

## Behavioral Techniques Guide

Use this guide in STEP 4 to apply behavioral techniques to your application concept.

Additional resources can be found here: <http://peec.stanford.edu/behavior/>

### BEHAVIORAL ECONOMICS, PSYCHOLOGY JUDGEMENT & DECISION MAKING LITERATURE

Principle	Definition	Example Applied to Energy Use
<b>First Cost Bias</b>	Later costs and savings are steeply discounted so that people make decisions mostly on up front cost	Purchasing energy inefficient appliances because they cost less up front
<b>Reciprocity</b>	People repay trust and gifts with high effort, sometimes even more so than if they are offered rewards that are contingent on the amount of effort produced	Give away reusable shopping bags along with a note asking for their help partnering to save energy
<b>Competition</b>	People seem to be more motivated by competition and rewards given to top performers rather than piece-rate rewards	Reward people who save the most energy, rather than a reward per 100kwh saved
<b>Sunk Cost Fallacy</b>	People become psychologically invested in costs that they have already paid, regardless of what the current costs and benefits are	This is why people often don't want to throw away their old refrigerator or their incandescent
<b>Defaults: Opt-out</b>	People tend to stick with the default option, so switching a program from opt-in to opt-out could have a large impact on program enrollment	Make enrollment in green energy programs and time of use pricing programs the default
<b>Defaults: Settings</b>	People tend to not switch away from default settings	Appliance manufacturers should set default settings to be energy conserving. E.g. new washing machines should come with the water setting on 'cold', new Xboxes should turn off after 2 hours of inactivity

<b>Defaults: Information / Choice Overload</b>	When faced with too much information or too many choices, people tend to do nothing and make no choices, thereby in effect choosing the default option. Too many choices thus exacerbates the opt-out effect.	Avoid giving too many energy saving tips; limit the number of different types of CFLs available; offer 4 packages of recommended weatherization tasks rather than 20 different weatherization options
<b>Choice Over Time</b>	People tend to value immediate benefits <i>much</i> more than they value future benefits, to an extent that seems unreasonable (i.e. to an extent that implies discount rates of up to 300%).	People are reluctant to pay the higher cost of an energy efficient appliance today even if it saves them money on electricity bills over the next few years. Government loans or asking people to commit to an energy goal can address.
<b>Goal Setting / Commitment</b>	Setting achievable goals and committing to an action can be very motivating to people.	Ask people to commit to a certain energy reduction percentage, or to commit to buying an energy efficient product the next time they purchase an appliance.
<b>Framing: Reference points</b>	People judge their well being relative to some reference point, which could be what they expect, what they have habitually experienced, or what other people are doing	Together with loss aversion, this suggests that, for example, information about a household's energy use should be presented relative to a goal of 10% energy reduction, or relative to households that use less energy.
<b>Framing: Loss Aversion</b>	People dislike losses <i>much</i> more than they like gains – framing something as a loss is more motivating than framing it as a gain.	Frame messages: "If you don't replace your old fridge, you will waste \$100 per year" might be a more effective message than "If you replace your old fridge, you will save \$100 per year"
<b>Framing: Percentage Bias, Mental Accounts</b>	People tend to separate purchases into separate mental accounts	Frame costs to be included in other, larger costs, e.g. if someone is already paying for a \$10,000 retrofit, suggest that they add on \$100 in new CFLS for all of their lights rather than suggesting it separately
<b>Bounded Rationality</b>	It is difficult for people to make complex calculations about present and future costs and benefits, because they have cognitive limits	2 extra mpg on a vehicle that currently gets 18mpg is much better than 2 extra mpg on a vehicle that currently gets 36mpg, yet many people think that it is the same.
<b>Public Goods:</b>	People are much more likely to contribute money or effort to a	Publish the names of everyone in a neighborhood along with

<b>Recognition</b>	public good if their actions are visible to others	their energy savings for that week
<b>Public Goods: Fairness</b>	People are more willing to contribute money or effort to a public good if they know that others also are contributing.	“Most of your neighbors have purchased solar panels for their homes in order to reduce emissions”
<b>"Herding"</b>	Something is good/bad because others indicate that it is	Many people standing in a line for something, will increase the likelihood that the next person walking by will want to join in
<b>"Self-herding"</b>	Something is good/bad because I've done it before	Buying coffee as Starbucks and become a Routine simply because you did it before and it felt good enough at that time (not necessarily because it makes you feel good this time)
<b>Anchoring</b>	We often base decisions on "anchor" values, regardless of their true value	A professor tells his class that he will be doing a poetry reading next week; half the class was asked if they would be willing to pay the professor \$10 to listen to his readings, the other half was asked if they would be willing to be paid \$10 to listen to the poetry. The anchor resulted in those that had the "pay the professor" side offered to give the prof money, whereas those in the "get paid by the prof" wanted to get money to hear the poetry
<b>"Free" is powerful</b>	"Free" things set off an emotional hot-button	One study found that if you offer high quality chocolate vs lo quality and the high quality is priced at 15 cents and low at 1 cent, most go for the high quality. If you set high quality price to 14 cents and low to free, then most take the low quality.
<b>Hot Emotions are powerful</b>	when experiencing strong emotions, pros and cons of rational thought play little influence	Comfort food eating; i.e., eating a lot of food when feeling down despite knowledge that it is a bad idea; engaging in risky sex in the heat of the moment.
<b>Procrastination</b>	A problem of inertia and emotions	Study example: Three classes given different levels of control over paper deadlines: one is told specific times for three drafts of the paper to be due, the second is told that they have three deadlines but can pick them, the third has complete flexibility and just has to get it in by the last day of class without penalty; results found that the class with the most predefined structure got the best grades
<b>Loss aversion</b>	People tend to strongly prefer avoiding losses rather than acquiring gains; with losses twice as powerful as gains	People would prefer to accept an option if it is avoid a \$5 surcharge rather than to receive a \$5 discount on the same item.

<b>Risk Aversion</b>	People tend to accept a lower but certain payoff rather than a larger payoffs that are less certain	People tend to accept \$50 guaranteed rather than a 50/50 chance of \$100
<b>Risk seeking behavior</b>	Individuals tend to take riskier options to avoid perceived loss	Let's Make a Deal after a person loses a larger sum off the board, they will likely start to become riskier at that point to try and make up the difference of their perceived loss.
<b>Controlling Expectations</b>	People react strongly to preconceived expectations	Study 1: One group was given a bottle of wine with a California label the other group received the same wine but in a South Dakota label. Results found that the "Cal" group enjoyed the wine more, enjoyed the dinner more, and stayed longer for the meal; Study 2: Offered the same medication, one at 50 cents a pill and one at \$5 a pill. The \$5 pill resulted in significantly better clinical outcomes, even though it was the same pill.
<b>Conscience framing</b>	People tend to act more ethically if they are given cues to be ethical	

Derived from Houde and Todd. "List of Behavioral Economics Principles."

## EFFECTIVE PRINCIPLES FROM ADDICTION RESEARCH

Theoretical Construct	Description	What it does	Intervention Examples
<b>Self-efficacy</b>	confidence in one's ability to do something (e.g., I'm 80% confident that I can walk 30 minutes a day)	consistently linked factor to physical activity engagement and maintenance	Setting goals that are slightly difficult but doable; increasing difficulty over time; Discuss potential barriers and make plans to deal with them
<b>Reinforcement</b>	A reward for doing a behavior	Over-time can develop complicated behavior routines	Training a dog works through reinforcement; give a dog food when they do what you want

<b>Reinforcement schedule</b>	A schedule on when a reward is paired with a behavior	Varying the reinforcement schedule from the beginning to end alters how strongly the behavior becomes	When starting a new behavior, behavior and reward should always be paired; over time the behavior and reward should be paired less and less so that the behavior happens without the reward; Video-games use this principle; whenever a character "level's up" it gets slightly harder to get to the next level
<b>Punishment</b>	A negative response to a behavior, meant to reduce the behavior in the future	If used correctly, can reduce engagement in unwanted behaviors; should be used judiciously	Punishment should be used sparingly when: a) predetermined rules about when a person would be punished are established; b) the punishment is perceived by individual as commensurate with the behavior. c) It is delivered <u>IMMEDIATELY AFTER THE BEHAVIOR</u> . The Super Nanny does a very good job with punishment when she does the "naughty" corner. In her technique, she establishes specific rules to be followed, if the child disobeys, they go in the "naughty corner" for a few minutes. If they get up before the minutes are up, the punishment gets longer. When the minutes are up, the parents asks the child to explain why they were in the naughty corner, once they do the parent gives them a hug.
<b>Classical Conditioning</b>	Pairing a stimulus that always creates a behavior with a neutral stimulus	Cues in the environment, over time can set off a behavioral routine.	This is really important in alcohol treatment work. Often times, certain friends, places, and even times of day have been temporally linked with drinking. In therapy, the patient is first asked to avoid the situations that are cues for drinking, later they engage in "extinction" of the pairing. This is done by bringing the patient to the place and then ensuring that they do NOT drink. Eventually the cue's strength weakens and the person can go. There is always the possibility of "spontaneous remission" though in which the cue's influence comes back full force even after extinction. The learning is more like a layer on top of previous learning rather than a replacement of old learning.
<b>Behavioral Routines</b>	"Auto-pilot"	Many behaviors, if done enough can be done with little or no conscious thought.	Creating routines by doing the same behavior during the same time of day, at the same location, with the same people (or alone), each time.

<b>Social Support</b>	encouragement/engagement of family friends in changing a behavior	It can be very helpful for predicting increased physical activity; it has also been shown to be a good buffer for stress (e.g., if someone is in a stressful situation, the stress does not affect their health as much if they have good social support).	Social Support is utilized in a few ways: Group sessions often utilize social support to function well; social support is also discussed in sessions, to gauge the supportiveness of a person's context for new behaviors (and if possible, to engage others in the behavior change process); Walking groups and neighborhood walking also developed; assertiveness training also sometimes part of treatment
<b>Modeling</b>	Teaching a behavior by showing it to someone rather than verbally explaining	Can be used well via "role-models" for good and bad behaviors; people tend to mimic actions of theirs	Therapists dealing with mental illness often do a lot of "modeling" of appropriate interpersonal behaviors within sessions; Therapists also use "role-plays" as a way to model behavior by having each person act out situations; for health promotion, modeling is done for showing proper exercise technique or by pulling in successful peers who have completed the task as a way to motivate others
<b>Social Norms</b>	what others are perceived to be doing	creates a strong nudge for specific behaviors	Campus campaigns (e.g., 70% of students don't drink); Towel reuse (e.g., one study was done that had difficult labels of specificity on the towel racks from 70% of people in this town put the towels back, to 70% in this hotel, to 70% of previous guests in this room, the framing of the numbers based on the room resulted in greatest change of behaviors.
<b>Maintenance</b>	Continuing to do a behavior after completing an intervention	It is very hard to create maintenance; it is a key problem in health behavior research	Techniques that have been tried: Relapse prevention, discuss likely scenarios after done and try to plan for them;
<b>Intrinsic vs Extrinsic Motivation</b>	The level to which a behavior is motivated by external factors (e.g., parent tells you to do it) vs internal factors (e.g., walking is rewarding to me, regardless of what others think)	Intrinsically motivated behaviors tend to result in better maintained behaviors	Interventions focused on increasing intrinsic motivation, Matt?

<b>Values</b>	Aspects of life that are important for an individual and give his/her life meaning (e.g., family, work, social justice, seeking truth, being wealthy, religion, ethics)	In Acceptance and Commitment Therapy, it is used as something to link any new behaviors to	Usually assessed via a self-report rank measure, or with asking something like "if you died, what would you like people to say about you and what you cared about"; health educator/therapist then works with patient to find links between behavior of interest and the value; another one is to identify a series of values and then identify specific behaviors that represent fulfilling those values; assign those behaviors
<b>Stages of change</b>	5-stages from the "Transtheoretical Model" Precontemplation (not thinking about behavior) Contemplation (thinking about it but not changing behavior) Prep (setting up a plan to change behavior) action (engaging in the behavior); maintenance (have been doing the behavior for a while)	Each Stage a person is in requires different information to be passed on; it gives a framework for giving appropriate information	Interventions are usually tailored to an individuals stage of change: Precont. people receive info about the pros and cons of behavior change but no push for goals; Contemplators - get a nudge towards setting goals and making plans; preparation - focused mostly on making specific actionable steps soon; action - reinforce positive behaviors and use graded goals for increasing self-efficacy; maintenance - reinforce and discuss relapse prevention strategies
<b>Outcome expectancy</b>	The perceived consequences and benefits of an action;	Useful as part of balancing out pros and cons to behavior-change	Decisional balance in which the pros and cons of engaging in a behavior and the pros and cons of not engaging in a behavior are put on a sheet and then discussed
<b>Ambivalence</b>	having mixed emotions about changing a behavior, part of the person thinks it is a good idea, part of the person thinks it is a bad idea	often results in inaction	Motivational interviewing (MI) was developed to target ambivalence. In MI, are assessed about their behaviors, results of the assessment are reported back, the therapist then takes a nonjudgmental stance; the therapist works to bring to the surface both sides of the equation and let the patient decide. Developed in substance abuse field but has grown into other areas.

Courtesy of Eric Hekler, U of Arizona

## KEY PRINCIPLES DERIVED FROM HEALTH BEHAVIOR CHANGE, APPLIED IN A COMMUNITY ORIENTED ENERGY INTERVENTION

Behavior Change Principle	Description
Self-efficacy	Belief in one's ability to perform a specific behavior and achieve the desired outcome. Self-efficacy can be enhanced through the four pathways described below.
Mastery experience	Successfully performing a behavior first-hand. Particularly enactive learning with feedback on performance. This improves one's ability to overcome barriers and fear associated with an action, to attain a resilient sense of self-efficacy, and to increase the likelihood of similar future actions.
Vicarious experience/Modeling	Observing a behavior carried out by another person and the outcomes that result. When the observer is similar to the model, the model successful at accomplishing the behavior, and the outcomes positive, then the observer's self-efficacy and likelihood of performing a similar action are boosted.
Persuasion	The process of encouraging or discouraging one towards action with verbal instruction, text, or images.
Physiological factors	Creating a positive perception of one's mood, affective state, or physiological arousal can improve performance. Shifting these states can also improve or impair attention, retention, and motivation associated with actions.
Key Learning Processes	
Attention	Attending or focusing on an action, message, or person performing the targeted action. This improves retention as well. Salient, attractive, personalized, and functional materials and activities can gain and maintain participants' attention.

Retention	Memory of which actions to change and how to change them. It is also important to recall the information at decision points and other appropriate times. Symbolic coding of information, visual demonstration, actual or imagined rehearsal, stories, and prompts and cues can assist with retention and subsequent recall.
Production	The conversion of concepts or thoughts into actions through actual or imagined rehearsal of behaviors, with actual guidance and feedback if possible. In practice, production is often implemented as role play scenarios and guided practice sessions with feedback.
Goals & feedback	Setting achievable, flexible, proximal, yet challenging goals and receiving feedback about individual and group performance facilitates behavior change.
Addressing barriers	The process of identifying, problem-solving, and removing obstacles to behavior change.
Behavioral Rehearsal	Practice of actions, real, imagined or vicarious, private or public.
Motivation	Drive to perform and persist at an action. This is influenced by the discrepancy between current behavior and desired behavior, positive and negative and internal and external outcomes or expectations that one believes will occur as a result of performing the action, as well as the factors below.
Values	Ethical, moral, or ideological beliefs that influence attitudes and self-expectations.
Competence	Accomplishing a task successfully builds competence and self-efficacy, enhancing motivating.
Challenge	A level of challenge that pushes existing skill levels but does not result in frequent failures enhances motivation.

Curiosity	Sensory curiosity (color, taste, sound, contrast) as well as cognitive curiosity (mystery, desire to understand information or events better) are motivating.
Choice & Control	Having perceived choice and control over one's environment, life events and actions is motivating, even in relatively inconsequential situations.
Context	Vicarious involvement with characters, events and activities in fictional, fantasy and other contexts is motivating, such as embedding actions in a game or story.
Community	Finding social meaning in identifying oneself or one's actions with desirable groups is motivating.
Cooperation & Competition	Cooperation among individuals within groups or teams and competition/ comparisons with other individual, groups or teams is motivating.
Premack Principle	A behavior that occurs reliably without intervention can be used as a reward for performing a behavior that requires intervention.

Published in: Marilyn Cornelius, Carrie Armel, Kathryn Hoffman, Lindsay Allen, Susan W. Bryson, Manisha Desai, Thomas N. Robinson. (2012). [Increasing energy- and greenhouse gas-saving behaviors among adolescents: a school-based cluster-randomized controlled trial](#), *Energy Efficiency*, July 2012.

## IDEAS FOR INFLUENCING BEHAVIOR, FROM DIFFERENT FIELDS OF STUDY

The below is excerpted from: Enernoc, Utility Solutions. (2013). Paving the Way for a Richer Mix of Residential Behavior Programs. Prepared by: Patrice Ignelzi, EnerNOC Utility Solutions; Jane Peters, Research Into Action; Katherine Randazzo & Anne Dougherty, Opinion Dynamics Corp.; Linda Dethman, The Cadmus Group; Loren Lutzenhiser, Ph.D., Portland State University. Prepared for: The California Investor-Owned Utilities: Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, and Southern California Gas.

Table 1. Ideas for Influencing Behavior Based in Cognitive Psychology and Cognitive Science

Broad Theoretical Concept	Specific Concept	Explanation of Concept’s Relevance to Energy Behavior
<b>Priming</b>	Positive & negative stimuli	A stimulus given prior to an offer than can lead householders to feel or act favorably or negatively to the offer. The stimulus can be as simple as a single word or a simple picture or as complicated as messaging or experiences.
	Conceptual priming	Information provided to activate representations in one area, such as a paragraph in an offer letter that activates “good” and “trustworthy” concepts. This activation can alter the meaning or importance householders place on a target behavior.
	Reducing negative stimulus	Householders may raise or lower thermostats based on feeling hot or cold, therefore reducing drafts or increased shading can minimize cue to change the thermostat.
	Associative priming	Providing a stimulus associated with positive EE behavior that can increase the probability of the behavior. For example, using “green imagery” on computer lock screens.
	Social cohesion—group inclusion priming	Using mimicry or a stimulus to induce a person to belong to a group. It can then highlight EE behaviors of that group.
<b>Decision Frame and Reference Dependence</b>	Inattention to target behavior or issues	Lack of interest in a target behavior that must be overcome before a desired change is affected.
	Saliency/relevance of issue or behavior	Perception that a behavior or technology is not salient or relevant, which must be overcome before a desired change is affected.
	Points of reference/comparison	A point of reference, such as the ENERGY STAR® label that makes it easier for householder to choose high-efficiency equipment.. What friends and family have/do can also serve as a point of reference.

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Metaphor &amp; Mental Space Theories</b>	Mapping concepts onto concrete images and understandings	Messaging about target behavior constructed to increase householder's understanding of its impact and importance and thus make the message more compelling; e.g., replacement of half of a household's lamps with LEDs would have comparable environmental impact to taking 500 cars off the road .
<b>Bounded Rationality and Decision Heuristics</b>	Anchoring	Similar to a point of reference, but uses alternative choices, such as the least expensive one, by which to judge the other choices.
	Recognition of target behavior	A behavior that seems foreign or outlandish is less likely to be adopted. Over time, with consistent messaging, the behavior can be recognized as normal and be adopted.
	Elimination (of choices so they are less overwhelming)	A strategy that makes decisions about choices more manageable, e.g., eliminating the most and least expensive options.
	Loss aversion	The tendency that people would rather avoid a loss than hope for a gain.
	Descriptive norms	Existing behavior patterns that reflect the descriptive norm.
	Cognitive capacity	Differences in householders ability to understand behavioral choices and weigh relevant trade-offs because everyone has limits to what can be retained in a decision-making context. This gives rise to decision heuristics.
	Ease and convenience	A target behavior that is inconvenient or difficult and thus is less likely to be adopted. If messaging shows how it can be easy to accomplish the behavior, adoption rates could be positively affected.
	Personal norms	How <i>we</i> think we <i>should</i> act.
	Fads/trends	Fads or trends that can affect willingness to adopt behaviors or technologies.
Subjective norms	A person's perception of social pressure about a behavior—how <i>others</i> think we <i>should</i> act.	

**Table 2. Ideas for Influencing Behavior Based in Social Psychology**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Theory of Planned</b>	Value of target behavior to person	How important the efficiency behavior is to the householder.

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Behavior</b>	Probable success of behavior	Sense that householder is part of a larger effort that makes a difference.
	Subjective norms	Perception of social pressure about a behavior—how <i>others</i> think we <i>should</i> act.
	Beliefs	Beliefs about target behavior and why one should or shouldn't engage in it
	Specificity	E.g., asking someone to conserve will be less successful than asking them to set the thermostat to 75° F in July
	Perceived behavioral control	The householder's perception of ability to take an action. A person may feel committed to energy efficiency but not be able to purchase appliances or CFLs because someone else in the family does this. Or the person may want the lights to be turned off when not in use, but others in the household will not cooperate
	Actual behavioral control	Different from perceived behavioral control in that the behavior in question may actually <i>not</i> be under his/her control.
	Self efficacy	A person may want the world to use less energy but does not feel his/her actions will make a difference or effect a change.
<b>Values-Beliefs-Norms (VBN)</b>	Worldviews/values	A common typology of energy-related world views that includes Humanistic Altruism, Biospheric Altruism, and Egosim. Biospheric values or world view would usually be associated with behaviors that are good for the environment.
	Personal norms	How <i>we</i> think we <i>should</i> act.
	Knowledge/Awareness	Awareness of lack thereof related to issues relevant to target behavior.
	Cognitive dissonance	Trying to make beliefs/actions consistent with one another, or making our beliefs consistent with those of others that we like or admire. E.g., if someone thinks of themselves as "green" and their non-green habits are pointed out, they may be motivated to change their habits.
	Personal Norms activated	Personal norms about how to act in certain situations that may not be felt relevant until a person or event points out the relevance, which activates the person's personal norms.
	Ascription of responsibility to self	The belief that using energy efficiently is a positive thing, but not feeling personal responsibility to do so.
<b>Attitudes-Beliefs-External Conditions</b>	Worldviews/values	See above.
	Awareness/ knowledge of consequences	Awareness about a behavior or the reasons the behavior is important.

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>(ABC)</b>	Personal norms	See above.
	Cognitive dissonance	See above.
	Perceived behavioral control	See above.
	Personal norm activated	See above.
	Ascription of responsibility to self	See above.
	External constraints on behavior	A person may be committed to energy efficiency but have external constraints on what can be done, such as certain building characteristics, or being a renter.

**Table 3. Ideas for Influencing Behavior Based in Neoclassical Economics**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Utility Maximization</b>	Constrained optimization and budgetary constraints	Consumers will choose the ideal product based on what they gain (happiness, end-use utility, energy savings) within their budgetary constraints; may be interested in using energy efficiently, but not have sufficient discretionary income to purchase efficient equipment
	Substitution effects	Customers choose less desirable, but more affordable, products and services to meet their needs. Rebates reduce the price differential between high-efficiency and standard-efficiency equipment, making the more desirable choice more likely.
	Income effects	As customers have more access to capital, they can buy more of anything, including energy-saving products, if that is what they value.
	Short-/long-term costs and benefits	Energy-efficient behaviors may have short-term costs and long-term benefits. How such costs and benefits are perceived can be important in decision making and can be influenced by program messaging
	Discount rates	Adjusts the value of future income; i.e., a dollar today is worth more than a dollar tomorrow. Thus, individuals require higher return in the future in exchange for sacrificing consumption now.

**Table 4. Ideas for Influencing Behavior Based in Behavioral Economics**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Time Inconsistency</b>	Discount Rates	Adjusts the value of future income, i.e., a dollar today is worth more than a dollar tomorrow. Thus, individuals require higher return in the future in exchange for sacrificing consumption now.
	Short-/long-term costs & benefits	Energy-efficient behaviors may have short-term costs and long-term benefits. How such costs and benefits are perceived can be important in decision-making and can be influenced by program messaging.
	Patience/impatience	If a new technology requires waiting (e.g. CFLs) for full return on investment, effectiveness, or quality enhancements, householders who are impatient are less likely to be willing to adopt it.
<b>Bounded Rationality &amp; Decision Heuristics</b>	Points of reference/comparison	A point of reference, such as the ENERGY STAR® label that makes it easier for householder to choose high-efficiency equipment. What friends and family have/do can also serve as a point of reference.
	Elimination of choices	A strategy that makes decisions about choices more manageable, e.g., eliminating the most and least expensive options.
	Loss aversion	The tendency that people would rather avoid a loss than hope for a gain.
	Risk aversion	Resistance to changing a behavior or purchasing a new technology because people don't want to take a chance on it not serving their needs.
	Anchoring	Similar to a point of reference, but uses an alternative choices, such as the least expensive one by which to judge the other choices.

**Table 5. Ideas for Influencing Behavior Based in Anthropology**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Culture as Webs of Meaning</b>	Actions as meaning	Actions are a result not of individual rational actors but are formulated in shared systems of value and meaning. Messaging should take account of and use these meanings
	Shared meanings	Culturally shared forms of value and meaning will influence individuals' acceptance of target behaviors

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
Linguistic Shifters	Words as indicators of social importance	Word choices that index individuals in existing social hierarchies. Language choices determine how one sees oneself in relationship to others in a culturally specific and established hierarchy of values and thus influence behavioral choices with respect to the individual's social position and values. Word choices in communications can be used deliberately to signal in/out group status, desired social actions, and expectations.

Table 6. Ideas for Influencing Behavior Based in Sociology

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
Relational Sociology	Symbolism	Symbolic power of target behavior in maintaining and advancing an individual's place in society.
	Social power	Social power of target behavior (other than symbolism) in maintaining and advancing an individual's place in society.
Life Choices & Chances	Chances	The idea that individuals' place in social hierarchies determines whether they can or cannot get products or services
	Choices	Perceptions of what options are available to the person within the constraints of chances (described above) or access.
	Importance	Relative importance of a target choice to individuals, largely determined by their social status and place in social hierarchies
Environmental Sociology	Lifestyle fit	How target behavior fits into energy-using lifestyles of individuals and social groups.
	Lifecycle stage	How the lifecycle stage of individuals' affects their view regarding the benefits of technologies and what messaging will be effective with them.
	Cultural meanings	Ethnic/cultural meanings of target behavior that can influence adoption; these can be important considerations in how messages about desired behavior are formed and targeted. This relates closely to Weber's webs of meaning in anthropology.
	Household dynamics	How target behavior fits into household dynamics will affect how quickly it is adopted versus resisted.
	Social constraints	How an individual's friends, family, and colleagues view a target behavior; social constraints on target behavior will affect adoption of behaviors or technologies .

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Social Exchange Theory</b>	Subjective costs & benefits	Subjective sense of cost-benefit of target behaviors. Costs and benefits are not perceived or experienced the same way by all people, which affects how costly or beneficial a target behavior is seen. This relates closely to Bordieu's theory of relational sociology.
	Fairness	Sense of fairness in what behavior is being requested compared to others.
<b>Social Stratification and Hierarchy</b>	Social class	Social class implications of behavior impact how easily or by what argument a behavior will be adopted. If energy conservation is viewed as something only high-income families can afford to care about, this will affect a household's willingness to adopt it.
	Economic class	Economic class implications of behavior (similar to social class implications)
<b>Labeling Theory</b>	Behavior labeling	How people relevant to an individual label a target behavior influences the individual's response to requests to change the behavior.
	Person labeling	Labeling of individual's engaging and not engaging in target behavior will influence how people respond to requests to change the behavior.
<b>Reference Group Theory</b>	Reference groups	Knowing the groups to which our target population aspires to belong can be used to influence behavior;. This is closely linked to Bordieu's intervention in relational sociology.

**Table 7. Ideas for Influencing Behavior Based in Legal Theories**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Obligations theory</b>	Sense of obligation	Activation of a person's beliefs about obligation toward target behavior.
	Values	Activation of a person's values associated with target behavior.
<b>Public good theory</b>	Benefits to society	Person's perception of the benefit of target behavior for larger society can be appealed to if present.
	Sense of cooperation	Activations of a person's sense of cooperation.
	Altruism	Appeal to a person's sense of altruism regarding target behavior.

**Table 8. Ideas for Influencing Behavior Based in Macroeconomics**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Classical Economics</b>	Demand and supply of products and services	Energy-efficiency products and services will be supplied and new ones introduced if providers see conditions as profitable. Consumers will demand these products (e.g., use rebates to buy efficient technologies) and services (e.g., maintenance) as long as they realize benefits, either in terms of financial savings or increased satisfaction.
	Fiscal policy	Government policies and regulation of energy prices directly affect individual decision-making involving energy investment and energy consumption.
<b>Keynesian Economics</b>	Monetary policy	Federal Reserve policy sets interest rates that can encourage (if low) or discourage energy-efficiency investment by firms and consumers.
	Short-/long-term costs and benefits	Government-funded energy-efficiency programs can influence individuals' perceptions of costs and benefits, through up-front incentives and other mechanisms
<b>Neoclassical Synthesis</b>	Fiscal policy	See above.
	Monetary policy	See above.

**Table 9. Ideas for Influencing Behavior Based in Diffusion of Technology Theories**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Diffusion of Innovations</b>	Compatibility of innovation with individual's attributes	Compatibility of energy behavior, e.g., sophisticated technology may not be compatible with people who are uncomfortable with technology and therefore will not accept it.
	Awareness/ knowledge of innovation	Awareness or knowledge of an innovation that must necessarily precede an individual's action to accept the innovation.
	Cognitive dissonance	Trying to make beliefs/actions consistent with one another, or making our beliefs consistent with those of others that we like or admire. E.g., if someone thinks of themselves as "green" and their non-green habits are pointed out, they may be motivated to change their habits.
	Visibility of technology	If a technology is not often seen, it will take longer for it to be tried and accepted.
	Trialability of technology	If the technology can be tried without much investment, it will be accepted more readily if it meets

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
		needs.
	Descriptive norms	Existing behavior patterns.
	Social learning	Learning new behaviors by observing others doing the target behavior.
<b>Hierarchy of Effects and Stages of Change</b>	Social learning	See above.
	Economic rewards for doing target behavior	Financial rewards offered to encourage the target behavior; a concern is that unless the rewards continue, the behavior may stop.
	Social rewards for doing target behavior	Social approval that can encourage a behavior; though when the behavior is invisible or when social approval is no longer experienced, the behavior may stop.
	Intrinsic rewards (altruistic) from target behavior	Rewards that are experienced internally; these can involve feelings of mastery or altruism or other types of satisfaction. Behaviors that engender these kinds of rewards are less susceptible to cessation.
<b>Technology Acceptance Model</b>	Knowledge/Awareness of innovation	Awareness or knowledge of an innovation that must necessarily precede an individual's action to accept the innovation.
	Personal utility of innovation	An innovation meets people's needs by saving money or other rewards and thus is more likely to be accepted.
	Convenience and ease of innovation	How convenient or easy it is to perform or use an innovation, which affects likelihood of adoption.
<b>Sociotechnical Systems</b>	Compatibility of behavior/technology with individual's attributes	See above.
	Conformity of behavior/technology with political-legal context	An innovative behavior or technology goes against the law or a political force is less likely to spread quickly.
	Conformity of behavior/technology with cultural context	An innovative behavior or technology that goes against the dominant cultural understandings of what is right is less likely to spread quickly.
	Capacity to adopt a behavior	E.g., lack of access to credit, contrary habits, or rental status will work against adoption of some behaviors and purchases.

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
	Concern	Concern about target behavior & related issues, including technology performance, that can work against acceptance. Conversely, concern about the size of one's energy bills can encourage behavior change.
	Constraints	Financial, building, or time constraints, for example, that can keep households from installing energy-efficient measures.

**Table 10. Ideas for Influencing Behavior Based in End-User Studies**

Theoretical Model	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Material Satisfaction Model</b>	Meeting functional needs of individual	If a product or behavior performs the functions that the person needs, it is more likely to be adopted.
	Satisfaction with features	Satisfaction with the features of a product holds a high priority in the purchase decision.
<b>Emotional Satisfaction Model</b>	Meeting expectations of performance/outcome	Perhaps more important in determining emotional satisfaction than actual performance is whether expectations for the performance or outcomes is met. .
	Meeting functional needs of individual	See above.
	Satisfaction with features	See above.
	Physical setting of use/behavior	The surroundings for the target behavior or product use have an impact on satisfaction.

**Table 11. Ideas for Learning Theory and Cybernetics**

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
<b>Learning Theory</b>	Positive reinforcement	Favorable events or outcomes that are presented after the behavior such as a reward or public acknowledgement of the desired outcome.
	Negative reinforcement	The removal of an unfavorable event or outcome after the behavior. In these situations, a response is strengthened by removing something unpleasant, such as a higher electricity rate.

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
	Punishment	The presentation of an adverse event or outcome that causes a decrease in the behavior it follows. For example, late fees or penalty fees are a form of punishment.
	Feedback	Includes reinforcement and punishment (as above), or information about one's current behavior and its consequences. Receiving any or all of these and other types of feedback or information can help change behavior.
	Social learning	Refers to learning through observation of others' behavior.
Cybernetics	Feedback loop	Describe the process of self-modifying systems wherein a trigger (information or behavior) modifies the information or behavior in the system. In energy, the simplest feedback is the bill, which may or may not serve as a trigger to modify household behavior.
	Information	Information supplied to end users in an attempt to control/modify their actions to benefit the system. Information is a central component of cybernetics theory as it applies to energy.

Table 12. Ideas for Influencing Behavior Based in Design and Environmental Psychology

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
Perceptions of Space	Aesthetic value	The aesthetics of a product or behavior are important to its appeal
	Symbolic meaning	Products and behaviors that communicate to others a high or desired status will be more readily adopted.
	Physical setting of use/behavior	The physical setting of the product or behavior, which communicates something about its desirability and can affect how individuals view and accept it.
System of Objects	Functional needs related to target behavior/technology	The need for a particular function, which will, of course affect willingness to adopt the behavior/technology.
	Economic value of target behavior/technology	The need to achieve economic effects, which affect willingness to adopt the behavior/technology.
	Symbolic meaning of behavior/technology	What the behavior symbolizes about those who perform it or what the technology symbolizes about those who use it.

Broad Theoretical Concept	Specific Concept	Explanation of Concept's Relevance to Energy Behavior
	Social value	Prestige, status, brand, and what it communicates about those who use the product or perform the behavior.