



KARBON BREWING CO. : Developing a Guide for Sustainable Beer Production

Background into the Brewing Industry

Beer and people have had a long history together, dating back to around 5000 BC. Over the years, beer has evolved through culture and time into the modern brewing industries of today. This evolution continues as we adjust our practices to mitigate the climate crisis. Brewing is a carbon intensive process, so the industry must do what we can to lessen our carbon footprint. Illustrating this well is Karbon Brewing, who are finding ways to reimagine the brewing industry and striving to share best practices across the industry.

Karbon Brewing

The founders of Karbon Brewing aim to foster eco-conscious conversations while indulging in the pleasure of delicious beer. Karbon Brewing's attempts to transform the industry, through mitigating the ecological consequences of conventional brewing methods. Karbon pledges to make a long-lasting, beneficial impact on the environment through using the most sustainable practices and developing a guide to sustainable brewing.

Areas of Interest

This project focused on 4 areas of interest to explore more sustainable practices for each topic:

- Energy use optimization
- Food/beverage manufacturing
- Recycling and end of life resource use
- Food waste and biomaterials

Research was conducted by reviewing other business, industry standards, as well as a literature review.

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Energy Use Optimization

Monitoring of energy use is becoming a more common practice however the shift to more energy efficient technologies is happening on a slow scale.

Explore alternatives to current energy intensive processes that use clean technologies and management strategies within brewing facilities.

Recommendations

- Perform energy efficiency audits and monitor usage to identify targets
- Replace machinery to more energy efficient technology
- Downsize equipment to match the demand for the production load

Food/Beverage Manufacturing

Traditional manufacturing systems do not operate as efficient as newer systems, modern manufacturing has become increasingly focused on sustainability, and resource use optimization such as water through innovative technology.

Recommendations

- Update facilities and systems where possible
- Implementation of state-of-the-art water treatment technology
- Continued exploration of water monitoring technology like the (Internet of Things) IoT-based system in the beverage manufacturing process



Resources

Recycling and End of Life Resource Use

The current beer industry has an excellent circular waste economy. This was accomplished by making bottle and can waste a valuable material that can be reprocessed and used. To analyze how different packaging options impact the sustainability of beers' waste process, and the effectiveness of the circular beer economy we can help guide the beer industry in choosing sustainable, effective and cost friendly packaging systems.

Recommendations

- Replacing single use bottle with aluminium can
- Replacing single use glass bottles with reusable bottles
- Replacing conventional kegs and casks with single use Polyethylene Terephthalate (PET) alternative
- Avoid the use of Multi-polymers and other plastic adhesives to make sure your product is compatible with recycling

Food Waste and Biomaterials

The brewing industry has opportunity to increase profit through the reutilization of materials historically may be deemed waste. The repurpose of food waste and biomaterials in support of new carbon neutral opportunities and increased profit through saving and selling repurposed biomaterials.

Recommendations

- Utilize or sell biomaterials/food waste for biofuels
- Create new products from food waste such as kombucha
- Increasing Life Cycle Assessment (LCA) to ensure maximum shelf life of organics, and knowing what to do with expired material



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