TERI’s experience on Biomass based Decentralized Energy Solutions for Industries – Incentive and Barriers

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Overview of Biomass Gasification at TERI

- Dedicated group working on various biomass conversion technologies
- Biomass Gasification R&D work started in 1984
- Well developed R&D, Prototype development, Laboratory and test beds facilities located at Gual Pahari (near Delhi)
- Developed biomass gasifier designs suitable for variety of biomass types for both thermal, power, cooling applications
- Developed biomass and solar hybrid system
- JV with Chanderpur Works, Yamunanagar for manufacturing and marketing of gasifiers
- License the technology to 10 different manufacturers in India
- International Technology Partnerships
  - **Technical University of Denmark** (two stage gasifier, LT CFB gasifier)
  - **Green Research Institute, Canada** (Fluidized bed gasification)
- TERI design gasifier system are exported to US, Finland, South Africa, Myanmar, Sri Lanka, Thailand, Bhutan and Uganda
Focus Segments

• **Power Gasifier**
  - Rural Mini Grids (10-40 kWe)
  - Captive/Grid applications (50-1000 kWe)
  - Total cumulative capacity of about 5 MWe gasifier system commissioned
  - About 2 MWe capacity is under implementation

• **Thermal Gasifier**
  - Biomass gasifier for industrial thermal energy applications developed
  - Capacity range – 25 kWth to 3 MWth
  - 650+ thermal gasifiers (70 MWth) have been installed in different industries
  - The replications of thermal gasifier in various industries have clearly established the gasifier technology as a cost effective energy delivery system.
Biomass gasifiers for thermal applications in Industries

- Industrial sector contributes 14% to GDP, prices of energy has been increasing steadily e.g. diesel oil prices have increased many folds in last 10 years
- Many MSME reeling under high energy costs, are shifting to gasification technology, which offers the convenience of commercial fuels but at much lower costs.
- TERI has been pioneer in realizing this potential in many MSME textile processing, food processing, rubber processing, plaster of paris, ferrous and non-ferrous melting furnace applications through a network of local service providers (LSPs) and the TERI licensee manufacturers (LMs)
Key Gasifier Installations

CIAE Bhopal

Remcom Thailand

Sulux Phosphate Udaipur

Jubliant Chittorgarh
Gasifier applications in MSMEs
<table>
<thead>
<tr>
<th>Application</th>
<th>Lead &amp; Alloy Melting and Red Oxide Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Temperature</td>
<td>850-950 DegC</td>
</tr>
<tr>
<td>Existing Fuel</td>
<td>Diesel</td>
</tr>
<tr>
<td>No. of furnaces</td>
<td>3 melting Pot, 1- Red Lead Furnace &amp; 1 Rotary Furnace</td>
</tr>
<tr>
<td>Fuel Consumption</td>
<td>20 L/h in melting &amp; 35 L/h in Rotary</td>
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<tr>
<td>Time for one batch</td>
<td>22 hrs</td>
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</table>
Biomass Consumption : 180 Kg/h

Thermal Output : 450000 Kcal/h to replace 45 L diesel/h

Project Cost : Rs. 35,00,000
Including civil etc.

Financing : Internal
Annual Saving : Rs 64 lakh
Financing Mechanism

• Incentive under MNRE program
  – Accelerated depreciation (80% in first year)
  – Subsidies (Rs 2 lakh/ 100 kWth)

• The major sources of funding were
  – Conventional loans from bank
  – Promoters equity

• Promoted thermal gasifier through energy service delivery models by our licensee in selected sectors

• Recently, SIDBI has given a line of credit of Rs 5 crore through our JV partner on trial basis
Suggestions to overcome Financing bottlenecks

• Allow thermal gasifier funding under bank **equipment financing** category

• Banks to link finance and cover perceived risk under
  – DICGC of RBI or
  – CGFT of GoI and SIDBI

• Bring RE based thermal energy solutions for MSME under **priority lending** status

• MNRE to **create dedicated fund** and **Concessional loan** to promote RE financing risks of banks

• Re-defined technology and cost bench mark
Thanks for your kind attention!!

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