NEWBERG CENTER

Bond Program
Building Our Future

Portland Community College

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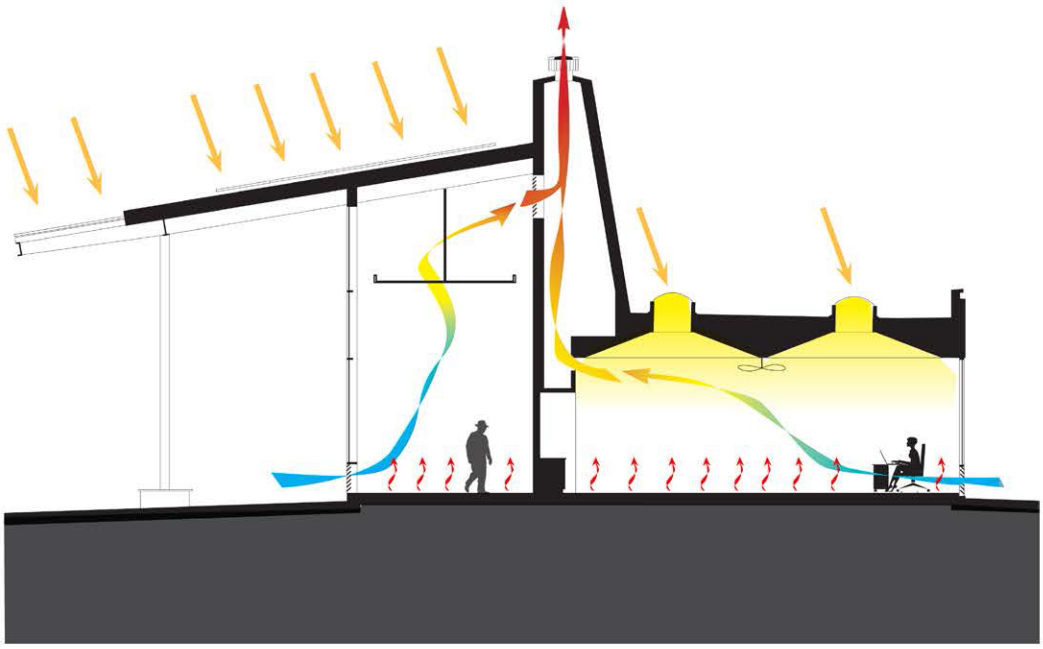
OPPORTUNITY – THEN. NOW. ALWAYS.

Hennebery Eddy Architects



The Newberg Center - Net-Zero Overview

For the Newberg Center, Portland Community College (PCC) set the goal of being one of the first Net-Zero academic buildings in the United States. To be Net-Zero means, over the course of a year, the building must generate as much energy as it uses. The building has been designed to operate as efficiently as possible, but achieving the goal of a Net Zero building each year depends on your help. This guide provides a general overview of the building's systems as well as instructions on how to effectively operate them to create a comfortable and efficient building.

LIGHTING

To reduce the building's energy use by over 15%, skylights in the classrooms and administrative area are integrated into a sloped ceiling system designed to provide even and diffused light without the need for electric lights. The skylight louvers track the lighting level in the room and open and close as necessary to maintain comfortable light levels. They also allow instructors to darken the room for presentations. The electric lights in the rooms are also tracking the light level and will adjust automatically to provide additional light when needed. You can help conserve energy by only turning the lights on when necessary.

FRESH AIR

Fresh air is provided through the louvers located on the exterior walls of the building. When fresh air is needed, the louvers automatically open. With the help of the roof-mounted ventilation turbines, cool air is drawn in through the louvers while hot air is released through the five stacks along the building's central spine in what is known as the "Stack Effect" - the tendency for hot air to rise. The ventilation turbines encourage the "Stack Effect" by spinning at very small wind speeds. This spinning creates a vacuum on their leading edge that helps pull hot air out of the building. On days when there is no wind, a small motor at each turbine can be engaged to spin the turbines to create this vacuum.

When outside air temperatures are too cold (below 55^{0}F) or too hot (above 80^{0}F) to bring air in through the louvers, Heat Recovery Ventilators bring in fresh outside air that is warmed or cooled by transferring heat as necessary between the incoming and outgoing air.

COOLING

In addition to providing fresh air, the louver system, in conjunction with the exposed concrete floor and concrete shear walls, also helps keep the building cool. During the warmer months of the year, the exposed concrete walls and floor act as thermal mass, absorbing heat from the surrounding air during the day to keep the indoor temperature cool. At night, the louver system opens up to allow the cool night air to move through the building, expelling hot air out through the stacks and removing the built-up heat from the concrete. This process is called "Night Flushing" and helps keep indoor temperatures cool without mechanical cooling. If additional cooling is needed, ceiling fans throughout the building can be turned on.

The building form also contributes to keeping the building cool by using large overhangs at south facing windows to keep heat from the summer sun from penetrating the building. Additionally, the south-facing Multi-Purpose room has exterior shades that can be lowered to further protect from the heat of the summer sun.

HEATING

Heat is provided through a radiant slab system - plastic tubing embedded in the concrete floor. Warm water circulating through the tubes warms the concrete floor to provide a consistent even indoor temperature. During the colder months of the year, the water in the tubing will typically be around 90 degrees and will provide an ambient temperature of 68 degrees. Because a radiant system heats people instead of the air, it is the most efficient system and does not create uncomfortable drafts like forced air.

Keeping the Building Comfortable

In addition to creating an efficient building, energy savings has been achieved by expanding the thermal comfort range 1° in each direction. PCC's standard temperature range is 69°F for heating and 77°F for cooling. At the Newberg center, the range has been set to 68°F for heating and 78°F for cooling the Classrooms and Office Areas and 82°F for cooling in the Commons. Because of the large-scale ceiling fans, the Commons area can tolerate a higher temperature because the additional air movement will make the space feel like 78° even if the thermostat reads 82°. You can help conserve energy and feel comfortable in the building by dressing appropriately for the season - wearing warmer clothes in the winter and cooler clothes in the summer.

BUILDING CONTROLS

Many of the building's systems have been mechanized to allow the building to operate most efficiently. However a number of overrides have been built into the system to allow you, the user, the opportunity to create a comfortable interior environment that meets your needs. Some of those overrides include:

- Opening and closing the louver system (when outside temperatures are between 55° and 80°) to bring more fresh air into the building.
- Turning on ceiling fans to provide additional cooling
- Opening and closing the skylight louvers
- Rasing and lowering window shades throughout the building