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Company Background

Antea Group is an international engineering and environmental consulting firm, specializing in full-service solutions in the fields of environment, infrastructure, urban planning and water. Antea Group was contracted by the Brewers Association in 2013 to create sustainability manuals that highlight the best practices for conserving resources during the process of brewing beer. The Brewers Association is a non-profit organization of brewers, for brewers and by brewers, and is made up of more than 2,700 U.S. brewery members and 45,000 members of the American Homebrewers Association. They work to inform breweries of current changes in legislation, provide marketing and networking channels for brewers and breweries, and post articles and guides on the best practices of every aspect of brewing.



“As a MnTAP intern, I have been able to use the skills I developed in the classroom and grow them in the field. Instead of looking at one small part of a process, I have gotten to see and work on a process from start to finish.” ~RW

Project Background

In creating the sustainability manuals for the Brewers Association, Antea Group launched a pilot benchmarking project. The purpose of the project was to collect data from 25 breweries and determine how much water, electricity, natural gas, and carbon dioxide (CO₂) is being used per barrel of beer, and determine how organic solids are handled. The current goal is to expand the nationwide study to 250 breweries of all types and sizes. Antea Group also conducts sustainability roadmapping, which involves an on-site assessment resulting in a three year plan the brewers could follow to slowly upgrade their processes. The savings from lower-cost changes could help support bigger capital improvements further down the road. The goal of this internship was to engage Minnesota craft brewers in the benchmarking project and perform site visits that would identify which projects would have the greatest return.

Incentives To Change

Craft brewing is a booming industry across the country. Ten years ago there were only five breweries in operation in the State of Minnesota, and now there



are over 80 in operation or opening this year. These breweries are expanding production every year. The pilot benchmarking study showed that efficiency increases with production and that a large margin in efficiency exists between brewers of similar size. Adding up the cost of water, electricity, natural gas and CO₂ per barrel can be as high as \$49 or as low as \$16 for brewers producing less than 500 barrels per year. This cost difference is the competitive edge that a new brewery may need to upgrade equipment, or increase capacity to expand their business.



the final product. The HVAC demand can be reduced year round by high volume low speed fans that reduce the temperature gradient caused by high ceilings, or by installing curtain walls or strip curtains that divide up production space to create more intentional temperature zones.

Better Maintenance

Proper maintenance is a low cost way to realize savings. Some utilities offer rebates for boiler maintenance and free consultations. Checking steam traps and air intake on the chiller and air conditioning units are two common maintenance items. A checklist to make sure the compressors and condensers are running in their optimal conditions is a good way to ensure success.

Smart Controllers

Smart thermostats or controllers for coolers reduce the power use in walk-in coolers and can extend the life expectancy of the compressor. Savings from an evaporator fan controller can be \$270 per year with a payback less than two years. Installing evaporator fan motors can save \$310 per year. One small brewery found that using the comfort fan recommendation and either the fan controller or the new fan motors would lead to a 7% energy reduction.



Solutions

Results from Benchmarking

The Brewers Association has divided craft breweries into four size categories, and in consultation with Antea Group, determined a national benchmark for the top 25%, median and bottom 25% in each of the four categories: electric, natural gas, water and CO₂ use. Monthly benchmarking is one way to spot sudden changes in usage that can indicate room for improvement. This project included nine breweries representing three of the four size categories. CO₂ was not included in this comparison, since its use only varies with the type of bottling or canning the brewery does. While water use showed the greatest opportunities for improvement, with only two brewers performing better than the national median, electrical improvements showed the greatest return on investment for achieving a benchmark in the most efficient 25% of the nation.

Better Temperature Control

The process of brewing beer involves high temperatures to create the wort, constant temperatures during the fermentation process and low temperatures to store

Recommendation	Annual Reduction (kWh)	Annual Savings	Status
Install Evaporator Fan Controller	3,060	\$270	Recommended
Manual Control of Comfort Cooling Fan	1,900	\$170	Recommended
New Evaporator Fan Motors	3,500	\$310	Recommended