Maharashtra State Power Generation Co. Ltd.,
Executive Director (O&M)-II,
Vidyut Bhavan, Katol Road, Nagpur - 440 013,
Ph: 0712 2592759, 2592761
Fax: 0712 2592763, 0712 2592760,
e-mail edgen2@mahagenco.in

No. ED (O&M)-II/Nagpur/FL-11/HO/ 488 Date: 21.09.2010

Sub.: MOM of the meeting on 'Energy Conservation' Dated 10.09.2010.

A meeting was organised in the office of the Executive Director (O&M)-II, MSPGCL, Nagpur to discuss to 'Energy Conservation' measures. Shri. Vijay Singh, Executive Director (O&M)-II, MSPGCL, Nagpur presided over the meeting. Shri. L.N.Margade, CGM (O&M), KTPS, Shr. Nikhare, CGM (O&M), KPKD and energy managers of all TPS except Parli TPS were present during the meeting.

The measures taken for energy conservation were shown in the format of 'Power Point' presentation by every TPS. The following points are discussed and guidelines are also issued accordingly:

- E.D. (O&M) has directed to nominate the Energy Managers and directors for each stream at TPS level as per Electricity Act-2003. The names of the officers nominated for this should be sent to HO within 8 days.
- The replaced BFP cartridges should be repaired and kept stand by. Providing energy efficient cartridges to BFPs should be taken up wherever such cartridges are not fitted so far.
- At Ash slurry booster pump house, energy efficient Seal water pumps commissioning is to be taken up.
- It is directed to reduce the Lighting transformer voltages by changing the taps in case of available margins.
- Feasibility of changing the taps of the Station transformers may also be explored for reducing the voltages.
- Stand by transformers should be kept 'Off' wherever possible.
- To run the Instrument air compressors with VFD is desired.
- Instrument air compressors & Service air compressors should be tuned up for its loading and un-loading time w.r.t. design values.
- Roof extraction fans replacement by 'Turbo Vane Fly Wheel' should be taken up in phase manner.
- C.T. fan blades replacement with FRP blades should be taken up in respect of CSTPS in phase i.e. 50 % in current year and remaining in the successive year.
- Trimming of impellers of various fans i.e. H_2CBP, DM pump, GS pumps should be done. All TPS to initiate actions in this regard within 6 months wherever valves are throttled.
- VFDs should not be purchased for Coal feeders as the Gravimetric feeders are being installed.
- Motor connections from Delta to Star connection should be done in case of under loaded machines. A report of this should be sent to this office within 1 month.
- Small capacity ELP to be kept in service instead of higher capacity ELP wherever possible.
- Low Watt CFLs should be used at the following locations:
  - Turbine Floor.
  - Plant Control Rooms.
  - Office Cabins.
  - Stair Case.
  - Passages.
  - Conference Hall.
  - Time office.

- Energy efficient lighting also be used in the colony area.
- Optimisation of C.W. system should be taken up.
- Feasibility of adoption of refrigerated air dryer system should be checked and implemented.
- Vapour absorption system should be used in place of vapour compression system.

- Sensors of AC cabins, Support and shaft insulators should be kept 'Off' when not required.

TPS wise energy conservation details shown during the meeting are as under:-

BTPS

- G S Pumps

- Old 10UP3m1 GS Pumps of Unit No-2 & 3 replaced with new Energy Efficient Pump Model-UP251/57.
- Total No of Pumps Replaced : 7 Nos.
- Total Cost of Replacement : Rs 98 Lacs
- Old Pump : Efficiency 61.7 % Load : 237 KW
- New Pump : Efficiency 84 % Load : 205 KW
- Yearly Savings per Pump : 32 KWh x 24 x 365 = 2,80,320 KWH
- Assuming 5 pumps running Total Energy saved for the year : 280320 x 5 = 14,01,600 Kwh Cost saved: Rs 1401600 x 3 = Rs 42,04,800

- CWCT Fans

- CWCT fans solid FRP blades replaced by New Hollow FRP blades for Unit-2 & 3 in phased manner.
- Total 21 fans blades replaced
- Total cost : Rs 2.8 Lacs x 21 = Rs 58.8 Lacs
- Benefits
- Current of CT Fans minimized from 120 A to 90 A
- Energy saved : Net saving of @ 30 amps Energy Saved /fan /per day : 30x415x24x0.85 =253.98 KW
- Energy saved for 21 Fans/Year : 253.98x365x21 = 19,46,756.7Kwh
- Yearly cost benefit : Rs 58,40,270

- AC Plant

- Unit No- 2 Air Conditioning plant[PCR] complete compressor/blower/radiator system replaced by new microprocessor based package unit of M/s Blue star.
- Total cost of supply installation and commissioning is Rs 40,00,000
- Old unit loading was @ 80 amps plus maintenance and spares cost @ Rs10,00,000 /Year

New package unit power consumption is average 72 amps+ maintenance and spares cost NIL for about 5 years

- Energy Saved : 8 x415x0.85x24=67.728 Kwh

Yearly Energy saved: 67.728*365 =24,720.72 Kwh

- Yearly Cost saved : Rs 1,74,162 (Including Repair & Maint cost of Rs 1,00,000/-

- Boiler Feed Pump

- Unit no 2 BFP 2C Recirculation valve was found passing
- complete valve with actuator replaced by new Masolinenon make valve which costs @ Rs16,00,000
- Unit no 2 BFP 2A performance is deterioration due to increased internal clearance and wear.

- Completed inside stator cartridge is replaced.
- Cost of cartridge repair and replacement is @ Rs19,00,000 in June 2010
- before replacement of cartridge

Pump discharge flow was 270T/hr
Motor current 290amps
Energy consumption was 9.78 kwh/h against
Design value of 8.09 kwh/h;
Pump efficiency 43.84% against design of 74.89%

- After replacement of inside cartridge

Discharge flow increased to 320T/h
At motor current of 290 A

- As such BFP current reduced by

@ 15 A at required flow

- Daily Energy saving : 15x6.6x0.85x24=2019.6 Kwh
- Yearly Energy saved : 2019.6 x 365 =737154 Kwh
- Which amounts to yearly cost savings of Rs 22,11,462 /-
- New Energy efficient motors level 2 fitted to Seal Water pumps at Booster pump house.
- 75 Kw x 1 & 30 Kw x 2 motors fitted.
- Yearly energy saved : 1,65,301 Kwh
- Cost saving : Rs 4,95,903 /-

➢ <u>Lighting Transformer</u>

- Lighting Transformer Tap changed from position-2 to 1 (Minimum) , thus lighting supply voltage reduced from 242 V to 237 V for Lighting Transformer No-1 & 2.
- Units saved due to this : 2,07,000 Kwh/Month
- Thus 24,84,000 Kwh/Year
- Cost Saving Rs 7,45,2000 /- per year

➢ <u>Instrument Air Compressor</u>

- IAC-2A & 2D fitted with VFD.
- On the basis of the actual Energy Meter Readigs recorded, it is found that, the energy consumption of each 90 Kw IAC reduced by 252 Kwh daily.
- Based on this Energy saved : 1,83,960 Kwh per year.
- Yearly Cost savings = Rs 5,51,880/-

➢ <u>Proposed replacement</u>
Turbo vane fly wheel roof extraction fans

- At present 32 nos of 2.2 Kw , motor driven roof extraction fans are installed for unit no 2 and 3 in turbine house to expelled out hot air since commissioning.
- Complete replacement of exhaust fan with Turbo vane fly wheel type self driven fans is proposed.
- Total proposed cost is Rs 8 Lacs
- Yearly saving 32x2.2*24*365 =616704 Kwh
- Yearly cost saving : Rs 18,50,112 /-

CSTPS

- Energy Conservation Case study – 1
  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%
  - Net Effective power saving = 35%
  - Energy saved/day = (16 + 20 x16/15) x √3 X 0.415 x0.8x24

    = 510.6 units
  - Units savings per year = 510.6 * 365 = 186376
  - Savings in Rs. @ 1.23 = Rs. 2.29 lakhs

Trimming of impellers of H_2BP & DM/GS pump at Stage-I&II.

- In Stage-I&II (4x210 MW) there are 8 DM/GS pumps & Stage-II 4 H_2 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 H_2BP & 8 DM/GS pump is carried out.
- Trimming resulted in average reduction in current by 5A & 10 A for H_2BP (2 Units) & DM/GS pumps (4 Units) respectively.

Energy Saving calculations:-

- Reduction in current = 5A x 2 + 10A x 4 = 50 A
- Power saving per hour = √3 X 0.415 X 50 x 0.8

= 28.75 KW

- Energy saved / month = 28.75*24*30 = 20700 units
- Units savings per year = 20700 * 12 = 248400
- Savings in Rs. @ 1.23 = Rs. 3.05 lakhs

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 x 1.23 = Rs.1476
- Cost saving per annum = 5.38 Lakhs
- Payback period = 16.05 / 5.38 = 3 years.

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.

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
= 11KW x 3 x 8 (hrs/day) x 365 = 96360 Kwh	= 11KW x 1 x 8 (hrs/day) x 365 = 32120 Kwh	=96360-32120 =64240 Kwh	= 64240 x 1.23 = Rs. 79015

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.

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

Annual Energy savings

MOTOR RUNNING HOURS = 24 X 6 = 144 Hrs

Energy Save In Units / per Year = 144 X 5 X 345 = 2,48,400 units
Annual Energy savings in Rs = 2,48,400 x 1.23
= Rs. 3,05,532

Measures taken for Energy Conservation and their benefits at 4 x 210 MW of CSTPS (MSPGCL) during 2007-08

SN	Measures	Invest - ment (Rs)	Power saving (KW)	Energy saving per day (KWH)	Cost saving per day (Rs) at @ Rs.1.40 /KWH	Cost saving per annum (Rs.Lakh)	Pay back period (Yrs)	Remarks
1	Switching 'OFF' the support insulator and shaft insulator heaters in Unit-1 and 2 when units are on bar	Nil	76.8	1843	2580	8.48	-	Availability of the units assumed as 90% for year
2	Switching 'OFF' the support insulator and shaft insulator heaters in Unit-3 and 4 when units are on bar	Nil	200	4800	6720	22.08	-	Availability of the units assumed as 90% for year
3	Stopping of one GS pump of Stg-II	Nil	332	7968	11155	36.64	-	--do--
4	Replacement of 125 Watt MV lamps by 70 Watt SV lamps in U-1 to 4 (200 Nos)	50000	11	198	277	1.01	0.50	Operation hrs - 12 hrs for 100 lamps & 24 hrs for 100 lamps
5	Replacement of 125 Watt MV lamps by 70 Watt SV lamps in Colony (50 Nos)	12500	2.75	33	46	0.17	0.75	Operation hrs - 12 hrs
6	Running of small capacity ELP (18.5 KW) instead of large ELP (90 KW) in Unit-3 & 4.	Nil	34.2	1641.6	2298	7.55	-	Availability of the units assumed as 90% for year
7	Operation of IDM pump for 9 hrs only in a day for Unit-3 & Unit-4 (Pump operation controlled by High/low level sensors)	1000	37	1110	1554	5.10	0.00	15 Running hrs of pump saved

8	Replacement of 18 Nos of Bubbler type level sensors by modified electronic sensors in AHP st-I&II	21600	4048	-	-	0.68	0.32	Power consumption per setting for 1 hr = √3 X 6.6 X 18 x 0.82 x 3 = 506 KW for a series of 3 motors. Monthly cons = 506 x 8 settings /month = 4048 KW
9	Running of 3 CW pumps instdaed of 4 CW pumps for Stg-I & Stg-II during winter session (4 months)	Nil	1150	27600	38640	47.01	-	Power consumption per day = √3 X 6.6 X 125 x 0.8 = 1150 KW
Total saving per annum						81.71		

Energy Audit of Unit-1 & Unit-3 carried out by ERDA,Vadodara in 3 phases from Jan -08 to Mar-08

KPKD

Energy Conservation Activities Carried out in 2009-10:-

Measures Implemented	Investment made (in Rs. Lakhs)	Saving achieved (in Rs. Lakhs)
Use of Timers & Power Saver Electronic Ballast (Timers : 20 Nos. & Ballast : 200 Nos.	0.81	0.03 (2009-10)
Preservation of U-1 & U-3 CDS Tubes	6.00	35.61
Optimization of Stage – I CW system	Nil	26.04
Optimization of Stage – II CW & Compressed Air system	Nil	89.74
Replacement of CT Fan GRP Blades by FRP Blades (CT Fan No 5)	2.90	2.11 (2009-10)
Saving of fuel oil due to less consumption than benchmarked target	Nil	1696.62
Replacement of LP Pump (50Kw) at Ash Handling plant by lower Capacity (11Kw) pump	0.22	6.83

Measures Implemented	Investment made (in Rs. Lakhs)	Saving achieved (in Rs. Lakhs)
Up gradation of H.P. Heater No. 6 Unit -1 with S.S. tube heaters	350	73 (per year)
Adopting Refrigerated Air Dryer System at unit 1 & 2	27	7.8
Refrigerated Air Dryer System	14	3.9
Replacement of cartridge of BFP 3A (reconditioned)	13.50	16.00
Total Saving in lakhs	400.43	1953.78

- Run the Boiler with four coal cycle at full load condition.
- Switch off Lights in boiler & turbine area whenever necessary.
- Ensure, only one CW pump should be in service during start up.
- In winter season 3 CW pumps are kept in service for Stage-I.
- CT fans should be made on/off as and when required, by monitoring CW inlet temperature & vacuum in condenser.
- Elimination of wastage of compressed air should be eliminated.
- During boiler start up only one air cycle, taken in service.

Proposed Energy Conservation Activities
Energy Conservation measures

- Use of Vapor Absorption System in place of Vapor Compression System .
- Energy Efficient Motors to be opted in future for replacement of old ones

Possibility for installation of Occupancy Sensors at Cabins, Toilets etc. to be explored. Office wiring modification to be done for light & fan circuits

KTPS

Energy Management Planning At KTPS

Appointment of Energy Manager

- Preferably Senior manager
- Responsible for overall coordination
- Reporting directly to CGM
- With technical background and familiar with organizational activities

Responsibility – CGM- KTPS

Energy Management Planned

2 Set up an energy monitoring and reporting system

- Set up system to collect, analyze and report on organization energy costs and consumption
- This will provide overview of energy use and related cost and identification of savings
- Recoding of historical as well as ongoing energy use and producing summary reports

Responsibility – EE(POG)

3. Conduct Energy Audit

Where and how energy is used and evaluate potential for savings

- Walk through survey, energy systems Review, Energy use analysis, energy budget to provides baseline for comparing energy use over time
- Audit by in-house or from outside

Responsibility – EE(POG)

Formulation of an Energy Policy Statement

- Guide efforts towards improving energy efficiency
- Represents commitment to saving energy
- Ensure that success is not dependent on individuals
- Declaration of commitment from KTPS management

Responsibility- Energy Manager

Energy Policy will

- Indicates general aims as well as targets relating to
- Energy consumption reduction (Electricity, Fuel oil, gas, Water, etc.)
    - Energy cost reduction
    - Timetables or Timely Action
    - Budgetary limits
    - Energy cost centers
    - Reorganization of management resources

Preparation and undertaking detailed implementation plan

- Project implementation plan will be developed as part of energy management
- Plan shall include implementation time frame, funding and budgetary requirement
- Projects can be diverse such as Changing or establishing operational procedures, asset acquisition etc.

Responsibility- Respective Area Heads

6. Implementation of Staff Awareness and training program

- Key is to maintain high level of awareness among staff
- Formal training sessions, newsletters, posters, publications etc.
- Communication of programs and case studies that demonstrate energy savings
- Outside specialist training

Responsibility- Training Sub Centre

Review

- Review of energy management policy and strategies will form the basis for developing an implementation plan for the next 12 month
- Types of Energy Audit
- Preliminary energy audit
- Detailed energy audit
- Type of energy audit chosen depends on
- Depth to which final audit is needed
- Potential and magnitude of cost reduction desired

Benchmarking Proposed for energy performance of KTPS

- Internal Benchmarking
- Historical and trend analysis
- External Benchmarking
- Across similar Power Generating Units

Scale of operation, vintage of technology, Coal Quality

Immediate Measures for Maximizing System Efficiency

- Elimination of steam leakages by trap improvements
- Maximize condensate recovery
- Adopt of combustion controls for maximizing combustion efficiency
- Replace of pumps, fans, air compressors, refrigeration compressors, and other energy conservation equipment, wherever significant energy efficiency margins exist

Reduction of Power Consumption for Bowl Mills

- At 100% design capacity of the Mill, each size of mill will have a typical figure as KW/Ton of coal ground. However, as the mill loading is reduced this value does not reduce proportionately, but would be higher/ ton of coal ground, especially for smaller size of mills.
- For the same output of mill, if the HGI value reduces or the PF Fineness or % moisture or % of large size raw coal increases, the power consumption of the mill per ton of coal ground would increase.
- For the same output of mill, if timely maintenance is not carried out, the power consumption of the mill per ton of coal ground would increase.
- Mill operation, if not optimised, would result in higher power consumption.

Steps Planned to Reduce Power Consumption for Coal Mill

- To provide, at design stage, planetary gearbox in place of worm gearbox. The efficiency of PGD is 95 % compared to 90% of gb with worm gear. The power saving will be about 20kw per mill.
- If the output fineness is permitted to be 98% thru 50 mesh instead of 99%, the power saving will be about 15-20 kw per mill(the spring compression can be reduced & output can be increased).
- Usage of specific oil (shell) in gearbox will reduce power consumption by 10-20kw (as claimed by the suppliers).

Energy Conservation Measures For Auxiliaries.

S.N.	Recommendations	Remarks
01	Clearing the ducts and passages (around the fans) of debris and ash to reduce hydrodynamic resistance.	The hydrodynamic resistance of ducts is reduced after overhaul.
02	Checking and restoration of healthiness of bearings of all HT and LT motors.	The bearing temp. of HT motors is reduced after overhaul.
03	Servicing of air compressors, non return valves, compressor lines, arresting the line leakage, etc..	Auxiliary power for compressed air system is reduced after overhaul.
4	Testing and replacement of transformer oils of generator and all auxiliary transformers.	Transformer oils are tested for water content, acidity, etc., and found to be all values are within the limit. Generator and unit auxiliary transformers' oil was filtered.

Sl. No.	Recommendations	Measures implemented	Remarks
4	Testing and replacement of transformer oils of generator and all auxiliary transformers.	Transformer oils are tested for water content, acidity, etc., and found to be all values are within the limit. Generator and unit auxiliary transformers' oil was filtered.	The improved quality of transformer oil reduced the winding temp. which lowered the winding losses.
5	Checking of resistance drop across the HT and LT breakers which should be in the range of 100 to 150 mW.	The spring tension of all the HT and LT breakers are adjusted, contact resistance is reduced by cleaning the contact surfaces.	The contact resistance of HT motor breaker's is reduced after overhaul.

Sl. No.	Recommendations	Remarks
1	BFP re-circulation valve passing may be arrested by lapping and blue matching or replacement of stem and valve seat.	The feed water flow passing in BFP re-circulation valve is reduced.
2	Servicing of pump impellers of ASP and RWP, reducing the water to ash ratio below 5:1 (from present value of 10:1) for ash slurry, maintaining the adequate pressure flow by throttling the valve, arresting the leakage in gland and pipe lines.	The auxiliary power for ASP is reduced

S.N.	Recommendations	Measures implemented	Remarks
01	Checking and restoration of clearance between impellers /blades and casing.	The clearance between impellers and casing is maintained as per manu-facturer's recommendation.	The internal leakages in fans is reduced and auxiliary power is reduced.
02	Checking and restoration of surface finish and profile of fan blades to the design condition.	ID fan impellers are replaced. PA and FD fan impellers blades are found O.K.	do
03	Checking of motor and fan bearings.	Drive and Non-drive end Bearings are checked and overhauled.	The bearing temp. are reduced after overhaul and thus the frictional losses in motors are reduced.
04	Controlling O_2 at APH outlet from 6.5 – 7.0 to below 4 %.	Damaged APH seals are replaced and furnace air ingress is also reduced.	The O_2 at APH is reduced to 4.0 - 4.5 %
05	Reducing the hydrodynamic resistance of flue gas duct	Debris is cleared in the flue gas duct.	The pressure drop across the flue gas duct has been reduced.

- Conclusions

- The timely overhaul of equipment will enhance the performance of the equipment.
- Reducing the air leakage through APH, furnace ingress, air/flue leakages in the ducts reduce the auxiliary power.
- Performance improvements will help in:
  - Reduced environmental burden
  - Improvement of reliability of power generation
  - Reduced oil Consumption.
  - Reduction in capital investment.
- The implementation of energy conservation measures during overhaul reduces the in-house auxiliary power.

NTPS

- ENERGY MANAGEMENT POLICY
  - NTPS has adopted the energy management policy w.e.f. 1-5-2009.
  - We have committed to excel in energy management and environmental protection through the efficient use of all energy resources and thereby minimizing the impact of our operations on environment and conserving the scarce natural resources.
  - Till now about 10 engineers of Nasik TPS have passed the energy auditors examination of Bureau of Energy Efficiency to become Certified Energy Auditors

- ENERGY AUDITS

- 2006 - Unit No.4 (210 MW) by M/s ERDA
- 2007 - Energy Audit of Common Auxiliaries by M/s ERDA
- - Mapping of Unit-3 (210 MW) by M/s Evonik

- ENERGY AUDITS –Year 2008

- Mapping of Unit-3 & 5 (210 MW) by

- M/s. Evonik

- Unit-4 Steam Path Audit, Boiler and Turbine RLA by M/s. Dusan, South Korea

- Flow Measurement for Water Balancing by M/s. ERDA.

ENERGY AUDITS – Year 2009

- CPRI has conducted Energy Audit of all NTPS units for assessment of achievable performance parameters such as station heat rate, auxiliary consumption, specific oil cons., coal transit loss.

- Technical Audit & Gap Analysis by NTPC

- Steam Path Audit, Energy Audit, Condition Assessment and Feasibility study of Unit-3 under R&M LE Program with German Assistance of - M/s. Evonic.

- EARTH HOUR DAY CELEBRATION

- NTPS has started celebrating Earth Hour Day from year 2009 as a symbolic gesture to create awareness amongst its employees and their families about earth's current situation – Global Warming.

- The Earth Hour was celebrated in NTPS Colony from 20:30 hrs to 21:30 hrs for one hour by putting off the all the lights & electrical appliances at homes –

  - on Saturday, 28th March 2009
  - on Saturday, 27th March 2010

- WATER CONSERVATION

- Raw Water Pumps:

  - 2 nos. of Ultrasonic Water Flow Meters of M/s. Hydrovision commissioned.

  - Raw Water Pump running hours reduced due to closing of RV.

- Ash Water Recovery:

  - Availability of recycled water from ash bund increased, resulting in lower raw water make up for ash disposal.

- WATER CONSERVATION

- Utilization of ETP Water

- 6 nos. of Vertical Slurry Pumps are fitted for ash slurry disposal of Unit 3, 4, & 5 resulting in reduction in evacuation time, water consumption & auxiliary consumption.

- OTHER MEASURES

- 95 CT fans replaced with M/s. Gammon make in Unit 3, 4, & 5.

- 5 nos. of energy efficient GS pumps replaced.

- Unit-4 AVR replaced with DVR

- Use of CFL fittings in Stage-II at various locations

- Checking & attending for high energy drain valves regularly, including BFP Recirculation Valves.

- TECHNOLOGY ABSORPTION, ADOPTION & INNOVATION

- Helium leak detector is used for detection of condenser air ingress.
- Infrared heat spy guns are used for furnace temperature mapping, surface temperatures of heat exchangers, coolers, pipings, passing of high energy drains valves etc.
- Hydrogen leak detector is used for generator hydrogen leakage detection.
- Ultra probe is used for detection of abnormal sound & leakages.
- Generation control room is being commissioned for networking of NTPS with HO.

➢ FUTURE PLAN OF ACTION

- Unit no.3 R & M LE Programmee (Energy Efficiency Programmee) with German assistance to –

➢ Increase unit capacity

➢ Improvement in loadability

➢ Improvement in heat rate

➢ Life extension

➢ Environmental safeguards.

- DPRs being prepared for various schemes in the area of energy conservation, process improvement, up gradation of technology & instrumentation.

PTPS

➢ MSPGCL PARAS TPS, 250 MW, U-3

- Energy meters on all Transformers and 6.6 KV outgoing H.T. feeders.
- Replacement of conventional 150 W HPSV Lighting Fixtures by 85/95 W CFL.
- VFD for 120 KW Seal Air Fan Motors for Coal Mills.

➢ ACTION TAKEN REPORTS

▪ Providing Energy Meters:-(MEAA-Meters for Energy Accounting & Auditing)

0.2 Class Energy Meters EMS (Energy Management Software System) having interfacing Computer Hardware Network (total 33 nos.) are procured and installed for 6.6 KV Transformers and Feeders.

Replacement of HPSV Lamps by CFL:-

- CFL Lamps of Make – OREVA, Rating – 85 W - 75 Nos. Rating – 90 W - 125 Nos.

Procured and Installation work is in progress.

➢ VFD for seal Air Fan Motors:-

- Proposal initiated on Dtd. 13/04/2010 and submitted vide T.O.LT. No. 418, dtd. 13/04/2010 to Corporate Office for Administrative Approval.

➢ SAVINGS IN TERMS OF MONEY/ TIME:-

- Installation of Energy Meters:-

The monitoring of Energy consumption is the first step for planning and taking necessary action for Energy Conservation. Transformer wise and Feeder wise Energy Consumption data is now recorded and appropriate action will be initiated accordingly.

Replacement of HPSV Lamps by CFL:-
Considering 24 Hours glowing of Lighting , Saving of Rs. 3,25,215/- per Year can be achieved @ Rs. 3/- per Unit.

Sr. No.	No. of HPSV lamps (150 W)	Total Energy Consumed in a Day	No. of CFL	Total Energy Consumed	Net saving
1	200	150x200x 24/1000 =720 KWH	75 (85 W) 125 (90W)	85x75x24/1000+90x125x24/1 000=423 KWH	720KWH – 423 KWH =297 KWH

- Savings by Providing VFD for Seal Air Fan:-

- Considering continuous running of 2 Coal Mills with 2 Nos. of 120 KW Seal Air Fan Motors (Actual Power measured @ 95 KW) Present Energy Consumption per Day

  = 95 x 24 x330 Days
  = 7,52,400 KWH.

  Saving of @ 45% Energy with VFD = 3,38,580 KWH/Year
  Considering the rate of Rs. 3/- per unit , the saving will be Rs. 10,15,740/- Per Fan /Year

(S.K.Itkhede)
T.A. to the Executive Director(O&M)-II
MSPGCL, Nagpur.

Copy s.w.r.to:

1. The Director (Operations), Mahagenco, Mumbai.
2. The Executive Director (O&M)-I/II, Mahagenco, Mumbai/Nagpur.
3. The O.S.D.to M.D., Mahagenco, Mumbai.
4. The Chief General Manager(O&M), Mahagenco., Koradi / Khaperkheda / Chandrapur / Bhusawal / Paras / Parli / Nashik / TPS, Works (HO).
5. The General Manager (TI&C), Mahagenco, Nagpur.
6. The Supdg. Engineer(FQAD), Mahagenco, Nagpur.