Ahascragh Distillery Revolutionizes Whiskey Production with 100% Renewable Energy using High Temperature Heat Pumps installed by Astatine

Figure 1: High temperature heat pump being craned into services yard

Summary of demonstration case

Located in the village of Ahascragh, approximately a two-hour drive from Dublin, stands a well-preserved brick mill that has been inexistence for over two centuries. Recently, this remarkable historical structure has been revitalized and transformed into a whiskey distillery, which is being powered by 100% renewable energy. Founders Gareth and Michelle McAllister wanted to distil zero-emissions spirits and change the traditional energy source for Irish whiskey production. Our experienced management team in Astatine met this challenge by installing high-temperature heat pumps that supply heat at 115°C, making these the first heat pumps in Ireland to supply heat in the form of hot water over 100 degrees.

Ahascragh is a whiskey distillery using high temperature hot water, generated by heat pumps, to distill their produce. The heat pumps also provide cooling to the process. 3 heat pumps provide all the high temperature heating, medium temperature heating, process cooling and process chill water loads. Ahascragh is a single staged heat pump cycle, where the integration is a newly engineered system, designed by Astatine's project engineers. The heat pump is combined with thermal storage, which allows the heat pumps to operate more efficiently.

"'Astatine's collaboration with Ahascragh Distillery is more than a tale of success; it is a call to action. It urges us to recognize that every organization, every sector, and every individual possesses the power to contribute to decarbonizing our world and securing a sustainable future.' says Astatine's CEO ***Tom Marren***

Oilon, Ahascragh's heat pump OEM, has delivered two P450 series heat pumps and one smaller P150 heat pump to the distillery. The P450 series pumps can generate temperatures as high as 120 degrees, although in Ahascragh, the designed operating temperatures are set at

115 degrees. Additionally, these pumps incorporate high temperature refrigerant technology, giving them an exceptionally low Global Warming Potential (GWP) value.

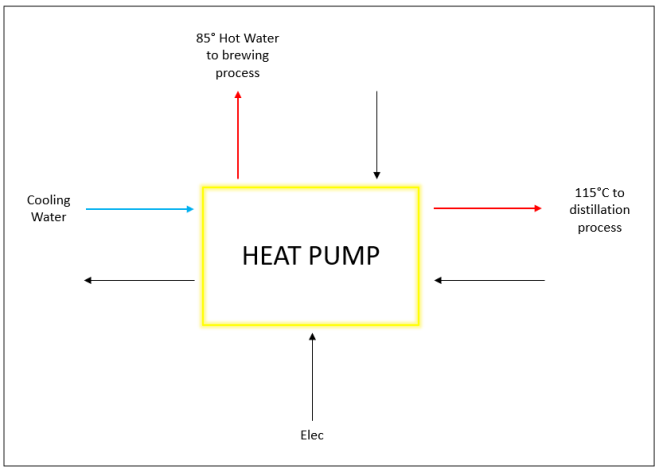

Figure 2: Integration single-line-diagram on Ahascragh Distillery Heat Pump

Operating experiences

From operating the distillery, we know the heat pumps are outputting 1 MW of heat whilst having circa 40% financial savings versus equivalent fossil fuel boiler solution. The secondary effects include a reduced peak thermal demand through an energy efficient design and no onsite carbon emissions associated with the process.

Sustainability

Brewing and distilling can be energy intensive processes, research indicates that energy is the most expensive operating cost in distilleries. Larger breweries consume less electricity than smaller breweries. However, no matter the size, all breweries need to make a conscious effort to reduce their use of non-renewable electricity. If distilleries adopted a more sustainable approach, installing heat pumps to distil their produce, they can save up to approximately two-thirds of the thermal energy used in the distilling process. Increasing costs in electricity in addition to existing and emerging global climate issues, increases the need for energy conservation in brewing and distilling facilities. By installing a heat pump you're not only reducing costs but also reducing your carbon emissions and contributing to the EU climate target of 55% emission reduction by 2030.

FACTS ABOUT THE CASE

Installation year: [2023]
Operating hours: [over 6200 hours p.a.]
Working fluid: [High Temperature Refrigerant]
Compressor technology: [Piston]
System manufacturer: [Oilon]
Performance in design point:

- **Heat source: [**60°C Cooling system Return Water]
- **Heat sink: [**115°C Pressured Hot Water]
- **Heat supply capacity: [**1 MW]
- **$COP_{Heating}$: [**5, COP was measured in laboratory and during testing]

Turnkey Project Investment cost: [€1m]
Savings: [€330,000 p.a.]
Estimated annual CO_2 savings: [736 tonnes p.a.]
Link to webpage or report: [https://astatine.ie/]

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All information were provided by the supplier without third-party validation. The infomation was provided as an indicative basis and may be different in final installations depending on application specific parameters.