

# WINE PRODUCTION

## POWERED BY THE SUN

*Sustainable Winery*

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It's no secret that the wine industry plays an important role in the Australian economy. The industry is experiencing strong growth – with exports in 2016 up by seven per cent annually to \$2.2 billion – and continues to generate employment and increase tourism of locals as well as visitors to Australia. Clearly, a lot of people enjoy a glass of Australian wine every once in a while!





Sandalford Winery

**H**ave you ever thought about the amount of energy required for wine production?

Energy is one of the main production costs for a winery. When HFM Asset Management was contacted by one of Australia's oldest and largest privately owned winemakers, Sandalford Winery, the challenges the company presented were to reduce its electricity expenditure and to improve the winery's carbon footprint.

The first step involved developing an understanding of the various unique activities and processes specific to wineries. In 2014, HFM

conducted a comprehensive utility audit of the winery, which led to our team being able to identify opportunities for improvement, and develop a business case for further investment. We found that significant opportunities existed for reductions in energy consumption and expenditure using both passive and active cost-saving measures. The following measures were put into action.

1. Based on the load profile of the facility and the available roof space, and taking into consideration shading by surrounding plant and rooftop equipment, a 100-kilowatt photovoltaic (PV) solar system was found to be feasible.
2. Based on Western Power regulations, a state-of-the-art protection system was included to add an additional layer of protection for the 100-kilowatt PV system. This protection system continuously monitors the grid parameters and sends corrective signals to the solar system in order to maintain consistent power supply throughout the network.
3. During the utility audit, HFM discovered that the site's power factor was tracking at 0.82 – this performance is relatively poor. To rectify this, a 200-kilovolt ampere reactive power factor correction system was selected to absorb reactive power and reduce the



Sandalford Winery's power distribution as at 1 February 2017

maximum power demand on site. As a result, the site's power factor is now tracking above 0.99, and both the load on the transformer and electricity costs for the winery have fallen.

4. A 500-kilovolt ampere diesel generator was sourced and installed to provide peak demand management and emergency backup power. Using an automatic transfer switch, the generator immediately switches on during power outages. When the network power is reinstated, the site is reconnected to the network and the diesel generator is switched off.
5. The site's main switchboard was replaced to accommodate all existing and new equipment. The switchboard houses the solar control gear, power factor

correction unit and the automatic transfer switch for the diesel generator. Because the new switchboard is located outdoors, it is equipped with a mechanical ventilation system to maintain a safe temperature inside the board.

6. The neutral cable from the transformer to the SMSB was no longer sufficient; therefore, an additional XLPE cable was installed. This improved safety in the operation of the facility.
7. To enable effective measurement and management of the site's energy usage, a smart metering network comprising nine EDMl meters was designed. The smart meters are able to send the data collected to the desired location using open protocol communication, enabling

advanced energy and maximum demand management.

8. The case data is streamed from the EDMl smart meters to Yardstick, an online utility-monitoring platform. The Yardstick platform allows both the on-site team and HFM to continuously track and monitor the site's energy usage, and optimise system performance.

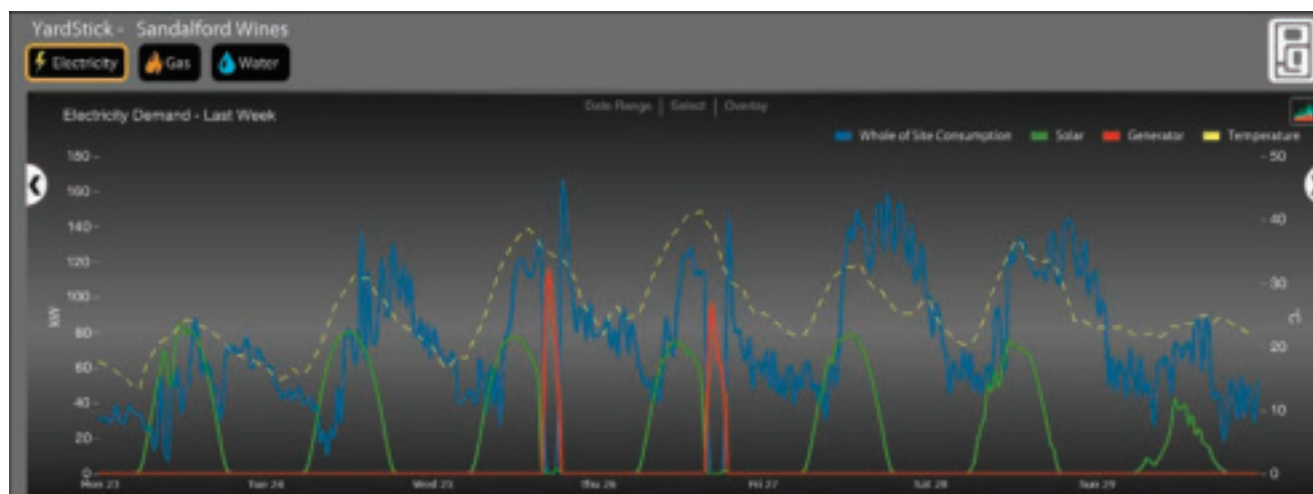
This project represents a great achievement for all parties involved. The recommendations and expenditure-reduction targets identified in the initial business case have been successfully delivered, and the winery has not only reduced its electricity costs, but so far this year, the solar power generated on site has exceeded the energy required for processing grapes – meaning the system has also offset some of the consumption for the restaurant and other facilities on site.

Sandalford's overall investment in sustainability was \$415,000, with a four-year payback period estimated by HFM during the initial feasibility analysis. At the beginning of 2017, Sandalford had already recovered approximately \$128,000, which was distributed as follows:

- \$35,000 financial benefit from the solar PV system
- \$18,000 financial benefit from power factor correction
- \$75,000 financial benefit from capacity charge reduction as a result of reduced maximum demand.

These savings were achieved as a result of close monitoring and cooperation. During the 2015/16 financial year, the site's demand during the network peak periods was effectively zero.





A graph of Sandalford Winery's electricity consumption

Since its installation, the PV system has resulted in emissions reductions equivalent to either:

- planting 899 trees and growing them for 25 years
- removing 320 cars from the roads for one month.


Education and awareness programs run continuously to promote the project's benefits, which include:

- live poster-board displayed within the winery cellar door
- winery tours

- industry site visits.

HFM will continue to work closely with Sandalford's on-site team to analyse and optimise system performance. For example, we have recently discovered an additional energy-saving opportunity through optimisation of the chiller. This matter is currently being discussed with the chiller provider to upgrade the control system.

Ongoing monitoring will also allow us to consistently implement the seasonal plan for offsetting capacity charges.

As this winery is located close to the Swan River in Perth, there is a potential opportunity to use water as a heat-transfer medium. This can be used to significantly reduce the chiller consumption. We are working on technical aspects and a business model to provide the required information to the winery, and to assist the company with taking further action. 

For more information, you can view a poster board showing current data at: <https://greensenseview.com/Dashboard/Load?dashboardkey=KTTXLXKY6Z#/>.

