

# Lighting

## Technology Families

- Integrated controls
- Advanced lamps
- Centralized DC power conversion systems
- Daylighting
- Signage

## Technology Area

LEDs and related controls continue to mature, having demonstrated their ability to achieve high efficacies and connectivity between lighting, window shades, and other building systems. New research into the role lighting plays on physical well-being of occupants may push specifiers to increase total installed lighting power, making continued development in easily installed, programmed, and tested lighting controls imperative to prevent achieved lighting demand reductions from backsliding. OLED hardware remains an immature but advancing technology. LEDs and connected lighting controls continue to draw consumer and operator interest for their non-energy benefits. Signage and indoor agricultural lighting have emerged as practical energy-saving opportunities.

## Unique Opportunities and Barriers

This sector continues to evolve with less utility ET intervention than some other sectors. However, though gains in efficiency and advanced features continue, there has been some backsliding on product quality. ETP will monitor this and intervene as appropriate to ensure maximum efficiency and quality. ETP will conduct this work with partners that include California Lighting Technology Center, other California utilities, and other lighting industry stakeholders and laboratories.

## Highlighted Priority Areas

*The “Highlighted Priority Area” tables list ETP priority = high or medium and ETP Role = Lead. As described above, none of the Lighting Technology Families meet this requirement.*

# Lighting at a Glance

Technology Family	Technology Subgroups	Definition	ETP Role	ETP Priority	Energy Savings Technical Potential				Technical Performance KI	Market Knowledge Index (KI)	Program Intervention KI
					Decarbonization Potential	Codes & Standards Alignment	Demand Flexibility Potential				
<b>Integrated controls</b>	Residential indoor/outdoor (home automation), lighting EMS	Overlays multiple functionalities of lighting, including on/off, color tuning, dimming, scheduling, and DR enabling. Uses many types of components: motion or occupancy sensing, BMS connections, etc. Also can have behavioral component.	2-Collaborate	3-Low					2-Medium	2-Medium	2-Medium
<b>Advanced lamps</b>	Residential and commercial indoor/outdoor connected lamps	Lamps that screw, snap, or plug into an existing socket (includes screw base, pin base, etc.) and are connected (has ability to communicate its status and be controlled via separate control system).	2-Collaborate	3-Low					2-Medium	2-Medium	3-Low
<b>Centralized DC power conversion systems</b>	24-48 volt DC internal grid using single transformation to power lighting systems. Higher voltage internal DC grid.	Moving from AC to DC or down-stepping DC to DC	2-Collaborate	3-Low					2-Medium	3-Low	3-Low
<b>Daylighting</b>	High performance passive daylighting, active daylighting (e.g., electrochromic), and fenestration accessories	Includes skylighting and side lighting, whether it is the glass panels or other fenestration-related technologies. Includes shading, blinds, light shelves, etc.	2-Collaborate	3-Low					1-High	2-Medium	2-Medium
<b>Signage</b>	Interior and exterior LED/LCD displays	LED billboards, message centers, menu boards and other LED or LCD displays	2-Collaborate	3-Low					2-Medium	2-Medium	3-Low