Status of China’s regional trading programs: progress and challenge

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2013 Aug 13-15
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• Background
• Pilot project at local level
• ETS and Power industry
• Challenges and problems
Background

- **GDP:**
  - 40 thousand billion RMB in 2010

- **GDP per capita**
  - 5,000 USD
  - Middle income level
Background

- China’s economic structure
  - During industrialization phase
Background

- China’s population and urbanization
  - Population: 1.35 billion
  - Urbanization: 50%
Background

- Energy consumption 3.25 billion tce in 2010
- Decoupling of economic growth and energy consumption during the 11th FYP
Background

- Policy context, objectives and envisioned role for new market instruments
  - China set the target to reduce its CO2 emissions per unit of GDP by 40–45 percent by 2020 compared with the 2005 level.
  - A binding target of reducing the CO2 emissions per unit of GDP by 17% during the 12th Five-Year Plan period was established.
  - China initiated low carbon pilot projects in five provinces and eight cities.
  - The National People’s Congress approved Outline of the 12th Five-Year Plan, which clearly mentions that China will establish statistical and verification systems for GHG emissions and gradually establish a carbon emissions trading system.
Background

• Overview of China’s GHG emission
  – According to China’s National Program on Climate Change, China’s total GHG emissions in 2004 were 6.1 billion tons of CO2 equivalents.
  – After removing the amount of carbon sink, the net emission of GHG in China in 2004 was 5.6 billion tons of CO2e.
  – China is still at a lower stage of development with a huge population.
Background

• Interest in carbon market

  – Emissions trading could help achieve the objective of controlling GHG emissions at lower costs.

  – The Government of China will, according to the requirements of the Outline of the 12th Five-Year Plan, gradually establish a market system for carbon emissions trading to promote the achievement of its carbon intensity reduction objective.

  – The National Development and Reform Commission (NDRC), is prompting with great efforts the establishment of a carbon market.

    • To promote trading of voluntary credits generated on a project-by-project basis
    • To organize relative provinces and municipalities to introduce emissions trading systems.
    • Try to establish a unified national system in 2015.
Background

• Key relevant initiatives

  – Strengthening local capacity to compile local greenhouse gas inventories
    • NDRC has published guidelines for compilation of provincial greenhouse gas inventories, and initiated the work on the compilation of local greenhouse gas inventories.

  – Plans to organize research on guidelines for emission accounting for key sectors
    • NDRC is now organizing research on the methodology for emission accounting for key sectors, and will publish guidelines for emissions calculation.
Pilot project at local level

- Why these regions?
  - Level of economic development
    - Relatively development
  - Strong economic power
  - Large carbon emission volume
  - Potential market volume
    - Large cap
    - Many market players
    - Trading volume
## Pilot project at local level

### Key index of pilot project provinces

<table>
<thead>
<tr>
<th>Province</th>
<th>GDP per capita (RMB)</th>
<th>Rank</th>
<th>Energy intensity (tce/10,000 RMB)</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>71935</td>
<td>1</td>
<td>0.582</td>
<td>1</td>
</tr>
<tr>
<td>Tianjian</td>
<td>71012</td>
<td>2</td>
<td>0.826</td>
<td>7</td>
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<tr>
<td>Shanghai</td>
<td>65334</td>
<td>3</td>
<td>0.712</td>
<td>3</td>
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<tr>
<td>Chongqing</td>
<td>27472</td>
<td>14</td>
<td>1.127</td>
<td>14</td>
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<tr>
<td>Guangdong</td>
<td>44070</td>
<td>6</td>
<td>0.664</td>
<td>2</td>
</tr>
<tr>
<td>Hubei</td>
<td>27876</td>
<td>12</td>
<td>1.183</td>
<td>20</td>
</tr>
</tbody>
</table>
Pilot project at local level

<table>
<thead>
<tr>
<th>Regions</th>
<th>Targets in 12th FYP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>18%</td>
</tr>
<tr>
<td>Tianjin</td>
<td>19%</td>
</tr>
<tr>
<td>Shanghai</td>
<td>19%</td>
</tr>
<tr>
<td>Hubei</td>
<td>17%</td>
</tr>
<tr>
<td>Guangdong</td>
<td>17%</td>
</tr>
<tr>
<td>Chongqing</td>
<td>19.50%</td>
</tr>
<tr>
<td>Shenzhen</td>
<td>(19.50%)</td>
</tr>
</tbody>
</table>

GDP share: 25.66% ➔

CO2 emission share: 18.64% ➔
Overall layout roadmap of China’s ETS

Pilot project at local level

2005~
CDM project

2011~
VER trading

2011~2013
Learning phase of pilot regions

2013~2015
Formal regional ETS

After 2016 National ETS

Overall layout roadmap of China’s ETS
Pilot project at local level

- Beijing—published “Proposal on the regulatory framework for the pilot emission trading scheme”
  - Trade subject: enterprises with stationary source emission
  - GHGs included: CO2
  - Trade system: under construction, prior to local exchange
1. Publish instructional policy
2. Determine participating agencies & allocation scheme
3. Publish guideline for carbon accounting
4. Publish the administrative regulation on carbon emission trading
5. Publish regulation for third party accounting & verification
6. Training: compile the emission report
7. Organize accounting for initial emission level
8. Establish the electronic reporting, registration, trading & monitoring system
9. Initial allocation of allowances
10. Trigger the trading
11. Improve supporting policy & trade system
12. Analyze results of Shanghai ETS & adjust for national ETS
Pilot project at local level

• Cap
  – Account CO2 emission cap according to the target of carbon per unit of GDP decrease during 2011 to 2015

• Allocation
  – Free allowance of 2013 will be allocated according to average annual emission of 2009-2011
  – Little allowance will be auctioned by government in the future
  – Enterprises should submit allowance annually. Allowance can’t be borrowed and will be cleared by the end of 2015.
Pilot project at local level

- Sector selection

- Abatement potential
- Reduction cost
- Sector competitiveness
- MRV infrastructure
Pilot project at local level

• MRV
  – Reporting system for enterprises entered into mandatory carbon market.
  – To publish “GHG accounting guideline” for various sectors
  – Appointed public and private energy service companies (ENSCos) to take on the responsibilities for the monitoring and auditing of the energy consumption in the city
  – Report GHG inventory at enterprise level including accounting methodology and monitor method adopted.
    • The report should be verified by the 3rd party.
## Pilot project at local level

<table>
<thead>
<tr>
<th></th>
<th>2020 GHG emission</th>
<th>Industries covered</th>
<th>Allocation</th>
<th>Register system</th>
<th>MRV</th>
<th>Regulation</th>
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</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>GHG inventory, model forecast</td>
<td>≥ 10,000 ton CO2e</td>
<td>Average emission of 2009-2011</td>
<td>Draft</td>
<td>Energy consumption report</td>
<td>Published</td>
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<td>Tianjin</td>
<td>Forecast</td>
<td>Industries with high energy consumption</td>
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<td>Draft</td>
<td>Database of emission factors</td>
<td>Draft under discussion</td>
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<tr>
<td>Shanghai</td>
<td>GHG inventory, model forecast</td>
<td>≥20,000 ton in industry sector; ≥10,000 in service sectors</td>
<td>2009~2011 history emission</td>
<td>Framework established</td>
<td>Report system according to sectors</td>
<td>Published</td>
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<tr>
<td>Hubei</td>
<td>2020 GHG emission report</td>
<td>≥60,000 ton</td>
<td>Under discussion</td>
<td>Research report</td>
<td>Draft “MRV regulation”</td>
<td>Draft incentive regulation</td>
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<td>Guangdong</td>
<td>2015 GHG emission forecast (tech + economic structure)</td>
<td>Industries with high energy consumption</td>
<td>New entrance and existing</td>
<td></td>
<td>National key energy consumption enterprises investigation</td>
<td>Draft</td>
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<tr>
<td>Chongqing</td>
<td>Accounting report</td>
<td>Enterprises with annual emission beyond 20,000 ton CO2</td>
<td></td>
<td>Under design</td>
<td>Draft technical report</td>
<td>Draft under discussion</td>
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# Pilot project at local level

## Exchanges in China

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Beijing</th>
<th>Tianjin</th>
<th>Shanghai</th>
<th>Chongqing</th>
<th>Guangdong</th>
<th>Hubei</th>
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<td>✓</td>
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<td>voluntary reduction trade</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>pollutant emission trade</td>
<td>✓</td>
<td>✓</td>
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<td></td>
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<tr>
<td>methodology</td>
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<tr>
<td>panda standard</td>
<td></td>
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<tr>
<td>energy efficiency methodology in building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China voluntary emission reduction standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Emissions of power industry

Energy related emissions account for about 77% of China’s total emissions, energy production and conversion account for 45% of the energy related emission. Electricity emissions accounted for about 30% of China’s total emissions, or about 2.4 billion tons of CO₂ emissions in 2008.

Source: Second national communication
# Emissions of power industry

<table>
<thead>
<tr>
<th>Installed capacity (GW)</th>
<th>Generating capacity (TWh)</th>
<th>Operating hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100MW</td>
<td>68</td>
<td>300</td>
</tr>
<tr>
<td>100—300MW</td>
<td>138</td>
<td>622</td>
</tr>
<tr>
<td>300MW</td>
<td>210</td>
<td>1029</td>
</tr>
<tr>
<td>600MW</td>
<td>245</td>
<td>1237</td>
</tr>
<tr>
<td>1000MW</td>
<td>49</td>
<td>250</td>
</tr>
<tr>
<td>Total</td>
<td>710</td>
<td>3438</td>
</tr>
</tbody>
</table>

Source: IEA ERI (2012)

Source: author calculated
Emission reduction pathways of power industry

Long term:
Low-carbon investment

Short term:
Low-carbon dispatch

Consumer response

Source: Australia Government (2011)
Emission reduction pathways of power industry

Long term: Low-carbon investment

Short term: Low-carbon dispatch

Consumer response

Pool Purchase Price

Power plants

Dispatch agency

Electricity consumers

Electricity sales price
## Electricity price reform Memorabilia

<table>
<thead>
<tr>
<th>Data</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 2003</td>
<td>The State Council approved the “power reform program”</td>
</tr>
<tr>
<td>March 2003</td>
<td>The State Electricity Regulatory Commission established</td>
</tr>
<tr>
<td>July 2003</td>
<td>The State Council promulgated the “power price reform program”, determining the power price reform objectives, principles and major reform measures</td>
</tr>
<tr>
<td>March 2004</td>
<td>Promulgated the benchmark electricity price policy, uniformly formulated and promulgated the Pool Purchase Price of new production units in each province</td>
</tr>
<tr>
<td>December 2004</td>
<td>The National Development and Reform Commission promulgated coal and electricity price linkage mechanism</td>
</tr>
<tr>
<td>March 2005</td>
<td>Promulgated 3 Interim Measures on Management of Pool Purchase Price, Transmission-distribution price and Electricity sales price</td>
</tr>
<tr>
<td>May 2005</td>
<td>The first coal-electricity price linkage</td>
</tr>
<tr>
<td>June 2006</td>
<td>The second coal-electricity price linkage, the adjustment of the various regions is between 1.5% and 5%</td>
</tr>
<tr>
<td>In 2007</td>
<td>“The Interim Measures for Allocation of additional revenue on Renewable Energy Power Prices”, “Small thermal power price cuts program”</td>
</tr>
<tr>
<td>July-August 2008</td>
<td>The third and fourth coal-electricity price linkage, electricity price raised twice</td>
</tr>
<tr>
<td>October 2009</td>
<td>Development and Reform Commission and Electricity Regulatory Commission jointly made “several opinions on accelerating electricity price reform(Drafts)”</td>
</tr>
<tr>
<td>October 2010</td>
<td>Development and Reform Commission promulgated “Guiding Opinions on the Pilot Implementation of Tiered Pricing for Household Electricity(drafts)”</td>
</tr>
<tr>
<td>December 2012</td>
<td>Canceled the two-track system of electric coal, perfected the coal and electricity price linkage mechanism</td>
</tr>
</tbody>
</table>
Electricity sales price and its components

- Electricity sales price consists of power purchase cost, transmission and distribution losses, transmission and distribution price and government funds;
- Power purchase costs account for about 65% -70% of the Electricity sales price;
- Government funds consists of Major national water conservancy project construction fund, Reservoir Resettlement Fund, the loan funds of rural power, additional city utilities, renewable energy power price surcharges.

Electricity price adjustment and linkage

• Pool Purchase Price adjustment and linkage
  – Pool Purchase Price assessed by the way “average social cost + reasonable income + tax”; New power plants in the same area implement the same price;
  – Tender Pool Purchase Price is determined by the tender price;
  – When fuel price volatility is too large, Pool Purchase Price will be adjusted accordingly.

• Electricity sales price adjustment and linkage
  – First determine the average Electricity sales price, which is the basis to determine the Electricity sales price of all types of users;
  – Household and agricultural production electricity price is relatively stable and lower than the average price; Commercial, industrial and other category electricity price, is higher than the average price and linked with the average price;
  – Electricity sales price adjustment consists of regular price adjustment and linkage price adjustment; linkage price adjustment is coupled with Pool Purchase Price, but only applied to industrial, commercial and other users.
Challenges and Problems

• Lack of legislation
  • Except for Shenzhen
• Impact to industries, especially to power industries
• Allocation
  • Rule of fair and transparent to be achieved
  • Allocation to new entrance
• Unified emission trading system be established
• Interaction with other policies (e.g. regulatory reform in power sector)
Thanks for your attention!

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2013.1.14