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ENARTIS NEWS

SAVING ENERGY IS GOOD FOR THE WINE INDUSTRY AND THE ENVIRONMENT

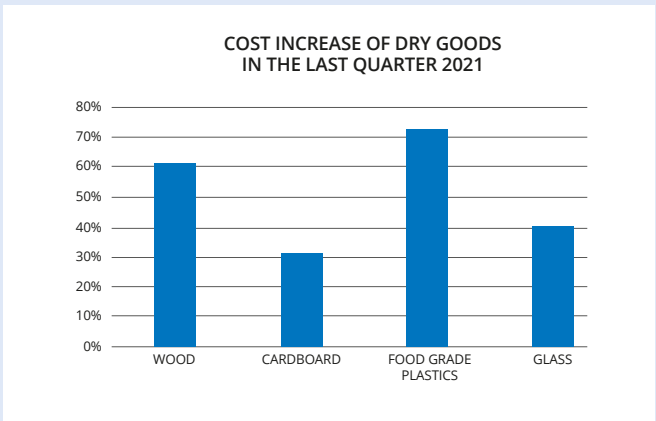
The first solution to rising electricity bills is to save energy. What can be done in the winery to lower consumption and keep costs down?

ENERGY ANALYSIS: COSTS AND ENVIRONMENTAL IMPACT

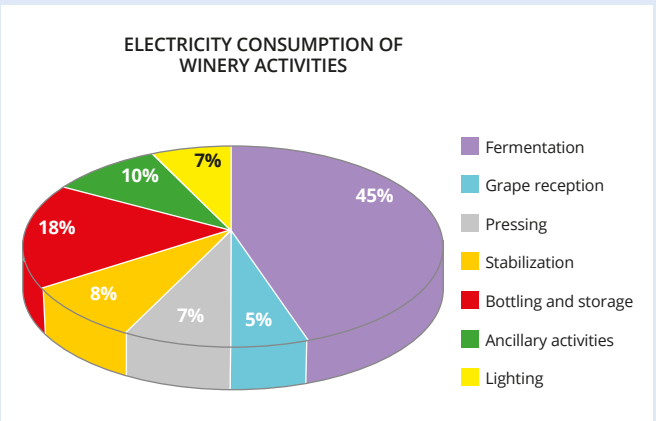
Electricity is the main source of energy for wineries. Rather than the costs arising from electricity consumption, in recent years attention has been focused on its environmental impact, in the wake of a spontaneous and global movement in the wine industry to make wine production an action that respects and protects the environment and the earth.
In fact, the wine industry is not very energy intensive and energy consumption is offset by the generation of significant turnover: compared to the cost of a bottle of wine, the economic savings from adopting solutions to reduce consumption have thus far been negligible.
Recent increases in energy prices, which in some countries have led to a twofold and threefold increase in the cost of a kilowatt-hour in two years, come on top of the increases of the so called "dry goods", raw materials used for bottling and packaging, (Graph 1) and up to 1000% rise in container and ocean freight rates already seen in the last quarter of 2021.
These cost increases will not be fully absorbed by wineries and will partly be reflected in price increases. Nowadays, in many market segments, the impact of energy costs can make the difference between being competitive or not.

ENERGY COSTS OF WINE

Calculating the energy cost of wine is a complex exercise because of the strong diversity of wineries and the strong variation of production processes that take place within the same winery, which leads to rather uneven electricity consumption.
To determine an average energy consumption value per litre of wine, the research group led by Riccardo Guidetti, Professor of Agricultural Engineering at the University of Milan, divided the winemaking process into three production macro-phases - mashing, vinification and bottling - and two service macro-phases - transport within the cellar and cold production.
In summary, the results indicate that the vinification phase is the one that requires the most energy, 80-90% of which is used for cold production, while the bottling phase is the one with the lowest absorption of the entire process (Graph 2). The estimated electricity consumption for vinification and bottling of one litre of wine is about 0.7 kWh, while for bulk wine is 0.5 kWh/L due to the limited impact of the bottling process.



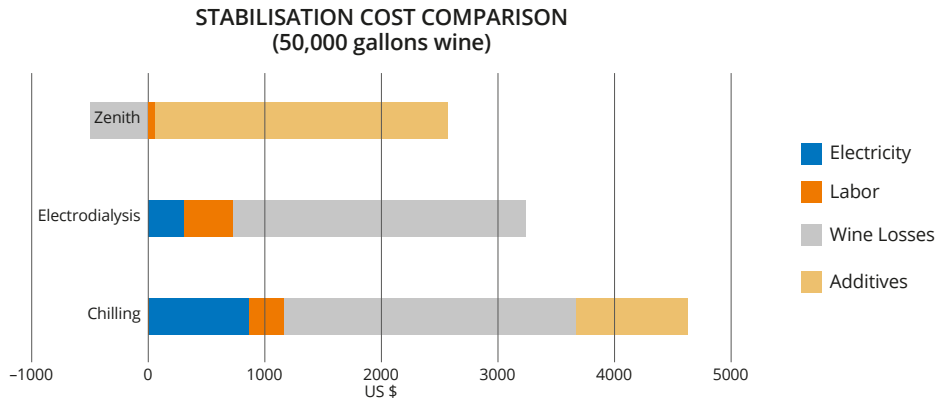
Graph 1: Cost increase of dry goods in the last quarter 2021 in Italy (source *Il Corriere Vinicolo* N. 4 – 2022)



Graph 2: Electricity consumption of winery activities (source *Il Corriere Vinicolo* N. 4 – 2022)

Table 1: Estimated electricity consumption of different tartrate stabilization techniques.

	COLD	ELECTRODIALYSIS	CATION EXCHANGE RESINS	POTASSIUM POLYASPARTATE
Energy requirement (kWh/hL)	1.6-2.2	0.22	0.04	0.006



Graph 3: Comparison of tartrate stabilization cost using different stabilizing techniques. Assumptions adopted for the calculation: electricity $ 0.199/KWh (California average); labor $18/hr (Wine Business Monthly); KHT added at 1g/L at $5/kg; chill for 10 days; 0.5% wine loss (for ED and chilling); $10/gallon bulk wine value; Zenith UNO full dose, full price.

HOW TO SAVE ELECTRICITY AND KEEP COSTS DOWN

Reducing electricity consumption is possible. Simple common-sense gestures, such as switching off lights and putting office and laboratory equipment and devices on stand-by when not needed, can save money without requiring investment.

The use of solar and photovoltaic panels is another way to reduce energy bills.

Of course, the energy analysis may conclude with the need to change equipment. In particular, given that cooling is the most energy-intensive process in the cellar, improving the energy efficiency of the refrigeration systems results in a significant reduction in consumption.

Savings can also come from changes to the production process. For example, the tartaric stabilisation process where chilling consumes about 60-90% more electricity than using a protective colloid such as potassium polyaspartate (Table 1).

Based on energy, labour and consumable consumption values deduced from the research carried out during the European Stabiwine project and indicated in the recent literature, we have calculated the average cost of tartaric stabilisation of 50,000 gallons (1,900 hL) in a Californian winery (Table 2).

Table 2: Sustainability comparison among different tartrate stabilization techniques applied for stabilizing 50,000 gallons wine.

	CHILLING	ELECTRODIALYSIS	ZENITH UNO
kg CO_2 emitted	4,047	1,075	8
Liters drinking water used	11,400	39,800	800

Switching from cold stabilisation to the use of potassium polyaspartate (Zenith Uno) can lead to an attractive reduction in production costs without requiring structural investment (Graph 3).

The reduction in operational costs also means a reduction in CO_2 emissions and, above all, in the consumption of drinking water, which, as a result of climate change, is now in short supply in many parts of the world.

Zenith	Range of potassium polyaspartate solutions for wine potassium bitartrate stabilization.
ZENITH UNO	Solution of potassium polyaspartate (KPA), ZENITH UNO is an effective, rapid and easy-to-use tool for potassium bitartrate stabilization in wine. It assures a long-lasting stability without impacting wine sensory quality and filterability.
ZENITH COLOR	Solution of KPA and Gum Arabic Verek. ZENITH COLOR allows to stabilize potassium bitartrate and colour in a single addition. Designed for red and rosé wine stabilization, it assures no changes in wine sensory quality and does not significantly modify its filterability.

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