EXECUTIVE SUMMARY – Hotel Case

INTRODUCTION

In order to help the franchise meet its sustainability goals, the Marriott hotel in Morris County, NJ, must design an Energy & Environmental Action Plan that is innovative, executable, and properly financed. As a result of an energy audit outlined in the PIP Agreement, all zero-cost measures to reduce energy and water use have been implemented. In order to capture additional savings from the proposed energy projects, the franchisee requires upfront capital.

The hotel should act strategically to tackle proposed projects by optimizing available and acquired funds. Furthermore, by taking advantage of federal, state, and utility-based programs such as tax benefits, a Demand Response (DR) program, NJ SmartStart rebates, and instituting a Green Hotel Participation Program (GHPP) which includes Green Rewards, Green Advocate Employee, and Towel Reuse programs, the hotel will serve as a model for energy efficiency and environmentally friendly business operations.

Energy & Environmental Action Plan A

Obtain a Property Assessed Clean Energy (PACE) loan that will appear as a charge on the hotel's property tax bill which will allow the hotel to quickly implement projects. PACE can be combined with several other incentives which alleviate the loan burden. Because it is necessary to meet requirements laid out in the PIP Agreement within certain timeframes, such a loan with a quick turnaround, manageable low interest rate and long-term payback horizon is ideal. Therefore, the hotel should pursue a PACE loan in addition to 179D, a tax credit provided to companies who reduce energy and power usage by a set amount, leverage available rebates through New Jersey's SmartStart Buildings program to reduce upfront costs, implement a DR program, and institute the GHPP.

Energy & Environmental Action Plan B

Pursue New Jersey's Clean Energy Program 'Pay for Performance' (P4P) to implement its energy efficiency measures in a comprehensive manner, in conjunction with the NJ Economic Development Authority's Energy Efficiency Revolving Loan Fund (EE RLF). In addition, take advantage of 179D, implement a DR program, and institute the GHPP. Unfortunately, the P4P program does not permit additional rebate incentives to reduce upfront costs making this plan less attractive to the franchisee. However, the P4P plan provides considerable reductions in costs to the franchisee, that is, if the facility can meet the requirements of a 15% energy reduction.

These action plans will position the Morris County, NJ Marriott hotel as a leader in overcoming structural and financial barriers to achieve energy efficiency and sustainability objectives. Furthermore, given the tightening policy surrounding climate change and the increasing threats of global warming, the hotel must get ahead of potential regulations and stakeholder concerns. If the hotel waits and simply reacts to these drivers, there will be significantly more upfront costs and deleterious effects on Marriott's reputation. For these reasons, an Energy & Environmental Plan must be supported by the franchisor, with resources, recognition, and potential funding as well.

Thank you for your time and attention.

INTRODUCTION

Given the significant opportunities to reduce energy usage, the Morris County, NJ Marriot must undergo an extensive energy and sustainability makeover. The hotel has already implemented many zero-cost, energy efficiency measures. In order to take the facility further in achieving energy and water cost savings, the franchisee faces the challenge of prohibitive upfront investment requirements. Thus, this report outlines an Energy & Environmental Plan A and B to confront the capital hurdle and vastly improve the hotel's dismal energy profile, occupancy rate, and ultimately employee and guest satisfaction.

BUILDING THE BUSINESS CASE & HOTEL ENERGY PROFILE

Energy Expenditure & Relative Energy Intensity

Marriott scored a staggeringly low 11 out of 100 in ENERGY STAR Portfolio Manager. As 64% of the utility bill, the hotel spends over $800,000 annually to keep the lights on, cool the building, and run equipment and appliances (Exhibit A). In order to save substantial electric utility bill costs, the hotel must invest in energy efficiency upgrades. These investments are low hanging fruit with manageable upfront costs and significant net worth of future cash flows. The U.S. lodging industry spends about six percent of all operating costs on energy.[i] Of the country's 47,000 hotels, average annual energy expenditure is $2,196 per room. The Morris County Marriott currently spends $3,683; a 67% greater sum. On average, the facility uses 144 kBtu's per square footage, which is 47% and 36% greater than the national and northeast energy intensity, respectively (Exhibit B). These numbers indicate significant inefficiencies in gas and electricity usage. Retrofitting the facility with energy efficient lighting, HVAC, and other equipment will improve the hotel's ENERGY STAR Portfolio Manager score, satisfy customers and employees, help the franchise meet sustainability targets, and lower utility bill costs.

ENERGY EFFICIENCY OPPORTUNITIES

The following recommendations include the proposed energy projects and additional effective measures designed to reduce energy costs and have a positive impact on the occupancy rate of the hotel. While financing a portion of the upfront costs is necessary to achieve these savings, payback will occur quickly and will result in higher operating profit for the hotel. The following projects are separated into three categories: quick and easy to implement, proposed energy upgrades (including PIP projects) identified through the energy audit, and high-cost, high-return upgrades. Including applicable rebates from NJ's SmartStart program alone reduces the originally outlined payback from 4.2 years to 3.22 years with an NPV of over $230k. These rebates are treasure chests for facility owners looking to reduce upfront costs and make investments more attractive.

Quick & Easy Upgrades

Green Hotel Participant Program

Towel Reuse Program

The hotel can reap savings through reduced laundry services which will lessen water consumption and electricity use during on-peak hours. According to the Alliance for Water

Efficiency, a hotel with 250 rooms at 80% occupancy could save up to 220,000 gallons of water per year – or about 1,100 gallons of water per occupied room per year. For our Marriott hotel with 353 rooms and an occupancy rate of 68%, this represents a savings of 264,000 gallons of water.[ii] A small sign in the bathroom can share these simple, yet alarming facts to encourage guests to hang their towels which will signify participation in the reuse program.

Green Rewards Program
A low-cost measure to lower energy costs during a guest's stay can be implemented through a Green Rewards Program. When a guest arrives at check-in, he or she can elect to participate in the program by receiving a "greener" stay at the hotel. This would include reuse of towels and sheets and a basic cleaning service. In return for enrollment in the program, the guest would receive extra rewards points through Marriott Rewards and/or points towards a free stay at the location. While this program may not be uniform across all hotels in the Marriott family, this hotel could serve as a pilot of the program.

Green Advocate Employee Program
The Green Advocate Employee Program offers incentives to employees who are able to brainstorm and present energy efficiency ideas to hotel management. Employees can receive recognition as "Green Employee of the Month" – an honor bestowed upon an individual if an energy or sustainability solution is successfully implemented. The Marriott's Morris County website can highlight employees who have identified innovative ideas and share best practices.

Proposed Energy Projects & Rebates
There are a number of energy efficiency rebates available through NJ's SmartStart program. These incentives will greatly reduce the costs of implementation. Below are potential rebates for the proposed energy projects. Additional rebates may exist and should be researched further.

Upgrade	Cost	Annual Savings	Rebate	Notes
Lighting	$40,000	$18,000	$8,900	Rebates include $35 per remote mounted occupancy sensor, $50 per induction lamp to replace a parking lot HID bulb, $20 per T8 to replace a T12, and $20-$100 per LED to replace an incandescent bulb. Based on estimation of hotel fixtures.
Room Thermostats	$160,000	$30,000 electric $15,000 gas	$26,475	Rebates include $75 per thermostat installed, offering a total rebate of $26,475 to cover the 353 rooms in the hotel.
VFDs & Motors	$50,000	$15,000	$20,720	Rebates include $110 per horsepower (median) on VFDs, leading to an extra savings of $6,600. Incentives for installing Electronic Commutated Motors to replace existing shaded-pole motor in refrigerated/freezer cases are $40 per ECM leading to an additional savings of $14,120 based on 353 rooms.
Kitchen	$10,000	$5,000	N/A	
Constant to Variable Vol. Conversion	$11,000	$3,000 electric $2,000 gas	N/A	
Chiller Plant	$188,000	$20,000 electric $2,000 gas	$77,805	Rebates include $91/ton (median) applied to three 285 ton chillers.

High-Cost, High-Return Upgrades
These high-cost, high-return upgrades are innovative solutions to reduce energy and power usage in the longterm. These are opportunities for the hotel to investigate further after the proposed energy projects have been implemented and other low-cost, easy measures have been fully utilized.

Keycard-Based Energy Management System
Keycards can be used to activate and deactivate the electrical and/or heating and ventilation systems of hotel rooms. When a room is occupied, the keycard provides electricity to the appliances while it must be removed when all guests have left the room. This type of energy management system has been used extensively in Europe and Asia and has recently been studied at the Westin Convention Center in Pittsburgh. The hotel invested about $195 per room into the program and received complete payback through energy savings in 10 months. The total annual reduction in energy costs amounted to 10%.[iii]

Commercial CHP, Cogeneration Plant
The hotel could take advantage of combined heat and power to achieve greater efficiency by using otherwise waste heat energy for heating or other industrial purposes. In addition to heating, the excess heat can also be used in the summer time as a fuel for an absorption chiller for cooling. However, this is a significant capital investment with a potentially long payback period and would need to be examined later when more capital is available.

FINANCING MECHANISMS

The GHPP should be implemented in either Energy & Environmental Action Plan since these programs not only offer utility bill savings, but exemplify the hotel's invigorated commitment to energy and sustainability as core to its mission, vision and values. It honors its employees and acknowledges the power of individual guests to act as good stewards in bettering our planet. In addition to the GHPP, leveraging a Demand Response program and taking advantage of 179D tax credits play a role in either action plan to minimize costs and position the hotel as a leader in achieving the most cost-effective plan.

New Jersey State Based

Demand Response in New Jersey

To capitalize on the hotel's BMS, the hotel can participate in a DR program. This will require a contract with a utility or third-party energy service provider where the hotel can voluntarily choose to curtail energy use to reduce peak demand in exchange for payment. This will provide an extra revenue stream, while insuring guest comfort is not compromised. Case studies of DR programs with comparable hotel space have shown that with only a $6,250 investment the hotel can achieve annual revenue and energy purchase savings of $20,000 and $75,000 respectively[iv]. Depending on the functionality of the BMS, the hotel may be able to participate in DR with virtually no upfront costs.

Federal Based

Tax Credits

Tax benefits are available to companies that install energy efficient property related to interior lighting systems, HVAC and hot water systems, or the building envelope, and may be eligible to deduct part or all of the associated costs immediately. Enacted as part of the Energy Policy Act of 2005 and extended through December 31, 2012, the IRC section 179D provides a deduction for certain energy efficient commercial building expenditures made by the taxpayer in lieu of capitalizing and recovering the costs through depreciation. Buildings built prior to 2009 must reduce total annual energy and power costs by a minimum of $16^{2/3}$% to qualify as a 'partially

qualifying property'. Although the proposed energy projects reduce the gas and electric bill by an estimated 10%, the savings are conservatively low. Assuming that the true percent savings would be well above the required reduction, Marriott can benefit from a tax credit that equals $0.60 times the square footage of the facility which amounts to $156,000, however the deduction is limited at $139,000. Exhibit C illustrates these and potential additional benefits of 179D according to an online calculator.

Energy & Environmental Action Plan A

Property Assessed Clean Energy (PACE)

A PACE loan provides an opportunity for the hotel owner to move forward with a comprehensive and rigorous plan to implement energy efficiency measures. These loans are a tax-lien financing program that will allow the hotel to originate a low interest loan that will cover the full cost of implementing efficiency measures. PACE financing represents one of the most promising schemes necessary for growth in commercial energy efficiency. As of February 2012 New Jersey became the latest of 28 states to pass legislation in the United States that enables municipalities to develop PACE programs in their communities. The timing of the project offers the hotel a unique chance to be one of the first New Jersey businesses to utilize the PACE model.

The hotel can approach The Clean Fund, a financial ally of the Better Buildings Initiative, to finance and develop the project. With no up-front costs, the hotel's only obligation would be to repay the loan (plus interest) over a period of 10-20 years, significantly longer than the expected payback of the project. For this project, the life of the loan is assumed to be 10 years. These payments would be administered through a charge on the hotels property tax bill and funneled to the Clean Fund, or the underwriting organization, through a municipal bond.

Approval for PACE financing will require the consent of the mortgage holder. This should be noted as a potential obstacle to the development of the project. However, the distinctive structure of the PACE model ties the cost of the project to the property and the repayment obligation transfers with ownership. As a result, selling the asset is a viable option, having not fully reaped the benefits of the efficiency improvements. For the purpose of this report, a 10 year horizon has been used to simplify the payment transfer.

The PACE financing structure permits the use of energy efficiency rebates. Thus, the franchisee can leverage the incentives for lighting, room thermostats, VFD's and motors, and the chiller plant. It is highly suggested to research further potential rebates as more detailed floor plans, equipment, bulbs and fixtures, and kitchen equipment are identified. Above rebates are based on rough estimates and the upfront costs may be even further dwindled down once specific counts are taken into consideration.

Energy & Environmental Action Plan B

Pay for Performance

If there are any hurdles in executing Plan A, the hotel should pursue the Pay for Performance (P4P) program, under the New Jersey's Clean Energy Program. The P4P program targets existing commercial, industrial and institutional buildings in NJ that have a peak demand of more than 100 KW. In order to receive all the incentives, the project will have to generate at least 15% electricity and/or gas savings and have a 10% Internal Rate of Return. While the P4P generates considerable savings, the hotel must show that the energy projects will reduce energy usage by at least 15%. Currently, the proposed projects only decrease the gas and electric bill by 10%. This is an area worth investigating. If it turns out that reductions meet the 15% threshold, Plan B may actually be a more valuable path forward.

Incentives equal up to 50% of the program costs and up to $50,000 to offset the cost of the development of an Energy Reduction Plan (ERP). The P4P program requires that the participant work with an approved partner that will develop the ERP, a financial plan to fund the project and a construction schedule.
The incentives are based on projected and saved kWh and have a cap of $2M per project. The incentive cash flow comes in three phases:

- Incentive #1: Between $5,000 and $50,000 upon approval of the ERP(approximately $26,000 for a hotel this size)
- Incentive #2: Up to 25% of total project costs upon successful installation of ERP measures,
- Incentive #3: Up to 25% of total project costs upon verification of compliance with the minimum required energy savings after one year of project implementation

Since capital is limited and the hotel owner will have initial costs related to contracting with an energy expert partner and the upfront capital costs, the timing of cash flows will be important. Under this scenario, the franchisor can play a significant financial role by supporting the initial program costs and hence helping to jump-start the retrofit of the hotel facility.

The P4P program offers several advantages for the hotel owner and the franchisor. For the hotel owner, the P4P program is designed to comply with a rigorous technical analysis and a minimum threshold of energy savings that will easily satisfy the terms of the PIP agreement. It is a P4P requirement that the 15% energy savings be accomplished within one year (18 months at the most) of project implementation. The set of financial incentives also corresponds to the hotel's lack of capital to invest and will help support investments that otherwise would have been difficult to finance through traditional banking channels. For the franchisor, by participating in the P4P program the hotel can get on track to receive Energy Star certification, since the P4P program requires the use of the Energy Star program's Portfolio Manager tool. If the hotel receives this award, it will join the 275 Marriott hotels that are Energy Star certified, adding to the franchise's already sterling environmental reputation. Additionally, the incentives provided by the program will reduce the franchisor's financial exposition to the project, which could even be further reduced if the hotel obtains financial support from the NJ Economic Development Authority's Energy Efficiency Revolving Loan Fund.

The main risk associated with the P4P program concerns the time it could take to implement. The program is subject to the state's decision making process and bidding regulations. This

could potentially translate into delays if the review and approval process is elongated on account of bureaucratic procedure.

Energy Efficiency Revolving Loan Fund for Plan B

The P4P program can be complemented with the NJ Economic Development Authority's Energy Efficiency Revolving Loan Fund (EE RLF). The EE RLF can provide up to 80% of the total cost of projects that have an approved ERP under the P4P program. The financial aid comes in the form of low interest rate loans that can be repaid in 3, 5 and 7 years. The eligibility requirements are the same as for the P4P program. The applicant undergoes a thorough technical and financial due diligence and has to present evidence of fund sources to complete the project. The disbursements are made against paid invoices, meaning the hotel owner will need to procure funds from elsewhere, preferably from the franchisor as a natural partner in this project. If awarded the funds, the hotel owner will have secured the project financing under very lenient terms and the franchisor will have helped finance the project without taking significant financial risk.

Loan from the Franchisor for Plan B

The participation of the franchisor in the financial structure of the project is paramount to implement the energy efficiency measures and improve the hotel's environmental footprint and that of the franchise as a whole. As seen previously, even with the existence of comprehensive energy efficiency programs in NJ, it is necessary that the hotel owner find financial support from the franchisor in the case of Plan B. Initial investment costs will have to be covered by the hotel owner. The costs of the project can be substantial for a hotel this size; however, they are minor within the franchise's project portfolio. In this sense, the hotel owner requests a loan from the franchiser to cover initial costs. The loan will be repaid with the cash flow from the P4P incentives and the monthly energy savings. In addition, if the hotel receives funds from the EE RLF these resources will go towards reimbursing the principal portion of the franchise's loan. However, the chances of accessing the EE RLF funds will dramatically improve if the franchise agrees to back the hotel in its application. With the franchise's participation, the project's probability of success improves and reduces the risk for all parties involved**.**

FINANCING STRATEGY – TIMING & STRUCTURE

Financing Assumptions

Assumed Terms:	Loan Amount	Term	Rate
Franchisor Loan	$40,000	5 years	8%
PACE Loan	$325,100	10 years	4.99%
P4P Incentive 1:	$26,000	One-Time Savings	
P4P Incentive 2:	$114,750	One-Time Savings	
P4P Incentive 3:	$114,750	One-Time Savings	
Revolving Loan	$318,250	7 years	4%
DR Program	$75,000	Annual Savings	
Tax Credits	$133,900	One-Time Savings	

Potential Savings & Rebates of Energy Projects

Efficiency Measure	Upfront Costs	Annual Savings	Rebates
Lighting	$40,000	$18,000	$8,900
Thermostats	$160,000	$45,000	$26,475
VFDs & Motors	$50,000	$15,000	$20,720
Kitchen equipment pilot retrofits	$10,000	$5,000	$0
Variable-Constant Conversion	$11,000	$5,000	$0
Chiller Plant upgrade	$188,000	$22,000	$77,805
Total	$459,000	$110,000	$133,900

Plan A Financials & Timing

Plan A: PACE	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Energy Savings		110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000
PACE loan	$ 325,100	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)
DR Program	$ 75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
GHPP	$ 1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total costs	$ 325,100	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)	(42,081)
Total savings		186,000	186,000	186,000	186,000	186,000	186,000	186,000	186,000	186,000	186,000
Net Savings	$ 76,000	143,919	143,919	143,919	143,919	143,919	143,919	143,919	143,919	143,919	143,919
NPV	$ 884,317										

Plan B Financials & Timing

Plan B: P4P	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Energy Savings		110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000	110,000
P4P	$140,750	114,750									
Loan from Franchisor	$40,000	(10,018)	(10,018)	(10,018)	(10,018)	(10,018)					
Revolving Loan	$318,250	(53,024)	(53,024)	(53,024)	(53,024)	(53,024)	(53,024)	(53,024)			
DR Program	$75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
GHPP	$1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total Costs	$459,000	(63,042)	(63,042)	(63,042)	(63,042)	(63,042)	(53,024)	(53,024)	0	0	0
Total savings		186,000	186,000	186,000	186,000	186,000	186,000	186,000	186,000	186,000	186,000
Net Savings	$116,000	250,666	122,958	122,958	122,958	122,958	132,976	132,976	186,000	186,000	186,000
NPV	$962,870										

*Financials for Plan A and B do not take tax credits into account

CONCLUSION

The Morris County, NJ Marriott hotel lags behind the industry average in terms of efficiency and has a significant opportunity to reduce operating costs and contribute to Marriott's sustainability goals. The hotel has the advantage of being located in the state of New Jersey, where a multitude of programs are available for funding efficiency capital projects. The PACE program offers an advantageous situation, providing a low-interest, long-term loan which also allows the hotel to take advantage of attractive rebates available through New Jersey's SmartStart Buildings program. In the unfortunate circumstance where a PACE loan cannot be obtained, the hotel can move to pursue the P4P program which will cover over half of the capital costs, with a majority

of remaining costs covered through the EE RLF. Plan A and B can be complemented with unique and forward-thinking programs such as the Towel Reuse, Green Rewards and Green Advocate Employee programs, tax credits achieved through 179D, and participating in Demand Response. If financing assistance is necessary from the Marriott franchise, this will be money wisely lent at low financial risk and can act as an example to other Marriott hotels in New Jersey. However, in the ideal situation, a PACE loan will be granted, rebates used, and the other innovative solutions implemented which will showcase the Morris County NJ Marriott as a leader in pursuing energy efficiency and sustainability efforts simply by employing all the tools in its shed.

EXHIBITS

Exhibit A

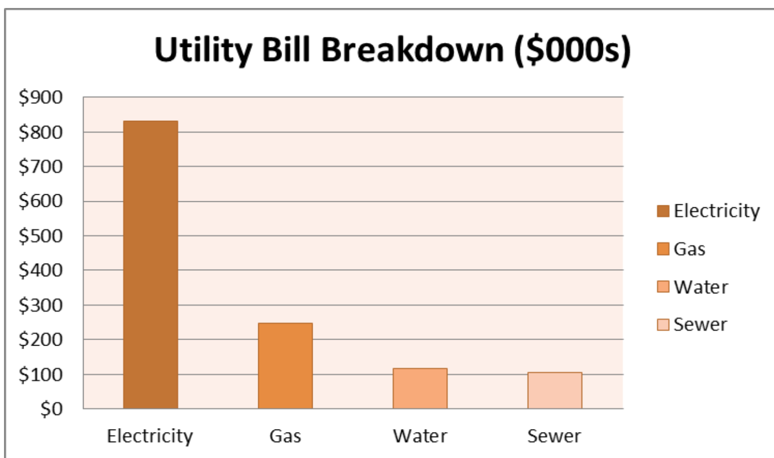

Exhibit B

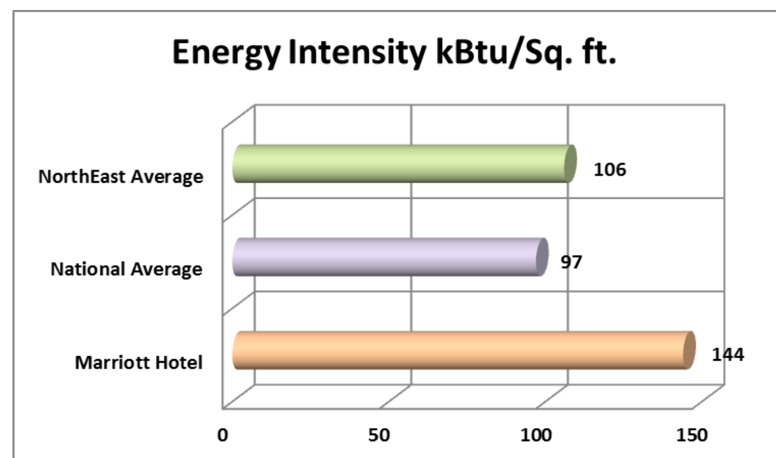

Exhibit C

Cost of Equipment, Vehicles, and/or Software:	459,000
Section 179 Deduction:	$139,000.00
50% Bonus Depreciation Deduction: (on any remaining amount above $139,000)	$160,000.00
Normal 1st Year Depreciation:	$32,000.00
Total First Year Deduction:	$331,000.00
Cash Savings on your Purchase: (assuming a 35% tax bracket)	$115,850.00
Lowered Cost of Equipment, Vehicles, and/or Software after Tax Savings:	**$343,150.00**

Compute

The calculator presents a potential tax scenario based on typical assumptions that may not apply to your business. This page and calculator are not tax advice. The indicated tax treatment applies only to transactions deemed to reflect a purchase of the equipment or a capitalized lease purchase transaction. Please consult your tax advisor to determine the tax ramifications of acquiring equipment or software for your business.

ASSUMPTIONS

Cost of electricity: $0.12

Price taken from Jersey Central Power & Light tariff schedule based on average on-peak, off-peak, winter, and summer kWh charge[v].

Discount rate: 10%

Range of 10-15% given to us by the U.S. Department of Energy; lower end utilized based on low-risk, high-return investments intrinsic in energy efficiency projects.

REFERENCES

---

[i] "Hotels: An Overview of Energy Use and Energy Efficiency Opportunities." *Energy Star*. N.p., n.d. Web. 24 Feb. 2012. <www.energystar.gov/ia/business/challenge/learn_more/Hotel.pdf>.

[ii] "Reuse your towels when staying at a hotel." *Practically Green*. N.p., n.d. Web. 24 Feb. 2012. <http://practicallygreen.com/reuse-your-towels-when-staying-at-a-hotel>.

[iii] Hasek, Glenn. "Keycard Based Energy Management Systems Gain Acceptance in U.S.." *Green Lodging News*. N.p., 2 Aug. 2007. Web. 24 Feb. 2012. <http://www.greenlodgingnews.com/keycard-based-energy-management-systems-gain-acceptance>.

[iv] "Strategically Green Payback and ROI Case Study." *Sol Vista Consulting*. N.p., n.d. Web. 24 Feb. 2012. <http://solvistaconsulting.com/casestudies.html>.

[v] "Prices to Compare Effective 10/1/11 through 5/31/12." *Jersey Central Power & Light*. N.p., n.d. Web. 24 Feb. 2012. <https://firstenergycorp.com/content/dam/customer/Customer%20Choice/Files/New%20Jersey/Price-to-Compare.pdf>.