Energy Conservation Strategies in China

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Founded in 2009

- 15 faculty members
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Research fields:
- Energy Supply and Demand
- Energy Efficiency and Conservation
- Energy Market and Carbon Markets
- Climate Change and Environmental Issues
- Energy Security and Warning
- Agricultural Emission Reduction
- Energy Modeling and System Development
Energy Conservation Strategies in China

- Energy conservation achievements
- New policy targets
- Policy actions
- Opportunities and Challenges
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Earlier policies

- Resource-conservation: one of the three basic state policies
- Stress both developing and saving, with priority given to saving
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**Energy Intensity (Year 2005=1)**

TPES (Mtce)

Sources: NBS (2012) and CEEP.
National achievements in the 11th FY

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National achievements in the 11th FY

- China has made unprecedented efforts to energy conservation since 2006.
- In the 11th FY, total energy consumption increased 6.6%/y, while GDP grew by 11.2%/y.
- Energy intensity was reduced by 19.1% in the 11th FY, equivalent to 340 Mtce savings.

Sources: NBS (2012) and CEEP.
Provincial achievements

Energy intensity reduction assignment in the 11\textsuperscript{th} FY

Sources: NDRC (2011) and Liao (2012).
Provincial achievements

Energy intensity reduction assignment in the 11th FY

- All the regions except for Xinjiang have successfully accomplished the assignments.
- Beijing ranks the first. It’s intensity decreased by 26.6%.

Sources: NDRC (2011) and Liao (2012).
### Backward Production Capacities Phased-out in the 11th FY

<table>
<thead>
<tr>
<th>Product</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small thermal power</td>
<td>76.82GW</td>
</tr>
<tr>
<td>Cement</td>
<td>370Mt</td>
</tr>
<tr>
<td>Steel</td>
<td>72Mt</td>
</tr>
<tr>
<td>Iron</td>
<td>120Mt</td>
</tr>
<tr>
<td>Coke</td>
<td>107Mt</td>
</tr>
<tr>
<td>Paper</td>
<td>11.3Mt</td>
</tr>
<tr>
<td>Glass</td>
<td>45M cases</td>
</tr>
</tbody>
</table>

- The proportion of thermal power generating units with a generation capacity above 300,000 kw each in China’s thermal power installed capacity increased from 47% in 2005 to 71% in 2010.
- The proportion of large iron production blast furnaces with a capacity above 1,000 cu m each increased from 48% to 61%.

*Source: State Council Information Office (2011).*
Energy intensity of main industrial products decreased remarkably

<table>
<thead>
<tr>
<th>Product</th>
<th>Y2005</th>
<th>Y2010</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal power supply</td>
<td>370 g/kwh</td>
<td>333 g/kwh</td>
<td>-10.0%</td>
</tr>
<tr>
<td>Steel</td>
<td>694 t/kce</td>
<td>605 k/tce</td>
<td>-12.8%</td>
</tr>
<tr>
<td>Cement</td>
<td>-</td>
<td>-</td>
<td>-24.6%</td>
</tr>
<tr>
<td>Ethylene</td>
<td>-</td>
<td>-</td>
<td>-11.6%</td>
</tr>
<tr>
<td>Synthetic ammonia</td>
<td>-</td>
<td>-</td>
<td>-14.3%</td>
</tr>
</tbody>
</table>

In end of 2010, 26 nuclear power units with a total installed capacity of 30.9 GW were under construction, making China a country with the largest scale of under-construction nuclear power capacity in the world.

In 2010, hydropower generation was 72.1 TWh, accounting for 17% of the national total power generation. For many years, China has stably ranked first in the world in both installed capacity, under-construction capacity and power generation of hydropower. At the end of 2010, the total installed capacity of hydropower is over 213 GW.

Wind power in 2010

Till the end of 2010, the total installed capacity of wind power reached **41.83 GW**. Rank 1st in the world.

Source: NDRC (2011)
The photovoltaic solar industry developed rapidly. Till the end of 2010, China had an accumulative installed capacity of 600 MW for PV solar power; the heat collecting area of solar water heaters had reached 16.8 million m².

Source: NDRC (2011)
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- **New policy targets**
- Policy actions
- Opportunities and Challenges
Energy Conservation Policy Levels

- National 12th FYP (National congress)
- Comprehensive Work Plan for Energy Conservation and Emission Reduction During the 12th FY (State Council)
- Sectoral Work Plan for Energy Conservation (Industrial, Transport, Building, ...)
- Provincial work plan (Provincial authorities)
- Launch a campaign to get 10,000 enterprises to save energy (company level)
- Residential...
New policy targets

- In addition to conventional intensity targets, **Controlling Total Energy Consumption** is proposed.

*Source: NDRC (2011)*
New policy targets

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- Reduce energy intensity by 16% in 2011-2015 (3.5% annually in average), and achieve energy savings of 670 Mtce.
- Reduce carbon intensity by 17% in 2011-2015.
- **Non-fossil energy** accounts for >11.4% in 2015, and >15% in 2020.
- Increase 40 million hectares of forest, and 13 billion cubic forest stock volume 2006-2020.

Source: NDRC (2011)
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- *Non-fossil energy* accounts for >11.4% in 2015, and >15% in 2020.
- Increase 40 million hectares of forest, and 13 billion cubic forest stock volume 2006-2020.
- Energy conservation is highlighted in the 12th Five-Year Plan *than ever before*.

Source: NDRC (2011)
Aggregate energy intensity reduction targets by province

10%
15%
17%
16%
18%

Sources: State Council (2011) and Liao (2012).
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Policy actions: industrial structure

- Limit the excessively rapid expansion of energy-intensive and highly-polluting industries
- Eliminate backward production capabilities
- Upgrading of traditional industries
- Adjust energy structure
- Increase the proportions of the service industry

Source: NDRC (2011)
Policy actions: responsibility

- Allocate the national targets to the regions
- Improve energy statistical, monitoring and evaluation systems
- Enhance the assessment of target responsibilities

Policy actions: economic policies

- Pricing mechanism reform
- Gov. funding on energy conservation
- Government green procurement
- Reform of environmental and resource taxes
- Curb the export of energy-intensive
- Energy efficiency labeling and certification for energy-conservation products...

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How about in 2011

- Total energy consumption climbed to 3.48 Btce.
- The main industrial energy intensive products continued increasing. eg. finished steel 9.0%, cement 11.2%.
- Energy intensity only reduced by 2.01%. According to this speed, it will only decrease by 9.6% in 12\(^{th}\) FY, much lower than 16%.

Source: NBS (22 Feb 2012)
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The situation is not optimistic.
Opportunities

- **Large market capacity** for high energy efficient technologies
  - 1.3 billion population, large product and infrastructure demands,
  - Low average and marginal cost for each technology

Source: Liao (2012)
Opportunities

- Unbalanced regional development means the undeveloped can “import” new technology from the developed.

Source: Liao (2012)
Opportunities

- Strong political will
Challenges

- Economic stages: industrialization and urbanization
- Investment-driven mode of economic growth, and most investment are construction industry related.
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- There many other economic-social development goals are conflict to energy conservation. How much priority is given to energy conservation and how to trade off them are most difficult.
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- Many residents have weak sense on energy conversation especially when their incomes are high.
- The high cost of energy conservation performance assessment.
Challenges

- The potential for energy intensity reduction is decreasing
Challenges

- Almost no one is responsible for the invisible energy wasting, such as the short-life of buildings, roads,...

Source: Xinhua
Thanks for your attention!

Q&A