Summary Report of Information Exchange of APEC Environmental Services

APEC Committee on Trade and Investment

January 2011
Summary Report of the project on Information Exchange of APEC Environmental Services

The project on Information Exchange of APEC Environmental Services (CTI/25/2010T) proposed by China, was approved in September 2010. This project was designed to take concrete actions to implement APEC Environmental Goods and Services (EGS) Work Programme by exchanging the information on both liberalization and technology aspects on environmental services (ES) within APEC economies. One of the important project activities was to hold a symposium of APEC ES during 29-30 November 2010 in Beijing, China.

The symposium was organized by Policy Research Center for Environment and Economy, Ministry of Environmental Protection of China. About 50 participants, including the representatives from APEC economies\(^1\), international experts, local experts and governmental officials, as well as NGO representatives, attended the symposium.

At the symposium, the participants mainly discussed on: 1) the classification, negotiation and market status and trends of ES; 2) transfer or diffusion of ES and ES-related technology.

For the details of the symposium including the information on the programme of the symposium is as attached.

The following points were made in the presentations and discussions in the symposium.

1) APEC has been playing an important role in negotiations on trade liberalization in ES and environmental cooperation.

2) Trade in ES, which have deep impact on sustainable development, have rapidly developed and had huge potential. As estimated, the ES market in the world has been increasing at a rate of 8% per annum. And the value of environmental market in 2010 grew to over 640 billion dollars. Therein, the services segment accounted for a little over half. This would place the environmental industry at roughly the same size as the pharmaceuticals or information technologies industries. Besides the rapid increase of outdoor ES market, it cannot be ignored that both global ES market and indoor ES market are of much importance and have huge potential for development. According

---

\(^1\) Active participants from 11 APEC economies, Canada; Chile; China; Hong Kong, China; Korea; Japan; Mexico; Papua New Guinea; Peru; Chinese Taipei; Viet Nam, participated the symposium.
to the market survey, it is estimated that the value of APEC member economies in indoor air quality consultation and improvement will be up to 26.4 billion dollars in 2010 and 87.8 billion dollars in 2020.

3) Up to now, 59 APEC members have already made commitments on ES. Compared with other service sectors, the restriction for the sector of ES is less. Furthermore, the clearer definition and more detailed classification of ES might be discussed in the future negotiations, which will help to improve the development of ES and the level of commitments.

4) Transfer and dissemination of ES-related technologies are very important for the achievement of sustainable development for APEC economies, which have been reiterated by APEC leaders in Yokohama and are important components of EGS Work Program as well. However, due to the barriers of intellectual property and transfer fee, it is very difficult for developing economies to get access to advanced ES-related technologies. To facilitate and promote technology transfer and dissemination in APEC, as well as to help fight against the climate change and achieve sustainable growth in APEC region, it is urgent and necessary for APEC to take concrete actions individually and collectively.

In order to take concrete actions to promote APEC ES cooperation, the participants made suggestions and recommendations from two aspects:

1) Classification of ES
   i) The ES could be redefined based on the demands of the environment: indoor ES which is for improving the indoor environment; the outdoor ES which is for improving the outdoor and regional environment; and the global ES which is for improving the global environment. This classification will be important complements for W/120 and CPC classification.
   ii) An APEC list of ES could be developed. In order to develop the list, APEC should a) made the information exchange on ES regularly; b) develop new survey and research projects on classification of ES, including research on the environmental classification systems in EU, comparison of EU classification and CPC classification, research on indoor ES and etc.; c) enhance the capacities of ES in developing economies, such as organizing training courses on APEC ES.

2) Technology Transfer or diffusion of ES
   i) APEC should specify the clear goal of APEC ES-related technology cooperation.
   ii) APEC should learn the current status and trends of ES-related technology market within APEC economies, including indoor ES-related technology market, outdoor ES-related technology market, and global ES-related technology market.
   iii) APEC should develop survey and analysis projects on ES-related technology, and identify the key fields of ES-related technology cooperation.
   iv) It is suggested that the ES-related technology should be classified into global
ES-related technology, outdoor ES-related technology and indoor ES-related technology. As for the technology transfer for the global ES, it is recommended to transfer it to developing economies freely, which is the experience of the distribution of the anti-ADIS drugs to Africa. Regarding the outdoor and indoor ES-related technology, it is recommended to operate according to the market model. Specifically, as to the outdoor ES-related, joint development should be considered.

v) APEC should enhance the capacities of developing ES-related technology by strengthening the capacities of the universities or institutions in green technology, strengthening the capacities on the regulations, standards in developing economies, developing APEC guideline and good practice of ES-related technology.

vi) APEC should facilitate the ES-related technology trade and reduce or eliminate the non-tariff barriers by establishing Special Fund for the ES-related technology transfer, developing joint study on ES-related technology, and setting up a transfer center of APEC ES-related technology.

vii) APEC should further promote the information exchanges of APEC ES-related technology, for example, to set a database of APEC ES-related technology, to hold workshops on ES-related technology, and to organize ES-related exhibition, exposition, etc.

viii) APEC should develop cooperative demonstration projects of APEC ES-related technology, and to distribute the good practice.
Day 1: 29 November 2010

<table>
<thead>
<tr>
<th>TIME</th>
<th>CONTENTS</th>
<th>CHAIRPERSONS/SPEAKERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30 – 9.15</td>
<td>Registration</td>
<td></td>
</tr>
<tr>
<td>9.15 – 9.45</td>
<td>Opening Ceremony</td>
<td>Chairperson: Prof. Xia Guang, Director General, Policy Research Center for Environment and Economy (PRCEE), Ministry of Environmental Protection (MEP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Speech by representative of Department of International Cooperation, MEP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Speech by Mr. Chen Chao, Deputy Division Director, Department of International Trade and Economic Affairs, Ministry of Commerce (MofCOM)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Speech by Mr. Tang Dingding, Director General, Center for Environment and Development, MEP / China – ASEAN Environmental Cooperation Center</td>
</tr>
<tr>
<td>9.45-10.00</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>10.00 – 17.00</td>
<td>Session I: The classification, negotiation and market status and trends of environmental services (ES)</td>
<td>Chairperson: MofCOM/MEP</td>
</tr>
<tr>
<td>10.00 – 10.30</td>
<td>Policy of Green Economy in China</td>
<td>Prof. Xia Guang, Director General, PRCEE, MEP</td>
</tr>
<tr>
<td>10.30 – 11.00</td>
<td>The negotiation status and trends of ES</td>
<td>Mr. Xie Cheng, Mission of China to the WTO</td>
</tr>
<tr>
<td>11.00 – 11.30</td>
<td>APEC EGS cooperation</td>
<td>Mr. Chen Chao, Deputy Division Director, Department of International Trade and Economic Affairs, MofCOM</td>
</tr>
<tr>
<td>11.30 – 12.00</td>
<td>ES in developing countries</td>
<td>Dr. Joachim Monkelbaan, ICTSD</td>
</tr>
<tr>
<td>12.00 – 13.30</td>
<td>Lunch break</td>
<td></td>
</tr>
<tr>
<td>13.30 – 16.30</td>
<td></td>
<td>Chairperson: Prof. Hu Tao, PRCEE</td>
</tr>
<tr>
<td>Time</td>
<td>Session</td>
<td>Speaker/Institution</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>13.30 – 14.00</td>
<td>Japan’s perspectives on the discussions of ES Service Liberalization</td>
<td>Mr. Furuya, director, Japan-China Economic Affairs Division Asia and Oceanian Affairs Bureau, Ministry of Foreign Affairs</td>
</tr>
<tr>
<td>14.00-14.20</td>
<td>Environmental Technology Cooperation Mechanism toward China-ASEAN's Green Development</td>
<td>Prof. Zhou Guomei, Deputy Director General, China-ASEAN Environmental Cooperation Center</td>
</tr>
<tr>
<td>14.20 – 14.40</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>14.40–15.30</td>
<td>Redefining ES from demand of the environment</td>
<td>Prof. Hu Tao, PRCEE</td>
</tr>
<tr>
<td>15.30 – 16.00</td>
<td>Indoor air environment service: Demand, supply and potential market in HK and APEC region</td>
<td>Prof. Lee Shuncheng, Research Center for Environmental Technology &amp; Management, Department of Civil and Structural Engineering, The Hong Kong Polytechnic University</td>
</tr>
<tr>
<td>16.00 – 16.30</td>
<td>Global ES: Demand, supply and potential market in China and APEC region</td>
<td>Prof. Mao Xianqiang, Beijing Normal University</td>
</tr>
<tr>
<td>16.30 – 16.50</td>
<td>Comments or questions</td>
<td></td>
</tr>
</tbody>
</table>

**End of Day 1**

**Day 2: 30 November**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Chairperson/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.00- 12.00</td>
<td><strong>Session II: Transfer or diffusion of ES and ES-related technology</strong></td>
<td>Chairperson: Prof. Zou Ji, Renmin University of China</td>
</tr>
<tr>
<td>9.00 – 9.40</td>
<td>Technology transfer in climate change</td>
<td>Prof. Zou Ji, Renmin University of China</td>
</tr>
<tr>
<td>9.40 – 10.20</td>
<td>Technology transfer issues in environmental services</td>
<td>Dr. Joachim Monkelbaan, International Center for Trade and Sustainable Development (ICTSD)</td>
</tr>
<tr>
<td>10.20 – 10.40</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10.40 – 11.10</td>
<td>Technology transfer and diffusion in CDM projects in China</td>
<td>Prof. Tian Chunxiu, Division Director, PRCEE</td>
</tr>
<tr>
<td>11.10 –  11.40</td>
<td>JICA’s technical cooperation in the field of environmental management</td>
<td>Mr. Taniguchi, Japan International Cooperation Agency</td>
</tr>
<tr>
<td>11.40-12.00</td>
<td>Comments and discussions</td>
<td></td>
</tr>
<tr>
<td>14.00 – 16.00</td>
<td><strong>Session III: How to further APEC’s work on ES</strong></td>
<td></td>
</tr>
<tr>
<td>14.00 – 15.00</td>
<td>Discussions on how to further APEC’s work on ES</td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>Event Description</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>15.00 – 15.20</td>
<td>Coffee break</td>
<td></td>
</tr>
<tr>
<td>15.20 – 16.00</td>
<td><em>Presentation of outcomes by discussion</em></td>
<td></td>
</tr>
<tr>
<td>16.00</td>
<td>Closing remarks</td>
<td></td>
</tr>
</tbody>
</table>

*End of the Event*
CONTENTS

1. Policy Orientation for Promoting Green Economy. P1
2. The Negotiation Status and Trends of Trade Liberalization on Environmental Services. P16
3. Environmental Services in Developing Countries. P18
4. Japan’s perspectives on the discussions of Environmental Services Liberalization. P22
5. Environmental Technology Cooperation toward China-ASEAN’s Green Development. P22
6. Redefining Environmental Services (ES) from the Side of Demand for Environment. P25
7. Indoor air environment service: Demand, supply and potential market in HK and APEC region. P29
8. Global-Environmental Service: Demand, supply and potential market in China. P37
9. Innovative Mechanism for Development and Transfer of ESTs: China’s Perspectives. P41
10. Technology Transfer Issues in Environmental Services. P45
11. Technology Transfer and Diffusion in CDM Projects in China. P49
12. JICA’s Technical Cooperation in the field of Environmental Management. P53
绿色经济发展的政策导向
Policy Orientation for Promoting Green Economy

环境保护部政策研究中心 夏 光
Policy Research Center of Ministry of Environmental Protection, China

Green economy has gained recognition around the world as an important countermeasure to the multi-crisis (financial crisis, economic recession, environmental degradation and climate change).

China has proposed the development of green economy, and put forward the new economic growth which is characterized as the low-carbon emissions in related industries such as construction and transportation.

 Contents

• 一、关于“绿色经济”
  Rethinking "green economy"

• 二、绿色经济发展的政策导向
  Policy Orientation for Promoting Green Economy

一、关于“绿色经济”
Rethinking "green economy"

“绿色经济”的两种含义
Two indications of the green economy

现在，人们在大量使用“绿色经济”这个概念，并把它看作是一种新的经济形态。

Today, people in the extensive use of "green economy" concept and put it as a new economic form.
If the green economy is a new economic form, then the original "old" economic patterns mean? What is the green economy in the original "old" economies outside the emerging pattern of economic activity, but refers to the original "old" economic structure changed to a "new" look? Or a bit of both?

In fact, people use the "green economy" in accordance with policies. their own understanding. If these problems are not clarified, neither grasp the extension of the concept, nor to develop targeted policies.

We should adopt such an attitude: the concept of just the rise, we can compare the broad or general to use it, so that it's hosted by a thought or idea to be spreading. When it is widely acceptance, we should turn to engage in serious polish and refinement to make it practice.

The same is true of the green economy. In the beginning, it is important to describe the importance to the new economic model, but not to find out the extension of the concept.

And when we put the green economy into practice, we need detailed understanding of exactly what is meant by the green economy, so as to have targeted policy formulation.
From this extent, we can see that the green economy has two meanings:

1. The first meaning refers to the "economy is to green“. It requests that environment or economic activities benefit to protecting the environment.

2. In this sense, the green economy is not just referring to certain industrial activities, but the whole economic system. It actually refers to the existing economic system should look by the "non-green-type" to "environmental protection".

Here, the "green" is the external limit on economic activity. It requires economic activities are not at the expense of the environment.

Therefore, at this time the green economy can also mean "green economy" or "environment-friendly economy."

Here, "green" is the external limit on economic activity. It requires economic activities are not at the expense of the environment.

Therefore, at this time the green economy can also mean "green economy" or "environment-friendly economy."
Yale University Professor Daniel and Professor Andrew Winston, in the book "From Green to Gold - How to use eco-smart business strategy to build competitive advantage", pointed out: "Why General Electric, Sony, Toyota, Walmart, these world's largest, toughest, the most profit-driven businesses are now talking about environmental protection? Because they gain the competitive advantage from the strategic management on environmental protection."

They maintained that "a whole new perspective on things, will bring real benefits. Over the past four decades, more and more companies find the flexibility on managing the pressure from green wave making potential benefits. In the future companies not only create a business profits, but also to create a healthy and sustainable world."

We can in this sense call green economy as "Green Nuggets", that is, environmental protection can become a source of economic profit as well as economic growth. For example, pollution control, environmental infrastructure, new energy development, green food R&D, can bring new profits. It changed the image that "environmental protection can just lose, not make money".

We can also see that "green economy" stress on "green" is pursuing profits, but also to create a business growth potential benefits. The future companies not only create a business profits, but also to create a healthy and sustainable world.

We should pay attention, at this moment "green economy" stress on "green" is environmental protection is also necessary to ensure that the economy is "green".

The second meaning refers to "from the environmental to the economy", that is, to obtain economic benefits from environmental protection activities. The emphasis is on "green".

Secondly, it means "from environmental to economy", means economic benefits from environmental protection.

"From Green to Gold" book pointed out: "To get competitive advantage from environmental protection is "green"."

It should be noted that the "green economy" emphasis was placed on "green", that is, for the purpose of environmental protection. Even it is necessary to give up part of the cost-effectiveness to ensure that the economy is "green".

Secondly, it means "from environmental to economy", means economic benefits from environmental protection.

They believe "From new perspective on things, will bring real benefits. Over the past four decades, more and more companies find the flexibility on managing the pressure from green wave making potential benefits. In the future companies not only create a business profits, but also to create a healthy and sustainable world."
• 以上两种含义分别强调了“绿色”和“经济”两个方面，它们的共同要求是追求同时产生环境效益和经济效益。

• Respectively, emphasized the meaning of the above two aspects: "green" and "economic". The common pursuit is to produce environmental benefits and economic benefits.

因此，二者合起来，可以形成一个绿色经济的定义：绿色经济是指那些同时产生环境效益和经济效益的人类活动。

• Therefore, the two together, can form a green economy definition: the green economy refers to those human activities that generate environmental and economic welfares.

2. “绿色经济”的两项外延
2. Two extensions of "Green economy"

• 按照绿色经济是能同时产生环境效益和经济效益的人类活动的定义，可以看到，绿色经济的外延由两部分组成：

• In accordance with definition of green economy, there are tow parts of the extension on it:

• 外延一：对原有经济系统进行“绿化”或生态化改造。

• Extension I: Transforming the original economic system to "green" or “ecological”.

它包括开发新的生产工艺，降低或替代有毒有害物质的使用，高效和循环利用原材料，降低污染物的产生量，对污染物进行净化治理等，这些活动都能减轻对环境的压力，并通过节约资源而获得经济效益，对传统产业都是适用的。

It includes the development of new production processes, reduce or replace the use of toxic and hazardous substances, efficient and recycling of raw materials, reducing the amount of pollutants, purification treatment of the pollutants and so on.

These activities can reduce the pressures on the environment and obtain economic.

• 实际上，现代工业已经在很大程度上做到了低排放甚至零排放，所以尽管产业是传统产业，但属性上已属于绿色经济。

• In fact, modern industry has largely succeeded in low-emission or zero-emission. It can be seen as green economy.


- It includes ecological agriculture, eco-tourism, organic food, renewable energy, services, high technology, forestation, etc., known as the "green industry" which is characterized by a natural environment-friendly.

- The “to accelerate the development of industrial, construction, transportation systems etc. with the characteristics of low-carbon emissions”, which are put forward by China’s Government developed, are within this scope.

- It includes ecological agriculture, eco-tourism, organic food, renewable energy, services, high technology, forestation, etc., known as the "green industry" which is characterized by a natural environment-friendly.

- These industries are not all new industries. Some industries have a long history, over several thousand years. For example, China’s traditional farming practices in using the principle of recycling of resources, is full of ecological civilization wisdom.

- These industries are not all new industries. Some industries have a long history, over several thousand years. For example, China’s traditional farming practices in using the principle of recycling of resources, is full of ecological civilization wisdom.

- These industries are not all new industries. Some industries have a long history, over several thousand years. For example, China’s traditional farming practices in using the principle of recycling of resources, is full of ecological civilization wisdom.

- We found the policy focus by clarified the extension of green economy, that is promoting green economic development.
• We need to develop policies in both directions. One is the promotion of the economic system of green-oriented policies. The other is to encourage green industry development policies.

3. “Green economy” applicability

3. The applicability of the “green economy”

The diagram illustrates the four quadrants of the green economy:

- Quadrant I: Green economy (dealing with environmental damage and poverty)
- Quadrant II: Green economy (post-pollution)
- Quadrant III: Green economy (economic development situations)
- Quadrant IV: Green economy (environmentally friendly situations)

From the diagram:

- In Quadrant I (green economy), realm that is most worth pursuing, but not the only state. Quadrant II is not satisfactory, but is also a last resort approach. People often have to go through this stage in order to reach the green economy realm.

- In Quadrant II, the special ecological system is absolutely necessary (for example Nature Reserve), where the environment is unique, and no need to emphasize the significance of a green economy.

- In Quadrant II, the particular circumstances that restrictions on development and preserve the original environment.

- In Quadrant III, no environmental protection with economic conditions, which is prone to the early stages of economic development situations.

- In Quadrant IV, the green economy is a market economy.

We need to have policies in both directions. One is the promotion of the economic system of green-oriented policies. The other is to encourage green industry development policies.

In Quadrant II, the special ecological system is absolutely necessary (for example Nature Reserve), where the environment is unique, and no need to emphasize the significance of a green economy.

In Quadrant II, the particular circumstances that restrictions on development and preserve the original environment.

In Quadrant III, no environmental protection with economic conditions, which is prone to the early stages of economic development situations.

In Quadrant IV, the green economy is a market economy.

- Quadrant I: Green economy (dealing with environmental damage and poverty)
- Quadrant II: Green economy (post-pollution)
- Quadrant III: Green economy (economic development situations)
- Quadrant IV: Green economy (environmentally friendly situations)

From the diagram:

- In Quadrant I (green economy), realm that is most worth pursuing, but not the only state. Quadrant II is not satisfactory, but is also a last resort approach. People often have to go through this stage in order to reach the green economy realm.

- In Quadrant II, the special ecological system is absolutely necessary (for example Nature Reserve), where the environment is unique, and no need to emphasize the significance of a green economy.

- In Quadrant II, the particular circumstances that restrictions on development and preserve the original environment.

- In Quadrant III, no environmental protection with economic conditions, which is prone to the early stages of economic development situations.

- In Quadrant IV, the green economy is a market economy.
• 第IV象限是既无发展也无环保的情况，反映了一些地方破坏了环境结果经济也无法发展的“双输”局面；
• In Quadrant IV, neither development nor environmental protection, reflecting the "lose-lose" situation;

• 所以发展绿色经济要放在特定的背景下理解。发展绿色经济也是有前提的。有时候即使不是绿色经济也要去发展，而有时候即使是绿色经济也不能发展。
• Therefore, developing green economy is on the specific background. It has prerequisite.

• 不应不分条件地总是把绿色经济置于很高的位置，它毕竟是一种经济活动，为了人类的生存环境，有时我们不得不放弃经济利益。
• It should not place the green economy at a very high position regardless of conditions. It is after all an economic activity. We had to give up economic interests in order to protect the living environment of mankind.

• 因此发展绿色经济要放在特定的背景下理解。发展绿色经济也是有前提的。有时候即使不是绿色经济也要去发展，而有时候即使是绿色经济也不能发展。
• Therefore, developing green economy is on the specific background. It has prerequisite.

• 绿色经济、循环经济、低碳经济、生态经济等都是当前被广泛使用的概念，理清它们之间的关系也很有必要，这样可以使人们在不同的层面和语境下使用之，避免概念之间互相干扰而扰乱认识。
• Green economy, circular economy, low-carbon economy, ecology economy are currently being widely used concept. It is necessary to clarify them, so that to avoid interference.

• 这种划分有其合理性，大致上使每个概念各归其位，清晰有序，但其中对生态经济的理解可能偏窄。
• This division has its own rationality. Each concept is generally the property of their place, clearly and orderly.
• 生态经济中的“生态”并非生态系统中的那个“生态”，而是指“环境”或“绿色”，就像生态文明中的“生态”是泛指自然（环境）一样，所以生态经济应该等同于绿色经济，而不是从属于绿色经济。这样，绿色经济与生态经济是同一的，绿色经济就是生态经济，它包含了循环经济和低碳经济。

通过这样的分析，我们分清了这些概念的层次，也可体现各个概念适合使用的特殊场合。

发展绿色经济，就是发展循环经济等这些具体的经济运行方式，从而说明我国过去出台的推动循环经济发展等政策措施仍然是有用和有效的，并非因为现在提出了绿色经济的概念而不再适用。

归纳一下，上述几个概念就形成了以下关系：

- Summarize

  循环经济
circular economy

  绿色经济（生态经济）
Green economy
  （ecological economy）

  低碳经济
  low-carbon economy

  生物经济
  Bio-economy

二、绿色经济发展的政策导向
Policy Orientation for Promoting Green Economy

由于绿色经济具有“绿色”和“经济”的双重特性，所以，积极促进绿色经济发展需要从环保和经济两个方面制定政策。

As the green economy has double feature as "green" and "economy". It needs to formulate policies to promote green economy development by these both sides.
一般来说，环境政策的主要目的是使经济更绿化，经济政策的主要目的是使环境更赚钱，这两者相互配合，相得益彰，获得共赢。

In general, the main purpose of environmental policy is to make the economy greener. The main purpose of economic policy is to make more money. It can obtain win-win situation.

---

**From economic field: Developing relevant policies in economic field**

- **Catalogue for the Guidance of Adjustment of Industrial Structure released by NDRC (December 2, 2005), which has the catalogue of encouraged industries, catalogue of limited industries and catalogue of phasing out industries**

---

**Encouraged list** mainly includes the promotion of economic development and resource conservation, and the key technologies, equipment and products that facilitate economic and social development, and are conducive to saving resources and environmental protection. The catalogue of encouraged industries lists the key technologies, equipment and products that are encouraged and supported.

**The catalogue of encouraged industries** refers to the key technologies, equipment and products that greatly facilitate economic & social development; and are conducive to saving resources, protecting the environment, upgrading & optimizing industrial structure and in need of policy measures for encouragement and support.

---

- **If the enterprise manufactures building materials with addition of no less than 30% of blast furnace slag**, fly ash or other ash from coal-fueled boilers (excluding blast furnace granulated slag); or manufactures gold or silver with waste liquid (residue) as raw material; or waste recycling operation unit sells the procured waste materials, the State will exempt the value added tax of the enterprise.

---

- **Regulations on Identification of Comprehensive Utilization of the Resources Encouraged by the State (Fagaiwenon Zi. No. [2006] 1864) released by NDRC, Ministry of Finance and State Administration of Taxation**: With reduction and exemption of value added tax, income tax and consumption tax of the enterprises that recycle and reuse waste, the State encourages enterprises to comprehensively utilize resources.

---

- **For utilization of coal mining, electricity manufactured by urban garbage and cement with at least 30% raw materials coming from sources other than coal mining, electricity manufactured by urban garbage and cement with at least 30% raw materials coming from sources other than coal mining, the State will follow the principle of immediately returning the value added tax at collection to the recycled asphalt concrete manufactured with the associated waste from coal mining, electricity manufactured by urban garbage and cement with at least 30% raw materials coming from sources other than coal mining.**

---

- **The State will follow the principle of immediately returning the value added tax at collection to the recycled asphalt concrete manufactured with the associated waste from coal mining, electricity manufactured by urban garbage and cement with at least 30% raw materials coming from sources other than coal mining.**
- The State will exempt 50% value added tax of the power and some new wall material products manufactured from gangue, coal slime, or oil shale and wind.

- In reduction and exemption of income tax: The income tax of an enterprise will be reduced or exempted within 5 years if it employs wastes such as waste water, gas or slag as main raw material for production.

- For processing and utilizing other enterprises废弃物, the enterprises can be exempt from the income tax for one year.

- The income tax of an enterprise will be reduced or exempted within one year if it treats or employs wastes of other enterprises.

- The Circular of the State Council on Further Strengthening Phasing out Outdated Productivity was released on February 6, 2009. China will accelerate phasing out of outdated productivity in such industries as electricity, coal, iron & steel, cement, non-ferrous metals, coking, paper making, tanning, printing and dyeing.

- The Circular of the State Council on Further Strengthening Phasing out Outdated Productivity was released on February 6, 2009. China will accelerate phasing out of outdated productivity in such industries as electricity, coal, iron & steel, cement, non-ferrous metals, coking, paper making, tanning, printing and dyeing.

- In addition, the collection of existing favourable taxation policies extracts and compiles existing favourable policies on value added tax and income tax for comprehensive utilization of waste, which specify the exemption of value added tax of special building material products with slag as raw material and immediately returning the tax at collection or after collection for the products that comprehensively utilize wastes.

- The Circular of the State Council on Further Strengthening Phasing out Outdated Productivity was released on February 6, 2009. China will accelerate phasing out of outdated productivity in such industries as electricity, coal, iron & steel, cement, non-ferrous metals, coking, paper making, tanning, printing and dyeing.

- The Circular of the State Council on Further Strengthening Phasing out Outdated Productivity was released on February 6, 2009. China will accelerate phasing out of outdated productivity in such industries as electricity, coal, iron & steel, cement, non-ferrous metals, coking, paper making, tanning, printing and dyeing.
• Technologies listed in the Outlines:
  - Comprehensive utilization of mineral resources: including 51 comprehensive utilization technologies in such fields as energy, minerals, metal minerals and non-metal minerals;
  - Comprehensive utilization of the “three wastes”: including 156 comprehensive waste utilization technologies in 10 fields such as coal, electricity, petroleum & gas, iron & steel, non-ferrous metals, chemicals, building materials, food, textile and paper making;
  - Recycling & reuse of wastes: Summarizing 27 comprehensive waste utilization technologies for waste metals, waste household appliance, waste tyres, waste paper, plastics, glasses and building waste;

• Other waste resource comprehensive utilization: 
  - Including 23 comprehensive waste utilization technologies for agricultural & forest waste, domestic waste and breeding waste and so on.

• Guide the extension & application of well-established and advanced technology and process: e.g. Employing sulfur-free gypsum to manufacture building materials;

• Guide the promotion of phasing out of outdated production technology, process and equipment;

• Comprehensive utilization of other wastes: 
  - Including 23 comprehensive waste utilization technologies for agricultural & forest waste, domestic waste and breeding waste and so on.

• Guide and facilitate commercialization of new technology: e.g. Commercialization of clean production process of smelting of rare earth elements.

• Guide the promotion of phasing out of outdated production technology, process and equipment;

• The release of the Outline will play an active role in guiding comprehensive utilization of resources and development of circular economy.

• Guide the promotion of phasing out of outdated production technology, process and equipment;

• The release of the Outline will play an active role in guiding comprehensive utilization of resources and development of circular economy.

• The release of the Outline will play an active role in guiding comprehensive utilization of resources and development of circular economy.

• The release of the Outline will play an active role in guiding comprehensive utilization of resources and development of circular economy.

• The release of the Outline will play an active role in guiding comprehensive utilization of resources and development of circular economy.
•近几年，在国家一系列鼓励政策的引导下，我国资源综合利用率取得了显著成效。

Guided by a series of national incentive policies, comprehensive use of resources has obtained significant achievements in China over the past few years.

• 社会生产和消费过程中产生的各种废弃物的回收和再生利用规模也不断扩大，环境效益和经济效益显著。

The scale of recycling and reusing various kinds of wastes generated during production and consumption is under continuous expansion with remarkable environmental and economic benefits.

• 矿产资源综合利用率水平有所提高，目前矿产资源总回收率已近35%，共生矿产综合利用率已近40%。

The comprehensive utilization rate of mineral resources has enjoyed some increase with overall recovery rate of mineral resources at about 35% and comprehensive utilization rate of associated minerals approaching 40%.

• 这些政策并非完全是新生的，而是在环境保护工作中已经使用的一些手段，例如规划、环评、监管、减排、考核等。

These policies are not entirely new, but has been used in environmental protection work, such as planning, environmental assessment, monitoring, mitigation, assessment and so on.

• 从环保领域制定政策：

Developing relevant policies in environmental field:

• 促进绿色经济发展的环境政策，也是针对上述绿色经济的两项外延，从促进传统经济绿化和鼓励绿色产业成长这两个方面来考虑的。

The promotion environmental policies on green economy development focus on two extensions of the green economy.
第一，提高环境准入门槛，促进产业结构优化。要根据环境容量、资源禀赋和发展潜力，把国土空间划分为优化开发、重点开发、限制开发、禁止开发等主体功能区，制定不同的区域发展政策。根据环境容量和资源承载力确定污染物排放总量控制计划，并以此为基础制定经济发展总体规划和专项规划。在一些特殊的地区，要实行环境优先。

第二，加强环境保护管理和执法。依法关闭高耗能、高污染的企业，对排放污染造成重大损失的企业和个人依法追责。围绕水污染防治、大气污染防治、城市环境保护、农村环境保护、生态保护、核与辐射环境安全和推动解决当前突出的环境问题等重点任务，严格执法。

第三，强化环境与经济综合决策机制，实行环境保护问责制。把环境保护前置于经济社会发展的决策阶段，在经济决策过程中强化环境保护的把关和引导作用。从环境保护方面提出对国家和地区经济发展战略的重要建议。对环境有重大影响的决策，应当进行环境影响论证，必要时实行环保一票否决。

第四，把环保要求纳入生产、流通、分配、消费全过程。广泛推行清洁生产，鼓励节能降耗，防范和应对污染事故，构建耗能少、污染的现代生产体系，实行有利于环境保护的流通方式，积极治理铁路、水运等运输污染，保障危险化学品运输和储存安全，限制高污染产品贸易，完善资源再生回收利用，建立清洁、安全的现代物流体系。

把环境保护作为国家宏观经济调控政策的主要标准和重要手段。改革干部考核和任用制度，使那些在落实科学发展观和开展环境保护方面成绩突出的干部得到重用。

Environmental protection as a national macro-economic control policies and important means of the main criteria. Reform of the cadre assessment and appointment system.

In strict accordance with laws and regulations and environmental standards, on the economic and social development planning, economic policy, construction projects, a rigorous environmental impact assessment, environmental capacity shortages and pollutants emission control plan more than the total area, strict limits for contaminants emissions from new construction projects and expansion.

First, improve the threshold of access and optimize the industrial structure. According to the environmental capacity and resources to determine the carrying capacity of total pollutant discharge control plan and as a basis for the formulation of economic development plan and special plans.

Secondly, to strengthen environmental protection management and enforcement. To close down the high energy consumption and high pollution enterprises, causing significant loss of emission pollution enterprises and individuals held responsible according to law.

Thirdly, to strengthen environmental and economic integrated decision-making mechanism, and the implementation of environmental responsibility, have a significant impact on the environment of decision-making, should carry out environmental impact argument, if necessary, to implement the green one-vote veto.

Fourth, the integration of environmental requirements into the production, circulation, distribution, consumption, the whole process. The implementation of the circulation pattern that is conducive to environmental protection.
• 大力倡导环境友好的消费方式，实行环境标识、环境认证、绿色采购和生产者责任延伸等制度，推行垃圾分类和消费品回收，建立绿色、节约的消费体系。

• Advocate environment-friendly consumption patterns
• The implementation of environmental labels, environmental certification, green procurement and systems.

• 第五，制定和实施环境经济政策，创新有利于环境保护的激励机制。出台绿色信贷、污染责任保险、绿色投资等环境经济政策，把产品消费后的处置责任前移到生产者，从而激励生产者按照环境友好的理念进行产品设计，优化生产过程。通过制定引导性的财政和价格政策，引导企业走清洁生产和循环经济之路。

• Fifth, the formulation and implementation of environmental economic policies and the creation of incentives in favor of environmental protection.
• Introduction of green credits, pollution liability insurance, green investment environment, economic policy, post-consumer disposal of the product.
• Through the development of leading financial and pricing policies, guiding enterprises to take the clean production and recycling economy road.

• 从总体上说，绿色经济属于经济范畴，所以促进绿色经济发展的政策应主要从经济领域来制定，其中产业政策和财政政策最为重要。

• Generally speaking, the green economy is one of the economic areas. Therefore, the promotion of green economic development policies should be formulated mainly from the economic field, especially the industrial policy and fiscal policy.

• 通过调整水、电、煤等资源价格促进企业采取资源节约型的生产工艺。

• By adjusting the water, electricity, coal and other resource prices for enterprises to adopt resource-saving production processes.

• 完善环境保护模范城市、生态省（市）、生态示范区、环境友好型企业、绿色学校、绿色社区等创建活动，使那些在推进经济发展与环境保护相互融合方面取得重要进展的地区获得荣誉和实惠。

• Improving environmental protection model cities, eco-provinces (municipalities), ecological demonstration zone, environment-friendly enterprises, green schools, green communities to create activities to those who promote economic development and environmental protection made important progress in terms of integrating the areas of access to honor and benefits.

谢谢！Thanks
The Negotiation Status and Trends of Trade Liberalization on Environmental Services

XIE Cheng, Permanent Mission of China to the WTO
29-30 November 2010

Outline of the Presentation

- Negotiations on trade in services in the WTO
- Current commitments on environmental services
- Negotiations on environmental services in the new round negotiations

Negotiations on trade in services in the WTO

- The framework of the GATS
  - Objective
  - Structure
  - Scope, coverage, and definition of four modes of services supply
- Doha Ministerial Declaration

What are the Environmental Services?

- Classification in the W/120
  - A. Sewage service
  - B. Refuse disposal services
  - C. Sanitation services
  - D. Other

What are the Environmental Services?

- Classification in the CPC prov.
  - Sewage services (CPC 9401)
  - Refuse disposal services (CPC 9402)
  - Sanitation and similar services (CPC 9403)
  - Cleaning services of exhaust gases (CPC 9404)

Current Commitments on Environmental Services

- General
  - Environmental services: one of the least-committed sectors under the GATS
  - 59 Members have undertaken specific commitments in at least one of the seven CPC sub-sectors of environmental services
  - In total, 318 sub-sectors have been scheduled
  - Recently acceded Members have undertaken a proportionally higher level of commitments
Current Commitments on Environmental Services

- Sectoral scope of commitments
  - Most Members have listed their commitments according to W/120 structure and headings, with reference to corresponding CPC definitions
  - In more than 20 schedules, commitments on environmental services

Current commitments on environmental services

- Commitments by mode
  - Mode 1: 47% of the commitments are fully bound and 42% are unbound
  - Mode 2: 91% of the commitments are full commitments
  - Mode 3: 85% of the commitments are

China’s Commitments on Environmental Services

Commitments cover all the seven sub-sectors
  - excluding environmental quality monitoring and pollution source inspection

- Market access commitments
  - Mode 1: Unbound except for environmental consultation services
  - Mode 2: None
  - Mode 3: Foreign services suppliers are

Negotiations on environmental services in the new round negotiations

- Request on environmental services
  - Bilateral requests of other WTO Member to China
    - Plurilateral request

- Offers on environmental services
  - Signaling conference in July 2008

Plurilateral Requests on Environmental Services

- Overview of plurilateral requests in services negotiations

- Requesting Members and recipients of the plurilateral request on environmental services

- Sector coverage
Offers on Environmental Services

• Some developed Members
  
  -the U.S.A: made modification on the classification of this sector
  
  -the E.U: partial improvement in Mode 1 and Mode 4 (Contractual service suppliers)
  
  -Japan made modification on the

Offers on Environmental Services

• Some developing Members
  
  -India: offers in two sub-sectors
  
  -Brazil: No offers in environmental services
  
  -Thailand: Substantial improvements on market access in Mode 4 (Contractual

Possible Offers on Environmental Services in the Signaling Conference

• Backgrounds of the signaling conference in July, 2008

• All the signaling of offers are conditional

• China’s signaling of offers on environmental services
  
  -Improved offer in the following sub-sectors where wholly foreign-owned enterprises are to be permitted:

Trends of Liberalization on Environmental Services

• The trends of DDA services negotiations

• The clustering approach on negotiations of environmental services and energy services

• Possible outcomes in negotiations on environmental services
  
  -Clarification of the definition and

Trends of Liberalization on Environmental Services

• Some concerns of developing countries on liberalization of environmental services
  
  -Cautious to making commitments on Mode 1

  -Lack of substantial commitments on Mode 4

GLOBAL PLATFORM
ON CLIMATE CHANGE, TRADE & SUSTAINABLE ENERGY

Joachim Monkelbaan, ICTSD

Environmental Services in Developing Countries
Overview

- Definition
- Challenges
- Benefits of liberalization
- Development criteria
- Negotiating strategy
- What is needed?
- Exciting new initiatives

Definition

“environmental services consist of those activities, which measure, prevent, limit, and correct environmental damage to air, water, soil, and problems relating to waste, noise, and ecosystems”

OECD/Eurostat

Challenges

- Investment in ES
- Technological capacity
- Access for the poorest
- Sustainability of project
- Development vs. liberalization?

Benefits of liberalization

- Increased efficiency
- Availability of environmental infrastructure
- Employment
- Spillover effects export-oriented sectors
- Export capacity of developing countries

The Environmental Market Development Model
**Development criteria in environmental services regulations**

1. Fair and equitable access by vulnerable groups
2. Pro-poor strategy into environmental service provision
3. Fiscal performance
4. Environmental efficiency of performance

**Development criteria in environmental services regulations – cont’d**

5. Economic efficiency or performance
6. Technical sustainability and enhance host’s capacity
7. Technology transfer

**Negotiating win-win options for developing countries**

- Framework agreement for Asia
- Conditions in mode 3 horizontal commitments
- Priority human development goals

**What is needed in developing countries?**

1. Definition
2. Assessment of environmental services
3. Data and information systems
4. Expert group
5. National overall strategy

**What is needed? Cont’d**

6. Regional approach
7. Domestic institutional capacity and regulatory regimes
8. Enhance the role of the private sector
9. Investment policies
10. Capacity building

**SE FTA**

= Sustainable Energy Free Trade Agreement
So.. it’s time to ACT!

ACT = Alliance for Clean Technology

Services (what does ACT do?)

Supporting partners: 中国政府、瑞士政府、联合国环境署、联合国气候变化公约、世界贸易组织、瑞中经济协会、上海和北京环境能源交易所、欧洲技术之旅、欧洲清洁能源协会等

谢谢

Thank you
Japan’s perspectives on the discussions of Environmental Services Liberalization
Tokoro FURUYA
Director, Japan-China Economic Affairs Division,
Ministry of Foreign Affairs, Japan

Introduction
Japan puts great emphasis on environmental issues
Environmental Services in APEC
Eco-tourism, EGS
Environmental Services in WTO
Plurilateral request on environmental services
Environmental Services in bilateral or other contexts

Environmental Technology Cooperation toward China-ASEAN’s Green Development
China-ASEAN Environmental Protection Cooperation Center (CAEC)

Contents
- Background
  - ASEAN Profile
  - China-ASEAN Cooperation
  - Global green development trend
- China-ASEAN Environmental Cooperation Strategy
  - Background
  - Cooperation Strategy 2009-2015
- Environmental Technology Cooperation

ASEAN: Profile(1)
- ASEAN established on 8 August 1967 in Bangkok by 5 original members (ASEAN-5): Indonesia, Malaysia, Philippines, Singapore and Thailand.
- Brunei Darussalam (8 January 1984); Vietnam (28 July 1995); Lao PDR and Myanmar (23 July 1997); and Cambodia (30 April 1999).
- Total population is about 567 million, spanning land area of 4.5 million sqkm. In 2006, combined GDP almost US$1.1 trillion and total trade of US$1.4 trillion.

ASEAN: Profile(2)
- ASEAN lies in a region that is extremely diverse in terms of ethnicity, culture, religion and political systems.
- Considered one of the world’s most successful regional organizations – a model for the developing world.

China-ASEAN Cooperation(1)
- Official Dialogue between China and ASEAN, 1991
- Jiang Zemin participated the China-ASEAN Summit, signed Joint Declaration, 1997
- Joint Declaration of the Heads of State/government of ASEAN and China on Strategic Partnership for Peace and Prosperity, 2003
China-ASEAN Cooperation(2)

- 01/01/2010, China-ASEAN Free Trade Area fully established.
- Duty free for 7251 products, 91.5% of import from ASEAN
- Duty free for 90% Chinese products exported to Indonesia, Malaysia, Philippines, Singapore, Thailand and Brunei Darussalam

Investment in ASEAN countries

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>21.9</td>
<td>32.4</td>
<td>1.35</td>
<td>2.14</td>
<td>1.16</td>
</tr>
<tr>
<td>Cambodia</td>
<td>26.6</td>
<td>22.6</td>
<td>1.69</td>
<td>1.43</td>
<td>0.76</td>
</tr>
<tr>
<td>Indonesia</td>
<td>4.69</td>
<td>5.27</td>
<td>1.63</td>
<td>0.84</td>
<td>21.57</td>
</tr>
<tr>
<td>Laos</td>
<td>4.72</td>
<td>20.94</td>
<td>75.5</td>
<td>25.69</td>
<td>47.84</td>
</tr>
<tr>
<td>Malaysia</td>
<td>8.08</td>
<td>0.18</td>
<td>1.63</td>
<td>0.12</td>
<td>0.29</td>
</tr>
<tr>
<td>Myanmar</td>
<td>1.63</td>
<td>4.69</td>
<td>8.64</td>
<td>21.57</td>
<td>7.36</td>
</tr>
<tr>
<td>Philippines</td>
<td>0.19</td>
<td>0.01</td>
<td>0.24</td>
<td>0.32</td>
<td>0.15</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.03</td>
<td>0.32</td>
<td>0.15</td>
<td>0.53</td>
<td>0.65</td>
</tr>
<tr>
<td>Thailand</td>
<td>2.94</td>
<td>1.86</td>
<td>0.06</td>
<td>0.10</td>
<td>0.80</td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.06</td>
<td>1.06</td>
<td>1.03</td>
<td>1.84</td>
<td>1.65</td>
</tr>
</tbody>
</table>

China-ASEAN Environmental Cooperation Strategy(1)

- Background
  - Premier Wen Jiabao stated at the 11th China-ASEAN Summit that "we are ready to discuss with ASEAN the formulation of a China-ASEAN strategy on environmental protection cooperation"

China-ASEAN Environmental Cooperation Strategy(2)

- Environmental protection has been made the 11th priority area of cooperation of China-ASEAN cooperation mechanism on the 11th China-ASEAN Summit.

China-ASEAN Environmental Cooperation Strategy(3)

- Six Priority Cooperation Field
  - public awareness and environmental education
  - environmentally sound technology, environmental labeling and cleaner production
  - biodiversity conversation,
  - environmental management capacity building, global environmental issues,
  - environmental goods and services industry
Global Green Development Trend

- Green development is the future of national and regional development.
- The great challenges and opportunities faced by economic development in future: green and low carbon.
- The development of economy:
  - Acceleration of new industrialization system, which is characterized by green and low carbon.
  - Sustainable development.

<table>
<thead>
<tr>
<th>Green Investment in the Green new deal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Amount (bil. RMB)</td>
</tr>
<tr>
<td>Japan</td>
<td>8140.0</td>
</tr>
<tr>
<td>America</td>
<td>13.96</td>
</tr>
<tr>
<td>Korea</td>
<td>310.4</td>
</tr>
<tr>
<td>Switzerland</td>
<td>26.41</td>
</tr>
<tr>
<td>France</td>
<td>11.64</td>
</tr>
<tr>
<td>Germany</td>
<td>8.26</td>
</tr>
<tr>
<td>China</td>
<td>215.0</td>
</tr>
<tr>
<td>Japan</td>
<td>115.0</td>
</tr>
<tr>
<td>South Korea</td>
<td>5.97</td>
</tr>
<tr>
<td>Brazil</td>
<td>17.93</td>
</tr>
<tr>
<td>South Korea</td>
<td>215.0</td>
</tr>
<tr>
<td>China</td>
<td>115.0</td>
</tr>
</tbody>
</table>

Green Investment in China (2005-2007)

<table>
<thead>
<tr>
<th>Field and Department</th>
<th>2005-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban, residential, and rural development</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Green and environment renovation and protection</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Green infrastructure and transportation</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Green energy</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Water conservation and pollution control</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Environmental protection and recovery</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Environmental management</td>
<td>2005-2007</td>
</tr>
<tr>
<td>Total</td>
<td>2005-2007</td>
</tr>
</tbody>
</table>

Green development in China (2005-2007)

- Green development in China (2005-2007)
  - Urban, residential, and rural development
  - Green and environment renovation and protection
  - Green infrastructure and transportation
  - Green energy
  - Water conservation and pollution control
  - Environmental protection and recovery
  - Environmental management
  - Total

Green development in China (2005-2007)

- Green development in China (2005-2007)
  - Urban, residential, and rural development
  - Green and environment renovation and protection
  - Green infrastructure and transportation
  - Green energy
  - Water conservation and pollution control
  - Environmental protection and recovery
  - Environmental management
  - Total

Green Investment (estimated) in 11th five-year plan

<table>
<thead>
<tr>
<th>Area</th>
<th>Investment amount (bil. RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pollution abatement and treatment</td>
<td>1530</td>
</tr>
<tr>
<td>2 Ecological conservation and biodiversity conservation</td>
<td>1200</td>
</tr>
<tr>
<td>3 Renewable energy</td>
<td>1500</td>
</tr>
<tr>
<td>4 Energy saving</td>
<td>500</td>
</tr>
<tr>
<td>5 Sustainable transportation</td>
<td>1400</td>
</tr>
<tr>
<td>6 Green building</td>
<td>400</td>
</tr>
<tr>
<td>Total</td>
<td>6080</td>
</tr>
<tr>
<td>Environmental Technology Cooperation(1)</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• To promote dialogue and cooperation in environmental protection industry.</td>
<td></td>
</tr>
<tr>
<td>• Annual Summit-mechanism</td>
<td></td>
</tr>
<tr>
<td>• Joint study on environmental sound technology: exploring demand and mechanisms</td>
<td></td>
</tr>
<tr>
<td>• To strengthen the cooperation on mutual recognition of environmental products and low carbon products</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Technology Cooperation(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Environmental technology demonstration</td>
</tr>
<tr>
<td>• Small-sized waste water treatment project</td>
</tr>
<tr>
<td>• Solid-waste treatment project</td>
</tr>
<tr>
<td>• Rural environmental protection</td>
</tr>
<tr>
<td>• To enhance environmental communication between government, enterprise and social organization through &quot;China-ASEAN Green Envoy Program&quot;.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Looking forward: achieving green prosperity</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Energy crisis, food shortage and climate change brings more challenges.</td>
</tr>
<tr>
<td>• Balancing the Environment and Development.</td>
</tr>
<tr>
<td>• Mainstreaming the Green Development for Economic Transformation.</td>
</tr>
<tr>
<td>• Green industry will be core in green development.</td>
</tr>
<tr>
<td>• Good Chances: Regional Environmental Cooperation between ASEAN and China.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Redefining Environmental Services (ES) from the Side of Demand for Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>HU Tao, LI Liping</td>
</tr>
<tr>
<td>WU Yuping, GUO Hongyan</td>
</tr>
<tr>
<td>MEP Expert Team of T&amp;E</td>
</tr>
<tr>
<td>November, 2010, Jintai Hotel, Beijing</td>
</tr>
</tbody>
</table>

THANKS!

CAEC: a platform and think tank for global and regional environmental cooperation
Contacting: zhou.guomei@chinaaseanenv.org
Outline

- Background
- Environmental problems
- Redefine EGS from side of demand for environment

Background

- APEC
  - How to promote APEC ES related to climate change issue?
  - APEC survey report in 3 countries
- WTO
  - How to promote CTE-EGS negotiation?
  - How does ES response to global environmental challenges related to MEAs?

Environmental problems

- Clarifying the meaning of the environment
- Problems of the environment
- Demand of EGS
- Environmental priorities

Environmental problems

- What does the environment mean?
- This is a fundamental question that should be answered before talking environmental problems, priorities and EGS
- Deepen our thinking and expand from the common environment towards
  - Micro level to indoor environment
  - Macro level to global environment

Meanings of the Environment

- Spectrum of the environment from micro to macro level
  - Indoor environment
  - Outdoor environment
  - Local environment
  - National environment
  - Regional environment
  - Global environment
Environmental problems

- Indoor environmental problems
  - 70% of people’s lifetime are averagely spent indoor where is the direct touch factor of human being
  - WHO reports most of health problems are related to indoor environmental quality
  - Indoor environmental goods and services can reduce, remove, recover and resolve the indoor environmental problems

Environmental problems

- Demand of EGS for indoor environment
  - The booming housing is bringing more opportunities
    - Each year there are about 1.6-2 billion square meter new houses
    - To ensure energy saving buildings, it is creating a lot of demand of goods and services
    - Landscape and horticulture design services
    - Indoor pollution cleanup and prevention also create a lot of demand for indoor goods and services, such as
      - VOC free furniture
      - Eco-labeled building materials

Environmental problems

- Demand of EGS for outdoor
  - Taking China as an example, the environmental targets of 11th five year plan (2006-2010) provides tremendous opportunities
    - Energy intensity 20% reduction
    - SO2 emissions 10% reduction
    - COD emission 10% reduction
    - Water consumption of value added industry 30% reduction
    - Sewage treatment rate reaching 70%
    - Industrial solid waste treatment rate higher than 80%
    - The demand of environment is huge, especially
      - energy and GHGs reduction
      - SO2 reduction

Environmental problems

- Outdoor, local and national environmental problems
  - Air pollution
  - Water pollution
  - Solid wastes
  - Biodiversity loss and ecosystem degradation
  - Noise
  - Radiation

Environmental problems

- Global environmental problems
  - Climate change
  - Ozone depletion
  - Biodiversity loss
  - POPs
  - Hazardous wastes Trans-boundary transfer regulated by Basal convention
  - And other MEAs regulated global environmental problems
Environmental problems

- Demand of EGS for global environment
  - Signed and new MEA treaty implementation brings opportunities
    - Both importing and exporting opportunities of energy saving and other GHGs control measures EGS for Post KY negotiation treaty and implementation, as described in IPCC AR4
    - CFC free EGS for ODS reduction
    - EGS for POPs convention implementation for both importing and exporting

- Environmental Priorities
  - Key factors of environmental priority setting
    - Health impacts > other impacts
    - Direct impacts > indirect impacts
    - Authorized responsibilities at different level organizations / governments taking their own responsibilities

Environmental problems

- Environmental Priorities of China
  - From past China’s narrow national interests, the rank should be:
    - Indoor > outdoor/local/national > global
  - From the current new strategy of China, the rank could be:
    - Indoor + outdoor/local/national + global
    - Strategy of Co-control of all pollutants
- For international community, like UN, WTO, WHO, they should focus on
  - First on global issues of MEAs and MDGs, and then indoor health issue to accomplish their responsibilities
  - outdoor/local/national is not a necessity because its mainly the national government responsibilities

Redefining EGS from side of demand for the environment

- Considerations from trade aspect and supply side of EGS
  - UN CPC service classification
  - W/120 classification
  - APEC environmental goods list
  - For WTO environmental goods

Redefining environmental industry and EGS

Scale of the environment

- Defining environmental industries for producing EGS based on the demand of environmental challenges at the whole spectrum
  - The EGS for improving indoor environment
  - The EGS for improving outdoor, local and regional environment (conventional ones)
  - The EGS for improving global environment
Redefining EGS from side of demand for the environment

- Coherent with existing CPC system
  - Water service
    - 9401 I means indoor water service
    - 9401 c means conventional water service
    - 9401 g means global water service
  - Solid waste service
    - 9402 I means indoor solid waste service
    - 9402 c means conventional waste service
    - 9402 g means global waste service
  - Air service
    - 9403 I means indoor air service
    - 9403 c means conventional air service
    - 9403 g means global air service

Redefining EGS from side of demand for the environment

- EGS in WTO Negotiations and APEC
  - Trade interest driven but environmental demand driven
    - Environment is used by trade officials as an excuse to promote exporting
  - National interest driven but global interest driven
    - It’s very necessary to have global environmental goods to improve global environment
  - Lack of coherence with MEAs
    - Not mutual supportive
    - Even conflicts
      - US section 301 probe
      - Non-tariff measures Vs barriers

Thank You!
Welcome your comments and suggestions
hu.tao@prcee.org

Indoor air environment service: Demand, supply and potential market in HK and APEC region

Prof Frank S. C LEE
HKPU
Nov 29-30, 2010
Beijing

Objectives

- To introduce the regulations on indoor air quality control and practices in HK, China, etc
- To Explain the significances of these regulations for citizen’s health protection
- Indoor air environment service, including the demand for such services, supply capabilities and potential markets in HK and APEC region.
**Why is the air quality we breathe important?**

- **Food**: 1 Kg
- **Liquid**: 2 Kg
- **Air**: 10 Kg

<table>
<thead>
<tr>
<th>Category</th>
<th>Survival</th>
<th>Weeks</th>
<th>Days</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquid</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Estimated annual deaths due to indoor and outdoor pollution exposure**

- Total deaths 2.8 million (indoor exposure)
- Total deaths 0.2 million (outdoor exposure)

- Developed countries (urban): 23%
- Developed countries (rural): 9%
- Developing countries (urban): 7%
- Developing countries (rural): 1%

**Indoor Air Quality (IAQ)**

- **Impurities in the air**
  - environmental tobacco smoke (ETS)
  - carbon dioxide (CO₂)
  - carbon monoxide (CO)
  - nitrogen oxide (NO)
  - organic gas and vapors
  - formaldehyde
  - ozone (O₃)
  - particulate fibers
  - radon
  - microorganisms
  - allergens

**The evidences of indoor air and health**

<table>
<thead>
<tr>
<th>Health Outcome</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALRI (children&lt;5yr)</td>
<td>Between 10-20 studies (but few measured exposure or dealt with confounding factors)</td>
</tr>
<tr>
<td>COPD (adults)</td>
<td></td>
</tr>
<tr>
<td>Lung cancer (coal)</td>
<td></td>
</tr>
<tr>
<td>Tuberculosis</td>
<td></td>
</tr>
<tr>
<td>Cataract</td>
<td></td>
</tr>
<tr>
<td>Upper airway cancer</td>
<td></td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
</tr>
<tr>
<td>Low birth weight</td>
<td></td>
</tr>
<tr>
<td>Prenatal mortality</td>
<td></td>
</tr>
<tr>
<td>Otis media</td>
<td></td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td></td>
</tr>
</tbody>
</table>

- **Indoor smoke contains a variety of health-damaging pollutants**
  - particles (complex mixtures of chemicals in solid form and droplets)
  - carbon monoxide
  - nitrogen oxides
  - sulphur oxides (mainly from coal)
  - formaldehyde
  - carcinogens (chemical substances known to increase the risk of cancer) such as benzo(a)pyrene and benzene.
Different housing characteristics and behaviors with vary

China IAQ Standard

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Temperature</td>
<td>14~16</td>
<td>Exc.</td>
<td>11</td>
<td>Fine Particulate</td>
<td>0.10</td>
<td>Exc.</td>
</tr>
<tr>
<td>2</td>
<td>Relative Humidity</td>
<td>40~70</td>
<td>Exc.</td>
<td>12</td>
<td>PM10</td>
<td>0.10</td>
<td>Exc.</td>
</tr>
<tr>
<td>3</td>
<td>Indoor Air Quality</td>
<td>0.1</td>
<td>Exc.</td>
<td>13</td>
<td>PM2.5</td>
<td>0.11</td>
<td>Exc.</td>
</tr>
<tr>
<td>4</td>
<td>CO</td>
<td>500</td>
<td>Exc.</td>
<td>14</td>
<td>Ozone</td>
<td>50</td>
<td>Exc.</td>
</tr>
<tr>
<td>5</td>
<td>O3</td>
<td>100</td>
<td>Exc.</td>
<td>15</td>
<td>Formaldehyde</td>
<td>0.10</td>
<td>Exc.</td>
</tr>
<tr>
<td>6</td>
<td>NO2</td>
<td>0.15</td>
<td>Exc.</td>
<td>16</td>
<td>Total Volatile Organic Compounds (TVOC)</td>
<td>0.1</td>
<td>Exc.</td>
</tr>
<tr>
<td>7</td>
<td>SO2</td>
<td>0.15</td>
<td>Exc.</td>
<td>17</td>
<td>Radon (Ra)</td>
<td>150</td>
<td>Exc.</td>
</tr>
<tr>
<td>8</td>
<td>NO</td>
<td>0.15</td>
<td>Exc.</td>
<td>18</td>
<td>Airborne Bacteria</td>
<td>500</td>
<td>Exc.</td>
</tr>
</tbody>
</table>

IAQ Objectives for Offices and Public Places in Hong Kong

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Excellent Class</th>
<th>Good Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Temperature</td>
<td>°C</td>
<td>20 ≤ &gt; 25.5</td>
<td>&gt; 25.5</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>%</td>
<td>40 ≤ &gt; 70</td>
<td>&gt; 70</td>
</tr>
<tr>
<td>Air Movement</td>
<td>m/s</td>
<td>&lt; 0.2</td>
<td>&lt; 0.3</td>
</tr>
<tr>
<td>Carbon Dioxide (CO2)</td>
<td>ppmv</td>
<td>&lt; 1000</td>
<td>&lt; 1000</td>
</tr>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>mg/m3</td>
<td>&lt; 2.000</td>
<td>&lt; 10.000</td>
</tr>
<tr>
<td>Respirable Suspended Particles (PMn)</td>
<td>μg/m3</td>
<td>&lt; 20</td>
<td>&lt; 100</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO2)</td>
<td>μg/m3</td>
<td>&lt; 40</td>
<td>&lt; 150</td>
</tr>
<tr>
<td>Ozone (O3)</td>
<td>μg/m3</td>
<td>&lt; 50</td>
<td>&lt; 120</td>
</tr>
<tr>
<td>Formaldehyde (HCHO)</td>
<td>μg/m3</td>
<td>&lt; 30</td>
<td>&lt; 100</td>
</tr>
<tr>
<td>Total Volatile Organic Compounds (TVOC)</td>
<td>μg/m3</td>
<td>&lt; 200</td>
<td>&lt; 400</td>
</tr>
<tr>
<td>Radon (Ra)</td>
<td>Bq/m3</td>
<td>&lt; 1500</td>
<td>&lt; 2000</td>
</tr>
<tr>
<td>Airborne Bacteria</td>
<td>cfu/m3</td>
<td>&lt; 500</td>
<td>&lt; 1000</td>
</tr>
</tbody>
</table>

Indoor Air Quality Certification Scheme

- The aims of the Scheme is to
  - Recognize good IAQ management practices and;
  - Provide incentives for owners of premises or property management companies to pursue the best level of IAQ
- 2 levels of IAQ objectives (Excellent Class and Good Class)
- Voluntary and self-regulatory approach
- Certified premises in HK:

<table>
<thead>
<tr>
<th>IAQ Class</th>
<th>No. of premises</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>105</td>
</tr>
<tr>
<td>Good</td>
<td>366</td>
</tr>
</tbody>
</table>

Information Provided by Government

- Background information
  - IAQ objectives
  - IAQ standard
- Certification information
  - List of certified premises
  - IAQ certification steps
  - IAQ service providers
  - IAQ consultants
  - IAQ contractors
  - IAQ laboratories
  - IAQ control facility suppliers
  - IAQ certificate issuing bodies and HOKLAS laboratories
- References
  - Guidance notes for the IAQ management
  - IAQ booklets and leaflets
  - IAQ centre and other useful contacts
Indoor Air Quality Certification Steps
- Owner of premises to engage a "IAQ Certificate Issuing Body" (CIB)
- CIB carry out a walk-through inspection
- Rectify the IAQ problems with the assistance of the CIB
- Conduct IAQ measurement
- CIB to certify the premises in compliance with IAQ objectives and issue a certificate
- Owner of the premises send to the Indoor Air Quality Information Centre (IAQIC) the certificate for registration and a copy of the certification report for record
- IAQIC to return the certificate to owner of the premises with a registration number for display in a prominent location for the public information
- Owner of the premises to initiate annual re-certification

Examples of IAQ Certification Scheme

US Indoor Air Quality Market and Trends

REPORT HIGHLIGHTS - US
- **IAQ equipment market** → $3.6 billion in 2005
  - Reach $10.4 billion by 2011, a 5.2% average annual growth rate (AAGR) over next 5 years.
- **Consulting and testing services** → $1.5 billion in 2005
  - Reach $2.7 billion by 2011 based on a 10% AAGR over the next 5 years.
- **Environmental services**, incl. mold remediation, asbestos abatement, and radon mitigation → $1.6 billion in 2005
  - Reach $2.9 billion by 2011, at AAGR of 9.5%.

REPORT HIGHLIGHTS - US
- The end-use markets with the biggest potential for applications of IAQ equipment and services include:
  - residential dwellings,
  - commercial buildings,
  - schools, and
  - health care facilities.
Major Capital Equipment Required for IAQ US

<table>
<thead>
<tr>
<th>Equipment</th>
<th>% of total</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air sampling equipment</td>
<td>29%</td>
<td>$50-$380</td>
</tr>
<tr>
<td>Duct cleaning equipment</td>
<td>25%</td>
<td>$2,500-$18,000</td>
</tr>
<tr>
<td>Moisture meter</td>
<td>24%</td>
<td>$290-$550</td>
</tr>
<tr>
<td>Thermometer</td>
<td>19%</td>
<td>$18-$180</td>
</tr>
<tr>
<td>CO2 meter</td>
<td>18%</td>
<td>$380-$680</td>
</tr>
<tr>
<td>Microbial lab</td>
<td>14%</td>
<td>$100,000-$1,000,000</td>
</tr>
<tr>
<td>PM meter</td>
<td>14%</td>
<td>$380-$400</td>
</tr>
<tr>
<td>Carbon-monoxide meter</td>
<td>12%</td>
<td>$50-$580</td>
</tr>
<tr>
<td>Others</td>
<td>2%-9%</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Total is greater than 100% due to multiple responses from single respondents*

Flowchart from IAQ Investigation to Potential Remediation

IAQ Remediation Direct Costs – US

IAQ Remediation Direct Costs – China

Research from CIETC (中国室内环境总)

China 12th 5-year Development Plan (Three Indoor Environmental Core Developments)

- **Ensure** air quality in both construction and renovation could be monitored, inspected and assessed
- **Improve** the quality of the air cleaning products, cleaning technologies and cleaning services
- **Promote** the use of indoor air cleaning products, cleaning technologies and cleaning services

China 12th 5-year Development Plan (Indoor environmental products/technologies examples)

- Indoor air purification equipment
  - Formaldehyde purifier, particle removal equipment
- Indoor air cleaning agent
  - De-odor spray, formaldehyde elimination spray
- Centralized ventilation system
  - Advance duct cleaning, indoor air monitoring
- Household air conditioner with air purification system
- Thermal exchange device (to household scale)
  - To keep indoor air temperature unchanged (enhance energy saving and reduce carbon emission)
China 12th 5-year Development Plan (Indoor environmental products/technologies examples)

- Large scale public air purification system enhancement
- De-odouring equipment
  - TiO₂ de-odouring system
- Household indoor air monitoring, alerting system development
- Industrial air pollution control
- Other energy saving technology

Indoor Air Environment Services

Ventilation Hygiene
- Methods, products and services for inspecting and cleaning the HVAC ducts
- Superior energy efficient filtration solutions to remove airborne particulate and gaseous impurities

Inspection of ventilation ducts

**Inspection Robot** facilitates inspection of the need for duct cleaning.

Various accessories can be used to obtain video and still digital pictures of the ducts which can then be saved on diskette.

The saved video or still pictures can be used for planning maintenance measures, engineering work or quality assurance.

Air Duct Inspection

**Before Cleaning**

**After Cleaning**

Air Duct Inspection

**Before Cleaning**

**After Cleaning**

**Effect of duct cleaning on the dust on duct surfaces and air flows in an office building in Beijing**

(K, Jun et al., 2000)
## Indoor Air Quality Consultancy and Remediation Market Value in APEC Region

**Year 2015**

- **APEC**
  - 61,000
- **USA**
  - 18,000
- **China**
  - 19,000

**Year 2020**

- **APEC**
  - 87,000
- **USA**
  - 26,000
- **China**
  - 31,000

## Market for ESI Consultancy and Remediation

<table>
<thead>
<tr>
<th>Year</th>
<th>APEC</th>
<th>USA</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>61,000</td>
<td>18,000</td>
<td>19,000</td>
</tr>
<tr>
<td>2020</td>
<td>87,000</td>
<td>26,000</td>
<td>31,000</td>
</tr>
</tbody>
</table>

## Indoor Environmental Service Market

### Market Potential
- Buildings, people, pollution and needs to save energy
- Strengthen when pollution increases and acts of energy savings materials – trade-off effect

### Factors affecting demand
- Stronger when pollution increases and acts of energy savings materials – trade-off effect

### Service market
- Based on existing factors – Demand factors are critical
- Linked with the need for Service market

### Market for Equipments and Materials
- Linked with the need for Service market

---

36
Demand factors for Indoor Environmental Services

- Laws, Regulations and Guidelines
- Changes of attitudes
- Increased knowledge
- Higher profit expectation (Saving of energy, better rents with Green Lead ratings etc)

Saving of energy by clean and balanced HVAC-system

- HVAC-Systems (air ducts) should be cleaned before taking new building in use and then periodically in every 6 months - 5 years.
- Dirty HVAC-system will cause a pressure drop that reduces air volume. This will be compensated with the fan which consumes more energy when pressure increase.
- Well balanced and clean HVAC-System can reduce energy consumption 30-40 %.

Global-Environmental Service: Demand, supply and potential market in China

Mao Xianqiang
School of Environment, Beijing Normal University

Thank you

Contents

1 MEAs: International Regulations on Global Environment
2 Defining Global Environmental Services (GES)
3 GES Market in China
   - Demand
   - supply
   - potential market

1. International Regulations on Global Environment

- MEAs dealing with global environment issues
  - United Nations Framework Convention on Climate Change (UNFCCC)
  - Convention on Biological Diversity (CBD)
  - The Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol)
  - Stockholm Convention on Persistent Organic Pollutants (POPs Convention)
  - Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (Basel Convention)
  - etc.

---

Page 37
**UNFCCC regulations**
- change in the Earth’s climate and its adverse effects are a common concern of humankind
- control of CO₂ and other GHGs to combat global warming
- calls for the widest possible cooperation by all countries
- common but differentiated responsibilities

**Other MEAs regulations**
- CBD regulations
  - dedicated to the conservation and sustainable use of biodiversity
  - The CBD work programs — ranging from agricultural biodiversity to forests, climate change to island issues, and plant conservation to ecosystems — set the agenda for key conservation and sustainable use activities around the world.
- Montreal Protocol regulations
  - eliminating Substances that Deplete the Ozone Layer
- Stockholm Convention
  - eliminating POPs
- Basel Convention
  - dealing with Hazardous Wastes

**2. Defining Global Environment Services**
- Extended environment spectrum
- Redefining environmental services based on the extended environment spectrum

**Definition**
- **Global-environmental services, environmental services for improving global-environment.**
- Global-environmental services is expected to deal with the problems such as climate change, ozone depletion, biodiversity loss, Persistent Organic Pollutants (POPs) emission, and hazardous waste transboundary, et al..

**Classification**
- According to global-environmental problems and the requirements from MEAs, we could draw the categories of GES as follows:
  - **UNFCCC-related GES**
  - **CBD-related GES**
  - **POPs-related GES**
  - **Montreal Protocol-related GES**
  - **Basel convention-related GES**
  - **Others**
- The above classification not only focus on how to deal with various global-environmental problems, but also how to conform to the international regulations smoothly. The classification will be in line with international responsibility and public concern.
UNFCCC-related GES
- Climate-friendly GES
- Mitigation and adaptation technologies and services
  - Such as, Clean/renewable energy technologies and services; energy efficiency technologies and services; CCS; carbon sinks services; sectoral adaptation; Risk evaluation; flexibility / adaptive management

CBD-related GES
- Biodiversity-friendly GES
- Biodiversity conservation and its sustainable use
  - Such as, agricultural biodiversity, forestry, wild plant conservation, ecotourism, Traditional Knowledge protection and utilization, et al.

Montreal Protocol-related GES
- Ozone-friendly GES
- Control substances that Deplete the Ozone Layer
  - E.g., CFC-free refrigerator technologies

Summary to Classification

The overall situation
- China's environmental services showing rapid development in the areas of:
  - Environmental protection consultancy
  - Operating of environmental pollution treatment facilities
- From 1993 to 2004, the annual growth rate of environmental services was up to approximately 25%, nearly 2 times of the growth rate of environmental protection product market.
Drivers for China's demand for GES

- Resource-saving and Environmental Friendly Society
- Industrial structure adjustment
- the Eleventh Five-Year Plan of Environmental Protection target
  - 20% energy intensity reduction during 2006-2010
  - 50 million ton of carbon sequestration increasing during 2005-2010
  - Et al.

GES demands of China

- Some specific demands
  - Eco-label certification service
  - Carbon financing services
    - Carbon CERs exchange service, such as Beijing, Tianjin and Shanghai exchange offices
  - Climate insurance
  - Nuclear safety service
  - Technology cooperation and technology transfer service
  - Capacity building service
  - Global-Environmental accounting service
  - Global-environmental education service
  - Low carbon transportation service

Global environmental goods supply and their services (installation & maintenance)

Such as:
- solar water heaters (China holds 75% of world market)
- photovoltaic equipment (China ranks No.2)
- wind power generation equipment (China ranks No.3)
- LED ESL (China ranks No.1)
- small hydropower equipment (China ranks No.1)

Rapid growth Environment Service market in China

According to investigations on environmental industry, the market growth rate of internationally comparable environmental services (excluding waste reuse products) is 54.2% during 1993-1997, and 27.3% during 1997-2000.

And according to the Report of China Environmental Services Development, from 1993 to 2004, the average annual growth rate of environmental services market was 25%.

Potential market for GES

1. National targets—The target and requirements of the 12th five-year plan
2. International obligation commitment
   - By 2020, the emission of CO2 per unit of GDP will be reduced by 40%-45%
3. Energy-saving environmental protection industry planning
   - Priorities: energy-efficient technologies and equipment, high efficiency and energy saving products, advanced technology, environmental protection service, etc.

   - To establish the environmental service system (financing and investment, engineering design and construction, facilities operation and maintenance, technical advice and training, et al.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>350</td>
<td>300</td>
<td>250</td>
<td>200</td>
<td>150</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

Potential market for GES

- Growth rate of environmental services market is expected to be 5-20% during the 12th Five-Year Plan period,
- and if the proportion of GES in the environmental services market is expected to be 10-15%, then,

GES potential market

<table>
<thead>
<tr>
<th>Category</th>
<th>In 2010 (billion RMB)</th>
<th>Predicted Growth Rate During the 12th Five-Year Plan (%)</th>
<th>In 2015 (billion RMB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNFCCC-related GES</td>
<td>6.57-12.66</td>
<td>15-25</td>
<td>9.85-16.07</td>
</tr>
<tr>
<td>CMB-related GES</td>
<td>1.07-1.61</td>
<td>10-20</td>
<td>1.18-1.93</td>
</tr>
<tr>
<td>Other MSAs-related GES</td>
<td>2.28-3.39</td>
<td>10-20</td>
<td>2.49-4.07</td>
</tr>
<tr>
<td>Total</td>
<td>11.9-17.65</td>
<td>15-20</td>
<td>13.69-24.42</td>
</tr>
</tbody>
</table>

Thank you very much for your attention!

Outlines

- Concepts on ESTs and analytical framework
- Perspectives on International Mechanism for D&D&T of ESTs
  - Institutional Arrangement
  - Performance Assessment and Monitoring
  - Innovative Financial Mechanism: MTAF
  - Policy Instruments
  - IPR issues
- Opportunities from financial mechanism
- Conclusions

Concept: ESTs may only be effective when they work as a whole package

- Hardware: devices, equipment, process, and complementary technological system, etc.;
- Software: awareness, knowledge, information, know-how, IPRs, designs, etc;
- Human resources: well trained and qualified;
- Financial resources to make D&T&T happen, and
- Enabling environment: regulating framework by both developed and developing countries, appropriate institutional arrangement; and infrastructure;
- Transfer of ESTs should be assessed on a basis of effectiveness in terms of speed, range, and size.
Concept: purpose

- The central purposes of EST R&D are for both protection of climate as global public goods and sustainable development;
- Developed countries should take major responsibilities to take leadership in D&D&T of EST, assisting developing countries to enhance their endogenous innovation capacity.

Analytical Framework: Structure-Conduct-Performance

Why we need innovative mechanism?

- Request by Article 4.5 and Bali Action Plan to address global externality
- Crucial roles of ESTs
- Urgent needs for D&D&T of ESTs (lock-in)
- Little progresses made since 1994
- barriers of TT to be overcome

We need to speed up D&D&T of ESTs to meet climate challenge

Major Components of the Innovative Mechanism for Development and Transfer of ESTs

- Institutional Arrangement: Intergovernmental Body under UNFCCC
- Performance Assessment and Monitoring
- Financial Mechanism for D&D&T of ESTs
- Policy Instruments, and
- Intellectual Property Issues
Institutional Arrangement 1

- Enhanced mechanism under UNFCCC: need a more effective and implementation-oriented/operational body to:
  - Provide advice, guidance, and recommendations;
  - Coordinate actions by different international stakeholders and governments’ policies;
  - Guide and supervise utilization of special TT fund based on public finance;
  - Promote communication and info/knowledge sharing; and
  - Monitor and assess the performance and progresses.
- Panels under the UNFCCC body

Institutional Arrangement 2

[Organizational Structure Diagram]

Institutional Arrangement 3

With priorities on:

- Policy dialogues and coordination for better incentives to private sectors and markets;
- Financing basic research and R&D; and
- Direct transfer and diffusion of publicly owned technologies.

Institutional Arrangement 4

Policy coordination to provide incentives for private sector

- Tax exemption for ESTs exports of companies in developed countries;
- Subsidies to encourage R&D and transfer of ESTs;
- Favorable conditions for EST-related export credits: guarantee for technology export credits, subsidies, etc.;
- Removal of technology export bans; and
- Other regulations, policies and measures.

Performance Assessment & Monitoring

- Speed of technology flow
  - Considering to avoid lock-in effects in developing countries
  - Needed time for innovation (R&D) and diffusion
- Range of technology flow
  - Covering most of the meaningful sectors
  - Larger market share and penetration
- Effectiveness
  - Emission reduction
  - Affordable and least cost and expected benefits

Innovative Financial Mechanism serving for D&T&D of ESTs

- Public private partnership based
- Public finance should take lead and be precondition of effectiveness of the financial mechanism
- Leverage private finance in market by providing incentives
- Channel and guide three markets: carbon, capital, and technology
Multilateral Technology Acquisition Fund (MTAF)

- A PPP framework for financing D&D&T of ESTs may be feasible by linking public and private finance;
- Significant amount of public finance from developed countries should play a leading role in guiding and attracting private financial resources into D&D&T of ESTs;
- A special fund based on public finance from developed countries need to be established and used to create incentives to private sectors through various policy instruments with impacts on capital market;
- A range of financial instruments may be applied for financing D&D&T of ESTs;
- Venture capital might be a typical form for private investment in ESTs.

Policy Instruments (1)

- Subsidies in R&D for invention and demonstration of identified ESTs in prioritized areas;
- Insurance to curb risks of investment in D&T&D of new ESTs;
- Loan guarantee or subsidies for exporting and diffuse ESTs;
- Direct investment in D&T&D of ESTs as share holder in normal forms or via venture capital investment;
- Investment in financial products related to D&T&D of ESTs by holding stocks, bonds and other potential financial products.

Policy Instruments (2)

- Investment in such infrastructure as information, transaction platform, monitoring and enforcement system;
- Expenses in capacity building in developing countries with development of human resources as a priority;
- Government purchases of ESTs;
- Permits, compulsory licensing for patented ESTs, etc; and
- Others.

Back to Major Components of the Mech

Opportunities from financial crisis

- Context: China’s plan on (2008-10) USD 586 bln of stimulus investments in ten focal areas (e.g., grid, transport and buildings); US’s bailout plan for automobile industry and other stimulus plans all over in the world;
- Opportunities to employ (import or export) low carbon technologies coupling these stimulus plans with views of restructuring economies toward low-carbon economy;
- From a technology roadmap to technology needs and supply assessment: what sectors, areas, key low carbon technologies;
- What favored conditions for low carbon economy may be offered?
- Mechanism for affordable price and broader range of penetration?
Conclusions

- ESTs and transfer of ESTS should be understood as a package;
- An innovative int’l mechanism should be created to scale up and speed up the technological and financial flows between developed and developing countries, covering mainly institutional innovation, MTAF, and IP protection & sharing system;
- Financial crisis provide both challenges and opportunities for restructuring the world economy toward low-carbon economy.

Thank you for your attention!

Contact:
Prof. ZOU Ji
zouji@ruc.edu.cn

GLOBAL PLATFORM
ON CLIMATE CHANGE, TRADE & SUSTAINABLE ENERGY

Technology Transfer Issues in Environmental Services
Joachim Munkelbaan, ICTSD

GLOBAL PLATFORM
ON CLIMATE CHANGE, TRADE & SUSTAINABLE ENERGY

Overview

- Trade in services as a vehicle for transfer of technology
- Barriers to TT
- IP
- Flexibilities for successful ToT
- Key points
- Channels for ToT in the GATS
- Practical strategy and new initiatives

GLOBAL PLATFORM
ON CLIMATE CHANGE, TRADE & SUSTAINABLE ENERGY

ICTSD - 国际贸易和可持续发展中心

GLOBAL PLATFORM
ON CLIMATE CHANGE, TRADE & SUSTAINABLE ENERGY

Definition ES

“environmental services consist of those activities, which measure, prevent, limit, and correct environmental damage to air, water, soil, and problems relating to waste, noise, and ecosystems”

OECD/Eurostat
Definition TT

"The broad set of processes covering the flows of knowledge, experience and equipment amongst different stakeholders such as governments, private sector entities, financial institutions, NGOs and research/educational institutions"

IPCC

OECD/Eurostat

Trade in services as vehicle for transfer of technology

Barriers to Technology Transfer

IP

Flexibilities in GATS Article IV

A. Attract a greater supply of foreign technology

B. Encourage interactions between domestic and foreign firms

Elements for successful transfer of technology
Key points

- Tacit knowledge
- The concept of TT in WTO negotiations
- Needs of developing countries
- Role of the WTO

Climate Change:

- Article 4.5 of the UNFCCC
- Copenhagen Accord
- Cancun: the TM?

A Knowledge Fund

A practical strategy

1. CCTIS
2. Mutually beneficial TT contracts

Example 1

A licensing agreement whereby a scientific team at a university owns a patent, which it licenses to a business that will pay royalties to the university upon sale of products using the claims of the patent.
**Example 2**

A joint venture whereby both parties invest human capital, funds or use of facilities, and other items of value, in order to develop a wind turbine design for high rainfall climates, and the parties agree to joint ownership of IP with distribution rights in different geographic territories.

**Example 3**

A developing country puts out a bid for a magnetic, high-efficiency public transport system and accepts an offer from a developed country company that offers an IP license to patents and documentation relating to the transport system, plus engagement with engineers from the local university.

"the reason it is difficult for the people to live in peace.. Is because of too much knowledge.”

道

**So.. it’s time to ACT!**

**ACT = Alliance for Clean Technology**

By ICTSD EGS programme and
Examples of issues

* Sectoral approach to emissions trading (lessons learned from the EU ETS), low-carbon city pilots in China
* Voluntary standards for emission reductions, how to integrate different carbon markets
* Aviation industry: from 2012 in EU ETS
Outline

- Brief Introduction of CDM
- Development of CDM Projects in China
- Evaluation of Technology Transfer in the CDM Projects in China
- Analysis of Barriers to Technology Transfer in the CDM Projects in China
- Suggested Approaches to Strengthening Technology Transfer

Brief Introduction of CDM

- One of three flexible mechanisms of Kyoto Protocol under the UNFCCC. A project-based mechanism to allow GHG emission reduction cooperation between developed countries and developing countries.
- Two purposes: to help developing countries to achieve SD and reach the final targets listed under the Convention; to help developed countries to meet their quantified emission reduction commitments.
- Three additionalities:
  - environmental additionality
  - technological additionality
  - fund additionality

Development of CDM Projects in China (1)

- Up to Nov. 25, 2010, the DNA of China has approved 2787 CDM projects, the annual emission reduction is estimated to be 500 million tCO₂e; 1046 projects have been registered in CDM EB, the generated annual emission reduction is predicted to be 240 million tons of CO₂e.
Development of CDM Projects in China (5)

Evaluation of Technology Transfer in the CDM Projects in China (1)
The evaluation and analysis results are based on the part outcomes of the EU-China CDM Facilitation Project.

Evaluation of Technology Transfer in the CDM Projects in China (2)
- 14 operating CDM projects were selected and field survey was conducted, which covered all the types of CDM projects and regions.
- the PDDs of more than 200 Chinese CDM projects were reviewed.
- 18 EU enterprises that had participated in Chinese CDM projects were interviewed.
- the CDM agencies in 10 provinces of China were interviewed.

Evaluation of Technology Transfer in the CDM Projects in China (3)

Evaluation of Technology Transfer in the CDM Projects in China (4)
The definition of technology transfer in this project mainly includes the following three contents and standards:
- "abroad": installations and designs are from other countries;
- "novelty": the technology is advanced and new compared with that in China;
- "capacity": capacity, skills and knowledge are acquired to operate and maintain the equipments.

Evaluation of Technology Transfer in the CDM Projects in China (5)
Key findins:
- CDM projects have created favorable conditions and provided support to the development and diffusion of new technologies in China, therefore it is of some positive effects. For example, CDM projects have provided a broad market for large-scale application of wind power technology; through CDM projects, the coke dry quenching (CDQ) technologies were diffused tremendously in China.
- There are relatively big obstacles to transferring technology through CDM, especially key technology to developing countries. Our study shows the following:
  - Strictly speaking, the CDM projects registered at EIB have not achieved real technology transfer. The so called "technology
**Evaluation of Technology Transfer in the CDM Projects in China (6)**

- The "technology transfer" is merely a transfer of the technology carrier-the transfer of installations. It is far from achieving the predicted targets of "developing countries can get advanced technologies through CDM projects".  
  - From PDDs review, less than 40% of the projects have mentioned technology transfer;  
  - <br>Even for these 40% projects field survey showed:  
    - 2/3 of the projects only had installations transfer, and the purchase of installations have no favourable price compared with that of the ordinary commercial trade;  
    - the rest 1/3 projects have mentioned knowledge and capacity training, it is simply installations operation and maintenance training.  
  - Based on CDM project types, those projects with so called "technology transfer" are mainly focused on non-CO2 CDM projects, such as fuel switching, NOx, HFC-23, CBM etc.

**Evaluation of Technology Transfer in the CDM Projects in China (7)**

- There are great demands in energy-efficiency and renewable energy CDM projects technology transfer, yet the transfer level is very low, mainly some installations transfer.  
  - Besides CDM projects type, the "technology transfer" level is also related to company scale, company nature, information availability, and local regulations.  
    - The areas with high economic development level, high information availability, and sufficient regulation system have relatively high levels of "technology transfer" in CDM projects.  
    - Large state-owned companies paid more attention to technology transfer in the negotiation compared with small and medium sized companies.

**Evaluation of Technology Transfer in the CDM Projects in China (8)**

- The technology transfer suppliers are mainly from EU and Japan. Among which, EU is mainly active in the field of renewable energy, in particular wind power and biomass CDM projects. Renewable energy installations exported from EU to China through CDM takes up 85% of the total export EU delivered to China. EU has made little contribution to the technology transfer of energy efficiency CDM projects, the export in such field through CDM is much lower than that of Japan.  
  - Comparing internationally, the ratio of CDM project "technology transfer" in China is approximately the same as other developing countries, which is 30-40%.

**Analysis of barriers to technology transfer in the CDM projects in China (1)**

- The technology supply side has serious barriers  
  - The lack of relevant policies from the government of technology supply side  
  - IPR overprotection of technology supply side  
  - The technology market monopoly  
  - Example: NO2 CDM project: the project contract requires the return of the catalyst used for treating NO2 back to the foreign technology owner.

**Analysis of barriers to technology transfer in the CDM projects in China (2)**

- There were barriers to technology transfer on the technology demand side  
  - There is no clear technology demand list;  
  - There are weak driving forces for project owners to pursue technology transfer;  
  - The lack of capacity: human capital, qualified management, access to information;  
  - Inadequate regulation system for technology-demand

**Analysis of barriers to technology transfer in the CDM projects in China (3)**

- The problems existed in CDM itself hindered technology transfer  
  - Methodology bottlenecks  
  - The development and technology transfer of CDM project is restricted by the additionality rules
Suggested Approaches to Strengthening Technology Transfer (1)

- **Policy proposal to the decision makers in China**
  - CDM project management and monitoring:
    - to introduce a clearer and more operational definition of technology transfer in the project approval process, at least at the DNA level;
    - to prioritize technologies to reflect China’s interest in promoting more SD and be aligned with China’s other initiatives for tackling climate change. For example, encouragement should be given to the projects that have a rather large co-benefits, such as the waste heat utilization project etc.;
    - to promote the capacity building of enterprises and ensure a good information access
    - to formulate related economic incentive policies

Suggested Approaches to Strengthening Technology Transfer (2)

- **Policy proposal to the government of developed countries and UNFCCC COP/CMP/EB**
  - the governments of developed countries can fund CDM technology transfer i.e. the governments can raise funds and establish a CDM technology transfer fund to subsidize technology transfer.
  - the governments of developed countries can formulate policies that provide economic incentives and encourage enterprises to transfer technology via CDM, e.g. to provide credit guarantees for technology export, to facilitate the examination and approval procedure for technology export etc.

Suggested Approaches to Strengthening Technology Transfer (3)

- establish rational international mechanisms to facilitate technology transfer in CDM projects
  - set up compensation mechanisms. The related fund could be used to support the development of new methodologies or support collaborative research and development efforts.
  - Host countries should be encouraged to set up "technology additionality" standards, and the DNA of all the countries should use these standards as the criteria for the approval of CDM project.
  - ...
1. About JICA: Japan’s ODA and JICA

Total budget: More than ¥1 trillion (about US$11 billion by DAC Rate in 2009: US$1=¥93.5)

2. JICA’ Efforts for the Environmental Management

JICA’s Project Map in the Environmental Management Field
(technical cooperation, 2010)

More than 60% of the projects in Asia
(Asia: 40 projects, Total: 81 Projects)

3. Case Study

1. Waste Management
   - Promotion of Circular Economy Project in China -

2. Water Environment Management
   - Program on Vietnam Urban Water Environment Management -

3. Climate Change
   - The Study for Promotion of CDM Projects in Dominican Republic -

Case Study 1: Waste Management
Promotion of Circular Economy Project in China
<Technical Cooperation Project> 2008.10-2013.10

Background
- China has initiated its 11th 5-year plan since 2008.
- They have adopted a Recycle Promotion Policy.

Project Purpose
- Strengthening the execution of environmental protection measures for the materials cycle.
- Following the recycle processes.

Partner country organization
- Sino-Japan Friendship Centre for Environmental Protection
Promotion of Circular Economy Project in China

1. Promotion of environmentally conscious business activities
   - Resources in
   - Production
   - Consumption
   - Recycling
   - White
2. Increase in Citizen Environmental Awareness
3. Promotion of eco-engineering industrial parks with recycling based industries
4. Promotion of appropriate management of waste

Case Study 2: Water Environment Management Program on Vietnam Urban Water Environment Management

Program Goal
To reduce pollution load to public water bodies in Vietnam, thereby improving water quality and satisfying various water needs.

 Component 1: Capacity Development of Administrative Institutions
 - MONRE and DONREs
 - Expert, T/C (VAST)
 - MOC and provincial development of public

 Main Target
Research Institutions T/C (VAST) T/C (Ho Chi Minh, Hanoi)

Project Purpose:
Capacity of MONRE (Central Gov.) and target DONREs (Local Gov.) on water

5. Improvement of water management planning:
   - Hanoi, HaiPhong, Da Nang, HaTien, Ba Ria-Vung Tau
6. Improvement of policy & systems:
   - Strengthening enforcement capacity of water pollution control
   - Making effective water pollution control measures

Program on Vietnam Urban Water Environment Management

Component 1: Enhancing Capacity of Vietnamese Academy of Science and Technology in Water Environment Protection 2008.1-2012.1

- Project purpose:
  Scientific and technological basis of VAST(WET) for the improvement of the water environment will be further strengthened

- Objectives:
  1. Improvement of water quality monitoring and development of analysis methods
  2. Suitable technologies on domestic and industrial wastewater treatment
  3. Improvement of training courses on water quality monitoring and wastewater treatment
  4. Encouragement of activities on water environment protection
  5. Partial country organization: Vietnamese Academy of Science and Technology, Institute of Environmental Technology

State of urban drainage
State of the laboratory VAST

Hanoi
HaiPhong
Da Nang
HaTien
Ba Ria-Vung Tau

Project Purpose:
Capacity of MONRE (Central Gov.) and target DONREs (Local Gov.) on water

Project Purpose:
Capacity of MONRE (Central Gov.) and target DONREs (Local Gov.) on water

Program on Vietnam Urban Water Environment Management

Component 3: Development of Drainage and Wastewater Infrastructure and Management Capacity

- MP, FIS:
  - Hanoi city environmental management plan (2000)
  - Hai Phong city environmental management plan (2001)

- Technical Cooperation:
  - Capacity development on sewerage management in Ho Chi Minh City (2009.5-2010.11)

- ODA loans:
  - Total amount: approximately US$150 millions
  - Urban water environmental management projects in Hanoi, HoChiMinh, Hai Phong, Hue, and Binh Duong Provinces.

- Project Purpose:
  - Ho Chi Minh City Water Environment Improvement Project (1) 2001.3 LIA
  - Ho Chi Minh City Sewage Treatment Plant

Case Study 3: Climate Change
The Study for Promotion of CDM Projects in Dominican Republic Development Study 2008.8-2010.12

Project Purpose

Background:
- Dominican Republic relies on fossil fuel but has difficulty to secure its stable import.
- Dominican Republic wants to promote CDM projects related to biogas or methane gas.
**Case Study 3: Climate Change**

The Study for Promotion of CDM projects in Dominican Republic

- Potential survey for each sector (solar, wind, form, waste, water, solid waste)
- Drafting PIN (Project Idea Note) and model PDD (Project Design Document)
- Developing Recommendation Paper and Action Plan
- Workshop and Seminar for private companies which have interest in CDM project
- Develop CDM projects in Dominican Republic

---

**Conclusion**

- Assistance for basic infrastructure of trade liberalization
- Arising issue – PPP or PFI, etc.

---

**Thank you for your attention**


---

END
Report prepared by

Policy Research Center for Environment and Economy, Ministry of Environmental Protection, China
Address: No. 1 Yuhuinanlu, Chaoyang District, Beijing, 100029, China
Tel: (86) 10-84665308       Fax: (86) 10-84665308
Email: li.liping@prcee.org
Website: www.prcee.org

Produced for

Asia-Pacific Economic Cooperation Secretariat
Adress: 35 Heng Mui Keng Terrace, Singapore 119616
Tel: (65) 68919600       Fax: (65) 68919690
Email: info@apec.org
Website: www.apec.org