

Energy Assessments and Savings Opportunities in Food and Beverage Businesses

Lauren Mattison

Sustainable Dairy Products
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UMassAmherst

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



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

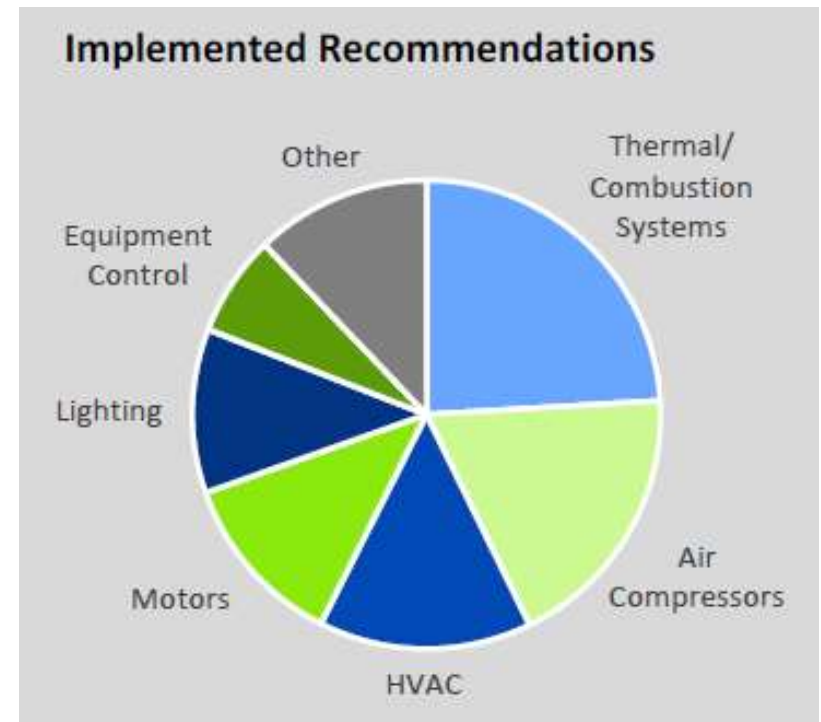
Industrial Assessment Center

- National program sponsored by U.S. Department of Energy, UMass serves New England
- Free, in-depth assessments to help reduce energy and resource costs
 - Electricity & fuel (natural gas, oil, propane, etc.)
 - Water
 - Waste
 - Productivity
- Key eligibility criteria
 - Manufacturing (SIC 20-39) 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

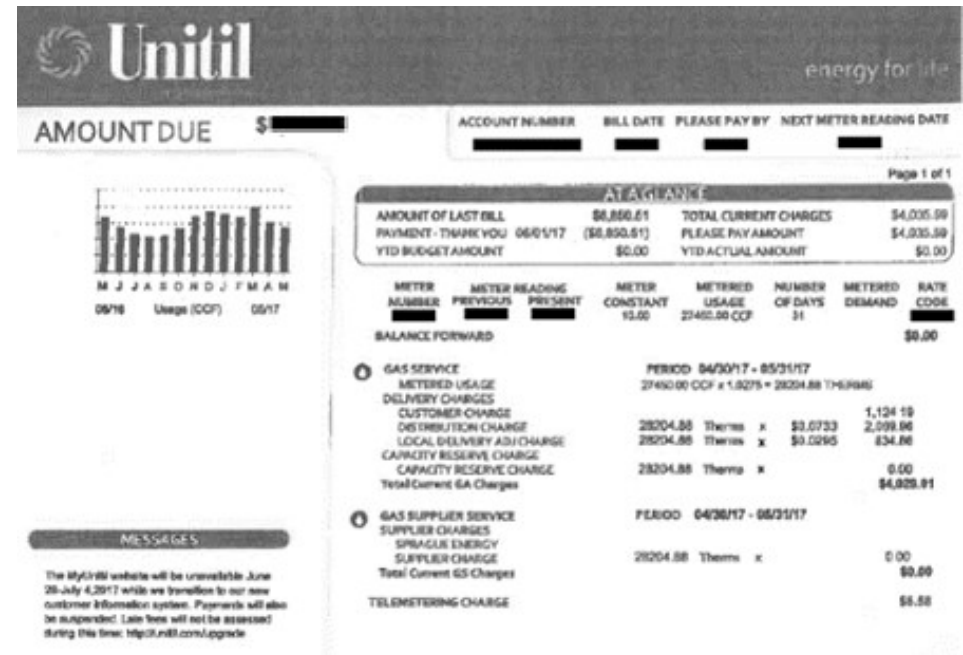
- Collect and review utility bills
- Site visit
 - Meet with staff
 - Tour facility
 - Collect data
- Analysis
- Report with detailed recommendations within 60 days
- Determine incentive eligibility, plan & implement

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

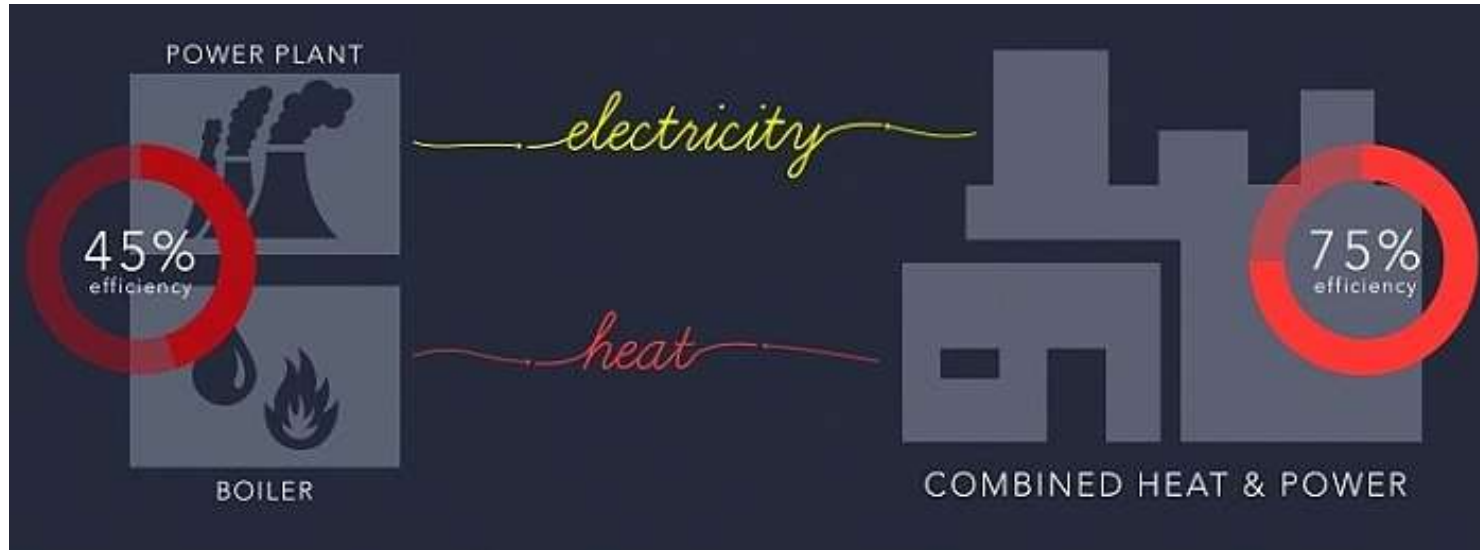
- Compressed air systems
 - Adjust pressure setting
 - Repair leaks
 - Eliminate unnecessary uses of compressed air
 - Increase storage
 - Replace old, inefficient equipment



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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



Case Study – Dairy 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 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
- 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**

Lauren Mattison
laurenm@umass.edu
413-545-0651

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