



We focus on improving organisational processes by implementing relevant technologies, embedding learnings into the business and supporting a culture of innovation, which will reinforce our drive for operational efficiency and resource optimisation.

An organisation's ability to enhance its knowledge base and innovate in its business goes a long way. In our industry, in particular, intellectual capital plays a significant role. As we operate in a highly competitive environment and we differentiate ourselves by employing our systems, data capabilities and insights to manage risk, deliver quality power, manage costs and build our business for the future. We always try to strengthen our knowledge-based capitals so that we can enhance the performance of our machinery and equipment.

### Strategic Focus

Innovation is driven and leveraged by the technology organisation, new materials business, and services and solutions business. The process also focusses on building new competencies and capabilities to enable our organisation to be future-ready.

Moreover, technology and a culture of continuous improvement are key enablers towards achieving the strategic objectives of industry leadership and cost leadership. We will continue to enhance our production processes, cost competitiveness, and environmental performance through capability building and collaboration with technology and research partners. Amidst changing customer needs, with renewables gaining pace and increasing regulatory risks, we strive to innovate and adapt to change continuously.

During FY2019-20, we focused on leveraging our R&D and innovation capabilities through Process Improvements, System Updatons and IT System & Infrastructure Upgradations.

### Process Improvement and Governance

Delivering Stakeholder Value	KPI	Trend	FY2018	FY2019	FY2020
Energy conservation initiatives led to reduced cost, enhancing profitability	Energy Conservation (MUs)	●	86.79	104.00	59.92
	Monetary Savings due to Energy Conservation (₹ in Crore)	●	15.03	47.95	12.70
Cost incurred towards Intellectual Capital to increase operational margin by optimising process, systems, IT and Infrastructure	Cost Incurred towards Intellectual Capital (₹ in Crore)	●	7.64	6.12	12.63

**Legend**

- Increasing Trend
- Decreasing Trend
- No Trend

### IT System & Infrastructure Upgradations

#### Towards Infrastructure Upgradation

As the world is progressing towards high-end technology and infrastructure upgradations, we are also progressing towards having an IT support system and infrastructure. During the year, to improve fault isolation, we installed support routing between different VLAN, which enabled Support high-speed scalability and accountability. Moreover, we enhanced security management control and monitoring of network traffic routing. We have ensured that all shop floor applications are always available for live and historical monitoring at all level.

### Cyber Security Enhancements

Cybersecurity is an important firewall with the upgradations in technology. Towards this end, we have standardised the smart protection suite at the end-user level by the deployment of Trend Micro AV with primary and secondary servers to facilitate the periodical auto refreshment of patches. Moreover, we have re-architected perimeter firewalls across all energy plants by hardening of services and allowing a need to have basis principles.

Additionally, we deployed the Vulnerability Management system to proactively identify errors and get it remediated before it is exploited by external/internal intrusion or malware. Further enabled periodic risk assessment for public-facing systems. For all public facing applications for plant-related data monitoring on handheld devices, we have enabled secure mode access.

### Implementation of Dashboard on Qlik Sense Platform.

MIS reporting tool which facilitates for viewing/monitoring of plant performance, maintenance, procurement, consumption and finance related data on a single platform. Deploying the Web-based common application with a single screen covering the multiple plants with major five modules, namely Finance and Summary, Plant performance, Consumables, Procurement and Market intelligence.

With the augmented graphics and data discovery features, Qlik Sense helps in spreading data literacy which means that users regardless of their skill set and capabilities can learn to intuitively draw meaningful insights from data and hence, learn to comprehend data. The capability of data scaling is also very beneficial to users who need to use a large amount of data from big data sources. Also, such efficient scalability allows many users to work on the same application at a single time.

### Implementation of Digital Enabled Platform to Facilitate the Concept of Work from Home

Due to Covid-19 pandemic impact in India, the working professionals had to undergo the dynamic changes to understand and cope up with the demand of working from the home concept wherein the multi-sites, multi peoples, multi-task are to be brought on a single platform to meet the current need of business requirement. This situation has made us bring in the concept of the virtual world connect on a single platform to collaborate the working culture to achieve a common goal.

### Process Improvements

During the year, the process improvement initiatives focused on conservation of energy through the reduction in auxiliary power consumption, start-up oil consumption, and coal consumption.

VIJAYANAGAR PLANT	BARMER PLANT	RATNAGIRI PLANT
Reduction in Auxiliary Power Consumption  <b>30Kwh</b> Reduced power consumption of instrument air compressor by running in suction throttle mode over base mode during reserve shutdown of the unit.  Reduced auxiliary power consumption for every cold startup by optimising the equipment's in service during the minimum export schedule, optimisation of total airflow, replacement of APH baskets during opportunity shutdown.  Reduction of Oil Consumption  Reduced oil consumption by adopting best operation practices such as deaerator preheating/pegging and use of BF gas during unit startup.  Reduction in Coal Consumption  <b>2,74,352 MT</b> Coal saved by using waste gases from blast furnace as fuel.	<b>29,952 Kwh</b> Energy Saved by stopping CT Fans in Winter season.  Energy Saving through APH Tube replacement  <b>2,381 kW</b> in Unit 2  <b>588 kW</b> in Unit 4  <b>1,041 kW</b> in Unit 6  Approximately 1KPa Condenser Vacuum improvement by Helium leak detection device.  <b>48 T/day</b> Reduction in DM Water consumption by rerouting condensate from VAM to Condensate Storage Tank.	Reduction in Auxiliary Power Consumption  Optimised discharge head pressure of PA Fans and CEPs, and running hours of CT Fans and SWIPs.  The number of running mills was optimised so as to keep the optimum number of coal mills running at higher coal flow  Reduction in Coal Consumption  <b>0.38%</b> increase  In efficiency of boiler by replacement of baskets in APH-A of Unit-1, along with the saving in ID Fan power consumption.

### System Upgradation

Following initiatives were taken towards system upgradations for the betterment of processes, product development, cost reduction and import substitution:

VIJAYANAGAR PLANT	BARMER PLANT	RATNAGIRI PLANT
<p>Replaced switchyard pneumatic generator circuit breakers with spring charge breakers, 6.6 kV breakers with improvised rack in/out facility type, 400kv bus CVTs with new version, and plant type battery banks with tubular battery banks for UPS.</p> <p>Implementation of DSM (Deviation settlement mechanism) in ABT as per 5th amended CERC regulations.</p> <p>Upgraded DCS Control room LVS (Large Video Screen) to Laser-based for better life enhancement.</p> <p>Replaced SBUI CT Fans vibration mechanical switch with two-wire advance transmitter and signals extended to DCS for improved protection interlock, reliability improvement.</p>	<p>Boiler Second pass water washing is done with an ultra-high pressure water jet to remove deposits and improve heat transfer at SH and RH tubes in Unit 5.</p> <p>The anti-abrasive coating on Boiler tubes started to improve the life of boiler tubes and MTBF.</p> <p>In Boiler PLSH area, refractory material and application procedure changed to reduce outages due to refractory damage.</p>	<p>CT Fans (Cooling Tower Fans) in Unit 2 were replaced with high-efficiency fans having better airfoil design.</p> <p>The MS pipeline of ACW system was replaced by SS316L material to minimise the leakages in the system due to seawater.</p> <p>Shifting of ESP control station to the main plant control room to optimise auxiliary power.</p> <p>Implementation of Layer-3 switch with VLAN configuration that enabled network loop protection and Ring Configuration for failover.</p> <p>Setup of Security Command Control Room for centralised surveillance and upgradation of CCTV storage from 15 days to 45 days.</p> <p>Upgradation of the plant to township intercom communication using E1 gateways to improve reliability.</p>