12th FYP

- China will be staying in the stage of industrialization and rapid urbanization during 12th FYP.
- Developed countries have never experienced such a high reduction in carbon intensity during their industrialization.
- Readjustment of the structure of economy and increase the contribution of less energy intensive industries will be difficult in China
- The forced retirement of low energy efficient production capacity will be less efficient and more expensive in China during the 12th FYP due to the substantial work done during the 11th FYP.

Achieving the national energy and climate target of the 12th FYP will be even difficult and more challengeable compared to the 11th FYP!

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New Policy Measures for the 12th FYP

- Inducing the carbon intensity reduction as a legally binding target
- Disaggregating the carbon intensity reduction target by province
- Capping national energy consumption, and to consider disaggregating national energy consumption quota by province
- Intensified efforts in promoting development and utilization of non-fossil fuels
  - 100GW wind & 20 GW solar PV added during the 12th FYP
  - 40 GW nuclear & 120GW hydro power under construction
- Low carbon development pilot & demonstration program
- ETS Pilot & demonstration program

Climate Policy from the 11th FYP to 12th FYP

Command and control

- administrative and political measures: Energy intensity targets have been set at the national, provincial and large-company level
- Reductions in energy intensity have largely been achieved by enforced closure of inefficient power plants and factories

Market-oriented Mechanism

- Emission Trading Scheme
- Economic tools (resource taxes, tax breaks, and channeling of subsidies and investment)

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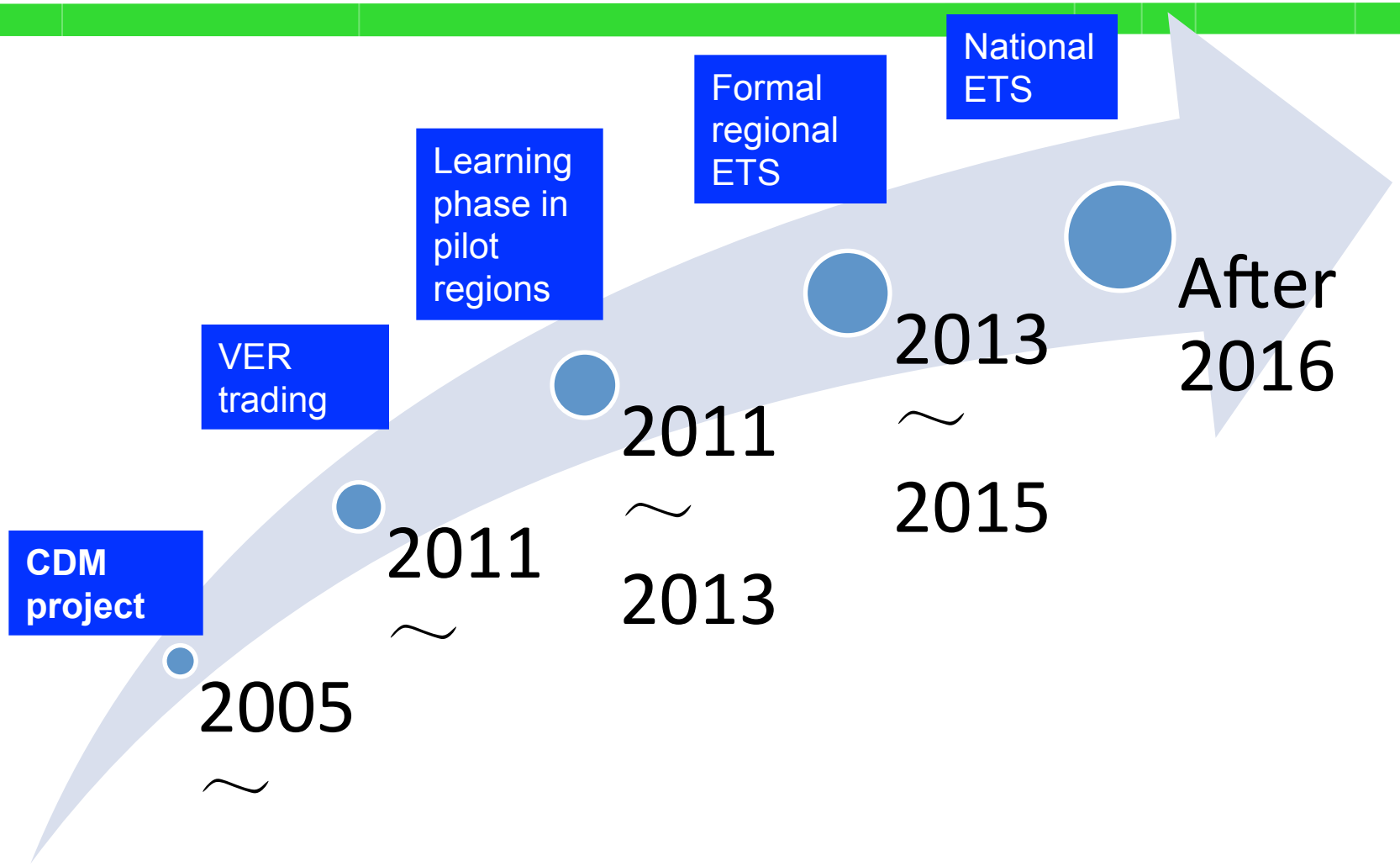
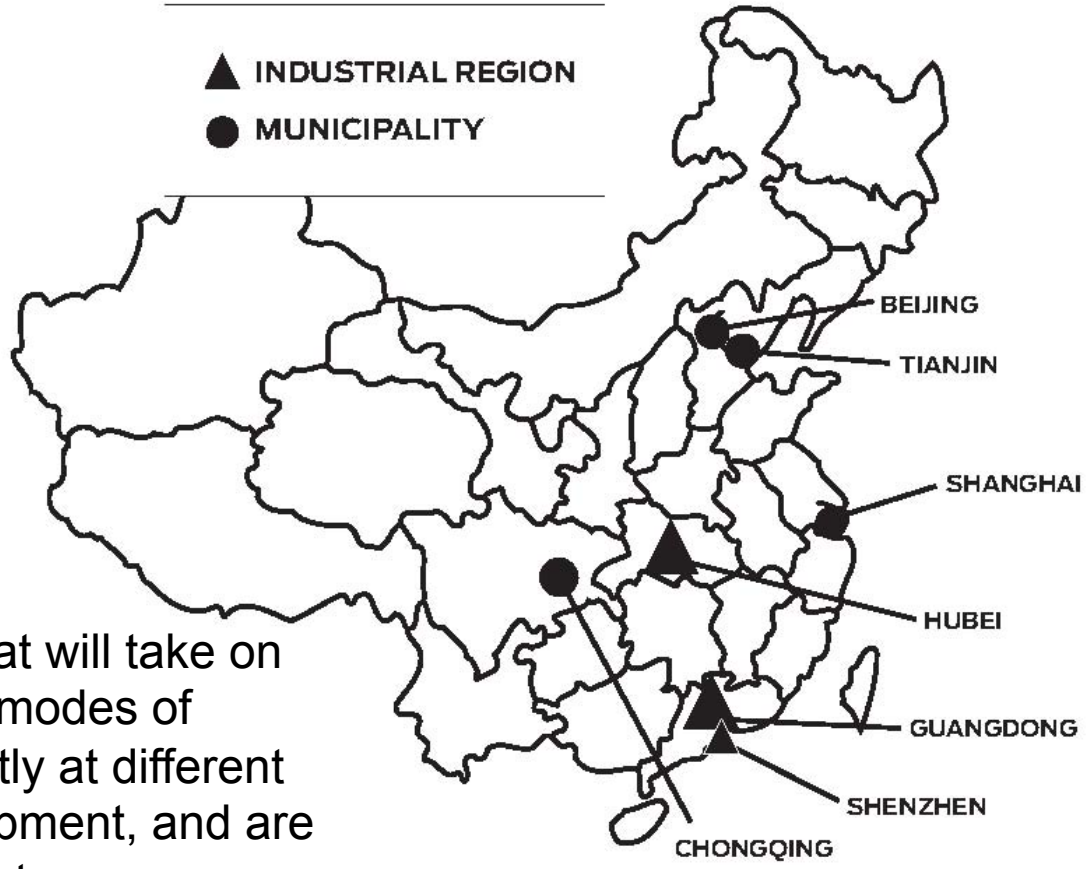
China's ETS Roadmap



ETS Pilot & Demonstration Cities/ProvinceS



The pilot sites that will take on and test various modes of trade, are currently at different stages of development, and are opting for different implementation paths.

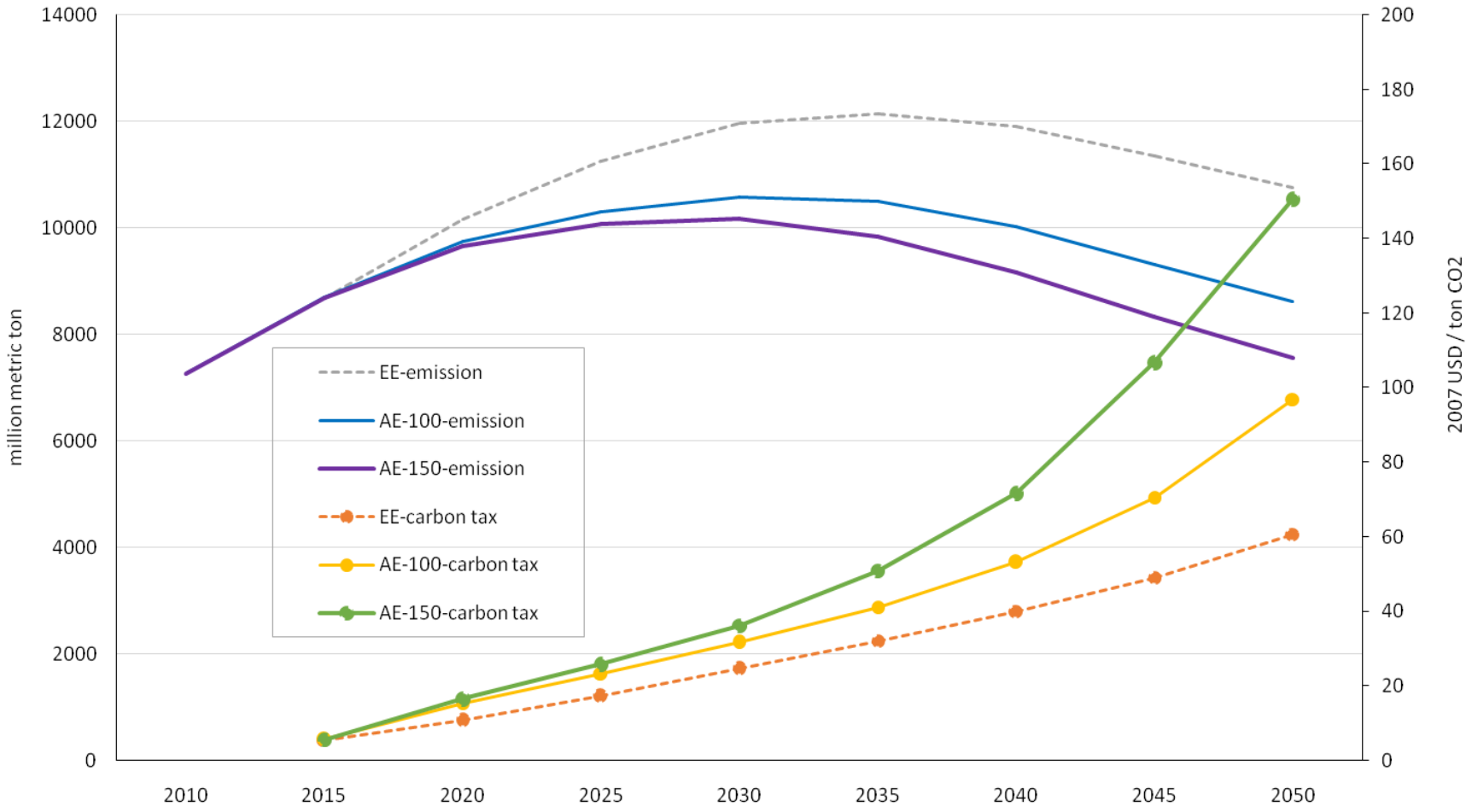
Progress in ETS Pilots

- ETS Coverage
  - Power and heat supply
  - Industry sectors
  - Service sectors (Business buildings)
- Carbon Emission Report and Verification
  - Direct emissions
  - Indirect emissions (electricity and heat used）
- Emission Allowance Allocations
  - Legal entity-based
  - Covering both direct and indirect emission
  - Free allocation
- ETS Established
  - 2013: Shenzhen, Shanghai, Beijing & Guangdong
  - 2014: Hubei & Chongqing

New Reform Initiatives Established at the Party's Third Plenum

- Reform targets
  - Slower but sustainable economic growth;
  - A shift in the economic structure from investment toward consumption, and;
  - Building an "ecological civilization"
- New measures highlighted
  - Liberalizing energy prices;
  - Taxing energy-intensive and highly polluting industries;
  - Levying taxes on resource inputs, and;
  - Developing market-based approaches for protecting the environment.

Carbon Price & Fossil Fuel CO2 Emissions



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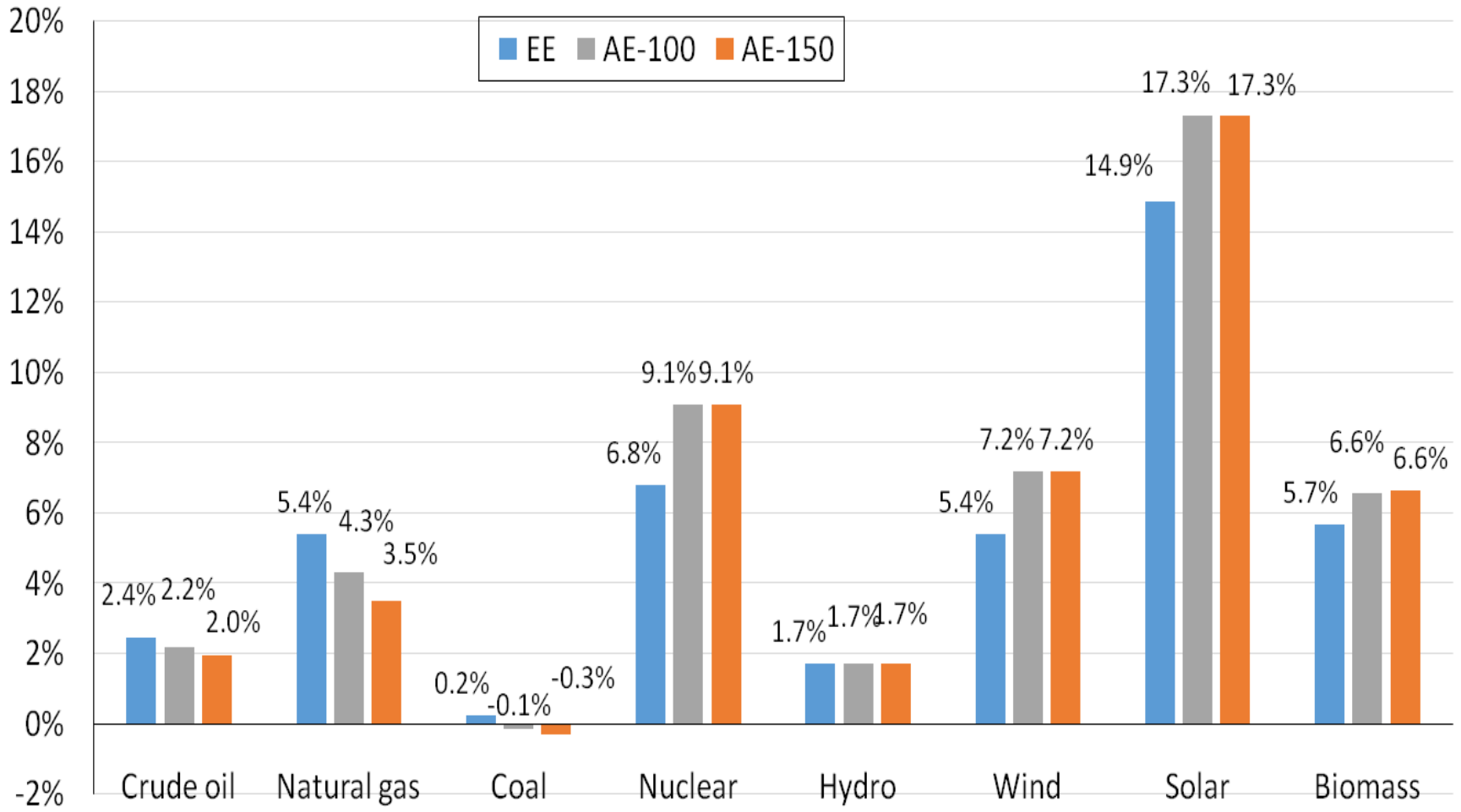
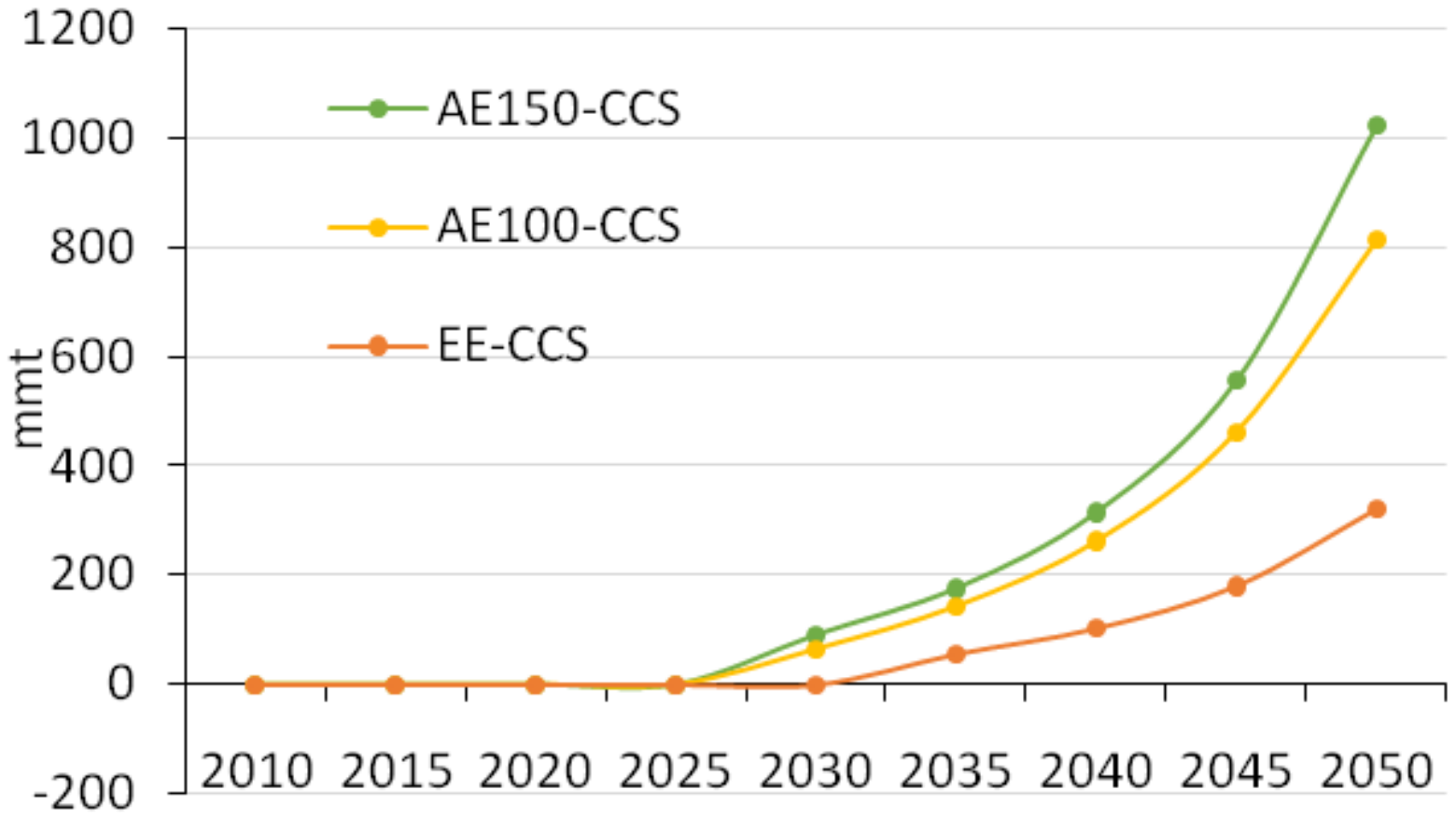
Average Annual Growth in Energy Consumptions from 2010 to 2050



CO2 Emission Reductions by CCS



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Concluding remarks

- Sustainable energy and LCD is motivated more by domestic strategic interests than international pressures.
- Political will is fast growing at all levels of governments
- Legally binding targets provide guidance for mobilising social, political and economic resources
- Market-based instruments will play an increasing role in China's low carbon development
- Reform targets and directions established at the Third Plenum will profoundly affect China's energy system transformation process.

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Thank you for your attention!

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