

The feasibility of biogas plants considered within the framework of overall mass and energy balances in the brewing and beverage industry

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“The whole issue is greater than the sum of its parts”
(Aristoteles)

Present situation

Energy management as a key component of competence in a beverage production facility

Can a brewery or a beverage manufacturer afford not to focus on the subject of ENERGY as one of its key capabilities?

We say: NO, because the supply with energy has in the past not been an accountable and budget cost item. If this significant part of the manufacturing cost remains hidden, suddenly in the long-term it will surely need to be accounted for.

Based on drastically increased energy prices and the uncertainty of how the energy market will develop in future, companies are more and more being forced to consider energy supply and costs and the optimal use of energy in their planning. At the same time there are major changes underway in the possibilities for the disposal of trade waste water and for brewery waste products. It is imperative that a sustainable waste management is developed and implemented.

In the past few years there has been the tendency to tackle only these issues as **single elements** in the Brewing and Beverage Industry **without examining them within the framework of the overall energy and material balance, including waste products and residues.**

As a consequence of this historical approach, **separate isolated solutions** were implemented in the areas energy supply, energy recovery, waste water treatment, stillage, spent grain, diatomaceous earth and yeast disposal etc **without consideration of cross linkages and synergies available between these individual solutions.**

Hasty, standardized solutions without any proper critical evaluation of the relevant local conditions and issues were implemented, with the company's criteria for break even targets, amortisation periods and Internal Rate of Return taken as some fixed dogma. Comparisons of performance with other companies using only a small number of samples and the rough cost-revenue comparisons in a static investment situation have absolutely no validity,.

A solar brewery, the sale of spent grain, the utilisation of spent grain as a fuel for burning, biomass power generation, biogas plants for treating brewery wastes – **which concept is the right one for my company?**

Concepts and methods

The basis for a correct decision making process is to undertake an **implementation study**, which has to be appropriately designed to fit the individual situation of the facilities under consideration - taking into account the existing infrastructure, energy and production costs as well as solutions for the wastes that are produced.

These **site related studies will** include all the issues raised above and will result in important background information for ensuing investment decisions.

As a result of our wide field of expertise in the areas of energy, by-product and waste management of breweries we can produce **sustainable** site-specific solutions. The importance of individual site analysis is evident, reflected in the changes that can be measured over time in

- Improvements in costs and revenues related to energy supply, waste disposal, waste water management
- improved operating parameters f.e. in changes to process operating conditions that result in improved product flows and energy balances
- improved technical approaches to problems and improved financial or environmental objectives of the company

Our methodology is suited to the food or beverage manufacturing industries, but particularly relevant to breweries, distilleries and other production facilities with a high specific process energy requirement: After a detailed investigation of the production process and other relevant operating parameters an initial estimation is carried out outlining the potential use and distribution of energy in the process flows e.g. reuse of any recoverable energy from the production process.

For the first time, **in conjunction with the complex methodology of analysing process parameters we utilise dynamic investment calculation methods** - the output from this process is the capital cost of the investment required. Various scenarios of energy supply and utilisation as well as process flows are modelled and their performance against specific criteria are measured. **A complete picture can be built for the first time from the individual components involved and the facility can be synergistically integrated by adjusting the key operating parameters.**

An additional advantage of a biogas plant, over and above that of energy production advantages outlined above, is the improved and predictable capability to dispose of and reduce waste. And: the **waste materials are now valuable, no waste!**

The documented estimates of potentials will reflect the required capital investments, optimization potential within the facilities and finally, the possibilities of contracting energy supply services.

Objectives

The objective is the optimal design of all energy and mass flows to enable, as close as possible, the complete utilisation of wastes, thus minimising the disposal of wastes externally and the reduction of purchased fossil fuel energy.

Through this absolutely new approach we come very close to the objective of a „zero waste brewery” and an “energy self-sufficient brewery”.

Result

Based on a systematic and site-specific implementation study, the company is, for first time, in a position to make well-based decisions on the question of the economical feasibility of implementing a new or restructuring an existing biogas facility. All other considerations, in which only part of the picture is analysed, will always lead to wrong and incomplete answers.

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