Border Energy Savings Program

Energy Audits & Project Facilitation in San Diego and Baja California

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San Diego Regional Energy Office

Competitiveness, Savings and Clean Energy in the US-Mexico Border Region

8 September, 2006
San Diego Regional Energy Office

- California-based, independent 501(c)(3) non-profit organization
- Provides energy education, energy audits, technical assistance, and regional planning for San Diego
- We are a trusted community resource: SDREO does not sell equipment or represent the local energy utilities.
- SDREO’s charter includes assisting in energy-related projects in the Border region of Baja California
- In 2006, expanding assistance to maquiladoras in Baja through funding by the North American Development Bank (NADBank) and California Energy Commission (CEC)
Border Energy Savings Program

- BESP provides technical assistance and realistic implementation avenues for energy-intensive industrial facilities in northern Baja California (focused on Tijuana & Mexicali)

- Funding: $50k from NADBank; $7k from CEC. Another $25k just awarded from the CEC’s recent International Energy Fund RFP

- Technical focus is on energy efficiency, as well as cogeneration (CHP) where feasible

- Part of the challenge is education on the benefits of energy efficiency—the focus is on PRODUCTION.

- The maquiladora sector can be volatile; industry requirements for making investments often include very short ROI periods.
Program Goals

▼ Increase competitiveness of Mexico’s manufacturing sector
  ▼ Help industrial facilities reduce operating costs
  ▼ Identify energy savings projects
  ▼ Link projects with financing options: NADBank seeks investments in this sector

▼ Increase access to objective technical assistance and information on energy efficiency
  ▼ Develop sustainable process to identify possible projects
  ▼ Cultivate relationships with local industrial and government representatives
  ▼ Facilitate distribution of information to facility managers, local contractors and relevant government officials.
Initial Activities Jan-April 2006

- Initial activities focused on building alliances with players in Mexico:
  - Corporación de Desarrollo Económico de Tijuana (CDT)
  - Secretaria de Desarrollo Economico (SEDECO)
  - CANACINTRA (Tijuana y Mexicali)
  - Industrial Associations, Maquila Assns, etc.

- Developed lists of potentially attractive and interested facilities in Tijuana and Mexicali. Most important sectors: Automotive, Electronics, Plastics, Glass, Paper, Metal Fabrication, Furniture

- Identify the best candidates: high likelihood for implementation!
  - High energy use and bills, with long operating hours (2+ shifts)
  - Energy-intensive processes – electric and/or gas
  - Solvent and willing to invest in upgrades receiving payback in 1-5 years

- Met with plant managers of top prospects to pitch the program
BESP Current Activities

▼ Since April, staff engineers have performed five industrial energy audits:
   ▼ Metal polishing and finishing **
   ▼ Water heater manufacturing **
   ▼ Glass bottle manufacturing **
   ▼ Paper manufacturing (100% recycled)
   ▼ LCD & plasma TV assembly

▼ SDREO generates a report for each industry which details each measure, including estimates of costs and savings

▼ Project investment requirements range from $250K to $5M+

▼ Paybacks average around 2.3 years for efficiency measures.

▼ Easily accessible savings average 11% of electricity consumption and 12% of electricity bill. Gas savings are variable and depend on the industry and its processes.
Most Common Opportunities

- Lighting retrofits (many!)
- Variable frequency drives (VFDs)
- Compressed air system maintenance
- Load management
- Boiler and oven maintenance
- Process controls
- Chiller compressor retrofits
- Cogeneration
- Changes to electric service connections
Annual Electricity Savings (MWh)  
Three Industries

- VFDs, 4581, 51%
- Compressed Air, 3035, 33%
- Lighting, 1471, 16%
- Load Management, 3, 0%
Annual Savings ($) by End Use - Three Industries

- **Lighting**, $142,838, 15%
- **VFDs**, $362,977, 39%
- **Compressed Air**, $206,919, 22%
- **Boilers and Ovens**, $216,551, 23%
- **Load Management**, $13,180, 1%
## Metal Polishing and Finishing

<table>
<thead>
<tr>
<th>Oportunidad de Conservación de Energía</th>
<th>Numero de artículos</th>
<th>Horas de Operación por año</th>
<th>Ahorro Estimado de Energía Eléctrica (kWh)</th>
<th>Reducción de Demanda Pico (kW)</th>
<th>Ahorro Estimado de Gas (kcf)</th>
<th>Ahorro Económico Estimado ($/yr)</th>
<th>Costo de Implementación Estimado ($)</th>
<th>Periodo de Recuperación (Años)</th>
<th>Recuperación de la Inversión (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Modificar la iluminación del área de producción</td>
<td>861</td>
<td>5,304</td>
<td>292,272</td>
<td>55</td>
<td>0</td>
<td>$27,035</td>
<td>$87,822</td>
<td>3.2</td>
<td>31%</td>
</tr>
<tr>
<td>2.1 Remplazar 250 watts MH</td>
<td>50</td>
<td>5,304</td>
<td>35,537</td>
<td>7</td>
<td>0</td>
<td>$3,287</td>
<td>$13,000</td>
<td>4.0</td>
<td>25%</td>
</tr>
<tr>
<td>2.2 Remplazar 400 watts MH</td>
<td>121</td>
<td>5,304</td>
<td>143,760</td>
<td>27</td>
<td>0</td>
<td>$13,298</td>
<td>$36,300</td>
<td>2.7</td>
<td>37%</td>
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<tr>
<td>3 Instalar VFD's en el sistema de extractores</td>
<td>26</td>
<td>5,304</td>
<td>798,782</td>
<td>91</td>
<td>0</td>
<td>$67,458</td>
<td>$243,100</td>
<td>3.6</td>
<td>28%</td>
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<tr>
<td>4 Instalar VFD's en el sistema de bombeo de agua caliente</td>
<td>8</td>
<td>5,304</td>
<td>270,027</td>
<td>31</td>
<td>0</td>
<td>$22,804</td>
<td>$67,020</td>
<td>2.9</td>
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<tr>
<td>5 Reparar las fugas de aire</td>
<td>15</td>
<td>n.a</td>
<td>106,455</td>
<td>0</td>
<td>0</td>
<td>$7,675</td>
<td>$1,500</td>
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<td>512%</td>
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<tr>
<td>6 Utilizar un blower para el área de pintado de polvos</td>
<td>4</td>
<td>5,304</td>
<td>246,310</td>
<td>28</td>
<td>0</td>
<td>$20,801</td>
<td>$5,000</td>
<td>0.2</td>
<td>416%</td>
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<tr>
<td>7 Reducir la temperatura de escape en calderas</td>
<td>2</td>
<td>8760</td>
<td>n.a</td>
<td>n.a</td>
<td>708</td>
<td>$7,151</td>
<td>$6,000</td>
<td>0.8</td>
<td>119%</td>
</tr>
<tr>
<td><strong>Totales - Ahorro de Energía</strong></td>
<td><strong>1,893,142</strong></td>
<td><strong>239</strong></td>
<td><strong>708</strong></td>
<td><strong>$169,508</strong></td>
<td><strong>$459,742</strong></td>
<td><strong>2.7</strong></td>
<td><strong>37%</strong></td>
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<tr>
<td><strong>Medidas Adicionales Sugeridas</strong></td>
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<tr>
<td>8 Consolidación de las 5 acometidas a una sola</td>
<td>1</td>
<td>8760</td>
<td>n.a</td>
<td>400</td>
<td>n.a</td>
<td>$65,000</td>
<td>$25,000</td>
<td>0.4</td>
<td>250%</td>
</tr>
</tbody>
</table>

벤 Industrial Polishing is working with NADB for project financing.
Glass Bottle Manufacturer

- Production is paramount!
- Mexicali: intense requires equipment derates
Carbon Impacts

- California Average Emissions Factor is .108 kg[C]/kWh. That is, for every kWh consumed by an end user, on average 108g of carbon are emitted from power plants supplying the state (Marnay, Fisher et al. 2002).
- In the four plants thus far analyzed: potential savings of 990 T[C] from electricity
- Since Northern Baja California is interconnected tightly with the California grid, we can use these factors.
- Projections: about 100-150X the savings we have identified thus far, or 99,000-148,000 t[C] in Northern Baja California. This number could be higher--smaller industries tend to have higher relative potential for savings, though projects are more difficult to identify and implement.
- Gas is a big question; the landscape is changing and usage will go up as NG becomes more available. CHP is a key question.
Next Steps

- Perform 2 more audits (for a total of 7)
- Facilitate connections to NADBank for financing
- Facilitate ID of ESCOs and other partners for project execution

New CEC grant tasks:
- Perform 2 additional audits (for a total of 9)
- Develop 2 case studies
- Coordinate ESCO/Industry networking event
Related Activities

▼ Assisting CEC with Governor’s Trade Mission & Expo in Monterrey, Mexico, Nov. 2006

▼ Border Energy Forum in October 2006 – Tampico, Mexico

▼ Border Energy Forum in October 2007 – San Diego