

St Austell Brewery set to save up to 65% on water discharge costs with innovative wastewater treatment technology



The eight-fold increase in production in recent years meant that St Austell Brewery was outgrowing its existing waste management facilities. Installing new wastewater treatment technology will reduce an expensive sewer discharge bill and future-proof the site for growth.

“St Austell Brewery has experienced huge success and growth in recent years,” explains Mark Little, European Strategic Projects Director at Envirogen Group. “Brewing operations have grown eight-fold and this strong growth looks set to continue. Such rapid expansion usually comes with additional costs, but by updating their wastewater treatment technology, St Austell will actually save money on their trade effluent bills, reducing them by up to 65%.”

“It became clear that the wastewater management systems were limiting the production capability at this site. Due to the brewing process, wastewater streams can have high organic loads and this high Chemical Oxygen Demand (COD) makes a big difference in the calculation of wastewater disposal charges. St Austell Brewery is currently having to tanker high strength wastewater streams from site, at an additional cost to the significant discharge fees required from their local water company, which levies some of the highest charges in the UK.”

Anaerobic treatment system reduces bills and generates free electricity

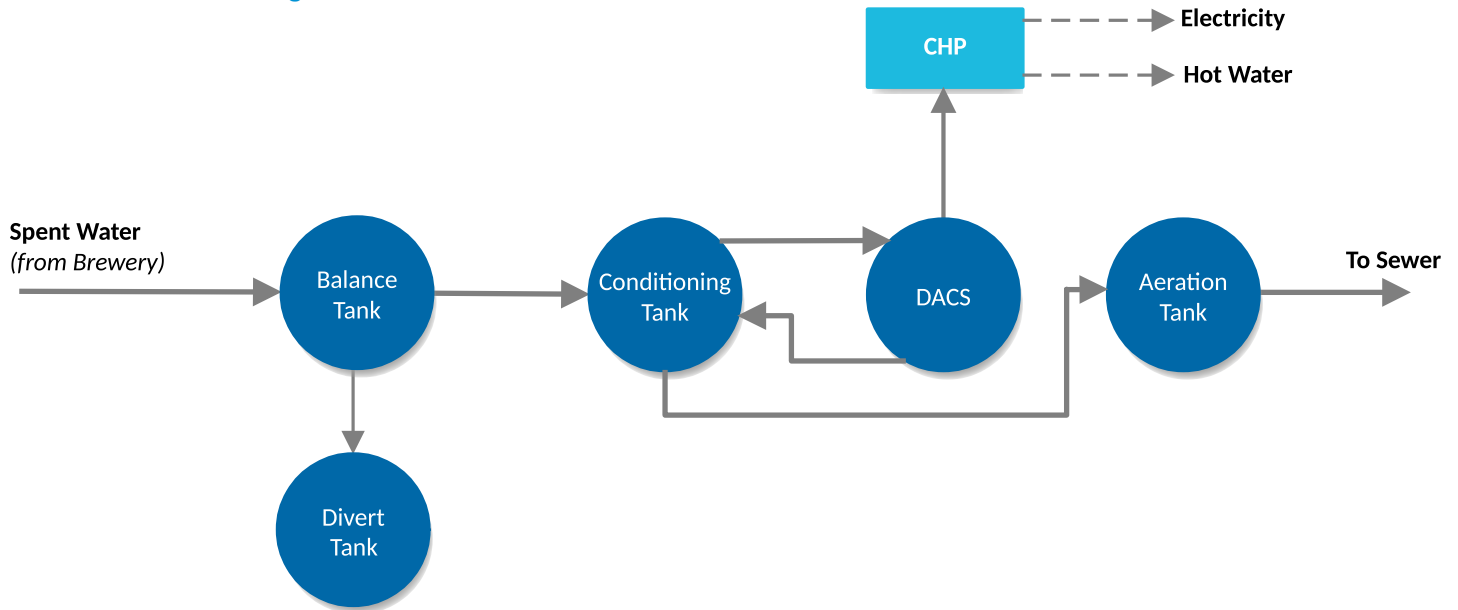
Mark Little continues: “St. Austell Brewery’s engineering team approached Envirogen to develop a solution that would address these rising costs and allow future expansion at the brewing site. We’ve worked with many breweries over the years and have found that their wastewater streams are ideal for anaerobic treatment, which significantly reduces the COD content of the wastewater by converting it into biomethane. The resulting biogas can be combusted in a CHP system to generate electricity and hot water. Many breweries are choosing to invest in this technology as the cost savings are so great. The operating costs of the proposed Downflow Anaerobic Carrier System (DACs) technology is particularly low and it provides access to a new income channel via renewable energy incentives.”

According to Clive Nichols, Project Engineer at St Austell Brewery, it made complete sense to invest in the Envirogen solution: ***“The savings on wastewater charges alone justify this investment and the system is forecast to deliver a very attractive return on investment. We’ll be reducing our COD content by approximately 90%, which translates into about a 65% saving on our wastewater bills. The biogas that we produce will be used to generate electricity for the site, which will reduce our electricity bills. We’ll also generate a return through the Government’s Feed-in-tariff (FiT), which we will receive for 25 years at a fixed rate, even though we are using the electricity on site.”***

DACS: innovation in water treatment technology

Together with the St Austell engineering team, Envirogen embarked on a design review programme to accurately determine the flow, load and composition of the post-production water streams. Downflow Anaerobic Carrier System (DACs) technology was recommended as the most viable solution. DACs technology is based on flocculated anaerobic biomass encapsulated within a fluidised carrier bed, which the untreated wastewater passes down through, using gravity as the only driving force. This unique downflow technology produces biogas with a very high level of methane, resulting in a clean and efficient burn.

DACS Process flow diagram:



Mark Little explains how it works: “The wastewater is screened and held in a balance tank, where the flow and concentration of the wastewater is continually mixed to form a homogenous feed to the next process stage. The wastewater is then directed to the conditioning tank where it is mixed with some of the anaerobically treated wastewater.”

This ‘conditioned’ water then makes its way to the DACS anaerobic treatment reactor. The biogas generated as a by-product of the DACS anaerobic process, is collected in the reactor headspace before the next stage of treatment. The buffered biogas is combusted in a Combined Heat and Power (CHP) plant to generate electricity. The hot water produced by the CHP plant is diverted to a closed-circuit water loop via a heat exchanger. This source of heat can be used on-site to supply hot water to other systems - and generate additional income through the Renewable Heat Incentive (RHI) - or used as a source of heat energy to elevate the temperature across the anaerobic system.

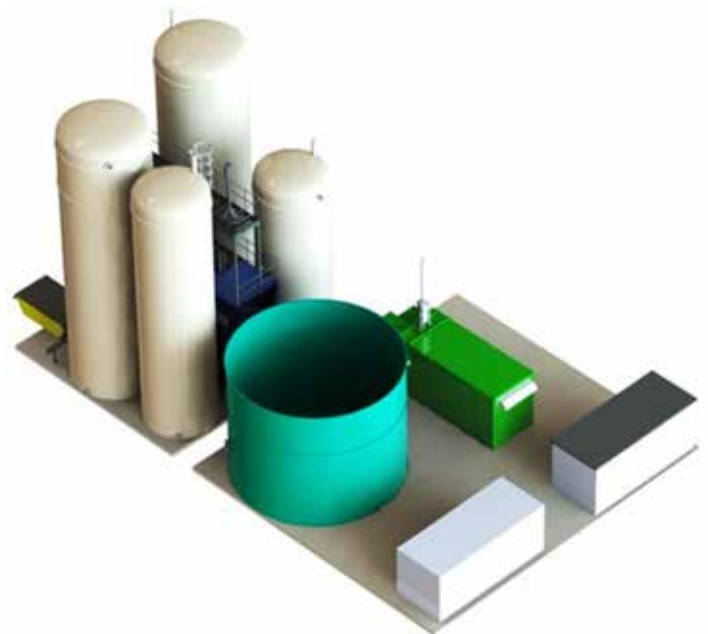
“The anaerobically treated wastewater and off-gases from the Balance, Conditioning and Divert tanks, are then passed to a simple aeration phase to oxidise any residual malodorous compounds, prior to discharge to the sewer,” he adds.

Designed with the community in mind

Mark Little continues: “We designed the system to deliver the maximum benefit to the brewery’s business at the lowest cost. To reduce the capital outlay, we made use of existing useful vessels and pipework. By using gravity flow where possible in the process, this solution benefits from particularly low operating costs.

“The DACS plant will be built from prefabricated process blocks that are engineered and manufactured off site and then constructed on-site as a ‘plug and play’ solution. This reduces construction time and minimises disruption on a busy site.”

Artists impression of the DACS wastewater treatment plant:



“Our brewery is located within a market town, so we wanted to make sure that any change we made would be to the benefit of the local community,” highlights Clive Nichols. *“Envirogen worked hard to ensure that the development would have the lowest possible profile ensuring that it would blend discreetly into the surrounding environment. As the COD concentration of the wastewater stream will be much lower after DACS treatment, we’ll require no tankering, which is great for the budget, and equally importantly, for the traffic around St Austell.”*

Futureproofed systems power growth and drive further cost savings

“St Austell Brewery is a growing business,” says Clive Nichols. “We needed a system that could expand with our production, so that we wouldn’t experience issues again in a few years’ time. Envirogen’s system will grow with us and allow us to produce up to five brews a day, which is the equivalent of 155,000 barrels/annum. As production increases, we can add more carriers and easily scale the brewery’s treatment capabilities. We’ll also have the option to add additional process steps at a later date that will allow us to clean and purify the wastewater for possible discharge to river and potentially recycle some of the water for our own use in cleaning processes. So not only will our treatment capacity increase, but we’ll have the capability to make even more cost savings. We’ll also have the option to generate revenue from the Government’s Renewable Heat Incentive (RHI), by using the hot water produced as a by-product of the electricity generation.”

“Throughout the process, we were impressed by Envirogen’s engineering capability. They offered a solution that provided much greater returns than the other tenders we received. Their technology caught our eye with its simplicity and low running costs. And, of course, the team have been a pleasure to work with. They have helped us through the planning process and have planned every detail of the project to ensure that the installation is as straightforward as possible.”

Key outcomes:

- COD load will be reduced by up to 90%
- Wastewater discharge costs will be reduced by approximately 65%
- Decreased electricity bills through the generation of renewable electricity
- Additional income generated from FIT
- Futureproofed production capacity of an additional 20%
- Very low OPEX, compared with other biological treatment systems
- Cost per manufacturing unit will decrease, due to lower operational costs, utility bill savings and additional revenue streams
- Peace of mind for ongoing performance with ongoing service and maintenance plan



About the client:

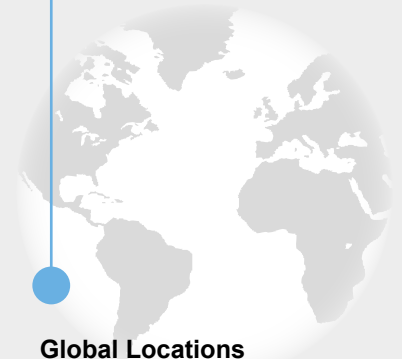
Family owned St Austell Brewery have been brewing award-winning beers such as Tribute, Proper Job and Korev for over 150 years. The brewery’s thriving estate of pubs, inns and hotels extend across the South West and its wine merchant business imports and distributes over 750 wines from across the world.

For more information about Envirogen water solutions and to find out how we can help your business grow, please contact us:

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