

Energy conservation measures at CSTPS, Chandrapur

2010-11

Replacement of CT Fan blades with FRP blades at Unit-2 Fan no – 3, Stage-I&II.

- In Unit-2 CT Fan no-3 CT Fan blades are replaced with FRP blades having increase in average velocity & air flow.
- The replacement of remaining blades of CT Fans of Unit-1 to 4 is covered under CPRI Capex DPR scheme.
- Benefits of replacement
 - Increased air flow by 20%.
 - Reduction in current by 15%.
 - Improved CT Fan performance.

Replacement of CT Fan blades with FRP blades at Unit-2 Fan no – 3, Stage-I&II.

Energy Saving calculations

- Reduction in current = $110A - 94A = 16 A$ (15%)
- % Power saving = 15%
- Increase in air flow = 7%
- Net effective power saving = 35%
 - Power saving (Direct) = 15%
 - Power saving owing to increased Airflow
= $20\% (1 - (1 - 0.07)^3)$
 - Net Effective power saving = 35%

Replacement of CT Fan blades with FRP blades at Unit-2 Fan no – 3, Stage-I&II.

Energy Saving calculations

- Net Effective power saving = 35%
- Energy saved/day = $(16 + 20 \times 16/15) \times \sqrt{3} \times 0.415 \times 0.8 \times 24$
= 510.6 units
- Units savings per year = $510.6 * 365 = 186376$
- Savings in Rs. @ 1.23 = Rs. 2.29 lakhs

Trimming of impellers of H₂BP & DM/GS pump at Stage-I&II.

- In Stage-I&II (4x210 MW) there are 8 DM/GS pumps & Stage-II 4 H₂ Booster pumps. Normally one pump remains in service for each Unit.
- As per recommendations during Energy Audit by M/S ERDA, Vadodara & CPRI Bangalore, the trimming of impellers of 4 H₂BP & 8 DM/GS pump is carried out.
- Trimming resulted in average reduction in current by 5A & 10 A for H₂BP (2 Units) & DM/GS pumps (4 Units) respectively.

Energy Conservation Case study – 2

Trimming of impellers of H₂BP & DM/GS pump at Stage-I&II.

Energy Saving calculations

- Reduction in current = $5A \times 2 + 10A \times 4 = 50 A$
- Power saving per hour = $\sqrt{3} \times 0.415 \times 50 \times 0.8$
= 28.75 KW
- Energy saved / month = $28.75 \times 24 \times 30 = 20700$ units
- Units savings per year = $20700 \times 12 = 248400$
- Savings in Rs. @ 1.23 = Rs. 3.05 lakhs

Energy Conservation Case study – 3

Provision of VFD to Coal Feeder Motors U-1&2 at Stage-I&II.

- In Stage-I (1x210 MW) there are 12 coal feeder motors.
- Investment is 16.05 lakhs

Energy Saving calculations

- Power saving = 50 KW
- Energy saving per day = 1200 Kwh
- Cost saving per day = $1200 \times 1.23 = \text{Rs.}1476$
- Cost saving per annum = 5.38 Lakhs
- Payback period = $16.05 / 5.38 = 3 \text{ years.}$

Energy Conservation Case study – 4



Renovation of Power House Lift at Unit-5.

- Total motor / generator of 11KW before renovation : 03 nos.
- Total motor of 11KW after renovation : 01 no.

Energy Saving calculations

Total units / power consumed per year before renovation of lift (Kwh)	Total units / power consumed per year after renovation of lift (Kwh)	Total units / power saving after renovation of lift (Kwh)	Total savings in Rs. @ 1.23 / unit
$= 11\text{KW} \times 3 \times 8$ (hrs/day) $\times 365$ $= 96360$ Kwh	$= 11\text{KW} \times 1 \times 8$ (hrs/day) $\times 365$ $= 32120$ Kwh	$= 96360 - 32120$ $= 64240$ Kwh	$= 64240 \times 1.23$ $= \text{Rs. } 79015$

Energy Conservation Case study – 5

Conversion of motor from delta to star at Sewage treatment plant.

- Total 06 no of Ariator fan motors delta connection is converted into star connection resulting in 50 % reduction of motor loading.

Energy Saving calculations

Description	Before modification	After modification	Benefit
Motor running current	31 A	20 A	11 A
Discharge pressure	2.5 kg/cm ²	2.5 kg/cm ²	----
Energy meter reading	10 kwh/hr	5 kwh/hr	5 kwh/hr
Starting kick	265 A	82 A	Reduction in starting kick by 183 A.

Energy Conservation Case study – 5



Conversion of motor from delta to star at Sewage treatment plant.

Annual Energy savings

$$\text{MOTOR RUNNING HOURS} = 24 \times 6 = 144 \text{ Hrs}$$

$$\begin{aligned} \text{Energy Save In Units / per Year} &= 144 \times 5 \times 345 \\ &= 2,48,400 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Annual Energy savings in Rs} &= 2,48,400 \times 1.23 \\ &= \text{Rs. } 3,05,532 \end{aligned}$$

Thank you.....

