Presentation Outline

1. Industry Sector
   a. China: Top 1000 Program
   b. China: Financing Energy Efficiency
   c. China: Outlook 2010 to 2015
   d. India: Perform, Achieve and Trade (PAT) System

2. Waste Sector
   a. Kenya: National Domestic Biogas Program
   b. Turkey: Waste-to-energy collaboration with cement industry
   c. Bangladesh: Community-based Composting Program
China: Top 1000 Program

China’s National Goal: Reduce energy intensity by 20% between 2005 and 2010

Top 1000 Program:

**Goal:** Reduce the energy intensity of the top 1000 companies with the highest energy consumptions in the country.

**Sectors Affected:** Iron and Steel, Petroleum and Petrochemicals, Electric Power, Non-ferrous Metals, Coal Mining, Construction Materials, Textiles and Paper

**Government Involvement:**

**National**—Approve list of top 1000 companies, guidelines for implementation and breakdown and assign national target at the regional level

**Local**—Assess companies’ energy saving potential, negotiate regional targets with national government, Ensure compliance with regional targets
Top 1000 Program: How it Works

Supporting policies

• 20 local energy conservation centers were funded

• Government officials who miss the regional target will not be promoted

Financial Incentives

• Very inefficient companies must pay higher energy prices

• Rewards and rebates are paid to companies that can prove reductions in energy use

Source: Lawrence Berkeley Lab
The Top-1000 program was one of the most successful programs for reducing energy consumption in China in the 11th Five-Year-Plan.

Between 2006 and 2008, the program has already nearly fulfilled its target for the entire five years.

Additionally, 2010 many very old and inefficient installations for the production of steel and cement were closed down.

### Top 1000 Program: Results

<table>
<thead>
<tr>
<th>Policy/Program</th>
<th>Primary Energy (Mtce)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11th FYP Target</strong></td>
<td><strong>Savings to Date 2006-2008</strong></td>
</tr>
<tr>
<td>Ten Key Projects</td>
<td>268</td>
</tr>
<tr>
<td>Buildings Energy Efficiency</td>
<td>112</td>
</tr>
<tr>
<td>Top-1000 Program</td>
<td>130</td>
</tr>
<tr>
<td>Small Plant Closures</td>
<td>118</td>
</tr>
<tr>
<td>Appliance Standards</td>
<td>79</td>
</tr>
<tr>
<td>Other savings including provincial programs</td>
<td>1146</td>
</tr>
<tr>
<td>Total Primary Energy Savings</td>
<td>1709</td>
</tr>
</tbody>
</table>

Source: Levine et al, Lawrence Berkeley National Laboratory, April 2010
China: Utility-Based Energy Efficiency Finance Program (CHUEE)

Background:
- China’s banking sector is not experienced with financing energy efficiency
- Banks are focusing too much on new projects, They have low interest and experience in financing upgrades of existing infrastructure

Program Origins:
- Chinese Ministry of Finance asked the International Finance Cooperation (World Bank Group) to develop new private sector initiative
  - 2007: The first "China Utility-Based Energy Efficiency Finance Program" (CHUEE) deals are approved by the Chinese Industrial Bank and Bank of Beijing
  - December, 2007: World Bank approved RMB 2.5 billion for the project
China: Utility-Based Energy Efficiency Finance Program (CHUEE)

Expanding lending to small and medium sized enterprises

CHUEE Financial Products

- Utility-Based Energy Efficiency Financing
- Finance to Energy Management Contractors
- Energy Efficient Equipment Financing
- Loans to End-User for EE improvement
- Financing to EE leasing
- Financing to EE Equipment manufacturers
China: Utility-Based Energy Efficiency Finance Program (CHUEE)

- CHUEE Energy Efficiency Loan and Investment Mobilization Forecast (Accumulative Value)

- Risk-sharing Facilities (CHUEE I and CHUEE II) are expected to be used up by the end of 2010.

- Projecting of cumulative loans to and investment in energy efficiency and emission reduction projects.

- By the end of 2010, CHUEE shall have mobilized more than $600 million bank loans and a total of close to $1 billion investment in emission reduction projects.
In the next five years, up to 1.5 trillion US-$ will be invested in strategic emerging industries in China.

“China’s next Five-Year-Plan aims to make its companies leaders in low carbon technologies by rapidly expanding domestic clean energy markets.”

Nick Mabey, CEO of E3G
India: Perform Achieve and Trade (PAT)

National Mission on Enhanced Energy Efficiency Target:
- Annual fuel savings of 23 million tons of oil equivalent (mtoe)
- Avoided electricity capacity of 19 000 MW by 2014 – 2015, equalling emission reduction of 98MtCO2/year

PAT target for the first 3 year cycle:
- National reduction target of 10 mtoe

The scheme is planned to start in April 2011 and has an energy savings potential of up to 12.5% of total national consumption.
The PAT mechanism functions as a trading program without fixed cap

• The several over 500 notified companies consume 231 mtoe annually, or 60% of total energy consumption of the country.

• A Specific Energy Consumption Reduction Target will be assigned to each of these units determined by:
  – Comparison with the most efficient units in the sector
  – Based on the fuel mix used

• Units which overachieve their target will receive Energy Saving Certificates (ESCerts) from the governing authority

• Units which fail to comply with their targets have to buy ESCerts to fulfill obligations
Perform Achieve and Trade (PAT): Challenges

**Biggest challenge:** Setting the specific energy consumption reduction norms for each unit

- Huge diversity of sectors and of production units in each sector regarding boundaries, technologies, fuel mix, products and quality
- Indian decision makers are likely to go for a "gate to gate assessment" instead of a product benchmark like the European Emission Trading System
- Idea of having several "bands" (Gold, Silver, Bronze, Tin) and then using a benchmark approach within each band

As Energy Saving Certificates will be of real monetary value intensive bargaining about target setting is predictable.
Kenya National Domestic Biogas Program

Kenya’s biogas goals:

– Develop a commercially viable, market-oriented biogas sector

– Install 8,000 new biogas units in rural areas in Kenya over 4 ½ years

National program chaired by the Ministry of Energy and implemented with financial assistance from the Netherlands
National Biogas Program: How it works

1. National program trains local masons to build anaerobic digesters. Installation of the official national biodigester model is subsidized by GTZ-PSDA

2. Masons conduct entrepreneurial business installing the biogas digesters for small rural farmers who use them to convert their livestock dung into biogas.

3. Farmers use the biogas as fuel for cooking, lighting and generating electricity in place of charcoal or wood.

4. The remaining waste slurry is used as nutrient-rich fertilizer for agricultural production.

Top to Bottom: Masons Training in Nakrur, Kenya; Biodigester construction; A biogas-fueled stovetop in Kenya
Biogas Program Results

• Official national biogas program was launched November 24, 2010

• Has installed over 800 units in just the first year

• Produce more than 6,000m3 biogas/ year. Saves more than 7,000 tCO2 annually

Potential Scale of Biogas Production

There are similar projects throughout the developing world, mostly in Asia and other parts of Africa. China has constructed the world’s largest waste-to-energy project based on cow manure, utilizing the dung of 250,000 cows at one facility for biogas production in Shenyang. The project reduces about 180,000 tCO2/year and supplies 38,000MW/year to the state electricity grid.
Huishan Dairy Farm, China
Wastewater Co-Processing in Turkey
Waste-to-Energy in Cement Kilns:

**Context:**

- The Izmut region of Turkey produces 240,000—340,000 tons of municipal and industrial wastewater sludge annually. Disposal is an environmental and health problem.

- Turkey is one of the largest cement-producing countries in the region. Cement production in the region contributes to national GHG emissions.

**An Innovative Solution:**

A Public-Private Collaboration—**Nuh Çimento**, the largest independent cement company in Turkey, is working with municipal governments to municipality to recover energy from municipal and industrial wastewater sludge and use it as a coal replacement in its cement production process. €1 million in funding provided by AFD.
The Nuh Çimento Co-Processing Project

The process:

1. Waste sludge is transported from municipalities to the cement plant under disposal contracts with several neighboring government authorities.

2. A waste-drying unit is constructed on site to dry the sludge, using waste heat generated at the cement plant at €1 million in funding provided by AFD to install the unit.

3. The dried waste is then used as an auxiliary fuel for cement production, replacing some coal usage.

4. The ashes are incorporated into the cement mix.
In 2009, Nuh Cimento set up one of the biggest treatment units for sludge from municipal and industrial wastewater treatment plants.

The unit can process 250 tons of waste sludge per day.

The project is estimated to reduce 250,000 tCO2 per year.

Plan to tap carbon finance through CDM, in collaboration with Ecofys.

Sludge drying facility at Nuh Cimento Cement Plant.
Cash for Trash in Bangladesh: The Community-based Decentralized Composting Model

The world’s first carbon-trading scheme based on compost

**Objective:** Control growing volume of municipal solid waste while reducing GHG emissions and increasing quality of life for urban poor.

**The Model:** Utilize public-private partnerships to employ the urban poor in the collection and composting of organic municipal solid waste that can be sold in the national market to improve soil quality.
Community-Based Composting: How it Works

1. Formally employ local “Waste Pickers” to collect organic waste

2. Employ rickshaw van drivers to transport waste to composting facilities

3. Compost waste in low cost facilities (also employing local residents)

4. Sell compost in the growing Bangladesh fertilizer market (currently fetches a price up to four times higher than it would get in Europe).

Source: Waste Concern
Program Results

- Government provided land for the facilities
- Reduced 17,000 tCO2e between 2006 and 2010
- Generates employment for 986 urban poor
- Saved landfill area of 33.12 acres (1m depth)

Source: Waste Concern
Scaling up

– Harnessed CDM to attract a €12 million investment from two Dutch banks to scale up the project.
– Building four large scale plants that will handle up to 700 tons waste/day
– At full capacity, will save 127,750 tCO2e per year, carbon credits worth $2.5 million. Retail value of compost will reach $14,000 per year.

National Implementation

– The Government of Bangladesh has implemented 46 replications of the decentralized composting model in 26 cities (With support from UNDP)
– First draft of national strategy for waste management forthcoming

International Replication

The model has been replicated in Vietnam, Sri Lanka and Pakistan, with good initial results.
Thank You