How Do Web-based Energy Use Portals Affect Consumer Energy Use?

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- Our team
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Presentation Overview

- What are third-party, Web-based energy use portals?
- Where do they come from?
- How do they work?
- How much energy can they save?
- What are the key features likely to provide the most value to utilities and their consumers?
- What have we learned from our case studies?
- Key conclusions
- Next steps

Smart Grid: the Information-Based Paradigm

- The term smart grid has been used quite broadly in many ways
- A smart grid includes a more participatory network, enabling consumers to actively manage their energy use
- Some studies suggest that when consumers have increased access to information about their energy usage an cost, they lower their energy consumption
- There are many different ways to provide consumers with increased and timely information, including enhanced billing approaches and in-home display devices
- A Web-based energy use portal is one avenue to provide consumers with improved information on their energy use and costs

What are Third-Party, Web-based Energy Use Portals?

- Non-utility organizations that provide specific information on energy use to consumers
- Some examples:

Web-based Energy Use Portal History

1973: Energy Crisis

1970s: The origins of building energy software

1980s: First-generation of simulation based analysis tools

1978: PURPA and NECPA Demand-side management programs began

1980s: Demand-side management programs grew rapidly

Mid 1990s: First Web-residential energy tool: Home Energy Saver, LBNL

ENERCOM

APOGEE INTERACTIVE

BERKELEY LAB ACLARA

HOME ENERGY SAVER
The first web-based do-it-yourself energy audit tool

1970 1980 1990 2000

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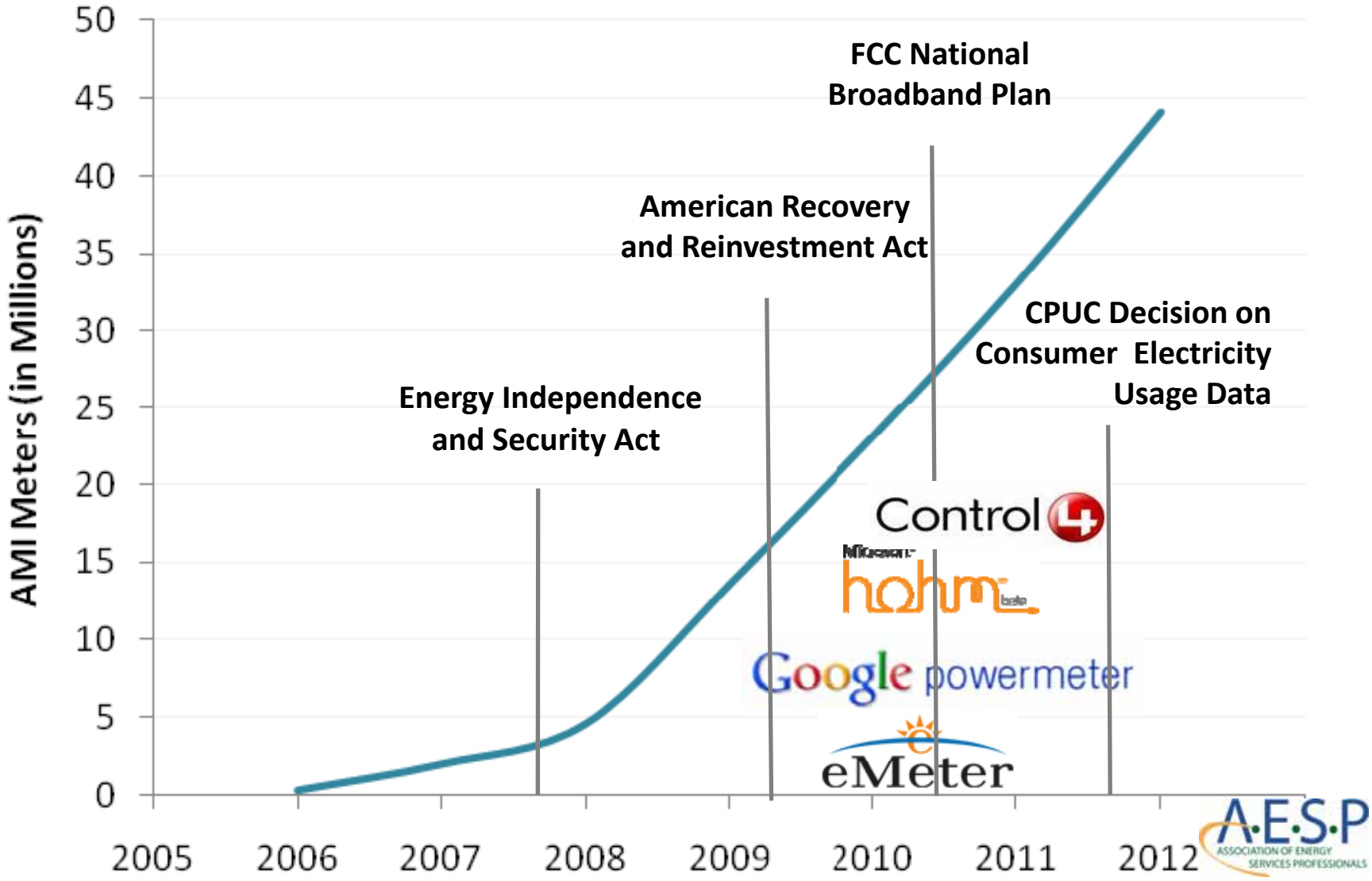
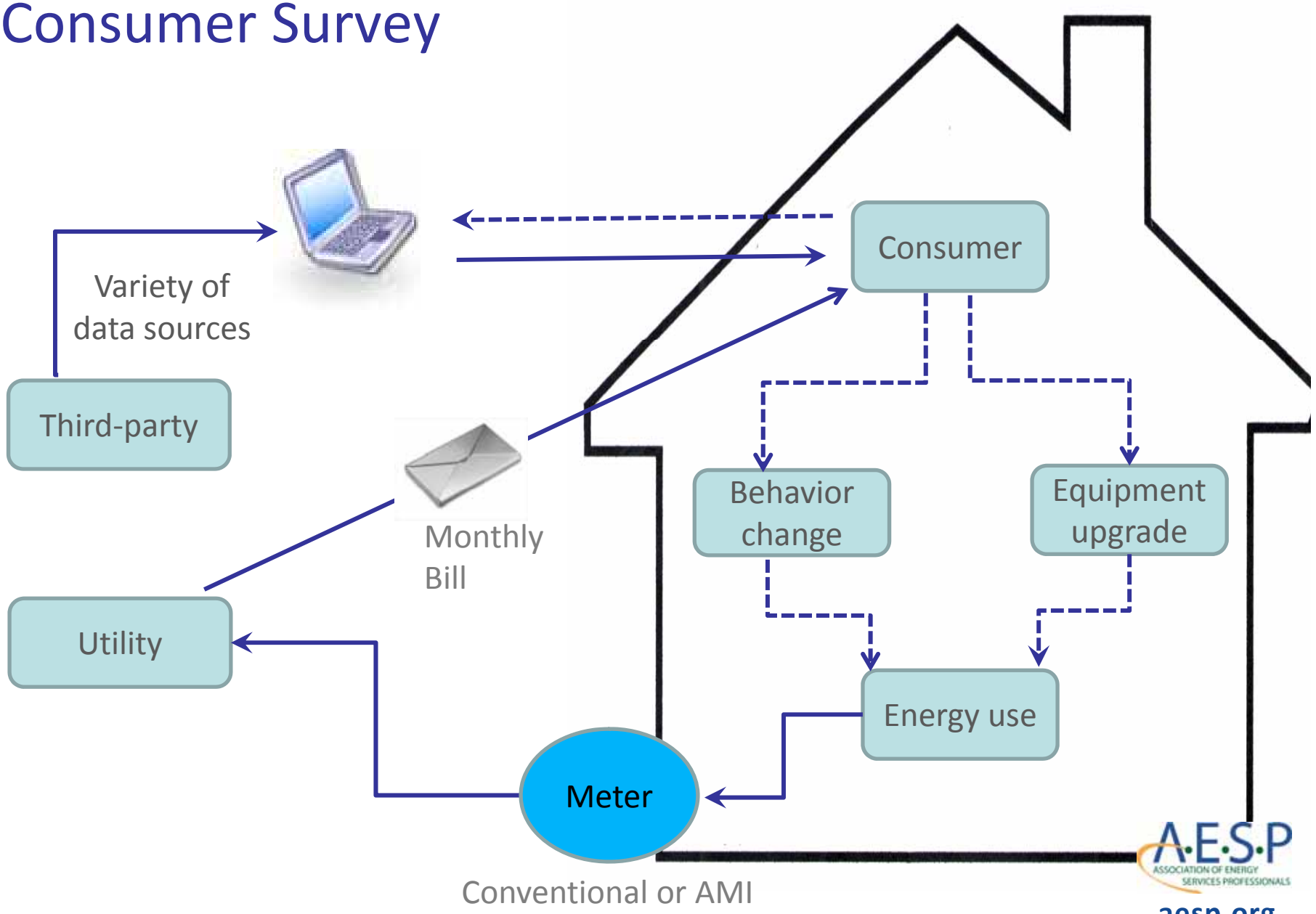
The Deployment of Smart Meters is Opening up New Opportunities for Third-Party Service Providers



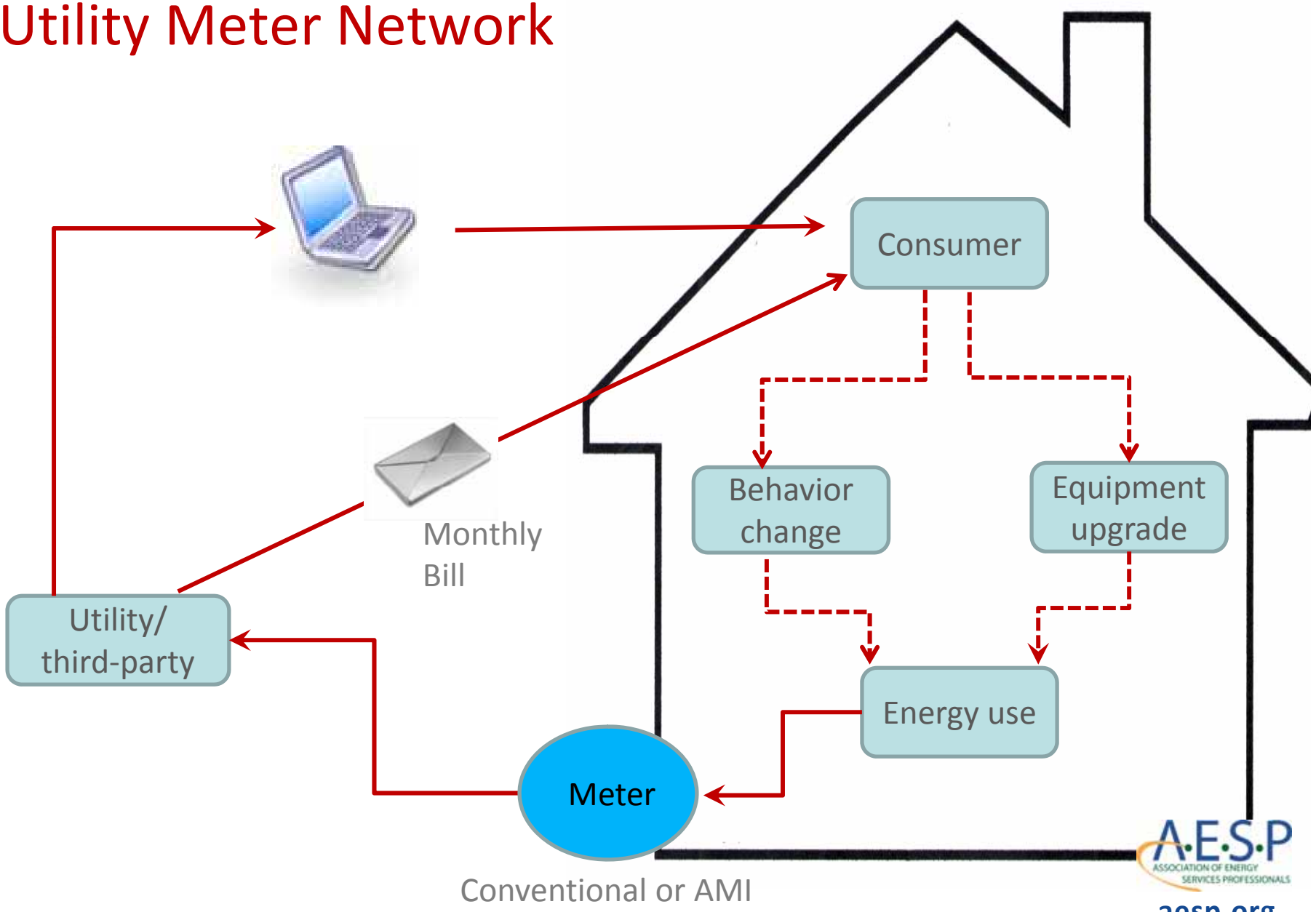
How Do Web Portals Work?

Consumer Survey



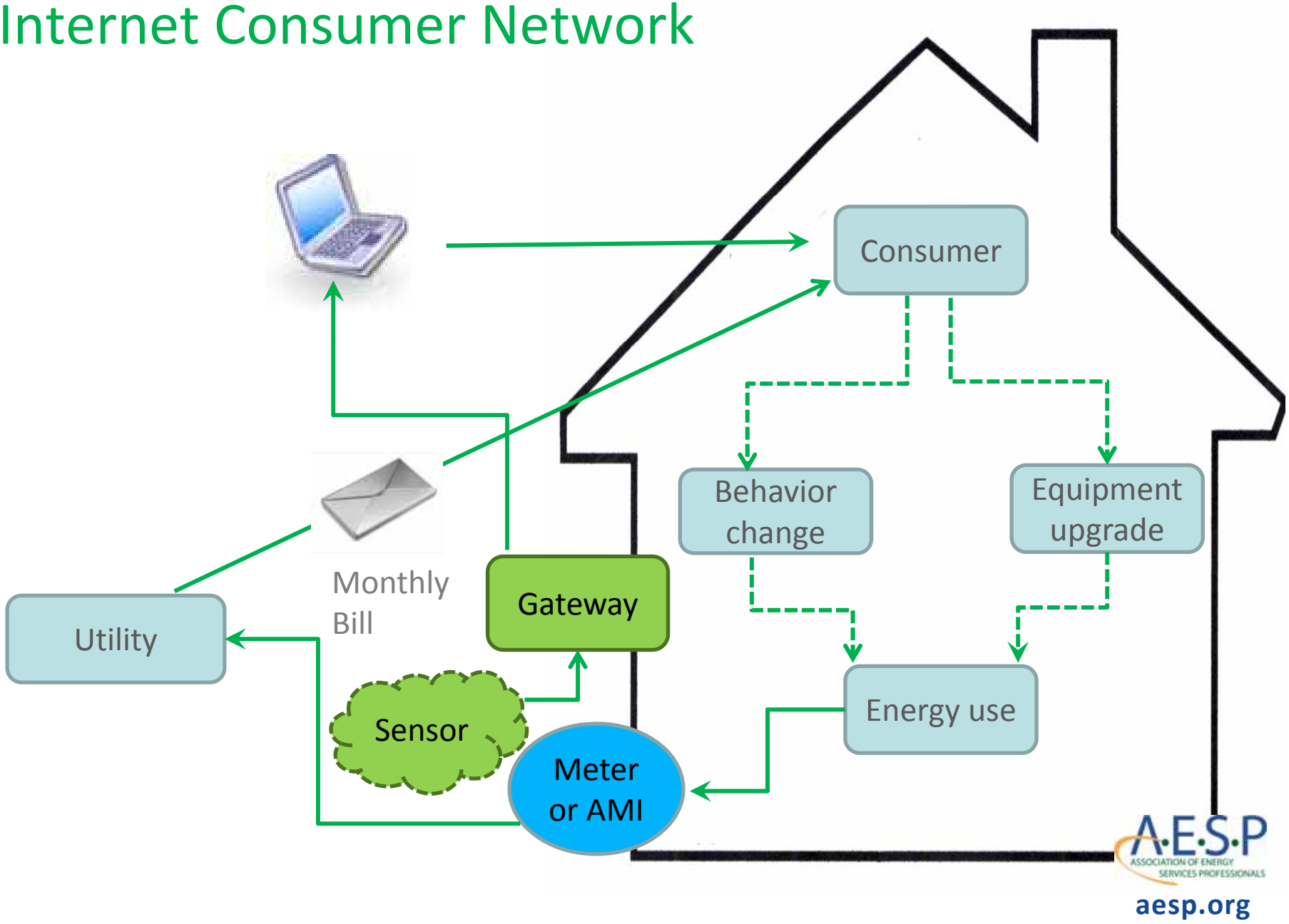
How Do Web Portals Work?

Utility Meter Network

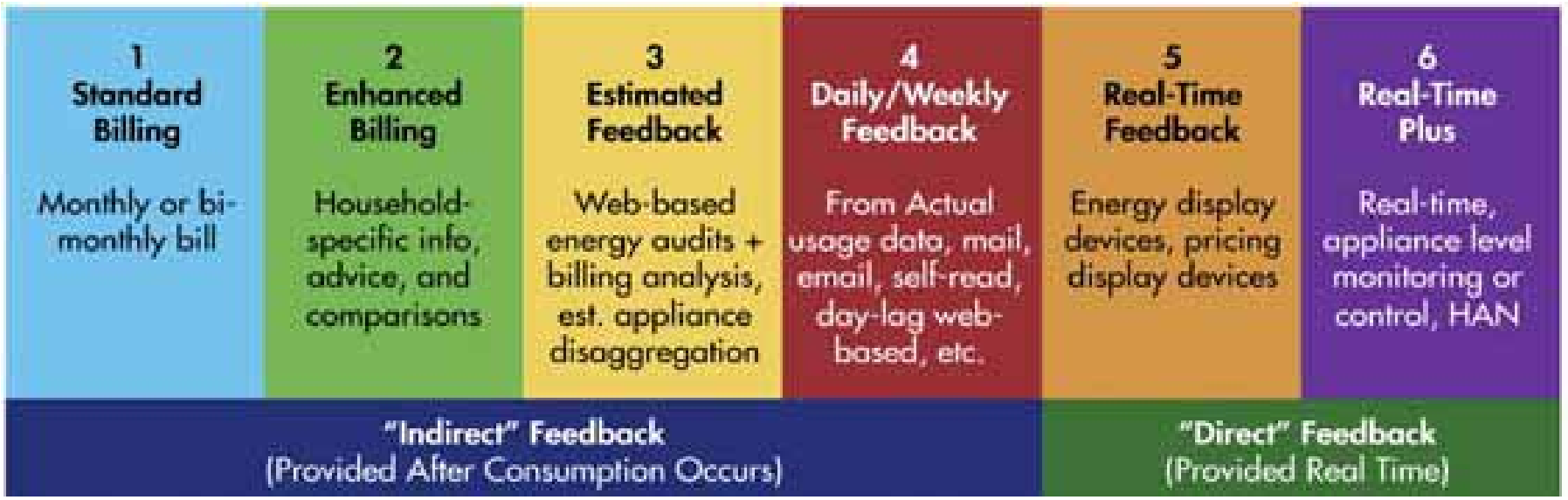


How Do Web Portals Work?

Internet Consumer Network



Wide Range of Technologies and Feedback Mechanisms



Source: EPRI 2009

OPOWER

HOME ENERGY SAVER
The first web-based do-it-yourself energy audit tool

Google powermeter

ACLARA

APOGEE INTERACTIVE

TED
The Energy Detective

+

Google powermeter

PowerCostMonitor.com
Think Green. Act Smart. Save Money.

+

Microsoft hohm beta

EnergyHub

TENDRIL
Smart Energy For Life

Control 4

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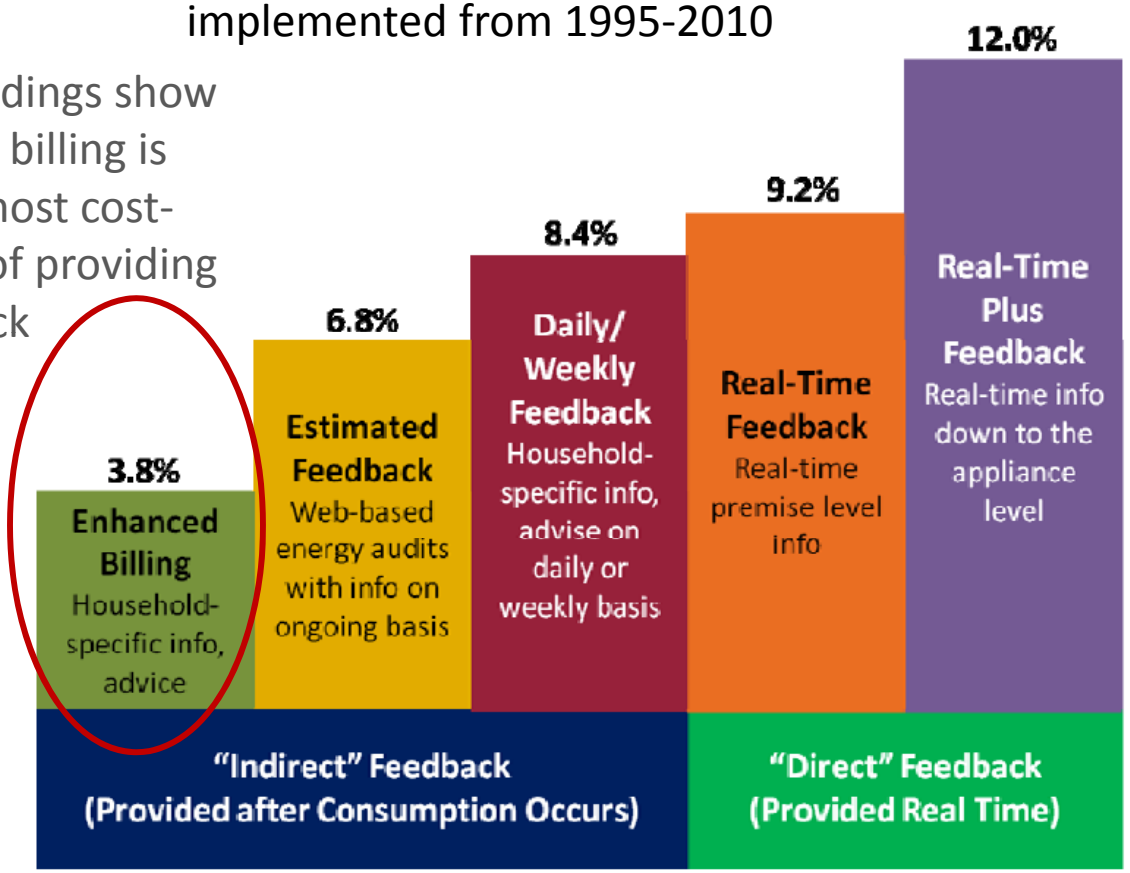
There is a Wide Range of Energy Savings Documented to Date: -6% to +32%

- Electricity savings from direct feedback ranged from 5% to 15%, while indirect feedback studies showed savings of up to 10% (Darby 2006).
- Overall savings effects across 31 independent studies ranged from -6% (i.e., increased energy use) to +18% (EPRI 2009).
- The most recent and comprehensive study today (Ehrhardt-Martinez et al. 2010) reviewed 57 independent studies and found that overall savings ranged from -6% to +32%

On Average Electricity Savings Using Different Feedback Mechanisms Ranged from 4% to 12%

Based on an ACEEE meta-review of 36 studies implemented from 1995-2010

Early research findings show that enhanced billing is currently the most cost-effective means of providing feedback



Increased estimated energy savings

Increased cost/effort to implement

Source: Ehrhardt-Martinez et al. 2010

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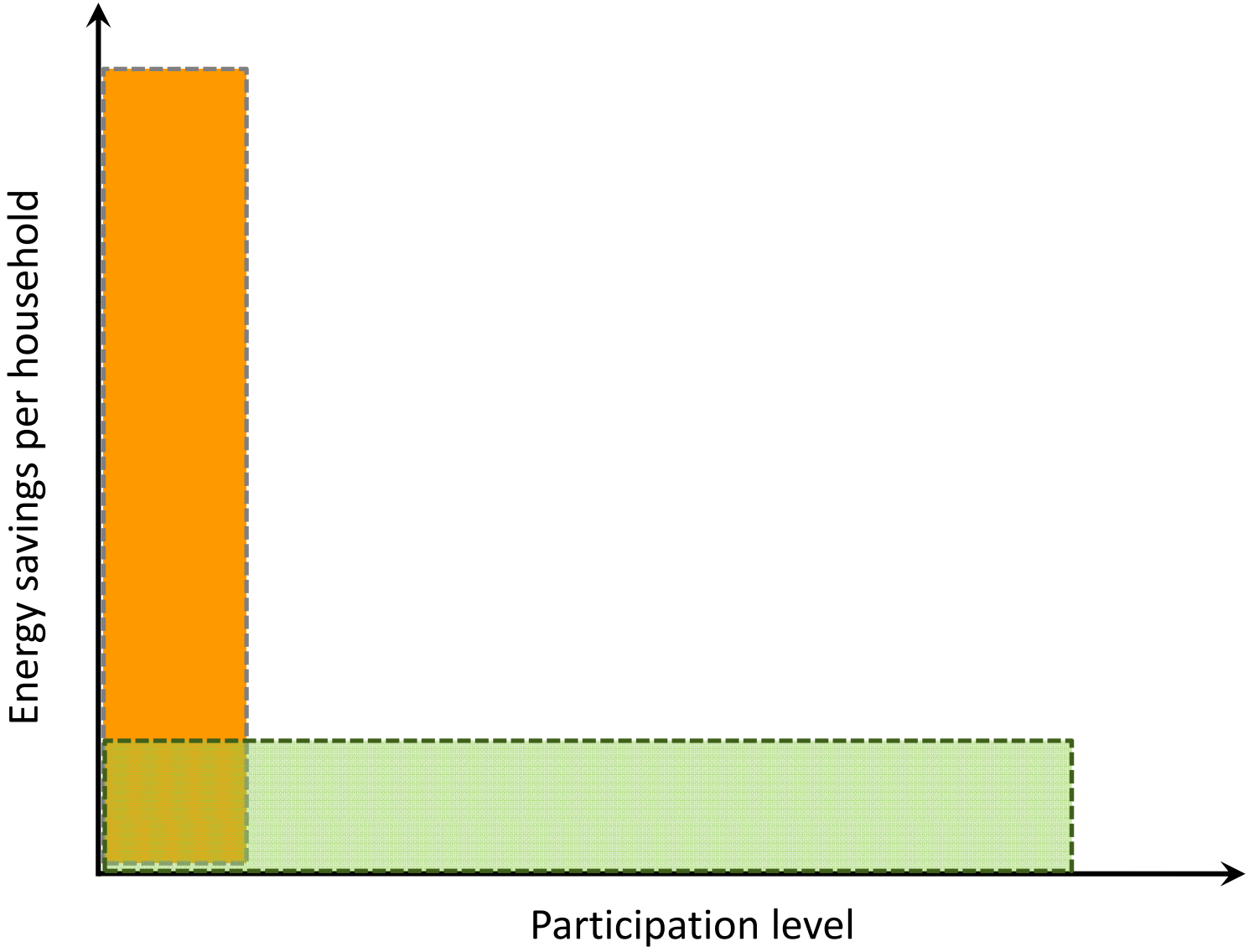
Why Savings Realized Range Widely

- Different types of feedback mechanisms and different types of technologies and programs
- Small research samples
- Short study durations/ Web portals are new, so have not undergone extensive long-term research
- Consumers who participate are volunteers

How Effective are Third-party, Web-based Use Portals?



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Example of Web Portal: eMeter

Source: Courtesy of eMeter 2010

Example of Web Portal: Energy Hub

Source: Courtesy of EnergyHub 2010

What are the Key Features Likely to Provide the Most Value to Utilities and their Consumers?

- Upgradable and scalable
- Clear and simple
- Interactive
- Frequent
- Appliance-specific consumption breakdown
- Provides meaningful historical and normative comparisons
- Provides personalized, tailored recommendations
- Uses targeted messaging to engage consumers, when relevant
- Uses motivational techniques, such as goal-setting, commitments, and competitions.

Google PowerMeter Case Studies

Co-ops	Number of members	Start date	Number of participants	Feedback	Status
White River Valley Co-op (MO)	42,000	2009	300 residential and commercial accounts	Positive	End date : Sept 16, 2011. Now using Energy Check
Minnesota Valley Electric Co-op	34,000	2009	20 members and 10-20 employees	Positive	End date : Sept 16, 2011. Now using Energy Tracker
San Diego Gas & Electric	~1.3 Million	2009	~7,000 members	Positive	End date: Sept 19, 2011. Now using Energy Charts

Survey Results MVEC (Source: Ryan Hendges, 2011)

- How valuable is Google PowerMeter? 6.8 out of 10
- Do either Google PowerMeter or Energy Check help you understand your electric usage? 82% Yes
- Have you been able to decrease your electric usage using either Google PowerMeter and/or Energy Check? 26% Yes, 39% No, 35% Don't Know
- Comments
  - The fact that MVEC is on the cutting edge of technology in providing its customers information that is not available with municipal utilities.
  - I am the envy of others who are with other electric companies!!
  - I love the idea, but it is clearly in its infancy. There is need for are finement in the GUI and information provided. You need to be able to tie high usage events back to "why" so that the consumer can take action to change.(e.g. cold weather, high wind, etc.)

Other Key Study Findings

- Technology alone is unlikely to generate sustainable energy savings
- The most effective Web-based energy use portals are likely to include both products and services
- The best of the tools offer an opportunity to enhance the value that co-ops can offer to their members
- There is a need and an opportunity for utilities to support their customers using these new tools and educate them on the value of available options
- Previous demographic studies suggest six categories of people that will have different responses to Web-portal offerings

Conclusions

- Concerns and caveats of Web-based energy use portals
  - Increased member questions and technical support demand
  - Dual fuel issues
  - Large software giants or smaller start-up companies
- Benefits of Web-based energy use portals
  - Enhance value that co-ops offer to their members
  - Address consumer complaints regarding high bills
  - Improve relationship with members by providing a new service
  - Evaluate and/or augment audit services and time of use pricing programs
  - Track energy usage of pre-pay consumers
  - Provide a platform to promote and enable energy efficiency, demand response, and other consumer education programs
  - Set a foundation for targeted marketing
  - Help consumers measure the benefits of their investments and behavior changes

Next Steps

- Join a coordinated effort by many utilities across the country to address:
  - Participation levels
  - Persistence of impacts
  - The impact of motivational techniques
  - The impact of different types of feedback on different demographic groups
- Increase participation levels by coupling Web portal technologies with services (e.g. pre-pay, budget assistant, appliance diagnostics, etc.)
- Conduct focus groups and consumer interviews in order to explore consumer preferences and reactions to new tools
- Achieve more savings by leveraging Web portals to improve energy efficiency programs and drive adoption of efficiency products and services (e.g. evaluate and/or augment audit services).

Thank You!

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