Energy Efficiency: a Win-Win
A Industrial Perspective

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Environmental and Energy Study Institute (EESI)
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Schneider Electric – the global specialist in energy management

24
billion € sales in 2012

41%
of sales in new economies

140,000
people in 100+ countries

4–5%
of sales devoted to R&D

Balanced geographies – FY 2012 sales

North America 25%
Western Europe 30%
Asia Pacific 27%
Rest of the World 18%

Diversified end markets – FY 2012 sales

Utilities & Infrastructure 25%
Industrial & machines 22%
Data centres 15%
Non-residential buildings 29%
Residential 9%
The Opportunity

Optimizing Energy Use
EE… A new opportunity?

EE is not new….

…. but it is underutilized

What is available in EE?

Studies by ACEEE and others suggest that the United States can cost-effectively reduce energy consumption by 25-30% or more over the course of the next 20-25 years.

- From 1970 to 2008 US EE gains met 75% of new energy demands
- New energy supply contributed only 25% demand

Source: Laitner 2008
The Possibility

Schneider Electric Facilities
Program Set a Corporate Goal of 4% Energy Reduction per Year

- Started with 18 US sites in 2005, expanded to 51 sites in 2009
- Energy Action Plan at each Facility.
- A Standard Practice Manual published
- Joined DOE Better Plants Initiative in 2009
- Quarterly Reviews and Annual Assessments
- Adopted as global guide to energy management in 2010
Reduction in Energy Consumption


-4% -8% -11% -18% -25% -25% -26% -30%

2005 2006 2007 2008 2009 2010 2011 2012

• Equivalent cost savings of more than $30 million
• More than 500 million kWh of energy (combined) saved through 2012
• Over 30% reduction in greenhouse gas emissions since 2004 - over 260,000 tons of CO2 equivalent avoided
Smyrna TN Results
What Were Our Key Projects?

- Building Management System
  - Single most important factor over the lifecycle
- Lighting Projects
  - T12 to T8 to T5 to now moving to LED where possible
  - Included emergency lights (small but constant use)
- Energy Efficiency Compressors

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Cost Savings</th>
<th>Required Budget</th>
<th>Simple Payback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect Present Economizers to Continuum and Install Economizers on the Remaining AHUs</td>
<td>$16,400</td>
<td>$40,000</td>
<td>2.4</td>
</tr>
<tr>
<td>Chilled Water Temperature Reset</td>
<td>$13,120</td>
<td>$100</td>
<td>0.0</td>
</tr>
<tr>
<td>Repair Compressed Air Leaks</td>
<td>$4,300</td>
<td>$1,700</td>
<td>0.4</td>
</tr>
<tr>
<td>Install Cogged-V Belts</td>
<td>$3,500</td>
<td>$360</td>
<td>0.1</td>
</tr>
<tr>
<td>Connect Forklift Charging to PowerLink</td>
<td>$3,300</td>
<td>$1,500</td>
<td>0.5</td>
</tr>
<tr>
<td>Control Operation of Task Lights</td>
<td>$2,200</td>
<td>$3,360</td>
<td>1.5</td>
</tr>
<tr>
<td>Install Vending Miser</td>
<td>$500</td>
<td>$600</td>
<td>1.2</td>
</tr>
<tr>
<td>Remove Unwanted Fixtures on the Top of AHUs</td>
<td>$380</td>
<td>$1,000</td>
<td>2.6</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$43,700</strong></td>
<td><strong>$48,620</strong></td>
<td><strong>1.1</strong></td>
</tr>
</tbody>
</table>
Opportunities

Typical EE Solutions
Small Building Energy Management

Energy Management Solution for small/medium buildings

- Monitoring & control solutions reduce consumption
- Energy reporting data supports compliance and certification requirements.
- Improves electrical installation operation and maintenance, hence reducing OPEX.
- Helps increase property value, maximize asset value and ease selling/renting.

Value Proposition
- Up to 20% energy savings thanks to a dedicated control
Chiller compressor control optimization

*Solution in brief*
- The chiller compressor is automatically controlled through a variable speed drive and a PLC.

*Value proposition*
- *Up to 20% energy savings* thanks to a dedicated control software.
Power Usage Effectiveness for Data Centers

- Integrated rack, power and cooling systems for data centers
- Decrease your data center’s PUE measure by up to 25%
Industrial Logistic Centers
Conveyor Energy Management

- Specialized conveyor control solutions
  - Optimization of energy usage
  - No reactive energy consumed.

- Up to 50% energy savings in operating mode.
Virginia Community College

**Energy Saving Performance Contract**

- ESCOs use energy savings to finance, install and maintain new EE equipment.
- Savings are guaranteed.
- Annual savings are used to fund up front capital investment.
- Reduces utility and O&M expenditure.

**CUSTOMER BENEFITS**
- Single-source for renovations and results
- Solution for funding shortfalls
- Institutional knowledge of all systems
- Holistic approach to problem resolution

**PROJECT AT A GLANCE**
- **Project Type:** Energy Performance Contract ($60 million over 4 years)
- **Location:** Commonwealth of Virginia, USA
- **Number of Buildings:** 315 (total of 7 million sq.ft. on 40 campuses)
- **Guaranteed Annual Savings:** Estimated to exceed $2 million annually upon completion
- **Energy Conservation Measures:**
  - Major mechanical systems, including DDCs
  - Water retrofits
  - Thermal storage
  - Lighting
  - Windows and doors
  - Roofing
  - Retrocommissioning

**Energy Bill**

**Before ESPC**
- Utility Bill

**During ESPC**
- Energy Cost Savings
- Contractor Payment

**After ESPC**
- Utility Bill
- Government Savings
The EE Industry

Where are the jobs
The Channel to Market for EE

- ≈ 80% of business flows through a variety of channel partners
- Solutions via partners have a multiplying effect on the # of jobs created

Image: Diagram showing the channel to market for EE, with flows from manufacturers to distributors, then to contractors and system integrators, leading to end users and energy management solutions.
Perspectives & Challenges

What we see
The Future

1. People, people, people
   - Skills and knowledge
   - Management, leadership, process *(50001, SEP)*, …

2. Visibility
   - Sub metering, performance, intensity,…

3. Tools
   - M&V, Diagnostics, Analytics, Benchmarking,…

4. Technology
   - Pervasive data enabling, integrated systems
Our Perspective on Inhibitors

● Market Inhibitors
  ● Low awareness and inadequate skills
  ● Limited incentives for designers and builders
  ● Comparative usage understanding

● Technology Inhibitors
  ● Systems level solutions/integration
  ● Measurement & verification

● Financing Inhibitors
  ● Incentive misalignment
  ● Limited or inadequate financing

● Regulation
  ● Inconsistent implementation of compliance with codes & policies
  ● Inconsistent & immature policies
  ● Inconsistent utility engagement across states
What is needed?

● Policy intervention where market barriers or failures inhibit optimal investment in EE
  ● Misplaced incentives such as the landlord tenant relation in buildings
  ● Distorted regulations – utility engagement in distributed generation or demand response programs.
  ● Unpriced costs & goods – environmental costs, education, training, research

● Assessment of the impact and effectiveness of current policies and regulations. – Many things work today but are underutilized
  ● State code programs – only two states require most current codes
  ● Utility programs - decoupling, EERS,
  ● Equipment standards – energy star,

● Putting policy and regulation at the right place.
  ● Federal, State, Local
Make the most of your energy™

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