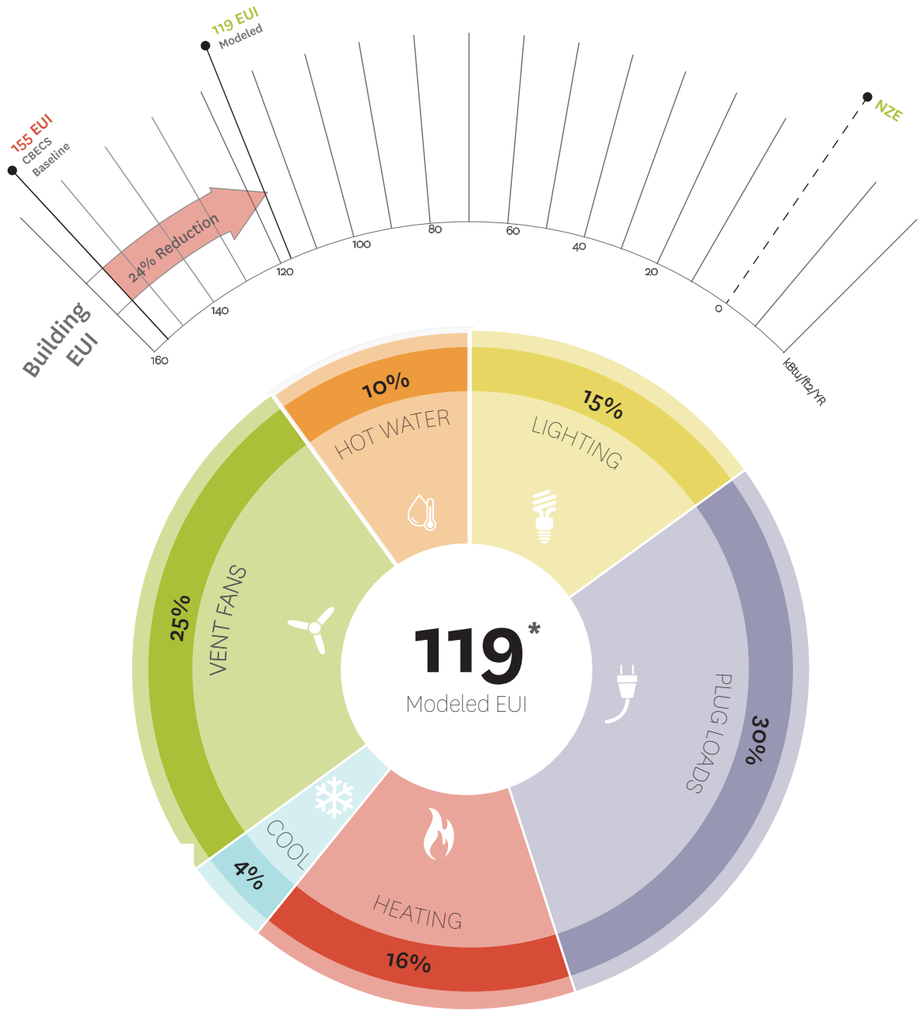
Lakeside at Black Butte Ranch
Sustainability Summary

Project Type: Commercial
Location: Sisters, Oregon
Built Area: 15,000 SF
Scope: New Building, completed 2015

Architect: Hacker
Energy Consultant: PAE



Design Summary
Black Butte Ranch, a resort community located in central Oregon, sits at the gateway to Oregon's high desert. First planned in the early 1970s, the new lodge area redevelopment replaces the well-worn existing pool facility and revives the "heart of the ranch." The magnificent site sits between the original modernist ranch buildings, the award winning Country House Condominiums, and the lodge; iconic "solar architecture" of its period. The new design is inspired by the barn-like simplicity of the Country House Condominiums and the abstracted landform roof lines of the lodge.

Key Sustainability Concepts
Sustainability is achieved through smart, site-sensitive design that utilizes the landscape and leverages an understanding of the local micro climate. A number of passive strategies, such as daylighting and natural ventilation, reduce the amount of energy loads used by the facilities. Building orientation and window placement allow for optimal daylighting while deep, low overhangs provide shading in the hot summer months. This strategy not only reduces the need for electric lighting but also enhances the indoor-outdoor connection. Natural ventilation is used to passively cool the buildings, taking advantage of the cool breezes that sweep across the adjacent lake. Concrete mass floors and walls hold heat and slowly release it in order to maintain stable interior temperatures throughout the year.

These passive strategies are supplemented with radiant floor heating/cooling which delivers optimal comfort for guests who are often barefoot in the spa, pool, and shower areas. This approach continues into the restaurant in order to maintain thermal comfort without forced air blowing across guests while they dine.

An energy model performed by PAE Consulting Engineers during design development compared different energy saving design strategies. The analysis focused primarily on options for the HVAC system, building envelope, and pool heating. A baseline building of a similar size and function (using code minimums for wall and roof insulation, ventilation rates, and equipment efficiencies) was used to compare each option and determine the best approaches for this project.

The final report showed that a geothermal heating/cooling system would greatly reduce the heating/cooling costs for the facility; however, the high first costs for drilling wells made implementing it out of budget. The second best option was a combination Variable Refrigerant Flow (VRF) system for heating/cooling and a Heat Recovery Ventilation (HRV) system for ventilating.

A solar thermal system heats the water in the pool during the swimming season and prevents freezing in the winter. Using a renewable resource to generate hot water for the pool greatly reduces the amount of energy required from propane-fired boilers. Post occupancy pool temperature monitoring shows that covering the pool at night is paramount in reducing the amount of water needing to be heated by a boiler in the early morning hours while also reducing evaporation.

The team tested the energy savings that would result from increasing the wall and roof insulation by R-5 and R-10 over code but found that this approach would not significantly reduce energy loads when compared to costs. This is mainly because the building is wood framed rather than a metal frame structure.

Natural materials and finishes are used throughout the building, inside and out. Wood framed construction makes up 95% of the structure, including cedar siding on the interior walls/ceilings and exterior walls/decking.