Roadmap of Reconciling Environment, Resources and Economy in China

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1. Features of interaction among environment, resources and economy
2. Challenges in the context of globalization
3. Roadmap of reconciling
4. Possibly decoupling?
1. Environment, Resources and Economy

---too much costs for the growth
A. Enormous pollutant emission has been following with rapid economic expansion.
B. Industrialization process has determined the features of resources consumption and pollution

Partially deterioration and generally stable before the mid-1990s

Partially improvement and nationwide deterioration

Agriculture booming

Light industry

Pre-Heavy Chemical industry

Urbanization rate

Heavy Chemical industry

GDP growth rate
C. Compressed industrialization process has brought about compound environmental problems

1) Industrialized countries, 150-200 years since the late half of 18th century to the late of 1980s;
2) Japan, 100 years from Meiji Revolution to the late 1980s;
3) Asian new industrializing countries and regions, 50 years in the 20th century;
4) China, 50 years from the beginning of 1980s to 2020; or 70 years from 1949 to 2020.
5) Attacked different environmental problems occurring in different stages of development, step by step;
6) In contrast, China is facing and struggling against all environmental problems at same time.
D. Imbalance of economic development has led to the imbalance tendency of environment problems
E. Poor eco-efficiency of economic performance exerts big burden on environment

- High capital inputs
- High resources consumption
- High pollution intensity
F. Heavy pollution and severe ecological degradation leads to big economic losses

- From 1983 to 2004, 8 research institutes and organizations have valued the economic loss caused by some kind of pollution such as air and water:
  - from 2.1% of GDP (East-west study center, 1992) to 9.7% of GDP (WB, 1995);
  - In 2004, 3.05% of GDP, SEPA;
- 4 research institutes and organizations have valued the economic loss caused by ecological damages:
  - from 5.4% to 12.47% of GDP
G. Heavy pollution and severe ecological degradation exerts big negative impacts on the public

The number of complaints about pollution related has increased at the rate of 30% in recent years
Moreover, economic growth cannot sustain any longer if following the current pattern of environment, resources and economy.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>GDP per capita</th>
<th>Urbanization level</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.2 billion</td>
<td>800US$</td>
<td>37%</td>
</tr>
<tr>
<td>2020</td>
<td>1.5 billion</td>
<td>3000US$</td>
<td>55%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Impact</th>
<th>Economic Impact</th>
<th>Eco-efficiency Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td></td>
<td>Scenario 1: no changes in eco-efficiency of economy</td>
<td>Scenario 2: maintain environmental situation in 2000</td>
</tr>
<tr>
<td>2020</td>
<td>Impact: 4-5</td>
<td>Eco-efficiency needs a increase by 4-5 times</td>
<td>Eco-efficiency needs a increase by 8-10 times</td>
</tr>
</tbody>
</table>
2. New challenges in the context of globalization
World Bank studies: atmosphere and water pollutants from 7 sectors, including steel, oil refining, food, chemical, paper, coloured metal and cement, account for 90 percentage of the total emissions and discharges from the 28 industrial sectors globally,

This percentage had never changed obviously in 30 years from 1960 to 1990,

The only change is movement from one place to another place
B. Trade in surplus and environment in deficit

- CCICED: Embodied energy in 2006 net exported goods reached to 668 million tec, 27.6% of the primary energy consumption;
- Tyndall Center for Climate Change Research: Net Chinese exports emitted 1.1 billion tons of carbon dioxide and accounted for 23 percent of Chinese emission in 2004.
- EIA, 2007: 28% of the total energy consumption, and 34% of the total GHG emission.
- In 2005, 5.5 million tons of SO2 emission from net exports-- 39% of total emission, and 61.5 billion tone of water-- 12% of total volume of water consumed by industrial and agricultural sectors
C. Trans-boundary hazard wastes

news paper: 80% of E-wastes of the world is moved to the Asian countries, and 90% of which is coming to China
In a word, China has to fundamentally renew its strategies to shape the model of environment, resources and economic growth from both domestic and global perspectives.
3. New Roadmap of Reconciling environment, resources and economy
### General Picture

<table>
<thead>
<tr>
<th>The top guidelines</th>
<th>Long-term goal</th>
<th>Pathways</th>
<th>Medium-term targets</th>
<th>Actions</th>
</tr>
</thead>
</table>
| Scientific Outlook on Development: *takes development as its essence, putting people first as its core, comprehensive, balanced and sustainable development as its basic requirement, and overall consideration as its fundamental approach.* |  ● Domestic: Harmonious Society—harmony among people; harmony between human and the nature  
● Global: Harmonious World |  ● Domestic: new industrialization road—technology-oriented, high economic benefits, low resource use, low pollution and full use of human resources.  
● Global: peaceful development road—cooperation, win-win and peaceful | All-round better-off society:  
● *Quadruple d GDP per capita by 2020;*  
● *Increase in sustainable ability*  
● ….. |  ● Creation of Innovative country;  
● Changing economic growth pattern;  
● Development zoning nationwide;  
● New rural construction;  
● ….. |
## Resource and Environmental Aspects

<table>
<thead>
<tr>
<th>Social consensus-building</th>
<th>Conservation culture/eco-civilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term goal</td>
<td>Resource-saving and environmental-friendly society</td>
</tr>
<tr>
<td>Pathways</td>
<td>Sound and fast development—resource-saving and environmental protection become preconditions to determine the growth rate of GDP</td>
</tr>
<tr>
<td></td>
<td>Three shifts in relationship between environment and economy</td>
</tr>
<tr>
<td></td>
<td>Help each other, cooperatively promotion, and jointly protection</td>
</tr>
<tr>
<td>Actions</td>
<td>Energy-saving and pollution abatement with two legal-bounding targets</td>
</tr>
<tr>
<td></td>
<td>Circular economy</td>
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<tr>
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<td>National program for climate change</td>
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<td></td>
<td>Economic policies</td>
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<td>SEPA to MEP</td>
</tr>
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<td></td>
<td>……</td>
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</tbody>
</table>
### Energy saving and pollutant abatement in the 11th 5-years period

<table>
<thead>
<tr>
<th>Type</th>
<th>Indicators(22)</th>
<th>Year 2005</th>
<th>Year 2010</th>
<th>Annual Growth Rate (%)</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economic Growth(2)</strong></td>
<td><strong>GDP (Trillion Yuan)</strong></td>
<td>18.2</td>
<td>26.1</td>
<td>7.5</td>
<td>expected</td>
</tr>
<tr>
<td></td>
<td><strong>Per capita GDP (Yuan)</strong></td>
<td>13985</td>
<td>19270</td>
<td>6.6</td>
<td>expected</td>
</tr>
<tr>
<td><strong>Economic Structure (5)</strong></td>
<td><strong>Proportion of Added Value of Service Industry (%)</strong></td>
<td>40.3</td>
<td>43.3</td>
<td>[3]</td>
<td>expected</td>
</tr>
<tr>
<td></td>
<td><strong>Proportion of Service Industry Employment (%)</strong></td>
<td>31.3</td>
<td>35.3</td>
<td>[4]</td>
<td>expected</td>
</tr>
<tr>
<td></td>
<td><strong>Proportion of Expenses for Research, Experiment and Development to GDP (%)</strong></td>
<td>1.3</td>
<td>2</td>
<td>[0.7]</td>
<td>expected</td>
</tr>
<tr>
<td></td>
<td><strong>Urbanization Rate</strong></td>
<td>43</td>
<td>47</td>
<td>[4]</td>
<td>expected</td>
</tr>
<tr>
<td><strong>Population Resource Environment (8)</strong></td>
<td><strong>Total National Population (10,000 persons)</strong></td>
<td>130756</td>
<td>136000</td>
<td>&lt; 8‰</td>
<td>mandatory</td>
</tr>
<tr>
<td></td>
<td><strong>Decrease of Energy Consumption per unit of GDP (%)</strong></td>
<td></td>
<td></td>
<td>[20]</td>
<td>mandatory</td>
</tr>
<tr>
<td></td>
<td><strong>Reduction of Water Consumption per unit of Industrial Added Value (%)</strong></td>
<td></td>
<td></td>
<td>[30]</td>
<td>mandatory</td>
</tr>
<tr>
<td></td>
<td><strong>Coefficient of Effective Use of Agricultural Irrigation Water</strong></td>
<td>0.45</td>
<td>0.5</td>
<td>[0.05]</td>
<td>Expected</td>
</tr>
<tr>
<td></td>
<td><strong>Comprehensive Use Ratio of Industrial Solid Waste (%)</strong></td>
<td>55.8</td>
<td>60</td>
<td>[4.2]</td>
<td>Expected</td>
</tr>
<tr>
<td></td>
<td><strong>Area of Reserved Cultivated Land (100million hectares)</strong></td>
<td>1.22</td>
<td>1.2</td>
<td>-0.3</td>
<td>mandatory</td>
</tr>
<tr>
<td></td>
<td><strong>Decrease of Major Pollutant Emissions (%)</strong></td>
<td></td>
<td></td>
<td>[10]</td>
<td>mandatory</td>
</tr>
<tr>
<td></td>
<td><strong>Forest Acreage (%)</strong></td>
<td>18.2</td>
<td>20</td>
<td>[1.8]</td>
<td>mandatory</td>
</tr>
</tbody>
</table>
As compared with 2006, energy intensity decreased by 3.27%, the total volume of SO2 and COD emissions, by 4.7% and 3.2%, respectively.
Circular economy

- A hundreds of national pilot projects including enterprises, industrial parks, cities and provinces
- Promotion Law for Circular Economy, issued this August and coming into effect from January 1, 2009.

Change the linear way of material flow to the circular way, raising the eco-efficiency, based on 3R principle.
National Program for Climate Change: targets

● Control greenhouse gas emissions
  – Energy intensity will be reduced by 20% by 2010;
  – Share of renewable energy (including large-scale hydropower) in primary energy supply will reach up to 10% by 2010;
  – The extraction of coal bed methane will be up to 10 billion cubic meters;
  – by 2010, the emission of nitrous oxide from industrial processes will remain stable as that in 2005;
  – Increase the forest coverage rate to 20% and have the increase of carbon sink by 50 million tons over the level of 2005 by 2010.

● Enhance capacity of adaptation to climate change
● Enhance R&D
● Raise public awareness and improve management
Initiatives in economic instruments

- Natural resources price and taxation reform
- Environmental fee and taxation: independent taxes and incorporated into other taxes related
- Environmental liability insurance
- Greening credit: equator principles
- Greening securities: benchmark for enterprises entrance in stock market
- Payment for ecologic services
- Tax-break for recycling
- Emission trading
- Public green procurement
- Green trade policies such as tariff reform

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- Natural resources price and taxation reform
4. Possibly Decoupling?
Weak/relatively decoupling: yes

Economic growth

Resources and emission intensity
GDP and Natural Resources Consumption *(Chinese Academy of Environmental Sciences, 2006)*
Natural resources efficiency from 1990 to 2003 in China (Chinese Academy of Environmental Sciences, 2006)
Figure 2-1 Transition in China’s economic growth and energy supply and demand (1971-2004)

Average annual growth and energy/GDP elasticity for 1980-2004
- Real GDP: 9.5%
- Primary energy production: 5.2%
- Primary energy consumption: 5.7%

Energy/GDP elasticity of primary energy consumption: 0.60

Source: Created by Zhidong Li based on “China Statistical Yearbook,” “Statistics Communicé on National Economic and Social Development in 2004,” and other materials.
Economic growth

Resource consumption and impacts on environment

Strong/absolutely decoupling?
5. negative impacts from financial crisis on energy conservation and pollution abatement? –yes/no

- Strong commitment from Chinese Government: not sacrifice environmental targets to stabilize the economic growth.
- 4 trillion RMB in next two years in four areas:
  - Medical treatment, education, social security;
  - Infrastructural construction;
  - Reconstruction of earthquake, including afforestation and forest management;
  - Environmental protection and natural conservation
thank you for your attention!