RASTEK® TECHNOLOGIES
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Automation & Control

About IOT

The Internet of Things (IoT) refers to the network of interconnected physical devices, vehicles, appliances, and other objects that are embedded with sensors, software, and network connectivity. These devices can collect and exchange data, allowing them to interact with their environment and communicate with each other over the internet.

Here are some key aspects of IoT:

- ✓ Connectivity
- ✓ Sensors and Actuators
- ✓ Data Collection and Analysis
- ✓ Applications
- ✓ Security and Privacy
- ✓ Scalability and Interoperability

The Internet of Things has the potential to revolutionize how we interact with technology and the world around us, enabling greater efficiency, automation, and convenience in various domains. However, it also poses challenges that need to be addressed to ensure secure and responsible implementation.

Who We Are

Electronics Aids & RASTEK Technologies, a sole proprietary firm, owned by founding member of RASTEK (Pvt) Ltd. Engr. Rafiq Ahmed Lakhani Mainly dealing in Electronic Systems, Special purpose Computers, Software and Peripherals. Technical Training Equipment with full facilities of installation, Maintenance, Comprehensive after sales support and Servicing of Specialized Electronic Systems.

Simply stated, RASTEK's goal is to provide total customer satisfaction. While we realize that the goal is elusive, We believe that anything less would be a disservice to our customers. Our work begins with clearly understanding your needs, maintaining an infra-structure that will respond to those needs, and providing consistently superior performance.

RASTEK is a leading supplier of innovative measurement products and positioning solutions in the fields of surveying, engineering, mining, construction, fleet management and GIS to business. government, education and the private sector. RASTEK is one of the country's leading distributors Test & Measurement Technologies.

RASTEK provides customers with experienced sales professionals, reliable and leading edge products and technologies from the most reputable manufacturers and a complete portfolio of value added services, including the after sales support, training on both hardware and software and integration of different technologies.

RASTEK Technologies In Collaboration With our partners Presents IOT/AI Based Solutions for Automation & Control

Commercial Solutions

Teaching & Training

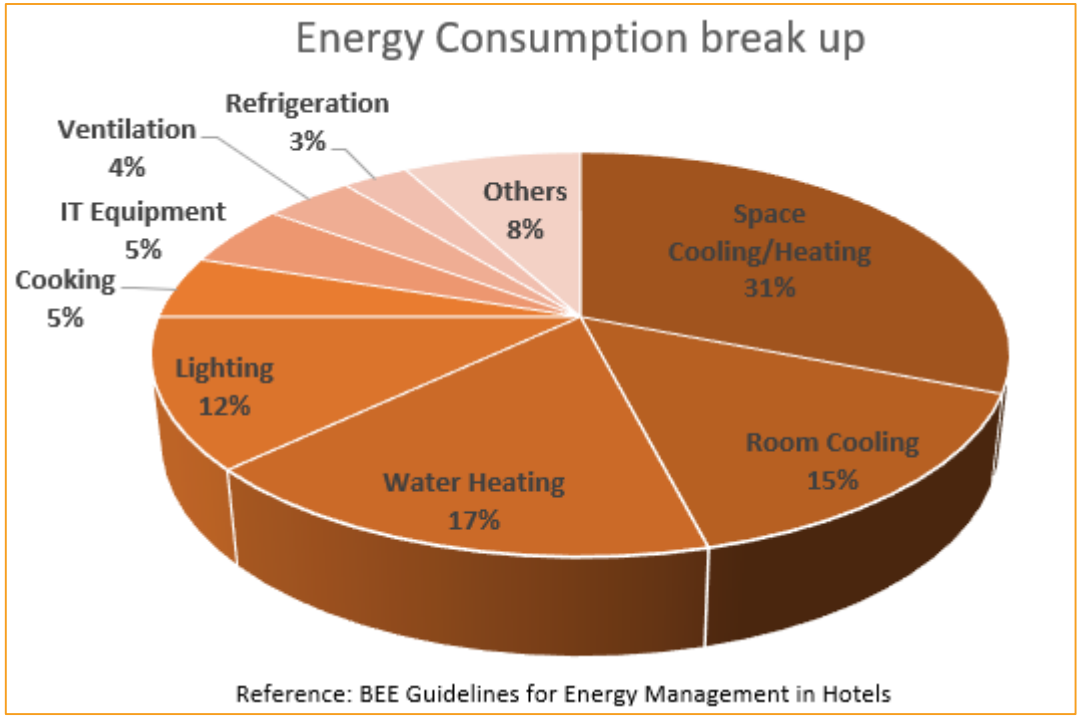
PROBLEMS WE FACED

Problem Faced by Hotels

High Energy consumption:
- Hotels can spend roughly **$2,296** per room each year on energy of which **50%** is wasted due to inefficient use
- Upto 57% energy is spent for HVAC & Lighting alone across the building
- Numerous energy savings solutions, very few proving to be effective

Comfort related issues:
Occupant discomfort represents 42% of all hotel complaints and decrease loyalty by more than 11%. Thermal, lighting and air quality discomfort leads to guest dissatisfaction and impact occupancy rate & reputation

Inconsistent temperatures in Banquet halls, restaurants and other open areas.



Reference: BEE Guidelines for Energy Management in Hotels

Maintain Healthy and safe Indoor Environment
- Challenges of maintaining a Safe & Healthy Environment
- No ability into limiting viral load propagation in centralized HVAC systems

Lack of Remote Manageability in Guest rooms
- HVAC & Lighting in Guest Rooms continue to run during non-occupied hours.
- 70% of Building are guest rooms, inefficient operations leads to significant energy wastage

Personalized Zone level control preferred by occupants
Occupants prefer having control on the HVAC & lighting systems in their guest rooms.
Guest Room Management systems are expensive and do not provide energy savings.

* References: Energy Star, BEE

Problem Faced by Hotels



Existing infrastructure not retrofit friendly:
- Wireless Technology required, Single controller preferred for multiple utilities
- With existing solutions, inability to quickly and economically retrofit the latest technologies in older buildings



Lack of Dashboarding:
Chief Engineers are devoid of dashboarding, actionable trends and insights on key building parameters accessible in real-time, on smart phones/ tablets or laptops from anywhere in the world.
- Energy break up for different types of areas



Manual controls:
- Excessive dependence on manual control for building O&M leads to errors, inefficient operations and is labor intensive.
- Lack of technical expertise for operating BMS/similar technologies. Smart Automation preferred.



Lack of predictive proactive systems to optimize operation based on weather patterns, heat load patterns etc.

Problem Faced by Hospitals



High Energy Consumption

- Since hospitals operates 24x7 they consume lot of energy. With lighting, HVAC, hot water and medical Equipment, their EPI (Energy Performance Index) is among the highest as a building class. Hence the need & opportunity for energy efficiency is high.



Maintain Healthy and safe Indoor Environment

- No monitoring of IAQ parameters – CO2, VOC, RH
- No ability to limit viral load propagation in centralized HVAC system



Manual control of HVAC & lighting systems

- Limited automation even with BMS deployed



Comfort issues

- Imbalance of air across the site leading to hotspots or cold spots



Lack of visibility into energy insights & reporting

- Multiple submetering for HVAC, lighting and other equipment
- Overall energy monitoring only at building level
- No anomaly detection - Inability to identify the equipment consuming higher energy than the required consumption

Problem Faced by Retail Store



High Energy Consumption

- Since Manual control of HVAC systems resulting in high energy consumption even in low occupancy hours with less cooling requirements

Maintain Healthy and safe Indoor Environment



- No monitoring of IAQ parameters – CO2, VOC, RH
- No ability to limit viral load propagation in centralized HVAC system

Manual control of HVAC & lighting systems



- Limited automation even with BMS deployed

Comfort issues



- Imbalance of air across the site leading to hotspots or cold spots

Lack of visibility into energy insights & reporting



- Inability to monitor multiple stores on a single dashboard
- Multiple submetering for HVAC, lighting and other equipment
- Difficult to compare their sites in different locations for analyzing energy usage and get insights like reasons behind high energy consumption for specific sites, etc. Overall energy monitoring only at building level
- No anomaly detection - Inability to identify the equipment consuming higher energy than the required consumption

COMMERCIALS SOLUTIONS

Dynamic Airflow Balancing (DAB) for Banquet halls, Restaurant etc.

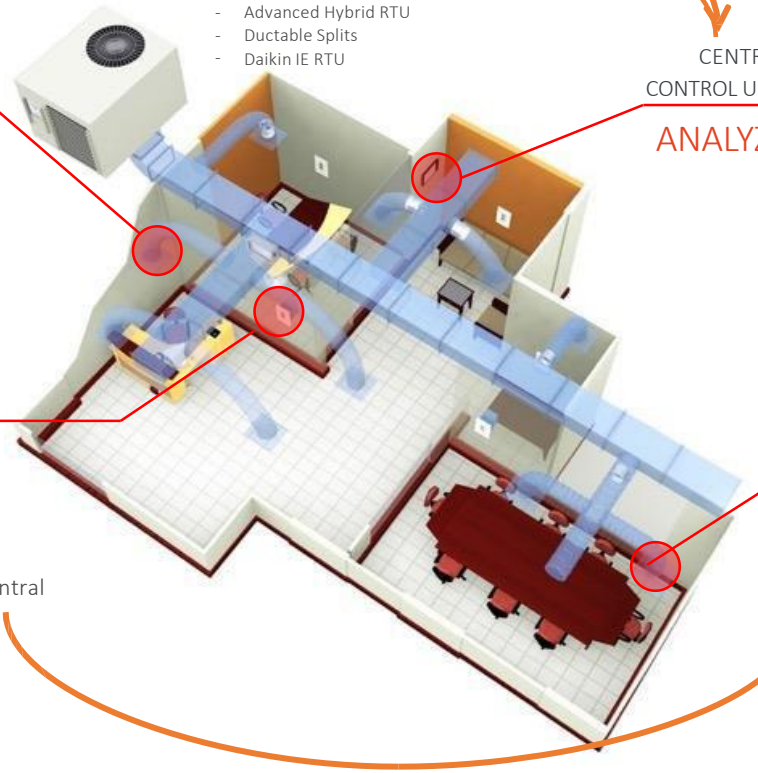


SMART NODE

SENSE

Controls sensors and other energy
equipment in the building on a real time basis

Central Plant Choices
- Staged RTU
- Fully Modulating AHU
- Staged RTU with VFD Fan
- Advanced Hybrid RTU
- Ductable Splits
- Daikin IE RTU



CENTRAL CONTROL UNIT

ANALYZE



Powered by our predictive algorithms the CCU is hub of information and management for all aspects of the building



WIRELESS ZONE CONTROLLERS

SENSE



Measures Zone & Airflow Temperature
Wireless communication (to Central Control
Unit) for easy installation

SMART DAMPERS

CONTROL



- Controls Airflow
- Patented – Cuts install time from
  45 minutes to 10 minutes

- Airflow control based on zone level CO_2 readings, temperature and humidity
- Smart Scheduling and Advanced Modes for greater flexibility & control
- Occupancy-detection based HVAC system control to minimize energy wastage.
- Manual or Machine Learning powered automated Pre-Conditioning
- Simultaneously switch between heating and cooling for individual zones while balancing

Dynamic Chilled Water Balancing Technology



A unique control solution for the Chilled water line of the Chiller System to understand, analyze and fine tune the performance under various conditions

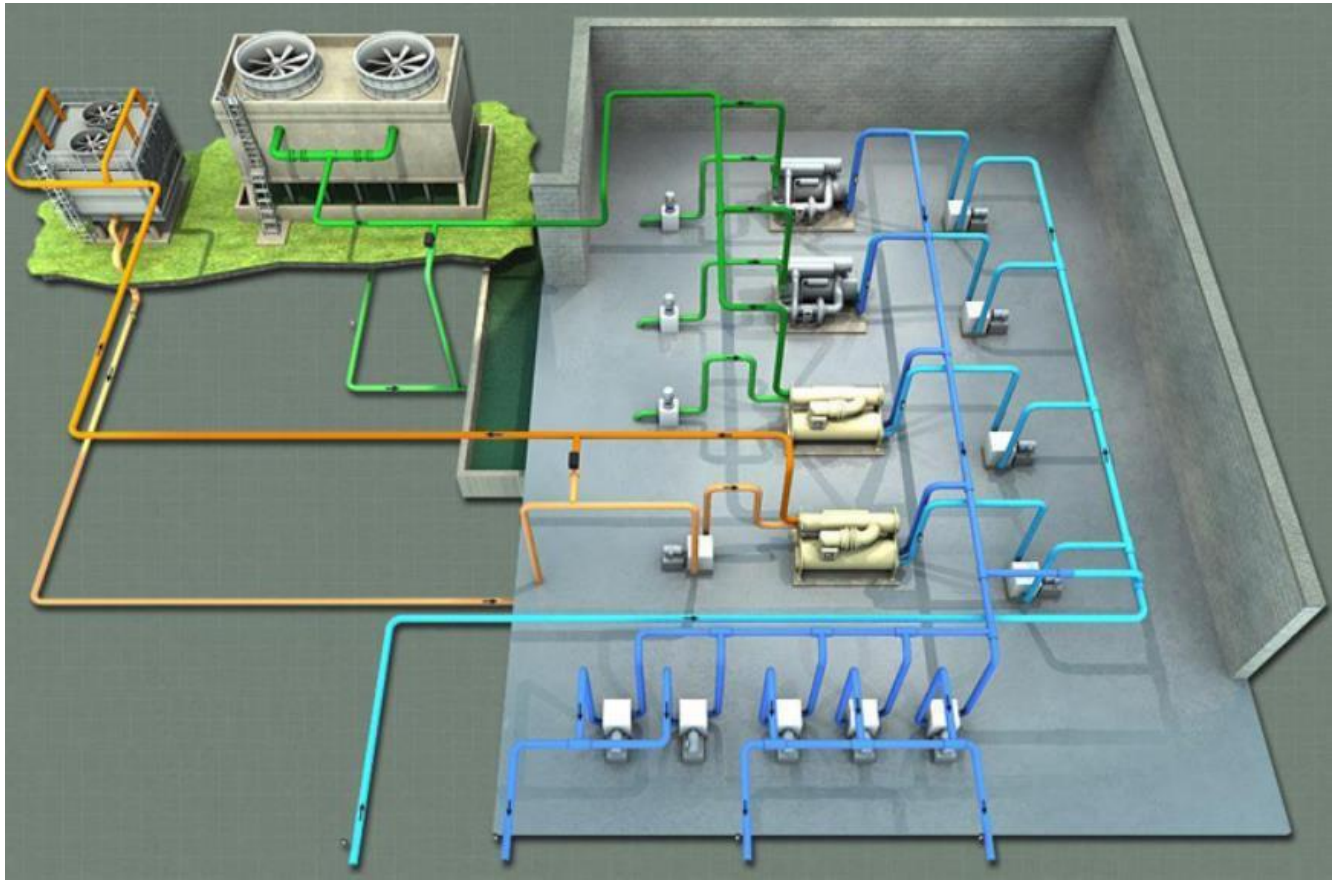
The sensors communicate directly with the CCU so that the operator can monitor the power consumption across the line and help optimize the overall performance of the system, hereby driving energy savings.

75F's Chiller Plant Management Solution

- Real time Monitoring of day-to-day performance of your Chiller Plant

- Compare and Co-relate the Chiller Performance against various factors such as Occupancy, Ambient Temperature etc.

- Operation Sequences provided to ensure energy consumption of the chiller plant is minimized



*Solution is WIP, Phase 1-Chiller Plant Monitoring will be rolled out by Q4 2020

Chiller Plant Managed Services

Offer Chiller Plant performance Monitoring at day-to-day basis

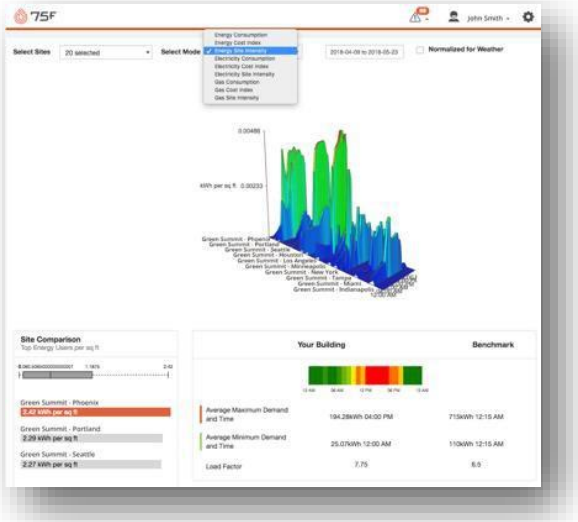
Provide Analytics on the performance the various Chillers and Subsystems

- COP of the entire plant with contribution from various subsystem
- Optimizing Condenser and the Evaporator Approach
- Verify the Differential Pressure Transmitter Set-point as per current building load

Monthly Report suggestions to improve the CPM efficiency

Provide Energy Breakup Across various subcomponents of the chillers





Challenges of Traditional Chiller Plant Manager

75F Epidemic Mode™ is a new sequence of operations designed to maintain healthy and safe indoor environments for 75F customers in the event of a global pandemic

Low visibility on the Building Load

- Only indication for CPM is Chiller Water Return Temperature (CHWR) and CHW Differential Pressure

Chiller Water Supply (CHWS) set point is generally Static

- At low CHWS Temperature (~5-6 C), excessive energy wasted.
- At elevated (~9C) CHWS Temperature, difficult for the CPM to respond to any comfort issues

Possible weather-based CHWS Temperature reset, not linked to actual building load

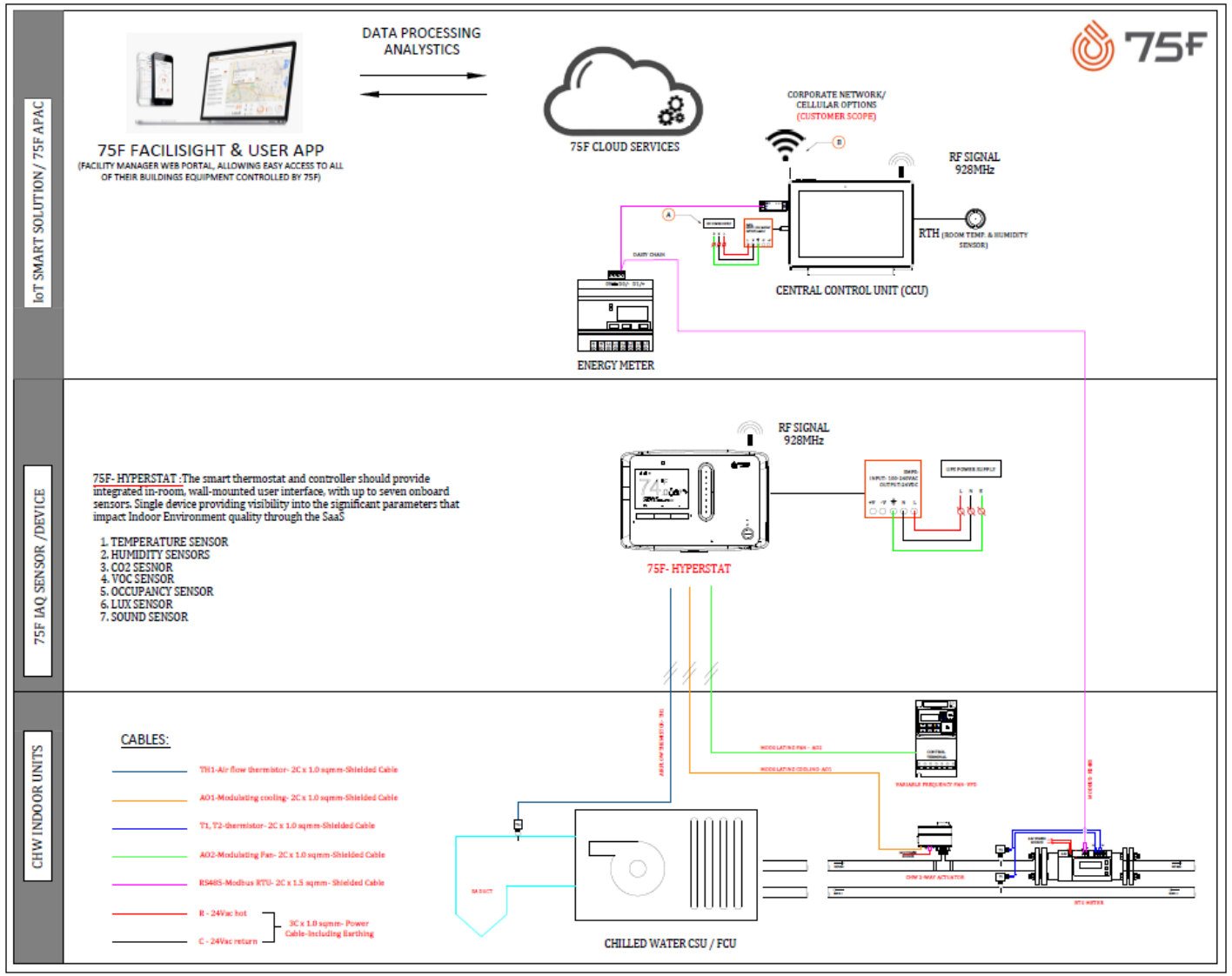
No out-of-box Remote Visibility for Portfolio Analytics



Controlling CSU/ Ductable Splits

Shopping malls have seen the Increasing requirement to maintain not just comfort but also Indoor Air Quality. Remote and on-site monitoring can alert the FM teams to ensure that IAQ levels in a room are adequate before it is occupied.

- Able to control Split and Chilled Water type units
- Provide Fresh Air Actuator control based on the IAQ values
- Allows for the system to go on “Auto Away” to optimize the energy usage based on onboard occupancy sensor.

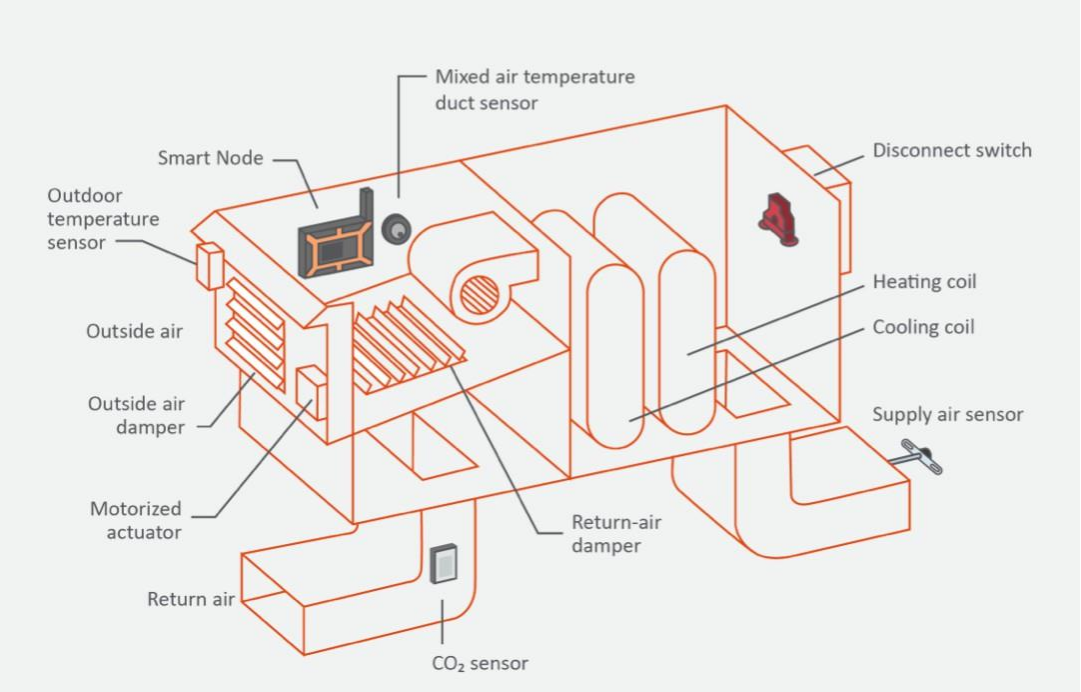


Outside Air Optimization

Provides optimum position of the outside air damper, to regulate amount of outside air that is bought into the building

Silent Features:

- Proprietary algorithms reduce energy use by 15-20% with OAO alone. Machine learning optimises energy efficiency, comfort, and IAQ even further.
- Includes an economizer controller, CO2 sensor and cloud computing software with predictive analytics
- Monitors and analyses return air CO2 for Demand Controlled Ventilation (DCV)
- Comparative Enthalpy Economizer logic is enhanced by predictive analytics to yield unprecedented energy savings and comfort.



Enhanced With Renatus:

- Works with VAV & DAB to provide variable economizing supply air temperature
- Weather based outside air temperature and humidity for enthalpy economizing
- Mixed air temperature and humidity sensing with minimum temperature safety

Hyperstat – Solution for Guest Room FCUs

For Guest rooms, Hyperstat can be used to control FCUs & Lighting

Key Features –

- HVAC and Lighting Control from single device
- Occupancy Based Lighting Control
- Indoor Air Quality Measurement (IAQ) and Display
- Integrates with Guest Room Key card



Benefits and Key Differentiators

Feature	Benefit
Easy-to-install wireless controls	Lower cost to install, less hassle. Great for retrofits and upgrading older BMS
Out-of-the-box, best-in-class sequences	Eliminates complex custom programming
Built-in occupancy sensor	Saves energy
Supply air sensors	Fault detection and diagnostics
Built-in VOC, CO2 and light sensors	Great for IAQ and WELL Building Standards
Integrated analytics and widgets for system operation	Allows all units at a site to be surveyed at a glance
Local overrides and inputs on OLED	Easier to install and comission
Remote configuration	Eliminates site visits

Hyperstat – Solution for Guest Room FCUs



Inbuilt sensors:

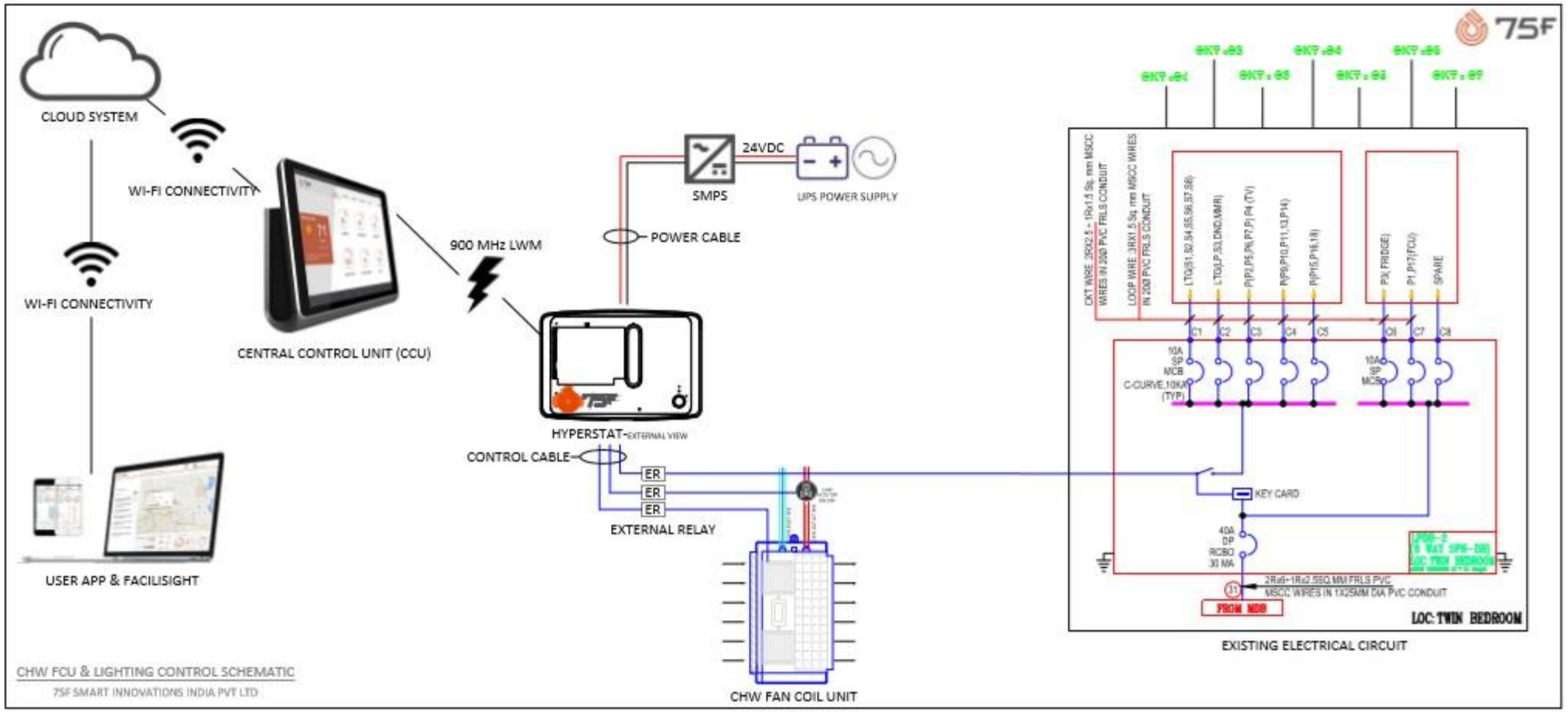
1. **Temperature**
2. **Relative Humidity**
3. **CO2**
4. **VOC**
5. **PM 2.5**
6. **Occupancy**
7. **Lux level**
8. **Sound**

- HVAC and Lighting Control: With 75F HyperStat™, both Lighting and HVAC can be controlled from a single device controller. The device allows you to have functionalities such as remote visibility, smart scheduling, and automation along with energy efficient sequence for operation of your HVAC

- Occupancy Based Lighting Control: 75F HyperStat™ ™ utilizes in-built PIR sensor to provide occupancy-based lighting control to detect whether the occupants in the room are present. In case the room occupants are not detected while the lights are on, 75F HyperStat™ ™ can send an alert to the facilities management or even automatically turn the lights off to provide additional savings.

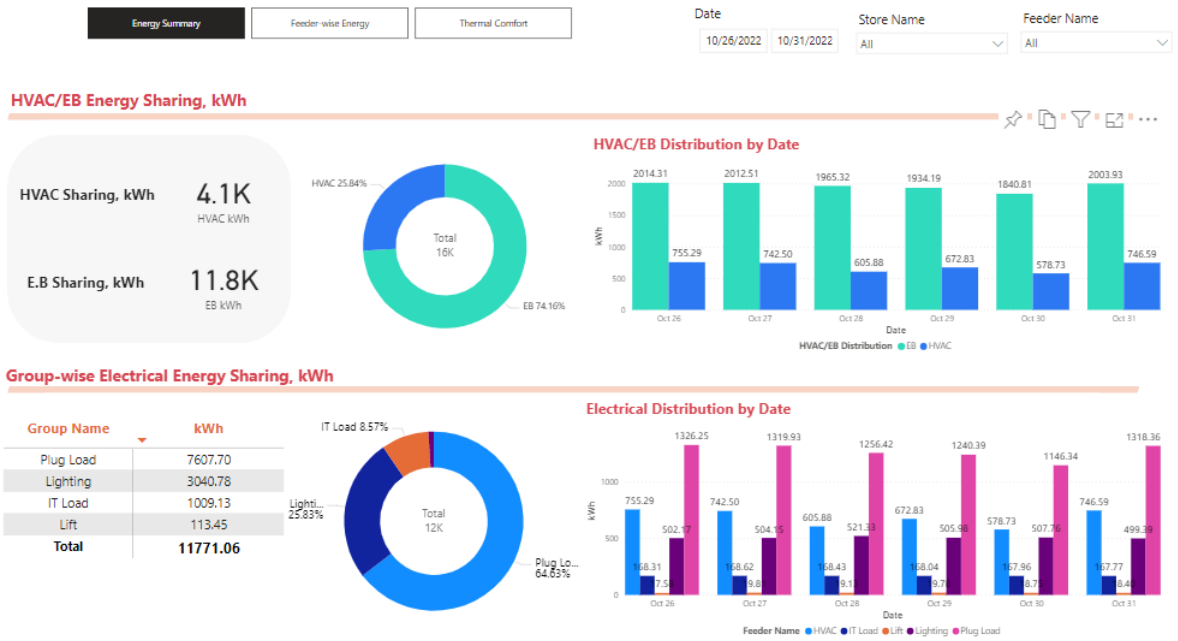
- Indoor Air Quality Measurement (IAQ) and Display: 75F HyperStat™ is packed with IAQ sensors measuring various parameters in the rooms such as CO2 levels, PM2.5, VOC, Illuminance and Sound Levels in addition to Temperature and Humidity Level. This parameter can be displayed to the occupants in the hotel rooms as well details can be sent to the Hotel Maintenance Team to respond accordingly.

Schematic – Hyperstat Connectivity with FCU & Lighting



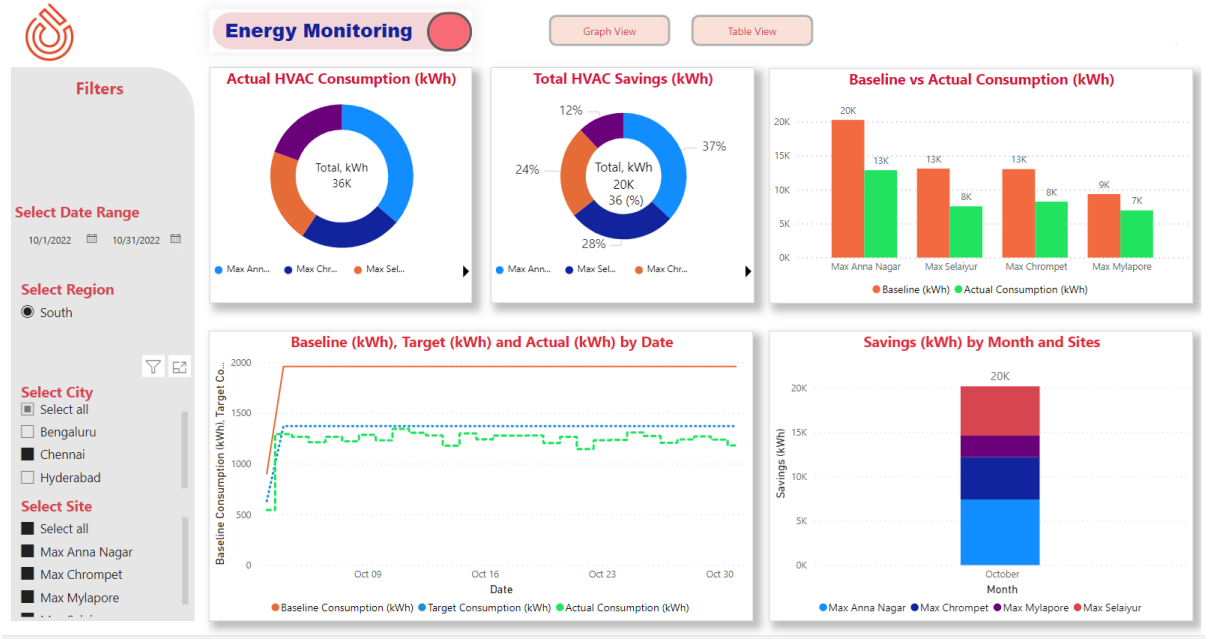
- The HyperStat™ will be set up in all the guest rooms on the wall, in place of the thermostats.
- These will be connected to the Chilled Water Fan Coil Units with External Relays.
- On the lighting part, HyperStat™ will be connected to the Keycard through External Relay.
- The HyperStat™ will communicate the details to the Central Control Unit & the CCU will integrate it with the Cloud.

Dashboard: Portfolio Monitoring



The Dashboard on the left side provides insight into the energy sharing of HVAC and other Electrical loads, Feeder-wise energy segregation, zone comfort and IAQ index. Overall HVAC and other Electrical consumption details on a day-to-day basis

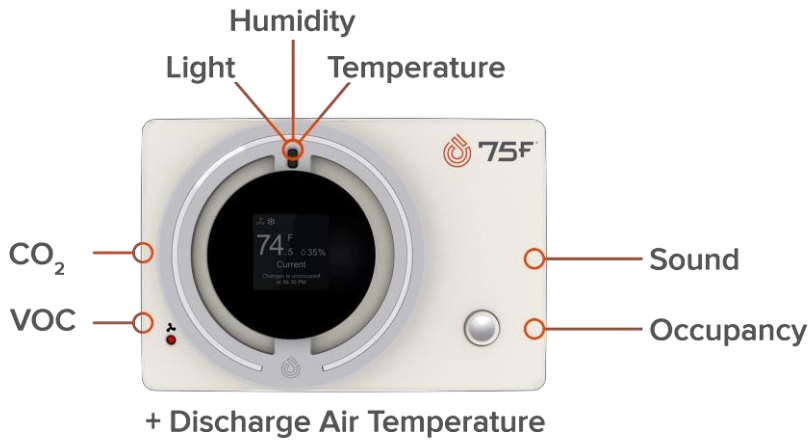
It also provide Energy Breakup of various feeders connected across the store and historical trends.



The Dashboard on the right side is a store dashboard that gives Energy Breakup for individual stores.

Live energy savings trends based on Actual vs Baseline consumption, Insights on Energy as well as Cost Benefit Analysis Graphs

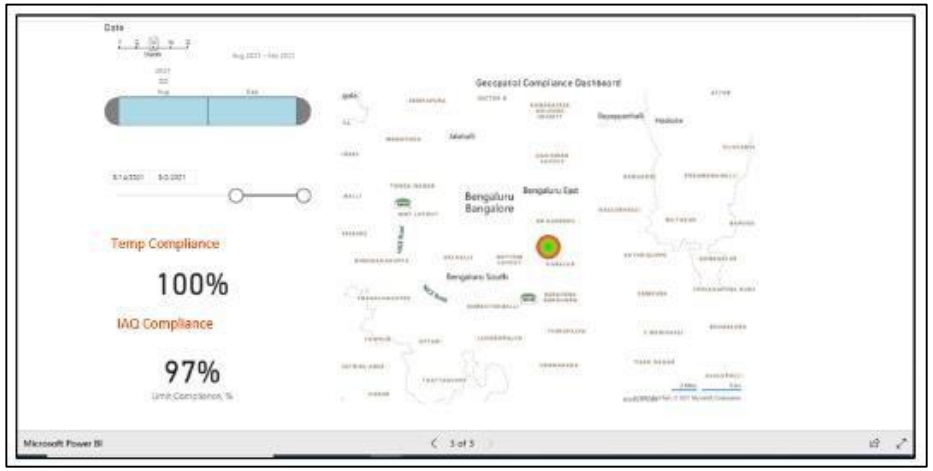
IAQ Monitoring



SmartStat

- Our Smart Stat can be installed at OPDs, Customer Sitting Area to sense Important IAQ parameters like Temp , RH , CO2 , VOC , Lux , Sound & Occupancy.
- Alarms will be generated and sent to the FM team if any IAQ parameter crosses the normal operating range.
- This can ensure comfortable environment for patients.

Dashboards for Easy Monitoring of IAQ for Multiple Rooms



Drilldown view of IAQ Parameters

Attribute	Today	Month	Quarter	Year	Normal Range
CO2, ppm	869	657	714	714	750 to 950
Humidity, %	47	52	52	52	45 to 65
Sound, db	50	49	50	50	Less than 80
Temperature, Deg.C	16	19	18	18	18 to 21
VOC, ppm	2	2	2	2	0 to 100

Household Solutions

Electrical
Multi-scenario solutions cover control of power, lighting, energy, and more.

Lighting
Industry-leading solutions for residential, commercial, and professional lighting.

Sensor
Control smart products in a smarter way to achieve an easier and safer life.

Major Appliance
Build scenario-specific smart solutions for major appliances.

Small Appliance
Smart home appliances let comfort and ease penetrate every corner of a house.

Kitchen Appliance
Cloud-based recipes and interconnected appliances bring a gourmet feast.

Pets
All kinds of smart pet products make pet care scientifically and easily.

Cleaning Robot
Fully-featured solutions for inertial navigation, laser, and vision robots.

Camera
Smart solutions for IP cameras across OS, protocols, and categories.

Smart Lock
Global platform and massive solutions cover home, apartment, hotel, and more.

Gateway
A highly secure and reliable smart control hub across protocols and categories.

Energy-Saving
Build multi-category energy PaaS solutions to create an efficient and green life.

Outdoor
Connect cellular devices worldwide and meet integration needs of outdoor categories.

Entertainment
With Tuya open platform, make digital products the center of a smart home.

More Solutions
Various perfected and cost-effective solutions quickly build your smart products.









Industrial Solutions

Long-range Wireless Sensors



Wireless Temperature Sensors



Humidity Sensors



Wireless Open-Closed Sensors

Wireless Gateways



North American IoT Cellular Gateways



International Cellular Gateways



Ethernet Gateways

Industrial Solutions

+ Accessories



Site Survey Tool

NIST

NIST Certifications



Facility Accessories

</> Software

iMONNIT

iMonnit Cloud Sensor Management Software

iMONNIT EXPRESS

iMonnit Express™ Standalone Sensor Management Software

iMONNIT ENTERPRISE

On-Premises Enterprise Data Management

Features & Benefits

Up to 50%
energy savings

higher comfort
+ air quality

10x faster to install



- Single device (Hyperstat) for HVAC & lighting control in Guest
- rooms
- Aesthetically pleasing
- Wireless communicates with Central Control Unit, reducing wiring and install costs & time.

Provides visibility into:

- Temperature
- Humidity
- Occupanc
- y CO2
- VOC
- SPM 2.5
- Lux level
- Sound

Up to 50% energy savings

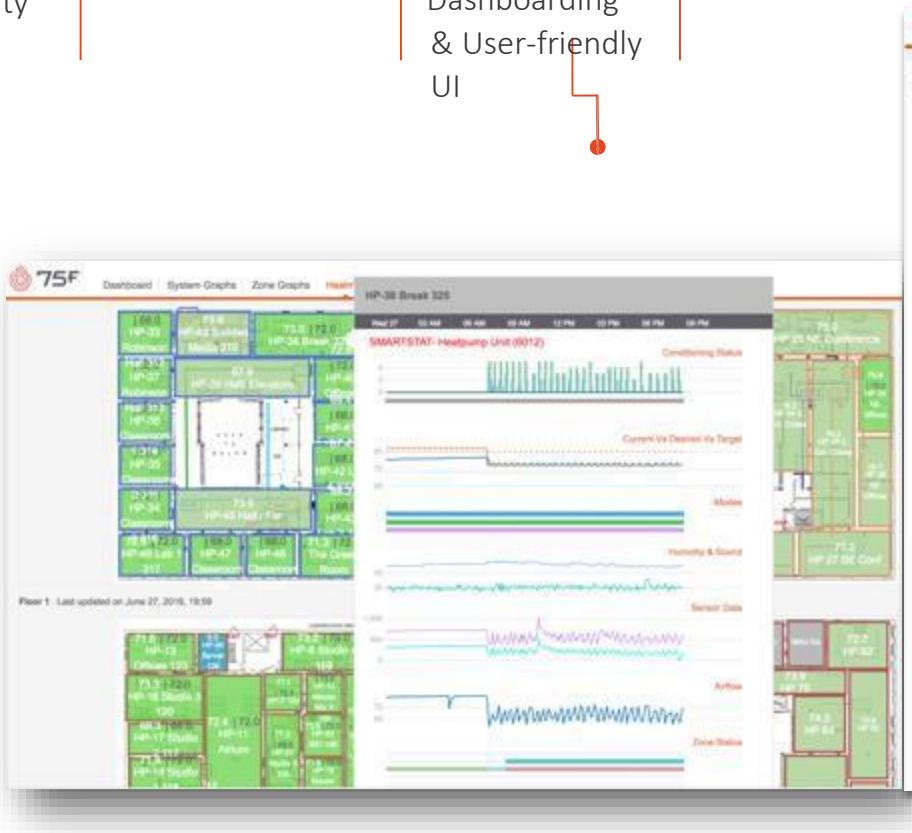
higher comfort + air quality

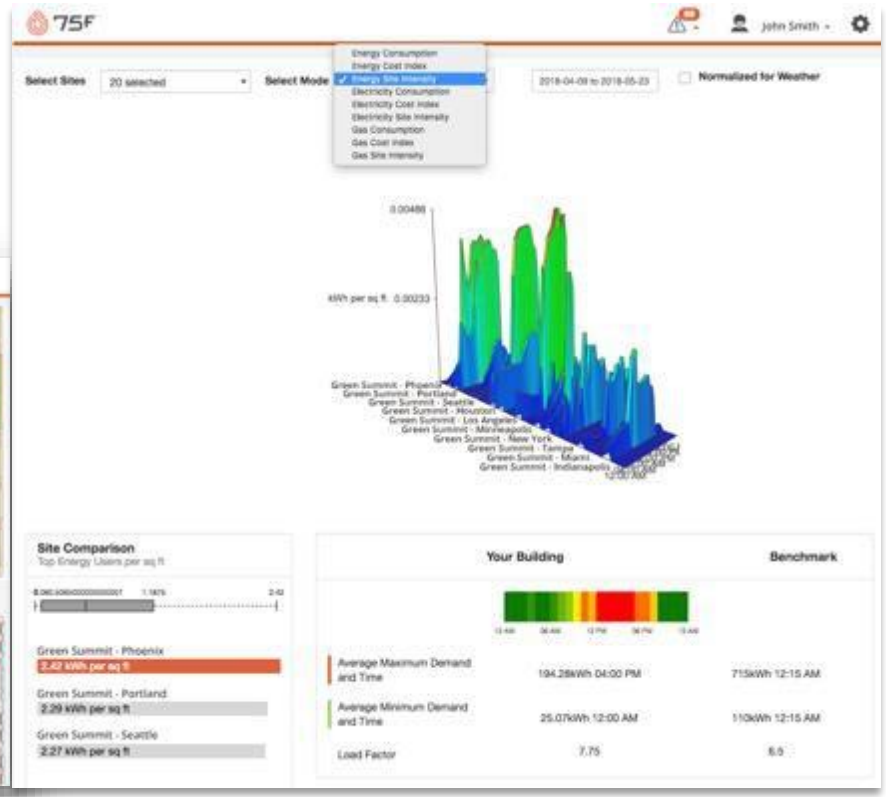
10x faster to install

Rich Dashboarding & User-friendly UI

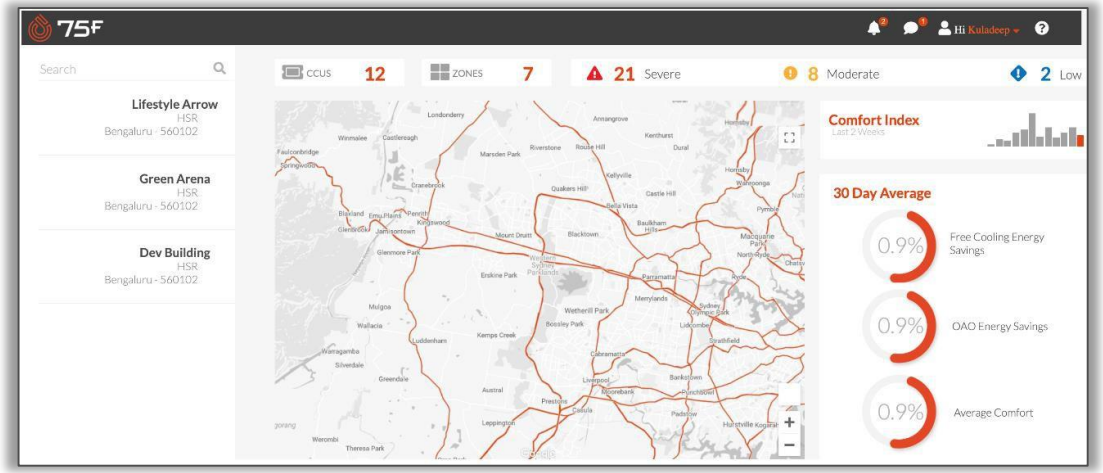
Remote visibility and control into all key building parameters viz.

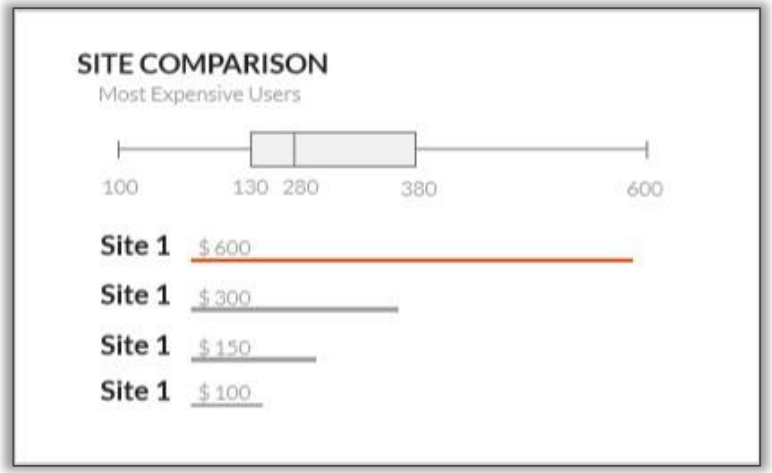
- HVAC & lighting Energy consumption (kWH/sft, $/sft etc.)
- AHU and Chiller parameters (VFD frequency, CHW actuator position, CHW flowrate, CHW & AHU energy consumption etc.)
- Indoor Environment (Temp, RH, IAQ, Lux level)
- Occupancy detection in Guest rooms
- Smart scheduling
- Etc…





Up to 50% energy savings | higher comfort + air quality | 10x faster to install | Rich Dashboarding & User-friendly UI | Granular Control | <4 year payback | Customized Building Analytics & Insights











The need of the hour is customised solutions for better analytics and reporting to enable better decision making for facility managers.

Teaching & Training Solutions



KL-900E Near Field Communication (NFC) Trainer

NFC (Near Field Communication) is a type of short-range wireless technologies, with typical distance of 10 cm or less. NFC is compatible with existing passive RFID (13.56 MHz ISO/IEC 18000-3) infrastructures.

KL-900E NFC Trainer covers three parts: (1)NFC Principle of Transmission, (2)NFC and Contactless Smart Card and (3)NFC Appliance Integration. We hope to provide a complete learning experimental instrument for NFC that covers from physical to application layer for the novice.



IOT-110 Edge IoT Teaching Platform

IOT-110 is a platform that integrates the training of edge computing, AI., and IoT. Its system consists of sensor modules, edge computing modules, and AI computing accelerators. The course provided is structured coherently and clearly, and the concepts of sensors, networks, and applications can be introduced progressively and thoroughly. With this system, users shall be able to deploy various smart applications of IOT and edge computing.

Each of the 16 sensor modules is embedded in a separate aluminum housing with a built-in hook and powered by a rechargeable lithium battery, so the sensor modules can be deployed in many different locations as well as on the training stand. The name of each sensor is printed on the housing.

IOT-100 Innovative IoT Experiment Platform



With the advent of IoT (Internet of Things), more physical objects are connected to internet to make everyday life easier. Topics about creating a user-friendly IoT experience become popular to IoT solution providers.

The Innovative IoT Experiment Platform (IOT-100) is a module-based solution to IoT experiment systems. It is constructed by various communication node boards, sensor modules, wireless integrated gateway, and open-source applications. The experiment topics include not only traditional “wireless sensing technology”, but also embedded system development, intelligent sensing technology, IoT composition technology, IoT chip control technology, and IoT engineering applications.

IOT-100 adopts 4 different wireless protocols: ZigBee, Bluetooth, WiFi, and EnOcean. Users can select one (or more) wireless sensing technology and transmit data to wireless integrated gateway via MQTT (Message Queuing Telemetry Transport) protocol for observation.

The functions of the Wireless Integrated Gateway are acquisition, packaging, and transmission of data. The data is transmitted to the cloud using MQTT protocol. On the webpage, students can observe the experiment results of data acquired from the wireless sensing node boards and sensor modules.

Comprehensive Teaching Platform for Intelligent Building System Integration and IOT Technology Development



Training Content:

1) Patch cords, programming, commissioning, operating, repair, and maintenance of the system
2) Connection and configuration training of HD coaxial video signal and hard disk video recorder
3) Connection and monitoring training of high-speed dome camera, infrared gun camera, monitor and hard disk video recorder.
4) Control PTZ motion and animated zoom training of high-speed dome camera through hard disk video recorder
5) Set and call high speed dome camera PTZ presetting bit and cruising through hard disk video recorder.
6) Auto-record training of monitoring screen dynamic variation and surrounding alarm
7) LAN monitoring training of network video monitoring management software
8) Connecting of illumination sensor and LED light with DDC control module, and analog input and output programming of Universal input function module.

Intelligent Building Engineering Technology Skills Training and Assessment Device



Training Content:

1) System installation, wiring, programming, debugging, operation, maintenance and repair 2) High-speed dome camera, infrared camera, monitor and hard disk video recorder connection and monitoring training.

3) Control the camera pan movement and lens movement training of the high-speed dome camera through the hard disk video recorder.

4) Set and call the camera pan preset position and cruise training of the high-speed dome camera through the hard disk video recorder.

5) The automatic video recording training of the monitoring screen dynamic changes and the surrounding alarms.

6) The connection and setting training of wall-mounted passive infrared intrusion detector, active infrared on-beam detector, sound and light alarm and hard disk video recorder.

7) Interaction training of video surveillance system and surrounding security system.

8) The installation, programming, development and integration of Niagara Framework open integrated application and development software

9) The monitoring interface design, development and monitoring of Niagara Framework open integrated application and development software

10) Illumination switch and tungsten halogen lamp connection with DDC control module and schedule time programming training

Water Supply and Drainage Integrated Monitoring System Training and Assessment Device (BACnet network)



Training Content:

1) System installation, wiring, programming, debugging, operation, maintenance, and repair
2) Drawing of system as-built drawing and control electrical schematic diagram.
3) Cutting, threading, welding and connection of galvanized pipe, stainless steel composite pipe, PPR pipe, UPVC pipe.
4) Installation of pipe fittings in domestic water supply system, fire water supply system, water supply system and drainage system
5) Installation of water heating devices such as water pumps, pressure transmitters, water meters, level gauges, signal butterfly valves, wet alarm valve groups, water flow indicators, closed sprinklers, terminal water testing devices, faucets, and showers
6) Pipeline pressure test and water flow test
7) Installation and wiring of water pump, power distribution cabinet, controller, command components, and operating components
8) Frequency conversion control PLC program design and debugging
9) PLC program design for sprinkler extinguishing control
10) The installation, programming, development and integration of Niagara Framework open integrated application and development software
11) DDC installation, wiring and debugging training

RASTEK® TECHNOLOGIES
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