Leveraging Your Advanced Metering Infrastructure (AMI) to Better Plan for Home Area Networks

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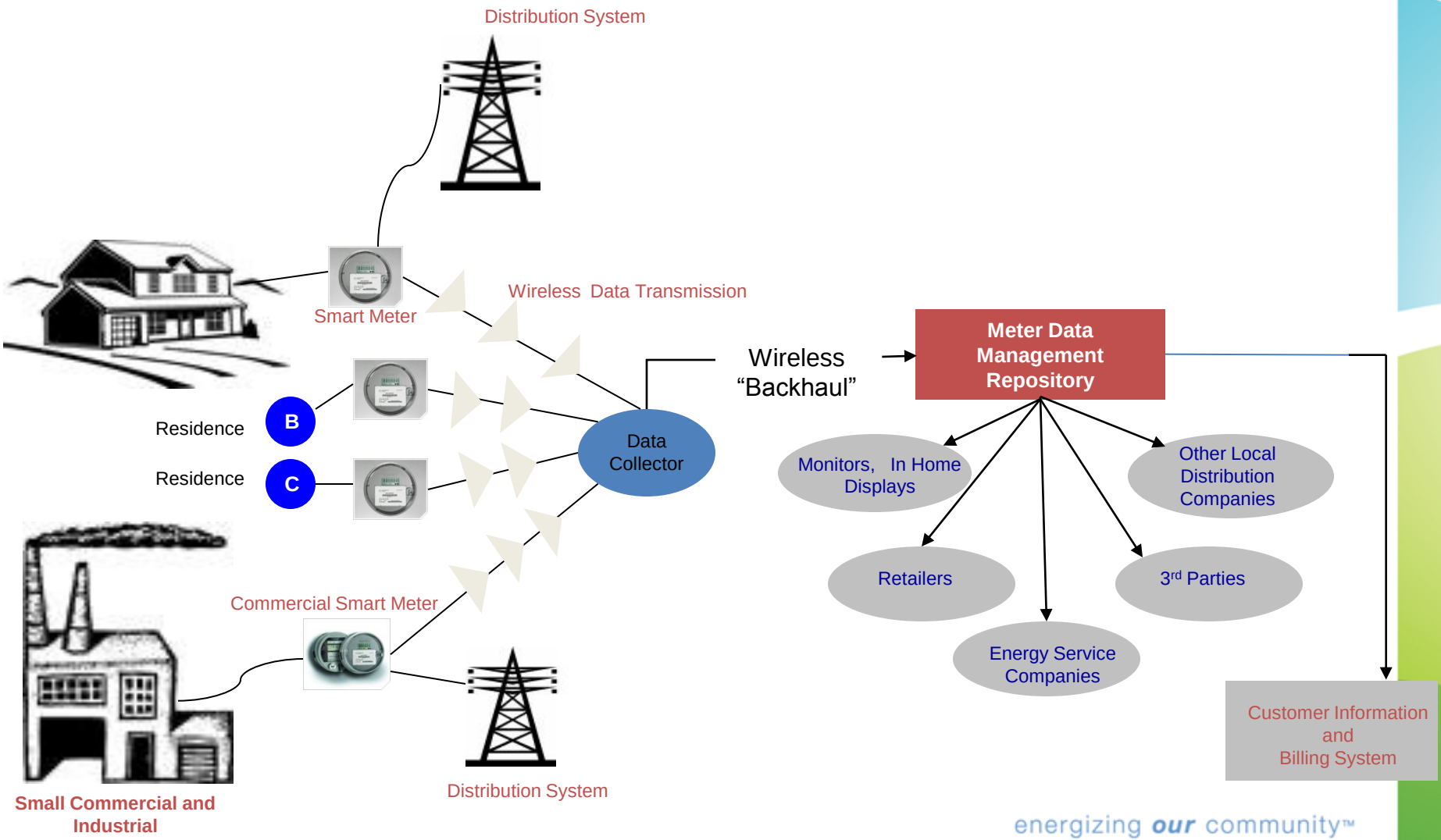
Advanced Metering Infrastructure (AMI)



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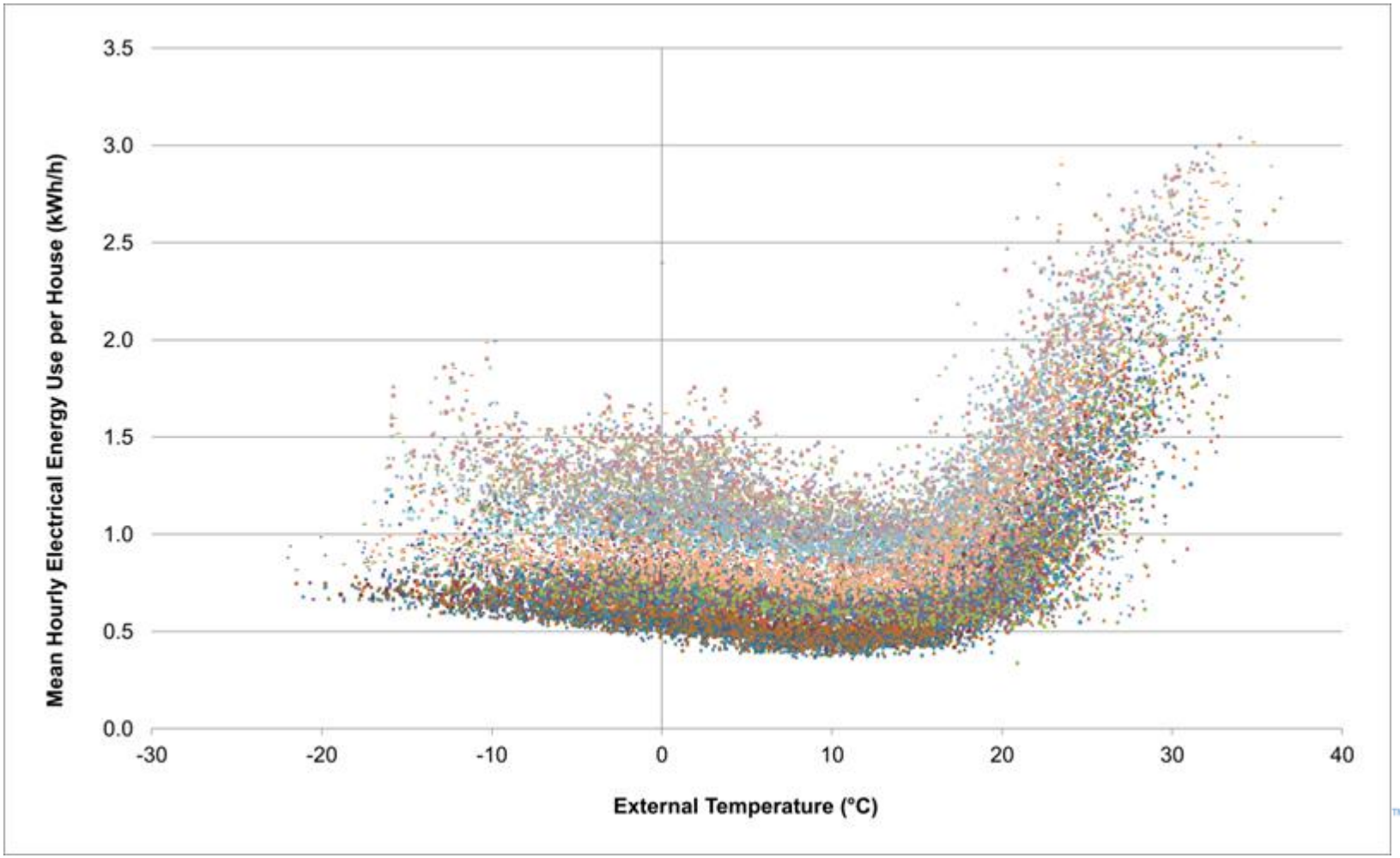
Ministry of Energy Vision

"Ontario has introduced smart meters — along with a "time-of-use" electricity price structure — ***to help you manage your electricity costs****, while helping Ontario to build a more efficient, more environmentally sound electricity system. Smart meters have been installed in residences and small businesses across Ontario."*

Customer Reactions

- Hostility towards rising electricity prices, HST and time-of-use rates
- Efforts to shift energy use are not measurable
- “I already do laundry at 2:00 AM; what else can I do?”

Study of Hourly Consumption Data vs. Temperature – National Research Council



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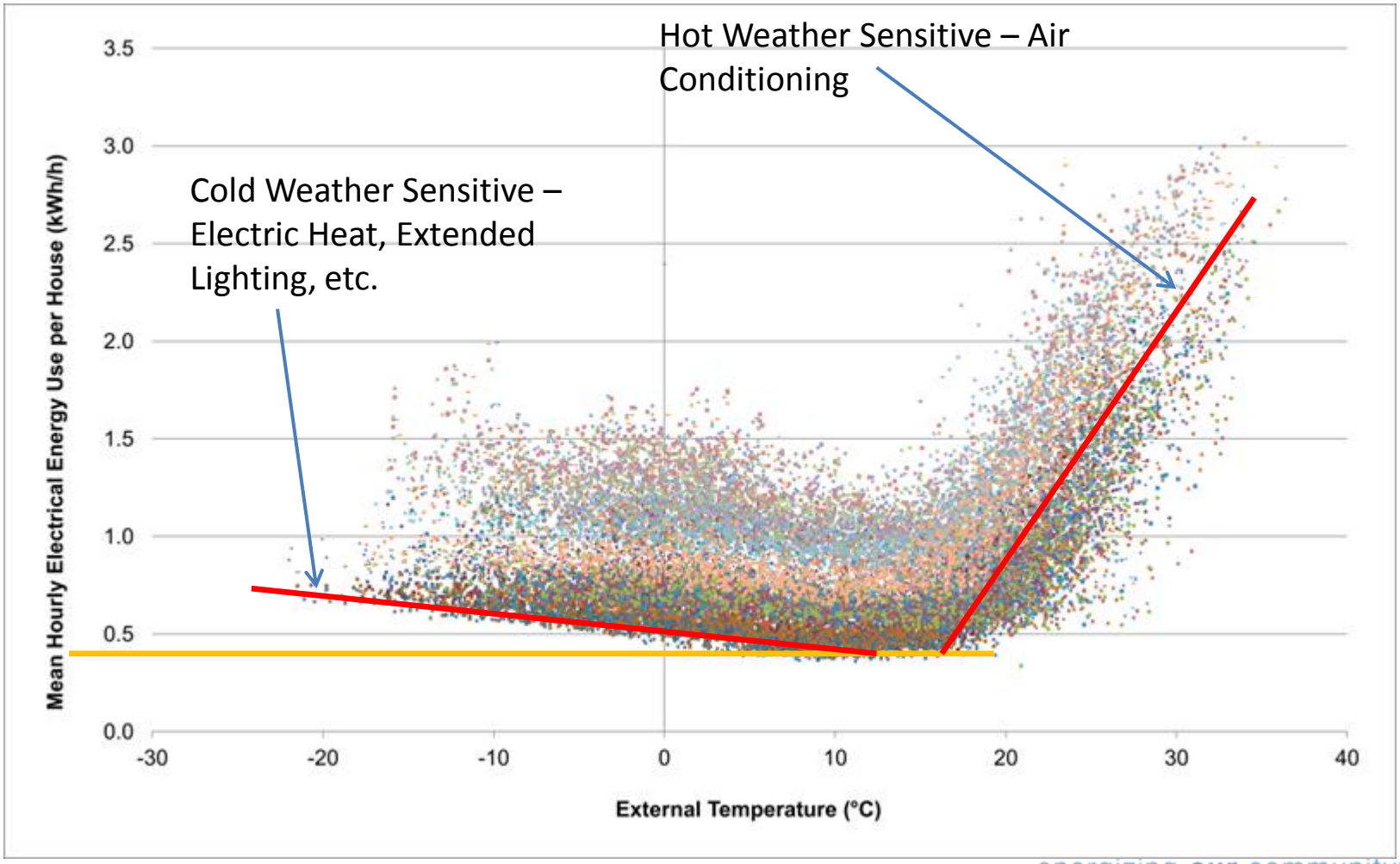

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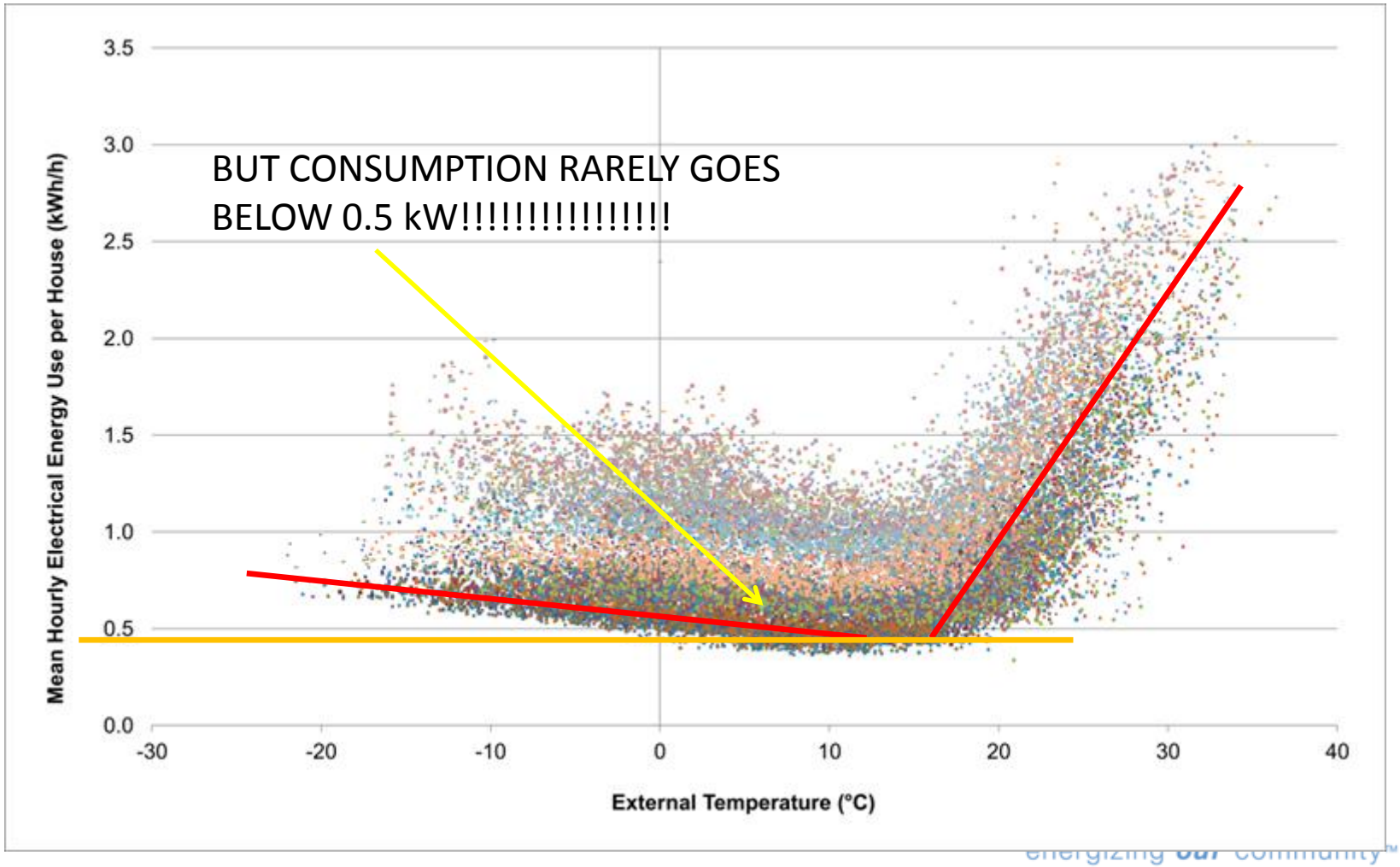

Phantom Power

- Known by a laundry list of names:
  - phantom load
  - idle current
  - vampire power
  - wall wart
- gadgets, electronic devices and appliances draw power even when they're switched off or not in use, just by being plugged in, and though it may seem trivial, it can add up over time

Knowledge is Power – Phantom Loads

- BHI evaluated phantom loads using an Energy Meter
- Loads were examined while they were “sleeping”, not charging, if applicable

Electric Toothbrush

- What is the annual phantom power (not charging) cost?
  - ❑ $0.27
  - ❑ $1.55
  - ❑ $3.10
  - ❑ $7.98

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52” Flat Screen TV, PVR, BlueRay

- What is the annual phantom power cost?
  - ❑ $5.78
  - ❑ $57.82
  - ❑ $97.82
  - ❑ $107.82

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Treadmill

- What is the annual phantom power cost?
  - ❑ $0.00
  - ❑ $3.78
  - ❑ $7.21
  - ❑ $10.91

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  - ✓ $10.91

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Homes Have an Incredible Inventory of Phantom Power Loads

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While you were sleeping…….

Appliance	Sleeping Watts	# in Household	Total Annual Energy Cost	Energy Management Strategy	Energy Cost Savings ($/yr)	Energy Savings (kWh/yr)
52" Flat Screen TV, PVR, Blueray	57	1	$ 57.64	Power Bar - 4 Hours/Day Operation	$ 48.04	414
40" Flat Screen TV, Satellite Box, DVD	19	2	$ 36.47	Power Bar - 4 Hours/Day Operation	$ 30.39	262
13" Flat Screen TV	2	1	$ 1.95	Power Bar - 2 Hours/Day Operation	$ 1.79	15
Commercial Printer	9	1	$ 9.81	Off During non-Business Hours	$ 7.79	67
i-Pad	0	2	$ -		$ -	-
Computer, Desk-top Printer, Hard Drive, Monitor (Non-Energy Star)	44	2	$ 89.16	Power Down - 7.5 Hour Operation / Day	$ 70.84	611
Computer, Hard Drive, Monitor (Energy Star)	14	1	$ 14.43	Power Down - 7.5 Hour Operation / Day	$ 11.47	99
Cordless Phone - Non Base Unit	2	6	$ 10.91	Charge 4 Hours/Day During Night	$ 10.00	86
Stereo	21	2	$ 45.70	Power Bar - 2 Hours/Day Operation	$ 41.89	361
Electric Toothbrush	3	4	$ 12.38	Charge 4 Hours/Day During Night	$ 11.35	98
Router	3	1	$ 4.02	Power Down - 7.5 Hour Operation / Day	$ 3.20	28
Android Cell Phone	0	3	$ -		$ -	-
Treadmill	10	1	$ 10.88	Power Bar - 1.0 Hour Operation / Day	$ 10.43	90
Charger	14	1	$ 14.21	Charge 4 Hours/Day During Night	$ 13.02	112
Front Load Washing Machine	4	1	$ 3.95	Power Bar - 2 Hours/Day Operation	$ 3.62	31
Table Radio	5	2	$ 10.45	Power Bar - 2 Hours/Day Operation	$ 9.58	83
Satellite TV Antenna Transformer	20	1	$ 20.10	Power Bar - 4 Hours/Day Operation	$ 16.75	144
TOTALS	227		$ 342.08		$ 290.16	2,501

A few surprises

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Impact of Phantom Load on Electricity Use

- Average home uses about 800 to 1,000 kWh/month
- The phantom load in this case study = 20 to 25% of the monthly consumption
- Did not consider other measures such as set-back of electric hot water heaters, etc.
- LDCs have a role to play in consumer education

Impact of Phantom Load on BHI CDM Targets

Household phantom load = 2,501 kWh

Residential Homes in Burlington = 58,733

Potential Conservation Effect = 146,900,000 kWh

BHI Consumption Target = 84,000,000 kWh

175 % of BHI Goal !!!!

Impact of Phantom Load on BHI CDM Targets

Household Phantom Load Demand = 157 W*

Residential Homes in Burlington = 58,733

Potential Conservation Effect = 9.2 MW

BHI Demand Target = 22 MW

42 % of BHI Goal !!!!

* Coincident Peak Demand Only

Technology to Assist Consumers

- Power Bars (w Remote Switch)
- Smart Power Bars (watch their phantom load)
- Web – enabled plug controllers
- Kill Switches
- Timers (use power themselves)
- Home automation systems

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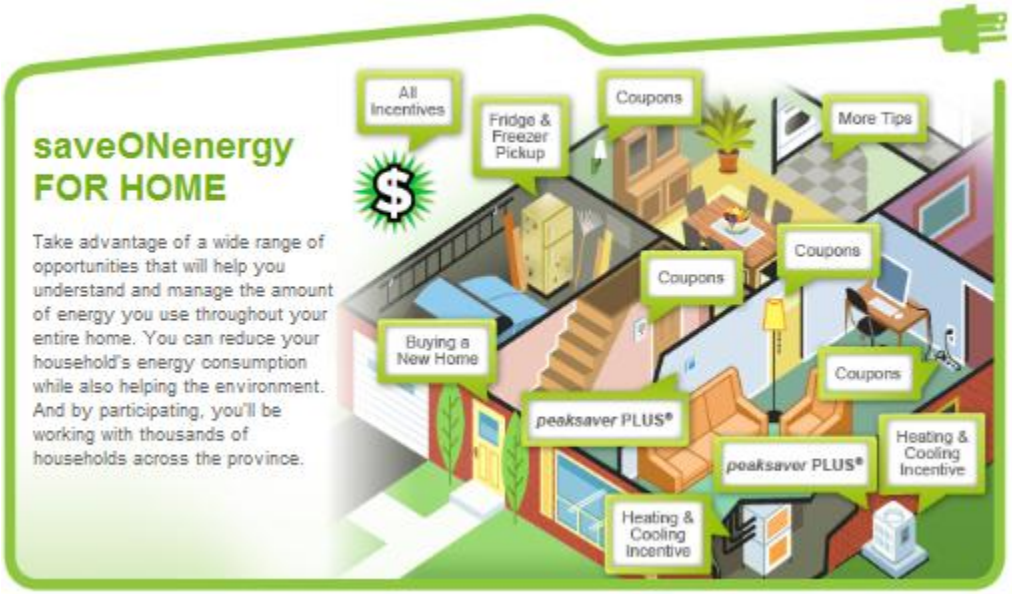
OESO Programs to Assist Residential Customers



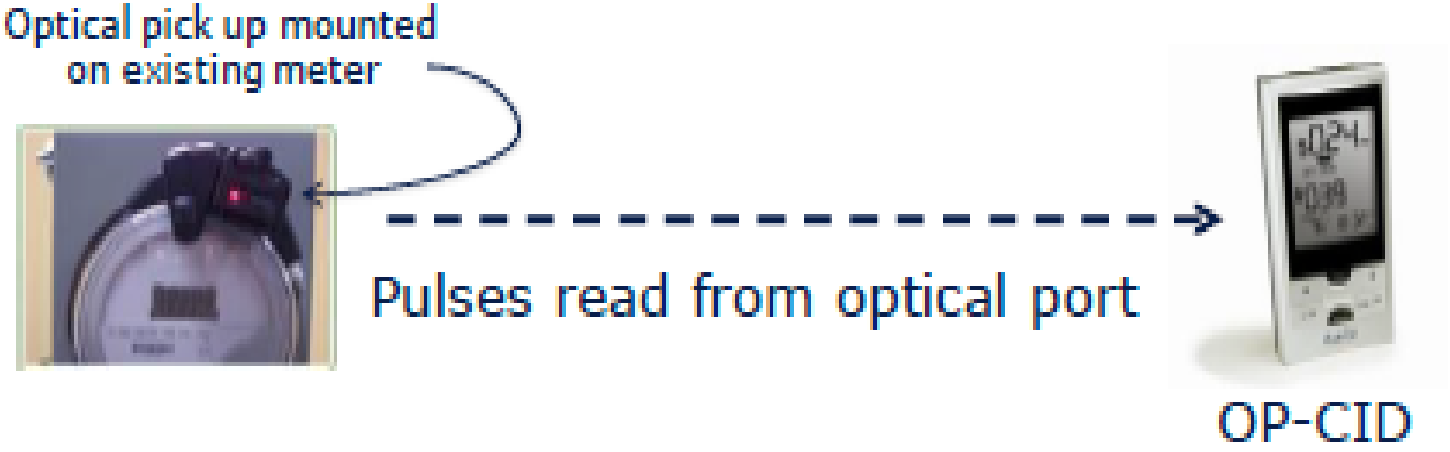
Conservation Impact of Smart Meters

- Analog Meters consume about 0.8 Watts
- Smart Meters consume about 0.5 Watts (with an occasional pulse to about 1.5 Watts)
- Savings across Burlington = 17.6 kW and 15,271 kWh
- Benefit accrues to ratepayers through lower distribution losses

In-Home Displays

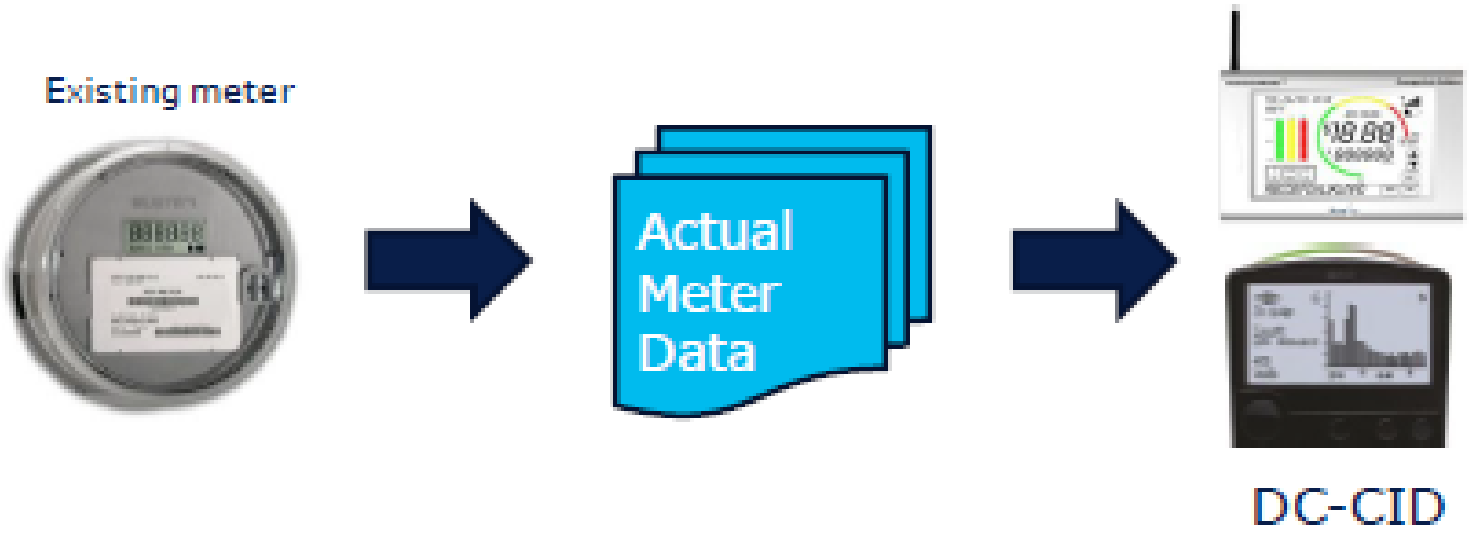
- Offer consumers near real time meter data
- Real time data is not available through MDMR supported data (Bill viewers, etc.)
- Allows for immediate feedback to customers
- Available to peaksaver+ customers at no charge

Data Collection - Optical



- Meets OPA Functional Specification and pricing
- Subject to alignment issues, vandalism, etc.
- Must be installed by a technician
- Must be reprogrammed when Time-of-Use rates, daylight savings time and “buckets” change
- Requires two sets of batteries, one of which is exposed to temperature extremes

Data Collection - Wireless



- Meets OPA Functional Specification and Pricing (with sufficient volumes)
- Can be shipped to customer – no installation requirement
- LDC must “pair” the device to the customer’s meter before shipping
- Direct Reset of Daylight Savings Time, Time-of-use “Buckets” and rates
- Allows for text messages (conservation encouragement, etc.)

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Comparison of Optical and Wireless Technologies

Capabilities	DC-CID	OP-CID
Meets OPA Requirements	Yes	Yes
Time synchronized with meter	Yes	No
Eliminates field installation by Utility/consumer	Yes	No
Eliminates Potential for misalignment, misreads	Yes	No
Eliminates vandalism or tampering	Yes	No
Exactly matches the meter reading	Yes	No
Changes TOU buckets with the meter automatically	Yes	No
Utility can update the rates remotely	Yes	No
Utility can change the TOU times remotely	Yes	No
Customer can match CID reading to meter	Yes	No
Can be used with any Elster meter	Yes	Yes
Utility can send messages to the CID	Yes*	No

Summary

- Phantom loads have a significant and growing impact on energy consumption
- LDCs must help customer awareness and provide tools for customers to measure and reduce phantom loads
- Smart meters and associated AMI are a solution

Questions??