

# Success Story

**Company name:** Cielo e Terra S.p.A.

**Country:** Italia



## 1) Description of the company and energy consumption:

Cielo e Terra S.p.A. is a winery producing over 20 million bottles of wine per year, mainly intended large retail, supermarket chains and international market. Since 2006 Cielo e Terra adopted a "lean" organizational model aiming to reduce waste and increase productivity. It adopted the principles of environmental protection, focusing on agricultural techniques used in the production chain upstream and water savings in the production process.

The company has a high consumption of electricity and natural gas (see table)

Electricity	Natural Gas
2.170 MWh	1.208 MWh

Cielo e Terra S.p.A. has been selected as a success story for PINE since it has already adopted a number of actions according to "lean" principles to increase energy efficiency, including automatic process control, optimization of schedules and material flows, efficient motors and LED lighting. Nevertheless, the company has still has a very high potential for further energy savings for several reasons: the production process runs continuously for over 6.000 hours per year (3 shifts for 5 days a week) and has a remarkable summer peak in electricity consumption related to cooling processes. Finally it is very open to innovation and willing to implement effective proposals.

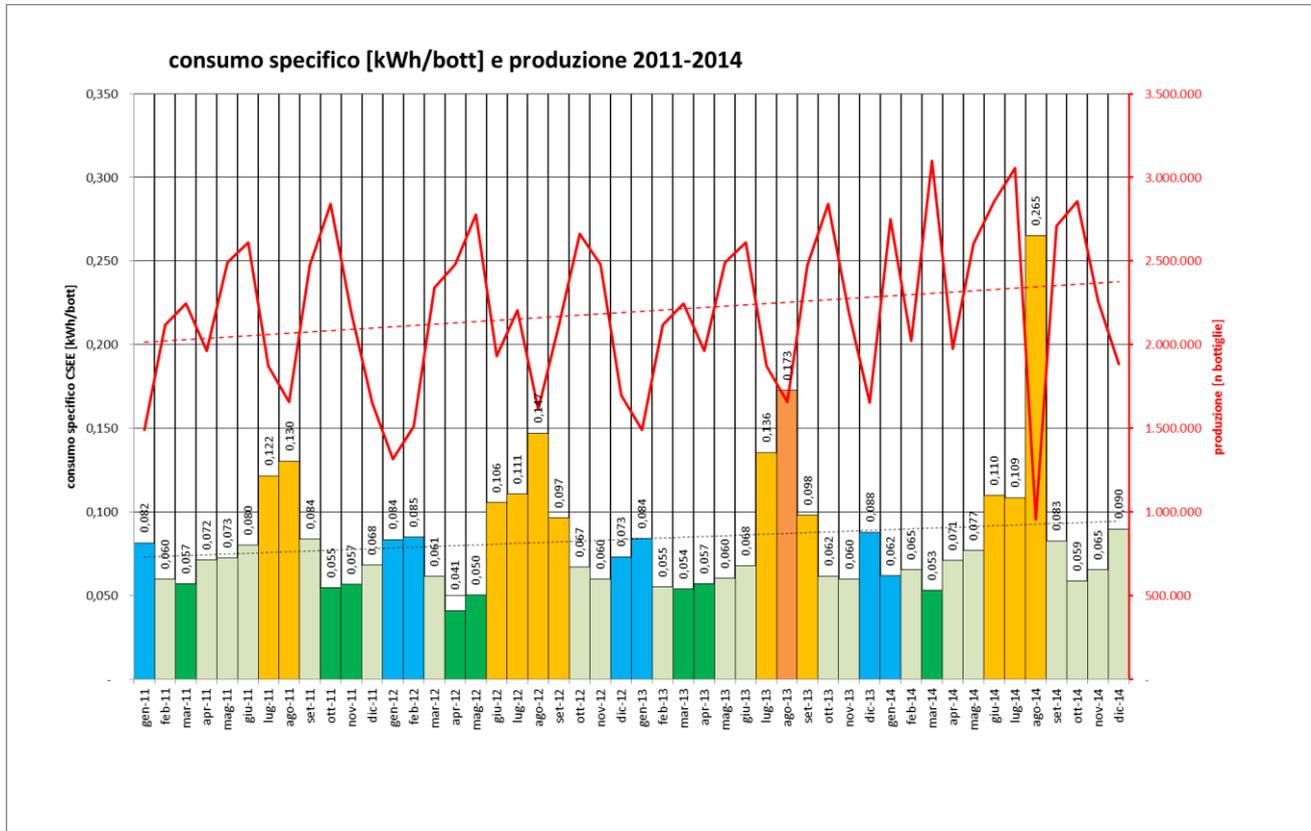


Fig. 1: The company

## 2) Description of the activities carried out with the company and key success factors

AREA Science Park has made three visits on site (two summer and one winter) to collect data of energy consumption: monthly use of natural gas and electricity from 2006 to 2013, electric load curves from the general meter and some sub-meters. Furthermore data on production volumes (e.g. number of bottles per month, liters of process water...) and outdoor temperatures have been collected on the same time scale as energy consumption. Finally thermographic analysis was used to detect the actual temperatures of the process and of the indoor environment.

The energy audit report gives an overview of the energy balance of the company and identify KPI (Key Performance Indicators) such as the amount of energy used to produce each bottle of wine, shown in the diagram below.



Linear regression analysis helps to identify two priorities for improving energy efficiency: the electricity base load (24% of total electricity consumption) and the refrigeration processes (38% of total electricity consumption).

The main result of the energy audit is a short list of effective actions to improve energy efficiency, that have been discussed and adapted to the company needs and constraints. The main topics are heat recovery, automatic temperature control, improvement of production, distribution and management of the compressed air.

The company can recover heat from both air compressor (approximately 80 MWh) and from refrigeration units (approximately 160 MWh), with a corresponding reduction in the consumption of natural gas. The two interventions have already been implemented, together with the overall rehabilitation of the boiler room, replacement of the steam generator and installation of heat storage tank.

Further savings will arise from optimizing process and air-conditioning temperatures, both in summer and winter, and installing solar shading to reduce the heat load in summer. These actions are expected to provide saving of over 48 MWh electricity and 74 MWh heat.

Finally interventions on air compressors (maintenance and upgrading of piping, reduction of the nominal pressure, eliminating air leaks, installing a new compressor with inverter control) will save at least 35 MWh electricity.

### 3) The savings:

The total energy savings sums up to 84 toe (corresponding to a reduction of emissions of 179 tons of CO<sub>2</sub>) per year.

Actions on compressed air and heat recovery have been already implemented, while other actions are in the planning stage and will be completed within three years.

	<i>Electricity saving</i>	<i>Natural gas saving</i>
<i>Actual Saving</i>	35 MWh	240 MWh
<i>Future Saving (within 3 years)</i>	187 MWh	438 MWh

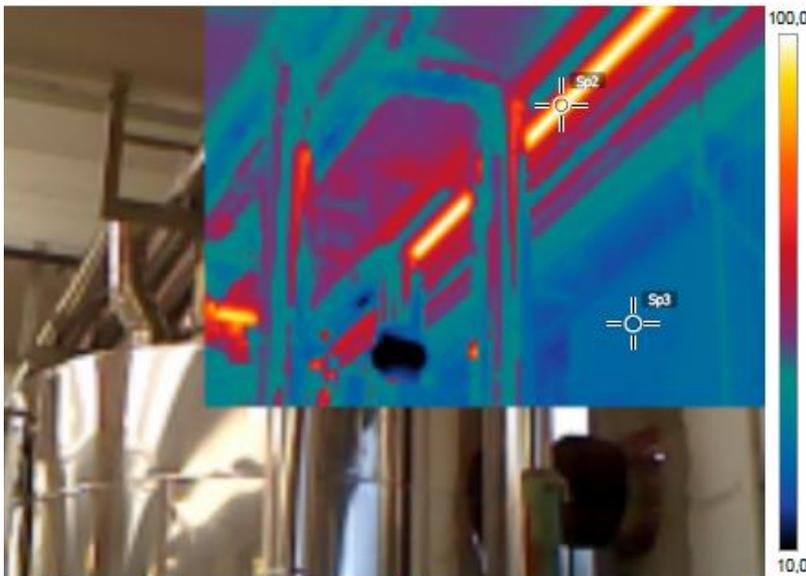


Fig. 2: Thermal imaging – a high temperature steam pipe without thermal insulation



Fig. 3: Owners: Pierpaolo and Luca Cielo