Unification with BACnet

Reduce Energy Through the Unification of the Largest Energy Consumers in a Building
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- VP Sales and Marketing: Blue Ridge Technologies
- 20+ Years in Lighting Controls with a Focus on BAS Integrated Controls
- 9 Years Contributing Member, BACnet International
- BACnet International Board of Directors
Quiz Time
Question 1: What is the largest consumer of energy and therefore responsible for the largest CO2 production?

- Transportation
- Industry
- Buildings
Quiz Time

Answer: Buildings

Energy Usage

- Buildings: 39%
- Industry: 29%
- Transport: 33%

70% of Electricity Usage

Source: Center for Climate and Energy Solutions
Source: www.energy.gov
Question 2: On average, what is the single largest electrical load in a building?
Quiz Time

Answer: Lighting

![Diagram showing commercial electricity usage]

**Commercial Electricity Usage: Aggregate**

- 38% Lighting

**Commercial Electricity Usage: Building Type**

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Lighting</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>46%</td>
<td>76%</td>
</tr>
<tr>
<td>Health Care</td>
<td>33%</td>
<td>75%</td>
</tr>
<tr>
<td>Lodging</td>
<td>22%</td>
<td>75%</td>
</tr>
<tr>
<td>Retail</td>
<td>32%</td>
<td>74%</td>
</tr>
<tr>
<td>Office</td>
<td>27%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Source: US DOE [www.eia.doe.gov](http://www.eia.doe.gov)
Question 3: On average, what is the second largest electrical load in a building?
Answer: HVAC
Current State of Energy

- Population is Expanding
- Energy Consumption is Increasing
- No Certainty In Pricing
  - Reduction in consumption does not necessarily equal reduction in cost
  - Real time pricing (Ex: Dallas, TX) connected systems can react. Disparate systems… not so much
Chart 5

U.S. Energy Consumption Projected to Rise

Quadrillion Btu

Historical

Projection

SOURCE: Energy Information Administration.
Manual Controls (at least 50% reduction)

Automatic shutoff
  - Scheduling
  - Occupancy Sensor
  - Alarm signal

Daylight Areas (independently controlled)

Exterior Lights (Astronomical or photocell & time switch)
Standards are very similar to ASHRAE 90.1 2010 and greater

Requires compliance at 10% of retrofit or renovation

Specifies:

- Daylight Harvesting (mandatory dimming in daylight areas)
- Manual Dimming Controls
- Advanced Occupancy Sensor Sequences of Operations
- Demand Response
- Plug Loads (50% of all plugs must be occupancy based)
Energy reduction will be driven by mandates or by user desire for reduction.

Either way it lowers consumption and therefore cost.

Good news all around as there are environmental and monetary (payback) incentives.
How Do We Start to Achieve Our Goals?

1. Start by reducing the largest consumer with the quickest payback - Lighting

2. Integrate or Unify via BACnet with the BAS

3. Take advantage of the integration through scheduling, occupancy, and more.
Why BACnet

• BACnet has become arguably the single most adopted Open protocol:
  • The current BACnet International Product Catalog contains 707 active products from 120 distinct manufacturers. (www.bacnetinternational.org)
  • BACnet Certifies communication capability through BTL
    • Currently Testing Protocol_Revision 14 (135-2012)
  • The majority of BAS systems today speak and/or route this protocol today
Types of Architectures

Stand Alone
No Shared Communication

Gateway

Native
Shared Comms: BACnet to BACnet
Installed Cost

- BAS Control Contractor
- Electrical Contractor
- Distributor
- Agent/Rep
- Manufacturer

Total Installed Cost

Stand Alone | Gateway | Native

Energy Savings Potential

www.bacnetinternational.org
The Cost of Proprietary

- Single source for replacements
- Forced change out or reduction of system capability due to EOL of critical components
- Two systems requires two support companies
- Limited to no integration between disparate systems equals less energy savings compounded over time.
Control Sequence Unification

Morning

Mid-day

Late Afternoon

Night

BAS Schedule: Occupied
Occupancy: No (30min timer)
Lights: Off
HVAC Temp: Reset
Ventilation: Minimum
Plugs: Off

BAS Schedule: Occupied
Occupancy: Yes (30min timer)
Lights: On (manually)
HVAC Temp: Set Point
Ventilation: Full
Plugs: On

BAS Schedule: Occupied
Occupancy: No (30min timer)
Lights: Off
HVAC Temp: Reset
Ventilation: Minimum
Plugs: Off

BAS Schedule: Unoccupied
Occupancy: No (10min timer)
Lights: Off
HVAC Temp: Night Set Back
Ventilation: Off
Plugs: Off
Integrating the 2 largest energy consumers in a building will allow for reduced energy consumption, reduction in cost (life-cycle and energy), and more control. This requires communication between vendors. BACnet is one of the most effective ways to accomplish this.
Thank You

Find out more @

www.bacnetinternational.org

www.thebacnetinstitute.org

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