Unlocking the Behavioral Wedge: Tools for Realizing Sustainable Energy Use Practices

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Managing an Invisible Resource
Buildings vs. Building Occupants

Studies of nearly identical units, occupied by demographically similar families, have reported large (e.g. 200-300%) variations in energy use. (see Lutzenhisser 1993)
Buildings vs. Building Occupants: A Story of a Military Demonstration Project

Standard military housing units used less energy than upgraded units. (Andres and Loudermilk 2010)
Buildings vs. Building Occupants: A Tale of Two Schools

Non-LEED schools have outperformed LEED schools as a result of occupant behavior. (Schelly and Cross 2010)

**Fossil Ridge HS:** LEED certified
- 2005: 6.95 kWh/ft²
- 2007: 6.24 kWh/ft²
- 10% decrease in kWh/ft² since opening in 2005

**Rocky Mountain HS:** Not LEED certified
- 2000: 9.62 kWh/ft²
- 2005: 7.11 kWh/ft²
- 2007: 4.79 kWh/ft²
- 50% decrease in kWh/ft² since 2000
The Scale of Savings

- **Dietz et al. (2009):** explores the potential energy savings from 17 household actions and suggests that a behavioral approach could save 123 million metric tons of carbon annually in year 10, representing 20 percent of household direct emissions or 7.4 percent of U.S. national emissions.

- **Laitner and Ehrhardt-Martinez (2009):** explores a more extensive list of household actions and finds potential energy savings of 22 percent reduction in household and personal transportation energy use over a 5 to 8 year period – roughly the equivalent of 9 quads per year.

- **Gardner and Stern (2008):** explores 27 household actions and concludes that energy savings of nearly 30 percent are possible.
Tools

Middle-Out Approach  TIME to Engage Communities

Targeting  Informing  Motivating  Empowering
Middle-Out Approach

Source: http://www.isixsigma.com/index.php?option=com_k2&view=itemlist&task=user&id=20128%3Amichaelcyger&limitstart=70
**TIME to Engage Communities**

- **Targeting**: looking past the averages to recognize the important patterns in your community and the diversity within (people, and actions)

- **Informing/Engaging**: helping people and communities to develop the capacity to be mindful of their energy.

- **Motivating**: using financial and non-financial mechanisms such as goals, norms, networks, commitments, and other mechanisms to turn intentions into behavior.

- **Empowering/Enabling**: removing financial and structural barriers, providing better choice sets, creating supportive communities.
Targeting

Don’t Assume – Do the Homework

- People-centered Initiatives – determine:
  - Community interests
  - current patterns of energy consumption
  - which actions are likely to yield the most savings and target a few
  - the actions that specific actors within a community must take
  - important sources of diversity across households, and how initiatives can address the variation across groups

- Community-targeted actions might include
  - Installing CFLs
  - HVAC tune ups and changing furnace filters
  - Setting/programming thermostats
  - Using fans instead of air conditioning
Informing

Provide information about energy consumption, technologies, programs, priorities, and amount of savings achieved.

Energy Consumption Feedback

Residential Feedback

Savings: 4-12%

Savings: 20%

Cisco Mediator
Informing

Average Household Electricity Savings (4-12%) Of Historical Programs by Feedback Type

- **Enhanced Billing**
  - Household-specific info, advice

- **Estimated Feedback**
  - Web-based energy audits with info on ongoing basis

- **Daily/Weekly Feedback**
  - Household-specific info, advise on daily or weekly basis

- **Real-Time Feedback**
  - Real-time premise level info

- **Real-Time Plus Feedback**
  - Real-time info down to the appliance level

**Annual Percent Savings**

- **“Indirect” Feedback**
  - (Provided after Consumption Occurs)

- **“Direct” Feedback**
  - (Provided Real Time)
Motivating

Look beyond financial incentives; Use Social Norms, Networks, Goals, Commitments, Competitions, etc.

Source: OPOWER
Empowering and Enabling

Removing financial and structural barriers, providing better choice sets, creating supportive communities

The Example of Choice Architecture:

• Choice architecture is about creating a context in which people are likely to make better decisions – decision that will make the choosers much better off, as judged by themselves. (Thaler and Sunstein 2008)
• Overcoming inertia and the status quo bias
• Hence, the BECC Low-Carbon Lunch Experiment
Empowering and Enabling

The 2009 BECC Low-Carbon Lunch

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<thead>
<tr>
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<th>ACEEE Conference Standard</th>
<th>BECC 2007</th>
<th>BECC 2009</th>
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</thead>
<tbody>
<tr>
<td>5-10% Vegetarian Lunch</td>
<td>5-10%</td>
<td>17%</td>
<td>80%</td>
</tr>
<tr>
<td>90-95% Meat-Based Lunch</td>
<td>90-95%</td>
<td>83%</td>
<td>20%</td>
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- Meat production is responsible for 18% of global greenhouse gas emissions (Pew Commission 2008)
- Omnivores contribute 7 times the GHG emissions of vegans
Applying the TIME Model

1. Evaluate what is important to your community
2. Assess current energy use practices
3. Select specific target behaviors
4. Set measurable goals
5. Get a commitment (make it public if possible)
6. Establish descriptive/injunctive norms
7. Model the right behavior
8. Provide support (community experts and resources)
9. Give regular feedback on progress (at the community and HH level)
10. Share the benefits with the community (community projects and lotteries)
Contact Information and Upcoming Events

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2012 Climate, Mind and Behavior Symposia:
Climate, Mind and Behavior, February 15 – 17
Climate, Cities and Behavior, April 25 - 27
Climate, Buildings and Behavior, May 23 - 25