Jess S. Jackson Sustainable Winery Building
WATER STORAGE
additional rainwater storage tanks at adjacent winery to irrigate the landscape

SOLAR ARRAY
produces enough energy to offset the building’s energy usage on an annual basis

R-76 ROOF/R-59.9 EXTERIOR WALLS
highly insulated walls and roofing contribute to the building’s overall efficiency

PASSIVE HEATING AND COOLING
natural ventilation and thermal mass from an 8-foot-high CMU wall and concrete slab passively cool the structure

WATER REUSE
all process water to be treated and reused with harvested rain water

NATURAL DAYLIGHT
strategically placed windows and skylight reduce the need for electrical lighting

ADAPTIVE TO NEW TECHNOLOGY
modular interior design allows for flexibility of interior spaces as technology evolves

NATIVE PLANTS
landscaping that requires minimal water and treats runoff from the roof

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is pursuing Living Building Challenge Net Zero Certification, the facility is designed for net-zero energy, carbon, and water thresholds, and houses innovative equipment and processes to demonstrate 21st century wine making techniques.

The building is located south of the Robert Mondavi Teaching and Research Winery, and August A. Busch III Brewing and Food Science Laboratory (BWF). The Jess S. Jackson Sustainable Winery Building is a valuable part of this research and teaching complex; it will allow the BWF to become self-sustaining.

The 8,500 sq.ft. building is a pre-engineered metal building with a significantly upgraded thermal envelope and ultra low air infiltration.

The building path to net-zero energy consisted of the following steps:

- Reduce the internal loads as much as possible
- Use passive cooling techniques
- Generate electricity from a roof mounted PV system to account for the remaining energy usage, at a minimum.
- Rain water harvesting and water treatment
Reduction of internal loads

The building uses an insulated envelope consisting of R-59.5 walls and a R-76 roof. The windows are high performance having a total unit performance U value of 0.21 and a Solar Heat Gain Coefficient of 0.24 with visible light transmittance of 43%. Infiltration rates are reduced by ensuring tight envelope and extremely tight roll-up doors so that the building is considered “tight” as designated by ASHRAE (leakage rates less than 0.1 cfm/sq.ft as tested and confirmed during commissioning). Daylighting helps keep the lighting loads reduced to a lighting power density (LPD) of .421 W/sq. ft., which is approximately 53.2% less than the allowed LPD as defined by the applicable California Building Code.

Passive Cooling Techniques

The building passively cools and heats itself as needed through natural ventilation and thermal mass. Although the outdoor temperature in Davis, CA can reach 102 °F in the summer, the cooling effect is achieved by taking advantage of the cool night delta breeze in the area (night temperature drops to about 60 °F) and thermal mass. A slab on grade floor and an 8-foot-high CMU wall, constructed within the thermal envelope, provides thermal mass throughout the building. Two 3,000 cfm fans turn on at night to charge the concrete slab and low carbon CMU walls that are installed throughout the building. The thermal discharge to these walls allows the building temperature to remain below 80 °F the next day.

Energy Generation (PV)

A PV system is provided on the roof of the building consisting of 16 Sunpower SPR-327NE 327 Watts panels laid out in 2 circuits of 8 panels each for a total of 5,232 Watts DC. The panels are installed flat on the roof that has a 9.4 ° tilt and oriented with a 150° azimuth. These panels are coupled with a SMA America Sunny Boy 5000-US inverter located in the electrical room. The roof and the system are designed to accommodate an expansion of up to 272 additional panels to offset future energy usage of process equipment installed in the building by the owner or to offset power needs of the adjacent BWF building.