



PROJECT SUMMARY:



CLIENT

AMP Clean Energy/
Simpsons Malt

PROJECT

£33.5m biomass
and electric boiler
decarbonisation project

PROJECT OVERVIEW

Founded in 1862 and based in Northumberland, Simpsons Malt uses large amounts of heat for the malting process. The Maltsters' Association of Great Britain estimates that producing just 1 tonne of malt takes 750kWh of gas and 150kWh of electricity, illustrating just how energy-intensive the process can be.

The company is a signatory to Science Based Targets and a Certified B Corporation, with the goal of achieving net zero Scope 1 & 2 emissions by 2030, which is 20 years ahead of targets set in the Paris Agreement.

While meeting their own net zero targets is important, Simpsons Malt is also aware that, as a key supplier to the Scotch whisky industry - around 90% of the malt produced at the Tweed

Valley Maltings site is for the distilling industry - they will play a significant role in reducing their customers' Scope 3 emissions to help meet their net zero targets.

With 90% of the malt produced on site destined for distilleries, decarbonising their malting process will not only help meet their net zero targets, but also those of the industry.

To put the impact of this project into perspective, 2.5kg of malt is required to produce just one litre of whisky and this new system will save 275g of carbon for every litre produced.

By achieving this, Simpsons Malt can affirm its position as an industry leader for sustainability and the ideal supplier for distilleries looking to meet their net zero targets.

VITAL SOLUTION

Vital Energi are working in partnership with AMP Clean Energy and Simpsons Malt to create an innovative new renewable energy system which will reduce their carbon emissions by 25,000 tonnes per year. The project will take place at Simpsons Malt's Tweed Valley Maltings headquarters in Berwick-upon-Tweed, Northumberland, Northumberland. This is the UK's largest malting site, and our work will result in an 80% carbon reduction for the site.

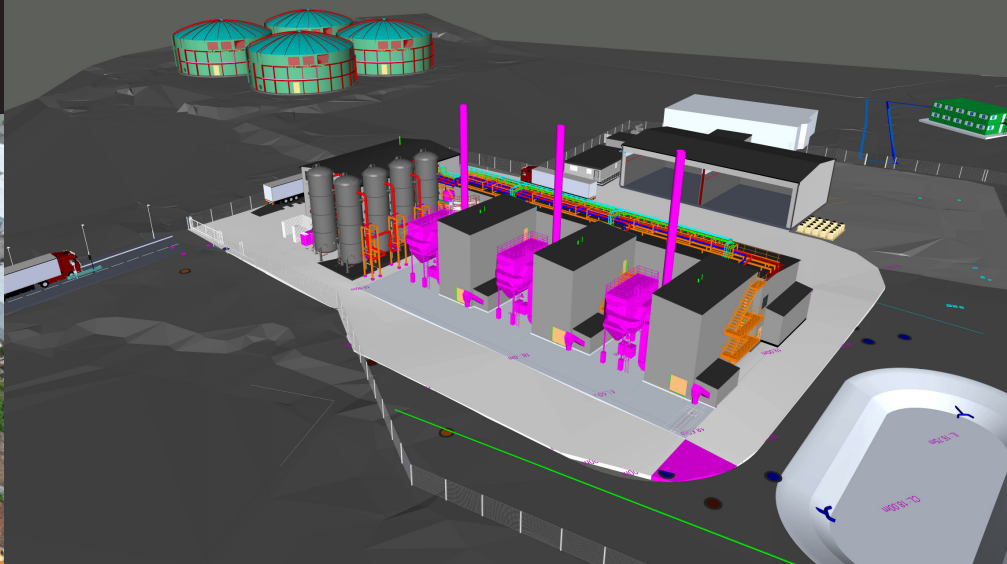
The project has an innovative technical and commercial solution which, as standard, generates heat using three biomass boilers. At other times, when the project receives free electricity from a North Sea wind farm, a 12MW electric boiler will be the primary heat generator.

Vital Energi are designing and building the heat generation plant, distribution network, and in-kiln heating systems which will generate approximately 25,000 tonnes of carbon

THE BENEFITS:

- > Project saves 25,000 tonnes of carbon per year.
- > A reduction of 80% at the UK's largest malting site.
- > Innovative commercial structure to leverage North Sea wind-generated electricity.
- > Biomass heat for times when electricity is not available.
- > Extensive modelling to prove viability.

(Right) The Energy Centre will provide heat for the kilns in the top left of the image. (Below) Our designers travelled to look at an electric boiler installation and learn more about the technology.



“With the Energy Centre delivering up to an 80% reduction in our Scope 1 & 2 emissions at our Tweed Valley Maltings site and around a 55% reduction company-wide, the project will not only have a significant impact on our own carbon footprint, but the Scope 3 emissions of some of the world’s leading whisky brands.”

MARK TARRY CEO AMP CLEAN ENERGY

reduction per year.

The Commercial Opportunity
Ideally, North Sea windfarms operate at a constant rate of electrical generation. Lowering their output or stopping altogether is extremely inefficient. A problem is created because the UK’s electricity grid is restricted and there are times when it cannot transmit the electricity from rural Scotland, where most North Sea windfarm power sees landfall, to the large, urban areas where it is required.

A better solution to lowering or stopping production is to find a customer who could take this electricity when necessary and the benefits to the wind producers are so great that they can not only offer free electricity but can sometime incentivise recipients.

By adding a 12MW electric boiler to their energy infrastructure, Simpsons Malt can utilise this free, renewable energy in the malting process. This overall opportunity allowed AMP Clean Energy to invest £33.5m into the Simpsons Malt facility, with Simpsons Malt purchasing heating requirements directly from AMP Clean Energy. This enabled them to completely revolutionise their energy infrastructure, whilst continuing to receive their energy at a competitive rate.

The Technical Solution

Simpsons Malt needs large amounts of heat for their kilns to turn their barley into malt. Germination & Kilning Vessels (GKVs), which is where the second and third stages of the malting process - germination and kilning - take place. Specifically, the heat is needed for the kilning process, where moisture is removed from the grains to create the finished malt product, with temperatures inside the GKV at this time ranging from 50 to 85

degrees.

As standard, this heat will be supplied by three 6MW biomass boilers which will run on local, sustainably sourced, low-grade, virgin wood chip procured by AMP Clean Energy.

At times when excess wind generated electricity is available, the 12MW electric boiler will be activated to take advantage of this.

To ensure the opportunity is optimised, if there is no heat demand when the electricity is available, the electric boiler charges thermal stores so it can be used later. This intelligent energy storage, which includes up to 1 million litres of water, ensures the system can always be utilised to take the North Sea wind electricity.

Vital Energi have created an intelligent algorithm which will automatically switch between the biomass and electric boiler and ensure the thermal stores are used optimally. By making this process as efficient as possible it will not only save energy costs, but also make a further contribution to decarbonisation.

The Distribution & Kilning Scheme

The heat generated via biomass and the electric boiler is transported through a newly installed, buried district heating network feeding two separate banks of heating coils with a total capacity of 28MW.

The air will pass over heating coils for direct use in the kilns for the malting process, turning the barley into malt, 90% of which is destined for Scottish whisky distilleries.

Collaborating on the Energy Model

In theory, this was a compelling opportunity, but significant work was needed to ensure it was viable as installing the biomass and electrical boiler represented a multi-million-

pound investment.

Vital Energi joined the partnership with a remit to evolve the design and deliver the project, but before that, we needed to model the energy data to predict how the system would generate and consume energy and this included how much excess energy would be available from the North Sea wind farms. To achieve this, we looked at historical data, meteorological data (wind) and created an in-depth model to predict the amount of electricity Simpsons Malt could use within the electric boiler in an average year.

Harnessing European Experience to Create a Successful Project.

Once we had established the project was viable from an energy data point of view, we evolved the design and looked at the market to identify the most appropriate electric boilers on the market.

In advance of the installation works, our team traveled to a number of European countries to undertake equipment inspections (Austria, Slovakia & Slovenia) All of the Biomass Boiler equipment was transported in over 50 articulated vehicles.

A Collaborative Partnership

By creating a partnership between Simpsons Malt, AMP Clean Energy and Vital Energi we were able to create a technical solution that allowed Simpsons Malt to take advantage of a unique commercial opportunity.

By combining our collected knowledge of the malting process and energy markets with a technical solution designed to optimise the opportunity, we were able to capitalise on the available renewable energy and not only help Simpsons Malt take a large step on their net zero journey but also their customers in the distilling and brewing industries.