

RESEARCH & COMMERCIALIZATION

An extraordinary experimental opportunity that is monitored constantly, evolving as new ideas in sustainable design and technology emerge



Photo courtesy Oregon State University

A Platform for Real-World, Real-Time Research

OSC will be the first Living Building of its scale — and it will come with a robust monitoring system to track net-zero energy and water goals in its 200,000+ square feet.

Sensors will monitor energy consumption, ambient conditions, water use, stormwater management, and occupants' use of building components and spaces. A central Data Command Center will receive over 1,000 points of measurement from these sensors, analyzing the data to control HVAC equipment and to record energy flows.

Researchers will use this data for real-time performance measurement and ongoing analysis. OSC enables them to assess thermal, air, lighting, and acoustic conditions using the embedded sensors, interior climate stations, and instrumented mobile carts for more detailed data. These tools, coupled with occupant surveys, let researchers assess the connections between environmental conditions and human comfort.

Research Themes

Five major research areas have been established for OSC. They are:

- Net-zero Energy Building Technologies and Strategies
- Water Use and Rainwater Retention
- Material Utilization, Waste, and Life Cycle Environmental Impacts
- Occupant Health and Performance
- Integrated Performance-Based Design, Construction, and Operation

Moving Research to Action

OSC will create a solid connection between its research agenda and the businesses that can turn it into marketable products and services.

OSC's five major research themes span industry sectors that are strong and growing in Oregon: including renewable energy, energy efficiency, and green building. State and local governments in Oregon are strong supporters of these sectors — and OSC is a test tube that gives companies the chance to prove their products in a real-world environment.

Leading the effort, the Oregon Built Environment & Sustainable Technologies Center (BEST) will connect the state's businesses with research happening in and around the building.

A Working Facility in its Natural Habitat

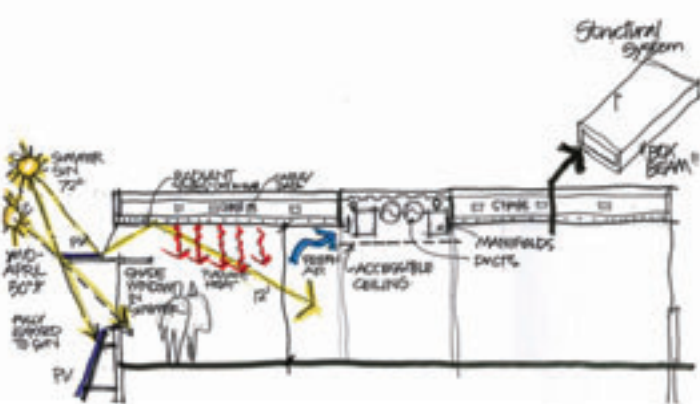
OSC is a living, breathing, and working building. An estimated 725 office tenants and 1,400 students and faculty will use the conference center, classrooms and offices daily. They will be joined by dozens to hundreds of visitors on any given day. The result: studies conducted at OSC will deliver real-world information.

The Strategy Depends on Research

To meet net-zero energy, OSC must reduce typical energy use by 70-80% to supply the building's energy needs on-site with renewable resources. And it must do the same with water. This has never been done on this scale before.

Because of this, research is critical.

OSC's closely integrated systems will require tuning and improvements. Occupants' behaviors will impact building performance in new ways. Even with goals met, systems can be simplified and costs reduced. The innovation and cost-reduction captured in the study of OSC will pave the way to a mainstream adoption of net-zero energy and water buildings.



Occupant Loads

Occupants of OSC will deeply impact its ability to achieve energy and water reductions. They will determine plug loads, lighting demands, acceptable temperature ranges, and water conservation.

OSC will benefit from a willing and engaged group of tenants, working in firms and organizations who share the mission.

Occupant behavior will be assessed using sensors that track building component and space use. Researchers will also use social science methods to assess behavioral patterns and subjective responses.

Export: Know-How

Oregon firms win green building work across the U.S. Place-of-origin matters, and hiring a green building expert from Oregon is like hiring a horse trainer from Kentucky. Internationally, Oregon firms are already in China, Dubai, South America, New Zealand and Australia. Living building know-how flowing from the OSC will continue and accelerate this success.

A Neighborhood Strategy

OSC is also the proposed anchor for Portland's first EcoDistrict, a strategy that combines high performance buildings with infrastructure – boosting energy efficiency, water efficiency and livability. This evolving strategy will benefit through research to better understand how the building can interact and partner with its surrounding neighborhood.

OSC's research agenda is flexible enough to accommodate pertinent questions from the material to the neighborhood scale.

The Framework: Managing a Dynamic Research Agenda

Research will be managed by the OSC Research Committee, comprised of members of the OSC design team, Oregon BEST and research faculty from the four Oregon BEST partner universities: Oregon Institute of Technology, Oregon State University, Portland State University, and the University of Oregon.

OSC is designed as a framework where a range of technologies can be applied, tested and eventually replaced with new solutions. Technologies can be deployed in an experimental setting, allowing comparative testing and control between experiments for thorough, valid assessments. With built-in flexibility and a management process in place, OSC will enable evaluation of methods and systems that haven't even been dreamed of today.