BEST PRACTICES ADOPTED IN JINDAL STEEL & POWER LTD., RAIGARH TO ACHIEVE ENERGY EFFICIENCY

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- *E&CC Department , JSPL, Raigarh performs following functions related to the continual improvement in energy efficiency:*

1. *Performance monitoring and Assessment.*
2. *Project Identification and Implementation*
3. *Internal Awareness towards improving energy efficiency.*

Performance Monitoring & Assessment

- *Data archiving from SAP and department (Energy, Non energy)*
- *Monthly calculation (as per WSA) and analysis of SEC of each section.*

SEC_Apr-Dec-14..xls

- *Internal & external energy audit of plant equipment & systems.*
- *Track new and emerging developments regarding technologies and practices and assess their applicability*

Energy Saving Technologies (Compilation).xlsx

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Project Identification & Implementation

Energy and Climate Change Department (E&CC) at Raigarh identifies and perform in-depth study to check the technical feasibility of projects. After the technical feasibility is confirmed the project is presented to the Top Management for approval and implementation.

BLAST FURNACE PRESSURE RECOVERY TURBINE @ BF-1

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Working Principle

Motor

- ***Motor is designed to run the blower independently.***
- ***Motor is selected with maximum power.***
- ***Gearbox is used to increase the RPM***

Blower

- ***Initially blower is driven only by motor.***
- ***No power saving***

Turbine

- ***As cleaned BF gas enters the turbine, it expands.***
- ***BF gas pressure energy is transformed to mechanical energy.***
- ***Clutch interlocking at 3000 RPM & RPM increase due to gearbox***

Blower

- ***As turbine acquire maximum RPM, motor load decreases leading to energy saving.***
- ***Adjustable stator blade adjust the blower flow.***

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Advantages

- *Electrical Power reduction up to 40%.*
- *Less space utilization as compared to Separate Electric Blower & TRT*
- *Less capital investment as compared to Separate Electric Blower & TRT.*
- *No energy conversion losses (6%)*
- *Total power saving up to 4 MW at pressure of 2.5 kg/cm2 (A).*
- *The blower is provided with adjustable stator blades, so as to regulate the volume of air flow.*
- *The turbine is also provided with adjustable stator blades that helps in controlling the BF top pressure.*

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WHRB FD Fan Suction Duct Modification

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ENERGY CONSERVATION ANALYSIS

Description	Units	FD fan -7A
Before Modification		
Static Pressure (Before IGV)	mmWC	-114
Discharge Static pressure	mmWC	809
Total static pressure head	mmWC	923
Motor input power	kW	80.80
Motor rated power	kW	90
Motor rated voltage	V	415
After Modification		
Static Pressure (Before IGV)	mmWC	-25
Discharge Static pressure	mmWC	809
Total static pressure head	mmWC	834
Reduction in speed	%	4.94%
Reduction in head	%	9.64%
Reduction in power consumption	%	14.11%
Reduction in power consumption	kW	11.40

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HOT STOVE WASTE HEAT RECOVERY SYSTEM @ BF-1

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Advantages

- *Hot stove waste heat recovery system improves combustion efficiency & saves energy by preheating combustion air and fuel gas for blast furnace hot stove by utilising the sensible heat of combustion waste gas exhausted from hot stove.*
- *Total Investment = 80 Lakhs.*
- *First year energy cost saving= 27.2 Lakhs.*
- *Year of establishment :2009-10*
- *Efficiency of Stove (on gas mode) before heat recovery =77.5%*
- *Efficiency of stove (on gas mode) after heat recovery=91.0%*
- *Due to hot stove heat recovery ,6796 Gcal (0.025 Gcal/t HM of thermal energy is saved , equivalent BF gas Saving of 9064 kNm3 is achieved.*

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Lighting Energy Saver

- *Installed at Sinter Plant.*
- *Rating: 60 KVA*
- *Energy Consumption before installation: 234553.8 Kwh/yr*
- *Energy Consumption after installation: 200400 Kwh/yr*
- ***Energy Savings: 34153.8 Kwh/yr***
- *Installation of Lighting En. Savers at other location of plant like DRI, RMH, RUBM, SAF etc in 2015-2016 is in process.*

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Other Energy saving schemes implemented	Fuel or Electricity saved
Reduction of Energy Consumption by using Magna Drive in ID fan 1B-1of AFBC of Pp-2	638 Mwh/yr
Reduction of Energy Consumption by using VFD in ID fan 1B of AFBC of PP-2	865 Mwh/yr
Optimization of PCI consumption in LDP with bf gas, change fuel mix (Coal saving 1400Ton/yr. is achieved due to fuel mix change).	Coal saving 1400Ton/yr. is achieved due to fuel mix change.
Increase hot blast temperature by Ceramic coating on inner surface of tuyers in BF-2 in 1 no. of tuyer.	Coke saving of 79 Ton/yr. is achieved due to coating of one tuyer.
In MLSM performed the proper tuning of heat exchanger valves to reduce the cooling effect on lubrication oil for roughing mill and IM/FM.	421 MWh/yr.
PLC program has been modified in MLSM: To stop furnace charging hydraulic system in case charging stop more than 20 mins To run the 03 Nos. hydraulic Pumps out of 05 at Finishing area Hydraulic System as required pressure is maintaining with 03 Pumps only. To drop down the speed of Mill main motors from 100% to 10% in case of idle running of mill for more than 10 minutes.	380MWh/yr

Energy Projects for 2015-16:	Fuel or Electricity saving (anticipated)
Air leak Audit in PP-1, DRI-1, BF-2, Sinter plant, LDP, power plant-3, plate mill compressor house)	Total nos. of leak 174 Quantity 668cfm 1170 MWh/yr
Intelligent Flow Control (IFC)in PP-1 Compressor house	607 MWh/yr.
Replacement of existing coal injection PD blower by Godrej-Aerzen turbo bower in DRI-2.	50% electrical energy saving on existing PD blower.
Modernisation of RH furnace in RUBM with Regenerative burners burning Blast Furnace Gas in place of Furnace oil with automatic on/off valves.	0.40 Gcal/t (0.050 Gcal/tcs)
Mullite bricks in place of ceramic modules (100 deg C temperature rises in COG)	2 MWh/hr (4nos. Of boilers)
Reduction of BF gas flaring (BF-1 inter connection line with BF-2 line)	Reduction from 20% to 10% in BF-1 (0.035 Gcal/tcs)
Energy Saving by the use of MV drive in 1.CA fan of BF-2 2. PCI ID fan of BF-2 3. Bag Filter ID fans of DRI-2 4. CFBC ID Fan PP-3 And LV Drive in 1. PD blower of DRI-1 2. AFBC-3 ID fan	 1. 1108.8 MWh/yr(140kw) 2. 1425.6MWh/yr(180kw) 3. 1831.5 MWh/yr 4. 1072.68 MWh/yr 1. 611.63 MWh/yr 2. 1730 MWh/yr
ISO 50001:2011	**In progress**

Internal Awareness

Sr No	Training program	Faculty	No of Training conducted	Year	Participants	Benefits achieved
1.	EnMS LA	BSI	01	2012	Team Nirantarta	For EnMS Implementation
2.	Awareness on Energy & climate Change	V.S. Kothari	01	2012	Team Nirantarta	To understand the objectives, Target, roles/Responsibility
3.	Energy conservation	NPC	01	2013	Team Nirantarta	Awareness for energy Conservation
4.	Energy Conservation Day	E&CC	01	2014	Across plant	Improve the awareness on EnCON.
5.	Hands-on training on Energy Audit	NPC	Scheduled in 2015-2016			

THANKING YOU ALL !!

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