

NATIONAL ENERGY ISSUES TO WATCH:

1. **Consumer Reports Shines a Light on The Best CFL and LED Bulbs** - The days of inefficient light bulbs are slowly coming to an end and recent tests from Consumer Reports showcase more than 30 different compact fluorescents and light-emitting diodes that can brighten indoor and outdoor spaces. Consumer Reports' comprehensive report on CFL and LED bulbs reveal that many problems of the earlier versions have been overcome and that these new efficient bulbs last longer and use far less electricity than the traditional incandescent bulbs. Shoppers now have a variety of different bulbs to match their needs. The full report will be available exclusively for Fans on Consumer Reports' Facebook Page (www.Facebook.com/ConsumerReports). Also online at www.ConsumerReports.org additional information can be found on light bulbs and further energy saving products. Check for rebates and coupons. Visit www.dsireusa.org/incentives or www.energystar.gov to find utility rebates and manufacturer rebates and coupons.

2. **EPA Directive 2011-06: ENERGY STAR Verification Testing Supplement** - Attached EPA Directive 2011-06, "ENERGY STAR Verification Testing Supplement: Selecting Products, Obtaining Products, and Reporting Results." This document provides additional guidance to EPA-recognized certification bodies on conducting verification testing. It is intended to serve as a supplement to EPA's general requirements for certification bodies. For general information on EPA's third party certification procedures for ENERGY STAR products, as well as a list of recognized laboratories and certification bodies, please visit: www.energystar.gov/3rdpartycert

3. **Getting the LEDs Out by Doug Chandler** - Solid-state lighting may save the free world. Someday. Probably not this month. The reality is that the whole lighting industry, and the broader electrical and construction and design and energy-efficiency markets of the world as well, are all waiting and watching for the light-emitting diode (LED) of their dreams — the one that will finally make incandescent, fluorescent, HID and all the other incumbent lighting technologies obsolete — to emerge onto the market in a blaze of light.
http://ewweb.com/mag/electric_getting_leds/

4. **Cree Acquires Ruud Lighting, Inc. to Accelerate the LED Lighting Revolution** - Cree, Inc. today announced the acquisition of Ruud Lighting, Inc., a leader in LED outdoor lighting, at an estimated net cost of approximately \$525 million. Combining two highly complementary LED innovators, the acquisition allows Cree to extend its leadership position and increase the adoption of energy-efficient LED lighting. 8/17 BUSINESS WIRE

5. **LED Market to Expand in U.S., Europe** - Analysis from Frost + Sullivan revealed that the light emitting diode (LED) market is primed to grow explosively in the next several years. The study estimated that the market, which earned revenues of almost half a billion in 2010, could reach as high as \$2 billion in 2017. The study from Frost + Sullivan concludes that the best way to help narrow that cost gap and continue market expansion is to increase awareness about the benefits of LED technology. Not just for now, but for the future, as well.
www.csemag.com

6. **DOE Relaunches its Energy.gov Website** - DOE announced on August 4 that it has relaunched the Energy.gov website as an interactive information platform offering localized data and resources to save energy and money. The new website makes it easier for visitors to get information specific to their cities, counties, and states, including information about energy tax credits, rebates, energy saving tips, and grant opportunities.
<http://energy.gov/> Also available on the EERE Web site: <http://apps1.eere.energy.gov/news/enn.cfm>

7. DOE Announces Funding Opportunities for Solid-State Lighting: Core Technology Research and Product Development (Round 8) - The U.S. DOE announced two Solid-State Lighting (SSL) funding opportunities on August 12, 2011. Under these funding opportunities, DOE seeks applications for projects to advance research, development, and market adoption of SSL technology. The funding is directed toward two existing DOE SSL R&D program areas for Core Technology Research and Product Development. DOE is soliciting SSL projects in the following categories:

- Core technology projects focus on applied research for technology development, with particular emphasis on meeting efficiency, performance, and cost targets. Selected projects will fill technology gaps or provide enabling knowledge or data.
- Product development projects focus on using the knowledge gained from basic or applied research to develop or improve commercially viable materials, devices, or systems. Selected projects will develop targeted market applications with fully defined price, efficacy, and other performance parameters necessary for success of the proposed product.

Applications are due November 3, 2011. For more information on the new funding opportunities, visit the DOE website at <https://eere-exchange.energy.gov/>

8. Halogen A19 lamps - Bulbrite's Eco-Friendly Halogen A19 lamp complies with the Energy Independence and Security Act (EISA), which takes effect Jan. 1, 2012 and requires general-service light bulbs to operate up to 30 percent more efficiently than current standards require. Consumers will gain the benefits of higher efficiency and superior lighting quality, giving them an alternative to CFLs and LEDs. The Halogen A19 is fully dimmable and can last up to 1,000 hours. <http://www.bulbrite.com/>

9. ASHRAE is now writing a guideline, SGPC 10, Interactions Affecting the Achievement of Acceptable Indoor Environments. <http://www.ashrae.org/pressroom/detail/2011-03-18>

10. USB Receptacles - Developed in response to the surge of consumer portable electronic devices that must be charged using a USB connection, Cooper Wiring Devices' combination USB charger with a tamper-resistant receptacle is ideal for residential, commercial, educational, municipal and hospitality applications. http://www.cooperindustries.com/content/public/en/wiring_devices.html

11. Loan Programs Wind Down - The two biggest clean energy programs to come out of the Recovery Act have been the cash grants in lieu of tax credits, and the federal loan guarantees for projects and innovative technologies. The loan programs' time is winding down. The U.S. DOE's Loan Programs Office provides a \$70 billion dollar investment program in alternative energy, financing a wide range of solar, wind, geothermal, bio-fuels, fossil and nuclear energy projects. Since March of 2009, the office has issued 42 conditional commitments for loans and loan guarantees totaling over \$40 billion with total project costs of \$63 billion. Most of the program winds down at the end of the current fiscal year on September 30. There are some project closings and some funds for additional elements to continue through the winter. A \$200 million proposal to continue some project financing in fiscal year 2012 is in the next budget. <http://loanprograms.energy.gov/>

12. Moat Prospects Dim for Lighting Equipment Manufacturers - A Field of Three Shrinks to One -Philips appears to have won the war of attrition among the giants, with Siemens pushing Osram to be independent and GE's laissez faire approach making it less of a player than before. While the conglomerates typically have strong manufacturing expertise and lower manufacturing costs, they prefer to compete in the market on technology and value added to the consumer, not simply on price. In order to continue pursuing that path in LED lighting, we think the incumbents will need to materially step up research and development, acquisitions, and capital spending in this area to have capable products in an increasingly competitive field. Given that General Electric and Siemens both have more compelling investment opportunities within their broader portfolios, we think their decision to step back from lighting makes sense and is prudent for shareholders. We expect firms like Hubbell, Cooper Industries, and Honeywell to benefit in the coming years from growing demand lighting controls and for quick and easy energy-efficient retrofits for buildings. <http://news.morningstar.com/articlenet/article.aspx?id=390212>

13. **Energy Efficiency: A Rare Bipartisan Issue** - At this time of partisan wrangling in Congress, energy efficiency stands as a rare issue that crosses party lines to garner bipartisan consensus. That comes as no surprise to efficiency advocates, who know that energy-efficiency programs are one of our best national investments. By lowering energy costs, they return more money to the economy than they cost taxpayers. The ENERGY STAR program that labels the most energy-efficient products on the market is a prime example. At a cost to the federal government of well under \$100 million annually, ENERGY STAR products cut energy costs for consumers and businesses by a whopping \$17 billion in 2009 alone! 8/16 AOL Energy

14. **NAESCO Northeast Regional Meeting** - September 19, 2011 - Con Edison Building, 4 Irving Place, New York, NY. The NAESCO Northeast Regional meeting will focus on the project implementation and program challenges remaining in one of the most robust markets for energy efficiency in the United States.

<http://www.naesco.org/events/meetings/northeast/2011/registration.htm>

15. **Electric Vehicle Market Forecasts** - Production of electrified vehicles is gearing up all over the world, and automakers are planning to launch an increasing variety of new models over the next few years. Hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and battery electric vehicles (BEVs) will all share the market stage as electrified vehicles continue to capture a larger portion of the total vehicle market. Pike Research anticipates that the annual market for hybrid electric and plug-in electric vehicles will grow to 2.9 million vehicles by 2017. This report analyzes the key market forces playing a role in the electric vehicle market and provides comprehensive lists of expected vehicle launches.

<http://www.pikeresearch.com/research/electric-vehicle-market-forecasts>

16. **Demand Side Management Solution, Free Industry White Paper** - Utilities are increasingly focused on conservation and managing energy demand. Many markets and jurisdictions want to reduce carbon dioxide emissions, increase use of renewable energy, and decrease energy consumption and demand. To achieve these goals, utilities need greater influence over customers' energy efficiency – a function of how much energy they use and when they use it – through energy efficiency and demand response programs. SAP® software for demand side management will help manage your portfolio of programs – from design and marketing to enrollment and payment of incentives – while providing visibility across your organization. http://www.pennenergy.com/index/research-and_data/white-papers/whitepaper-display/8776960220/whitepapers/pennenergy/general/demand-side_management.html

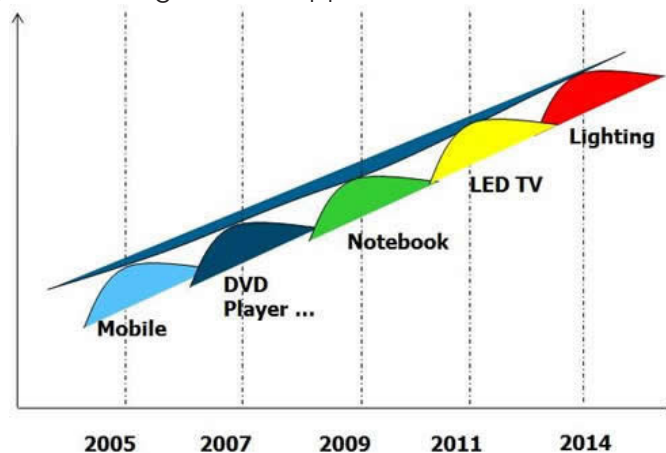
17. **Keeping Manufacturing in the United States** - The U.S. solid-state lighting (SSL) industry sits on the cusp of major technology advances that will revolutionize the industry and greatly accelerate energy efficiency here and around the world. In 2007, lighting manufacturers employed almost 60,000 people nationwide and shipped products valued at \$13.5 billion. Large and small manufacturers, as well as technology start-ups, are well aware of the worldwide regulatory trend toward more energy-efficient lighting. In 2009 alone, U.S. companies, many of them start-ups, raised about \$300 million in venture capital for advanced lighting products. However, as in the semi-conductor and information technology sectors before, U.S. solid-state lighting companies are faced with economic factors that have led to the globalization of those industries, including lost jobs, a dispersal of the technology infrastructure largely built in this country, and ultimately a U.S. trade deficit. DOE aims to help improve U.S. manufacturing efficiency and avoid the loss of technological expertise, intellectual property and manufacturing jobs to other countries.

http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_whitepaper_july2010.pdf

18. **Standard 90.1-2007 Established as National Reference Standard for Federal, Commercial Buildings by DOE** - ANSI/ASHRAE/IESNA Standard 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential Buildings, has been established by the DOE as the commercial building reference standard for state building energy codes under the federal Energy Conservation and Production Act. As a result, states are required to certify by July 20, 2013, that they have reviewed and updated the provisions of their commercial building code regarding energy efficiency, including a demonstration that the provisions of their commercial building codes regarding energy efficiency meet or exceed 90.1-2007. The DOE also has issued a rule that requires new federal buildings, for which the design for construction begins on or after Oct. 11, 2012, to meet the requirements of 90.1-2007. <http://www.ashrae.org/pressroom/detail/standard-established-as-national-reference-by-doe>

19. **DOE Announces Round 8 Funding Opportunities for Solid-State Lighting** - The US DOE has announced two solid-state lighting (SSL) funding opportunities seeking applications for projects to advance research, development, and market adoption of SSL technology. The funding is directed toward two existing DOE SSL R program areas for Core Technology Research and Product Development: (1) Core technology projects; (2) Product development projects. Potential applicants should note that the response time for both opportunities has been lengthened and applications are due 3 November. http://www.semiconductor-today.com/news_items/2011/AUG/DOE_240811.html

20. **LED Market Continues to Grow Rapidly, Transitioning to Lighting Applications** - Backlight Demand Predicted to Peak in 2013, to be Overtaken by an Increased Demand for LED Lighting. As shown in the latest DisplaySearch Quarterly LED Supply/Demand Market Forecast Report, market indicators continue to predict a rise in LED usage across applications, with lighting leading the way in LED applications with a predicted increase of 20% over 2010. The total package revenue for backlight and lighting applications was \$7.2 billion in 2010 and is forecast to reach \$12.7 billion in 2014. A heightened demand for LED lighting applications is the main driver of this dramatic increase. Fortunately, suppliers have taken note of these trends and have planned for increased capacity in the future. In 2011, DisplaySearch predicts global LED capacity will reach 180 billion units, and by 2013 will reach 227 billion. Figure 1: Changes in LED Applications Over Time



21. **2011 ENERGY STAR Products Partner Meeting** - With planning for the 2011 ENERGY STAR Products Partner Meeting underway, EPA anticipates that the online meeting registration system will be available to partners in late August.

22. OUCH! More Bad Economic News - Gross domestic product growth rose at annual rate of 1.0 percent the Commerce Department said, a downward revision of its prior estimate of 1.3 percent. In the first quarter, the economy advanced just 0.4 percent. The government's second GDP estimate for the quarter confirmed growth almost stalled in the first six months of this year. Economists estimate that the natural rate of unemployment is 5.2 percent. If the economy began growing immediately at the same rate the payroll survey reported during the tech bubble (+265,000 jobs per month), unemployment would not return to this level until mid-2014. More realistically, if employers began hiring at the same average rate they did during the 2003-2007 expansion (+176,000 jobs per month), unemployment would not return to its natural rate until 2018.
<http://heritageaction.com/2011/08/ouch-more-bad-economic-news/>

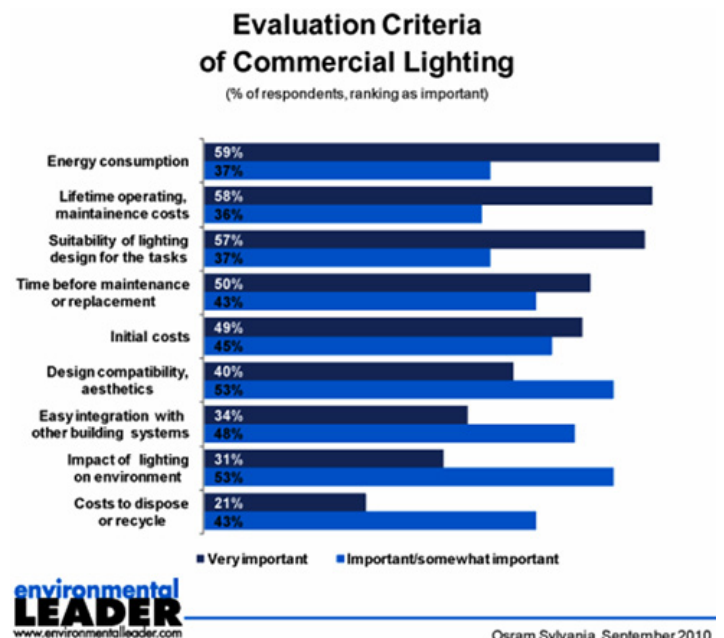
23. Report Outlines Breakthroughs in Energy Efficiency for Buildings - The DOE's Pacific Northwest National Laboratory (PNNL) authored the report, which investigates 190 research and development projects sponsored by the department from fiscal year 2005 to 2009. Technologies detailed in the report are organized in four critical areas: building envelope, HVAC and water heating, lighting and windows. The report highlights:

- 11 commercially available products
- 41 emerging technologies projected to enter the market within the next three years
- 68 technologies being researched for potential market introduction

<http://www.edcmag.com/articles/report-outlines-breakthroughs-in-energy-efficiency-for-buildings>

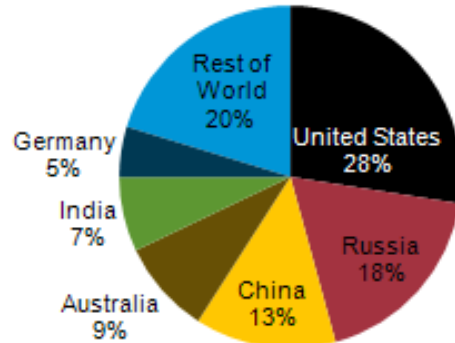
24. Industrial Market: Opportunity for Energy Efficiency Growth by Dan Carazo - The single largest mega-market in the U.S. economy for future energy efficiency gains is the Industrial Sector. Since 1980, the U.S. Industrial Sector has cut the amount of energy it uses to produce each dollar's worth of goods in half. Yet despite this, the total energy consumption for industrial use has increased dramatically over the past three decades. The share of electricity utilized by the industrial sector increased between 1990 and 1994 from 25% to 35% of all U.S. energy consumption. By 2007, the U.S. Industrial Sector was responsible for nearly 32% of the country's entire energy consumption with electricity representing the single largest percentage of the consumed fuel that powers industry. As companies have become more concerned with their operational costs, energy efficiency solutions are increasingly being adopted by industrial customers. Since 2000, according to Trends in Global Energy Efficiency, 2011, a report published by ABB, the industrial sector's energy consumption has steadily declined by 2.9% per year, falling by 12% in 2009 alone with electricity accounting for 26% of all industrial energy sources. Energy-efficient upgrades—including lighting, motors, drives and solar energy production—will remain top choices. <http://tedgreenroom.com/>

25. How Commercial Lighting Is Evaluated - Graphic from OSRAM Sylvania, as posted to www.EnvironmentalLeader.com



26. **United States Leads World in Coal Reserves** - The United States leads the world with over 260 billion short tons of proven recoverable coal reserves—28% of global reserves. Recoverable domestic coal reserves, at current mining levels, would last 222 years.

Global share of recoverable coal reserves



27. **Encellium Technologies to Exhibit at IDEX/Neocon Canada Sept. 22-23** - A web-based application, Polaris 3D provides an industry first 360-degree, three-dimensional view of lighting energy use in a building or complex. The software is used to commission, configure and manage Encellium's ECS, which has been proven to cut lighting energy expenditures by 50 to 75 percent and significantly reduce CO2 emissions. With Polaris 3D, users will no longer need to navigate through single floors, or a 'tree architecture,' to reach a specific control zone. Instead, they will get a 3D, colorized thermo-graphic view of system parameters to identify areas and trends of lighting inefficiencies throughout a building. <http://idexneocon.com>

28. **LSCG Announces Sub-\$15 LED Lamp** - Lighting Science Group and Dixon Technologies India Pvt. Ltd has announced a high-performance, sub-\$15 omnidirectional 60-watt equivalent A19 LED bulb that will be available in India by the end of the year and will be sold worldwide by Lighting Science Group early next year. Utilizing Lighting Science Group's revolutionary technical design, the bulb is the first in a series of products being jointly manufactured and distributed by the two companies. The full line of products will include street lights, outdoor and industrial light fixtures and replacement bulbs. The Indian market for LED lighting is expected to grow to \$400 million by 2015 (53% per annum), making it one of the fastest-growing sectors of one of the fastest-growing economies in the world.

29. **Lutron Services Company Expands National Authorized Service Network through Agreement with SYLVANIA Lighting Services Company** - Lutron Services Co., Inc. (LSC) recently announced that SYLVANIA Lighting Services Corp. (SLS) has become an Authorized Service Center Subcontractor. Under the agreement, SLS will perform services related to Lutron Electronics Co., Inc. commercial lighting controls products, including system start-up services, system programming, warranty and post-warranty support services. In addition, SLS service maintenance customers now have the opportunity to explore a broader set of services within one convenient SLS support plan that can include Lutron Field Service Engineers performing technical support and inspection of Lutron interior lighting controls systems.

30. **New LED Lasts 25,000 Hours** - Omni-directional LED A-Line lamp from OSRAM SYLVANIA, available in two wattages equivalent to 40w and 60w incandescents. Energy efficient, dimmable and available this summer. <http://www.sylvania.com/BusinessProducts/Innovations/LEDLampsandRetrofits/>

31. **Osram IPO Threatened by Economic Woes and LED Slowdown** - Siemens has planned to take its lighting subsidiary Osram public in a fall IPO, but bad news in financial markets and slower than expected LED sales could change those plans. Siemens AG announced in March a plan to publicly list its Osram GmbH LED and lighting subsidiary in an initial public offering (IPO) planned for this fall, but recent stories in the press have suggested that Siemens may change its plans. The combination of a tough solid-state-lighting (SSL) market and weakness in the equity markets may have significantly lessened the potential IPO value. A Reuters story published earlier this month was among the first to suggest that Siemens might delay the IPO or pursue a different strategy for spinning out the Osram unit. Analysts that had valued Osram as high as 6 to 8 billion euros (\$8.6 to \$11.4 billion) now expect a drop in valuation of as much as 35%. <http://www.ledsmagazine.com/news/8/8/28>

32. **Siemens** - A Bloomberg report quoted an ING Groep NV analyst saying that Siemens, with a \$19 billion "acquisitions war chest," would soon take advantage of the recent plunge in valuations and begin buying.

33. **Philips Recalls Reflector Flood Lamps** - On August 11, the U.S. Consumer Product Safety Commission (CPSC) announced a voluntary recall from Philips Lighting Company of Somerset, N.J. Philips has recalled about 1.86 million EnergySaver (aka Marathon or Marathon Classic) compact fluorescent dimmable reflector flood lamps due to a laceration hazard. According to the CPSC news release, "The glue that attaches the glass outer envelope or globe to the body of the lamp can fail allowing the glass outer envelope to fall and strike persons and objects below, posing laceration hazard to consumers." The products involved in the voluntary recall were manufactured from March 2007 through May 2010. <http://www.cpsc.gov/cpsc/pub/prerel/prhtml11/11302.html>

34. **Philips Introduces Fortimo LED HBM High-Brightness Module** - Philips today announced a new addition to its Fortimo LED family - the Fortimo LED High Brightness Module (HBM). Fortimo LED HBM is an easy to design-in, compact, high lumen LED module for white light applications. The product delivers all the benefits of LEDs without the complexity and recurring R&D costs of lens optics-based LED solutions. <http://www.ledsmagazine.com/products/32205>

STATE ENERGY ISSUES TO WATCH:

- 1. NYSERDA Announces \$3 Million Rebate Program** - The New York State Energy Research and Development Authority announced a \$3 million rebate program for the purchase of high-efficiency ENERGY STAR refrigerators and clothes washers. The program, which was announced Wednesday, will begin Sept. 2. Rebates of \$350 will be available for high-efficiency refrigerators and \$250 for high-efficiency clothes washers that meet Consortium for Energy Efficiency super-efficiency levels. More information about eligible appliances is available at www.cee1.org
- 2. MEA Announces Its Clean Energy Programs for Fiscal Year 2012** - The Maryland Energy Administration's has announced its fiscal year 2012 clean energy programs. The programs include Save Energy Now and the Lawton Loan program (targeting the industrial sector), grants to homeowners installing solar, wind and geothermal (the Residential Clean Energy Grants program). <http://www.energy.state.md.us/News/documents/AugustNewsletter.pdf>
- 3. Chelan County, WA PUD to Distribute Energy-Saving Light Bulbs to Customers** - Chelan County PUD has announced that the company will distribute free energy-saving light bulbs to customers. Customers can visit any PUD office in Wenatchee, Leavenworth or Chelan to receive a bag of 20 CFLs. In the average home, lighting accounts for about 20 percent of the electric bill. The easiest way to start saving energy is to switch to compact fluorescent bulbs, the company said. 8/17 Datamonitor
- 4. City Making Streetlights More Energy-Efficient** - The city of Merced, CA said it will begin retrofitting its streetlights today to install energy-efficient lights. The city contracted with Siemens Industry for a \$7.2 million energy-efficiency project to lower its utility bills, boost efficiency and become greener, according to a news release. The city owns more than 5,600 streetlights. 8/17 www.mercedsunstar.com
- 5. Energy Upgrade California for Commercial Properties** - Only single-family detached houses are eligible for Energy Upgrade California rebates and incentives at this time. The Energy Upgrade program for existing commercial buildings is being developed. The energy reduction targets and specific types of upgrades will be tailored to the commercial building envelope and business uses. The launch date will be announced on this website: <https://energyupgradeca.org/county/orange/commercial>
- 6. 10,000 Commercial Green Building Projects Earn LEED Ratings** - The U.S. Green Building Council reached a new milestone today with its Leadership in Energy and Environmental Design rating system: The 10,000th commercial building project was certified to the organization's standards. LEED-certified commercial space now totals 1.3 billion square feet of property around the globe. <http://www.greenbiz.com/news/2011/08/31/10000-commercial-green-building-projects-earn-lead-ratings>
- 7. New NanoMarkets Report Forecasts European OLED Lighting Market to Reach \$1.5 Billion by 2016** - Industry analyst firm NanoMarkets has released its latest report titled, "OLED Lighting Markets Europe-2011," that says the market opportunities in Europe for OLED lighting will generate \$1.5 billion in OLED lighting panel sales by 2016. <http://www.nanomarkets.net>

MONTHLY FEATURE:

SSL POSTINGS - POSTINGS@LIGHTINGFACTS.COM

Because solid-state lighting has the potential to last longer than traditional lighting technologies, addressing product reliability or lifetime has been a key issue for SSL. So it's not surprising that lifetime was one of the topics under discussion at the U.S. DOE sixth annual SSL Market Introduction Workshop, which was held last month in Seattle. Figuring prominently in several discussions was IES TM-21, a much-anticipated method for extrapolating the lumen maintenance of LED products, which a technical committee of the Illuminating Engineering Society of North America (IES) has been working on for some time. But TM-21 was mentioned in Seattle with the caveat that it was not yet approved, which made its inclusion in any sustainability or lifetime equation somewhat premature.

That status has changed, however, with the final IES board approval last week of TM-21. To understand why that's big news for the industry, it's helpful to take a step back and look at two related IES standards: LM-79 and LM-80.

LM-79 is an approved method for taking electrical and photometric measurements of SSL products. It covers total flux, electrical power, efficacy, chromaticity, and intensity distribution - and applies to LED-based products that incorporate control electronics and heat sinks (including integrated LED products and complete luminaires), but not to bare LED packages and modules, nor to fixtures designed for LED products but sold without a light source. Unlike traditional photometric evaluation, which involves separate testing of lamps and luminaires, LM-79 tests the complete LED luminaire because of the critical interactive thermal effects. While LM-79 doesn't address product reliability or life, it does provide for the important calculation of complete luminaire initial efficacy.

LM-80 is an approved method for measuring the lumen maintenance of LED packages, arrays, and modules at various temperatures. It specifies a minimum testing period of 6,000 hours, although 10,000 hours is preferred, and it requires testing at a minimum of 1,000-hour increments. But LM-80 provides no determination or estimation of expected life or lumen output beyond the test data - which, even with 10,000 hours of testing, falls far short of the claimed lifetimes of most SSL products on the market today. That's where TM-21 comes in.

Whereas LM-80 only defines how to collect LED lumen maintenance data, TM-21 spells out a way to use that data to estimate the lumen output beyond the LM-80 test period. So the two methods are designed to work hand-in-hand, with TM-21 providing a way to project the lumen maintenance of an LED and help estimate the potential useful life of an LED luminaire.

However, it's important to note that TM-21 focuses on a specific light source component (package, module, array), not on an entire luminaire. A complete luminaire is a complex system, with many other components that can affect lifetime - such as the driver, optics, thermal management, and housing. The failure of any one of these can mean the end of the luminaire's useful life, even if the LEDs are still going strong. So any meaningful projection of lifetime has to take all of these components into account, and not just focus on the LEDs.

This means that, in helping to project the expected lumen output of the light source as part of a total system, TM-21 is just the first step. But it's an important first step, and it means that the journey to nailing down the issue of useful SSL lifetime has finally begun.