

Some good ideas from Lorien

An energy saving project at Magor

Lorien Engineering Solutions, the engineering design and project management company, is helping A-B InBev UK significantly reduce the energy demand at its Magor site in Wales. Following this success, Lorien are now starting to support AB InBev UK's Samlesbury brewery as well.

by **Martin Hobbs**
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Over 40 targeted investments have so far been made in every part of the brewery, utilities and packaging plant. The investments have a combined payback of less than 18 months, including Lorien's affordable fee! As a result, from October 2008 to March 2010, energy efficiency per hectolitre has improved by 12.2% and in 2009 water usage per hectolitre was reduced by 20.7%.*

It must be pointed out that much of Magor's success is due to the engagement and hard work of the whole brewery team. Operating procedures have been re-written by the operators to emphasise how to minimise water and energy loss. Masses of suggestions have been put forward for evaluation as well as the implementation of leak detection and repair programmes. It is second nature at the site to turn lights out where not required!

One of the more novel investments tackled the energy-intensive process of conveying spent grains by installing a low-pressure compressor system. Previously the brewery used a dedicated standard instrument air (7 barg) compressor to convey the grains from the mash filter troughs to the silos. The system already benefited from using wet air (no drying air losses nor drying energy required) and the compressor pressure was reduced to as low as possible (4.5 barg). However, the new single stage screw compressor operates at around 2 barg, thus much less electrical energy is required and a smaller motor is used. The compressor afforded a good payback in part because the dedicated wet air system, including air receiver, was already in place.

Another example of electrical saving has been the installation of new induction lighting, to replace both low- and hi-bay lamps and fittings. Induction lamps provide the same or better light levels for around half the power. The lamps have around 100,000 hours life, compared to say 10,000 hours for



Spent grains discharge from mash filters using a dedicated wet air screw compressor working at only 2 barg.

metal halide lamps and 50,000 for LEDs.

There is no warm up time and they are suitable for control with movement detection or light levels. In addition, their brightness and daylight colour often means fewer fittings are required for the same light level, which really helps the payback calculation. This type of lighting is relatively new to market, with limited suppliers but has proven very successful at Magor.

Induction lamps are fluorescent lamps without electrodes or filaments. Rings with magnetic coils create an

electromagnetic field using a high frequency generated by the electronic ballast. This field goes around the glass filled tube. Electrons discharged by the magnetic coils collide with mercury atoms inside the tube and become excited. These electrons give off energy in the form of invisible UV light. The conversion to visible light occurs when it passes through a phosphor coating on the inside surface of the tube.

Another less common investment has been the installation of carbon dioxide vaporisers which use waste heat from the secondary refrigerant instead of steam. Warm brine (ca. 0°C) returning from the fermenting vessels is passed through a heat exchanger system,

which vaporises the liquid CO₂ and cools the brine (to ca. -2°C) – remember liquid CO₂ is around -27°C @ 18barg so there is plenty of thermal driving force from the brine. There is an intermediate heat exchange stage using a

food safe glycol as extra protection. The existing steam vaporisers have been kept in use as superheaters, so a little steam is still used to keep the CO₂ gas away from the condensation point to protect the downstream pressure reducing equipment etc. They also serve as handy back-up vaporisers should there be a problem. This is a great investment because it not only saves on natural gas (steam) but also electricity (fridge) so has a short payback.

These are just three of the more innovative investments at Magor – as said there have been many more, from new steam boiler hot water softeners which re-use excess brewing liquor, to VSD control of stress corrosion blowers.

As a result of the investments, Magor is rapidly climbing AB InBev's worldwide energy league tables, receiving plenty of acclaim on the way! ■



Detail of the induction lamp and fitting. The same light level for half the power.

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