Renewable Energy for Process Heat

Feasibility Report - Case Study

De Bortoli Wines

This feasibility study was conducted as part of our Renewable Energy for Process Heat Opportunity Study – Phase 1. This project was undertaken in partnership with Climate-KIC Australia and in collaboration with Sustainability Victoria and the Department of Planning, Industry and Environment (NSW). The project was part-funded by the Australian Renewable Energy Agency (ARENA), more information here. A second phase of the project was commenced in early 2020, more information here.

The purpose of the feasibility study was to determine the technical and commercial feasibility of replacing some or all of the current fossil fuel process heating on the site with renewably powered alternatives, and to detail a pathway to implementation including technical and financial specifications and a business case for investment.

This case study summarises the findings of the study and is published with permission of the proponent. For more information about A2EP and the project, go to a2ep.org.au.

SITE DETAILS

Company:	De Bortoli Wines
Site:	Bilbul, Riverina, New South Wales
Application sector:	Winery
Technologies featured:	Heat pump
Consultant engaged for this study:	2XE | 2xe.com.au

Australian Alliance for Energy Productivity (A2EP)

A2EP is an independent, non-partisan, not-for-profit coalition of business, government and research leaders promoting a more energy productive economy. We advocate for the smarter use of energy for improved economic outcomes.

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De Bortoli Wines Bilbul, Griffith NSW

Context

- Wine production
- Site has both winery and packaging operations with a large, low temperature (<100°C) heat demand driven by packaging process heating, CIP, sanitisation and regeneration filters.
- Heat demand is primarily serviced by two individual hot water ring mains each with unique hot water generation technologies including a solar thermal array (~200kW), condensing boilers (2 x 280kW) and a Raypak hot water generator (960kW). Some heat recovery is obtained from air conditioning systems.

Proposal

- Ammonia heat pump recovering waste heat from DBW's refrigeration system to generate hot water for process heating requirements. Mycom HS4 reciprocating compressor. Heat pump output can be modulated between 100kW and 900kW within a few minutes. Electrical consumption of the heat pump is to be offset with a 270kW solar PV system.
- This heat pump will dramatically offset gas consumption of existing boilers used for process heat in the packaging hall and cellar.
- CAPEX: ~$950,000
- Payback of 4.8 years, excluding potential Energy Saving Certificates generation or ARENA funding.
- Project benefits:

Net case	Capital cost ($)	Net energy savings		Fossil fuel displacement				
		Cost savings	Energy reduction	Fossil fuel savings	Additional elec. use	GHG saving (tCO2-e)	Renewable energy fraction (total)	Renewable Energy Fraction (thermal)
Heat pump w/ Solar	~$950,000	11.2%	28.6%	86.0%	1,354 GJ/year	8.6%	11.6%	87.1%

- Productivity benefits: cooling tower water savings, reduced maintenance costs, reduced plant downtime/increased plant reliability, improved refrigeration efficiency.