

GMR VEMAGIRI POWER GENERATION LIMITED
East Godavari (Andhra Pradesh)

Unit Profile

The Vemagiri project of GMR Vemagiri Power Generation Ltd., promoted by GMR Group of consists of one advanced class industrial heavy-duty type Gas Turbine with generator, one steam turbine with generator, one triple pressure heat recovery steam generator (HRSG) all capable of operating in combined cycle mode.

The plant has achieved Commercial Operation (CoD) on 16th September 2006.



Energy Conservation Programs

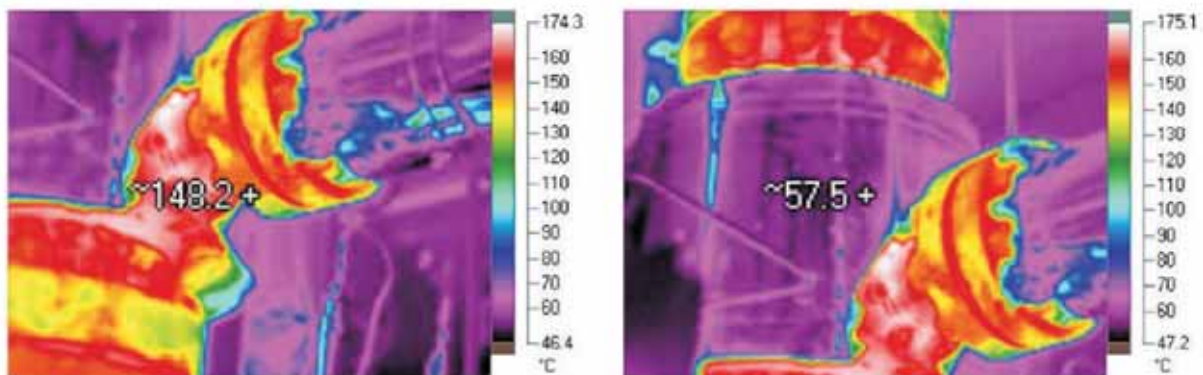
Projects implemented by GVPGL

1. Instrument Air Compressor optimization

Total savings is $0.67 \text{ Mu} * 3 \text{ no's} = 1.97 \text{ MU/year}$

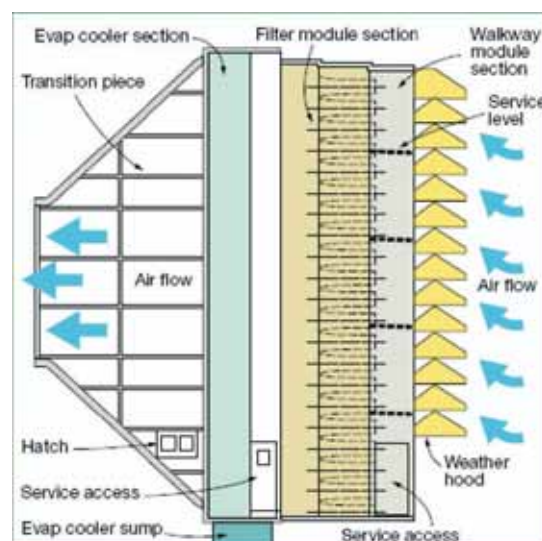
2. Multistage Pressure reduction valve.

HP/IP Feed Water Pump



- Thermal images shows passing from the Automatic Pressure Reduction valve Valve of HP/IP boiler feed pump.
- By Installing multistage pressure reduction drag valves Pressure is reduced in many stages (13 – 40) avoiding the high pressure difference across the valve and thereby reducing the erosion of its seat.

3. Gas turbine inlet filter Replacement Cycle.



- By replacing GT inlet filters before the pressure drop across the filtration system is, 4 in. H₂O. A delta DP of 4 in. H₂O translates to about a 1.4% loss in output and about half a percent loss in heat rate.
- Best O&M practice to maintain the GT inlet filter healthiness & periodic monitoring of Inlet pressure losses about a 1.4% increase in output

4. Plant Lighting Load Optimization

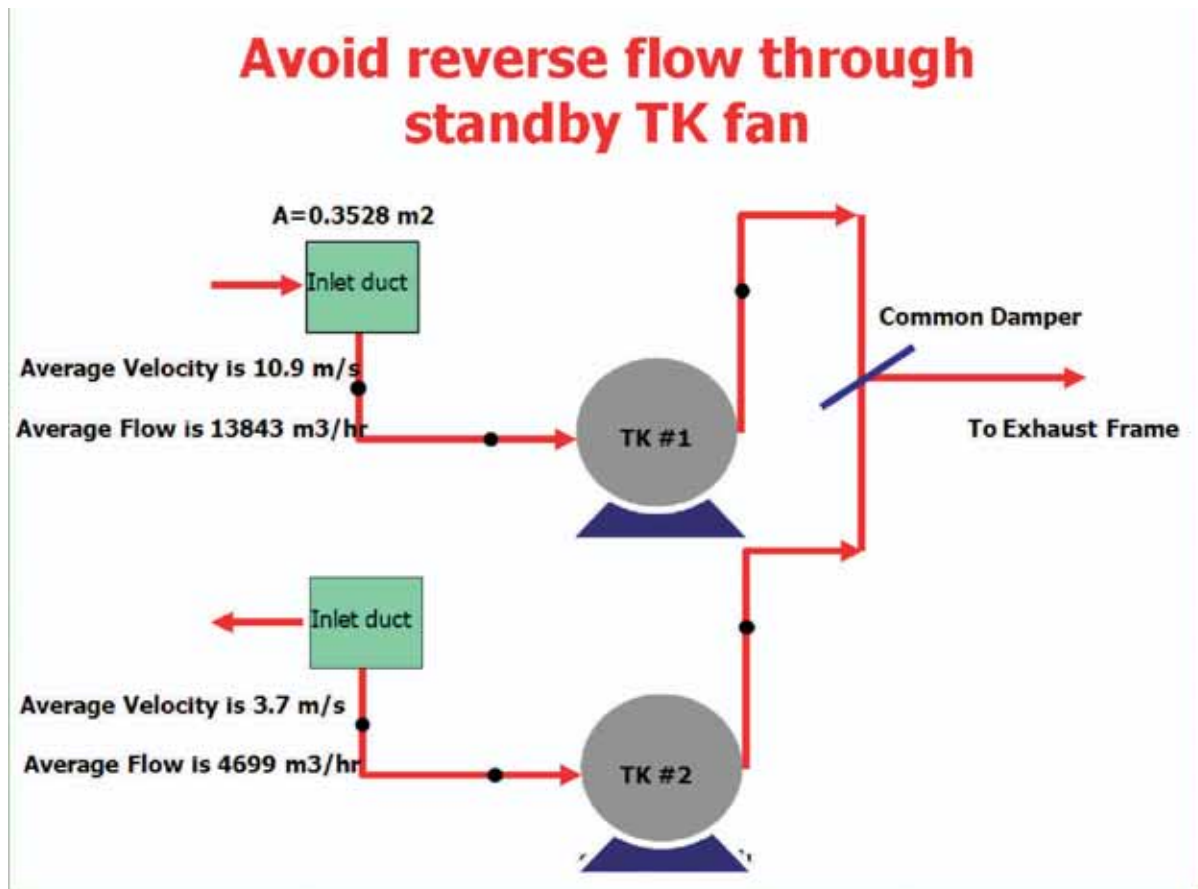
- By optimizing the lighting voltage of the dedicated lighting transformer power savings has been achieved.
 - o Before Lighting Voltage was 240-250 V
 - o Now Lighting Voltage is 210V.
- Also by switching off unnecessary Lights at unmanned and less used areas in the plant, saving around – 20kWh.

5. Plate Heat Exchanger

- In plant for CCW and ACW heat exchange, 2 PHE's are available but before only one PHE was in service by taking both the PHE's parallel in operation, pressure drop in the across the PHE's has been reduced and better Heat exchange noticed between the Fluids.
- PHE parameters Comparison

| | Past | | Present | |
|-------------------|----------------------------------|-----------------|----------------------------------|-----------------|
| | ΔP (kg/cm ²) | ΔT (°C) | ΔP (kg/cm ²) | ΔT (°C) |
| Hot fluid | 0.9 | 4.4 | 0.5 | 7.2 |
| Cold Fluid | 1.2 | 3.6 | 0.7 | 5.2 |

6. Gas Turbine Compartment Fan modification



- The approximate loss that occurs because of the improper closing of the damper
 - o 33.9%
 - o Past power consumption for TK fan - 85 kW

Reverse rotation of the stand pump is arrested by modifying the command damper.

- Power Savings is – 23 kW
- Power savings per year is $2 \times 23 \times 24 \times 365 = 0.42 \text{ MU}$
- Annual Savings – Rs.10.12 Lacs.

Apart from the Above mentioned Projects

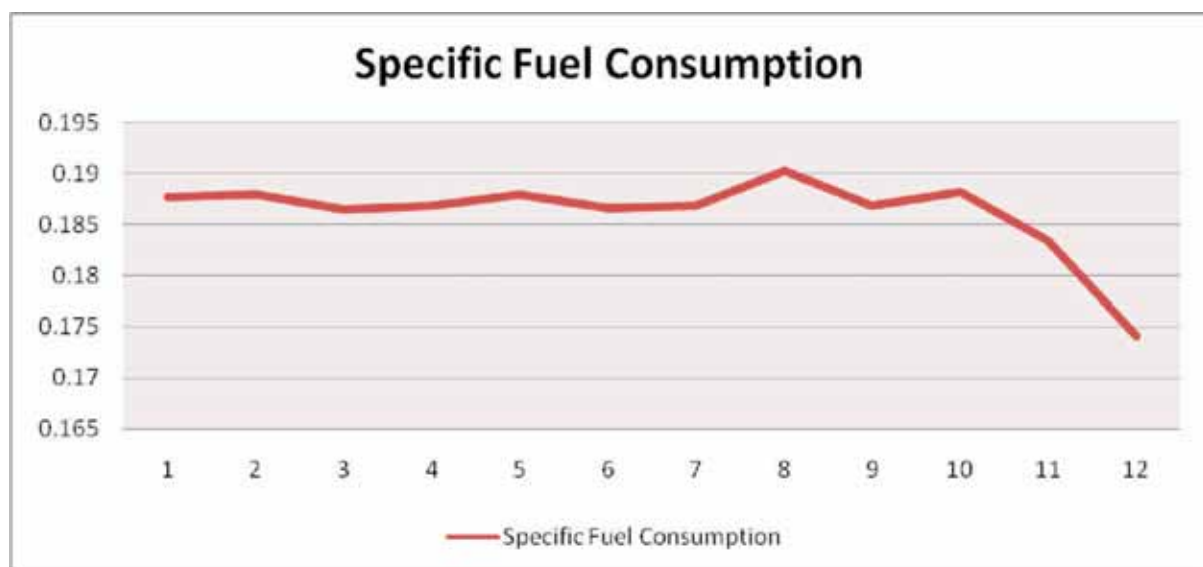
Variable Frequency Drive (VFD) has been installed for Condensate Extraction Pump (CEP) in the Month of October.

- Frequency has been reduced to 43.4 Hz from 50Hz
- CEP motor rating – 431 kW

- By varying the frequency power consumption of the motor is reduced to 305 kWh.
- **Annual Energy Saving – 1095 MWh.**
- **Annual Savings – 2* 1095000= Rs. 20.93 Lacs**

Specific Fuel Consumption for the year 2010-11

| Month | Energy Generation kWh | Fuel Consumption SCM | Specific Fuel Consumption |
|--------------|-----------------------|----------------------|---------------------------|
| April-10 | 268302000 | 50358283 | 0.187692537 |
| May-10 | 244225000 | 45913742 | 0.187997715 |
| June-10 | 192316000 | 35857850 | 0.186452765 |
| July-10 | 272880396 | 50979699 | 0.186820672 |
| August-10 | 261671604 | 49180753 | 0.187948376 |
| September-10 | 260114000 | 48553503 | 0.186662398 |
| October-10 | 255284000 | 47703455 | 0.186864257 |
| November-10 | 205600000 | 39123172 | 0.190287802 |
| December-10 | 205883000 | 38461837 | 0.18681405 |
| January-11 | 220702000 | 41538085 | 0.18820892 |
| February-11 | 200129000 | 36706106 | 0.183412229 |
| March-11 | 227749000 | 39650005 | 0.174095188 |
| Total | 2814856000 | 524026490 | 0.186164582 |



Auxiliary Power Consumption

- Saving by Reduction in Aux. Power

| | 2010-11 | 2009-10 |
|---|--------------|-----------|
| Plant load Factor, % | 82.9 | 88.68 |
| Gross generation, MU | 2814.86 | 3011.23 |
| Auxiliary power, % | 2.98 | 3.12 |
| Auxiliary power, MU | 83.88 | 93.95 |
| Total savings in aux power, MU (93.95-85.29) | 10.07 | |
| Designed Heat Rate (Kcal/kWhr) | 1730 | |
| Heat Rate (Kcal/kWhhr) | 1710.26 | 1700.82 |
| GCV (kcal/Scm) | 9187 | 9003.5 |
| Gas Consumption, MMSCM | 524.06 | 568.8 |
| Calculation (1730-1710.26)* 2814.86MU (generation) | 55565.3364 | Kcal |
| Gas savings Million (55565.3X %82.9 PLF) | 46063.6639 | Kcal/Year |

EHSQ Policy at GMR VPGL

- Adopting prudent utility practices to generate reliable and Quality power complying with the requirement of all the stake holders.
- Providing clean, healthy and safe work environment through the prevention of human ill health & injury and prevention of environmental pollution arising out of GVPGL activates.
- Ensuring compliance with applicable legal and other requirement to which GVPGL subscribes.
- Optimum utilization of resources and reducing waste generation.
- IMS in to every activity of GVPGL with a focus on continual improvement and sustainable growth.
- Involvement of employees at all levels to inculcate Total quality culture.

Improving the quality of Neighboring community through Corporate social responsibility