Toxics Use Reduction and Resource Conservation: Competitiveness Impacts for Massachusetts Businesses

Massachusetts Toxics Use Reduction Institute (TURI) and Massachusetts Office of Technical Assistance and Technology (OTA)

TURI Report #2017-002
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Note about this slide deck

- This slide deck includes an assortment of slides, for use as a resource when you are developing a presentation. Please note in some cases there are two different slides for a single company, as we have presented the information in a variety of ways. Choose whichever one meets your needs.
Dry Cleaners

• 5 sample dry cleaners that received assistance from TURI
• Small, family-owned businesses
• All shifted to 100% professional wet cleaning
• All achieved savings in operating costs
• Ten-year savings range from $28K to $375K
## Dry Cleaners

**Table 1: Capital Investments, Savings, ROI and 15-year NPV at five garment cleaning facilities**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Capital investment(^b)</th>
<th>Savings - annual labor costs</th>
<th>Savings - monthly operating costs</th>
<th>Savings - monthly resource costs</th>
<th>ROI/ ROI discounted(^d)</th>
<th>15 year NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH(^a)</td>
<td>$51,880</td>
<td>$26</td>
<td>($432)(^c)</td>
<td>$414</td>
<td>4.3/2.6</td>
<td>$136,725</td>
</tr>
<tr>
<td>Ace</td>
<td>$33,981</td>
<td>$5,835</td>
<td>$181</td>
<td>($81)(^c)</td>
<td>2.6/1.4</td>
<td>$48,715</td>
</tr>
<tr>
<td>K&amp;Q</td>
<td>$63,146</td>
<td>$5,134</td>
<td>$80</td>
<td>$86</td>
<td>1.0/0.3</td>
<td>$28,084</td>
</tr>
<tr>
<td>AB</td>
<td>$33,512</td>
<td>$2,053</td>
<td>$425</td>
<td>$429</td>
<td>5.3/3.3</td>
<td>$111,074</td>
</tr>
<tr>
<td>KMK</td>
<td>$38,151</td>
<td>$22,047</td>
<td>$683</td>
<td>$1,083</td>
<td>18.8/12.4</td>
<td>$474,577</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>5.7/3.6</strong></td>
<td><strong>$159,835</strong></td>
</tr>
</tbody>
</table>

\(^a\) This facility experienced savings of about $1,400 per month on claims for damaged garments.

\(^b\) These investments were offset by TURI grants of: $18,000, $17,000, $17,000, $8,500, and $15,000, respectively. However, the TURI grant is not factored into the calculation of ROI and NPV.

\(^c\) Parentheses denote a cost increase.

\(^d\) Discount rate set at 5%.
Decorative chrome plating

• Columbia Manufacturing
  – Facility upgrade to reduce use of hexavalent chromium
  – Tripled plating capacity, increased competitiveness nationally

• Independent Plating
  – Installed trivalent plating line
  – Eliminated cyanide plating, reduced hydrochloric acid
Semiconductor Manufacturing – Analog Devices

• Reduced energy use by more than 16 million KWH per year through conservation initiatives.

• Reduced water consumption by nearly 90 million gallons per year through water use conservation projects.
Paints & Coatings – Stainless Steel Coatings

• Reduced the use of xylene by 57 percent and eliminated the use of hexavalent chromium.
• Saved more than $15,000 per year in reduced waste disposal costs.
• Reduced hazardous waste generation by 52 percent.
• Reduced energy costs by 20 to 25 percent and saved 14,500 pounds of CO2 emissions per year.
Stainless Steel Coatings

- Reduced the use of xylene by 57 percent and eliminated the use of hexavalent chromium.
- Saved more than $15,000 per year in reduced waste disposal costs.
- Reduced hazardous waste generation by 52 percent.
- Reduced energy costs by 20 to 25 percent and saved 14,500 pounds of CO2 emissions per year.
Independent Plating

• Reduced the use of toxic chemicals by more than 500,000 pounds, including:
  – Cyanide compounds by 95 percent
  – Hexavalent chromium compounds by 88 percent
  – Hydrofluoric acid by 100 percent

• Reduced the use of acids, bases and other reportable metal compounds.

• Made the switch from hexavalent chromium to trivalent chromium on several production lines, with assistance from a TURI incentive grant.
Analog Devices

- Reduced energy use by more than 16 million KWH per year through conservation initiatives.
- Reduced water consumption by nearly 90 million gallons per year through water use conservation projects.
- Reduced the use of sodium hydroxide and hydrochloric acid for resin regeneration in deionized water production processes.
- Newsweek magazine ranked Analog Devices as among the top 50 greenest companies in the United States in 2014.
Siemens Healthineers

- **Stratus® CS Analyzer**: Provides quantitative cardiac assays for fast, accurate testing of patients with suspected myocardial ischemia (reduced blood flow to the heart).
- Contains a chemical in the family of octylphenol ethoxylates (OPEs), used as a surfactant.
- OPEs have been identified as a Substance of Very High Concern (SVHC) under REACH.
- Siemens Healthineers requested TURI’s assistance in identifying a surfactant that would work as well as the OPEs for its specific applications in medical diagnostics.
- TURI provided funding to support a partnership between Siemens Healthineers and a researcher at the University of Massachusetts Lowell.
- Working together, the team was able to identify an alternative with equally good technical performance. The team is now conducting further testing to assess health & environmental impacts.
Chemgenes Corporation

• Reduced the use of chloroform by more than 55 percent and hexane by more than 35 percent.
• Improved manufacturing efficiency, saving $215,000 in chemical purchases, regulatory fees and disposal costs.
• Reduced solid waste from 25,000 to 8,000 lbs. per year.
• Anticipates reducing the use of hexane and ethyl acetate by 27,000 lbs., or 70 percent annually, through the installation of a new solvent recovery and recycling system, purchased with help from a TURI incentive grant.
## Auto shops

### Table 9: Annual savings at two auto shops

<table>
<thead>
<tr>
<th>Facility</th>
<th>Annual savings</th>
<th>Other business factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mike’s Auto Body</td>
<td>$1,371</td>
<td>• Facility undertook several TUR initiatives. Some increased costs and others yielded savings. Taken together, they yielded net annual savings.</td>
</tr>
<tr>
<td>912 Auto Center</td>
<td>$3,357</td>
<td>• Facility made a capital investment of $60,000 in a new spray booth associated with its move to a new location. Worker/owner experienced direct health benefits.</td>
</tr>
</tbody>
</table>
## Auto shops: 912 Auto Center

### Table 8: Investments, costs and savings at 912 Auto Center

<table>
<thead>
<tr>
<th>Product</th>
<th>Capital investment</th>
<th>Annual savings</th>
<th>Other business factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-based paints</td>
<td>n/a</td>
<td>No change in costs</td>
<td>• Eliminating paint reducer counterbalanced increased cost of the water-based paints.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Worker/owner no longer experiences dizziness while mixing paints.</td>
</tr>
<tr>
<td>Water-based gun washing solution</td>
<td>$1,000</td>
<td>$3,357</td>
<td>• Capital investment was optional; water-based system could also have been used with existing equipment.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Water-based system works more quickly (one wash instead of several washes).</td>
</tr>
<tr>
<td>Spray booth</td>
<td>$60,000</td>
<td>n/a</td>
<td>• New booth was necessary due to move to new facility; new booth also facilitated use of water-based paints.</td>
</tr>
</tbody>
</table>
912 Auto Center

• Water-based paints
  – No change in costs (eliminating paint reducer counterbalanced cost for water-based paints)
  – Worker/owner no longer experiences dizziness when mixing paints

• Water-based gun washing solution
  – Capital investment of $1,000 (optional – could have used existing equipment)
  – Annual operating cost savings: $3,357
  – Works more quickly than solvent-based system

• Spray booth
  – $60,000 capital investment
  – New booth was necessary due to move to new facility; also facilitated use of water-based paints