Efficient use of energy in small size brewery

Abstract content

Industrial production is a significant consumer of both materials and energy. Therefore efficient use of energy in production is important for reaching of the global sustainability targets. Overall there are more than 20 breweries in Latvia, most of which are small size breweries. Increased resource and energy efficiency could benefit these companies by reducing production costs as well as reducing environmental impact from beer brewery. On the other hand there is an absence of a specific reporting system for companies to declare their production performance information; therefore no statistical data are available for comparison of case study brewery with other breweries in the region. In addition the literature regarding specific energy consumption in small size breweries is scarce.

To evaluate the efficiency of energy consumption in the brewery the case study data was compared to recommendations of the Reference Document on Best Available Techniques in the Food, Drink and Milk Industries (BAT)* (the drawback of this approach is that these recommendations apply for breweries with capacity over 1 million hl of beer per year) and other cases studies or medium size breweries. The aim of this study is to (1) evaluate resource and energy consumption patterns and (2) determine potential resource and energy efficiency improvements in a small-size brewery in Latvia. Historical data on raw-material and energy resource consumption for previous three years (2011-2013) were was provided by brewery representatives. This data was analysed and compared to other cases in literature to evaluate production efficiency. Specific water consumption was found to correspond to typical benchmarks given in EU Best available technology Reference documents. Specific energy and electricity consumption of the studied small-size brewery exceeded the reference values 1.8 and 2 times respectively. Even though reference values are given for larger breweries the differences are significant. To further investigate energy consumption patterns in the brewery and to identify potential efficiency improvements additional data was collected and measured. Brewhouse process information was used to calculate energy losses during beer brewing. It was found that significant potential for energy savings could be achieved by implementing heat recovery after boiling stage. Furthermore, to determine electricity consumption for three different types of bottling (glass packaging, plastic packaging and barrels) a monitoring system was set up. Measurements of energy consumption were performed for three months. Results show that specific energy consumption for different types of packaging vary x times. Additionally significant energy consumption during off-time was determined and change in equipment management could provide important savings. As well results of the implemented monitoring provide valuable data for determining the correction factors for different bottling possibilities.


Key words

Energy intensity, Resource intensity, Industrial symbiosis; Brewery, Heat loss

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