

Giant Eagle

Energy Management

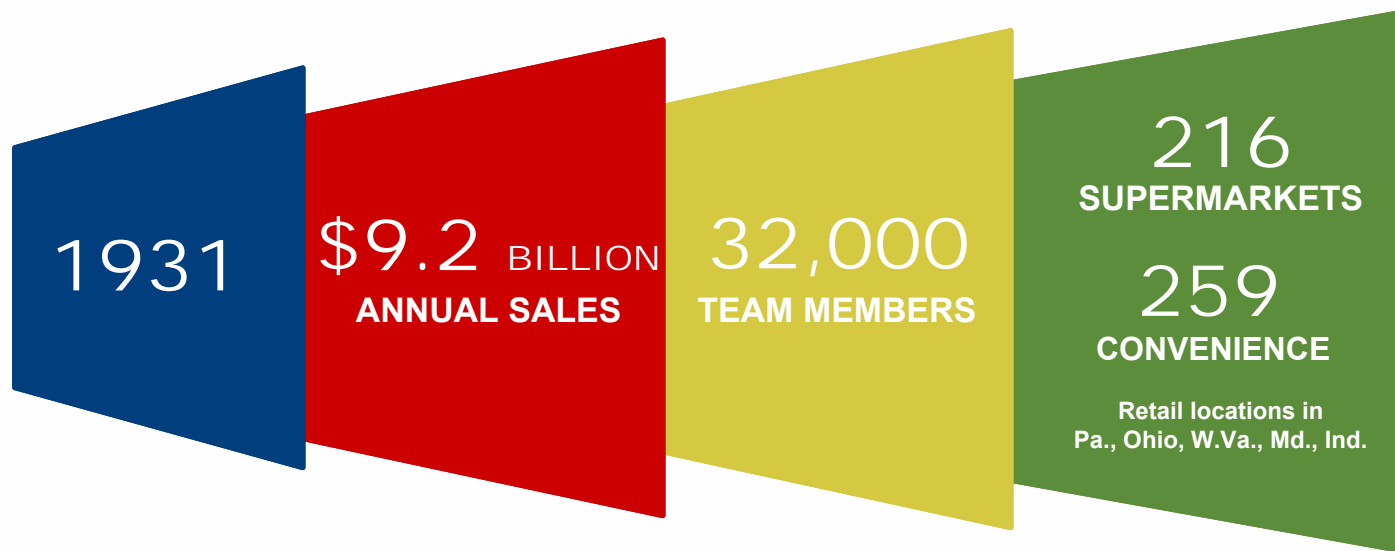
AEP Annual Ohio Energy Management Conference
February 2/19/2020



Agenda

- Energy Program Overview
- Case Studies
- Current Projects

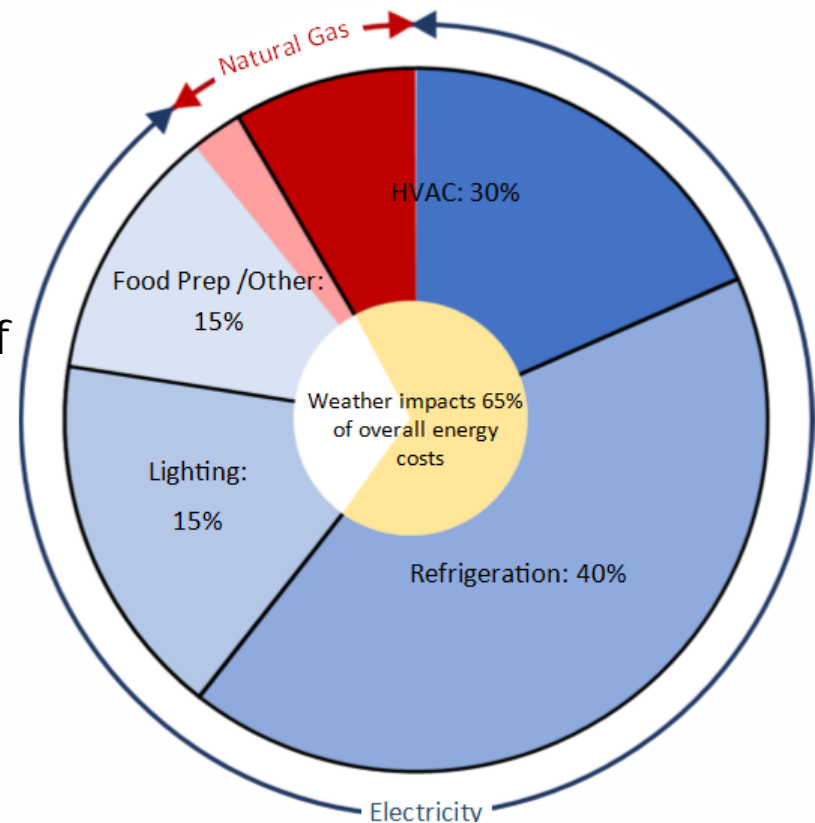
Giant Eagle Overview



Planning for Energy Cost Reduction Projects

Get into the Weeds

- Understand current consumption
 - Energy consumption by site
 - Focus on major end uses of energy
 - Utilize sub-metered data
 - Look at demand profiles and time of use
- Look at your energy expense
 - Allocate expense into high level buckets
 - Consumption
 - Demand
 - Capacity



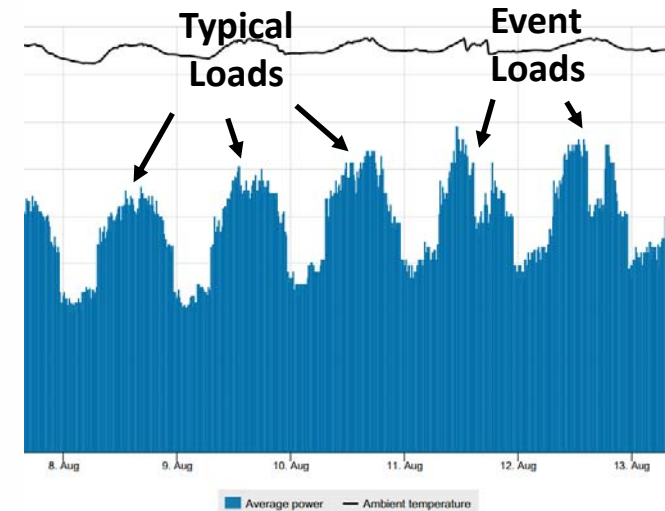
Evolving Opportunities

- Fruit that has fallen
 - Implement easy to make operational changes that can be implemented through existing control devices
 - Setpoints
 - Setbacks
- Low hanging fruit
 - Projects with a relatively low cost, quick payback, that are easy to implement
- Stretch projects
 - Look at holistic savings opportunities by considering non-energy impacts such as maintenance and asset availability
 - Put multi-year strategy in place

Demand Response and Peak Load Shaving

Maximizing Existing Programs

- Prior to 2016, Giant Eagle participated in traditional demand response programs by lowering electricity demand in supermarkets
- In 2016, Giant Eagle began to monitor instantaneous load on PJM and engaged demand response load shed during peak times to lower our capacity tags for the following year
- Increased events required:
 - Additional resources devoted to program
 - Increased communication to supermarkets and internally at corporate
 - Measurement and verification of performance



Retro-commissioning

Optimizing Efficiency of Existing Systems

- Validate system setpoints are in line with internal standards
- Identify and correct where equipment is not operating properly
 - Broken lighting contactors
 - Bypassed VFDs
 - Inefficient compressor
- Measured and verified savings of 10% energy reduction on major building systems
- Filled in information gaps
 - Large HVAC units without VFDs



LED Lighting

Significant Reduction Over Time

- Implemented Over Five Years
 - Started with backrooms and stock areas
 - Convenience Stores
 - Salesfloor, Cases and Exterior
- Energy Efficiency Win
 - Reduce a major end use of energy by more than 40%
 - Implemented along with dimming and other controls
- Auxiliary Benefits
 - Lowered maintenance costs
 - Fewer outages
 - Improve aesthetic



Current Projects

Better Insight and Control

- Centralized system information platform
 - Pulling in major system settings and data into holistic platform
 - Creating insight across entire portfolio in real-time
- Advanced HVAC control
 - Reactive, dynamic controls
 - More sophisticated control strategy

Questions?



Incorporating Energy Best Practices at the A&F Co. Global Home Office

February 18th-19th

Energy Management/Procurement

About Abercrombie & Fitch Co.

- ✓ Global Home Office Energy/Utilities are approximately 10% of total utility spend for A&F
- ✓ Global Home Office is a campus with over 2.5 million square feet of space including Distribution Centers, Office Space, Labs, and a Data Center
- ✓ 16 buildings spread over 500 acres

AGENDA

- ✓ Capital Project Best Practices
 - AEP Incentives
 - Lighting
 - Exterior LEDs
 - Interior LEDs
 - Lighting Controls/Schedules
 - Data Center
 - Server Virtualization
 - Hot Aisle Containment
 - Air Side Economizing (Heat loads when not occupied)
 - VFD Compressors

- ✓ Operational Best Practices
 - Scheduling/Setpoints
 - Retrocommissioning
 - Culture of Operational Savings
 - Modeling/Measurement
 - Team Meetings
 - Cross Functional Collaboration
 - Financial Threshold/Consumption Checks



Capital Project Best Practices

Capital Project Best Practices

AEP Incentives



- **Efficient Products**
- **Bid4Efficiency**
- **Network Lighting Controls**
- **Process Efficiency**
- **Data Center**
- **New Construction & Major Renovation**
- **Combined Heat & Power**
- **Incentive NOW**
- **E-Motor Rewind**
- **Energy Efficient Financing**
- **Express Program**
- **Continuous Energy Improvement**
- **Automated Benchmarking**

Capital Projects Best Practices

LED Lighting



Parking Lot Lights and DC 2 Redesign

End of 2015/Early 2016
Parking lot lights and some exterior fixtures were changed to LEDs.

DC2 redesign included lighting at 0.5 watts per square foot (0.4 watts/square foot below code)

Campus LEDs

Interior desk spaces in the HO, campus stores, and some exterior lights on buildings

Specialty Fixtures

Some decorative lighting

DC Evaluation

Conversion of DC High Bays, Office Spaces, and installation of advanced lighting controls

We are at 0.5 watts per square foot in high bay areas and economics to LEDs did not make sense when we did the HO

Note: All lights are scheduled via schedules in EMS or Occ sensors

Capital Projects Best Practices

Data Center



~92% Virtualized & Virtual Desktop rollouts

End of 2015/Early 2016
Parking lot lights and some exterior fixtures were changed to LEDs

Hot Aisle Containment & Air Side Economizer

Raised operating setpoints inside data center expanding the hours of using outside air temp

Over 94% Virtualized

Continued replacement of antiquated equipment

~ 95% Virtualized & replaced battery backup

Capital Projects Best Practices

VFD Compressors



DC2 Now Operating with Old DC1 Compressors

DC2 shuttered for
extended period and
had compressors
salvaged and taken to
DC1

One compressor fails and we install one with a VFD

By end of the year all 3
compressors were
swapped out



Operational Project Best Practices

Operational Projects Best Practices

Scheduling/Setpoints



EMS Setpoints on DC Conveyors

Setbacks reduced from 20 minutes to 7 minutes

Campus LEDs

Lighting Schedules updated for HO & DC spaces, exterior daytime coding was updated

Cooling Setpoints Raised in DCs

Increased cooling setpoint and became more aggressive on nighttime setback schedules for HVAC looking more at recovery time and other factors

Chiller Loop Setpoints Raised & More Aggressive Scheduling

Holiday setbacks more aggressive and investigation into the freeze protection setpoints/scheduling

Operational Projects Best Practices

Scheduling/Setpoints



2015 EMS Setpoints on DC Conveyors

Setbacks reduced from 20 minutes to 7 minutes

2016 Campus LEDs

Lighting Schedules updated for HO & DC spaces, exterior daytime coding was updated

2017 Cooling Setpoints Raised in DCs

Increased cooling setpoint and became more aggressive on nighttime setback schedules for HVAC looking more at recovery time and other factors

2018 Chiller Loop Setpoints Raised & More Aggressive Scheduling

Holiday setbacks more aggressive and investigation into the HW loop setpoints/scheduling

2019 Retrocommissioning

Operational Project Best Practices

2019 Retrocommissioning Initiatives

- 1) End of 2018/Ongoing Reduce or eliminate “Chimney Effect” on HO VAV and HW Radiant Loop system along with implementing 45 degree hot water resets
- 2) Spring 2019/Ongoing - Remove user locked setpoints from VAV. Dead band decreased. Setpoints now broadcasted from AHU now. This also eliminated hunting and conflict between VAVs in open areas. **Status: HO (Phase 1) Done DC’s Started, est. 80% done**
- 3) May 2019 - Chilled water set points raised from 42 deg to 44 deg at both DC’s

Operational Project Best Practices

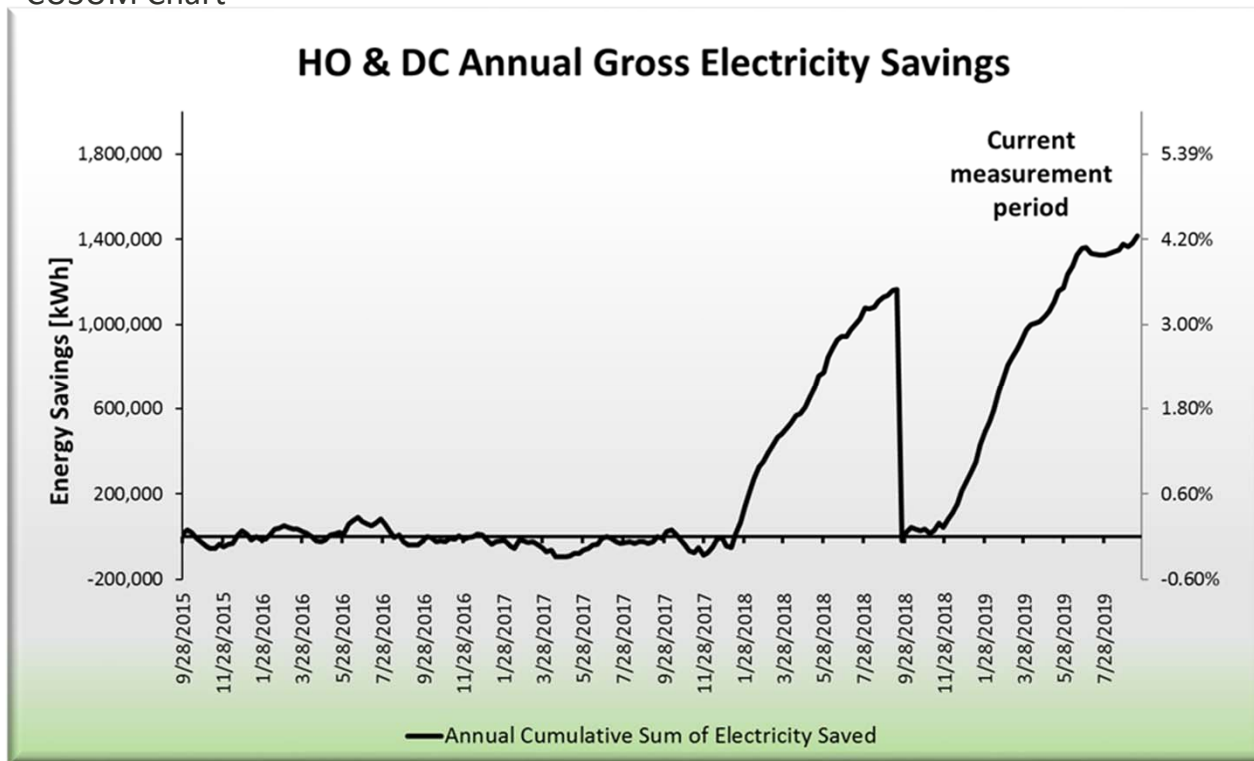
2019 Retrocommissioning Initiatives

- 4) Spring 2019 - Chilled water set point raised from 44deg to 50deg for building with data center/IT at the HO.
- 5) June 2019 – Match staged cooling of chillers to building demand based on schedule to eliminate whole plant running
- 6) Dec 2019 – Change boilers to Lead / Lag configuration. Both ran constantly previously.
- 7) Dec 2019 – Aggressive Scheduling of DC2 AHUs

Operational Projects Best Practices

Culture of Operational Savings

CUSUM Chart



Modeling/Measurement (AEP CEI)

- Find Statistically Significant Energy Drivers
- Provide validated measured savings to finance
- Catch all for overlapping savings on larger meters
- Can be done in Excel but AEP Program provides access to better statistical tools

Operational Project Best Practices

Culture of Operational Savings

Team Meetings/Group Emails

- Too easy to get lost in the day to day
- There will always be fires to put out
- Stay on target for critical dates like peak periods and holidays
- You won't catch every operational savings
- Identify cascading and interconnected savings
- Go together, you will need buy in for some projects

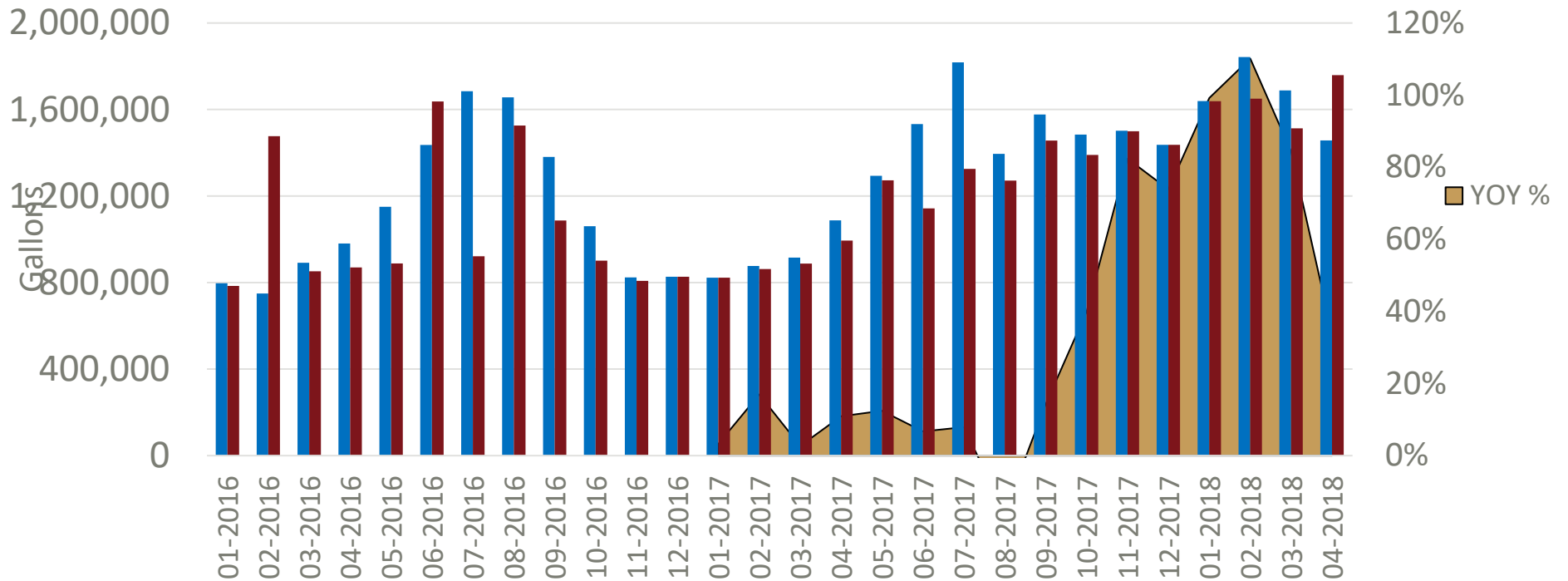
Cross Functional Collaboration

- Maximize areas of expertise and highlight those doing the work as high as you can
- There are legitimate reasons projects don't work
- Energy has a legitimate use
- Be able to pass on things to the next person

Operational Project Best Practices

Financial/Consumption Threshold Checks

HO Water & Sewage Consumption



Energy Efficiency

Total HO and DC Savings Since 2010

\$3M+

- Over \$500K in Annual Savings

105 Million kWh

- Over 14 Million kWh Annual Savings



Questions?