Hearty Welcome to All

19th National Award for Excellence in Energy Management
29th Aug – 31st Aug, 2018 at Hyderabad

Presented By:
Mr. Ahmer Ali Khan – Sr. Manager (E&I)
Mr. Jagdish Barla – Sr. Manager (Mechanical)
Mr. Sudhir Samantary – Sr. Executive (Technical Cell)
Kapilas Cement Manufacturing Works (here-in-after referred to as KCMW), a Unit of OCL India Limited (a Dalmia Bharat Group Company), is operating a Cement Grinding Unit having installed capacity of 1.7 MTPA in Odisha, commissioned on 28th March, 2008.

A Captive Solar PV Power Plant of 2.5 MW commissioned on 28th March, 2014, operating under REC mechanism.

Presently operating a LOESCHE VRM (LM 56.3+3 CS) with 1.70 MTPA capacity for Clinker and Slag grinding separately.

Predominantly manufacture Portland Slag Cement (PSC) and Composite Cement (CC) with 100% road dispatches.

Several innovative projects undertaken to achieve following milestones:

✓ 7% & 16% **reduction of Electrical Energy** in both consecutive year of 2016-17 (39.9 KWH/T) & 2017-18 (35.5 KWH/T) respectively over 2015-16 (42.88 KWH/T).

✓ 26.12 % & 28.87 % **reduction of Thermal Energy** in both consecutive year of 2016 -17 (74.84 Kcal/Kg cement ) & 2017-18 (72.05 kcal/kg cement ) respectively over 2015-16 (101.3 kcal/kg cement ) in PSC.

✓ 6.37 % & 7 % of the **total Power consumption substituted by Solar Power** in FY 17 & FY18 respectively.

✓ 82 % of the **total Power consumption substituted by Open Access from our own GPP(WHRS)** in FY 207-18 respectively.

✓ 27.73 % **reduction in Carbon foot print** in Yr 2017-18 ( 351 Kg/ton) over 2013-14 (487 Kg/ton)

✓ **Green belt developed** over 33% of the total area with 1,10,612 ( survived) species planted

✓ **100% utilization of harvested rain water achieved** for Process & Domestic consumption, except for drinking
Kapilas Cement Manufacturing Works

Process Flow Diagram - Cement Manufacturing

- SLAG STOCK PILE 2 x 12500 MT
- COAL STOCK PILE 1 x 4000 MT
- CLINKER FROM WAGON TIPPLER
- CLINKER SILO 25000 MT
- CEMENT SILO 2 x 7500 MT
- ROTO PACKERS 2 x 180 TPH
- GYPSUM STOCK PILE 2 x 2500 MT
- TO HAG & COAL MILL
- COAL CRUSHER
- PADDLE MIXTURE
- 8 X 90 TPH TRUCK LOADERS
- DISPATCH TO CUSTOMERS
- 4 X 2500 MT COMPARTMENT SILO
- RABH
- CEMENT VERTICAL ROLLER MILL
- SLA​​N GYPSUM:

- COAL STOCK PILE
- CLINKER FROM WAGON TIPPLER
- Gypsum Stockpile 2 x 2,500 t
- Cement Vertical Roller Mill
- Paddle Mixture
- Dispatch to Customers
- 8 x 90 TPH Truck Loaders
- Roto Packers 2 x 180 TPH
Benchmark: Where We Are..Where To Go...

Overall PSC Grinding Power Kwh/Ton

Packing Power Kwh/Ton

Total PSC Power (Kwh/Ton)

HEAT CONSUMPTION KCAL/KG OF CEMENT
ENERGY CONSERVATION PROJECT IMPLEMENTED

No of Project Completed: 45 Nos.
Cost Saving Achieved: 784.8 INR Lacs
Electrical Energy Saved: 97.64 Lacs kWh
Thermal Energy Saved: 44947 M Kcal
Project With Nil Investment: 21 Nos
Investment Made: 647 INR Lacs
### Energy Conservation Actions: Without Investment

<table>
<thead>
<tr>
<th>No</th>
<th>Title of Project</th>
<th>Year</th>
<th>Annual Electrical Saving (Lacs kWh)</th>
<th>Annual Electrical Saving (INR - Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Both Packer bag cleaning blower stop when respective radial/tangential belt not running</td>
<td>15-16</td>
<td>1.98</td>
<td>11.9</td>
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<tr>
<td>2</td>
<td>Switching of 2 no's of transformer of solar power plant during night hrs.</td>
<td>16-17</td>
<td>0.29</td>
<td>1.8</td>
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<td>3</td>
<td>Replacement of 531BC3 and 531BC4 motor from 45 KW to 37 Kw</td>
<td>16-17</td>
<td>0.34</td>
<td>2.1</td>
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<tr>
<td>4</td>
<td>Replacement of 491BC3 motor from 45 KW to 37 KW</td>
<td>16-17</td>
<td>0.11</td>
<td>0.7</td>
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<td>5</td>
<td>To stop the Compressor of Packing plant and utilize compressor of CVRM</td>
<td>16-17</td>
<td>2.7</td>
<td>2.4</td>
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<tr>
<td>6</td>
<td>Cooling tower fan to be stopped and Temperature sensor installed to reduce running hour of fan.</td>
<td>16-17</td>
<td>0.21</td>
<td>1.3</td>
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<tr>
<td>7</td>
<td>Packer Interlock logic modified for reduction of idle running</td>
<td>16-17</td>
<td>2.16</td>
<td>13</td>
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## Energy Conservation Actions: Without Investment

<table>
<thead>
<tr>
<th>No</th>
<th>Title of Project</th>
<th>Year</th>
<th>Annual Electrical Saving (Lacs kWh)</th>
<th>Annual Electrical Saving (INR - Lacs)</th>
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<tbody>
<tr>
<td>8</td>
<td>Installation of belt starvation switch and development of logic to minimize idle run of belt conveyor</td>
<td>16-17</td>
<td>0.27</td>
<td>1.6</td>
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<td>9</td>
<td>Ventury removal from Coal Mill ID Fan</td>
<td>16-17</td>
<td>0.41</td>
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<td>10</td>
<td>Packing House Compressor &amp; MC Silo compressor to be connected with Bag House compressor</td>
<td>16-17</td>
<td>1.1</td>
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<td>11</td>
<td>Reduced power consumption during CVRM mill heat-up &amp; cooling time</td>
<td>16-17</td>
<td>0.05</td>
<td>0.3</td>
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<td>12</td>
<td>Removal of damper of ID fan motor</td>
<td>17-18</td>
<td>4.53</td>
<td>2.71</td>
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<td>13</td>
<td>Optimization of Compressor air use and stopping of two numbers of Auxiliary compressor</td>
<td>17-18</td>
<td>1.81</td>
<td>1.09</td>
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<td>14</td>
<td>Switching off two no's of distribution transformer</td>
<td>17-18</td>
<td>0.44</td>
<td>0.26</td>
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<td>15</td>
<td>Conversion DELTA TO STAR for 10 no's of motors</td>
<td>17-18</td>
<td>4.53</td>
<td>2.72</td>
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<td>16</td>
<td>Replacement of 11 no's of under loaded motors with lower capacity motor</td>
<td>17-18</td>
<td>7.55</td>
<td>3.62</td>
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<td></td>
<td><strong>TOTAL SAVINGS (Without Investment) - A</strong></td>
<td></td>
<td><strong>28.48</strong></td>
<td><strong>14.81</strong></td>
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### Energy Conservation Actions: Without Investment

<table>
<thead>
<tr>
<th>No</th>
<th>Title of Project</th>
<th>Year</th>
<th>Annual Thermal Saving (M KCal)</th>
<th>Annual Thermal Saving (INR - Lacs)</th>
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<tbody>
<tr>
<td>17</td>
<td>Slag to be stored in shed in rainy season &amp; to be stored in outside shed in summer season for reduction in heat consumption</td>
<td>On going</td>
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<td>18</td>
<td>Reduction of False air Across the system limited to 12%</td>
<td>On going</td>
<td>44947</td>
<td>36.97</td>
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<td>19</td>
<td>Master roller sealing arrangement for restriction of false air</td>
<td>16-17</td>
<td></td>
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<td>20</td>
<td>Reduction on coal mill residue on 90 Micron</td>
<td>16-17</td>
<td></td>
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<tr>
<td>21</td>
<td>Reduction in mill inside water spray</td>
<td>16-17</td>
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<td></td>
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<tr>
<td></td>
<td><strong>TOTAL SAVINGS (Without Investment) - B</strong></td>
<td></td>
<td>44947</td>
<td>36.97</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL SAVINGS (Without Investment) A+B (Electrical &amp; Thermal Energy)</strong></td>
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<td>51.78</td>
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<tr>
<td>No</td>
<td>Title of Project – Power Saving</td>
<td>Year</td>
<td>Annual Electrical Saving (Lacs kWh)</td>
<td>Annual Electrical Cost Saving (INR - Lacs)</td>
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<tr>
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<td>-------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Installation of VFD for stacker belt conveyor</td>
<td>15-16</td>
<td>0.06</td>
<td>3.6</td>
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<tr>
<td>2</td>
<td>To Stop 591FNB air slid fan by modifying bag filter discharge chute</td>
<td>15-16</td>
<td>0.03</td>
<td>2</td>
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<tr>
<td>3</td>
<td>Classifier bottom bearing cooling arrangement modification</td>
<td>15-16</td>
<td>2.6</td>
<td>155.9</td>
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<td>4</td>
<td>Cooling tower one no of pump stop by modify CVRM motor O/L water direct discharge to Tower</td>
<td>15-16</td>
<td>0.22</td>
<td>13.3</td>
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<tr>
<td>5</td>
<td>Three nos of 50KVA lighting energy saving device installation</td>
<td>15-16</td>
<td>0.42</td>
<td>25.2</td>
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<tr>
<td>6</td>
<td>Installation of VFD for L21BC1</td>
<td>15-16</td>
<td>0.04</td>
<td>2.1</td>
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<tr>
<td>7</td>
<td>Installation of new GRR under buy back scheme with better speed regulation</td>
<td>15-16</td>
<td>0.68</td>
<td>40.5</td>
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<tr>
<td>8</td>
<td>Installation of VFD for coal conveying blower 1</td>
<td>16-17</td>
<td>0.03</td>
<td>1.8</td>
</tr>
<tr>
<td>9</td>
<td>Installation of VFD for coal conveying blower 2</td>
<td>16-17</td>
<td>0.03</td>
<td>1.8</td>
</tr>
<tr>
<td>No</td>
<td>Title of Project – Power Saving</td>
<td>Year</td>
<td>Annual Electrical Saving (Lacs kWh)</td>
<td>Annual Electrical Cost Saving (INR - Lacs)</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------------------------------------------------------------------</td>
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<td>------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>10</td>
<td>Replacement of 300 nos of 70watt HPSV lamp with 32watt LED lamp</td>
<td>16-17</td>
<td>0.42</td>
<td>2.5</td>
</tr>
<tr>
<td>11</td>
<td>Up-gradation of mill classifier and replacement of new design tire and liner along with Optimization of Mill</td>
<td>16-17</td>
<td>27</td>
<td>162</td>
</tr>
<tr>
<td>12</td>
<td>Installation of VFD for Packing plant bag filter fan 1 and 2</td>
<td>16-17</td>
<td>4.32</td>
<td>26</td>
</tr>
<tr>
<td>13</td>
<td>Installation of SPRS FOR 2500KW ID fan motor</td>
<td>16-17</td>
<td>20.25</td>
<td>121.5</td>
</tr>
<tr>
<td>14</td>
<td>Star feeder up-gradation</td>
<td>16-17</td>
<td>4.05</td>
<td>24.3</td>
</tr>
<tr>
<td>15</td>
<td>Replacement of existing pump by Grundfos Energy efficient pump as per pump energy audit</td>
<td>16-17</td>
<td>0.88</td>
<td>5.3</td>
</tr>
<tr>
<td>16</td>
<td>Multi-compartment slag bin extraction air slide sized changed from 300 mm to 400 mm (To increase the TPH &amp; power reduction).</td>
<td>16-17</td>
<td>0.14</td>
<td>0.8</td>
</tr>
<tr>
<td>17</td>
<td>Packer Bin to packer hopper- Single discharge to be modified to double discharge</td>
<td>16-17</td>
<td>0.14</td>
<td>0.8</td>
</tr>
<tr>
<td>18</td>
<td>Blower Installation at Packing Plant for body cleaning purpose &amp; reduction in compress air consumption</td>
<td>16-17</td>
<td>0.14</td>
<td>0.8</td>
</tr>
<tr>
<td>No</td>
<td>Title of Project – Power Saving</td>
<td>Year</td>
<td>Annual Electrical Saving (Lacs kWh)</td>
<td>Annual Electrical Cost Saving (INR - Lacs)</td>
</tr>
<tr>
<td>----</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>------</td>
<td>-------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>19</td>
<td>Louver ring design modification</td>
<td>17-18</td>
<td>2.93</td>
<td>17.6</td>
</tr>
<tr>
<td>20</td>
<td>Replacement of existing RAL by 400x400mm against 300X300mm of Wagon tippler bag house</td>
<td>17-18</td>
<td>0.36</td>
<td>2.2</td>
</tr>
<tr>
<td>21</td>
<td>Capacity up gradation of OPC air slide of MC silo</td>
<td>17-18</td>
<td>1.51</td>
<td>9.1</td>
</tr>
<tr>
<td>22</td>
<td>Installation of 3 no's of VFD for mill feeding circuit</td>
<td>17-18</td>
<td>0.85</td>
<td>5.1</td>
</tr>
<tr>
<td>23</td>
<td>3 no's of VFD installation for packing plant bag filter fan</td>
<td>17-18</td>
<td>1.81</td>
<td>10.9</td>
</tr>
<tr>
<td>24</td>
<td>Replacement of 300 no.s of 70watt HPSV lamp with 32watt LED lamp</td>
<td>17-18</td>
<td>0.53</td>
<td>3.2</td>
</tr>
</tbody>
</table>

**TOTAL SAVINGS (With Investment) – Electrical Energy**

<table>
<thead>
<tr>
<th>Total Electrical Saving (Lacs kWh)</th>
<th>Total Electrical Saving (INR - Lacs)</th>
<th>Total Thermal Saving (M KCal)</th>
<th>Total Thermal Saving (INR - Lacs)</th>
<th>Total Investment Made (INR - Lacs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>97.64</td>
<td>784.8</td>
<td>44947</td>
<td>369.7</td>
<td>647</td>
</tr>
</tbody>
</table>

**Summary of Savings of EnCON Projects**

- Total Electrical Saving: 97.64 Lacs kWh
- Total Electrical Saving: 784.8 INR Lacs
- Total Thermal Saving: 44947 M KCal
- Total Thermal Saving: 369.7 INR Lacs
- Total Investment Made: 647 INR Lacs
# Energy Conservation Actions : With Investment

<table>
<thead>
<tr>
<th>No</th>
<th>Year</th>
<th>Title of Project</th>
<th>Annual Electrical Saving (kWh)</th>
<th>Annual Thermal Saving (Ton/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18-19</td>
<td>Installation 3 numbers of VFD for Auxiliary bag filter fan</td>
<td>50,909</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>18-19</td>
<td>Cooling tower water circulation system running from only two pumps instead of 3 pumps</td>
<td>2,67,520</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>18-19</td>
<td>Installation of FRP blades in place of conventional blade</td>
<td>6,000</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>18-19</td>
<td>Screw compressor installation replacing reciprocating compressor</td>
<td>2,21,000</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>18-19</td>
<td>HAG upgradation of existing HAG from 15 to 20 MKCAL</td>
<td>2,60,375</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>18-19</td>
<td>Installation of Occupancy sensor</td>
<td>36,000</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>18-19</td>
<td>Installation of 300 no.s of LED lights</td>
<td>1,05,120</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>9,46,924</strong></td>
<td><strong>0</strong></td>
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</table>
Innovative Project: 1

❖ Project: Cooling tower water circulation system running from only two pumps instead of 3 pumps (Pump energy audit by Groundfoss)
❖ Objective: Reduction of Specific Power Consumption.

✓ Scope :

   Earlier we were operating with 3 nos of pump i.e. 75, 55 & 37 KW for equipment cooling.

✓ Action taken :

1. Done the pump energy audit & replaced with energy efficient pump to operate the total system with 2 pump i.e. 90 & 22 KW.
2. Total 55 KWh saving.

✓ Benefits :

   - Sp power on cement reduced by 0.24 kWh /Ton
   - Annual Electrical Cost Saving Rs. 21.92 Lakh/Annum
Innovative Project: 2

❖ Project: False air reduction across the mill circuit by rocker arm sealing & applying flase air arrester.

❖ Objective: Power saving

✓ Scope:

In Loesche Mill LM 56 3+3 c/s there there is huge amount of flase air ingress through master roller.

✓ Action taken:

1. Same discussed with Vendor M/s Alta Vista & developed rocker arm sealing with expansion joint.

2. Also CVRM door & flanges we have given false air arrester to reduce false air ingress to the mill.

✓ Benefits:

- Sp power on cement reduced by 0.3 kWh/Ton
- Annual Electrical Cost Saving Rs. 27.85 Lakh/Annum
Innovative Project: 3

- Project: CVRM Louvre ring angle modification from 60 deg to 70 deg
- Objective: Reduction of pressure drop & power saving.

✓ Scope:
  Earlier CVRM was equipped with 60 deg angle profile louvre ring. feasibility check for pressure drop reduction by changing the profile angle from 60 deg to 70 deg.

✓ Action taken:
  - Installed new modified 70 deg louvre ring.

✓ Benefits:
  - Saving in pressure drop by 25 MMWG
  - Sp power on cement reduced by 0.19 kWh/Ton
  - Annual Electrical Cost Saving Rs. 17.94 lakh/annum
Innovative Project: 4

- Project: Conducted Motor load study and undertook replacement of under loaded motors across the plant and conversion of DELTA to STAR connection.
- Objective: Reduction of specific power consumption.

 ✓ Scope:
  - During project time belt conveyor was designed for higher capacity with higher KW Motor.

 ✓ Action taken:
  - Studied the motor running load & replaced with suitable lower KW motor as available in plant

 ✓ Benefits:
  - Sp power on cement reduced by 0.7 kWh/Ton
  - Annual Electrical Cost Saving Rs. 5.28 million

<table>
<thead>
<tr>
<th>SL No</th>
<th>Date</th>
<th>Current</th>
<th>KW=Current<em>415</em>0.8/1000, PF=0.8</th>
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<td>115</td>
<td>66.13</td>
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<td>2</td>
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<td>24.05.2017</td>
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<td>26.05.2017</td>
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<table>
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<tr>
<th>SL No</th>
<th>Date</th>
<th>Current</th>
<th>KW=Current<em>415</em>0.8/1000, PF=0.8</th>
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<td>56.35</td>
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<td>31.05.2017</td>
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<td>03.06.2017</td>
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<td>55.78</td>
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<td>Avg</td>
<td>56.07</td>
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</tbody>
</table>

Average KW saving in 511 BC1= 66 KW - 56 KW=10 KW
KWH Saving/hr= 10 KWH
Average running Hour /day= 8 hrs
Total running hour in a year considering 320 days=8X320= 2560 Hrs
Total Energy saving will be= 2560*11=25600 units
Cost saving in terms of energy @ Rs6/- per unit=25600*6= Rs 153600/-
Renewable Energy Usage From 2.5 MW Solar PV Power Plant

Initiatives taken to optimize Renewable Energy Generation & Consumption:

✓ Tilting solar module two times in a year with trials at different angle on every season.

✓ Cleaning entire solar modules in 4 cycles in a months for summer and winter season instead of 2 Cycles suggested by OEM.

✓ Planting tress like water melon, pineapple, aloe-vera for cooling of solar modules during summer season.

✓ Water spraying system arrangement done for one inverter on top of the module for cooling purpose.

✓ Switching of power transformer of solar power plant from 06.00PM to 06.00AM . Thus saving 80Kwh everyday.

✓ Consuming 82% of our total power requirement from WHRS based CPP installed at our Integrated Cement Plant in Odisha through Open Access

Future Plan

▪ Installation of additional 12.5 MW ground mounted Solar power in FY19 & 20.
Renewable Energy Usage Continues…..

Clean Energy Solutions (Solar study lamps) & Clean cooking Households (Fuel efficient stove) distributed to nearby village to promote use of renewable Energy

Planting water melon, pineapple plant below Solar Panel
GHG INVENTORIZATION – CARBON FOOTPRINT REDUCTION

Estimated Net CO₂ emissions in kg /ton of Cementitious material

- KCMW AVERAGE 351
- DALMIA BHARAT GROUP AVERAGE 570*
- INDIAN AVERAGE 526
- GLOBAL AVERAGE 617*

*Based on Cement Sustainability Initiative (CSI) GNR data published in Year 2017.

❖ Initiatives to reduce carbon footprint:

✓ Increase in use of B F Slag %
✓ Journey started with 43.5% in year 2013 to 67.2% in Year 2018
✓ Reduction of thermal energy (Kcal/Kg) by process optimization
✓ Installation of 2.5 MW solar PV power plant to utilize renewable energy and Reduction of total KWH consumption through various initiatives.
✓ Improving clinker factor by higher addition of slag for cement upto70% & Reduction of Fuel oil consumption by im
✓ proving reliability
✓ Use of battery operated vehicle for internal transport.

Dalmia Bharat Group Globally Ranked No 1 by CDP (Carbon Disclosure Project)
GHG INVENTORIZATION – CARBON FOOTPRINT REDUCTION

Kapilas Cement Manufacturing Works

COMBINED CO2 EMISSION
(kgCO2 / Ton of Final Products)

SCOPE-1: BURNING OF FUEL
(kgCO2 / T Cement)

- 29%

SCOPE-2: PURCHASED ELECTRICITY
(kgCO2 / T of Cement)

- 19%

SCOPE-3: CLINKER FOR CEMENT GRINDING
(kgCO2 / T of Cement)

- 13.26%

SLAG% IN PSC

+ 33.23%
Total Plant Area: 347 Acre
Plantation Area: 114 Acre (33%)
**GHG INVENTORIZATION – Green Belt Development**

- **Green Belt Developed over an area of 115 acre in Factory & Colony premises**
- **1.30 Lacs Trees planted; 1.10 Lacs trees survived, with the Survival Rate of 85%**
- **Gap Filling is done every year**
- **150 types of different species planted**
- **Landscaping coverage developed over an area of 17 acre in plant & colony**
- **In house Nursery, developing 1 lac saplings every year for consumption & distribution.**

**Development of Green Belt**

- **Ornamental** 15%
- **Meditional** 2%
- **Fruits** 1.20%
- **Flowers** 10%
- **Valuables Trees with Big Trunks, 71.80%**

**Planted Saplings**

<table>
<thead>
<tr>
<th>Year</th>
<th>2014-15</th>
<th>2015-16</th>
<th>2016-17</th>
<th>2017-18</th>
</tr>
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<tbody>
<tr>
<td>PLANTED SAPLINGS</td>
<td>22699</td>
<td>22226</td>
<td>20003</td>
<td>17319</td>
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<tr>
<td>PLANTED SAPLINGS (Survived)</td>
<td>18838</td>
<td>18448</td>
<td>16602</td>
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**Planted Saplings (Outside Plant Premises)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2014-15</th>
<th>2015-16</th>
<th>2016-17</th>
<th>2017-18</th>
</tr>
</thead>
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<tr>
<td>2014-15</td>
<td>24378</td>
<td>28476</td>
<td>36892</td>
<td>26332</td>
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<tr>
<td>2015-16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016-17</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2017-18</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Systematic green belt development initiative:

- Organic farming vegetable cultivation throughout 43560 Sq Ft area.
- Canteen waste, other agriculture & garden waste are used to prepare vermin compost along with cow dung received from distributed cows to near by villagers. This eliminates the hazard of chemical fertiliser usage. Also ground water contamination is prevented.
- Development of green house & Poly house around 360 Sq Mtr for seedling development
- 10000 nos of pineapple planted below solar panel for solar panel effective cooling.
GHG INVENTORIZATION – Green Belt Development

- CCR Side Area
- Raw material Storage yard
- Near Packing House area
- Colony area
- Arial View of the plant
Use of Battery operated vehicle for plant internal transport saved 13,000 Kg CO2 emission per year.

Installed Solar water heating system on G+8 storied Residential Tower for 119 households. Thus saved 205632 Kwh in a year considering gysers capacity of 1.5 KW each and 4 hrs running in a day, thus saved 193294 Kg CO2 emission in year.
Approach For Energy Conservation Initiatives towards Excellence

1. Core Committee Team
2. Daily Monitoring
4. Analyzing & Brain Storming to evolve Energy improvement projects
5. Action Plan & Implementation
6. Achieving Goals
7. Rewards
Core Committee Team - Energy Cell

- Unit Head
- Tech Head

- Raw Material Handling
- CVRM, Coal Mill, HAG
- Packing Plant
- Utility & Compressors
- Solar Plant

Total No's of Project Proposed: 63
Total No's of Project Accepted: 55
No's of Project Executed: 42
No's of Project WIP: 13
Methodology: Energy Levers

Kapilas Cement Manufacturing Works

Effective use of Energy Levers in 2017-18

- VRM & Process Optimization: 69%
- VFD Installation & power optimization: 14%
- Motor load study & optimization: 10%
- Compressor power minimization: 5%
- Equipment Idle running: 2%

**VRM POWER OPTIMIZATION**
1. Dam ring
2. False air
3. Feed size control
4. Separator efficiency

**Power factor & efficient silo management to avoid peak hour usage**

**Fans & blowers efficient running**
1. As required convert delta to star connection of motor

**Compressor power minimization**
1. Stopping auxiliary compressor

**Equipment idle run minimization**
1. Stop interlocks
2. starvation stop
3. Shop stoppage power

**Solar power**
Idle Running Hr Monitoring

Idle Hour Counter On main PLC screen
Digitization in Monitoring

Ewatch system access from Computer

Ewatch system access from Mobile

Kapilas Cement Manufacturing Works
Best Practices in Green Supply Chain

- Reverse Logistics in Raw Material Trucks (Hywa) implemented
- Eye on Wheels – Reduce Truck Turn around Time (TAT) from 8 hours to 4 hours
- Maximised Bulk Cement Dispatches
Implementation of ISO 50001:2011

Steps followed for Implementation of ISO 50001:2011

- ENERGY POLICY
- ENERGY PLANNING
- IMPLEMENTATION & OPERATION
- CHECKING
- MEASUREMENT & ANALYSIS
- NON CONFORMITIES
- CORRECTION, CORRECTIVE & PREVENTIVE ACTION

CONTINOUAL IMPROVEMENT

INTERNAL AUDIT OF ISO 50001:2011

MANAGEMENT REVIEW

Kapilas Cement Manufacturing Works
Implementation of ISO 50001:2011

SCOPE FOR IMPLEMENTATION OF 50001 AS PER PDCA CYCLE MAINTAINED

4.1 General requirements
4.2 Management responsibility
4.3 Energy policy
4.4 Energy planning
  - Energy review
  - Energy baseline
  - EnPI
  - Objectives, targets & action plans
4.5 Implementation and operation
  - Training
  - Documents
  - Communication
  - Design
  - Operational control
  - Procurement

4.6 Checking
  - Measuring and monitoring
  - Legal requirements
  - Internal auditing
  - Nonconformance, corrective, preventive
  - Records

4.7 Management review
Awarded IGBC Green Building Platinum Award with rating of 87 points

Salient Green Features of OCL Kapilas Residential Project:

- **Energy Efficient Building Envelope** (Roof R Value-12 Sq. M-K/W, Wall R Value0.7 Sq. M-K/W & glazing unit SC and U Value 0.27 & 3.5 W/Sq. M-K)


- **Energy Consumption Monitoring Using Sub-metering**

- **Adequate Indoor Air Quality**

- **Adequate Landscape Area** (> 30% of the total site area)

- **Adequate Day lighting within all regularly occupied spaces.**

- **Designed for Differently Abled People.**

- **Waste Management Practices** adopted.

- **Water Efficient Plumbing System** (>40% water cons. reduction)

- **100% Use of STP treated water for flushing & Greenbelt**

- **Use of FSC certified wood based material** (>80% wood based material).

- **Implementation of No Smoking Policy within all building blocks**

- **Use of CFC/HCFC Free HVAC and Fire Suppression System**
"Kapilas Cement Manufacturing Works" is in the process of achieving **Green Co Certification**

**“Green Co Certification signifies the initiatives to reduce their ecological footprint, in several areas such as energy efficiency, water, GHG, waste reduction”**

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<th>Present Status</th>
<th>Target</th>
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<td>3</td>
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<td>GHG Emission Reduction</td>
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<td>5</td>
<td>Waste Management</td>
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<td>Material Conservation, Recycling &amp; Recyclables</td>
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<td>Life Cycle Assessment</td>
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<tr>
<td>10</td>
<td>Others (Ventilation, Site Location &amp; Innovation)</td>
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<td><strong>Total</strong></td>
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<td><strong>240</strong></td>
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Awards & Accolades

Awarded Energy Efficient Unit at CII National Energy Management Award, 2017 held at Hyderabad
Awards & Accolades

National Energy Conservation Award
YOU SEE GREY?
WE SEE GREEN.

Our plants produce the World's Greenest Cement. It's no coincidence that we were the first company globally to be part of the MSE and EPR. This characteristic innovation-led approach has not only made us the fastest growing cement major in India but also helped us fulfill our responsibility towards ensuring growth that's right for the country.