



## BREWING

This Scottish Brewery was founded on this site in the 17th Century. Over the last 400+ years the site has been continually extended and developed to the extent that it is now one of the leading contract breweries in the UK. The site now brews, containerises (cans/kegs/bottles), and packages its own label beer and other label beers under contract.



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# THE PROBLEM

The brewing process is highly energy intensive: including – boiling, cooling, filling, pasteurising, and pumping. The steam generation process accounts for the most significant portion of energy costs, with refrigeration and compressed air being the highest requirements on the electrical side. The process is manually maintained and commissioned, which is both time and resource consuming in a competitive, race-to-the-bottom market.

## THE CHALLENGE

- Minimise energy consumption
- Maximise microbiological control
- Optimise downstream productivity
- Reduce Energy used in downtime
- Optimise loading

## INDUSTRY SPECIFIC ISSUES

- How is boil off measured? Is it accurate? Is boil off consistent?
- Steam control during heat up and boil off
- Crude steam control during both heat up and boil off
- On/off control of steam – Consistency of steam usage
- Heat exchanger effectiveness
- Hot Liquor Management – Cold water top up, Hot water dump and steam top up. This will cause problems with sequencing the boilers in the boiler house and lead to efficiency losses



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# THE SOLUTION

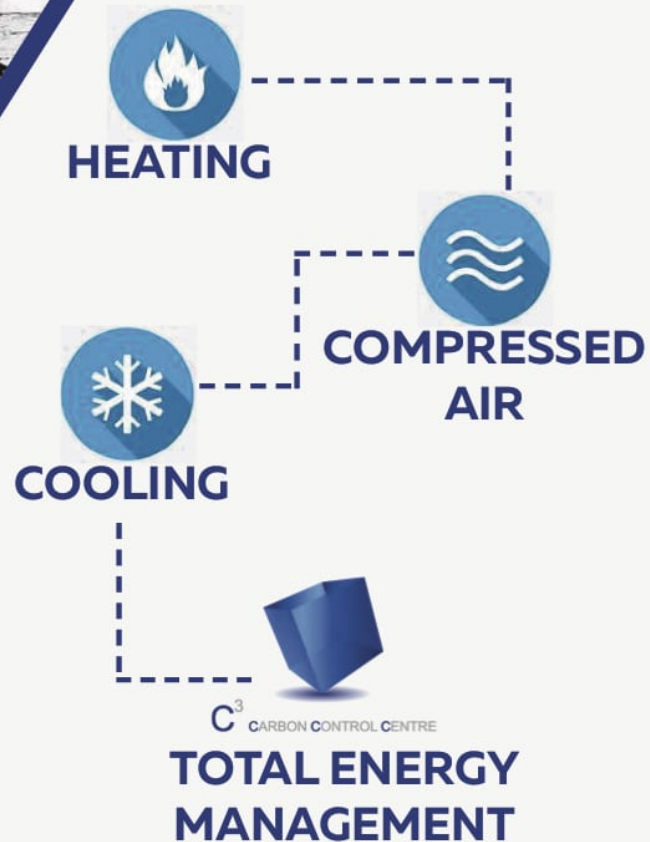
## HEAT RECOVERY

Heating – Implemented Heat Recovery from TDS blowdown, Automated Bottom Blowdown, Steam Trap repair, Insulation and cladding upgrade, and TDS control.

Compressed Air – Installed several new receivers, reprogrammed sequencers, addressed leaks, reduced generation pressure, repaired pipework.

## REFRIGERATION

Optimised the main refrigeration plant, and linked the entire site's Glycol pipe-work to take the load from 2 x other Refrig plants onto one plant.



## TOTAL ENERGY MANAGEMENT

EMS – Connected onsite SCADA to our central monitoring system (C<sup>3</sup>), applied software analytics to years of historical data to identify control opportunities, Correlated energy data with non-EMS data (weather, production volumes, etc) to enable real-time monitoring of KPIs.



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# PHASE TWO

With our C<sup>3</sup> 'Smart Brewer' System in place, CC is now working on phase 2, which will deliver a further tranche of 'guaranteed savings' with a 2 - 3 year payback. These savings are identified and verified through the C<sup>3</sup> system. C<sup>3</sup> and Crowley Carbon are now an integral part of delivering an ongoing continuous improvement programme on site with targeted capital investment, guaranteed savings, compliance protocols, and improved operational performance.

# THE RESULT

**Total Project Cost:** £715,000  
**Savings:** £355,000 per annum  
**Saving of CO2:** 2,357T  
**Simple ROI:** 2yrs

## Energy Savings

**Steam :** 5,875 MWH = £141 k  
**Compressed air:** 782 MWH = £59 k  
**EMS:866 MWH = £65k**  
**Refrigeration: 1,204 MWH = £90k**

## C<sup>3</sup> SUBSCRIPTION SERVICE

1. Energy mapping
2. Live & historical energy monitoring
3. Energy reporting and quarterly reviews
4. Multi - site comparison
5. Energy consumption forecasting



C<sup>3</sup> CARBON CONTROL CENTRE



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