L&T Electrical & Automation
Control & Automation
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Editorial Message

Dear Reader,

I wish you and your family a very happy and prosperous New Year!

With the "Make in India" initiative drawing the attention of foreign companies to manufacture their products in India, the most talked about endeavour of the Narendra Modi / Central Government is 'Smart Cities'. The major objective behind the Make in India is to focus on job creation and skill enhancement in 25 sectors of the economy while attracting capital and technological investment in India.

Experts predict that India's urban population will grow by 40% and contribute 75% of India's GDP by 2030 which means there is requirement of comprehensive development of physical, institutional, social and economic infrastructure.

The Smart Cities initiative would provide core infrastructure and offer a decent quality of life to its citizens, enhance performance and interactivity of urban services to reduce costs and resource consumption. This initiative addresses and integrates four core pillars -- multimodal mobility, reliable power, secure and smart infra, and clean environment. To build these pillars, you need to have solutions which can create a strong foundation.

Smart solutions will definitely bring change to our lives by giving us live status updates on traffic, pollution, parking, water, power and so on. Emerging technologies are poised to reshape our urban environments. Using sensors, wireless networks, web and mobile-based applications, Smart Cities are soon going to become a reality.

With our extensive knowledge, understanding and expertise in the Electrical & Automation space, we are geared to support the Smart Cities mission with competencies and solutions like SCADA, Control System, Electrical and MIS. Our expertise incorporates the know-how, acquired from the commissioning of various solutions across verticals like Building Management System, Highway Traffic Management System, Power Management System, Water SCADA and Automatic Meter Reading over the last decade.

C&A has another interesting new offering in its portfolio – Video Analytics Solutions. For meeting the security and surveillance needs of Smart Cities, video analytics can be used for Object detection, Face recognition, License plate recognition, Assets security, Loitering detection, Overcrowding identification and Emergency response scenarios.

In the case study section, we reveal how Integrated Building Management system installed at the Hyderabad Metro Rail successfully operates and manages various utilities for the convenience, comfort and security of travelers.

We are also delighted to feature an interview with Mr. Prashant Newaskar, Chief Engineer – RAPDRP at Maharashtra State Electricity Distribution Company Limited that captures his experience of working with C&A.

Finally, we are sharing insights about 'Industrial Internet of Things' (IIOT) and its perspective on Smart Cities' development that fulfills the need of changing marking demands.

I hope you enjoy reading this new issue of CANVAS and I look forward to your ongoing support, encouragement and feedback.

Happy Reading !!

J. K. Chattopadhyay

SMART Operation - Understanding the Business Value of Industrial IoT

In today's fast-paced environment, manufacturers are implementing advanced technologies to accomplish the objectives like delivering quality product on time or increasing production capabilities and quickly introducing new products to the marketplace. Smart operation is the top priority for manufacturers today. It is the one where systems across the enterprise are digitally connected and huge volume of data is shared to gain better visibility and quick decision-making.

For years, the automation industry has been centered on a five-layer hierarchical architecture - Purdue model of Computer Integrated Manufacturing (CIM) which defines manufacturing operation management. But today we see there are tremendous technological innovations and refinements in the processor capability, power consumption, memory availability and communications channel which bringing change when creating the CIM reference model of hierarchical data flow in manufacturing operation. It is a model that defines how information would flow from the shop floor into high-level enterprise business systems. And, since it is always assumed, each layer would share the upward flow of information.

With the IIoT (Industrial Internet of things), the model of a hierarchical data flow is changing instead of point-to point data capturing and sharing it with the next-level. Due to technological innovations, now the objects of everyday life will be equipped with microcontrollers, transceivers for digital communication, and suitable protocol stacks that will make them able to communicate with one another and with the users, becoming an integral part of the Internet. This will change the whole perceptive of assets/systems hierarchy in the enterprise. The sensors/actuators will be embedded in physical objects and linked to wired/wireless network, leveraging internet protocol for communication with centralized systems.

The industrial automation systems are modeled on 5-layer hierarchical architecture based on the Purdue Reference Model (PRM). Typically, these layers are:

Level 5 – Business layers : ERP, Plant Performance
Level 4 – Operation Systems : Production planning, MES
Level 3 – Supervisory : Process Control, SCADA
Level 2 – Control Systems : PLC, DCS
Level 1 – Devices : Sensors, Actuators, Instruments
Level 0 – The physical process

However, with the advent of new technology, the difference between layers has started diminishing. The layers have actually started merging.

Communication

Let us look at the communication between layers from Level 1 to Level 5. Most of the prevalent deployments require the Level 1 to communicate with Level 2 only. Controllers in Level 2 process the data and further pass it on towards Level 3. With the implementation of IIoT and IPV6, Level 1 devices are becoming IP enabled and hence able to directly communicate with systems residing in other layers.

Similarly, Industrial IP (IIP) allows all layers to communicate with each other over IP network.

Processing Power

Now, let us look at the processing power at different levels. The earlier Level 1 devices were mostly designed to specific data gathering or actuating activities and have little processing power. However, with the immense development in computing & processing power, new CPU chips are available at much cheaper costs. So, in the same size, power consumption and cost, the Level 1 devices have become more intelligent.

Similarly, Level 2 controllers, which used to process controlling logic & algorithm and pass on the information to Level 3 for supervisory control, have graduated to faster, powerful and leaner processors. The processing that is done on Layer 3 computers is now possible and manufacturers have started embedding them in Level 2 controllers.

Data Gathering

In the traditional model, the Layer 0 devices gather only necessary signals and each upper layer processes it further, extracting meaningful information from it. The higher the layer the more meaningful is the information for overall business context. However, the source data itself was of less quantity and size. Nowadays, devices have become more intelligent and powerful, hence they not only gathers information required for control and automation purpose, they also gather and process additional information that can be directly processed by systems at higher level as well as can take actions based on instructions received from higher level of systems.

Apps in place of Applications

Intelligence in traditional automation systems are based on large application running on servers and workstations. Applications can execute multiple functions, are bloated in terms of computing power required and have slow release cycle for new functionalities. With the introduction of mobile devices like Smartphone, Tablet or Laptop, 'Apps' which can do small number of functions for specific activities in really small footprint in terms of computing power required have become popular. The release cycle of 'Apps' is also very fast.

This is changing the way automation of systems is handled. User can monitor the automation systems operation and performance using an App, whereas the O&M team uses another App for handling the work order and history of equipment maintenance. The top management uses an analytics App for viewing the overall system's performance with respect to business context.

As a result of these innovations, the difference between layers has started diminishing and merging of layers is happening. From 5-layer architecture, it has started becoming 3-layer architecture -

Level 3 – Business layers & Operation Systems

Level 2 – Supervisory : Process Control, SCADA

Level 1 – Devices & Control Systems

Level 0 – The physical process

These have created a new way of solution realizations for both automation system manufacturers and System Integrators. The solutions do not consist of Product, Software and Integration, but a significant portion is continual Services – evolving system configuration, discovery of meaningful information from multitude of data and new way of decision support systems. New business models have started emerging and we are going to see new competitive landscape in the market.

Video Analytics - the third eye for Smart Cities

Smart Cities are being widely talked about. At L&T Electrical & Automation's Control & Automation (C&A) business, we develop solutions that make smart a little bit smarter. We do it through Video Analytics which essentially means making better sense of everything you see - essentially adding a smarter edge to the function of security and surveillance.

Video Analytics plays an important part in the benefits that Smart Cities offer. It leads to intelligent security and surveillance, smart traffic management and smart retail. In a Smart City powered by L&T Video Analytics, the number and severity of accidents and incidents can be reduced through a better understanding of how people behave. When an incident occurs, enhanced information should enable the emergency service providers to respond more quickly and effectively.

Video Analytics plays a vital role by identifying events, attributes or patterns of behaviour through video analysis of recorded situations. It monitors video streams in real-time, automatically generates alerts and facilitates forensic analysis of historical data to identify specific incidents, trends and patterns, to keep people safe and prevent accidents or criminal activities.

In meeting the security and surveillance needs of Smart Cities, Video Analytics can be used for object detection in crowded environments, face recognition, license plate recognition, asset security, loitering detection, overcrowding identification and emergency response scenarios.

It has the most comprehensive applications ranging from Behaviour Analysis to Face Recognition, which enables coping with crowded scenes. Its unique Artificial Intelligence capability called NAMS (Nuisance Alarm Minimization System) helps to minimize false alarms.

L&T's core strength lies in offering a whole spectrum of sustainable and scalable systems in security solutions for City Surveillance Systems. This helps organizations to detect more, understand more, and have actionable information to either respond proactively to prevent an incident or respond rapidly if and when, one does occur.

With over 30 years of domain knowledge, application expertise and world class integration experience, L&T is well positioned to be a partner for making your city safe and secure.

Our solution features

Face Recognition in a Crowd

L&T's ***iVision$_{max}$-VAS***'s iQ-FACE is the world's first many-to-many Facial Recognition system that can operate in a crowded scenario. The iQ-Face can detect and record faces in busy environs for manual review. It detects first and then automatically recognises multiple faces, which can be matched against a specified database or multiple databases.

iQ-Face excels in uncontrolled environments with variable lighting, continuous movement, low resolution and variable facial angles and increases the probability of identification of 'wanted' individuals in a crowd.

Object Detection in Crowded Areas

Unlike traditional Video Motion Detection (VMD), which relies on motion to perform its detection, our solution is capable of detecting even tiny objects invisible to the human eye that are placed in the most common and dangerous environments such as busy or crowded places despite obscuration and constant movement. It is able to distinguish between objects that are left for a few seconds and objects that are abandoned for much longer periods of time. The detection time can be adjusted to suit the needs of the user and the constraints of the environment.

License Plate Recognition

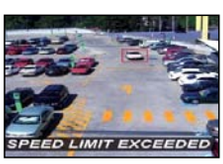
L&T's ***iVision$_{max}$-VAS*** provides highly accurate License Plate Detection and Recognition. The system can detect and record plates for manual review. The more comprehensive License Plate Recognition system incorporates License Plate Detection and then automatically reads the required characters in any image. With the ability to use colour, it can recognize plates from almost any country. It can compare this information against a database or multiple databases and take action, such as trigger a control relay to open a gate, detect license plate details of speeding vehicles and recognize the license plates of stolen vehicles to compare it with a police database.

People/Vehicle Counting

It is equipped with facility to count and give a cumulative total of the number of objects that have passed through one or more areas of interest that are drawn on the screen. The software will count traffic that passes through a region in specified directions whilst ignoring traffic from other directions. Sophisticated filters, including human templates and the ability to see perspective can be used to ignore unwanted objects and focus only on humans or cars for instance.

It can consolidate values from multiple cameras or servers, and has the ability to automatically add and subtract count totals. This is extremely useful in determining occupancy levels where there are multiple entry and exit points

Vehicle Speeding Detection



The technology has a high intelligence and is able to detect the speed of vehicles and raise an alarm if a vehicle is exceeding authorized speed limits. Using different methods, traffic speed of every vehicle can be calculated. It measures the time taken by a vehicle from Point A to Point B and provides the average speed, which is important to track vehicles slowing down at Speed Cameras. By using License plate recognition feature, the system can assist law enforcement and automate the finding process for violated vehicles and individuals.

Perimeter Detection & intrusion Detection

The perimeter protection function is used to secure off-limits areas of property at night (or day) and protect from intrusion. The software can alert security personnel in the event of an intruder attempting to trespass or when a person comes within a specified distance of a valuable asset. Whenever a defined perimeter is breeched, the event is recorded and an alarm can be raised. Any number of areas of interest can be set up on the screen with separate filters. The flexibility of the software is such that it can differentiate between different types of objects allowing the user to ignore certain objects and target others such as people but not small animals and it can even distinguish between cars and trucks, and focus on the specific target.

Theft Detection

Its unique Non-Motion Detection feature prevents thefts from occurring. It is capable of detecting the removal of multiple objects from crowded and busy scenes despite obscuration and constant movement in the camera's field of vision. The system can detect when someone has removed the object from its location and identify the suspect using many-to-many face recognition system. The detection time is fully configurable to suit the constraints of the environment and the needs of the user.

Red Light Violation Detection / Parking Violation

L&T's ***iVision$_{max}$-VAS*** suite offers a comprehensive solution for the many applications required in the road & traffic industry like intelligent traffic monitoring, law enforcement, parking. It prevents illegal parking for all kinds of vehicles or for specific vehicles, prevents vehicles from crossing the line when the traffic light is red.

It handles complex and changing environments, such as different time periods for parking regulations, parking specifications for particular vehicles, and has the flexibility to meet any unexpected incidents.

It has a comprehensive monitoring system to monitor the entire city's traffic, from high speed freeways to low-speed areas such as schools, shopping malls and hospitals.

Smoke & Fire Detection

Our solution is particularly useful for forest fire detection, industrial and tunnel safety applications. It operates both during the day and night, and enables visual identification of smoke/gas leak in situations where traditional smoke detection products would be ineffective. For example, standard smoke and fire detection systems cannot always be used in busy city environments, especially if they involve open air situations.

Case Study

Integrated Building Management System for Hyderabad Metro Rail

About Customer

L&T Metro Rail (Hyderabad) Limited (HMRL) is a Special Purpose Vehicle incorporated by Larsen & Toubro (L&T) to implement Hyderabad Metro Project on Design, Build, Finance, Operate and Transfer (DBFOT) basis. The Company is a subsidiary of L&T Infrastructure Development Projects Limited (L&T IDPL), an infrastructure development arm of L&T. It has to its credit, 50 successful projects across many sectors comprising metros, railways, highways & expressways, bridges, seaports, terminals, airports, urban infrastructure, rope ways, water supply projects, sanitary engineering projects, bulk material handling projects, power transmission utilities, gas/oil pipelines, hydel power and nonconventional energy projects.

Need

India is experiencing a rapid rate of urbanization, which is expected to grow 40% by the year 2030. With the growing population in Metro cities, it becomes very important to provide sustainable infrastructure to withstand the growing demands.

Hyderabad is one such city, which is on the verge of tremendous growth in population and traffic. Being the capital city of Telangana state, it has emerged as the hub of IT/ITES, Biotech, and Pharma and Tourism sectors and expanded over 70 kms. Hence its requirement for a quick means of transport that would reduce the travelling time of passengers.

The government therefore decided to set up a well-planned public transportation infrastructure through Hyderabad Metro Rail Project to meet Hyderabad's rising public transport needs and escalating vehicular traffic. From amongst the various public transport options available, it emerged that high-capacity rail-based metro systems were ideally suited to meet Hyderabad's emerging need in urban areas. Metro rail is preferred over other means of transport since it provides faster, cost effective, convenient, secure and comfortable travelling at lower costs.

L&T was awarded the prestigious task of implementing this project of national importance. It comprised three high-density Metro corridors covering a total distance of 71.16 km, involving 66 ultra-modern station buildings, state-of-the-art depots and complete infrastructure.

For assisting the railways in achieving their technological needs, L&T Electrical & Automation's Control & Automation (C&A) Business Unit joined hands with HMRL to deliver Integrated Building Management System (IBMS) at all its 66 stations, Admin Operation Control Centre (OCC) and 2 Depots at Uppal & Miyapur.

Solution

For the convenience, comfort and better security of travellers, each station/depot of HMRL has various systems such as HVAC, Power Distribution System, Fire Alarm and Protection Systems, Lighting, PHE, UPS, Lifts and Escalators, Automatic Fare Collection System (AFC), CCTV and various other electrical and mechanical systems.

In pursuit of flexibility, interoperability and efficiency, HMRL sought an intelligent Building Management Solution that would support new and improved operations and customer services over

the life span of the Metro services and thus benefit the public, operators and the L&T team.

C&A was responsible for the design, engineering, supply, installation, testing, commissioning & life cycle support of the Integrated Building Management System (IBMS) at 66 ultra-modern stations and 3 depots, including the setting up of an OCC and Back up Control Centre (BCC).

C&A has delivered its state of the art ***iVision***$_{max}$ SCADA suite along with RTUs configured in redundant architecture at each of the stations and depots for monitoring and controlling of various parameters of the station building. At OCC and BCC, ***iVision***$_{max}$ SCADA suite is implemented in redundant architecture along with ORACLE RDBMS based Historian, in disaster recovery configuration.

C&A's ***iVision***$_{max}$***-IBMS*** solution controls and monitors 63000+ I/Os, 321 control panels and 1600+ instruments spread across all stations. It monitors and controls lighting as well as equipment such as lifts and escalators, Fire Alarm System, HVAC, STP/ETP, PHE, UPS, VFD, DG Sets, Energy Meters, Electrical System so as to provide better comfort for passengers at stations by effective utilization of ventilation & air conditioning and electrical installations.

System Highlights

- Helps in automatic fault detection and diagnosis strategies for building energy performance, HVAC sub systems and their control instruments.
- Senses emergency conditions such as fire and executes predefined emergency mode sequences, which in turn ensure that all related equipment at station premises function in safe mode of operation
- Protects against hot and cold temperature extremes. This generally involves running heating or cooling system pumps when external temperature reaches a set level.
- Tracks entire data from all the stations at OCC and BCC in real time, eliminating any chances of possible human error.
- Provides equipment scheduling (operating equipment as required), Optimum start / stop (running of HVAC equipment only during occupancy), Operator adjustment (accessing of set points to tune the system), Monitoring (logging of temperature, trends, equipment start & run time, operator log on etc.), Alarm reporting (notify failed equipment, out of limit temperature / pressure) and status of specialised systems like lighting control, load management, access control, etc.
- Offers high-level dashboards through which operation teams can easily monitor the efficiency, availability, performance, safety and security of the entire facility. It also creates a safer, secure and more comfortable facility which facilitates better building control and lower operating costs.

One of the biggest challenges faced during commissioning, was setting up a high speed network, extending across 70 km covering all stations & depots and OCC & BCC buildings for real time communication. The commissioning team had to manage a vast geographic canvas as the site implementation was carried out simultaneously at multiple locations. It implemented the city wide OFC Network in ring configuration with Network Management System to monitor all the network nodes for robust communication between the various stations and master stations.

For managing the different sub-systems installed at various facilities of the site, integration was another challenge. The IBMS system at each station had to be interfaced with 20+ sub-systems from multiple vendors, with different control philosophies. To address this, C&A used industry preferred standard Modbus protocol to collect precise and accurate data.

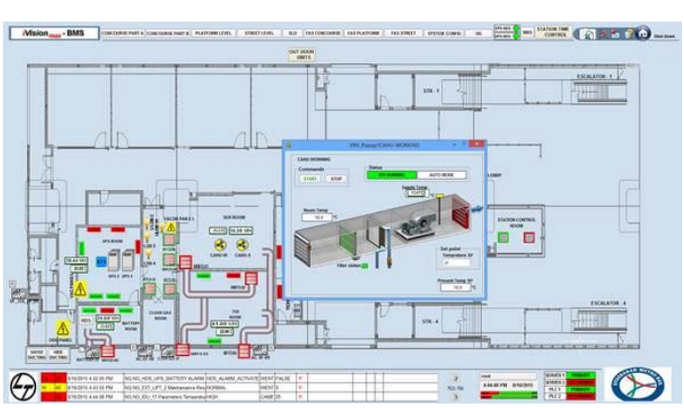
iVision$_{max}$***-IBMS*** is also integrated with the Communication system on OPC and Asset management system using MQ/XML, which provides equipment data for maintenance management, asset tracking & utilization and spares management.

The first phase of the project has been completed and the system is already in operation for 7 Stations, Admin OCC and 2 Depots – Uppal & Miyapur. To ensure on-time delivery of the project, site teams have been parallelly working on the project throughout.

Benefits

The system architecture perfectly suits Hyderabad Metro Rail's Infrastructure and expansion requirements. This ensures the availability of live data at centralized location with following benefits.

- Ease of operation and improved reliability
- Total system integration with a single interface
- Enhanced service delivery
- Better utilization of power and human resources
- Effective incident management in case of accidents / emergencies
- Clear understanding and control over energy consumption, which helps in cost reduction
- Convenience for operators and passengers, thereby leading to customer satisfaction
- Maximum system availability, reliability through automation integration and optimization of entire subsystems
- Improved operation & maintenance with visualization of all the station parameters and operation data at a centralized location
- Optimized performance and greater control, creating operational synergies and reducing complexity over the lifecycle of Metro facility



C&A Participates in Inter Solar 2015

L&T Electrical & Automation's Control & Automation (C&A) Business Unit along with Power Transmission and Distribution IC of L&T Construction Group participated in InterSolar 15, one of India's largest exhibitions and conferences for the solar industry. The event was held in Mumbai during November 18-20, 2015.

C&A displayed its **Vertor RECon** (Solar Grid Inverter). The REcon Line of Central Inverters are highly reliable, efficient and offer essential features designed for large solar plants. The modular industrial design of the inverters makes it easy to install, operate and maintain and also improves durability and efficiency over its entire lifecycle.

C&A also delivers high-efficiency power evacuation systems on concept-to-commissioning basis for utility-scale solar PV plants. Its BOS solutions comprise HV/MV switchboards, RMUs, relays, transformers, meters, SCADA and control systems. It designs, engineers, manufactures, tests and installs electrical systems, electrical protection and control systems and civil installations adhering to prevailing electrical standards.

Inter Solar is an important industry platform for manufacturers, suppliers, distributors, service providers and partners in the global solar industry. The event also provided a platform for interaction with interested customers and vendors.

Enhance Customer Support Model

Customer Voice Matters	*L&T AUTOMATION*
We welcome your feedback, Email us customervoice@LnTEBG.com	

The ultimate goal of a customer-centric organization is to provide a satisfying experience during every customer interaction. Over the past few years, Control & Automation (C&A) Business has continued to grow its market share in India. This growth is due to the high degree of trust customers have in C&A's ability to make their processes safe, efficient and reliable.

To build a customer centric organisation, C&A has taken the first step. It has created a dedicated email-id "CustomerVoice@LnTEBG.com" in order to capture the voice of its customers. Customers' views, suggestions and grievances will be monitored and resolved by a dedicated committee.

Mr. Jayanta Chattopadhyay, Head of Control & Automation Business Unit says, "We want to make sure that we listen to every customer's voice and provide answers to their utmost satisfaction within 24 Hours of receipt of emails. This initiative will further enhance our capability to keep our promises and deliver responsive support on time".

C&A has also established an After-Sales Support Cell and Training Center at its Navi Mumbai campus to offer its customers an unparalleled service experience..

Customer Speak

The Control & Automation (C&A) business of L&T Electrical & Automation has executed part A of Restructured Accelerated Power Development Reform Programme (RAPDRP) project sponsored by Government of India through PFC - Power Finance Corporation as a nodal agency for Maharashtra State Electricity Distribution Company (MSEDCL) at a value above Rs. 200 crore.

RAPDRP programme was divided into two parts -Part-A and Part-B. The scope included was establishment of baseline data (AT&C loss in each town having a population of more than 30000) with IT applications like Meter Data Acquisition, Automatic Meter Reading, Billing, Collections, GIS, MIS, New Connection, Disconnection, Customer Care Services, Web self service, Energy Audit to measure AT&C losses and enhance consumer service as well as strengthening the distribution network.

After completion of the project, we spoke with Mr. Prashant Newaskar, Chief Engineer-APDRP, to capture his experience while working with C&A during the execution of the project.

Brief us about MSEDCL's Operations in Maharashtra

The Maharashtra State Electricity Distribution Company Limited (MSEDCL) is the power distribution company in the state of Maharashtra. It supplies electricity to a staggering 2.25 crore consumers across all categories in Maharashtra. Presently, its existing network handles peak load of about 16000 MW.

With a vision to cater 24x7 power supply (except agricultural), MSEDCL has formulated an infrastructure plan. The plan envisages segregation of Single phase and Gavthan consumers, erection and commissioning of local sub-stations to reduce technical losses, addition of HT lines, and augmentation of distribution transformers besides existing electrical distribution network to provide good quality electricity to the consumers...

Please give us brief initiatives of R-APDRP project and how it has helped MSEDCL and consumers

The objective of RAPDRP programme is to measure and take action to reduce the aggregate technical and commercial (AT&C) losses in the power distribution areas and provide better consumer services.

L&T was awarded a contract by MSEDCL for Information & Communication Technology (ICT) implementation work which includes installation of 25,400 modems for AMR (Automatic Meter Reading) , establishment of IT infrastructure in 810 offices along with communication network, asset mapping & consumer mapping on GIS, development of various applications (New Connection, Disconnection, Network Data Management, Energy Audit, GIS, CRM, etc.), integration of the legacy system with existing and new applications along with Identity & Access Management System, setting up of a Data Centre in Mumbai, Disaster Recovery Centre in Nagpur and 24X7 customer care centre (CCC) at Bhandup (Mumbai) covering 95 towns in an area of 25,342 Sq. Kms.

This project established the baseline data of revenue and energy by automatic monthly Energy Audits & Management Reports, without human intervention. It is an excellent tool for helping MSEDCL to strengthen distribution network, proper energy accounting and auditing, bringing transparency, AT&C loss reduction and has helped towards fulfilling MSEDCL's vision of providing 24x7 power supply.

The project has also helped MSEDCL to automate various processes like online bill payment, New connection, Disconnection, Meter change tracking, name or address change, payment and consumer complaint and its status for all consumers across the state. Now consumers can receive their monthly bills via email by registering on MSEDCL's website. Consumers can register complaints / requests by contacting CCC on toll free phone number or website.

How is your experience of working with L&T-C&A?

We have been working together to tailor the system to MSEDCL's need. It was a significant achievement that we have accomplished. RAPDRP project was launched in all states of India. MSEDCL-RAPDRP was front runner along with Gujrat and West Bengal. We are very satisfied with L&T's way of project execution, performance of system supplied and professional approach shown during the project execution. This resulted in successful completion of RAPDRP project in MSEDCL.

Do you consider L&T a preferred ITIA for future work in MSEDCL?

The RAPDRP – part A project has clearly fulfilled its aim of establishing baseline data and identifying pockets to reduce aggregate technical and commercial (AT&C) losses in Maharashtra. The government of India has announced the second phase of similar project under the name of 'Integrated Power Development Scheme' (IPDS) with the objective to provide 24x7 power. The scheme will help in the reduction in AT&C losses; establishment of IT enabled energy accounting / auditing system, improvement in billed energy based on metered consumption and improvement in collection efficiency.

In Maharashtra, additional 126 towns with a population above 5000 shall be covered under IPDS scheme. We shall be happy to work with L&T again and suggest that L&T participates in the IPDS scheme.