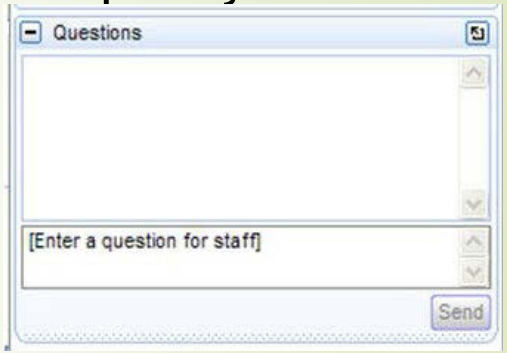
Brewing Up Energy Savings

October 27, 2020
2-3pm Eastern

Housekeeping

- Attendees phone lines are muted to preserve audio quality.
- Submit a question via the Questions box on your GoTo control panel.



- After the presentation, as time permits, our presenters will answer questions submitted via the Questions box.

Poll Questions

Questions

Sustainability Opportunities

Brewing up Energy Savings Webinar

October 27, 2020

Presented By

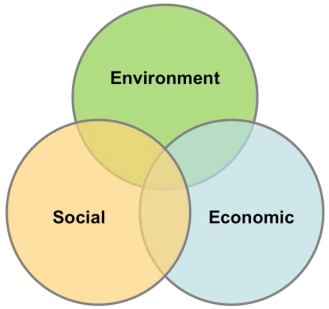
Kaylyn Kirkpatrick, Technical Projects Coordinator - Brewers Association

The Perfect Pint

How can I produce the highest quality beers in a profitable manner that also:

- Minimizes natural resource usage
- Lessens my environmental footprint
- Provides a safe working environment
- Attracts and retains the best employees
- Creates value in the community
- Protects my supply chain ingredients
- Enhances my image as a responsible brewer
- Helps me sell more beer

Economic Benefits



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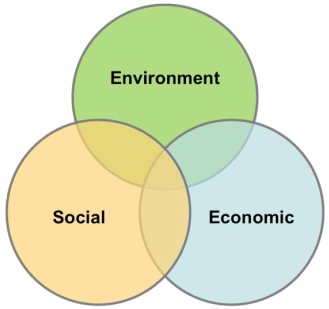
Increased Efficiencies ***Reduced Business Disruption Risks*** ***Enhanced Brand Image*** ***Long Term Profitability***

Environmental Benefits



Less Utility Usage

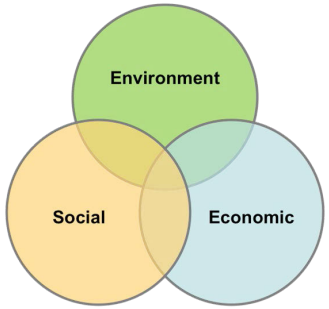
+

Less Waste Creation

→

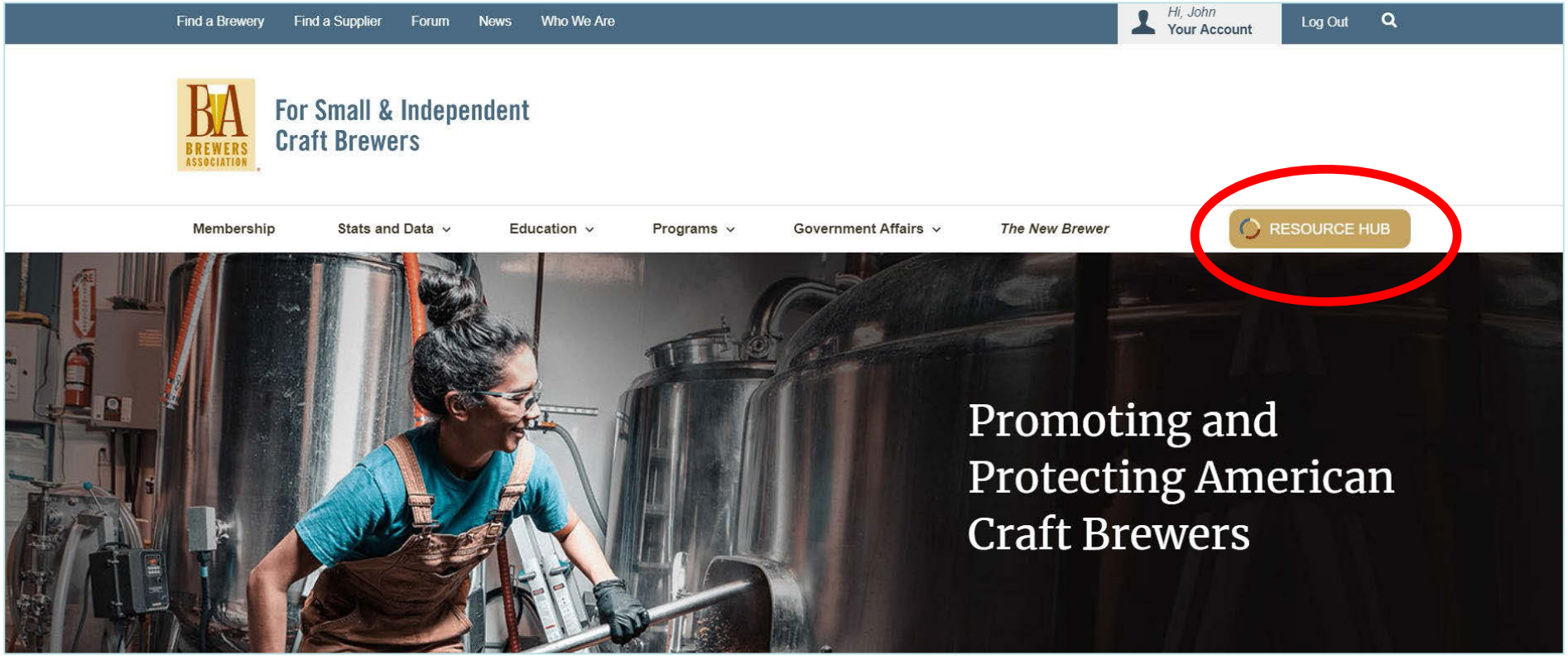
Lighter Footprint

Social Benefits



Engaged Employees + *Loyal Consumers* + *Supportive Community* → *Successful Business*

All the Resources You Need



RESOURCE HUB

Browse Resource Hub Categories

Explore the Brewers Association's most high-value resources and tools in one click.

Production

- Brewhouse
- Cleaning
- Fermentation
- Filtration
- Cellaring
- Packaging
- Sanitation

Ingredients

- Barley
- Hops
- Malt
- Water
- Yeast

Brewing Supplies

- Kegs
- Cans
- Glass
- Process Aids

Quality

- Analysis
- Lab
- Microbiology
- Sensory
- Food Safety

Safety

- Training
- Hazards
- Prevention
- OSHA

Sustainability

- Benchmarking
- Energy
- Green Building
- Solid Waste
- Wastewater
- Water Usage

RESOURCE HUB

Benchmarking

Environmental stewardship is a top priority for both craft brewers and craft beer enthusiasts. Maintaining a healthy balance between stewardship, social enrichment, and economic vitality is important to the future success of craft brewing. Through its benchmarking work, the Brewers Association and sustainability subcommittee encourages conscientious brewing practices that will ensure the long-term success of the craft beer industry.

FILTER RESULTS

(•) All ( ) Seminars ( ) Webinars ( ) Educational Publications ( ) Articles ( ) The New Brewer

Refine Results

Displaying results 1-7 of 7

Educational Publications

Sustainability Benchmarking Tool

Member Exclusive

The Sustainability Benchmarking Tool is an easy to use spreadsheet-based template designed to help brewers track and decrease their use of natural resources. Read More ›

Educational Publications

Sustainability Benchmarking Reports

Member Exclusive

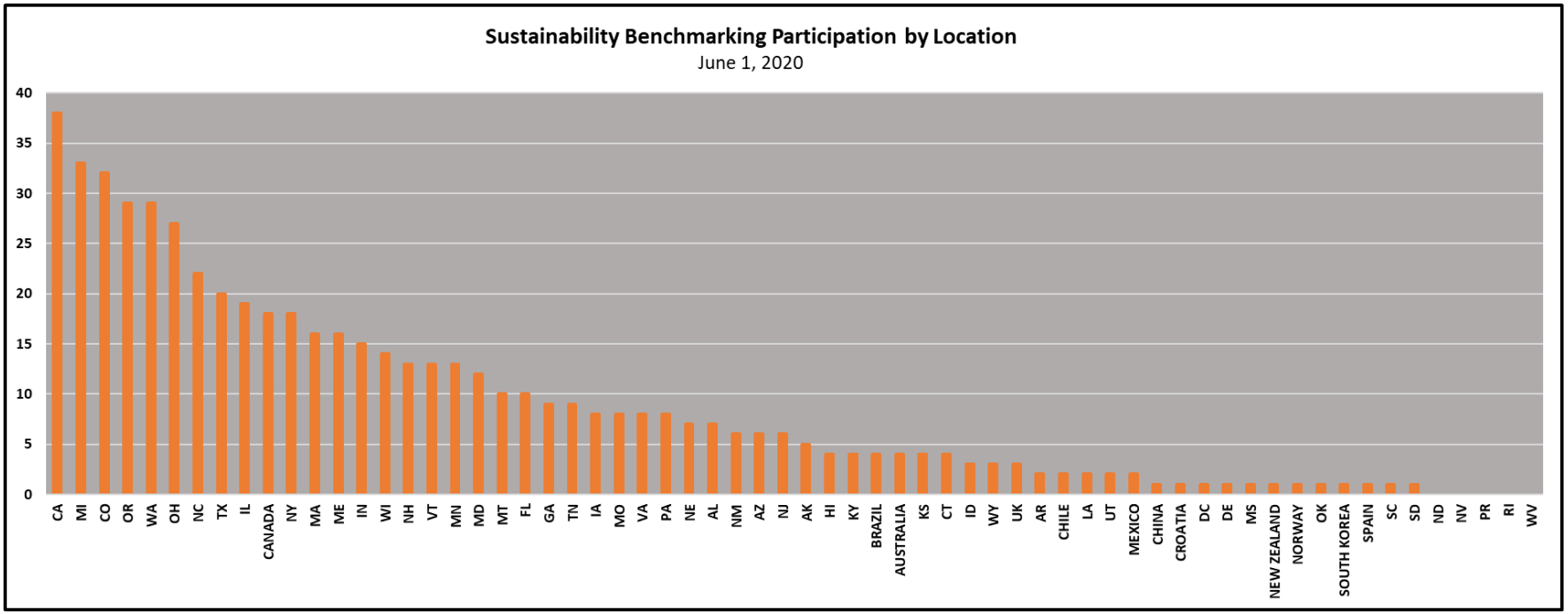
The Sustainability Benchmarking Reports provide a platform for the craft brewing community to share best practices for identifying how to use water more efficiently, generating less wastewater and solid waste, decreasing total energy usage,

CERTIFIED BREWERS ASSOCIATION INDEPENDENT CRAFT

BA BREWERS ASSOCIATION

Benchmarking Participants

Over 550 BA member breweries of all sizes!



Menu Driven Excel File

Easy Data Entry

Sustainability Benchmarking
Basic Data Input

Main Menu

XYZ Brewery

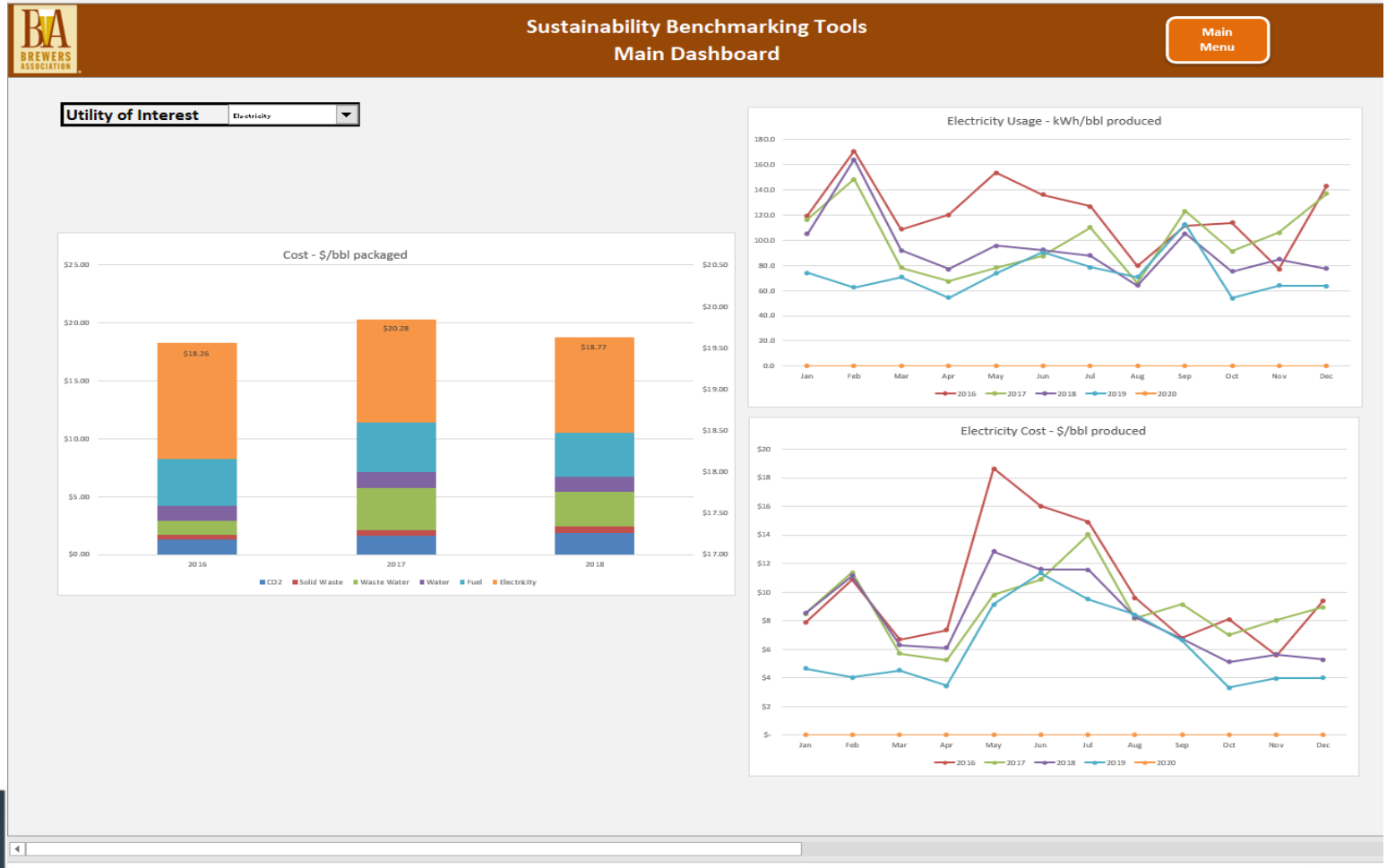
Resource Key Performance Indicators (KPI's)	Units	2018 Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18
BBL Packaged (Default Normalizing Factor)	bbl	1,836	1,766	1,655	2,063	2,127	2,035	2,376	2,157	2,181	2,363	1,813
Electricity - Total Purchased Usage	kWh	26,734	30,802	31,630	35,558	47,376	52,365	49,060	55,321	44,902	10,511	33,301
Electricity - Total Purchased Cost	$	5,162	5,936	5,931	6,989	8,763	9,754	9,031	10,153	8,397	1,961	5,218
Electricity - Solar Generated On-site (if applicable)	kWh											
Fuel - Total Purchased Usage	therm	4,868	3,947	4,008	3,294	3,211	3,375	3,218	2,903	3,062	3,279	3,735
Fuel - Total Purchased Cost	$	4,885	3,936	4,246	3,671	2,881	1,886	1,826	1,641	1,746	1,865	2,510
Fuel - Biogas Generated On-site (if applicable)	therm											
Water - Total Purchased Usage	gal	249,849	249,849	249,849	230,649	230,649	230,649	267,055	267,055	267,055	268,301	268,301
Water - Total Purchased Cost	$	1,226	1,226	1,226	1,132	1,132	1,132	1,297	1,297	1,297	1,316	1,316
Water - Groundwater Pumped On-site (if applicable)	gal											
Wastewater - Municipal/Private Treatment Works Disposal Cost	$											
Off-site Waste Disposal Quantity (typically estimated)	lb											
Off-site Waste Disposal Cost	$											
Off-site Waste Recycling Quantity (typically estimated)	lb											
Off-site Waste Recycling Revenue	$											
CO2 - Total Purchased Quantity	lb	17,520	9,260	20,480	18,600	8,100	25,990	20,000	51,390	19,500	21,980	18,200
CO2 - Total Purchased Cost	$	1,796	949	2,099	1,907	830	2,664	2,050	5,267	1,901	2,143	1,774

You have selected to use the Basic Data Input Sheet. The majority of breweries will use this sheet to enter their key sustainability related data. Determine which month to start entering data. It is always good to start with January and go back at least two years from the current year. However, there is no right or wrong month to select. Just get started!

BREWERS ASSOCIATION CERTIFIED INDEPENDENT CRAFT

BREWERS ASSOCIATION

Intuitive Dashboards



Progress Reports

Sustainability Benchmarking Tools
Monthly Scorecard

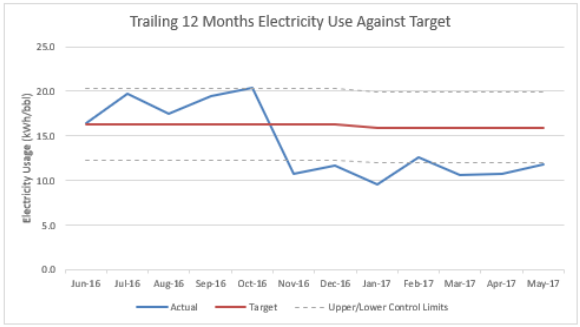
Main Menu

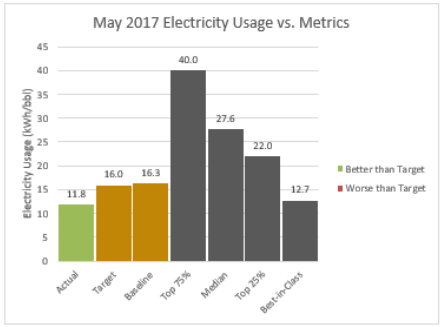
Select Year
2017

Select Month
May

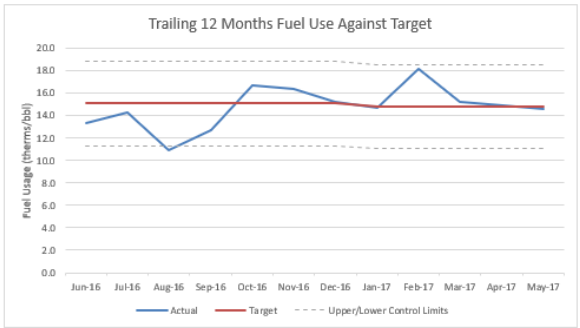
Control Limit
25%

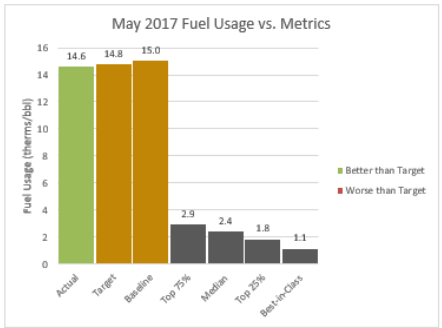
This Month: $5,165 saved
(vs. Baseline)
Past 12 Months: $25,139 saved
(vs. Baseline)



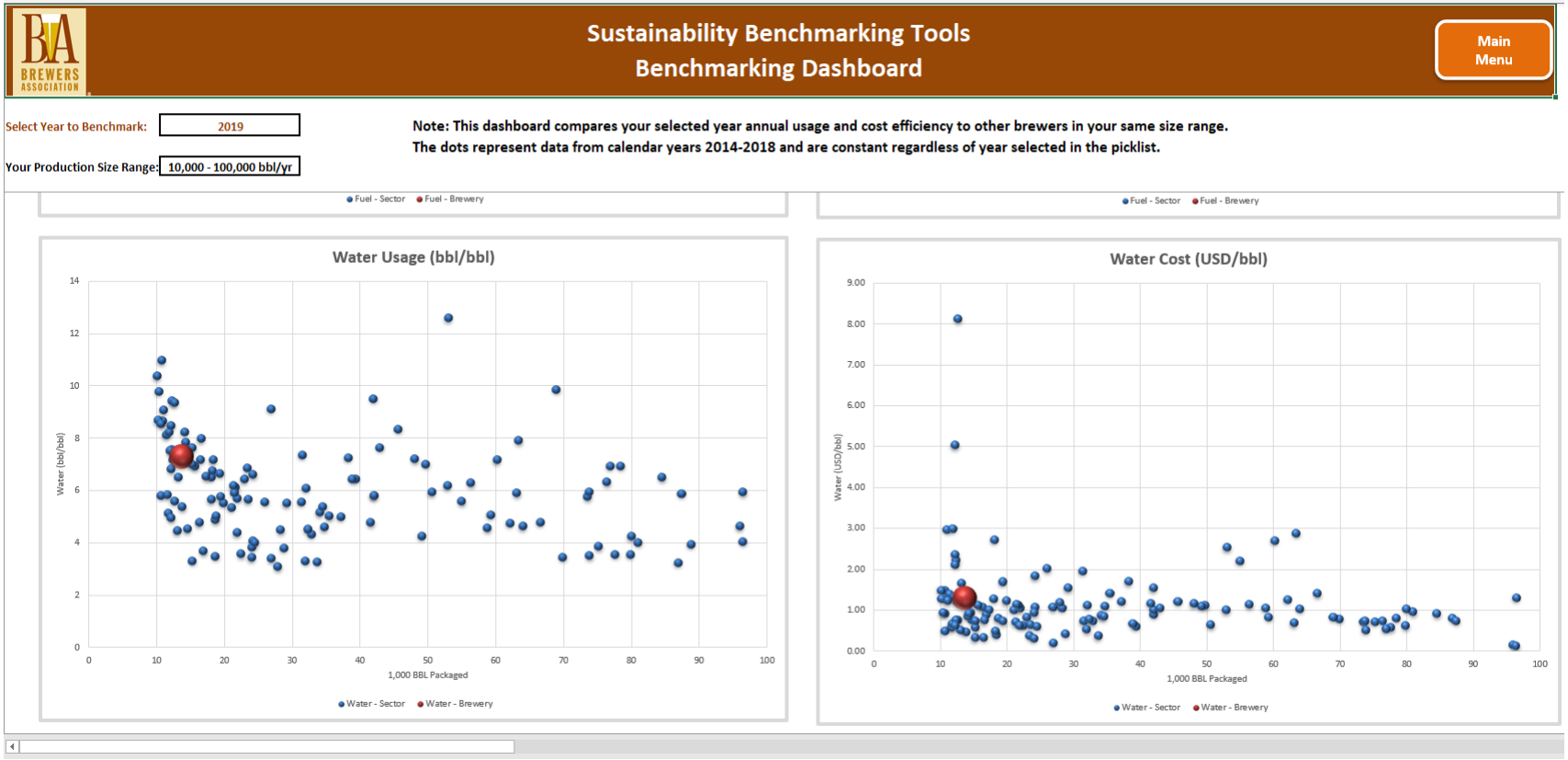


This Month: $416 saved
(vs. Baseline)
Past 12 Months: $9,737 saved
(vs. Baseline)





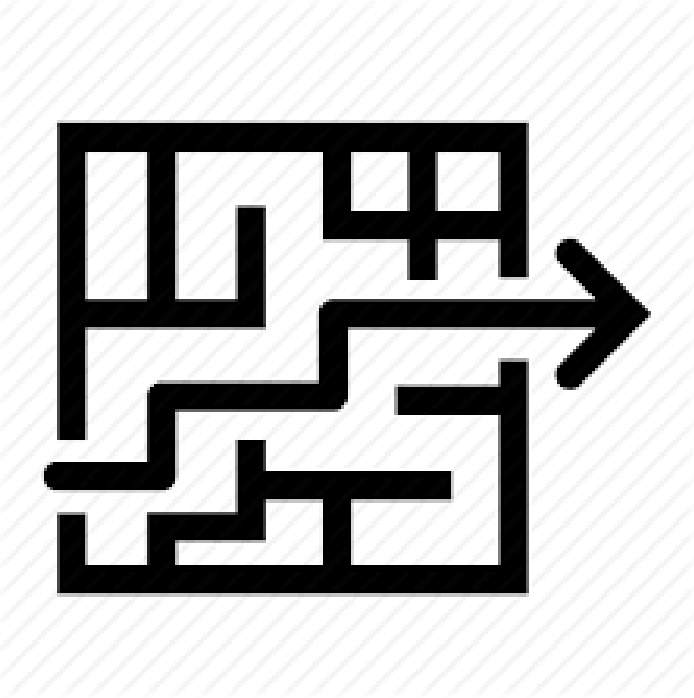
Comparisons to Others



Execution

Using the benchmarking tool:

- I know where I am
- I know where I want to be
- But, how do I get there?



Other Resources

Energy Toolkit

Energy Manual (6M)

Energy Management Handout

Guidance

Set-Points

Employee Engagement

Insulation

Lighting

Checklist

Energy Audit

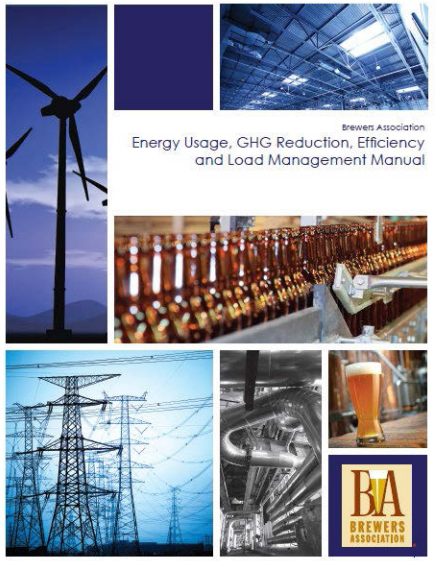
Future Design Tips

Spreadsheet Tools

Energy/GHG Data Collection

Renewable Energy Cost

Calculator



- Usage Details
- Data Management
- Best Practices
- On-site Strategies
- Case Studies

benchmarking@brewersassociation.org

Questions?

Kaylyn Kirkpatrick

Technical Projects Coordinator

Brewers Association

Kaylyn@brewersassociation.org

ENERGY STAR® Treasure Map for Microbreweries

Danny Macri
U.S. EPA ENERGY STAR Program
Sector Manager

October 27, 2020

Thank you

- US EPA P2 Program
  - Whitney Lehrer, US EPA Region 6 – P2 Program
  - Stephanie Cheaney, US EPA Region 6 – P2 Program
- US EPA ENERGY STAR
  - Jerry Lawson
  - Walt Tunnessen
  - Craig Haglund
- Brewers Association-John Stier
- Efficiency Vermont-Pat Haller
- State of Colorado-Kaitlin Urso and Derek Boer
- ENERGY STAR Industrial Advisor, Bruce Bremer

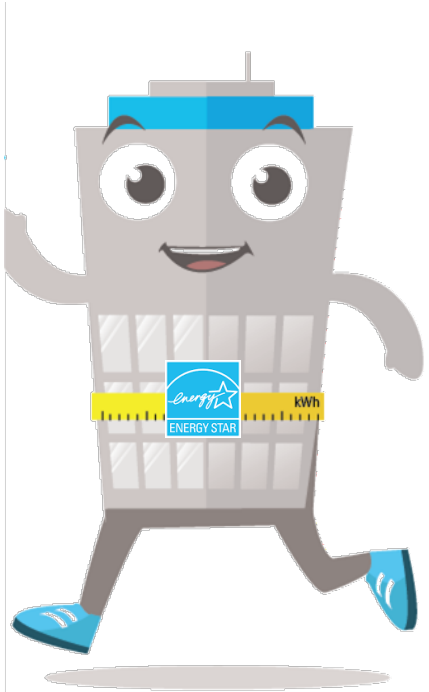
Why care about energy?

- Improves financial performance
  - 2017 brewing industry spent $327 million on energy related costs*
  - Treasure Hunts have been reported to help identify upwards of 10% energy savings
- Reduces GHG and other air emissions
  - kWh + Therms = CO2 + $
- Improve relationship with community and customers.

*2017 Economic Census: Table EC1731BASIC

What do pirates and ENERGY STAR have in common?

?



4

They both like treasure hunts and searching for joules!

5

What are Treasure Hunts?

A dynamic and fun way to find no and low-cost energy savings opportunities in your plants and build a culture of energy efficiency.

- Usually 1-3 days event; production/non-production days
- Conducted by internal stuff; supplemented with consultants
- Engages decision makers

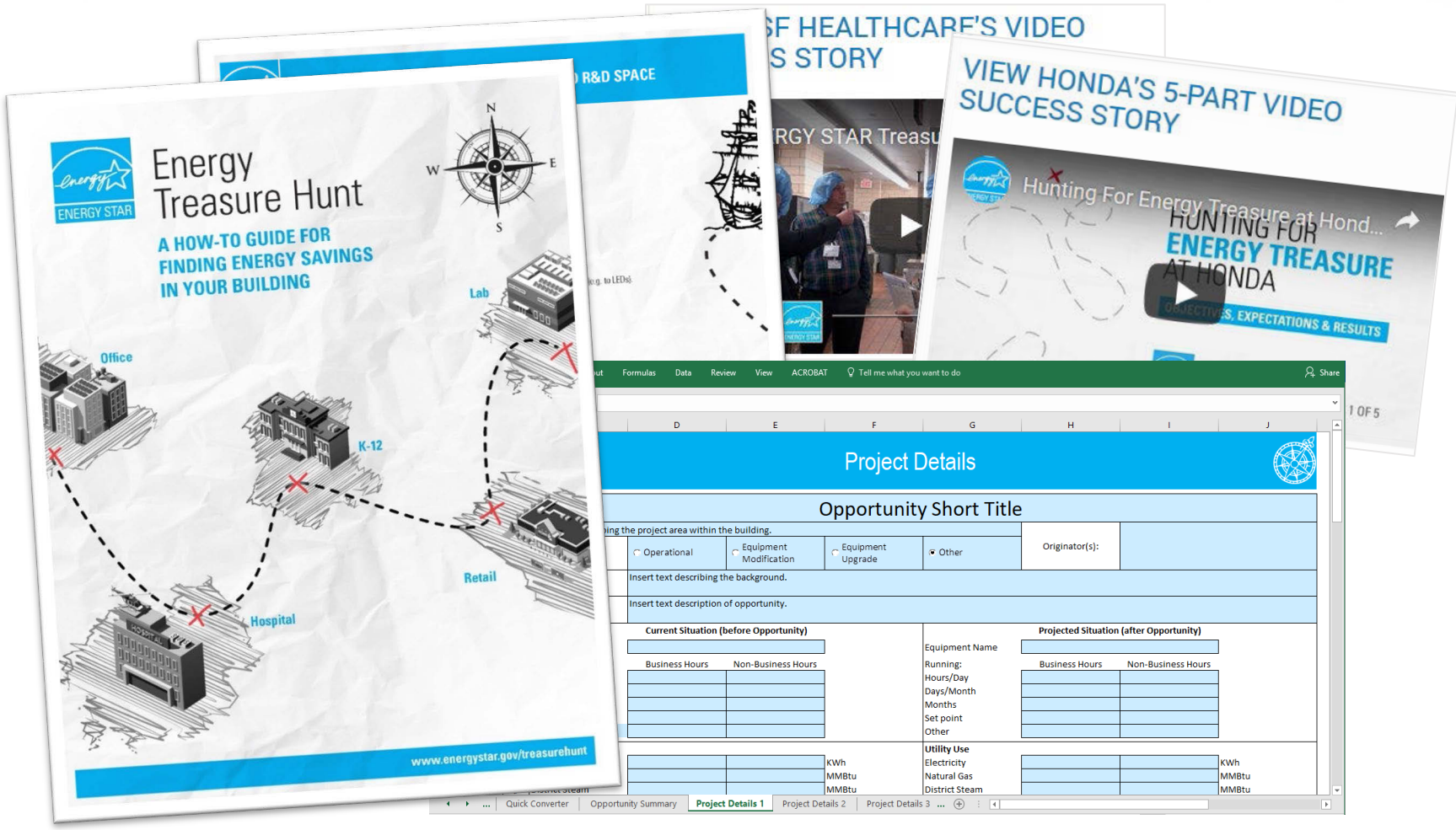
Dressing as a pirate is optional, but often effective!

Treasure Hunts vs. Audits*

	Treasure Hunt	Audit
Tone	Opportunities	Problems
Participants	Plant staff	External consultant
Led By	Facilitator	Auditor
Focus	Operational, behavioral	Operational, Small/Large capital projects, procurement
Results	Identified and discussed during treasure hunt	Delivered post audit in report
Presented to	Senior/Plant management by staff	Audit commissioner by auditor

*The tone and format of audits vary. This table captures general themes and perceptions of these activities.

Planning your own Treasure Hunt



www.energystar.gov/TreasureHunt

Treasure Maps

- Available for various plant and building types, including:
  - Manufacturing Plants
  - **Microbreweries**
  - K-12 schools
  - Retail stores
  - Hospitals
  - Labs
  - Worship facilities
  - Convenience Stores
  - Hotels, motels, inns
  - Multifamily housing
  - Retail stores
  - and more…

Brewery Treasure Map

- Printable checklist of energy savings opportunities in breweries
  - Low cost actions
  - Capital investment upgrades
- Sections organized based on brewery systems

- Facility Management
- Brewing/Production Equipment
- Hot Water and Steam Systems
- Chillers
- Refrigeration
- Motors
- Pumps and Pumping Systems
- Fans
- Lighting
- Building Envelope
- HVAC
- Brewpubs and Employee Kitchens
- Office Equipment

https://www.energystar.gov/buildings/tools-and-resources/energy_treasure_map_microbreweries

Examples from the Map

2 Brewing/Production Equipment

Low Cost Upgrades

- ❑ Check thermal processes for insulation damage, and radiant and convection heat losses.
- ❑ Check if conveyors and other transport equipment have automatic stop controls to avoid idle running.
- ❑ Assess if labeling glue pot temperatures can be setback or turned off during non-production times.

Capital Investment Upgrades

- ❑ Assess opportunities for waste heat recovery from the brew kettle such as:
  - ❑ Using vapor condensers or heat exchangers to preheat incoming wort

5 Refrigeration

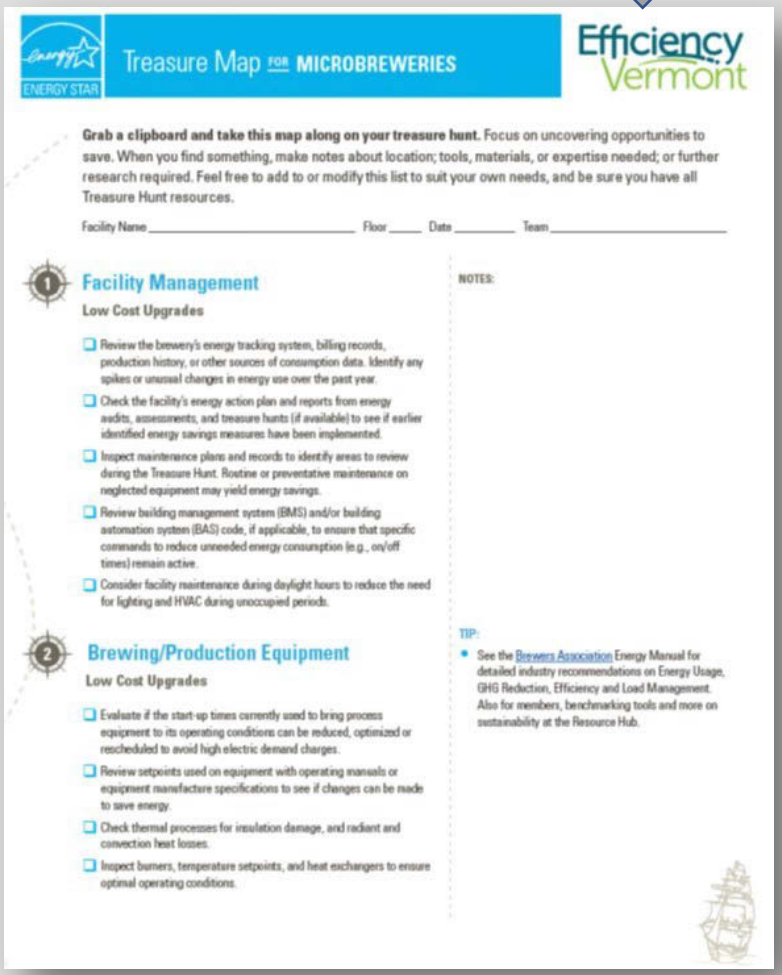
Low Cost Upgrades

- ❑ Ensure products are not stacked directly under or in front of evaporators in cold storage units.

Co-Branding Brewery Treasure Map

Your Logo Here

- States, municipalities, utilities, chambers of commerce, associations NGOs invited to co-brand the Brewery Treasure Map with your logo.
- Contact Jerry Lawson (lawson.jerry@epa.gov)



Treasure Map FOR MICROBREWERIES

Efficiency Vermont

Grab a clipboard and take this map along on your treasure hunt. Focus on uncovering opportunities to save. When you find something, make notes about location; tools, materials, or expertise needed; or further research required. Feel free to add to or modify this list to suit your own needs, and be sure you have all Treasure Hunt resources.

Facility Name _____ Floor ____ Date _____ Team _____

1 Facility Management

Low Cost Upgrades

- ❑ Review the brewery's energy tracking system, billing records, production history, or other sources of consumption data. Identify any spikes or unusual changes in energy use over the past year.
- ❑ Check the facility's energy action plan and reports from energy audits, assessments, and treasure hunts (if available) to see if earlier identified energy savings measures have been implemented.
- ❑ Inspect maintenance plans and records to identify areas to review during the Treasure Hunt. Routine or preventative maintenance on neglected equipment may yield energy savings.
- ❑ Review building management system (BMS) and/or building automation system (BAS) code, if applicable, to ensure that specific commands to reduce unneeded energy consumption (e.g., on/off times) remain active.
- ❑ Consider facility maintenance during daylight hours to reduce the need for lighting and HVAC during unoccupied periods.

NOTES:

2 Brewing/Production Equipment

Low Cost Upgrades

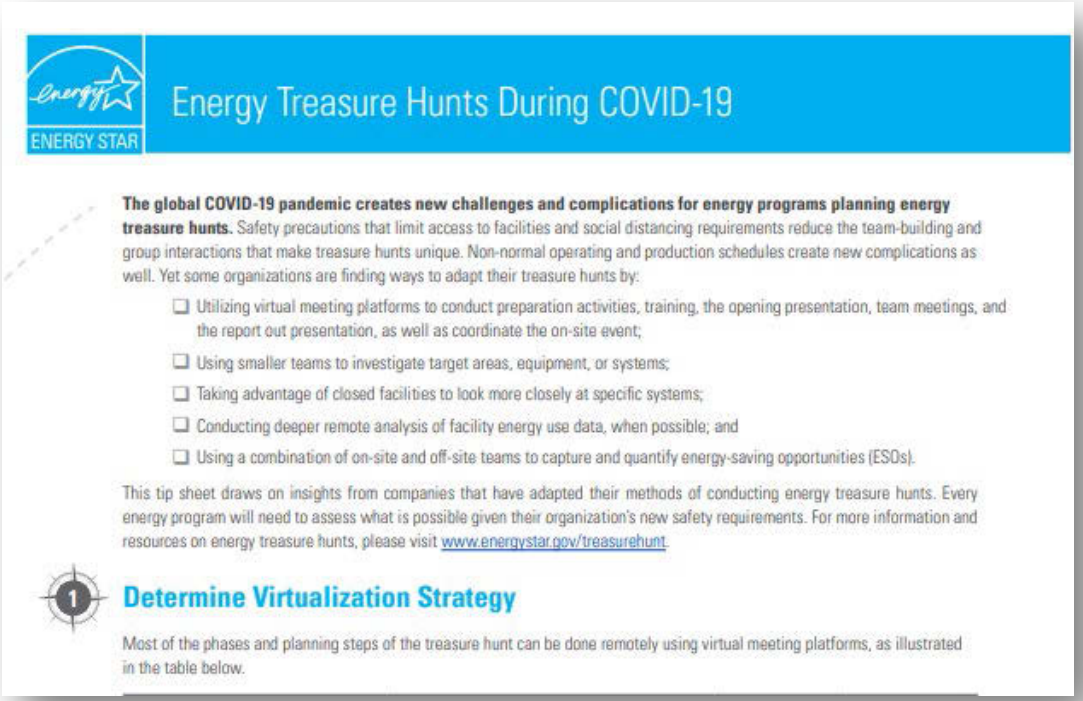
- ❑ Evaluate if the start-up times currently used to bring process equipment to its operating conditions can be reduced, optimized or rescheduled to avoid high electric demand charges.
- ❑ Review setpoints used on equipment with operating manuals or equipment manufacture specifications to see if changes can be made to save energy.
- ❑ Check thermal processes for insulation damage, and radiant and convection heat losses.
- ❑ Inspect burners, temperature setpoints, and heat exchangers to ensure optimal operating conditions.

TIP:

- See the Brewers Association Energy Manual for detailed industry recommendations on Energy Usage, GHG Reduction, Efficiency and Load Management. Also for members, benchmarking tools and more on sustainability at the Resource Hub.

Treasure Hunts during COVID

Tip sheet draws insight from companies that have adapted their methods for conducting treasure hunts.



Energy Treasure Hunts During COVID-19

The global COVID-19 pandemic creates new challenges and complications for energy programs planning energy treasure hunts. Safety precautions that limit access to facilities and social distancing requirements reduce the team-building and group interactions that make treasure hunts unique. Non-normal operating and production schedules create new complications as well. Yet some organizations are finding ways to adapt their treasure hunts by:

- ❑ Utilizing virtual meeting platforms to conduct preparation activities, training, the opening presentation, team meetings, and the report out presentation, as well as coordinate the on-site event;
- ❑ Using smaller teams to investigate target areas, equipment, or systems;
- ❑ Taking advantage of closed facilities to look more closely at specific systems;
- ❑ Conducting deeper remote analysis of facility energy use data, when possible; and
- ❑ Using a combination of on-site and off-site teams to capture and quantify energy-saving opportunities (ESOs).

This tip sheet draws on insights from companies that have adapted their methods of conducting energy treasure hunts. Every energy program will need to assess what is possible given their organization's new safety requirements. For more information and resources on energy treasure hunts, please visit www.energystar.gov/treasurehunt.

1 Determine Virtualization Strategy

Most of the phases and planning steps of the treasure hunt can be done remotely using virtual meeting platforms, as illustrated in the table below.

https://www.energystar.gov/buildings/tools-and-resources/energy_treasure_hunts_during_covid_19

Done Treasure Hunt, Now What?

Conduct Treasure Hunt

Earn recognition through ENERGY STAR Find the Treasure Campaign
Energystar.gov/treasurehunt

Reduce brewery energy intensity by 10%

US EPA ENERGY STAR CHALLENGE FOR INDUSTRY

Earn recognition through ENERGY STAR Find the Treasure Campaign
Energystar.gov/industrychallenge

Find the Treasure Campaign

7,148,000
Potential energy savings found (MMBtu)

37.9
Potential cost savings (millions of dollars)

378,400
Potential emissions avoided (metric tons CO2e)

Name: Amcor
Type: Pharmaceutical, food, and home-care products packaging supplier
More >

Name: Colgate-Palmolive
Type: Consumer products
Potential Savings: 9.6%, 3.4%, 6.8%, 3.5%, 16.1%, 5.5%
More >

Name: Sherwood Cass R-VIII School District
Type: High School
More >

Name: Allergan
Type: Pharmaceutical manufacturing company
Potential Savings: 21%, 50%
More >

Name: Columbia Association
Type: Property management organization
Potential Savings: $2,400
More >

Name: The Boeing Company
Type: Aircraft, satellite, and telecommunications manufacturing
Potential Savings: 7.3%, 19.7%, 6.7%, 17.9%
More >

Name: Kilroy Realty Corporation
Type: Real Estate Investment Trust
Potential Savings: $20,300
More >

Name: Lockheed Martin
Type: Aerospace, defense, and advanced technologies
Potential Savings: 12%, 5%, 17%, 3%, 19%, 5%
More >

https://www.energystar.gov/treasure-hunt-listing

Find the Treasure Campaign

Get ENERGY STAR recognition for your Treasure Hunt!

- Plan and conduct Treasure Hunt
- Submit a summary of your savings through energystar.gov/treasurehunt
  - Date and site
  - Total estimated energy savings
  - List top 3 energy savings measured
- Earn recognition
  - Receive certificate
  - Be featured on ENEGY STAR website

Promotional Resources for Third Parties

- **Spread the word to your stakeholders, constituents, and customers**
  - Use ready-made, co-brandable communications materials, including tweets, web buttons, creative graphics, template emails and newsletter articles, and more.
- **Earn recognition**
  - Third parties, such as ESCOs and utilities, can submit the results of a Treasure Hunt on behalf of customers.
  - Both sponsors and participants will be eligible for recognition from EPA for their efforts.

Challenge for Industry

Reduce energy intensity by 10%

- Facility pledges to **reduce energy intensity** by 10% or more within 5 years or less
- Brewery determines its intensity metric (MMBTU/unit or MMBTU/volume recommended)
- EPA awards sites certificate, communication materials, and letter to Owner/CEO
- No penalty for not meeting reduction target

US EPA ENERGY STAR CHALLENGE FOR INDUSTRY

www.energstar.gov/industrychallenge

Thank You

Danny Macri
U.S. EPA ENERGY STAR Program
Macri.Daniel@epa.gov
202-343-9536

Vermont Department of Environmental Conservation's Environmental Assistance Office uses the Cohort Model to Provide Technical Assistance to Businesses

- Peer-to-peer resource development and sector-specific P2 recommendations
- Up to 10 businesses per cohort
- Each cohort business receives on-site technical assistance on P2, a best management practices toolkit, regular opportunities for peer-to-peer networking, access to community partners and sustainability consulting
- Cohort duration 12 months with 6-12 months of follow-up to measure impact
- Cohort members required to have an environmental data tracking system (Excel) to assess solid waste, water, wastewater, and energy
- Cohort members sign a commitment agreement to meet specific improvement targets
- P2/sustainability drives compliance

VERMONT

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Energy Treasure Hunt
Efficiency Vermont

Patrick Haller
Senior Energy Consultant

AGENDA

- Who's on the Treasure Hunt Team?

- What are you looking for?
- Where to Start?
- Examples
- Resources

  EPA Treasure Map for Microbreweries

Who's on the Treasure Hunt Team?

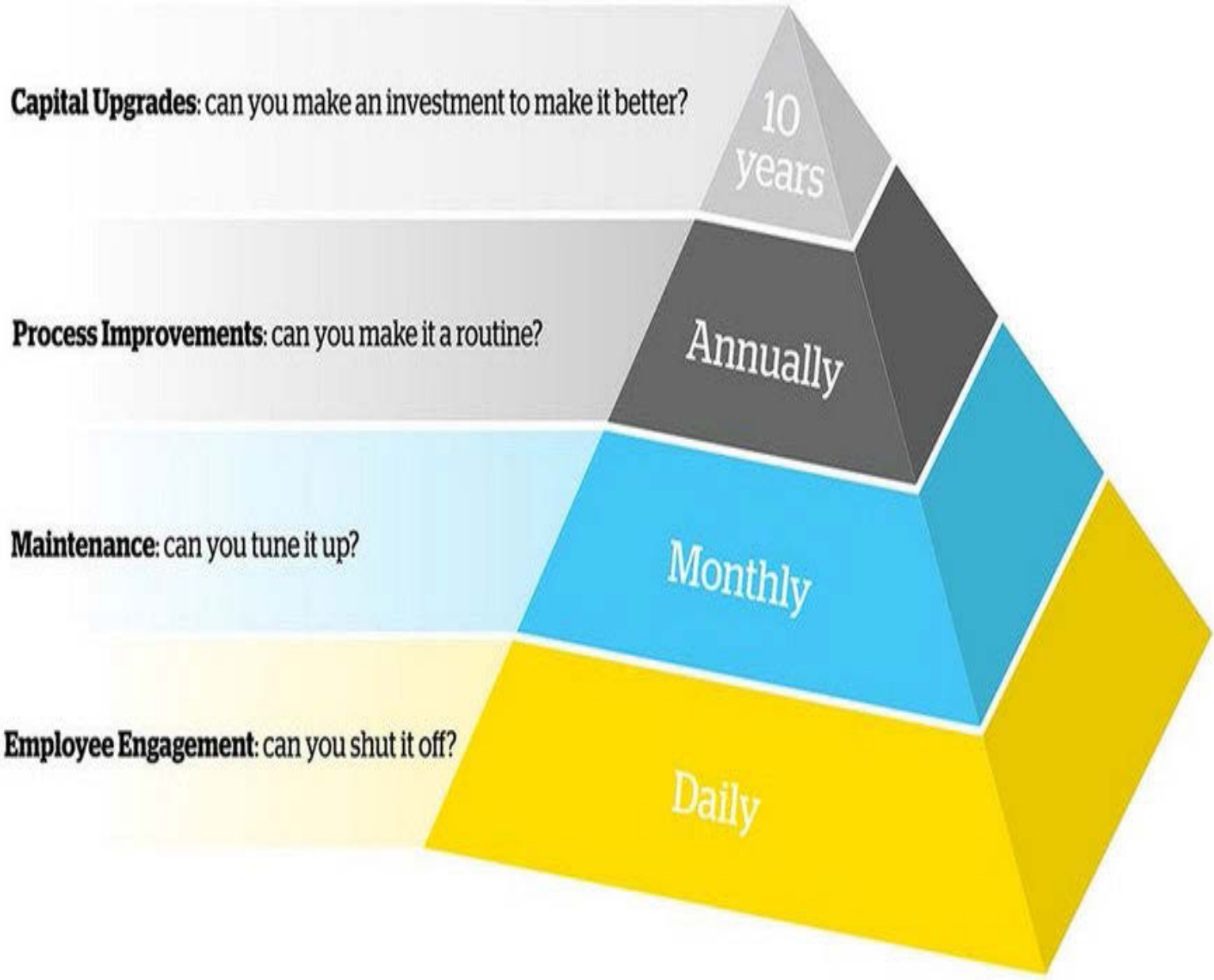
Buy-in/Sponsored by upper management

- Head Brewer
- Operations staff
- Maintenance
- Accounting/finance
-External peers
-Local Utility Reps

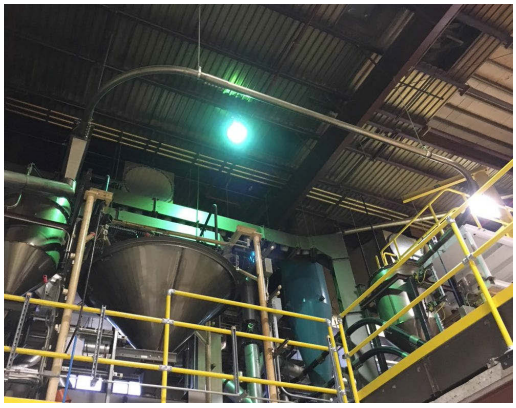
Four Quick Questions to Identify Energy Efficiency Opportunities

Question	Type of Opportunity	Frequency of Decision	Examples
Can you shut if off?	Employee Engagement	Daily	Only operate equipment to serve a need. • Turn off floor fans in unoccupied areas • Setback HVAC in unoccupied areas • Turn off conveyors without product • Turn off extra air compressor capacity • Shut down backup boilers kept at idle
Can you tune it up?	Maintenance Activity	Monthly	Maintain equipment to operate as intended. • Fix compressed air and water leaks • Fix steam leaks and failed steam traps • Insulate steam and condensate piping • Insulate HW and chilled water piping • Change air filters and clean coils
Can you make it routine?	Process Improvement	Annually	Optimize and monitor key processes. • Optimize supply to meet demand • Use SOPs to ensure consistency • Create and track key performance indicators • Process materials just enough • Reduce scrap
Can you make an investment in it?	Capital Upgrade	10 Years	Address bottlenecks or poor performance. • Replace lighting with LEDs and controls • Implement a Building Management System • Upgrade boiler burner efficiency and part load control • Recover waste heat • Increase throughput per unit of energy

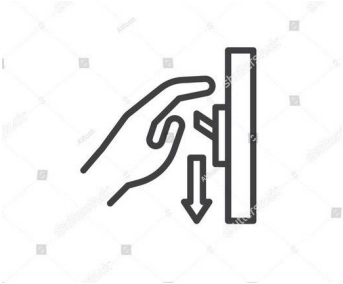
Impact Pyramid



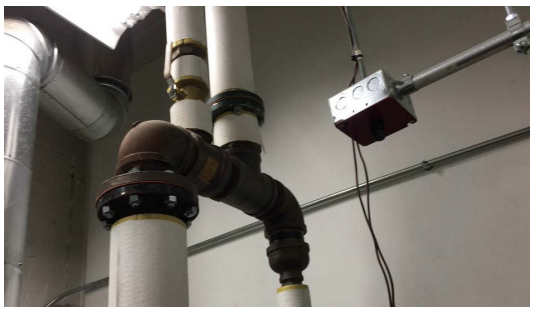
Four “Quick” Questions

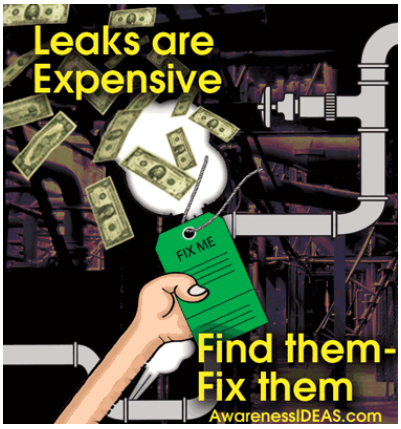


Can you shut it off?



Can you tune it up?





Can you make it routine?

Can you make an investment in it?

FOR BUSINESS

High Efficiency Condensing Unit

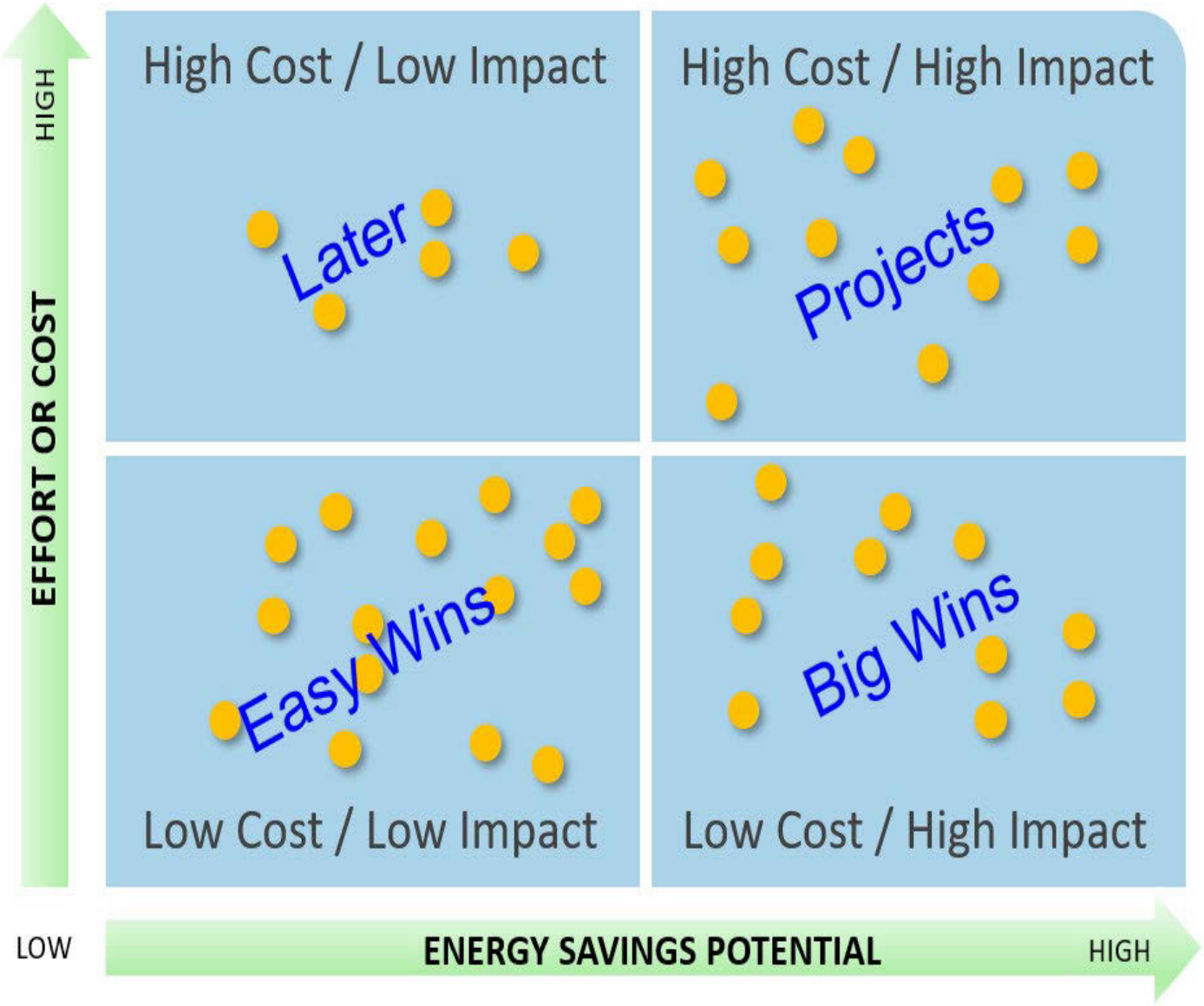
Up to **$2,000** unit off at time of purchase

FOR BUSINESS

High Efficiency Evaporators

Up to **$1,500** per unit off at time of purchase

Prioritize: **Place energy efficiency opportunities in 1 of the 4 quadrants below.**

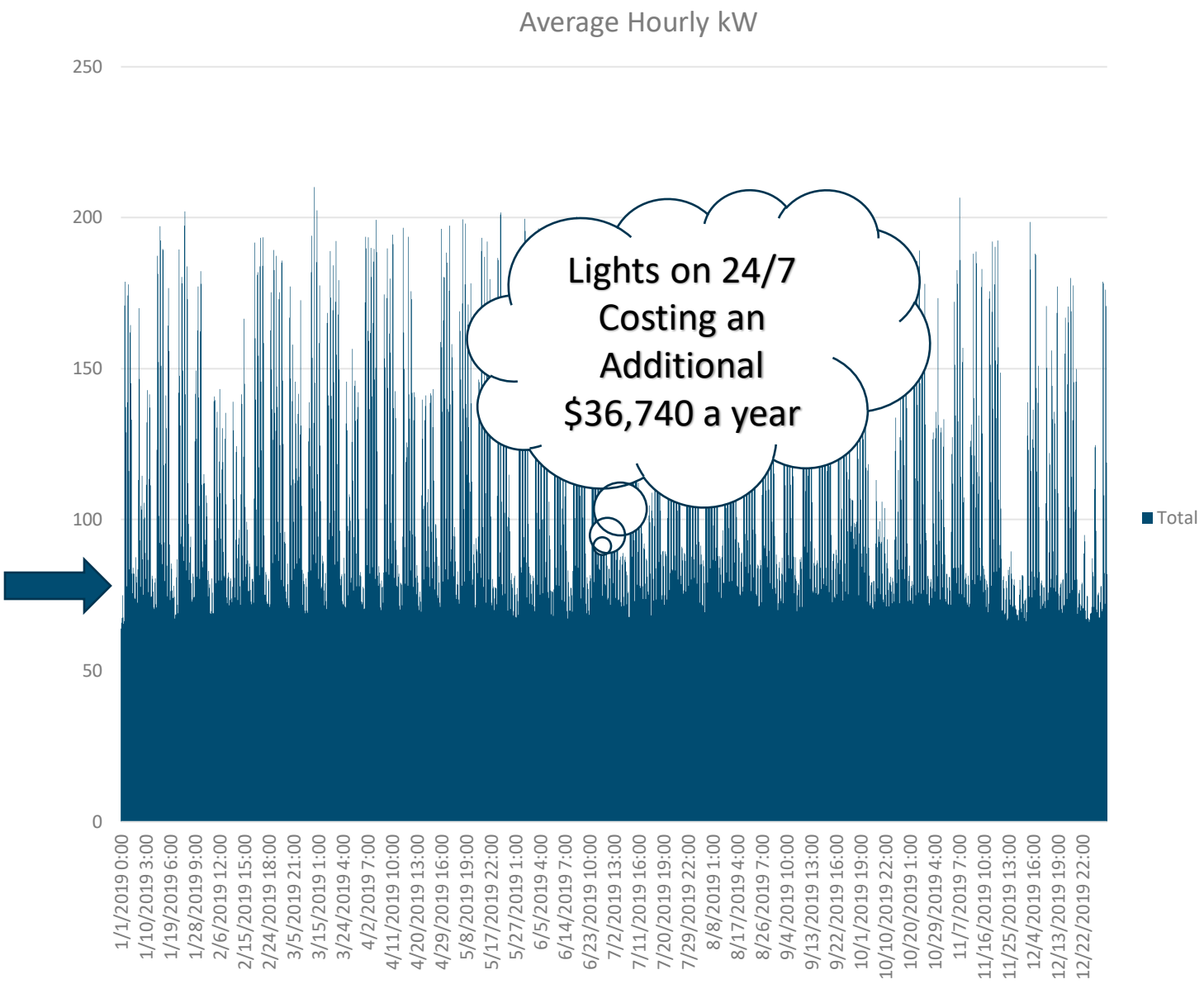


Where to start, what to look for?

Next, some real-world examples
5 Slides

Utility Data

Operations, M-F 7:00 to 3:30



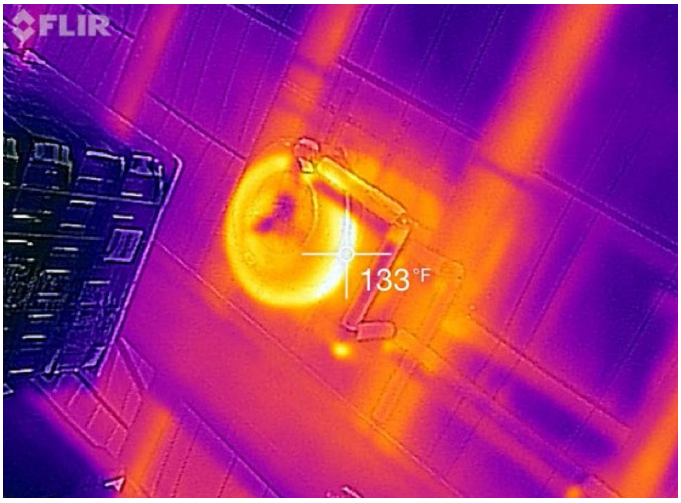
Examples: HVAC Settings
Look at Building Management System

Non-Production Area: AHU 9, 17,18

- Current State
  - Space is occupied M-F, 7a – 6p. No set back or scheduling of air.
  - Space set points are 72 Cooling, 68 Heating
- Opportunity:
  - Enable schedule to close OA dampers
  - Schedule to space temp setbacks.
  - Change occupied space set points.
- Savings: = $3,000 to 5,000 per year
- Cost = $0, In house
- Simple Payback = Now

More Examples

Loading Dock Heater, Mid-July



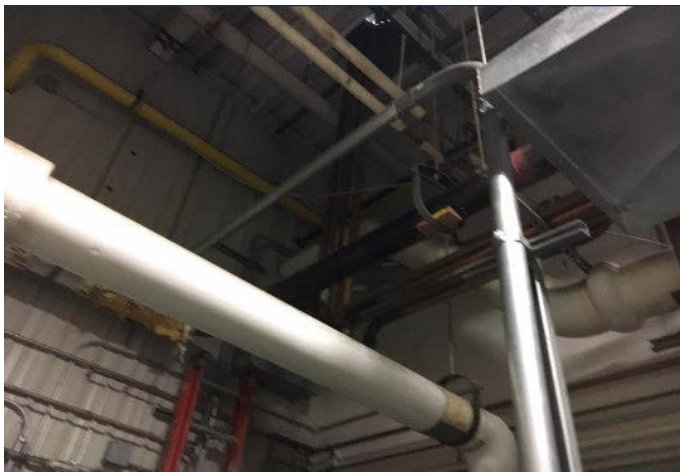
Compressed Air Use

Compressor Pressure Reduction

Compressed Air Cabinet Cooler

Examples Continues

15 Feet of Un-insulated steam pipe, savings, $860 ; cost $350



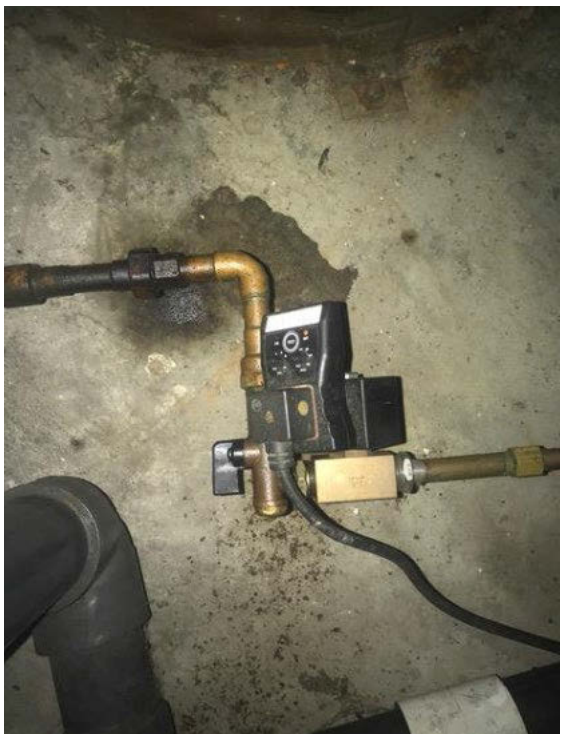
Draining Condensate

Keg washer, Draining Steam Condensate

Compressed Air Leaks

(can find CO2 and Nitrogen too!)

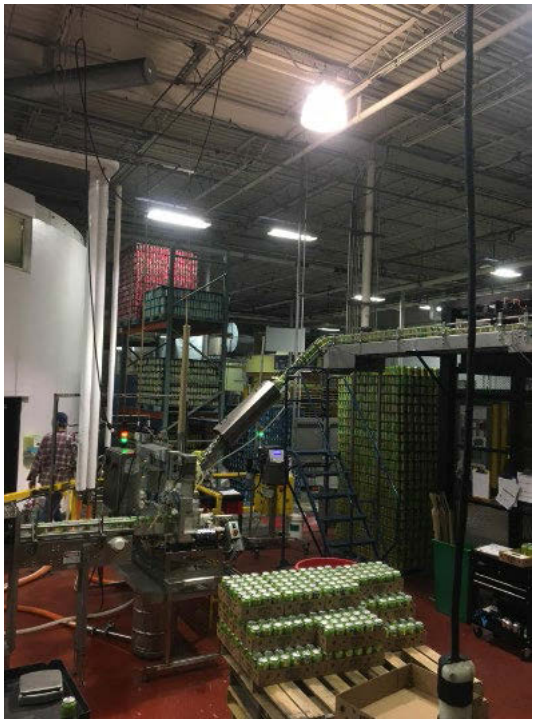
Final set of exampels



Replace Compress Air Timed Drain with a No-Loss Drain.

Cost: $200,

Annual Savings = $200



Replace 1100 Watt MH with 360 W LED.

Cost: $600, Annual Savings $700-$800

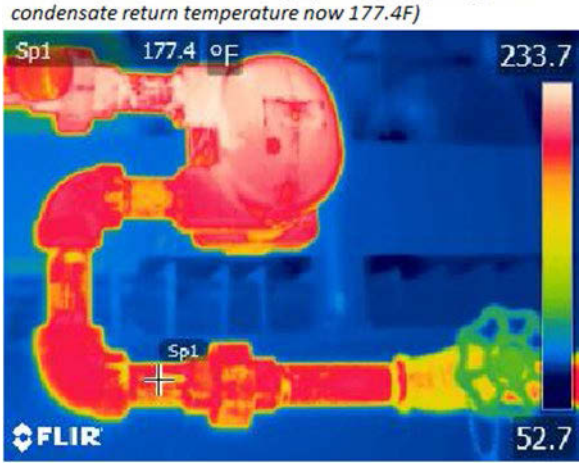
Steam Trap Survey

Top: Failed

Above: Steam trap failed open (note condensate return temperature is 207.8F)

Below: Replacement steam trap operating properly (note condensate return temperature now 177.4F)

Bottom: Replaced



Use an IR Camera

Un-insulated Steam Pipe

Energy Treasure Hunts

Looking for quick ways to save energy

Efficiency Vermont

- ❑ For example, using a flat plate heat exchanger to cool wort using municipal water and returning the warmed municipal water to a hot liquor tank for use in next brew and/or Clean in Place water.
- ❑ Assess appropriateness of creating a more concentrated wort which can be diluted to optimal gravity prior to fermentation.
- ❑ Control any CO_2 exhaust fans such as cellar fans using CO_2 level controlled VSD motors on the fans.

3 Hot Water and Steam Systems

Low Cost Upgrades

- ❑ Review boiler setpoints. Locate the boiler's operating manual.
- ❑ Verify proper boiler preventative and predictive maintenance schedules are being followed. Ensure all boiler components are optimized.
- ❑ Measure the boiler's exhaust temperature to determine if combustion efficiency can be improved.
- ❑ Inspect the boiler's air-to-fuel ratio and ensure that it is correctly calibrated.
- ❑ Check and reduce excess air (O_2) to lowest level possible based on boiler's configuration.
- ❑ Inspect burners and fire-side heat exchangers and clean, calibrate, or adjust as needed.
- ❑ Inspect boiler fire tubes for excessive scale build-up.
- ❑ Review frequency of boiler blowdown, and assess the minimum required blowdown needed to maintain acceptable boiler water quality.
- ❑ Establish daily boiler operation log and regular boiler preventative maintenance program to assure that boilers and control systems are operated to achieve optimum fuel efficiency.
- ❑ Clean heat exchangers. Verify heat exchanger actual pressure drop against the designed pressure drop and actual heat transfer against the designed heat transfer.
- ❑ Review steam trap maintenance practices. Establish a Steam Leak Management Program.
- ❑ Ensure that steam distribution systems are properly insulated.
- ❑ Confirm overall control system operations.

Capital Investment Upgrades

NOTES:

TIP:

- For tasks beyond your staff's skills or capacity, consider professional services.

TIP:

- Consider an "all utility audit" that will look for billing errors and proper rate classification for your electricity, natural gas, heating oil, water/sewer, and telecommunications. Such audits are free unless the analysis finds you are due refunds, then the auditing firm is paid a pre-agreed percentage after your refund is complete. If you find no refund, you have confirmed you are not overpaying.

Thank you!

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Efficiency Vermont

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