

Smart Buildings Vision

Smart buildings that enable productive



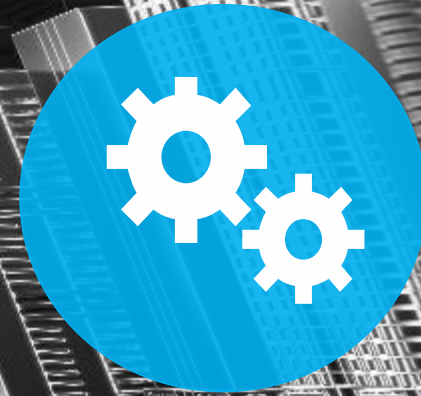
Connected

Connected buildings with smart devices and sensors capturing real-time performance data.



Efficient

Efficient resource management and predictive maintenance using building performance telemetric data.



Productive

Track and manage the building management activities from a mobile device. Make people work better and faster with Smart Building-provided services.

i-BEMS : System of Systems



Connects to the control systems operating in silo and help to save the energy



Lighting Control



HVAC Control



Electrical Energy Monitoring

Our approach to deliver Smart buildings

End to End Ownership

- L&T TS is prime owner, responsible for overall program management and deliverables.
- Home grown Smart building IoT Platform – iBEMS



- L&TTS Solution for System of Systems

Assured local support

- System Integration services leveraging L&TTS expertise combined with partnership with local implementation partners



Smart Buildings Vision & Strategy

- Partnership with Microsoft Corporation to leverage Smart Buildings Services Design & Deployment

Strategic partnership with OEMs

- Partnership with OEM suppliers for engineering, supply & implementation based on L&TTS experience with Smart building automation

World's Smart Buildings



i-BEMS - Smart Use Cases



Lawn Management

- // Detect PH, Temperature, Humidity and rain water of Lawn
- // Algorithm to water the lawn / add manure based on the above parameters
- // Saves unnecessary watering of the lawn



Elevator Management

- // Enhancing efficiency by Predictive Maintenance & Control
- // Live Dashboards and Summary reports



Smart Ticketing for Cafeteria

- // Operator will be able to identify which counter are used more and will be able to position the counters better based on the usage.



Smart Parking

- // Track number of cars entering and leaving parking (parking guides and Mobile interface)
- // Track empty slots and report
- // Automated number plate recognition while entry and exit
- // Automated Barricade with access cards



Waste Water Treatment

- // Monitor and control water treatment plant
- // Monitor water quality PH, BOD, BYD, Ecoli and Chlorine)
- // Generate report for Pollution control board



Video Analytics

- // Integrated Video Camera with algorithms to detect CO₂, Occupancy, Lux, Fire and Smoke and Intrusion

i-BEMS - Smart Use Cases



Meeting Room Management

- // Automatic Occupancy detection using sensors inside meeting room
- // Ability to check “Booking” status of the meeting room based on room booking status from Outlook
- // Ability to control lighting and HVAC based on occupancy and room booking status.



Transportation

- // Ability to interface with Moovit service in order to provide public transportation information
- // Ability to interface with Waze/Google service in order to provide traffic information



Smart Lockers

- // Ability to view locker notifications in the application
- // Locker allocation management (reminders, overdue)
- // Ability to find free locker



Smart Campus Services

- // Ability to display location of corporate services including status (busy, open/close, occupancy)
- // Ability to find and book the services
- // Service notifications and reminders
- // Service booking for employees



Notification

- // Ability to display notifications and reminders
- // Location based notifications
- // Quiet periods, automatic silence when in meeting, etc.



Cafeteria

- // Ability to receive and display cafeteria related notifications

i-BEMS - Smart Use Cases



Location Management and Navigation

- // Ability to record the location of the individual (indoor and outdoor).
- // Routing service for route calculation inside the campus.
- // Ability to find people & facilities in the campus.



Workspace Management

- // Notification to employee when his space is occupied.
- // Ability to search for available workspace according to personal preferences.
- // Book unassigned/available workspace.



Ride sharing/ Pool Cars

- // Availability management (who is ready to share a vehicle, to add the passenger).
- // Ability to manage Requests to join the ride management
- // Ability to notify users when next car returns to campus.



Smart Toilets

- // Ability to display toilet location on map.
- // Ability to find toilets that are available.



Gym Management

- // Ability to book gym machine from the gym itself.
- // Ability to manage and display occupancy status of employees & specific machines.
- // Training programs management.



Smart Vending Machines

- // Ability to map the location and properties of available vending machines
- // Ability to find closest machine.
- // Ability to display stock info for each machine.

i-BEMS – Key Benefits



Key Benefits: Space optimization through Mobile cubicles leading to cost savings

Hot Desking



Key Benefits: Single view of all systems connected through i-BEMS, Alarm notification and Reports helps to improve operational efficiency.

Facility Manpower - Operational Efficiency



Key Benefits: Energy savings on Baseline model with scheduling/profiling/Dimming and set point optimization.

Energy Optimization



Key Benefits: The system learns the patterns of occupancy, heat load and ambient conditions over a period of time and applies analytical model to trigger the ideal setpoint for the connected HVAC equipment.

Machine Learning



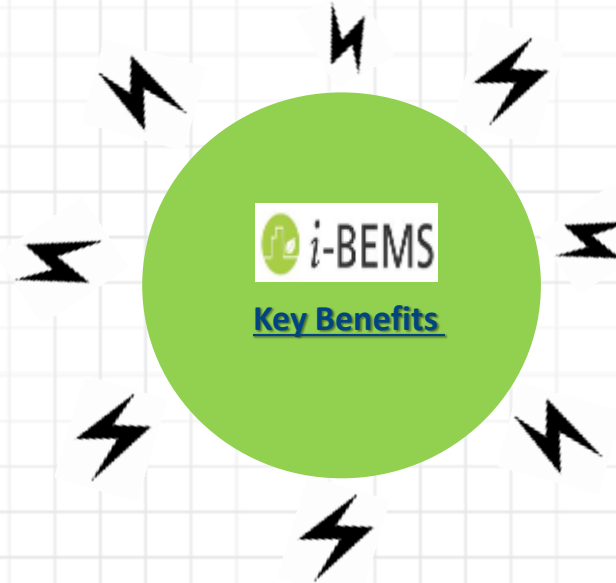
Key Benefits: i-BEMS monitors critical performance parameters like COP, TR (Tonnage) and IPLV (Integrated Part Load value) that helps in effective prediction of equipment maintenance needs.

Efficiency Monitoring for Critical Modules (Chillers, AHU/RTU, VAV)



Key Benefits: Helps to optimize the energy consumption for meeting and conference rooms.

Conference Room Booking



Key Benefits: Real time analytics helped in identifying the energy patterns and faults addressing both losses and enhancing customer experience.

Analytics



Key Benefits: Helps to avoid penalty from Utility and higher tariff rate.

Go Green - Peak Demand Optimization



Key Benefits: Supports Open Source Protocols such as Modbus /BACnet.

Protocol Agnostic Design



Key Benefits: Helps to host the solution on any cloud platform.

Cloud Agnostic Design