Energy Technology Assistance Program

Technology Seminar – June 15, 2011

Presentation Overview

• ETAP Program
  • Focus technologies
  • ETAP services

• Overview of ETAP Technologies
  • Savings opportunities
  • Rebates
  • Example project financials

• How to Participate
ETAP Focus Technologies

- Bi-level lighting fixtures for parking lots and garages
- Wireless lighting controls
- Wireless HVAC controls

Focus Technology Benefits

- Cost-effective energy savings
- Short payback periods
- Installation that requires minimal disruption to occupants & avoids costly asbestos abatement
- Highly customizable
- Works with variety of building automation systems (BAS)
ETAP Services to Speed Adoption

- Free technical assistance
  - Project scoping
  - Audits
  - Technical and economic feasibility analysis
- Identification of additional financial resources
- Implementation assistance
- Rebates

Wireless HVAC Controls
Wireless HVAC Controls

Opportunity

Wireless Networking allows DDC-like functionality without the difficulty of re-wiring

- Significant Energy Savings
  - Especially for Constant Air Volume (CAV) systems
- Improved performance data
  - Zone-level temperatures
- A solution for the most difficult, least controllable buildings (e.g., asbestos).

ETAP-supported Wireless HVAC Controls

- Wireless Pneumatic Thermostats (WPTs)
  - Less than one quarter the cost of a traditional DDC zone retrofit
  - HVAC energy savings: 10% – 25%
- Discharge Air Regulation Technique (DART)
  - ~10% the cost of a traditional VAV retrofit and minimally intrusive
  - HVAC energy savings: 25% - 55%
Wireless HVAC Controls

Maintenance and Operation Considerations

• Wireless HVAC devices are battery operated
• Systems monitors and reports battery power levels
• May require annual battery replacement but some installations have shown strong battery performance for multiple years

Wireless HVAC Controls

Maintenance and Operation Considerations

• Additional information made available through devices can help troubleshoot and predict complaints resulting in maintenance savings
  • What are actual set points for zones?
  • Are zones maintaining temperature?
  • How are neighboring zones performing?
• Eliminates need for periodic system wide re-commissioning of thermostats
Wireless HVAC Controls
Financial Incentives (ETAP)

- $0.18 / kWh annual savings
- Calculated based on estimated project savings

Wireless HVAC Controls
PG&E Financial Incentives

- Incentives for WPT or DART
  - $0.09/kWh
  - $100/peak kW
  - $1.00 / therm from PG&E
Wireless HVAC Controls

Example Project Financials

Values listed below are provided as examples only and may not reflect your project's actual costs or savings.

<table>
<thead>
<tr>
<th>Building Size (sqft)</th>
<th>Assumed # of Zones</th>
<th>Assumed # of Thermostats</th>
<th>Annual kWh Savings</th>
<th>Annual Them Savings</th>
<th>Annual Energy Cost Savings</th>
<th>ETAP Incentive</th>
<th>Utility Incentive</th>
<th>Net Project Cost</th>
<th>Payback</th>
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</thead>
<tbody>
<tr>
<td>200,000</td>
<td>210</td>
<td>210</td>
<td>520,000</td>
<td>155,000</td>
<td>70,000</td>
<td>95,600</td>
<td>1,06,800</td>
<td>50,600</td>
<td>0.3</td>
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<tr>
<td>95,000</td>
<td>153</td>
<td>153</td>
<td>234,000</td>
<td>31,500</td>
<td>69,750</td>
<td>42,120</td>
<td>1,4</td>
<td>35,190</td>
<td>1.4</td>
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<tr>
<td>25,000</td>
<td>63</td>
<td>63</td>
<td>65,000</td>
<td>8,750</td>
<td>19,375</td>
<td>11,700</td>
<td>2.1</td>
<td>14,600</td>
<td>2.1</td>
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</table>

Assumptions:
1. @ $0.15/kwh and $1.10/therm energy rate
2. Includes standard utility rebate of $0.05/kwh and $0.10/therm
3. Includes standard utility rebate of $0.05/kwh, $1.10/therm, and $150/thermostat demand response incentive
4. ETAP incentive capped at 100% of project costs after utility incentives.

Bi-level Lighting for Parking Lots and Garages
Parking Garage and Lot Lighting
Savings Opportunity

Inefficient Existing Fixtures

• HID
• Older multi-lamp fluorescent

More light is delivered than is needed

• In unoccupied areas
• When daylight is sufficient
ETAP-supported Bi-level Lighting

Bi-level or dimming fixtures with integrated occupancy sensors

• Garages
• Lots
• Stairwells
• Pathways

Energy Savings

• Source change from an inefficient fixture
• Reduced light levels when light not needed
• Energy Cost Savings: 25% - 70%
Bi-level Lighting

Other Benefits

- Improved Light Quality
- Improved personal safety
- Extended lamp life lowers maintenance costs

ETAP Financial Incentives

- ETAP Incentives
  - Bi-level LED - $200/fixture
  - Bi-level T8/T5/Induction - $100/fixture
  - Bi-level Lamp & ballast retrofit (garage only) - $40/fixture
Bi-level Lighting
PG&E Financial Incentives

- LED - $0.05/kWh and $100/peak kW reduction
- T8/T5* - $25/fixture, or $0.05/kWh and $100/peak kW reduction
- Lamp & ballast retrofit / Induction - $0.05/kWh and $100/peak kW reduction

http://pge.com/mybusiness/energysavingsrebates/rebatesincentives/let/
http://pge.com/includes/docs/pdfs/mybusiness/energysavingsrebates/incentivesbyindustry/
ligh4ng_catalog_final.pdf

*Additional prescriptive T8 & T5 incentive options are available, based on fixture types. See PG&E lighting catalog for more details.

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Bi-level Lighting
Example Project Financials

<table>
<thead>
<tr>
<th>Location Type</th>
<th>Existing Fixtures</th>
<th>Existing kWh</th>
<th>Proposed kWh</th>
<th>kW Savings</th>
<th>Annual Energy Cost Savings</th>
<th>Total CAP Incentive</th>
<th>Utility Incentive</th>
<th>Net Project Cost</th>
<th>Payback in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parking Garage 150 W att HPS</td>
<td>207,436</td>
<td>90 W LED, bi-level</td>
<td>126,724</td>
<td>166,714</td>
<td>$25,907</td>
<td>$20,000.00</td>
<td>$10,239</td>
<td>$19,011</td>
<td>3.54</td>
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<tr>
<td>Parking Garage 100 Watt HPS</td>
<td>217,504</td>
<td>New vapor line or reflector, 100 watt, and 2 100W lamps</td>
<td>124,644</td>
<td>129,120</td>
<td>$20,868</td>
<td>$17,500</td>
<td>$6,844</td>
<td>$46,509</td>
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<tr>
<td>Parking Lot 400W Metal Halide</td>
<td>19,272</td>
<td>220 W LED</td>
<td>37,942</td>
<td>52,220</td>
<td>$7,850</td>
<td>$9,600</td>
<td>$2,637</td>
<td>$26,183</td>
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<tr>
<td>Parking Lot 250W HPS</td>
<td>58,545</td>
<td>150W Induction</td>
<td>27,766</td>
<td>38,378</td>
<td>$4,557</td>
<td>$4,530</td>
<td>$1,539</td>
<td>$17,466</td>
<td>3.37</td>
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Values listed above are provided as examples only and may not reflect your project's actual costs or savings.

Assumptions:
1) fixture quantity for garages, 45 fixture quantity for lots - 1 for retrofits
2) Annual operating hours of 8,760 for garages, 4,380 for lots
3) Bi-level fixtures operate at 50% power, 25% of the time
4) $0.05/kWh energy rate
5) Standard utility rebate of $0.05/kWh, and $100/peak kW reduction
6) Includes estimated maintenance savings $50 per fixture for garages, $100 per fixture for lots
Wireless Lighting Control for Parking Garages and Interior Spaces

Interior Lighting Savings Opportunity

More light delivered than is needed

- In unoccupied areas
- In areas which require less light due to:
  - Sufficient daylight
  - Personal preferences
ETAP-supported Wireless Lighting Controls

Wireless Control Systems

- Parking garages and lots
- Interior space

Energy Savings

Reduced light levels when not needed

- Occupancy sensing
- Automatic scheduling
- Daylight harvesting
- Personal control
- Energy Cost Savings: 10% - 50% (or higher)
Wireless Lighting Controls

Financial Incentives

- ETAP Incentive
  - $0.18/kWh

- PG&E Incentive
  - $0.05/kWh and $100/kW reduction

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Wireless Lighting Controls

Example Project Financials

<table>
<thead>
<tr>
<th>Building Size (sqft)</th>
<th>Annual Energy Cost Savings XXX</th>
<th>ETAP Incentive</th>
<th>Utility Incentive $</th>
<th>Net Project Cost</th>
<th>Payback in Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,000</td>
<td>$15,797</td>
<td>$18,956</td>
<td>$9,478</td>
<td>$62,663</td>
<td>4.9</td>
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<td>50,000</td>
<td>$31,602</td>
<td>$27,923</td>
<td>$16,961</td>
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<tr>
<td>150,000</td>
<td>$94,790</td>
<td>$113,748</td>
<td>$56,874</td>
<td>$274,113</td>
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</tr>
</tbody>
</table>

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Assumptions:
1. $0.15/kWh energy rate
2. Approximate breakdown of space = 50% open office and 50% private office
3. Power at controlled points = 5kW
4. Approximate blended savings from scheduling, daylight harvesting, presence detection and personal control = 40% for open office and 5% for private office space
5. Standard utility rebate of $0.05/kWh
How to Participate

• Cities, counties, special districts, community colleges, and universities throughout California are eligible for technical assistance and financial incentives

• Contractors can submit bids to install ETAP projects

• Manufacturers with qualifying products may benefit from ETAP financial incentives

• Public building owners can implement ETAP retrofits, taking advantage of utility incentives

ETAP Participants

Cities
Berkeley
Concord
Covina
Davis
Fairfield
Hayward
Irvine
Livermore
Long Beach
Oakland
Palo Alto
Pleasanton
Richmond
Sacramento
Salinas
San Bernardino
San Francisco
Santa Cruz
Santa Monica
Santa Rosa
Visalia
Walnut Creek

Counties
Alameda
Contra Costa
Marin
Orange
Placer
Sacramento
San Mateo
Santa Clara
Solano
Sonoma

Public Institutions
Cal Poly Pomona
CSU Fullerton
CSU Long Beach
Delta College
Hartnell College
UC Berkeley
UC San Diego
UC San Francisco
UC Santa Barbara
UC Santa Cruz

Public Agencies
AC Transit
BART
Port of Oakland
SMUD

<table>
<thead>
<tr>
<th>TRACK OUR PROGRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of agencies enrolled: 37</td>
</tr>
<tr>
<td>ETAP rebate dollars reserved: $574,479</td>
</tr>
<tr>
<td>ETAP rebate dollars remaining: $1,992,637</td>
</tr>
<tr>
<td>Total energy cost savings: $426,766</td>
</tr>
<tr>
<td>Energy savings in projects with reserved rebates: 3,461,445 kWh</td>
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</tbody>
</table>
Follow Up Questions

ETAP Website
http://energy-solution.com/etap

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