Exploring Energy Efficiency as an Investment:
The Value of Investing in Energy Efficiency

CenterPoint Energy

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- Regulatory processes and litigation support
- Energy market modelling and economics
- Customer strategies
- Fuel services
- Resource procurement
- Operations and performance improvement
- Asset transaction support

- Energy technology and technology management
- Business planning and strategy
- Renewables
- Energy efficiency and sustainability
- Greenhouse gas/climate change
- Clean energy
- All aspects of generation and transmission
Topics

» The case for energy efficiency…
» …but don’t ignore the NEBS!
» Types of typical projects
» Comparing project economics
» Developing an on-going strategy
» Positioning for the future
Google Buys *nest* for $3.2 Billion

(It’s the network, dude!)
Numerous Opportunities to Improve Efficiency

**National Energy Efficiency Potential**

*McKinsey & Company Study-Unlocking Energy Efficiency in the U.S. Economy*  
A $520 Billion investment in efficiency measures would yield $1.2 trillion in gross energy savings by 2020

*Lawrence Berkeley National Lab-U.S. Building-Sector Energy Efficiency Potential*  
1/3 of Business as usual electric consumption can be saved at a cost of 2.7 cents per kWh  
2.5 year simple payback  
Savings at 3.5 times larger than the investment required


For the Environmental Protection Agency, Climate Protection Partnerships Division, Office of Air and Radiation, under U.S. Department of Energy Contract No. DE-AC02-05CH11231.
Relative Cost and Risk of Various Strategies

Source: Practicing risk aware electricity regulation -- Ceres, April 2012
2013 Rankings by State: Energy Efficiency across the U.S.

Source: ACEEE 2013 rankings
http://www.aceee.org/state-policy/scorecard
Energy Efficiency Risk vs. Return

Source: ACEEE
Risk vs. Return: *the Efficient Frontier*

A portfolio above this curve is impossible.

High Risk/High Return

Medium Risk/Medium Return

Low Risk/Low Return

Optimal portfolios should lie on this curve (known as the “Efficient Frontier”).

Portfolio’s below the curve are not efficient, because for the same risk one could achieve a greater return.

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(1)
Typical Natural Gas Energy Efficiency Initiatives

» HVAC

» Water Heating

» Cooking

» Process Steam and Steam Traps

» Behaviour –oriented programs

» Retro-commissioning

» Strategic Energy Management
# Energy Efficiency as an Investment

<table>
<thead>
<tr>
<th>Energy-efficient equipment</th>
<th>Annual Energy Savings</th>
<th>Total or Incremental Cost</th>
<th>Simple Payback</th>
<th>Measure Lifetime</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low flow faucet aerator</td>
<td>$4 per aerator</td>
<td>$5</td>
<td>1 year</td>
<td>5</td>
<td>$12</td>
</tr>
<tr>
<td>Low flow showerhead</td>
<td>$11 per showerhead</td>
<td>$10</td>
<td>1 year</td>
<td>7</td>
<td>$52</td>
</tr>
<tr>
<td>Condensing furnace</td>
<td>$100 (residential)</td>
<td>$900</td>
<td>9 years</td>
<td>20</td>
<td>$171</td>
</tr>
<tr>
<td>Boiler with economizer</td>
<td>$15,000</td>
<td>$50,000</td>
<td>3 years</td>
<td>15</td>
<td>$59,000</td>
</tr>
<tr>
<td>New steam trap</td>
<td>$250 (comm.)</td>
<td>$250</td>
<td>1 year</td>
<td>5</td>
<td>$830</td>
</tr>
<tr>
<td>High-efficiency tankless water heater</td>
<td>$50 (residential)</td>
<td>$400</td>
<td>8 years</td>
<td>20</td>
<td>$140</td>
</tr>
</tbody>
</table>

Assumptions: 10% discount rate, 2% inflation
Sources: CenterPoint Energy inputs, Navigant calculations
Many Options, but Limited Investment Capital

» Simple Payback

» Cash Flow Analysis

» Net Present Value

» Internal Rate of Return

» Return on Investment
Simple Payback

» How long to recover my expenditure?

» Cost / Savings = payback (years or months)

» Well understood and widely used - but very simple

» Does not address time value of money or profitability
Net Present Value (NPV)

» More comprehensive than payback analysis

» More input data required- but time investment rewarded

» Considers lifecycle costs and timing of cashflows

» Considers maintenance, profitability, inflation, etc.

» Considers the “cost of waiting”
Internal Rate of Return (IRR)

- More comprehensive than payback analysis
- More input data required- but time investment rewarded
- Provides a measure of investment efficacy, in %
- Textbook definition: discount rate to return NPV = 0
### Table 3 — NPV and Profitability

<table>
<thead>
<tr>
<th>Analysis Factors</th>
<th>Non-Comprehensive Project</th>
<th>Comprehensive Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment</td>
<td>$100,000</td>
<td>$400,000</td>
</tr>
<tr>
<td>Savings</td>
<td>$40,000/yr.</td>
<td>$100,000/yr.</td>
</tr>
<tr>
<td>Simple Payback</td>
<td>2.5 years</td>
<td>4 years</td>
</tr>
<tr>
<td>IRR (10 yrs.)</td>
<td>38%</td>
<td>21%</td>
</tr>
<tr>
<td>NPV (10 yrs. @ 12%)</td>
<td>$126,040</td>
<td>$165,100</td>
</tr>
</tbody>
</table>

Source: U.S. Department of Energy
Waiting Can Be Costly

### Cost of Delay and Cash Flow Analysis

<table>
<thead>
<tr>
<th>Project cost</th>
<th>$2,052,900</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple payback</td>
<td>3 years</td>
</tr>
<tr>
<td>Interest rate</td>
<td>8.00 %</td>
</tr>
<tr>
<td>Financing term</td>
<td>5 years</td>
</tr>
<tr>
<td>Year(s) postponed</td>
<td>1 year</td>
</tr>
<tr>
<td>Project cost increase due to postponement</td>
<td>5.00 %</td>
</tr>
<tr>
<td>Estimated energy cost increases after Year 2</td>
<td>10.00 %</td>
</tr>
<tr>
<td>Annual increase in energy costs after year 2</td>
<td>2.50 %</td>
</tr>
<tr>
<td>Estimated energy savings in first year (Year 1)</td>
<td>75.00 %</td>
</tr>
</tbody>
</table>

**Cumulative Cash Flow Impact Comparison**

<table>
<thead>
<tr>
<th>Year</th>
<th>Option A</th>
<th>Option B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1,000,000</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>2</td>
<td>$1,500,000</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>3</td>
<td>$2,000,000</td>
<td>$2,500,000</td>
</tr>
<tr>
<td>4</td>
<td>$2,500,000</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>5</td>
<td>$3,000,000</td>
<td>$3,500,000</td>
</tr>
<tr>
<td>6</td>
<td>$3,500,000</td>
<td>$4,000,000</td>
</tr>
</tbody>
</table>

**Net Present Value**

| Net Present Value of Option A | $754,748 |
| Net Present Value of Option B | $384,826 |

For purposes of this calculation, all cash flows are being discounted at the interest rate indicated in cell G7 - financing paid monthly in arrears.

**Option A (Fast Track Financing)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Savings</th>
<th>Project Cost including financing</th>
<th>Annual Cash Flow</th>
<th>Cumulative Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$416,250</td>
<td>$(499,505)</td>
<td>$(83,255)</td>
<td>$(83,255)</td>
</tr>
<tr>
<td>2</td>
<td>$610,500</td>
<td>$(499,505)</td>
<td>$110,995</td>
<td>$457,875</td>
</tr>
<tr>
<td>3</td>
<td>$625,763</td>
<td>$(499,505)</td>
<td>$126,258</td>
<td>$625,763</td>
</tr>
<tr>
<td>4</td>
<td>$641,407</td>
<td>$(499,505)</td>
<td>$141,902</td>
<td>$641,407</td>
</tr>
<tr>
<td>5</td>
<td>$657,442</td>
<td>$(499,505)</td>
<td>$157,937</td>
<td>$657,442</td>
</tr>
<tr>
<td>6</td>
<td>$673,878</td>
<td>$0</td>
<td>$673,878</td>
<td>$673,878</td>
</tr>
</tbody>
</table>

**Option B (Waiting for Cash)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Savings</th>
<th>Project Cost</th>
<th>Annual Cash Flow</th>
<th>Cumulative Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>1</td>
<td>$616,250</td>
<td>$616,250</td>
<td>$110,995</td>
<td>$1,677,605</td>
</tr>
<tr>
<td>2</td>
<td>$630,500</td>
<td>$630,500</td>
<td>$126,258</td>
<td>$1,677,605</td>
</tr>
<tr>
<td>3</td>
<td>$645,763</td>
<td>$645,763</td>
<td>$141,902</td>
<td>$1,677,605</td>
</tr>
<tr>
<td>4</td>
<td>$661,407</td>
<td>$661,407</td>
<td>$157,937</td>
<td>$1,677,605</td>
</tr>
<tr>
<td>5</td>
<td>$673,878</td>
<td>$673,878</td>
<td>$1,127,714</td>
<td>$1,677,605</td>
</tr>
</tbody>
</table>

**Important Notice**

Fast track financing generates 96% more cash than waiting!
Energy Efficiency Investments vs. Perceived Risk

Figure 1 - Perceived "Riskiness" of Energy Efficiency compared to Core Business Projects

Less Risky: 55%
As Risky: 42%
More risky: 3%

Figure 3 - Hurdle Rates demanded of Energy Efficiency compared to Core Business Investments

Higher: 35%
Same: 50%
Lower: 15%

Source: Imperial College London Energy Futures Lab
Drivers for Energy Efficiency Investment

Figure 6 - Energy Efficiency Project Drivers (Scored Out of 160)

Source: Imperial College London Energy Futures Lab
Barriers to Energy Efficiency Investment

Figure 7 - Energy Efficiency Project Barriers (Scored out of 160)

Source: Imperial College London Energy Futures Lab
All $ Are Not Created Equal!

<table>
<thead>
<tr>
<th>Industry</th>
<th>Net Margin</th>
<th>Revenue Equivalent of $1 in Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>3.52%</td>
<td>$28</td>
</tr>
<tr>
<td>Automotive</td>
<td>3.45%</td>
<td>$29</td>
</tr>
<tr>
<td>Building Materials</td>
<td>0.82%</td>
<td>$122</td>
</tr>
<tr>
<td>Drug</td>
<td>18.4%</td>
<td>$5</td>
</tr>
<tr>
<td>Food Processing</td>
<td>3.02%</td>
<td>$33</td>
</tr>
<tr>
<td>Medical Services</td>
<td>4.66%</td>
<td>$21</td>
</tr>
<tr>
<td>Restaurant</td>
<td>11.04%</td>
<td>$9</td>
</tr>
<tr>
<td>Retail Store</td>
<td>3.33%</td>
<td>$30</td>
</tr>
<tr>
<td>Trucking</td>
<td>2.79%</td>
<td>$36</td>
</tr>
<tr>
<td>Total Market</td>
<td>7.84%</td>
<td>$13</td>
</tr>
</tbody>
</table>

1$ saved is not the same as a 1$ earned...

Source: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/margin.html
And What About the NEBS?

“Non-Energy Benefits are nothing new, but are rarely given their due.” They can and will trump economic or quantitative analysis.

- Lighting quality and/or increased productivity
- Reduced water consumption
- Fewer oil tank car derailments and explosions
- Reduced volume of asthma cases
- Reduced maintenance labor cost
Develop a Strategy

» **Do your research** utilizing experts and online tools

  “watch out for vendors with a magnet & an oil additive”

» **Compare the alternatives** including all incentives

» **Implement** the project – follow the plan

» **Track** and monitor savings

  “what gets measured gets managed”

» **Invest in training and continuous improvement**

  “don’t just fuhgeddaboudit!”
REBATES FOR BUSINESS

OUR REBATE PROGRAMS OFFER MANY WAYS TO SAVE

Purchasing new equipment and upgrading existing equipment is a big part of any business, whether you’re planning a new facility or running an existing one. CenterPoint Energy’s rebate programs make it easier to install higher efficiency equipment for greater energy savings and a healthier bottom line.

2015 Rebates for Business

We offer the following natural gas equipment rebates to help you save on your energy investment. For more information, click on the links below.

**Boiler & boiler system components**
- Download boiler system application
- Download boiler system components application
- Download informational fact sheet

**Boiler tune-ups**
- Download application
- Download informational fact sheet

**Heating system steam traps**
- Download application
- Download informational fact sheet

**Energy recovery wheels & plates**
- Download application
- Download informational fact sheet

**Foodservice equipment**
- Download foodservice equipment application
- Download spray valve and ENERGY STAR dishwasher application
- Download kitchen hood demand control ventilation application
- Download informational fact sheet

**Custom rebates**
- Call your account manager at 612-321-4330 or 1-800-234-5800, ext. 4330 for an application.
- Download informational fact sheet

Unit & infrared heaters
- Download application
- Download informational fact sheet

Forced-air furnaces
- Download application
- Download informational fact sheet

Water heaters
- Download application
- Download informational fact sheet

Carbon monoxide sensors
- Download application
- Download informational fact sheet
Key Influencing Factors for the Future

- Uncertain Economic Conditions
- Natural Gas Supply Outlook and Pricing
- Oil Supply/Demand Relationship
- China’s & India’s Energy Policies
- Regulatory Reaction to Grid Disruption
- Climate Change Strategy
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