

Sustainability center may have unique top in bid to be net-zero

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Published: November 12th, 2009



Leave it to the **Oregon Sustainability Center** to tip its cap to the sun.

The center will rely heavily on solar panels to produce all of its own energy, and the building's current design calls for the largest solar array to be placed on top. But its 'hat' would be angled to harvest the most sunlight possible. The array would produce 39 percent of the building's energy needs.

"To get the sun to hit those panels at an optimum angle, it can't just be flat," said Jill Sherman of **Gerding Edlen Development**. "That tilt requires the panels to be above the top of what would otherwise be the roof."

The downtown site chosen for the Oregon Sustainability Center has created challenges for designers. The building will be smack-dab in the middle of a streetcar line and be limited to a 33,500-square-foot site. And it's difficult for a 200-foot-tall structure to meet the Living Building Challenge.

Kyle Andersen, lead project designer and associate principal with **GBD Architects**, said other projects pursuing the **Living Building Challenge** are more wide than tall, allowing for more roof space to locate photovoltaics.

"Obviously, having your photovoltaic array on top of your building is the most efficient place," he said. "Earlier we were looking at a much taller building, but the roof doesn't get bigger and that's where your (photovoltaics) go."

"The top of this building is bigger than the floor plate," Andersen added. "It's striking to look at, but it's also required to meet those energy needs. In the summer, it will actually turn the meter backwards and store that energy in the power grid. In the winter, we'll be drawing off that grid."

A taller building needs more energy, so project architects have pursued novel ways to place photovoltaic panels on the high-rise.

Supplementing the main array will be other photovoltaics installed into the sides of the building itself.

Polycrystalline solar cells will be used on the 10th-floor canopy, as well as on sunshades all around the building. The building's lower canopies will use a bifacial photovoltaic that can generate electricity on both sides.

"The bifacial (photovoltaic) is not as efficient, but having different technologies on the building allows us to monitor them," Andersen said. "There's the opportunity for a solar manufacturer to come to us and swap things out with new technology. We're treating the building as a lab."

"If this building could have the same area and we could push it lower, the energy conservation measures wouldn't have to be this aggressive," he added. "But in downtown, you are restricted by the grid the city wants to preserve."

Yet a height limit on the site could throw a wrench into the development of the center. But Sherman said the city of Portland is in talks with developers to create a provision that would eliminate height restrictions for high-rise projects that target net-zero energy. The goal would be for the provision to encourage development of exceptionally sustainable buildings.

"(A height provision) has been identified as a possibility," said Michael Armstrong, senior sustainability manager with the Bureau of Planning and Sustainability. "We're looking at a range of possible options and at this point we don't have a specific course of action."