Presentation on
Smart Money on Smart Buildings
for
SENEA
NORTHEAST SUSTAINABLE ENERGY ASSOCIATION
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Managing the 4 C’s in Buildings

Cost
Comfort
Complaints
Control
Aligning ALL Constituents

Owner

Building Management Nirvana

Tenant

Comfort

Super

Complaints

Cost

CONTROL
Smart Building Wish List

• Use energy only when required
• Devices self report
• Network self heals
• Data maintains integrity
• Building Systems self optimize
Smart Buildings Drive Value

- Reducing Energy Consumption / Managing Load
- Preventing/Identifying Problems
  - Detecting Leaks
  - Potential Equipment Failures
  - Sub-optimal performance
- Improving Comfort
- Providing Amenities
- Optimizing Performance
Making a building SMART

2018 and Beyond

Augment

Predict

Analyze / Understand

Control

Data / Device / Network

Current State
Smart Building Integration

- Energy Management
- HVAC
- Lighting
- Elevators
- Fire, Life-safety
- Access & Security
- Water
- 24/7 Monitoring
- High-speed Internet
- Wireless Connectivity
- VPN Access
- IP Telephony
- Smart Devices/Phones
- AV Conferencing
- Interactive Media
- Digital Signage
The Internet of Things

Moore’s Law in Full Effect

COSTS ↓ SPEED, PERFORMANCE, RELIABILITY ↑
Control of a Smart Building

- Occupancy
- Scheduling
- Temperature / Set Points
- Equipment
- Runtime/Operation
- Modulation/Actuation
- Lighting and Light Levels
- Energy Use
- Feedback / Sensors
In the Clouds

Holistic Predictive Analytics
IN VOL VING THE ECO-SYSTEM

Human Intelligence drives Automated Intelligence
Smart Device Networks

CLOUD

3rd-party Platforms

CONTROL

Devices

Open Protocols:
- MQTT
- OBIX
- Project Stack
- Haystack
- LONMARK INTERNATIONAL
- ASIA
- BACnet
- Modbus

The power of unused energy

enocean

Bluetooth® 5

Wi-Fi

ZigBee

Sentient Buildings
SMART CONTROLS – Integrating the Old & The New

CLOUD

CONTROL

DEVICES

Open Protocols
MQTT, OBIX, Project Haystack
LonMark International, BACnet, Modbus

Sentient Buildings
SMART CLOUD INTEGRATION – Cross Compatibility

CLOUD

CONTROL

DEVICES

Open Protocols

- MQTT
- OBIX
- Project Haystack
- LonMark
- BACnet
- Modbus
- enocean
- Bluetooth 5
- WiFi

Sentient Buildings
Multi-Family Building Automation

**Wireless Products**

1. **Thermostat**
   - Controls the preset temperature when the room is unoccupied.

2. **Integrated Light Switch**
   - Real-time dimming allows management of energy use and costs.

3. **Coming & Leaving Home**
   - Coming Home & Leaving Home wireless switch.

4. **Occupancy Sensor**
   - Controls HVAC and lighting loads via occupancy status.

5. **TV Control**
   - Automatically turns off when there is no occupancy.

6. **Window Sensor**
   - Determines window status and sets HVAC into energy savings mode.

7. **Power Strip**
   - Controls plug loads in unoccupied rooms.
Commercial Office Automation

**Wireless Products**

1. **Thermostat**
   Returns to preset temperature when room is unoccupied.

2. **Light Control**
   Real value dimming & Daylight Harvesting allows management to control energy use and costs.

3. **Power Strip**
   Controls plug loads based on room occupancy.

4. **Occupancy/LUX Sensor**
   Controls HVAC and lighting loads via occupancy status.

5. **TV Control**
   Automatically turns off when Key Card is removed.

6. **Window Sensor**
   Determines window status and sets HVAC into energy savings mode.
Solution
- 400+ Luxury Condominium Unit retrofit in Verona, NJ
- Installed Mesh Network-Fan-Coil/Thermostatic Control
- Dual-Temperature Loop for Chillers & Boiler Plant
- Wireless Communication to Head-End BMS
- Operates on a single a singe gateway with no repeaters installed in units or on floors
- Combined electric gas savings of 30% while maintaining adequate tenant comfort

Challenges
- Owners association required that no repeaters or gateways to be installed in the apartments or in the corridors
- No wires to be installed for installation of thermostats
- Only three floors to be installed in initial phase
Solution

- 8th Largest Commercial Office Building in NYC with over 2+ million rentable square feet
- Installed Base Building Automation System
- Wirelessly controlling over 500+ radiator valves and 300+ Thermostats, with communication to the central plant
- Largest EnOcean Wireless Deployment of its kind in NYC

Challenges

- Control System was wiped out after Sandy
- Windows are extremely old allowing for significant infiltration
- Boilers had to run 11 pounds of pressure
- Required thermostatic control of perimeter radiation to help with significant imbalances