Financial Benefits of Water Efficiency Programs

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Program Manager
Alliance for Water Efficiency
Water Efficiency Benefit-Cost Analysis for Six Communities

Province of Ontario, Canada
- City of Guelph
- Regional Municipality of Waterloo
- City of Waterloo

Oakland County, Michigan, United States
- Commerce Township
- Lyon Township
- Southwest Oakland Township

All have water systems operated by the Oakland County Water Resources Commissioner's Office

Reconnecting the Great Lakes Water Cycle
Components of Benefit-Cost Analysis

**Inputs**
- Demographic data
- Weather data
- Customer utility rates
- Water demand forecast
- Avoided utility costs
- Efficiency program information
- Energy data

**Outputs**
- Water savings
- Costs and benefits
- Impact to revenue and rates
- Greenhouse gas and energy reductions
What are Example Costs Associated with Water Conservation Programs?

• Cost of incentives
  – Rebates
  – Device Distribution/Installation
• Staff time
• Marketing and Outreach
What are Example Benefits Associated with Water Conservation Programs?

• Short-term
  – Water purchase costs (if supplied by wholesaler)
  – Variable water treatment costs
    • Energy costs related to pumping and treatment
    • Chemical costs

• Long-term
  – Avoid, Defer, and/or Downsize Expansion Projects
Community Characteristics

City of Waterloo, ON

Southwest Oakland Township, MI

Source: Google Earth. 2014.
Water Use Profiles

Region of Waterloo, ON
- Single-family: 35%
- Multifamily: 27%
- Other: 10%
- CII: 26%
- Non-revenue Water: 2%

Southwest Oakland Township, MI
- Residential: 81%
- Irrigation: 0%
- Commercial: 11%
- Non-revenue Water: 5%
Indoor Water Efficiency Programs Evaluated

- Toilet Replacements
- Toilet Flapper Replacements
- Clothes Washers
- Hot Water Recirculation Systems
- Voluntary New Home Specifications
- Residential Package Graywater Systems
- Pre-rinse Spray Valves
- Restaurant Certification
- Capacity Buyback Program
- Cooling Towers
- Site Visits
- Education
Outdoor Water Efficiency Programs Evaluated

- Landscape Surveys
- Weather Based Irrigation Controllers
- Soil Moisture Sensors
- Efficient Sprinkler Nozzles
- Residential Rainwater Harvesting
## Guelph, ON Costs and Benefits

<table>
<thead>
<tr>
<th>Activity Name</th>
<th>PV Cost ($)</th>
<th>PV ($) Benefit</th>
<th>NPV ($)</th>
<th>B/C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Flush Toilet Rebate, SF</td>
<td>$ 1,676,300</td>
<td>$ 12,068,155</td>
<td>$ 10,391,855</td>
<td>7.20</td>
</tr>
<tr>
<td>Royal Flush Toilet Rebate, MF</td>
<td>$ 525,400</td>
<td>$ 2,534,944</td>
<td>$ 2,009,544</td>
<td>4.82</td>
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<tr>
<td>Royal Flush Toilet Rebate, ICI</td>
<td>$ 55,800</td>
<td>$ 441,405</td>
<td>$ 385,605</td>
<td>7.91</td>
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<tr>
<td>Smart Wash Washing Machine Rebate</td>
<td>$ 1,333,250</td>
<td>$ 4,806,374</td>
<td>$ 3,473,124</td>
<td>3.61</td>
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<tr>
<td>Blue Built Home - Bronze</td>
<td>$ 329,280</td>
<td>$ 545,126</td>
<td>$ 215,846</td>
<td>1.66</td>
</tr>
<tr>
<td>Blue Built Home - Silver</td>
<td>$ 15,900</td>
<td>$ 21,487</td>
<td>$ 5,587</td>
<td>1.35</td>
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<tr>
<td>Greywater Reuse Systems</td>
<td>$ 21,000</td>
<td>$ 3,157</td>
<td>(17,843)</td>
<td>0.15</td>
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<tr>
<td>ICI Audit and Capacity Buyback Program</td>
<td>$ 967,395</td>
<td>$ 12,323,719</td>
<td>$ 11,356,324</td>
<td>12.74</td>
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<tr>
<td>Rainwater Harvesting System</td>
<td>$ 50,000</td>
<td>$ 7,264</td>
<td>(42,736)</td>
<td>0.15</td>
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<tr>
<td>Healthy Landscape Visit</td>
<td>$ 368,970</td>
<td>$ 36,022</td>
<td>(332,948)</td>
<td>0.10</td>
</tr>
<tr>
<td>Efficient Home Visit Surveys (GEL/NetZero City)</td>
<td>$ 229,505</td>
<td>$ 24,127</td>
<td>(205,378)</td>
<td>0.11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 5,572,800</strong></td>
<td><strong>$ 32,811,780</strong></td>
<td><strong>$ 27,238,980</strong></td>
<td><strong>5.89</strong></td>
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</tbody>
</table>
## Region of Waterloo, ON Costs and Benefits

<table>
<thead>
<tr>
<th>Activity Name</th>
<th>PV Cost ($)</th>
<th>PV ($) Benefit</th>
<th>NPV ($)</th>
<th>B/C Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>CII Tank-Type HE Toilet</td>
<td>$ 8,791</td>
<td>$ 124,655</td>
<td>$ 115,864</td>
<td>14.18</td>
</tr>
<tr>
<td>CII Valve-Type HE Toilet</td>
<td>$ 50,168</td>
<td>$ 94,846</td>
<td>$ 44,678</td>
<td>1.89</td>
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<tr>
<td>CII Laundromat</td>
<td>$ 12,900</td>
<td>$ 27,250</td>
<td>$ 14,350</td>
<td>2.11</td>
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<tr>
<td>CII Pre-Rinse Spray Valve</td>
<td>$ 22,170</td>
<td>$ 334,930</td>
<td>$ 312,761</td>
<td>15.11</td>
</tr>
<tr>
<td>Community Education</td>
<td>$ 1,290,042</td>
<td>$ 370,051</td>
<td>$ (919,991)</td>
<td>0.29</td>
</tr>
<tr>
<td>School Curriculum</td>
<td>$ 143,338</td>
<td>$ 32,530</td>
<td>$ (110,808)</td>
<td>0.23</td>
</tr>
<tr>
<td>Developer Incent: Hot W. Recirc System</td>
<td>$ 57,335</td>
<td>$ 61,771</td>
<td>$ 4,436</td>
<td>1.08</td>
</tr>
<tr>
<td>Developer Incent: RainW Harv. System Plumbed</td>
<td>$ 334,455</td>
<td>$ 38,147</td>
<td>$ (296,309)</td>
<td>0.11</td>
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<tr>
<td>Targeted User Prog: Education</td>
<td>$ 1,146,704</td>
<td>$ 1,390,991</td>
<td>$ 244,287</td>
<td>1.21</td>
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<tr>
<td>Targeted User Prog: Audit</td>
<td>$ 365,512</td>
<td>$ 495,456</td>
<td>$ 129,944</td>
<td>1.36</td>
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<tr>
<td>Targeted User Prog: Rebate</td>
<td>$ 401,346</td>
<td>$ 2,644,591</td>
<td>$ 2,243,245</td>
<td>6.59</td>
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<tr>
<td>CII Cooling Tower</td>
<td>$ 267,564</td>
<td>$ 168,968</td>
<td>$ (98,596)</td>
<td>0.63</td>
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<tr>
<td>Restaurant Certification Program</td>
<td>$ 121,837</td>
<td>$ 636,457</td>
<td>$ 514,619</td>
<td>5.22</td>
</tr>
<tr>
<td>CII Audit/Recommendations</td>
<td>$ 1,469,215</td>
<td>$ 3,498,394</td>
<td>$ 2,029,179</td>
<td>2.38</td>
</tr>
<tr>
<td>Developer Incent: GreyW. Recyc. System</td>
<td>$ 86,003</td>
<td>$ 4,496</td>
<td>$ (81,507)</td>
<td>0.05</td>
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<tr>
<td>Residential Rainwater Harvesting Rebate Outdoor Only</td>
<td>$ 157,672</td>
<td>$ 19,958</td>
<td>$ (137,714)</td>
<td>0.13</td>
</tr>
<tr>
<td>Toilet Flapper Replacement</td>
<td>$ 86,003</td>
<td>$ 158,866</td>
<td>$ 72,864</td>
<td>1.85</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 6,021,057</strong></td>
<td><strong>$ 10,102,358</strong></td>
<td><strong>$ 4,081,302</strong></td>
<td><strong>1.68</strong></td>
</tr>
</tbody>
</table>
## Oakland County, Michigan Costs and Benefits

<table>
<thead>
<tr>
<th>Activity Name</th>
<th>Commerce</th>
<th>Lyon</th>
<th>SW Oakland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B/C Ratio</td>
<td>B/C Ratio</td>
<td>B/C Ratio</td>
</tr>
<tr>
<td>Residential High-Efficiency Toilet Rebates</td>
<td>13.57</td>
<td>1.42</td>
<td>2.29</td>
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<tr>
<td>Residential High-Efficiency Clothes Washer Rebates</td>
<td>2.84</td>
<td>0.45</td>
<td>0.71</td>
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<tr>
<td>Residential Efficient Irrigation Nozzle Replacements</td>
<td>0.51</td>
<td>0.09</td>
<td>0.09</td>
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<tr>
<td>Residential Irrigation ET Controller Rebates</td>
<td>1.22</td>
<td>0.20</td>
<td>0.21</td>
</tr>
<tr>
<td>Residential Soil Moisture Sensor – Targets High Water Users</td>
<td>3.08</td>
<td>0.69</td>
<td>0.83</td>
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<tr>
<td>Large Landscape Surveys</td>
<td>4.27</td>
<td>0.74</td>
<td>0.77</td>
</tr>
<tr>
<td>Large Landscape Irrigation Controller Rebates</td>
<td>3.94</td>
<td>0.64</td>
<td>0.66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7.22</strong></td>
<td><strong>0.75</strong></td>
<td><strong>0.97</strong></td>
</tr>
</tbody>
</table>
What is the Financial Impact of Water Conservation and What about Rates?

- Reduces short-term costs
- Reduces long-term costs
- Sustains water resources
- Reduces sales volumes (and revenue if rates are not adjusted)
Westminster’s Story

- Citizens complained about being asked to conserve when rates would just go up anyway
- Westminster reviewed marginal costs for future infrastructure if conservation had not been done
- Since 1980 conservation has saved residents and businesses 80% in tap fees and 91% in rates compared to what they would have been without conservation
- Report posted at: [www.financingsustainablewater.org](http://www.financingsustainablewater.org)
Financial Instruments to Manage Revenue Risk
A new white paper explores opportunities for utilities to use financial instruments - such as derivatives, insurance and bonds - to manage weather-related revenue risk in an increasingly volatile climate.

Rates. Revenue. Resources.
Financing Sustainable Water is an initiative of the Alliance for Water Efficiency that was created to provide practical information to guide utilities from development through implementation of rate structures that balance revenue management, resource efficiency and fiscal sustainability. Headquartered in Chicago, the Alliance serves as a North American advocate for water efficient products and programs, and provides information and assistance on water conservation efforts. Learn More

FEATURED RESOURCES
- Case Study
  Budget-based Rates
- Case Study Hover Example
  New case study title here

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