

# Digital Transformation

## Utilities step up their IT-OT initiatives

While efforts to move towards information technology (IT)-operational technology (OT) convergence have been under way, the Covid-19 pandemic has compelled utilities to accelerate this shift. Utilities are prioritising their IT-OT initiatives and realising the benefits of fast-tracking their digital transformation plans in order to work remotely and effectively. Leading utilities share their experience in the implementation of IT-OT technologies during the past one year and their ongoing plans. Excerpts...

**What new IT and OT technologies have been implemented by your organisation in the past one year or so? How have these helped improve the company's overall performance?**

### B.B. Mehta

OPTCL is a progressive power utility in the eastern region, having a medium-sized transmission network of 14,387 ckt. km. The utility has already established a robust optical ground wire (OPGW) communication backbone of 4,346 km to support all its IT and OT applications. In the recent past, OPTCL has successfully implemented unified load despatch and communication supervisory control and data acquisition-energy management systems (SCADA-EMS), phasor measurement units (PMUs), geographic information system (GIS), substation automation system, digital tele-protection coupler (DTPC), advanced metering infrastructure (AMI), remote surveillance and videoconferencing projects.

AMI in OPTCL covers 124 locations including powerhouses and grid substations for precise energy accounting and

report generation activities, utilising both OPGW network and multi-protocol label switching leased circuits. Remote and local surveillance using pan, tilt and zoom (PTZ) camera in 66 substations has been completed, which helps OPTCL in the supervision of operations and maintenance (O&M) activities. The traditional power line carrier communication-based intertripping scheme has been upgraded to DTPC, with a total of 86 panels operating on OPGW links. The fibre network is also utilised here for providing videoconferencing, enterprise resource planning (ERP) and webmail service of OPTCL to grid substations.

About 10 new locations have been added to the existing OSI-SCADA system of 186 substations. However, for precise and minute monitoring of power systems, 29 PMUs have been installed at eight locations in OPTCL under the unified real-time dynamic state measurement system scheme. Similarly, GIS has been implemented in 127 locations of OPTCL, which facilitates close watching of transmission elements. In addition, a

3D view of all elements is possible, using special database features in GIS.

### Nimesh Mehta

CLP India was already on an accelerated journey of digital transformation, when the Covid-19 pandemic upended the way organisations work the world over. Even before the pandemic, we had started enabling network access for employees from anywhere, any time and from any device, as a part of our digital transformation initiatives. We undertook initiatives such as introducing virtual desktop and conditional access for personal devices and adopting ZScaler for cloud security.

We also adopted OPSWAT (omni-platform security with access technologies), the MetaDefender Kiosk that scans all external drives before they are used within our IT network. The kiosk scans not only external drives but also the OT network to ensure its safety. This USB scanner has eight anti-malware engines and CLP India is one of the first companies in the country to have adopted this cybersecurity practice for the smooth



**B.B. Mehta**

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**Nimesh Mehta**

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**Arijit Mitra**

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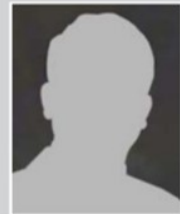
**Sanghamitra Pyne**

Head IT, Generation, CESC Ventures, RPSG Group



**Santadyuti Samanta**

Head-IT, Tata Power Delhi Distribution Limited



**BSES**

Spokesperson

operation and safety of its OT network.

The purpose of our digital transformation is simple – efficiency, employee empowerment and business enablement. Due to our prior readiness, employees as well as the management team of CLP India were able to change the way they worked, while keeping the business running and customers happy during the lockdown period.

#### **Arijit Mitra**

Over the past one year, the focus of IT and OT initiatives in Noida Power Company Limited has been on bringing its Oracle outage management system implementation project to completion in order to create the platform for a truly integrated advanced distribution management system (DMS), together with SCADA and DMSs, which were already live. The integrated systems are expected to have a transformative effect on the manner in which distribution networks are managed in the company. In addition, smart metering has taken off in right earnest in our licensed area, with the conversion of single-point supplies in housing societies to multi-point supplies, where smart prepaid meters control supplies to individual households. This has opened up a new paradigm in the relationship with our customers, where real-time information exchange offers new opportunities for strengthening the engagement. Along with smart grid initiatives, the company has focused on investing in technologies supporting smart substations.

#### **Sanghamitra Pyne**

The power companies of the RPSG Group are in the power generation and distribution business across India. The group owns and operates generation stations in Kolkata, Haldia and Chandrapur (Maharashtra). CESC Limited, a company of more than 100 years, is the distribution licensee for the cities of Kolkata and Howrah. CESC also has power distribution franchisee businesses in Bikaner, Kota and Bharatpur in Rajasthan as well as Malegaon in Maharashtra. Apart from that, group company Noida Power Company Limited distrib-

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B.B. Mehta

utes power in Greater Noida.

The information and communications technology (ICT) and digital initiatives in the distribution business cater to services encompassing commercial, technical, engineering, supply chain management, customer relationship management (CRM) - through enterprise bespoke systems, ERP, data analytics as well as online channels using the organisation's portal. Consumer experience has been enhanced through an AI-powered chatbot named “ebuddy” embedded with the portal, and the introduction of WhatsApp-based commercial and supply-related interaction to supplement our CRM, interactive voice response system and call centre systems. We have also introduced various mobile- and tab-based apps, developed in house and deployed across generation and distribution functions and services.

On the generation front, tab-based apps are used by generation station engineers for regular or preventive maintenance jobs. The maintenance data is captured by the app and subsequently used in analysis dashboards, which helps in the

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Nimesh Mehta

detection of any pattern of equipment failure and breakdown. Similarly, three-shift operation data of generation station equipment is captured through an app, for logging and analysis. We have also adopted machine learning (ML)-based predictive maintenance systems for monitoring the health of the generation assets.

Apart from apps for O&M of generation plants, in-house apps for senior management and leadership are used for real-time information dashboards integrated with SCADA for distribution and generation units. In our GIS, we have developed an app and a web-based system to capture and map the consumers' indexing data to the upstream distribution transformer and feeders. This helps in load analysis, outage management, loss control and efficient network management.

Throughout the extremely trying times of the past few months, with the Covid-19 pandemic, lockdown and the fury of the super cyclone “Amphan”, our organisations have been ensuring business continuity for the essential electricity generation and supply services. Here, our digital initiatives and IT teams played a huge role, with the use of digital collaborative tools and VPN, which provided support to our brick and mortar business, while ensuring that social distancing norms were followed. We have also ramped up our cybersecurity measures, which include security audits, system hardening and introduction of multi-factor authentication. We have our own optical fibre network, CESC-NET, connecting our establishments, and forming the communication backbone for all digital initiatives. We are also ramping up our data centre and disaster recovery (DC-DR) infrastructure and using a hyper-converged infrastructure (HCI) to ensure business continuity while reducing the data centre carbon footprint.

#### **Santadyuti Samanta**

Tata Power Delhi Distribution Limited (TPDDL) started its journey in July 2002

with an almost zero digital footprint. It started with the deployment of communication on optical fibre, connecting all its establishment in its licensed area, SAP (ERP) to take care of the business process alignment, automated meter reading (AMR), geographic information system (GIS), substation automation, distribution automation and supervisory control and data acquisition (SCADA), outage management system (OMS) and distribution management system (DMS), which came to completion in 2012, when the newly deployed SAP-ISU-CRM and OT systems like SCADA-OMS were integrated along with its consumer information systems. TPDDL then went in for the next technology roadmap to deploy smart grid technologies such as smart meter-advanced metering infrastructure meter data management system, data science and business intelligence systems on SAP HANA and big data applications, mobility solutions to increase the efficiency of field crews and real-time transactions through its field force automation project, GIS upgrades and ADMS application automated integrated OMS. The integrated security system consists of perimeter intrusion detection through sensors, surveillance cameras and access control, all integrated with each other and the security control room. TPDDL deployed an integrated network management system and a security information and event management to enhance the cybersecurity.

TPDDL has deployed many customer-facing applications through its SMS-WhatsApp-mobile app portal to increase the digital inclusion of its customers. Today, there are more than 0.3 million customers who use WhatsApp services, 0.2 million mobile app users, 0.1 million monthly Paytm users. Almost all customers are served billing and payment information through interactive bill platforms every month. Further, the use of recently launched smart meter services and real-time communicators is increasing at an exponential rate. As a result, digital payment rose from 7 per cent to over 85 per cent in a sustainable

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Arijit Mitra

way in the past two years. In the past one year, it has increased from 60 per cent to over 85 per cent.

There are more than 1,000 mobility application users who are integral to run the business. They use it to read the meters, serve bills, collect revenue, among other things. The revenue collection mechanism is completely automated and smart meter outage detection is also integrated with outage management architecture. The data from the smart meter is being archived and analysed to optimise the entire bouquet of services and enhance its efficiency.

The above initiatives have created a lot of data, which has helped identify the transactions impacting the KPIs and further in making predictions. TPDDL has a data warehousing architecture and customised dashboards that are equipped with ML-enabled predictive capabilities, prescribing the users on what they should do. This has helped forecast demand, identify defaulting customers, and predict the load growth for the distribution transformer.

All the above initiatives have increased the complexity and skill requirement to

“In the post-pandemic scenario, we are likely to move to a more hybrid model of working, supplementing feet-on-ground activities with digital tools across the business.”

Sanghamitra Pyne

a different level. TPDDL has taken up a massive reskilling programme not only for the IT executives but also for the business users. It has certified itself to the CMMi Level5 and adopted an agile development framework. TPDDL has also deployed an omni-channel contact centre solution, which is enabled with the latest artificial intelligence (AI) capabilities to give customers a next-level experience and automate many customer services.

Due to the work done by TPDDL, India's ranking in “getting electricity” on the World Bank's ease of doing business index has improved from 137 in 2015 to 24 in 2020. TPDDL has been recognised in the top 20 utilities for digital adoption on the international Smart Grid Index since 2018.

#### **BSES spokesperson**

BSES discoms are committed to ensuring quality and reliable power supply, as also consumer convenience. For the same, they have been exploring and deploying the latest and suitable technologies in various areas of operation. In fact, they have been deploying best-in-class technologies and focusing on automation digitalisation, mobility, IoT, AI, ML and smart initiatives. BSES discoms deal with numerous assets and a very vast infrastructure that is diverse and geographically widespread, generating large amounts of data on a daily basis.

IT systems are used for data-centric computing; OT systems monitor events, processes and devices, and make adjustments in enterprise and industrial operations. IT and OT convergence is the buzzword these days. BSES discoms have leveraged these technologies to improve work efficiency and the range and quality of their deliverables.

Moreover, BSES is effectively facilitating a strong digital relationship with its consumers for their convenience and has been promoting digital for a while now. The push towards digitalisation has come in handy for the discoms during the Covid-19 pandemic. In fact, its digi-

talisation efforts have received a fillip as more and more consumers are taking to digital to connect with BSES.

Consumers can connect with the discom and apply for a host of services, including new connection, registering complaints and even bill payment, from the comfort of their homes and offices, using mobile apps, website, SMS and social media networks such as Facebook, Twitter and WhatsApp. In fact, there is no need for a consumer to visit a BSES office for availing of any service. They can do so from the comfort of their homes and offices.

In support of the government's measures to contain the spread of Covid-19 and for the safety of consumers and employees, some BSES services, including meter reading and bill distribution, had been curtailed during the initial phases of the lockdown. But this was not an issue for BSES consumers, as they could not only get both through self-service, but also a rebate while doing so.

The adoption of digitisation and focusing on automation digitisation, mobility, IoT, AI, ML and smart initiatives helped BSES immensely in carrying out its business during the lockdown.

BSES is also using technology for carrying out its day-to-day operations and for the benefit of employees. During Covid times, this is helping BSES employees, vendors, business associates and consumers to participate in virtual meetings and collaborate online from the safety of their homes, locations and workstations as the case might be.

In fact, adapting to the "new normal", BSES discoms are relying heavily on technology to connect with consumers. During the pandemic, BSES launched "BSES Aap Ke Saath" – a novel and perhaps a first-of-its-kind initiative in the country – by a power distribution company to organise virtual online meetings with its resident welfare associations (RWAs). Since the launch of the platform in April, the discom has reached out to over 2,000

"TPDDL's initiatives have increased the complexity and skill requirement to a different level."

Santadyuti Samanta

RWAs. Apart from this, BSES discoms are also using technology to settle power theft cases. The permanent Lok Adalats in BSES areas are helping resolve power theft cases virtually. This new virtual platform is facilitating consumers to resolve issues through the online E-PLA.

BSES has drawn up an elaborate programme for using drones for monitoring the health of the electricity network, including high voltage lines and grid substations. Using high resolution imagery and infrared thermo scanning, it will involve the inspection of overhead lines and equipment, grid substations, connections, damaged switches, capacitors, detection of theft of equipment and intelligent line profiling. A few pilots have also been undertaken.

**What are some of the business areas that will be covered through IT-OT integration going forward? Which technologies do you think will be most relevant in the future?**

**B.B. Mehta**

Under the future plan of OPTCL, establishment of a Tier 3 standard data centre is planned at corporate headquarters, Bhubaneswar, to house various application servers for a centralised operation.

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BSES spokesperson

Also, revamping and operationalisation of the existing SCADA backup control centre at the 400 kV Meramundali grid substation of OPTCL is planned. A mock drill of real-time operation from this control centre was carried out last month.

Further, as per the advice of the Forum of Regulators, the SAMAST project has been taken up for end-to-end operation scheduling, energy accounting and open access approval to computerise all IT back-end activities of the SLDC, which shall go live by 2021-22.

**Nimesh Mehta**

Going forward, the industry will focus on cost optimisation, asset management and process automation that will improve productivity and lead to the upgradation of ERP systems. Many companies will also embrace business analytics, as it will enable data analysis from different applications and environments, which will help them define new goals and processes, in line with the business needs.

CLP India is rigorously implementing Industry 4.0, an effective approach that drives the adoption of cutting-edge technology and automation to enhance business outcomes, empower employees and serve customers better. Enabling technologies is not our end goal, but a catalyst of transformation for achieving our sustainable business goals. In the short to medium term, we plan to undertake initiatives that include upgradation of the existing ERP solution to automate various processes; monitoring of enterprise KPIs (key performance indicators) through installation of a business intelligence platform; and carrying out pilot projects to analyse various plant-level activities using IoT devices and sensors to improve the overall availability of assets.

A combination of an unwavering dedication to operational excellence and adoption of advanced technologies built on the foundation of sustainable practices and conservation of resources is CLP India's way of contributing to an



equitable future for all.

**Arijit Mitra**

In the immediate future, robotic process automation is expected to play a very important role across processes in enhancing automation and improving accuracy of response. Combined with cognitive technologies including image recognition and conversational AI, it can unleash an immense power in unlocking efficiencies across functions. With the advanced distribution management platform going live, there will be even more focus on field area network automation in the next phase, apart from substation automation. Also a migration from a traditional ERP to an intelligent ERP in the form of SAP S/4HANA, comprising a digital core, is planned in the next one year in order to power the engine room for various critical business processes. As real-time inputs from advanced DMS applications as well as information from the frontiers of business processes travel back from a variety of applications including mobile applications, an enormous business value in such a rich fund of information can be realised with the help of analytics, thereby enabling the organisation to take better decisions across functions.

**Sanghamitra Pyne**

Apart from the IT and OT initiatives that we have adopted, we are moving towards

ramping up the entire ICT services using Industry 4.0 tools while enhancing cybersecurity. The organisations have completely revamped the way business works with the use of collaborative technical tools. In the future, there will be a more decision-based system and a higher level of analytics from the data, which is captured from IoT devices, smart meters, sensors, etc. The use of technology will help data democratised decision-making, and in the post-pandemic scenario, we are likely to move to a more hybrid model of working, supplementing feet-on-ground activities with digital tools across the business.

**Santadyuti Samanta**

TPDDL is working on the deployment of IoT for reliability and asset management. It is also undertaking research and development on new technologies like NLP, AI and predictive integration in business process to improve customer services. We are also working on Kafka, image analytics, robotic process automation, blockchain and AutoML, which are expected to be launched in the next fiscal.

**BSES spokesperson**

Some of the other technologies that have been deployed or are in the process of being deployed are:

- IoT-based condition monitoring of distribution transformers and breakers to improve the customer supply experience.

- Decision-making through analytics to accurately predict future trends.
- VR-based training modules for employees to improve their skill sets and working efficiency.
- Deployment of DMS in our ring network.
- Dashboards to improve visibility of organisational performance.
- CRM system is under implementation for a 360-degree view of the customer and providing a different level of experience.
- Smart metering solutions are being planned for deployment in BSES Yamuna Power Limited.
- Integrated call centre technology is under deployment.
- Robotic process automation has been deployed for customer segmentation and behaviour analysis to improve the level of services to customers.
- Drone-based inspections have been deployed to improve maintenance activities.

Power utilities, which traditionally were wary of adopting new technologies, are now realising their benefits and potential and investing heavily in them. An emerging technology trends survey conducted by GlobalData reveals that cybersecurity, big data, cloud computing, robotics and IoT are being seen as the top five technologies that will have the maximum impact on the sector, over the next three years.

Cybersecurity is receiving maximum attention from power companies to protect grids from cyberattacks. Power utilities have realised the crippling effect that cybersecurity issues can have on the grid and are willing to heavily invest to guarantee protection. Big data and cloud computing are useful tools that support these initiatives. IoT is helping power companies, including BSES, to remotely monitor and manage their assets. Using IoT, utilities can also conduct predictive asset maintenance. ■

*(B.B. Mehta's responses include data inputs from Priyadarshan Patra, SGM, and Priti Ranjan Mekap, DGM, OPTCL.)*