

SSL Postings

U.S. DEPARTMENT OF ENERGY

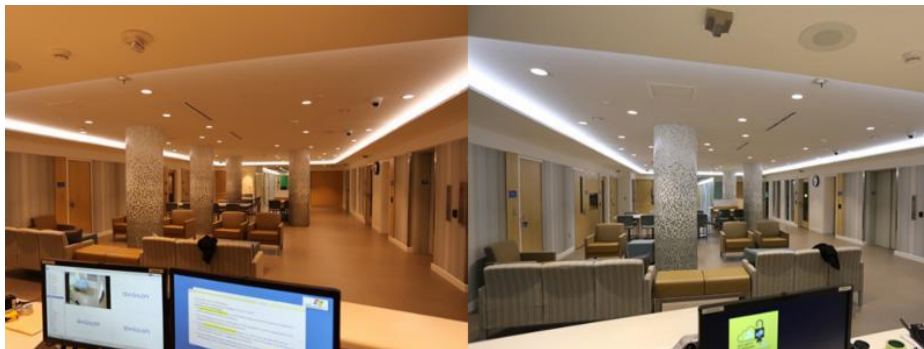
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Tunable Lighting in a Medical Behavioral Health Unit

Seattle's new Swedish Medical Behavioral Health Unit (BHU) serves adult patients who are struggling with mental-health conditions. As part of a renovation of existing infrastructure, the designers sought to leverage biophilic design tenets, incorporating color-tunable luminaires in common areas and using advanced controls for dimming and color tuning, with the goal of providing a better environment for staff and patients. ZGF Architects, which headed the renovation, invited DOE to document the performance of the LED lighting systems as part of a [GATEWAY](#) evaluation.

SSL technology provides new opportunities for controlling the intensity, distribution, and spectrum of light. Tunable LED systems enable adjustments in spectral power distribution (SPD) and light output that are easier to implement than with conventional fluorescent lighting systems. The availability of these new systems, combined with a growing understanding of the nonvisual effects of light, has increased awareness and excitement.

The lighting system for the BHU's corridors and dining/activity space was designed to operate according to a daily schedule, including a change in the SPD of the downlights throughout the day. The CCT ranged from 2400 K at night to 6000 K midday, aligning with daily color variation of the sky. The intensity level also varied, with lower levels of light through the evening and night and higher levels in the morning and early afternoon.



The project provided an opportunity to document possible benefits as well as concerns in the design, installation, and operation of tunable LED lighting systems intended to achieve biophilic and circadian goals in a specialized healthcare application. Here are some key takeaways, as described in a [new report](#):

- Tunable LED systems can provide significant energy savings compared to non-tunable alternatives, based on the dimming typically incorporated into tunable applications.

- Achieving design goals related to circadian and other biological and behavioral effects of lighting sometimes requires higher illuminances than those recommended for visual tasks, and consequently may increase energy use during the hours when those high illuminances are needed.
- Allowing the building occupant some degree of manual control can increase energy savings.
- Commissioning of tunable systems remains a challenge, given current field practices and capabilities.
- Developing a detailed specification of the desired control sequences and outcomes early in the design process can help identify potential shortcomings with the specified control solution, and can make the commissioning process more efficient.
- Estimating and measuring the SPD at expected eye locations is important for implementing circadian design goals, but there's currently no easy way to estimate the SPD at possible eye positions in an architectural space during the design process.
- Scientific evidence continues to emerge, relating the medical effects of tunable lighting to proposed lighting metrics, but none of the metrics have been formally adopted for use in lighting practice.
- Future projects would greatly benefit from collaborative design and research teams with expertise in biophilic design and in lighting and medical research.

The renovation of Seattle's Swedish Medical Behavioral Health Unit provided a chance to better understand how LED systems are delivering value to end users, and how those systems can be improved to deliver better quality and efficiency. For the complete findings, download the [full report](#).

Best regards,
Jim Brodrick

As always, if you have questions or comments, you can reach us at postings@akoyaonline.com.