



our Home spaces

# Set & Go Energy Management

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# Meet the user expectations



**Ubiquitous**

Customer Recognition of Technology



**Low Cost**

Use Existing Customers

Network

Display Devices - iPhones, Tablet PCs



**Loosely Coupled**

System Elements can be added at any Time



**Easy To Install**

OHS Technology Requires NO Changes to  
Access Point to install



**Easy To Maintain**

Set & Go



**Available**

Priced and available for the Retail DIYer

# Thermostat and USNAP



## UC Berkeley Proof of Concept PCT Project



Thermostats have a single button which activates an energy savings temperature set back



Thermostats must have the three LEDs; Red, Yellow, Green.

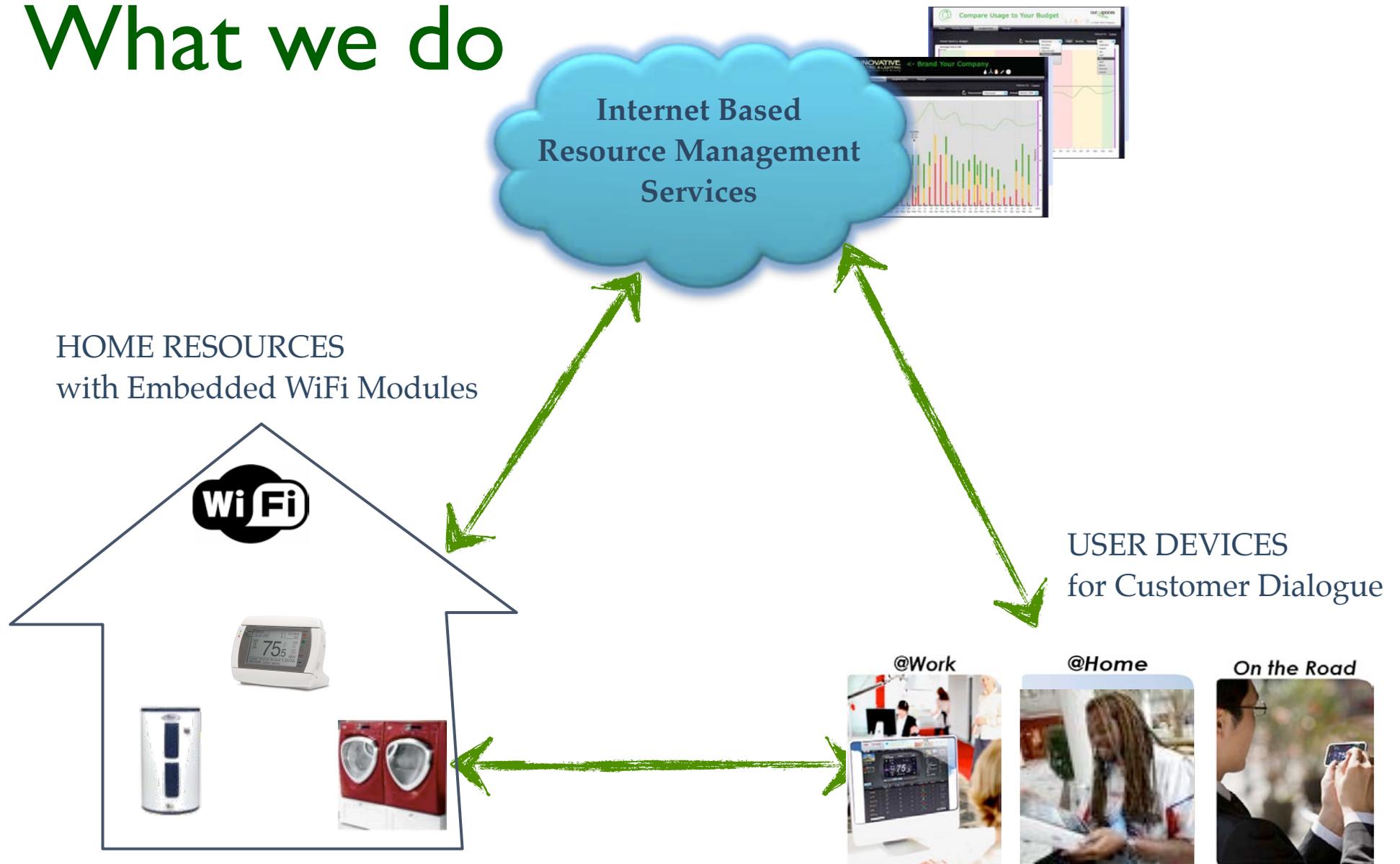


Thermostats are able to be set back temperature for Demand Response.



Thermostats communicate using Utility Smart Network Access Port (USNAP).

# What we do



# Open ADR

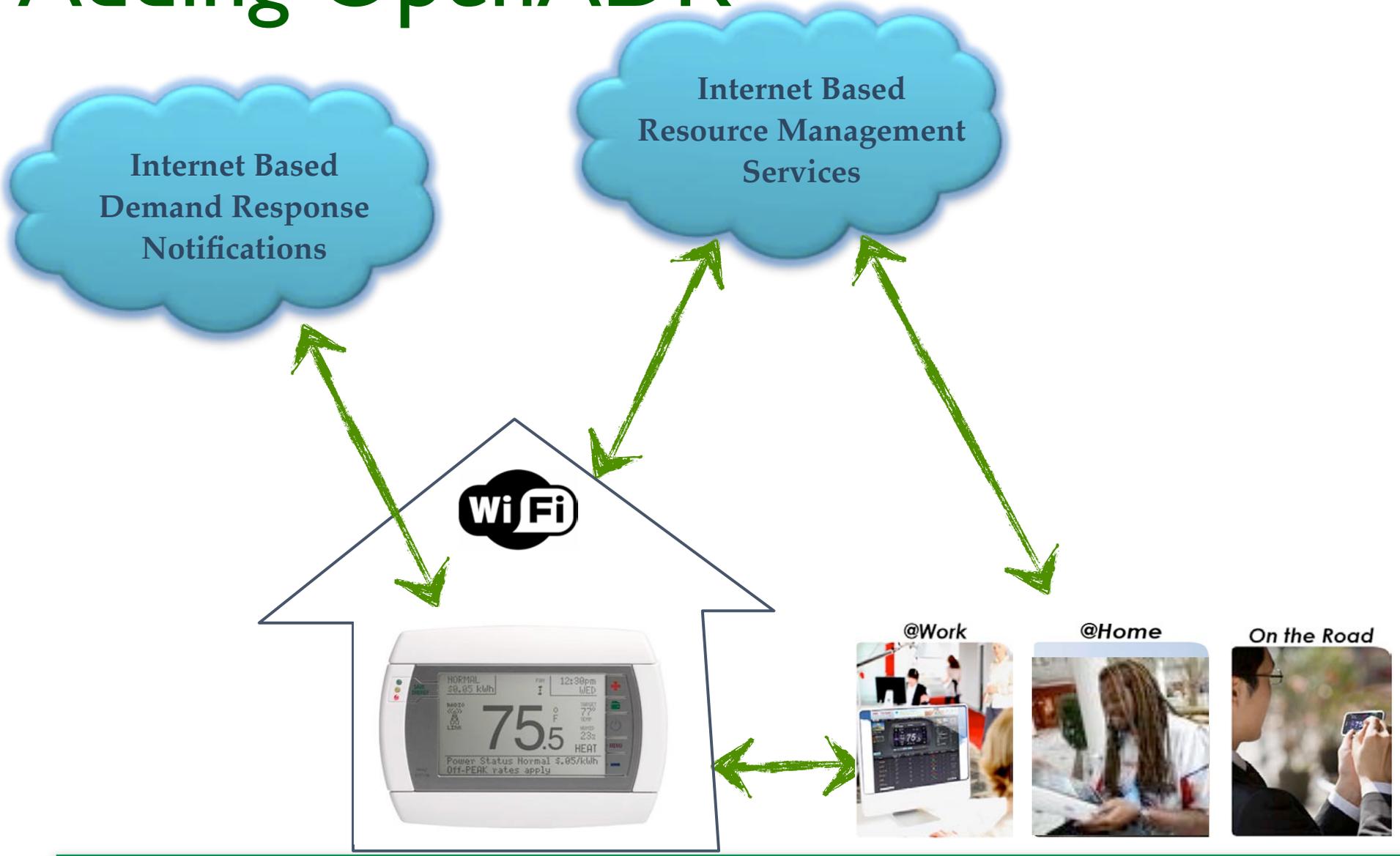


**SELECTED BY DOE/NIST AS A STARTING POINT FOR A NATIONAL  
SMART GRID DEMAND RESPONSE STANDARD**

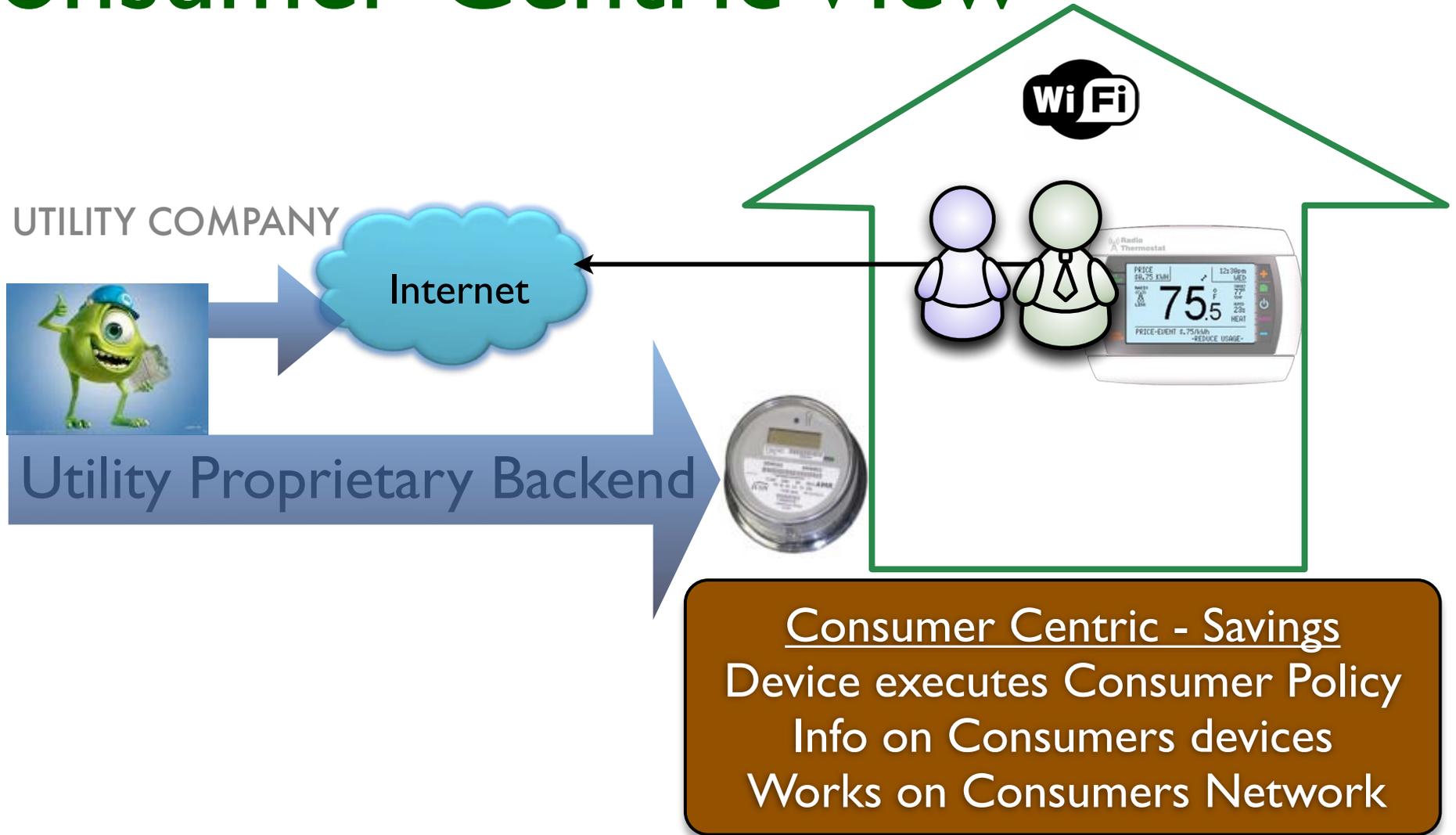


**CAN LOW COST, COMMERCIALLY AVAILABLE DEVICES USING  
COMMERCIALLY AVAILABLE LOW COST COMMUNICATIONS CHANNELS  
(Internet) BE USED TO SUPPORT RESIDENTIAL DEMAND RESPONSE ?**

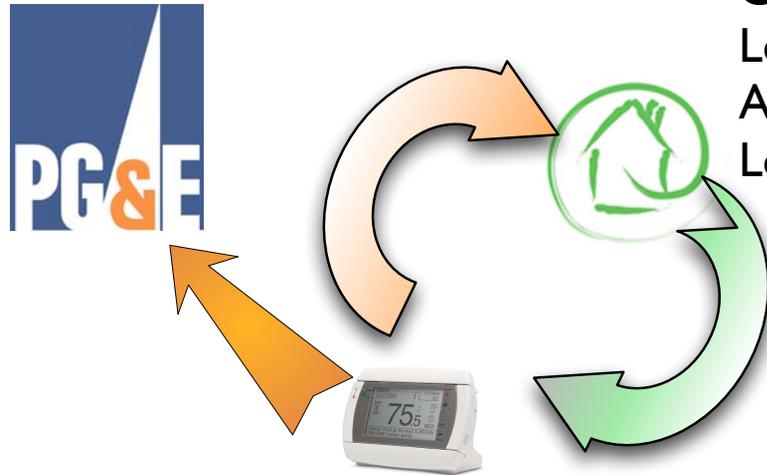
# Adding OpenADR



# Consumer Centric View



# OHS Solution



## WiFi Device with Embedded Energy Policy

Communicates OHS Server - What to Do  
Communicates Utility Proxy - What is Happening  
Communicates User - What I want now

## Our Home Spaces

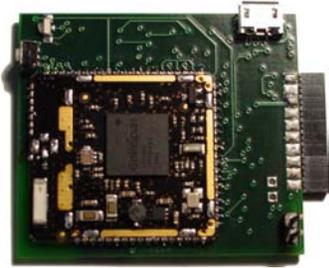
Logs Information - user, utility, appliance  
Analytics for best price / comfort based on user input  
Loads WiFi Module with “Best Energy Fit” Algorithm



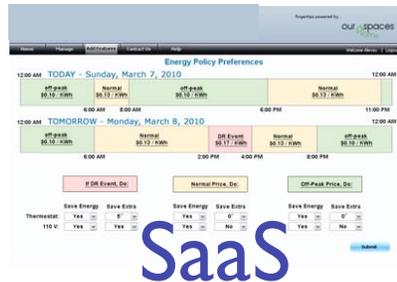
## Decision Maker - Consumer

Alerts / early warning  
Metrics / Better money saving decisions  
Timely information

# WHY OHS ?



WiFi Module Firmware - GO Part of the Solution  
Core to all of our WiFi Designs  
Embedded Software  
OpenADR Client can be loaded via Firmware update

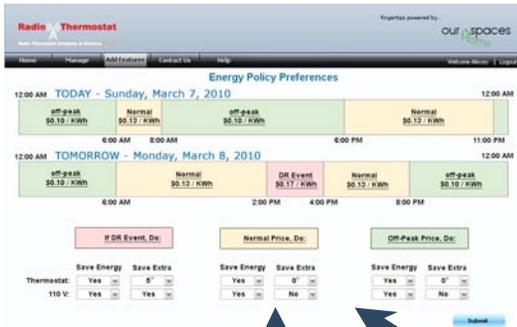


Software As A Service - SET Part of the Solution  
GUIs - easy for user to Set  
Analytics - aligns schedule to prices  
Alerts & Alarms - sets the thresholds  
Data Store - audit



User Device Applications - TRUST Part of the solution  
Timely notifications to the user  
Alerts if Thresholds are exceeded  
Override Option  
Customer is always in control

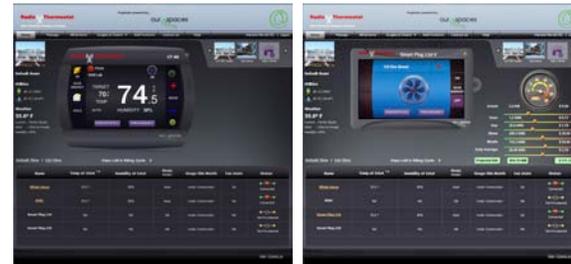
**UtilityPortal** that Customers Logs on to  
Set Energy Policy Preferences  
Synchronize to pricing schedule



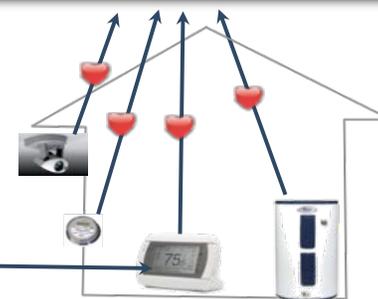
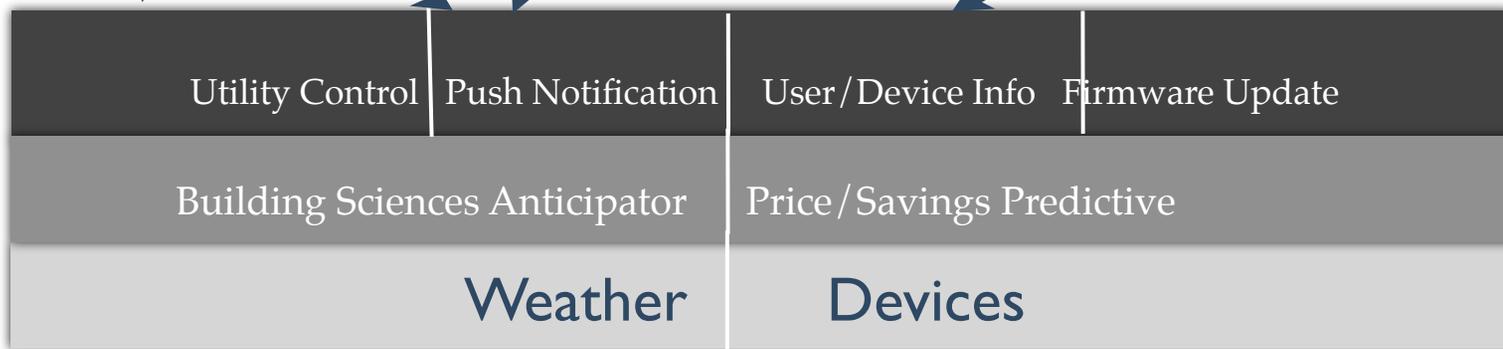
**Customer's Notification:**  
D/R Event  
Utility Message  
Other



**Customer's Control Portal** used to:  
Override D/R Event  
Set Temperatures  
Turn Appliance on/off



**REST API**



# Version 2.2

# Summer 2010



Whole Home Usage

Aggregated  
Instantaneous  
Corrolated with Price

Multiple Home Support

Easy to Navigate

Displays devices per home

Home and Vacation

fingertips powered by... **our spaces Home**

Home | Manage | All Devices | Graphs & Charts | Add Features | Contact us | Help | Welcome Marvell CES | Logout

**Default Home**

**Utilities**

\$0.13 / kWhr  
\$2.32 / AcreFt

**Weather**

**55.0° F**

Current : Partly Cloudy  
Wind : SSW at 24 mph  
Humidity : 94%

**Radio Thermostat** CT-80

DR OHS Lab ON

SAVE ENERGY TARGET 70° F

TEMP **74.5** ° F

HOLD AUTO HUMIDITY 38%

STATISTICS PROGRAM

123 Elm Street | Test Home | Add a Home

Days Left in Billing Cycle: 5

| Name              | Temp at tstat ° F | Humidity at tstat | State (mode) | Usage this Month   | Fan state | Status          |
|-------------------|-------------------|-------------------|--------------|--------------------|-----------|-----------------|
| <u>Whole Home</u> | 75.0 °            | 38%               | Auto         | Under Construction | On        | Connected       |
| <u>HVAC</u>       | 75.0 °            | 38%               | Auto         | Under Construction | On        | Connected       |
| Smart Plug 110    | NA                | NA                | NA           | Under Construction | NA        | Not Provisioned |
| Smart Plug 220    | NA                | NA                | NA           | Under Construction | NA        | Not Provisioned |

Help | Contact us

## Thermostat control

Program  
Instantaneous +/-  
Modes, Fan, LEDs

## Environment Sensors

Zone Temp  
Humidity  
Special Conditions

## Energy Information

D/R Event  
Save Energy  
Pricing Area and LEDs



Smart Plug control / appliance

Air Conditioning

Water Heater

110V Appliance - vampire

Appliance Sensors

Relay State

Energy LED

D/R Event

Special / Alarm Conditions

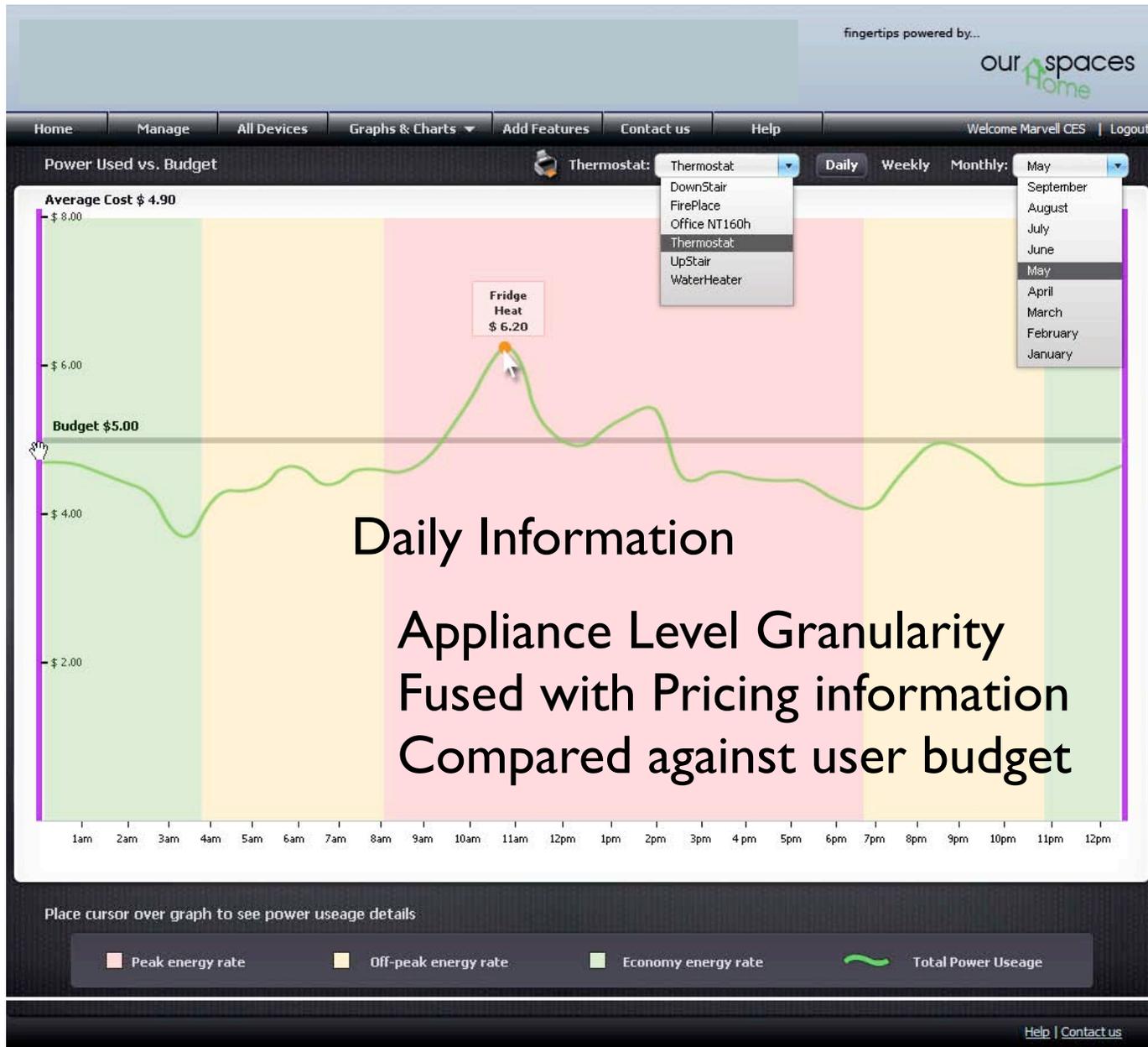
Energy Usage Information

Power

Power Factor

Current

Voltage



Irrigation Controller



A/C Controller



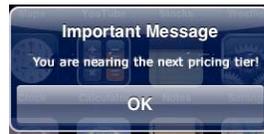
iPad Whole Home Controller



Radio Thermostat Controller



Alerts / Alarms



### Consumer Options

Camera



Light Controller



Hot Water Controller



# OpenADR Ready Installations



Radio Thermostat Company of America



## Single-Family Residential

- PARTNER - Radio Thermostat of America.
- Potential Cost Savings - 22%



## Hotels, Schools & Hospitals - Light Commercial

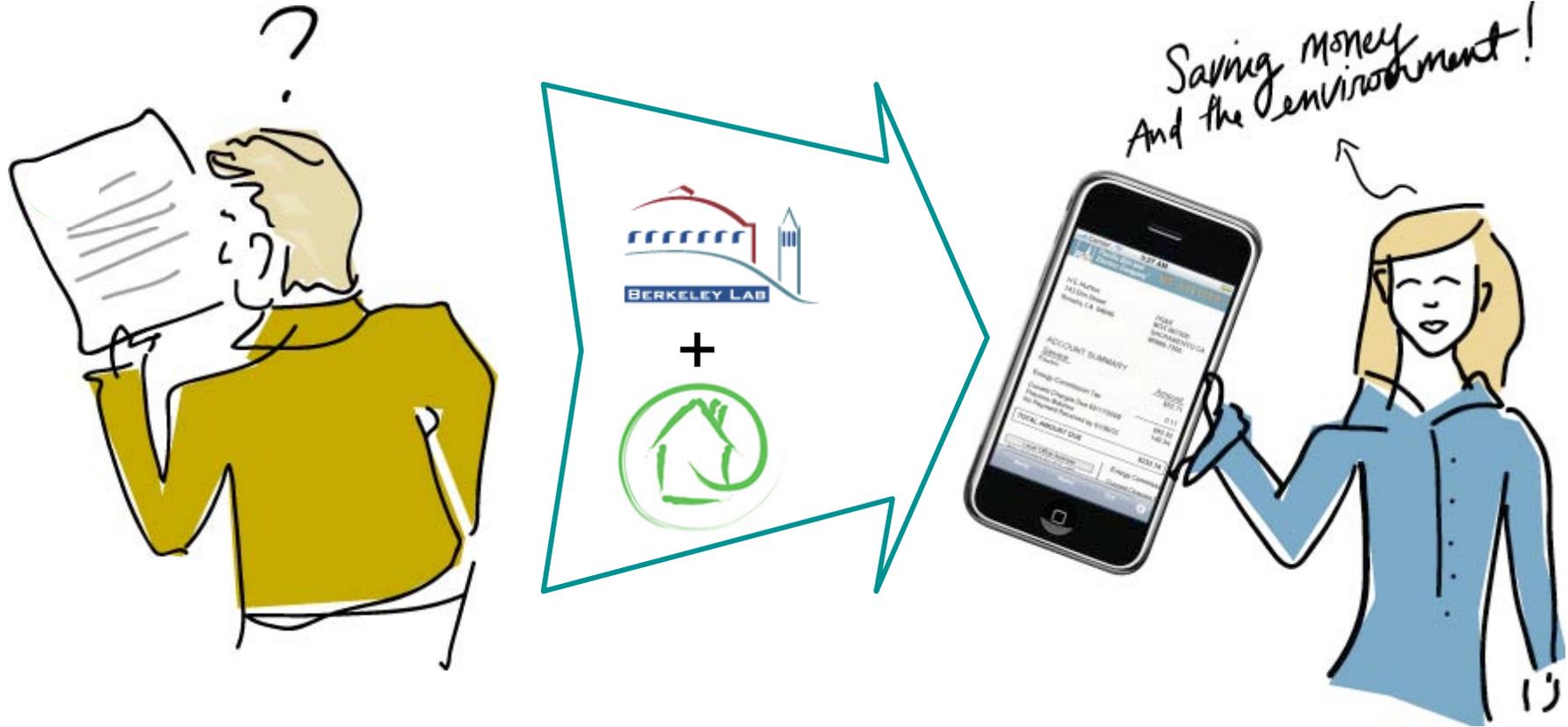
- PARTNER - Energy ETC.
- Potential Energy Savings of 23%  
\* Energy ETC - Santa Clara Schools & Hilton



## Multi-Unit Residential

- PARTNER - Place Properties
- Potential Energy Savings of 31%  
\* Brant Creek Properties/500 unit military

# What Can We Do Together?





our **A**spaces  
Home

# Set & Go Energy Management

## Thank You