

# Best Practices for Improving Energy Efficiency in Wineries

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# Energy audits in wineries

\* 20 in the period 2007-2009, in Spain (CO2OP Project)

\* 37 in the period 2013 – 2015, in four countries (TESLA Project)

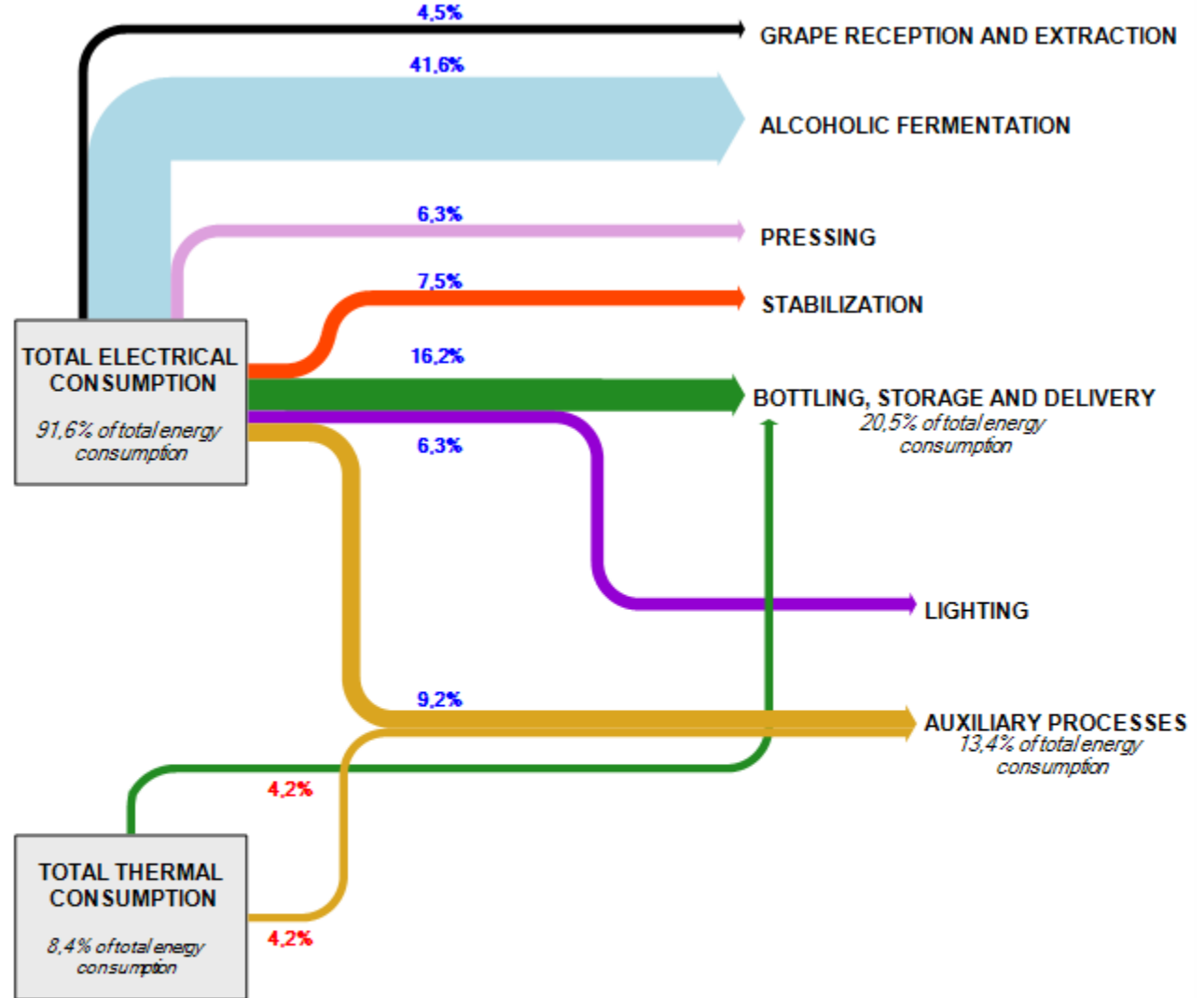


# Energy consumption in wineries

- A typical winery: 30.000 hectolitres wine / year
- Average electrical energy consumption: 11 kWh / hl wine
- Average thermal energy consumption: 1 kWh / hl wine
- Electrical energy cost 0.12 €/kWh
- Thermal energy cost: 0.07 €/kWh

**Considerable differences between wineries  
=> Large potential for improving energy  
efficiency**

# Energy flows for a typical winery



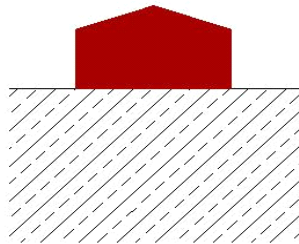
Percentage values (%) in blue refer to electrical energy consumption  
 Percentage values (%) in red refer to thermal energy consumption

# Energy efficiency in wineries

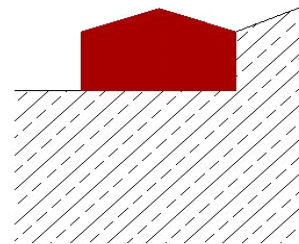
- Energy efficient design for the building of new wineries
- Efficiency in general-purpose equipment
- Efficiency in equipment specific for wineries
- Efficient energy management for processes and operations



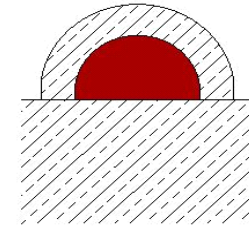
# Energy efficient design for the building of new wineries



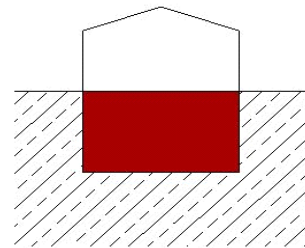
**Aboveground**



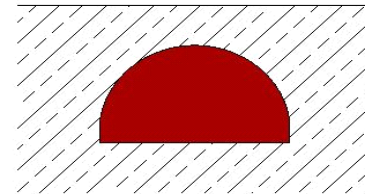
**Partially underground, walls in contact with a slope**



**With sun-shading elements: buried**



**Totally underground, basement**



**Totally underground**

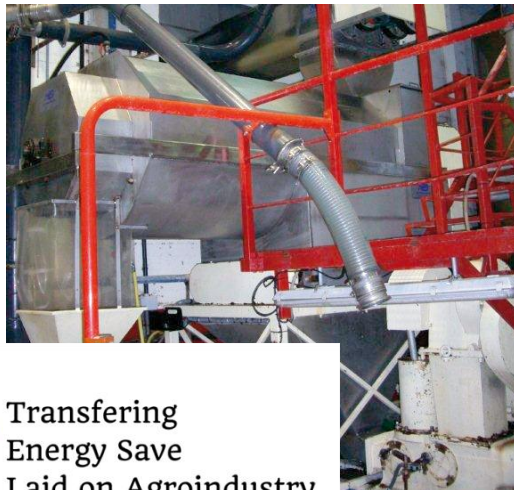
# Efficiency in general-purpose equipment: Technologies for cooling and refrigeration

- Cooling storage systems
- Efficient wine storage in refrigerated conditions
- Proper thermal insulation and sun-shading for the cooling and refrigeration equipment



# Efficiency in general-purpose equipment: Other technologies

- High efficiency engines
- Proper motor sizing and control
- Lighting



**tesla** 

Transferring  
Energy Save  
Laid on Agroindustry



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Programme of the European Union



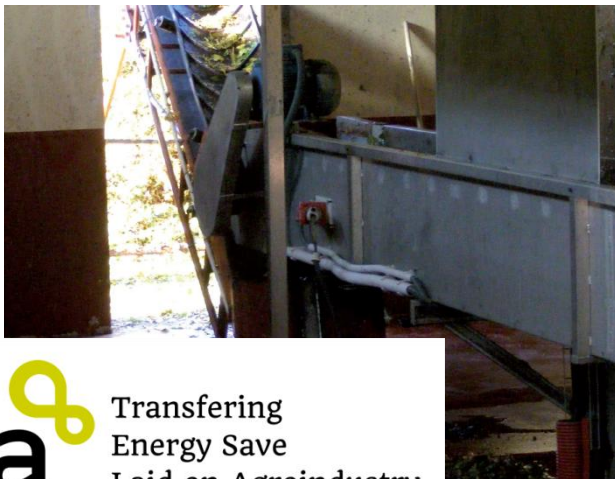
# Efficiency in equipment specific for wineries

- Change presses by decanters
- Heat and cold exchange processes in stabilization
- Pasteurization versus filtration



# Efficient energy management for process and operations

- Night harvesting
- Wine storage management
- Energy efficiency management applying ICT solutions
- Energy management systems certified according to ISO 50001:2011



# Energy efficiency in wineries: Conclusions

- A key aspect: Cooling technologies
- Periodical monitoring of equipment efficiency
- A large improvement potential related with a better management of processes and operations
- Continuous improvement of energy management

