Biogas Scenario in India

By

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Excellent Renewable Pvt. Ltd.
ENERGY SECTOR IN INDIA
Energy Sector in India

Energy Consumption in India

• India is the second largest commercial energy consumer in Non-OECD East Asia, comprising 19 percent of the region’s total primary energy consumption.

• Per capita energy consumption has increased by 42% in two decades, resulting into increase in total energy usage to 91%

As per the 2011 Census, 44.7% rural households had no access to electricity.
Energy Sector in India

• India was the fourth largest consumer of energy in the world in 2011, after the United States, China, and Japan.
• Largest source of energy is Coal followed by Petroleum
• Depends heavily on imported crude oil, mostly from the Middle East
Renewable energy Sector in India

Renewable energy sources

• India's Renewable Energy installed contribution has increased to 26,267 MW or 12.45% of the total installed Capacity by the end of 2012.

• The total potential for renewable power generation in the country as on 31.03.12 is estimated at 89774 MW.

• Twelfth Five Year plan period has a target of installing 30 GW of Grid Tied Renewable power capacity addition, comprising 15 GW from wind, 10 GW from solar, 2 GW from small hydro and 3 GW from biomass.
Biogas in India

Biogas generation possibilities from different industries
Biogas in India

Biogas potential

• **Cattle dung**: India has a potential of generating $6.38 \times 10^{10}$ m$^3$ of biogas from 980 million tonnes of cattle dung produced annually. In addition, 350 million tons of compost would also be produced.

• **Solid Waste**: Every year there is an estimated 30 million tonnes of solid waste and 4,400 million cubic meters of liquid waste generated the urban areas of India.

- Surplus biomass : 17000 MW
- Cows manure and poultry droppings : 1500 MW
- Urban Wastes : 2600 MW
- Industrial Wastes : 1300 MW
Biogas industry scenario

- The Biogas industry is not really mentioned when one talks about renewable energy.
- It faces stiff competition from other renewable sources like Solar, Wind and specifically Biomass.
- Very few competent players
- Huge potential for small (family size) plants
- There is a possibility to convert this potential into large size plants, but very little work done in this area
Biogas Scenario in India

Issues and Challenges

• Lack of technology standardization

• Availability of biogas plant components at economically viable rate

• Availability of waste in large quantities

• Policy frame work

• Legislative hurdles
Opportunity

Technical service and biological consulting

• The technology available in India is mainly for cattle dung based biogas plants of smaller size.
  • Majority of plants are manually operated
  • Biogas is used for cooking
• There are few other technologies for kitchen waste based plants - but for small to medium scale plants.

Due to lack of technology and lack of awareness, a huge amount of biodegradable waste remains unutilized/unprocessed.

There is a demand for technology provider for industrial scale biogas plants with high level of automation

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Opportunity

Feeding system

• In current scenario, feeding is generally done manually

• Slurry is mixed with hand or mechanical mixture

• It makes larger plants inoperative

Mechanical automated feeding can reduce human efforts and speed up the process
Opportunity

Biogas storage and roofing

- Biogas is stored into floating dome MS holders
- Such holders have relatively shorter life—especially when not maintained properly
- Biogas loss is relatively high

Economically viable properly designed biogas storage roof can reduce loss of biogas
Opportunity

Agitators

- No standard mixing system available for biogas
- Customized mixtures are installed inside digesters – less efficient and maintenance is costlier affair

Agitators especially designed for biogas plant with low maintenance can reduce operating cost

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Opportunity

Biogas engines

• Biogas engines of smaller size are not available in India

• Generally diesel engines are converted to run on biogas - high risk, low efficiency

• Huge demand for smaller biogas gensets in rural India especially where the area is un-electrified
Opportunity

Biogas Enrichment plants

• There is huge number of small size biogas plants in India—especially in Goshalas (Cattle hostels)

• Access biogas remains unutilized

Economically viable small size enrichment system with bottling facility can avoid loss of biogas.

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ABOUT ERPL
ERPL Leadership Team

Highly experienced team with over 100 years of combined renewable energy experience

**Deepak Gadhia – Chairman**
Mr. Gadhia serves as Chairman of ERPL and has over 30 years of experience in renewable energy. He previously led Gadhia Solar where he was instrumental in creating India’s first solar steam cooking system. Having built the world’s largest solar cooking systems at Shirdi, Tirupati and Brahmakumari, he is known as the Solar Cooking Authority across India. He holds a Bachelor of Science in Process & Environmental Engineering (Germany).

**Hemant Patel - CEO**
Mr. Patel serves as CEO of ERPL and has over 30 years of global experience in project management, supply chain and manufacturing plant set-up. Previously he led DuPont’s Project Engineering System and built large chemical plants in Spain and Singapore. He holds a BTech in Chemical Engineering from IIT-Bombay and an M.S. in Chemical Engineering from Syracuse University.

**Dipen Kanabar – COO**
Mr. Kanabar serves as the COO of ERPL. He has over 17 years of experience in IT product delivery having been involved in marketing fire protection systems for a family business. He holds a Bachelor of Engineering from V.J.T.I. Mumbai.

**Harish Desai – Director**
Mr. Desai serves as a Director of ERPL. He is an entrepreneur with over 30 years of experience. He is part of the Excel Group, which has turnover of over US $6 million.

**Karthik Chandrasekar – Director**
Mr. Chandrasekar serves as a Director of ERPL. Previously he was an Energy Portfolio Manager at the Acumen Fund. He holds an MBA from the University Of Chicago Booth School of Business, an MS in Public Policy and Management from Carnegie Mellon University and a BTech in Chemical Engineering from IIT Bombay.

**Pranav Gadhia - VP of Marketing**
Mr. Gadhia serves as the VP of Marketing of ERPL. Previously he spent eight years working as the Director of Finance & Marketing at Gadhia Solar where he led the installation of India’s first solar steam cooking system. He holds a Bachelor of Commerce from Mumbai University.

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# Multi-level Product Offerings

## Comprehensive Approach to Biogas Implementation

### ERPL Product Range

<table>
<thead>
<tr>
<th>Industrial Bio-CNG Plants</th>
<th>Gas Management Solution for Agro-industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-10,000 cum</td>
<td>25-100 cum per hour capacity</td>
</tr>
<tr>
<td>Centralized Agro, animal and food waste management</td>
<td>For ETPs in dairies and other industries</td>
</tr>
<tr>
<td>Electricity (&gt; 50 kW)</td>
<td>Storage and pressurizing of biogas from ETP</td>
</tr>
<tr>
<td>Bio-CNG for industrial and vehicle use</td>
<td>Clean fuel for cooking and boilers</td>
</tr>
<tr>
<td></td>
<td>Payback &lt; 1 year</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Biogas Plants for Institutions &amp; Communities</th>
<th>Family Size Biogas Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>25- 500 cum</td>
<td>1-4 cum</td>
</tr>
<tr>
<td>For Villages, Gaushalas, Hostels, Canteens</td>
<td>For Rural &amp; Urban Household</td>
</tr>
<tr>
<td>Food, human &amp; animal waste management</td>
<td>Food, human &amp; animal waste management</td>
</tr>
<tr>
<td>Electricity (off-grid up to 50 kW)</td>
<td>Clean cooking fuel</td>
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<td>Organic fertilizer</td>
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Bottled biogas from animal, food & agro waste

Gas produced in ETP Plants flared earlier due to insufficient pressure is now used for cooking

Biogas Plants for Institutions & Communities

Family Size Biogas Plants

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Upcoming 1 MW Bio-CNG Plant

Waghodia, Vadodara

Client Name: Muni Seva Ashram, Goraj
Plant Size: 13,000 Ncum/day
Feed Material: 130 MT/day of mixed feed
Project status: Under construction
Technology: Mix feed CSTR

BOOT project housed in SPV
Total project cost: INR 20 Crores
Payback: < 5 years

<table>
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<tr>
<th>Annual Income (E)</th>
<th>INR ( Crores)</th>
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<tbody>
<tr>
<td>Revenue – Bio-CNG</td>
<td>10</td>
</tr>
<tr>
<td>Revenue – Organic Fertilizer</td>
<td>3</td>
</tr>
<tr>
<td>Total Project Revenue</td>
<td>13</td>
</tr>
<tr>
<td>EBITDA</td>
<td>6.75 (52%)</td>
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</table>

1st Megawatt scale mix-feed biogas plant in India
Commonsense is the realised sense of proportion!

Thank you!

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