Chandrapur Super Thermal Power Station
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1. Introduction of MAHAGenco & CSTPS
• MAHAGenco is Maharashtra State run Power utility company.

• Highest overall generation capacity and the highest thermal installed capacity amongst all the state power generation utilities in India.

• Second highest generation company after NTPC in terms of installed capacity.

• Only State Utility having balanced generation portfolio involving thermal, hydro, gas and solar stations.
Chandrapur Super Thermal Power Station (CSTPS) is located in Chandrapur district of Maharashtra.

Region rich in mineral wealth (Ex. coal and limestone). Large number of coal mines gave the city name- *Black Gold city*.

With total capacity of 2340 MW (now 1920 MW) - the largest coal based power plant of MAHAGenco satisfying more than 25% of total Maharashtra needs.

Extension of 500 MW X 2 in final stage.

Coal is sourced from WCL, MCL, SECL, SCCL and MCL.
Region known for its hot and dry climate. Humidity is very low in the region. However it receives an average annual rainfall of 1249.4 mm.

The plant gets water supply from own Erai Dam & Chargaon Dam.

@ 40000 m³/day water is also supplied to Chandrapur city from the Erai dam.
Achievements of CSTPS

- National Productivity Award for Better Performance - 13 times
- Incentive Award for reduction in Sp. fuel oil consumption - 7 times
- Incentive Award for reduction in Aux. power consumption - 2 times
- Green-tech Award for Environment – 2 times (Silver).
- Quality Circle movement is well established and QC from CSTPS achieved Excellent & par excellent awards in national & International Conventions.
CSTPS is a Certified Unit For;

ISO 9001
Quality Management System.

ISO 14001
Environment Management System.
Since 26 May 2004

OHSAS 18001
Occupational health & safety
Management System.
Since 1Oct. 2005
<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Capacity</th>
<th>Date of Commissioning</th>
<th>Date of Commercial Operation</th>
<th>Age</th>
<th>Unit position</th>
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<tbody>
<tr>
<td>1</td>
<td>210 MW</td>
<td>15-Aug-83</td>
<td>01-Nov-84</td>
<td>32; Decommissioned</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>210 MW</td>
<td>11-Jul-84</td>
<td>16-Sept-85</td>
<td>31; Decommissioned</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>210 MW</td>
<td>03-May-85</td>
<td>01-Apr-86</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>210 MW</td>
<td>08-Mar-86</td>
<td>04-Nov-86</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>500 MW</td>
<td>22-Mar-91</td>
<td>01-Dec-92</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>500 MW</td>
<td>11-Mar-92</td>
<td>01-Dec-93</td>
<td>24</td>
<td></td>
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<tr>
<td>7</td>
<td>500 MW</td>
<td>01-Oct-97</td>
<td>01-Mar-98</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>500 MW</td>
<td></td>
<td></td>
<td></td>
<td>Commissioning is in progress</td>
</tr>
<tr>
<td>9</td>
<td>500 MW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit No.</td>
<td>Capacity</td>
<td>Date of Commissioning</td>
<td>Age (Yrs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>-----------------------</td>
<td>-----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1 MW</td>
<td>Oct-2010</td>
<td>06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2 MW</td>
<td>Mar-2012</td>
<td>04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2 MW</td>
<td>May-2012</td>
<td>04</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Water Circuit
Erai Dam - Our Source of Water
Erai Dam Features

• Constructed in 1984, it is 420-metre masonry dam, on the river Erai at a distance of about 12 km from the power station.

• Reservoir area – approx. 7041 hectares (550 km$^2$)

• Effective Storage Capacity – 193 mm$^3$.

• Erai Dam height raised by 0.5 meter in Sep-2010.

• Water storage increased by 18 mm$^3$. Net storage- 211 mm$^3$.

• Full Supply Level – 207.500 meter

• Water availability as on date: 205.325 meter

• This water is sufficient for days: 234 days
Water supply

- Water is supplied by 5 nos. of pipelines by gravity flow and distributed to 2 nos. of reservoirs in CSTPS area.

- Diameter of pipes are:
  - 4 lines of 1200 mm dia. PSC pipe.
  - 1 line of 1600 mm dia. M.S. pipe (common).

- Further water is used for different purposes as:
  i) Cooling water system for condenser & plant auxiliaries
  ii) Air conditioning and ventilation system
  iii) Ash handling system
  iv) Power cycle make up
  v) Equipment cooling system
  vi) CPU regeneration,
  vii) Coal dust suppression system
  viii) Potable water system
  ix) Service water system/Fire-Fighting
  x) Gardening
Water from Erai Dam

ERAI DAM

Chandrapur City

Stage-I&II
One Day Reservoir

Stage-III
One Day Reservoir

CSTPS Plant Premises
One Day Water Reservoir
Quality of water

• Flowing through forest catchment area and no industries and population upside, the quality of water available to CSTPS is with least contamination.

• The water is free from oil, detergent and other industrial pollutants.

• Even the seasonal variations are very minor.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>pH</th>
<th>Cond</th>
<th>Chloride</th>
<th>Total Hardness</th>
<th>p Alkalinity</th>
<th>M Alkalinity</th>
<th>Turbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td>-</td>
<td>uS/Cm²</td>
<td>ppm</td>
<td>ppm</td>
<td>ppm</td>
<td>ppm</td>
<td>NTU</td>
</tr>
<tr>
<td>Raw water</td>
<td>8.0 - 8.57</td>
<td>257</td>
<td>12</td>
<td>74</td>
<td>0</td>
<td>108</td>
<td>1-5</td>
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</tbody>
</table>
Water Circuit

ERAI DAM

One Day Reservoir

Stg. I & II
AHP- 6 pumps
(Cap. 800 M3/hr of each)

Stg. I & II
RWP – 8 nos.
(Cap. 1600 M3/hr of each)

WTP-I

Pretreatment plant

Domestic Water

For DM

For softening

Ash disposal of Stg. I & II

Fire Fighting

CHP

ETP – III

COLONY

CTPonds B/D

ETP – II

B/L

ETP – I

Clear Water

= Fire Fighting.
= Wastewater to ETP's.
= Recycled Water.
= Fresh Water.

User-64/ENV CELLIYearly Data
3. Water Balance
# Area wise annual water consumption

<table>
<thead>
<tr>
<th>Year</th>
<th>Cooling water</th>
<th>D.M water</th>
<th>Ash handling water</th>
<th>Fire fighting</th>
<th>Domestic</th>
<th>Effluent generated</th>
<th>Total water utilised</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-10</td>
<td>35048818</td>
<td>1220222</td>
<td>18146502</td>
<td>803000</td>
<td>4374398</td>
<td>1874463</td>
<td>61467403</td>
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<tr>
<td>2010-11</td>
<td>26330720</td>
<td>1219235</td>
<td>21163532</td>
<td>803000</td>
<td>4241667</td>
<td>1438460</td>
<td>55196614</td>
</tr>
<tr>
<td>2011-12</td>
<td>29109380</td>
<td>1337915</td>
<td>26853417</td>
<td>805200</td>
<td>4841160</td>
<td>1589261</td>
<td>64536333</td>
</tr>
<tr>
<td>2012-13</td>
<td>34662480</td>
<td>1511777</td>
<td>28471231</td>
<td>803000</td>
<td>4697184</td>
<td>1822435</td>
<td>71968107</td>
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<tr>
<td>2013-14</td>
<td>28980514</td>
<td>1046358</td>
<td>28898514</td>
<td>803000</td>
<td>3991936</td>
<td>1248080</td>
<td>64968402</td>
</tr>
<tr>
<td>2014-15</td>
<td>33900037</td>
<td>1442704</td>
<td>26203084</td>
<td>803000</td>
<td>3962729</td>
<td>1879422</td>
<td>68190976</td>
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<tr>
<td>2015-16</td>
<td>33265856</td>
<td>1276707</td>
<td>27438118</td>
<td>803000</td>
<td>4270450</td>
<td>1669700</td>
<td>72810048</td>
</tr>
</tbody>
</table>
Average annual consumption of water:

- Cooling Water: 49%
- D.M. water: 2%
- Ash Water: 39%
- Fire fighting: 7%
- Domestic generated: 2%
- Effluent generated: 2%
### Avg. Water Consumption on Daily Basis

<table>
<thead>
<tr>
<th>Purpose</th>
<th>M³/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire fighting</td>
<td>1700</td>
</tr>
<tr>
<td>D.M.Water</td>
<td>3050</td>
</tr>
<tr>
<td>Ash water</td>
<td>76050</td>
</tr>
<tr>
<td>Domestic water</td>
<td>18650</td>
</tr>
<tr>
<td>Cooling water</td>
<td>95550</td>
</tr>
<tr>
<td>Raw water</td>
<td>195000</td>
</tr>
</tbody>
</table>
Specific water consumption

- As per revised notification of MoEF, the limit of specific water consumption is 3.5 lit/kwh.

- MSPGCL is committed to achieve this norm. Same is being done by strict monitoring of water consumption of each TPS by corporate office.

- We are confident that the Slightly higher specific water consumption will be brought down within next six months.
4. Technological/Operational challenges and constraints
1. Wet Ash slurry system (in 20:80 ratio) is used for ash handling which require more water.

2. Ash bund is @18 Km from TPS. Frequent leakages leads to loss of water.

3. No separate Service water line for auxiliary cooling.

4. Clinker formation prone ash in coal; requires high amount of water to remove it.

5. More number of blow downs required to CT Pond as coal & cement dust contaminate the cooling tower water.

6. Pipelines used for supply of water from Erai dam are very old.- 31 years.