

# **Role of IT in Power Sector –Focus on Distribution systems**

by

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## **Introduction**

Information Technology (IT) has the potential to contribute significantly in the power reforms process, particularly in the areas of business process automation, revenue and commercial management, distribution system automation, consumer relationship management (CRM) and ATC loss reduction.

The power distribution utilities in India have initiating major reforms using IT as the key enabler for improving revenue collection, minimizing ATC losses, proper energy accounting and efficient consumer services. This article discusses the role of IT in Power Sector, with special focus on Distribution reforms.

## **Business challenges of Indian power utilities**

In the wake of the Indian Electricity Act 2003, the complexity and challenges of the power sector have increased manifold. The Act invokes the philosophy of liberalization, competition and commercial motive for business survival. This makes the process of balancing the commercial objectives vis-à-vis the social concerns even more challenging. In the present business environment, utilities have to re-engineer and automate their business processes for sustainable growth and survival, with the following objectives:

1. Capacity building and operational efficiency
2. Business process efficiency
3. ATC loss reduction
4. Metering, billing and collection efficiency
5. Total energy accounting
6. Better customer relations and consumer satisfaction

The adoption of latest and best-of-breed technology is essential to fulfill the above objectives and therefore, Information Technology is perceived as the principal thrust area to spearhead our country's agenda of power reforms, despite the difficulties faced due to the slow absorption of new technologies.

## **Challenges of IT in Power Sector**

There is a plethora of IT options available in the market today and it is important not to get carried away by the technology wave, but choose the appropriate (best-fit) technology, as per the industry needs, at the right time for the right set of applications. The selection of IT systems and tools should be based on long-term strategic and business continuity perspective. The following factors are critical in any IT implementation:

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1. Adoption of open architecture and adaptive communication network based on proven standards and specifications
2. Consistent infrastructure for data collaboration, communication and interoperability
3. Authentication and role-based access to the network
4. Robust and scalable architecture to support large volume of transactions
5. 3-tier architecture for easy modifications of business logic and SW deployment
6. Platform-independent application components for easy migration to new platforms
7. Disaster Recovery and Continuity Planning

### **Adoption of open architecture and adaptive communication network**

For implementing any hardware/ software based solutions for the enterprise, it is extremely important and critical to have a robust, scalable, adaptive and open systems computing and communication architecture. Going by the information systems lifecycle, emergence of new technologies and technical obsolescence, the data network infrastructure, around which the enterprise applications are built, survives the longest. Therefore, the network infrastructure should be built around standards-based technology, conforming to ISO/ IEC 11801 and EIA/ TIA 568B framework.

### **Data collaboration, communication and interoperability**

The global best practices approach in applications development is to have a modular design, integrating various applications and accessible through a common interface or “dashboard”, with secured access control, multi-level user permissions and audit trail. The enterprise software “dashboard” is the gateway to various integrated business applications – Automated meter reading, data logging, billing, collection and CRMS.

### **Robust and scalable system architecture**

The choice of hardware platform, OS, database and front-end tools would depend upon the type and volume of transactions. Robust and scalable system architecture should support future expansion, role-based authentication, secured databases and larger volume of transactions and disaster recovery.

### **Disaster Recovery and Continuity Planning**

Automated data backups are essential for the protection of vital data and their recovery during catastrophic failure. Apart from hot incremental backups, it is essential to take cold backups of the entire database and applications. For mission-critical applications, it is better to have separate Database and Application Servers. Clustering solution at both OS level and database level is recommended, along with RAID support for data redundancy. The integration of Servers, RAID storage and backup devices through Fiber-channel architecture enhances efficiency and performance. Cross backups across multiple servers, preferably at remote locations, are healthy business practice. Many installations now provide for a dedicated Disaster Recovery Server, with data replication facility.

## **Role of emerging technologies**

The gap in IT adoption globally and in the Indian power sector is apparent. Globally IT is being used to enable operations at a transaction level thus providing advantages like in-built process controls, workflow enabled transactions, single point of data capture and support for timely strategic decision making. On the other hand, in India, the core operations are still manual and therefore face issues like ad-hoc decision making, poor data quality, long decision making cycles and under utilization of IT investments.

Therefore, IT has to be selectively adopted as a business strategy to improve commercial and operational performance. The need is to develop a synergy between IT and the Indian Power Sector and emerging technologies can play a defining role in profitability and quality of services.

### **Consumer Database indexing and Electrical Network mapping**

Development of electrical consumer and network database is necessary for a host of power sector applications like asset management, revenue management, energy audit and load flow studies. Several distribution companies (Discoms) are using GIS technology to map their HT/ LT consumers and electrical network assets. This required a GPS survey of consumer households, the connected electrical feeders and distribution transformers. All the consumers are given the unique electrical address (or CIN, Consumer Index Number) so that it is possible to segregate the consumers feeder-wise or DT-wise for energy audit and accounting purposes. The geo-referenced data is mapped on the underlying satellite imagery of appropriate scale.

### **IVRS-based consumer call centre**

Electrical consumer is the focus of an IVRS-based call centre where IT application can be adopted for consumer's benefits. The IVRS-based system is aimed at improving customer services and increasing staff efficiency. For example, an IVRS-based system is operational in Dehradun for single window clearance of all types of customer complaints. The call center addresses consumer complaints ranging from no power, billing, payment-related and connection-related. In the round-the-clock facility offered to electrical consumers of Dehradun town, the complainant logs the call through interactive voice guidance to access information on bill-related matters, while the respective substations track down electrical complaints.

## **Integration of business and IT strategy**

The global IT market for the power distribution sector provides a wide range of technologies and solutions. These solutions address the entire business value chain in power distribution – from setting up distribution network and service connection to distribution load management, delivery of power and customer services.

Therefore, IT investments and implementation should be driven through a structured and comprehensive IT strategy, aligned with the business goals. The interfaces and integration between different software applications should be well-defined. A synergy should be established to maximize benefits from IT investments to best serve the business needs. Effectiveness of IT investments should be monitored on an on-going basis. Business process automation should aim at data capture at source- to reduce transaction time, enable built-in process controls, enables audit trail, and provide appropriate and reliable information for decision support. Seamless business process integration accelerates transactions and optimizes sharing of information across business processes.

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**About the author:**

Mr Jayant Sinha is an engineer with over 23 years experience, specializing in IT solution design and implementation in the Power sector. He has executed various IT Projects for NTPC in Rihand, Dadri and Auraiya. He is currently posted at the Uttarakhand Power Corporation Ltd. as Head of IT and involved in the planning and development of IT systems for Power Distribution automation and reforms.

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