Improvement in Energy Efficiency and Energy Conservation Initiatives at Khanna Paper Mills Limited

KHANNA

KPML JOURNEY

Incorporated in 1985

Among Top 5 Paper Producers in India

Annual Group Turnover of ₹ 3,000 Crores

The Largest Waste-Paper based Mill in India

Diversified Product Range Packaging Board, Printing & Writing, Newsprint

Single Site with 4.2 Lakh TPA Capacity

KPM - Where do we Stand

1. Unique : Scale of Operation

Companies > 35,000 MT p.m. Capacity	Only 7, KPM in Top 7
Single Site : 35,000 MT p.m. Capacity	Only 3, KPM in Top 3
Manufacturer With 3 Biggest Segment	Only 1, That's KPM
Largest Importer in North (Paper Ind.)	KPM - No.1
Largest Recycled Based Mill	KPM - No.1
Mills(>30 K p.m) in a District with >25 L Population	Only 1, That's KPM

KPM - Where do we Stand

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2. Technical : Superiority and Leadership

How many Mills with 750MT DIP Facility	Only KPM, Next best - 300 MT
How many have SFT Plant	Only 3, KPM in Top 3
Machine >6Mtr Deckle,1000 mpm	Only 1, PM 5
Paper Machine >10,000 MT p.m.	Only 10, KPM has 2
Most advanced Head Box in Paper	Only KPM - No.1
Board Rec. Mill: Broke Str. + Under Layer + SFT	Only 2, KPM in Top 2

KPM - Where do we Stand

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3. Product : Range - Supremacy - Leadership

Leader in Duplex Board	KPM - No.1
Maximum Nomination in Duplex	KPM - No.1
Leader in Newsprint	KPM - No.1
Max. No. of Publishers in Newspaper	KPM - No.1
Range w&P (Vir-Rec: 48 - 140)+ Copier	Only KPM, In Top 5
Paper & Board - Virgin & Recycled	Only KPM

PRODUCT PORTFOLIO

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PACKAGING BOARD

- VIRGIN
- RECYCLED

Capacity – 1.60 Lakhs TPA

APPLICATION

FMCG, Pharmaceutical, F&B, E-Commerce and Liquor Carton

PAPER

- W&P
  - VIRGIN
  - RECYCLED
- COPIER

Capacity – 1.20 Lakhs TPA

APPLICATION

Publications, Notebooks, Stationery and Commercial Printing

NEWSPRINT

- STANDARD

Capacity – 1.40 Lakhs TPA

APPLICATION

Newspaper, Magazines, Advertisement and Brochures

PRODUCT PARTNERS

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State Energy Conservation Award-2022-2023

(Department of New and Renewable Energy, Government of Punjab)

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Summary of Completed projects at KPML

Project	Proposed Benefits	Estimated Saving (Lacs/annum)	Target Date/Status
14 MW STG Overhauling	Increased Power Generation by 700 KW	653	Completed
Replacement of old inefficient Air Preheater with Efficient Air Pre-heater system	1. Better boiler efficiency 2. Energy saving in terms of air and fuel. 3. Low air consumption and reduction in aux power consumption.	120	
Replacement of Standard Efficiency IE1 / Re-wound Motors with Premium Efficiency IE3 Motors	Low electrical energy consumption	6.48 Lac kWh resulting in savings of INR 43.0 Lacs annually	

14 MW Overhauling Improvement Sheet

Parameter	UOM	Before Overhauling	After Overhauling
Turbine load	MWH	12.5	14
Specific Steam consumption	MT/MW	5.8	5.4
Saving in Specific steam consumption	MT/MW	0.4	
Saving in steam consumption for total power generation	MT	5.6	
Power Generation benefit due to lower Specific steam consumption	MW/Hr	1.0	
Saving due to less steam consumption @ Rs.7.5/- per Unit	Lacs/day	1.9	
Overhauling expenses	Lacs	119.9	
Payback Period	Days	64	
	Month	2.1	
Annual cost saving	**Lacs/Annum**	**653**	

Efficiency Improvement of 14 MW Turbine by overhauling

Replacement of old inefficient Air Preheater with Efficient Air Pre-heater system

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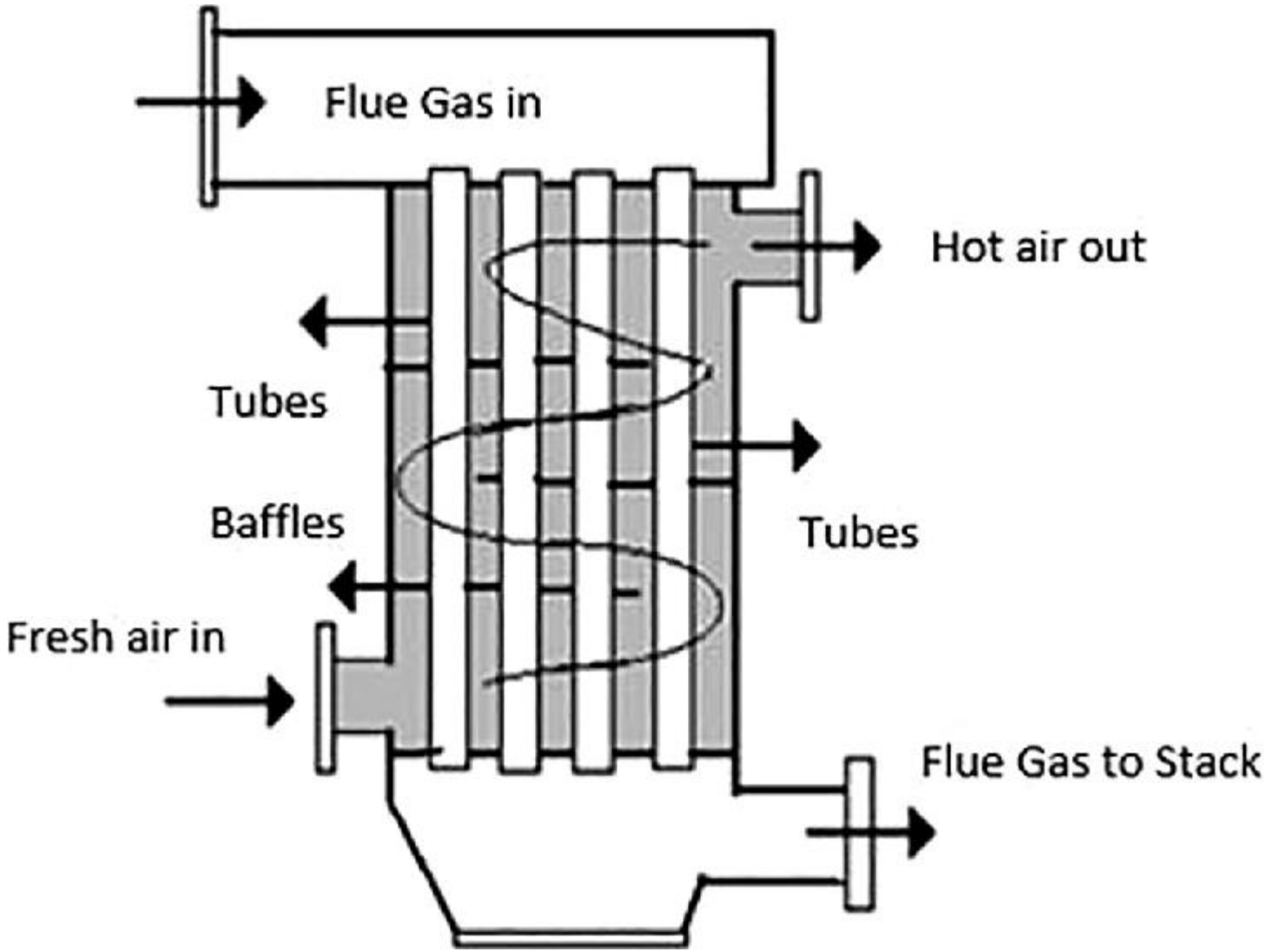
❖ **Background**

- Air Preheater on 100 TPH Boiler
- Tubes in top & bottom modules developed cracks
- Short circuiting of flue gas and air to the boiler
- Loss of essential heat
- Increased power consumption in Auxiliary equipment

❖ **Improvement**

- Replacement of top and bottom modules
- Short circuiting of flue gas and air to the boiler was stopped
- No loss of essential heat
- Reduction in O2% from 7 to 4.5%
- Increased Boiler efficiency by 1.5%
- Reduction in power consumption of Auxiliary equipment

Replacement of old inefficient Air Preheater with Efficient Air Pre-heater system



Replacement of old inefficient Air Preheater with Efficient Air Pre-heater system

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APH performance @ Dec'22											
Date	Flue Gas temprature		Air temprature		APH Efficiency		Difference			Temprature Gain/loss	Contribution in boiler Efficiency (%)
	Inlet(Deg. C)	Outlet (Deg. C)	Inlet (Deg. C)	Outlet (Deg. C)	Flue gas side(%)	Air side(%)	Flue gas (Deg. C)	Air(Deg. C)	Efficiency		
01-12-2022	216.21	118.75	16	92.83	48.68	38.38	97.46	76.83	-10.31	-20.63	3.84
02-12-2022	215.53	117.89	16	92.99	48.94	38.59	97.64	76.99	-10.35	-20.65	3.85
03-12-2022	222.89	121.09	16	94.77	49.20	38.08	101.79	78.77	-11.13	-23.02	3.94
04-12-2022	223.85	120.48	16	95.80	49.73	38.39	103.37	79.80	-11.34	-23.57	3.99
05-12-2022	224.38	121.78	16	96.03	49.24	38.40	102.60	80.03	-10.83	-22.57	4.00
06-12-2022	219.68	120.69	16	106.94	48.60	44.65	98.99	90.94	-3.95	-8.05	4.55
07-12-2022	216.71	119.34	16	102.13	48.51	42.91	97.37	86.13	-5.60	-11.24	4.31
08-12-2022	218.72	121.52	16	101.68	47.95	42.27	97.19	85.68	-5.68	-11.51	4.28
09-12-2022	217.84	120.76	16	101.19	48.10	42.21	97.08	85.19	-5.89	-11.89	4.26
10-12-2022	215.94	119.72	16	99.25	48.12	41.63	96.22	83.25	-6.49	-12.98	4.16
11-12-2022	213.79	118.77	16	106.57	48.04	45.79	95.02	90.57	-2.25	-4.45	4.53
12-12-2022	213.44	118.21	16	106.90	48.23	46.04	95.23	90.90	-2.19	-4.32	4.55
13-12-2022	211.41	117.76	16	106.22	47.93	46.17	93.65	90.22	-1.76	-3.43	4.51
14-12-2022	212.71	117.67	16	105.92	48.32	45.71	95.04	89.92	-2.60	-5.12	4.50
15-12-2022	210.89	116.83	16	104.52	48.26	45.42	94.07	88.52	-2.85	-5.55	4.43
16-12-2022	211.36	117.46	16	103.15	48.06	44.61	93.90	87.15	-3.45	-6.74	4.36
17-12-2022	218.67	120.86	16	104.73	48.26	43.78	97.80	88.73	-4.48	-9.07	4.44
28-12-2022	234.43	146.79	16	124.16	40.12	49.52	87.64	108.16	9.39	20.52	5.41
29-12-2022	180.41	118.19	16	98.04	37.85	49.90	62.23	82.04	12.05	19.81	4.10
30-12-2022	139.27	89.88	16	72.23	40.07	45.61	49.39	56.23	5.54	6.83	2.81
31-12-2022	229.77	145.19	16	120.70	39.57	48.98	84.58	104.70	9.41	20.12	5.24
Average	212.76	120.46	16.00	101.75	46.75	43.67	92.30	85.75	-3.08	-6.55	4.29

Replacement of old inefficient Air Preheater with Efficient Air Pre-heater system

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APH performance @ Jan'23 (After shut)											
Date	Flue Gas temprature		Air temprature		APH Efficiency		Difference			Temprature Gain/loss	Contribution in boiler Efficiency (%)
	Inlet(Deg. C)	Outlet (Deg. C)	Inlet (Deg. C)	Outlet (Deg. C)	Flue gas side(%)	Air side(%)	Flue gas (Deg. C)	Air(Deg. C)	Efficiency		
01-01-2023	218	138	16	120	39.60	51.49	80	104	11.88	24	5.20
02-01-2023	228	140	16	112	41.51	45.28	88	96	3.77	8	4.80
03-01-2023	230	145	16	117	39.72	47.20	85	101	7.48	16	5.05
04-01-2023	228	145	16	118	39.15	48.11	83	102	8.96	19	5.10
05-01-2023	232	146	16	120	39.81	48.15	86	104	8.33	18	5.20
06-01-2023	230	145	16	117	39.72	47.20	85	101	7.48	16	5.05
07-01-2023	224	142	16	115	39.42	47.60	82	99	8.17	17	4.95
08-01-2023	223	142	16	117	39.13	48.79	81	101	9.66	20	5.05
09-01-2023	223	142	16	116	39.13	48.31	81	100	9.18	19	5.00
10-01-2023	218	134	16	117	41.58	50.00	84	101	8.42	17	5.05
11-01-2023	224	142	16	119	39.42	49.52	82	103	10.10	21	5.15
12-01-2023	224	141	16	118	39.90	49.04	83	102	9.13	19	5.10
13-01-2023	218	138	16	117	39.60	50.00	80	101	10.40	21	5.05
14-01-2023	220	140	16	116	39.22	49.02	80	100	9.80	20	5.00
15-01-2023	216	134	16	117	41.00	50.50	82	101	9.50	19	5.05
Average	223.73	140.93	16.00	117.07	39.86	48.68	82.80	101.07	8.82	18.27	5.05

Replacement of old Inefficient Air Preheater With Efficient Air Pre-heater System

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Description & Details of Project:

- APH bottom module tubes was laying in worn out conditions and for the same area cast able was applied all around at worn out areas for its safety. The failure takes place at inlet end of tubes within a distance of 300mm, APH tubes are subjected to vortex erosion when flue gas passes through the tubes and this happens only in ash containing fuels such as coal with flue gas flowing through tubes.
- With fuels containing Sulphur, the acid formation takes place and the corrosion is accelerated, the temperature of the APH tubes will be closer to ambient temperature at air inlet section, the sweating of tubes here promotes corrosion spots, the ash in flue gas also deposite at this points and leads to choking of the tubes. to overcome unscheduled shut down frequently due to failure APH tubes it is to be replaced on time.
- Previously it was replaced in April'2016 and Purchase lead time is approximate 6 to 8 months for material supply, need to start process of procurement so that material is available on site and this can be replaced with plant shut as per plan schedule. In last shutdown in 2018, it was checked and found that the several holes are developed in tubes.

Project Benefits (Summary)

Present Status :	Benefits After Implementation: Monetary Benefits included
1. 100 TPH APH tubes are damaged 2. High air consumption leading to high aux. power consumption. 3. Low boiler efficiency.	1. Better boiler efficiency 2. Energy saving in terms of air and fuel. 3. Low air consumption and reduction in aux power consumption.

ROI / Payback

Saving in terms of fuel will be approx 180 Lacs/annum and power reduction will be 250 kwh which makes it approx 120 Lacs/annum.

Estimated Project Cost (INR)

Total Cost of Project: 184 Lacs			

Period

Start date	Jan-22
End date	Dec-22
Total Period	11 Months

Replacement of Standard Efficiency IE1 / Re-wound Motors with Premium Efficiency IE3 Motors

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❖ Background

- "Critical motor replacement study"
- Standard Efficiency IE1 Motors
- Motors rewound more than 3 times identified
- Low efficiency
- High electrical energy consumption

❖ Improvement

- Replaced with Premium Efficiency IE3 motors.
- More energy efficient
- Low electrical energy consumption

❖ Benefits

The above proposal resulted in annual savings of **6.48 Lac kWh** resulting in savings of **INR 43.0 Lacs** annually and required an initial investment of **INR 94.0 Lacs.**

Replacement of Standard Efficiency IE1 / Re-wound Motors with Premium Efficiency IE3 Motors

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Area	EQUIPMENT NAME	Motor KW	Motor RPM	Application	Eff.Old %	IE 3 Eff %
PM 1	Fan Pump No. 5	45	1,500	Pump	91.5	94.2
PM 1	Fan Pump No. 7	37	1,500	Pump	91.5	93.9
PM 1	Fan Pump No. 8	37	1,500	Pump	91.5	93.9
PM 1	Pressure Screen no.1	37	1,500	Screen	91.5	93.9
PM 1	Mould Blower No.2	55	1,500	Blower	92	94.7
PM 1	Coating Blower No. 1	75	1,500	Blower	92.5	95
PM 1	Broke Pulper	75	1,000	PULPER	92	94.6
PM 1	Pope reel	75	1,500	SECTIONAL DRIVE	92.5	95
PM 1	Broke Tower pump	45	1,500	Pump	91.5	94.6
PM 2	Broke pulper agitator	45	1,000	PULPER	91.5	93.7
PM 2	Old T/C Coating Blower 4	45	1,500	Blower	91.5	94.6
PM 2	Trim Blower for rewinder	30	3,000	Blower	89	93.8
PM 2	Chest Pump No. 7	30	3,000	Pump	89	93.8
PM 2	UTM Pit No.2 Agitator	75	960	PULPER	91.6	94.6
FILLER PLANT	F/L T.D.R 24"	260	1,000	REFINER	92	96
FILLER PLANT	P/L. Mixing Chest No. 4 Pump stand by Top Plant	37	1,500	Pump	91.5	93.9
FILLER PLANT	Chest Pump No.1	30	1,500	Pump	91	93.8
SFT	Intensa Maxx Drive	75	1,500	Pump	92.5	95
SFT	Contaminax Drive	75	1,500	Pump	92.5	95
SFT	Stock preparation dilution pump	75	1,500	Pump	92.5	95
SFT	Pulper dilution pump	75	1,500	Pump	92.5	95
SFT	DF shower pump	75	3,000	Pump	92	94.7
BOTTOM PLANT	Krofta Feed Pump No.1	30	1,500	Pump	91	93.8
utility-1	High Pressure Desuper he	55	2,975	Pump	92	94.3
utility-1	Desuper Heating Pump-2	55	2,900	Pump	92	94.3
utility-1	Cooling Tower Fan -1	37	1,500	Fan	91.5	93.7
utility-1	Cooling Tower Fan- 3	37	1,500	Fan	91.5	93.7
utility-1	Cooling Tower Fan-4	37	1,500	Fan	91.5	93.7

List of Replaced Motors

Summary of on-going projects at KPML

Project	Proposed Benefits	Estimated Saving (Lacs/annum)	Target Date/Status
Replacement of 17.5 MW STG with 23.3 MW.	Increased power generation with improved efficient Turbine	2523 (collaborative saving)	April 2024
100 TPH BOP Equipment	Increased Steam generation		April 2024
100 TPH Boiler Pressure Part Replacement	Sustainability		April 2024
100 TPH ESP Up-gradation	Increased plant reliability		April 2024
New Cooling Tower 6000m3	To cater new 23.3 MW and 6.5 MW STG		April 2024
100 TPH Bed plate with nozzle replacement	Better Fluidization	79.5	April 2024
70 TPH CHP Up-gradation	Reduction in fugitive dust emission	Plant reliability	March 2024

Sludge Dryer

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Objective of the Project

1. To increase the dryness of paper waste sludge from 50% to 75% to consume in the boilers as a fuel.
2. To generate energy by using sludge as a fuel for boilers after mixing it with coal.
3. To consume waste paper sludge received from ETP.
4. **Investment: 509 Lacs (approx.)**
5. **Estimated Saving: 990 Lacs/annum.**

Incinerator: Waste to Energy Boiler

Objective of the Project

- To generate energy from waste plastic.
- To consume plastic waste produced by KPML which is 120-130 TPD.
- To safely disposing the plastic waste and getting gains from it by producing energy.

Present Status

Technical Finalization in Progress

Replacement of 17.5 MW STG with 23.3 MW

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Objective of the Project

- To enhance power generation with improved efficient Turbine.
- To increase efficiency of STG with less steam consumption in comparison to existing 17.5 MW.
- Existing turbine is having defects such as wear out of HP gland fins and inter-stage fins, steam leakage from parting plates, pitting on LP blades.
- **Investment: 3900 Lacs (approx.)**
- **Saving: 2523 Lacs/annum (Considering per unit rate 7.5)**

Grid Islanding Project

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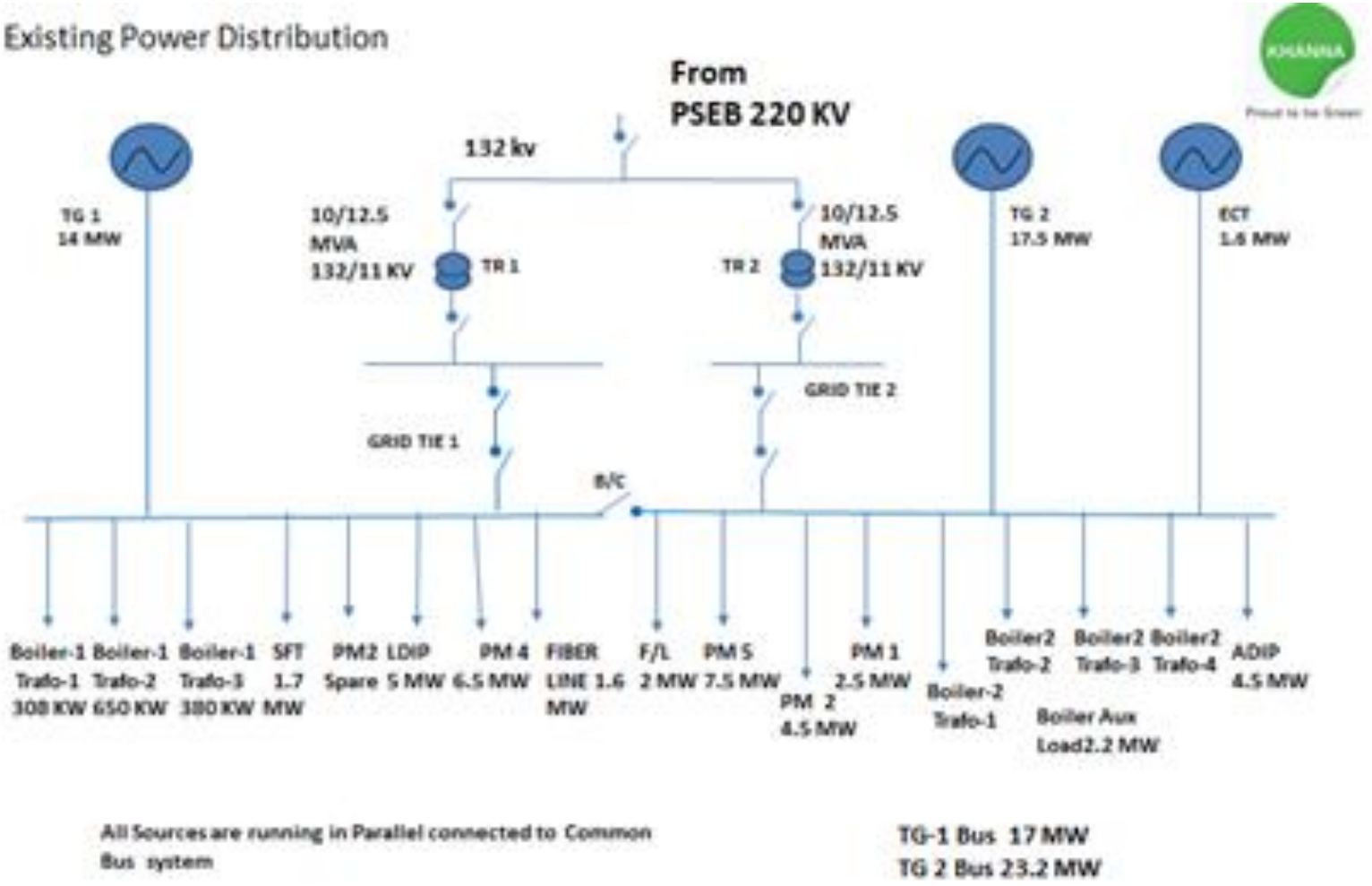
❖ **Background**

- All plant loads connected on the same network
- Separate load on the grid was not possible due to constraint of the distribution network.
- TG and Grid running in parallel mode
- Any disturbances in the Grid network resulted in disturbances in the TGs
- Loss of production amounting to huge financial loss

❖ **Improvement**

- Grid Islanding and protection systems
- Planned in Mar’24 shutdown
- Isolate the in-house generator in case of fluctuations happened on the grid side.
- Prevent blackouts, production and financial loss.
- Energy saving as the TG run at lower frequency
- Reduction of fault levels in the system
- Increased life of the switchgear.

Grid Islanding Project



SLD POWER DISTRIBUTION/GENERATION SYSTEM

Grid Islanding Project

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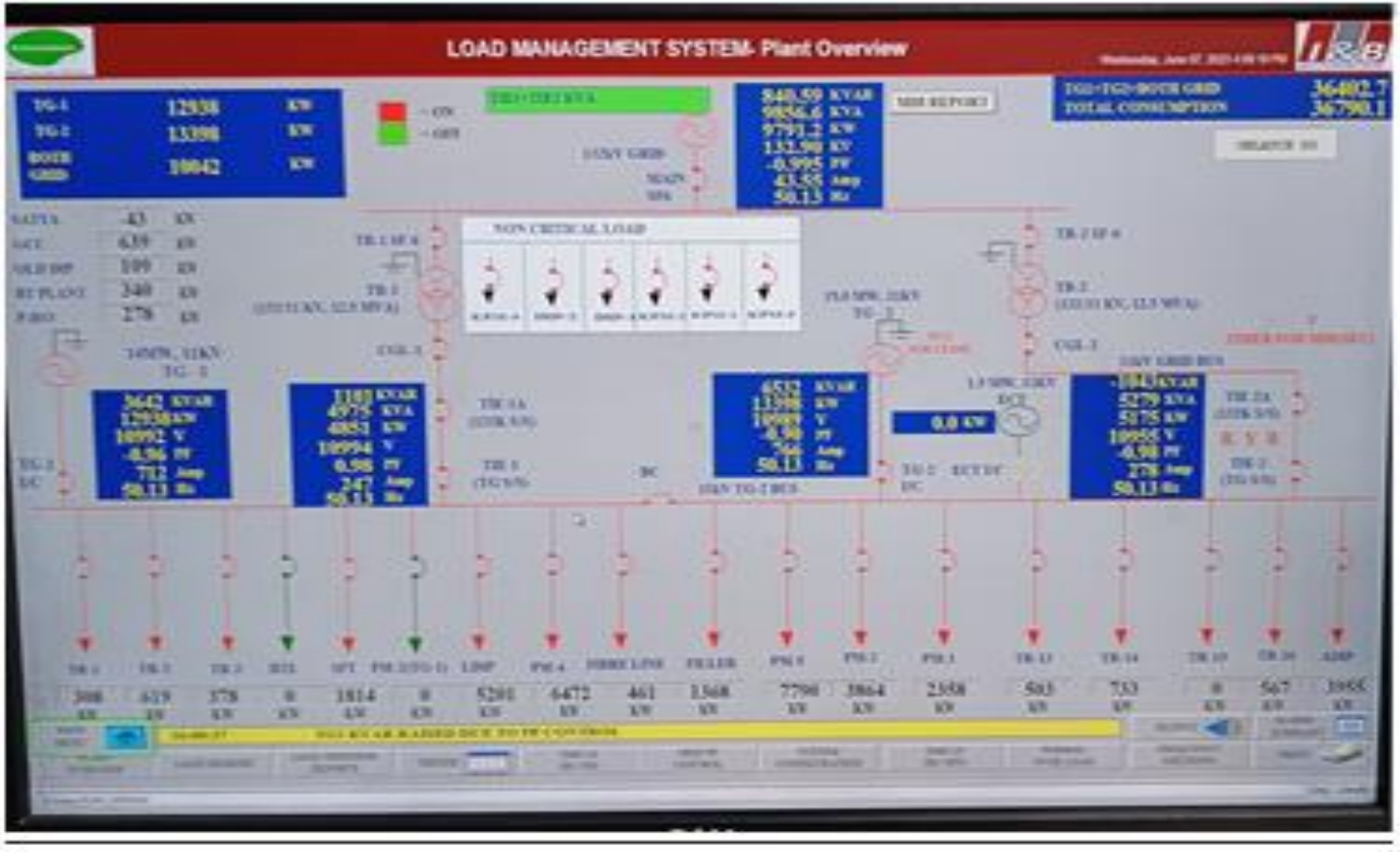
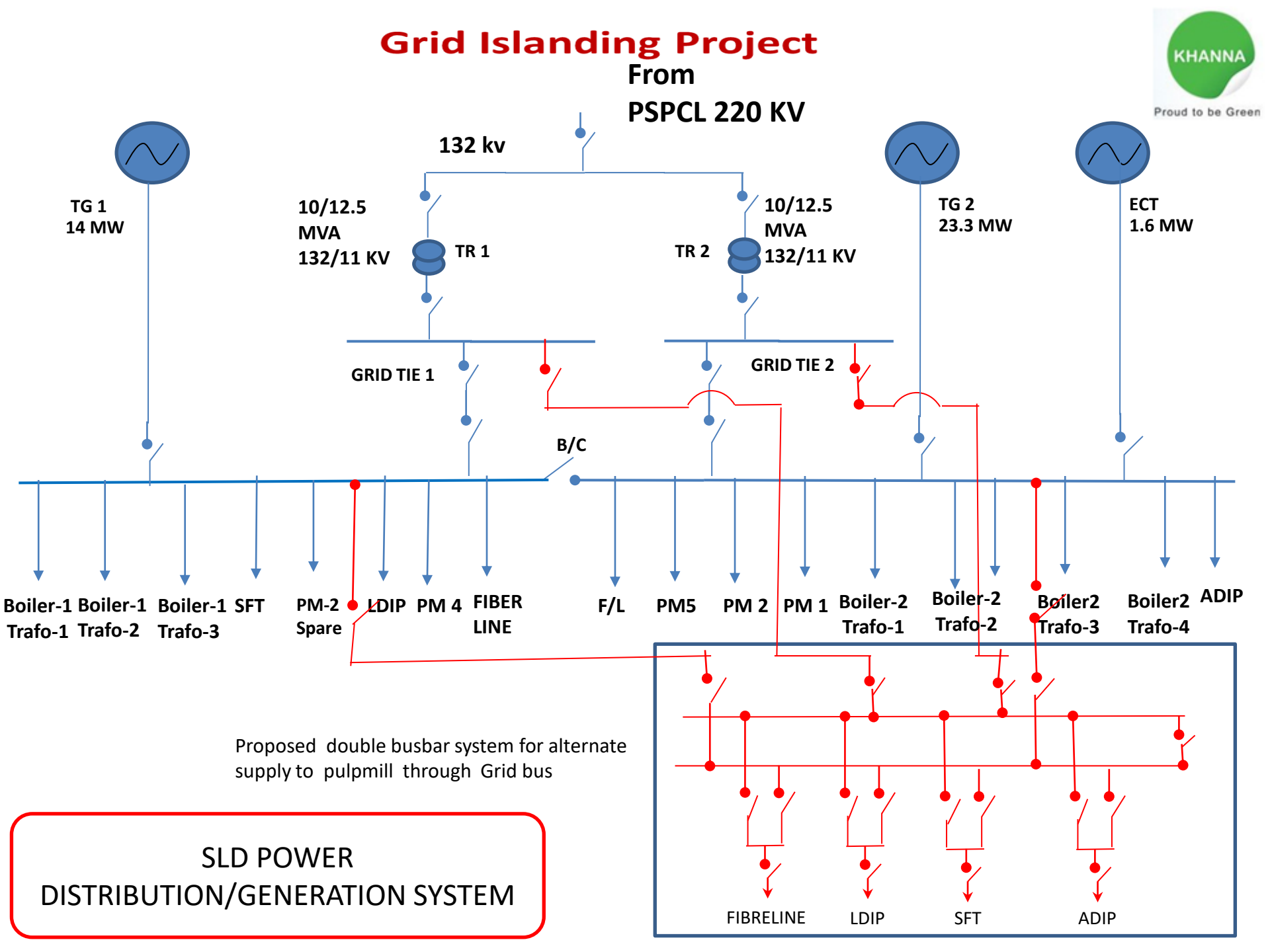


Grid Islanding Project



Proposed double busbar system for alternate supply to pulpmill through Grid bus

SLD POWER
DISTRIBUTION/GENERATION SYSTEM

Grid Islanding Project

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Project Benefits (Summary)	
Present Status :	**Benefits After Implementation: Monetary Benefits included**
1)In existing power distribution all plants are connected to same network and separate load on Grid is not possible due constraint of distribution network. 2.During any disturbances in Grid network disturbances are recorded in TGs also. We have provided Grid islanding relay to sense the grid disturbances and isolate the Grid bus immediately. Due to this machine also affected due voltage surges. This leads to failure of Electronic devices like drives, PLC Cards, loss of chemicals during black out conditions, Quality issue.	If we can separate some load from TG bus and if we can get flexibility to run the different pulp mill on TG or Grid as per requirement then we will get following advantages. 1.Machine stoppage due to grid disturbances can be avoided. 2. TG tripping due to grid disturbance can be avoided. 3. TG can be run at lower frequency it may leads to Energy saving. 4. System fault level also reduced leading to increase in life of switchgear. **Tangible benefits** **TG-1 run in parallel with Grid and TG-2 run in island mode** Power saving of 6% through frequency reduction by 1 Hz (50 Hz to 49 Hz) If TG-2 is running at 49.0 Hz power saving by reducing 1 Hz is 900 KW Energy saving = 15000*0.06=900 KW For 320 Days = 900*320*24=6912 MWh Saving considering grid charges 7.5 Rs/Unit = 518 lacs Production and quality loss due to black out situation - 50 lacs Electronic card and drive failure spare cost due to Grid fluctuation- 50 lacs Total saving- 618 lacs

ROI / Payback
0.7 years

Estimated Project Cost (INR)			
Machinery Cost	**20 Lacs**	**Electrical cost**	**230 lacs**
Total Cost of Project:	**250 Lacs**		

Period			
Start date	10.08.23	End date	15.04.24
Total Period	8.5 Months		

Replacement of Liquid Ring Vacuum Pumps with Energy efficient Turbo Blowers

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- **Background**
  - Conventional Liquid Ring Vacuum Pumps used in mould, wire and the press section
  - High operating costs
  - High pulsation/variation
  - Maximum efficiency is about 70%Motors
  - Sealing water
  - Anti-scaling Chemicals
  - Max. life 10 Years
- **Improvement**
  - More Energy Efficient (85% efficiency)
  - Constant pulsation
  - Smooth Operation
  - No Sealing Water
  - No Anti-scaling chemicals
  - Additional buildup of 15% of more capacity
  - 20 Years Life

Replacement of liquid Ring Vacuum Pumps With Energy Efficient Turbo Blowers

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The Wire & press part of the PM4 uses conventional vacuum pump, these vacuum pumps have high operating cost & more pulsation/variation in the vacuum system resulting in complex operation & affecting the runnability of the machine. We propose to replace these conventional vacuum pumps with Turbo blower which operates on constant pulsation resulting in low variation in vacuum system which ultimately results in smooth operation of machine. Additionally it also consumes less power compare to the conventional vacuum pumps.

Project Benefits (Summary)

Present Status :	Benefits After Implementation: Monetary Benefits included
1. Existing power consumption is about 1275Kwh for vacuum system	1.Revised power consumption will be about 1110Kwh for vacuum system, having a potential saving of 165Kwh
2.Vacuum pump exhaust from seal pit is open to atmosphere due to low temperature	2.Turbo blower exhaust high temperature dry air can be used for headting in PV Blower system, having potential to save 0.045Ton of steam /Ton of Paper.
3.Because of the breaks the efficiency of the machine with existing vacuum pump or upgrading these vacuum pumps remains the same.	3.The efficiency of machine will be improved by low no of breaks, having a potential improvement in machine by 0.5%
4.Exsiting vacuum pumps has efficiency to maximum 70%	4. The Turbo blower has inherent additional buildup of 15% of more capacity and new Turbo blower is having 85% efficiency.
5.High sealing water consumption requires additional clear water.	5.No sealing water consumption.
6.Antiscaling chemical is additionally required for sealing water system	6. No antiscaling chemical required.
7. High inventory due high number of equipments & consumables	7.Low inventory due to less equipments & less consumables.
8.Complex piping design & prone to more failiure	8.Simple piping design & less piping
9. Life of existing vacuum pumps is maximum 10 years	9. Turboblower vacuum pumps is upto 20 years

ROI / Payback

1.83 years / 22Months

Period

Start date	**Aug-23**
End Date	**April-24**

Replacement of Liquid Ring Vacuum Pumps with Energy efficient Turbo Blowers

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❖ **Benefits**

- Annual Power savings : INR 103 Lacs
- Annual Steam Savings: 4455 MT amounting to INR 55.7 Lacs*
- Increased production with 0.5%efficiency increase in machine : INR 74.25 Lacs
- **Total Savings : INR 233.2 Lacs**
- **Net Investment: INR 427 Lacs**
- **Payback : 22 Months**

Other Energy Efficiency Initiatives (Completed)

Installation of VFD at Various Plant Areas

Project Description	Rated kW	Savings (kW).	Savings (MWh).	Monetary Savings (Lacs)	Investment (Lacs)
Installation of VFD in 1100 Drum Pulper Dilution Pump	110	20.5	164.0	9.35	Nil*
Installation of VFD in Dilution Pump ADIP (Andritz De-Inking Plant)	55	12.0	96.0	5.4	Nil*
Installation of VFD in stock feed to clear filtrate at LDIP (Lamort De Inking Plant)	55	16.0	128.0	7.29	Nil*
Installation of VFD in NP02 Prime Cell Floatation feed pump	200	37.3	288.0	17.5	Nil*
Installation of VFD in SPE 15 Screen Feed Pump	200	36.0	288.0	16.41	Nil*
Installation of VFD in Fractor Feed Pump in ADIP (Andritz De-Inking Plant)	250	45.8	367.0	20.92	Nil*
Installation of Drive Compressors for Ash Handling System	2 nos. of Compressors - 160 kW each	35	280	15.96	20.0
Installation of VFD at 100 TPH ID Fan	200	22	176.0	10.03	3.0

* Arranged In-house

Installation of VFD at Various Plant Areas

Project Description	Savings (kW)	Savings (MWh)	Monetary (Lacs)	Fuel Savings	Investment (Lacs)
Installation of efficient Coal Crusher at 100 TPH Boiler	36.0	293.0	21.0	-	19.0
Efficiency Improvement of 14 MW Turbine by overhauling	600	5040	378.0	-	120.0
Replacement of Air Pre Heater modules of 100 TPH Boiler	-	-	230.0	2100 MT/annum	120.0
Installation of Compressor and replacing inefficient ETP Blowers	40.0	35.0	23.0	-	45.0

Installation of Compressor and replacing inefficient ETP Blowers

Investment (Lacs)	Monetary Savings (Lacs)	kW Savings
45.0	21.0	40.0

Installation of VFD in
1. NP02 Prime Cell Floatation feed pump in ADIP 2. SPE 15 Screen Feed Pump

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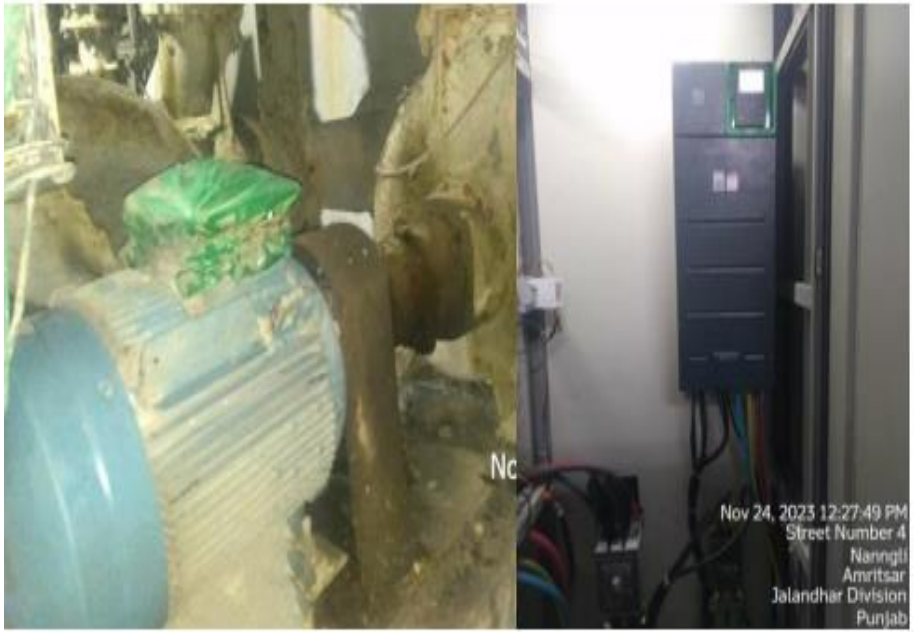
Investment (Lacs)	Monetary Savings (Lacs)	kW Savings
In house	17.5	37.3

Investment (Lacs)	Monetary Savings (Lacs)	kW Savings
In house	16.41	36.0

Installation of VFD in
1.Fractor Feed Pump in ADIP 2. in stock feed to clear filtrate at LDIP

Investment (Lacs)	Monetary Savings (Lacs)	kW Savings
In house	20.92	45.8



Investment (Lacs)	Monetary Savings (Lacs)	kW Savings
In house	7.29	16.0

Installation of Drive Compressors for Ash Handling System

KHANNA

Compressor 1

Compressor 2

KHANNA

Thank You

…….. For Patient Listening