Greenhouse Gas Emission Reduction and Industry

The World Bank
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The Current Global CDM Project Portfolio

- Globally - over 1,500 projects in the UNFCCC's CDM portfolio (registered, registration requested or at validation phases)
- Around 500 CDM projects have been registered
- 10.5% (166 out of 1584) are in the industrial energy efficiency sector with average emission reductions of 100,000 tCO2e/yr
Energy Use and Sustainable Development in Industry

- Challenge - scaling up industrial activities in an economically, socially and **environmentally** sustainable way
- Improving the efficiency of industrial energy systems can reduce the GHG emissions for which industries are responsible
- Good potential for energy efficiency in the industrial sub-sectors in ECA (UNDP World Energy Assessment):
  - about 40% for the building materials industry
  - 25 to 30 percent for chemicals, aluminum and food industries
- Implementation of energy efficiency projects in industry are usually associated with increased productivity and greater access to global markets
Reducing the energy intensity of existing industrial production, for example:

- Replace outdated plant and equipment with modern energy-efficient equivalent
- Use more efficient motors and boilers, optimize pipe diameters; insulate pipes
- Use waste heat to generate power, avoid radiation losses
- Improve housekeeping procedures; maintenance
- Introduce/improve process control and automation
- Make use of cleaner fuels, increase share of renewables
- Promote long-term energy management, improve insulation of buildings, and/or install meters
Example - Water Pumping Efficiency, Georgia

- Up to 40% losses in water supply system due to bad quality pipes and inefficient pumps.
- Replace pipes and install more efficient pumps at 100 stations
  - reduce GHG emissions by reducing the amount of energy required to deliver a unit of water to end users in municipal water utilities
  - improve energy efficiency in water pumping by 15% or average reduction in energy consumption of 50,000 kWh/year at each station
- AM0020 "Baseline methodology for water pumping efficiency improvements"
Example - Installation of Modified CO2 Removal System in Ammonia Plant, India

- Energy Efficiency
  - installation of modified CO2 removal system in Ammonia Plant to reduce steam consumption
  - Reducing the energy required for steam generation
  - Reduction of ca. 96 GWh/year
  - Total reduction: ca. 245,000 tons CO2e over 10 years

- Additionality - No legal act for steam optimization in India

- Project complies with all good and safe engineering practices
Challenges - Multiple EE Opportunities at Multiple Facilities

District Heating: (i) Production (Boiler Efficiencies/Fuel Choices, CHPs); (ii) Delivery System Loss Reduction; (iii) End User (Metering, Control, Insulation, Windows)
Challenges - continued

- **Inadequate incentives**
  - Heat or electric supply companies do not want to invest and lose sales revenue
  - End users may face subsidized energy prices – inadequate incentive to conserve energy

- **Additionality**
  - Many low cost measures may not be additional
  - Aggressive efficiency standards may crowd out CDM role

- **Uncertainty**
  - Multiple decision-makers are often involved

- **Cost**
  - Investment financing is often very limited
  - Viable higher cost projects may face financing constraints
  - CDM Transactions costs can be high – need bundling mechanisms or programmatic approach
Managing Challenges - Bundling and Programmatic Approaches

- Bundling CDM Activities
  - "A group of things fastened together for convenient handling."
  - Combine small but similar projects to reduce transaction costs (all entities must be known at time of registration)
  - Standardize baselines and additionality tests
  - Local agency alliance to aggregate projects
  - Eliminate redundant elements of project processing
  - Present carbon buyer with attractive deal size

- Programmatic CDM
  - deliberate program put in place to reduce GHG emissions
  - E.g. grant or soft loan programs, testing and labeling programs to promote a large number of small activities
Example – Implementation Arrangement for a Bundled Project

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1 bundle

Sub-project (legal) agreements

Company A

Implementing agency

ERPA

Reporting/community benefits etc
Questions to Keep in Mind

- Who is the bundling agency?
  - Financier/technology provider/private company/1 of the companies/entrepreneurs/NGO/other?
  - Are risks and benefits understood by all parties?
- Title and authorization to emission reductions, Letter of Intent signing?
- Are legal arrangements secure, adequate?
- Capacity as counterpart?
- Appraisal issues?
**Example - Czech Umbrella Project**

- **Umbrella Concept**
  - Czech Energy Agency is the intermediary
  - CEA to aggregate similar projects
  - Bundled Program For 16 Small Hydro Projects – Evaluated individually using common methodology

- **Role of CEA**
  - Active support programs and Energy Audit Programs – Future State funding on year to year basis
  - Trained to screen and monitor projects and provide limited support

- **Developed validated standard baselines –**
  - Czech Electric Sector
  - District Heating Projects
  - Campus Type EE Projects
Example – Vertical Shaft Brick Kiln Industry (VSKB), India

- Improve thermal performance of brick manufacturing through:
  - Replace conventional technologies (like clamp) with VSKB technology
  - Bundle 14 projects with energy savings - 23 GWh$_{th}$ per year, less than 50,000 CO2e per year
  - Bundling Agency - Technology and Action for Rural Development (TARA) institution

- Methodology “Energy Efficiency and Fuel Switching Measures for Industrial Facilities” AMS II.d

- PDD Ready when enough VSBKs implemented. Crediting period limitations, since all must have the same length and start date:
  - Critical mass/ number of kilns needed to justify CDM costs
  - OK if – kilns identified, reasonably short time span between first and last
Reducing GHG Emissions in Industry

- Decrease production of industrial gases, such as:
  - CO2 generation in cement production,
  - N2O emissions at fertilizer facilities,
  - CH4 emissions in oil and gas production and mining
- Structural shifts to new, less energy-intensive industrial products
The project bundles two sub-projects:

1. Blended Cement - Reduce the clinker content by introducing limestone and other materials such as fly-ash in the finish grinding process. About 60% of ERs are attributed to process changes for producing blended cement.

2. Fuel Switch - Use alternative fuels (such as rice husk, coconut and palm oil waste) instead of coal, oil, and gas.

Benefits:

- 10-12 million tonnes CO2 emission reductions (10-year crediting period)
- IRR expected to increase from 7% without CDM to 11.2% with CDM

Timing - less than 15 months PIN to ERPA negotiations

A new methodology was required.
Example – Danilovsk Associated Gas Production

- Oil production yields Associated Petroleum Gas (APG)
  - Vented as methane (21 time GWP of CO2)
  - Flared as CO2 and methane if combustion is not complete
- Danilovsk use of APG that would otherwise be flared to produce electricity used for re-injection pumping in oil fields
  - ERs around 163,000 tCO2e per year
  - Sale 70% expected ERs (2008-12 vintage) @ $6.6 tCO2e
  - Returns > 12% total investment cost
  - Post 2012 sales not clear but validated project could qualify for another 15 years of sales – return would then be around 50% of investment cost
Summary

- EE opportunities are large but often underdeveloped
- Good Energy Audits are an effective way to find targets
- EE standards can be complimentary or competitive with carbon financing
- Bundling can help to manage transaction costs for smaller projects
- Carbon finance can help but not eliminate financing barriers
Thank you
www.carbonfinance.org