

## EMERGING TECHNOLOGIES SHOWCASE WEBINAR:

### HIGH PERFORMANCE COMMERCIAL BUILDINGS:

- DAYLIGHT REDIRECTING FILM
- SECONDARY GLAZING/INTERIOR STORM WINDOW SYSTEMS
- INTELLIGENT OUTLETS

*Jay Stein, Executive Vice President, E Source*

*Rob Curry, Senior Project Manager, Northwest Energy Efficiency Alliance (NEEA)*

*Rob Penney, Senior Energy Engineer, Washington State University Energy Program (WSU EP)*

*Rob Peña, Associate Professor, University of Washington (UW) Integrated Design Lab*

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Question and Answer Session

Daylight Redirecting Film

Jay Stein, E Source

**Q: Which orientations (N, S, E, W) are the basis of the savings analysis?**

A: The savings analysis that I gave you is based on a southern orientation. There are some other analyses based on other orientations and the film does work pretty well in those orientations too, but it's not as cost effective as those other orientations and I think it remains for some more work to be done to really sort all those issues out.

**Q: Are the savings for lighting energy or whole building energy?**

A: These are savings for lighting energy only. [Comment from Steve Selkowitz at LBNL: The savings were lighting only; not demand or HVAC impacts.]

**Q: Were there any studies done on cross effects, that is, how it affected HVAC?**

A: I haven't seen any work specifically done on HVAC effects. I actually don't know whether the simulation results I showed you include HVAC effects or not. They would be similar to what you would get for any daylighting or lighting measure. Daylighting is pretty attractive from the cooling energy reduction perspective so I'd expect kind of similar HVAC savings as we've seen in other daylighting situations.

Q: Does the cost savings analysis take into account reductions in demand charges?

A: I'm not entirely sure at this point. This is pretty early work so I would have to look into that.

Q: Does the daylight film change the exterior or interior appearance of the windows in a way that might be distracting or unappealing aesthetically?

A: I don't know if it's distracting or unappealing. The view is not as clear through the glaze. In the picture that I showed earlier, the view is not as clear through the clerestory glazing. I don't know how often people try to see outside through the clerestory glazing. In many cases it's blocked by the light shelves anyway. And yes, I think it's rare but I think some people might find that unappealing.

Q: From the pictures, it appears there may be some glare at the surface of the glazing unit, akin to fritted or frosted glazing. Have measurements been taken of the glare?

A: Lawrence Berkeley National Lab has a whole study on the glare associated with using the daylight redirecting film and they have come to the conclusion that it's not at all a problem for glare. So I would refer to anybody who's got a question in that area to review the work that Lawrence Berkeley National Lab has done in this area.

[editor's note: the study referred to is "Empirical assessment of a prismatic daylight redirecting window film in a full-scale office testbed"]

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<http://eetd.lbl.gov/daylight/daylight-field-test.pdf>

Q: What is the life of this and does it break down or yellow?

A: I would suspect it to have a long lifetime. I don't know that any of this has been out there long enough to test it for yellowing or not. I doubt that yellowing is going to be a problem but that's one that we'll have to check with 3M.

Additional questions answered off-line:

Q: As visible transmittance declines with these retrofit systems, would we expect building occupants to have a perception of the space getting darker, or would their lighting energy use rise to compensate?

A: [Rob Curry] No, you can vary that value depending on orientation so you can get it where you want. Typically you want your transmission to avoid glare at about 50%. If you get an excess of that, the blinds would be pulled down at all times to avoid glare. You can get to 70% clear but of course nobody would do that. You could probably get it down to 20%. Again, that's just tuning the glazing.

On multi-story class A buildings, the problem is solar loads, which is the opposite issue from residential that gets into these low-e systems of secondary glazing. Also, these are made with a type of aluminum that match the existing systems, which becomes very important with building owners - they disappear and match, which is important with high-dollar spaces. Also, these products have a 20-year warranty.