China’s Energy Efficiency Policies

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PRC’s Energy Consumption Mix

- Industries consume 58% of total energy; 3/4th of which is consumed in Iron & Steel, petro chemical, and cement industries.
- Buildings consume about 1/3rd of the total energy consumption.
**Energy Intensity Trend in the PRC and elsewhere**

- PRC’s energy intensity is more than double the world average and OECD average.
- PRC’s energy intensity sharply declined by 60% since 1990.
- There has been a sharp decline (1990 – 2000), moderate increase (2000 – 2005) and again decline since 2006.
Energy Efficiency Challenges

• PRC is the largest energy consumer and GHG emitter in the world and energy consumption grew at 6.0% p.a 1990 – 2007.
• PRC is increasingly dependent on energy imports.
• Over 58% of energy in PRC is consumed in the industrial sector.
• Poor urban air quality due industrial air pollution.
• The per capita energy consumption in PRC is less than 20% of OECD average.
• However, the energy consumption per unit of GDP in PRC is about twice the OECD average.
• Energy consumption per unit output in heavy industries in PRC is more 25% higher than OECD average.
Achievements during $11^{th}$ FYP (2006 – 2010)

- Energy intensity improvement target of 20% was set under $11^{th}$ FYP and actual achievement was 19.1%.
- The growth in energy consumption was 6.6% p.a. compared to GDP growth of 11.2% during $11^{th}$ FYP.
- The energy to GDP elasticity was reduced from 1.04 ($10^{th}$ FYP) to 0.59 during $11^{th}$ FYP.
- However, China’s energy consumption increased from 2,475 mtce in 2006 to excess of 3,100 mtce in 2010.
- The energy savings achieved is in excess of 600 mtce compared to business as usual. (more than combined energy consumption of South East Asia)
Policy Initiatives under 11th FYP

• 1,000 key enterprise (over 100,000 tce) program targeting the largest energy consumers in the country.
  – Energy Saving responsibility contracts with quantified energy savings to be achieved and penalties for non compliance.
  – Establish corporate energy management units
  – Adapt energy audits and energy metering.
  – Establish dedicated energy management systems.
  – Increase investments in energy efficiency
  – Develop internal incentives and penalties.

• Provincial government expanded the program to include the second tier enterprises.
Policy Initiatives under 11th FYP

• Capital subsidies for energy efficiency investments. (RMB 200 – 250 per mtce saved). More than $15 billion was allocated by government during 2007 – 2009.

• Provincial level monitoring and supervision systems were established.

• Regulations on phasing out and elimination of obsolete inefficient industrial capacity.

• Compensation for eliminating backward capacity

• Differential energy pricing and taxation for technologies earmarked for elimination.

• More stringent energy efficiency requirements on approval of new capacity.
Energy Efficiency Improvement During 12th FYP (2011 – 2015)

- National target of 16% improvement in energy intensity and 17% improvement in carbon intensity over 2010
- The measures initiated in the previous program was implemented with increased coverage.
- The scope of Key Enterprise program was expanded to include 10,000 enterprises consuming more than 5,000 tce.
- Supervision and Monitoring mechanisms to verify energy savings was strengthened.
- Development and promotion of new EE technologies.
- Further developing energy performance contracting.
- Instituting corporate energy management systems in key enterprises.
Possible Strategy for Meeting Energy Intensity Targets

Changes of economic output

- Growth in household energy use (+47 Mtoe)
- Shift towards tertiary sector (-350 Mtoe)
- Shift within secondary sector (-235 Mtoe)
- Boiler, furnace, and motor efficiency (-97 Mtoe)
- 20 GW of waste heat recovery (-49 Mtoe)
- 510 million m² of building retrofits (-16 Mtoe)
- Remaining (-102 Mtoe)

2015 target: -16%

Source: Bloomberg New Energy Finance analysis. Note: Figures in brackets denote change in energy consumption relative to a scenario with economic growth to 2015 with 2010 energy intensity.
PRC Energy Saving Efforts under the 12th FYP (2011 – 2015)

- PRC has achieved 18.2% reduction in energy intensity during 12th FYP.
- Subsidy program expanded to cover ESCOs and smaller projects. (>100 tce and < 10,000 tce) with additional local government top up.
- Subsidies cover 10% – 15% of investment cost.
- Exemptions from income tax for eligible ESCOs
- US $113 billion during 11th FYP to achieve energy savings of 379 million tce at an average cost of $300) per tce.
- US $200 billion during 12th FYP to achieve 400 million tce at an average cost of $500) per tce.
Key Initiatives 12th FYP

- Allocation of responsibilities for achieving energy intensity reductions to local governments
- Improved energy consumption statistics and monitoring and piloting real time data collection.
- New capacity in energy intensive industries tightly controlled and subject to energy assessment.
- Speed up phasing out of backward capacity of energy intensive industries. Targets allocated to provinces.
- Provinces and enterprises failing to phase out backward capacity to be penalized.
- Promoting upgrading and retrofitting of traditional industries.
Key Energy Saving Efforts Implemented under 12\textsuperscript{th} FYP

- Upgrading efficiency of industrial & heating boilers (2\% - 5\% improvement)
- Waste heat and back pressure recovery in industrial plants (20 GW of electricity generation)
- Variable frequency drive motors (2\% - 3\% improvement)
- Energy efficiency improvement in space heating (500 million sq. m with improved heat supply systems) with meters.
- Deploy automated Energy Management Systems in large industries.
- Promote advanced technologies in steel, petro chemical, chemical, cement and non ferrous industries.
- Install desulphurization systems in key industries.
Conclusion and Summary

• China has achieved improvement in energy intensity of 34% compared to 2005.
• The energy conservation efforts have avoided close to 750 mtce of energy consumption roughly equal to the energy consumption of India.
• More than half of energy intensity reduction is due to structural changes in the economy.
• The 13th FYP (2016 – 2020) set a target for further reduction of energy intensity by 15%.