



The solution to maintaining a controlled level of temperature and humidity – at very low operating costs

There are many challenges faced in both the Australian and international wine markets. The following can attribute to an increase in cost of production and can have an impact on the quality of the final product:

- Resilience of and ability to respond to extreme weather events
- Energy efficient temperature control in hot climates
- Control of humidity in barrel halls with dry conditions
- Improving product quality and value in markets faced with changing climatic conditions

These issues contribute to product quality and its market value as well as the loss of wine through the production and maturation process. Collectively affecting operational costs, return on investment and bottom line profit.

The loss of wine can be as high as ten percent depending on the conditions in the cellar (temperature and humidity), and the length of time the wine is stored in the barrel. To manage this evaporation loss and to maintain wine quality by minimising the ullage in the barrel, the lost volume is regularly replaced or topped up with wine of similar quality, which adds a significant cost to production.

Designed to efficiently cool wine barrel storage rooms

Climate Wizard Supercool is the latest evolution of the successful Climate Wizard range. It achieves even greater cooling capacity by adding a specially designed direct evaporative stage after the indirect heat exchanger. By using this technique, the very low supply temperatures achieved by the indirect heat exchanger are further cooled with required moisture being added to the supply air.

Climate Wizard Supercool's ability to provide the necessary cooling performance at a very low operating cost is due to the fact that it uses no mechanical compressors or harmful refrigerants. This in turn makes it the natural choice for cooling winery barrel halls.



Target storage temperature, humidity and energy savings achieved

Barossa Valley Estate

Project Address

Barossa Valley, SA

Design & Construct

Seeley International partnered with DCM Services to find the perfect solution for Barossa Valley Estate.

Equipment

2x Climate Wizard CW-80S Supercool Intelligent Climate Controller

Barossa Valley Estate has recently undertaken an extensive expansion and redevelopment of its Barossa Valley facilities to complement the super premium wines that are produced from locally grown grapes.

Project Requirements

Barossa Valley Estate required a climate control solution for their barrel storage hall and the below requirements were set in their design brief:

- Minimal energy consumption
- Maintain the wine temperature within the barrel, at or near the target storage temperature of 16°C
- Ambient relative humidity within the barrel hall to be maintained at a level between 65% and 75%
- Maintain stable wine temperatures

“The team at Seeley embraced the opportunity to develop new solutions and engaged a multi-disciplinary, scientific and technically lead approach, driving a project focussed on delivering a control system that can react to immediate ambient conditions, and also run responses based on predictive models and forecasts”

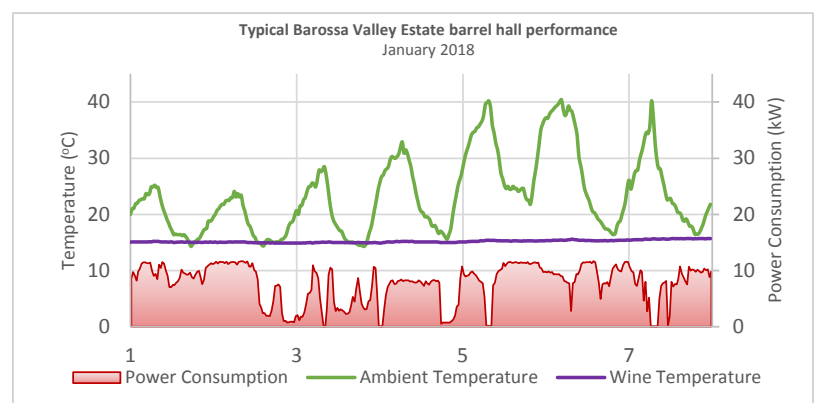
Alan Hoey, Director, Barossa Valley Estate

Project Deliverables

With the key project requirements in mind, Climate Wizard was quickly determined as the perfect solution. Climate Wizard CW-80 Supercool units were installed, together with well designed duct work that evenly distributes the cool air throughout the barrel hall, addressing stratification of the air.

Performance Data

Since installation, Seeley International has had temperature and humidity monitoring equipment installed in the barrel hall. The equipment records the actual wine temperature in barrels from floor to ceiling level, the barrel hall ambient temperature and the relative humidity. The monitoring of the actual wine temperature was a step further than had been done before. It provided significant information about how the wine temperature fluctuates with the changes in the internal barrel hall temperatures over each 24 hour period. The plot below illustrates a typical hot period and the resulting temperatures.



As part of the cooperative work with Barossa Valley Estate, the energy consumption of the Climate Wizard units was monitored by the engineering team at Seeley International. This was recorded with the aim of comparing to the estimated energy that would have been required, should the winery have selected a traditional refrigerated system and humidification system to perform the same duty. The results indicate that the Climate Wizard Supercool system provides incredible savings of up to 80% compared to the energy that a refrigerated system would have used.

Intelligent Climate Control

To further enhance the system capability and continually improve on delivering energy efficiency and automated control, in 2017 Barossa Valley Estate installed Seeley International's newly developed Intelligent Climate Control (ICC). The ICC utilises the features below to recommend the most energy efficient control strategy to achieve the humidity and cooling capacity demanded by the building management system:

- Data on ambient atmospheric conditions
- A predictive CW-80 model derived from sensor telemetry
- Live weather forecasting

As a result a further reduction in energy consumption was quickly realised by Barossa Valley Estate, throughout the 2018 summer.



World's most awarded winery cools its barrel hall with Climate Wizard

Taylors Wines

Project Address

Clare Valley, SA

Design & Construct

Seeley International partnered with Cold Logic to find the perfect solution for Taylors Wines.

Equipment

1x Climate Wizard CW-80S Supercool

Taylors Wines knows a thing or two about making premium quality wines, as evidenced by their 2017 most awarded winery in the world ranking by the World Association of Wine Writers & Journalists. They're also highly committed to sustainability and energy efficiency. So, when they decided to build a new barrel hall, they turned to Climate Wizard to control temperature and humidity.

Project Requirements

Maintaining their commitment to energy efficiency, Taylors required a solution that delivered the below requirements:

- Minimal energy consumption
- Maintain the targeted wine temperature within the barrel at or near 16°C
- Maintain the Ambient relative humidity within the barrel hall at a level between 65% and 75%

For three generations the Taylor family has crafted multiple award winning Australian wines in the heart of the Clare Valley. The Taylors philosophy rests on the principle that the finest wines are those made with the greatest dedication and care.



Performance

The table below outlines the cooling performance of Climate Wizard in the Clare Valley region.

Clare Valley	
Model	CW-80S
DB / WB	36.6/17.3
Supply Air Temp. (°c)	12.6
Standalone Cooling Capacity (kW)	57.4
Standalone COP	5.7

Project Deliverables

One Climate Wizard CW-80S unit was installed to achieve precise temperature and humidity control within the barrel hall; enabling Taylors Wines to ensure consistent premium quality and reduce angel's share.

When installed in a barrel hall environment, Climate Wizard has the capability to maintain the 65-75% relative humidity specified. By pairing this with external cue points on the building, Taylors Wines has full capability to control the environment to precise temperatures and humidity levels. As a result they are seeing significant reductions in their energy consumption as well as a reduction in loss of wine due to evaporation.



Angove cellar door reduces energy usage by 87%*

Angove Family Winemakers

Project Address

Angove Wines
McLaren Vale & Renmark, SA

Contractor

AM Air-conditioning (Cellar Door)
Roe-Aire (Barrel Hall)

Equipment

Cellar Door: 1 x CWH-15S Plus
Barrel Hall: 4 x CWH-15S Supercool

Angove Family Winemakers is a fifth generation family business dedicated to crafting super premium and single vineyard wines from McLaren Vale, together with diverse wines from some of South Australia's great wine growing regions.

Project Background

Angove Wines operate over two major South Australian wine regions, with a cellar door in McLaren Vale and a second cellar door along with winery and barrel storage in Renmark.

The barrel hall in Renmark required a climate control solution that would maintain the wine temperature within the barrels, at or near the target storage temperature of 16°C. The humidity within the hall was to be maintained at a level between 65% and 75%.

After researching many different climate control options, Angove found that Climate Wizard was the perfect solution to meet their requirements and soon installed 4x Climate Wizard CW-H15S units.

Energy Savings Attract Further Installations

Six months following the successful installation of Climate Wizard in their barrel hall, Angove realised the need for a better cooling solution for their cellar door and restaurant. The existing refrigerated unit was not coping in the warmer weather due to multiple bi-fold doors being open throughout business hours, as well as the constant flow of customers in and out of the building.

The outstanding performance and energy savings of their barrel hall installation lead them to investigating Climate Wizard as a solution for their cellar door. The cellar door area spans over 277m² and contains a café/lounge that leads through to a courtyard area.

Project Requirements

With the cellar door operating 7 days a week and offering night time functions, Angove's design brief set the following requirements:

- Capability to run for long periods of time
- Able to have doors open during use
- Provide a comfortable temperature for visitors
- Assist in also cooling the courtyard area
- Reduce cooling energy costs
- Improve the efficiency of an existing reverse cycle system

Solution

One Climate Wizard CW-H15S Plus unit was installed to supplement the existing but unsatisfactory refrigerated system. The previous performance of the Climate Wizard units installed in their barrel hall proved that the technology could cope with running for long periods, as well as having the capability to provide a consistent and comfortable temperature with no moisture added to the air in the space.

The Climate Wizard units provide fresh, cool air at supply temperatures of 12.5°C to the cellar door and create a curtain of air around the opening of the bi-fold doors, reducing the energy consumption of the refrigerated unit. The energy savings from reducing the load on the refrigerated unit provided a significant 87% energy saving. The cool air produced by Climate Wizard also spills out into the courtyard area, which keeps visitors cool during hot summer days.

“Temperature is one of the most important controllable variables in the winemaking process, since installing four Seeley Climate Wizards to control the climate of our new state of the art barrel hall we have seen a significant increase in wine quality. The main benefits are in retention of freshness and importantly in the vibrancy of colour. Our 2018 wines show a significant increase in both these aspects and are some of the best wines we have made. The Climate Wizard has had a measurable impact on wine quality.”

— Richard Angove, *Joint Managing Director, Angove Wines*

*Based on customer feedback from installation.



Hyper-efficient climate control all over the globe

Bosman Family Vineyards

Project Address

Lelienfontein
Wellington, South Africa

Contractor

Marius Louw, Director
Louwco Cooling Solutions

Equipment

2x Climate Wizard CW-H15S Supercool

The rich history of Bosman Family Vineyards is a testament to the family's commitment to people, the land, and of course, the art of wine-making. The first generation of the Bosman family arrived at Lelienfontein Farm in 1798. Here they produced wine on the estate up until 1957, when the family turned their focus to their vine nursery. In 2007, eighth-generation Petrus Bosman returned to the long-held family dream and released the first wines from their newly renovated 260-year-old cellar.



Performance

The table below outlines the cooling performance of Climate Wizard in the Wellington region.

Wellington, South Africa

Model	CW-H15S
DB / WB	31.2/19.3
Supply Air Temp. (°c)	16
Standalone Cooling Capacity (kW)	5.5
Standalone COP	3.1

Project Background

Bosman have gained a reputation for always seeking out the latest and greatest technology — not only in their agricultural practises but also their winemaking. Petrus Bosman regularly experiments with a range of innovations; in particular those that promote energy-efficiency.

One innovation in particular was a new type of barrel seen in Spain that is an alternative to the traditional wooden oak barrel. The vessel, square in shape, is made of plastic and claims to provide various benefits and cost savings. In order to properly conduct this 'experiment', Bosman needed a controlled environment in terms of temperature and humidity.

Project Requirements

The below requirements were set in the design brief:

- Room temperature requirement of max 20°C inside
- Minimum humidity of 70% (34°C DB and 19°C WB outdoors)
- Energy efficient
- Ability to control and maintain temperatures
- No need for a power upgrade

Project Deliverables

Maintaining their commitment to innovation and energy efficiency, Bosman installed two Climate Wizard Supercool CW-H15S units. Installing Climate Wizard allowed Bosman to reduce their capital expenditure due to eliminating the need for a power upgrade.

The two units installed were able to deliver:

- Supply airflow: 2,200 L/s
- Supply temperature: 15.8°C
- Input power: 3.6kW

Results

The system at Bosman meets all the client's requirements despite a very high ambient temperature, and the room is also positively pressurised with the help of motorised dampers.

Because the room is constantly being supplied with fresh air, the pressure would continue to rise if the pressure is not relieved.

The wine store easily maintains 20°C throughout the year with capacity to maintain temperatures as low as 13°C during 42°C days (as tested on site).

Installations in the winery sector around the world

The hyper-efficient benefits of Climate Wizard have been realised across numerous installations in the winery sector, delivering seamless climate control solutions around the world including Australia, South Africa.

Climate Wizard technology is used extensively throughout Australia spanning a wide range of temperatures and conditions including New South Wales, Western Australia and Southern Australia in various applications including:

- Barrel Halls
- Warehouse Storage
- Bottling facilities
- Tasting and Function Rooms

Performance table for different wine regions – stand alone cooling

Location:	DB / WB (°C)	CW-H15S			CW-80S		
		Supply Air Temp. (°C)	Stand alone Cooling* (kW)	Stand alone COP	Supply Air Temp. (°C)	Stand alone Cooling*	Stand alone COP
McLaren Vale	36.4/18.1	12.5	10.0	5.5	13.5	50.7	5.1
Barossa Valley	40.6/17.6	10.2	13.0	7.2	11.5	66.1	6.6
Adelaide Hills	31.1/16.1	11.4	11.5	6.4	12.3	60.1	6.0
Riverland	39.1/18.6	12.4	10.2	5.7	13.4	51.4	5.1
Coonawarra	39.7/18.9	12.6	9.9	5.5	13.6	49.5	4.9
Margaret River	33.6/18.9	14.6	7.2	4.0	15.4	36.1	3.6
Hunter Valley	39.7/21.1	15.9	5.4	3.0	16.7	25.5	2.5
Yarra Valley	37/18.2	12.5	10.0	5.6	13.4	51.0	5.1
Mornington Peninsula	34.4/19.2	14.8	6.9	3.8	15.5	34.6	3.5
Sanoma Valley	32.8/18.8	14.8	7.0	3.9	15.4	35.4	3.5
Napa Valley	40/19.7	13.7	8.4	4.7	14.7	41.4	4.1
Tuscany	37/21.2	16.9	4.1	2.3	17.6	18.8	1.9
Sicily	33.8/16.6	11.2	11.7	6.5	12.2	61.0	6.1
Rioja	37.5/20.9	16.3	4.9	2.7	17.0	23.0	2.3
Stellenbosch	33.9/19.9	16.0	5.4	3.0	16.6	26.1	2.6

*Based on 20°C barrel hall relief air temperature



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We provide full technical support to ensure optimal design for each application.

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