Continental Automated Buildings Association (CABA)
Energy as a Managed Service
Phase 3: Quantitative Consumer Opportunity Assessment
United States Final Full Draft Report
January 12, 2011

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Background & Objectives

Overview

Traditionally, energy has been low interest product category, but there is an opportunity to redefine the delivery of residential energy in this new era of fast-rising prices and advanced Internet networking technology. Providing energy as a managed service (EMS) potentially broadens the scope of energy product/service offerings and allows for the redefinition of the customer relationship. With the advent of network-enabled smart appliances and home systems, homeowners can potentially better understand and control their energy use and reduce their energy consumption and monthly bills.

Sponsoring members of the Continental Automated Buildings Association (CABA) collaborative Research Program sought to better understand homeowner opinions and attitudes about and implications for energy as a managed service for the home. To this end, sponsor companies contracted with POCO Labs to execute a three-phase research engagement exploring energy management topics with the most natural initial target market: homeowners aged 25 – 64 with broadband Internet access and a minimum household income of $50,00. Sponsors developed the goals and objectives for this project along with the specific areas of interest to explore and test with consumers.

The following phases were executed; P3 outcomes are described in this report and P3 Canada findings are presented in a separate report.

Phase 1 Development of use case/scenario example concepts as directed by project sponsors.

Phase 2 In-depth interviews with 48 U.S. and Canada homeowners about household energy habits, awareness of energy usage, EMS concepts, exploration of use case/scenarios.

Phase 3 Quantitative survey among a large representative sample of broadband Internet households in the U.S. and Canada, addressing residential energy usage and EMS topics as further defined and expanded in P2 research.

Background & Objectives

Specific research objectives for this study include the following:

Reaction to EMS Concepts

- Measure the appeal of the Energy as a Managed Service concept, as well the appeal of as several EMS components (EM application, EM device, energy audit, smart plug, EM appliance/home system, independent rating organization for EMS devices and receiving energy usage data from comparable homes).

Purchase Considerations

- Determine acceptability of utility companies, appliance manufacturers, and retail stores as providers of EMS products/services;
- Understand which appliances/home systems homeowners desire in EMS-enabled form, as well as the anticipated price premium for "smart" appliances/home systems;
- Among two-partner households, determine which spouse will take the lead in shopping for and learning about EMS products/services; and
- Assess interest in an independent rating organization for EMS devices.

Time of Use Pricing (TOU)

- Measure receptivity to Time of Use pricing, along with homeowner expectations about how they expect they would change their household habits, and how much money they would expect to save as a result of those changes; and
- Among current TOU customers, document their experiences with TOU pricing.

Phase 3 Summary Approach

Research Objective Continued

Conservation & Energy Management Attitudes

- Measure the degree to which interest in Energy Management Services is correlated with a desire to save money, and with a desire to reduce energy consumption for environmentally-friendly reasons.

EMS Market Segmentation

- Identify and quantify the size of market segments based on their ability to correlate with interest in adopting EMS products/services.

A 24 minute online survey was conducted nationwide in both the U.S. and in Canada, with a representative sample of 2,989 broadband Internet households in the U.S., and 718 equivalent households in Canada. The survey was conducted from November 23 –December 8, 2010.

Respondents are members of an online market research panel and met the following criteria:

- Own a single-family home;
- Are between the ages of 25 – 64;
- Have a minimum household income of $50,000 (median household income in the U.S. is $53,000); and
- Are solely or jointly responsible for managing and paying utility bills for the household.

The margin of error for a sample of **2,989 (U.S.) is +/- 1.8% at the 95% confidence interval**. That is, 95 out of 100 times the results obtained from the sample fall within 1.8% of the results that would have been obtained if we had surveyed the entire population.

The results are projectable to the population of **U.S. broadband Internet households** aged 25 -64 with incomes of $50,000 or more.

Demographic Profile of Respondents

The online sample closely matches the demographics of broadband households age 25 – 54 with a minimum household income of $50K.

U.S. Broadband Households $50K+ Age 25-64			U.S. Sample (n=2,989)
Age	25-34	24%	17%
	35-44	33%	25%
	45-54	25%	32%
	55-64	18%	25%
Marital Status	Married	75%	84%
Children in HH	Yes	47%	46%
Income	$50K-$74K	36%	24%
	$75K-$99K	25%	30%
	$100K-$149K	23%	35%
	$150+K	16%	11%

Source: Pew Internet & American Life
April 2009 Economy Survey

Reaction to EMS Concepts

As found in P2 research, the concept of Energy as a Managed Service (EMS) is **appealing to the great majority of homeowners.**

- 57% give the concept a **top-2 box score** for likeability, and 53% agree strongly that it's designed "for people just like me."
- If available at a reasonable price, **44% would probably or definitely get EMS**.
- These scores indicate a very high receptivity to EMS.
- The broad EMS concept is **significantly more likeable to current TOU customers** (top-two box score of 62% vs 55% among non-TOU customers).
    - It's likely that homeowners who pay Time of Use pricing have a better awareness of their energy usage because they see their peak and off-peak usage patterns in the monthly bill. **When homeowners know the differential between peak and off-peak prices and pay accordingly, the benefits of EMS are easy to see.**

Interest in using EMS is **equally high regardless of the size of potential price hikes** in energy.

- Respondents were presented with a future scenario in which energy prices were predicted to rise by either 10%, 20%, or 30% by 2013 (the rate of increase was randomly chosen for each).
- Likelihood to find EMS likeable and to get it was **consistently high for all three proposed futures**. That is, EMS is **very appealing** if prices increase only by 10% by 2013. This is a **strong indication** that homeowners have already reached **their limits for price increases** and will be ready to get on board once EMS products and services are widely available. There aren't hold-outs who are willing to absorb 20% and 30% price hikes before considering EMS.

EMS is **equally likeable** regardless of average residential electricity costs.

- States were divided into low, medium, and high electricity costs based on 2010 kWh per hour prices. Homeowners residing in low and medium cost states **like EMS just as much** as those who live in high cost states.

All regions in the U.S. like EMS equally.

Reaction to EMS Concepts

Established by project sponsors as evaluated in P2 qualitative research, six components of an EMS system were presented for homeowners' consideration. **All are considered highly likeable**, with top-2 box scores ranging from 57% to 71%:

- Smart Thermostat (71%)
- Energy Manager Application (67%)
- Energy Audit (65%)
- Smart Plug (61%)
- Energy Manager Device (59%)
- Smart Appliance or Home System (57%)

Of these, **several are significantly more likeable** to homeowners who pay **Time of Use** pricing for their energy:

- EMS application
- EMS device; and
- a smart appliance or home system.

On an Energy Management application, homeowners expect the most useful data sampling rate will be **cost per day**, although per month and per hour data are also preferred by some.

The notion of getting aggregate data from **similar homes** as part of the EM app is **of moderate but not high** likeability. The idea got **a lukewarm reception** in P2 research as well.

Purchase Considerations

In P2 research, consumers expressed that a natural conduit for EMS products and services would be their energy utility company. The P3 quantitative research bears this out.

- About half (53%) say they would "absolutely" or "most probably" consider getting EMS products and services from their **energy utility**. For appliance manufacturers and retail stores, expression of **strong consideration is much lower** (23% and 19% respectively).

While homeowners in P2 qualitative research said they'd want to "start small" with one or two EMS components, data from P3 respondents indicates that **there will be a market for larger EMS product/service bundles** as well.

- In fact, about one-quarter (27%) put together a bundle of 4-5 items, and another 28% made bundles of 6 or more EMS items.

Respondents showed the **greatest interest in putting together bundles that included HVAC**. They rightly assume that controlling aspects of HVAC will result in the **greatest impact** on their energy costs.

- The most popular items as part of a bundle (which always included the EMS application) are an EMS device (62%), a thermostat (61%), a smart plug (52%), air conditioning (40%), water heater (40%), and furnace (38%).
- **Chosen least often** are a range or cooktop (11%) and an oven (11%).

Homeowners expect that EMS-ready appliances and home systems **will cost more** than standard ones.

- Just a handful (2% - 5%) say that the "smart" version won't cost more .
- **The premium for EMS capabilities varies from an extra $51 (average) for a smart thermostat, to an extra $223 (average) for a smart furnace; and for appliances - between $107 and $144 based on specific unit types.**

When buying a new appliance, homeowners want **an independent rating** for EMS return on investment.

- When asked to choose between similar/equivalent models of a new appliance purchase, 70% prefer the one that's been tested and rated, compared to the unrated appliance that costs 10% less.

Time of Use Pricing

In P2 research, homeowners said they want a better understanding of their energy use. Most aren't aware of how much energy they use and how much it costs, regardless of their involvement in paying the bill.

There is ample evidence in the P3 research that many **homeowners don't attend** to the details of their utilities.

- When asked if they had TOU pricing, **a very substantial 40% simply didn't know**.
- To a lesser degree, **26% of homeowners don't know** if their utility has installed a "smart meter."
- About **one-third use Auto Pay** for electricity, gas, or both, making it easy for these homeowners to be **in the dark about their energy consumption.**

In the in-depth P2 interviews, homeowners said that EMS would definitely change their behaviors due to awareness and options to engage. **This expectation is evident in the P3 research too.**

- We used Time of Use pricing as the Energy Management Service in order to solicit assumptions about how behavior/energy usage might be affected.
    - Fully one-third (34%) of homeowners who **don't have TOU now expect to dramatically change their household habits with TOU,** while 43% would change their habits a "moderate" amount.

Have current TOU customers changed their habits since the introduction of Time of Use pricing? Yes, but slightly less than that predicted by future TOU customers.

- In TOU homes, 21% say they've changed their habits "a lot" or "a great deal," while a comparable **44% say they've made "moderate" changes.**

Time of Use Pricing

When TOU pricing goes into effect, many homeowners expect **considerable savings** .

- About one-quarter expect to save up to 10%. 37% predict saving between 11-20%, and 27% believe they'll save 21-30% on monthly energy costs. **It will be important to manage consumer expectations as TOU pricing is introduced in new locales.**

Some but not all current TOU customers seen savings as a result of TOU pricing.

- 37% say their bills are lower with TOU pricing, while **39% find they pay about the same amount as before**. One-quarter (24%) **see higher bills with TOU pricing; especially residents in Western states (34%).**

Most frequently, homeowners say they will **shift use of the dishwasher, dryer and washing machine**, with TOU pricing.

About one-quarter (26%) predict they will shift their use of **the furnace most/all of the time**.

- **Among current TOU customers, about one-third of dramatically changed their habits for using the dishwasher, dryer and washing machine. About one-third report shifting their furnace and AC usage most/all of the time.**

Conservation & Energy Management Attitudes

The primary motivations for getting and using EMS are **money-related, not environmental**.

Homeowners want to **save money and better manage** the budget.

Among the other reasons tested to use EMS, the most popular is **"conserving natural resources."** This idea is roughly twice as popular as "preserve our country's natural areas and wildlife" and "to help reduce climate change."

- Although "saving money" is the primary motivation for using EMS, the **homeowners who are most likely to get EMS are significantly more likely to engage in what might be considered environmentally conscious behaviors**.

- In the past five years, EMS adopters are **significantly more likely** than non-adopters to have:
    - Replaced regular bulbs with CFLs, LEDs;
    - Bought an energy-efficient appliance;
    - Recycled or donated computer, cell phone;
    - Installed a low-flow shower head or toilet; and
    - Switched to reusable grocery bags.

EMS Market Segmentation

Based upon attitudes about energy consumption, conservation, and climate change, self-reported conservation behaviors, and motivations for adopting EMS, the market consists of five unique segments:

- ***Family First*** (9%) – Moderate likelihood to get EMS;
- ***Comfort and Convenience Seekers*** (19%) – Low likelihood;
- ***Active Conservationists*** (19%) – Highest likelihood;
- ***Climate Change Skeptics*** (24%) – Low likelihood; and
- ***Practical Conservationists*** (29%) – Moderate likelihood.

All segments, first and foremost, are interested in EMS because they want to save money on their energy bills. But each segment **differs in their secondary motivations** for getting EMS.

- ***Family First*** want to improve their children's future, to be good stewards for religious reasons, and to strengthen security by reducing reliance on foreign oil. These are nearly as important as saving money.
- ***Comfort and Convenience Seekers*** want to save money and manage the budget better. These are twice as important as any other motivation.
- Besides saving money, ***Active Conservationists*** want to conserve natural resources and preserve natural areas
- Other than saving money and managing the budget, ***Climate Change Skeptics*** want to reduce dependence on foreign oil. This large segment (24%) has a lower likelihood to get EMS.
- ***Practical Conservationists*** want to conserve natural resources, improve their children's future, and preserve natural areas about equally (with saving money and budgeting being first and second motivations).

Conclusions & Recommendations

Reaction to EMS Concepts

Broadband households are **ready to adopt EMS now**, regardless of the size of future energy price increases.

Energy as a Managed Service **was very well received**, as were all EM components (smart thermostat, energy manager application, energy audit, smart plug, energy manager device, smart appliance or home system).

Purchase Considerations

Energy companies should **take the lead public role** in presenting EMS items for sale. Homeowners are far more inclined to buy EMS from their energy utility than from either appliance manufacturers or retail stores.

EMS bundles should include the most popular items: an EMS control device, a smart thermostat, a smart plug, and an energy audit.

Assume that **both the male and female** head of household will shop for and make decisions about EMS items.

Consider the marketing value of **an independent rating organization** for EMS devices. Tested and rated appliances will sell better than those without the rating sticker.

Conclusions & Recommendations

Time of Use Pricing

It will be important to **manage consumer expectations** as TOU pricing is introduced in new locales. Many homeowners will expect considerable savings by shifting their energy usage to off-peak times of day.

Three-quarters believe their energy costs will drop by more than 10%. At the same time, homeowners plan to change their habits a "moderate" amount (43%), or a lot/a great deal (34%). **Will their actual behavior match up with their expected cost savings?**

Expect three appliances to be an "easy sell" for EMS: **dishwasher, washing machine, and dryer**. Homeowners are **very willing** to run these appliances during off-peak hours.

Conservation & Energy Management Attitudes

Two phrases neatly encapsulate homeowner thoughts about climate change and Energy as a Managed Service**: "Save money", and "conservation."** EMS should be marketed with these ideas in mind.

Saving money and better managing the budget are the top reasons homeowners cite for getting EMS, and their thoughts about reducing energy usage and environmental impact **favor the objective and frugal tone of "conservation."**

Note that 45% of all **homeowners strongly identify with the idea** that "conserving energy now is an important investment in our future."

Conclusions & Recommendations

EMS Market Segmentation

All segments are interested in EMS because **people want to save money and manage their budgets**, but the ordering of priorities after those two **varies by segment**.

Practical Conservationists (29%) want to conserve natural resources, improve their children's future, and preserve natural areas about equally.

Climate Change Skeptics (24%) think the best reason to get EMS is to improve our security with less dependence on foreign oil. But really, they just want to save money.

Comfort and Convenience Seekers (19%) are also motivated by savings. Other factors don't matter to them.

Active Conservationists (19%) want to conserve natural resources and preserve natural areas (and save money).

Family First (9%) want to improve their children's future, to be good stewards for religious reasons, and to strengthen security by reducing reliance on foreign oil (and save money).

A broad marketing campaign for EMS adoption should **stress saving money and a frugal "conservation" mindset**, to appeal to all segments.

Households & Energy Usage

Primary Fuel Source	NE A	Midwest B	South C	West D
Electricity	6%	13%	52%[ABD]	29%[AB]
Oil	32%[BCD]	1%	2%	1%
Gas	55%[B]	81%[ACD]	43%	64%[AC]
LP gas	3%	4%	2%	2%
Wood	3%	1%	-	1%
Solar	-	-	-	1%

Average Monthly Bill	NE A	Midwest B	South C	West D
Electricity	$126[B]	$110	$164[ABD]	$119[B]
Gas	$117[BCD]	$96[CD]	$79[D]	$54

- The primary residential fuel source varies significantly by region, as do average monthly bills for electricity and gas.

Households & Energy Usage

The majority of U.S. households have central air, central forced air heating, and a programmable thermostat. Many homes have more than one t-stat (27%), especially in the NE (40%), and the South (34%).

HVAC Systems in Households	% of Households
Central air conditioning	66%
Central forced air heating	64%
Window air condition units	15%
Radiant heat, or radiators	12%
Wood burning, pellet, or gas stove	12%
Heat pump	9%
Baseboard heat (electric)	6%
Solar powered	1%

Other Items in Households	% of Households
A programmable thermostat	65%
Multiple thermostats	27%
Hot tub	12%
In-ground swimming pool	10%
Tankless water heater	5%
Solar panels	2%

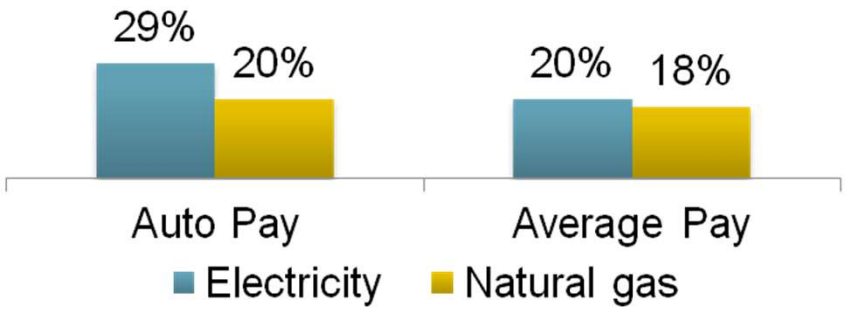
Homeowner Expectations About Future Electricity Prices

Expected Electricity Bill Increase by 2013	% of Households
1 – 10%	34%
11 – 20%	38%
21 – 30%	18%
31 – 40%	3%
41 – 100%	6%

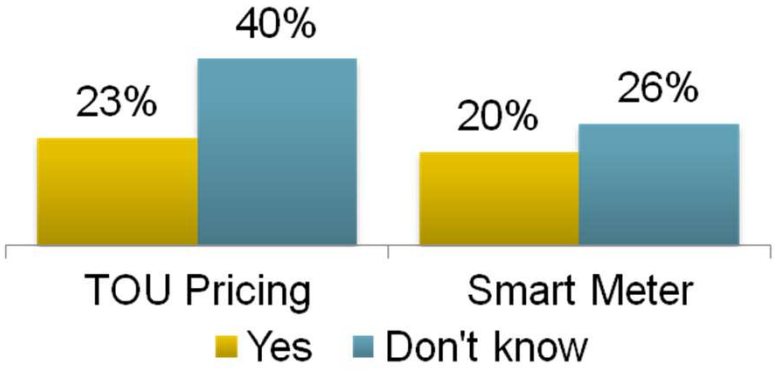
- 38% of respondents expect that by the end of 2013, their electricity bill will be 11 – 20% higher than what they pay now.
- Another one-third expect to pay between 1 – 10% more than they do now.
- The average expected increase is 19%.

Households & Energy Usage

Homeowners Participating in Auto Pay / Average Pay



Homeowners With TOU Pricing / Have a Smart Meter



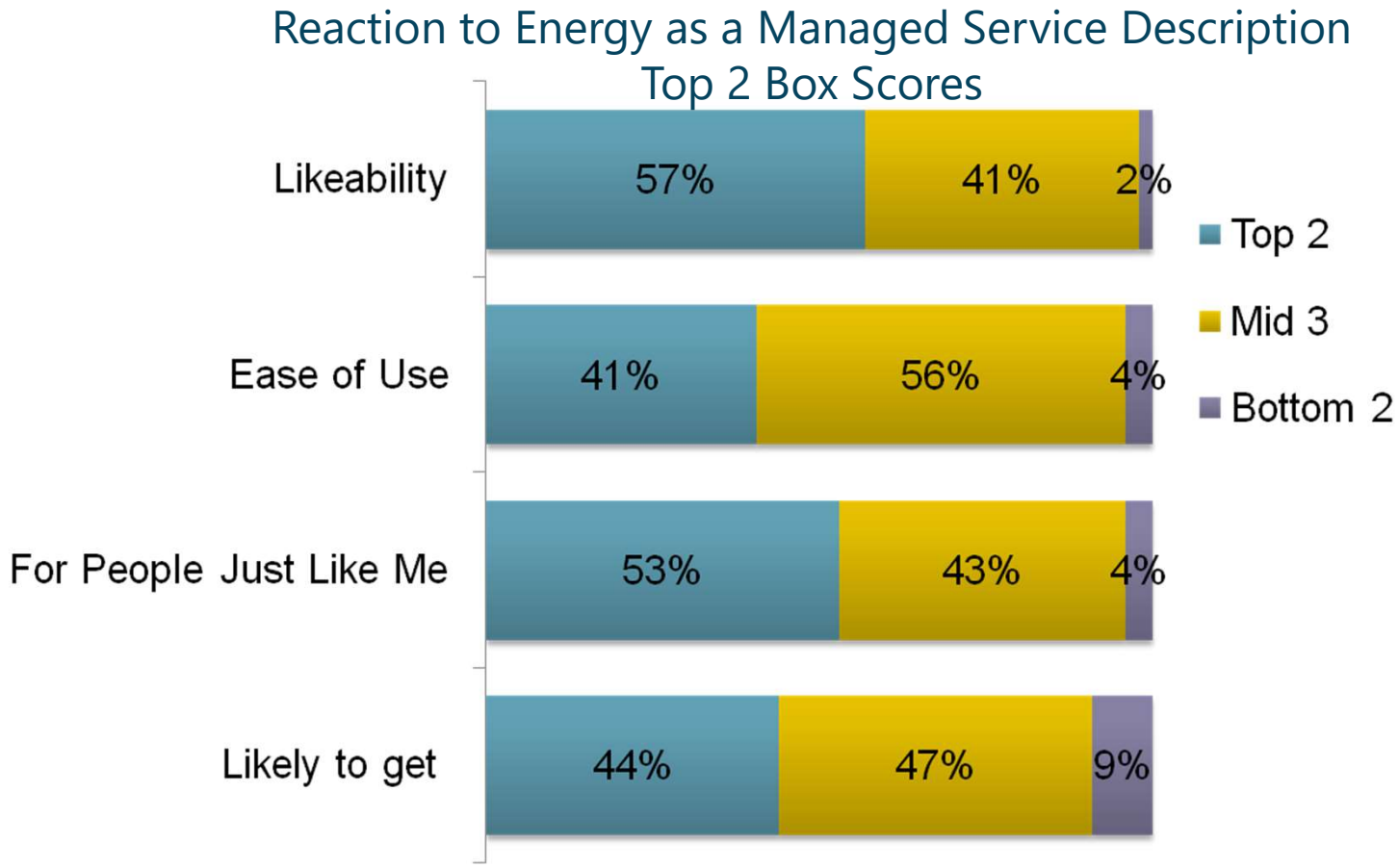
Reason to Use Average Pay	% of Households
Budgeting purposes/ easier to manage bills	44%
Consistent payments each month /no surprises	36%
To equalize the amounts between seasons	21%
Convenience/ease/ simplicity	7%
Cheaper/cost savings	2%
Seemed like a good idea	1%
Other	1%

- Auto Pay (used by 29%) and Average Pay (used by 20%) **may make is easier to some** homeowners to be unaware of the particulars of their energy usage and costs.

- Note that a very sizable **40% don't know if they have Time of Use pricing**, perhaps due to their unfamiliarity with the utility bill.

Reaction to EMS Concepts

Energy as a Managed Service (EMS) is **highly appealing** to the great majority of homeowners.



Reaction to EMS Concepts

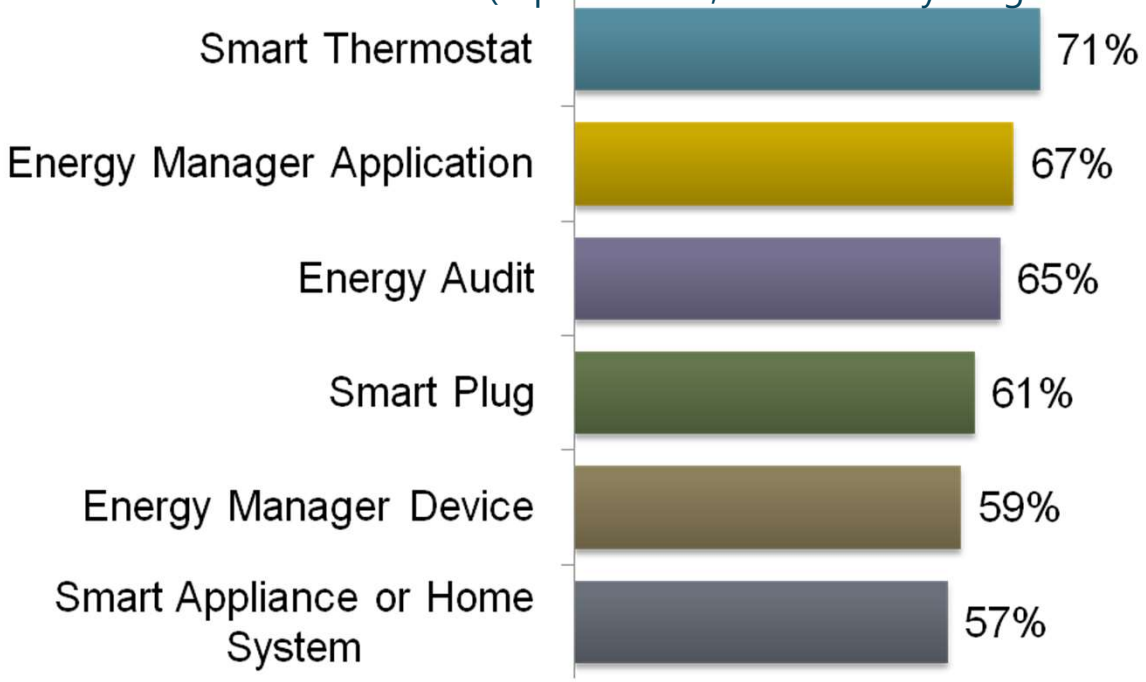
- EMS likeability is significantly greater among:
  - Current TOU customers (62% vs 55%)
  - Females (60% vs 53%)
  - Older rather than younger
    - 35-54 (61%)
    - 55-64 (57%)
    - 25-34 (50%)
- Likelihood to get EMS is significantly greater among:
  - Current TOU customers (49% vs 42%)
  - Men (47% vs 41%)

- There are **no significant differences** in likeability and likelihood to get based on:
  - Region
  - 2010 residential electricity prices. Residents in low cost, medium, and high cost electricity states find it equally appealing.
  - Context of price increase presented (10/20/30%). EMS is very appealing if prices increase only by 10% by 2013. This is a strong indication that **homeowners have already reached their limits for price increases** and will be ready to get on board once EMS products and services are widely available.

Reaction to EMS Concepts

All tested EMS components are considered **very likeable**.

EMS System Components
Likeability Top 2 Box Scores
(7-point scale; 7=Like everything about it)



- Of these, several are significantly **more likeable to homeowners who pay Time of Use pricing** for their energy: the EMS app, the EMS device, and a smart appliance or home system.

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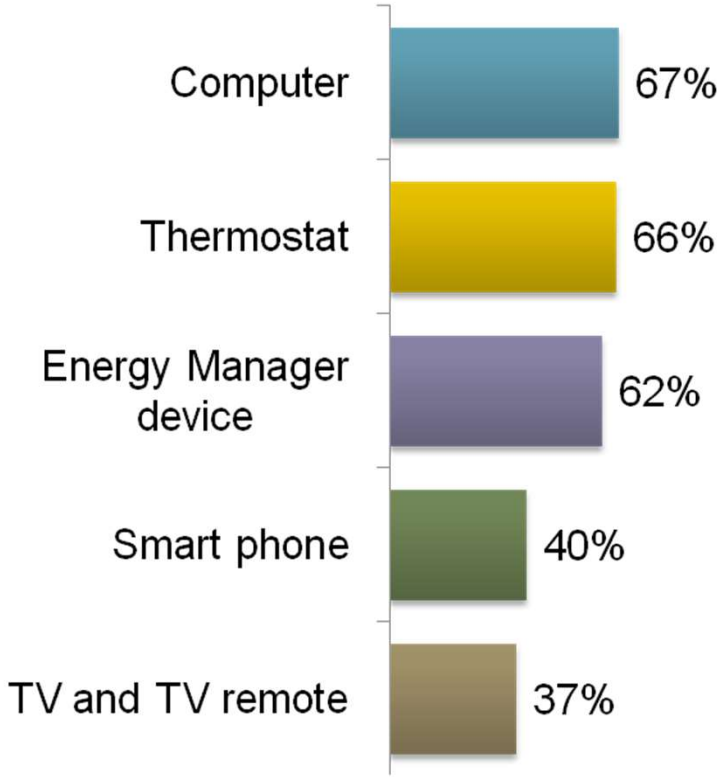
Reaction to EMS Concepts

Appeal of EM App Platforms
Top 2 Box Scores
(7-point scale; 7=Very appealing)



- When asked where they'd like to reach and use the EMS app, homeowners say a smart phone and TV/remote are **less appealing** than what may be more immediately familiar platforms:
  - Computer
  - Thermostat
  - EMS device

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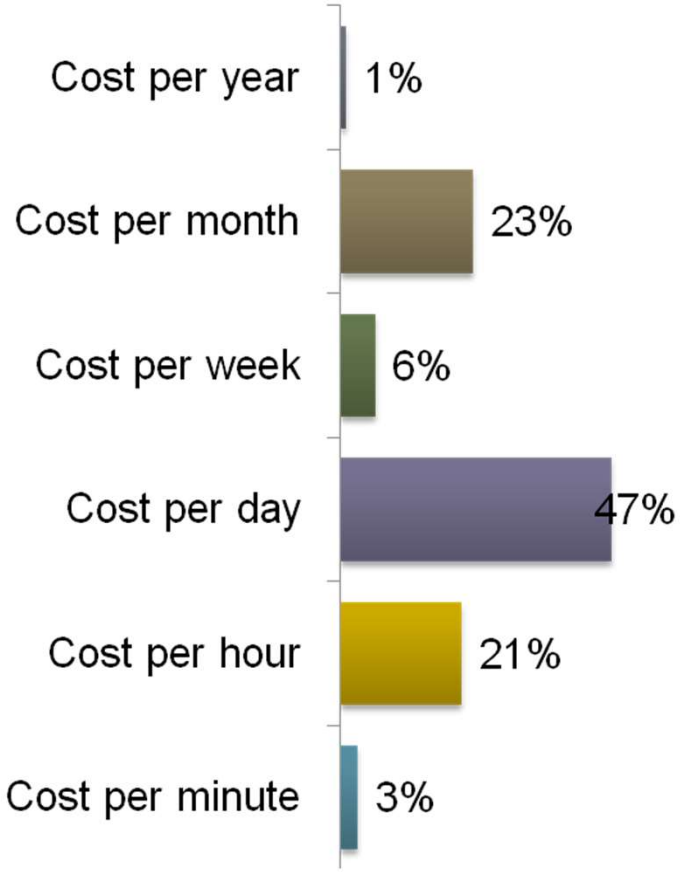
Reaction to EMS Concepts

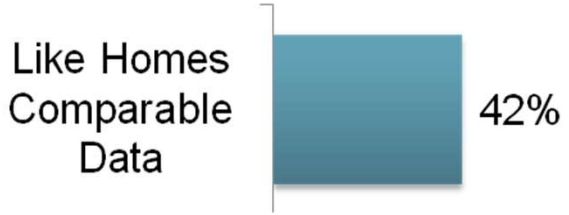
Homeowners expect the most useful data sampling rate will be **cost per day**, although per month and per hour data are also preferred by some.

Preferred Data Sampling Rate



Like Homes Comparable Data Likeability Top 2 Box Scores

(7-point scale; 7=Like everything about it)

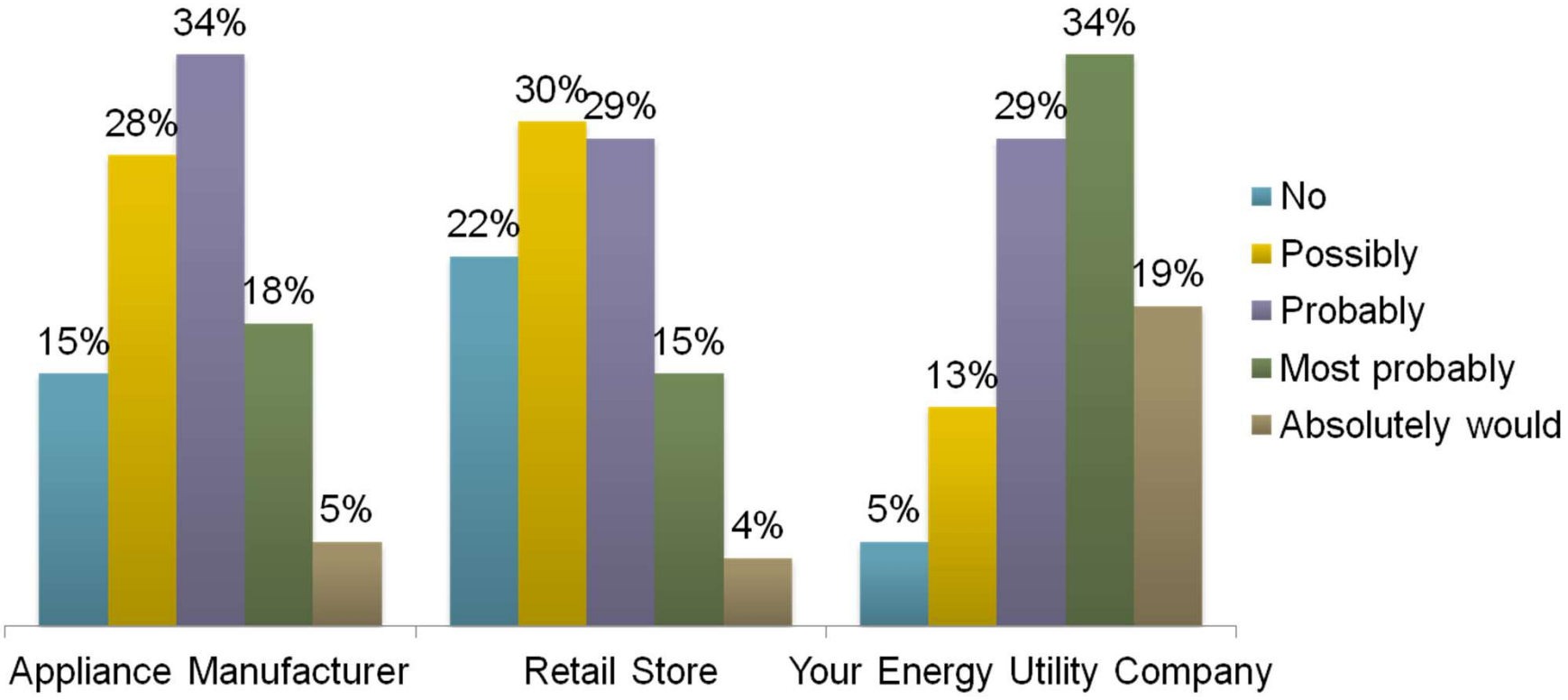


- The notion of getting aggregate data from similar homes as part of the EM app is of moderate but not high likeability.
  - The idea got a lukewarm reception in P2 research as well.

Purchase Considerations

Homeowners are more likely to consider getting EMS products/services from **their utility** than from a retail store or an appliance manufacturer.

Likelihood To Consider Getting
EMS Products/Services From:



Purchase Considerations

Popular EMS bundles would include an EMS device, a thermostat, smart plug, AC, water heater, and furnace.

Preferred Starter Bundle		
% Homeowners Chose	**"Smart" Version of Item**	**Average Premium**
62%	Energy Manager Device	N/A
46%	Energy Audit	N/A
52%	Smart Plug	N/A
61%	Thermostat	$51
40%	Air Conditioner	$196
40%	Water Heater	$125
38%	Furnace	$223
25%	Refrigerator	$144
23%	Dryer	$122
20%	Washing Machine	$128
16%	Dishwasher	$107
11%	Range or Cooktop	$137
11%	Oven	$136

Purchase Considerations

There will be a market for **both smaller and larger** bundles of EMS products and services.

% Homeowners Chose	Bundle Size Chosen (from 13 possible items)
16%	1 Item
29%	2-3 Items
27%	4-5 Items
28%	6+ Items

% Homeowners Chose	Most Popular Bundle Combinations (include these items at minimum)
41%	EMS Device and T-stat
36%	EMS Device and Smart Plug
34%	Smart Plug and T-stat
34%	EMS Device and Energy Audit

Purchase Considerations

Expect couples to **jointly** consider most items when buying EMS components.

	Primary Shopper Among Couples		
EMS Item	**Male**	**Female**	**Both**
Smart Plug	24%	18%	58%
Thermostat	24%	18%	58%
Subscribing to an EMS	20%	14%	66%
Time of Use Pricing	20%	16%	64%
Furnace	19%	15%	67%
Air Conditioner	19%	14%	67%
Water Heater	19%	18%	63%
Oven	14%	18%	68%
Washing Machine	14%	15%	71%
Range or Cooktop	13%	18%	70%
Dishwasher	13%	17%	70%
Refrigerator	12%	14%	74%
Dryer	12%	16%	72%

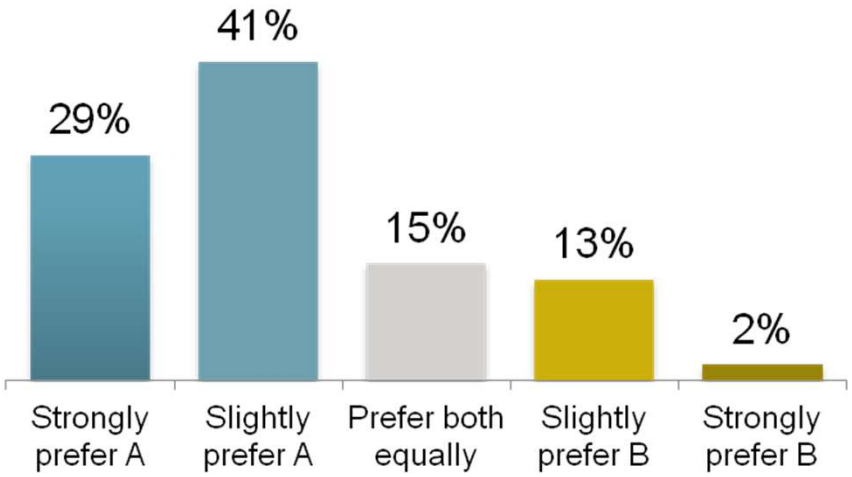
Reaction to EMS Concepts

Homeowners want an **independent** organization test/rate appliances, devices or home systems such as furnaces that can be connected to an energy manager service (appliances).

Appliance A or B?

Tested/rated on ROI by independent organization

Costs 10% less
Not tested/rated



- When comparing between two similar appliance models for purchase:
  - 70% prefer one that's been tested/rated for ROI on EMS components.
  - Just 15% prefer an unrated appliance that costs 10% less.

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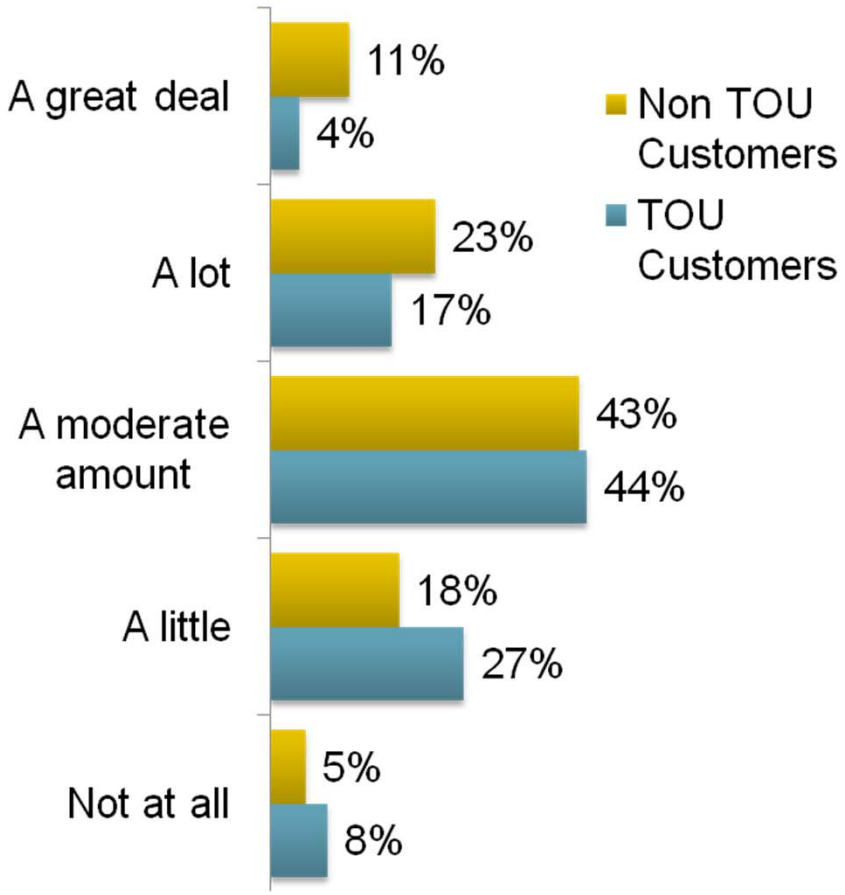
Time of Use Pricing

Current TOU customers indicate how their habits **have changed**, while non-TOU customers **predict how** they'll change habits when get TOU pricing.

To What Extent Will/Have Household Habits Change to Reduce Energy Bill?



- Fully one-third (34%) of homeowners who don't have TOU now expect to **dramatically** change their household habits with TOU.
- Since the introduction of TOU pricing, TOU customers **have changed** their habits but slightly less than that predicted by future TOU customers.
  - In TOU homes, 21% say they've changed their habits "a lot" or "a great deal while one-third of non TOU homes expect to make the same size changes.

Time of Use Pricing

Time of Use Pricing Expected Savings	% Homeowners
Up to 10%	25%
11-20%	37%
21-30%	27%
31-40%	5%
50% or more	6%

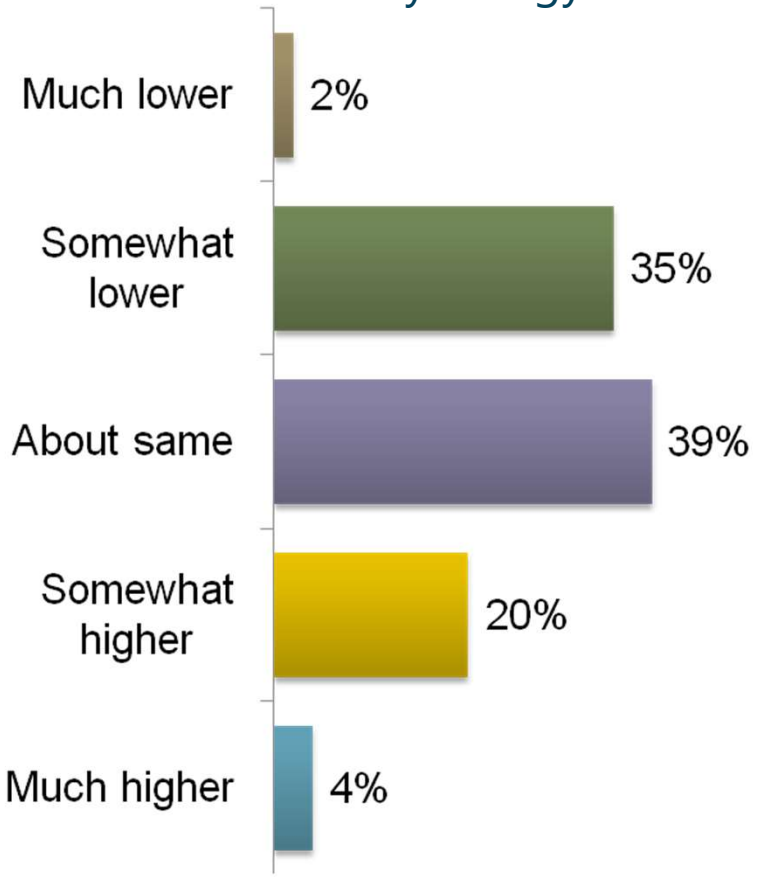
- When TOU pricing goes into effect, many homeowners expect **considerable savings.**
  - About one-quarter expect to save up to 10%. 37% predict saving between 11-20%, and 27% believe they'll save 21-30% on monthly energy costs.
- It will be important to **manage consumer expectations** as TOU pricing is introduced in new locales.

Time of Use Pricing

Some but not all current TOU customers seen savings as a result of TOU pricing.

- 37% say their bills are lower with TOU pricing, while 39% find they pay about the same amount as before.
  - Lower energy bills are more common in the NE (44%) and Midwest (46%)
  - Higher energy bills are significantly more common in the West (34%)

With TOU Pricing in Effect, Homeowners Say Energy Bills Are:



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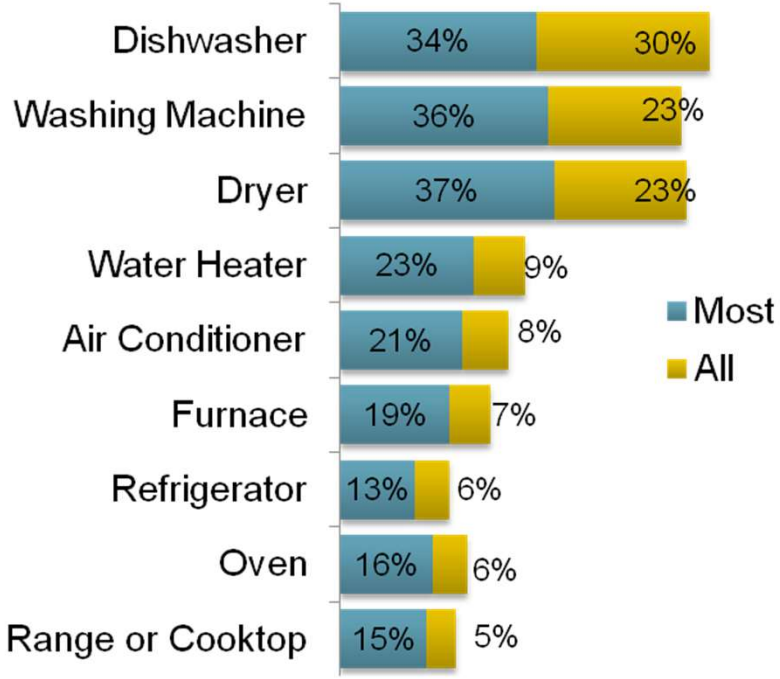
Time of Use Pricing

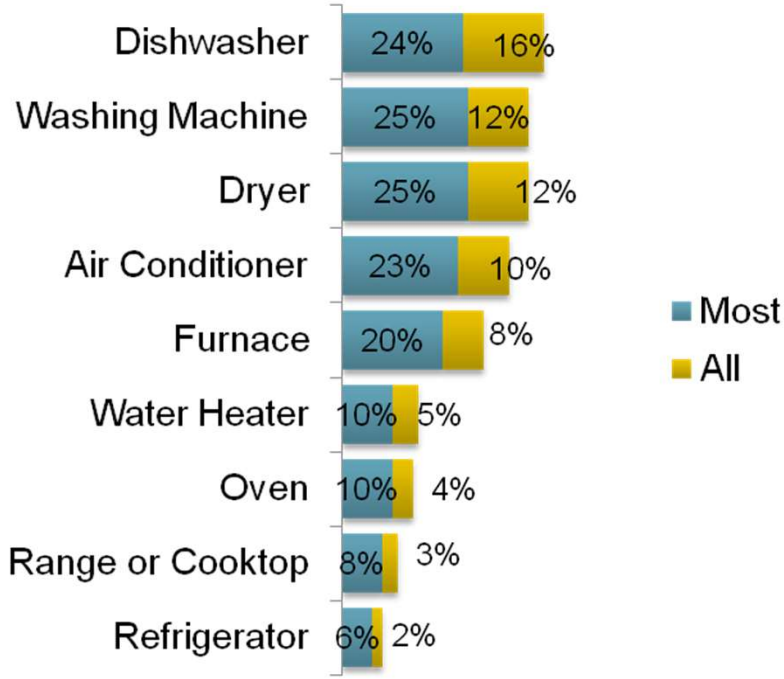
Most frequently, homeowners say they will shift use of the dishwasher, dryer and washing machine.

About one-quarter (26%) predict they will shift their use of the furnace most/all of the time.

Plan to Shift Energy Use All/Most of the Time by Appliance



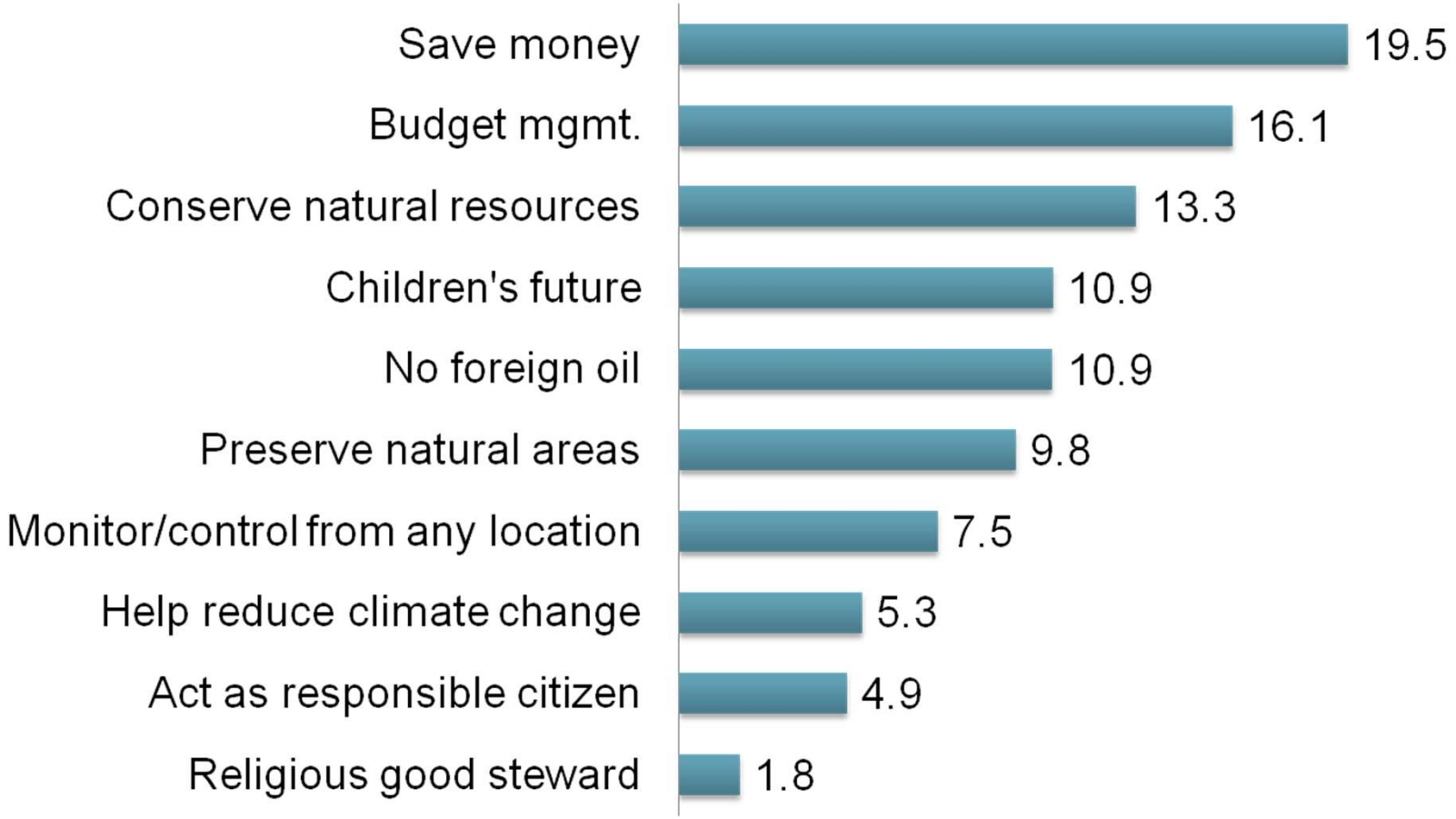
TOU Customers Who Shift Energy Use All/Most of the Time by Appliance



Conservation & Energy Management Attitudes

The primary motivations for getting and using EMS are **money-related**, not environmental.

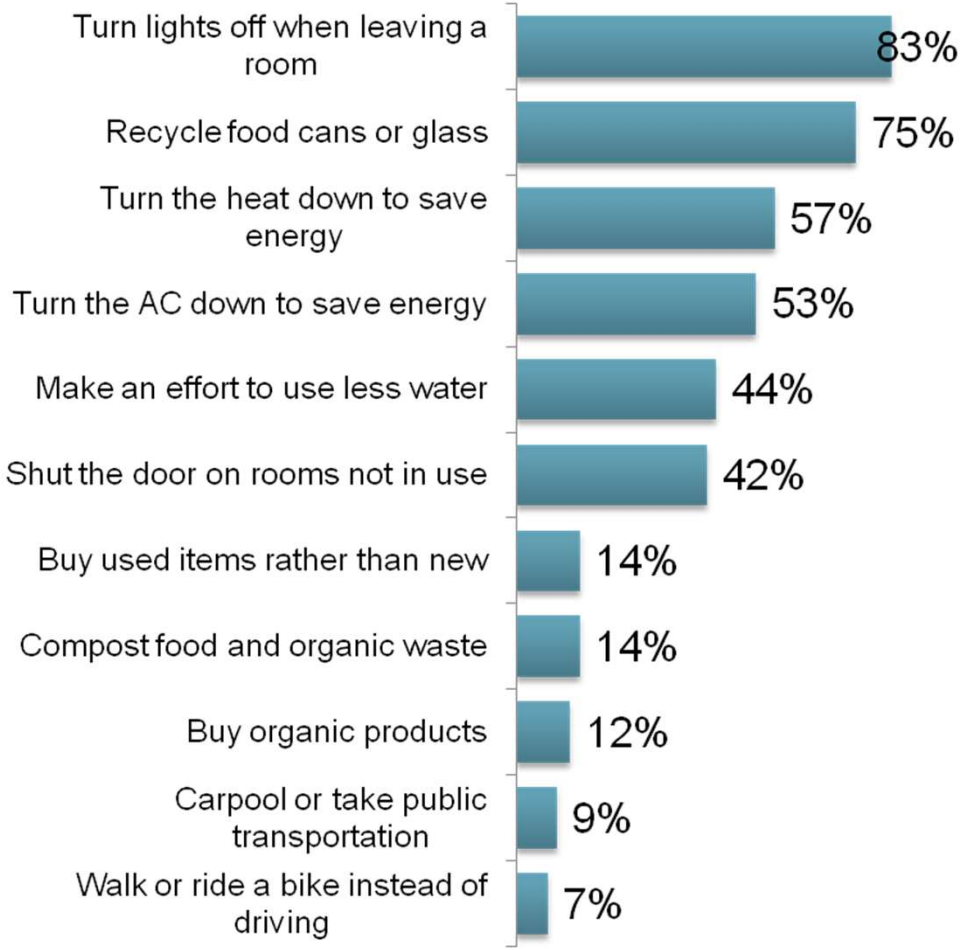
Energy Management Motivations
All Homeowners



Conservation & Energy Management Attitudes

Conservation Behaviors Top 2 Box Scores

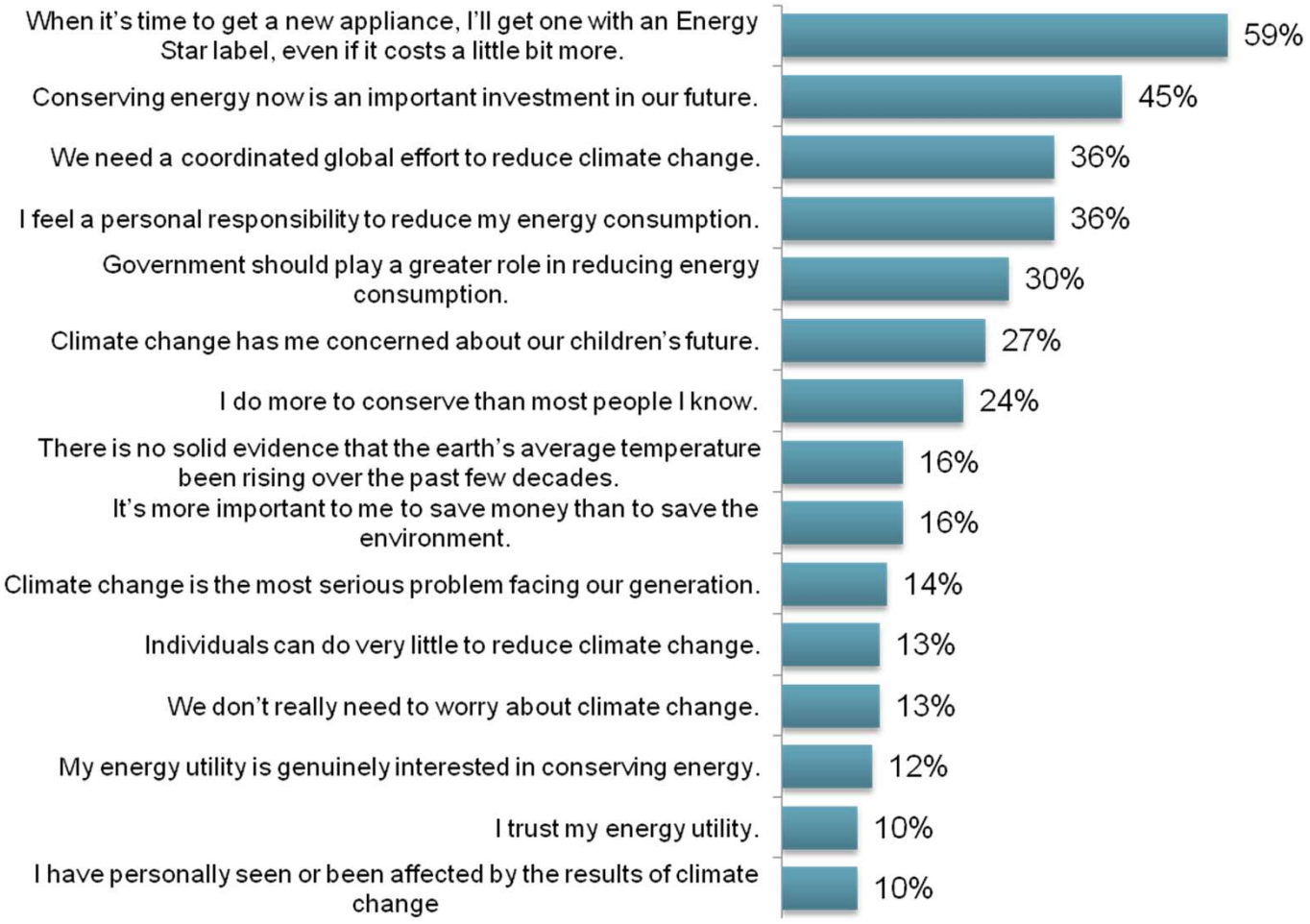
(7-point scale; 7=Describes me exactly)



- All conservation behaviors are slightly but significantly more prevalent among:
  - EMS likely adopters
  - Residents in Western states
- Most behaviors are reported more often by women than by men

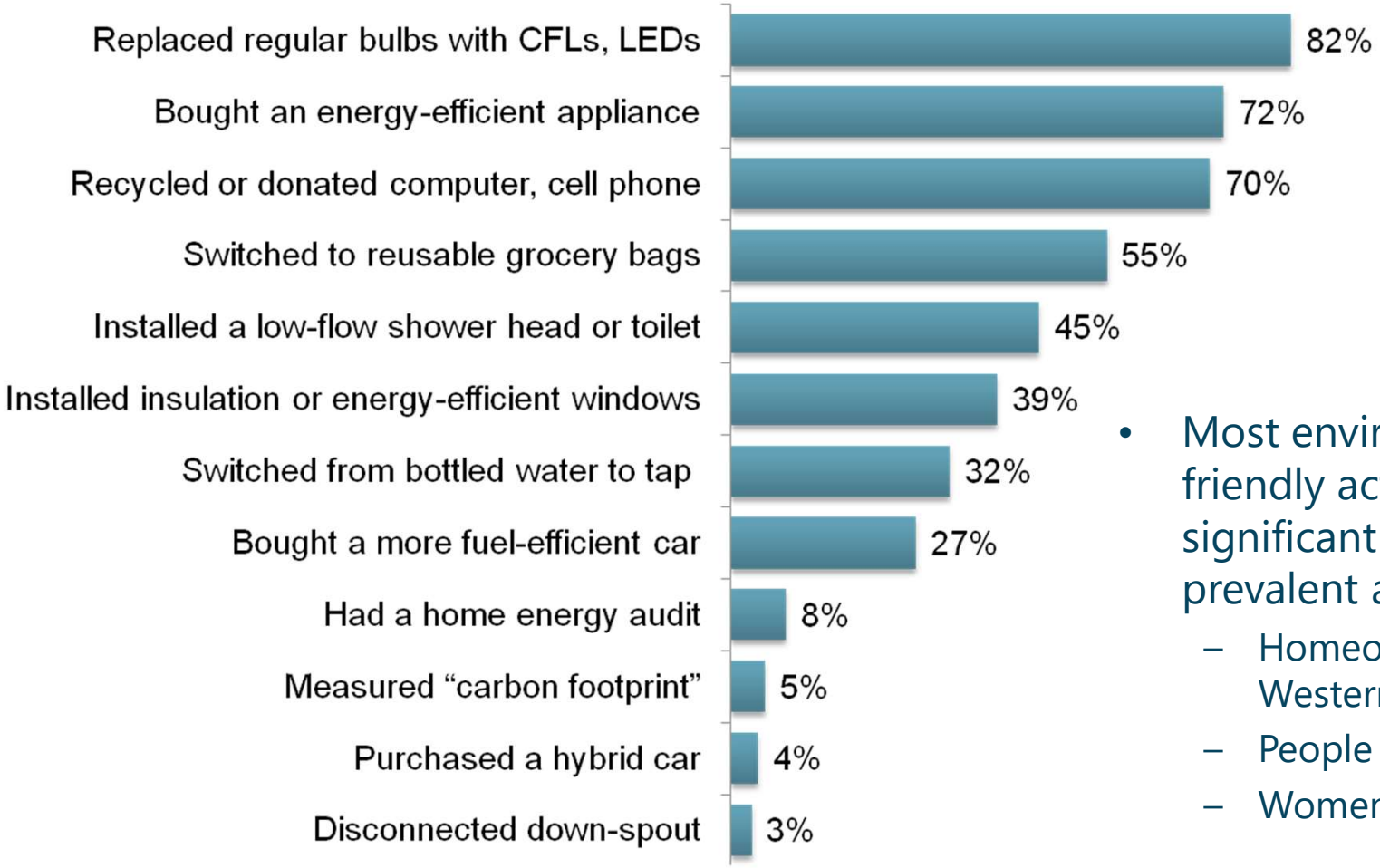
Conservation & Energy Management Attitudes

Conservation Attitudes / Climate Change Attitudes
Top 2 Box Scores
(7-point scale; 7=Describes me exactly)



Conservation & Energy Management Attitudes

Environmental Activities Done in Past 5 Years

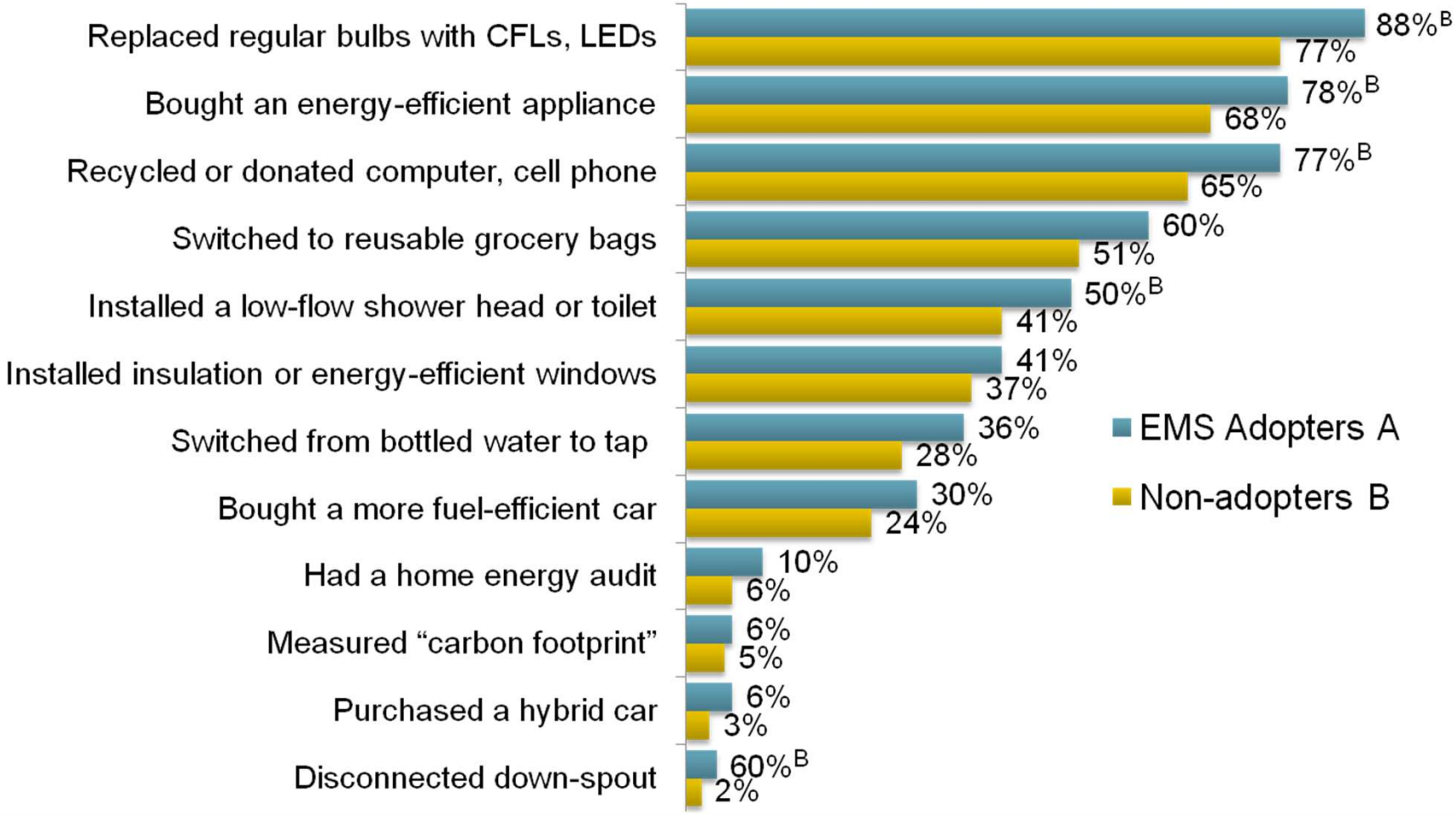


- Most environment-friendly activities are significantly more prevalent among:
  - Homeowners in Western states
  - People aged 55-64
  - Women

Conservation & Energy Management Attitudes

Homeowners who are most likely to get EMS are **significantly more likely** to engage environmentally-conscious behaviors.

Environmental Activities Done in Past 5 Years



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EMS Market Segmentation

Overview

Market segmentation is the art and science of grouping individuals with similar characteristics, thereby making them more easily identifiable strategic targets. A segmentation quantifies the size of each segment and allows for the estimation of the potential economic opportunity available within each segment.

The EMS market segmentation included the examination of the following variables as potential inputs:

- Attitudes about energy consumption, conservation, and climate change (Q901 – Q915);
- Self-reported conservation behaviors (Q301 – Q311);
- Motivations for adopting EMS (Q501 – Q510); and
- Household characteristics and energy consumption: Demographics, size and age of home, cost of energy bill, types of HVAC systems in place, fuel sources, etc. (These variables were investigated but did not contribute to the segmentation.) .

Principal component analysis with Varimax rotation was used, resulting in factor scores calculated for each respondent on each of 8 factors:

1. Climate Change Concern Score
2. Natural Resource Conservation Score
3. Active Energy Conservation Score
4. Day-to-Day Conservation Behavior Score
5. Transportation & Consumption Reduction Score
6. Energy Utility Trust Score
7. Responsible Citizenship Score ***(Not used in segmentation)***
8. Religious / Family Motivation Score

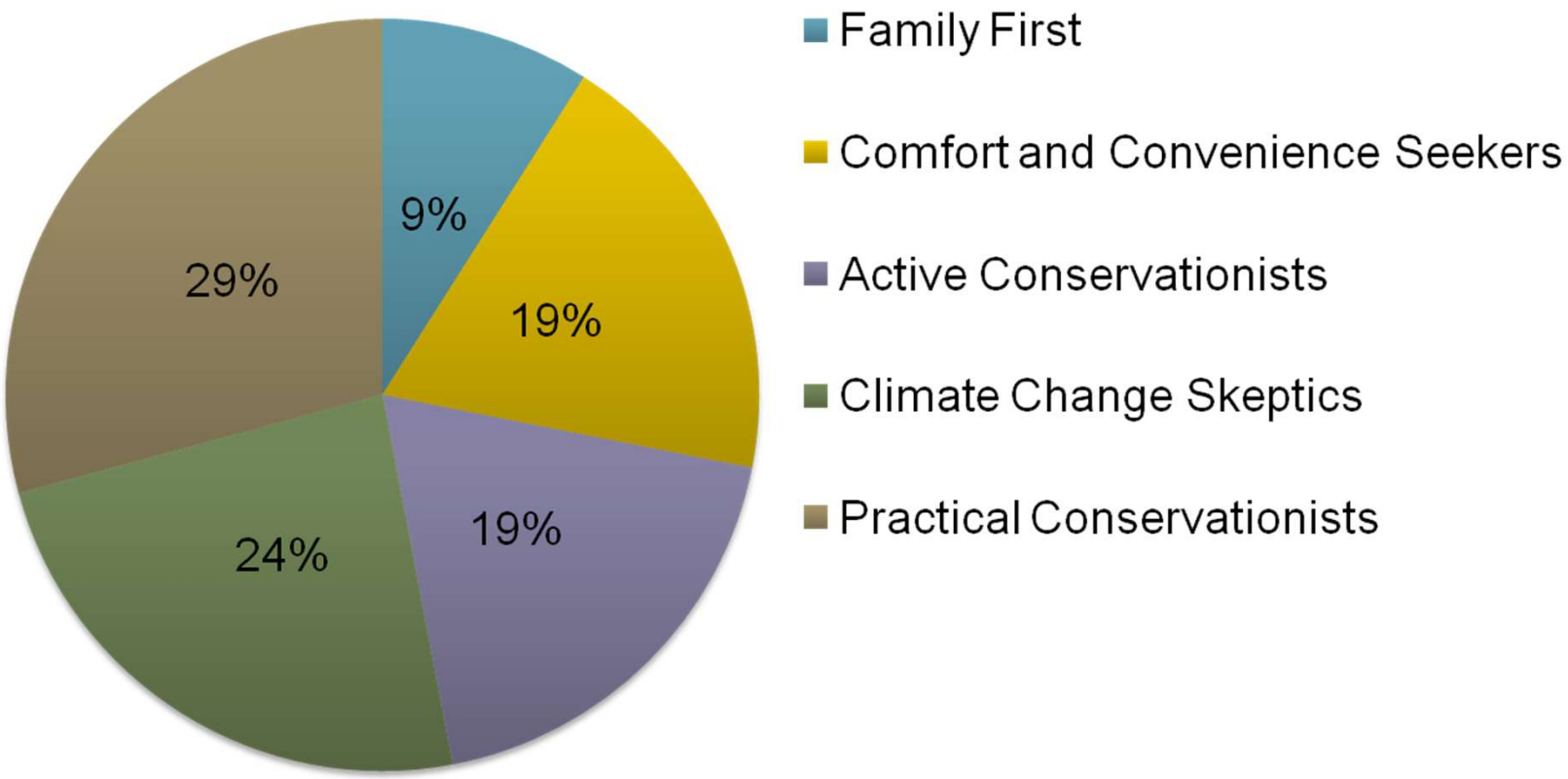
EMS Market Segmentation

Scores on 8 factors successfully segment the market for EMS.

Factor	Top Contributing Variables
Climate Change Concern Score	Q908 We don't really need to worry about climate change. (Negative) Q904 We need a coordinated global effort to reduce climate change. Q912 Climate change has me concerned about our children's future.
Natural Resource Conservation Score	For better household budget management (Negative) To preserve our country's natural areas and wildlife To conserve our natural resources
Active Energy Conservation Score	Q913 I do more to conserve than most people I know. Q911 When it's time to get a new appliance, I'll get one with an Energy Star label, even if it costs a little bit more. Q905 I feel a personal responsibility to reduce my energy consumption.
Day-to-Day Conservation Behavior Score	Q301R10 In cold weather, turn the heat down to save energy Q301R11 In warm weather, turn the air conditioning down to save energy Q301R4 Make an effort to use less water
Transportation & Consumption Reduction Score	Q301R9 Walk or ride a bike instead of driving to a destination Q301R8 Carpool or take public transportation Q301R5 Buy used items rather than new Q301R7 Compost food and organic waste
Energy Utility Trust Score	Q910 I trust my energy utility. Q909 My energy utility is genuinely interested in conserving energy.
Responsible Citizenship Score ***This is primarily a US/Canada differentiator and is not used in subsequent analysis***	To strengthen our security by reducing our reliance on foreign oil (Negative) To act as a more responsible citizen
Religious / Family Motivation Score	To be a good steward for religious reasons To improve our children's future

EMS Market Segmentation

The market consists of five unique segments as shown below.



Highest interest in EMS: Active Conservationists

Lowest interest: Comfort and Convenience Seekers, Climate Change Skeptics

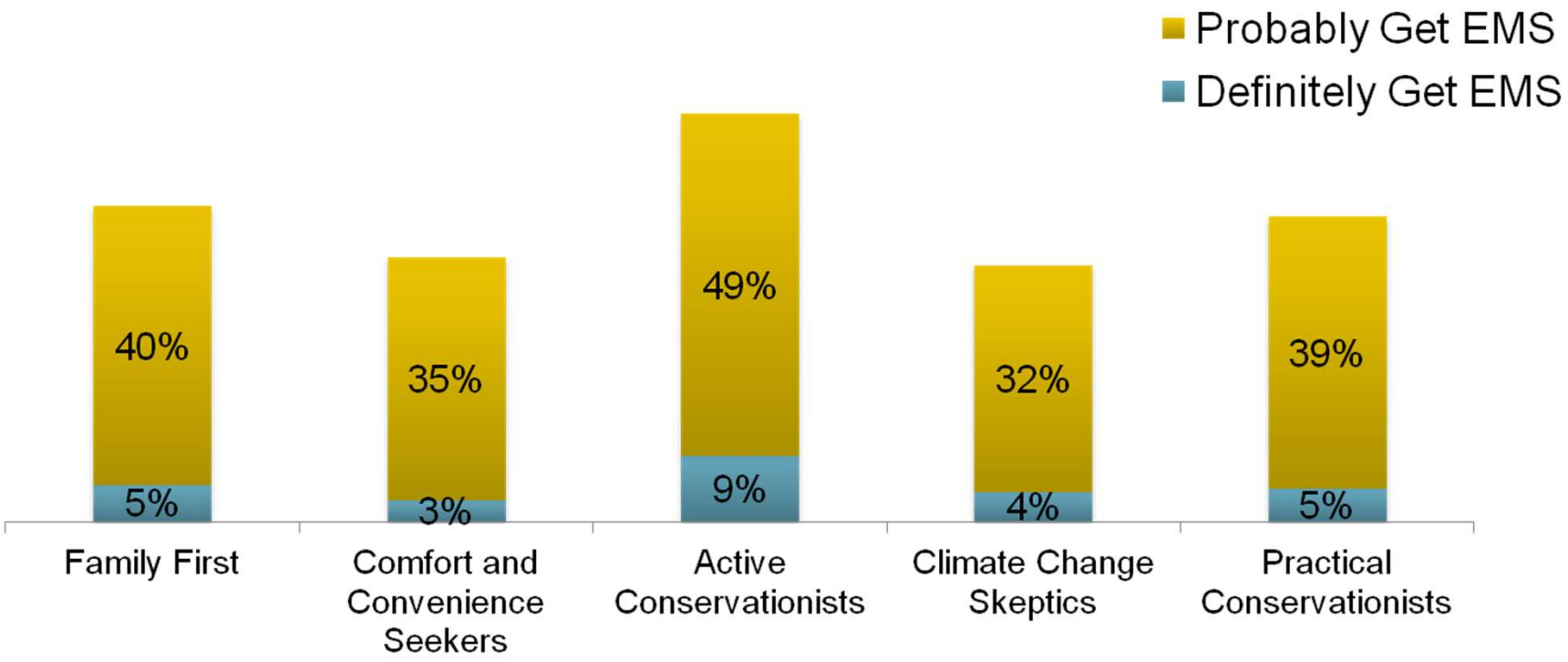
EMS Market Segmentation

Segment Summary

	Family First	Comfort & Convenience Seekers	Active Conservationists	Climate Change Skeptics	Practical Conservationists
Brief Description	By far the highest-scoring group for religious & family motivations	By far the lowest scoring group on day-to-day conservation behaviors	By far the highest scoring group on transport & consumption reduction – more substantial behavior shifts, e.g., alternative transportation, buying used goods	By far the lowest scoring group on climate change concern	The highest scoring group on day-to-day conservation behaviors – typical HH-related items such as turning down heat or AC
Size of Segment (% of Population)	9.0%	19.1%	18.9%	23.8%	29.2%
Demographic Differences	More male, more likely to have children in HH	--	Slightly more female	Slightly more female, married	More female
Political Differences	More likely self-identify as Republican	Balanced proportions of Rep., Dem. & Ind.	More likely self-identify as Democrat	Most likely self-identify as Republican	Balanced proportions of Rep., Dem. & Ind.
Attitude, Behavior & Motivation Differences	Fairly low climate change concern, highest religious & family motivation	Lowest day-to-day conservation behavior	High climate change concern, highest transport & consumption reduction	Lowest climate change concern	Highest climate change concern, highest day-to-day conservation behavior
EMS Likelihood	Moderate	Low	*Highest*	Low	Moderate

EMS Market Segmentation

Interest In EMS By Segment



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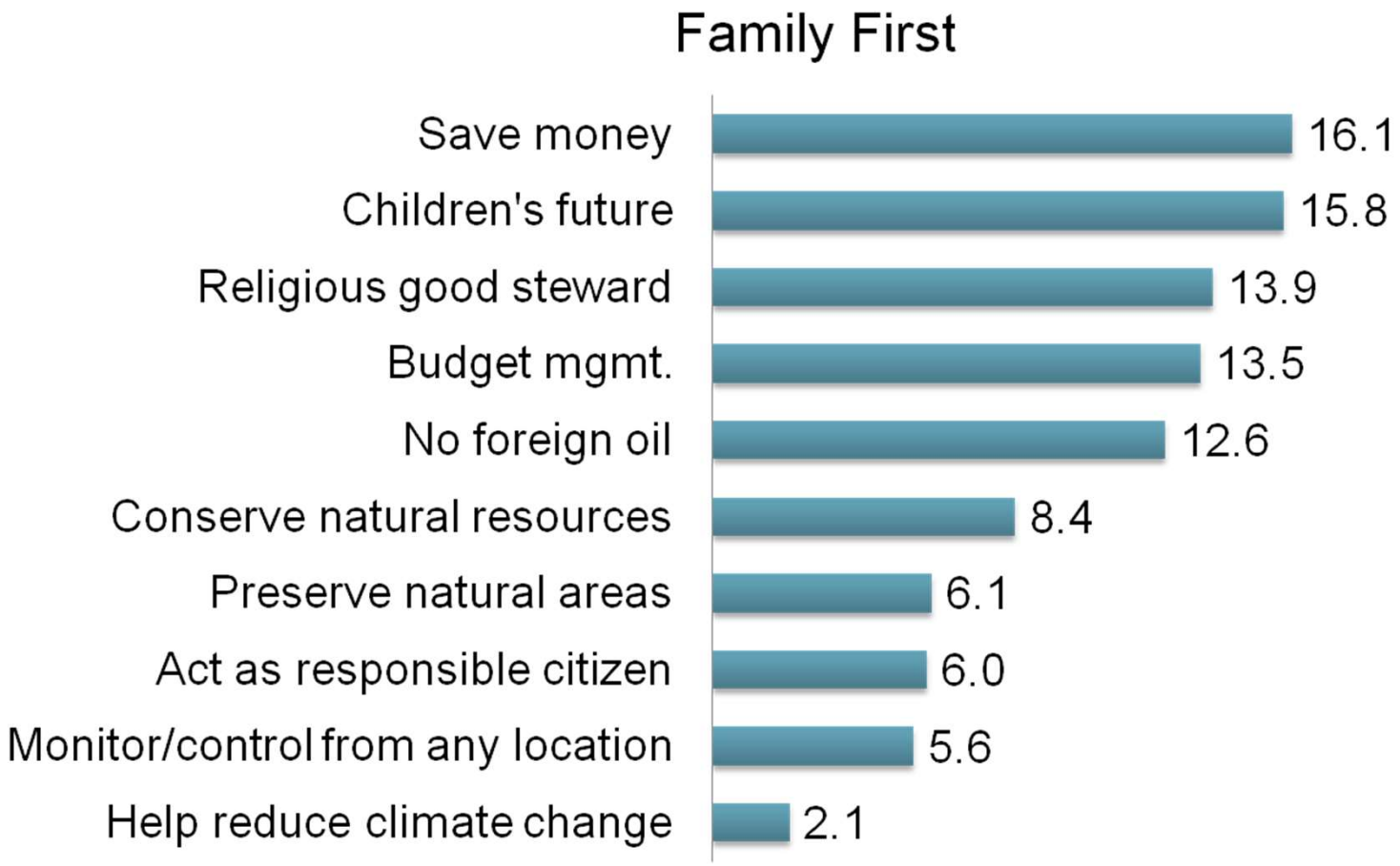
EMS Market Segmentation

Family First prioritizes children's future and religious stewardship **higher** than any other segment.

9% of Market

Moderate EMS Likelihood



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EMS Market Segmentation

Family First Profile

		Family First A	Other Segments B
Region	Northeast	22%	34%[A]
	Midwest	26%	21%
	South	33%[B]	22%
	West	19%	24%
Age	25-34	22%	17%
	35-44	25%	25%
	45-54	32%	32%
	55-64	21%	26%
Marital Status	Married	85%	84%
Children in HH	Yes	57%[B]	45%
Income	$50K-$74K	29%	24%
	$75K-$99K	32%	30%
	$100K-$149K	32%	35%
	$150+K	7%	11%[A]

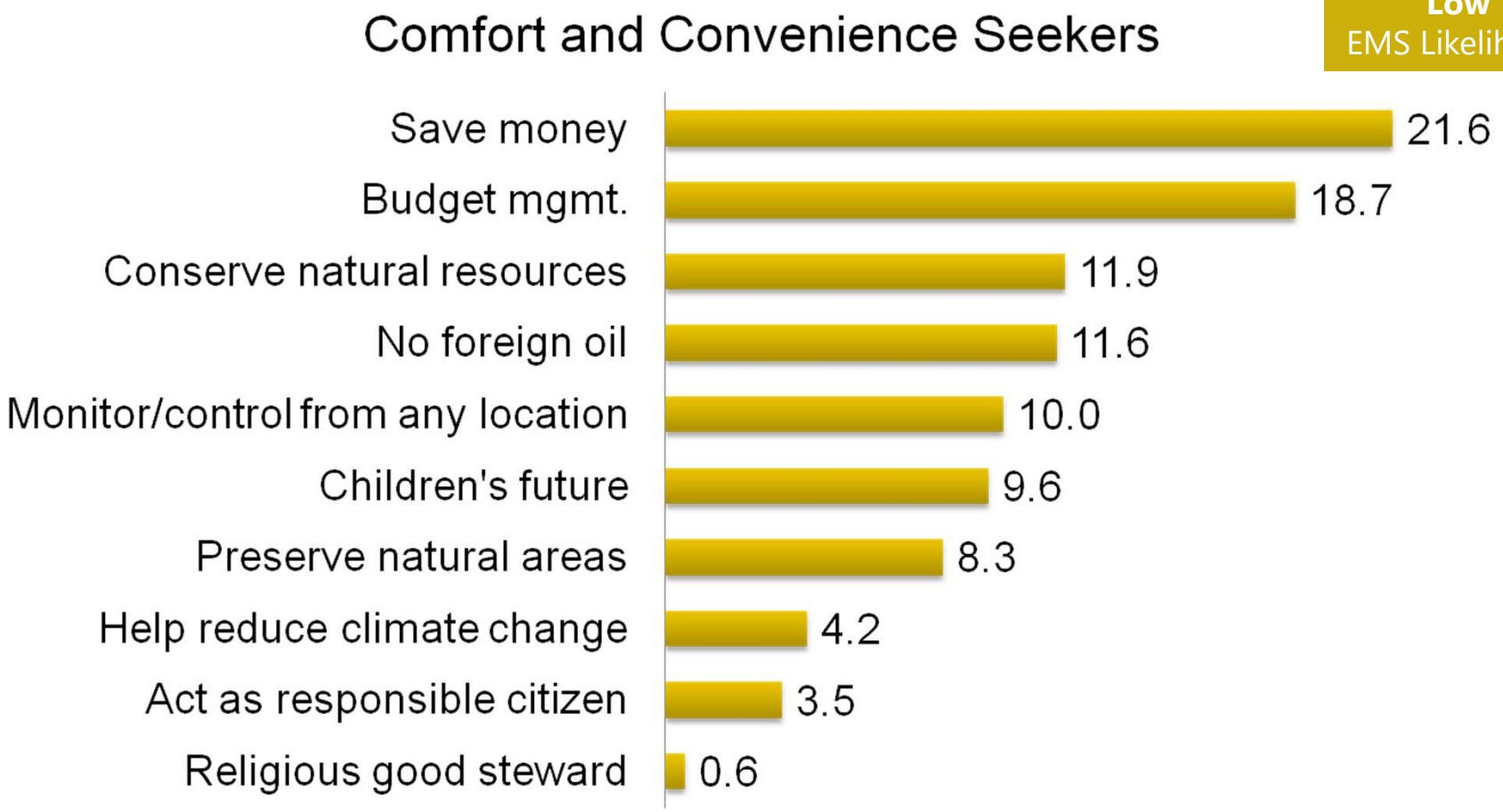
- Compared to other segments, this segment is:
  - More prevalent in the South
  - More likely to have children
  - Slightly lower income

EMS Market Segmentation

This **least** EMS-positive group is primarily motivated by economic considerations

19% of Market

Low
EMS Likelihood



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EMS Market Segmentation

Comfort and Convenience Profile

		C & C A	Other Segments B
Region	Northeast	40%[B]	31%
	Midwest	18%	22%
	South	22%	23%
	West	20%	25%[A]
Age	25-34	20%	17%
	35-44	32%[B]	24%
	45-54	25%	34%[A]
	55-64	23%	26%
Marital Status	Married	84%	84%
Children in HH	Yes	47%	46%
Income	$50K-$74K	21%	25%[A]
	$75K-$99K	31%	30%
	$100K-$149K	35%	35%
	$150+K	13%	10%

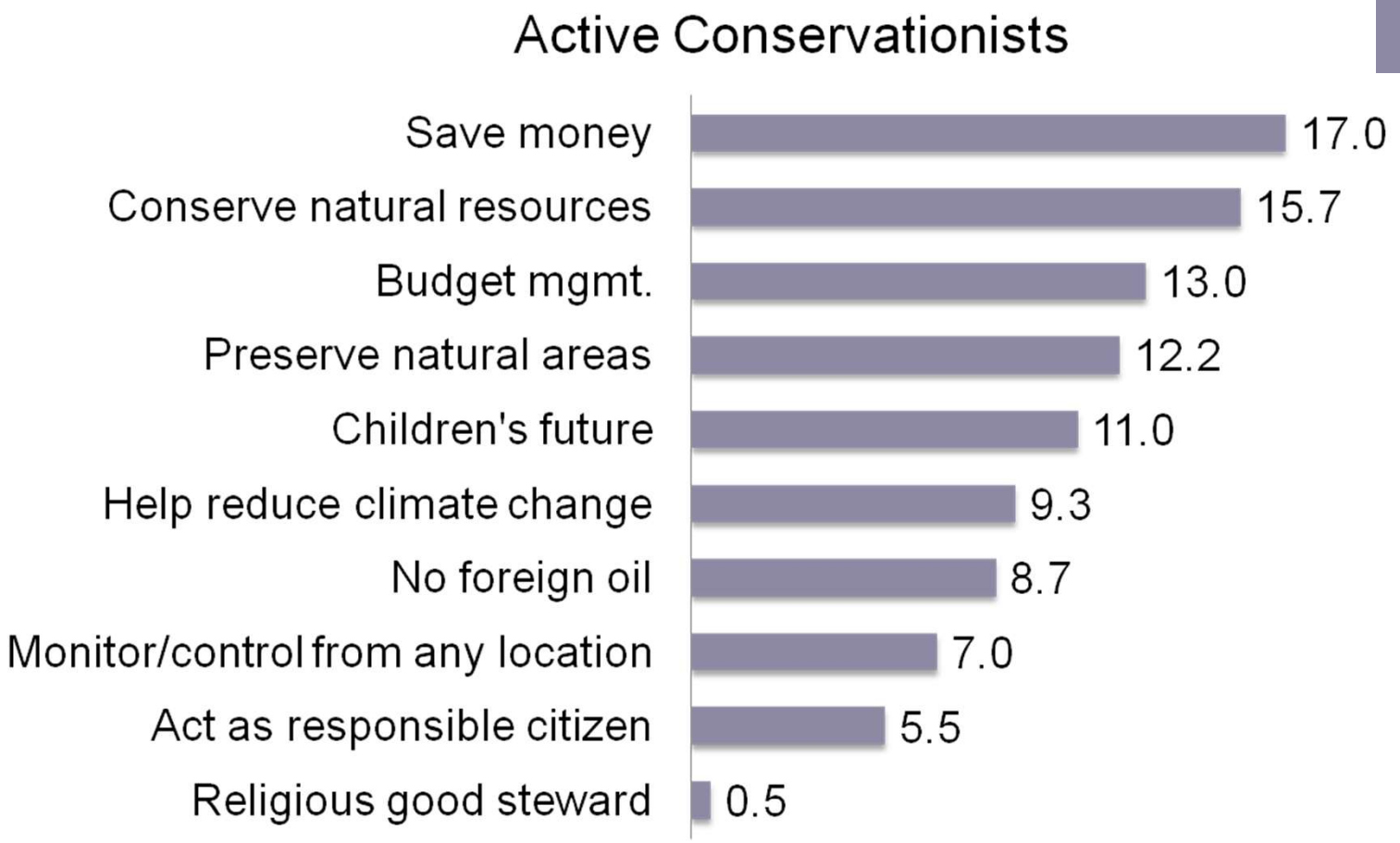
- Compared to other segments, this segment is:
  - More prevalent in the Northeast
  - Slightly younger
  - Slightly higher income

EMS Market Segmentation

This **most** EMS-positive group is highly motivated by the message of conserving natural resources.

19% of Market

Highest EMS Likelihood



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EMS Market Segmentation

Active Conservationists Profile

		Active Conserv. A	Other Segments B
Region	Northeast	31%	33%
	Midwest	19%	21%
	South	19%	24%[A]
	West	31%[B]	22%
Age	25-34	18%	17%
	35-44	26%	25%
	45-54	31%	32%
	55-64	24%	26%
Marital Status	Married	82%	84%
Children in HH	Yes	46%	46%
Income	$50K-$74K	24%	24%
	$75K-$99K	31%	30%
	$100K-$149K	34%	35%
	$150+K	11%	11%

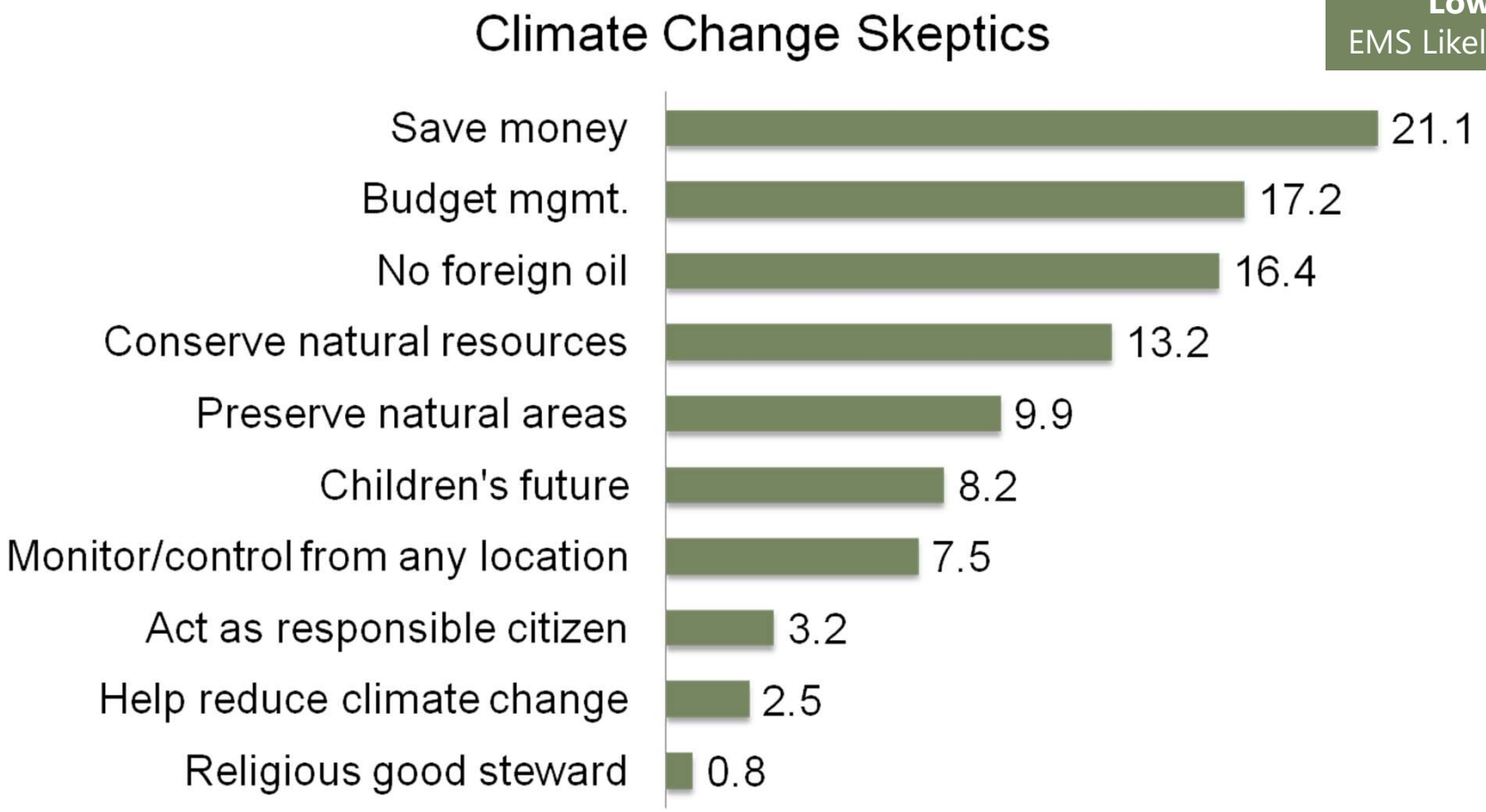
- Compared to other segments, this segment is:
  - More prevalent in the West

EMS Market Segmentation

Climate Change Skeptics are **more motivated** by reducing dependence on foreign oil than other segments.

24% of Market

Low
EMS Likelihood



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EMS Market Segmentation

Climate Change Skeptics Profile

		Skeptics A	Other Segments B
Region	Northeast	28%	34%A
	Midwest	25%B	20%
	South	24%	23%
	West	23%	24%
Age	25-34	13%	19%A
	35-44	21%	27%A
	45-54	37%B	31%
	55-64	29%B	24%
Marital Status	Married	88%	83%
Children in HH	Yes	43%	47%A
Income	$50K-$74K	25%	24%
	$75K-$99K	29%	31%
	$100K-$149K	34%	35%
	$150+K	11%	11%

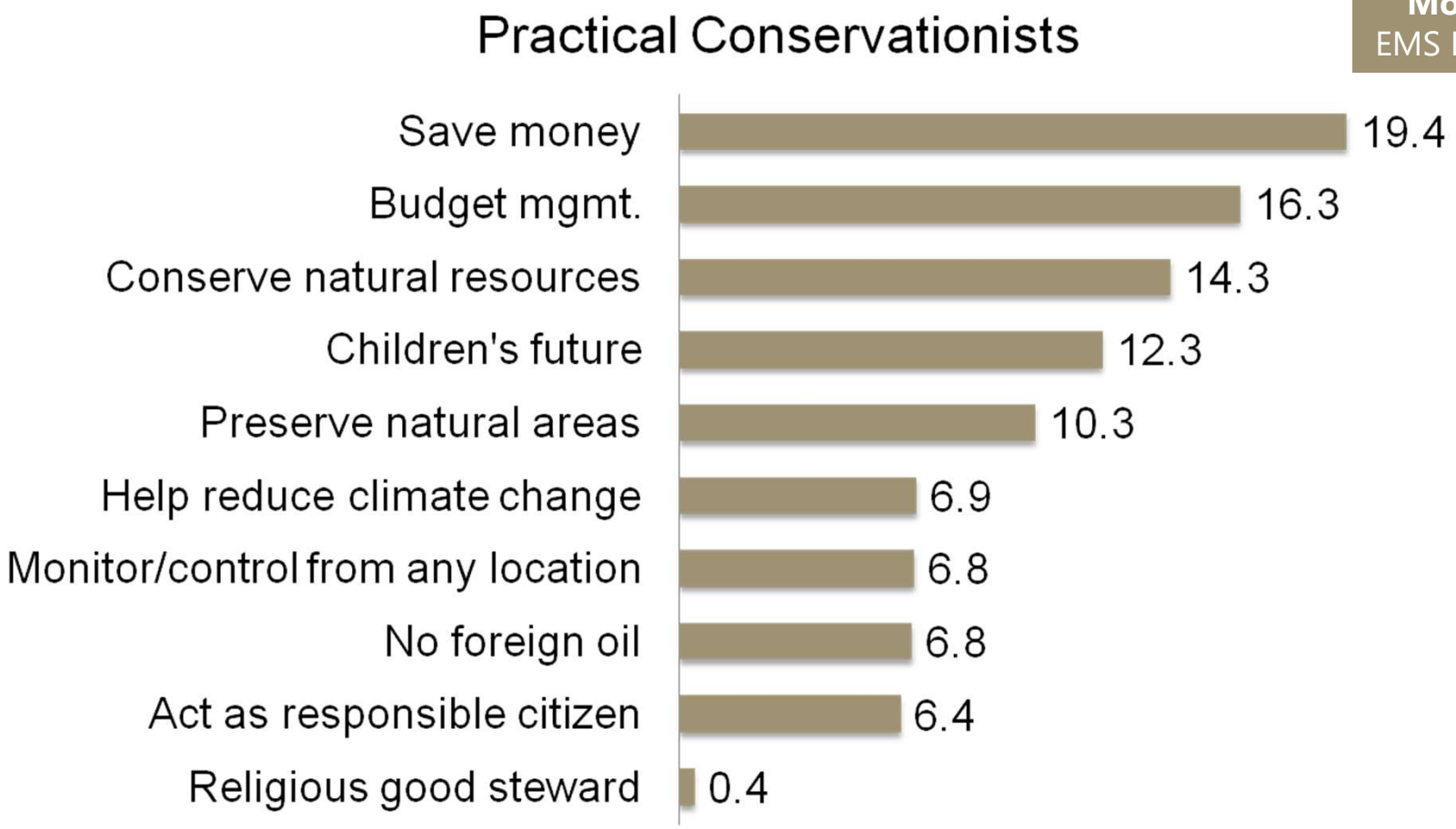
- Compared to other segments, this segment is:
  - Slightly more prevalent in the Midwest
  - Older
  - Slightly less likely to have children at home

EMS Market Segmentation

Practical Conservationists prioritize HH budget management and conserving natural resources. This is the **largest** of the 5 segments.

29% of Market

Moderate EMS Likelihood



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EMS Market Segmentation

Practical Conservationists Profile

		Practical Conserv. A	Other Segments B
Region	Northeast	35%[B]	31%
	Midwest	19%	22%
	South	22%	23%
	West	24%	24%
Age	25-34	17%	17%
	35-44	24%	26%
	45-54	33%	32%
	55-64	25%	25%
Marital Status	Married	82%	85%
Children in HH	Yes	45%	47%
Income	$50K-$74K	25%	24%
	$75K-$99K	30%	31%
	$100K-$149K	35%	35%
	$150+K	10%	11%

- Compared to other segments, this segment is:
  - Slightly more common in the Northeast

Appendix

Context Setting: Fewer Resources, Greater Demand, Higher Prices

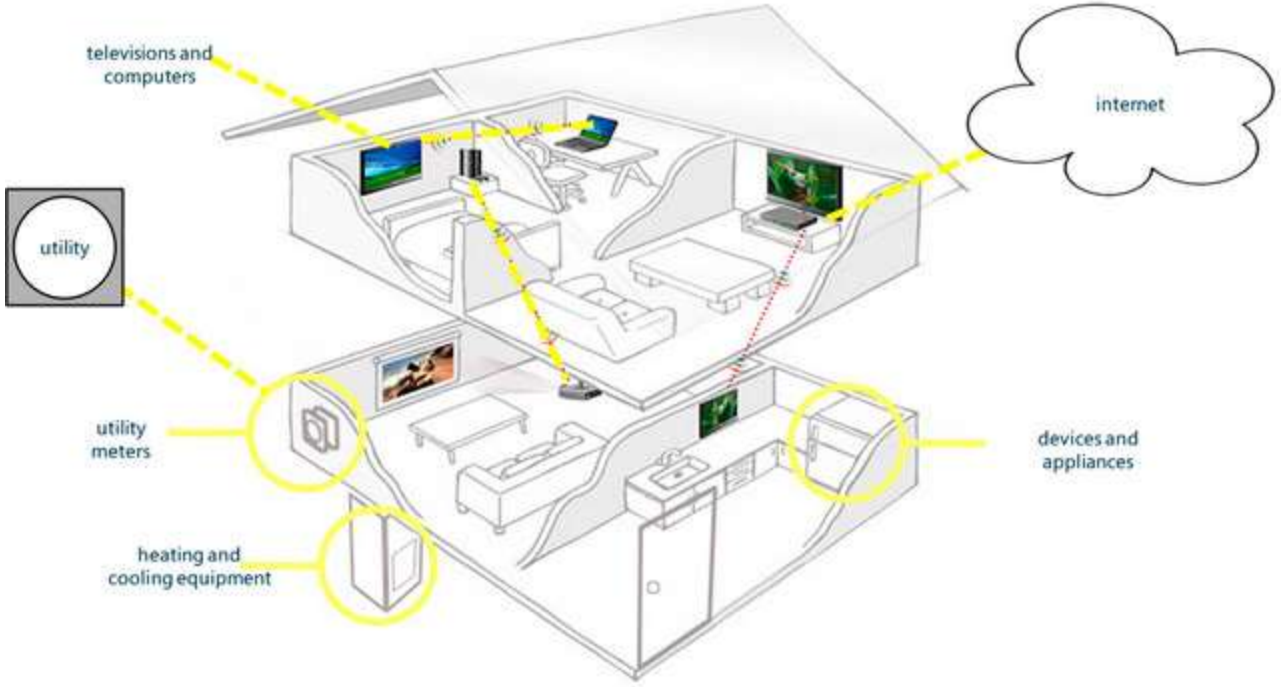
The coming years will see considerable increases in the prices for electricity, fuel, and water. Prices will go up because demand continues to grow – both in North America and across the world, as developing nations become more industrialized. At the same time as demand is growing, natural resources like oil and water become scarcer, resulting in higher prices. No one can predict the future, but it's likely that in the next three years, your monthly utility bills will be considerably higher than they are now, for the same volume of service.

2010		**2013 (projected)**
Electricity bill:	$[RESTORE RESPONSE]	$XXX (10/20/30% increase)
Natural gas bill:	$[RESTORE RESPONSE]	$XXX (10/20/30% increase)

Companies are developing systems and tools to help homeowners and utility companies cut energy consumption and reduce the amount of money spent for electricity. This next section presents some of their ideas. Please read the descriptions carefully with your household in mind.

Whole Home Connectivity

Today, many homes have some level of communication between devices, systems and/or appliances. For example, there is a connection between your TV and your cable/satellite service. There is a connection between your electricity, water and gas lines and your utility meters. You might have a wireless network that connects your computers, TVs, and music systems.



Some homes have advanced connectivity.

For example, smart utility meters can communicate with heating and cooling systems and appliances to enable the control, diagnostics and monitoring of utility consumption.

As technology progresses, new devices, appliances and home systems will make advanced connectivity options available to homeowners.

Energy as a Managed Service

Homeowners use energy to make their homes comfortable, provide light, and to run a variety of appliances and devices. Typically, a monthly energy bill tells homeowners the total amount that they have to pay, but provides limited information about whether or not they are using too much energy or even what they should be using.

Homeowners could make better informed decisions about energy usage if they had more details. A homeowner would have Energy as a Managed Service if they received detailed information about energy usage by individual devices, appliances, and home systems, and they could use that information to run their appliances/systems at maximum efficiency, reduce their energy consumption, and reduce their monthly energy bill.

Energy as a Managed Service Components

EMS Application

An energy manager software application lets homeowners view and control home energy consumption using a computer, TV remote, smart phone or thermostat. The application provides energy consumption information for the home as a whole, and for individual devices connected to the home network such as a furnace, air conditioner, hot water heater, dryer, pool, hot tub, or TV.

Energy as a Managed Service Components

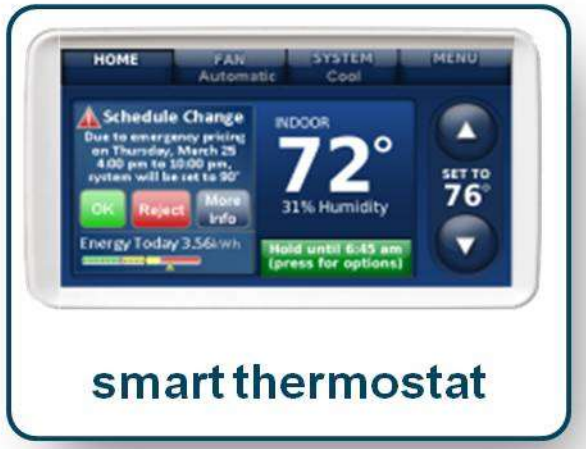
EMS Device

An energy manager device is a consumer electronics device that connects to a home network. It exchanges information with the energy utility and with devices, appliances, and home systems, to help the homeowner make better informed decisions about home energy use. It has a touch screen and Internet access, and can run other applications like calendars, social networking, and weather.

Energy as a Managed Service Components

Smart Thermostat

A smart thermostat connects to a home network. It reduces unnecessary on/off cycling by the heating and cooling system or heat pump. It can connect to the Internet to send the homeowner a distress alert, or to check the latest energy prices from the energy utility and adjust the heating and cooling system accordingly. Using a smart phone, a homeowner can control the smart thermostat while away from home, a useful feature to start the furnace warming up the house before people arrive home, or to control a humidifier or de-humidifier based on weather conditions. It has a touch screen and Internet access, and be used to check stocks, traffic or weather.



Smart Plug

A smart plug fits on top of existing electrical outlets. It's equipped with components to make it controllable on a home network. A smart plug gives homeowners detailed information about how much energy an individual appliance is using. Because it's programmable, people can also control appliances.

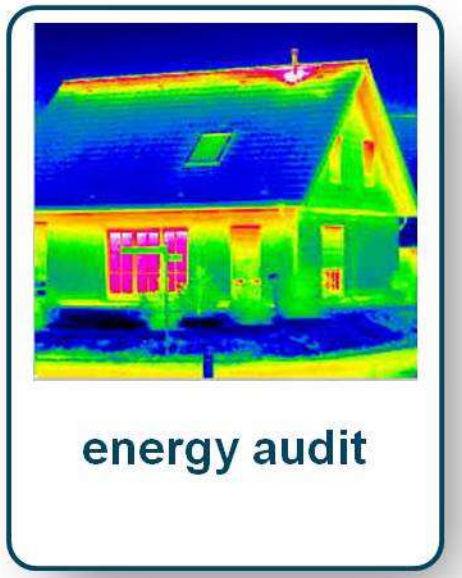
For example, a person could have a TV set-top box turn off at midnight and turn on again at 7 in the morning. A smart plug can send information to the energy utility. In necessary circumstances, your utility could control an appliance in your home when attached to a smart plug, if you give your consent.

Energy as a Managed Service Components

Energy Audit

An energy audit evaluates your home's energy efficiency using a standardized index that compares homes with current energy efficiency standards. In other words, your home's energy efficiency is compared to itself as if it were built today using current building standards. The audit uses information about your home's physical properties, appliance information, energy usage history, plus a test for drafts from doors and windows.

Along with your energy efficiency score, you will receive efficiency information about your windows, walls, lighting, air conditioner, furnace, water heater, attic insulation, duct system, air infiltration, and appliances. The report includes recommended actions and associated costs to upgrade your home to today's efficiency building standards. For each recommendation, you'll receive a timetable showing the amount of time needed to recover your investment through reduced energy costs.



Energy as a Managed Service Components

Smart Appliance or Home System

A smart appliance or home system such as a furnace, air conditioner, pool pump or hot water heater can receive, interpret and act on a signal received from a home energy manager system, utility, or third party energy service provider. The technology in the appliance or home system can automatically adjust its operation depending on the signal's contents and settings from the owner. These signals may include time-based pricing of energy to help reduce energy costs among other functions. Additionally, a smart appliance or home system may have the capability to provide alerts and information to consumers. Smart operating modes must be allowed to have the option to be locally overridden at the appliance or home system at the consumer's discretion.

Other Concepts Tested

Time of Use Pricing

Right now, most homeowners are charged a single price per kWh. In the future, homeowners will be charged Time of Use or Time Based Pricing, which follows the supply and demand pattern. Homeowners will be charged according to the amount of energy they consume during peak and off-peak usage times.

Most homeowners' average monthly cost will remain the same whether they're charged using standard pricing or Time of Use or Time Based pricing. If they choose to, homeowners can save money by shifting some of their energy consumption to off-peak times, when energy costs less.

Time of Use Pricing Example		
Rate	Time of Day	Monthly Cost to Run a Dishwasher
Peak	2pm – 9pm	$6.75
Off-peak	9pm – 2pm	$4.35
	Weekends	

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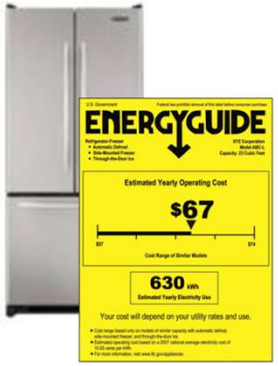
Other Concepts Tested

Independent Organization Testing/Rating

Next, think about what you consider important when buying a new appliance. In the future, there may be an independent organization whose purpose is to rate the return on investment of appliances, devices or home systems such as furnaces that can be connected to an energy manager service.



smart ENERGY CERTIFIED

SMART ENERGY is an organization that tests and measures how devices perform when used in conjunction with energy management features and systems. When this appliance is operated with a SMART ENERGY CERTIFIED service:

Estimated yearly Operating Cost	630 kWh
$47	Estimated yearly Electricity Use

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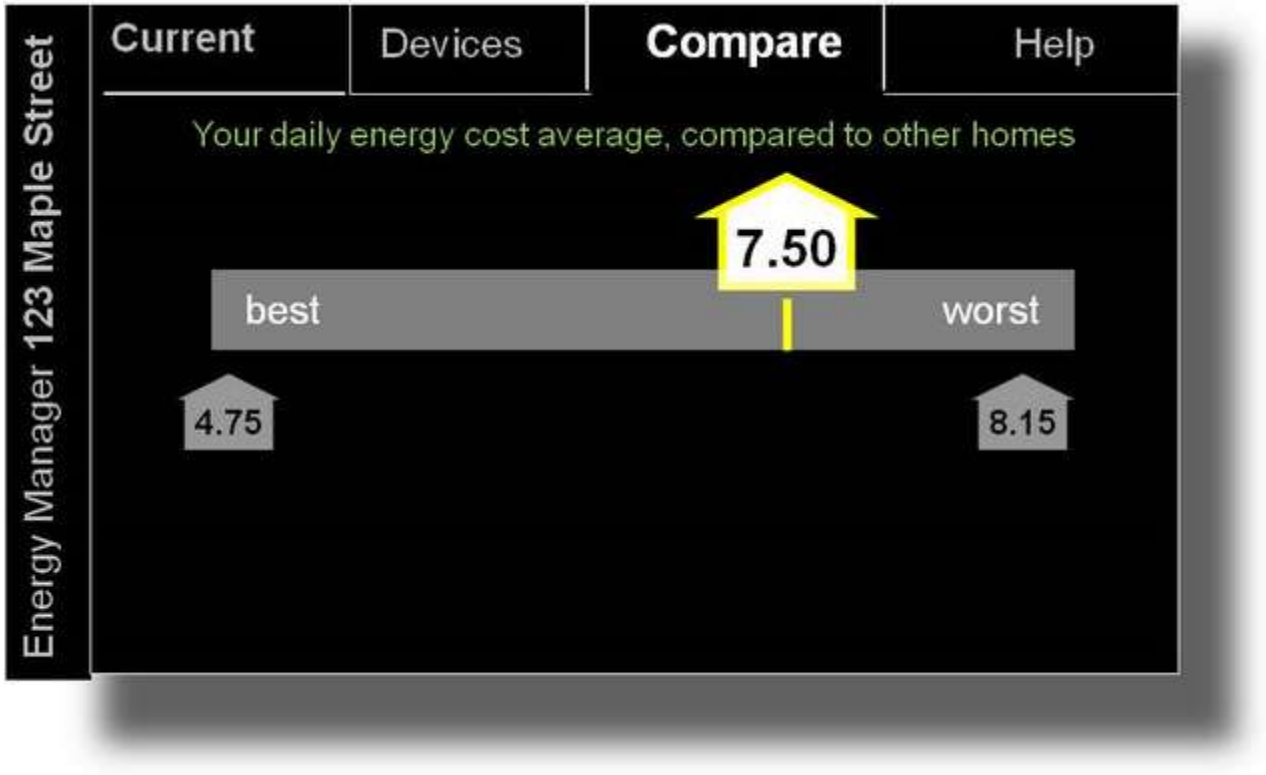
Like Homes Comparable Data

If desired, the Energy Manager application could display aggregate data from homes in your zip code with similar qualities to yours, such as square footage, age of the home, number of people in the home, etc.



Appendix

Terms of Use

Disclaimer

POCO Labs, LLC was engaged by CABA to prepare this report. The data on which this report is based was derived from consumers and not independently verified; accordingly the results may reflect inaccuracies in the underlying data. Other methods or approaches to the study may have yielded different results.

In no event will CABA nor POCO Labs, LLC be liable for direct, indirect, special, incidental, economic, cover, or consequential damages arising out of the use or inability to use this report even if advised of the possibility of such damages.

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Appendix

About Continental Automated Buildings Association's (CABA)

The Continental Automated Buildings Association (CABA) is a leading industry association that promotes advanced technologies in homes and buildings in North America. More information is available at www.caba.org.

About POCO Labs

POCO Labs is a professional services consultancy specializing in strategic product, business and service development for Fortune 100+ companies and leading industry organizations and institutions. POCO Labs' experience is diverse by industry with a focus on delivering unique consumer and business solutions - and at times - by collaboratively engaging strategically complementary organizations.

Our Michigan based firm offers a robust range of professional services including: concept development; pilot and prototype development and management; consumer and market research, financial analysis and business modeling; roadmapping and strategic alliance development. We do all of this in the spirit of creating new products, services and businesses for our clients.

Innovation driven market challenges were the impetus for POCO Labs' creation. And, our principals have been responsible for developing and growing businesses via the refinement and development of internal competencies and leveraging external collaboration with our clients. Our job is to make seemingly unconnected relationships among clients, technology, hardware, software, content, products, services, organizations and people connected.

For more information:

Visit: www.pocolabs.com

Contact: David Skelly, Founding Partner — 616.302.0550 — POCO Labs, LLC 545 North Main Street, Suite 202, Milford, MI 48381 USA


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