Light-RITE California
The Lighting Retrofit Information, Training and Education program – dedicated to implementing best practices in California's public buildings

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California is embarking on some of the boldest building retrofit programs in the country to address aggressive and pioneering climate goals set by the state's legislature and voters. In order to ensure that this massive investment is both well spent and achieves maximum energy savings, we need to engage rapidly in educating and training our public facility managers and decision makers on the implementation of best practices for lighting retrofits.

We need to quickly develop an integrated statewide educational program that teaches our public building facility managers best practices and implementation strategies, focusing on the top 10 lighting retrofit strategies that have been proven to reliably capture the most savings.

Background
Concern about climate change and greenhouse gas emissions has heightened public interest in programs that advance deep energy efficiency practices and parallel, concurrent investment in renewable energy, in order to reach zero net energy (ZNE) goals.

An array of legislative mandates (including AB1109 and AB32), the Long-Term Energy Efficiency Strategic Plan adopted by the CPUC, and new Building Energy Efficiency Standards (2013 Title 24 and Title 20) have provided leadership and direction supporting the underlying goals of ZNE through deep commitments to energy savings in buildings.

Perhaps one of the largest near-term opportunities for energy savings exists with relighting our public building stock (schools, universities, colleges, as well as state and municipal buildings) with highly efficient lighting technologies that have routinely demonstrated energy savings of 50% or better. Unfortunately, as a whole, facility managers and other decision makers have a limited knowledge of best practices, and they face a daunting task in selecting from a growing array of solutions.

Limited Knowledge of Best Practices
Currently facility managers and decision makers within the public sector do not have the depth of knowledge and experience required to ensure that best practices are integrated efficiently with these retrofit programs. Managers are poorly

prepared to make informed decisions when confronted with a wide range of unfamiliar technologies, implementation practices and evaluation mechanisms.

This has been a common challenge within the public building arena, where facility directors and implementers are routinely making short-term decisions that threaten to diminish both the benefit and the efficacy of large public investments in energy efficiency. Public building managers will be confronted with an ever-increasing array of new technologies and claims at the same time public funding will expand and the pressure to act will be compounded by looming deadlines to meet legislated goals. Failure to integrate best practices and effective contracting will result in lower savings, early failures and poor use of public funds.

Implementation and Contracting Challenges

Most facility managers don't understand how to develop a basic building audit, how to evaluate contractors in terms of saving benefits, and how to prioritize options and implement a lighting retrofit program. As the number of technology and implementation options grows, the tasks of starting and managing a large retrofit will become even more daunting.

Collective Action

Building managers across California are typically dealing with very similar building applications and room types with a potentially narrow set of best-practice options for retrofitting. Collective action would significantly enhance the efficacy associated with teaching best practices, particularly given the common nature of lighting interiors. For example, a finite series of best-practice lighting options has already been developed and demonstrated for classrooms, bathrooms, corridors, and private offices. We should leverage these successes and promulgate them statewide as a standard set of best-practice solutions. There is no need to research new solutions or invest in new technologies when implementing today's best practices across the board could easily reduce lighting energy use by 50 percent or more.

Secondly, the costs of these lighting retrofits could be reduced significantly with collective bulk purchases of particular best-practice technologies. This type of collaborative collective action across the public building sector could help develop and promulgate best practices across the state.

Measurement and Verification

It is critical that every retrofit project within the state's public purview include a detailed measurement and verification in order to quantify the savings actually achieved. We have found that within the public buildings sector, rigorous and standardized M&V is rarely an integral part of any retrofit program. Facility managers need to be trained in how to establish and conduct a standard assessment program.

M&V will also serve a critical role in ensuring that the state's investment in energy efficiency is both rigorous and effective in yielding a high level of savings. This will

also build public trust, a critical component for the long-term success of this publicly funded process.

Finally, M&V will provide success stories and lessons learned that will serve as examples and inform further development of ongoing training programs.

Proposal
Establishing a statewide training and education program on best practices for lighting retrofits, specifically tailored to the needs of public facility managers, is one of the best strategies we can adopt to ensure that public investments are being wisely spent to achieve the largest potential savings.

Best-practice solutions involve using technologies and approaches that have routinely been shown to achieve large savings, cost-effectively, while enhancing quality and maintenance characteristics.

Proposed Structure
We propose to establish a statewide certified training program, owned and disseminated by a consortium of public stakeholders. Program completion by at least one senior manager will be a prerequisite for any retrofit undertaken at a public facility. The program will be offered as a modular series of 7–8 integrated classes at key stakeholder sites (taught by the community colleges) and could involve an online component.

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As a long-term partner with California on energy policy, the lighting industry (NEMA) has committed strong support to helping California realize its ZNE goals, specifically, with a systems approach to applying best-practice solutions that achieve deep energy savings. The industry will partner with the state's educational collaborative in the interest of seeing a systems-based approach developed for lighting retrofits that support California's long-term ZNE goals and aspirations.

Key training modules for certificate qualification:

- Introduction to lighting technologies and efficient design
- Case studies in public buildings
- Best practices (top 10 retrofit strategies)
- How to conduct lighting audits
- Implementation/contracting/purchases
- Measurement and verification
- Maintenance practices
- Education

Next Steps
We propose convening a roundtable meeting of the Consortium of Public Building Stakeholders focused on best practices and facility manager education. This meeting will facilitate development the agreements, process elements, and work schedule for moving forward.

Appendix

Best practices *are defined as coordinated technologies, systems and design approaches that typically provide savings of 25–50 percent over standard practices while avoiding negative environmental impacts. Best practices may change over time as improved components, technologies, and design approaches become available.*
— Siminovitch et al., CPUC *Strategic Lighting Plan*

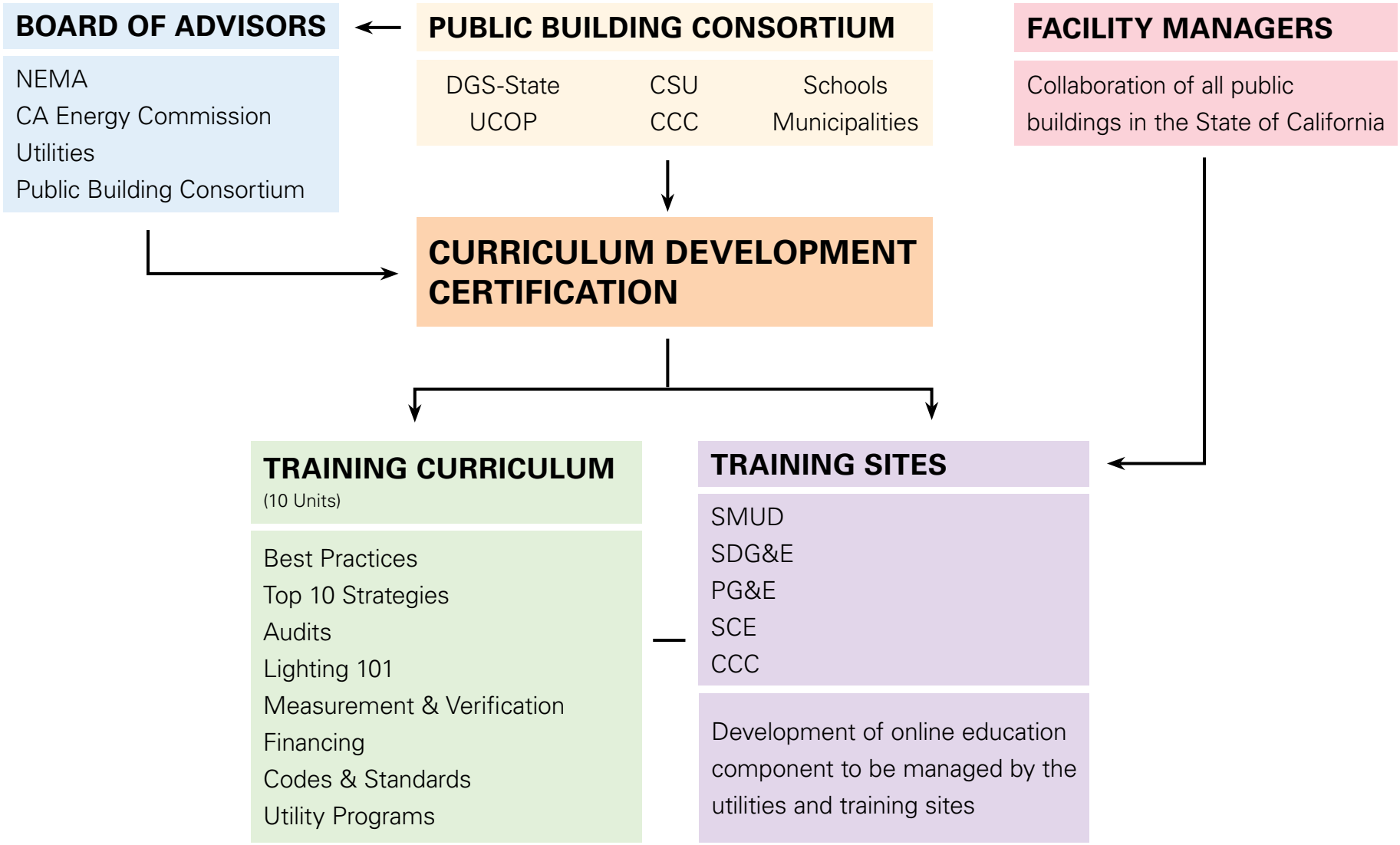
We have seen a number of key strategies that have proven to be highly effective, yielding large savings, good returns on investments, and many times resulting in improved quality and maintenance characteristics. We propose to develop this in the top practices that can be relied upon to meet savings expectations in any facility. Guidelines for best practices will further evolve based on collective action with the stakeholders and lessons learned.

Top 10 best-practice strategies:

1. Bi-level, sensor-based exterior lighting for parking, areas and pathways
2. Bi-level fixtures in all building façade and wall pack applications
3. Bi-level lighting in all stairwells
4. Sensor-based, bi-level lighting in all corridors and along paths of egress
5. Retrofit incandescent applications to LED (direction and omnidirectional) lamps
6. Bi-level, sensor-based high bay fixtures (as in warehouse and storage facilities)
7. Occupancy-vacancy sensors in all bathrooms
8. Simplified daylighting sensors in perimeter spaces and lobby/entry spaces
9. Retrofit two-circuit spaces with lighting controls that offer auto-on to 50%, manual to 100%, and auto-off settings
10. Task-ambient lighting in all office spaces

CALIFORNIA'S LIGHTING RETROFIT INFORMATION, TRAINING & EDUCATION PROGRAM: LIGHT-RITE CALIFORNIA

Giving our state's workforce the tools and training they need to apply best practices in public buildings.



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