

Making Energy Personal

Intel® Technologies Connect Consumers and Utilities for Energy Management



Figure 1. Home Energy Dashboard Based on Intel® Architecture

The Power Grid. Empowered.

The power grid is becoming smarter and better equipped to keep up with user demand and reduce costs for utilities. While smart grid infrastructure is being updated to be more connected and efficient, it is essential that end users monitor and manage their own consumption in order to level demand and reduce overall usage.

The home energy dashboard based upon Intel® architecture involves consumers in energy management and enables utilities to roll out time of use pricing, demand response and other energy saving programs. At the same time, it allows consumers to maintain comfort and satisfaction.

Raising Energy Consumption Awareness

With the smart grid gaining momentum, utility operators are trying to encourage residential customers to take more control over managing their energy costs. Customers can shift usage from on-peak to off-peak time periods and benefit from alternative pricing options, assuming they have information that allows them to correlate their consumption patterns with more complex rate structures. But when customers don't understand how new pricing programs work, the ramifications can be significant.

For example, the initial rollout of smart meters has raised apprehension from a number of consumer advocacy groups concerned about issues of confusion, privacy and even safety. This is not necessarily because meters themselves are bad technologies, but because consumers need complementary technologies to bridge the gap in understanding created by the meter rollout. It's clear – energy customers require solutions that enable them to understand the impact of new pricing programs in order to make better decisions and successfully implement demand pricing.

Enter the home energy dashboard, shown in Figure 1. It is designed to meet the needs of both consumers and utilities in managing energy usage and leveraging smart grid investments.

For consumers, the dashboard:

- Provides ease of use, with interfaces similar to other popular consumer devices
- Raises awareness of energy consumption, pricing and budgeting
- Facilitates decision-making aimed at reducing or reallocating energy consumption while maintaining comfort
- Delivers feedback that reinforces participation and progress on energy reduction

For utilities, the dashboard:

- Reduces peak energy consumption and assists customers with time-of-use pricing
- Enables demand response notification, measurement and verification
- Provides opportunities for a direct connection to consumers to roll out future programs

Giving Customers More Control

Today, most customers don't have a device or portal communicating their energy consumption; and when they do, it's a device providing simple aggregated data for the entire home. While better than nothing, solutions that merely read out energy consumption are ill-equipped to drive changes in consumer behavior. Utilities looking to roll out time-of-use or other services to reduce peak consumption and lower costs need to enable consumers to understand their energy usage and adapt their behaviors to control demand.

Opening a new line of communication with customers, the home energy dashboard is both highly interactive and offers useful information. Designed with sleek user interfaces and compelling graphics, it can draw in consumers and appeal to them over the long term, resulting in a higher return on investment. In the example shown in Figure 2, the home energy dashboard, coupled with sensors that communicate energy data over wireless radios, allows consumers to monitor the energy consumption of any electrical load and identify ways to conserve.

Intel consumer-oriented technologies can help utilities better leverage their investments and make their existing programs more effective. As new services and programs are introduced, software updates can be transmitted to the highly-capable home energy dashboard in the

Features	Value
Simple data mining	Present energy and pricing data in an easy-to-read table or chart for any time interval.
Application development environment	Allow utilities to develop and distribute applications that fit customer needs.
Secured network	Implement robust security on the home network that is controlled by the user.
Plug & Play	Support standard interfaces (wired and wireless), so dashboards communicate with appliances, smart plugs or just about anything.
Long product lifetime	Ensure the dashboard platform has enough computing headroom to run future applications, thus extending its useful life.

Table 1. Dashboard Features

field. The dashboard is designed with future capabilities in mind, such as communicating with appliances and consumer devices, turning things on and off using smart plugs, and supporting other services, like tying into existing home security. In addition, the dashboard offers compelling features and future capabilities that will allow it to garner the interest of households:

- **Energy consumption awareness:** Enables customers to better understand energy usage
- **Personalized recommendations:** Suggests ways households can save money by running high energy consumption devices, like dishwashers and air conditioning, at off-peak times
- **Goal setting:** Encourages households to track energy consumption to a monthly budget and monitor their progress on a regular basis

▪ **Demand response:**

Gives customers more control over energy expenditures and allows utilities to easily notify of new pricing and opt-in procedures

Adapting to Utility Requirements

Dashboard requirements can vary by locality and change over time, which is why the home energy dashboard is customizable based upon specific utility operator requirements. The device supports demand response and comprehensive pricing structures, and adds value over time by implementing future services, some of which could create new revenue streams for utilities. Several features worthy of consideration when trying to garner more attention from customers are listed in Table 1.

Enabling Consumers to Partner with the Utility TODAY

The home energy dashboard developed by Intel provides an opportunity for utility operators to establish closer relationships with their customers. As a first step, utilities can begin field trials in the fourth quarter of 2011 with a system based on a validated Intel® Atom™ processor-based platform, which communicates with both smart meters and utility backend infrastructure. It's time to make energy personal for consumers.



Figure 2. Measuring Electrical Loads with Smart Sensors

To learn more about Intel® solutions for smart grid, visit www.intel.com/go/energy

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