INTRODUCTION

Background

The lodging industry is highly energy intensive.\(^1\) Hotel facilities operate 24 hours a day and have multiple space types, which can include ballrooms/conference areas, pools and other amenities, and commercial kitchens.\(^2\) As a result, large energy savings opportunities exist in this market. However, several barriers make lodging energy efficiency challenging to address. For hotels, guest comfort is a primary objective, leaving little room for facility downtime for implementing efficiency measures that could disrupt hotel visitors. When equipment fails there is often no time to carefully research replacement options without negatively affecting the customer experience, so available equipment is often chosen over the most efficient option. Moreover, the diversity of the hotel market in terms of management and ownership structure, size of the facility, and amenities offered, makes it difficult to effectively reach all lodging energy savings opportunities through efficiency programs.

In 2013, a Consultant Team presentation to the Council identified hospitality (restaurants and lodging) as an important market segment where there is opportunity for greater savings.\(^3\) As described further in the following section, lodging offers cost-effective potential efficiency savings of over 36,000 annual MWh (electric) and 4.4 million annual therms (gas) in National Grid and NSTAR territory.\(^4\) In order to capture the energy saving potential in the lodging industry, the Program Administrators (PAs) will need to gain a firm understanding of the lodging market and identify and implement the program practices that most effectively overcome barriers in the industry.

The purpose of this memo is to provide information about the lodging market in Massachusetts as well as current efforts to address efficiency opportunities in the sector. The memo evaluates the potential for savings from lodging facilities and identifies barriers that need to be overcome to capture this potential. The memo also explores effective programs being implemented in other jurisdictions and identifies opportunities to enhance the PAs’ current program offerings. Although NSTAR has developed and implemented a successful outreach strategy for large hotels in the Boston area, additional strategies could further improve current program effectiveness and

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\(^1\) Based on Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey, Lodging is the 3rd most energy intensive building activity per building; 6th per square foot.

\(^2\) For the purposes of this memo, “lodging” refers to hotels, motels, and bed & breakfasts and excludes buildings such as dormitories and assisted living facilities.


support efforts by the other PAs.

**Methodology and Data Sources Used**

The following background data on the lodging market relies heavily on publicly provided information from the American Hotel and Lodging Association and U.S. EPA.\(^5\) Information relative to efficiency potential in this market was largely derived from a report developed by POINT380 and documents available through the EPA.\(^6\) To select effective practices for consideration by the Massachusetts PAs, we researched lodging programs in other jurisdictions and spoke with representatives from these programs as well as representatives from hotel and lodging associations. Initial efforts to inventory lodging efficiency programs in other jurisdictions revealed that this market has not been widely targeted by efficiency programs. Nevertheless, we identified some effective strategies for reaching lodging customers and possibilities for improving the Massachusetts programs to more effectively capture the energy efficiency potential in this sector.

**Summary of Recommendations**

Based on a review of the lodging market in Massachusetts and effective practices and opportunities, we recommend the PAs take the following actions.

- Complete a lodging market analysis and develop segmentation strategies
- Provide comprehensive efficiency services while promoting the most promising measures
  - Advance CHP among good candidates
  - Promote energy management systems
- Develop relationships with organizations close to the lodging industry
  - Work with hotel and lodging associations
  - Utilize account managers
  - Create a statewide position
- Pursue opportunities that meet both energy and hotel business needs
  - Align efficiency upgrades with scheduled renovations
  - Leverage stated sustainability goals
  - Assist with green/sustainable program participation
  - Review emerging technologies

**MARKET SEGMENT INFORMATION**

**Description of Massachusetts Hotel Market**

Hotels are an important aspect of Massachusetts’ economy. According to the American Hotel and Lodging Association, the lodging industry generates $1.3 billion in tax revenue at the state and local level and accounts for

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8.1 percent of the jobs in the Commonwealth (both direct and indirect).\textsuperscript{7} As of 2008, the AHLA identified 841 lodging properties in Massachusetts, including 80,489 guest rooms.

In the hotel industry in general, there are three basic ownership/management structures with additional substructures. These include:

1. Independent Hotels
   a. Managed by the owner
   b. Owned by one company and managed by a management company
2. National chains (e.g., Marriott) where the property is owned and/or managed by the chain
3. Franchises
   a. Managed by the owner
   b. Owned by the franchisee and managed by a management company

The hotels in Massachusetts reflect all of these ownership/management structures, ranging from large chain hotels such as the Courtyard Marriott to small bed and breakfasts that may only operate seasonally. However, there is little comprehensive information that describes the total population with further granularity such as by ownership and other characteristics like size, age, or types of amenities.

**Energy Use in Hotels**

Nationwide, lodging properties have an average annual total energy intensity of 87 kBtu per square foot and an average energy cost of $1.42 per square foot.\textsuperscript{8} More than 60 percent of total energy use is in the form of electricity.\textsuperscript{9} Although many factors, services, and amenities affect hotel energy use, 80% of consumption in a typical lodging property is accounted for by space conditioning, water heating, and lighting. Additional energy usage comes from refrigeration, cooking, office equipment, and other various uses. Hotel facilities operate 24 hours a day and have multiple space types, which can include ballrooms/conference areas, pools and other amenities, and commercial kitchens, and tend to have high thermal loads.

For most hotels, the competitive nature of the industry prevents them from raising room rates to increase revenue. Therefore, reducing costs is the primary way hotels can increase profit margins. Energy expenses account for the largest portion of hotel annual operating budgets after labor costs.\textsuperscript{10} Moreover, in recent years, utility expenditures were the fastest-growing operating cost for hotels. Therefore, reducing energy use makes good financial sense for the hotel industry, allowing them to keep costs down. According to the EPA, every 10 percent reduction in energy use is equal to increasing the average room rate by $1.35 in full-service hotels or $0.62 for limited-service hotels.\textsuperscript{11} For a hotel with 150 rooms, this could result in an additional $34,000 to $74,000 in profit annually.

**EFFICIENCY POTENTIAL AND COST-EFFECTIVENESS IN massachusetts**

A 2012 study conducted by POINT380 and sponsored by National Grid and NSTAR provides some insight into lodging efficiency potential and cost-effectiveness in those utilities’ territories.\textsuperscript{12} Results suggest that lodging offers substantial cost-effective potential gas and electric savings. Table 1 shows the relative program cost of savings for different business types in National Grid and NSTAR territories and the estimated quantity of accounts. Estimates are specifically provided for lodging customers. Based on this information, lodging customers provide saving that are ranked 4\textsuperscript{th} most cost-effective out of 12 customer types (a cost of $0.39 per annual kWh, and $0.033 per lifetime kWh).

\textsuperscript{7} https://www.ahla.com/uploadedFiles/AHLA/government_affairs/State_Fact_Sheets/Massachusetts.pdf
\textsuperscript{9} Ibid.
\textsuperscript{11} Ibid.
Table 1. Electric Savings Cost Effectiveness

<table>
<thead>
<tr>
<th>Rank</th>
<th>Customer Type</th>
<th>$/kWh (lifetime)</th>
<th>$/kWh (annual)</th>
<th>Accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ref. Warehouse</td>
<td>$0.000</td>
<td>$0.00</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Grocery</td>
<td>$0.024</td>
<td>$0.27</td>
<td>4,103</td>
</tr>
<tr>
<td>3</td>
<td>Health</td>
<td>$0.025</td>
<td>$0.22</td>
<td>8,807</td>
</tr>
<tr>
<td>4</td>
<td>Lodging</td>
<td>$0.033</td>
<td>$0.39</td>
<td>1,114</td>
</tr>
<tr>
<td>5</td>
<td>Retail</td>
<td>$0.038</td>
<td>$0.43</td>
<td>22,862</td>
</tr>
<tr>
<td>6</td>
<td>Restaurant</td>
<td>$0.039</td>
<td>$0.36</td>
<td>14,135</td>
</tr>
<tr>
<td>7</td>
<td>Large Office</td>
<td>$0.040</td>
<td>$0.46</td>
<td>9,271</td>
</tr>
<tr>
<td>8</td>
<td>Small Office</td>
<td>$0.043</td>
<td>$0.42</td>
<td>50,604</td>
</tr>
<tr>
<td>9</td>
<td>Miscellaneous</td>
<td>$0.043</td>
<td>$0.50</td>
<td>8,430</td>
</tr>
<tr>
<td>10</td>
<td>School</td>
<td>$0.045</td>
<td>$0.44</td>
<td>3,747</td>
</tr>
<tr>
<td>11</td>
<td>Warehouse</td>
<td>$0.045</td>
<td>$0.52</td>
<td>4,797</td>
</tr>
<tr>
<td>12</td>
<td>College</td>
<td>$0.046</td>
<td>$0.51</td>
<td>1,133</td>
</tr>
</tbody>
</table>

Figure 1 below shows the relative magnitude of potential savings per account (the vertical axis) and the magnitude of potential savings for all accounts (the horizontal axis) of different business types. The size of the bubble represents the number of customers. The potential for lodging is about 32 MWh per account. The total for all lodging establishments is about 36,000 MWh based on the quantity of 1,114 in this combined National Grid and NSTAR territory. Although the overall size of the lodging market is relatively small compared to other markets, results suggest that lodging establishments have the fourth highest electric opportunity per account of all business types.

Figure 1. Magnitude of Electric Savings

Table 2 below shows the cost-effectiveness of potential gas savings by customer type, as well as the number of accounts in the same Massachusetts National Grid and NSTAR territories. Hotels provide cost-effective savings at a cost of $4.65 per therm, and $0.32 per lifetime therm, making lodging customer savings 7th most cost-effective out of 10 customer types.

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14 Ibid.
Table 2. Gas Savings Cost Effectiveness\(^{15}\)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Customer Type</th>
<th>$/Therm (lifetime)</th>
<th>$/Therm (annual)</th>
<th>Accounts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hospital</td>
<td>$0.14</td>
<td>$2.24</td>
<td>4,878</td>
</tr>
<tr>
<td>2</td>
<td>Office</td>
<td>$0.15</td>
<td>$2.79</td>
<td>45,150</td>
</tr>
<tr>
<td>3</td>
<td>Retail</td>
<td>$0.23</td>
<td>$4.05</td>
<td>12,977</td>
</tr>
<tr>
<td>4</td>
<td>Miscellaneous</td>
<td>$0.24</td>
<td>$3.90</td>
<td>5,414</td>
</tr>
<tr>
<td>5</td>
<td>FoodStore</td>
<td>$0.28</td>
<td>$4.35</td>
<td>2,125</td>
</tr>
<tr>
<td>6</td>
<td>Restaurant</td>
<td>$0.28</td>
<td>$4.23</td>
<td>9,336</td>
</tr>
<tr>
<td>7</td>
<td>Hotel</td>
<td>$0.32</td>
<td>$4.65</td>
<td>885</td>
</tr>
<tr>
<td>8</td>
<td>College</td>
<td>$0.36</td>
<td>$5.47</td>
<td>2,467</td>
</tr>
<tr>
<td>9</td>
<td>Warehouse</td>
<td>$0.36</td>
<td>$6.76</td>
<td>2,349</td>
</tr>
<tr>
<td>10</td>
<td>School</td>
<td>$0.42</td>
<td>$6.71</td>
<td>2,113</td>
</tr>
</tbody>
</table>

Figure 2 below indicates the magnitude of potential gas savings per hotel. Of all business types, hotels offer the highest opportunity for gas savings per account at almost 5,000 therms per account. As a sector, hotels offer 4.4 million therms of potential in annual savings.

Figure 2. Magnitude of Gas Savings\(^{16}\)

SEGMENT-SPECIFIC MARKET BARRIERS

Customer Experience

In addition to barriers common among other sectors (e.g., lack of knowledge about energy use and efficiency measures, resistance to change), there are a number of barriers to energy efficiency unique to the lodging market. First, the customer experience is the focus of these businesses and drives the decision making process. Efficiency, which is not necessarily visible to the customer, tends not to be a priority. Additionally, hotels may worry that efficiency measures will have a negative impact on the customer experience, such as lowering the quality of light by converting to more efficient options. Because most hotels operate 24 hours a day year round,

\(^{16}\) Ibid.
there is little downtime during which facilities can implement efficiency upgrades without negatively affecting guests’ experience. Thus, efficiency projects need to either enhance the customer experience--or at least be invisible to the customer--as a first test to be approved by management. When equipment fails there is often no time to research replacement options without affecting the customer experience, so available equipment is often chosen over the most efficient option. Moreover, efficiency may compete with other capital investments more directly tied to the hotel’s core functions such as improvements to lobbies, rooms, or meeting spaces.

**Diversity in the Market**

As previously described, there are a number of ownership and operating models in the hotel industry. This can make it difficult to engage with the real decision makers and persuade them to take action on efficiency projects. Reaching the right person within the management structure is important to get approval and a budget for efficiency projects. For example, it can be difficult to know if a Marriott is part of the national chain or is a franchise unit in which the owner of the hotel has paid for the name and for reservation services, but has no other affiliation with Marriott. One report indicated that there are 3,180 Marriotts in the United States, but the company only has control over 734 of these when franchises and timeshare properties are excluded.\(^\text{17}\) It is also confusing in that a parent company such as Marriott operates facilities under many different brands, such as Ritz-Carlton, Renaissance, and Courtyard.

In addition to diversity in ownership structure, hotels vary based on many dimensions that affect energy use such as size. The table below describes several other such hotel features and how they affect energy use.\(^\text{18}\)

**Table 3. Hotel Features That Affect Energy Use**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Questions Affecting Energy Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laundry</td>
<td>In-house or outsourced?</td>
</tr>
<tr>
<td>Swimming pool(s)</td>
<td>Indoor or out? Heated or not?(^\text{19})</td>
</tr>
<tr>
<td>Health Club/Spa</td>
<td>Hours of operations? Open to the general public?</td>
</tr>
<tr>
<td>Meals</td>
<td>Full dining services? Serving non-guests? 24-hour room service?</td>
</tr>
<tr>
<td>Meeting Facilities</td>
<td>Number and size? Ballroom? Exhibition space?</td>
</tr>
<tr>
<td>Heating/cooling/ventilation</td>
<td>Central HVAC or through-the-wall units for guest rooms? Central air handler or heat pump/dedicated unit for corridor ventilation and conditioning?</td>
</tr>
<tr>
<td>Room types</td>
<td>Single rooms or suites?</td>
</tr>
<tr>
<td>Target customer</td>
<td>Family vacation or business guests?</td>
</tr>
<tr>
<td>Other activities</td>
<td>Casino, theater, retail, etc.?</td>
</tr>
<tr>
<td>Size</td>
<td>How is energy use in the building metered? Are there multiple buildings on the property?</td>
</tr>
</tbody>
</table>

Because of the diversity in both ownership structures and building system types, it can be challenging to compare energy use across hotel properties to understand which hold the most savings potential. It can also be difficult to address efficiency opportunities across the hotel market with a single program delivery.


\(^{19}\) Heated pools are the norm in the Northeast, but there may be some stand-alone, in ground pools which are not heated.
Human Behavior Affects Energy Usage

Another challenge to efficiency in the hotel market is the fact that energy use is a function of hotel guest and employee behavior. Many guests who stay in hotels expect and pay for a certain level of comfort, which may cause them to behave differently than they would in their own home. For example, they may take extra long showers, keep the room warmer in the winter, and neglect to turn off lights when not occupying the room. Employees also affect hotels’ energy consumption and can be an important part of saving energy both in terms of promoting it to guests and taking steps themselves to reduce hotel energy use.

CURRENT MASSACHUSETTS PRACTICE

Efforts to Address Lodging Efficiency

The Massachusetts PAs do not have a statewide initiative or approach to targeting the lodging sector. Hotels, motels, and inns are served through custom retrofit, prescriptive, new construction, upstream and in some cases, direct install programs depending on their size, needs and project type. As shown in Table 4, NSTAR made a concerted effort to target the lodging market and reached over 20% of its electric customers in this sector in 2012. NSTAR’s average lodging customer size is 5 times larger than the average size lodging customers for National Grid and WMECO. The PAs are focusing on their larger customers as shown by the fact that the average participant size in 2012 was from 3 to 5.4 times larger than the average customer in the lodging sector.

National Grid served the fewest customers in this market but achieved the highest average participant bill reduction, with savings of over 12% on the electric bill. National Grid was the only gas PA with significant lodging engagement, reaching 42 participants and achieving average gas bill reductions of over 10%.

Table 4. Lodging Sector Participation 2012

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric (Energy in MWh)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLC</td>
<td>27</td>
<td>910</td>
<td>10,509</td>
<td>8.7%</td>
<td>34</td>
<td>389</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ngrid</td>
<td>12</td>
<td>912</td>
<td>1,304</td>
<td>10,565</td>
<td>148,686</td>
<td>12.3%</td>
<td>0.9%</td>
<td>109</td>
<td>880</td>
<td>163</td>
</tr>
<tr>
<td>Nstar</td>
<td>78</td>
<td>382</td>
<td>21,190</td>
<td>194,711</td>
<td>312,090</td>
<td>10.9%</td>
<td>6.8%</td>
<td>272</td>
<td>2,496</td>
<td>817</td>
</tr>
<tr>
<td>WMECO</td>
<td>13</td>
<td>202</td>
<td>677</td>
<td>8,302</td>
<td>28,627</td>
<td>8.2%</td>
<td>2.4%</td>
<td>52</td>
<td>639</td>
<td>142</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>1496</td>
<td>24,080</td>
<td>224,088</td>
<td>489,402</td>
<td>10.7%</td>
<td>4.9%</td>
<td>185</td>
<td>1,724</td>
<td>327</td>
</tr>
<tr>
<td>Natural Gas (Energy in Therms)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbia</td>
<td>21</td>
<td>4,600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ngrid</td>
<td>42</td>
<td>898</td>
<td>61,287</td>
<td>597,375</td>
<td>12,762,939</td>
<td>10.3%</td>
<td>0.5%</td>
<td>1,459</td>
<td>14,223</td>
<td>14,213</td>
</tr>
<tr>
<td>Nstar</td>
<td>52</td>
<td>2,842,576</td>
<td>65,887</td>
<td>597,375</td>
<td>15,605,515</td>
<td>11.0%</td>
<td>0.4%</td>
<td>1,569</td>
<td>14,213</td>
<td>14,213</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>971</td>
<td>65,887</td>
<td>597,375</td>
<td>15,605,515</td>
<td>11.0%</td>
<td>0.4%</td>
<td>1,569</td>
<td>14,213</td>
<td>14,213</td>
</tr>
</tbody>
</table>

The general trend in the Customer Profile Study is that the PAs are able to achieve higher average percent savings (i.e., savings as a percentage of load) for smaller customers. Larger customers, who have higher consumption and tend to participate over time to reduce their energy use, had a lower average percent savings. As shown in Figure 3, however, the 2012 smaller lodging customers showed a lower percent reduction than the large participants. The PAs could review these projects to identify whether the same opportunities and level of comprehensiveness are being pursued across the sector.

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Data source is 2012 C&I Customer Profile Study, Chapter 8 Tables. No data were provided for Unitil or Berkshire. National Grid gas savings comprised 86% of the gas savings in the lodging sector. Some data were suppressed to protect customer confidentiality.
Successful Aspects of Current Approach

According to Pat Maher, a consultant who has been hired by the American Hotel and Lodging Association to act as their “green guru,” Massachusetts’ approach to addressing hotel energy efficiency has been industry leading, at least for large hotels. His opinion was corroborated by Dan Ruben, Executive Director of Boston Green Tourism. Dan has been very impressed with NSTAR’s outreach efforts to hotels in the Boston area.

LODGING PRACTICES AND OPPORTUNITIES FROM OTHER JURISDICTIONS

A review of programs targeting the lodging market identified several practices that work to overcome barriers in the industry. These practices were gleaned from program descriptions on utility websites, ACEEE papers, program evaluations, and interviews with program managers and representatives from hotel associations. Programs and outreach efforts reviewed included those offered by: Ameren Illinois, Wisconsin Focus on Energy, San Diego Gas & Electric, Southern California Edison, Efficiency Vermont, Baltimore Gas & Electric, Pacific Gas & Electric, Delmarva Power, the American Hotel and Lodging Association, and Boston Green Tourism.

Provide Comprehensive Efficiency Services

Effective EE programs in the lodging industry offer audits that look at the building comprehensively, not just prescriptive incentives. Ideally, hotel audits will look at both the guest rooms and communal spaces including lobby, conference rooms, spa and restaurant. Further, since hotel owners often own multiple buildings in the state, programs can improve customer experience and engagement by working with larger owners to develop and implement projects across their portfolio of buildings.

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The Lodging Energy Efficiency Program (LEEP) offered by Southern California Edison and San Diego Gas and Electric is an example of a program offering comprehensive services. The program begins with a comprehensive investment-grade audit, after which the auditor provides a report with recommended updates, return on investment, and available incentives. Incentives are offered on a per kWh savings basis for measures ranging from basic lighting to major system replacements for air conditioning, energy management system (EMS) controls, and refrigeration systems. By providing a range of solutions, the comprehensive audit enables hotel owners to understand investments they might choose to make in the short term such as lighting while assessing cost effective upgrades they can make in the longer term when undergoing renovations.

The following efficiency measures have been proven through experience to have relatively quick returns on investment. Many of the measures save both electricity and gas.

- LED lighting redesign/retrofit in lobby, common areas, and the back of the house where long hours of operation are common
- Ozone laundry systems
- Vending machine controls
- VFDs on pumps and fans including heat pump loop pumps, heating loop pumps, air handlers and pool pumps
- Energy management systems
- Demand controlled circulator pumps for domestic hot water
- Combined heat and power

Build Effective Relationships

Because of the complicated and diverse ownership structure found in the hotel industry, relationship building is a key element of programmatic success for this sector. However, because many hotels, motels and inns are small customers, the PAs are unlikely to have the capacity to build one-on-one relationships with each owner in their territory. Relationship building through trade associations is a key approach used in Ameren Illinois’ lodging effort, which falls under the ActOnEnergy program umbrella. Of primary importance is working with the local hotel associations, which are instrumental in working with smaller hotels. Hotel trade associations are organizations that hoteliers look to for information and view as a trustworthy resource. To more effectively reach hotel customers, Ameren Illinois has a hotel market sector coordinator into place. The sector coordinator became actively involved with hotel trade organizations and put together presentations and information for hotel representatives. Representatives from the Illinois Hotel and Lodging Association frequently accompany him on site visits to hotels to introduce him to general managers, who can then point him to engineering staff or other decision makers. The hotel sector coordinator indicated that having a key point person who is a constant presence has been an important aspect of the program’s success. Initially, it took about a year for the hotel sector coordinator to gain traction among the sector and for hotels to recognize him as a resource.

For lodging accounts large enough to merit one, employing an account manager has been an effective way to build relationships with hotels, communicate energy efficiency program offerings, and spur participation. For example, it appears that NSTAR has account managers who work directly with and are knowledgeable about hotels. A process evaluation of PG&E’s lodging program finds, among other things, that contractor outreach and account management are the two most effective marketing strategies in this sector. Account managers also played an important role in the success of a hotel initiative undertaken by Wisconsin’s Focus on Energy. Their account management strategy sought to proactively build relationships with larger lodging customers while offering a basic level of service to all interested lodging customers. Account managers can help large lodging customers to consider long-term energy management strategies rather than isolated one-time improvement projects.

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22 LEEP is implemented by Energy Solutions for Southern California Edison and San Diego Gas and Electric
Consider both Large and Small Hotels Markets

A 200 room chain hotel and 10 room bed and breakfast are both part of the lodging industry. Although full-service hotels may offer the largest opportunities for energy saving, numerous opportunities also exist for smaller lodging establishments. Given differences in types and size of equipment, ownership, and building construction types, distinct strategies may need to be developed for both large and small lodging customers.

For example, Efficiency Vermont’s webpage indicates that certain lodging savings opportunities such as commissioning are most appropriate for larger hotels, while also listing opportunities for smaller hotel businesses. Specifically, it suggests that smaller inns and bed and breakfasts may be eligible for Building Performance, a program to improve the comprehensive energy efficiency of buildings in small businesses and residential rental properties.

Effective outreach strategies may also be different based on the size of the hotel. As previously mentioned, account managers have been effective for reaching large hotel customers in places such as California, while the Ameren Illinois hotel market sector coordinator suggested that the best way to reach smaller customers was through local hotel associations. Working to address the needs of all hotels regardless of size will ensure that all opportunities in the sector are captured.

Meet Hotels Business Concerns and Needs

Among the services offered by SCE and SDG&E’s lodging programs is assistance with green/sustainable program participation, as desired. Although hotels may worry about negative impacts of energy efficiency upgrades on their guests’ experience, they may not realize that efforts to save energy can attract customers and improve their comfort. There have been an increasing number of businesses and government agencies that ask hotels for environmental achievements in Requests for Proposals (RFPs). The U.S. Environmental Protection Agency (EPA) and the State of Florida are examples of organizations that require employees to stay in green hotels when traveling. The federal government is also developing incentives for federal staff and meeting planners to choose green hotels that meet certain green meeting standards. Moreover, several travel booking sites highlight environmentally conscious hotels and Bed and Breakfasts. For example, Orbitz highlights Energy Star hotels, while the American Hotel & Lodging Association developed guidelines for going green with TripAdvisor. Properties that meet the guidelines can apply for the TripAdvisor GreenLeaders program at green.tripadvisor.com. Using the competitive advantage hotels may enjoy by “going green” in market strategies can be an effective way to encourage participation in efficiency programs. Providing support for green hotel programs along with incentives for energy efficiency improvements may entice hotels to participate that would not undertake efficiency on their own.

Train Hotel Staff

Training for building operators or facility engineers in the lodging sector can support and augment participation in efficiency programs. For example, Wisconsin’s successful lodging program included extensive training for lodging workers. The seminars help lodging property owners and managers understand hotel energy use; identify opportunities for energy savings facility-wide; estimate energy savings potential and develop effective energy-management plans. Projects of participating properties accounted for ~25% of electric lodging savings and 13% of gas lodging savings.

Webinars are another way to disseminate information to hotel staff. Pat Maher, the “green guru” hired by the American Hotel and Lodging Association, pointed out that organizations such as Boston Green Tourism may develop webinars and partner with utilities that sponsor the training opportunities. This allows hotel customers to receive information from sources they already trust, while linking to opportunities offered by the utilities. Non-technical staff can also benefit from targeted training seminars that raise awareness regarding energy use in buildings and ways to reduce it.

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**Provide Benchmarking**

Benchmarking was one element the Ameren Illinois hotel sector coordinator would like to see included in Ameren’s efforts to address the market. Because hotel owners often own multiple buildings in the state, programs can achieve success working with large owners to implement projects in their portfolio of buildings. Establishing a benchmark rating (e.g., ENERGY STAR performance ratings) can help hotel owners identify their best- and worst-performing facilities. Benchmarking helps to prioritize the most cost-effective upgrades; if efficiency improvements across an entire portfolio are not feasible in the short-term, beginning with low scoring facilities is a good first step. Benchmarking helps to account for differences in size and services offered to normalize energy use. The LEEP program, for example, provides Energy Star benchmarking as a service of the program.

**Support Combined Heat and Power**

One energy efficiency measure that can cost-effectively address several of the largest end uses in the hotel industry is combined heat and power. The facilities operate 24 hours a day and tend to have high thermal and electric loads. Three-quarters of the hotel industry’s total energy is devoted to end uses that could be cost-effectively provided by CHP, including heating water and guest rooms, air conditioning, and lighting. However, not all hotels are good candidates for a CHP system, particularly those facilities with less than 100 rooms. A market analysis completed by EPA’s CHP Partnership suggests that about 10,000 of the almost 48,000 hotels in the United States have energy characteristics appropriate for CHP technology. Over 1,000 of these facilities could realize a simple payback of five years or less on an investment in a CHP system. The required size of the system largely depends on the size of the hotel. As seen in the chart below, sizing for the thermal load for a typical 230 room full service hotel results in a recommended CHP system with 140 kW thermal output. In addition to efficiency benefits, CHP systems can provide emergency power during grid outages and limit impacts on services and revenues.

**Figure 4. Typical Thermal Loads, 230 Room Hotel**

The EPA estimates that ninety-eight hotels in the U.S. have installed CHP systems and provides case studies to

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27. Ibid.
28. Ibid. This benefit is most relevant to large casinos.
demonstrate successful project outcomes. For example, in 2005, Embassy Suites in San Luis Obispo, California installed an 85-kW fuel cell CHP for its full-service hotel. The facility includes 196 guest rooms, 11 meeting rooms, a pool and fitness center, and a restaurant and lounge. The system serves approximately 40 percent of the building’s electric demand and over 75 percent of average thermal demand and is projected to save the hotel between $900 and $1,200 a month. Other hotels have installed CHP systems with the support of incentives offered through programs like the New York State Energy Research and Development Authority’s Distributed Generation and CHP Program.

RECOMMENDATIONS

Although there has been some success in reaching the lodging market in Massachusetts, there are opportunities for the PAs to enhance current outreach efforts and program offerings to achieve greater energy savings. The strategies described below are based on effective practices that have been implemented elsewhere but are relevant and applicable to the lodging industry and PAs in Massachusetts.

Complete a Lodging Market Analysis and Develop Segmentation Strategies

The hotel industry is a diverse sector with multiple variables. Addressing all hotel efficiency opportunities will require different strategies based on some of these key variables. A first step in developing a systematic and comprehensive approach to this important market sector would be to complete a market analysis to facilitate better understanding of its key characteristics. The market research should seek to identify key ownership structures, associations and groups, and players. Information about ownership structure, in particular, provides valuable information about how decision-making occurs for sub-segments of the market and for individual customers. Understanding the organizational structure, and reaching those who have the power to make projects happen, is important. This research may be best achieved as a team effort by outside sales and account managers, marketing, evaluation and planning, all working. Once the lodging segment is more fully characterized in terms of ownership, building type and vintage, energy consumption, and hotel amenities, then a diverse set of strategies and effective practices can be developed to garner savings across the spectrum of hotels, motels and inns, from the largest to the smallest.

Another recommended action is for NSTAR to share their work in the hotel sector with other PAs, including how they have approached outreach, worked with associations, structured projects, and identified efficiency opportunities and measures. Identifying and sharing their successful strategies will help elevate services to hotels across Massachusetts. In addition, other PAs with successful smaller hotel projects should also share the key factors that contributed to the success of those projects to support replication.

Provide Comprehensive Efficiency Services While Promoting the Most Promising Measures

To address the lodging market, the PAs should offer comprehensive efficiency upgrades as opposed to just prescriptive incentives and consider both the guest rooms and communal spaces. While all opportunities should be identified and addressed, advancing relevant measures that address multiple end uses can ensure that hotels take advantage of the post promising energy savings opportunities. Two of these measures are further described below.

ADVANCE CHP AMONG GOOD CANDIDATES

There are currently five CHP systems installed in hotels in Massachusetts with a total capacity of 560 kW, for an average of 112 kW per system. The U.S. EPA study published in 2005 finds that Massachusetts has the potential for 49,000 kW of CHP capacity in hotels with more than 100 rooms, ninth highest in the nation.

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32 CHP in the Hotel and Casino Market Sectors, 2005, Figure 13, Page 32 http://www.epa.gov/chp/documents/hotel_casino_analysis.pdf
33 Ibid, Table 23, Page 46
appears to be an underutilized efficiency resource in the hotel industry in Massachusetts. Further exploring and promoting CHP as an efficiency measure for hotels could provide cost-effective savings not currently being captured. An important first step would be to identify those hotels that would be the best candidates for CHP systems. Additionally, Dan Ruben of Boston Green Tourism indicated that CHP is heavily restricted in downtown Boston, likely as a result of interconnection and safety concerns related to the type of electric network in that area. Understanding these challenges and working to address any regulatory barriers that exist may be required before promoting the technology.

PROMOTE ENERGY MANAGEMENT SYSTEMS
Energy management systems (EMS) are computerized systems that allow hotels to control monitor and energy use from a central point in the facility. These systems can be particularly useful for addressing the challenges guest and employee behavior present for reducing energy use. For example, guest room systems based on occupancy sensors or key-card access allow guests to adjust lighting and HVAC settings while in their rooms, but reduce energy usage when the room is empty. This ensures that hotel guests are comfortable while in their rooms, but reduces unnecessary energy use in rooms that are unoccupied. It also reduces energy use from cleaning staff inadvertently leaving lights or other equipment running in unoccupied rooms. Energy management systems can provide other functions including control of equipment and temperature in various zones within the hotel. Offering these systems through efficiency programs can address multiple end uses in hotels and should be promoted by the PAs. To support this effort, the PAs could develop a case study of successful implementation of one of these systems and disseminate it to hotels through the hotel associations.

Develop Relationships with Organizations Close to the Hotel Industry

WORK WITH HOTEL AND LODGING ASSOCIATIONS
Partnerships and relationships are an important component of successful efficiency programs targeting the hotel industry. State hotel and lodging associations provide extensive outreach and education services to their members and have established credibility. Working through these associations is an effective route to reach the end customers. Partnerships with hotel associations have proven to be especially effective. This may be especially true for reaching smaller hotels and bed and breakfasts. While the Massachusetts Lodging Association is likely a good partner for reaching hotels statewide, many communities have their own associations. For example, the Five College Area Bed and Breakfast Association is a group for B&Bs located in an around Amherst. Working with organizations such as this can help the PAs disseminate information and gain program participants. Developing and offering training materials in collaboration with hotel associations will provide credibility to the information and reach a wider audience. NSTAR has already been active among hotel groups in the Boston area, which has proven to be successful.

CREATE A STATEWIDE POSITION
In addition to individual PA representatives, creating a new statewide position that would be responsible for planning, strategy, and relationship building for the lodging industry would ensure further consistency across service territories and devote sufficient resources to engaging the hotel industry and promoting efficiency opportunities.

UTILIZE ACCOUNT MANAGERS
Additionally, account managers working to specifically target the hotel industry can help to build relationships with key large customers. These same sector specialists should be the PA representatives to various lodging associations. Consistency among those working with the hotel industry can help to foster relationship building and trust between the PAs, hotel associations, and hotel customers.

Pursue Opportunities that Meet Both Energy and Hotel Business Needs
As discussed throughout this memo, the guest experience is paramount to hotels’ goals and decision making. There are several ways efficiency programs can help hotels save energy while minimizing the impact on hotel guests or even improving the guest experience. Therefore, the PAs should strive to pursue opportunities that meet both energy savings goals and hotel business needs.

34 http://www.fivecollegesbb.com
ALIGN EFFICIENCY UPGRADES WITH SCHEDULED RENOVATIONS
First, PAs can capitalize on scheduled hotel renovations and new construction. Hotels are renovated periodically to freshen the look and feel of the hotel, maintain certification if they are part of a chain or franchise, or maintain the quality of the customer experience. These renovations can happen as frequently as every five to seven years. While renovations typically involve non-energy items such as carpet, finishes, and bedding, lighting or appliances can be part of the renovation as well. Upgrading lighting, televisions or refrigerators in guest rooms as part of a renovation can be an opportunity for efficiency projects. Using these times of change to promote efficiency measures can help to minimize concern over negatively affecting the customer experience. Polling hotels to find out when these renovations are scheduled to happen can help PAs reach out to hotels before they undertake upgrade projects. The PAs may enlist the help of local associations for outreach support.

Continuing to offer upstream incentives for equipment relevant to the lodging market can also help to encourage the uptake of efficient options during schedule renovations. Upstream programs can also help increase the purchase of efficient equipment when the need for unexpected replacement arises and time is of the essence in order to keep a business running with minimal disruption.

LEVERAGE STATED SUSTAINABILITY GOALS
Another way to meet both energy saving and hotel business needs is to leverage stated sustainability or energy reduction goals. Some hotels recognize the value in being good corporate citizens and have set environmental goals. For example, Marriott has goals to reduce energy and water use in their hotels 20% by 2020 as compared to the baseline year of 2008. Hilton has similar goals. However, these types of goals may only apply to properties that are managed by Marriott, and not to franchised properties. Identifying hotels with stated efficiency goals and approaching these businesses with proposals that help them achieve the corporate goals is likely to be an effective outreach strategy for the PAs.

ASSIST WITH GREEN/SUSTAINABLE PROGRAM PARTICIPATION
In addition to stated corporate goals, knowledge of other ways efficiency might benefit hotels, such as travel site recognition or gaining a competitive advantage with government RFPs, can be used to appeal to hotel managers and decision-makers. These may include programs such as TripAdvisor’s GreenLeaders program.

REVIEW EMERGING TECHNOLOGIES
Staying current on emerging technologies that could save energy and improve customer experience may also encourage efficiency in the hotel industry by meeting hotel business needs and concerns. For example, tunable LED systems enable operators to alter the color temperature of lighting fixtures to improve circadian, mood, visual acuity, perception, productivity, and performance. Such systems have largely been piloted in buildings such as hospitals and offices, though could be very applicable to the hotel market. Other example technologies include LightSpeaker®, an LED light that also serves as a high-quality loudspeaker that installs like a light bulb. Measures that save energy and enhance customer experience are especially likely to gain traction among hotel customers.

CONCLUSION
The lodging industry is highly energy intensive and represents additional energy efficiency potential in Massachusetts. Several distinct barriers make capturing the efficiency potential in this sector challenging. However, enhancements to current program approaches can help to overcome these barriers in all types and sizes of lodging facilities, supporting the uptake in efficient equipment, systems, and behavior among hotels. This memo describes some of the successful strategies that have been implemented in other jurisdictions as well as some of the effective practices already being implemented in Massachusetts that can be built upon. A good first step for the PAs will be to better understand the hotel market in the state by completing a market assessment. The PAs can then work to build relationships with other organizations close to the hotel industry, provide services that support hotel business needs and goals, and incorporate promoting measures such as CHP into program offerings.