Introduction to BuildingIQ

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BuildingIQ Overview

- BuildingIQ combines advanced machine data analytics and predictive modelling in a software solution to deliver intelligent, automated HVAC energy management
- Proven 10 - 25% HVAC energy savings and up to 20% peak load reduction for demand (DR) events
- 45+ million sq ft contracted with REITs, government, utilities, and enterprises:
- Backed by industry-leading vendors and partnered with U.S. and Australian national labs
- Publically Traded - ASX: BIQ
BuildingIQ Value

Benefits for Hotels:

✓ Automated Energy Efficiency
✓ Real Time Data/24-7 Monitoring
✓ 10%-25% Energy Savings (electricity, gas, steam)
✓ Automated Demand Reduction (iCAP Tag Avoidance)
✓ No Capital Costs
✓ Works with any BMS (BACnet)
✓ Improves Comfort – Reduces Complaints
✓ Contributes to LEED and Energy Star Points
✓ Results are automatically Measured & Verified
  ✓ Monthly Reporting
  ✓ Mass P4P Program
BuildingIQ in the EMIS Landscape

Analytics & Reporting

Facility Management

Fault Detection & Diagnosis

Optimized Setpoint Control

Continuous HVAC Optimization and Control
Unique Approach

Learning by Listening – Thermal Model

Uses advanced algorithms to continuously “learn” and model thermal characteristics

• Learning from analysis of energy, weather and BMS data coming from the building
• Every building has a thermal lag / storage
• Intelligently determines optimal setpoint targets
• Automatically adapts to changes in usage patterns
• No need for detailed documentation HVAC system
Building Thermal Model
Predictive Energy Optimization™

60,000 iterations daily

Continuous HVAC Energy Reduction
Predictive Energy Optimization
Predictive Energy Optimization

Operating Hours

- Occupancy Start: 8am
- Cooling Energy
- Costs: $.16, $.40, $.17, $.40
Predictive Energy Optimization™
Peak Demand Reduction

Automated Demand Curtailment

iCap Avoidance

Grid Peak Forecast
Energy Efficiency & Demand Reduction

Sample Monthly Report

Savings this Month
 Logged when BuildingIQ is Operational

Cumulative Savings Summary

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Actual</th>
<th>Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure</td>
<td>$125,799.99</td>
<td>$111,470.89</td>
</tr>
<tr>
<td>Usage (kWh)</td>
<td>629,000</td>
<td>557,354</td>
</tr>
</tbody>
</table>

Weekday Load Profile

Actual_Power vs Baseline_Power

Hour of day

June 26, 2016
Building Visualization
Real-Time Troubleshooting

Power and baseline real-time data

Equipment OFF

Sudden drops in SAT for short periods of time

ZT, SAT, and SAP closely following BIQ set points
BuildingIQ Services – leads to RCx +

• Monitoring of HVAC system to support local staff
  – Daily identification and troubleshooting of HVAC System
  – Regular review of system performance
  – Ongoing analysis to identify operational anomalies, root causes, and resolution

• Ongoing software and hardware support, upgrades, enhancements, data hosting and backup

• Monthly reporting of weather normalized energy consumption and cost performance versus baseline

• Communication of HVAC system faults identified during performance analysis
Hotel Facility Parameters for Success

Hotel Parameters:

- ✓ BMS with BACnet/OPC connectivity
  - ▪ We can work with you to upgrade
- ✓ ~100,000 SF of Common Area:
  - ▪ Lobby, Conference, Hallway, Pool/Gym, etc.
- ✓ Central Plant or Networked DX with DDC (or both)
- ✓ Internet Connection
- ✓ Interval Meter Data – Eversource with “Green Button”
Automated Measurement & Verification

- Adheres to IPMVP (*International Performance Measurement and Verification Protocol®*)
- Cloud-based
- Automated
- 3rd Party Certification in California
- Certified for M&V and Energy Savings Certificates (ESCs) under the New South Wales Energy Savings Scheme
Case Study: M Resort

- 527,000 Sq. Ft.
- Casino + restaurant + retail + conference
- Delta Controls BMS
- Advanced control strategies already in place
  - Highly efficient

- 12% HVAC energy savings
- 13% HVAC peak load reduction

DR Performance

<table>
<thead>
<tr>
<th>Time</th>
<th>Baseline (kW)</th>
<th>Actual (kW)</th>
<th>Drop (kW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4:30 PM</td>
<td>1800</td>
<td>1200</td>
<td>600</td>
</tr>
<tr>
<td>5:00 PM</td>
<td>1600</td>
<td>1000</td>
<td>600</td>
</tr>
<tr>
<td>5:30 PM</td>
<td>1400</td>
<td>800</td>
<td>600</td>
</tr>
<tr>
<td>6:00 PM</td>
<td>1200</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>6:30 PM</td>
<td>1000</td>
<td>400</td>
<td>600</td>
</tr>
<tr>
<td>7:00 PM</td>
<td>800</td>
<td>200</td>
<td>600</td>
</tr>
</tbody>
</table>

March 25, 2016
Hotels Coming on Line 2016

- Paris Hotel
- Cesar’s
- Riviera
- Renaissance
- Harrah’s
Case Study: NYC Tower

- Largest LEED-EB in NYC
- A-Grade 2.5m SF
- Schneider BMS
- 7 FT engineers

$800k+ annualised savings
13% HVAC reduction
3x payback on typical BIQ Fees

BuildingIQ Cumulative Savings

June 26, 2016
Case Study: Federal Building

- High-security, Government building
- 125,000 sq.ft.
- Trane Tracer BMS
- Building’s design provided additional challenges to overcome

- 15% HVAC energy savings
- Building gained 6 Energy Star points
Case Study: NV Energy HQ

- NV Energy HQ (Las Vegas)
- A-Grade 274K SF
- ALC BMS
- Resulted in Agreement to install 10M SF in NVE territory

20% HVAC savings
Significant peak reduction
100% remote installation

Comparative Demand over Average Day

June 26, 2016
## BuildingIQ Potential Hotel Savings

### HVAC Optimization

<table>
<thead>
<tr>
<th>Bldg BMS SF</th>
<th>kWhr/SF/Yr</th>
<th>Ave $/kWhr</th>
<th>HVAC %</th>
<th>HVAC Spend</th>
<th>BIQ HVAC Reduced</th>
<th>BIQ Fee</th>
<th>Net Savings/Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>22</td>
<td>$0.16</td>
<td>0.40</td>
<td>$140,800</td>
<td>0.18</td>
<td>$12,000</td>
<td>$13,344</td>
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</table>

### ISO New England Capacity Charge Avoidance

<table>
<thead>
<tr>
<th>Bldg BMS SF</th>
<th>Peak Demand (MW)</th>
<th>HVAC %</th>
<th>HVAC Demand</th>
<th>2017-18 Capacity Charge/MW</th>
<th>Bldg HVAC Cap Charge</th>
<th>BIQ Curtailment</th>
<th>Net Saving/Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>0.4</td>
<td>0.40</td>
<td>0.16</td>
<td>$139,440</td>
<td>22,310</td>
<td>0.20</td>
<td>$4,462</td>
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</table>

### Mass P4P Incentive

<table>
<thead>
<tr>
<th>Bldg BMS SF</th>
<th>kWhr/SF/Yr</th>
<th>HVAC %</th>
<th>HVAC kWhr</th>
<th>BIQ HVAC Reduced</th>
<th>kWhrs Saved</th>
<th>P4P Incentive</th>
<th>Incentives/Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>100,000</td>
<td>22</td>
<td>0.40</td>
<td>880,000</td>
<td>0.18</td>
<td>158,400</td>
<td>$0.12</td>
<td>$19,008</td>
</tr>
</tbody>
</table>

*Approximately 10.5% of overall building electrical budget
There will be Gas/Steam Savings along with Operational Savings

**Total Annual Savings**: $36,814
Guaranteed Pay Back

Cash Positive

Guarantee that your fee will never exceed the savings we create.
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THANK YOU!
NEXT STEPS...

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