A stylized city skyline is depicted on the left side of the cover, with various building silhouettes in black and dark red. To the right, a large, bright sun with jagged rays is shown in shades of yellow and orange. The background is a gradient from red at the top to dark blue at the bottom. Several circular bokeh light effects are scattered across the lower half of the image.

PARKS ASSOCIATES

SMARTENERGY
SUMMIT:
ENGAGING THE CONSUMER

PROGRAM GUIDE

JANUARY 24-26, 2011 | AUSTIN, TEXAS

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Residential Energy Management



Residential Energy Management

Opportunities for Digital Systems and Services

A **LANDMARK RESEARCH PROJECT** that assesses the market for digital systems and services used to monitor, control, and manage electricity in the home:

- The **best opportunities** for products and services in residential energy management
- Current and planned **Smart Grid deployments**
- **Market momentum** of technologies employing emerging energy management solutions
- **Consumer interest** in these solutions, including a nationwide survey
- Profiles of **innovative companies** and utilities in the U.S. and around the world
- **Government efforts** to promote innovation and adoption

Up to 85% of U.S. households are willing to buy in-home energy monitors if these solutions can reduce their electric bills.

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Welcome

to the **2011 SMARTENERGY** SUMMIT

Thank you for attending Parks Associates' Smart Energy Summit: Engaging the Consumer.

2010 concluded with utilities making steady progress in their HAN trials, and 2011 began with several big REM announcements at CES. The entry of several big players underscores the massive market opportunities in this space, with Verizon, Toshiba, LG, GE, and Panasonic all showcasing new connected home solutions on the CES showroom floor.

We are optimistic about the future of this market in large part because of the results from our latest consumer surveys in our **Residential Energy Management** research. Here we found a distinct shift in consumers' perceptions of energy-related solutions. Consumers are starting to seek out energy-efficient products and services not just to conserve energy and save money but also to upgrade their home and improve their lifestyle or living conditions.

Of the 80% of U.S. households that performed some form of energy-related upgrade recently, 68% were motivated to save on their utility bill, and 65% cited personal comfort as another primary reason for making upgrades. These, along with other findings, show the consumer mindset shifting to the point where they will be demanding more energy-related solutions—and willing to pay for them.

The challenge is in aligning this demand with market offerings. Utilities have the infrastructure, but their process for enabling the HAN component of their smart meters will be slow and extended, opening many short-term opportunities for independent REM networks (iREM Nets) from a variety of players. Our forecasts indicate iREMs will outnumber utility-based HANs for at least the next 10 years. However, once utilities complete their trials, HAN deployment will be swift, so major providers of REM solutions need to work in parallel with utilities as part of a long-term strategy.

Parks Associates' **Residential Energy Management** is an annual program featuring industry reports and consumer surveys designed to provide our clients with quantitative and qualitative market assessments, along with growth forecasts.

Please visit www.parksassociates.com/homesystems to learn more.

We would like to thank the sponsors of **Smart Energy Summit**: AlertMe, Direct Energy, DMN3, ecobee, Gige Networks, GreenWave Reality, HomeGrid Forum, HomePlug Powerline Alliance, Ingersoll Rand Residential Solutions, Motorola's 4Home Solution, NextEnergy®, Panamax/Furman, Reliant Energy, and the Z-Wave Alliance.

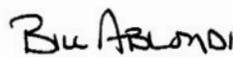
We hope you enjoy the event and look forward to your feedback,



Tricia Parks
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Bill Ablondi
Director, Home Systems Research
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SUPPORTERS



TUESDAY, JANUARY 25

9:30 AM

**Andres Carvallo**

*Executive Vice President
and Chief Strategy Officer*

Grid Net

Mr. Carvallo will explore how in the coming years the electric industry will evolve dramatically in how it makes infrastructure investments and what products and services it will offer. Historically, electric utilities had been extending already existing grid networks and offering services with very little variation to the infrastructure needed, to the business model and to the customer offerings. He will share his vision of what will happen as grid optimization becomes center to the Smart Grid investments driven by the proliferation of electric vehicles, distributed generation (e.g., solar PV), and distributed energy storage. We will see a re-design of the grid networks, the business models, and the customer offerings. Terms like Islanding, De-coupling, V2G, B2G, H2G, Dynamic Modulation, Predictive Volt/VAR, Demand Action, Predictive FDIR, and Advanced Power FACTOR will become more and more popular.

A View into the Future: Customer Driven Smart Grids

Mr. Carvallo will explore how in the coming years the electric industry will evolve dramatically in how it makes infrastructure investments

WEDNESDAY, JANUARY 26

9:00 AM

**Ron Ambrosio**

*Senior Technical Staff Member,
IBM Global Research Executive,
Energy & Utilities Industry;
Chairman, U.S. Dept. of Energy
GridWise Architecture Council;
Chairman, U.S. National Inst. of
Standards and Tech. SGIP Smart*

*Grid Architecture Committee; Convenor, ISO/IEC JTC 1
Special Working Group on Smart Grid*

end communication, advanced metering, home area networks and many others give us the tools needed to enable a participatory grid. This discussion will present some of the survey results above, review lessons learned from important pilot projects, and present thoughts on how we should be approaching the design of a participatory grid for the residential consumer, including the use of social computing technologies and the potential to unlock the consumer's personal motivations.

Engaging the Consumer—How to Make Smart Grids “Participatory”

One of the great challenges in smart grids has been to describe and quantify the consumer value proposition. It seems intuitive that a “smarter grid” should be better, but intuition doesn't always make for good business decisions. IBM surveys conducted around the world indicate there is high-value placed by consumer on being involved in their energy management, rather than having decisions made for them—they want to be a participant in the process. The broad range of technologies that fall within the smart grid scope, including end to

WEDNESDAY, JANUARY 26

12:30 PM

**George W. Arnold, Eng.Sc.D.**

*National Coordinator for
Smart Grid Interoperability,
National Institute of Standards
and Technology*

U.S. Dept. of Commerce

How will Consumers Benefit from the Smart Grid?

Modernizing the electric grid to provide clean and reliable power for the 21st century is a key national priority and the focus of significant private and public investment. While many people think of the smart grid as synonymous with smart meters, there is much more

to it. Many of the improvements being made to the grid are “behind the scenes” and less physically visible to consumers—but nevertheless deliver benefits that consumers will see in the form of reduced costs, fewer outages, and more secure energy supply.



Energy: Consumer Demand and New Business Models

The residential energy management market experienced major transitions in 2010 and into 2011. Utilities expanded their trials of Home Area Networks (HANs) solutions, and other service providers have identified new business opportunities in this space. Energy management solutions have become a focal cultural and political topic in the U.S.

All these changes put much more emphasis on the consumer, who will be critical in the success of future endeavors. This workshop focuses beyond the smart grid and into the home, where companies ultimately must compete to expand revenues and justify their expenditures. The research presented details the changes in the consumer perspective from 2010 to 2011 and examines new business models and opportunities that follow these changes.

12:30 Registration

1:00 Home Area Networks: State of the Market

- Update on the Ecosystem, Products and Services
- The International Picture: China, Europe and Africa
- 2011 Watch List: Opportunities and Pitfalls

2:15 Break

2:30 Understanding the Consumer: What We've Learned in 2010

- Consumer Classification and Segmentation
- Value Propositions that Motivate Consumers
- Review of Utility Education and Marketing Programs

3:15 Assessment of Major Opportunities: Drivers vs. Inhibitors

- Control Systems
- Energy Management & Monitoring Services
- Smart Appliances
- Electric Vehicles, Batteries & Charging Stations
- Photovoltaic Systems

4:15 Emerging Business Models—Alternative Approaches

- What business models are emerging in the residential energy management market?
- How are utilities' business models changing due to AMI deployments? What rate structures must be implemented to support new opportunities?
- Energy as a Service—this change will create opportunities for which companies? What are the key attributes of the service? What is the go-to-market strategy? What has been learned from market trials?
- The advent of systems that can take advantage of alternative utility rate structures such as time-of-use billing, critical peak pricing and demand response programs is discussed widely, but will manufacturers be able to profitably market products with these capabilities?
- Are there installation service opportunities for residential energy management systems?
- Will participants in this market take a page from the mobile phone service providers and subsidize equipment in order to sell services?
- What are the key metrics that need to be considered when building a business plan for this market?

John Heflin Baker, Jr., Chief Strategy Officer, Austin Energy

Jerry Kurtze, Senior Manager of Marketing & Business Development, Motorola Mobility

Jennifer Pulliam, Director, DSM Product Development, TXU Energy

Steve Samolinski, Director, Solution Management, Ingersoll Rand

5:30 Networking Reception

Network in an intimate setting with colleagues, event sponsors, and Parks Associates analysts.

PRESENTING ANALYSTS



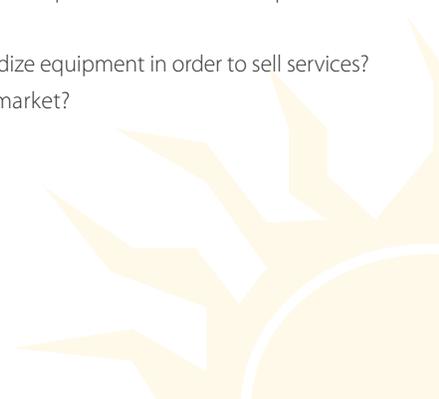
Bill Ablondi

Director, Home Systems Research
Parks Associates



Farhan Abid

Research Analyst
Parks Associates





MONDAY, JANUARY 24

- 12:30 Registration Desk Open
- 1:00 Smart Energy Workshop | Energy: Consumer Demand and New Business Models
- 5:30 Networking Reception

TUESDAY, JANUARY 25

TEXAS BALLROOM II & III

- 7:30 Registration Open and Breakfast
- 8:45 **Setting the Stage:**
2011 Landscape for Energy Management Services
Bill Ablondi, who has led Parks Associates' Residential Energy Management project since its inception, discusses the current consumer climate regarding acceptance of energy management solutions. This presentation features consumer survey data and analysis of the market forces shaping the landscape for energy management systems and services, with an assessment of several major market opportunities.
Bill Ablondi, Director of Home Systems Research, Parks Associates

- 9:30 **OPENING KEYNOTE:**
A View into the Future:
Customer Driven Smart Grids
Andres Carvallo
Executive Vice President
and Chief Strategy Officer
Grid Net



- 10:30 Break in Showcase Area
- 11:00 **Smart Grid Deployments: Balancing Benefits and Costs**
Building out a smart grid requires immense capital and resources, but utilities risk losing those expenditures without careful consideration of consumer attitudes and possible inhibitors to adoption. This panel features executive presentations on the challenge of crafting business strategies and deployment plans that account for all factors that can help or hinder deployment of a smart grid.
John Heflin Baker, Jr., Chief Strategy Officer, Austin Energy
Brian Dawson, CEO, Calico Energy
Sheri Givens, Public Counsel, Texas Office of Public Utility Counsel
Moderator—Bill Ablondi, Director of Home Systems Research, Parks Associates

- 11:45 **Solutions that Deliver on the Promise**
Successful business models for residential energy management have to come from an understanding of the balance between consumer motivations and their willingness to spend. While consumers show high interest in cost savings, they likewise demand demonstrable benefits before offering their full-fledged support for a solution. This panel features utilities, manufacturers, and installers discussing the challenges of communicating benefits to consumers and the barriers that must be overcome on the path to mass-market acceptance.
Gavin Cato, Director of Strategic Alliances, Elster Solutions
John LaCour, COO, DMN3
Stuart Lombard, President and CEO, ecobee
Bill Muston, Manager, Research & Development, Oncor Electric Delivery Company LLC
Steve Widergren, Principal Engineer, Pacific Northwest National Laboratory
Moderator—Stuart Sikes, President, Parks Associates

LUNCH

- 12:45 **Networking Lunch**—Sponsored by the Z-Wave Alliance



- 2:00 **Perspectives on Europe and Asia**
The implementation of smart grids around the globe has increased exponentially over the past several years. Deployments in many countries are well ahead of the U.S. and could provide valuable lessons to utilities, solution providers, and government entities. Although cultural, regulatory, and industrial particulars for each market vary widely, experiences of the various participants in Europe and Asia can help guide those seeking success in the U.S. This panel examines the unique factors driving adoption of smart grid infrastructures in Europe and Asia, including the activities of utilities and their partners, what lessons can be exported, and the different definitions of success.
Greg Memo, CEO, GreenWave Reality
Colin Calder, CEO, PassivSystems
Moderator—Farhan Abid, Research Analyst, Parks Associates

AFTERNOON

- 3:00 **Break in Showcase Area**—Sponsored by Motorola's 4Home Solution



MORNING



TUESDAY, JANUARY 25

TEXAS BALLROOM II & III

AFTERNOON

3:30 **Cloud-based Energy Management for Consumers**

Smart grid technology developers are turning to the cloud to deliver energy management services. The cloud computing market is expected to grow significantly in the coming years and offers compelling benefits, but presents some new challenges. This panel session will bring together current participants, technology enablers and those with a keen eye on the opportunity for delivering energy management solutions through the cloud. Discussions will focus on the opportunity, business models, keys to engaging the consumer and the challenges to overcome.

David Bercovich, *Vice President, Business Development, AlertMe*

Jerry Kurtze, *Senior Manager of Marketing & Business Development, Motorola Mobility*

Roy Perry, *Director, Technology Integration, CableLabs*

Eric Saltzman, *COO, EcoFactor*

Moderator—**Bill Ablondi**, *Director of Home Systems Research, Parks Associates*

4:30 **Energy as a Service**

Electricity is a commodity and a valuable one, but regulatory changes and technology advancements are introducing a new dimension into this business: competition. The proliferation of broadband allows a variety of players to offer value-added services beyond their current commodity offerings. For example, electricity providers can now offer energy monitoring and management services along with electric power. This panel features presentations from a variety of different service firms—from telcos and MSOs to security companies and retail electricity providers—about opportunities they see in residential energy management.

Eric Bruno, *Senior Vice President, Consumer Product Management and Development, Verizon*

Scott Burns, *Manager, Smart Energy Product Management, Reliant Energy*

Christopher Deutschen, *Senior Manager, Direct Energy*

David Hennekes, *Vice President, Residential Markets, TXU Energy*

Steve Malnight, *Vice President of Integrated Demand Side Management, PG&E*

Moderator—**Farhan Abid**, *Research Analyst, Parks Associates*

EVENING

5:45 **Networking Reception**

Network & view latest innovations in the Showcase

7:30 **A Lone Star Dinner: Join Parks Associates for a barbecue feast at Stubb's BBQ—as only Texas can offer.** —Transportation Provided



WEDNESDAY, JANUARY 26

TEXAS BALLROOM II & III

7:30 **Continental Breakfast & Registration**

8:30 **Welcome & Opening Remarks: Opportunities Ahead of the HAN**

Parks Associates provides an analysis of energy management opportunities for manufacturers, service providers, and utilities based on extensive consumer research and assessments of innovative solutions being introduced into the market.

Bill Ablondi, *Director of Home Systems Research, Parks Associates*

9:00 **OPENING KEYNOTE: Engaging the Consumer —How to Make Smart Grids “Participatory”**

Ron Ambrosio

Senior Technical Staff Member, IBM Global Research Executive, Energy & Utilities Industry; Chairman, U.S. Dept. of Energy GridWise Architecture Council; Chairman, U.S. National Inst. of Standards and Tech. SGIP Smart Grid Architecture Committee; Convenor, ISO/IEC JTC 1 Special Working Group on Smart Grid



10:00 **Partners in Progress: The Ecosystem Continues to Grow**

The electric utility industry, traditionally a one-dimensional business responsible for delivering power to consumers, is transitioning into a dynamic mode of operation. Numerous industries, sparked by consumer interest, new technologies, and government funding, are leveraging AMI and broadband deployments to develop new energy management products, services, standards, and business models. These presentations address key areas of growth, areas for new partnerships, and strategic plans to further ignite consumer demand and accelerate adoption.

Greg Ennis, *Technical Director, Wi-Fi Alliance*

Randy Kauffman, *President, NextEnergy*

Rob Ranck, *President, HomePlug Powerline Alliance*

Moderator—**Farhan Abid**, *Research Analyst, Parks Associates*

MORNING

11:00 Break in Showcase Area

11:30 Perspectives from the Ecosystem

The ecosystem for residential energy management systems and services continues to expand, encompassing retailers, ISPs, manufacturers, and installers along with utilities, but at its core, the consumer is still king. The energy industry will not realize the full benefits of the smart grid without engaging consumers, whose attitudes and demands will largely determine the parameters of successful business models. This interactive panel explores the role of different players in providing mass-market solutions that generate viable long-term businesses.

- Kris Bowring**, Sr. Director, Emerging Business, Best Buy
- Al Choperena**, President, SimpleHomeNet, Inc.
- Mark Komanecky**, Vice President of Sales & Marketing, Eragy
- Ivan O'Neill**, Strategic Alliance Manager, Southern California Edison
- Steve Samolinski**, Director of Solution Management for Connected Home Solutions, Ingersoll Rand

Moderator—**Stuart Sikes**, President, Parks Associates

12:30 LUNCHEON KEYNOTE: How will Consumers Benefit from the Smart Grid?

LUNCH

George W. Arnold, Eng.Sc.D.
National Coordinator for Smart Grid Interoperability, National Institute of Standards and Technology
U.S. Department of Commerce



1:45 Opportunities beyond the HAN

Much of the discussion about the impact of smart grids on the residential market focuses on the home area network, but new technologies are creating opportunities for an array of new products and businesses. This session features manufacturers who are deploying advanced products and creating new business strategies for smart appliances, electric vehicles, and more.

- Utz Baldwin**, CEO, CEDIA
- Andy Melder**, Powerline Marketing, Broadcom
- JT Thompson**, Utility Sales Leader, GE Appliances and Lighting

Moderator—**Farhan Abid**, Research Analyst, Parks Associates

2:45 Gateways into the Home

AFTERNOON

Companies looking to offer end-to-end energy management solutions have a variety of options for reaching systems on the HAN. Traditionally, the utility meter has had the role of “energy gateway” to the home, but new devices are emerging that expand the market vision of the HAN to a network encompassing all systems and devices in the home. The home gateway thus becomes critical to creating whole-home residential energy management solutions. This interactive session addresses gateway options for the home, the different efforts in developing control standards for end-to-end networking, and analysis of the potential benefits to the consumer and the industry.

- Mike Dow**, Business Development, Freescale Semiconductor representing IPSO Alliance
- Chano Gomez**, Director of Business Development, Lantiq North America, Inc. representing HomeGrid Forum
- Bill Scheffler**, Senior Director of North American Business Development, Z-Wave Alliance
- Kenneth Wacks**, Member, GridWise Architecture Council, U.S. Department of Energy
- David Waskevich**, Market Development Engineer, Industrial Business Unit, STMicroelectronics, Inc.

Moderator—**Bill Ablondi**, Director of Home Systems Research, Parks Associates

3:45 Special Session: Smart Energy Summit Roundtable Wrap Up

Join Parks Associates' analysts and selected conference participants to discuss their perspectives on key takeaways from Smart Energy Summit. The three-day conference features more than 50 speakers sharing their views on a variety of topics ranging from smart grid deployments to energy as a service, not just a commodity, to opportunities beyond energy management control systems. This session provides attendees the opportunity to explore questions raised during the Summit and assess the implications for their businesses while setting the stage for a final round of networking.

Moderator—**Bill Ablondi**, Director of Home Systems Research, Parks Associates



Residential Energy Management: State of the Market 2011

by Bill Ablondi, Director, Home Systems Research, Parks Associates

Consumer concerns about the environment, rising costs of energy, depreciating infrastructure components, and economic pressures are driving change in the utility industry. Utilities are responding by shifting into a dynamic mode of operation through the introduction of Advanced Metering Infrastructures (AMI). States and the federal government are supporting these moves in hopes the implementation of smart metering technology and energy management programs will meet the demand for energy without the need for new power plants.



Forecasting the installation of smart meters in the residential market requires consideration of several factors beyond market acceptance:

- The ability of utilities to fund deployment of smart meters and the necessary AMI infrastructure
- The willingness of local governing bodies, e.g., public utility commissions (PUC), to approve rate structures that make smart meters attractive to consumers and utilities
- Utilities' willingness to commit to long-term deployments

Smart Meters

The key component of an AMI is the smart meter—a digital meter capable of recording and reporting usage data to providers and households. Smart meters with an appropriate user interface allow consumers to make informed decisions in response to real-time household power consumption data. In addition, smart meters can allow utilities to monitor and control systems in the home, provided those meters are equipped for that task. Most smart meters currently deployed outside trial programs provide utilities with consumption data but are not controlling systems in homes.

At the end of 2008, utilities had installed approximately 4.6 million residential smart meters. Collectively, utilities have announced plans to install more than 50 million smart meters for residential customers over the next 3-4 years.

- At the end of 2009, approximately 12% of U.S. households had an AMI-capable electric meter, rising to 20% in 2010.
- By 2015, utilities will have installed approximately 56 million meters on over 40% of all households.

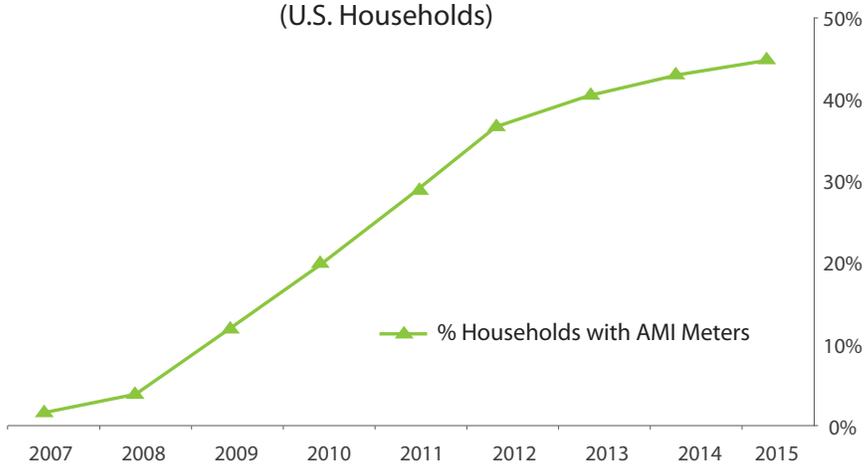
However, few of the meters currently deployed are activated for use in two-way monitoring, communications, and control applications. Virtually all HAN-activated meters installed as of the end of 2010 are in test, trial, or pilot programs, and that likely will not change in the short term. The primary reasons for this include:

- Lack of a ratified ZigBee Smart Energy 2.0 profile
- Cautious approach among utilities—many utilities indicate they will be cautious with HAN deployments even after commercial products incorporating ZigBee SE 2.0 become available
- The need for PUC approval of rate structures that take advantage of smart grid capabilities—which could be a time-consuming process
- Time required to educate consumers about the benefits of HANs to stimulate their engagement and avoid any (further) backlash

These are all temporary inhibitors, but it means the market for solutions that work as part of independent (non-utility) residential energy management networks (iREM Nets) will grow more quickly than the HAN market over the next five years and remain dominant for the next ten years. By 2015, over 10 million U.S. households will have an iREM Net, and less than six million will have a utility-based home area network (HAN).

Households with AMI-Capable Meters

(U.S. Households)



© 2011 Parks Associates

Over the next 10-15 years, utilities will choose the technologies best suited to their needs and deploy them rapidly in their service regions.

For these reasons, Parks Associates has prepared an extended HAN forecast, beyond the standard five-year forecast horizon, which predicts that HANs and iREM Nets will match household deployments by mid 2020, with HANs then surpassing iREMs to approach almost 40% penetration by 2022. (See page 16 for more details on this forecast.)

Drivers and Inhibitors Affecting Adoption of REM Solutions

Consumers are not engaged in managing their electricity use

- Many take typical steps to avoid waste, but few are aware of solutions that have the potential to cut costs conveniently and enhance their comfort.
- Parks Associates' 4Q 2010 consumer survey revealed nearly 50% of U.S. households are still not at all familiar with the term "smart meter."
- Utilities are well-positioned to build awareness, but initial deployments of smart meters in some regions spurred skepticism of smart grid capabilities nationally.
- Many consumers are not willing to allow utilities to control systems in their home even if they can override control.

Utilities face multiple hurdles in AMI deployments

- Economic recession is hindering utilities' ability to make large AMI investments.
- Many of the new benefits require approval of new tariffs.
- Utilities seek to shed load; consumers seek savings.

Opportunities for residential energy management systems are not confined to utility-based HANs

- Consumers will adopt products and services that provide convenience, enhance comfort, and save money.
- PCTs, IHDs, and remote monitoring services are good examples of offerings that can provide value to consumers even if not part of a utility HAN or alternative billing program.
- Home controls are effective tools for consumers when they manage their participation in utility TOU and DR programs even if not part of a HAN.

Multiple technology contenders for control standards hinder adoption

- Chipsets which support multiple network protocols, both wired and wireless, will drive down the cost of supporting multiple network standards, thus pushing the industry over the standards hurdles.
- Collaboration among proponents of alternative standards will increase integration opportunities and choices for manufacturers, utilities, and consumers.

Energy management business models remain a work-in-process

- Consumers are willing to pay for systems and services to help them reduce expenditures on energy, but the amounts may not be not enough to create attractive business opportunities.
- Business models based on subsidizing equipment with recurring fees may be a viable option in a manner somewhat parallel to the models used for security systems and mobile phones.

Drivers to the adoption of REM solutions

- Consumer desire to reduce expenditures on energy
- Ready availability of solutions proven to be cost-effective
- Continued introduction of affordable products by manufacturers, service providers, and retailers that consumers know and respect
- Improved consumer education initiatives by utility companies as they continue to deploy advance metering infrastructures
- Emergence of remote home monitoring and control services that build on broadband Internet access
- Efforts by industry alliances and consortia in cooperation with major CE and home improvement retailers (once they commit to the REM category) to build consumer awareness for REM solutions
- Introduction of monitoring and control services by ISPs

Promising Residential Energy Management Solutions

by Farhan Abid, Research Analyst, Parks Associates



In its latest “Energy and Winter Fuels Outlook” report (<http://www.eia.doe.gov/steo/contents.html>), the U.S. Energy Information Agency (EIA) projects the retail cost of electricity will grow year-over-year by approximately 1.5%. Increases in production costs combined with growing demand for electricity are driving these higher costs.

Utilities are taking steps to deploy **Advanced Metering Infrastructures (AMI)**, spurred in part by government stimulus funds, to help them better manage their electricity distribution systems and enable alternative rate structures and programs that could save money. For example, utilities can implement time-of-use (TOU) billing or demand response (DR) programs that offer their customers variable rate plans in which they charge a lower rate during certain times of the day and a higher rate during others. Consumers can then decide when to use energy-hungry appliances such as dryers and dishwashers.

Utilities are deploying 10-11 million smart meters each year across the U.S.

- Utilities had installed 13-14 million AMI-capable meters on U.S. residences at the end of 2009.
- By the end of 2015, approximately 56 million meters will be installed on over 40% of households.

However, few meters currently are enabled to communicate with in-home devices. Numerous trials are underway, but no full-scale HAN deployments exist. This situation will change in the latter part of the decade as trials conclude and utilities use these results to determine which technologies to deploy.

There will be a period of rapid HAN implementation from 2015 through 2020.

Utility-based home area networks (HANs) represent only one of several possible paths for residential energy management solutions and services to enter the consumer market. **Consumer demand for energy-saving solutions will attract new sets of players**, including communications service providers and technology vendors. Even security monitoring service provider ADT has entered this market.

The ability to remotely monitor a home and control systems such as thermostats and door locks is attractive to many consumers. Broadband service providers see these capabilities as logical extensions of their offerings.

Other examples of utility-independent solutions include simple handheld energy monitors that communicate via a sensor attached to an electromechanical meter. More advanced products offer capabilities such as Wi-Fi-enabled thermostats capable of two-way communications for Web-based remote monitoring services.

INTEGRATED REM SOLUTIONS

Integrated REM solutions—adding energy monitoring and control capabilities with existing home control applications increases the attractiveness of products and expands the target market.



Energy management applications will coexist with other applications on the home network including data, entertainment, security and lighting control.

Web-based software and service platform developers are providing APIs to third-party application developers so that their consumer-based applications are integrated into larger platforms. They want their applications to do more than simply the task at hand; for example, they want their energy applications integrated with and accessible through social networks. The goal is to engage consumers with the platform to do more than simple energy monitoring and control.

Notable REM Solutions



AlertMe

AlertMe's solution is a home security and energy management platform. Simple components allow consumers to monitor and manage their energy remotely through the cloud.



ecobee

ecobee's two-way communicating thermostats are intuitive, DR enabled, and can be managed by consumers through the web. Customers can program email or text alerts for DR events, maintenance alerts, and more. Utility can send DR signals and control HVAC systems to reduce energy consumption during peak events.



GreenWave Reality

GreenWave Reality provides a platform that allows consumers and utilities to manage energy consumption more efficiently. With simple DIY smart plugs and power strips, GreenWave Reality provides consumers and utilities with powerful tools to better understand overall energy usage patterns, enabling them to better balance energy distribution on the grid including incentivizing customers to shift demand from peak to off-peak times.

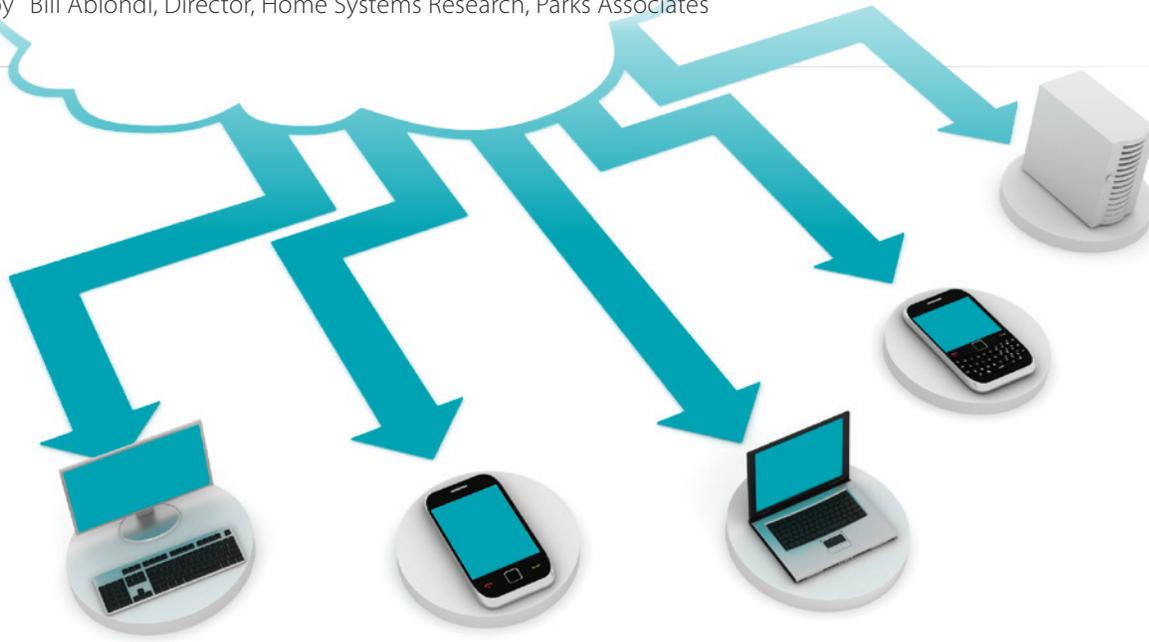
LEADING TECHNOLOGY FIRMS

Leading technology firms are developing solutions in this area:

- **ADT**—The company introduced the ADT Pulse whole-home automation solution in October 2010. System includes home security, energy management, and home control components.
- **GE**—GE is doing numerous things in the REM and smart grid space. The company will launch the GE Nucleus later this year, which is a wall-outlet Internet gateway that communicates with a smart meter and transmits energy consumption data to the cloud.
- **Cisco**—The company's Home Energy Controller (HEC) is being employed as part of Duke Energy's smart metering pilot in the Carolinas. The HEC is an energy monitoring and management display supported with a full web interface that offers cloud-based services and provides weather, traffic, and other data.
- **LG**—LG is developing smart appliances, including washers and dryers.
- Other innovative solutions include cloud-based services and mobile applications.

Energy Management from the Cloud

by Bill Ablondi, Director, Home Systems Research, Parks Associates



Remote home monitoring services are emerging applications sparked by the availability of broadband and demand for content access from the cloud.

Consumers can connect a variety of sensors (motion, door/window, power, water, etc.) and a camera to an Internet connection that then feed information to a website. Users can receive notifications on a mobile phone or by email should a change in status or an alert occur or check for updates via any web-connected device.

An early player in this area is **iControl**, which now collaborates with **ADT Security** to allow ADT customers to access their home status or receive alerts across multiple platforms. It is a value-added feature to professional security monitoring made affordable by the pre-existing diffusion of broadband capabilities within many homes currently paying for professional monitoring.

Another early participant is **Alarm.com**, which sells its service through independent security dealers. The company originally provided control capability using X10 technology but has now switched to **Z-Wave**. As is the case with the ADT offering, Alarm.com dealers offer the self-monitoring and control capabilities as additive features to professional monitoring services.

Companies can build off remote monitoring to offer remote control solutions for other systems, including HVAC, lighting, security, and door locks.

Video and telephone service providers are actively exploring remote home monitoring services as opportunities to expand service bundles and build customer loyalty, with communication service providers such as **AT&T**, **Qwest**, and **SureWest** already offering services.

The adoption of remote monitoring systems and services will occur gradually and only after consumers become aware of these capabilities. Conditions that may accelerate adoption include offerings from major service providers that couple remote home control and monitoring services with Internet, voice communications, and content services. This bundling strategy, combined with the marketing might of these large players, could easily ignite consumer demand.

Parks Associates' surveys show over 30% of U.S. broadband households are interested in the ability to remotely control appliances and thermostats and monitor security cameras through a PC or mobile device. U.S. respondents rate their interest in the ability to remotely monitor their homes via IP or web cameras the highest of any provided remote application. Remote monitoring and control of thermostats was next, followed by remote lighting control.

Other applications within the category of remote monitoring systems and services include activity monitoring of elderly family members, "latchkey" children, and pets as well as power outage and severe weather notifications.

The number of households with some form of remote monitoring and control will surpass 14 million by 2015 as security system and broadband service providers build consumer awareness for these capabilities. At the end of 2009, there were approximately 3.4 million households with self-monitoring capability. Most of these homes had a webcam or IP camera installed as the primary means of monitoring.



By 2015, 11% of all households will have remote monitoring and control systems installed.

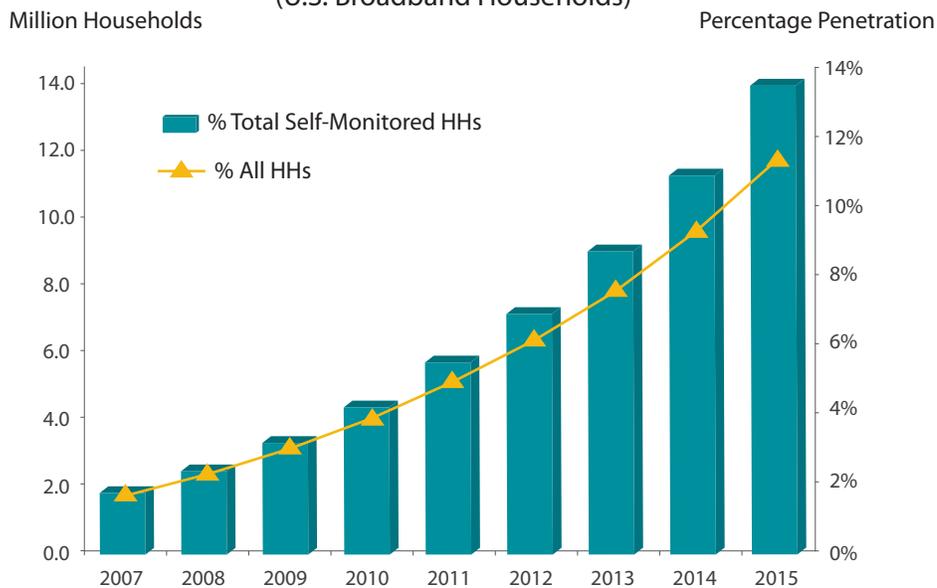
These systems enable consumers to control systems in the home such as HVAC, lighting, security, and door locks remotely.

Rollouts of monitoring services by security and communications providers will grow this market, and as a result, most consumers with remote monitoring capabilities will not subscribe to separate, fee-based services, especially in the early stages. Many will have access to these capabilities as part of existing subscriptions to professionally monitored services or broadband subscriptions.

As the capabilities of fee-based services increase, expanding beyond standard remote monitoring solutions, these offerings will attract more consumers. By 2015, five million households will subscribe to fee-based, self-monitoring services, accounting for 35% of all households with remote monitoring capability. Applications include remote monitoring and control to manage energy-consuming systems. Parks Associates' consumer research indicates 15-20% of U.S. broadband households are very likely to pay for an energy monitoring service at a cost of \$5-\$10 per month. This group of households represents the early-adopter market from energy-related remote monitoring.

Self-monitoring Households and Penetration

(U.S. Broadband Households)



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Opportunities Ahead of the HAN

by Bill Ablondi, Director, Home Systems Research, Parks Associates

The residential energy management market is not limited to smart meter deployments and HAN activations.



Parks Associates forecasts that consumers will adopt systems that display and allow them to better manage their electricity consumption.

Some of these systems will be connected to data and/or control networks in homes, and others will operate on a stand-alone basis.

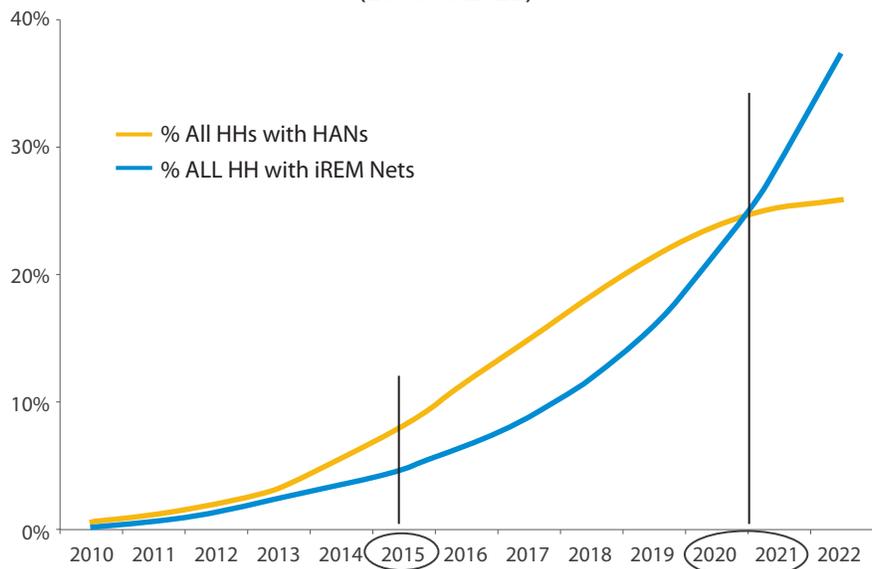
Detailed forecasts for selected systems that can operate in either a HAN or independent residential energy management network (iREM Net) are in Parks Associates' report *Residential Energy Management: Forecasts for AMI Deployments and Energy Management Solutions*, published in June 2010.

A basic iREM Net includes a programmable communicating thermostat. More capable iREM Nets include load control modules (LCMs) for water heaters and/or pool pumps and integrated controls for other energy-consuming systems. A control system dedicated to security or lighting is not considered an iREM Net in this analysis.

Parks Associates forecasts that **more than 10 million U.S. households (8% of U.S. households) will have some form of iREM Net by the end of 2015.** Another 4.7%, or **5.9 million, will have a HAN.**

If a household has a HAN, it is unlikely to also have an iREM Net. Consequently, the two solutions are considered to be mutually exclusive. Clearly, there is a significant opportunity, especially in the early stages of the market, for companies to provide products and services that enable iREM Nets.

U.S. Households with HANs vs. iREM Nets
(2010 to 2022)



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The Question Remains:

“How will Utilities Engage Consumers in Energy Management Solutions?”

Utilities have the motivation, capability, and, for the most part, trust of consumers to provide viable energy-saving solutions. Parks Associates' research indicates that consumers trust their electric utilities regarding information and solutions for energy conservation and cost savings.

To be able to monetize this trust, utilities must find ways to micromanage demand in order to fully utilize their generation capabilities and operate their distribution networks more efficiently. Therefore, utilities will activate smart meters with HAN capabilities once they complete their trials and determine which technological approaches are most likely to achieve their goals.

This activation will take time. As a result, **iREM Nets will be more prevalent than HANs at the end of 2015**; however, there will be a period of rapid implementation of HANs from 2015 through 2020 and beyond. By 2020-2021, the percentage of households with HANs will equal that of households with iREM Nets. As a result of HAN implementation, growth of iREM Nets will decline, and the percentage of households having them will level off...and then decline in the 2020s.

The implications are clear for firms targeting opportunities in residential energy management. **Ultimately, opportunities for solutions within utility-driven market environments will be dominant**, but over the next 8-9 years (2011 to 2020), opportunities in iREM Nets will be most prevalent. Therefore, firms seeking to be major providers of REM solutions must develop parallel go-to-market strategies to succeed in the long term: one that addresses the near-term opportunities for iREM Nets and another focused on working closely with utilities. Parks Associates' forecasts function as a "market clock" which companies can use to time their shifts in priorities and resource allocations.

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Opportunities Beyond the HAN

by Farhan Abid, Research Analyst, Parks Associates

Residential energy management and the smart grid market will serve as catalysts for the adoption of many new energy technologies.

Frequently, and for good reason, discussions about this emerging market focus on the expansion of smart grids as these solutions enable electricity distribution systems to manage alternative energy sources (e.g., solar and wind), improve reliability, facilitate faster response rates to outages, and manage peak-load demands. The deployment of REM technologies creates opportunities that include smart appliances, electric vehicles, and microgeneration, among other things.



There are numerous local, state, and federal incentives supporting the development, installation, and implementation of microgeneration technologies, targeting both consumers and enterprises, in order to save money and encourage conservation.

- A federal tax credit of 30% of cost is available for existing homes and new constructions to install geothermal heat pumps, small wind turbines, or solar energy systems.
- A federal tax credit of 30% of cost, up to \$1,500, is available for homes to upgrade to energy-efficient HVAC systems, insulation, water heaters, and windows and doors.
- Corporate Renewable Energy Grants of 30% of property value are available through the U.S. stimulus fund for businesses installing solar, geothermal, or wind turbines.

New Markets

The advent of alternative energy will change the role of the individual from a simple consumer to a power generator; households will have the ability to sell power back to the utility. The main opportunities will take one of three forms—smart appliances, electric vehicles, and microgeneration.

Smart Appliances

Appliances typically account for only 13% of electricity consumption (EPA 2010).

Appliance manufacturers are developing Smart Appliances that can be controlled by the electric utility to temporarily reduce power or delay some normal operations during peak pricing periods. The owner can override the utility's actions if desired. **Some examples of how these appliances will operate during peak times:**

- » A refrigerator delays its defrost cycle—a cycle that takes more energy than normal operating mode—until the energy cost is lower.
- » A dryer reduces the wattage used by the heating coils.
- » A dishwasher delays its start until a time of day when electricity rates are lower.

- CE manufacturers developing Smart Appliances include GE, LG, Panasonic, and Whirlpool. All major appliance manufacturers have announced the launch, production, or development of smart, connected appliances.
- The primary focus of manufacturers is to support utility DR programs.

Challenges

- Additional incentives are necessary to drive market acceptance.
- Utility subsidies and tax incentives will be required.
- Smart appliances should be viewed as one component of energy-efficient homes, not as stand-alone product opportunities.



Electric Vehicles

- Growing popularity in recent years driven by:
 - » Rising cost of gasoline
 - » Environmental concerns
 - » Improvement in battery storage technology
 - » Government support through tax credits
- The Obama Administration has a goal of supporting the deployment of 1 million plug-in electric vehicles by 2015.

Driving ranges vary depending on how people drive and other factors, such as the weather and use of heater or air conditioner.

Challenges

- **High Price**—the average cost for an electric vehicle is over \$30,000.
- **Batteries are developed by third parties.**
- **Charging stations** must be made widely available.
- **Utilities must develop means** to handle additional load on power grid.
- **Billing mechanisms** to handle roaming charges must be developed.

WHAT IS MICROGENERATION?

Microgeneration, or local energy generation, is the ability to generate power and electricity on a small scale through renewable sources of energy such as solar, wind, and geothermal. Microgeneration can support the functioning of small islands, army bases, neighborhoods, individual homes, schools, and small business buildings independent of the power grid.

Types of Microgeneration

- **Wind Turbines**
 - » Electricity generated by converting wind power through the use of turbines
- **Geothermal Energy**
 - » Extracting heat present in the ground and converting it into electricity
- **Solar Energy Systems**
 - » Capturing light energy from the sun with the help of solar cells embedded in photovoltaic panels (PVs) and converting it into electricity

Microgeneration

- **Strong Interest**
 - » There is strong interest among consumers and enterprises to learn more about alternative energy.
 - » Consumers and businesses alike want to find out how they can support and benefit from microgeneration industries.
- **Utilities Need Backup**
 - » The growing demand for energy and the cost of developing more power plants are motivating some utilities to consider microgeneration as a backup to tackle load shedding and power outages.
- **New Markets**
 - » The advent of alternative energy will change the role of the individual from a simple consumer to a power generator; households will have the ability to sell power back to the utility.

Challenges

- **Ability to Integrate** with the Electricity Grid
 - » Many technological and regulatory challenges exist in integrating microgrids with the larger power grid.
- **High Cost**
 - » Even with financial incentives, the technology is expensive to develop and implement, and the rate of return for PVs and other renewable technologies is not clear.



The Consumer Mindset

by Farhan Abid, Research Analyst, Parks Associates

Engaging consumers is critical to the success of all participants in the REM market—including utilities, communication service providers, CE and appliance manufacturers, and suppliers of in-home networking gear and control systems.

Understanding consumer attitudes, opinions, needs, and motivations is the initial step in understanding the demand and drivers for various residential energy management (REM) systems and services.

A primary question addressed in Parks Associates' REM research is...

"How motivated are consumers to manage their electricity consumption?"

If they are uninterested, then there will be limited opportunities for many of the systems and services being introduced into the market. On the other hand, if they are interested in cutting energy costs (and Parks Associates' Residential Energy Management research shows that they are), we need to determine what motivates them and whether they are willing to pay money to achieve their goals.

Key segmentation parameters include household energy expenditures, CE ownership, current service contracts, and attitudes about energy savings and utility control of their appliances.

The vast majority of consumers are very interested in reducing expenditures on energy consumption, and they are willing to pay to save.

The problem is, on average, consumers are not willing to pay enough to cover the cost of required systems. Consumers are willing to pay \$80 to \$100 on a one-time basis for a system that will save 10-30% on their electricity bill. Therefore, **innovative business models must be developed to capitalize profitably on the opportunities.** Companies must address the following questions in developing successful business strategies.

What factors affect interest and willingness to pay to reduce electricity costs?

Over one-half of all U.S. broadband households report their electricity rates have increased more than 10% from 1Q 2009 through 1Q 2010. These market conditions have generated a general interest in energy-saving solutions. That does not necessarily translate into willingness to pay for REM solutions, but in combination with a renewed cultural emphasis on energy conservation, it does create an overall base of interest.



Are there specific groups of consumers to target in the early stages of REM market development?

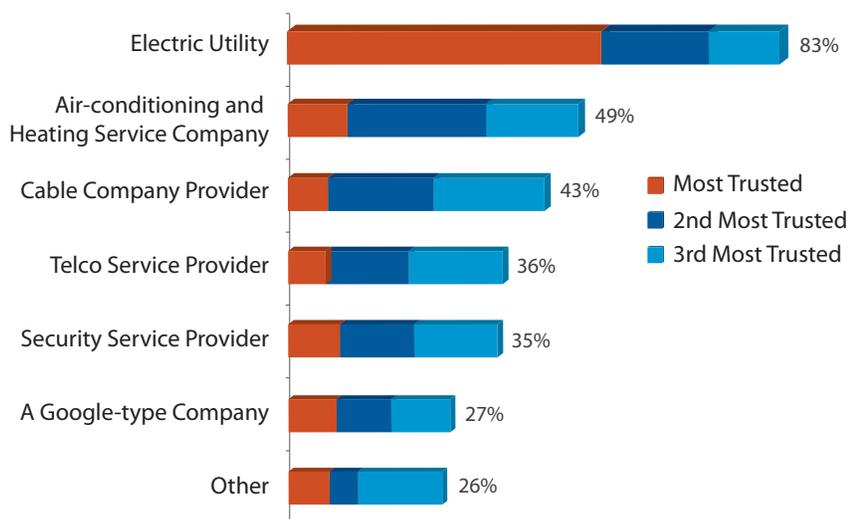
- Consumers who are environmentally conscious (37% of U.S. broadband households)
- Consumers reporting a willingness to allow utilities to control systems in their home (35% of U.S. broadband households)
- Consumers who subscribe to professionally monitored security services (14% of U.S. broadband households).
- Consumers who are actively engaged in managing their energy consumption. For example, 3% of U.S. broadband households place a timer on their water heater, and 58% set back their thermostats to limit their energy usage. Both groups would be excellent prospects to adopt REM solutions.
- Young consumers (18-34), which represent 24% of U.S. broadband households.



Who do consumers trust to help them manage their energy consumption?

Consumers look to electric utilities for energy monitoring and savings solutions FIRST, but other service providers are strong contenders to gain the trust of consumers if they choose to offer energy management services. Consumer levels of trust in cable, telco, and security service providers are relatively equal when considering an energy monitoring service. Having that established relationship with a provider (including a billing relationship and some level of in-home infrastructure) is significant, as Google-type companies (i.e., over-the-top providers) do not score as well among consumers for REM-oriented services.

Trusted Providers for an Energy Monitoring Service (Among U.S. Broadband Households)



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ecobee, founded in 2007, delivers intelligent conservation solutions for real people. The company is building its product platform around The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™. ecobee's products are sold for use in single family homes (new and retrofitted), multi-family dwellings and light commercial properties. www.ecobee.com



GreenWave Reality

The GreenWave Reality platform creates smart energy- efficient homes through the monitoring and controlling of devices. This system benefits both utilities and consumers; utilities enhance their relationship with consumers and can better balance energy on the grid while consumers can conserve energy with a minimal impact to their lifestyle by easily monitoring and controlling their appliances and adding intelligent LED lighting.

The GreenWave Reality solution is an ideal way for utilities to greatly enhance the value of smart meter deployments by providing consumers an affordable, secure, and easy-to-use system to gain a more comprehensive understanding of their energy consumption. At the same time, GreenWave Reality provides utilities with powerful tools to better understand overall consumer energy usage patterns, enabling them to better balance energy distribution on the grid including incentivizing customers to shift demand from peak to off-peak times. www.greenwavereality.com



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Z-Wave products and applications include lighting, HVAC, door locks, alarm panels and security, sensor devices, window shade control and more. Z-Wave is also at the forefront of green energy with devices that read whole home energy use and smart switches that control "vampire power". Z-Wave devices can be managed locally and through mobile devices such as laptops, smart phones and i-pads. www.z-wavealliance.org

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The Continental Automated Buildings Association (CABA) is a not-for-profit industry association dedicated to the advancement of intelligent home and intelligent building technologies in North America. CABA "Your Information Source for Home & Building Automation". www.caba.org



The Custom Electronic Design & Installation Association (CEDIA) is an international trade association of companies that specialize in planning and installing electronic systems for the home.

These systems include home networking, home automation and communication systems, media rooms, single or multi-room entertainment systems, and integrated whole-house subsystems providing lighting control, security, and HVAC systems. www.cedia.org



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ESNA; Energy Services Network Association is a global association of utilities and solution suppliers to promote and to expand the adoption

of Network Energy Services (NES) architecture and infrastructure together with the value added applications for secured, reliable and cost-effective automatic meter management, Billing, CRM and CIS.

ESNA initiates the development of a standardised open application protocol Interface between the utility enterprise software and the Advanced Meter Infrastructure to ensure the growth to majority of Smart Metering and Smart Grids in near future. www.esna.org



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SIPFORUM The SIP Forum is an IP communications industry association that engages in numerous activities that advance and promote SIP technology, such as the development of industry recommendations, the SIPit interoperability and testing events, special interoperability workshops, and general promotion of SIP in the industry. One of the Forum's recent technical activities is the development of the SIPconnect Technical Recommendation—a standards-based recommendation that provides detailed guidelines for direct IP peering and interoperability between IP PBXs and VoIP service provider networks, and the SIPconnect Compliant Certification Program through which eligible companies can gain SIPconnect validation and the right to license the use of the SIP Forum's 'SIPconnect Compliant' certification mark—the official brand of the leading standard for SIP Trunking products and services. Other important Forum initiatives include work in Fax-over-IP interoperability, User Agent Configuration, and the opportunities for SIP in Smart Grid deployments. www.sipforum.org

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The mission of the SunSpec Alliance is to accelerate the growth of the renewable energy industry by driving data and communications interoperability standards. www.sunspec.org



The U-SNAP Alliance is an open industry association. The U-SNAP Alliance is a non-profit mutual benefit corporation formed to create a low cost connector standard for connecting Home Area Network (HAN) devices to Smart Meters. The U-SNAP Alliance fosters collaboration and education among industry stakeholders who seek interoperable, secure and cost effective solutions for extending the Smart Grid to energy aware consumer products. www.usnap.org



The Wi-Fi Alliance is a global non-profit industry association of hundreds of leading companies devoted to the proliferation of Wi-Fi technology across devices and market segments. With technology development, market building, and regulatory programs, the Wi-Fi Alliance has enabled widespread adoption of Wi-Fi worldwide.

The Wi-Fi CERTIFIED™ program was launched in March 2000. It provides a widely-recognized designation of interoperability and quality, and it helps to ensure that Wi-Fi enabled products deliver the best user experience. The Wi-Fi Alliance has completed more than 7,000 product certifications to date, encouraging the expanded use of Wi-Fi products and services in new and established markets.

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MONDAY, JANUARY 24

- 12:30 **Registration Desk Open**
- 1:00 **Smart Energy Workshop** | **Energy:** Consumer Demand and New Business Models
- 5:30 **Networking Reception**

FOOTHILLS II

PARKS ASSOCIATES

TUESDAY, JANUARY 25

- 7:30 **Registration Open and Breakfast**
- 8:45 **Setting the Stage: 2011 Landscape for Energy Management Services**
- 9:30 **OPENING KEYNOTE: A View into the Future: Customer Driven Smart Grids**
Andres Carvallo, *Executive Vice President and Chief Strategy Officer, Grid Net*
- 10:30 **Break in Showcase Area**
- 11:00 **Smart Grid Deployments: Balancing Benefits and Costs**
- 11:45 **Solutions that Deliver on the Promise**
- 12:45 **Networking Lunch**—Sponsored by the Z-Wave Alliance
- 2:00 **Perspectives on Europe and Asia**
- 3:00 **Break in Showcase Area**—Sponsored by Motorola's 4Home Solution
- 3:30 **Cloud-based Energy Management for Consumers**
- 4:30 **Energy as a Service**
- 5:45 **Networking Reception**—Network & view latest innovations in the Showcase
- 7:30 **A Lone Star Dinner: A barbecue feast at Stubb's BBQ** —Transportation Provided

TEXAS BALLROOM II & III



WEDNESDAY, JANUARY 26

- 7:30 **Continental Breakfast & Registration**
- 8:30 **Welcome & Opening Remarks: Opportunities Ahead of the HAN**
- 9:00 **OPENING KEYNOTE: Engaging the Consumer—How to Make Smart Grids "Participatory"**
Ron Ambrosio, *Senior Technical Staff Member, IBM Global Research Executive, Energy & Utilities Industry; Chairman, U.S. Dept. of Energy GridWise Architecture Council; Chairman, U.S. National Inst. of Standards and Tech. SGIP Smart Grid Architecture Committee; Convenor, ISO/IEC JTC 1 Special Working Group on Smart Grid*
- 10:00 **Partners in Progress: The Ecosystem Continues to Grow**
- 11:00 **Break in Showcase Area**
- 11:30 **Perspectives from the Ecosystem**
- 12:30 **LUNCHEON KEYNOTE: How will Consumers Benefit from the Smart Grid?**
George W. Arnold, Eng.Sc.D., *National Coordinator for Smart Grid Interoperability, National Institute of Standards and Technology, U.S. Department of Commerce*
- 1:45 **Opportunities beyond the HAN**
- 2:45 **Gateways into the Home**
- 3:45 **Special Session: Smart Energy Summit Roundtable Wrap Up**

TEXAS BALLROOM II & III

