AWRI

opportunities in a new climate

Case Study

Improving winery energy efficiency – St Hallett

Background

Energy audits conducted by the AWRI have shown that heating and refrigeration account for very high percentages of a winery's energy consumption and greenhouse gas (GHG) emissions. Heating and cooling in more efficient ways can therefore result in significant savings as well as mitigate GHG emissions.

In 2009 St Hallett conducted an energy audit and identified many equally important small and large projects and initiatives where improvements could be made. As part of St Hallett's environmental sustainability journey, over the last decade the business has been implementing many projects to improve carbon and energy efficiency, taking small achievable steps to reach a longer term sustainability goal.

Winery details

The St Hallett winery in South Australia processed 3,273 tonnes of grapes in 2015, sourcing grapes from its own and growers' vineyards in the Barossa Valley. The winery makes 78% red wine and 22% white wine and does not package wine on-premise.

Net winery greenhouse gas emissions (GHG): 425 t CO_2-e

Emission reduction initiatives:

Automated refrigeration	Thermal energy storage	LED lighting
Ammonia refrigeration system	Insulation of brine lines	Flotation to clarify white juice (in place of cold settling)

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GHG emissions reduction strategies at St Hallett

In 2013 St Hallett undertook several projects to improve carbon and energy efficiency:

- Replacement of the Freon refrigeration system with an ammonia system, bringing the refrigeration plant to 100% ammonia operated;
- Insulation of brine lines in the production cellar and throughout the winery; and
- Replacement of mercury vapour/metal halide lights with light-emitting diode (LED) lighting throughout the production area.

Table 1. Summary of benefits from carbon and energy efficiency projects at St Hallett

	Ammonia chiller	Insulation of brine lines	LED Lighting	Total
Annual electricity savings (kWh)	143,581	15,728	32,278	191,587
% electricity savings	22	2.4	5	28.9
Annual carbon savings (t CO_2-e)	93	10	21	125
Cost savings	$13,784	$1,510	$3,099	$18,392

These projects resulted in a 34% reduction in direct carbon emissions from the site. Wine movement has increased by 50% during the last five years but these initiatives have only increased electricity usage by just 14%. St Hallett is now the best performing Entwine winery member in its size category (2,000-10,000 tonnes) for electricity usage and amongst the best of all Entwine winery members (including larger scale sites).

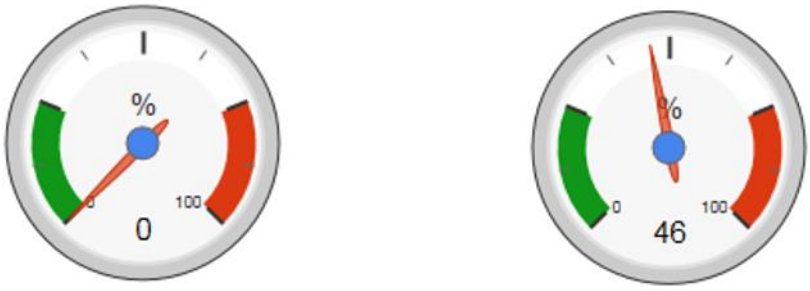

Figure 1. Ranking of St Hallett's electricity use per tonne of grapes crushed in 2014/15 among Entwine winery members, within its size category (left) and across Australia (right). The dials show that St Hallett has the lowest electricity use within its size category and is in the lowest 46% of all Entwine winery members for electricity use.

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Additional options for reducing electricity

St Hallett has looked at other ways to reduce electricity usage such as using flotation for solids removal in place of refrigeration for cold settling. This can achieve greater processing efficiency with less energy input.

Smart cooling techniques have been implemented, including cooling at night time, and installing fan systems to pull in cool air during the night time into zones that need cooling and warm air during the day time into barrel maturation rooms.

AWRI energy audits show that there are also other practices that have been successful in reducing electricity usage. These include reusing water that has been heated for one process as a preheating option for another (e.g. hot water boiler). Similarly, heat loss from a boiler flue can be captured and used to pre-heat water entering a boiler. AWRI modelling indicates that these techniques could potentially save up to 30% of a winery's water heating bill. This has both an environmental and economic benefit to the winery. Other opportunity for savings in water heating is through changing to a different heating technology (e.g. electrical versus natural gas or solar), with many wineries investing in solar panels as an energy source.

Acknowledgement

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Further reading

https://www.sthallett.com.au/about-us/sustainability/

http://www.awri.com.au/commercial_services/environmental-strategy/refrigeration/

Contact

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