Using Home Energy Scoring to Motivate Energy Improvements

Analysis of factors influencing consumers’ willingness to pay for energy-efficient home improvements

November 19, 2013, Behavior Energy and Climate Change Conference
Project Background

DOE Home Energy Score (researcher-modified version)

Home Energy Report

<table>
<thead>
<tr>
<th>Score</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address: 13 Bosworth Ct. Anytown, US 98765</td>
<td>Home size: 2,200 square feet (heated area)</td>
</tr>
<tr>
<td>Year built: 1972</td>
<td>Air conditioned: Yes</td>
</tr>
</tbody>
</table>

Your home's current score: 4

Uses more energy: 1, 2, 3, 4

Uses less energy: 9, 10

Your home with improvements: 9

Estimated 10 year savings: $10,875

The Home Energy Report is a national rating system. The Score reflects the energy efficiency of your home based on the home’s structure and heating, cooling, and hot water systems. The Recommendations pages show you how to improve the energy efficiency of your home to achieve a higher score and save money.

Assessment date: 08/09/2012
Scored in: 2012
Score ID: 1949325
Qualified assessor #: 101019
Experimental Design

Manipulated two factors

- Report type (decision environment)
- Housing condition (situational factor)

<table>
<thead>
<tr>
<th>Decision Environment</th>
<th>Report Type</th>
<th>Housing Situational Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control (No report)</td>
<td>Selling</td>
</tr>
<tr>
<td></td>
<td>Home Energy Score only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Basic Report (Score + High-level recommendations)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detailed Report (Score + Detailed recommendations)</td>
<td></td>
</tr>
</tbody>
</table>
Research Questions

How is WTP for home energy improvements impacted by a consumer’s:

- Decision environment (score & report detail)
- Housing situation (buy, sell, stay)
- Do-it-yourself (DIY) home repair preference
- Political affiliation
- Preference for tax incentives
- Preference for public availability of the Home Energy Score
### Survey Design

WTP for 5 energy-efficient improvements

<table>
<thead>
<tr>
<th>Question WTP Action</th>
<th>Avg. Cost</th>
<th>Savings /Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 25 CFLs</td>
<td>$100</td>
<td>$220</td>
</tr>
<tr>
<td>2. Two Smart Outlets &amp; Two Power Strips</td>
<td>$40</td>
<td>$80</td>
</tr>
<tr>
<td>3. Attic Insulation</td>
<td>$1,100</td>
<td>$450</td>
</tr>
<tr>
<td>4. Duct Sealing</td>
<td>$950</td>
<td>$380</td>
</tr>
<tr>
<td>5. Air Sealing</td>
<td>$1,400</td>
<td>$250</td>
</tr>
</tbody>
</table>
Survey Design

WTP questions in three formats:

- Yes/no

4. It will cost you about $950 to hire a professional contractor to seal and insulate the ducts in your home. If you have your ducts sealed and insulated, you will save about $380 each year on your utility bill.

Would you hire a contractor to seal and insulate your ducts for $950?

- Yes
- No
Survey Design

WTP questions in three formats:

- **Matrix**

4. It will cost you about $950 to hire a professional contractor to seal and insulate the ducts in your home. If you have your ducts sealed and insulated, you will save about $380 each year on your utility bill.

Would you hire a contractor to seal and insulate your ducts if the price was $ _______?

<table>
<thead>
<tr>
<th>$500</th>
<th>$650</th>
<th>$750</th>
<th>$850</th>
<th>$950</th>
<th>$1,050</th>
<th>$1,150</th>
<th>$1,250</th>
<th>$1,350</th>
<th>$1,450</th>
<th>$1,550</th>
<th>$1,650</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
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<td>No</td>
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</tr>
</tbody>
</table>
Survey Design

WTP questions in three formats:

- **Slider**

4. It will cost you about $950 to hire a professional contractor to seal and insulate the ducts in your home. If you have your ducts sealed, you will save about $380 each year on your utility bill.

Please move the slider to the MAXIMUM you would be willing to spend to have a professional come into your home and seal your ducts.

$0  
$1,800

0 200 400 600 800 1000 1200 1400 1600 1800

insulate and seal your ducts.
Survey Distributions

U.S. Panel (Qualtrics)
- Dispersed across U.S.
- 897 Valid Responses

CT Population (Self-selected)
- Early Adopters from DOE CT Neighbor to Neighbor grant
- 586 Valid Responses
- Same overarching results, but slightly higher WTP than U.S.
Repair Preferences

Unhandy
- Air Seal
- Ducts
- Attic
- Outlets
- CFLs

Handy (DIYer)
- Air Seal
- Ducts
- Attic
- Outlets
- CFLs

Handy preferences show a higher inclination towards Attic and Ducts compared to Unhandy. DIYers are more inclined to perform repairs themselves, as indicated by the taller bars for Attic and Ducts.
Political Affiliation

![Bar Chart]

- **Independent**
  - Air Seal
  - Ducts
  - Attic
  - Outlets
  - CFLs

- **Republican**
  - Air Seal
  - Ducts
  - Attic
  - Outlets
  - CFLs

- **Democrat**
  - Air Seal
  - Ducts
  - Attic
  - Outlets
  - CFLs

The chart compares energy costs associated with different political affiliations, with the y-axis representing the different affiliations and the x-axis showing costs ranging from $0 to $1,000.
Findings Discussion

No single factor affects consumers’ WTP

The decision process is influenced by many factors, such as:

- Heuristics/Associative Memory
- Anchoring Effects/Framing
- Evaluability
- Social Norms/Peer pressure
- Housing, Personal, and Market Characteristics

Artwork: Mark Wagner
Program Recommendations

- Test different framing options (words matter!)
- Increase understanding among all homeowners
- Consider the do-it-yourselfer
- Target home buyers and provide incentives
- Target Democrats and Independents as early adopters to gain traction
- Bundle incentives and rebates at the outset
- Make it public and develop social norms
Concluding Thoughts

- Choice decisions are fraught with emotion

- Labeling programs are helpful, but need a basis for understanding

- Audience considerations are critical

- Nudging factors - like tax incentives and public availability of the Home Energy Score - should be part of the policy discussion

Artwork: Mark Wagner
Any Questions?

BIG Thanks to:

Dan Ariely, Duke University
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(formerly Duke University)

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Artwork: Mark Wagner