BHARAT ALUMINIUM CO. LTD. KORBA , CHHATTISGARH

Specific Energy Consumption reduction drive

Company Profile

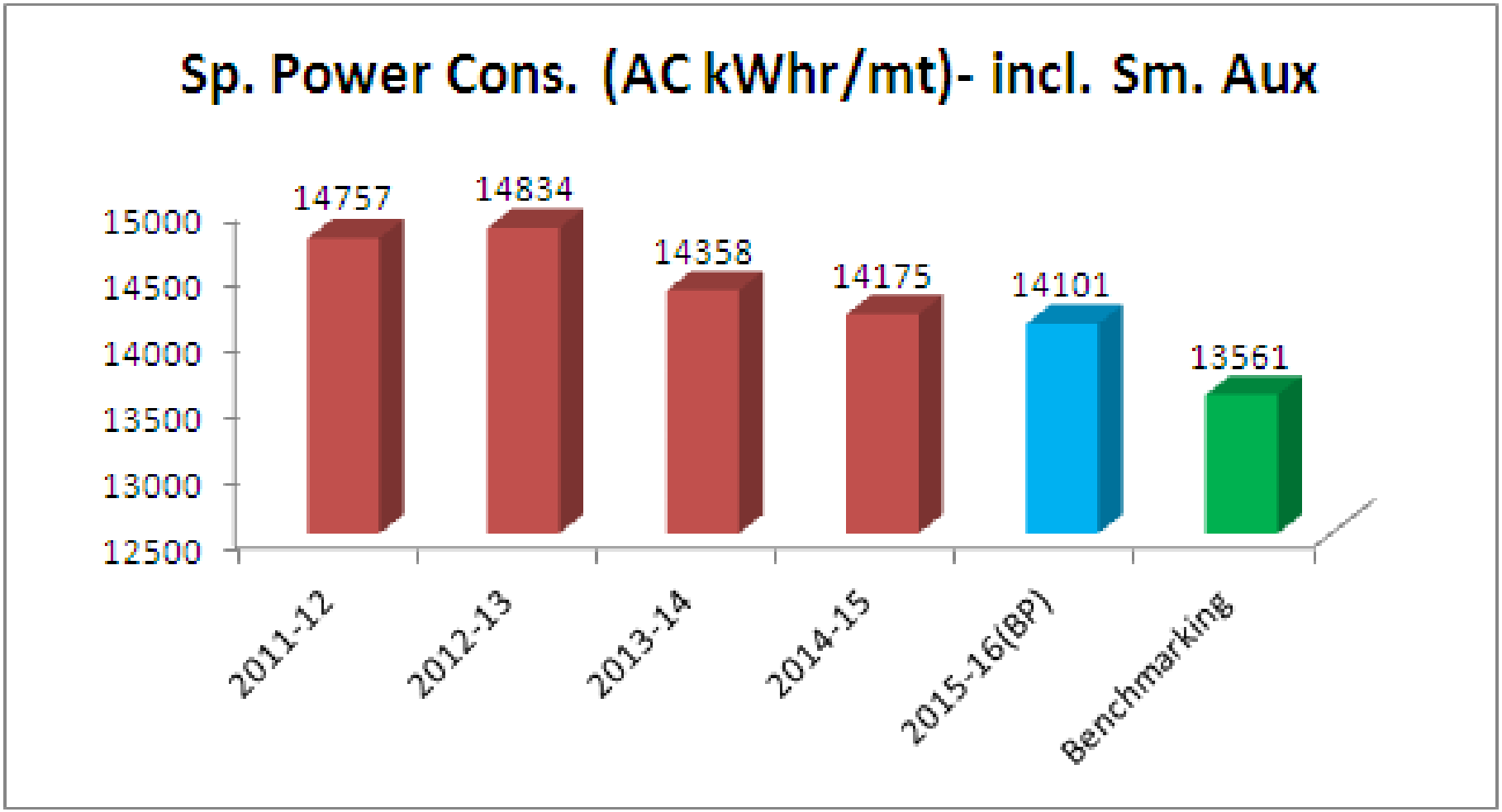
- Bharat Aluminum Co. Ltd. (BALCO) was incorporated in the year 1965 as a Public Sector Undertaking (PSU).In the year 2001, Government of India disinvested 51% equity & management control in favor of Sterlite Industries limited.
- BALCO has built up a production capacity of 245000 Tonnes per annum of Aluminium smelting capacity & expanded its fabrication to include three properzi mills, three pig casting machines , integrated hot & cold rolling mills along with captive power plant of 810 MW capacity.
- Upcoming Plants under commissioning/ ready for production:

  Coal fired Power Plant rated 1200 MW capacity

  Aluminium Smelter with production capacity of 325000 Tonnes per annum

Reduction of Specific Energy Consumption in Pot-Room

Sp. Energy Consumption Trend



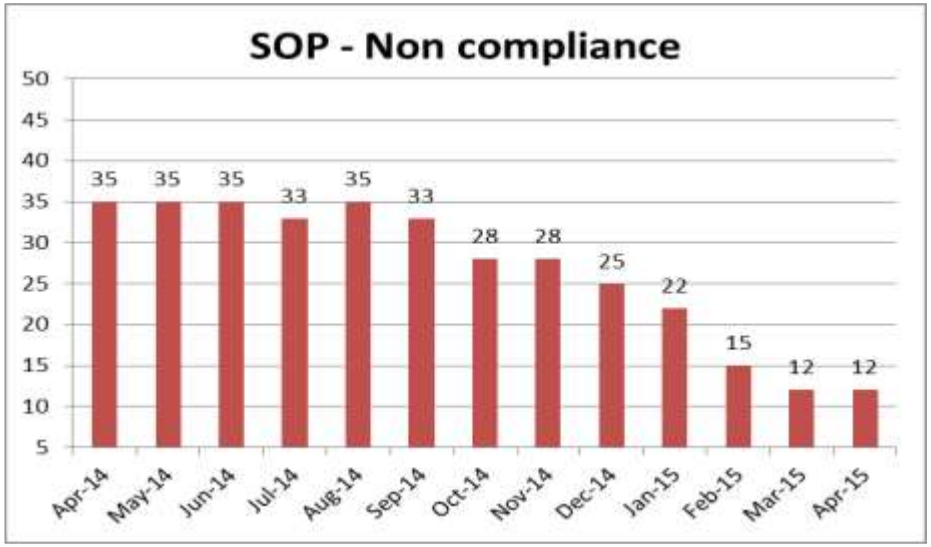
Key Initiatives

1. Cathode mapping

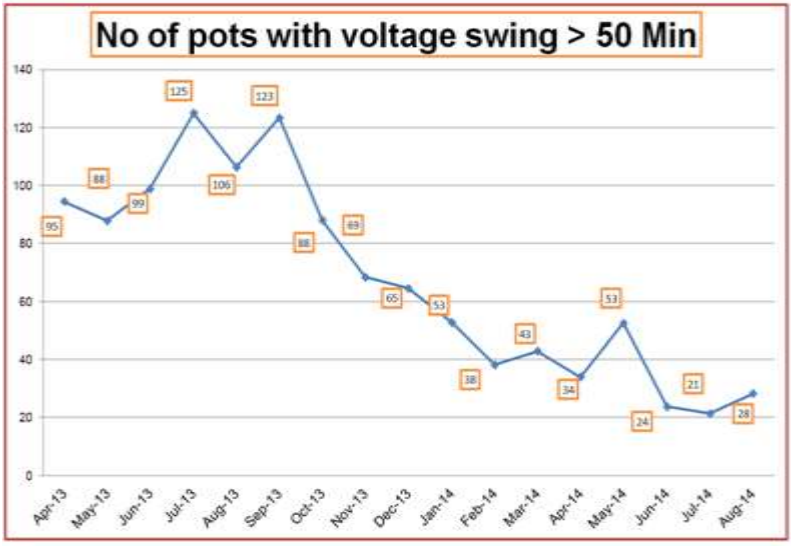
POT	519								
S1	S3	s3	S2	S3	S3	S3	S2	S1	S3
B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
S1	S3	s3	S2	S3	S3	S3	S2	S1	S3
S3	S3	S2	S3	S3	S3	S3	S2	S2	S1
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
S3	S3	S2	S3	S3	S3	S3	S2	S2	S1

CODE		
S1	High	SLUDGE
S2	Medium	SLUDGE
S3	No	SLUDGE

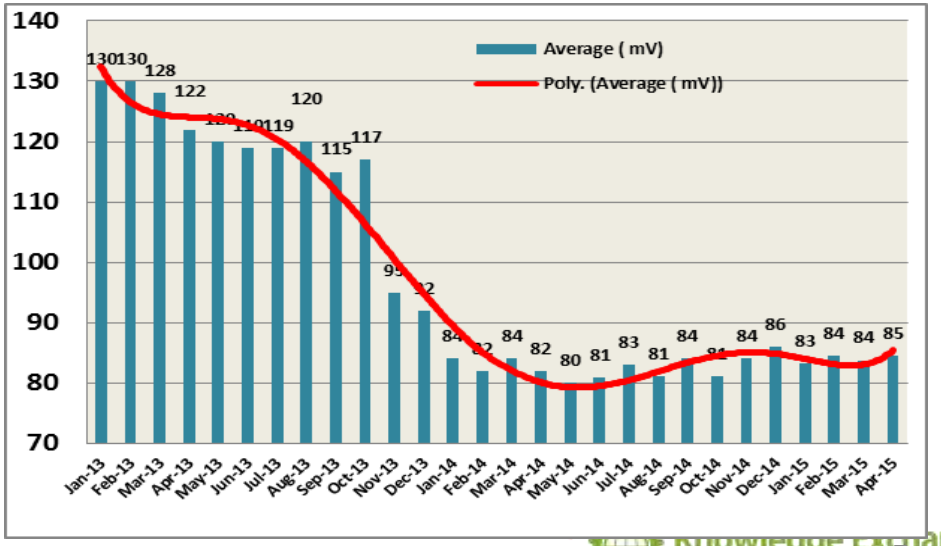
2. SOP non compliance



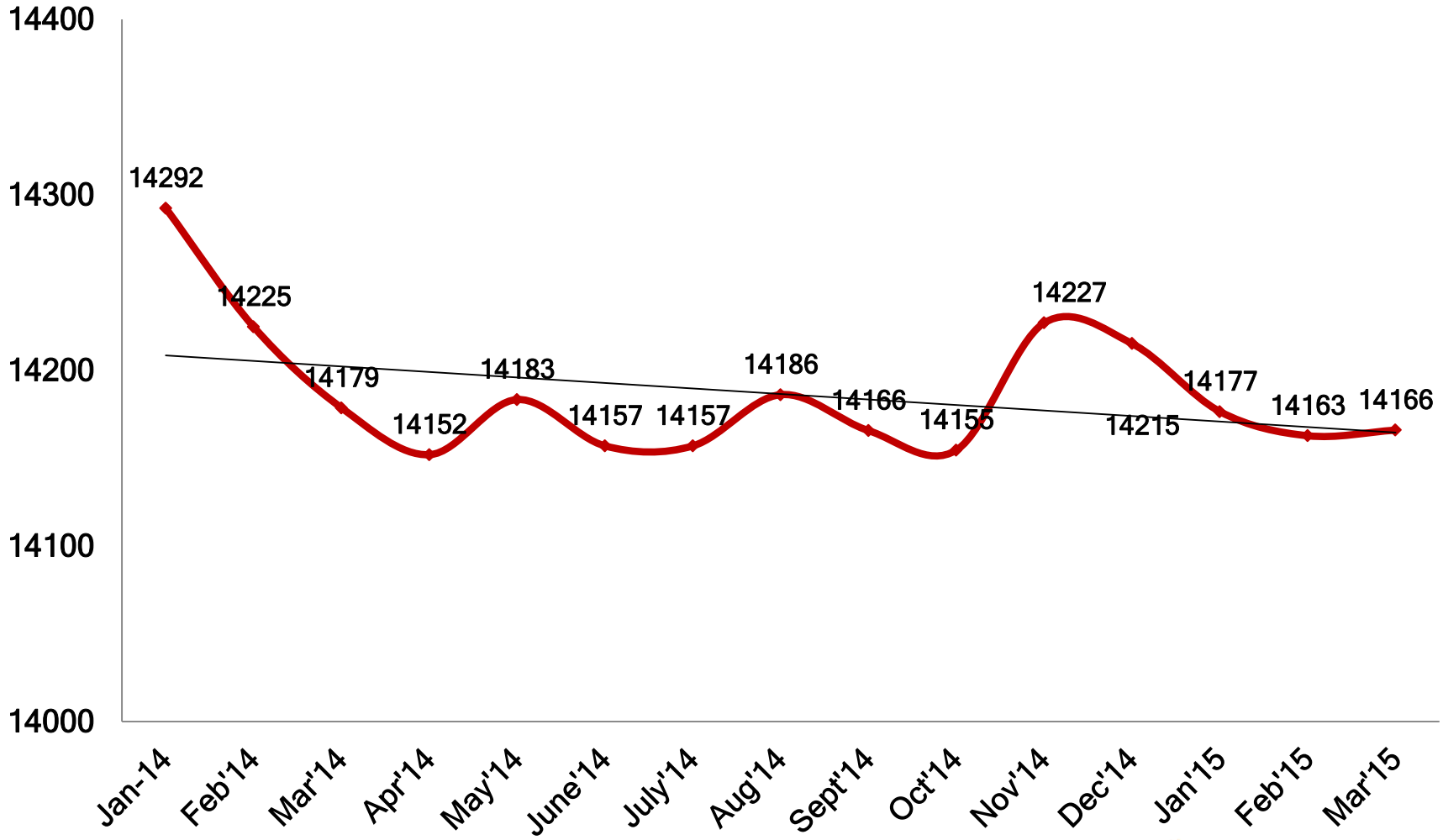
3. Single beam



4. Stub to carbon drop

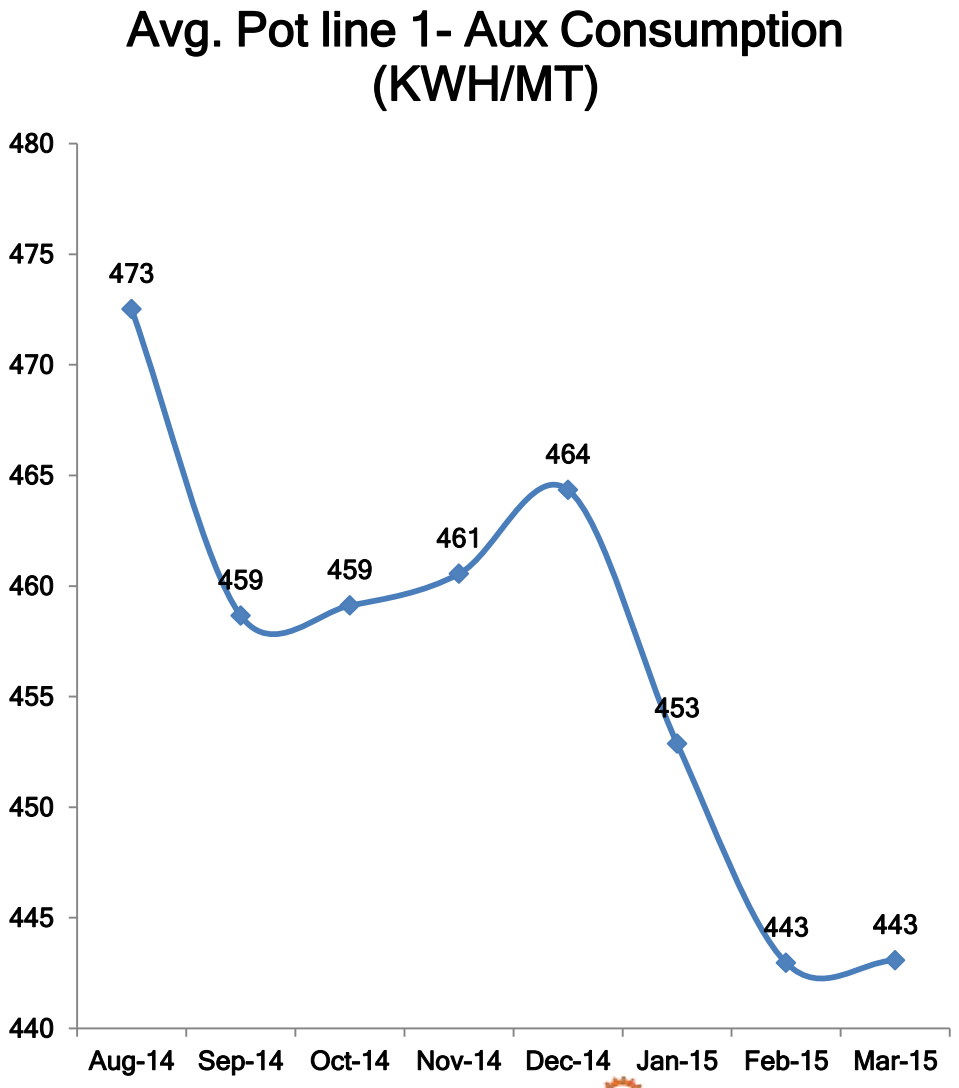


Monthly Sp. Energy Consumption Trend



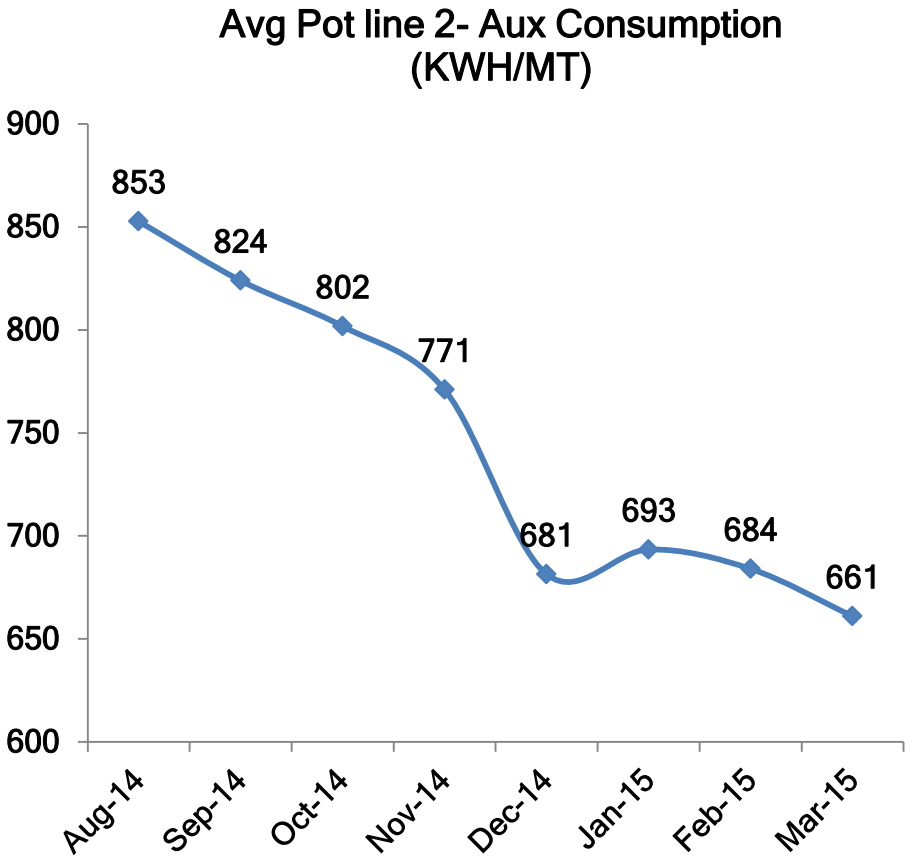
Pot line 1- Auxiliary Power Consumption reduction

- Extra BTAP unloading point installation at Alumina handling to reduce the compressor running by 2 hours in each rake.
- Installation of header in the Potline-2 compressed air and Integration of air lines of both Pot-lines and utilizing excess air in the system; Reduced the number of Compressors required to operate for Unloading of LP rake: Saving 11Mwhr/day.
- Identification of suction losses in FTP and rectification of same and thereby reducing load on FTP ID fans.
- 100% implementation of nozzles in cooling hoses in Potroom
- Ideal hour of running compressor avoided when Alumina Unloading is not required
- Internal Air leakages Audits & rectification on regular basis



Pot line 2- Auxiliary consumption

- Extra chambers operated for venting were taken offline in FTP
- Rectification of problems in inlet & outlet dampers of ID fans in FTP
- PRV installation in compressed air line in all tanker unloading points.
- PRV installation in all unloading station of Alumina handling.
- Streamlining of operational parameter of all Pressure vessel in Alumina handling.
- Energy saving by utilizing the Excess flow of high pressure compressor in Alumina Unloading at 16000 MT silo : Saving 9 Mwh/day.



Way Forward

- Modification of New alumina handling (PL2) unloading station and installation of Extra DP lines in each station to reduce compressed air consumption.
- Implementation of Star type filter bags in FTP Pot line 1.
- Duct modification in Pot line 1 FTP to reduce the load of ID fans.
- Air end up-gradation of compressor at pot line 1.
- Installation of Stortz coupling & pneumatic wrench at alumina handling to reduce unloading time , which will result in reduction in compressor running.

Modification in Induced Draft Fan for High Reliability & Energy Savings

CPP-540 MW, BALCO

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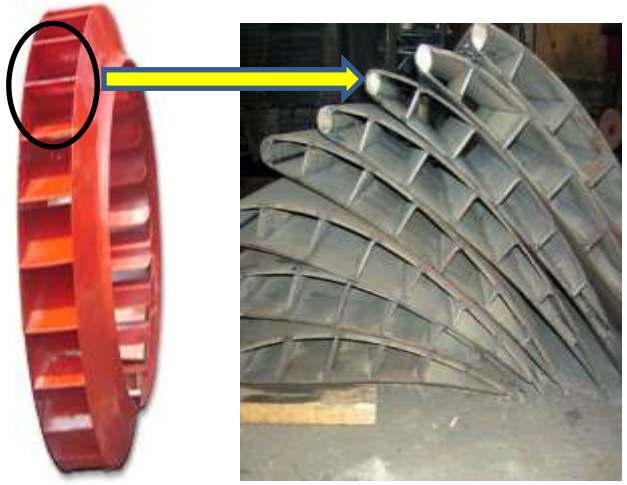
BEFORE IMPROVEMENT

In all four units of CPP-2, Installed Induced Draft Fans were having hollow aero foil type vanes.



The problems which we were facing are,

- Because of high ash content in coal used, the vanes used to get eroded and created unbalance in fan impellers and resulted in high fan vibrations.
- Due to higher vibration, we were forced to do impeller dynamic balancing frequently, which causes losses in following forms:
  - Reduced boiler efficiency due to reduced load operations
  - Increased specific energy consumption in the form of both coal and Electricity.
  - Reduced unit utilization.

IMPROVEMENT DONE

It has been proposed to replace complete ID Fan with new one which will be solid profile impeller vanes with higher efficiency. Also, Install VFD with the fan and thus efficiency can be improved with wide OPEN IGV operation.

Savings Realized from the Improvement:

- Zero generation reduction due to balancing work of Induced Draft Fan impellers and resulted savings in terms of
  - Elimination of generation loss
  - Saving of Fuel oil
  - Saving of coal and electricity due to improved efficiency
  - Reduced Energy Consumption of IDF due to VFD operation.

COST SAVING CALCULATION

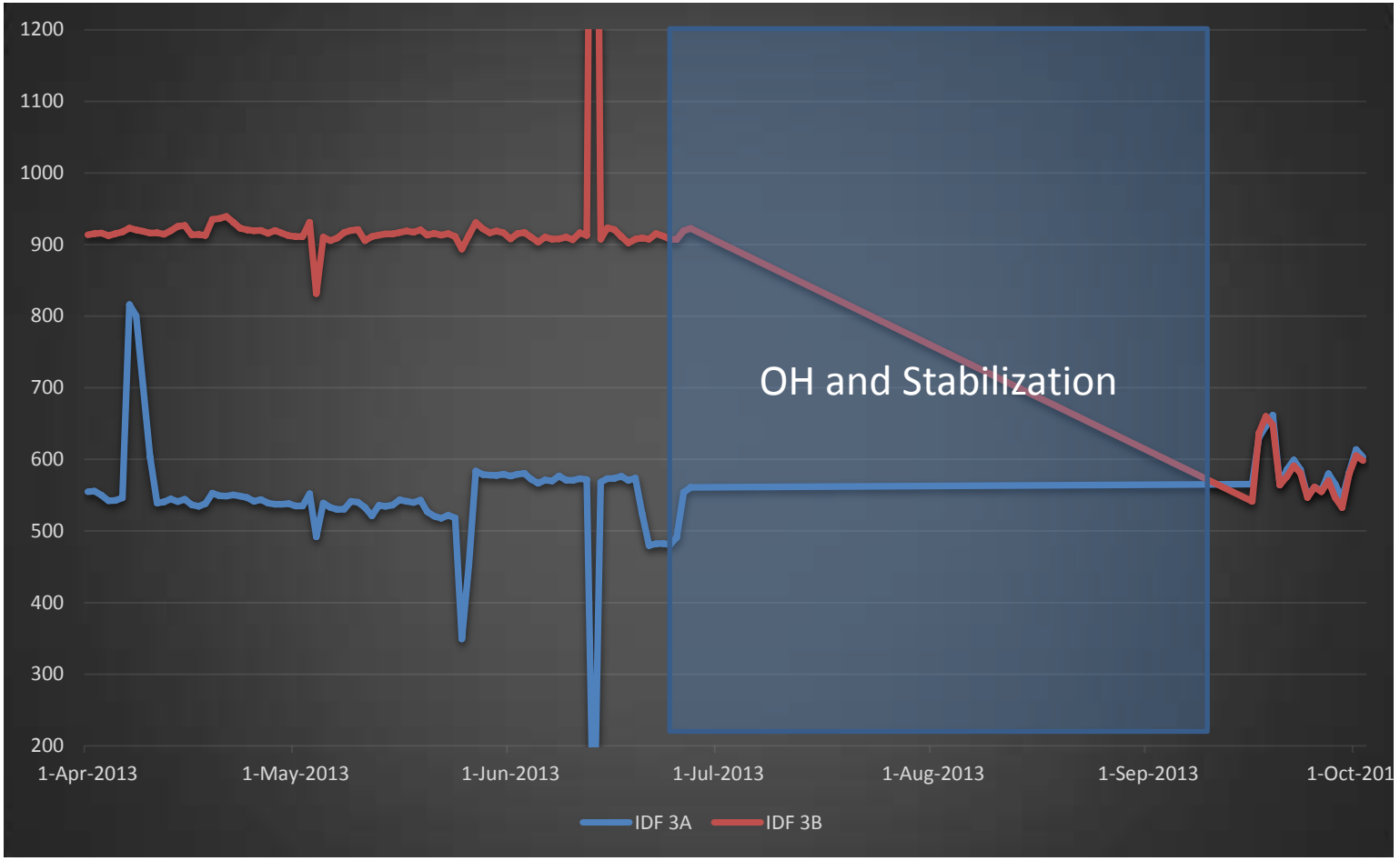
Generation loss in U#3 due to ID fan balancing			
Month	Gen Loss in MU	HFO(KL)	LDO(KL)
Apr-12	0	0	0
May-12	0.3815	8.7	7.35
Jun-12	0	0	0
Jul-12	0	0	0
Aug-12	0.571	20	7.2
Sep-12	0.4359	11.7	0
Oct-12	4.1576	119.6	0
Nov-12	0.274	0	0
Dec-12	1.073	12.5	0
Jan-13	0	0	0
Feb-13	0.2075	0	0
Mar-13	0.822	0	0
Apr-13	0	0	0
May-13	0.807	12.3	0
Jun-13	0	0	0
	8.7295	184.8	14.55

Considering power cost of Rs 1 per unit, Cost saving due to Generation loss(In Lac)	87.29
Considering HFO cost of Rs56000 per KL, Cost saving due to HFO loss(In Lac)	103
Considering LDO cost of Rs72000 per KL, Cost saving due to LDO loss(In Lac)	10.4
Total Cost Saving(In Lac)	130.86

Total Cost of Project = 160 Lac

Pay Back = 1.83 Yrs

ENERGY SAVING REALIZED



Electrical Energy Saving due to VFD installation is approx. 300 KW/Hr

Payback:

Total cost of VFD Installation	= 100 Lac INR
Savings with 2.0 INR unit cost(90% Availability)	= 47.3 Lac INR/Yr
Pay Back	= 2.1 Yrs

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Thank You

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