# Energy & Store Development Conference

# E+SD 2016

FMI

THE VOICE OF FOOD RETAIL

Energy & Store
Development Conference
E+SD 2016

# How Low Can You Go?
# Cutting Store Energy by 50 Percent

Cathy Reynolds, VEIC/Efficiency Vermont
Andrew Goldberg, Hannaford Bros Co

Efficiency Vermont is the country's first energy efficiency utility created in 2000. It is operated under contract with the State of Vermont by the Vermont Energy Investment Corporation.

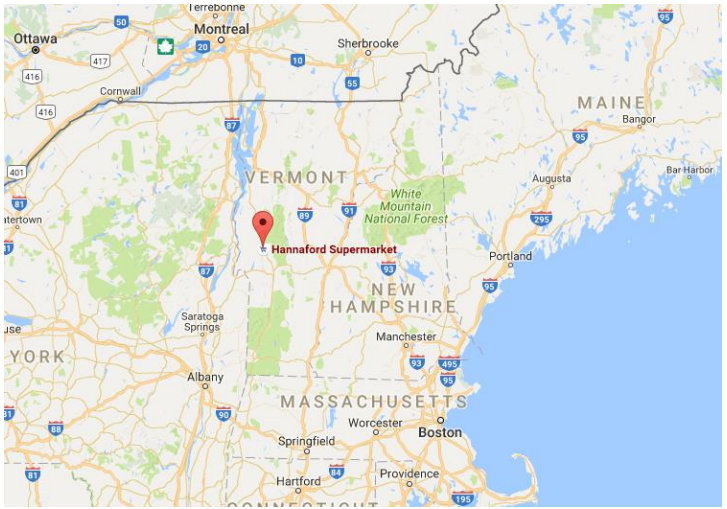
Efficiency Vermont

# Pilot Program: Deep Energy Retrofits

- Commercial buildings, Total energy
- Reduction of 50%
- No change of use
- Performance based, $10/ft$^2$ in 4 payments
- “At the meter”
- Weather normalized (HDD)
- 2014 base year, 2017 performance year

# Hannaford #8409 – Brandon, VT

- 19,857 square feet
- 1,647,00 kWh/yr
- 13,000 gallons LP
- Built in 1993
- Acquired in 2010
- “Opportunity”



# MMBTU/Square Foot

- Small store – high usage
- Brandon pre-project
- Energy Star = 8/100
- Worst performing store in chain (MMBTU/SqFt)

# Hannaford Engineering

- Structure
- Energy Team
- Focused on installing efficiency measures across the chain

# Hannaford and Efficiency Vermont

- Relationship
- Ongoing Projects
- Territory
- Pilots and metering

Efficiency Vermont

# Why Brandon?

- Old facility
- No recent activity
- Move? Relocate?
- Lots of opportunity!
- Different approach
- Everything was on the table
- $\$10/ft^2$ was motivating factor -$180,000 incentive potential from Efficiency Vermont

# Hannaford Store List

| Average: Kbtu/SqFt | 223 | 220 |
|---|---|---|
| | Jan 2014 - Dec 2014 | Jan 2015 - Dec 2015 |
| Location Name | KBTUs Per SqFt | KBTUs Per SqFt |
| 08409-Brandon | 444.0 | 401.3 |
| 08149-Portsmouth-Islington | 327.3 | 356.7 |
| 08376-Glenville | 293.0 | 294.9 |
| 08417-Hampden | 300.7 | 294.4 |
| 08334-Wappinger | 286.4 | 292.3 |
| 08313-Clinton | 319.6 | 292.1 |
| 08143-Boothbay Harbor | 268.2 | 290.3 |
| 08380-South Glens Falls | 302.4 | 288.2 |
| 08335-Pawling | 295.2 | 285.1 |
| 8016-Derry, NH | 281.7 | 284.3 |
| 08161-Burlington - North Ave | 268.7 | 277.4 |
| 08353-Essex | 268.3 | 271.8 |
| 08333-Greenwich | 275.4 | 271.1 |
| 08160-Northwood | 281.5 | 269.7 |
| 08395-Kingsbury | 253.8 | 268.9 |

# Existing Conditions

- Lighting – 400w MH
- Refrigeration – Old open cases with T12 lighting
- HVAC – Older rooftops with air balance issues
- Exterior – MH exterior lighting store and parking
- Controls – commissioning opportunities
- Sleeping store tour – what can you learn?


WOW!
2 for 5
Real Savings Every Day
2.29
SNACK Little Debbie CENTER
Little Debbie
THE BIG FREEZE
WOW!
2/5.00
Nabisco
frusan


frozen seafood
ARNOLD
PREMIUM
STUFFING
$2.99
$1.39
BUBBA
BUBBA


DELICIOUS VARIETY, FRESH-PACKED TO GO
REDI-DELI


LENNOX Industries Inc.
DALLAS, TEXAS
MODEL NUMBER OAD16-300-1
MIC LB-62749D
SERIAL NUMBER
NOMBRE DE SERIE
5693H06437
08/93
MIC 8-9951D


EXIT

# Sleeping Store Tour

- Tour store when closed
- Controller settings vs reality
- Verify on site, overnight
- Are relays connected?
- Does program match conditions?
- What can you learn?

# Shut it Down!

- What is the cheapest kWh?
- If not in use, shut it down!
- Findings at night are often surprising and not what you expect


Real Savings Every Day
$5.49
FRISCHETTA
DIGIORNO
frozen pizza


This week only!
7.99
roastery chicken
$5.99 ea.
roastery turkey breast
$8.99 ea.
CAUTION HOT


Turn Off
When
Not
In Use

# Other Opportunities identified

- Refrigerating a storage room
- Can we consolidate cases?
- Why are we lighting the potatoes?
- EnergyStar self-contained cases


ganic
a simply good pick


potatoes
squash
onions
Save 30¢
69¢
4 99
2 69
IDAHO
RUSSET POTATOES

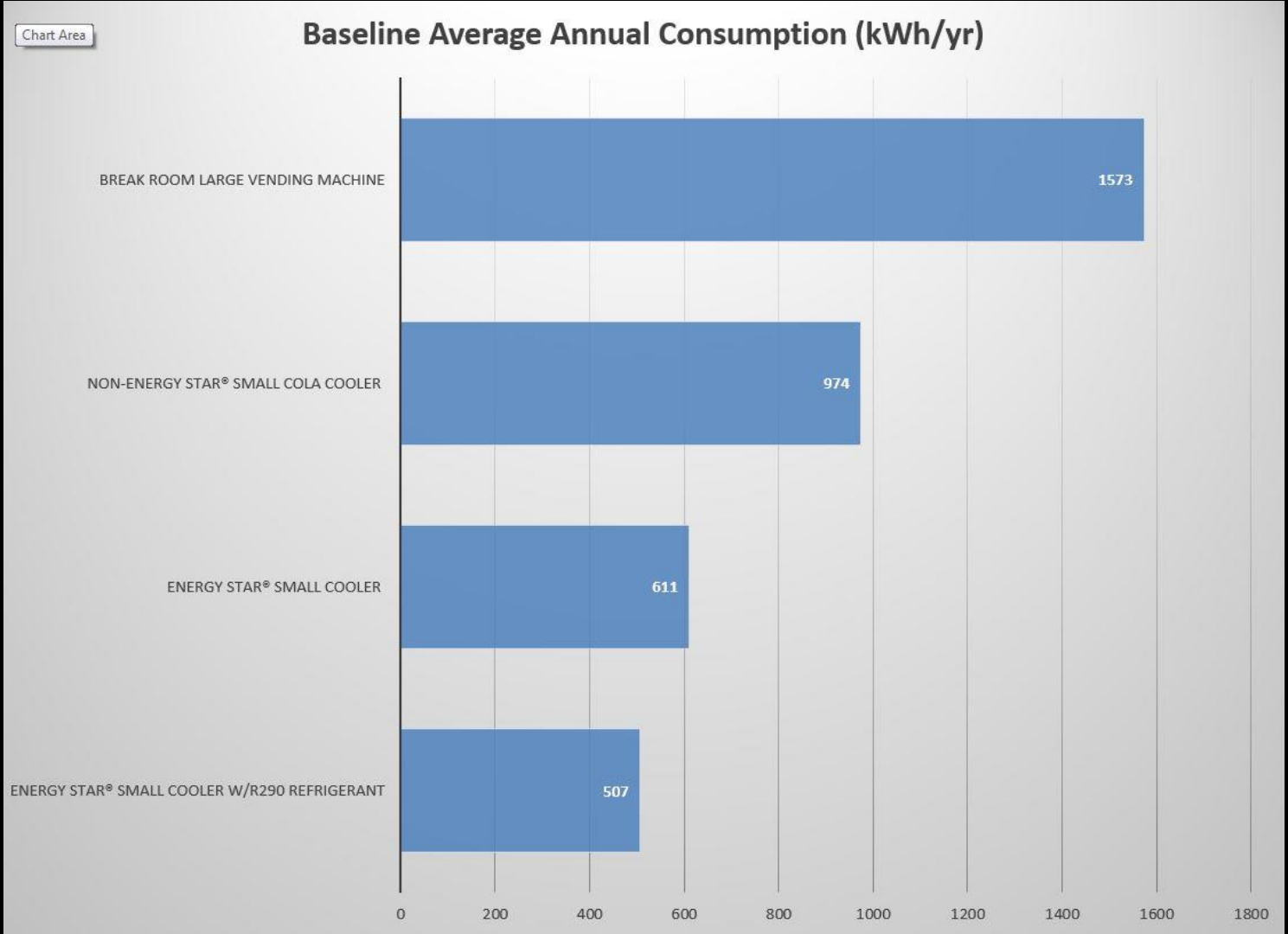


Chart Area
Baseline Average Annual Consumption (kWh/yr)
BREAK ROOM LARGE VENDING MACHINE
1573
NON-ENERGY STAR® SMALL COLA COOLER
974
ENERGY STAR® SMALL COOLER
611
ENERGY STAR® SMALL COOLER W/R290 REFRIGERANT
507
0
200
400
600
800
1000
1200
1400
1600
1800

# Project Plan

- Guide to expected savings
- Progress barometer
- Communicate with Efficiency Vermont

# Pilot Program: Deep Energy Retrofit

Brandon 8409 ECM Summary Rev5.xlsx - Microsoft Excel

File | Home | Insert | Page Layout | Formulas | Data | Review | View | Add-Ins | Acrobat

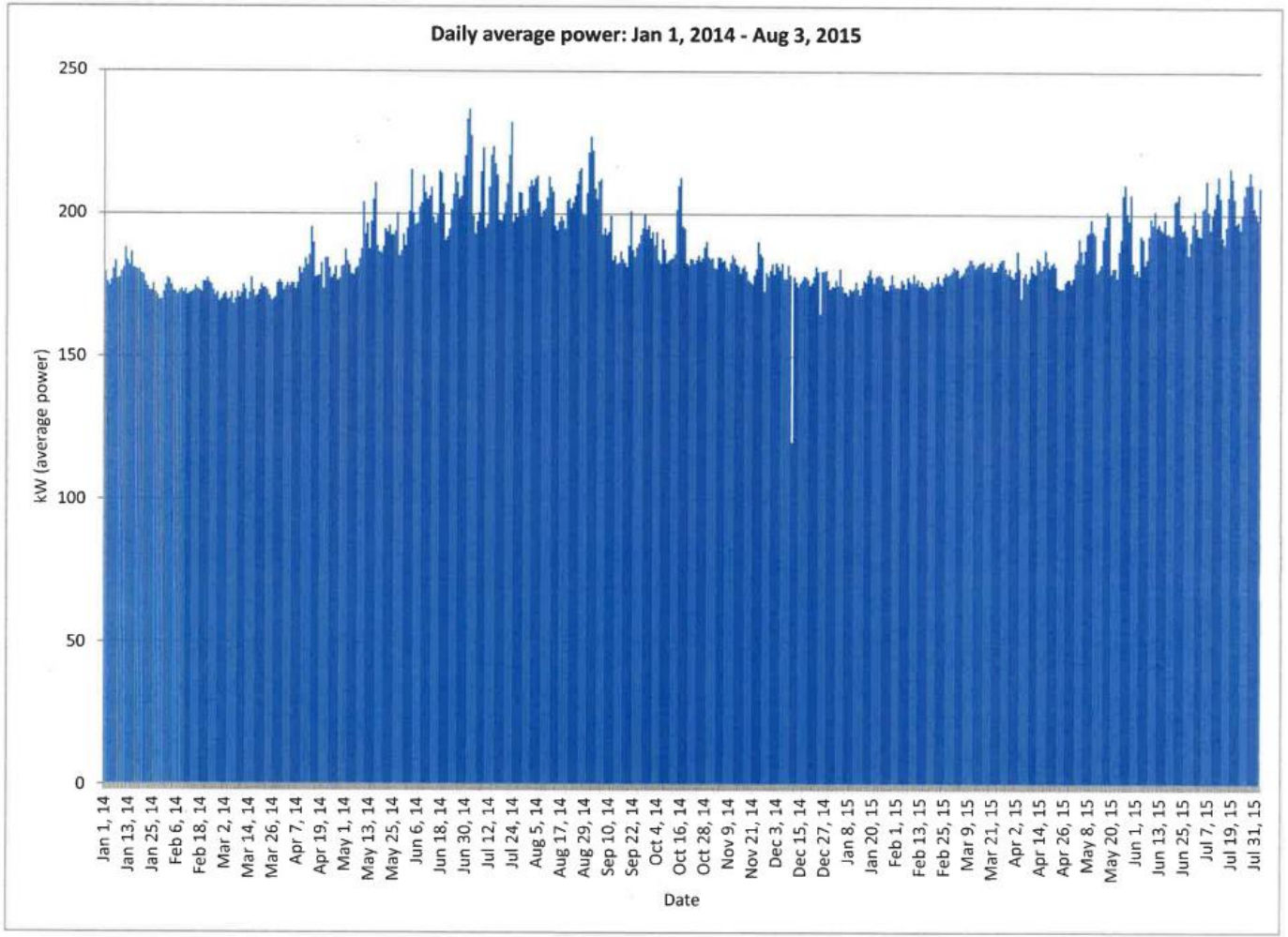
Cut | Copy | Format Painter | Paste | Clipboard
Calibri | 11 | Font
Wrap Text | Merge & Center | Alignment
Number | Number
Conditional Formatting | Format as Table | Cell Styles | Styles
Insert | Delete | Format | Cells
AutoSum | Fill | Clear | Sort & Filter | Find & Select | Editing

C24 | 1000/ft

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Brandon Hannaford 8409 | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Floor Are | | 18,866 | square feet (19,857 sq. ft. in ESPM) | | | | | | 7,544,238 | kBtu/yr total site energy use | | | | | | | | | | | | | |
| 3 | Electric: | | 1,610,263 | kWh/yr | 85.4 | kWh/sf/yr | | 51.3 | kWh/sq.ft./yr is national grocery store average | 400 | kBtu/sf/yr total site energy (LPG 3/14-2/15 & electric 4/14-2/15, normalized to 365 d/y from 353 d/y) | | | | | | | | | | | | | |
| 4 | Propane: | | 22,510 | gal/yr LPG | 1.1 | Therms/sf/y | | 0.38 | Therms/sq. ft./yr is national grocery store average | 2048.41 | MMBTU Propane | | | | | | | | | | | | | |
| 5 | ECM # | Energy Conservation Measure | Savings per Door or per Measure (kWh/yr) | Total Savings (kWh/yr) | Total Savings (kWh/yr) | Total Savings at $0.14/yr ($/yr) | Total Propane Savings (kBtu/yr) | Total Energy Savings (kBtu/yr) | Percent Reduction each Measure (%) | Total Reduction all ECMs (see bottom of column | Notes | | | | | contractor | cost | schedule | | | | | | |
| 6 | 1 | Heat Seal Unit in Deli | 1,357 | 1,357 | 1,357 | 274 | 0 | 6,673 | 0.1% | 0.1% | | | | | | Flynn Energy | $ 700 | Complete | | | | | | |
| 7 | 2 | Heat Seal Unit in Produce | 568 | 568 | 568 | 80 | 0 | 1,939 | 0.0% | 0.1% | | | | | | Flynn Energy | $ 700 | Complete | | | | | | |
| 8 | 3 | Propane Hot Water Heater | 0 | 0 | 0 | 0 | 15,088 | 15,088 | 0.2% | 0.3% | | | | | | NE Air and Brown Electric | $ 13,682 | Complete | | | | | | |
| 9 | 4 | Lighting (main sales, peripheral, exterior) | 186,000 | 186,000 | 186,000 | 26,040 | | 634,818 | 8.4% | 8.7% | | | | | | Lighting Solutions | $ 145,520 | Q4 2015 | | | | | | |
| 10 | 5 | *removed line for Groom* | | | | 0 | | 0 | 0.0% | 8.7% | | | | | | | | | | | | | | |
| 11 | 6 | ECM Upgrade at LT & MT Walk-ins (Groom Energy) | | | 29,565 | 4,139 | | 100,905 | 1.3% | 10.1% | | | | | | | | | | | | | | |
| 12 | 7a | EMS (Groom Energy - Condenser VFDs, FHP controls) | | | 80,808 | 11,313 | | 275,798 | 3.7% | 13.7% | | | | | | | | | | | | | | |
| 13 | 8 | Kysor Warren LT Closed Cases' | | | 36,282 | 5,079 | 10,000 | 133,830 | 1.8% | 15.5% | Includes ECMs,LEDs; Excludes ASH increase | | | | | | | | | | | | | |
| 14 | 9 | Replace RTUs w/higher EE EER/IEER - cooling savings | | 15,019 | 15,019 | 2,103 | 0 | 51,260 | 0.7% | 16.2% | | | | | | | | | | | | | | |
| 15 | 10 | Close open low temperature cases | 3856/ft | 77,120 | 77,120 | 10,797 | 10,000 | 273,211 | 3.6% | 19.8% | | | | | | ZeroZone, Hannaford PM | $ 40,000 | TBD | | | | | | |
| 16 | 11 | Close open deli, dairy & beer cases | 1328/ft | 265,920 | 265,920 | 37,789 | 10,000 | 931,237 | 12.3% | 32.1% | | | | | | Hillphoenix, Commercial Refrigeration | $ 57,916 | Q1 2016 | | | | | | |
| 17 | 12 | Upgrade produce cases (ECMs & T8 Lighting) | | | | | | | | 32.1% | Removed from scope due to age of Produce cases and cost of upgrade not providing any energy improvements | | | | | | | | | | | | | |
| 18 | 13 | Outdoor LT walkin thermal envelope (curtains, air seal, etc) | TBD | | | | | | | 32.1% | | | | | | P&M Construction | $ 48,358 | TBD | | | | | | |
| 19 | 14 | Reflective paint on back wall at LT exterior walkin | TBD | | | | | | | 32.1% | | | | | | | | | | | | | | |
| 20 | 15 | Decrease or eliminate 24/7 light fixtures | | | | | | | | 32.1% | included in lighting SOW | | | | | | | | | | | | | |
| 21 | 16 | Turn interior lights & case lights off during unoccupied times | | | | | | | | 32.1% | included in lighting SOW | | | | | | | | | | | | | |
| 22 | 17 | Engage store staff to optimize procedures/scheduling | | | | | | | | 32.1% | | | | | | | | | | | | | | |
| 23 | 18 | Anti-Sweat heater control on LT frozen reach-in cases | 630 | 68 doors | 42,840 | 5,998 | 0 | 146,213 | 1.9% | 34.1% | | | | | | Materials from AEC, Install TBD | $ 3,000 | Q1 2016 | | | | | | |
| 24 | 19 | Install night shades on MT fresh meat cases 44 linear ft | 1000/ft | 44,000 | 17,600 | 2,464 | 5,000 | 65,069 | 0.9% | 34.9% | | | | | | Commercial Refrigeration | minimal | Complete | | | | | | |
| 25 | 20 | Impact doors on receiving doorway | | | | | 225,100 | 225,100 | 3.0% | 37.9% | | | | | | Tom Moran project | $ - | Complete | | | | | | |
| 26 | 21 | Shut down extra Produce evap, shut fans | TBD | | | | | | | 37.9% | | | | | | Mike Cavalieri project | $ - | Complete | | | | | | |
| 27 | 22 | Replace chicken display units | TBD | | | | | | | 37.9% | Getting energy data from case manufacturer | | | | | | | | | | | | | |
| 28 | 23 | Retrofit LEDs to reach-in frozen cases | 234kWh/dr | 16,380 | 16,380 | 2,293 | | 55,905 | 0.7% | 38.7% | May be able to use harvested lights from previous projects | | | | | Lighting Retrofit Services | | | | | | | | |
| 29 | 24 | Install destratification fans (sales floor and backroom) | TBD | | | | | | | | | | | | | Brown Electric | $ 15,195 | Q1 2016 | | | | | | |
| 30 | 25 | Install case motion detectors on all reach-in cases | TBD | | | | | | | | | | | | | | | | | | | | | |
| 31 | 26 | Kitchen exhaust vent TOD control | TBD | | | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | | | | | | |
| 33 | | **Total Savings Electric & Propane** | | | **774,059** | **$ 108,368.26** | **275,188** | **2,917,051** | **38.7%** | **38.7%** | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | | ***Also may want to consider:*** | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 7b | Replace condensers w/Flying Bird & FHP controls | | | | | | | | | | | | | | | | | | | | | | |
| 37 | 7c | Replace compressors with higher EER compressors | | | | | | | | | | | | | | | | | | | | | | |
| 38 | 9b | Optimize RTUs if not able to replace (old 1993 units though) | | | | | | | | | | | | | | | | | | | | | | |
| 39 | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | | **Notes:** | | | | | | | | | | | | | | | | | | | | | | |
| 41 | | 'Kysor Warren LT Closed Cases - total | | | 36,282 | kWh/yr | | | | | | | | | | | | | | | | | | |
| 42 | | Evaporator Fans | 215 | 14,594 | | kWh/yr | Primary assumptions include 46 Watts per evaporator fan for Hussmann and 29 Watts per ECM evaporator fan for existing Kysor Warren cases. | | | | | | | | | | | | | | | | | |
| 43 | | LED Case Lights | 21,683 | 21,683 | | kWh/yr | Based on actual wattage from site inventory, store hours, and assumption that Kysor Warren cases have LEDs. Includes refrigeration savings. | | | | | | | | | | | | | | | | | |
| 44 | | Low Energy Doors/Anti-sweat heaters | (494) | (33,614) | | kWh/yr | Based on average amps per case from Ardco nameplate on Hussmann cases and the case data amps for Kysor/Warren provided in the cut sheets received for GLV5VA&GIV5VA. | | | | | | | | | | | | | | | | | |
| 45 | | Defrost Heaters | N/A | 1,019 | | N/A | Based on 45 min per day run time and Amps given in cut sheets for both Hussmann & Kysor/Warren. | | | | | | | | | | | | | | | | | |
| 46 | | ASH Door Controls | | | | | | | | | | | | | | | | | | | | | | |
| 47 | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 | | | | | | | | | | | | | | | | | | | | | | | | |
| 49 | | | | | | | | | | | | | | | | | | | | | | | | |

ECMs

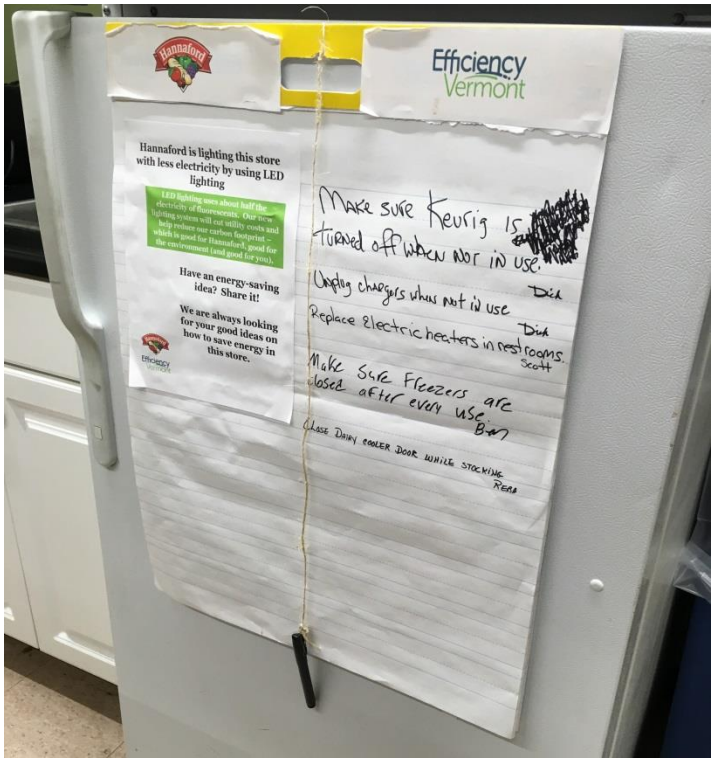
Ready | 55%

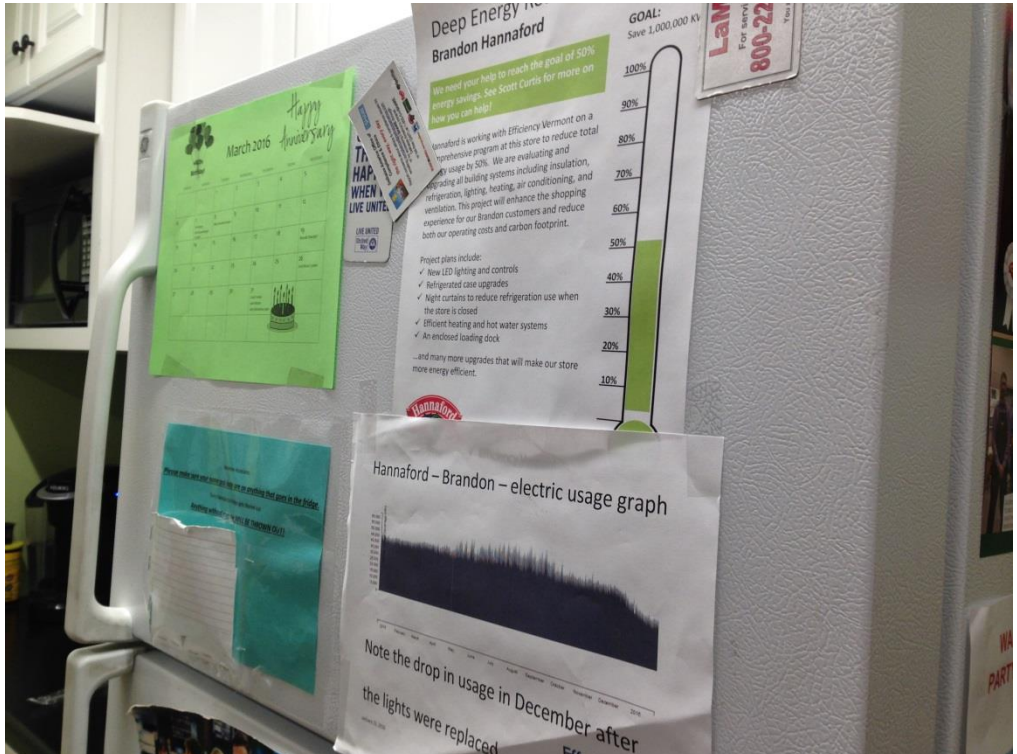

Daily average power: Jan 1, 2014 - Aug 3, 2015
kW (average power)
250
200
150
100
50
0
Jan 1, 14
Jan 13, 14
Jan 25, 14
Feb 6, 14
Feb 18, 14
Mar 2, 14
Mar 14, 14
Mar 26, 14
Apr 7, 14
Apr 19, 14
May 1, 14
May 13, 14
May 25, 14
Jun 6, 14
Jun 18, 14
Jun 30, 14
Jul 12, 14
Jul 24, 14
Aug 5, 14
Aug 17, 14
Aug 29, 14
Sep 10, 14
Sep 22, 14
Oct 4, 14
Oct 16, 14
Oct 28, 14
Nov 9, 14
Nov 21, 14
Dec 3, 14
Dec 15, 14
Dec 27, 14
Jan 8, 15
Jan 20, 15
Feb 1, 15
Feb 13, 15
Feb 25, 15
Mar 9, 15
Mar 21, 15
Apr 2, 15
Apr 14, 15
Apr 26, 15
May 8, 15
May 20, 15
Jun 1, 15
Jun 13, 15
Jun 25, 15
Jul 7, 15
Jul 19, 15
Jul 31, 15
Date

# Community and Associates

- Goal to share with associates and community
- Associates ideas
- Customers asking questions
- Store started to look and feel different
- Posters!

# Community and Associates



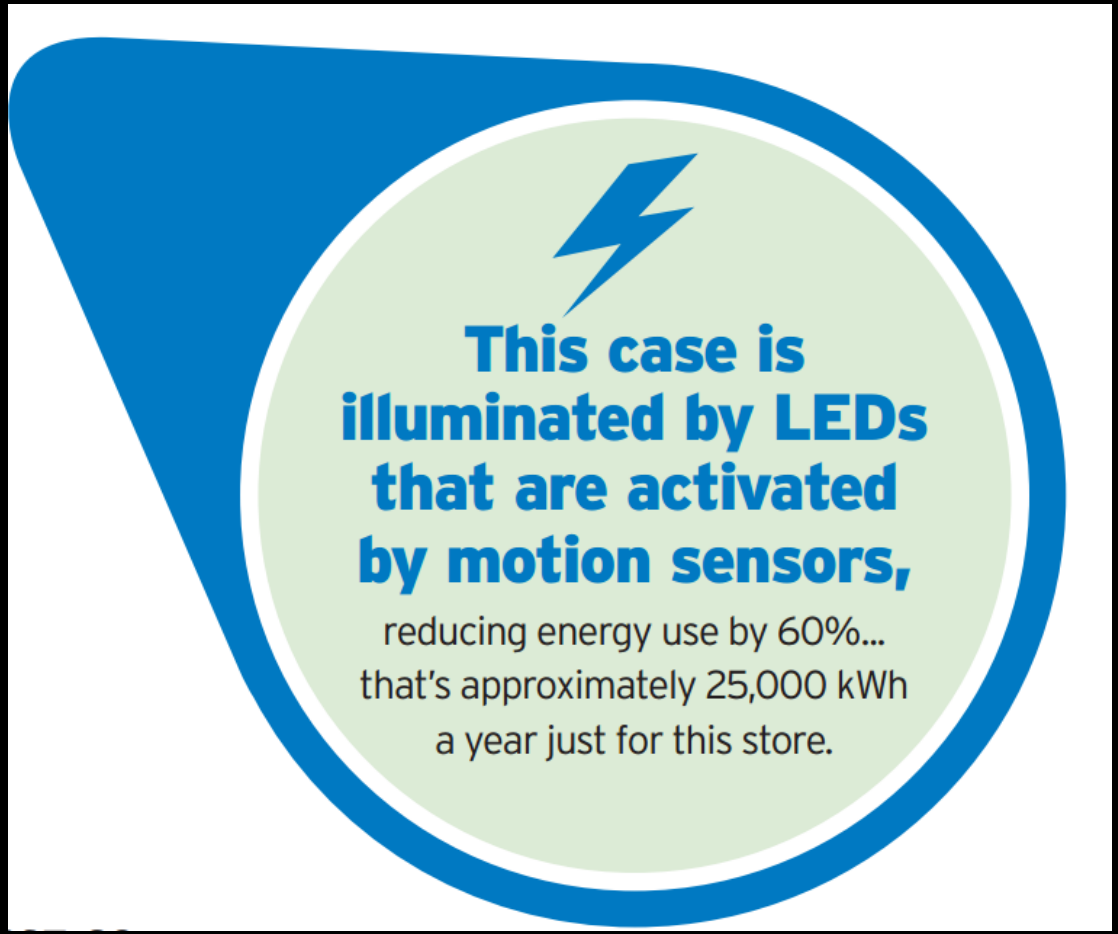

Our promise to you
A superior
shopping experience,
For your protection, this store is monitored by closed circuit TV.
AUTOMATIC
CAUTION
DOOR
Deep Energy Retrofit
Progress:
Brandon Hannaford
Hannaford is working with Efficiency Vermont on a comprehensive program at this store to reduce total energy usage by 50%.
We're evaluating and upgrading all building systems including insulation, refrigeration, lighting, heating, air conditioning, and ventilation. This project will enhance the shopping experience for our Brandon customers and reduce both our operating costs and carbon footprint.
Project plans include:
✓ New LED lighting and controls
✓ Refrigerated case upgrades
✓ Night curtains to reduce refrigeration use when the store is closed
✓ Efficient heating and hot water systems
✓ An enclosed loading dock
... and many more upgrades to make our store more energy efficient!
Hannaford
Efficiency Vermont

# Hannaford added doors to the cases to keep the cold air in, and the warm air out.

Cases are illuminated by LEDS that are activated by motion sensors. LED lighting uses about half the electricity of fluorescents. Our new cases will cut utility costs and help reduce our carbon footprint – which is good for us, good for the environment, and good for you.

Efficiency Vermont

Hannaford


This case is illuminated by LEDs that are activated by motion sensors,
reducing energy use by 60%...
that's approximately 25,000 kWh
a year just for this store.

# Energy efficiency is something you can help with

How much does it cost to leave this freezer door open?
$21 per hour.
Close the door!

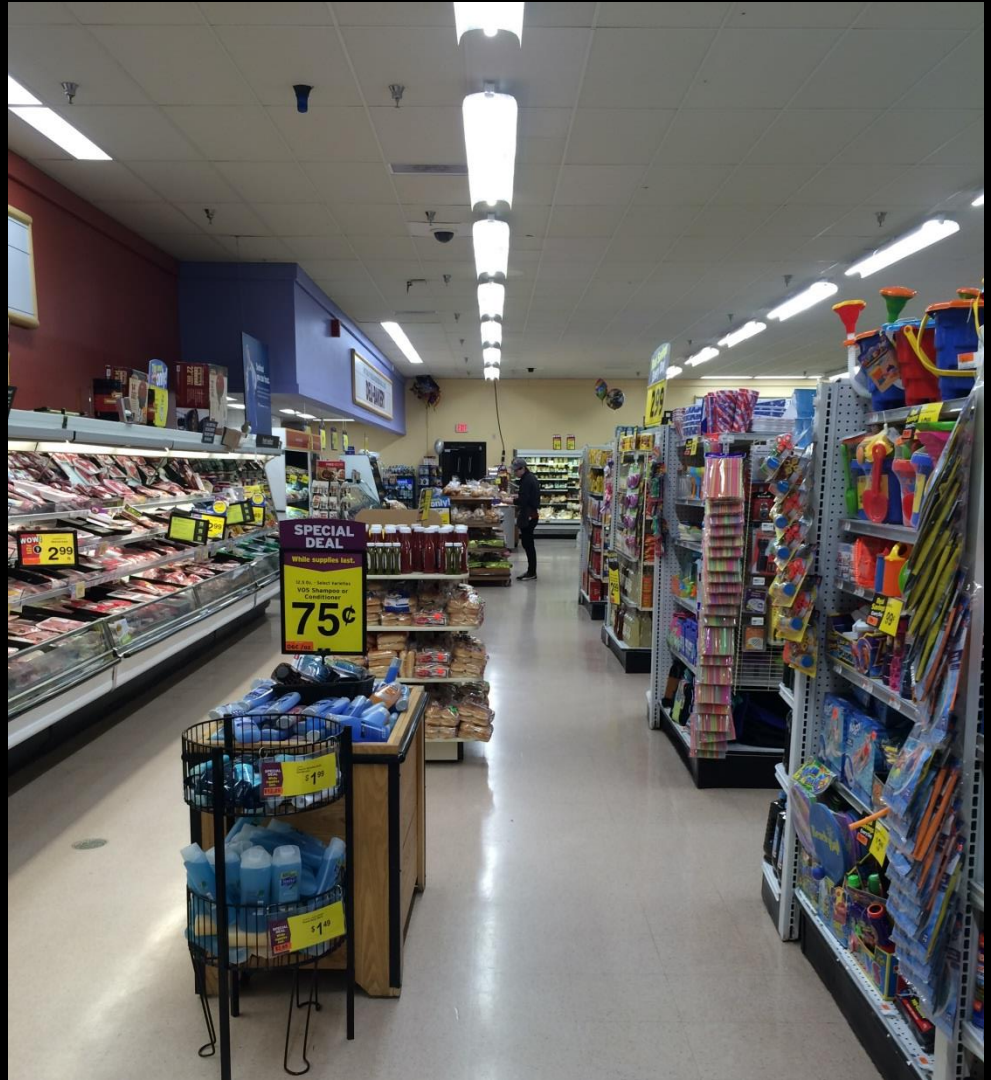
Hannaford

Efficiency Vermont

# Completed Measures

- Lighting and controls
- Display cases –doors, lights and motion sensors, q-sync motors, ASH, controls
- Walk-in freezer (OPM)
- Loading dock
- Plug loads
- Night shades


BUTCHER BLOCK


SPECIAL DEAL
While supplies last.
75¢

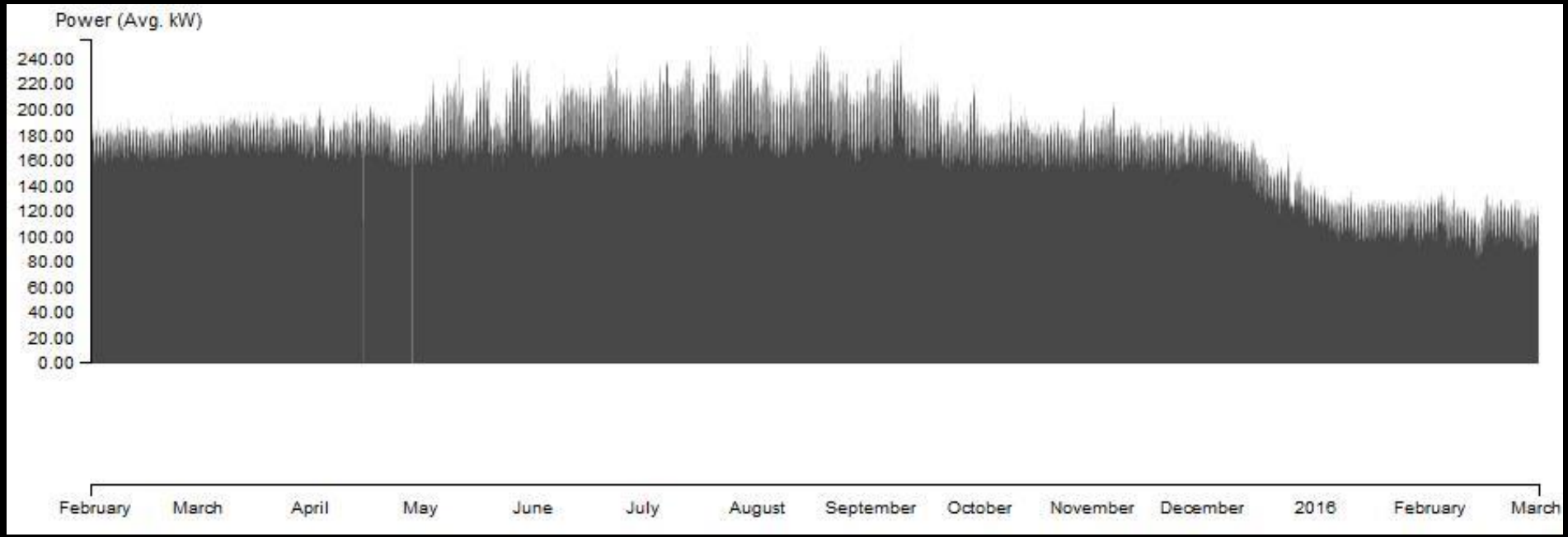

BUTCHER BLOCK
RESTROOMS

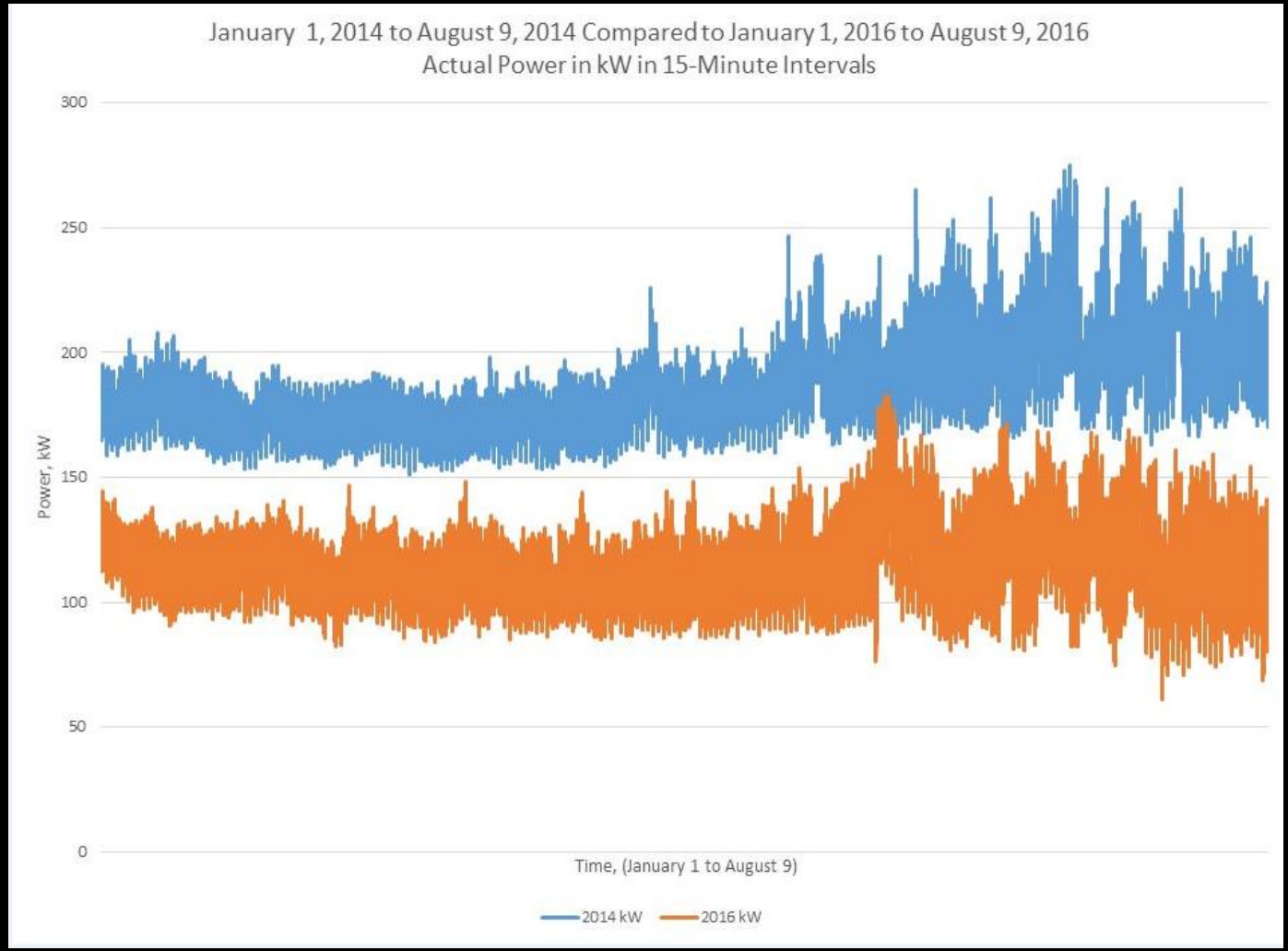

Seafood you can trust.
frozen seafood
REDUCED
15% off
MARKN Price
SPECIAL!
WET FLOOR

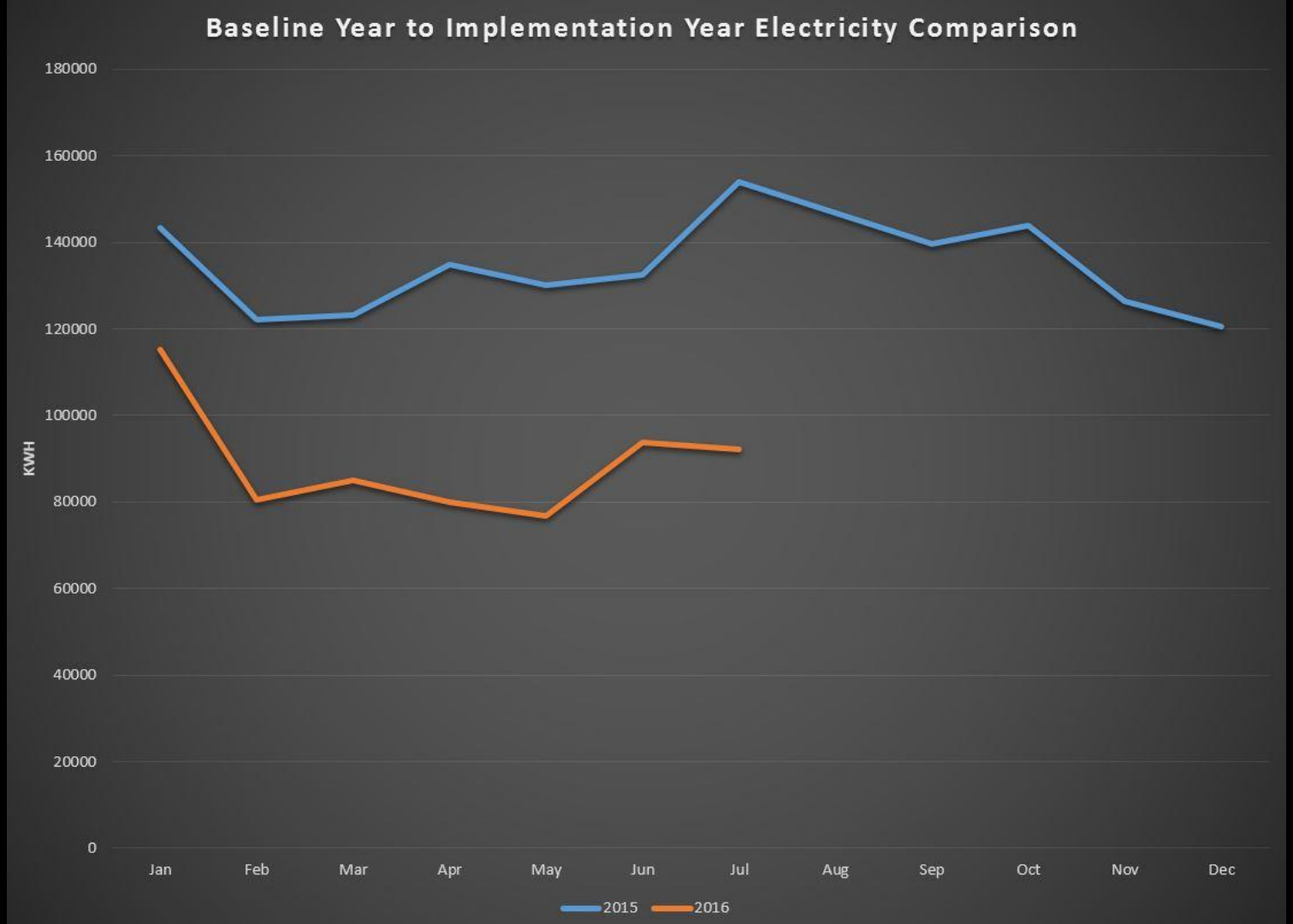

Real Savings Every Day
99¢


ACIS BOARD


1
Love
The Pride of
The Neighborhood
WOW!
2/5.00


Power (Avg. kW)
240.00
220.00
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
February
March
April
May
June
July
August
September
October
November
December
2016
February
March


January 1, 2014 to August 9, 2014 Compared to January 1, 2016 to August 9, 2016
Actual Power in kW in 15-Minute Intervals
300
250
200
150
100
50
0
Power, kW
Time, (January 1 to August 9)
2014 kW
2016 kW


Baseline Year to Implementation Year Electricity Comparison
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
KWH
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2015
2016

# Capital Allocation

- Upgrade vs replace
- Non typical measures
- Budget constraints
- 20+ year old cases
- Large incentive was a motivator

# Shared Learning

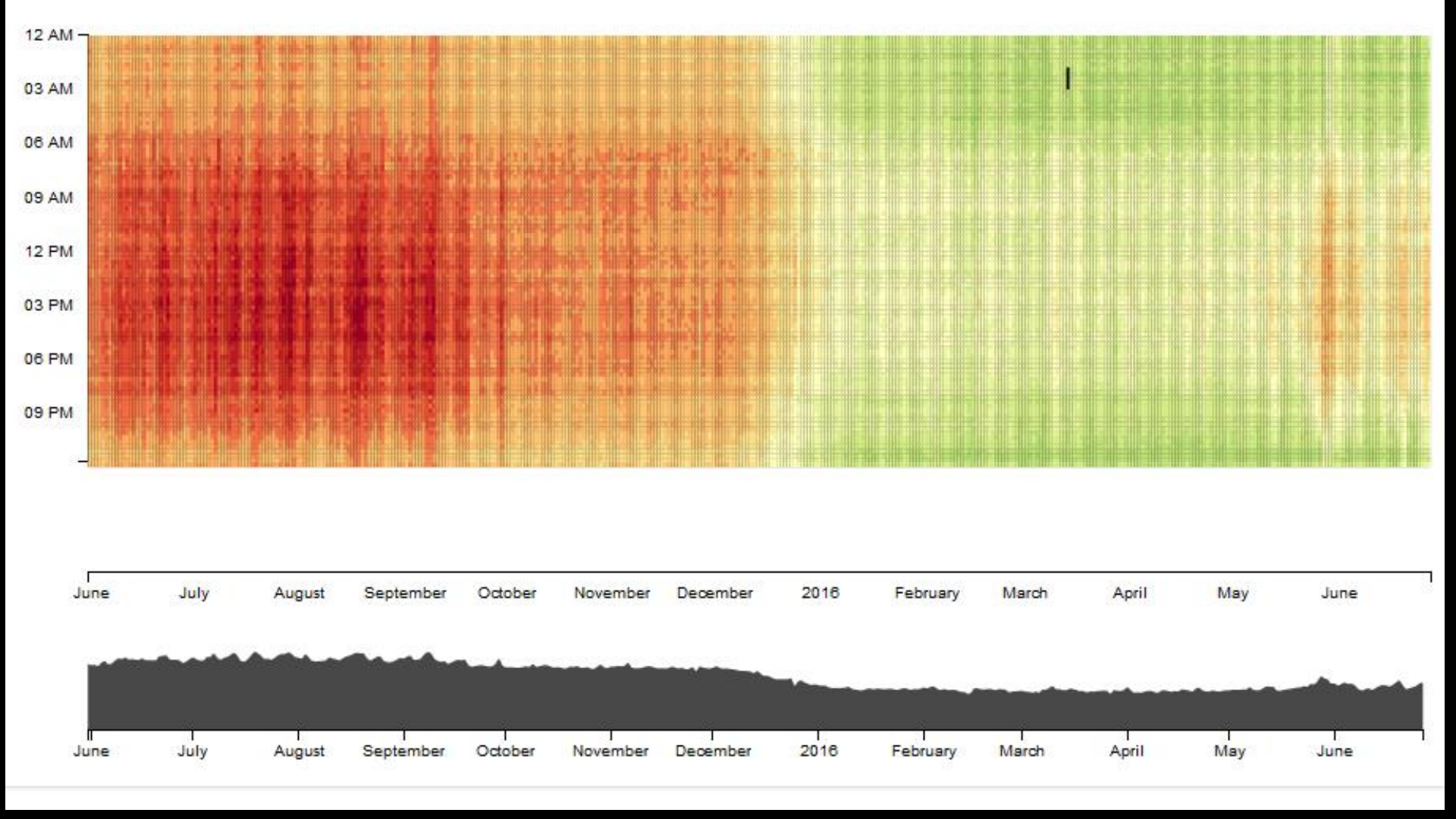
- Verify actual operation
- Reach-in cases in more departments
- Q-Sync fan motors 30% less energy than ECM
- Case motion detector strategy
- LED controls/dimming
- Employee engagement
- Refrigerated spaces

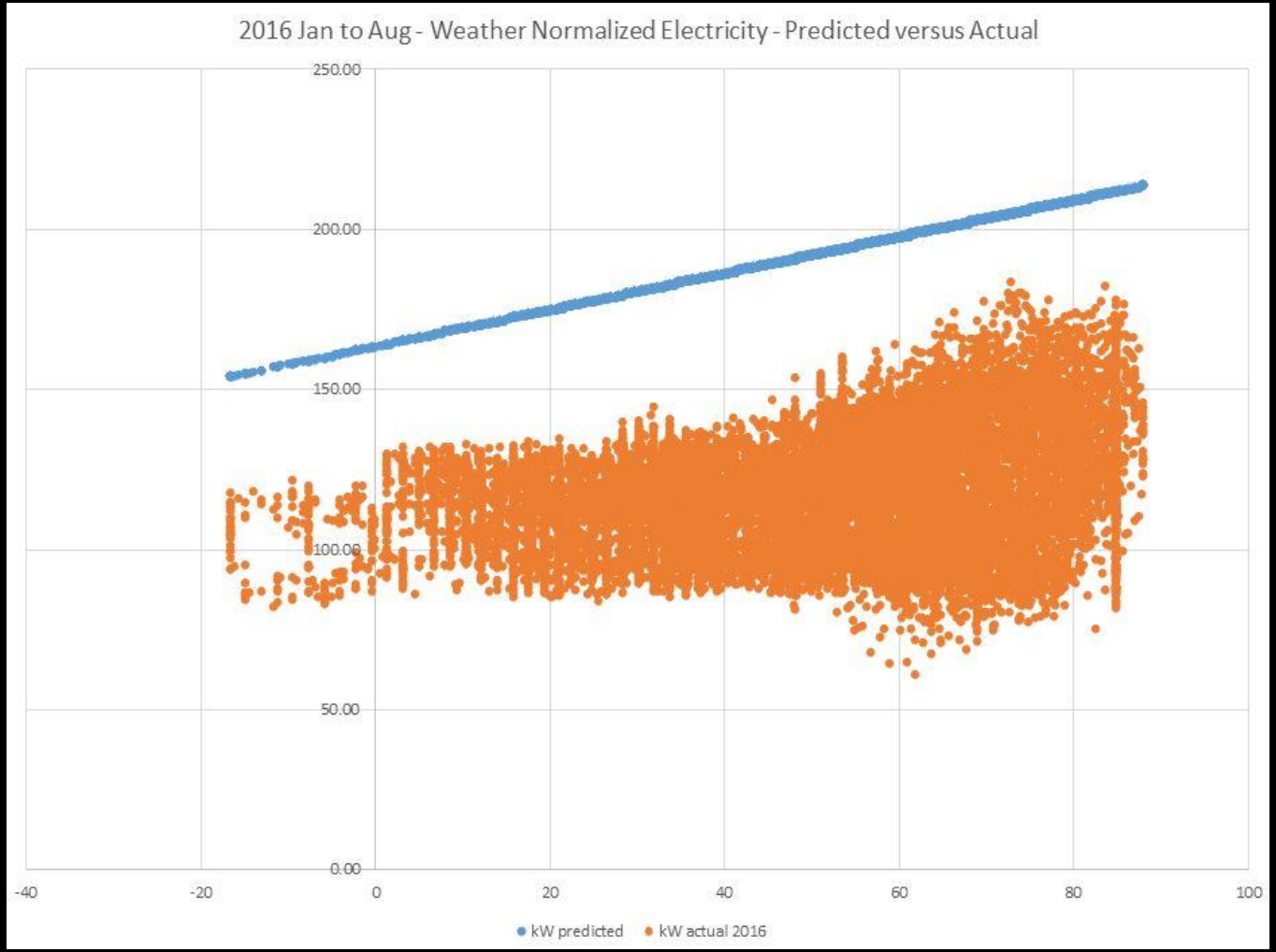
# Shared Learning (cont'd)

- Value of sub metering
- Beverage coolers (GDMs)
- Heat Seal hand-wrappers
- Lighting removal w/no replacement
- Continuous commissioning of controls

# Brandon by the Numbers

- Total energy saved
- Total dollars spent
- Total Efficiency Vermont incentive
- Net ROI
- Sales Impact


12 AM
03 AM
06 AM
09 AM
12 PM
03 PM
06 PM
09 PM
June
July
August
September
October
November
December
2016
February
March
April
May
June
June
July
August
September
October
November
December
2016
February
March
April
May
June


2016 Jan to Aug - Weather Normalized Electricity - Predicted versus Actual
250.00
200.00
150.00
100.00
50.00
0.00
-40
-20
0
20
40
60
80
100
kW predicted
kW actual 2016

# Do Differently?

- Identify all measures, costs, savings, then prioritize
- Start with complex (longer lead time) items first
- More frequent internal updates

# Next

- Time to start next worst offender!
- We have started pulling together a project plan for the next “worst” store in the chain

# Thank you

- Questions?