Green Growth in industries?

Output growth strategy that promotes low carbon technologies and practices

Green Growth ‘Criteria’?

- Energy efficiency
- Clean technology
- Fuel switch/use of renewable
- Waste reduction
- Recycling
- Technology leapfrogging
- Product design for demand side management etc.
India: Major policies linked to Green Growth

Industry Sector:

Direct


Indirect

- **Power generation** – Energy efficiency (EC Act, PAT), Renewable (National Solar Mission 2010, Renewable Purchase Obligation - RPO), reduction in transmission and distribution losses

Other:

- Standard and labelling of appliances - Star labelling
- Energy conservation building code
- Enhanced fuel efficiency in transport - Car labelling (forthcoming)
- Expanding the forest cover - National Mission for a Green India
Energy Efficiency: Important Green Growth Criterion

Decomposition of energy demand - Indian manufacturing industries

Based on Annual Survey of Industries, India 1973-74 – 2010-11
Energy Conservation Awards

- Participation (voluntary) increased from 123 units in 1999 to 773 in 2012
- Investment energy conservation in 2012 = INR. 1948 Crores
- Monetary saving achieved in 2013 = INR. 2886 Crores in 2013
- A payback period of 8 months

Electrical energy saving in terms of equivalent avoided Capacity in MW

Bureau of Energy Efficiency, Government of India, 2014
Initiatives ranged from low to high cost

Source: IPCC 2014
Driving forces behind actions

- Cost Competitiveness
- Influence of policy
- Price consideration
- Consumer demand
- Exportability

Source: Chakraborty & Roy 2012
Energy Conservation Act (2001)

- Provides for the legal framework, institutional arrangement and a regulatory mechanism at the central and state level

- Both voluntary and mandatory provision of energy efficiency

- Identified the Designated Consumers with energy consumption over and above a threshold

- Created the nodal institutional set-up – Bureau of Energy Efficiency (BEE) and State Designated Agencies

- Mandatory appointment of Energy Managers and Energy Audit done by accredited auditors

- Created Energy Conservation Fund for implementation of Energy Conservation measures and sustain awareness creation
Energy efficiency performance of Indian industries vis-à-vis world

Aluminium

Iron and Steel

Cement

Paper

Source: Dasgupta 2014
Pace of process change – not similar for all industries

Cement

Steel

Source: Dasgupta 2014
Perform Achieve and Trade

- **Genesis** – EC Act, 2001
- **Industries covered** – Aluminium, Cement, Chlor Alkali, Fertilizer, Iron and Steel, Pulp and Paper and Textile along with Power sector
- The 478 large energy consuming units - Base line for each unit
- A market based mechanism through certification of energy savings that could be traded
- Target setting – 2010-12, compliance – 2012-15, then trading

- Trading mechanism will play an important role

- Trading can be carried out bilaterally, or on special platforms in the power exchanges

- Fungibility with Renewable Energy Certificates can be provided

- Financial penalty for non-compliance linked to quantum of non-compliance

- Energy Efficiency Services Ltd. (EESL) has been created as a corporate entity to provide market leadership

- Venture Capital Fund – under consideration

- Target- saving of 6.6 MTOE at the end of the first cycle of PAT
Potential beyond energy efficiency: Role of carbon price
Results from GCAM

Graph showing CO2 Emission per year (MTC) from 2005 to 2050. The graph includes four scenarios:
- **Reference scenario**
- **Advanced EE technology scenario**
- **Global Carbon price scenario**
- **Global carbon price with advanced EE technology scenario**

The graph indicates a steady increase in CO2 emissions from 2005 to 2050, with the Advanced EE technology scenario showing a lower trend compared to the Reference scenario.
Potential beyond energy intensive industries

Industries other than energy intensive industries covered under PAT – big role to play
Implications for power generation

Long run green growth in industry requires large scale electrification

Projected consumption of fuel use for electricity generation in Indian in 2050: comparison of Reference scenario and green growth policy scenario
Concluding Remarks

- So far energy efficiency is in focus as a green growth strategy for Indian industries

- Evolution of initiatives – from voluntary participation in Energy Conservation Award to mandatory PAT

- PAT is emerging as an important market based mechanism to enhance energy efficiency in industries – with accommodating fiscal and financial policies

- Our research shows that non-PAT sectors have equally important green growth potential

- Results from GCAM show global carbon price can induce further response to reduce direct and indirect emission from industries

- Adoption of CCS and other high cost technologies will become an imperative in achieving green growth
Global Change Programme
http://juglobalchangeprogram.org/

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Thank you