

# Energy Management



**Presentation By:-**

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**LEAD- BTG Operation**

**O&M  
Performance**



**Benchmarking**



**About Us**



**TSPL Energy  
Management &  
Other  
Initiatives**

## "TSPL Vision, Mission & Values"

### VISION

To become the best performing & the most competitive power plant in India with world-class sustainability practices aided by technology, Innovation and strong governance framework with aim to partnering in progress of the nation.

### MISSION

To power India's growth by sustainable technologies that efficiently utilize energy resources embracing Vedanta's core values.

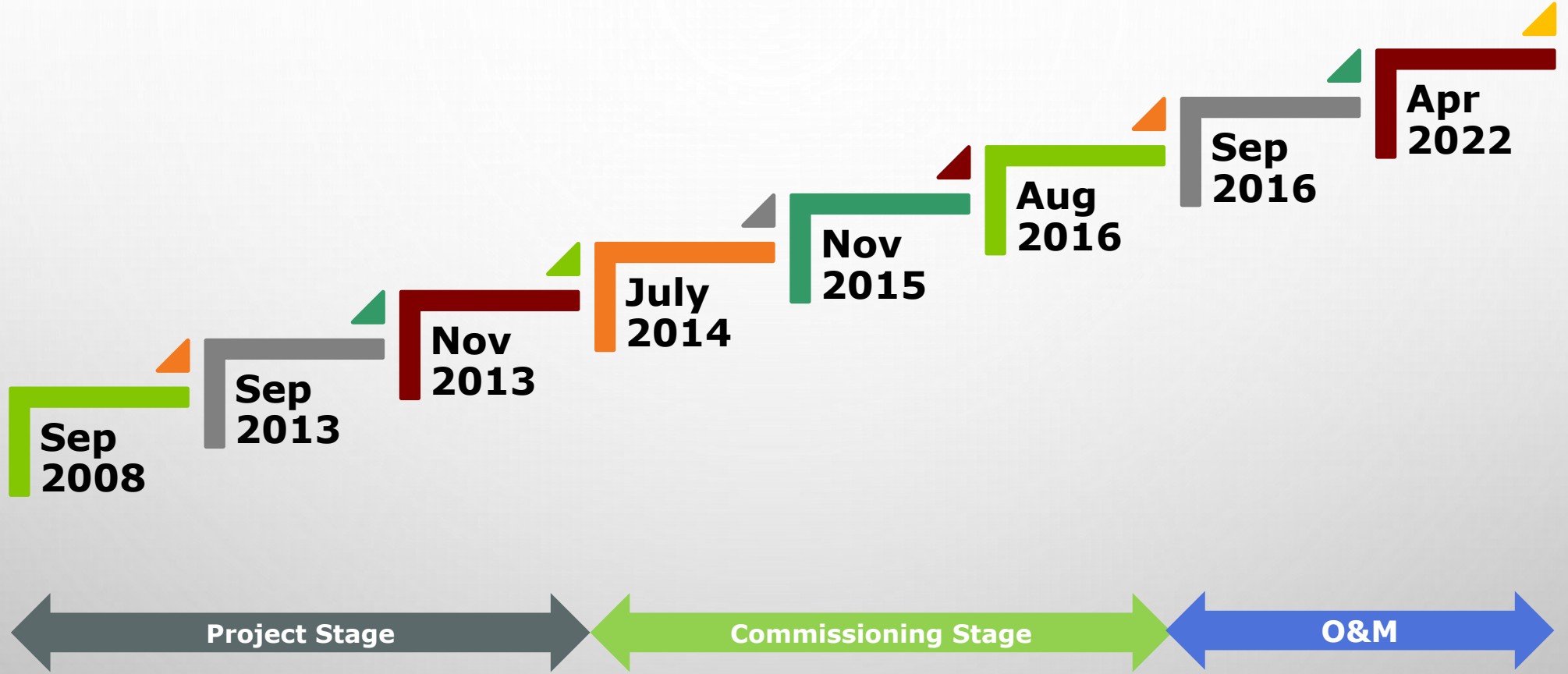
### VALUES

- > **Trust** 
- > **Entrepreneurship** 
- > **Innovation** 
- > **Excellence** 
- > **Integrity** 
- > **Respect** 
- > **Care** 



| Component                 | Details  |
|---------------------------|--|
| Location                  | Village- Banawala, Dist. Mansa, Punjab                                     |
| Land                      | 2113 Acres   |
| Technology                | Super Critical Power Plant   |
| Plant size                | 3 x 660 MW   |
| Water Resource            | Water corridor from Kotla Branch of Jagga Canal.                           |
| Water Allocation          | 80 Cusec   |
| Coal Linkage              | Mahanadi Coal Limited (MCL)<br>Fuel Supply Agreement with MCL of 7.72 MTPA |
| Railway Line Connectivity | Rail Corridor from Sadda singhwala Railway station.                        |
| Power Evacuation          | 3 Double circuit 400 KV lines  |
| Nearest Railway Station   | Sadda Singhwala (16 Kms)   |

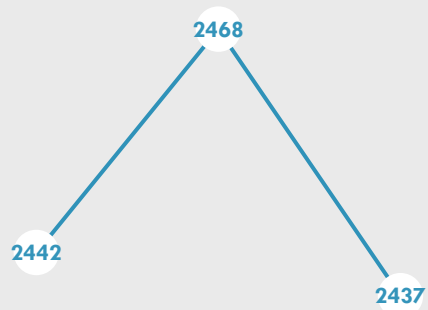
# Major Milestones



## O&M Performance

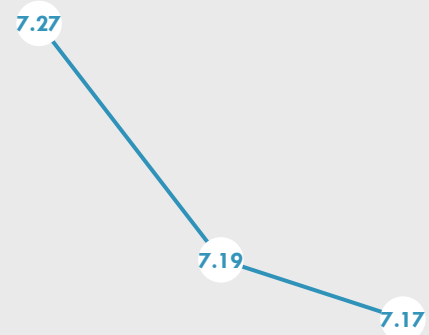
| Parameters               | UoM                | 2021-22 |
|--------------------------|--------------------|---------|
| Annual Generation        | MUs                | 8896    |
| PLF                      | %                  | 51      |
| Availability             | %                  | 76      |
| Gross Heat Rate          | KCal/KWh           | 2262    |
| Auxiliary Power          | %                  | 7.17    |
| Boiler Efficiency        | %                  | 86.6    |
| Turbine Heat Rate        | KCal/KWh           | 1949    |
| DM Water Consumption     | %                  | 1.33    |
| Raw Water Consumption    | m <sup>3</sup> /MW | 1.81    |
| Specific Oil Consumption | ml/KWh             | 0.47    |

STATION NET HEAT RATE  
(ACTUAL) KCAL/KWH



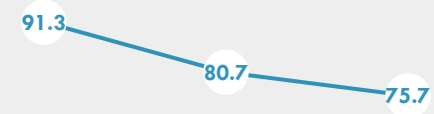
2019-20      2020-21      2021-22

STATION AUXILIARY POWER  
CONSUMPTION (ACTUAL) %



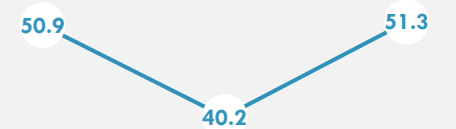
2019-20      2020-21      2021-22

PLANT AVAILABILITY FACTOR  
%



2019-20      2020-21      2021-22

PLANT LOAD FACTOR %

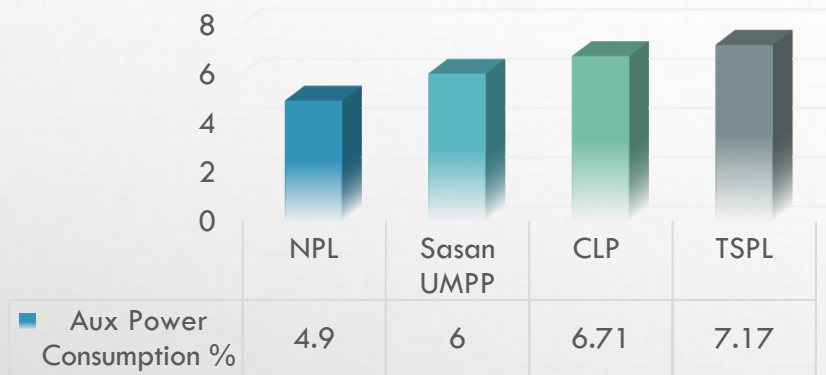


2019-20      2020-21      2021-22

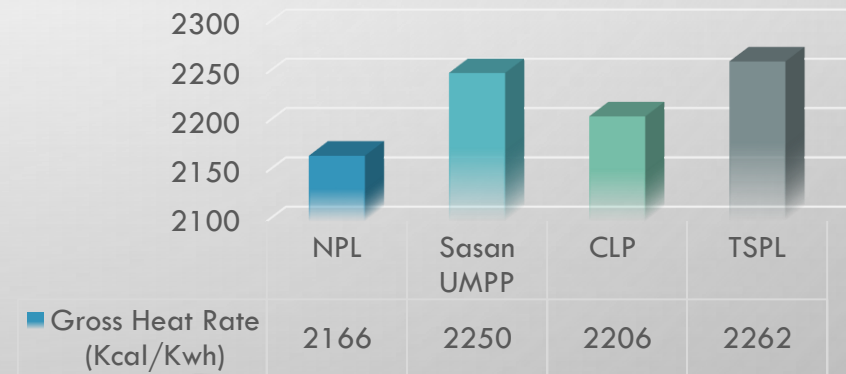


## Benchmarking

### AUX POWER CONSUMPTION %



### GROSS HEAT RATE (KCAL/KWH)



## List of Major Encon project

List of ENCON Project Planned 2022-23

| Title of Project | Annual Electrical Saving<br>(Million kWh) | Annual Thermal Saving<br>(Million Kcal) | Investment<br>(Rs in Million) | Comment   |
|------------------|---|---|-------------------------------|---|
| 1                |   |   |                               | 50MW Solar power plant  |
| 2                | 2.20                                      |   |                               | CW Pump 1A Motor Speed reduction                                    |
| 3                | 0.29                                      |   |                               | Station OCCW Inter connection to stop 1 OCCW pump stopping out of 3 |

List of ENCON Project 2021-22

| Title of Project | Annual Electrical Saving<br>(Million kWh) | Annual Thermal Saving<br>(Million Kcal) | Investment<br>(Rs in Million) | Comment   |
|------------------|---|---|-------------------------------|---|
| 1                | 4.23                                      | 3634                                    | 2.5                           | Unit 2 CW motor pole increase for speed reduction                   |
| 2                | 2   | 1641                                    | 2.5                           | Unit 3 CW motor pole increase for speed reduction                   |
| 3                | 0.36                                      | 307                                     |                               | Firefighting pipeline underground to overground (phase 1 completed) |

List of ENCON Project 2020-21

| Title of Project | Annual Electrical Saving<br>(Million kWh) | Annual Thermal Saving<br>(Million Kcal) | Investment<br>(Rs in Million) | Comment   |
|------------------|---|---|-------------------------------|---|
| 1                | 0.355                                     |   |                               | Conversion of HFO to LDO, Stoppage of HFO forwarding pump |
| 2                | 0.052                                     |   | 0.25                          | High-Capacity boiler Drain pump in Unit 3                 |
| 3                | 0.484                                     |   | 0.75                          | Bottom ash slurry pump impeller trimmed to reduce RPM     |
| 4                | 8.203                                     |   | 20                            | CEP VFD installation in Unit 1 & Unit 3                   |

List of ENCON Project 2019-20

| Title of Project | Annual Electrical Saving<br>(Million kWh) | Annual Thermal Saving<br>(Million Kcal) | Investment<br>(Rs in Million) | Comment   |
|------------------|---|---|-------------------------------|---|
| 1                | 0.00                                      | 1435.5                                  | 0.855                         | O2 Grid Installation for Dry Flue gas reduction                                 |
| 2                | 2.30                                      |   | 9.2                           | CEP VFD installation in Unit 2  |
| 3                | 0.003                                     |   | 0.325                         | OCCW Corrocoating in unit 3 AOH   |
| 4                | 0.01                                      |   | 2.2                           | Use of Solar power in Hostel roof   |
| 5                |   | 8672                                    |                               | Condenser segregation from vacuum system side for condenser vacuum improvement. |

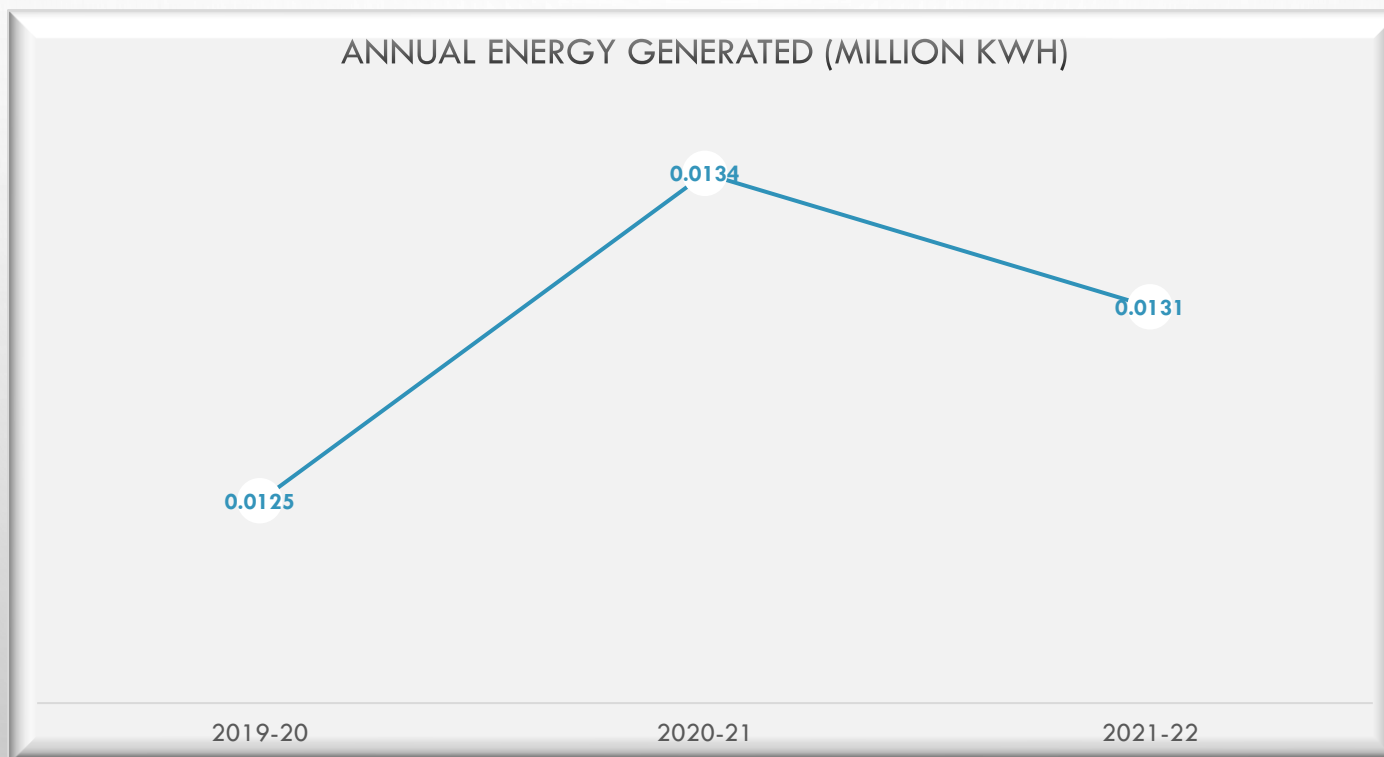


## Innovative Projects

| Name of the Project                               | Brief description on why innovative  | Trigger for implementing the project                           | Replicability            | Impact on SEC                                     |
|---|--|--|--------------------------|---|
| Cooling water pump motor pole change              | <p>"CWP speed reduction by CW motor pole changing from existing 16 to 20 Pole. 02 Nos. of CW motors (11kV,5.25MW, 373RPM,16 pole) are installed for individual unit &amp; 06 nos. for 03 Units. At present, in normal operating condition, CW motors power consumption is 9.5 MW with both pumps running at full speed i.e., 370 RPM. However, during single pump operation, CW motor power consumption is in the range of the 4.2 - 4.7 MW.As we are operating our units mostly at less load, There is a high potential of power savings due to less Cooling water flow required. Study from M/s VVR Consultant has highlighted that total flow of CW pumps are more than total design flow requirement. Further, to meet the design / process efficiency M/s VVR Consultant has suggested to reduce the one of the existing motor speeds from 370 RPM to 328 RPM."</p> | At Less Load, Low Delta T across condenser due to high CW flow | Implemented in U2,U3     | 1000 KW in 1 unit                                 |
| Installation of VFD in condensate extraction pump | <p>There is substantial pressure drop across the Deaerator Control valve . Due to high operating pressure than required, the power consumption of CEP is also higher than the required. The discharge pressure of condensate pump varies from 30-32 kg/cm<sup>2</sup> whereas De-aerator pressure is around approx. 11.0 kg/cm<sup>2</sup>.TSPL commissioned VFD in U2 CEP motor in June 2019. VFD installation will incur significant advantages in terms of APC reduction. Throttling losses are reduced effectively by employing variable Frequency Drive. TSPL commissioned VFD in U2 CEP motor in June 2019. VFD installation will incur significant advantages in terms of APC reduction. Throttling losses are reduced effectively by employing variable Frequency Drive.</p>   | APC Reduction  | Implemented in all units | 500 KW in 1 unit                                  |
| Reduction of Specific Raw Water Consumption       | <p>Thermal power stations are one of the most water consuming industries. Since water remains the scare resource, its optimum utilization is necessary for the sustainability of the environment. Many of the power plants across the world were shutdown owing to source of water for running the plant dried due to less rainfall in the specific regions. Different strategies are proposed to increase the cycle of concentration for thermal power stations to conserve the water requirement. We had optimized COC and it has a significant effect on the reduction in the water use.</p>  | SRW reduction  | Implemented              | Specific raw water reduce from 1.99 to 1.81 l/kWh |

## Renewable Energy

Installed Capacity:- 0.03 MW



## Environment Management – Ash Management

| Particulars  | UoM  | 2019-20 | 2020-21 | 2021-22 |
|--|------|---------|---------|---------|
| Ash Stock in Plant (Yard+Pond)                                   | Tons | 2499978 | 3267418 | 3492696 |
| Ash Generated  | Tons | 1868370 | 1935130 | 2401432 |
| Ash Utilization  | %    | 107.5   | 60.3    | 90.6    |
| Ash Utilized in Manufacturing of cement/concrete - other similar | %    | 68.8    | 29.9    | 35.3    |
| Ash Utilized in ash fly bricks                                   | %    | 10.6    | 16.3    | 31.3    |
| Ash Utilized in mine filling                                     | %    | 3.0     | 0.6     | 7.3     |
| Ash Utilized for Roads pavements                                 | %    | 25.2    | 13.4    | 16.8    |

## Environment Management - Emission

| Particulars                              | UoM    | 2019-20  | 2020-21  | 2021-22  |
|--|--------|----------|----------|----------|
| Total CO2 Emissions Per KW of Generation | Ton/KW | 0.000908 | 0.000916 | 0.000908 |
| Current Sox Emissions at Full Load       | mg/Nm3 | 910      | 950      | 935      |
| Current NOx Emissions at Full Load       | mg/Nm3 | 210      | 240      | 218      |
| Particulate Matter                       | mg/Nm3 | 47.65    | 49.21    | 48.63    |
| Mercury                                  | mg/Nm3 | BDL      | BDL      | BDL      |

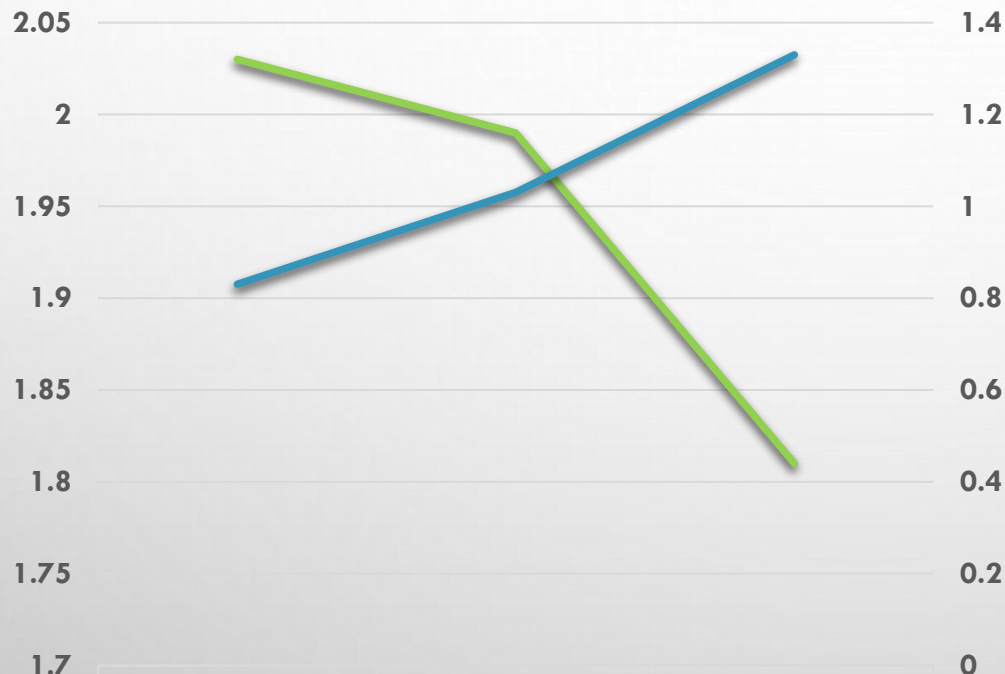
**The timelines to comply with the Sox norms for TSPL is by 31st December 2024. (MOEF & CC notification. To ensure compliance, TSPL is proceeding with further steps in consultation with PSPCL and other related parties for retendering for FGD project.**

**TSPL is also planning to implement biomass cofiring within their boilers.**

# Environment Management - Water

## Zero Liquid Discharge Plant

**Water Consumption**



|                                      |      |      |      |
|--------------------------------------|------|------|------|
| Raw water Consumption of Plant m3/MW | 2.03 | 1.99 | 1.81 |
| DM Water Consumption of Plant %      | 0.83 | 1.03 | 1.33 |

**Best Practices in water management**

- Daily Monitoring of Water balance
- Firefighting line upgrade from underground to Overground
- Increase of COC from 5 to 7 for NDCT make up reduction
- Fire water usage approval mechanism for Head O&M



## Best Practices In Plants – (Non Energy Efficiency)

1. Asset Optimization (AO) framework in place for ensuring standardize operational and maintenance practices. AO framework has become key driver for business excellence and operational efficiencies. Helps improve and sustain organizational performance through the adoption of right processes, practices & capabilities. A specific focus on improving the Asset performance and reliability.
2. Vedanta sustainability assurance program (VSAP) framework in place for ensuring standardize HSE and Non-HSE practices. VSAP has become key driver for business excellence. A Specific focus on improving the HSE, supplier and contractor management and social sustainability and stake holder engagement.
3. Integrated Management System (IMS) framework in place for ensuring streamlined procedures and continual improvement to push business with better quality, improved health and safety, and increased productivity.
4. TSPL's premises is covered with green belt with approximately 4.5 lakh trees inside the plant. TSPL has also taken the initiative and developed Miyawaki (mini thick forest) near plant vicinity by planting 5000 trees (approx.) in Village Peron. In this FY, we are planning to plant more than 15000 saplings in the vicinity for increasing the green cover in the vicinity.



## Teamwork, Employee Involvement & Monitoring

- Daily Review Meeting includes defects, issues and plant performance & Chaired by Head O&M.
- Monthly Operational Review includes entire month plant performance and chaired by COO.
- Digital solution for monitoring like PIVISION and FLEETMONITORING.
- Digital solution for automatic daily report generation.
- Efficiency monitoring and action plans alongwith schedule review with management in place.
- AO framework in place to ensure best in class analytical tools and practices been carried out for asset management, followed by monthly internal audits and annual external audit.
- VSAP framework in place to ensure best in class safety standards and practices been carried out for HSE and Non-HSE function, followed by monthly internal audits and annual external audit.
- Rewards and Recognition for business and sub-business partners.

# Awards and Recognitions

**TSPL conferred with CSR Times Award 2021**  
At 8<sup>th</sup> National CSR Summit

We are proud to announce that TSPL has been awarded the CSR Times Award 2021 in the Rural development and infrastructure category for our 'TSPL Gram Nirman project'

**Pankaj Sharma**  
General Manager, Operations

This award signifies our relentless efforts towards uplifting the society.

**TSPL Wins Two CSR Awards**  
at 10th India CSR Leadership Summit & Awards, 2021

- Excellence in Promotion of Sustainable Agriculture  
Project Navl Disha
- Excellence in Community Infrastructure Development  
TSPL Gram Nirman Project

Committed to powering lives and changing contours of Rural Punjab

**TSPL won awards at the CII National Electrical Safety, Power Quality & Reliability Circle Competition 2021**

Vedanta TSPL bagged three awards at the CII National Electrical Safety, Power Quality & Reliability Circle Competition 2021 held on 28th, 29th & 30th October 2021 through CII Virtual Platform. Over 40 organizations had participated in the event. TSPL won the awards in the following categories - Best Organisation for Electrical Safety, Power Quality & Reliability Management, Best case study on Electrical Safety Risk Management & Best-case study on Achieving Energy Efficiency and Productivity through Electrical Safety, Power Quality & Reliability.

Energy efficiency are essential to help become more economic, save energy, protect the environment & ameliorate business performance. These prestigious awards are testament to Vedanta TSPL's energy efficient measures, safety driven environment & constantly enhanced operational technique. Special Congratulations to the Electrical team on this commendable win!

**TSPL has been certified as Single-use Plastic Free premises by CII**

We are proud to share that TSPL has been recognized as Single-use Plastic Free premises by Confederation of Indian Industry (CII). This recognition is a testimonial of our efforts towards 'Zero harm, zero waste, and zero discharge' vision of Vedanta.

Plastic and plastic products have been detrimental to our environment and their usage had to be stopped. TSPL took the initiative of not using Single-use plastic products within its premises. TSPL is a leading power plant and aims to conserve nature and use green methods to make our future better. The appreciation received from the CII is another feather in our cap, strengthening our resolve to become a sustainable and environment friendly place to work.

**TSPL has been conferred With "Clean Generator of The Year Award 2021"**  
Under the Environment Excellence Category from Mission Foundation.

**TSPL wins 'Significant Achievement in HR Excellence' Award at the CII National HR Excellence Award FY'22**

We are proud and humbled to announce that TSPL has been awarded "Significant Achievement in HR Excellence" for second consecutive year at the 12th CII National HR Excellence Award FY'22. The CII HR Excellence award aims to promote best HR practices amongst the organizations and transform them into high-performing organizations. The award was presented virtually on 24th March 2022.

We are thrilled as this award is testimony of the continuous, rigorous hard work of the entire team.

**TSPL CONFERRED WITH ANNUAL GREENTECH CSR INDIA AWARD 2021 FOR 'RURAL DEVELOPMENT'**

TSPL is proud to announce that TSPL has been bestowed with the 8th Annual Greentech CSR INDIA Award 2021 under 'Rural Development' category for our series of well structured socio-economic projects that have been conceived and implemented aiming towards progress and development of the area and its people.

This award is a testament to TSPL's efforts in demonstrating the highest level of commitment to CSR & serving as a catalyst to understand the intrinsic value of CSR in business excellence and sustainability.

**TSPL bags Gold Apex India CSR Excellence Award**

TSPL received Apex India CSR Excellence Award in Gold category for outstanding achievement in Community Development Program by Apex India Foundation.

TSPL was recognized for its efforts in developing and dedicating several community development projects in villages around the power plant ensuring better amenities for rural community at large thereby enhancing their living standards. Several need-based infrastructure projects were undertaken in verticals like health & hygiene, education, agriculture amongst others and handed over to the community, addressing their immediate concerns.

Projects ranged from ensuring better sanitation facility for children in the school to transforming garbage dump into a community park, installation of community RO, laying underground pipeline for waste water management and many more.

This award is a testimony to our commitment & consistent efforts towards bringing a positive impact in the society.



# Awards and Recognitions



vedanta | TALWANDI SABO POWER LIMITED | TSPL

### TSPL recognized as "Great Place to Work"

It is indeed a proud moment for TSPL to be certified as "Great Place to Work". This is the first time TSPL has been recognized for this great feat. We shall continue our undaunted efforts and determination to thrive for the best and shall earn such recognition in the coming years as well!

**Great Place To Work Certified**  
MAY 2021-MAY 2022  
INDIA

- Vikas Sharma, CEO & WTD, TSPL



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### TSPL awarded for Efficient Management in Fly Ash Utilization & NSHR Reduction by Mission Energy Foundation

**Most Efficient Fly Ash Management > 500MW Powerplant 5th time in a row!**

**Best Energy Efficient Plant - Coal, Northern Region**



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TSPL has been recognized by

**LEGENDS of MALWA**  
19th EDITION 2022

**Legends of Malwa, Dainik Bhaskar Business Award 2022 for 'Excellence in Social & Environmental Communication (Social Media)'**

This award is testimony of our dedication and commitment towards transforming for good and reshaping our society



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**AIMA**

WELCOME TO  
**9th BUSINESS RESPONSIBILITY SUMMIT & PROJECT EXCELLENCE CONTEST & RECOGNITION**  
4th AUG 2022 (THU) | ONLINE  
Private Sector Category 1  
**Winner**  
Talwandi Sabo Power Ltd - Navi Disha

Krittika Bhatt | Abdus Sattar

TSPL emerged as the Winner at 9th AIMA (All India Management Association), Business Responsibility Summit for Promotion of Sustainable Agriculture - Project 'Navi Disha'



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**APEX INDIA CSR EXCELLENCE AWARD 2021**

### TSPL won the coveted APEX INDIA CSR EXCELLENCE GOLD AWARD 'Agriculture Development'

**CATEGORY**  
This recognition is for TSPL Navi Disha Project (promotion of sustainable agriculture)



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TSPL is bestowed with

**CEE's National Award for Excellence in Water Management 2022 in "IPP COAL Above 500 MW" category**

This award is a testimony to our resolute efforts in the ESG Journey.