

# Global Energy Management System Implementation: Case Study

Chile

## Viña Cono Sur

*Dedicated to sustainability*



Viña Cono Sur's casona in Chimbarongo.

### Business Case for Energy Management

Viña Cono Sur was founded in 1993 with the vision of producing premium, expressive and innovative wines from the New World. The company's fundamental pillars are quality, innovation and sustainability. The first sustainability efforts began with the transformation of 40 hectares to organic production—there are now more than 300 hectares. In 2002, the vineyard was jointly certified in the ISO 9001 and ISO 14001. In 2007, Cono Sur became the first vineyard to neutralize the emissions associated to the shipping of the wines to destinations all around the world. We currently neutralize 27 percent of the total emissions. In 2010, we certified our greenhouse gas emissions report under the CEMARS® scheme, based on the ISO 14.064-1.

The year 2012 brought intense dedication to implementing and certifying a management system based on the ISO 50.001, which was achieved in mid-2014. And so, energy has become a strategic pillar for the vineyard, as more efficient processes have a direct

impact on the carbon footprint and overall care for the environment.

*“Energy efficiency has become the spine of our management system”*

—Christian Maire, Head of Sustainability

#### Case Study Snapshot

<b>Industry</b>	Winery
<b>Product/Service</b>	Wine production
<b>Location</b>	Chimbarongo, Chile
<b>Energy Management System</b>	ISO 50001
<b>Energy Performance Improvement Period</b>	3 years
<b>Energy Performance Improvement (%)</b> over improvement period	7,2
<b>Total energy cost savings</b> over improvement period	21.070 \$USD
<b>Cost to implement EnMS</b>	50.000 \$USD
<b>Payback period (years)</b> on EnMS implementation	2,4
<b>Total Energy Savings</b> over improvement period	947,8 (GJ)
<b>Total CO<sub>2</sub>-e emission reduction</b> over improvement period	71,78 (Metric tons)

The winemaking process consumes the most amount of energy within the vineyard, primarily through the use of liquefied petroleum gas (LPG) and electricity. However, specific actions have been taken to improve the global performance indicator from 0.81 MJ/l of wine to 0.53 MJ/l of wine.

We have also incorporated photovoltaic plants in five of their estates, which are expected to be up and running

by February 2018. This will allow us inject green energy into the irrigation system and significantly reducing the carbon footprint.

During 2017, Cono Sur’s work in energy management was recognized by the Ministry of Energy, as well as the Chilean Agency for Energy Efficiency. The winery was awarded with the Gold Energy Efficiency Seal in the 2017 version.

**Business Benefits Achieved**

One of the principle benefits from implementing an energy management system was having a detailed understanding of each process and knowing the specific consumption of each energy source. This allowed the vineyard to direct efforts towards significant consumption sources, while leaving aside those that were thought to have a more significant impact on energy performance. Hence projects such as lamp replacements were postponed and substituted with others, such as isolating the hot and cold water pipes.

The main improvements were implemented in the following processes: Irrigation (energy use), boilers (LPG consumption), coolers (electricity consumption), and fork-lifts (LPG consumption).

This last season’s LPG consumption performance indicator for boilers improved by 22 percent compared to the base year. This resulted in a savings of 746,376 MJ, which corresponds to approximately 28,700 liters of LPG throughout the season.

Regarding the cooling equipment’s electricity consumption, the last season showed a 9.3 percent improvement compared to the base year, which equals to 56,000 kWh decrease in energy use.

**EnMS Development and Implementation**

Cono Sur’s work in sustainability began in 2000 with organic vineyard management, and continues up until this day with an integrated management system. This

system includes quality, environment, carbon footprint, occupational health and safety, and energy.

2000	Organic wine certification project	
2002	Certification ISO 9001-ISO 14001	
2007	CarbonNeutral@delivery	
2010	CEMARS® (ISO 14064-1)	
2011	Green Company of the Year	
2013	Sustainability Code of wine industry	
2014	OHSAS 18001 – ISO 50001	
2016	Corporate sustainability award - environment	
2017	Gold Energy Efficiency Seal	

**Organizational:**

An energy management system comes from the need to strengthen an existing integrated management system, as it allows for managing environmental and greenhouse gas aspects at the same time.

The energy management system was certified in June 2014, two years after its implementation, and is therefore a fully-developed system. The certification was renewed in 2017.

The organization has a sustainability committee (figure 1) that meets every two months with the objective of reviewing management system tasks and compliance levels. In addition, there is an energy management team consisting of members from the sustainability, enology and maintenance areas.

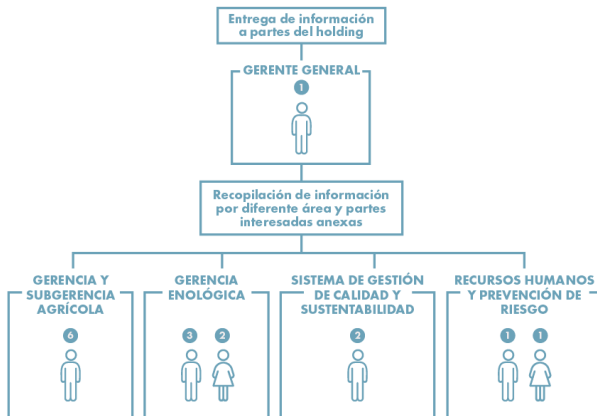


Figure 1: Sustainability Committee.

**Energy review and planning:**

With the help of an external specialist, the vineyard began to implement the energy management system in mid-2012. It worked to identify energy uses among all grape production and winemaking processes within the Santa Elisa estate. The base year was defined in relation to the agricultural year, which is from June of one year to May of the following year. This enabled the vineyard to identify significant energy-consuming processes, and thus direct efforts toward implementing actions that would positively impact resource efficiency.

Significant energy uses were identified as LPG consumption, electricity and diesel within the boilers, cooling and pumping and agricultural machinery, respectively (figure 2). The main actions implemented: Separating the cold and hot water pipes within the wine cellar; replacing boilers and plate heat exchangers; replacing cooling equipment; modifying operations; implementing variable frequency drivers within the irrigation system; and replacing metal halide lamps for LED lamps.

The KPIs correspond primarily to the MJ/liter of wine in enology and the MJ/m3 of irrigation pumping.

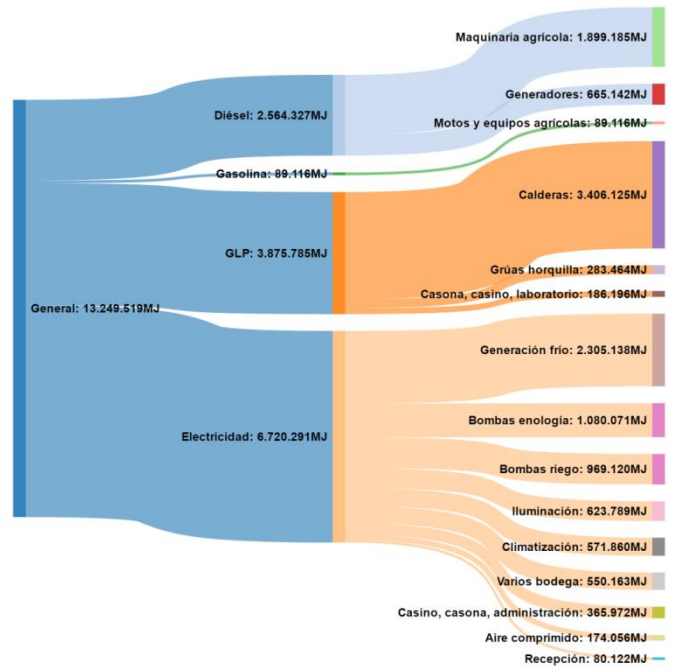


Figure 2: Energy consumption in the last season.

Energy efficiency improvement projects have been financed through the vineyard’s own resources. The only time they worked with external companies was for implementing the photovoltaic plants, under long-term contract agreements for purchasing green energy.

*“Having a detailed understanding of our processes has allowed us to make better decisions.”*

—Matías Ríos, Enology Director

**Cost benefit analysis:**

Just as previously stated an external consultant aided in the implementation process working with Viña Cono Sur for 18 months. This cost upwards of \$20,000 USD.

Some actions were cost-free, as they were associated with other services. For example, replacing the boilers was part of a negotiation with an LPG supplier. However, changing the plate heat exchangers and separating the pipes cost approximately \$50,000 USD, a project with an estimated payback of four years. Recently, variable frequency drivers were added to the irrigation system with an estimated 3.5-year return on

investment. Other actions taken are expected to have a shorter period of return, such as the LED lamps, which are expected to pay for themselves in 2.5 years.

Other costs are associated with implementing energy consumption monitoring platforms within the vineyard's main processes. In addition, the certification's fee must be considered, which is renewed every three years.

The vineyard's area of sustainability was responsible for implementing the energy management system, which aims to maintain and improve the system while contemplating quality, the environment, occupational health and safety and their carbon footprint.

Personnel trainings include:

- ✎ Energy efficiency within the wine industry.
- ✎ Understanding and implementing the ISO 50.001.
- ✎ The principles of energy efficiency.
- ✎ Auditing the ISO 50001 management system.

### Approach to performance improvement:

The following energy performance indicators were defined upon implementing the energy management system, which are primarily associated with grape production and winemaking processes:

- ✎ Irrigation: kWh/m<sup>3</sup> water-pump irrigation
- ✎ Boilers: MJ/liter of wine
- ✎ Cooling: MJ/liter of wine

The indicators are constantly verified in order to determine process performances compared to the base year.

A remote monitoring system for irrigation was implemented to monitor energy and water flow. This information can be accessed online and displays each irrigation sector's performance (figure 3).



Figure 3: Irrigation energy platform.

Energy meters in the wine cellar read and collect data on a daily basis. A remote monitoring platform is currently being implemented within all equipment associated with significant energy consumption (figure 4).



Figure 4: Wine cellar energy platform.

### Approach used to validate results:

Energy consumption data is stored daily and then periodically reported to the Sustainability Committee. A yearly energy review compares the performance of all critical processes to the base year. The performance indicators (KPIs) are the basis for determining efficiency improvements to be taken with each resource.

Each process's performance is continuously reviewed and validated via comparisons to the base year (figure 5).



**Figure 5:** Performance improvements in LPG consumption of the boilers

The organization also conducts periodic internal audits, evaluating the management system's performance. In addition, third-party audits ensure that the system is functioning correctly.

In 2017, Viña Cono Sur applied for the Energy Efficiency Seal, which is issued by the Ministry of Energy and the Chilean Energy Efficiency Agency, that awarded the leading companies that promote energy efficiency within Chile. Professional experts then verified the successful energy efficiency measures taken in the Santa Elisa estate's vineyards and wine cellar. As a result, the vineyard was given the most prestigious award in its category, crediting savings of 109,342 kWh/year (393.6 GJ/year) within the two flagship projects implemented between 2015 and 2017.

#### Steps taken to maintain operational control and sustain energy performance improvement:

Work instructions that define the equipment's operative criterion have identified the coolers and boilers as the primary sources of significant energy use.

Operational criteria have also been defined within the winemaking process, standardizing and shortening a wine's cooling period.

An online temperature monitoring system is being implemented in order to identify variations in real time.

Separating the hot and cold water lines helped in reducing the possibility of error.

Permanent training sessions both ensure that defined procedures are carried out, and stress the importance of caring for our resources

#### Development and use of professional expertise, training, and communications:

In order to get started, an external consultant with expertise in energy helped the vineyard implement a management system. They also collaborated in training the teams that would implement energy efficiency and the ISO 50.001.

Throughout the entire implementation process of the energy management system, all personnel that could affect the organization's performance were trained in several areas, already mentioned above. Additionally, all personnel working within the wine cellar attend regular lectures on rational resource uses, principally in energy and water.

Training needs are identified annually in order to provide training programs led by internal or external sources.

The winery's auditing team has been trained in both energy efficiency and auditing the energy management systems. This team is responsible for carrying out energy management system audits.

#### Tools & resources:

It is important to mention that Viña Cono Sur's energy management system implementation was aided by the fact that they already had a certified quality and environmental management system.

Senior management assigned an internal team of professionals to implement the energy management system with the constant help of an external consultant. Thanks to the previously certified ISO 14001 management system, measurement equipment was already installed and provided data for collecting



information. For the processes that did not already have specific meters, state-of-the-art equipment was used to estimate consumption. Every process with significant energy consumption currently has a consumption measurement system.

- ✎ Obtaining reliable data.
- ✎ Having resources for the project's success
- ✎ Sharing achievements with the entire organization
- ✎ Viewing energy efficiency as a business opportunity

## Lessons Learned

The ISO 50.001 is a technical standard that must be supported by accurate information obtained through consumption measurements within all processes that could impact the efficient use of a resource. Thus, the implementation must not be made in haste, rather take its time to obtain reliable information, which then becomes the basis for all future decisions.

It is advisable to contact locally or internationally recognized suppliers to ensure accurate information, even when service costs are greater than easier or cheaper alternatives.

Leaning on experts' experience in the field is highly helpful, especially for companies who do not dominate this issue.

Energy efficiency can be seen from both an environmental point of view (managing environmental aspects, carbon footprint, etc.) and a financial point of view (cost management).

## Keys to Success

- ✎ Having the commitment of senior management.
- ✎ Forming a work team that involves the entire organization.



Cono Sur employees receiving the 2017 Seal of Energy Efficiency, Gold

*“This seal is not only a source of pride for our company, but also evidence of our vineyard’s commitment to the environment and a constant search for developing renewable energies”*

—Adolfo Hurtado, General Manager

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit [www.cleanenergyministerial.org/energymanagement](http://www.cleanenergyministerial.org/energymanagement).

