INDIA’S FIRST DISTRICT COOLING SYSTEM – GIFT CITY

Presented by:

Mr. Rajeev Sharma, Vice President, GIFT CITY

Wednesday, 16th June 2021 | 17:30-19:00 (India) | 20.00 - 21.30 (Manila)
Total Chiller Installation – 1,45,000 Tr

Total Required Cooling capacity – 2,40,000 Tr

Thermal Energy Storage Capacity

(70%) Diversified HVAC Capacity = 1,68,000 Tr

Total Built Up Area = 62 mn. Sq.ft.

Total Cooling Load Demand = 2,40,000 Tr

30% CAPEX Reduction due to load Diversity

Required Chiller Capacity (in Thousands)

- Conventional System
- DCS System

40% Saving

Power Requirement (in mW)

- Conventional System
- DCS System

50% Saving
1. **THERMAL STORAGE TANK ENGAGEMENT**

   a. Chillers operate at near Full Loads: Best IKW – Optimized Power use


### ikW/TR

<table>
<thead>
<tr>
<th>Year</th>
<th>ikW/TR</th>
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<tbody>
<tr>
<td>2015-16</td>
<td>1.21</td>
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<tr>
<td>2016-17</td>
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<td>2017-18</td>
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<tr>
<td>2018-19</td>
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<td>2019-20</td>
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<tr>
<td>2022-23</td>
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*PROJECTED*
• DCS plant smaller than 30,000 Tr are unable to take full advantage of economic of scale

• DCS Plant having capacity larger than 60,000 Tr are over expensive and loose the DCS advantage.
Business Model – Green Field – Hypothetical Example

Example – Case of setting up a DCS plant

Plant Size – 10,000 Tr ; Cost - Rs.100 Cr (13 mn. USD)

Considering: YoY Cooling load increase - 20%

Tariff Increase : 2.5% yoy

- B/ even - working OPEX : 5 – 6 Yrs
- B/ even - Total OPEX : 6 – 7 Yrs
- Part CAPEX Recovery : 10 - 12 Yrs
- Net Profit : 13 – 25 Yrs
- Profit – less cost of planned equipment replacement : 26 Yr onwards

- Part of Initial CAPEX deployed, to be recovered under City Development charges
- Fixed cost component goes to CAPEX recovery
- Tariff – 2 Stage: Fixed & Variable
Green Field Model

Break Even Point Graph

- OPEX Break Even Point
- Total OPEX Break Even
- 'Part CAPEX' Recovering
- Profit after Recovering 'Part CAPEX'

- Generation Cost/TR-Hr
- Tariff / Tr-hr
- Demand Load (%)

Sustainable Air Conditioning with District Cooling Systems | 16th June 2021 | 17:30 to 19:00 IST
### Business Model – Retrofit – Hypothetical Example

**Example – Case of setting up a DCS plant**

- **Plant Size** – 10,000 Tr; **Cost** - Rs.100 Cr
- **Considering:** Upfront load availability: **40%**
  - YoY Cooling load increase: **15-20%**
- **Tariff increase** – **2.5% YoY**

<table>
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<tr>
<th>Category</th>
<th>Period</th>
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<tbody>
<tr>
<td>B/ even - working OPEX</td>
<td>2 – 3 Yrs</td>
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<tr>
<td>B/ even - Total OPEX</td>
<td>4 – 5 Yrs</td>
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<tr>
<td>Total CAPEX Recovery</td>
<td>14 – 15 Yrs</td>
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<tr>
<td>Net Profit</td>
<td>15 Yrs onwards</td>
</tr>
<tr>
<td>Profit – less cost of planned equipment Replacement</td>
<td>26 Yr onwards</td>
</tr>
</tbody>
</table>

**Note:**
- CAPEX deployed, to be recovered through tariff and demand Contracts
- Tariff – 2 Stage: Fixed & Variable
Retrofit Model

BREAK EVEN POINT

- Generation Cost/TR-Hr
- Tarriff / Tr-hr
- Demand Load (%)

OPEX Break Even Point

Total OPEX Break Even

‘CAPEX’ Recovering

Net Profit
Business Model – Key Points For Attention - Green Field

• Technical Feasibility - Technology selection
• Availability of Space / Location for Utility & Piping network corridor
• Preparation of Overall plan & Guidelines - DCS supply and Usage
• Cooling Demand Estimates
• Availability of Power, water, sewage source, other Utility interconnect
• Initial Funding source & recovery of interest and capital
• Tariff Structure, Metering & Regulatory body
• Break even - CAPEX & OPEX
• ROI / IRR
Policy

1. Regulatory framework for tariff determination

2. Availability of Power on subsidized model for DCS to connect to residential building.

3. Govt. to give Building developers TAX exemptions/benefits to encourage connecting to DCS.

4. DCS investors to be encouraged by Govt. for special benefits in Power Purchase Agreement, establishing Solar power plant and non-conventional energy use.
Thank You

Suggestions are Welcome…

rajeev.sharma@giftgujarat.in