



TOPIC: SUPPLY CHAIN, ENGINEERING, STRATEGY & FINANCE, AGRIBUSINESS, ENVIRONMENT

BREWING A SUSTAINABLE FUTURE: A HOLISTIC APPROACH TO ECO-FRIENDLY BEER PRODUCTION

🕒 7 min read

In an era where environmental consciousness is paramount, industries across the board are reevaluating their practices to minimize their ecological footprint. The brewing industry, with its significant consumption of resources and production of waste, is no exception. To address this, breweries worldwide are increasingly adopting sustainable practices throughout their production processes. From minimizing resource consumption to investing in renewable energy and optimizing packaging and distribution, breweries are revolutionizing their operations for a greener future.

1. Minimizing Resource Consumption, Optimizing Production Processes, and Investing in Sustainable Technologies

Efficient resource management lies at the core of sustainable brewing. Breweries are focusing on minimizing energy and water consumption throughout their operations. By optimizing raw material usage and production processes, breweries can significantly reduce their environmental impact.

As an example, breweries are investing in innovative wort boiling and brewhouse systems, that feature heat recovery mechanisms. These optimize energy efficiency while maintaining or improving the quality of the final product. These systems not only reduce energy consumption but also contribute to cost savings in the long run. Examples are Exergon (Banke), Equitherm (Steinecker), Schoko (Schulz), Shark (Ziemann), Jetstar / IWM (GEA) and SmartBoil (Braukon).

Rod Waite, Director of Engineering at First Key Consulting, says, “Breweries are in a position these days to leverage the many sustainability innovations being put forth by reputable vendors. They just need to be careful to make educated decisions when implementing new technologies and process concepts to ensure the desired outcomes are achieved.”

The adoption of sustainable technologies is a key strategy for breweries looking to minimize their environmental footprint. Changing to hot water as heat medium combined with heat pumps, for instance, are being increasingly used to harness renewable energy sources such as geothermal or solar energy for heating and cooling processes. By utilizing these technologies, breweries can significantly reduce their reliance on fossil fuels and lower their carbon emissions.

Another example is that of reducing water consumption and optimal wastewater treatment and disposal. Beer is approximately 95% water, and the amount of water needed in the brewing process is such that the volume of water used is multiple times greater than the volume of beer produced. The water-to-beer ratio varies widely (e.g., close to a ratio of 2 for those highly efficient, vs a ratio of 8 or greater for others). The major usage areas are packaging, brewhouse, utilities and cellars. A detailed survey of water usage in the brewery can help reveal points in the process where water is wasted, whether due to leaks or to unnecessary use of this precious resource. The survey can also help point to areas where recycling may become a viable option. Measuring usage and tracking water usage as a KPI, along with setting goals, has helped breweries drive improvement. These improvements will not only help sustainability, but they will also help lower production costs, as the cost of water is not just the price of the incoming water, but it also includes the sewer service charge. The Brewers Association has published the “Water and Wastewater: Treatment/Volume Reduction Manual” which provides a very good collection of tools, best practices, and case studies to help brewers in the journey of lowering water usage, and provides options for wastewater treatment and disposal.

2. Sourcing Renewable Energy and Collaborative Partnerships

Transitioning to renewable energy sources is a crucial step towards sustainable brewing. Breweries are increasingly sourcing electricity from renewable sources such as wind, solar, and hydroelectric power. By investing in renewable energy infrastructure, breweries not only reduce their environmental impact but also contribute to the growth of the green energy sector.

Another approach is that breweries are actively engaging in collaborative partnerships with other local industries to source clean energy more efficiently and effectively.

One promising avenue for renewable energy sourcing is through joint ventures with other local industries, such as the establishment of joint geothermal plants. Geothermal energy, where available, offers a reliable and sustainable source of power. By partnering with neighboring industries, breweries can leverage shared resources and infrastructure to access geothermal energy at a larger scale and lower cost.

Additionally, breweries are exploring the use of district heating systems, which distribute heat generated from renewable sources, such as biomass or solar thermal energy, to multiple buildings within a local area. By tapping into district heating networks, breweries can significantly reduce their reliance on fossil fuels for heating and hot water needs. Collaborating with other businesses and municipalities to expand and optimize district heating infrastructure can further enhance the sustainability and resilience of these systems.

Through strategic partnerships with local industries and communities, breweries can not only access renewable energy more affordably but also contribute to the development of integrated, decentralized energy systems. By working together towards shared sustainability goals, breweries can strengthen their connections with the local community and foster a more resilient and environmentally friendly energy landscape.

3. Implementing Total Cost of Ownership (TCO) Calculations

When making investment decisions, breweries are increasingly considering the total cost of ownership (TCO) rather than solely focusing on upfront costs. TCO calculations take into account not only the initial investment but also the operational and maintenance costs over the entire lifespan of the equipment. By adopting this approach, breweries can make informed decisions that maximize sustainability and long-term cost savings.

Tim Wolf, Senior Advisor, Engineering from First Key Consulting says, “Breweries must embrace innovation and experimentation to enhance efficiency without compromising quality and their own unique core values.”

An example of this would be when a brewery considers replacing its boiler system. Using TCO analysis, the brewer compares the costs of different boiler options, considering factors such as the initial purchase price, its energy efficiency, the expected maintenance requirements, the fuel costs, and the expected lifespan. In this way, the brewery is able to identify the most cost-effective solution that minimizes energy usage and long-term expenses, rather than simply going for the option that has the lowest initial investment.

4. Implementing Reliability-Centered Maintenance

Reliability-centered maintenance (RCM) is a proactive approach to equipment maintenance that focuses on optimizing reliability, safety, and environmental performance. By implementing RCM practices, breweries can minimize downtime, reduce energy consumption, and prolong the lifespan of their production equipment. Regular maintenance and equipment upgrade also ensure optimal efficiency, further contributing to sustainability goals.

5. Lowering Carbon Footprint through Packaging and Logistics

Reducing carbon emissions associated with packaging and logistics is another area of focus for sustainable breweries. Breweries in some parts of the world are opting for returnable containers over single-use packaging to minimize waste and energy consumption. Lightweight primary and secondary packaging materials are being used to reduce transportation-related emissions and minimize environmental impact. These lightweighting efforts also result in lower packaging costs. Careful engineering and testing of these design changes can help ensure a good quality of the packaged beer when the consumer experiences the product.

Moreover, breweries are increasingly sourcing raw materials locally to reduce transportation distances and support local economies. By embracing green logistics practices, such as optimizing delivery routes and utilizing eco-friendly transportation modes, breweries can further lower their carbon footprint throughout the supply chain.

6. Participation in International Benchmark Surveys

Engaging in international benchmark surveys is a crucial strategy for breweries committed to sustainability, providing them with valuable insights and comparative data on key performance indicators such as water and energy consumption per hectoliter of beer produced. These surveys offer breweries the opportunity to assess their operations against global standards and identify areas for improvement, driving progress towards more sustainable practices.

Participating in international benchmark surveys offers breweries several benefits:

Comparative Analysis:

Benchmark surveys allow breweries to compare their performance metrics with industry peers on a global scale. By analyzing data from other breweries of similar size, production layout, or geographic location, breweries can gain valuable insights into their relative efficiency and identify opportunities for optimization.

Identification of Best Practices:

Through benchmark surveys, breweries can access information on best practices and innovative solutions for resource management. By learning from leading performers in the industry, breweries can adopt strategies to improve efficiency, reduce waste, and minimize environmental impact.

Stakeholder Communication:

Engagement in benchmark surveys enhances breweries' ability to communicate their sustainability efforts to stakeholders effectively. By providing transparent and credible data on their environmental performance, breweries can build trust with consumers, investors, and regulatory authorities, demonstrating their commitment to sustainability.

The brewing industry is undergoing a paradigm shift towards sustainability, driven by the growing awareness of environmental issues and the need for responsible business practices. By focusing on minimizing resource consumption, investing in sustainable technologies, sourcing renewable energy, considering TCO calculations, implementing reliability-centered maintenance, and adopting eco-friendly packaging and logistics practices, breweries can pave the way for a more sustainable future. With collective efforts and innovative solutions, the brewing industry can continue to thrive while minimizing its impact on the planet.
