

Leveraging Smart Meters: Low Cost EE for Low Income

Improve cost effectiveness by 10x



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A Bold Claim

The impact of low income energy efficiency programs can be increased by an order of magnitude (10x) using existing technology.

The cost of program delivery can be **reduced**
Measured energy reductions can be **increased**

Existing Barriers

- Too expensive to analyze every home, so using a “one size fits all” approach
- Inability to accurately measure the impact of efficiency measures across participants
- Lack of continuous feedback to improve the process

What's needed?

A way to quickly, accurately and inexpensively analyze residential energy use



Results from Several Programs

Program	Participants	Duration	Average reduction in kWh	Average reduction in therms	Reported by
Energy Upgrade Mountain View	1,239	3 years	5.5%	16.4%	HEA
Energy Upgrade Mountain View (top quartile)	310	3 years	14.5%	32.6%	HEA
Alameda County	299	1 year	7.4%	13.0%	BKi
Silicon Valley Energy Watch	85 low income seniors	1 year	10.2%	12.2%	Green Pro Network & HEA

The Big Energy Use Categories

Building



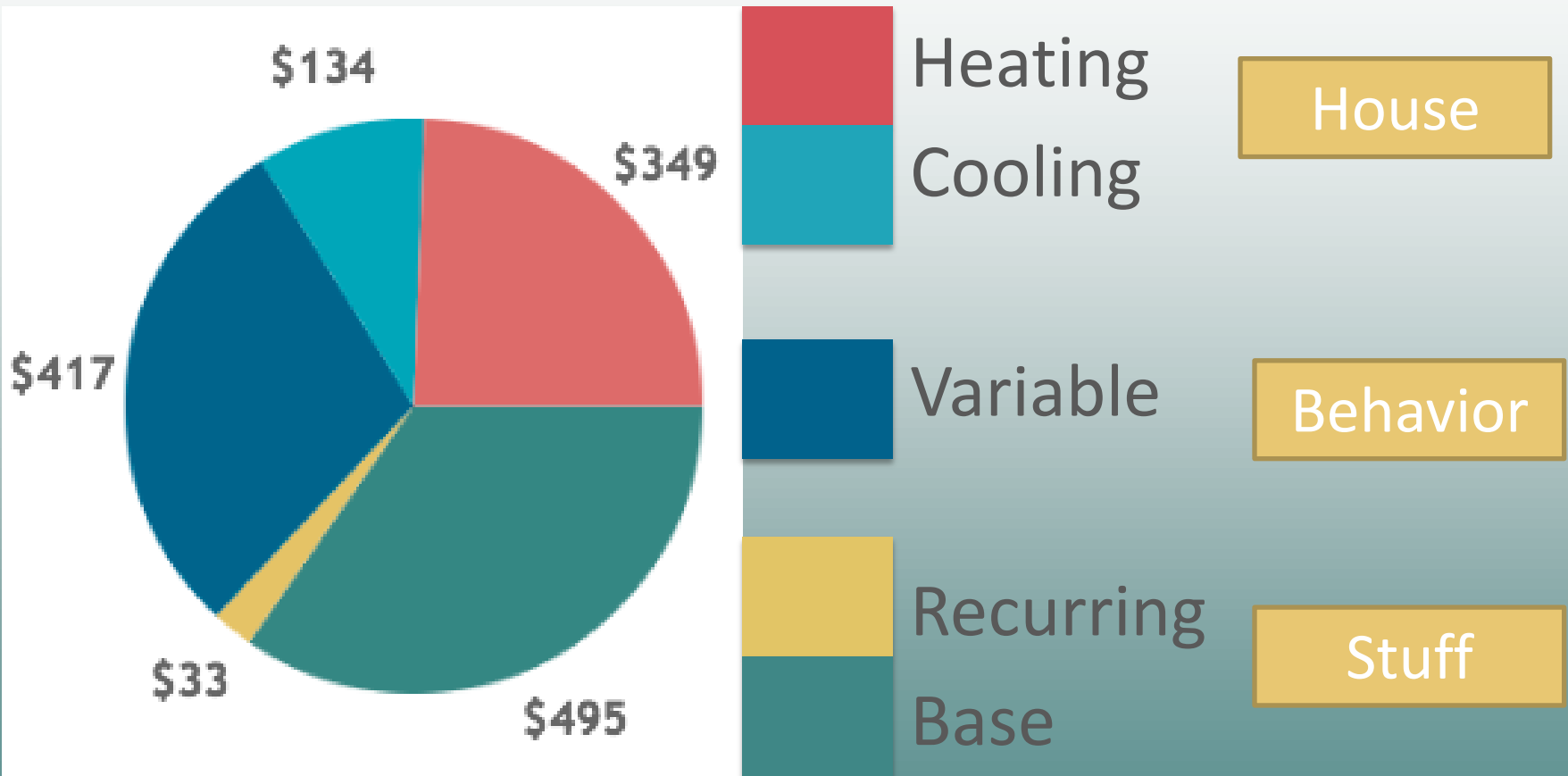
Stuff



Behavior



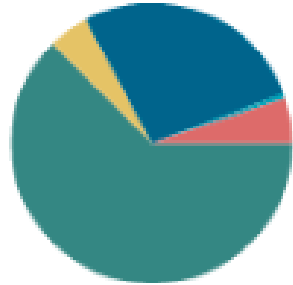
Example: \$1,414 per year



Analysis produced using remote, automatic smart meter analysis

Implies Different Interventions

Winter Heating	\$100	5%
Summer Cooling	\$8	0%
Variable	\$522	27%
Recurring	\$90	5%
Base	\$1,207	62%



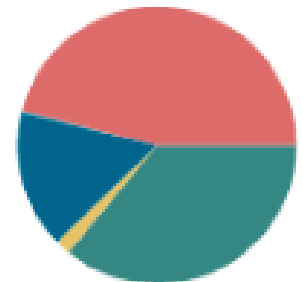
\$1927/year

Focus on
Plug Loads



Focus on
HVAC

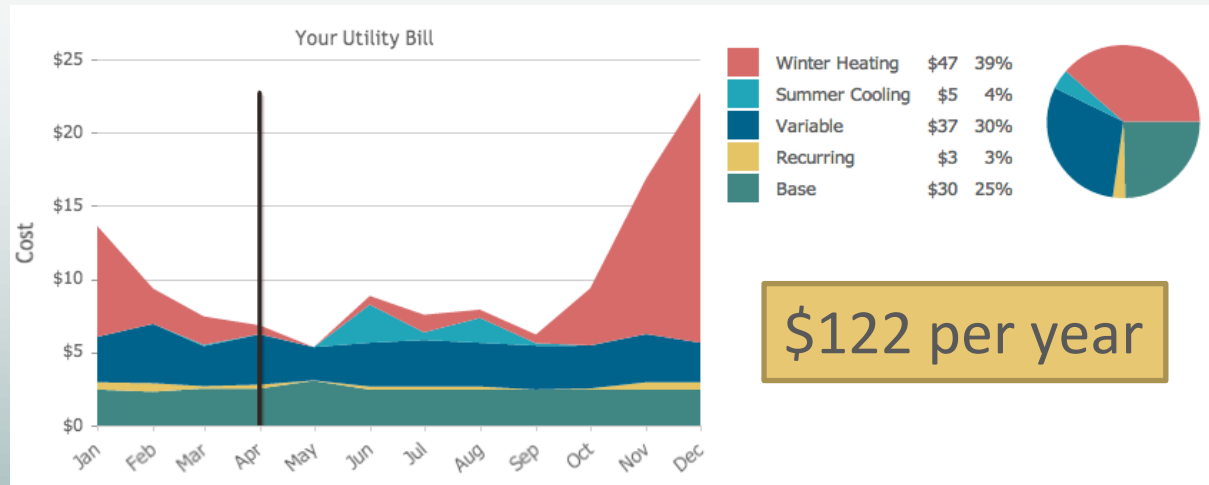
Winter Heating	\$885	46%
Summer Cooling	\$4	0%
Variable	\$308	16%
Recurring	\$35	2%
Base	\$692	36%



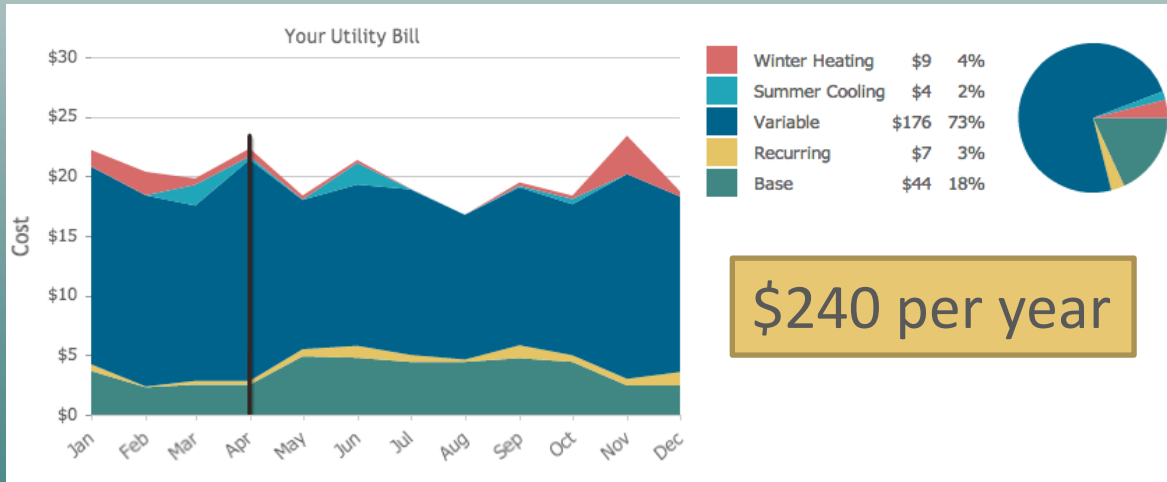
\$1,924/year

Low income examples

Typical Energy Use



\$122 per year

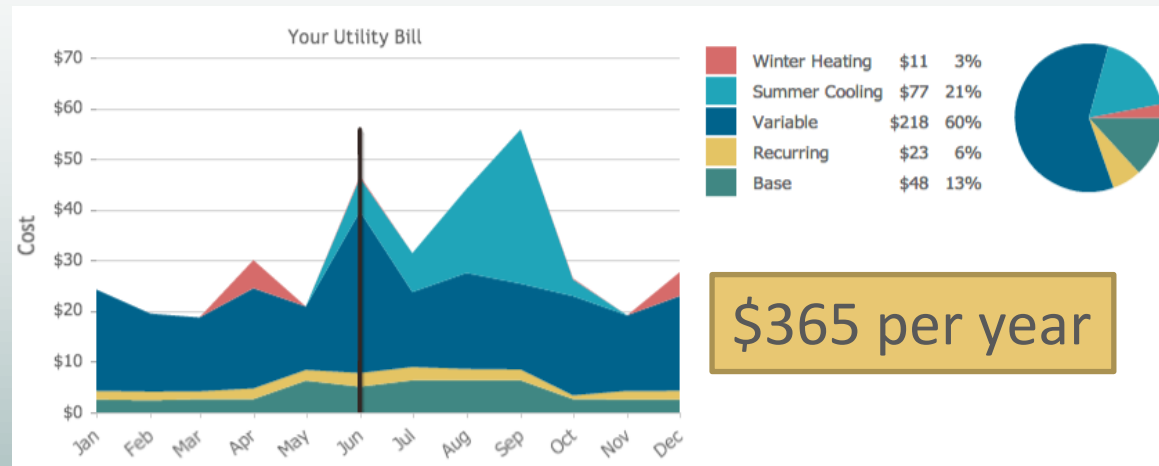


\$240 per year

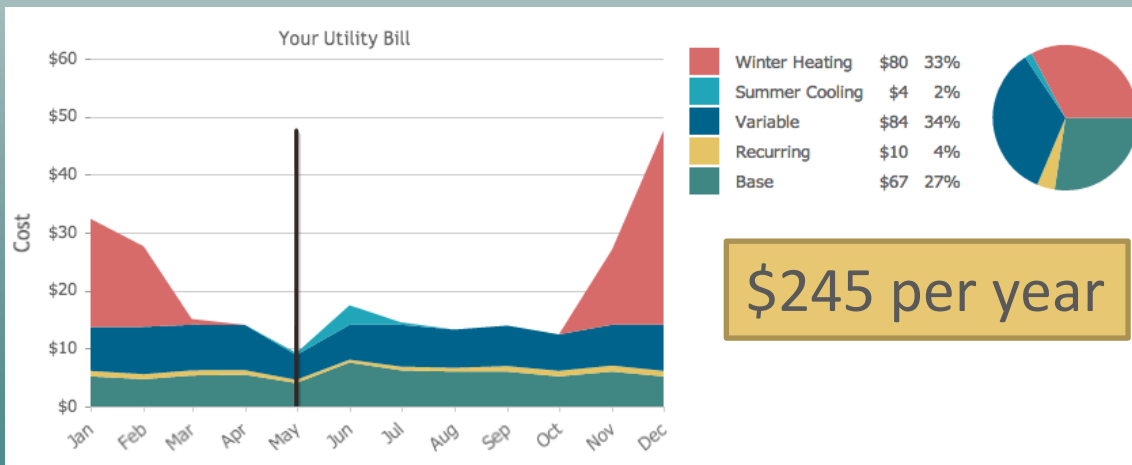
Focus on Behavioral

Low Income Examples

Cooling and Behavioral



\$365 per year

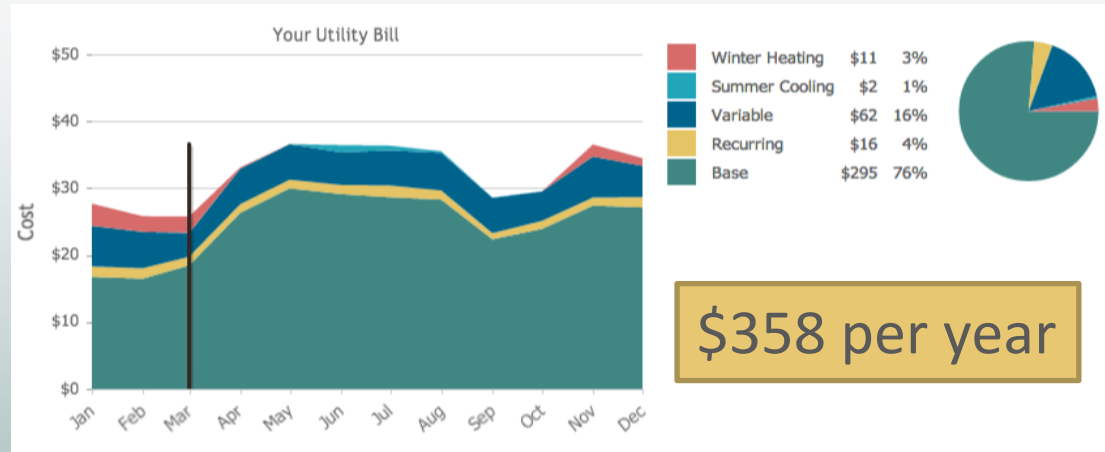


\$245 per year

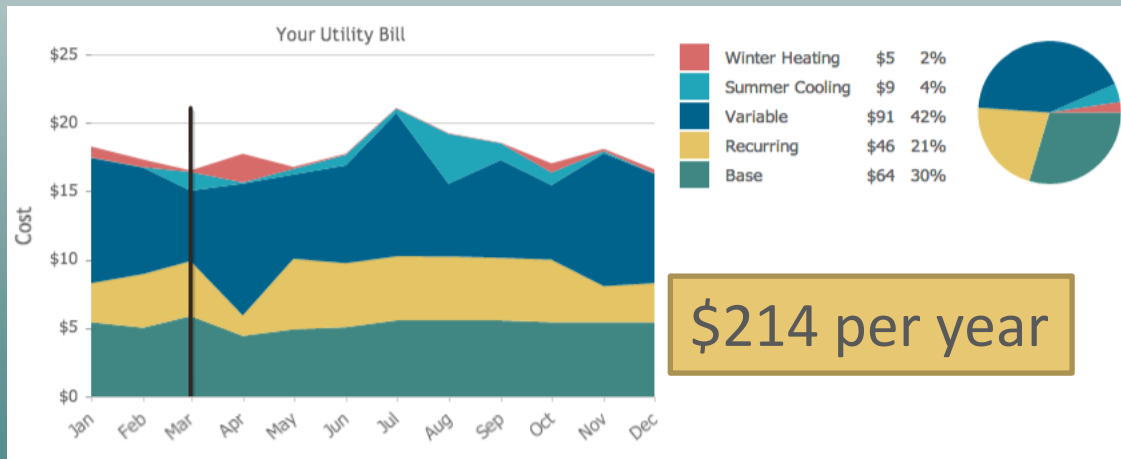
Heating and Behavioral

Low Income Examples

Focus on Base
(always on)



\$358 per year



\$214 per year

Recurring or
scheduled

Call to Action

California's \$9B investment in smart meters is not being utilized for EE

- Pilot smart meter diagnosis within existing program delivery structure to verify results
- Set standards for EM&V based on analysis of changes in smart meter data

Backing up the 10X claim

Program Metric	EUMV (2011-2014)	EUCA by PG&E (2011-2012)
Total number of participants	1,576	3,823
Participants analyzed using Billing Data	1,239	1,625
Electric savings per participant (kWh)	301	203
Natural Gas savings per participant (therms)	62	74
GHG savings per participant (lbs CO ₂ e)	993	1,101
Reduction in electric use (all participants)	5.52%	5.40%
Reduction in natural gas use (all participants)	16.44%	16.40%
Reduction in electric use (top quartile)	14.49%	7.18%
Reduction in natural gas use (top quartile)	32.58%	19.87%
Total cost of program	\$409,000	\$25,310,500
Program cost per participant	\$260	\$6,621

Source of EUCA results: [2010-2012 Whole House Retrofit Impact Study](#) pages 5, 13, 32, 34 & 37.