



Photography courtesy of
GBD Architects

RESILIENT AND ONE OF A KIND

NEW OREGON STATE TREASURY RESILIENCY BUILDING: BUILT TO WITHSTAND LIFE'S CHALLENGES

The Oregon State Treasury knows the importance of resiliency in unpredictable times. When plans began for its new headquarters, the ability to remain operational following a disaster event was priority number one.

The recently completed facility is the first US Resiliency Council (USRC) Platinum-rated building in Oregon and the first USRC-rated seismically isolated building in the United States. By targeting net-zero energy use, it also shows how resilient design, renewable energy and energy efficiency go hand in hand.

“Our need to be up and operating at all times really drove the requirements for the building,” said Byron Williams, chief administrative officer, Oregon State Treasury. **“There was a significant overlap between our resiliency and energy efficiency efforts.”**

OREGON STATE TREASURY RESILIENCY BUILDING

Energy-Efficient Features

Passive Systems

- High-performance envelope
- Daylighting strategies

Active Systems

- Variable refrigerant flow with DOAS and energy recovery
- LED interior and exterior lighting
- Heat pump water heater
- High-efficiency server racks with uninterruptible power supply



ONE TOUGH BUILDING

The Oregon State Treasury Resiliency Building is built to withstand earthquakes, floods, wildfires and other potential events, all aided by a net-zero design that reduces the amount of energy needed to remain up and running. The facility has many resiliency features, but its base isolators stand out with their ability to reduce earthquake shake by as much as 75%.



"These base isolators are kind of like massive hockey pucks with layers of steel through them. The building is isolated from the ground and can move 18 inches in each direction, which is pretty phenomenal," said Craig Stockbridge, principal, GBD Architects.

The building can go into a self-sufficient island mode for extended periods of time thanks to the large solar array,

battery storage system and generator that form an energy microgrid. Low energy use and backup water and sewage systems also make island mode possible.

The ventilation system maintains healthy air quality with a complete exchange of indoor air and fresh outdoor air every 30 minutes, and uses advanced filtration to protect against wildfire smoke when necessary. In the case of an earthquake, fully visible, exposed ductwork and system connections allow for easier inspection afterwards.

"This building needs to be immediately re-occupiable after a major quake. It must be safe to go back inside, and we need to be able to visually inspect the connections. Otherwise, it could be days, if not weeks, maybe months before you get back inside," Stockbridge said.

POWERED AND BACKED UP BY THE SUN

Banks of rooftop solar panels comprise an approximately 240 kW solar array designed to produce more energy than the building consumes. Energy Trust of Oregon provided \$35,000 in solar incentives in addition to supporting the Treasury's renewable energy planning and strategy.

Along with powering the building's daily operations, this impressive solar array is also a key element for backup power and storage. A battery storage

system captures power from the solar system and stores it for use during a power outage.

"This building can be in island mode for at least a week, if not longer, with the ability to keep generating energy with the solar array on top. The energy storage is a 250 kWh battery system, and we have a generator with diesel backup power," said Chris Lowen, mechanical engineer, Glumac.

Energy Efficiency-Related Savings

- \$147,000 in estimated Energy Trust cash incentives
- \$16,000 in estimated annual energy cost savings
- 204,200 annual kWh savings

Solar Installation

- 238.65 kW system capacity
- 308,996 annual kWh generated
- \$35,000 in Energy Trust cash incentives
- \$24,000 in estimated annual energy cost savings

Additional Incentive Support

- Early design and technical assistance
- Modeled savings installation
- Advanced metering
- Anticipated net-zero certification through ILFI

REACHING NET ZERO

Aiming for net-zero energy use, the project team took a whole-building approach and received energy modeling and support from Energy Trust's Path to Net Zero offering. Passive energy strategies and internal load were key areas of focus for right-sizing systems and the solar array.

The building receives plenty of natural daylight and has a white interior with light-shaded oak that dramatically lowers the amount of energy used by its lighting system. Automated clerestory windows provide additional natural light and help ventilate the building.

The high-efficiency HVAC system includes variable refrigerant flow (VRF) with a dedicated outdoor air system and radiant floors to improve comfort and indoor air quality. This system also has the ability to perform heat recovery, which lessens the energy impact from the building's server room. A high-performance envelope with a super-insulated roof, walls and windows further reduces the load on the HVAC system.



Sometimes when we set priorities, it comes back to money and we have to make sacrifices. But **we started to see that there was a natural meshing of the resiliency priorities with the net-zero energy priorities.** And a key factor in all of this was our partnership with Energy Trust of Oregon," said Zach Stevens, associate for the project's energy modeler, WSP.

STRONG COORDINATION

Energy Trust hosted an early design charrette with stakeholders to help coordinate energy goals, strategies and available incentives. The Treasury also received post-occupancy metering and Energy Trust incentives of over \$180,000 in total. The building is expected to save \$40,000 in energy costs each year.

"We will be tracking the building's energy performance as it's occupied," Stevens said. "I'm always really happy when we have that opportunity to engage in measurement verification. Because sustainability is not just something that lives in design, you have to be able to look at the real energy we're consuming."





Project Team

- Benton Electric (solar trade ally)
- GBD Architects
- Glumac
- Oregon State Treasury
- Pence Construction
- PJ's Land Development LLC
- WSP



A WELCOME PLACE TO WORK

Along with being resilient, the Oregon State Treasury is a truly comfortable and beautiful place to spend the work day. Fresh, healthy indoor air, reliable and efficient heating and cooling, operable windows and natural daylight all provide a welcoming space for employees and guests. Decorative features add to the unique look and feel, including a wall made of preserved

moss and a mural by artist Addie Boswell that celebrates the region's indigenous communities.

"It really sets an example of what a state building can do," Williams said. "Not just in having the building built, but how it can benefit the community that we live in."

Find incentives and support for your new building or major renovation project at www.energytrust.org/newbuildings or call **1.877.467.0930**.

Energy Trust of Oregon

421 SW Oak St., Suite 300, Portland, OR 97204

1.866.368.7878

energytrust.org