Energy Assessments and Savings Opportunities in Food and Beverage Businesses

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Sustainable Dairy Products Northeast Summit

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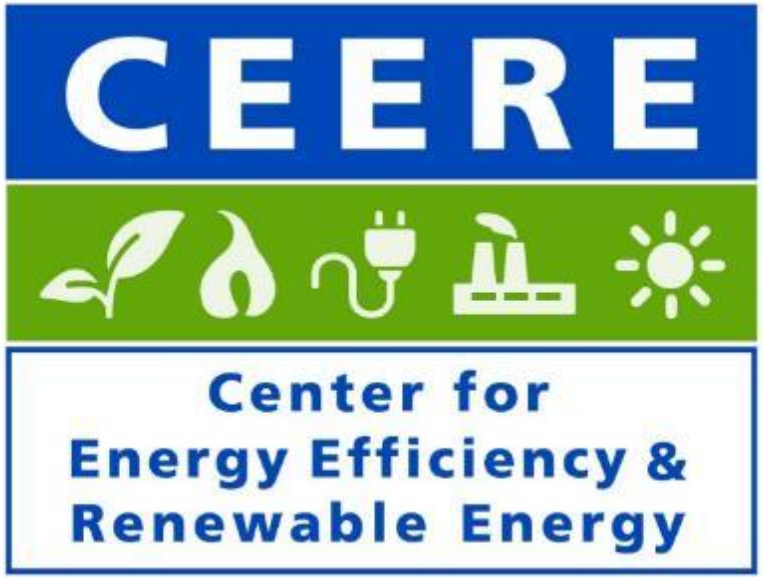

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Benefits of Energy Efficiency

- Reduce operating costs
- Reduce emissions
- Reduce maintenance costs
- Improve work environment or customer experience
  - Light quality
  - Temperature control, comfort
- Earn utility incentives/rebates or other grants

Identifying Efficiency Opportunities

- External assessment
- Internal suggestions or "treasure hunt"
- Equipment vendors
- All of the above!

Why Have an External Assessment?

- Fresh set of eyes
- Technical expertise
- Metering tools
- Impartial advice
- Confidential

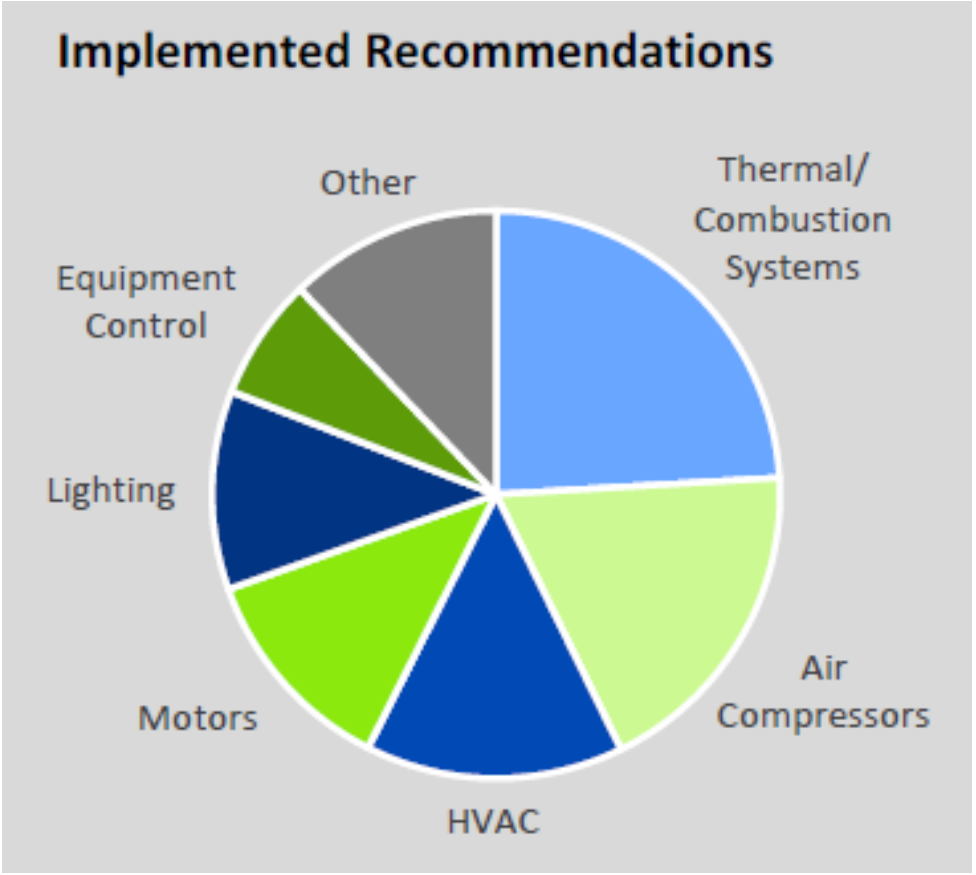
- Identify new savings opportunities
- Quantify the savings potential for ideas you have
- Compare options for upcoming equipment purchases
- Prioritize opportunities
- Documentation to help earn project approval or utility incentives

Industrial Assessment Center

- National program sponsored by U.S. Department of Energy, UMass serves all of New England
- Free, in-depth assessments to help reduce energy and resource costs
  - Electricity & all fuels (natural gas, oil, propane, etc.)
  - Water
  - Waste
  - Productivity
- Key eligibility criteria
  - Manufacturing or water/wastewater treatment facility
  - Annual energy bills $100,000 - $2.5 million

Industrial Assessment Center

- 800 assessments by UMass since 1984
- Recommendations include
  - Equipment replacement
  - Installation or reprogramming of controls
  - Maintenance procedures
- Average assessment
  - 3 recommendations implemented
  - $61,000 annual cost savings
  - 1.5 year average payback period



Assessment Process

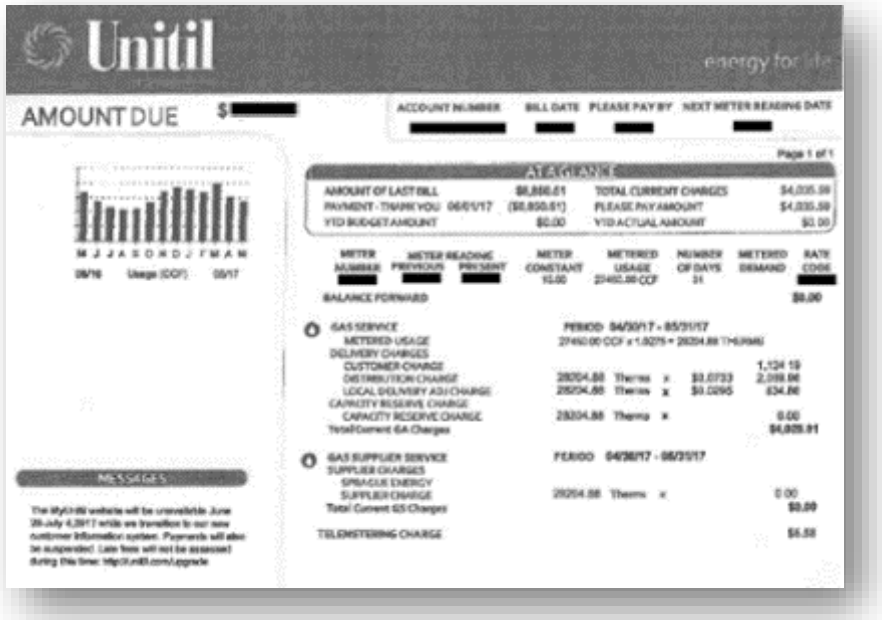
- Collect and review utility bills
- Site visit
  - Meet with staff
  - Tour facility
  - Collect data
- Analysis
- Report with detailed recommendations within 60 days
- Determine incentive eligibility, plan & implement

Sample Recommendation Table

Recommendation		Annual Savings			Implement. Cost	Payback Period
		Energy		Cost		
1	Reduce exhaust on scrubbers during off hours	Electricity (kWh)	182,994	$20,825	$20,400	7 months
		Natural Gas (MMBtu)	1,035	$14,159		
2	Turn off air compressor at night	Electricity (kWh)	212,716	$24,207	$1,000	1 month
3	Reduce speed of anodizing NO2 fan during off hours	Electricity (kWh)	174,066	$19,809	$3,330	2 months
4	Implement temperature setback in the office	Electricity (kWh)	14,575	$1,659	$1,000	1 month
		Natural Gas (MMBtu)	525	$6,864		
5	Repair compressed air leaks	Electricity (kWh)	73,575	$8,373	$2,400	3 months
6	Install VFD on pumps in aqueous washers	Electricity (kWh)	60,242	$6,856	$24,500	3.6 years
7	Reduce the compressor pressure	Electricity (kWh)	22,889	$2,605	$500	2 months
8	Turn off wash line pumps when conveyor belts are off	Electricity (kWh)	22,706	$2,584	$1,000	5 months
9	Reduce temperature in washer tanks	Natural Gas (MMBtu)	122	$1,597	$500	4 months
10	Insulate pipes and condensate tanks	Natural Gas (MMBtu)	94	$1,227	$1,013	10 months
11	Turn off the paint area exhaust fan	Electricity (kWh)	3,518	$400	$100	1 month
		Natural Gas (MMBtu)	52	$679		
Total		**Electricity (kWh)**	**767,281**	**$87,318**	-	**6 months**
		Natural Gas (MMBtu)	**1,828**	**$24,526**	-	
		Total	-	**$111,844**	**$55,743**	

Common Findings & Opportunities

- Utility bills
  - Tax exemption
  - Power factor penalty
  - Multiple accounts
  - Late fees



Common Findings & Opportunities

- Lighting
  - Upgrade equipment
  - Install or optimize controls – occupancy sensors, daylight sensors, timers

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Common Findings & Opportunities

- Refrigeration and process cooling
  - Install automated controls – variable frequency drives to adjust motor speed to load
  - Optimize sequencing of equipment
  - Upgrade motors
  - Install automated doors, strip curtains, night covers
  - Replace old, inefficient equipment

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Common Findings & Opportunities

- Ovens and process heating
  - Add insulation
  - Clean and tune boilers
  - Recover heat from oven or boiler exhaust
  - Maintain steam traps

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Common Findings & Opportunities

- Compressed air systems
  - Adjust pressure setting
  - Repair leaks
  - Eliminate unnecessary uses of compressed air
  - Increase storage
  - Replace old, inefficient equipment

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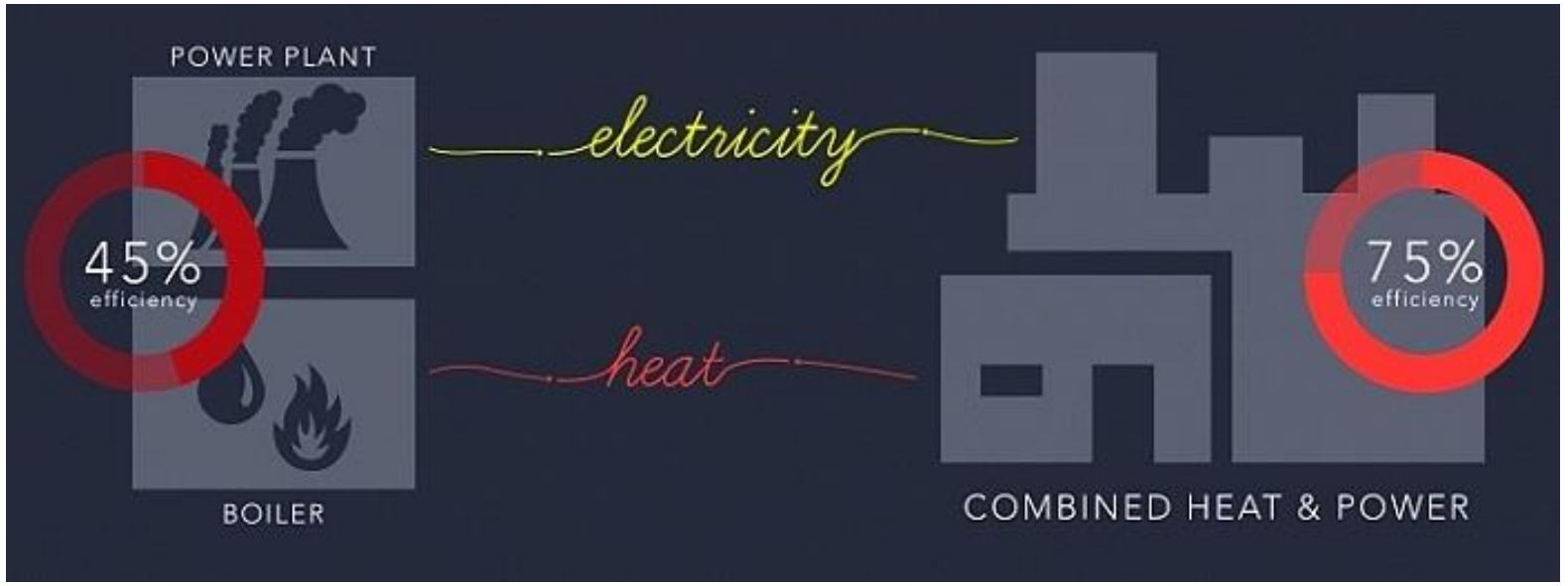
Common Findings & Opportunities

- Combined heat and power / cogeneration
  - Joint generation and use of electricity and thermal energy
  - High efficiency, increased reliability, reduced energy costs
  - Can be fueled by biogas from an anaerobic digester



Case Study – Dairy Processing Facility 1

- 215 employees, 94,000 square foot facility
- Implemented 5 of 7 recommendations
  - Adjust refrigeration system sequencing to optimize operation
  - Tune boiler twice a year to optimize operation
  - Repair compressed air leaks
  - Upgrade lighting
- Annual cost savings $56,000
- Implementation cost $46,000, 10 month payback before incentives

Case Study – Dairy Processing Facility 2

- 1,200 employees, 300,000 square foot facility
- Implemented 11 of 17 recommendations
  - Upgrade chillers
  - Adjust refrigeration system settings to optimize operation
  - Tune boiler twice a year to optimize operation
  - Reduce air compressor pressure to the level needed
  - Install programmable thermostats
  - Upgrade lighting and install occupancy sensors
- Annual cost savings $175,000
- Implementation cost $242,000, 1.4 year payback before incentives

Other Resources

- Utility or state programs
  - Mass Save, Mass Energy Efficiency Partnership, UMass Clean Energy Extension
  - Efficiency Vermont
  - Efficiency Maine
  - Eversource, Unitil
  - List of programs around country: www.cee1.org/content/member-directory
- Agriculture programs
  - Massachusetts Farm Energy Program
  - USDA programs
- Financing programs
  - Massachusetts Property Assessed Clean Energy (PACE)
- Green Your Bottom Line workshops & webinars

Summary

- Energy efficiency is good for business – a cost-effective way to reduce operating costs and increase sustainability
- There are opportunities in every food and beverage business
- This work should be ongoing as there are changes in your equipment, process, production schedule, etc.
- There are many resources available to help – take advantage of them!

Contact me to discuss how we can assist your business or connect you to the appropriate resources

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