Strategic Options for Increasing Energy Efficiency in Large Office Buildings – Phase III

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## Abbreviations and Acronyms

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>BOMA</td>
<td>An organization and network of professionals involved in building ownership, management, development, and leasing.</td>
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<tr>
<td>CCI</td>
<td>Clinton Climate Initiative seeks to create and advance solutions to the core issues driving climate change. CCI works with governments and businesses on three strategic program areas: increasing energy efficiency in cities, catalyzing the large-scale supply of clean energy, and working to stop deforestation.</td>
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<tr>
<td>CPUC</td>
<td>California Public Utilities Commission – A California government entity that regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies.</td>
</tr>
<tr>
<td>CEI</td>
<td>Continuous Energy Improvement Program – a CEE program approved by the CPUC to begin in 2010 whose objective is to achieve a minimum of 2 percent additional energy savings in large industrial and commercial facilities through relationship management with their owners.</td>
</tr>
<tr>
<td>CEE</td>
<td>Customer Energy Efficiency Programs – Programs administered by PG&amp;E on behalf of CPUC to increase energy efficiency within the State of California.</td>
</tr>
<tr>
<td>M&amp;V</td>
<td>Measurement and Verification (M&amp;V) – Process and methods developed and used by CPUC to measure cost-effectiveness of its energy efficiency programs.</td>
</tr>
<tr>
<td>ESCO</td>
<td>Energy Services Company – A business entity hired by a building owner or manager to identify energy efficiency measures, their energy savings potentials, costs, and feasibility. An ESCO may be contracted to implement such measures and may be compensated based on energy savings performance.</td>
</tr>
<tr>
<td>LEED</td>
<td>The Leadership in Energy and Environmental Design – A green building rating system developed by the U.S. Green Building Council (USGBC) that provides a suite of standards for environmentally sustainable construction.</td>
</tr>
<tr>
<td>USGBC</td>
<td>U.S. Green Building Council -- A 501(c)(3) non-profit community of leaders working to make green buildings available to everyone within a generation.</td>
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EXECUTIVE SUMMARY

PROJECT GOAL

PG&E has been undertaking a multi-phase and innovative energy efficiency program development effort to understand the large commercial building market in its service territory, to understand the reasoning behind the relatively low levels of adoption of energy efficiency measures, and to implement strategic larger integrated energy saving options for increasing energy efficiency in large commercial buildings.

PROJECT DESCRIPTION

The first phase of work classified the commercial building market and described the market’s energy use. The second phase of research built on the initial research conclusion that being seen as a sustainable organization or having a green building has a positive impact on the value of an owner’s property or business. In this study, potential concepts were tested with building owners and other stakeholders to see what would spur interest in aggressive (more than 30 percent) energy savings programs.

PROJECT FINDINGS/RESULTS

Results from this first phase of research show the one-third of PG&E’s electricity sales are to commercial buildings, which range in size from hundreds of square feet in floor space to more than one million square feet and which have a variety of uses from dry cleaners and restaurants to hotels and large office buildings. The research showed that bundling energy savings measures could reduce building energy use by up to 30 percent. It also showed that achieving energy efficiency alone would not motivate decision makers at these facilities to invest in and adopt energy-saving measures. This initial work identified links to LEED-based initiatives that can align energy efficiency programs with a building owner’s sustainability goals.

PROJECT RECOMMENDATIONS

One outcome of this investigation was the outline of an approach for a whole-product program. A whole-product combines integrated energy efficiency measures (energy efficiency, demand response) with other valuable services (distributed generation, conservation) as a solution to the building owners and operators. The research also showed that to be successful, PG&E's program must provide tangible value to building owners such as large energy dollar savings along with a high return on investment (ROI). A valuation model created during this phase of work has shown the possibility of increasing building value by transforming wasted energy into investments in energy efficiency and LEED certification and because of the aggressive high energy savings a positive cash flow with a higher ROI from the energy efficiency program. This model has also indicated that owners can increase their building’s value without any upfront cost.
**Sustainable Solution Overview**

The current phase of research is designed to prove the value proposition for the whole-product concept, demonstrating a synergy between energy efficiency and sustainability, and to develop PG&E's capabilities to implement the concept. This whole-product concept has been given the name “Sustainable Solution” to reflect this connection. Figure 1 below shows representative elements of a Sustainable Solution offering. Ultimately, verified energy savings and LEED certification result in a measured increase in property value.

**Figure 1 - Sustainable Solution Elements**

In a Sustainable Solution, PG&E serves as a trusted advisor. They provide the building owner objective consulting services during the decision making process and help measure the energy savings performance once the project implementation is complete. PG&E’s advice is impartial and valued by its customers. The company has extensive energy efficiency expertise and access to a vast array of resources to enable a successful energy efficiency project. PG&E’s Sustainable Solution services include:

- Engineering support to project potential energy savings and project costs
- Decision making support to help the potential customer estimate project value and communicate that value to the ultimate decision-makers
- Rebates and incentives as well as support to help customer access special financing based on potential savings
- Project management support to help the customer select project managers, design investment grade audit contracts and understand energy service contracts
- Measurement and verification (M&V) support to help the customer measure savings and capture any available financial incentives.
PG&E leads the Sustainable Solution phases for customer engagement. These steps result in a building owner’s decision to implement energy efficiency measures that can produce more than 30 percent energy savings. Table 1 outlines broad phases of the Sustainable Solutions process, which is detailed more fully later in this document. Customer engagement occurs intensely during the first four steps of the process. PG&E’s advisory role enables the customization of the Sustainable Solution, providing the customer the right mix of services that overcome specific barriers to making investments that produce deep energy savings.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Desired Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Potential Customer Identification</td>
<td>Prioritized list of qualified, prospective customers</td>
</tr>
<tr>
<td>2. Concept Proposal to Facilities and</td>
<td>Customer educated about the concept and team gains an understanding of the</td>
</tr>
<tr>
<td>Operations Managers</td>
<td>prospect’s needs, decision process, budget, time-frame, and receptiveness to</td>
</tr>
<tr>
<td></td>
<td>Sustainable Solution</td>
</tr>
<tr>
<td>3. PG&amp;E feasibility study</td>
<td>Commitment to proceed with team formation and preliminary audit</td>
</tr>
<tr>
<td>4. Third-party Preliminary Audit</td>
<td>Agreement to sign contract for Investment Grade Audit (IGA)</td>
</tr>
<tr>
<td>5. Investment Grade Audit</td>
<td>Signed contract to implement energy efficiency measures</td>
</tr>
<tr>
<td>6. Implementation</td>
<td>Measures installed, commissioned and accepted by customer</td>
</tr>
<tr>
<td>7. Ongoing Technical and Financial</td>
<td>Verification of Sustainable Solution performance and payment of utility and</td>
</tr>
<tr>
<td>Measurement and Valuation</td>
<td>government incentives</td>
</tr>
</tbody>
</table>

**Table 1 - Outline of Sustainable Solutions Process and Outcomes**

One of the greatest benefits of Sustainable Solution to the customer is a significant return on investment, less reliance on the companies’ capital budget while gaining energy savings and if in the process, LEED or Energy Star recognition for these optimal gains in building energy performance. Another important customer benefit is the information and support provided by PG&E to reduce their perceived technical and financing risks. Feasibility studies and preliminary audits reduce decision making costs and the time to make a good decision. PG&E’s rebates and incentives, as well as government tax incentives for energy efficiency, also contribute to a lower the investment payback period. PG&E’s independent advice, furthermore, helps improve the credibility of measurement and verification of these energy savings and financial benefits.

In addition to a high level of electricity and natural gas savings PG&E accrues for its customers with the implementation of a solution, PG&E realizes enhanced customer relationships through the Sustainable Solutions process. The Sustainable Solution builds on the traditional utility audit with more breadth and depth (more focus on being out of the box and using innovative solutions like emerging technologies), and ongoing support throughout the customer’s decision making process.
SUSTAINABLE SOLUTION PILOT OUTCOMES SUMMARY

In preparation for the pilot, the team refined the Sustainable Solution concept and developed educational presentations to explain the value of this approach to prospective customers. A complete explanation of technologies, financing options along with the cost analysis and figures showing the lowered use of capital costs and return on investment is important to overcoming barriers to energy efficiency projects in large commercial office buildings. To help with this process, the team built financial analysis tools to evaluate various project scenarios and to assess the impact of energy savings on property value.

Customer engagement creates a partnership between the potential customer and PG&E based upon a shared vision of an financially acceptable return on investment, sustainability and common goals for energy saving. The pilot program has specified and tested a project team structure where PG&E’s Sales and Service group and Emerging Technology group have played leadership roles. Early in the Customer Engagement process, the customer joins the project team and participates in the selection of an energy services vendor, who will conduct the investment grade audit and be the implementation project manager. One outcome of the pilot is a questionnaire to guide the project team's assessment of project manager candidates.

The InterContinental Hotel San Francisco was identified, in November 2009, as the target customer for the pilot Sustainable Solutions offering. This property meets screening criteria that includes building size, building location, energy saving potential, and existence of or plans for a sustainability strategy. The hotel is a 450,000 square-foot building in downtown San Francisco. It is a relatively new structure with an enthusiastic director of engineering. The director was championing the LEED certification of the hotel as well as other green projects in concert with a corporate sustainability strategy called Green Engage.

PG&E presented the Sustainable Solutions concept to the hotel’s management, who were receptive to the prospects of improving energy use by 30 percent and gaining points for LEED certification. PG&E followed up this informational presentation with a preliminary energy efficiency audit and identified 14 energy savings measures that produced a 30 percent reduction in the hotel's utility bill as well as a 30 percent reduction in electric and gas usage. An initial financial evaluation of the overall project estimated a $0.50 per square-foot reduction in energy expenses and a $65 per square-foot increase in building value. A concept proposal described these financial benefits as well as the benefits of special financing options, utility incentives, and LEED certification. This report included a preliminary 15-year financial analysis including quarterly cash flows, Net Present Values, tax benefits and other financial data. Hotel management responded positively to the proposal and proceeded to form a team with PG&E to define a scope of work and select an implementation contractor.

The selected contractor collaborated with the hotel and PG&E to refine the costs and benefits of a Sustainable Solution. The contractor performed the their own preliminary audit and was able to confirm the potential for 30 percent energy reduction in the hotel. Using the audit results, QDI Strategies finalized the 15-year financial analysis including quarterly cash flows, Net Present Values, tax benefits and other financial data.
Because of the high value of this project, nearly $1.5 Million, the hotel ownership group has needed to approve the Sustainable Solution proposal and the next step, funding of an investment grade audit. The financial criteria was the most important criteria in the decision by the owners, but they also considered the specific guest impacts, both during and after implementation. Over a five month period, the Sustainable Solutions team (hotel management, PG&E, project manager, and supporting consultants) has refined the mix of efficiency measures, adjusted project timing, and evaluated alternative financial options to deliver the optimal proposal to the owners. The financial features of the final Sustainable Solution proposal presented in October 2010 are:

- Guarantee 30% ($233k) annual energy cost savings
- Generate positive cash flow of more than $50K per year for the first four years (assuming PG&E rebates are spread over four years and payment of principal and interest on a 10 year 4% loan)
- Internal Rate of Return of 12.6%
- Net Present Value (NPV) of $319K over a 15 year life just from energy savings, with NPV of $1.47 Million over a 15 year life when demand response (DR) savings, PG&E incentives, and tax credits are included.

A minority of the ownership group supported the proposal to fund the complete Sustainable Solution proposal at the InterContinental San Francisco. A consensus decision was required to move forward. Financial paybacks exceeding three years and project timing are among the reasons to defer the decision to fully fund the entire project.

An important outcome of the pilot is the value of teaming with the customer and using this relationship to educate them about the financial savings and technical options for saving energy. Customer engagement throughout the Sustainable Solution pilot has informed the decision makers about the range of opportunities to beneficially invest in sustainability and energy efficiency. As a result, the InterContinental is planning to make close to $0.5 Million in energy efficiency investments in the next year providing about 40 percent of the energy savings of the full-scale Sustainable Solution proposal and a total of more than $1 Million in efficiency investments over the next five years. Additionally, interaction between the project team and the hotel’s decision makers has led to plans to adapt elements of the Sustainable Solution to other hotel properties in their portfolio. The InterContinental Group, which is the franchisor for the hotel, will be exploring with PG&E energy efficiency opportunities in more than 100 hotels it operates in the PG&E territory.

**CONCLUSIONS AND RECOMMENDATIONS SUMMARY**

The pilot has demonstrated that providing financing and ROI options along with sustainability is a driver to broad acceptance of energy efficiency in the large commercial building market and has tested a delivery process to bring the Sustainable Solution to a prospective customer. The ultimate objective of the pilot was to show that a Sustainable Solution simultaneously creates value for the customer and for PG&E. The customer engagement process has enabled the hotel’s decision makers to view energy efficiency more broadly and as a cost effective investment with a good ROI and helped them plan for more extensive retrofits than would not have been considered otherwise. The hotel plans to implement a significant number of the recommended measures in the near term and is assessing options for executing the full Sustainable Solution over a longer term.
period. The pilot process also allowed PG&E to establish a deep, informed relationship with this customer who is now receptive to implementing energy efficiency projects at its other properties in PG&E’s territory.

In retrospect, there may have been a more ideal pilot customer than the InterContinental Hotel. The hotel has great qualifications, including a management champion for energy efficiency, but the hotel already has a high level of sustainability and efficiency achievement. Because of this, a 30 percent improvement requires implementation of many emerging technologies and longer payback technologies. One recommendation is to refine the target customer selection criteria and include a specific Energy Star rating, ceiling from which a 30 percent Sustainable Solution is more easily achievable and has an appealing ROI for the customer in the near term.

The decision making process for the hotel is complex because of the hotel’s unique ownership structure (70% and 6% by individuals and 14% by the IHG). A recommendation is to explore and understand the customer’s decision making process for high value projects, bring ultimate decision makers into the process as soon as feasible, and educate all participants in the decision making process and decision barriers for the Sustainable Solution.

The Sustainable Solution proposal template produced by PG&E during the pilot is a very valuable document as it contains information to assess near-term and long-term energy efficiency and sustainability options. One recommendation is to work with the customer to adapt the proposal into a sustainability and return on investment strategic plan, which could include near term, quick payback measures to show immediate successes and a longer term plan for high-level LEED certification and the more aggressive 30 percent energy savings Sustainable Solution.
INTRODUCTION

BACKGROUND

Commercial buildings account for more than one-third of the electric load in PG&E's territory and large commercial buildings represent a significant opportunity for large energy savings. Commercial building energy inefficiencies result from a number of interrelated factors including building age, building design, inefficient energy technologies, and poor operating practices. A significant amount of the energy saving opportunities remains in this market sector because there are barriers to investing in energy efficient technologies and equipment. These barriers include: short investment horizon, credibility of energy savings estimates, competition for capital and the allocation of benefits between tenant and owner.

Previous research has described market trends and drivers that influence decision making with respect to energy efficiency in large commercial office buildings. The research has revealed that energy efficiency alone does not provide enough value for decision makers to make significant changes in energy efficiency adoption behavior or investments in energy-related infrastructure. The research concludes, however, that the benefits of being seen as a sustainable organization or green building do have significant impact on the value of an owner's property and overall business.

The initial research has identified marketing and channel options for new programs that align energy efficiency programs with the building owner’s goals. It has also suggested that a “whole product” approach, which enhances a core energy efficiency product with other valued products or services, can be best positioned to compel a customer to buy in.

The next phase of work has resulted in concepts for a PG&E commercial buildings program that align the sustainability features and benefits with the goals of building owners. Concepts built on the first phase research can potentially produce an estimated reduction in building energy use by up to 30 percent. Traditional utility programs have focused on individual technologies installed independently or one-by-one as the means to save energy in buildings. The whole-product approach would include energy savings measures and business services such as design and engineering support, financing, sustainability, and real estate value enhancement as the entire package to sell to building owners.


Whole-product concepts present a value proposition that PG&E could offer building owners and operators and help them increase their building’s sustainability, energy efficiency and overall value. The most promising whole-product concept is based on leveraging the value of LEED certification being enhanced using energy efficiency improvements along with financing options that provide excellent ROIs, positive cash flows with less dependence on capital budgets. The table below compares a LEED-based energy efficiency program, which serves as the core elements of a PG&E whole-product offering, with current practices.

<table>
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<tr>
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<th>Stand Alone Energy Efficiency Measure</th>
<th>Commercial Building Energy Efficiency within a LEED Program</th>
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<tr>
<td>Energy Efficiency Benefits</td>
<td>Potential Energy Savings</td>
<td>Delivers points required for LEED – which increase building value / brand value, potentially including energy savings benefits</td>
</tr>
<tr>
<td>Operational Value</td>
<td>Engineering staff is spread thin and lack skills or experience to execute complex energy efficiency projects</td>
<td>Top driven LEED projects increase the visibility and funding priority of energy efficiency activities.</td>
</tr>
<tr>
<td>Performance Value</td>
<td>Past projects have not had ongoing measurement to demonstrate savings were achieved</td>
<td>LEED has requirements and processes for ongoing measurement – which also drives operational performance</td>
</tr>
<tr>
<td>Financial Value</td>
<td>Energy savings create a positive cash flow to pay back investment in an energy efficiency project. Projects, however, compete for limited funding with other corporate initiatives.</td>
<td>Whole building projects that include an energy efficiency component use energy savings to pay for energy efficiency upgrades that help with LEED certification. LEED value may result in acceptance of longer paybacks for an energy efficiency project.</td>
</tr>
</tbody>
</table>

The previous research projects have pointed to three requirements for a successful whole-product program. First, utilities must expand their view of energy efficiency to encompass its impact on sustainability, which is an important business objective of many owners. Second, financing barriers need to be lowered, and third, the utility’s role must grow beyond that of solely a source of energy consulting and incentives. Feedback from people in the decision making process at commercial buildings has pointed to areas where PG&E can help fulfill these requirements. These areas of value align directly with customer requirements. Figure 1 illustrates these value drivers and the synergy in an entity providing a whole-building solution.
In a whole product program, the utility’s role expands from technical resource to business solutions advisor, providing building owners and engineers with leadership and program support. Utility’s roles in this approach include:

- Take the lead with engineering, financing, and program design to bring building owners a total solution meeting efficiency, sustainability, and economic needs.
- Coordinate and offer LEED design expertise to assure owners that the solutions maximize energy efficiency opportunities.
- Provide owners with access to the most efficient technologies (emerging technologies) to improve the performance of new energy efficiency investments.
- Take the lead in helping owners develop performance contracting vehicles and relationships that reduce the owner’s implementation risk.
- Design incentive programs that support continuous efficiency improvement, perhaps by paying out incentives over time, based on performance.

As the previous work indicated, this whole-product approach should include emerging technologies, demand response and have the potential to evolve so it incorporates on-site generation and renewable energy so it is a complete integrated demand side management approach that enables the long-term goal of zero net energy buildings. The foundation for this long-term objective is PG&E’s current lineup of energy efficiency measures for large commercial buildings. The initial, near-term, whole-product offering consists of the core elements of PG&E’s program packaged with the value drivers in Figure 1 to satisfy building owner desires to increase property value while meeting their sustainability objectives. One of the project’s recommendations is to continue to demonstrate the whole-product concept in commercial settings.

This whole-product approach is now referred to as the “Sustainable Solution.” As shown in the table below, some of these product features are available through PG&E’s Customer Energy Efficiency (CEE) group and other Programs while other
elements represent opportunities for further development during the pilot program, which is the subject of this report.

<table>
<thead>
<tr>
<th>Sustainable Solution Elements</th>
<th>PG&amp;E Currently Offers</th>
<th>Additional Sustainable Solution Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Valuation of Energy Efficiency (EE) in Buildings</td>
<td>• Energy Star building rating as the metric.</td>
<td>• Sell EE at building owner level (not operations level) • Test and use best practices valuation tools</td>
</tr>
<tr>
<td>2. Energy Efficiency Design Consulting</td>
<td>• Efficiency audits • Emerging Technology consulting and demonstration sites • CEE large customer programs (MTM)</td>
<td>• Out of box efficiency audits that include ET, DR and DG options • Long-term efficiency implementation plan • Long-term technology consulting • Integrated self-generation, EE, and conservation strategy</td>
</tr>
<tr>
<td>3. Energy Efficiency Project Financing</td>
<td>• PG&amp;E UESC program for government buildings</td>
<td>• Utility on-bill financing • Local district on-tax bill financing • Third-party financing</td>
</tr>
<tr>
<td>4. Energy Efficiency Project Implementation</td>
<td>• Provider references</td>
<td>• ESCOs as service providers • Contracting and project management assistance to vendors • Tools to help manage implementation</td>
</tr>
<tr>
<td>5. LEED Certification Support</td>
<td>• Innovation points for demonstrating emerging technologies</td>
<td>• Consulting to achieve and value various levels of LEED</td>
</tr>
<tr>
<td>6. Energy Efficiency Performance Verification</td>
<td>• Emerging technologies (ET) demonstration project • NRR verification process • RCx program/incentive</td>
<td>• ET development of combined sub-metering and control • ESCO performance guarantees</td>
</tr>
<tr>
<td>7. Energy Efficiency Incentives</td>
<td>• Program support for capturing utility rebates and incentives</td>
<td>• Incentives based on building energy efficiency • Program support for different levels of audits (including investment grade), and LEED certification</td>
</tr>
<tr>
<td>8. On-site Generation Support</td>
<td>• Solar programs</td>
<td>• Distributed Generation options offered</td>
</tr>
<tr>
<td>9. Carbon Credits</td>
<td>• Data center energy efficiency measures</td>
<td>• Valuation of and planning energy efficiency to reduce carbon</td>
</tr>
<tr>
<td>10. Green Energy Credits</td>
<td></td>
<td>• Program for commercial customers</td>
</tr>
</tbody>
</table>

**TABLE 3 – LARGE BUILDING SUSTAINABLE SOLUTION ELEMENTS**
There has been a significant amount of effort, spearheaded by the Clinton Climate Initiative, Building Owners and Managers Association, U.S. Green Building Council, and other organizations, to address on a national basis the barriers to adoption of energy efficiency retrofits in commercial buildings. Key elements of this work focus on developing tools for real estate leaders to measure the value of energy efficiency and sustainability in commercial buildings. Other initiatives relate to creating templates for transparent, customer friendly measurement and valuation tools that allow financial institutions to capture energy savings benefits.

These efforts complement PG&E’s current program to bring energy savings and sustainability to their customers. The Sustainable Solution has been designed to offer PG&E’s customers a value proposition that is compelling and within PG&E’s current capabilities.

**OBJECTIVES**

The objectives of the pilot project are to assess the market acceptance of the Sustainable Solution concept and to demonstrate the ability of PG&E and its project team to sell and implement this Solution. Feedback from the customer and other participants of the pilot will enable the refinement of product features, definition of PG&E’s role and resource requirements, and the identification of marketing, financial analysis, and implementation tools. The best measure of the pilot’s success is a commitment from the target customer to implement meaningful elements of the Solution.

Specific deliverables for this pilot are to finalize the development of the Sustainable Solutions offering, design a delivery organization for PG&E, create a value proposition to bring to prospective customers, and report on the response of these prospects to the Sustainable Solution proposal. Tools to analyze the benefits of the offering and processes to sell and deliver a Solution are also outcomes of the current phase of work.

**SUSTAINABLE SOLUTION DESCRIPTION**

PG&E’s Sustainable Solution is composed of three major stages: customer engagement, implementation, and measurement and verification (M&V). The outcomes of the Solution are verified energy savings for the customer and PG&E, and certification for sustainability, including LEED certification.

Customer engagement is identifying prospective consumers, educating them on the benefits of a Sustainable Solution, and influencing their attitudes and behaviors so that they decide to optimize energy efficiency and sustainability in their building. In the customer engagement steps, a project team selects the service features of the Solution, including energy efficiency measures, project financing, and implementation service contractors that best satisfy the needs of the customer. Implementation follows the acceptance of an investment grade audit and encompasses the design and installation of the technical systems. M&V proves the value of the Solution, enables the payment of utility incentives, and provides feedback for continuous energy efficiency improvements.
The diagram below shows the three major categories of activities for a Sustainable Solution as well as two major decision points.

The current project has refined the activities and mapped them into the Sustainable Solution process. Features and benefits of the Solution have also been developed and incorporated into educational materials, sales presentations and messaging to communicate the value of the Solution to customers.

**SUSTAINABLE SOLUTION SERVICE FEATURES**

The table below provides examples of PG&E’s services that could be combined to create a Sustainable Solution. These features have elements from existing PG&E energy efficiency programs as well as new PG&E elements resulting from current research and future elements. Service providers selected by the project team also provide services in delivering the solution. Third party providers are expected to contribute heavily in the implementation stage with engineering/design, procurement, installation, and commissioning services.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Sustainable Solution Feature</th>
<th>Potential PG&amp;E Elements of Solution</th>
</tr>
</thead>
</table>
| Customer Engagement | • Valuation of energy efficiency (EE) in buildings                     | Element in standard PG&E Program  
New PG&E element in pilot  
• Define, measure, and promote value impact of sustainability on building value  
• Application of property valuation tools |
|                | • Energy efficiency consulting                                         | Element in standard PG&E Program  
• Efficiency audits  
• CEE commercial customer programs  
• Retro-commissioning program and incentive  
• Data center energy efficiency measures  
• Emerging Technology (ET) consulting and demonstration sites  
New PG&E element in pilot  
• Preliminary Sustainable Solution efficiency audit  
Future PG&E element  
• Long-term efficiency implementation plan  
• Long-term technology consulting  
• Integrated self-generation, EE, and conservation strategy |
|                | • Sustainability consulting                                            | Future PG&E element  
• Integrated EE and sustainability strategy  
• LEED planning  
• Valuation of carbon credits |
|                | • Energy efficiency and demand response incentives                     | Element in current PG&E Program  
• Direction on optimizing utility rebates and incentives  
• Program support for incentive capture (ET support)  
Future PG&E element  
• Program incentives for different levels of audits (including investment grade) and LEED certification  
• Incentives based on building energy efficiency  
• Incentives linked to portion of energy savings opportunity captured |
| Implementation | • EE project financing support                                         | Element in current PG&E Program  
• Utility Energy Services Contracting Program (government and institutional buildings)  
New PG&E element in pilot  
• Support for investment grade audits  
• Referral to third-party financiers  
• PACE financing option  
Future PG&E element  
• Future availability of on-bill financing  
• Loan guarantees |
|                | • Project management consulting                                        | Element in current PG&E Program  
• Provider references for individual measures  
New PG&E element in pilot  
• Referral to project managers  
Future PG&E element  
• Project managers for turn-key program design and implementation  
• Possibly contracting and project management assistance  
• Tools to help manage implementation |
The table emphasizes the near term features of the solution, which supports the most promising value proposition of sustainability, combining energy efficiency benefits with the value of LEED certification. These features should involve emerging technologies and demand response and can evolve over time to incorporate conservation, on-site generation and renewable energy. The long term Sustainable Solution will resemble a complete integrated demand-side management approach that advances the future goal of zero net energy buildings.

Throughout the course of the pilot, details of the Sustainable Solution elements have been assessed and, if warranted, more fully developed. Legal documents (Guaranteed Savings Agreements, Level II Investment Grade Audit contract, Memorandum of Understanding [MOU] alternatives) have been evaluated and drafted. San Francisco’s PACE financing model has been adapted to the Sustainable Solution concept by introducing third-party financing options into the model. Current federal sources of funding, including DOE project funds, stimulus (ARRA) funds, and tax credits have been assessed for applicability to the pilot project.
**Sustainable Solution Process**

The flow chart below is a schematic of the Sustainable Solution process followed during the pilot.

1. Identify Potential Customers
2. Propose Sustainable Solution to Facilities and Operations Managers
3. Facilities / Operations Managers Agree to Participate in Feasibility Study
4. PG&E Feasibility Study
5. Owner Agrees To Proceed
6. Develop and Review Project Management Prospects
7. Third Party Preliminary Audit
8. Select Project Team
9. Prepare Investment Grade Audit
10. Owner Agrees to Proceed with Investment Grade Audit and Explores Funding
11. Conduct Investment Grade Audit
12. Write Sustainability Implementation Plan
13. Owner Agrees to Implement
14. Owner Contracts with Project Manager
15. Implement Selected Measures

**Figure 4 - Sustainable Solution Process Flow Diagram**

This process map illustrates the coordination of the work to be done and the major decision points along the way. As the pilot proceeded, the team learned the complexity of the decision making process and refined the Whole-Product/Sustainable Solution process developed in the previous phase of research. An investment grade audit (IGA) is a key building block in achieving the Sustainable Solution savings objectives; and the process redesign emphasizes IGA related tasks and decisions.

The reason for the emphasis on the IGA steps in the process is that, in most corporate settings, upgrades to a facility’s energy infrastructure must compete for capital funding with non-energy-related investments. Both energy and non-energy investments are rated on a single set of financial criteria that generally stress the expected return on investment. The IGA forecasts operating savings from energy projects such that there is a high level of confidence in the decision to implement the project.

Another important aspect in this process design is the selection of a project management organization to coordinate project design and implementation, and to potentially guarantee savings if required. Once selected, the organization provides all of the engineering work, financial estimates, evaluation and measurement support, and rebate applications for the owner. This project management role is critical because Sustainable Solution is a high impact, comprehensive effort that may tax the engineering and management resources of most building owners.
In a Sustainable Solution, PG&E has a leadership role through the execution of the investment grade audit (IGA): PG&E is driver of the first nine steps in the process. Throughout the process, PG&E is a trusted advisor, providing technical content and analysis to show the project feasibility. During the first four steps PG&E recommends implementation partners, is proposing the concept to hotel management and providing them with a technical and economic assessment that justifies the project. Once management gives the go-ahead to conduct an IGA in step five, PG&E continues to lead the process, ultimately supporting the owners in developing an acceptable IGA agreement. At the tenth step, when the owner agrees to move forward with the IGA, there is a legal commitment to either implement the defined retrofit program or reimburse the project management organization for the work performed to complete the Investment Grade Audit. PG&E is responsible for or a major contributor to all the outcomes in the process. These outcomes are summarized in the table below.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify Potential Customers</td>
<td>Target site for pilot</td>
</tr>
<tr>
<td>2. Propose Sustainable Solution Concept to Facilities and Operations Managers</td>
<td>Concept presentation and agreement to conduct feasibility study</td>
</tr>
<tr>
<td>3. PG&amp;E feasibility study</td>
<td>Preliminary audit and PG&amp;E proposal to site management</td>
</tr>
<tr>
<td>4. Owner agrees to proceed</td>
<td>Authorization to form team and select third party for next level of audit</td>
</tr>
<tr>
<td>5. Third-party Preliminary Audit</td>
<td>Third-party proposal</td>
</tr>
<tr>
<td>6. Select Project Team</td>
<td>Prepare draft Investment Grade Audit (IGA) contract and proposal to owners</td>
</tr>
<tr>
<td>7. Owner agrees to proceed with Investment Grade Audit and Applies for Financing</td>
<td>Owner presentation of revised project scope and economics and signed contract to conduct IGA</td>
</tr>
<tr>
<td>8. Prepare Investment Grade Audit</td>
<td>Detailed quantification of the expected energy savings</td>
</tr>
<tr>
<td>9. Write Sustainability Implementation Plan</td>
<td>Scope of work to implement Sustainable Solution</td>
</tr>
<tr>
<td>10. Owner Agrees to Implement</td>
<td>Owner presentation of terms and conditions to complete Sustainable Solution</td>
</tr>
<tr>
<td>11. Owner Contracts with Project Manager</td>
<td>Signed contract to implement project</td>
</tr>
<tr>
<td>12. Implement Selected Measures</td>
<td>Engineering, procurement, and installation of measures prescribed by plan</td>
</tr>
<tr>
<td>13. Ongoing Technical and Financial Measurement and Verification</td>
<td>Periodic performance measurement and reports</td>
</tr>
</tbody>
</table>

PG&E’s current sales and service organization has the role of trusted advisors to their large commercial and industrial customers. This role leads to a long term relationship
where the PG&E representatives help the customer initiate and implement energy efficiency incentive programs. This reputation as trusted advisor is a result of many years of successful program implementation, their leadership in energy efficiency, as well as respected engineering expertise. The advisory role reduces the perceived technical risks that customers may have related to energy efficiency projects.

The Sustainable Solution builds on this expertise in a more complex offering that encompasses sophisticated financial options as well as the benefits of sustainability. One goal of the pilot program is to more fully develop the responsibilities and skills for PG&E sales and service team.

**SUSTAINABLE SOLUTION PILOT PROGRAM**

The pilot has been executed by PG&E and its team following the Sustainable Solution process.

**PILOT SITE**

The InterContinental Hotel San Francisco was identified, in November 2009, as the target customer for the pilot Sustainable Solutions offering. This property meets screening criteria that includes:
- Building size – a commercial building with floor space more than 350,000 square feet
- Building location – located within PG&E’s service territory
- Energy saving potential – energy savings opportunities amounting to at least 30 percent of the total building energy use
- Awareness of sustainability – existence of or plans for a sustainability strategy

Descriptive material for the hotel appears below. The hotel is a relatively new structure with an enthusiastic director of engineering. The director is championing the hotel’s LEED certification as well as other green projects in concert with a Corporate Sustainability strategy called Green Engage.
INTERCONTINENTAL HOTEL SAN FRANCISCO BACKGROUND

<table>
<thead>
<tr>
<th>Site</th>
<th>InterContinental Hotel San Francisco</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td>888 Howard Street, San Francisco, CA 94103</td>
</tr>
<tr>
<td>Year Constructed</td>
<td>2008</td>
</tr>
<tr>
<td>Total Floor space</td>
<td>452,098 square feet</td>
</tr>
<tr>
<td>Building Ownership</td>
<td>InterContinental Hotel</td>
</tr>
<tr>
<td>Property Management</td>
<td>InterContinental Hotel</td>
</tr>
<tr>
<td>Energy Star Level</td>
<td>76</td>
</tr>
<tr>
<td>LEED Certification Level</td>
<td>Gold (pending)</td>
</tr>
</tbody>
</table>

The InterContinental Hotel San Francisco opened in February 2008 with a goal of implementing sustainable building practices and operating in a socially responsible, ecologically respectful, and financially sound manner. The ownership and staff are following a strategy to meet this goal and ensure a robust and third-party verified comprehensive green program. The key element of the strategy is the U.S. Green Building Council’s (USGBC’s) Leadership in Energy and Environmental Design Existing Building Operation and Maintenance (LEED EBOM) green building rating system. This rating system incorporates the U.S. EPA’s ENERGY STAR energy performance scale to verify efficiency. The assessment of the hotel’s performance in the LEED categories was completed on March 31, 2010. Awarding of LEED Gold Level certification is expected by the end of 2010.

Harry Hobbs is currently the Director of Engineering at the InterContinental Hotel, San Francisco. His more than 30 years of experience in building operations management at companies including Marriott Hotels & Resorts, Johnson Controls and Sun Microsystems has given him a keen understanding of operational and financial best practices for commercial buildings. In June 2008, InterContinental San Francisco created a “Green Team” to execute a vision to operate the new hotel in a sustainable manner. As the chairman of the “Green Team”, Harry became a leader in the LEED certification process, using Energy Star and LEED criteria as important guide posts for achieving the hotel’s vision and instituting several energy and resource-saving measures. Harry is an advocate of continuous improvement and actively practices benchmarking, which is integral to Energy Star and LEED activities, to make the InterContinental San Francisco as efficient as possible.

The InterContinental San Francisco sustainability initiatives fall into seven major categories: Green Energy, Water Conservation, Green Cleaning and Sustainable Exterior Management Program, Encouraging the Use of Public Transportation,

Recycling, Composting and Waste Diversion Program, Sustainable Purchasing, and Commitment. The hotel's energy savings initiatives follow the guidelines of Energy Star’s rating program. Details of sustainability and energy efficiency performance appear on the Energy Star web site. Highlights of seven categories are listed below:

**Green Energy**
The hotel has a signed contract to purchase renewable energy credits to offset 100 percent of hotel's energy use through 2011.

**Water Conservation**
The LEED EBOM water calculator estimates that in full occupancy the hotel saves 3,413K gallons of water per year with a variety of water saving strategies.

**Green Cleaning and Sustainable Exterior Management Program**
The hotel has a comprehensive green cleaning program, from using green cleaning chemicals and equipment to environmentally preferred paper products. The majority of cleaning chemicals used to clean hotel guest rooms, public areas and restrooms are Green Seal or Environmental Certified.

**Encouraging the Use of Public Transportation**
More than 75 percent of all employees take public transportation, bike, walk, or carpool every day to and from work and the hotel has programs to encourage guests to be car-free when in the city.

**Recycling, Composting and Waste Diversion Program**
The hotel diverts more than 63 percent of our waste from the landfill through composting, recycling, and waste avoidance programs.

**Sustainable Purchasing**
This program protects the environment and protects occupant health and wellbeing by purchasing environmentally friendly guest room amenities, key cards and paper made from recycled materials, ENERGY STAR qualified electronics, and energy-efficient lights with the minimum mercury possible.

**Commitment**
The hotel has organizational initiatives and financial resources in place to support sustainability efforts. A Green Team (sustainability working group) is made up of Executive level staff, including the General Manager and numerous department heads. Full staff involvement in green initiatives is guided by communications from management and inclusion of a sustainability measure in performance evaluations. Hotel ownership has provided capital costs for energy improvements and green power.
To achieve an Energy Star rating of 76, the hotel has implemented a suite of energy saving measures. The technologies used, by strategy, are listed in the following table.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Re-commissioning</td>
<td>• Adjust Dampers</td>
</tr>
<tr>
<td></td>
<td>• Boiler Tune-up</td>
</tr>
<tr>
<td></td>
<td>• Chiller Tune-Up</td>
</tr>
<tr>
<td></td>
<td>• EMS Audit</td>
</tr>
<tr>
<td>Lighting</td>
<td>• Compact Fluorescents</td>
</tr>
<tr>
<td></td>
<td>• Daylighting</td>
</tr>
<tr>
<td></td>
<td>• Planned Lighting Maintenance Program</td>
</tr>
<tr>
<td>Load Reductions</td>
<td>• ENERGY STAR Procurement Policies</td>
</tr>
<tr>
<td>Fan Systems</td>
<td>• Energy Efficient Belt Drivers</td>
</tr>
<tr>
<td></td>
<td>• Improved Fan Controls</td>
</tr>
<tr>
<td>Heating and Cooling Plant</td>
<td>• Chilled Water Loop Temperature Control</td>
</tr>
<tr>
<td></td>
<td>• Economizer Cooling</td>
</tr>
<tr>
<td></td>
<td>• Evaporative Cooling</td>
</tr>
<tr>
<td>Other Technologies/Strategies</td>
<td>• Water Saving Toilets</td>
</tr>
</tbody>
</table>

**TABLE 7 - INTERCONTINENTAL HOTEL SAN FRANCISCO ENERGY EFFICIENCY STRATEGIES**

**SUSTAINABLE SOLUTION CONCEPT PRESENTATION**

Late in the fourth quarter of 2009, PG&E presented the Sustainable Solutions concept to the hotel’s director of engineering, who was receptive to improving his building’s energy use by 30 percent and gaining points for LEED certification. The baseline energy use for the hotel is in the table below.
Based on PG&E’s understanding of the hotel’s annual energy use, an initial financial evaluation of the overall project estimated a $0.50 per square foot reduction in energy expenses. The building valuation model constructed in the last phase of this work was used to estimate a $65 per square foot increase in building value. A concept presentation, summarized in the figure below, estimated the operational and financial benefits to the hotel. PG&E and the hotel agreed that the next step of a feasibility analysis was warranted by these results.

**References for building value change analysis**


††Results are within the range of $24 to $171 /SF increased building value presented in CoStar’s Green Study; www.costar.com/uploadedFiles/Partners/CoStar-Green-Study.pdf.
FEASIBILITY STUDY

PG&E followed up the initial informational presentation with a preliminary energy efficiency audit and identified five areas to save electricity and four areas with opportunities to save natural gas.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Electricity Reduction (%)</th>
<th>Natural Gas Reduction (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation measures</td>
<td>5.0%</td>
<td>5%</td>
</tr>
<tr>
<td>Central plant</td>
<td>7.5%</td>
<td></td>
</tr>
<tr>
<td>Lighting and controls</td>
<td>7.1%</td>
<td></td>
</tr>
<tr>
<td>Foodservice</td>
<td>2.4%</td>
<td></td>
</tr>
<tr>
<td>Other Controls</td>
<td>8.4%</td>
<td></td>
</tr>
<tr>
<td><strong>Total Electricity Savings</strong></td>
<td><strong>30.4%</strong></td>
<td></td>
</tr>
<tr>
<td>Boiler Controls</td>
<td></td>
<td>&gt;9%</td>
</tr>
<tr>
<td>Ventilation air heat recovery</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Hot water heat recovery</td>
<td></td>
<td>TBD</td>
</tr>
<tr>
<td>Solar water heating (pool)</td>
<td></td>
<td>8%</td>
</tr>
<tr>
<td><strong>Total Gas Savings</strong></td>
<td></td>
<td>&gt;22%</td>
</tr>
</tbody>
</table>

These energy savings measures produced at least a 30 percent reduction in the hotel’s utility bill. These are summarized in Table 9 and detailed in Appendix 1.

PG&E formally presented the Sustainable Solution offering to the hotel’s general manager and director of engineering in January, 2010. The bottom line of the proposal was a multi-year, $1.5 million project, which could increase its property value by 15 percent and demonstrate leadership in sustainable properties within the hotel market. The proposed efficiency measures, once implemented, can contribute to the hotel’s achievement of the highest LEED certification level. A future phase of the Sustainable Solution plan would incorporate efforts to reach LEED platinum certification.

The concept proposal is the output of the Feasibility Study. It is an important document for securing the hotel’s authorization to create a project team and engage a third-party audit. An outline of the proposal document is below and key results of the proposal follow.

1. Executive Summary
2. A Sustainable Solution
3. Property Value
4. The Energy Plan
5. Financing Options
6. Project Costs
7. Project Schedule
8. Summary and Next Steps
9. Attachments

QDI Strategies has created a cash flow model to estimate the value of the Sustainable Solution’s energy savings and calculate a return on investment as well as to prepare a valuation analysis to project any increase in property value. Information about the annual energy cost savings and the cost of the technologies to produce these savings are critical inputs to these models as well as to the pilot site’s decision making process. Additional information about analytical tools developed for this project is presented later in this report.

PROPERTY VALUE
In the feasibility study, the team has used industry research to estimate the impact of going green on a building’s value. This sales comparison method has shown an average increase of 15 percent in property values. Most of this gain in value comes from turning the increased attractiveness of the property in higher room rates, increased occupancy, and brand image.

ENERGY PLAN
The table below shows the projected economics from the measures that were proposed in PG&E’s preliminary audit. The simple payback of a $1.5 million investment in the proposed project is more than five years.

<table>
<thead>
<tr>
<th>Measure</th>
<th>kWh Savings</th>
<th>Gas Savings (DT)</th>
<th>Cost to Implement</th>
<th>Rebates (Energy savings only, not including DR)</th>
<th>Total Rebates / kWh Saved</th>
<th>Measure Payback Ranges</th>
<th>Payback Before Rebates - Years</th>
<th>Payback After Rebates</th>
<th>% of Baseline Energy Savings</th>
<th>Energy Savings per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projecte Sustainable Solutions Economic from preliminary PG&amp;E Audit (Cost estimate is maximum to implement)</td>
<td>1,843,300</td>
<td>3,954</td>
<td>$1,500,000</td>
<td>$132,200.00</td>
<td>$0.072</td>
<td>7 - 17.4 Years</td>
<td>5.7</td>
<td>5.2</td>
<td>30%</td>
<td>$263,702</td>
</tr>
</tbody>
</table>

TABLE 10 - ENERGY SAVINGS PLAN FROM FEASIBILITY STUDY

The proposed energy saving measures discussed have been evaluated using the Energy Star scoring methodology along with the InterContinental Hotel’s current scoring to assess their impacts on points for LEED certification. These measures increase the hotel’s current Energy Star score, which enabled a LEED gold rating, to a maximum value of 95 that is essential to the achievement of LEED platinum certification. They would add a total of 12 LEED points, moving the hotel closer to the score required for LEED platinum certification. The plan includes effective use of commissioning and sub-metering capabilities of the project team to verify the energy conservation, efficiency, and demand response results of the proposed measures.
FINANCING OPTIONS
There are four broad financing strategies available to building owners, each with its own costs and advantages. These options include:

- Mortgage Funding
  - Funds for energy investments can be included in mortgage renewal
- Property Assess Clean Energy (PACE) programs
  - Municipal bond backed funds provide advantages as they are designed with energy efficiency investments in mind.
- Independent third party financing
  - Based on property value of energy savings, many Energy Service Companies will arrange financing.
- Line of credit financing
  - Capital budgets for efficiency investments can be financed with bank financing or internal funds

To evaluate options, owners need to establish their individual financing objectives and criteria, such as:

- The timing of financing needs and decisions.
- The owner’s and lender’s financing objectives, including sustainability financing
- Tax options related to energy efficiency improvements
- Opportunities for financial support from government financing programs such as the U.S. Department of Energy, the California Energy Commission, or the City of San Francisco.
- Opportunities to use depreciation to accelerate the cash flow of the project.

PROJECT COSTS AND SCHEDULE
The efficiency measures proposed by the feasibility study were planned to be engineered, installed and commissioned over a six month period. The project is now planned to be engineered, installed and commissioned over a two year period. Two-thirds of the estimated $1.5 Million project cost is for the energy efficiency measure with the balance for engineering, commissioning, management, and contingencies.

The preliminary nature of this feasibility proposal introduces uncertainties in energy savings, costs and revenues, and in the timing estimates for the sustainable solution. These identified risks will be substantially reduced by the execution of an investment-grade audit prior to finalization of financing for the project.

NEXT STEPS FOLLOWING THE FEASIBILITY STUDY
PG&E’s Sustainable Solution team reviewed the findings of the Feasibility Study with the hotel’s director of engineering before presenting the project proposal to
hotel management. There was positive feedback from hotel management on a number of elements of the concept and how these elements would benefit the hotel. While they perceived the overall Solution to be an energy efficiency project rather than a sustainability project encompassing green certification, the proposed Sustainable Solution presented sufficient value for them to want to pursue next steps. The reason for reduced interest in the LEED aspect of the value proposition was the fact that management had already started a project to achieve LEED Gold certification. They commented that it would be difficult to factor in sustainability benefits in their decision to move forward because their LEED efforts began before the start of their discussions with PG&E on the Sustainable Solution project. Management still gave a strong positive reaction to the LEED value of the proposal and envisioned that the Sustainable Solution could benefit them in future efforts to achieve a LEED Platinum rating.

Hotel management, including the general manager and director of engineering, subsequently agreed to pursue the opportunity to take the next steps in the implementation of a Sustainable Solution. Management has provided feedback to the scope of the project so that the Solution best meets their needs. The next steps, at this point, were to fine tune the recommended measures and update the financial calculations so that a project management organization can be selected to engineer and implement the Solution.

**PRELIMINARY AUDIT**

A preliminary audit that includes emerging technologies builds on the feasibility assessment completed by PG&E. The objective of this stage of work is to have a third party look more closely at the efficiency opportunities, outline a scope of work, and deliver refined project costs and energy savings numbers for financial analysis. Favorable financial projections would initiate an investment grade audit.

A third party has been selected by the hotel and PG&E to fill the energy auditor role and to be implementation manager. The selection followed a defined process and the implementation manager filled an important part of the project team structure, Figure 6.

**PROJECT TEAM STRUCTURE**

The project team includes the customer that receives the value of the Sustainable Solution and all parties delivering services to create this value. The team structure evolves throughout the course of the Sustainable Solution process. In the first stages of the effort, the customer and PG&E’s support team are the primary members. This group champions the project, manages budgeting, data management, M&V, and technology assessment work.
The PG&E support team behind the Sustainable Solution has included the PG&E’s Emerging Technologies Department (ET), Customer Energy Solutions Department (ESM), and Energy Service and Solutions Department. QDI Strategies, Inc., a marketing consulting firm, has assisted ET in developing the Sustainable Solution concept and implementing the pilot with PG&E. Account managers in the Services and Solutions department established relationships with the pilot customers. ESM provides technical, product, and segment support to assist the customer in participating in the pilot feasibility studies and implementation.

For large, complex projects, the customer may not have the engineering and project management resources to implement the Solution by themselves. With regard to the current proposal, the hotel and PG&E saw the necessity of a third party project manager to take the ownership of developing and implementing the plan. This third party would be the Project Implementation Manager and would have responsibilities to implement the energy saving measures and in project management.

Team members and their relationships during the implementation stage are shown in Figure 6.

This project team structure is based on that used in a major energy efficiency project at the Empire State building; discussions with the project managers for this project confirmed the applicability of their organization to the Sustainable Solution project. Team members’ roles and responsibilities are summarized by Table 11.

<table>
<thead>
<tr>
<th>Role</th>
<th>Team Member</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| Owner           | Hotel ownership group| • Financial analysis of project  
|                 |                      | • Takes on risk of IGA (pays for the IGA if the IGA meets project goals but ICH decides not to proceed)  
|                 |                      | • Provides financing for project  
|                 |                      | • Contracts with implementation project manager                                |
| Project Management | Hotel engineering    | • Assure/schedule access to property  
|                 |                      | • Ensure low impact on operations  
|                 |                      | • Status reporting to ICH management                                           |
| Project         |                      | • Responsible for and ensures meeting contract goals                            |
PG&E’s role in Sustainable Solution implementation continues to be as a trusted advisor. Advisory services are provided by PG&E at no cost to the owner. With respect to project implementation, these services include:

- Advice on third-party implementation partners
- Contracting support
- Implementation consulting
- Support to assess impact on property valuation
- Measurement and evaluation
- Public relations and communications

PG&E’s team has a continual presence with the customer during the project, organizing and facilitating regular progress meetings from the time of initial contact with the potential customer through the project’s conclusion. During

<table>
<thead>
<tr>
<th>Role</th>
<th>Team Member</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design and Operations Review</td>
<td>implementation management company</td>
<td>• Reports project results relative to goals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manages implementation contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Documents implementation changes and systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Applies for utility incentives</td>
</tr>
<tr>
<td></td>
<td>PG&amp;E team</td>
<td>• Advise technical approach</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Support and update financial models</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Advise contract terms and conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develops Sustainable Solution Investment Plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Advise on M&amp;V approaches and requirements</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Provides energy baseline data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Analyzes implemented measure performance data (for the first full year of operations following completion of implementation)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Seeks means to maximize promotion of the project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Incentive payments and processing</td>
</tr>
<tr>
<td></td>
<td>Hotel engineering, Independent project consultant, and Project implementation management company</td>
<td>• Review IGA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Review measure design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Review implementation plans</td>
</tr>
<tr>
<td></td>
<td>Project implementation management company</td>
<td>• Responsible for IGA completion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manages implementation contractors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Documents implementation changes and systems</td>
</tr>
<tr>
<td></td>
<td>Subcontractors</td>
<td>• Engineer and procure measures</td>
</tr>
<tr>
<td></td>
<td>Independent project consultant</td>
<td>• Delivers and installs measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Ensures schedule and technical success of implementation plan and execution</td>
</tr>
</tbody>
</table>

**TABLE 11 - PROJECT IMPLEMENTATION TEAM ROLES AND RESPONSIBILITIES**
these customer interactions, the team has presented energy efficiency measures for the site and the commensurate energy savings. The technical specifications have been well supported by the team’s financial analyses. These team meetings have allowed the InterContinental Hotel to optimize the Sustainable Solution to its current operational and budgetary needs. The close working relationship between PG&E’s team and the hotel has enabled the development of a comprehensive proposal, incorporating the project specifications and the financial requirements, which the team presented to the hotel’s decision makers. PG&E’s team also worked with the hotel in identifying and selecting a project implementation partner.

**PROJECT IMPLEMENTATION MANAGER SELECTION**

The Sustainable Solution Team for the InterContinental Hotel has put together a structured process to select a project implementation management partner to complete project team. The major steps in partner selection are preparation of selection criteria, screening and recruitment of candidate partners, interviews with leading candidates, request formal proposals from top candidates, partner selection, and execution of a memorandum of understanding with selected partner.

The leading candidates have been screened from a population of capable companies. These companies fell into four categories: Property Management Companies, Project Management Companies, Project Management Companies with energy expertise, and Energy Service Companies (ESCOs). Research and subsequent phone interviews screened a wide range of companies for financial strength, project management and energy efficiency experience, cost control capabilities, record of executing collaborative projects, competencies in integrative building controls, and ability to provide performance guarantees. Screening has led to recruitment of eight candidate partners.

<table>
<thead>
<tr>
<th>Property Management Companies</th>
<th>Project Management Companies</th>
<th>Project Management with energy expertise</th>
<th>ESCOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jones Lange LaSalle</td>
<td>Project Management Associates (PMA)</td>
<td>Lime Energy</td>
<td>Honeywell</td>
</tr>
<tr>
<td>CB Richard Ellis</td>
<td>Turner Construction</td>
<td>Schneider Electric</td>
<td>Johnson Controls</td>
</tr>
</tbody>
</table>

**TABLE 12 - CANDIDATE PROJECT IMPLEMENTATION PARTNERS**

Potential partners have been invited by project leaders to discuss capabilities specific to this project with the Sustainable Solution Team (hotel managers, PG&E staff, and project advisors). The capabilities presentations have described the company, its business and management processes, and staff to accomplish project goals. They included any subcontractors needed to meet project objectives. Using background materials about the hotel project (including the Sustainable Solutions Project Description reproduced in Appendix 2) potential partners have addressed questions related to their capabilities, resources, reputation and experience.
Two candidates were selected by the Sustainable Solution Team to participate in the final selection phase. The team requested each to perform a preliminary audit of the property and supply the team with the following information:

1. A list of energy savings measures to meet the 30% savings goal
2. Projected project costs
3. Ability to meet proposed schedule
4. Specify team members and their roles
5. The commissioning, measurement, and valuation plan
6. List of finance options
7. Other resources that you can bring to this project
8. Documents for initiating the investment-grade audit

Based on this request, the candidates conducted a walk-through of the hotel with the Sustainable Solutions Team. Potential implementation partners made formal presentations of their energy efficiency analysis of the hotel and estimated costs to implement to the Team and responded to a series of questions, Appendix 3.

Each individual company interviewed at this stage communicated their relevant qualifications, expertise, and results of their audit. There were common characteristics among the respondents that directed the Team to focus on firms in the “Project Management with Energy Expertise” and ESCO categories. The team’s perceived strengths and weaknesses of these categories are summarized in the table below.

In addition to the qualifications and expertise of each candidate, the evaluation heavily weighted the estimated costs and benefits of the project. Consideration was also given to the justification of these energy savings and financial factors as well as to the clarity of the presentations that justified assumptions. The team subsequently selected one firm to be the implementation project manager.

<table>
<thead>
<tr>
<th></th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Property Management Companies</strong></td>
<td>Understand hotel operations Project management expertise</td>
<td>Limited energy expertise Engineering and energy expertise subcontracted</td>
</tr>
<tr>
<td><strong>Project Management Companies</strong></td>
<td>Engineering expertise Project management expertise Construction oriented</td>
<td>Limited energy expertise</td>
</tr>
<tr>
<td><strong>Project Management with Energy Expertise</strong></td>
<td>Engineering expertise Project management expertise Energy expertise Local project management presence Customized M&amp;V approach</td>
<td></td>
</tr>
<tr>
<td><strong>ESCOs</strong></td>
<td>Engineering expertise Project management expertise</td>
<td>Processes and procedures more suitable for large projects</td>
</tr>
</tbody>
</table>
PG&E’s Emerging Technologies Program

<table>
<thead>
<tr>
<th><strong>Strengths</strong></th>
<th><strong>Weaknesses</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy expertise</td>
<td></td>
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<tr>
<td>Efficiency expertise</td>
<td></td>
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<tr>
<td>Building controls expertise</td>
<td></td>
</tr>
<tr>
<td>Performance contracting option</td>
<td></td>
</tr>
</tbody>
</table>

**Table 13 - Strengths and Weaknesses of Implementation Manager Candidates**

Interviews with the candidates have confirmed the uniqueness of the Sustainable Solution. None of the companies interviewed has attempted to achieve deep energy savings in a commercial building that is as energy efficient as the InterContinental Hotel, and with a portfolio of energy efficiency measures that includes innovative technologies.

The candidates have provided feedback that may be useful in improving the selection process and selection criteria. One recurring feedback on the Sustainable Solution approach is that the implementation team must possess substantial controls expertise to capture/reach the energy savings objectives within the budget of $1.5 million. This is related to comments about the challenge of achieving the hotel’s goals when the low hanging fruit has already been picked. Some felt the requirements of a preliminary audit, need to provide performance guarantees, and the preexisting list of measures from the feasibility study limited the scope of the project to the findings of the feasibility study.

The PG&E team and InterContinental Hotel have selected Schneider Electric as the project implementation manager for this specific program. Schneider Electric provides technology and integrated solutions to optimize energy usage in a wide range of markets including commercial buildings. They are a global specialist in energy management and a world leader in energy efficiency. From the time of Schneider’s selection, the firm and their project leader have been instrumental in the refinement of the Sustainable Solution concept for the ICH site. Specifically, Schneider worked closely with the team to come up with the right technical and budgetary options that would best meet ICH’s business requirements. The collaboration of PG&E, ICH and Schneider Electric in the development of project specifications and completion of a preliminary audit is in many ways unique and has led to a number of lessons learned discussed later in the report.

**Preliminary Audit Results**

The winning preliminary audit is the starting point of a rigorous financial analysis of the project by QDI Strategies and other members of the Team. Key inputs to the analysis are the cash flows associated with the energy saved as a result of project implementation and costs related to investment in the selected energy efficiency equipment. In the original audit, the chosen project implementation manager projected $305K of savings at a maximum project cost of approximately $1.5 million. These results of the preliminary audit are summarized in Table 14.
QDI has created two financial models to assess project economics. The first model is an owner’s decision model that looks at the overall project economics over an estimated 15 year life of the project. This model is related to the owner’s income statement. In addition to the cash flows from energy savings, this model has inputs to assess the impact of tax credits, special financing, and utility financial incentives on the project’s net present value and payback.

**TAX CREDITS**
The Energy Policy Act of 2005 included a tax incentive to improve the energy efficiency of commercial buildings. The "Commercial Building Tax Deduction" establishes a tax deduction for expenses incurred for energy efficient building expenditures made by a building owner. The deduction is limited to $1.80 per square foot of the property, with allowances for partial deductions for improvements in interior lighting, HVAC and hot water systems, and building envelope systems. The Emergency Economic Stabilization Act of 2008 extends the benefits of the Energy Policy Act through December 31, 2013. Appendix 4 provides additional details about this tax deduction.

**SPECIAL FINANCING**
A recently developed financing tool is the Property Assessed Clean Energy (PACE) program. PACE creates voluntary tax liens on existing commercial or residential property to secure financing for energy efficiency retrofits. The liens can be paid off on the property tax bills. The lien effectively shifts operational expense from energy bills to property tax bills on the property owner’s financial statement. The effectiveness of PACE in commercial energy retrofits is being tested and potential characteristics of successful commercial programs include: owners with high energy bills, more than 10 percent equity, and expectations of keeping the property for a while. Owners with good sources of capital are most likely to participate when there are favorable interest rates.

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Utility Financial Incentives

PG&E offers rebates and other incentives to businesses and non-residential customers to increase their energy efficiency. The Standard Energy Efficiency Rebate Program covers a variety of specified improvements, including:

- Agricultural Improvements
- Appliances and General Improvements
- Boilers and Water Heaters
- Business Computing
- Food Service Improvements
- Heating, Ventilation and Air Conditioning Improvements
- Lighting
- Refrigeration

Customized Retrofit Incentives, previously known as the Non Residential Retrofit (NRR) Program, is a calculated incentive program that provides incentives for custom retrofit improvements that are not covered under the standard rebate program. After a project proposal is reviewed and approved by PG&E, funding is appropriated in order for the project to be implemented. Incentives are based on actual reduction in energy use.  

The total potential standard and customized incentives available for the Sustainable Solution at the InterContinental Hotel are $175,000, based on PG&E’s preliminary assessment. The PG&E team has assessed incentive structures that would pay for performance over time.

The second financial model is a property valuation tool. The solution team has utilized a combination of property valuation methods to quantify the increase in the property value attributable to the sustainable solution. The four methods are:

- Income capitalization,
- Property cost,
- Sales comparisons, and
- Hotel metrics.

Major contributors to increased hotel valuation are increases in revenue because of a “green” image and decreases in operating costs from the energy saving measures. The valuation tool projects the economic impact of the LEED rating on the hotel. This has been done by estimating the increase in revenue that would be achieved from attaining either Silver or Gold LEED certification. Gross margin uplift has been based on occupancy changes that industry experts project from LEED labeling at the existing industry margin contribution rate, which may make this a conservative estimate if the hotel’s average operating margin exceeds industry averages.

The financial analyses have forecasted a return on investment of almost 12 percent when the hotel implements the full Sustainable Solution. This is equivalent to a payback of the investment in all the measures of about five years. Corresponding improvements in the operating margin lead to an estimated increase in hotel value of $32 million. The table below summarizes the financial

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9 See Footnote 5.
A preliminary audit and financial analysis have provided a third party view of the benefits of the proposed Sustainable Solution to the InterContinental Hotel San Francisco. Presentation of the project and its benefits to decision makers led to a decision regarding the initiation of an investment grade audit.

**Investment Grade Audit**

An investment grade audit (IGA) is a highly detailed examination of the building’s energy infrastructure and performance. This level of detail is essential in giving decision makers confidence in making decisions when energy and non-energy investments are rated on a single set of financial criteria that generally stress the...
financial return on investment. For contracts that include performance guarantees, an IGA is a requirement. To develop this high level of confidence the IGA, at a minimum, must provide (1) an analysis of the current energy usage of a facility and (2) a feasibility and economic study of several potential energy saving measures. To accurately define energy savings of 30 percent or more, it is necessary to look at the entire building and the interactive effects among the various energy savings measures that could be implemented within a building. Key outputs of the audit are: annual consumption baseline for all utilities and detailed description of projects with analysis of potential energy and cost savings. An investment grade audit should be detailed enough so that a technically competent reviewer can effectively assess the proposed project.

The Building Owners and Managers Association (BOMA) International and the Clinton Climate Initiative (CCI) have developed the BOMA Energy Performance Contracting (BEPC) model, which is a standardized, user-friendly contracting model that allows building owners and operators to successfully execute large sophisticated retrofits with high levels of operational improvements. The BEPC Toolkit contains a template for an investment grade audit.\(^\text{10}\)

PG&E has coordinated the development of the IGA contract with CCI, who has provided the Team with the most recent IGA contract model. This contract has been successfully applied in a major energy efficiency project at the Empire State Building.

The fundamental conditions of the Investment Grade Audit are:

1. If the project implementation manager (contractor) does not find a specified amount of savings at a specified cost, the owner does not have to pay anything to this “contractor”.
2. If the “contractor” does identify sufficient savings within budget, the owner has the option of moving forward with a contract to do the minimum scope of work defined in the IGA, or declining to do the project and paying the “contractor” a fee for the IGA,.
3. The ownership of the audit output and the degree of specificity of the output, in terms of engineering drawings, is a negotiable item in the contract.

The estimated cost to prepare an investment grade audit for the proposed Sustainable Solution is $80,000.

For performance based contracts, the IGA may be an input to the project’s measurement and verification (M&V).

**Measurement and Verification**

Measurement and verification (M&V) is a means for assessing risk prior to making project commitments and a tool for assessing an implemented project’s benefits, costs, and return on investment. M&V is the responsibility of the project implementation manager and is a project cost.

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\(^{10}\) [www.boma.org/Resources/BEPC/Pages/default.aspx](http://www.boma.org/Resources/BEPC/Pages/default.aspx)
M&V techniques are also applied in LEED certification programs and utility energy efficiency programs. A key part of LEED is recertification. Buildings can recertify as frequently as annually, but must do so every five years. This requirement is compatible with more rigorous, ongoing M&V protocols for energy efficiency measures, which may in turn necessitate advanced metering and retro-commissioning.

There are four options for M&V options in the international performance measurement and verification protocol (IPMVP)

- a. Retrofit isolation with key parameter measurement
- b. Retrofit isolation with all parameter measurement
- c. Whole Building
- d. Calibrated simulation

While it appears that a Whole Building approach would be well-matched to a Sustainable Solution, the choice of a specific option is determined by the value and complexity of the overall project. One requirement of the implementation project manager is the design and costing of the M&V process. Since one of the main purposes of M&V is to validate payments or performance guarantees, the cost of M&V should be less than the payment amount or guarantee that is at risk. The use of M&V data and systems to aid in LEED recertification and utility incentives verification may justify higher M&V expenses.

M&V introduces additional project costs. ESCOs, for example, charge for measurement services as well as for the cost for providing performance guarantees. Typical costs for M&V range from 5 percent to 10 percent of the annual energy cost savings.

**INVESTMENT GRADE AUDIT PERFORMANCE GOALS**

The investment grade audit transfers some of the risk from the hotel to the implementation manager. When it came to setting performance goals for the IGA, the project implementation manager initially backed down from the annual savings of $305K projected by the preliminary audit. The level of savings was reduced to $166K, which lowered the maximum project cost to less than $1 million and resulted in a six year payback. The hotel’s management did not believe this would form an acceptable proposal for the decision makers, so the Solutions team, including the implementation manager, developed an alternative proposal that ultimately guaranteed to find $233K of annual savings for a project cost not to exceed $1.365 million.

**DECISION MAKING**

**SUMMARY**

The Sustainable Solutions team has proposed a project to the Intercontinental Hotel that embodies a suite of energy efficiency measures and calculated financial benefits. Major decisions in the Solution process are associated with the customer’s commitment to spend money to implement this proposal. There are risks and uncertainties surrounding these decisions. One objective of customer...
engagement has been the mitigation of risk and reduction of uncertainty by educating the customer on the features of the Solution and by quantifying the benefits in the financial analyses. Sales activities have similarly attempted to reduce risk, in part, during negotiation of the bundle of measures in the Solution, the pricing of the product and services, and establishment of investment grade audit contract terms.

The two critical, interconnected decision points for the customer are 1) when there needs to be an agreement to proceed with the investment grade audit (IGA) of the Solution and 2) when the customer needs to commit to implementing the project as confirmed by the IGA. In step 10 of the Sustainable Solution process (see Figure 4), the decision maker is committing to either paying the project implementation manager for the cost of the audit, or agreeing to do the scope of work defined in the IGA; assuming the decision maker initially agrees to go forward with the IGA.

In the pilot program, the decision makers (hotel owners) have reviewed the Solutions proposal whose benefits to the hotel are summarized below.

- Guarantee 30% ($233K) annual energy cost savings
- Generate positive cash of more than $50K per year for the first four years (assuming PG&E rebates are spread over four years and payment of principal and interest on a 10 year, 4% loan
- Internal Rate of Return of 12.6%
- NPV of $319K over a 15 year life just from energy savings, with NPV of $1.47M over a 15 year life when DR savings, PG&E incentives and tax credits are included.

The owners have made a decision against proceeding with an IGA for the complete Sustainable Solution for reasons that will be explained later in this section of the report. The decision making process, however, has revealed alternative energy efficiency projects that meet the hotel’s needs. The hotel has decided to pursue significant portions of the original solution, amounting to almost 40 percent of the energy saving value of the initial proposal during the first year of a multi-year implementation plan.

The following sections discuss the decision making related to the investment grade audit, drivers for the decision, and lessons learned that enable PG&E to fine tune elements of their Sustainable Solution.

**Decision Makers**

The decision maker is the highest ranking employee at an organization who will either approve or veto the proposal. Financial decision makers are typically determined by management’s budget authority. Since the proposal for the Solution has requested an investment of approaching $1.5 million, the hotel’s ownership group is the ultimate decision maker to initiate the IGA and fund the project.

This decision making team has been composed of decision makers and individuals, internal and external to the organization, who influence the decision. This team has remained in place throughout the project. The initial composition of the team has been dominated by hotel management, who are major influencers of the decision, because customer engagement for the Sustainable Solution process starts at the engineering management level. Hotel management kept the decision makers apprised of the project throughout project development. As the project moved into the IGA phase, owners became more fully involved in the process.

The InterContinental Hotel San Francisco is owned by a group of investors with other property investments in the Bay area and the InterContinental Hotel Group, who is a global corporation.
Decision making is collaborative, but complex because of the varying decision criteria among the owners.

InterContinental Hotel Group (IHG) is a corporate franchising organization. Part of their value-add as a franchisor to its franchisees is to provide leadership in areas such as sustainability as well as direction in capital budgeting. This group is directly concerned with the structure of each franchisee’s balance sheet and takes a leadership role in all capital budget decisions. They also have the role of bringing corporate sustainability and other strategies to the myriad of IHG properties, which include other hotels in the San Francisco area. The corporate finance and engineering departments of IHG have been part of the Sustainable Solution decision making.

Other parties have been involved in the decision making process as advisors, including the hotel’s “green team”, hotel management consultants, and representatives of BOMA and CCI. The InterContinental Hotel’s “Green Team” focuses on greening properties through LEED certification and has influence on policies for implementing equipment, including energy saving technologies, and practices that impact LEED scores. A hotel management consultant has endorsed the concept as a hedge against future energy price increases as well as demonstration of the InterContinental Hotel Group’s leadership in sustainability.

“Conceptually, what is trying to be achieved with a new Title 24 building [InterContinental Hotel San Francisco] is revolutionary. What intrigues/excites me about this project is that if executed and the ESCO comes through on the guarantees of energy savings, we should be able to develop a model that is transferable to the owned and managed estates, which will yield significant energy savings for IHG. This would be an unprecedented breakthrough and would create tremendous goodwill for us as leaders in energy reduction initiatives. This would really position us well as it is inevitable that utility rates will increase in the future.”

This type of information guides the decision maker, who ultimately must satisfy their own criteria for making the decision to move forward with the Sustainable Solution.

**Decision Criteria**

The hotel owners have one common goal and that is to gain a satisfactory return on their investment in the InterContinental Hotel San Francisco. Their decision criteria are, therefore, financially oriented and include the size of investment, the rate of return, and preservation and appreciation of their asset. Local ownership has different rate of return requirements than corporate owners making them more receptive to longer payback projects. All members of the ownership group have shared sustainability goals and expect to achieve LEED gold for the building in the near term and LEED platinum sometime in the future.

Hotel management is most concerned about hotel operating budgets and operating profits. Operating profits are impacted by top line revenues, so any impact on occupancy rates is of interest to operations management. Studies have shown that sustainability can positively impact occupancy rates and hotel management would like to see how their investments in LEED certification translate into revenue increases. Operating costs such as energy also drive profits. Because changes in hotel infrastructure and operating procedures introduce some uncertainty into the hotel’s operating costs, a performance guarantee on the project is appealing to operations managers.

The value of LEED points from the Sustainable Solution and the option for PACE financing, have provided little influence on the decision to move the project to implementation. The hotel already has invested in LEED gold certification and there will be no additional LEED value until the hotel seeks LEED Platinum certification. PACE financing at this time does not appear to offer any advantages over financing options currently available to the hotel, as its owners have arrangements in place to secure much more attractive financing than they can through the current PACE Program. The hotel has expressed its support for the San Francisco PACE Financing Program and is looking into how it
can secure its preferred rates through the PACE Program structure. Once the PACE program is mature and there are examples of how it benefits commercial properties such as hotels, then it may be of interest to the decision makers.

In addition to financial criteria, IHG corporate decision makers have other decision drivers. The corporate group is responsible for protecting the hotel brand and image. In this regard, it is concerned about customer satisfaction and the impact of project implementation on the customer. It is also important to them that sustainability efforts are in alignment with the corporate sustainability strategy. IHG corporate, furthermore, sees value in the project if it is applicable and scalable to their other properties.

Hard numbers have had the most influence in the decision making. These are energy cost savings and return on investment in corresponding energy efficiency measures. Some members of the decision making team appeared to accept payback period of up to six years, while others adhered to the two to four year payback criteria that most commercial building owners seem to apply. Less value has been given by the decision makers to property value changes due to sustainability because investments in Sustainability were already underway prior to the Sustainable Solution.

To reach a positive decision for the Sustainable Solution, it is important for the customer’s project champion to clearly communicate the features and benefits of the project to all decision makers. The InterContinental Hotel, like many prospective customers, has multiple decision makers with differing decision criteria. The hotel’s Director of Engineering has delivered the message to hotel management that conveyed the cost savings and cash flow benefits of the project as well as presented a financial value proposition, including tax advantages, which has appealed to the hotel’s owners. Decisions associated with complex projects, such as the Sustainable Solution, require a significant amount of time to accomplish and this time can be shortened by involving the decision makers as early as possible in the process.
SUSTAINABLE SOLUTION PILOT RESULTS

The pilot project has evaluated the market acceptance of the Sustainable Solution at the InterContinental Hotel San Francisco. PG&E’s Emerging Technologies group and QDI Strategies have finalized the development of a Sustainable Solutions offering, designed a delivery process, created a value proposition to bring to prospective customers, and developed tools to analyze the benefits of the offering. These outcomes are further summarized in the Table below.

<table>
<thead>
<tr>
<th>Sustainable Solution Elements</th>
<th>Results of Current Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valuation of Energy Efficiency in Buildings</td>
<td>• Developed valuation presentations and messaging for owners</td>
</tr>
<tr>
<td></td>
<td>• Developed valuation model based on economic benefits from capturing the value of LEED, energy savings, financing options and incentives.</td>
</tr>
<tr>
<td>Energy Efficiency Consulting</td>
<td>• Pilot approach for project leadership with roles for Emerging Technologies and PG&amp;E Sales and Service organization</td>
</tr>
<tr>
<td>LEED Certification</td>
<td>• Calculation of LEED points from energy efficiency initiatives</td>
</tr>
<tr>
<td>EE Project Financing</td>
<td>• Assessment of applying San Francisco’s PACE financing model to the Whole-Building concept</td>
</tr>
<tr>
<td></td>
<td>• Introduction of third-party financing options into PACE model</td>
</tr>
<tr>
<td></td>
<td>• Evaluation of federal sources of funding for whole-product including DOE project funds, stimulus (ARRA) funds, and tax credits</td>
</tr>
<tr>
<td>Project Implementation</td>
<td>• Pilot approach for customer engagement and project implementation with roles for PG&amp;E’s Emerging Technologies and Sales and Service groups</td>
</tr>
<tr>
<td>Incentives</td>
<td>• Development of incentive program for the Sustainable Solution, which pays for performance over time.</td>
</tr>
</tbody>
</table>

**Table 16 - Results of Sustainable Solutions Product Development**

Hotel’s Decision

The best measure of pilot success is a commitment from the target customer to implement meaningful elements of the Solution. While the pilot customer, the InterContinental Hotel San Francisco, chose not to pursue the full implementation of the proposed sustainable solution, the hotel is planning to make close to $0.5 Million in energy efficiency investments in 2011 delivering about 40 percent of the energy savings of the full-scale Sustainable Solution proposal and a total of more than $1M over the next five years.

The decision to scale-back the size of the project is in some way related to the differing investment criteria of the members of the ownership group. The maximum paybacks for the group ranged from three year to six years. For the InterContinental Hotel Group, there are also competing energy efficiency investments such as a hotel property in the southeast that has an Energy Star rating 30 percent lower than the rating of the San Francisco hotel.

To bring the payback period down and create a consensus decision to move forward, the team introduced options to eliminate the high payback measures in the Solution and/or to reduce implementation costs. Analytical tools developed during the pilot allowed the team to look at different scenarios. The table below illustrates a favorable scenario in comparison to three initial proposals.
The analysis has shown it is possible to achieve an acceptable payback by cutting out long payback measures such as condensing boilers and solar pool heaters, and by bringing the project management of these reduced number of measures in-house. An internal project lead can help reduce some of the purchased project management costs.

<table>
<thead>
<tr>
<th>Proposed Energy Savings Plans</th>
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<tbody>
<tr>
<td>Plan Summary</td>
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<tr>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Projecte Sustainable Solutions Economic from preliminary PG&amp;E Audit (Cost estimate is maximum to implement)</td>
</tr>
<tr>
<td>Projected Sustainable Solution - ESCO Estimated Economics</td>
</tr>
<tr>
<td>IGA Sustainable Solutions Proposal Guaranteed Savings</td>
</tr>
<tr>
<td>Lodging Savers Phase I Project Plan</td>
</tr>
</tbody>
</table>

**TABLE 17 - ENERGY SAVINGS PLAN ALTERNATIVES**

While this outcome is not the full Sustainable Solution with “deep” energy savings, it represents an evolution towards this goal. It achieves the objective of engaging the customer and designing a set of energy savings measures that meets their need. The delivery process resembles PG&E’s traditional approach of using its existing third party contractors for implementation support, but partners with ICH engineering group for project oversight, and collaborates with an energy services contractor for project management and implementation.

The new project team structure has:
- InterContinental Hotel engineering group as the project lead
- Lodging Savers (a PG&E third party contractor) to oversee the process of measuring savings and managing appropriate M&V work to make sure ICH gets eligible PG&E incentives.
- The selected project implementation manager to oversee all project implementation.

**Lessons Learned**
Feedback from the customer and other participants of the pilot has shown that the Sustainable Solution is a flexible offering. This flexibility has enabled the refinement of product features and definition of PG&E’s role and resource requirements to meet the hotel’s near-term needs. The pilot has shown that key components of the offer are materials to educate the customer about integrated energy savings and the financial analysis tools to demonstrate their value. Other lessons learned from the pilot are:
• The Sustainable Solution process is a viable way to educate customers and reach decision makers. It is important to reach the decision makers as soon as possible in the process.

• PG&E provides a valuable lead generation role to energy services providers in the Sustainable Solution.

• Customers value the objective input of PG&E and their understanding of measurement and verification approaches. Their advice helps reduce the uncertainty around the selection of viable technologies, measurement of their performance, and verification of benefits.

• PG&E’s enhanced audit is a valued tool for providing the customer with information that helps them communicate with energy services companies. The audit gives estimates of energy savings, project costs, demand savings, incentives and financing options that are a starting point in developing a project with an ESCO.

• Customers value LEED certification and understand the connection between energy efficiency and LEED. When targeting customers for a solution, the marketing team should rate them by the LEED certification level or Energy Star score.

• Because of the unwillingness to look at long payback measures, a bundle of measures is often unbundled by the customer and there is cherry picking of the short payback measures. Building in energy price increases or looking at paybacks of incremental costs may help shorten payback periods.

• Performance guarantees and an investment grade audit are perceived by the customers to be insurance policies that hedge against risks in the project. The value of these policies needs to be clearly expressed and priced.

• There is belief, but uncertainty about the contribution of sustainability to increased property value. The InterContinental management group believes that sustainability will create value, but not yet certain of the measurement of that value. The value proposition for the Sustainable Solution emphasizes the “hard” value created through energy savings as well as the “softer” value from a competitive advantage of being “green.” As the metrics around LEED buildings become more established, owners will be able to assign specific values to each of their sustainability investments. In the short term, the “hard” values created through energy savings can fund the investments in sustainability.

• While the customer faces risk related to the performance of the installed energy efficiency measures, PG&E and the project implementation manager also face financial risks. PG&E risks the loss of their marketing and feasibility study investments and the project implementation manager may not recover costs to perform a preliminary audit and an investment grade audit. Transparent communications between PG&E and the implementation contractor on items such as on economic assumptions, minimum return on investment, and total estimated available energy savings would help ameliorate these risks.

• It is difficult to describe the benefits of PACE financing to commercial building owners. Before offering PACE financing, the team needs to understand the need for external financing and how PACE financing rates and terms compete with conventional borrowing. Additionally the team needs to answer the question whether or not bundling the conservation measures together into one contract improves the finance-ability of the project.
CONCLUSIONS AND RECOMMENDATIONS

The Sustainable Solution is a viable means to educate commercial building owners about the value of energy efficiency and motivate them to implement measures to help them realize this value. The customer receives the value of reduced energy expenditures, a smaller carbon footprint, and the significant upside benefits that result from being perceived as a sustainable property (LEED ratings today are the primary measurement of sustainable properties). PG&E achieves its energy savings goals through the implementation of a deep – 30 percent – integrated energy savings program, and its service costs per kWh saved may go down when serving large, high energy saving potential customers.

The pilot has demonstrated the Sustainable Solution value proposition to the customer. Key elements of this proposition are PG&E’s role as the trusted advisor in the customer engagement phase and the value PG&E provides throughout project implementation. During customer engagement PG&E has helped the customer reduce risk and calculate the increase in the business value through energy savings and sustainability. The pilot customer has used PG&E’s unbiased engineering resources to make appropriate business decisions.

The pilot has only been conducted with one customer and this was a challenging customer. The pilot site, the InterContinental Hotel San Francisco, has a management champion for energy efficiency, a high level of sustainability, and an Energy Star rating in excess of 76. This makes a targeted 30 percent improvement difficult without the implementation of the most advanced and longest payback technologies. The long payback periods discouraged the implementation of the full solution, but the customer education has encouraged the hotel to implement a significant number of the recommended measures in the near term. The customer has been very positive about their relationship with PG&E and the direction of the pilot since the start of the project. Important lessons have been learned by the Sustainable Solutions team in bringing the pilot to this point.

The overarching lesson is to recognize that the Sustainable Solution is an amalgamation of products and services that solve a defined customer need. To succeed in selling solutions, there are two requirements. First, the solution must have high levels of integration and should not be just a bundle of products, which does not create value and can be unbundled. Second, PG&E needs to recognize the difficulty in selling solutions, which cost more to develop, have longer sales cycles and require intimate knowledge of customer’s business. This may necessitate changes in organization design and performance measurement.11

The relationships in a solution sale need to be conducted at a high level. PG&E’s role as a trusted advisor is compatible with the needs of an executive decision maker and PG&E’s services should not only address the technical needs of the customer, but their strategic needs too.

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Another important lesson is that there is not one solution for all customers. The Sustainable Solution is flexible and customizable. It can be shaped to meet a targeted customer’s “deep” energy savings needs. A targeted customer is a building that has available energy savings potential of at least 30 percent. The economics of serving a customer with lower savings potential needs to be addressed on a case by case basis.

The table below maps other key lessons learned to Sustainable Solution process steps where improvements can be made.

<table>
<thead>
<tr>
<th>Process Step</th>
<th>Lessons Learned</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Identify Potential Customers</td>
<td>• Not all customers qualify for “deep” energy savings.</td>
<td>• Use Energy Star scores as well as energy consumption and business type to qualify prospects</td>
</tr>
<tr>
<td></td>
<td>• Solutions selling requires intimate understanding of the customer</td>
<td>• Learn customer’s business, strategies, and decision makers</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Propose Sustainable Solution Concept to Facilities and Operations Managers</td>
<td>• Solution sales require early involvement by decision makers</td>
<td>• Connect with decision makers through facilities and operation managers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. PG&amp;E enabled feasibility study</td>
<td>• This study is a valuable document for project and strategic planning.</td>
<td>• Use the document as a template for helping the customer develop a sustainability strategy</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Owner agrees to proceed</td>
<td>• The sales cycle for a solution sale can be long, many months or a year.</td>
<td>• Make sure customer’s business needs and issues are identified as soon as possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Third-party Preliminary Audit</td>
<td>• To reduce payback period, customers unbundle an integrated offer</td>
<td>• When performing an audit note the interdependencies and synergies of different measures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Select Project Team</td>
<td>• Customers value PG&amp;E’s objective opinions.</td>
<td>• Set appropriate expectations for the roles that PG&amp;E and other team members will play in the</td>
</tr>
</tbody>
</table>

One challenge going forward will be to continue to strive for 30 percent improvement with the implementation of a Sustainable Solution. The pilot has shown that the first 15 to 20 percent savings is easy. The questions are 1) how to achieve the rest of the savings and 2) will achieving these savings be economically feasible. Another challenge will be identifying and engaging decision makers. For qualified customers, it is important to know the customer, find the decision makers, and understand their motivations. Unfortunately decision makers for the largest customers may be located out of PG&E’s service territory.

**Sustainable Solution Enhancements**

This pilot project worked within the framework of the existing incentive structure and program design currently approved by the CPUC. Changes to these existing program designs and incentives could help make the Sustainable Solution and deep energy savings programs more compelling to owners.

Several specific changes to the approved utility incentive programs are suggested by the lessons learned from this pilot.
1. The incentive payment process is complicated, it is costly for the utility to manage, and it introduces additional expenses for the customer. The current approach primarily considers individual measures and not a bundle of measures like the Sustainable Solution. One proposal to simplify the process and reduce costs is to provide additional financial incentives to ESCOs or other turn-key contractors and move this incentive processing function to the contractors thereby streamlining the overall process.

2. Traditional rebates and incentives for commercial buildings are not specifically geared to encourage deeper dive savings, which is the objective of the Sustainable Solution. Structuring the rebates or other financial incentives based on the amount or percentage of energy saved in a building may be a way to financially support deeper dive retrofits.

3. An offer from the utility, tied to the electric bill and guaranteeing a lower rate for a period of time because of the utility-guaranteed energy savings, may be an attractive feature for the Sustainable Solution

Next Steps
PG&E can advance the Sustainable Solution concept and continue to increase the penetration of energy savings measures in large commercial buildings by extending the reach of the initiative with the InterContinental Hotel Group (IHG) and by acquiring new customers for the Solution.

Next steps for expanding service with the existing customer include:
- Provide InterContinental Hotel Group (IHG) additional support in implementing elements of a Sustainable Solution at the Mark Hopkins
- Assist IHG with opportunities to adopt energy efficiency measures in their other Bay Area properties.
- Evaluate the potential to create a replicable business model throughout the IHG managed hotels using synergies with their Green Engage Tool.
- Build a structured “offering” for IHG properties that may be applicable in the majority of small to mid-size hotels / motels

To extend the initiative to other large commercial buildings, the next steps include activities to address lessons learned and to target the most qualified customers.

1. Establish qualifying criteria for selecting most qualified customers. Criteria to consider are:
   - Largest customers that offer the greatest opportunity for energy savings and are most economical to serve with the existing resources.
   - Customers with local decision makers who are well-connected to project champions, such as the chief engineer.
   - Large commercial buildings that are not yet LEED certified or have only attained Gold certification
   - Buildings with an Energy Star score less than 75

2. Target the largest customers and apply customer engagement steps of the Sustainable Solutions process
   - The largest 225 commercial buildings in the PG&E market, buildings larger than approximately 325,000 square feet of floor space, should be targets for the Sustainable Solution as it is presently designed. This represents about 1/3 of all commercial building space. It is estimated that each building could save an average of $525,000 per year in energy costs from implementing a Sustainable Solution with a 30% energy savings.

3. Develop and allocate appropriate Sales and Services resources to help targeted customers engage in the Sustainable Solution
o Estimate PG&E’s cost to deliver the Solution and time to complete the sales cycle.

o Shorten the sales cycle if possible
  ▪ Identify decision makers at prospective customers to help move these opportunities quickly through the sales process.
  ▪ Design enhanced audits, contracts and other documents that are easy to implement

o Adapt financial tools developed in pilot as a sales resource. Use tools to translate the opportunity into business solutions for the building owners

o Conduct training on consultative selling and introduce Sales and Services representatives to the business requirements for completing a Sustainable Solution sale.
  ▪ Link this training to ongoing training programs for current portfolio of energy efficiency measures.
  ▪ Provide guidelines for the selection of contractors and review of investment grade audit agreements

4. Develop a tactical plan for addressing the broader opportunity for Sustainable Solutions in the commercial sector

  o There are an estimated 420 buildings in the size range from roughly 125,000 to 325,000 square feet. This represents another 18% of commercial space. The average building in this segment should be able to save about $120,000, using the assumption of a 30% energy reduction. These cost savings may require a lower cost sales approach,

  o Validate the potential economic impact of the Sustainable Solution based on building size and building use in order to establish the viability of the Sustainable Solution approach in comparison with existing stand-alone measures.

  o Explore options for reducing Sustainable Solutions costs
    ▪ A “baseline audit” that could be used for a three year sustainability plan
    ▪ A three year M&V approach – conducting a single M&V study at the end of a three year implementation plan
## Appendix 1 – Preliminary Measures

Phase I Energy Saving Measures Worksheet, January 2010 (Entries highlighted in yellow are engineering estimates)

<table>
<thead>
<tr>
<th>Measure</th>
<th>% of target</th>
<th>kWh/yr saved</th>
<th>Installed Cost $</th>
<th>Measure Incentive</th>
<th>$/kWh/y (no incentive)</th>
<th>$/kWh/y (w/ incentive)</th>
<th>Energy savings $/yr</th>
<th>Measure Life Years</th>
<th>Lifetime Cost Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation measures</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>0.19</td>
<td>0.19</td>
<td>34,450</td>
<td>5</td>
<td>0.038</td>
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<tr>
<td>Central plant controls</td>
<td></td>
<td></td>
<td></td>
<td>0.56</td>
<td>0.19</td>
<td>0.19</td>
<td>52,000</td>
<td>15</td>
<td>0.038 Engineering study</td>
</tr>
<tr>
<td>Garage CFL</td>
<td></td>
<td></td>
<td></td>
<td>0.05</td>
<td>0.19</td>
<td>0.19</td>
<td>19,514</td>
<td>10</td>
<td>0.005</td>
</tr>
<tr>
<td>Other lighting</td>
<td></td>
<td></td>
<td></td>
<td>0.33</td>
<td>0.19</td>
<td>0.19</td>
<td>11,310</td>
<td>5</td>
<td>0.066</td>
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<tr>
<td>Daylighting controls</td>
<td></td>
<td></td>
<td></td>
<td>0.63</td>
<td>0.19</td>
<td>0.19</td>
<td>5,200</td>
<td>5</td>
<td>0.125 Delta= 1 to .5 W/sf in 40,000sf, 2000hr/y</td>
</tr>
<tr>
<td>Guestroom bath wall switch</td>
<td>1.3%</td>
<td>66,810</td>
<td>10,982</td>
<td>5345</td>
<td>0.16</td>
<td>0.08</td>
<td>8,685</td>
<td>7</td>
<td>0.023</td>
</tr>
<tr>
<td>Chase closet timer switch</td>
<td>0.2%</td>
<td>11,446</td>
<td>3,400</td>
<td>1890</td>
<td>0.30</td>
<td>0.13</td>
<td>1,488</td>
<td>7</td>
<td>0.042</td>
</tr>
<tr>
<td>BMS lighting control</td>
<td>0.4%</td>
<td>20,000</td>
<td>10,000</td>
<td>0.63</td>
<td>0.19</td>
<td>0.19</td>
<td>2,600</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Melink Hood</td>
<td>1.1%</td>
<td>57,770</td>
<td>54,126</td>
<td>4600</td>
<td>0.94</td>
<td>0.86</td>
<td>7,510</td>
<td>10</td>
<td>0.094</td>
</tr>
<tr>
<td>Other foodservice</td>
<td>1.3%</td>
<td>70,312</td>
<td>5.0%</td>
<td>265,00</td>
<td>0.94</td>
<td>0.86</td>
<td>9,141</td>
<td>10</td>
<td>0.071</td>
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<tr>
<td>Guestroom control mods (TV + temp + lamps)</td>
<td>2.4%</td>
<td>120,120</td>
<td>7.5%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15,616</td>
<td>7</td>
<td>0.095 $150 per guestroom</td>
</tr>
</tbody>
</table>

Note: Entries highlighted in yellow are engineering estimates.
<table>
<thead>
<tr>
<th>Measure</th>
<th>% of target</th>
<th>kWh/yr saved</th>
<th>Installed Cost $</th>
<th>Measure incentive</th>
<th>$/kWh/y (no incentive)</th>
<th>$/kWh/y (w/ incentive)</th>
<th>Energy savings $/yr</th>
<th>Measure Life Years</th>
<th>Lifetime Cost Effective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting room DC ventilation</td>
<td>3.8%</td>
<td>202,242</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.06</td>
<td>26,291</td>
<td>8</td>
</tr>
<tr>
<td>Hallway DC ventilation</td>
<td>1.9%</td>
<td>103,137</td>
<td>2.8%</td>
<td>150,11</td>
<td>7,508</td>
<td>0.28</td>
<td>13,408</td>
<td>8</td>
<td>0.041</td>
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<tr>
<td>Parking lot VFD control</td>
<td>0.4%</td>
<td>20,000</td>
<td>1.6%</td>
<td>87,000</td>
<td>28,643</td>
<td></td>
<td>2,600</td>
<td>8</td>
<td>0.063</td>
</tr>
<tr>
<td><strong>Total Electric</strong></td>
<td><strong>30%</strong></td>
<td><strong>1,613,948</strong></td>
<td><strong>$611,859</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$209,813</strong></td>
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<td></td>
</tr>
<tr>
<td>Conservation</td>
<td>5%</td>
<td>12,250</td>
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<td></td>
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<td>7</td>
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<tr>
<td>Foodservice</td>
<td>2%</td>
<td>4,865</td>
<td>20,000</td>
<td>4.11</td>
<td></td>
<td>2,968</td>
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<td>Usage study</td>
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<td>Boiler controls</td>
<td>9%</td>
<td>21,067</td>
<td>30,000</td>
<td>1.42</td>
<td></td>
<td>12,851</td>
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<td>Usage study</td>
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</tr>
<tr>
<td>Ventilation air heat recovery</td>
<td></td>
<td>100,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Usage study</td>
<td></td>
</tr>
<tr>
<td>Hot water heat recovery</td>
<td></td>
<td>30,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Usage study</td>
<td></td>
</tr>
<tr>
<td>Solar water heating (pool)</td>
<td>8%</td>
<td>18,400</td>
<td>150,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Meeting room DC ventilation</td>
<td>0%</td>
<td>418</td>
<td>23,125</td>
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<td>255</td>
<td>8</td>
<td>Usage study</td>
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</tr>
<tr>
<td>Hallway DC ventilation</td>
<td>0%</td>
<td>936</td>
<td>$33,825</td>
<td>36.14</td>
<td></td>
<td>571</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Gas</strong></td>
<td><strong>24%</strong></td>
<td><strong>57,936</strong></td>
<td><strong>$386,950</strong></td>
<td></td>
<td></td>
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<td><strong>$24,117</strong></td>
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<td></td>
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<tr>
<td><strong>Total Installed Cost</strong></td>
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<td></td>
<td><strong>$998,809</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Total Annual Savings</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>$233,930</strong></td>
</tr>
</tbody>
</table>
Appendix 2 – Project Description for Potential Partners

Creating Property Value Through Sustainability

InterContinental Hotel, SF
February 2010

Objective: Reduce electric and natural gas consumption of San Francisco’s InterContinental Hotel by 30 percent below its defined baseline in November 2009 to secure it as the leader in sustainable properties within the hotel market.

The InterContinental Hotel is a two-year old $200 million, 550 guestroom property with a goal to be the leading hospitality sustainable property in San Francisco -- to improve its bottom line and increase the property’s value. This “Sustainable Solution” is based on an aggressive energy savings plan (a preliminary plan developed by PG&E to be refined to an investment-grade sustainability plan prior to financing) to reduce energy consumption by 30 percent and to use the energy dollar savings to pay for the energy saving measures. To be economically viable to hotel owners, this 30% energy savings must be achievable at a project cost of $1 to $1.5 million.

The sustainability plan may be financed through public or private funding mechanisms. The selection of funding sources is pending the development of the investment-grade plan, the cash flow projections and available financing terms.

The project timeline is:
- Select project management and implementation partners for the sustainable solution team: March 5, 2010
- Submit investment-grade sustainability plan to owners: May 12, 2010
- Owners’ approval to proceed with implementation: June 7, 2010
- Complete installation of energy measures: April 2011.
- Commission, monitor and improve energy performance: through 2012.

The sustainable solution plan will include conservation efforts (identify opportunities and educate staff and guests) to reduce energy, contributing 5 percent of the 30 percent energy savings goal.

Due to the innovative nature of this project, all management and implementation partners will participate on a sustainability team, working to achieve the most
favorable and cost-effective solution for the hotel. The anticipated team structure is shown below.

The operational impacts of project planning, implementation and monitoring are critical. All team members must be dedicated to ensuring the hotel’s exceptional customer experience and pride among its staff in becoming the sustainable leader.
Appendix 3 – Project Management and Implementation Partner Interview Questions

Alignment of your business and this project’s objectives

1. How does this project fit with your business objectives?
2. What team structure would you suggest for this project? What roles does your company propose to fill and what roles would be fulfilled by what subcontractors?
3. How will you ensure compatibility of your work with hotel management and operation requirements?
4. Give brief examples of two projects where you have filled these roles, that are most similar to this project, and list references we can contact to discuss them.
5. Outline the project steps you would follow to achieve the objectives of this project. What management systems and processes do you use to ensure that you stay within budget and on schedule?
6. What contractual arrangements, contract models, and terms do you propose for this project?
7. Please provide an itemized list of all project costs. How does the total cost compare to projects you normally undertake? What is the proposed fee for this work?

Achieving the technical objectives

8. Please provide a preliminary list of energy measures and costs that you propose to reach 25% energy savings, for electricity and for natural gas. How will you refine this to an investment-grade plan? What opportunities do you see to increase energy savings beyond 25%?
9. Please state your building system controls capabilities and how they will benefit this project.
10. How can you support the project’s achieving 5% energy savings through conservation efforts?
11. What energy sub-metering capabilities can you supply? What would be measured? At what cost?
12. What ongoing measurement and valuation capabilities can you supply? What are your data analysis and energy information system capabilities? How can they be used in this project?

Project resources you can provide

13. What project financing options does your company provide?
14. By what process and with what resources would you provide the investment-grade audit? What is the cost of the audit?
15. By what process and with what resources would you provide a performance guarantee? What is the cost of the guarantee?
16. What resources can you provide to this project beyond those for which you are compensated?
17. What capabilities make you the best choice for this project?
**APPENDIX 4 – ENERGY-EFFICIENT COMMERCIAL BUILDINGS TAX DEDUCTION**

Last DSIRE Review: 11/01/2010

<table>
<thead>
<tr>
<th>State:</th>
<th>Federal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incentive Type:</td>
<td>Corporate Deduction</td>
</tr>
<tr>
<td>Applicable Sectors:</td>
<td>Commercial, Construction, State Government, Fed. Government, (Deductions associated with government buildings are transferred to the designer)</td>
</tr>
<tr>
<td>Amount:</td>
<td>$0.30-$1.80 per square foot, depending on technology and amount of energy reduction</td>
</tr>
<tr>
<td>Maximum Incentive:</td>
<td>$1.80 per square foot</td>
</tr>
<tr>
<td>Equipment Requirements:</td>
<td>Not specified, but building must be certified as meeting specific energy reduction targets as a result of improvements in interior lighting; building envelope; or heating, cooling, ventilation, or hot water systems.</td>
</tr>
<tr>
<td>Start Date:</td>
<td>1/1/2006</td>
</tr>
<tr>
<td>Expiration Date:</td>
<td>12/31/2013</td>
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<tr>
<td>Web Site:</td>
<td><a href="http://www.efficientbuildings.org">http://www.efficientbuildings.org</a></td>
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<tr>
<td>Authority 1:</td>
<td>26 USC § 179D</td>
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<tr>
<td>Date Enacted:</td>
<td>8/8/2005 (subsequently amended)</td>
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<tr>
<td>Date Effective:</td>
<td>1/1/2006</td>
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<tr>
<td>Expiration Date:</td>
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### APPENDIX 5– ANALYTICAL TOOLS

The financial models developed for this project cover several dimensions of financial performance that are of interest to owners and building operations managers. The table below shows the types of analysis that have been built into projections that can be used with owners who are looking for different payback options and who can be educated on the total value that the Sustainable Solution can provide their buildings.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional Payback Calculations</strong></td>
<td></td>
</tr>
<tr>
<td>Simple Payback on Initial Investment Using Energy Savings</td>
<td>Payback years on initial investment cost and one year of M&amp;V considering energy savings only</td>
</tr>
<tr>
<td>Payback (Energy &amp; DR Savings on Initial Investment)</td>
<td>Payback years on initial investment cost and one year of M&amp;V considering energy savings and DR savings</td>
</tr>
<tr>
<td>Payback (Energy &amp; DR Savings + Rebates) on Initial Investment</td>
<td>Payback years on initial investment cost and one year of M&amp;V considering energy savings, DR savings and rebates</td>
</tr>
<tr>
<td><strong>Fully Costed Financial Evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>Simple Payback On Energy</td>
<td>Payback years considering energy savings only</td>
</tr>
<tr>
<td>Simple Payback On Energy and DR Savings</td>
<td>Payback years considering energy and DR savings</td>
</tr>
<tr>
<td>Simple Payback On Energy and DR Savings including PG&amp;E Rebates</td>
<td>Adds PG&amp;E Incentives to the savings above</td>
</tr>
<tr>
<td>ROI on the Invested $ over the life of the investment <strong>without DR savings</strong></td>
<td>Average Energy Savings per year plus rebates over the life of the investment</td>
</tr>
<tr>
<td>ROI on the Invested $ over the life of the investment <strong>without DR savings</strong></td>
<td>Average Energy Savings per year, DR savings and rebates over the life of the investment</td>
</tr>
<tr>
<td>Projected Cost</td>
<td>Total cost of all investments and expenses over 15 years</td>
</tr>
<tr>
<td><strong>Fully Costed Financial Evaluation</strong></td>
<td></td>
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<tr>
<td>Net Present Value (15 Yrs) of Energy Savings at projected, 6.5% Cost of Money and a 6.5% discount rate on a 10 year loan</td>
<td>Formula: NPV of energy savings at (int rate, 15 years) at cost above</td>
</tr>
<tr>
<td>Net Present Value (15 Yrs) of Energy and DR Savings at projected, 6.5% Cost of Money and a 6.5% discount rate on a 10 year loan</td>
<td>Formula: NPV of energy savings and DR savings at (int rate, 15 years) at cost above</td>
</tr>
<tr>
<td>Internal Rate of Return of Energy and DR Savings</td>
<td>IRR of EE and DR savings net of cost</td>
</tr>
<tr>
<td>Internal Rate of Return of Energy and DR Savings and Rebates</td>
<td>IRR of EE amd DR savings plus incentives net of cost</td>
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<tr>
<td><strong>Sustainable Solution Return Evaluation</strong></td>
<td></td>
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<tr>
<td>NPV (15 Yrs) With Energy Savings Plus Incentives</td>
<td>Includes incentive payments for DR and Rebates, 15 yrs</td>
</tr>
<tr>
<td><strong>Sustainable Solution Return Evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>NPV With Incentives and Tax Credit savings</td>
<td>Energy Tax Credit - value of savings of $1.20 per SF at 40% Tax Rate -- Assumes the building has already taken some of the tax credits; potentially $1.80 per SF is available</td>
</tr>
<tr>
<td>NPV with Incentives, Tax Credits, and Depreciation and Interest Deductions</td>
<td>Tax savings from Interest and Depreciation Deductions at 40% Tax Rate</td>
</tr>
<tr>
<td>Annual Energy and DR Savings</td>
<td>Net Present Value of Average Annual energy and DR savings</td>
</tr>
<tr>
<td>Asset Valuation from Energy Savings Investments</td>
<td>Market Value increased based on capitalizing energy savings, using Capitalization Rate that buyers would pay (8%)</td>
</tr>
<tr>
<td>Net Operating Income (year 15)</td>
<td>Includes savings from energy efficiency measures, DR, rebates, interest, depreciation, and gross margin increase</td>
</tr>
<tr>
<td>Capitalized Value of Operating Income Increase at Cap Rate in <strong>15th Year</strong></td>
<td>Year 15 (or year 3) Capitalized value of NI increase at Capitalization Rate that buyers would pay (8%)</td>
</tr>
<tr>
<td><strong>Potential Increase in Building Value from Capitalizing on Sustainable Position</strong></td>
<td>(Kok Research) IBER Fisher Center for Real Estate and Urban Economics, U of C Berkeley WORKING PAPER NO. W08-001 DOING WELL BY DOING GOOD? GREEN OFFICE BUILDINGS By Piet Eichholtz, Nils Kok John M. Quigley August 2009)</td>
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APPENDIX 6—CASE STUDY/CUSTOMER SURVEY

(Following Page)
CASE STUDY

InterContinental San Francisco—Elegance and Responsibility

PG&E programs help LEED-certified hotel become one of the nation’s greenest

Opened in 2008, the InterContinental San Francisco is one of more than 4,500 hotels in the worldwide InterContinental Hotels Group, the world’s largest hospitality company by number of rooms. The 32-story, 600,000-square-foot InterContinental San Francisco tower encompasses 550 guest rooms with floor-to-ceiling windows, 14 suites, 2 ballrooms, 21 meeting rooms and approximately 43,000 square feet of meeting space, as well as a Michelin-starred restaurant, a 10-room treatment spa, a full-service fitness center and an indoor pool.

From the day its doors first opened, the InterContinental San Francisco has demonstrated a uniquely passionate commitment to environmental sustainability and energy efficiency. With the enthusiastic support of hotel management, Chief Engineer Harry Hobbs and his team have carried out a green campaign that in 2011 produced LEED Gold certification from the U.S. Green Building Council. The hotel is the first InterContinental property, and one of the few hotels in America, ever to achieve this prestigious ranking for sustainability.

The hotel also has comprehensive recycling and composting programs (including two solar-powered trash compactors), compact fluorescent light bulbs and LEDs in all guest rooms and most public spaces, a dimming system controlling exterior and ballroom lighting, and occupancy sensors in guest rooms, stairwells and back areas (offices, storage, housekeeping) that control lighting and thermostats to reduce energy consumption when no one is present. ENERGY STAR® appliances and green cleaning methods are used throughout the hotel, and most employees commute via public transportation.
The Initiative
Retrocommissioning for Energy Savings

When the InterContinental San Francisco opened, its annual electricity consumption was six million kilowatt hours, at a cost of $675,000 a year. Within six months of the opening, Hobbs saw opportunities for reduced energy consumption that had been missed in the construction of the building. He asked Pacific Gas and Electric Company (PG&E) for an audit under its Retrocommissioning Program to better identify those opportunities.

Two local firms, CB Engineering and Intergy, carried out the survey and ultimately executed a variety of retrocommissioning projects that reduced the hotel’s energy consumption by nearly a million kilowatt hours and their electric bill by $72,000 in just the first year and $130,000 overall (about 19 percent). The hotel’s capital cost of $60,000 for the measures was more than half covered by a LodgingSavers rebate of $35,000, so the simple payback on the initial effort was less than four months.

Furthermore, because the survey identified these issues so soon after the hotel opened, many of the measures taken were covered by the original developer’s warranty. For example, an installation flaw in the guest room thermostats was causing both wasted energy and guest complaints, and the retrofit overseen by PG&E’s Retrocommissioning Program saved the hotel $75,000 in natural gas and electricity costs—and eliminated the complaints.

“Pacific Gas & Electric has been such a staunch advocate of what we’ve been doing that even with the measures that we’ve implemented that weren’t directly under their programs, they have provided the hotel with guidance that emphasized our best interests. Juan Miller, our PG&E account representative, and Deanna Meredith of LodgingSavers have always had tremendous integrity and assisted us on the best way forward, even with measures for which the San Francisco Energy Watch rebates were more lucrative. PG&E and LodgingSavers helped to identify and define every measure we took and maximize our return on investment.”

—HARRY HOBBS, CHIEF ENGINEER, INTERCONTINENTAL SAN FRANCISCO

The Partners
LodgingSavers and San Francisco Energy Watch

For the next phases of the InterContinental San Francisco’s campaign, the hotel and PG&E brought in two powerhouse partners—LodgingSavers and San Francisco Energy Watch (SFEW).

LodgingSavers is a PG&E program specifically designed to help hotels reduce their energy consumption by providing energy audits, efficiency measures and rebates through a PG&E partner. Santa Cruz-based Ecology Action provides LodgingSavers auditing, direct install and retrocommissioning measures to hundreds of hospitality customers across the PG&E service area.

San Francisco Energy Watch is administered by PG&E in collaboration with the City and County of San Francisco. SFEW helps San Francisco business and multifamily residential properties reduce their energy costs by offering free energy assessments and energy-efficient equipment and rebate programs. Hobbs credits PG&E and LodgingSavers for identifying the opportunities and providing the integrity to help the hotel maximize its rebates.
The Projects
Lighting and Air Conditioning

The LodgingSavers program helped the InterContinental San Francisco execute a 2009 lighting retrofit for the valet parking garage and service area hallways. In the garage, 102 metal halide lamps were consuming 210 watts of power apiece, a figure that dropped by more than 75 percent when 42-watt compact fluorescent lamps (CFLs) were installed. In the back areas, 50-watt MR-16 halogen lamps were replaced by 30-watt IR halogen lamps. Overall, about 1,000 fixtures were retrofitted in the $45,000 project. LodgingSavers delivered a $32,000 rebate to cover most of the capital cost, and the retrofit lowered the hotel’s annual energy costs by $35,000, so the simple payback for the project was about five months.

Another project with a speedy return on investment was a lighting retrofit in the hotel’s two evacuation stairwells, where 260 54-watt fluorescent fixtures remained on 24/7. All fixtures were retrofitted with a bi-level “blinkie” lighting system, in which an occupancy sensor turns off the primary lamp automatically when no one is present and a 3-watt “night light” provides minimal illumination until the primary lamp is needed. The $45,000 retrofit has provided $35,000 in annual energy cost savings, supported by a $17,000 SFEW rebate and the estimated simple payback is 10 months. The project has also gotten an enthusiastic response from environmentally-aware hotel guests who use the stairways and applaud the hotel’s green commitment.

The largest and most impactful energy-saving measure to date has been the 2010 installation of a water-side economizer for the rooftop HVAC system. The economizer takes advantage of the cool San Francisco weather to provide more efficient air conditioning with less need for chillers. The capital cost for the project was $220,000, including $18,000 for a helicopter to deliver the equipment to the roof, but it has paid off beautifully. The HVAC system now operates its chillers about 2,000 fewer hours per year, reducing the building’s energy demand for air conditioning by eight percent and cutting the hotel’s electric bill by $75,000 a year. And with a $28,000 rebate to support it, the project’s payback period will be about 27 months.

The next project planned is the installation of variable frequency drives (VFDs) on two chillers in the HVAC system, which currently run in on/off mode. The project is projected to have the same energy-saving potential as the highly successful water-side economizer project. Also on the drawing board are seven other measures, including VFDs for the condenser water pumps and exhaust fans, a chilled-water temperature reset and an overall HVAC equipment optimization. These measures are expected to reduce energy use by another half-million kilowatt hours and produce another $67,000 in rebates from LodgingSavers.

The GATEWAY Project
New LED Technology

PG&E’s Pacific Energy Center (PEC) provides educational programs and design tools for energy-efficient buildings and serves as a showcase for new products identified by PG&E’s Emerging Technologies Group. The PEC also happens to be across the street from the InterContinental San Francisco.

In 2009, PEC engineers suggested testing new lighting technology at the hotel under the auspices of PG&E and the U.S. Department of Energy’s (DOE) Gateway Program. Hobbs had long wanted to replace much of the hotel’s existing lighting with LEDs, but had been unable to find new LED products of sufficient consistency or quality.

The DOE and PEC experts selected the new lighting to meet the hotel’s strict standards. 900 new 6.5-watt LED MR16 lamps were installed in the lobby and other public areas of the hotel, replacing 20-watt and 30-watt halogens in a wide variety of lighting fixtures, such as recessed downlights, track lights and multi-lamp linear luminaires. Also, two sets of 75-watt halogen PAR30 lamps were retrofitted with 11-watt LEDs. After burning for a set number of hours, the lamps are removed and assessed for color consistency and quality of output. The LEDs, provided free of charge, have reduced the hotel’s energy costs by about $5,000 a year.

Having identified the best available LED technology, the hotel moved forward with a larger retrofit, replacing 3,000 guest room lights with LEDs in 2011. The $40,000 project is expected to take another $30,000 off the hotel’s annual electric bill, and with another $17,000 rebate from SFEW, payback will occur in less than a year.

“...The beauty of working with PG&E and the DOE is that we had the best minds available to help identify the best-quality LED products, and we didn’t have to do the research on our own. And we got the best available technology installed in our most public spaces, where it not only saves energy but enhances the guest experience from the moment they walk in the front door."

–HARRY HOBBS, CHIEF ENGINEER, INTERCONTINENTAL SAN FRANCISCO
The Bottom Line
Savings and Satisfaction

In three years of remarkable efforts, the InterContinental San Francisco has reduced its energy consumption by nearly 20 percent and its energy bills by more than a third. The capital costs of the various measures taken have been significantly defrayed by nearly $200,000 in rebates from LodgingSavers and SFEW, and the overall payback on investment is about 18 months.

The hotel’s ENERGY STAR® rating has improved from 64 to 87, which, in conjunction with LEED Gold, makes the InterContinental San Francisco one of the greenest large hotels in the nation. Hobbs gives enormous credit to his PG&E and LodgingSavers colleagues for his success.

“This relationship has been enormously satisfying, personally and professionally. Juan and Deanna have been tireless, continually positive, and always available with their help and guidance. We couldn’t do the things we’ve done without the wholehearted commitment and support of this team. They simplified the process to the extent that we feel this will serve as a model to other hotel properties considering similar measures. Together, we’ve shown what can be accomplished in a very short time with the right teamwork—and teammates.”

—HARRY HOBBS, CHIEF ENGINEER, INTERCONTINENTAL SAN FRANCISCO

The Future
On to the Mark!

The InterContinental San Francisco’s energy conservation program has been so successful that management has decided to carry out similar operations at another InterContinental hotel, San Francisco’s legendary Mark Hopkins, a Nob Hill institution since 1926. An 85-year-old hotel offers even more opportunities to save energy than a three-year-old building, and the objective is to reduce the Mark Hopkins’ annual energy costs from $1 million to $750,000.