

Finelite's Task /Low Ambient Approach: The Personal Lighting System (PLS)

Acterra Award for Environmental Enterprise

Program Summary:

Widely recognized for award-winning research and large-scale commercial lighting product innovations for **Environmental Enterprise**, Finelite works closely with leading architects, lighting consultants, engineers and contractors throughout the United States — not just as a vendor but also as a highly knowledgeable technical resource. Unlike most lighting manufacturers, Finelite is a company that embraces change. We understand that what worked yesterday may not work today; so, rather than risk becoming complacent by virtue of industry leadership or commercial success, we drive change in every department and at every level of the organization.

Our Vision: Finelite enhances people's lives and the environment through better lighting.

In 1991, Terry Clark formed Finelite, a privately held independent company. As a veteran of the lighting industry, Terry saw the tremendous value of high-performance indirect lighting in America's workplaces and schools, while recognizing the issues preventing this user-preferred lighting from becoming a standard in buildings where visual comfort, visual health and occupant performance & satisfaction are high priorities. In response, Terry founded Finelite on the premise that innovative and attractive high-performance indirect fixtures could be built to the highest quality standards, shipped and installed quickly and sold at affordable prices. Terry firmly believed that by combining these attributes with indirect fixtures capable of performing effectively in buildings with low ceilings, the world's finest workplace lighting would finally be within reach of virtually all commercial and institutional organizations. To this end, Finelite invested millions of dollars in independent research studies, illumination technology, product design, advanced manufacturing systems and environmental sustainability. Today, Finelite maintains its headquarters in Union City, California, and focuses its resources on the design and manufacture of high performance, environmentally sustainable lighting systems for offices and educational facilities. A leader in manufacturing processes and technologies, Finelite utilizes a systematic and lean component inventory approach that allows continuous product improvement while simultaneously eliminating waste. Finelite, Inc, the California Lighting Technology Center (CLTC), and the California Energy Commission, through its PIER (Public Interest Energy Research Program), partnership, have developed a Task/ Low Ambient lighting approach for office lighting that promises increased user satisfaction and energy savings of over 50%. This approach features a patent-pending, energy-efficient, LED-based Personal Lighting System (PLS). PLS gives office workers extraordinary control of the lighting on the tasks and vertical surfaces in their offices and workstations.

1. Leadership

Finelite recognizes the integral role lighting plays on a broad scale. According to a December 2007 McKinsey Report, lighting is a primary mechanism that can be used to significantly reduce CO2 emissions. Setting new benchmarks in innovation, quality,

efficiency, performance, customer service, sustainability and value has made Finelite the industry leader it is today. Our never-ending pursuit of perfection in these areas and more will not only ensure the Company's continuing leadership position, but more importantly will bring the finest workplace and educational lighting to those who will benefit the most.

Working with the California Energy Commission, through its PIER (Public Interest Energy Research Program), Finelite has developed two systems solutions designed for the two large scale markets, commercial offices and school.

For the office, the Finelite Personal Lighting System (PLS) is a unique, patent-pending solid-state tasking lighting system that offers a Task/ Low Ambient lighting approach for office lighting that promises increased user satisfaction and energy savings of over 50%. The optical performance, the temperature performance, LED selection, color binning, and luminaire efficacy have been fully documented and sets the standard for the industry.

For Schools, Finelite's dedication to lowering lighting energy consumption can be seen in our innovative approach to system-based lighting design. Take our Integrated Classroom Lighting System (ICLS), for example. Studies show that Finelite's ICLS reduces lighting-based energy consumption by an average of 30% to 50% over traditional classroom lighting while producing a lit environment teachers prefer by a wide margin over standard approaches.

President and founder of Finelite, Terry Clark, works at the state policy level supporting legislation such as Assembly member Alberto Torrico's Green-Building Bill. Assembly Bill 527 requires the Department of General Services to work with the California Energy Commission to create a state plan to implement the new technology beginning in 2009. It differs from other green building bills before the Legislature by ensuring that including technology developed by the Public Interest Energy Research Program (and funded by the State of California), such as Finelite's innovative designs, are utilized by the State.

As innovators of the lighting industry and engaged with the California Energy Commission, we champion research and design, working hard to change the market. Finelite recognizes the need for social responsibility among the large scale commercial office and school markets. By offering better lighting for buildings, focusing on innovation, and providing affordable lighting solutions that solve real problems, Finelite is truly on the forefront of driving energy policy for the state.

2. Significant Environmental Benefits

Our Personal Lighting System (PLS), designed in accordance with the federal Energy Efficiency Promotion Act of 2007, is a unique, LED based, solid-state task lighting system that allows for a 50% reduction in power consumption compared to even the most efficient fluorescent task lights. Not only are PLS fixtures manufactured in a paperless lean environment with significant amounts of recycled content, these fixtures are end-of-life recyclable, too. Their die cast aluminum and steel components are 100% recyclable,

while the other parts, comprising only 10% of the PLS total weight, are easily removable and completely lead-free. The carefully designed and patent pending thermal management of the LED junction temperature provides for greater LED life. In an office environment at an average of 6 hours use per day, that means nearly 30 years of expected life.

When PLS is used as part of Finelite's Integrated Office Lighting System (IOLS), typical offices can achieve lighting power densities as low as 0.50 to 0.65 watts per square foot. Lighting a significant number of offices with this approach would remove 1,000 MW from the California energy grid, allowing the State to meet the reductions outlined in the Governor's recent comprehensive energy plan. In fact, this Task/ Low Ambient lighting approach beats California's aggressive Title 24 standards by 50%.

Applied nationally, the potential energy savings using the IOLS approach reaches staggering levels. Assuming the lighting density of roughly 10 billion square feet of commercial office space could be reduced by one watt per square foot (a conservative assumption for IOLS); the result would be an annual energy saving of 28 billion Kilowatt-hours, which could potentially account for 2/3 of total reduction in lighting energy savings goals in the United States. That is equivalent to the output of 20 medium sized power plants — and enough energy to power 4.7 million homes. Viewed from another perspective, the energy savings would equal removing 3.2 million cars from the Nation's roads which is a significant CO2 reduction.

Environmental sustainability is one of Finelite's core objectives, one that not only applies to our products but that we constantly pursue and actively practice in every area of our business. We practice what we preach; leading by example to demonstrate that sustainable design benefits everyone.

Because we're committed to the green spirit of lighting, our fixtures are engineered with the most efficient combinations of ballasts, lamps and optics available to produce the most light from the least amount of energy. At Finelite, product sustainability doesn't end with energy savings. Many of our main fixture components contain high percentages of recycled materials, and every Finelite fixture goes through an environmentally friendly powder coat paint process. Even our packing and shipping methods are sustainability-driven: special palletized packing allows us to eliminate the need for boxes that would otherwise be discarded soon after arrival at the jobsite.

Finelite's sleek indirect / direct ambient fixtures utilize patented optical technology to allow unprecedented spacing between fixtures without sacrificing lighting quality. Not only do wider fixture spacing translate to fewer fixtures and therefore lower energy consumption, the ability to mount so close to the ceiling means that low ceiling heights no longer preclude the use of high-performance, visually comfortable lighting. The result: tremendous energy savings in a far greater number of buildings. Further, the reduction in floor-to-floor height requirements made possible by the system would translate into a reduction in necessary building materials for new construction.

3. Potential Model for Business Community

Finelite's Personal Lighting System is easily transferable, cost effective and user friendly. When combining PLS with indirect/direct fixtures capable of performing effectively in buildings with low ceilings, the world's finest workplace lighting is within reach of virtually all commercial and institutional organizations. Finelite has invested millions of dollars in independent research studies, illumination technology, product design, advanced manufacturing systems and environmental sustainability.

Our own office design blends layers of light creating an office space that is affordable, energy efficient and comfortable for all employees. Using this approach Finelite is able to showcase very affordable, sustainable office space with excellent light. We have discovered that our employees are extremely satisfied with the level of personal control they have over light levels at their individual workstations. User's preferences vary for reasons, such as the aging eye. It is becoming increasingly more important as today's workforce is primarily comprised of the baby-boomer generation. Research shows that this aging workforce is requiring more light to continue optimum performance while legislation is requiring less energy be used in offices. The affordable, sustainable solution is Finelite's PLS.

Finelite's ICLS system is demonstrated in a working classroom, used extensively as a training facility for architects, engineers, lighting consultants, and members of the local and national business community.

Finelite is an active participant in energy-related lighting research, allowing objective evaluation of the success of our theories and technologies in real-world settings. Why is Finelite so firmly committed to objective research? Because energy conservation and sustainable design in the built environment is simply too important to leave to subjective interpretation.

4. Demonstrating Program Commitment

In addition to offering tremendous energy saving benefits, PLS is beautiful and sustainable with proven performance, having recently won the US Department of Energy's "2007 Lighting For Tomorrow" Solid State Lighting Competition in two out of four categories. Using a long-life and energy-efficient LED light source PLS provides high-quality white light for more than 45,000 hours, nearly 30 years of useful life in typical office applications. Consciously employed as a sustainable strategy, a minimalist design aesthetic uses little material in the product manufacturing. When end of life does occur, units may be disassembled and recycled. Over 98% of the unit is steel, aluminum, cooper, or cardboard shipping materials, all of which can be 100% recycled.

Using our website and unique marketing approach, Finelite ensures the continued success of the task / low ambient lighting system. The Finelite team strives to get the word out to the community through educational tours and training sessions. Using our office to showcase our sustainable design, Finelite gave onsite office tours to over 200 key lighting

industry professionals in 2007. Through our involvement with Sustainable Silicon Valley Leadership Group we were recently honored with a visit from Governor Arnold Schwarzenegger which further exposed our approach to the community. This year Finelite experts will reach out to agencies, designers, architects, and engineers by offering an AIA training course nationwide to bring our **Environmental Enterprise** innovations into the hands of those who execute and make decisions in building design.

5. Collaborative Effort

The Integrated Office Lighting System Project is research in progress, being conducted by the California Lighting Technology Center, located in Davis, CA. The goal of this project is to develop, demonstrate, and commercialize an office task / low ambient lighting system that operates at about 0.7 to 0.8 Watts per square foot connected load, providing uniform illumination while meeting Illuminating Engineering Society of North America (IESNA) recommended target illumination levels for general office work. Results are showing that as low as 0.5 Watts per square foot is feasible for an office task / low ambient lighting system, less than half of the current Title 24 (California's energy standard) lighting power density allowance.

The first phase of the IOLS research project includes the development of an LED-based task lighting system with occupancy sensing controls, limited power usage, easy positioning, and high quality illumination of horizontal tasks and select vertical surfaces. As the outcome of this first phase, Finelite, in conjunction with the California Lighting Technology Center, developed the patent pending Personal Lighting System (PLS), manufactured by Finelite.

Additional components of the IOLS research project includes field demonstration projects to document the energy savings potential of the IOLS design approach as well as occupant satisfaction. Preliminary results are showing that, PLS achieves up to 50% energy savings over current fluorescent task and undercabinet light fixtures. Because PLS provides such high-quality task lighting, the ambient light in the office can be reduced by an additional 35% to 50%. Together, this yields energy savings of up to 70% for new construction and even more when remodeling older offices. Integral occupancy sensor control provides additional savings in intermittently occupied work areas. Findings also show dramatic increases in user satisfaction; widespread adoption of IOLS not only saves energy and reduces greenhouse gas emissions, but improves productivity levels for the ten billion square feet of commercial office space in the U.S.

With the CLTC, Finelite continues to gather research which will galvanize the legislators in their efforts to educate the community. State government agencies promoting Finelite's PLS office task / low ambient lighting system will perpetuate California's progressive energy standards and facilitate the U.S. energy savings and greenhouse gas reduction goals.