




22nd National Award for Excellence in
Energy Management 2021

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1.0 About Plant – Last 20 years Performance



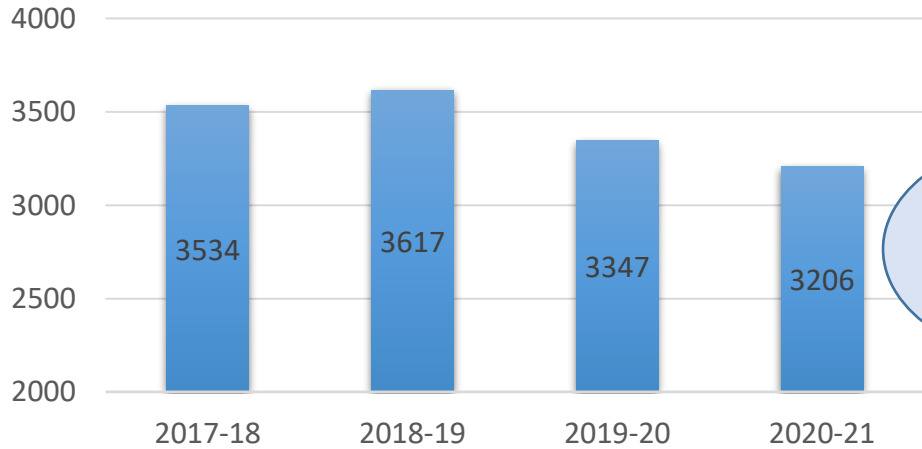
Description	Remark
Avg. Plant Load Factor (PLF)	92.90 %
Avg. Availability	95.00 %
Avg. Specific Oil consumption	0.116 ml/kwh
Aux Consumption without FGD	7.75 %
Aux Consumption with FGD	9.08 %
Heat Rate	2289 Kcal/kwh

ADTPS achieved Plant load factor > 100% For 9 financial year

2.0 Energy Consumption Overview

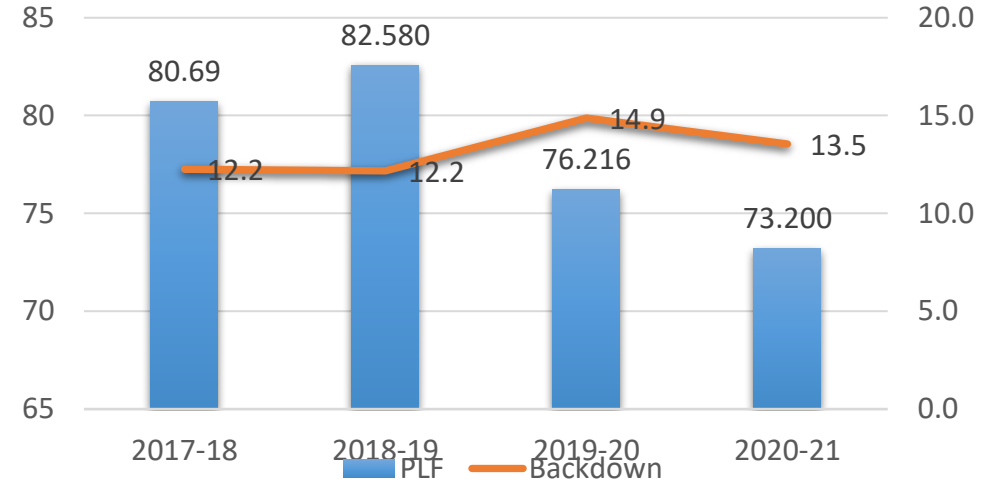
Energy Consumption Overview

Generation in MUs



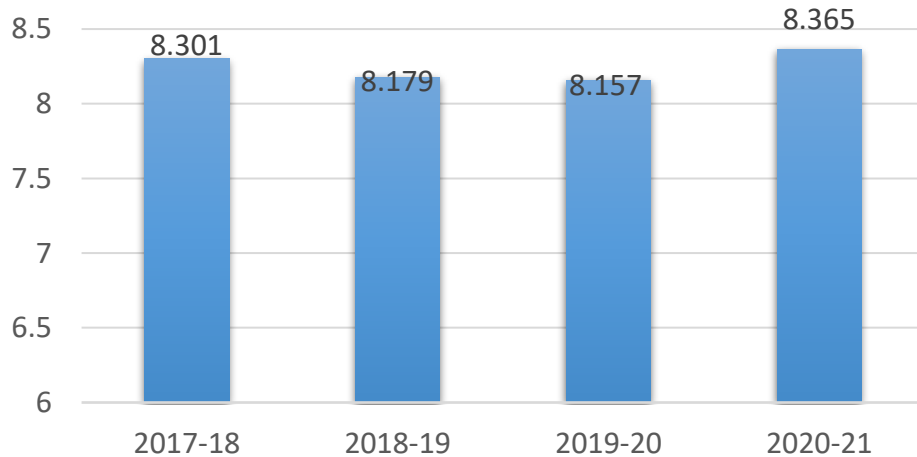
Additional PLF loss 11.30% due to Zero scheduling

PLF & Backdown in %

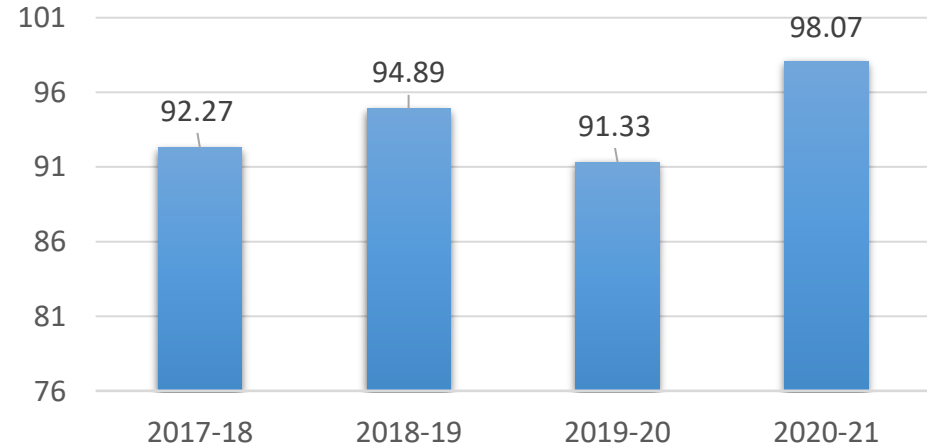


Backing down -592.959 MUs
U1 Zero Scheduling -494.627 MUs

Aux power consumption in %

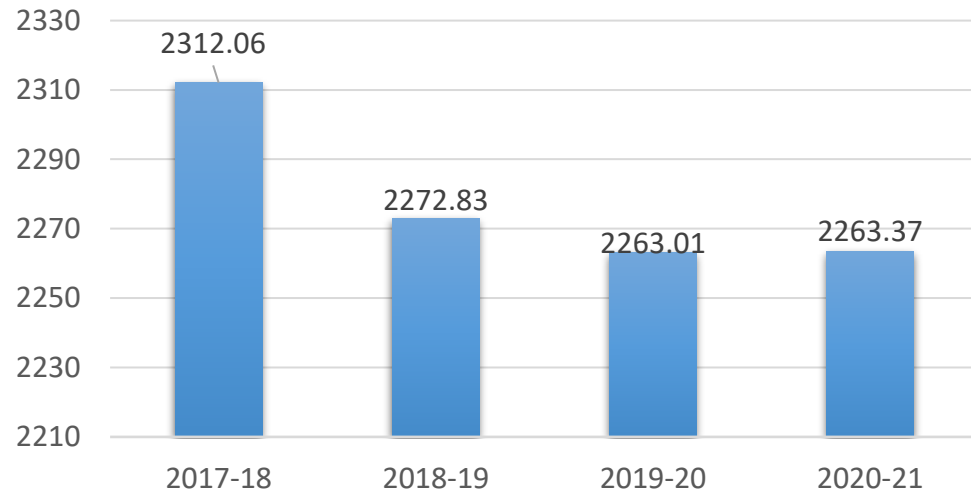


O&M Availability in %

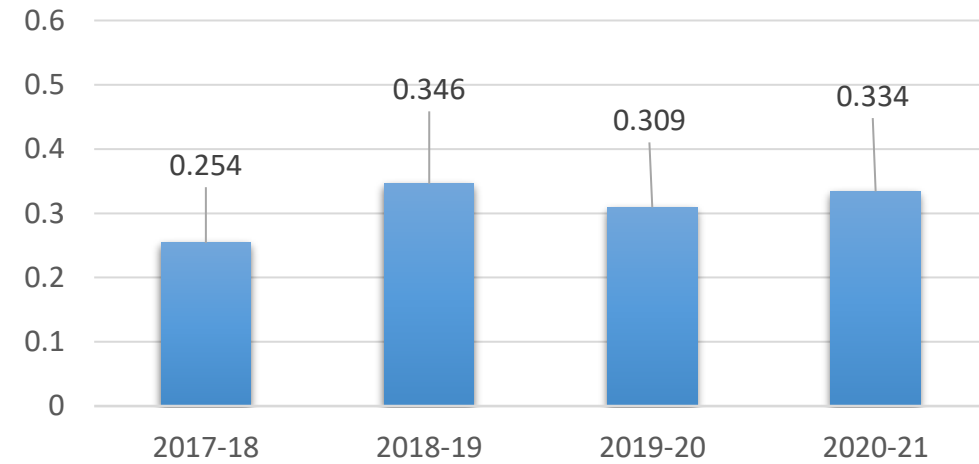


Energy Consumption Overview

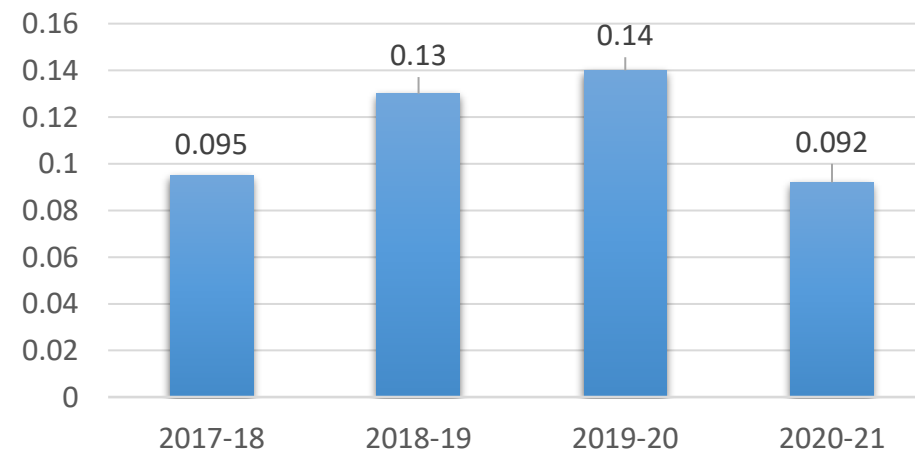
Heat Rate in Kcal/KWh



DM Water Consumption in %



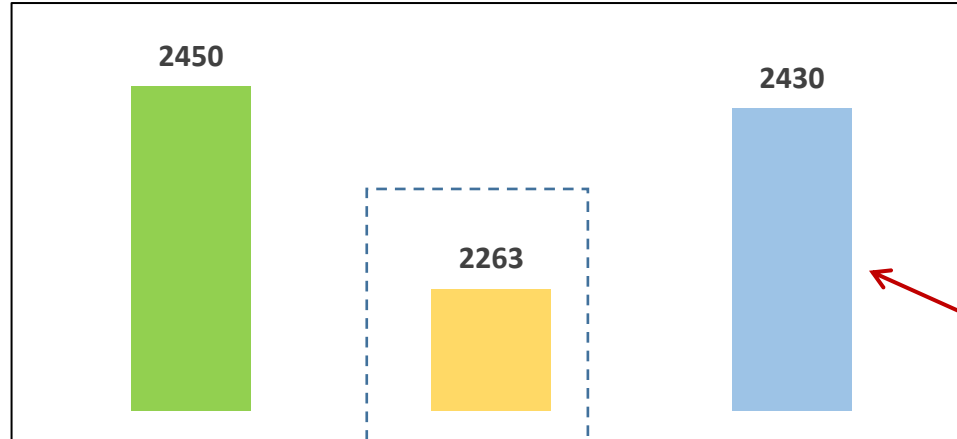
Sp. Oil consumption in ml/KWh



3.0 Information on Internal / National & Global benchmark

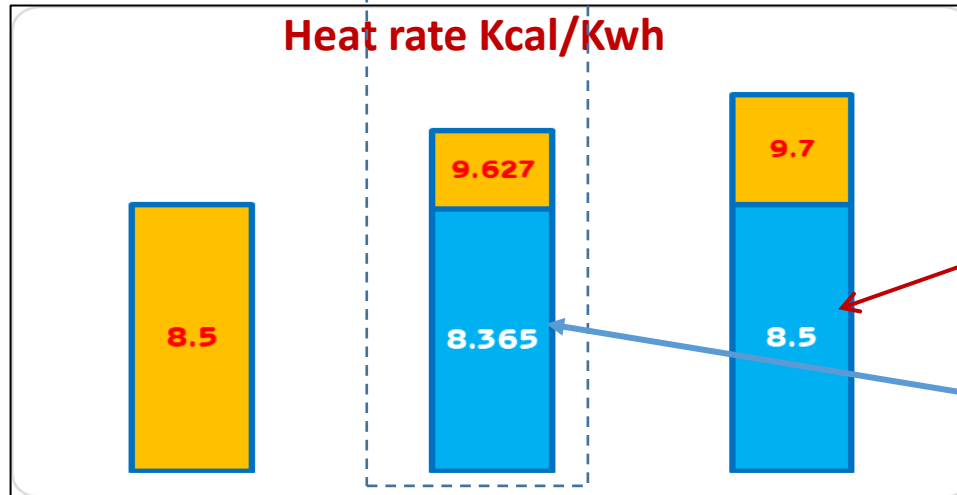
Benchmarking

ADTPS FY 20-21



MERC MYT Target	
Heat rate	2430 kcal/kwh
Aux Power	8.5 % + 1.2 % for FGD

MERC SEC Target for FY Year 2020-21



Without FGD

Aux Power consumption in %

Backing down by 592.959 MUs

National SEC Benchmark

Source- CEA Recommendations for thermal generating stations for tariff period 2019-24

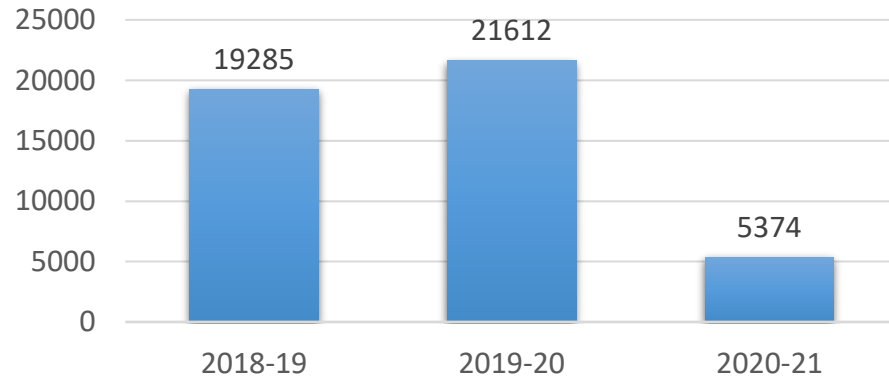
Bench Marking with Peer Companies for FY 2020-21

Description	UoM	GWEL-Warora	JSW-Ratnagiri	ADTPS-Dahanu	RPG-Dhariwal	Lanco-Amarkantak	GKE-Kamalanga
Availability	%	84.13	73.57	98	98.28	94.12	85.16
PLF	%	74.86	58.97	73.2	80.46	86.93	77.16
Loading Factor	%	88.99	80.16	74.69	81.86	92.36	90.61
Aux. Power consumption	%	8.27	8.15	8.365	7.67	8.16	6.81
Sp. Oil consumption	mL/Kwh	0.15	0.09	0.09	0.05	0.09	0.15
DM Water Make-up	%	0.14	0.49	0.33	0.2	0.32	0.19
Heat Rate	Kcal/Kwh	2313	2346	2263	2332	2363	2323

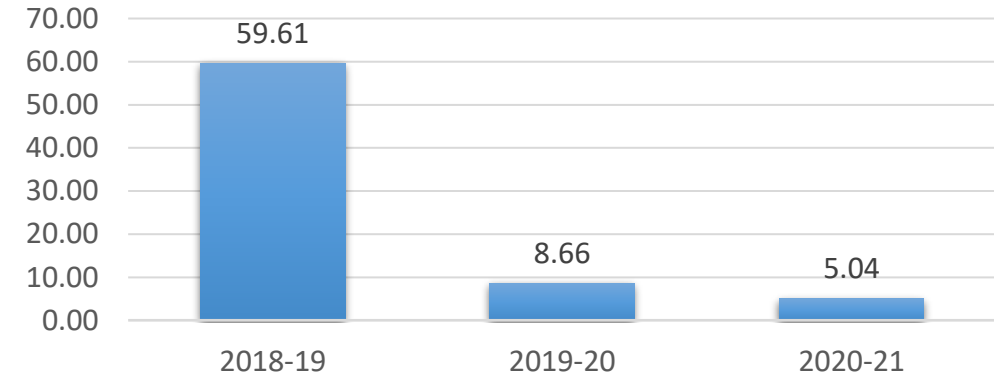
4.0 Energy Saving projects implemented in last 3 years

Summary of Investment and saving

Saving of coal in MT



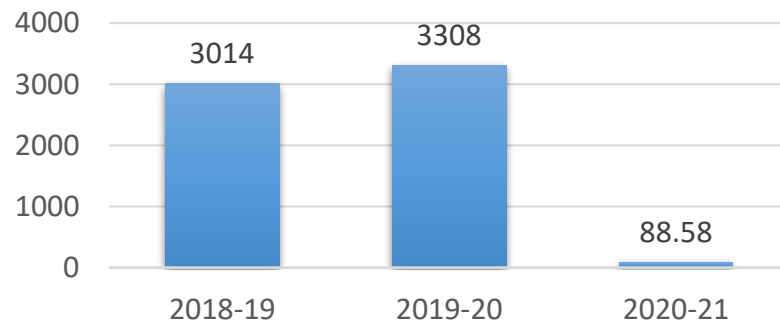
Energy saving in million KWh



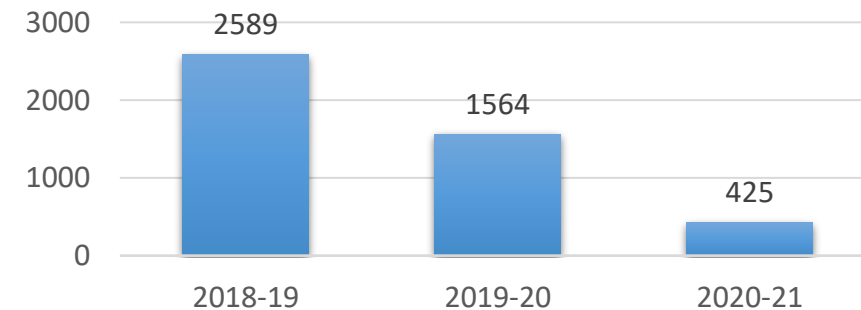
Coal saving in 3 Years – 46271 MT

Energy saving in 3 Years – 73,31 Million Kwh

Investment in Lacs



Saving in Lacs



Investments in 3 Years – 6410 Rs Lacs

Financial Impact in 3 Years – Rs 4578 Lacs

Energy Conservation Projects 2020-21

Energy Saving Project	Savings /Year (Rs. Lacs)	Investments (Rs. Lacs)
HP Heater Performance improvement by attending parting plate leakage	249.00	0.25
Replacement of BFP Cartridge in BFP 1A	160.60	58
Installation of Energy Efficient Lighting	15.70	30.33

Energy Conservation Projects 2019-20

Energy Saving Project	Savings /Year (Rs. Lacs)	Investments (Rs. Lacs)
Unit-2 Replacement of IP turbine by new one and Overhauling of LP Turbine.	1007	3212
Unit-2 Heat rate improvement due to HP Heater Performance attending of parting plate leakage	75	1
Unit-2 Air Preheater – Seals are upgraded by double seal and Flue gas duct leakage and replacement of flue gas duct expansion bellows	265	44
De – staging of impeller Condensate Extraction Pump in Unit-2	1	10
Installation of CEP VFD in Unit-1	33	40
Improvement in Heat rate by jet cleaning of APH basket in unit-2	183	0.75

Energy Conservation Projects 2018-19

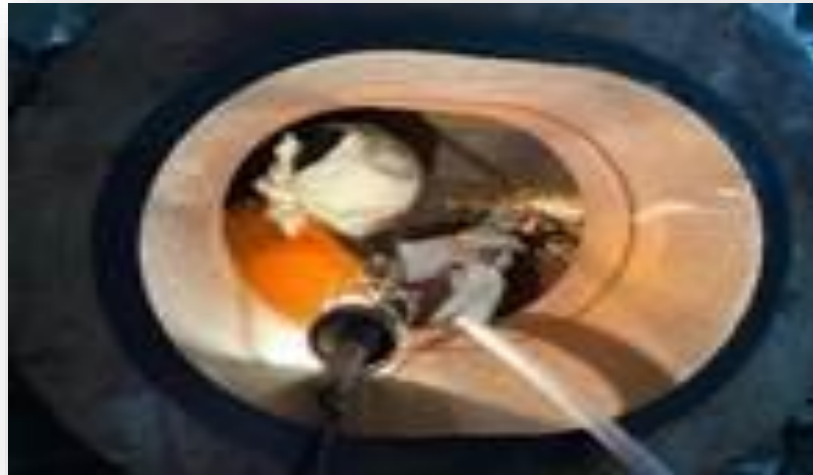
Energy Saving Project	Savings /Year (Rs. Lacs)	Investments (Rs. Lacs)
Renovating & Modernization of Unit-1 Air Preheater	224	500
Improvement in HP heater performance	344	12
Reduction in slip loss of BFP hydraulic coupling in U-1	333	91.8
Renovating & Modernization of Unit-1 Flue gas path duct	177	10
Replacement of HP Turbine by refurbished one. Overhaul of IP Turbine, LP Turbine in Unit-1 overhauling.	1216	2400
CW Pump running hrs optimization during backing down	295	0

5.0 Energy Saving projects

Project-1 HP Heater Performance improvement

HP Heater– Work Carried Out

1. Bottom plate welding joint grinding with pneumatic grinder and welding done.
2. Protective plate fabricated at heavy eroded area to strengthen Original parting plate.
3. Ensure seal welding and thoroughly inspection done before HPH box up.
4. Air pressure test carried out and observed satisfactory.



Photo



HPH-5 plate welding joint



HPH-5 LHS Outer side base plate eroded.



HPH-5 bottom base plate hole



HPH-6 bottom base plate

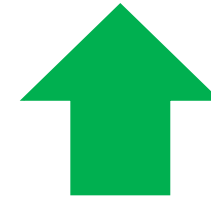


HPH-6 corner

HP Heater Performance Improvement

Parameters	UOM	Before Overhaul	After Overhaul
HP Heater feed water outlet temperature	°C	237.91	247.97

- Increase in FW Temp in HPH 5 & 6 – 10.06 °C
- Heat rate Gain - 7.85 Kcal/kwh



Net Benefits 2.7 Cr/Year

- Saving 1 Kcal/Kwh – 31.72 Lacs/Unit

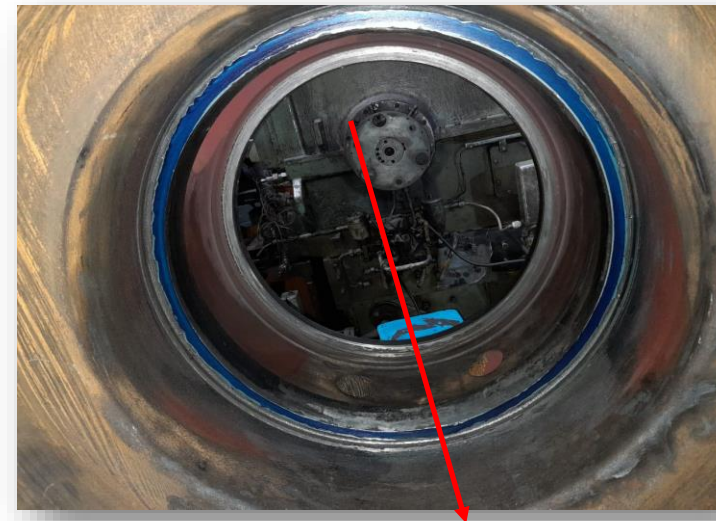
2 Replacement of BFP Cartridge in BFP 1A

BFP 1A – Work Carried Out

- Manual lapping done to achieved parrelality of abutment face
- 100% Contact area achieved
- Cartridge, Suction-Discharge, and copper coated gasket replaced.
- Pump float checked found ok.
- Alignment between main pump and Hydraulic coupling checked .



ABUTMENT FACE BLUE CONTACT AREA
BEFORE LAPPING

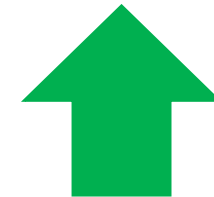


ABUTMENT FACE BLUE CONTACT AREA AFTER
LAPPING

Performance Improvement after cartridge replacement

Parameters	UOM	Before Overhaul	After Overhaul
Improvement in BFP Current	Amps	634	574

- Improvement in BFP Loading by – 582 KW
- APC Reduced by 0.41 %



Net Benefits 1.6 Cr/Year

Cost of Project 0.58 Cr

- Assuming Availability – 90 %
- Saving Cost 3.5 Rs/Kwh

Project -3 Installation of Energy Efficient Lighting

Renovation of lighting system by EE lights

Existing System

Conventional light fittings with high power consumption like 150W HPSV for street lighting, 70W for general illumination at plant & tunnel, 400W MH fittings for high bay and lighting towers, 40 W fluorescent tube lights at MCC & residences are in service

Proposed System

Replacement of conventional light fittings by energy efficient LED light fittings

Cost

- 30.33 Lakhs (Including GST)

Benefits

- Aux Power Reduction – 448 MWh per annum
- Financial benefit – 15.70 Lakhs / annum

Energy Cost- 3.5 Rs /Kwh

Energy Saving

Sr No	Description	No of fittings to be replaced	Saving in Watt per fitting	Per annum MWH
1	Replacement of HPSV general illumination fittings	770	45	151.76
2	Replacement of flood lights	50	575	125.92
3	Replacement of High bay lights	60	290	76.21
4	Replacement of fluorescent lights by LED	815	22	52.36
5	Replacement of Street lights - Plant	60	87	22.86
6	Replacement of Street lights - Colony	35	127	19.47
			Total Saving	448.58

Energy Efficiency Lighting in Plant Area

Turbine Area



Boiler Area



Unit-1 Energy Saving Project Carried out June 2021

Replacement of HP & IP Turbine - OH of LP Turbine



Refurbished HP turbine

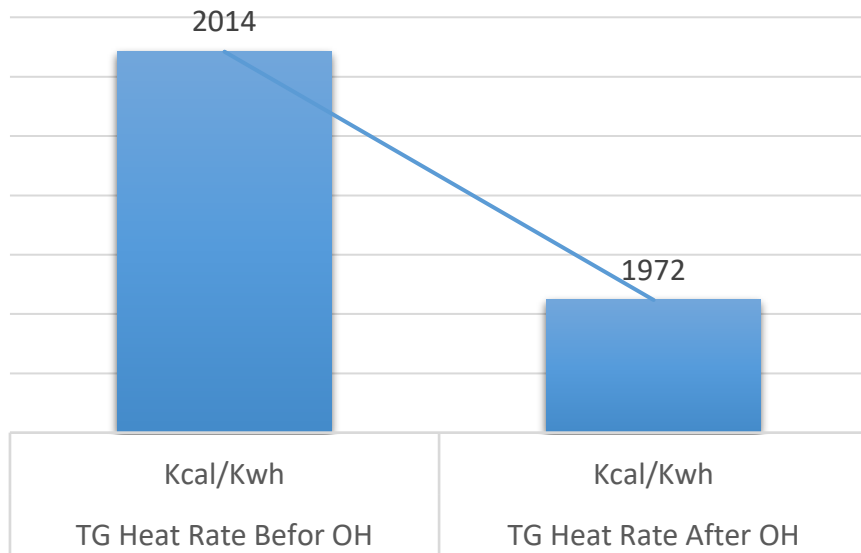


Refurbished IP turbine



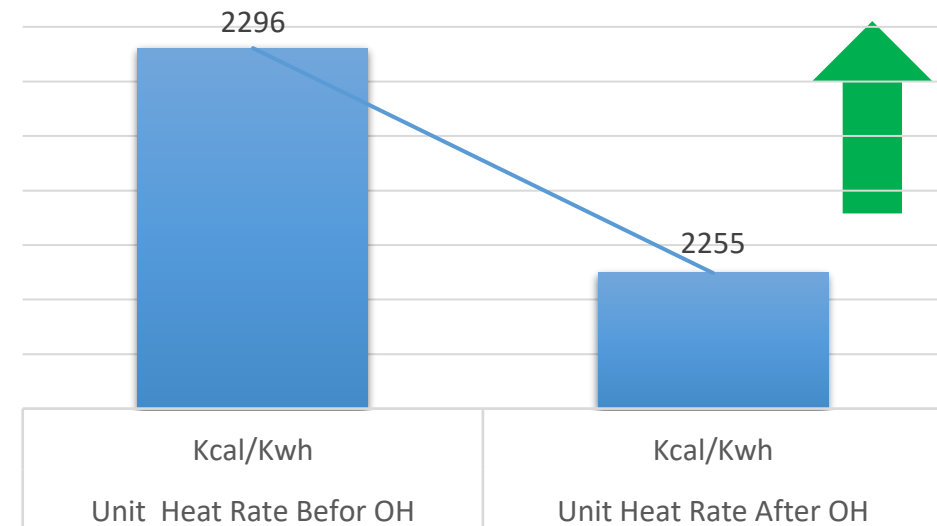
Servicing LP turbine

Performance improvement in Heat Rate



2.08 % Reduction in TG Heat Rate

1.80 % Reduction in Unit Heat Rate



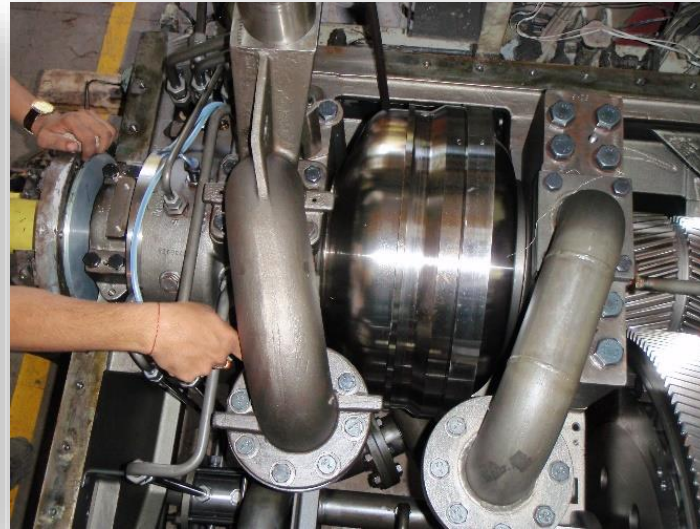
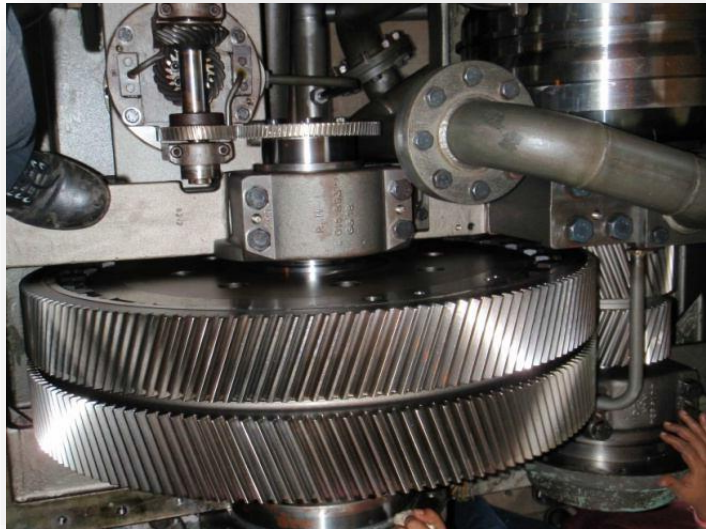
Net Saving in Unit Heat rate	Kcal/Kwh	41
Net Saving/Year	Rs Crs/Year	12.10
Investment	Rs Crs	16.57



Reduction in slip loss of BFP 1B hydraulic
coupling in U-1

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Auxiliary power reduction through innovative approach of reduction in gear ratio of boiler feed pump hydraulic coupling



Modified Gear ratio
retrofitted in existing
hydraulic coupling

Gear Ratio was changed
from 165/41 to 133/36

Reduction in Aux Power

Parameters	UOM	Before Overhaul	After Overhaul
Improvement in BFP Current	Amps	637.03	576.92

- Improvement in BFP Loading by – 584 KW
- APC Reduced by 0.11 %

Net Benefits 1.61 Rs Cr/Year

Cost of Project 1.05 Rs Cr

Pay Back Period – 8 Months

Auxiliary power reduction of 4.60 Mus / Year & gains are recurring

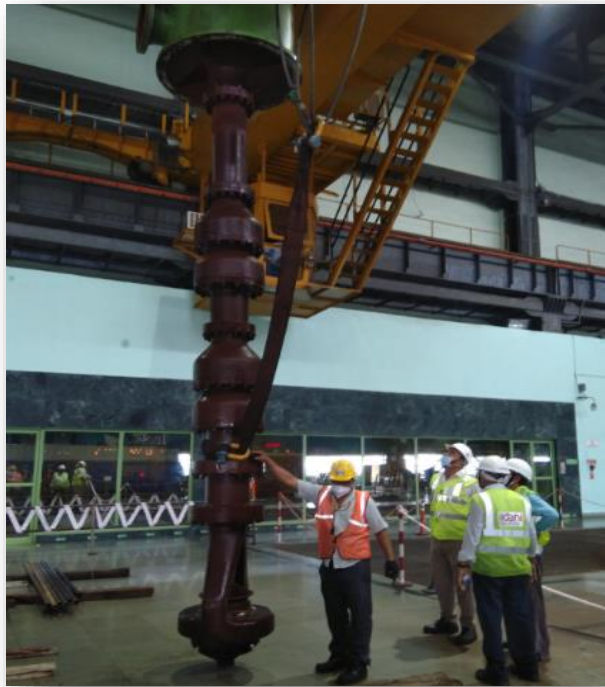


- Assuming Availability – 90 %
- Saving Cost 3.5 Rs/Kwh



De-staging of - CEP 1B

De-staging -CEP 1B



Parameters	UOM	Data
Net Saving	Amps	8.54
Net Saving /Year Assuming 10% Availability	Kwh	18173
Net Saving/Year	MUs	0.02
Net saving /Year	Rs Lacs	0.64
Project Cost	Rs Lacs	9



Installation of Coal Feeder VFD Drive
panel

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Installation of Coal Feeder VFD Drive panel



Parameters	UOM	Data
Net Saving	KW	6.75
Net Saving /Year Assuming 90% Availability	Kwh	53244
Net Saving/Year	MUs	0.05
Saving in Rs Lacs Assuming Saving Cost 3.5 Rs/Kwh	Rs Lacs	1.86

6.0 Renewable Energy

Installation of 55 KW solar Power at ADM Building



- FY 2020-21 Solar Generation -69800.36 Kwh
- FY 2020- 21 PLF – 14.49%
- Total Solar energy generation since inception -244022 Kwh

New Initiative

- ADTPS also identified place for installation of another **550 KW Roof Top solar (Project Cost @ 360 Lacs)**
- **Roof Top solar at AAQM station**
- In plant, 160MW solar power generation area identified. This will be reduced 149 Mus of auxiliary power consumption. (Assuming 17% PLF)

7.0 Environment Management-Ash Utilization

Dry Evacuation system 2005

It is the first of its kind of system installed in India. In classifiers – mixture of fly ash is separated into fine ash

Ash Gridding Unit 2011

First unit being used in the any power plant in Asia for improving coarse ash utilization

To grind the coarse ash into finer size of less than 45 μm , thus improved total ash utilization

300 MT Ash Storage Silo 2014-15

To counter day - to - day fly ash demand variation in availability of ash lifting vehicle

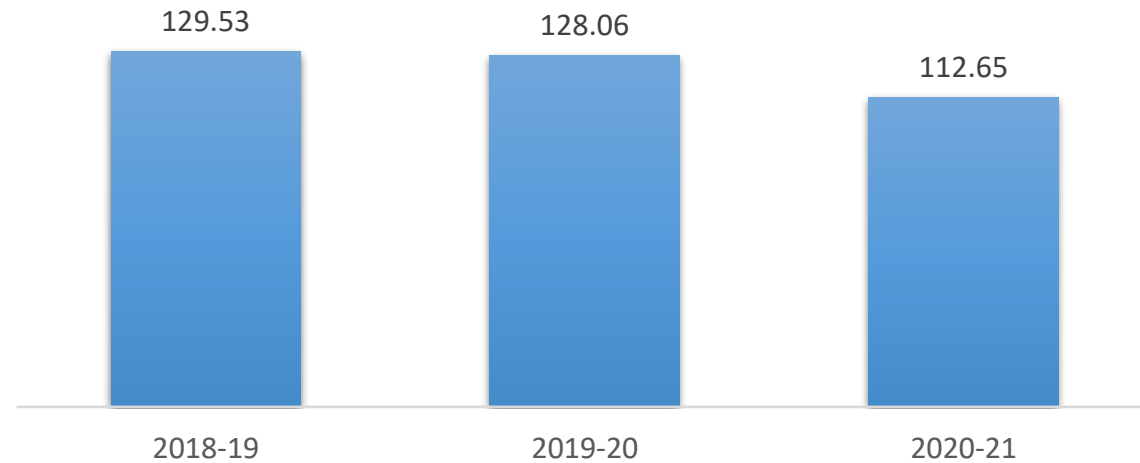
100% ash utilization since FY 2014

Dry Ash Silo's & Ash Grinding Unit

Fine & Coarse Ash Silo's



Ash Utilization in %



Ash Grinding Unit & 300 MT Silo



Particulars	UOM	2018-19	2019-20	2020-21
Ash Generated	Tons	564376	425076	375348
Ash Utilization	%	129.53	128.06	112.65
Ash Utilized in manufacturing of cement/concrete	%	64.58	68.35	56.18
Ash Utilized in Fly Ash Bricks	%	64.94	59.72	56.47

8.0 Environment Management Emission



- **India's First Energy Sector Sustainability Linked Bond** with legally binding ESG targets for renewable energy penetration and reduction of GHG emission intensity in line with COP26 goals.
- **Committed to the short-term target of reductions of Green House Gas (GHG) Emission Intensity by 60% from FY19 levels to stay in line with COP26 targets.**
- **AEML have publicly announced a target of 70% renewable penetration by 2030."**

Maharashtra Pollution Control Board
महाराष्ट्र प्रदूषण नियंत्रण मंडळ

Information Disclosure Program for
Air Pollution Abatement

Air Pollution Card

Dahanu Thermal Power Station

Very Good

Industry Description

MPCB Regional Office (RO) : Thane
Sub-Regional Office (SRO) : Tarapur II
Type : Red
Scale : Large
Sector : Power

Address

Dahanu, Agavan, Thane,
Maharashtra

What does the rating mean?

Better Performing plants (i.e. plants with lower particulate matter (PM) concentration in stack emissions) get more stars. A 4-star or 5-star rating implies that most of the recent stack samples of the plant report PM emissions below a standard of 150mg/Nm3. A plant's star rating also benchmarks its relative performance: as of ratings date, 38 percent of rated plants have done better (received 4 or 5 stars) and 43 percent of rated plants have done worse (received 1 or 2 stars).

Star Rating Key

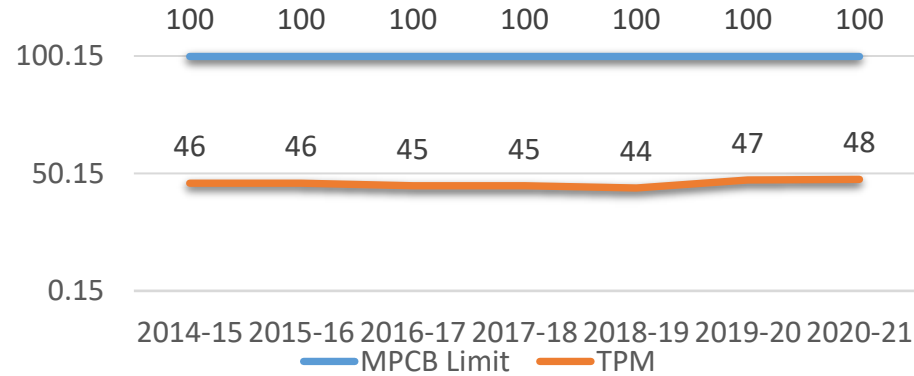
Very Poor Poor Moderate Good Very Good

Adani Dahanu Thermal Power Plant operating in Eco Sensitive Zone and complying stringent Environmental Norms

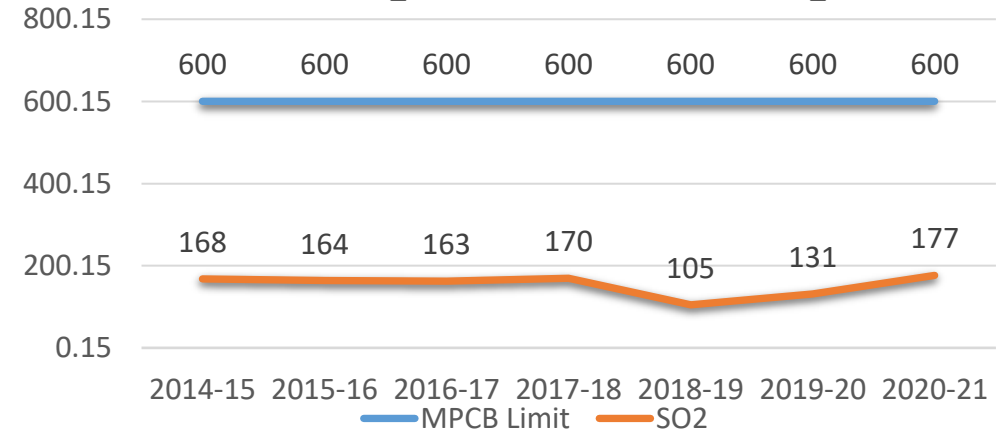
Rated in 5-star category by MPCB for consecutive 03 years.

Stack Parameters

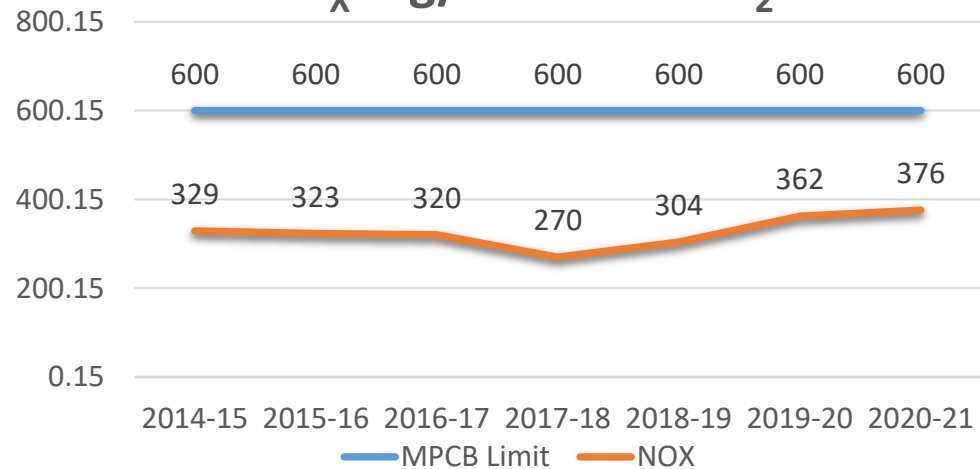
TPM mg/Nm³ at 6% O₂



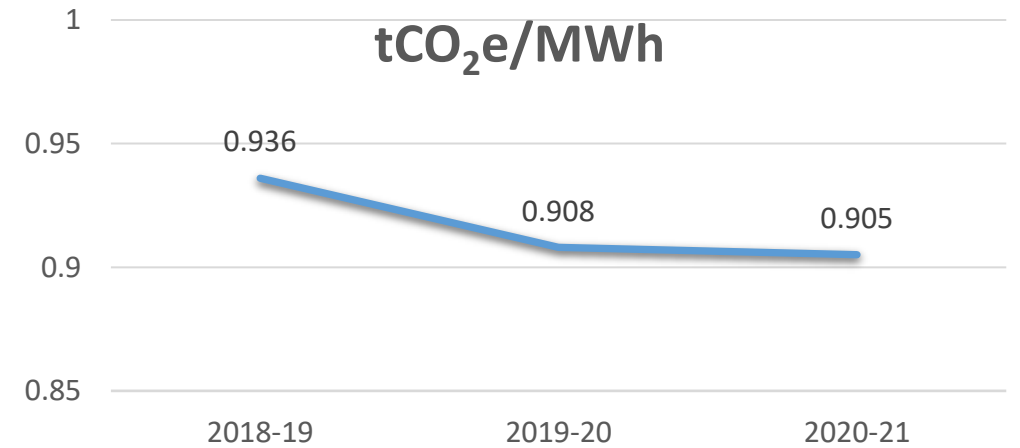
SO₂ mg/Nm³ at 6% O₂



NO_x mg/Nm³ at 6% O₂



Reduction in GHG Emission tCO₂e/MWh



PAT -2 Cycle

FORM B
(See rule 5)

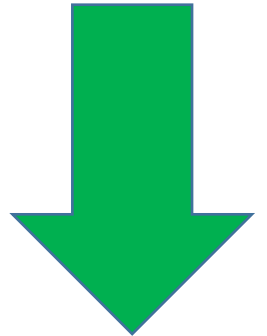
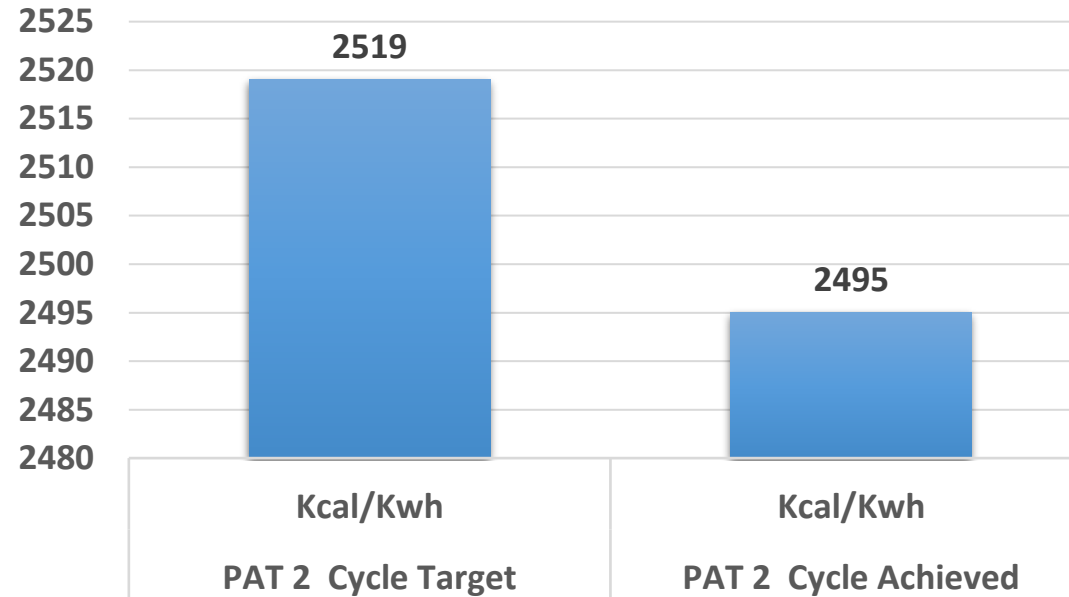
CERTIFICATION OF VERIFICATION

I/We Mr.G.Subramanyam (Director of Siri Exergy and Carbon Advisory Services Pvt Limited, Hyderabad, the Accredited Energy Auditor, have undertaken a through independent evaluation of the activities undertaken by M/s. ADANI ELECTRICITY MUMBAI LTD.ADANI DAHANU THERMAL POWER STATION.P.O-AGWAN,Palghar, Maharashtra-401608 – TPP0073MH a designated consumer for compliance with the energy consumption norms and standards specified under the Government of India Ministry of Power notification number S.O.1264(E) dated 31/03/2016 the during target year compared to the baseline year and consequent entitlement requirement of energy savings certificates and certify that-

The verification of the data collection in relation to energy consumed and specific energy Consumption per unit of production in the baseline year and in the target year in Form1 under Rules 2007 or Rules 2008, has been carried out diligently and truthfully;

- (a) The verification of the identified energy efficiency measures, and the progress of their Implementation given in Form II and Form III under Rules 2008 has been carried out diligently and truthfully;
- (b) The verification of the compliance with energy consumption norms and standards during the target Year has been carried out diligently and truthfully;
- (c) the verification of the total amount of energy saved, year-wise after the baseline year and until target year or otherwise and request made by the designated consumer, the Entitlement of (+) 8749 (Nos) energy savings certificate (s) required to be issued have been carried out diligently and truthfully.

Station Net Heat Rate in Kcal/Kwh



Reduction in
SHNR by 24
Kcal/Kwh

M/S Siri Exergy, an AEA has carried out M&V audit and recommended **8749** Escerts for achieving better net heat rate than the target under PAT cycle – II .

ADTPS had similarly achieved **4591** Escerts during the PAT cycle – I in FY 2014-15.

Emissions much lower than norms

- Flue Gas Desulphurization (FGD) plant for Sox removal
- Air Quality monitoring system

Efficient Plant Performance

- Best in Class:
 - Station Heat Rate
 - Aux Consumption
 - Sp Oil Consumption



Green belt development

- Coal blending (80:20)
- 100% Fly ash utilization (cement blocks)
- Horticulture
- Vegetation
- Rain water harvesting

Lowering Carbon Footprint



Installation of Online Ash Analyzer to monitor Ash % in coal



Online emission & effluent data connectivity to CPCB & MPCB portal



Installation of FGD in FY 2007 and ESP since inception



100% ash utilization since FY 2014

Go Green Initiative –

Electric Vehicles for Business Travel.



ISO 46001 Certification

Water Efficiency Management system



- Mapping all usage of water
- Define Limits and control
- Metering
- FY Target – Reduction of 10% from base line



EVERY DROP COUNTS!



Use of Drip Irrigation in entire Horticulture

• Ground Water Table Enhancement

- ❖ Bore wells
- ❖ Artificial ponds
- ❖ Collection of roof drains

• Process Water optimization

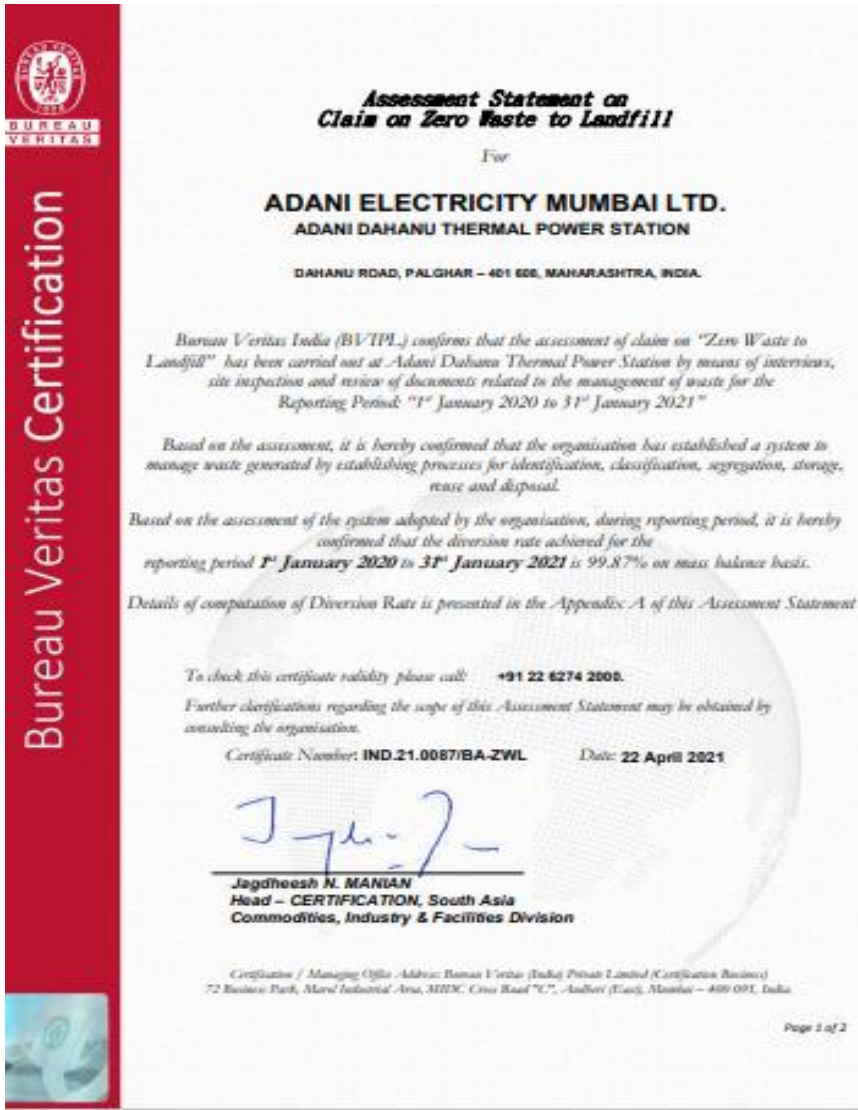
- ❖ Reuse of sample drains
- ❖ Blow down optimization

• Treated Sewage Effluent Utilization

- ❖ Used in non fruit bearing plants
- ❖ Sludge as a fertilizer

Be Water

Zero Waste To Landfill Certified Since 2021



- Monitoring & segregation of waste generated
- Diversion Ratio -99
- Repair, Reuse & Recycle





- Condition based oil replacement
- Recycling of Oil
- Waste Disposal through Authorized Re-users
- Composting of Canteen, Domestic & Horticulture Waste and use as manure
- Use of reusable insulation pads for turbine
- Ash Utilization more than 100% since 2014

SAY NO TO SINGLE USE



SuP free Installation - Initiative
Certified Since 2021

- SuP Items are banned
- 17 items were identified – 08 items eliminated
- Balance will be eliminated by March'22



SuP free Installation - Initiative

- ❖ Recarpeting of bitumen road by use of Plastic & Polythene
- ❖ Ban on Plastic & Polythene since 2013
- ❖ Use of Biodegradable bags for saplings
- ❖ Vendors & contractors are also encouraged to follow SuP norms

9.0 Best Practices in the plant

SAP



Digital Logbooks



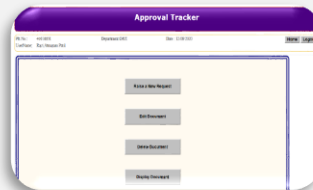
QR code-based Safety & Environment Data sheet.



Knowledge Management through MS teams



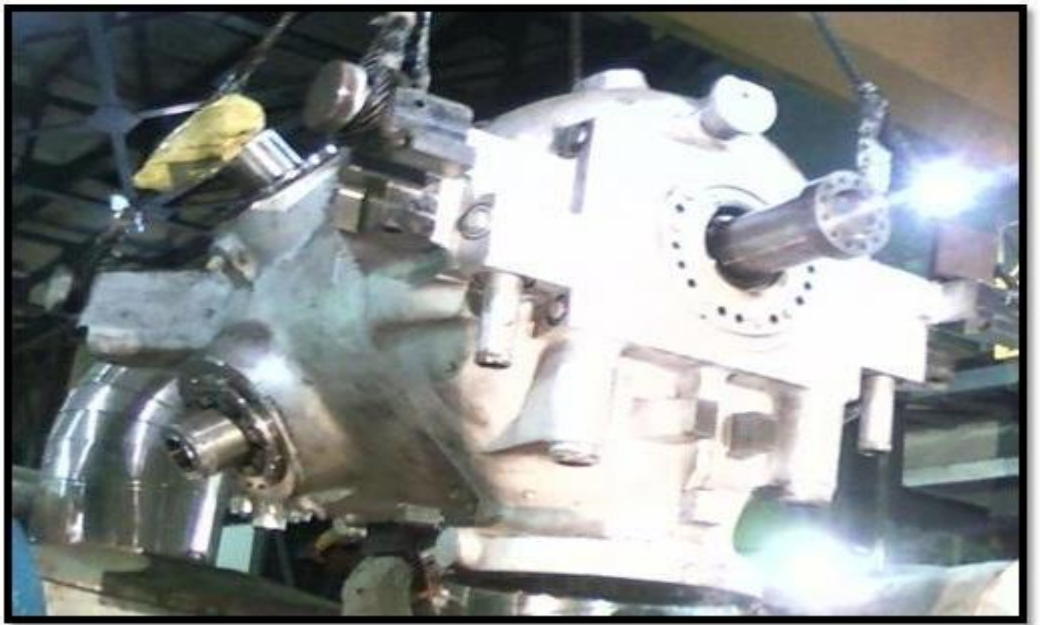
Digital approval portal - Esign



Remote Operation of Stack analyzer moisture removal system



- Use of modular concept that allows the replacement of major assemblies in a minimum amount of time and expenditure (e.g. HP turbine module, CW debris filter, Primary & Secondary fans rotor, Boiler feed pump cartridge, vacuum pump, CW pump)
- Modular Scaffolding for Boiler Overhauling



HP Turbine Module



Scaffolding



Before Plantation



After Plantation

- Developed man made forest consisting of Ultra-High-Density mass plantation and high-density planting of mango, chiku and guava
- During FY2020-21 Total 54174 tree planted in ADTPS premises.
- 449.18 Acre land is under plantation.

The ADTPS conducted study in December – January which restrained the species richness of many elements *viz.*, amphibians, reptiles and even plants especially herbaceous species. Following species are found

Groups	Species
Plants	187
Molluscs	1
Insects (Including butterflies)	53
Spiders	7
Amphibian	1
Reptile	4
Birds	69
Mammals	3

Comprehensive study of Biodiversity at ADTPS is planned by mid of August-21. Confederation of Indian Industry (CII

10.0 Teamwork Employee involvement & Monitoring

Invite for 7th Quiz - Theme-Energy Conservation



DINESH MANTRI

To Dahanu Users

Reply

Reply All

Forward



Tue 15/12/2020 08:48

Dear All,

On the occasion of Energy Conservation week, TTC along with EMC cell has organized an Energy Quiz to refresh the knowledge about energy conservation and latest regulatory reforms.

Time line – 15th December 2020 to 18th December 2020(EOD)

Kindly use following link to attempt it. Results will be declared on 30th December.

If it asks for authentication, provide your login and password.

All The Best



7th Quiz – Year-2020-21

Prize Distribution - Energy Quiz competition



DTPS_IT Helpdesk
To: Dahanu Users

 You forwarded this message on 26/02/2020 14:09.

Dear All,

On the occasion of Energy Conservation Week ,Equiz competition was held to refresh energy knowledge .

Following are winners of Equiz competition

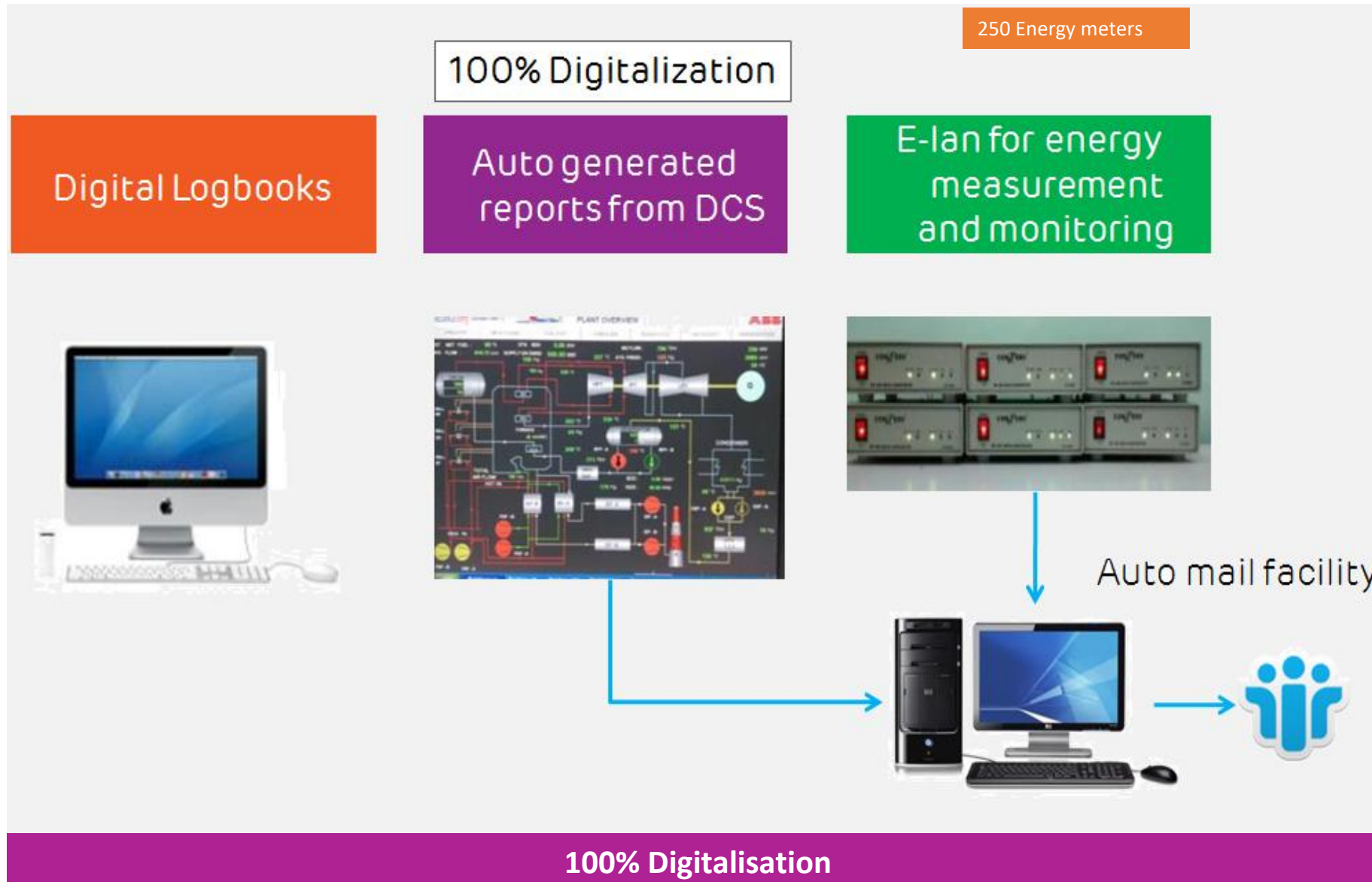
Sr Nos	Name
1	Pavan K. Sharma
2	Manish Kore
3	Jignesh Bari
4	Supriya Zadbuke
5	Sidhhesh Urmotkar

Prize distribution is scheduled Today in DPM at 15:00 Hrs.

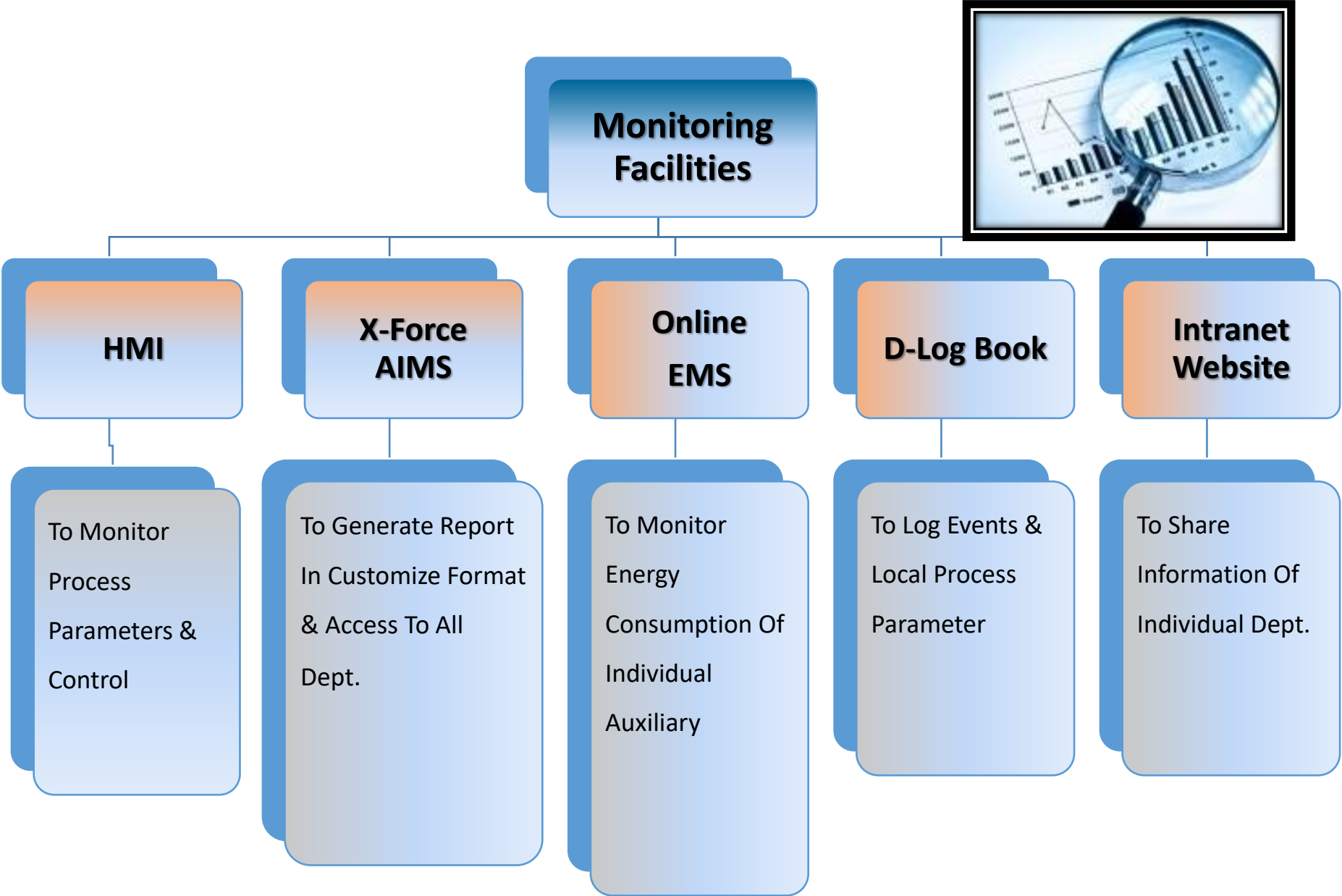
Many thanks once again to all the participants for their active participation and making this event a grand success.

Energy Management Cell

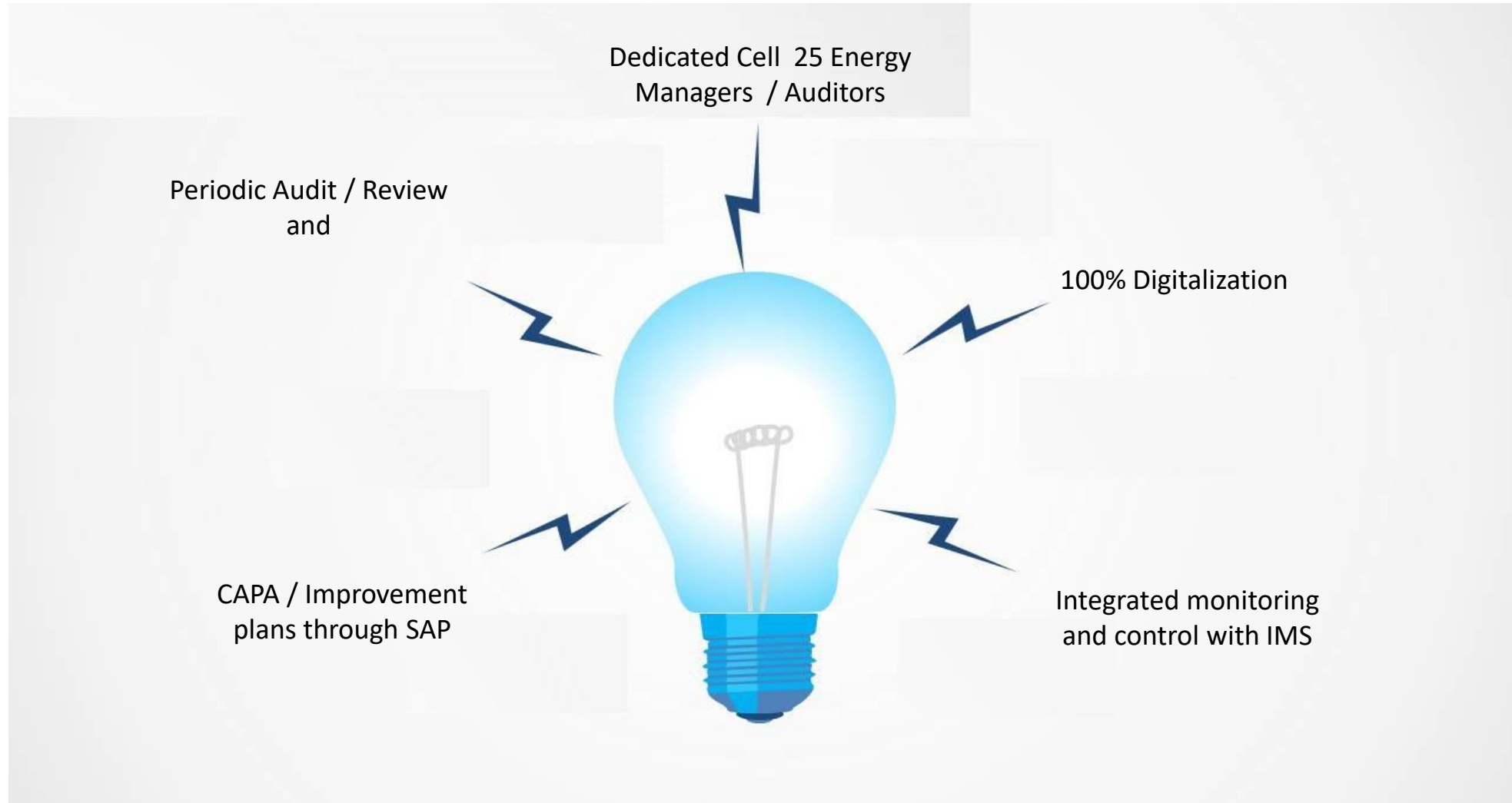
Energy Management System



Monitoring Facilities At DTSPS



Objectives Of Monitoring System



ADTPS is 1st Plant to be certified with ISO 50001

Monitoring Reports

01

Daily Energy
Deviation
Reports

02

Monthly Building
Energy Deviation
Report

03

Monthly Turbine &
Heater Performance
Test

04

Area wise Aux
Power Report

05

Air ingress system
in Boiler

06

Quarterly
Insulation Survey

07

Quarterly Air leak
survey

08

Yearly Pumps & Fans
Performance Testing



Monthly Review Of Overall Plant Performance

Plant Performance, Defects, Work Order Status
Review With All Sectional Heads

Departmental Meeting With All Team Members

11.0 Implementation of ISO 50001



BUREAU VERITAS
Certification

ADANI ELECTRICITY MUMBAI LIMITED
DAHANU ROAD, DISTRICT PALGHAR – 401 608, MAHARASHTRA, INDIA.

Bureau Veritas (India) Pvt. Ltd. (Certification Business) certify that the Management System of the above organization has been audited and found to be in accordance with the requirements of the Management System Standards detailed below

Standards
ISO 9001:2015, ISO 14001:2015, ISO 45001:2018 & ISO 50001:2018

Scope of certification
ELECTRICITY GENERATION IN 2X 250 MW COAL FIRED POWER STATION

Original cycle start date ISO 9001 & ISO 14001:	20 March 2008
Original cycle start date ISO 50001:	12 May 2014
Original cycle start date ISO 45001:	20 March 2020
Expiry date of previous cycle ISO 9001 & ISO 14001:	19 March 2020
Expiry date of previous cycle ISO 50001:	11 May 2020
Expiry date of previous cycle ISO 45001:	Not Applicable
Recertification Audit date:	28 February 2020
Recertification cycle start date:	20 March 2020

Subject to the continuous satisfactory operation of the organization's Management System, this certificate expires on: **19 March 2023**

Certificate No. **IND.20.10867N** Version : 1 Revision date: **20 March 2020**

3-7-20

Certification Authority:
Jagdish M. BANARJ
Head – CERTIFICATION, South Asia
Corporation, Industry & Facilities Division

Local office:
Adani Veritas India Private Limited (Certification Business)
72 Business Park, Akshay Industrial Area, MIDC, Chembur, T1,
Andheri (East), Mumbai – 400 076, India

Standards: **QM 003 EM 004 OHSMS 001 EMS003**

For further information regarding the scope of the certificate and the responsibility of the management system, please refer to the certificate and the organization's Management System. For more information, please contact the organization.
For more information, please refer to the certificate and the organization's Management System.

10.0 Long Term Vision on Energy Efficiency

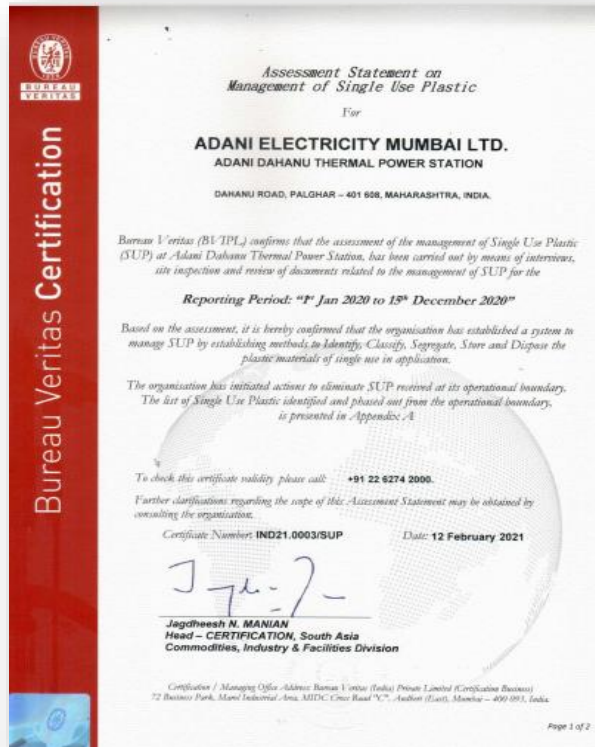
Energy Saving Project	Investments (Rs. Crs)
Procurement of New IP Turbine module	41
Procurement of new HP and LP Heaters	24
Procurement of Economizer and reheater coil	18
BFP Hydraulic coupling with modified gear ratio	1.05
Refurbishment of HP module	1
Total Cost	85.05

12.0 Major Achievements System approach

Single Use Plastic Assessment Certificate

Zero Waste to Landfill Certificate

Water Efficiency Management System



Award and Recognition



We're listening.

adani
Electricity

The power of service 