ACEEE 30
30 Years of Energizing Efficiency

The Human Dimensions of the Growing Energy and Climate Imperatives

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Asking the Right Questions

- Physicist and now Princeton Emeritus Professor John Wheeler once commented:

"We shape the world by the questions we ask."

- Hence, if we are failing to ask the right set of questions, then we may very well end up with less than the best set of answers.

Some Opening Observations

- Energy efficiency is the farthest reaching, least-polluting, and fastest growing energy success story of the last 40 years.
- Energy efficiency has met 75 percent of the new demands for energy-related goods and services since 1970 while new energy supplies have met only 25 percent of those demands.
- But energy efficiency remains a highly invisible success story.
- At the same time, we are in the midst of an economic quandary that may be severely constrained by the energy and climate imperatives, as well as by growing demands from developing economies.
- Yes. . . “Science and technology can create much better choices.” (DOE Secretary Chu 2009)
- *But we won’t get there unless we bring people back into the process.*

Creating an Energy Revolution

A revolution doesn't happen when society adopts new tools, it happens when society adopts new behaviors.

Clay Shirky, Digital Guru

Examining the current scale of the behavior resource. . . .

Estimating the Behavioral Resource

- **Current Consumption Level:** Residential energy use and household use of personal vehicles = 38% of total U.S. energy consumption today.
- **The Question:** What is the scale of potential energy savings assuming people-centered approaches?
- **The Method:**
  - Identifying more than 100 separate conservation and energy efficiency measures (all cost-effective) that could be taken in a short period of time.
  - Apply a Monte Carlo probability simulation – allowing a random distribution of eligibility, participation, and saving magnitudes – we found an energy savings potential on the order of about 9 Quads compared to current use.

Categories of Household Behaviors that Impact Residential End Use

Cost \ Frequency of Action	*Infrequent*	*Frequent*
Low-cost / no cost	**Energy Stocktaking Behavior** Install CFLs Pull fridge away from wall Inflate tires adequately Install Weather Stripping	**Habitual Behaviors and Lifestyles** Slower Highway Driving Slower Acceleration Air Dry Laundry Turn Off Computer/Other Devices
Higher cost / Investment	**Consumer Behavior** New EE Windows New EE Appliances Additional Insulation New EE Car New EE AC or Furnace	

Source: Laitner, Ehrhardt-Martinez, and McKinney (2009)

Potential Near-Term Household and Personal Transportation Energy Savings

Category of Actions	Potential National Energy Savings (Quads)
Conservation, Lifestyle, Awareness, Low-Cost Actions	4.9 (57% of total savings)
Investment Decisions	3.7 (43% of total savings)
Total Energy Savings	~8.6 +/- 1.5 (22% of HH energy)

Source: Laitner, Ehrhardt-Martinez, and McKinney (2009)

How Much is 9 Quads of Primary Energy Savings Within the US?

- ~9% of total US energy consumption in 2008;
- ~600 gallons of gasoline equivalent per household;
- ~240 medium coal-fired power plants; and it is
- Roughly equal to the total annual energy consumption of either Brazil or South Korea, and just slightly less than total annual energy consumption in the UK (~10 Quads), France (~11 Quads) and Germany (~14 Quads)

The two big conclusions: (a) even these conservative estimates indicate that a people-centered approach can result in significant energy savings; but (b) it would require a very large shift in focus, policy, and effort if we are to engage and fully develop the behavioral resource.

And now, exploring the possibilities through feedback mechanisms. . . .

The New ACEEE Feedback Study

Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities

June 2010 --- ACEEE Report Number E105

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The teleconference news event is available online at:

http://www.aceee.org/press/e105pr.htm

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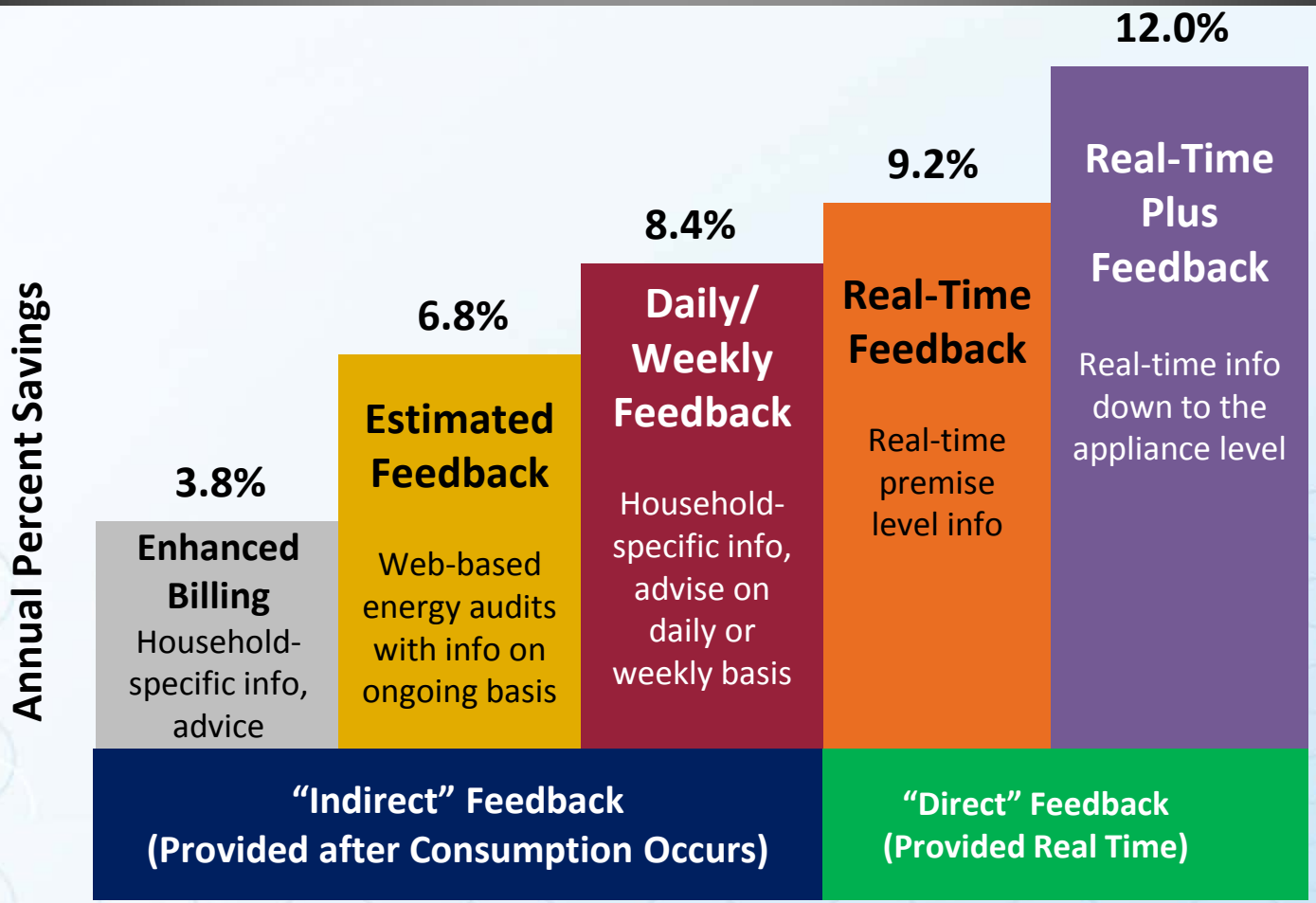
The Feedback Meta Review

An assessment of 61 primary research studies of 57 feedback initiatives:

- Several continents and 9 countries
- 21 studies 1974-1994 – What we call the “Energy Crisis Era”
- 36 studies 1995-2010 – What we call the “Climate Era”

Region	Number of Studies	Percent
United States	33	57%
Europe	13	22%
Canada	9	16%
Other	3	5%

Average Household Electricity Savings (4-12%) by Feedback Type*



*And yes, with persistent feedback there is persistent savings. . .

Exploring new strategies that might help get us there. . . .

Strategies to Catalyze Behaviors?*

- **Targeting:** scale, people, and actions
- **Informing:** consumers, producers, policies, and programs
- **Motivating:** norms, networks, goals and commitments
- **Empowering:** dissolution of the financial and structural barriers to provide and enable significantly better choices

***Source: Adapted from Karen Ehrhardt-Martinez**

Targeting: Scale, People and Actions

- A compelling vision, narrative, and images
- Community-based social marketing*
  - Home weatherization and deep retrofits
  - Smaller homes with greater amenities
  - From compact fluorescents to LEDs
  - Convergent, multifunctional electronics
  - Onsite power production and energy supply
  - Real-time and optimized production and consumption

*with ideas borrowed and adapted from Doug McKenzie-Mohr, Ph.D., McKenzie-Mohr & Associates Inc., http://www.cbsm.com.

Informing: Consumers, Producers, Policies, and Programs

On-Going Energy Consumption Feedback

The Energy Detective

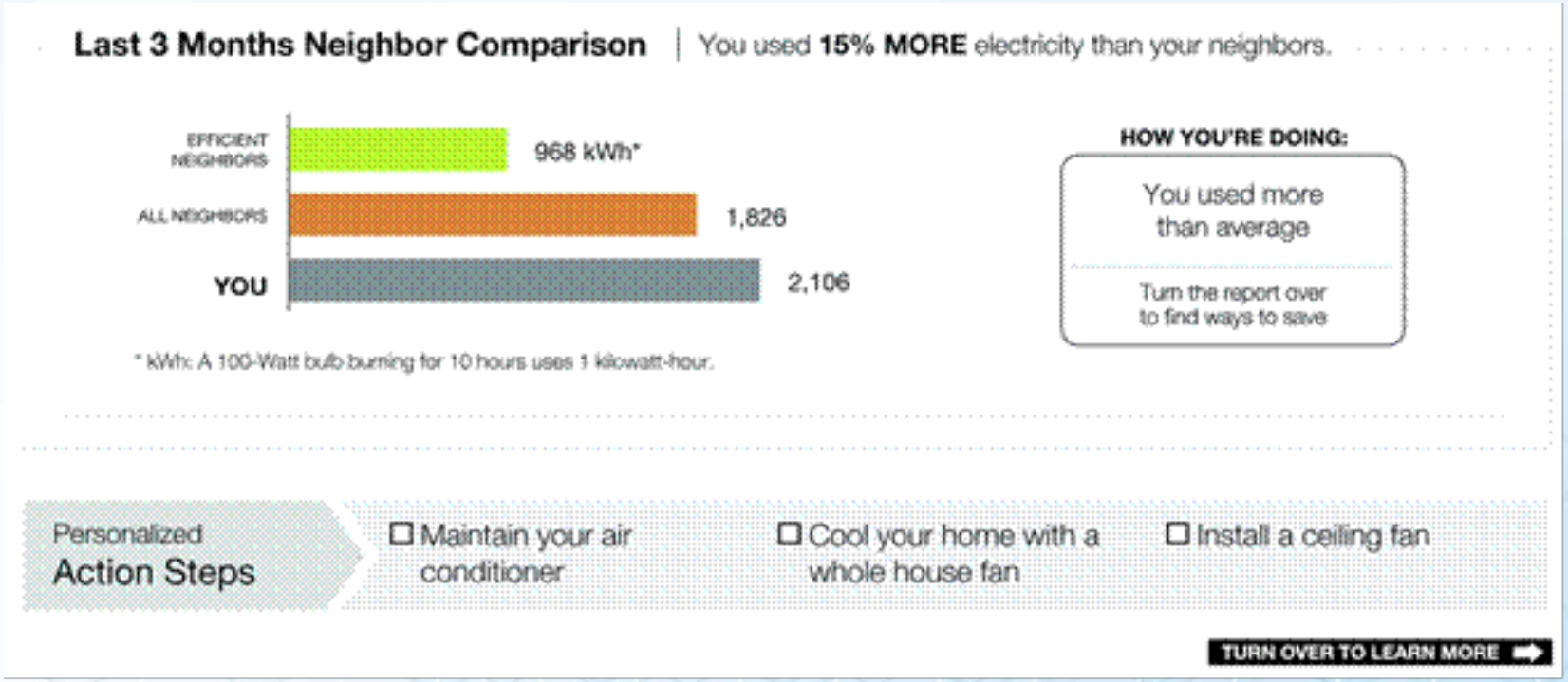
Savings: 5-15%

Savings: 20-25%

Cisco Mediator

Motivating: Norms, Networks, Goals, and Commitments

Communicating Social Norms



Savings: 2.5% today (much more tomorrow?)

Empowering: Removing Barriers to Provide and Enable Better Choices

- 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

The 2009 BECC Low-Carbon Lunch (the conference new default)

	ACEEE Conference Standard	BECC 2007	BECC 2009
Meat-Based Lunch	90-95%	83%	20%
Vegetarian Lunch	5-10%	17%	80%

- BECC is the Behavior, Energy, and Climate Change Conference (see www.BECCConference.org)
- Meat production is responsible for 18% of the global greenhouse gas emissions (Pew Commission 2008)
- Omnivores contribute 7 times the GHG emissions than vegans

Large Indirect Savings

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Finally, An Ace in the Hole?
Cialdini's Six "Weapons of Influence"

Perhaps six useful tools to integrate "friendly persuasion" into deep retrofit activities within entire communities:

- **Reciprocity:** people will repay favors.
- **Commitment and Consistency:** people will stick to commitments made publicly.
- **Social Proof:** people will do what other people do.
- **Authority:** people obey authority figures.
- **Liking:** people are more influenced by those they like.
- **Scarcity:** people desire what is perceived as scarce.

Source: Robert Cialdini, *Influence: The Psychology of Persuasion* (2007).

The Good News About the Transition to a More Energy Productive, Climate-Friendly Economy

- It is does not have to be about ratcheting down our economy;
- Rather, it can be all about:
  - using innovation and our technological leadership;
  - investing in more energy productive behaviors and technologies (including both existing and new opportunities); and
  - developing new ways to make things, and new ways to get where we want to go, where we want to work, and where we want to play.
- ***The opportunities for a robust, smart future are there – but revolutions don't happen without people***

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