Making Sense of Non-Energy Benefits: Results from the Weatherization Assistance Program

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OUTLINE

- Overview of Weatherization Assistance Program (WAP)
- Some Preliminary Ratepayer Cost Savings Results
- Some Preliminary Ratepayer Energy Savings Results
- Some possible benefits associated with climate change
What Is WAP?

- U.S. Department of Energy (DOE) provides grants to states and territories based on funding formulas
- States provide grants to local weatherization agencies
- Local weatherization agencies deliver services
- States/agencies leverage DOE funds
- WAP was established in the 1970s and is the U.S.’s largest residential energy efficiency program
WAP Production in 2008

- 54,121 single-family units
- 5,920 small multifamily (2-4) units
- 11,058 large multifamily (5+) units
- 14,998 mobile homes
- Funding: DOE - $233M; LIHEAP - $319M; Other $115M
- Most frequently installed measures: air sealing & insulation
Evaluation Goals

• Impact
  – Energy Savings: Measure gas, electric, fuel oil, and LPG savings
  – Cost Savings: Measure first year and measure life savings
  – **Non-energy Benefits**: client, economic, environmental, and ratepayer
  – Cost-Effectiveness: Energy and non-energy benefits

• Process
  – Administrative: Document how grantees and subgrantees implement the program
  – Field Process Study: Observe audits, installation, and inspections
  – Case Studies: Identify innovative approaches to weatherization
Framework for Understanding Non-Energy Benefits
Ratepayer Benefits

- Weatherization can have multi-faceted impacts on household budgets
- The result is that households often find it is easier to pay utility bills post-weatherization
- Utilities & ratepayers then benefit from reduced costs associated with arrearages and disconnections
- There are other impacts related to rate subsidies, and interest costs.
## Occupant Survey Findings

### Treatment (pre) to Comparison Survey

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>PreAudit Incidence</th>
<th>PostWX Incidence</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trade Offs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is hard or very hard to pay energy bills</td>
<td>74.6%</td>
<td>58.5%</td>
<td>-16.1%</td>
</tr>
<tr>
<td>Did not buy food to pay energy bills</td>
<td>33.2%</td>
<td>23.1%</td>
<td>-10.1%</td>
</tr>
<tr>
<td>Did not fill prescriptions to pay energy bills</td>
<td>27.5%</td>
<td>18.5%</td>
<td>-9.0%</td>
</tr>
<tr>
<td>Got disconnect notice</td>
<td>39.0%</td>
<td>32.6%</td>
<td>-6.4%</td>
</tr>
<tr>
<td>Had natural gas or electric disconnected</td>
<td>7.2%</td>
<td>3.4%</td>
<td>-3.8%</td>
</tr>
<tr>
<td>Wanted to use heat but was disconnected</td>
<td>2.7%</td>
<td>1.7%</td>
<td>-1.0%</td>
</tr>
<tr>
<td>Ran out of bulk fuel because could not pay</td>
<td>10.1%</td>
<td>6.2%</td>
<td>-3.9%</td>
</tr>
<tr>
<td>Paid less than the amount owed</td>
<td>46.0%</td>
<td>36.0%</td>
<td>-10.0%</td>
</tr>
</tbody>
</table>

All differences are statistically significant at the 95% confidence level
Ratepayer Benefits: Rate Subsidies

- Two thirds of WAP clients live in states with rate subsidy programs
- ~20% of WAP clients participate in electric or gas PIPP programs: in these cases most or all electricity and gas savings accrue to ratepayers
- ~10% of WAP clients participate in electric or gas rate discount programs: the discount of 25% accrues to ratepayers
- In PY2008, for single family homes, of the $184M (US) NPV of electric and gas savings, ~$41M accrue to ratepayers (~22%)
Ratepayer Benefits: Other Estimates

- Shutoffs only marginally reduced post-wx: 1%
  - ~ $15 benefit per job accrues to the client, $15 to the ratepayers

- Interest Savings on Arrearages
  - Can be charged to clients or subsidized by utility
  - ~ $15 benefit per job accrues to the client, $5 to the ratepayers
Energy Savings Benefits

- WAP provides utilities a path for low-income energy savings
- DOE urges states and agencies to leverage DOE funds
- Leveraged utility funds buys established program services:
  - Trained weatherization workforce
  - Whole house audits
  - Financial accountability with Savings-to-Investment Ratio test for potential measures
  - Energy savings can be estimated by climate zone, house type, and fuel type
SOME PRELIMINARY ENERGY SAVINGS RESULTS:

Natural Gas and Electricity Savings in Homes by House Type and Climate Region (PY 2008)

<table>
<thead>
<tr>
<th></th>
<th>Natural Gas Savings</th>
<th>Electricity Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SF</td>
<td>MH</td>
</tr>
<tr>
<td>National</td>
<td>17.8%</td>
<td>12.6%</td>
</tr>
<tr>
<td>Very Cold</td>
<td>17.8%</td>
<td>13.9%</td>
</tr>
<tr>
<td>Cold</td>
<td>18.5%</td>
<td>13.2%</td>
</tr>
<tr>
<td>Moderate</td>
<td>16.1%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Hot-Humid</td>
<td>19.6%</td>
<td>7.5%</td>
</tr>
</tbody>
</table>
Climate Change Benefits

- One can expect that utilities will be increasingly involved/included in climate change action plans

- Weatherization contributes both to mitigation and adaptation

- Mitigation is accomplished through energy savings

- Adaptation is accomplished by making homes less vulnerable to climate change events, such as heat waves

- Health-related adaptation benefits could be significant in reducing medical costs and mortality from hyper/hypothermia (~$270, $400, and $717 per job first year benefit, respectively)
Key Contributors

- Oak Ridge National Laboratory
  - Erin Rose, Beth Hawkins

- APPRISE, Inc.
  - David Carroll, Ferit Ucar

- Energy Center of Wisconsin
  - Scott Pigg, Claire Cowan

- Others
  - Michael Blasnik, Greg Dalhoff