

Smart Devices

Presentation for the Illinois Stakeholder
Advisory Group (SAG)

June 24, 2014



ENVIRONMENTAL LAW & POLICY CENTER
Protecting the Midwest's Environment and Natural Heritage



Citizens Utility Board

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Outline

Guiding Principles – Why Smart Devices?

The Basics of AMI

Examples of Smart Devices and Apps

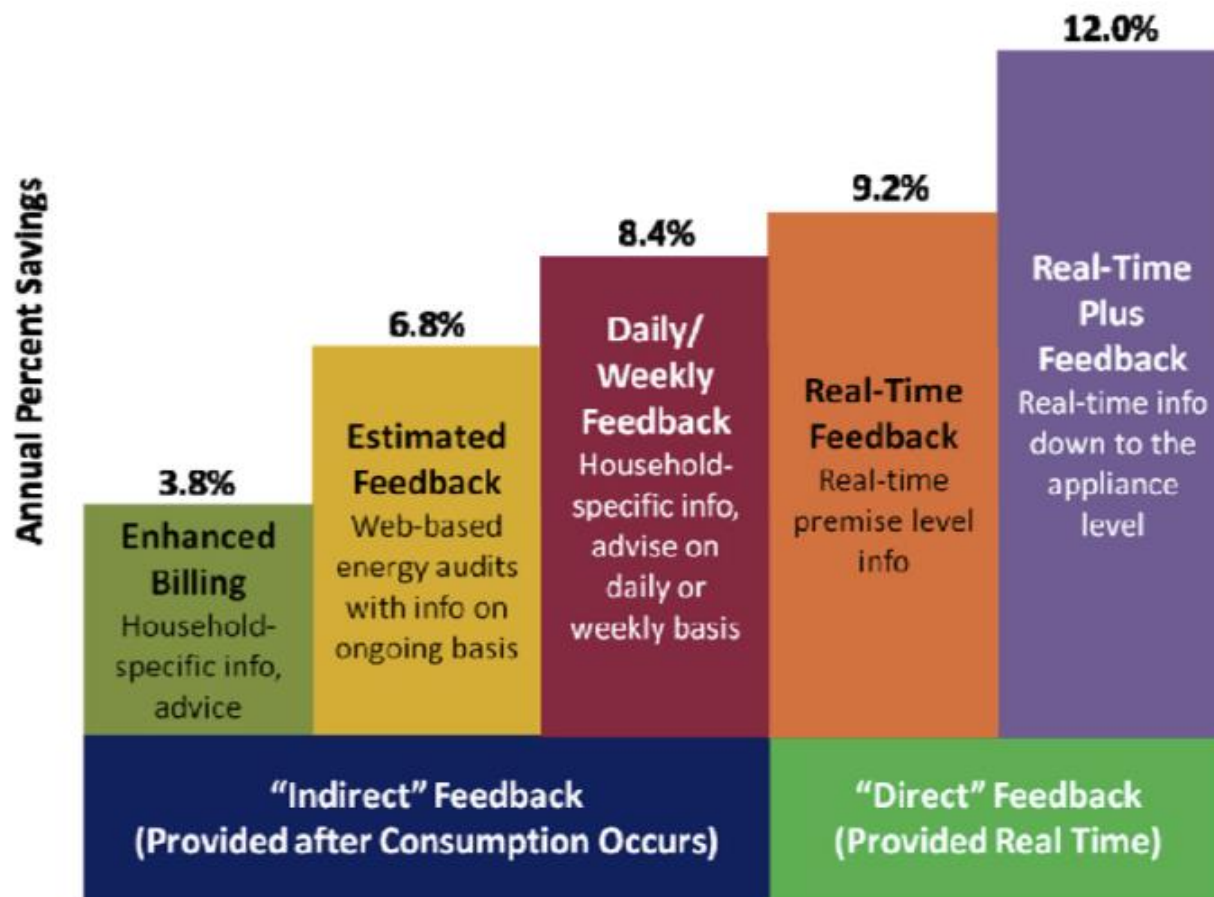
ICC Orders and Next Steps

Guiding Principles

- Utilities have an obligation to utilize their smart grid and Advanced Metering Infrastructure (AMI) investments to help consumers save energy and reduce peak demand.
- Consumers have the right to access and utilize their own usage data (and the right to share their own data with third parties).
- Utilities must make it easy for consumers to access, utilize and share their own data.
- Energy savings are greatest when consumers receive specific, real-time feedback on their usage.
- Enabling technologies to access and utilize the usage data are widely available and consumer options must not be limited to only those provided by the utility.

Energy Savings and Feedback Type

Average Household Electricity Savings (4-12%) by Feedback Type



Based on 36 studies implemented between 1995-2010

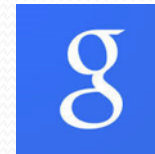
What do these companies have in common?

TOSHIBA
Leading Innovation >>>



HONDA
The Power of Dreams

Panasonic



HITACHI
Inspire the Next

SAMSUNG



Outline

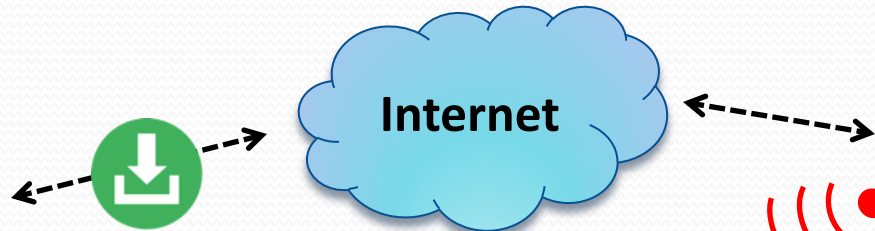
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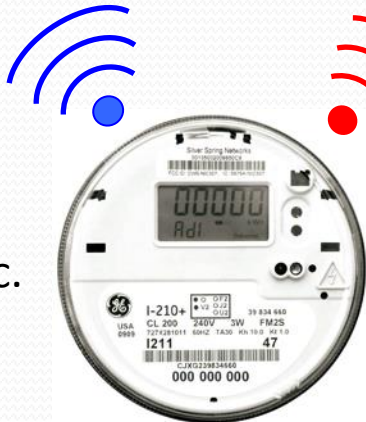
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Advanced Metering Infrastructure (AMI)



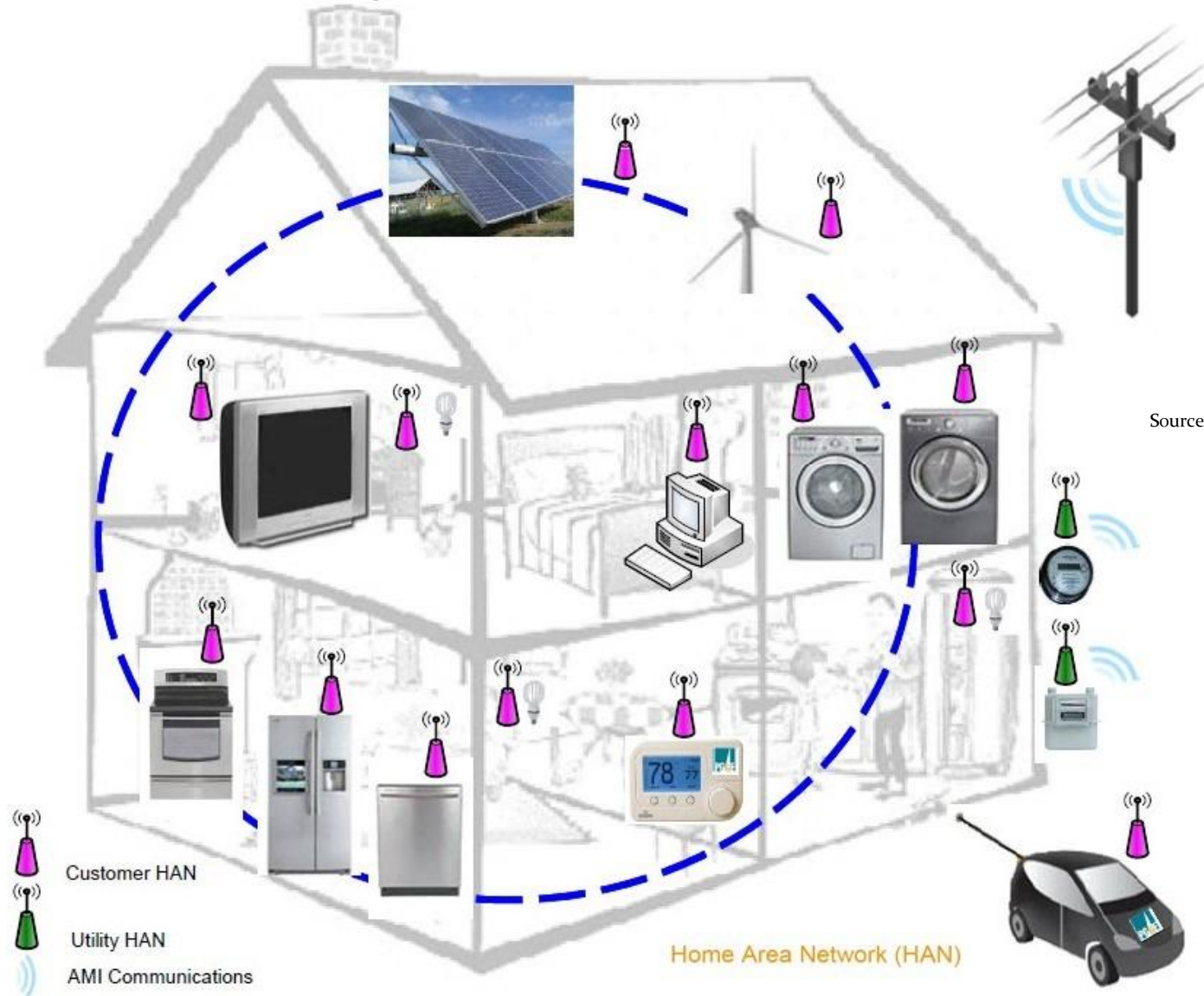
Utility "Back Office"

Wi-Fi,
ZigBee,
Z-Wave, etc.



- Two-way communications
- Usage data stored at 15 minute intervals
- Near real-time data available directly from the meter

Smart Devices in a Home Area Network (HAN)



Source: smartgridawareness.org

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What are Smart Devices?

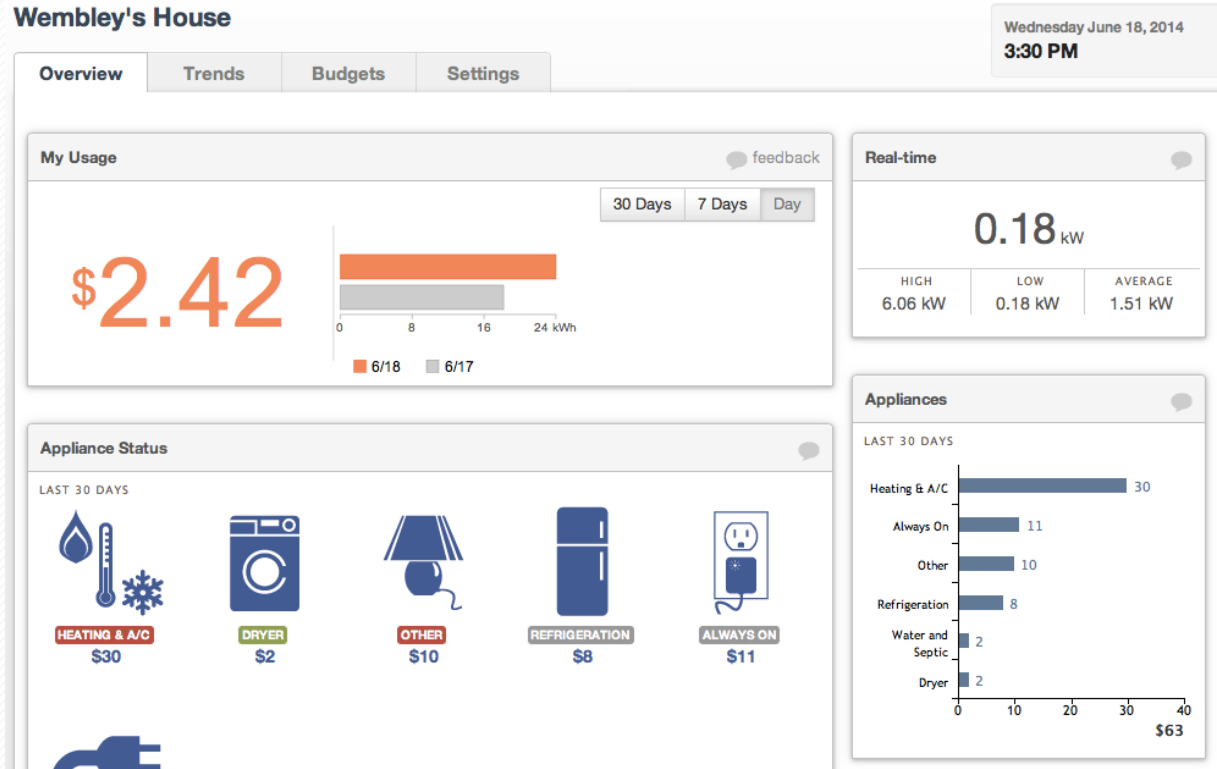
- Smart Devices are hardware (and applications) on the customer side of the meter that help customers reduce energy use and peak demand.
 - In-home displays, smart thermostats, plugs, power strips, switches, appliances, smart chargers for electric vehicles, gateways
 - Can connect to a wireless home area network (HAN), and can be controlled with smart phones, tablets, and computers.
- Smart Devices may or may not utilize AMI information

Example – Whirlpool Smart Appliances and 6th Sense Live™



- Remote monitoring and control
- Text and email notifications (upon cycle completion, etc.)
- Diagnostics and maintenance alerts

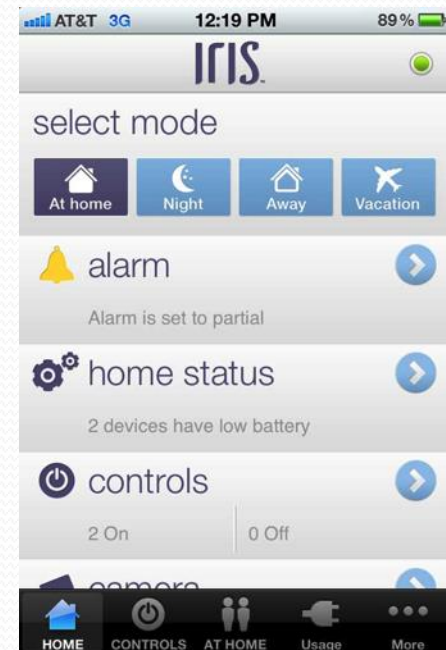
Example – Blue Line Innovations PowerCost Monitor and PlotWatt



- Alberta pilot (IHD only) – 9% savings, 17% savings for homes with electric heat and hot water
- 170,000 units provided by the Ontario Power Authority at no cost to customers

Example – Lowe's Iris

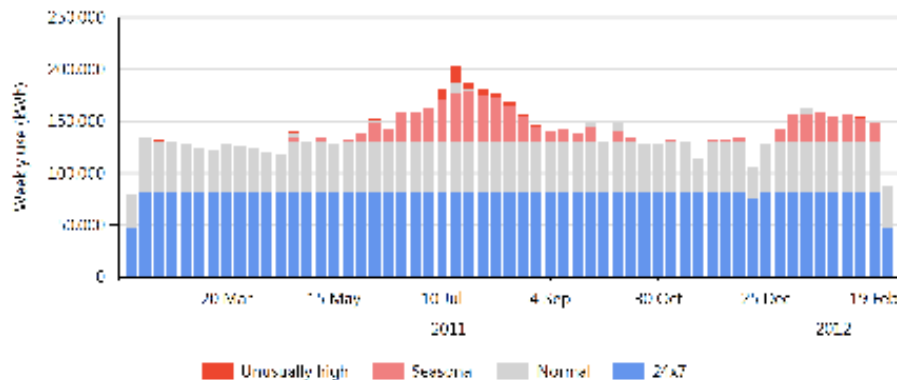
- Indoor/outdoor wireless cameras
- Door, window, cabinet, motion sensors
- Sprinkler and outdoor faucet controllers
- Smart key fobs
- Smart plugs and switches
- Smart thermostats
- Compatible with Blue Line Innovations monitor



Example - ENERGYai™

Commodity: **Electricity**
Analysis Period: **2 February 2011 - 29 February 2012**
Prepared for: **Midwest Property Group**
Report Date: **2 November 2012**

Electricity use over the analysis period. Each bar is the use for one week:



Potential Savings Opportunities

- \$44,400** 57% of all electricity use appears to be "24x7" load - from equipment which is almost never turned off. Reducing this continuous demand by 10% (48.5 kW) would save about \$44,400 per year.
- \$6,840** 8% of all electricity use occurs during seasonal rises in early summer and early winter. If these are primarily heating and cooling loads, then a 10% improvement in overall HVAC efficiency would have saved about \$6,840.
- \$6,060** Electricity use was higher than expected for 473 hours over the analysis period. Eliminating the excess use would have saved an estimated \$6,060. Much of this high use occurred in early summer.

In combination, these actions would have the following impacts:



Avoided use:
547,000 kWh



Cost savings:
\$57,300

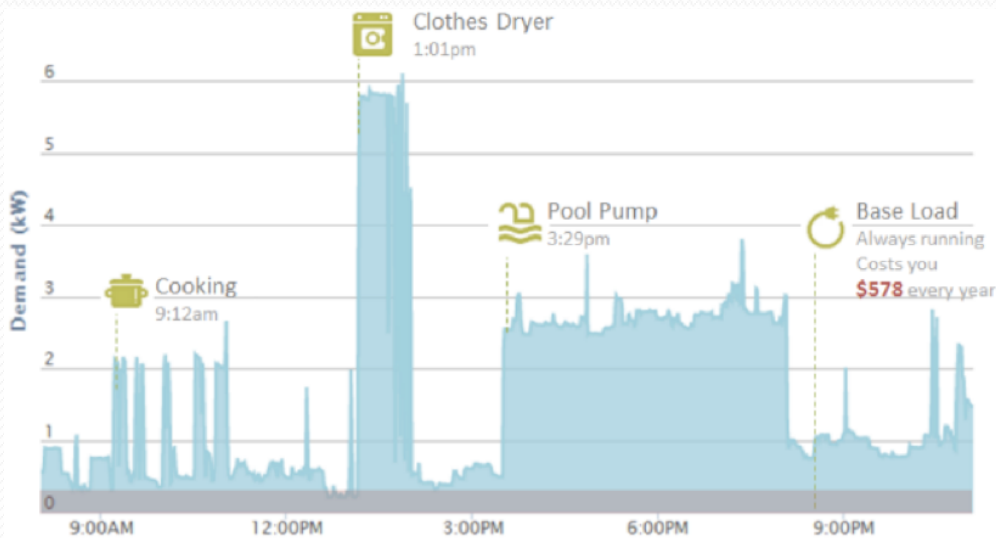


Avoided CO₂ emissions:
931,000 lb

- For commercial and industrial buildings with 6-13 months of hourly or sub-hourly load data
 - Electricity
 - Gas
 - Water
 - Steam
- Customized recommendations for savings based on load anomalies
- Compatible with Green Button Download
- \$20 per report

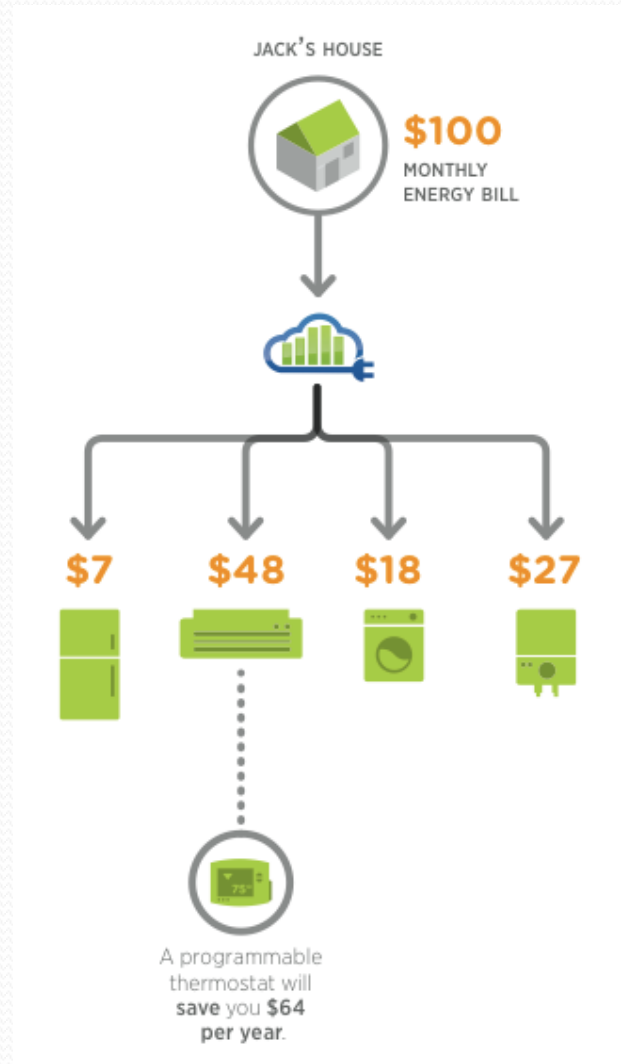
Example - Bidgey

Appliance-level signatures ...



- Actionable insights for customers
- Prevention of high bills before they happen
- Neighborhood comparisons at the appliance level
- Reduced marketing costs for utilities
- Works with AMI data but more effectively with real-time HAN data (using a ZigBee gateway)

... lead to energy disaggregation



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ComEd: Final Order in 13-0495

- The Commission: there is an “inherent link between AMI deployment and the energy efficiency potential that it brings...ComEd’s smart meter deployment has the potential to enable significant energy efficiency and demand reduction by customers. The Commission believes it is important that ComEd take steps to integrate its smart meter deployment with additional measures that produce energy efficiency savings for customers.
- The Commission orders ComEd to develop and implement a comprehensive plan, involving manufacturers, retailers, and other third parties, to enable smart devices to interact with ComEd’s smart meters and to make it easy for customers to identify and purchase these smart devices.
- The Company should use funds from the R&D/Emerging Technologies budget to pay for this program. Some funding may also be allocated from Education/Outreach.
- The Company must seek input from the SAG to further develop this program and report back to the Commission within 6 months from the date of this order.

Ameren IL: Final Order in 13-0498

- The Commission “is dedicated to providing consumers with all available tools to take control of their energy use, maximize savings and encourage conservation. This approach includes leveraging the investments of smart grid.”
- “The roadblock appears to be a lack of standards and coordination among AIC and manufacturers... AIC’s smart meters could provide effective tools for greater energy reduction and management if they are paired correctly with smart home devices. The Commission believes that ELPC’s smart devices program could provide a mechanism to unlock additional savings previously unattainable if interoperability standards are developed and consumers can make choices knowing which devices are compatible with their meters and which are not.”
- AIC must spend the remaining emerging technologies budget on the proposed smart devices program. At a minimum, AIC must develop a comprehensive plan for smart devices including potential programs that deploy home devices in conjunction with smart meters. In addition, AIC must discuss its plan with the SAG and report back to the Commission within 6 months.

Next Steps (from utility presentations in March)

- Ameren has \$3.5 million allocated for investment in Smart Devices in PYs 7-9, and has said they are “committed to working with stakeholders to design a program”
- ComEd has identified 20 products and services that ComEd can help bring to the market either through partnerships, promotions, or direct delivery ... ComEd is currently reviewing the initial set, developing project charters, and establishing a 2014 release schedule for these products / services

What would we like to see?

- Continued commitment and dedication of adequate resources from ComEd and Ameren
- A prioritization of device types based on energy savings potential
- A vendor forum to discuss issues, opportunities and ways to accelerate availability of devices
- Full transparency of device compatibility and availability on the ComEd and Ameren websites (i.e., like the SDG&E model but to include both HAN and AMI devices/applications)
- Others?

The SDG&E Model

- Compatible Devices

The following devices have been tested and are compatible with our smart meter network. This list will be updated frequently as we are continually testing products for use with our smart meters. Some devices can be programmed to include energy cost information. Please visit the manufacturer's website for more information.

| Manufacturer* | Model | Device Type | Device FW tested | Programs and Special Offers |
|---|--------------------------------------|---------------------------------------|------------------|--|
| Aztech Associates, Inc. | Classic In-Home Display / S 000-0600 | In-home Display | 4.1 | <ul style="list-style-type: none"> - Reduce Your Use Enabling Tech Credit - 10% Discount |
| Ceiva Logic, Inc. | Ceiva Homeview Display | In-home Display | c508en-5016 | <ul style="list-style-type: none"> - Reduce Your Use Enabling Tech Credit - \$10 discount for customers. Discount code: SDGEHV |
| Digi International | ConnectPortX2e SE | Router | 3.0.6.17 | <ul style="list-style-type: none"> - Reduce Your Use Enabling Tech Credit |
| ecobee, Inc. | Smart | Programmable Communicating Thermostat | 3.3.0.582 | <ul style="list-style-type: none"> - Reduce Your Use Enabling |

- SDG&E has tested and validated 11 devices that are compatible with their AMI system
- Includes a clear manufacturer validation process for new devices

Questions?

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