Kyoto Protocol and Sustainable Development: Application of CDM to Renewable Energy

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Presentation outline

- Sustainable development and CDM
- Recent developments: Key elements of Bonn agreement on CDM structure
- Application of CDM to RE: Opportunities and challenges

Sustainable development and CDM

Dual purpose of CDM

Assist Non-Annex I Parties in

- achieving sustainable development
- contributing to ultimate objective of UNFCCC

Assist Annex I Parties in achieving compliance with their QELRCs

Sustainable development

- Brundtland Commission: development that meets the needs of the present without compromising the ability of future generations to meet their own needs
- Kuhn (1998): Sustainability means to sustain ability. Both the ability of the environment to regenerate and the ability of people to retain control over their living conditions

SD priorities for India

- Poverty alleviation
- Economic and social development
- Safe drinking water
- Primary health care
- Universal primary education
- Population control
- Food security
- Energy supply
- Environmental protection

Operationalising SD in CDM

- SD indicators
- Multi-tier screening framework
- Projects must have
  - No major local opposition / burden on local communities
  - No environmental burden shifting (e.g. toxic wastes, land use degradation)
  - Social and economic benefits (enhanced local economic development, employment generation)
  - Local environmental benefits (improved air quality)

Key elements of Bonn agreement on CDM structure

Bonn agreement: Key decisions on CDM

- **Prompt start for CDM**
- **Annex I public funding for CDM to be additional to ODA and financial obligations**
- **Annex I Parties to refrain from using CERs from nuclear facilities**

Bonn agreement: Key decisions

- Afforestation and reforestation projects eligible under CDM in first commitment period (subject to cap of 1% base year emissions, times 5)
- Generous allowance of sinks activities
  - Forest management, cropland management, grazing land management, and revegetation eligible under Art 3.4 (Parties should fix choice of activities)
  - Appendix Z cap on FM in Art 3.4 and

Bonn agreement: Key decisions

- **Domestic action to constitute 'significant element' in Annex I Parties' efforts**
- **2% share of proceeds from CDM only to contribute to adaptation fund**

- **Non-participation of United States**

Bonn agreement: Key decisions

- **Host country decision on SD**
- **Fast-track procedures**
  - **RE upto 15 MW**
  - **Energy efficiency improvement activities to reduce energy consumption on ss/dd side by up to 15 GWh per year**
  - **Other project activities that both reduce emissions by sources and directly emit <15 KT of CO_2-eq annually**

Application of CDM to RE: Opportunities and Challenges

RETs as CDM projects

Direct carbon displacement – well-established emissions additionality

High sustainable development benefits

- local environmental benefits
- improvement in quality of life - (lighting for education, work, better health with improved cookstoves) gender issues
- Improvement in quality of output (SHS, biomass)
- employment generation
- market creation and expansion
- local energy security

Ongoing initiatives in India

- Renewable energy programmes
- 9th Five Year Plan emphasis on
  - Adequate, reliable and quality electricity to all
  - Electrification of villages
- 10% share of RE in total installed capacity for grid electricity generation by 2012
- Fiscal and financial incentives
- Barriers: high upfront costs, intermittent source, unfamiliar technology, lack of infrastructure & after sales service

Power generation - wind

- 45000 MW potential in India
- Current installed capacity – 1267 MW
- Information on potential wind farm sites available
- Infrastructure for production and servicing exists

Solar power

- National development priority
- Limited financial resources with government
- Potential in Thar desert (north-west India)
  - Low population densities
  - High solar radiation

Biomass-based energy

- Energy security for poor and vulnerable communities
- Use of locally available fuels – market creation
- Electrification of remote rural areas (domestic, micro industries, etc)
- 17000 MW potential for biomass gasification in India
- Improved quality of output e.g. silk reeling

Wind pumps

- Fostering national development objectives
  - Irrigation, drinking water, environment
  - Being promoted through demonstration programmes, financial incentives
- High emissions additionality potential
  - Can replace a 5 HP electric pump at a windy site
  - Saves >1850 kg CO_2/yr for each electric pump replaced

Solar home systems

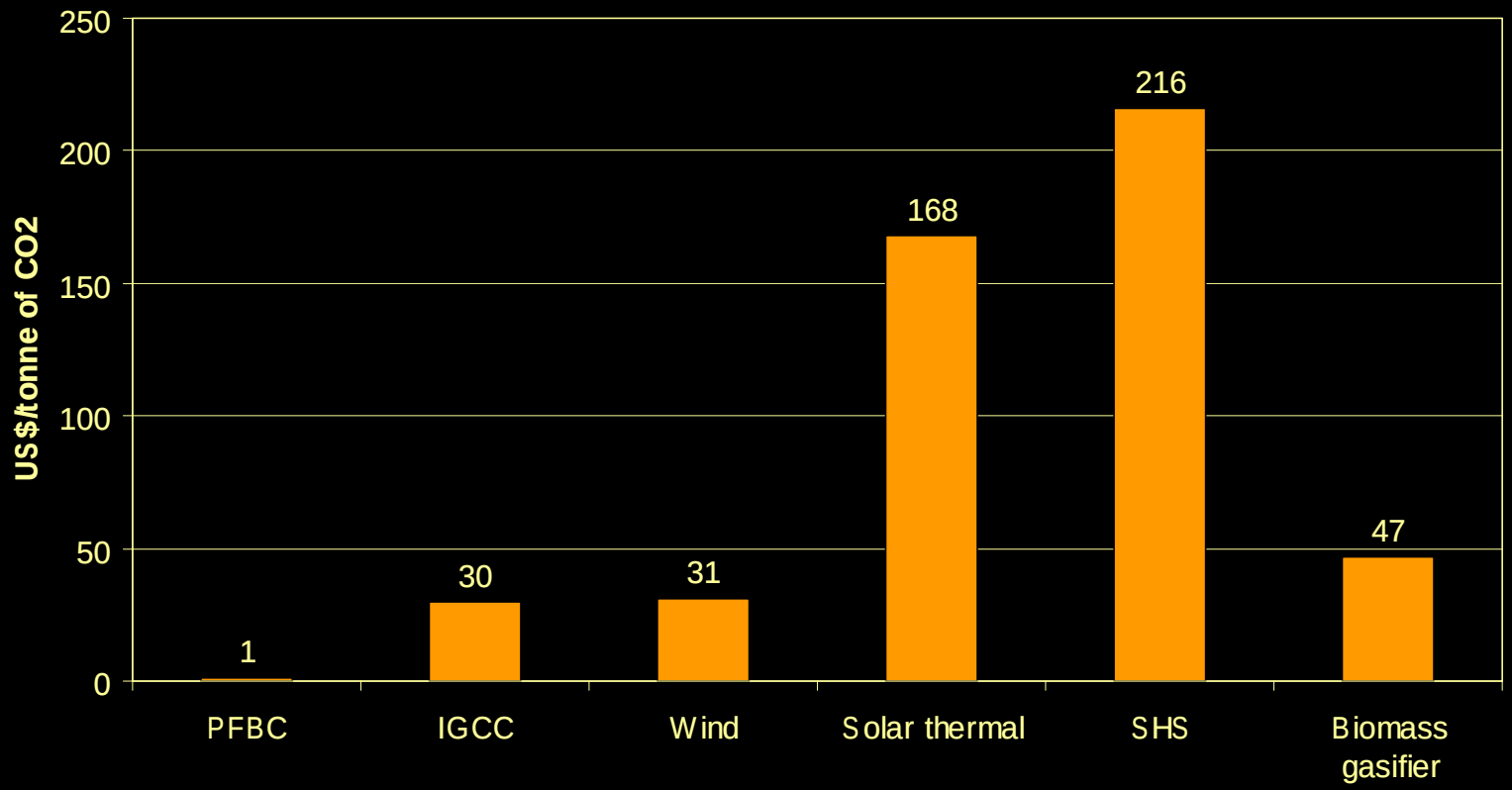
- 100,000 systems in India (3.2 MWp installed capacity) on 31 December 1999
- Market expansion, 20% reduction in system price over last 5-6 years
- 80,000 villages need electricity for lighting and power
- Remote rural settlements, small industries, irrigation, etc
- Very high cost of extending grid network to remote areas

SHS: Incremental cost of abatement

	Baseline	SHS
Unit size (Wp)		50
Economic lifetime (years)		12
Capital cost (Rs/system)		20000
Fuel cost (Rs)	1608	
Annual O&M costs		728
Discount rate (%)	10	10
Emission factor (kg CO_2/yr)	226	0
Incremental cost (US$/t$CO_2$)		216.37

Source: www.teriin.org/climate/baseline.htm

Cost of GHG abatement



Source: www.teriin.org/climate/baseline.htm

Cost – SD tradeoff

Project type	US$/ tCO_2	Rural devt	+ local envt impacts	Access to state-of-the-art tech
PFBC	1	Low	Medium	Medium
IGCC	30	Low	High	High
Wind	31	Medium-High	High	High

Challenges under CDM

- High incremental cost of abatement
- Small project size (wind pumps)
- High transactions costs (esp. for decentralised options) as fraction of project cost
- Dilution of demand for CDM - interest in low cost options (e.g. PCF)

Opportunities under CDM

- Clear environmental additionality
- Inherent SD benefits – high ‘quality’ of CERs
- Short gestation period for decentralized options
- Standardized baselines
- Clustering of small projects (for approval and verification)
- Streamlined process – fast-track procedures at international level, host country prioritization

Thank you!