India Japan Technology Cooperation through Sustainable Development

Building capacity through Research, Development, Demonstration and Deployment (RDD&D) collaboration

July 23, 2012

Yokohama, Japan

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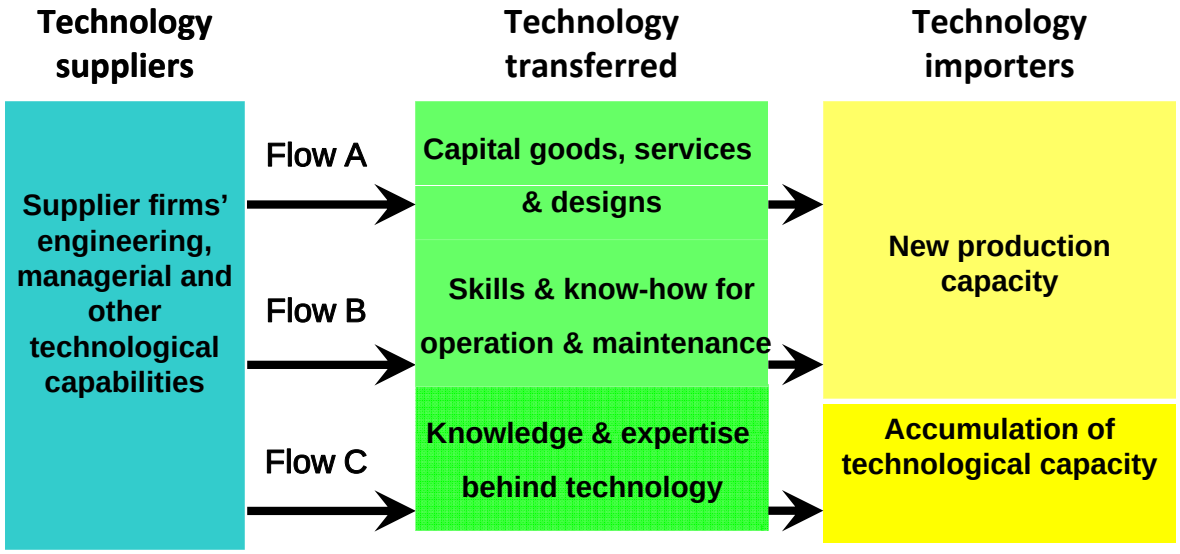
Introduction

- Global energy demand will grow by 55% between 2005-30
- 74% of the growth will be on account of increase in demand in developing countries
- Meeting the growing energy demand through conventional means would not be environmentally sustainable
- Effective Research, Development, Demonstration and Deployment (RDD&D) strategies are needed for Energy Efficient (EE)/Renewable Energy (RE) technologies for sustainable growth
- R&D (innovation) of EE/RE technologies are often happening in developed countries while D&D (adoption) is needed in developing countries
- Collaboration between developed and developing countries through various stages of innovation process is pivotal to building of technological capacities along with effective international technology transfer

Technology transfer and technological capabilities

- Technology transfer takes place within the broader context of technological change
- Impact of technology transfer depends upon the technological capacity of recipient country. This capacity determines whether future innovation and adoption of the technology will take place in the recipient country
- Building technological capacity is most important in developing countries where long term economic development and poverty reduction are primary concerns
- Why focus on international collaborative RDD&D?
  - Would help to build technological capacity of developing countries and offer creative ways to address IPR issues

Three flows of international technology transfer



Small and Medium Enterprises(SME) sector in India

- Accounts for 45% of manufacturing output and 40% of India's total exports
- Many energy intensive sectors like foundry and forgings, glass and ceramics, textiles, food processing, etc
- Uses obsolete energy inefficient technologies
- Good scope to save energy by developing and demonstrating cleaner technological options

Unique RDD&D initiative by TERI in Indian SMEs

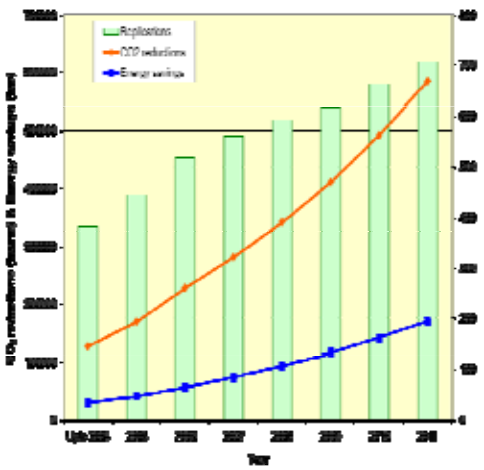
- Initiated in 1994 by TERI with support from a European bilateral agency
- Identified energy inefficient operations in four SME sub-sectors:
  - foundry sector
  - glass sector
  - brick sector and
  - biomass applications
- TERI in collaboration with international experts worked towards development and demonstration energy efficient technologies in each of the four sectors
- Diffusion of the demonstrated technology was possible due to accumulation of technological capacity within TERI and Indian partners
- TERI and Indian partners provides training and hand-holding support of local service providers as well as SME operators during technology replication

Glass - small sized melting furnace

Energy savings: 25-50%

Impact of the RDD&D initiative

- 95 energy efficient cupola furnaces and 76 pot furnaces replicated in foundry and glass sectors. Energy saved in the two sectors about 102,000 tonnes of oil equivalent (365,000 tonnes of CO2)
- Diffusion of the technologies was made possible by constant modifications to the demonstrated technologies e.g. lowering of cost and adapting to local requirements
- Many more self-replicated versions of these furnaces by local service providers whose energy savings have not been quantified



Application of low carbon technologies in SME sector – A joint TERI/IGES Research project

Overall Goal:

a) Promotion of low carbon technologies in India

Cooperation Framework:

a) "Science and Technology Research Partnership for Sustainable Development" promoted by JICA and JST

Target sectors:

a) Small and Medium Enterprises

Focus:

a) Energy efficient technologies

Time period:

a) 4 years (2010 -14)

Implementation partners:

a) India: TERI and selected SMEs
b) Japan: IGES, Kyoto University and selected Japanese companies

Heat pump (EHP/GHP)

- **Application:**
  - SMEs (Food processing), Small Restaurants
  - Process air cooling, Office air conditioning
- **Features:**
  - Simultaneous heating and cooling
  - Higher efficiency than conventional AC s
- **Energy Saving:**
  - Estimated energy savings: 18-21 % (EHP)*
    41-43 % (GHP)*

**based on pre implementation detailed study*

- **Suppliers:**
  - Mayekawa, Yanmar
- **Likely sites:**
  - Milk Processing Unit
  - Chocolate manufacturing Unit
  - Casting and Foundry Units

Compressed air systems

- **Application:**
  - SMEs (OEMs of automobile parts, Engineering industry)
- **Features:**
  - Use of Inverter based compressors (VFD)
    - Consumes power according to the load variation
    - Estimated energy saving: 8-25% (based on variation in air requirements)
  - Better operating practices
    - Reducing pressure losses, piping layout and fittings
    - Loading/unloading time optimization
    - Proper ventilation of compressor room
- **Suppliers:**
  - Hitachi

Recommendations

- Collaborative RDD&D projects can play a vital role in enhancing the technological capacities of developing countries
- The area of collaboration should be based on local needs and involve local actors
- Sharing of knowledge and expertise by foreign experts in such projects are vital for their success
- Anchoring the technology in intermediaries such as local R&D/academic institutions will ensure sustainable replication of the demonstrated technologies
- Bilateral and multilateral funding mechanisms can play an important role in promoting RDD&D on cleaner technologies
- Such projects should be focused on specific applications/sectors and should have a longer time frame

Thank you

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