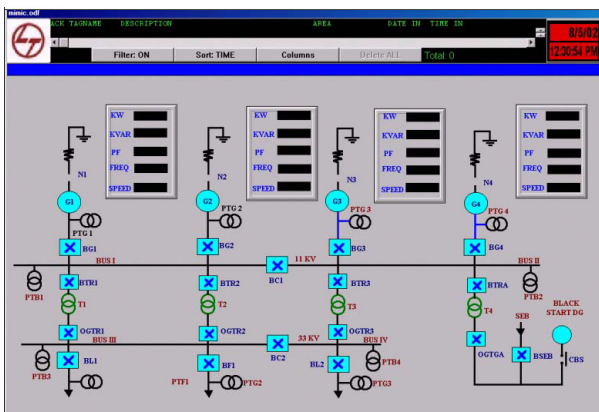


# LnTEMS™ - plus

## Power House /Substation / DG Automation - LnTEMS™ - plus

Though Industrial Consumer constitutes nearly 55 percent in terms of Revenue to an Electric Utility, the irony is that they are always facing chronic power shortages with low voltage supply and involuntary load shedding. Power is important for running the industry and will be an important factor in advancing the competitiveness and reducing the cost of the Product. With no reliable power supply, Industrial Consumer are increasingly putting up captive generation and today it accounts for, nearly 20 per cent of total installed capacity in India. However such Captive plants are costly in terms of capital investment and running expenses. Power management/ Demand Management, hence, becomes a crucial initiative towards profitability of any industry by mitigating power shortages and reducing capital needs for additional power capacity expansion..



Generally, the costs related to power can be categorized into following components:

- Cost of capital required for investing into generators and distribution system
- Cost of running the generators (Fuel, Maintenance and Manpower costs)
- Utility company charges (MD, kWh, commitment charges, etc.)
- Indirect costs of "Production Loss" due to unreliable power system.

A need surely exists for an automation system that will help user to take control of above costs. How? Well, L&T AUTOMATION has the answer!

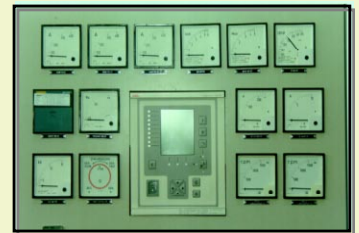
Power system in any industry is a combination of captive generation and the grid. Captive generation can be again a combination of DG sets, Gas turbine generators, Steam turbine generators etc. The connected load generally consists of critical and non-critical loads (priority/non-priority loads). Hence there

is a scope to manage the balance between the available power and the connected load so that all costs are within limits.

A good automation system and SCADA provide following functionalities for efficient Power Management:

- ◆ Synchronization of generator/s with the bus, generator bus with the grid

- Before the generators are connected to the BUS the generators have to be synchronized with the BUS in terms of Voltages, Frequency,



Phase Sequence and Phase Angle through the PLC system. This is done through a synchronization relay and Check Synchro Panel using one of the following sequences:

- **Dead Bus mode**

Breakers are closed directly i.e no sequencing will be there

- **Check Synchro Mode**

Voltage & frequency are adjusted by Push Buttons provided in the Synchronization Panel. Corresponding AVR/Governor gets the signal from PLC as per the selection made. If Voltage/frequency is to be increased in more than one Gen., the PLC will issue parallel command to corresponding AVR/Governor. Breaker is closed manually once the voltage & frequency match.

- **Auto Mode**

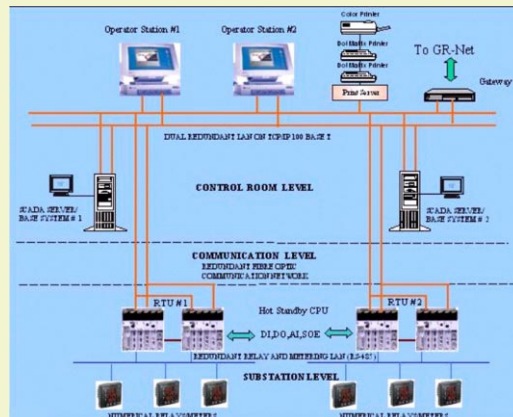
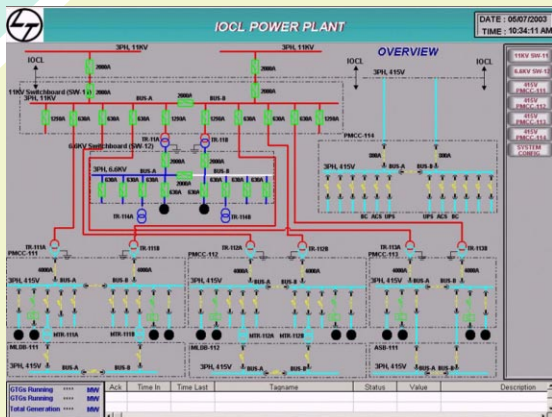
Above procedure is carried out by automatically using Auto Synchronizing Relay & PLC

- ◆ Active and reactive load sharing between the generators based on their capacities by corresponding Governor/AVR control.

- ◆ Control on maximum power to be drawn from generator

- ◆ **Load demand management such that,**

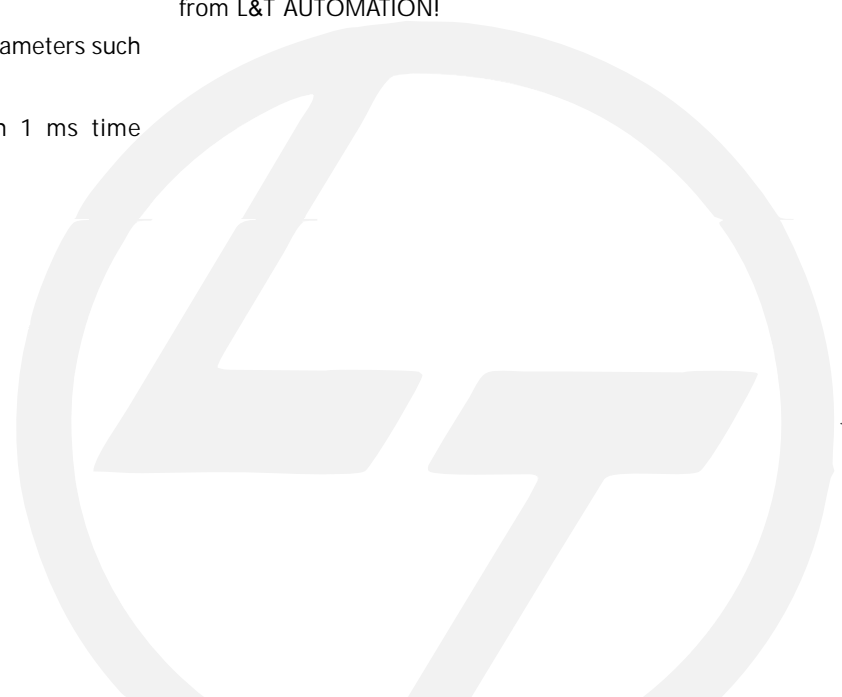
- MD is never exceeded (*Penalty charges are avoided*)
- Power from utility company is fully drawn so that commitment charges are effectively utilized. (*Less cost per unit consumption*)



- If load is low, generators are switched off. (*Running cost of generator is saved*)
- ◆ **Load shedding and bus isolation from the grid**
  - If load is more than the available power, due to loss of generation capacity, load shedding program immediately initiates load shedding based on non-priority assigned to loads. Thus, tripping of complete power supply is avoided and *possible loss of production is prevented*.
  - df/dt based load shedding prevents tripping of generators as load is reduced based on the level of rate of drop in the frequency.
  - System automatically prompts the operator to switch on tripped load based on available power.
- ◆ Generator protection
- ◆ Data acquisition and archival of all electrical parameters such as KWh, KVA, KVAR, MD, V, I, PF etc.
- ◆ Alarm management and event logging with 1 ms time stamping using SOE modules.
- ◆ Network visualization and operator controls

- ◆ Trends (real-time and historical) and reports on energy consumption pattern
- ◆ Connectivity to DCS and MIS, based on open and standard protocols

The Power House / Substation/ DG automation and SCADA package, LnTEMS™-plus offers all the above functionalities. It is an effective tool for Power / Demand Management by achieving energy efficiency through reduction of kilowatt-hours of energy consumption or demand load management or displacement of demand from peak to off-peak loads. It is a scalable solution based on standard software & hardware platforms and uses standard & open protocols. Thus, LnTEMS™-plus, benefits the Users through higher energy efficiency, improvement in quality of power, reduced / nil outages for critical processes / loads and also reduction in cost of power. All this is coming to you from L&T AUTOMATION!



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