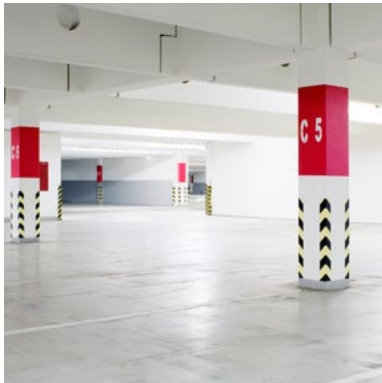


THE PROGRESSIVE REVOLUTION



EFFICIENT FOR A NEW ERA

DAWN OF A NEW VISION



Table of Contents

Time is Money – Join the Ongoing Lighting Revolution Today!

- 1** :: SunView LED Lighting: Our Difference, Your Gain
- 2** :: Start of the New Lighting Era
- 3** :: Smart Street Lighting, Smart Buildings, Smart City, Smart Grid
- 4** :: The Energy Savings Plan (ESP)
- 5** :: The Benefits of LED Lighting
- 6** :: Planning and Presentation of the Retrofit Process
- 7** :: Project Analysis, Program Audit, and Payment Plan
- 8** :: Performance Specifications
- 9** :: Safety and Cleanup Specifications
- 10** :: Product, Work, and Warranty Specifications
- 11** :: SunViewLED - Industry Leader

Reference Credits



SunView LED Lighting: Our Difference, Your Gain

Who is SunView LED Lighting?

SunView LED Lighting is a unique environmentally conscientious company that combines breakthrough technologies for customized lighting solutions with affordable energy efficient programs. These programs offer a range of **pay from the savings for the project implementation** with realized expense reduction immediately upon installation. SunView is also unique in that we manufacture our own products. Therefore, we can design lighting for our customer's specifications, needs, and budget. Our products are ecologically sound and contribute to a cleaner and greener world. Our customers enjoy the benefits of enhanced upgraded living and working areas, reduction in energy use, savings in electricity costs, and safer, healthier environments. We are dedicated to offering our customers detailed services that accommodate their needs into the future and provide a 'win-win' situation for all involved.

Why are SunView LED Lighting Solution Products Different?

SunView LED Lighting products are beyond comparison to other lighting products in the LED lighting industry. Our real difference benefits our customers exclusively and places our products as the quintessential solution for lighting worldwide. We do not state this to compete with others in the industry. The reality is that our technology is so advanced, that we leave the rest of the industry to itself and move forward with the most innovative energy efficient and cost savings products available in the market today. Our Research and Development team continuously improves our technology. Our competitors merely try to emulate us.

Although we carry the same credentials and certifications as others in the industry, our technology soars above them. No one compares to the details of our luminosity, wattage, temperature range, and power factors. Our laboratories are constantly striving to even outdo ourselves to bring to our customers the finest products in the industry. Our components contain only the finest technology from Japan, Korea, and the United States. We never use inferior technology to reduce costs. This is why SunView LED Lighting leads the industry.

Our Representatives will be glad to discuss the details of our cutting edge lighting products with you. Here are the basic highlights of the LED bulbs developed by SunView LED Lighting's incredibly advanced technology:

- ❖ We have the **highest lumens per wattage** in the Industry.
- ❖ We have the **lowest wattage** in the Industry.
- ❖ We have the **lowest LED light source temperature** in the Industry.
- ❖ We have the **highest power factor** in the Industry.

WELCOME TO THE
FUTURE VISION

- ❖ We utilize only the **finest lighting technology** from Japan, Korea, and the United States.
- ❖ We **manufacture and develop** our own products.

Because of the above, the average lifespan of a SunView LED bulb far exceeds those of our competitors. The higher the lifespan of the bulb results in the longer span of light available. Therefore, longer lifespan translates into our customers saving more money over a longer period of time just by choosing our LED bulbs for their retrofitted and custom lighting solutions. And finally, because we directly develop, design, research, and manufacture our own products, there are no outsourcing or middle distribution issues for our customers.

With SunView LED Lighting, the customer receives the best savings over time, the finest product on the market, and one hundred percent of the benefit of our manufacturing and technological expertise. Why go anywhere else?

What distinguishes SunView LED Lighting from other companies?

Beyond what we have already stated regarding our independent manufacturing status, ability to custom design bulbs, and the use of the finest technology for LED bulbs in the industry, we have a partnership with **APANET Green Technology Systems** that further indicates our determination to provide the most comprehensive lighting solutions possible. This gives our customers the ability to layer platforms for application development into the future.

APANET Green Technology Systems is a preeminent company focused on the reduction of energy consumption by implementing better technological intelligence for use of that consumption. Their work began with environmental protection in the workplace, but their ability and goals extend much further. Their experience in control managed automated buildings has led them to broaden their services into solutions for Smart Street Lighting. Utilizing

LonWorks control networks, APANET achieves the interoperability demanded by customers who want to be able to choose solutions that support multiple applications across a common network using products or services from diverse providers. APANET is a member of LonMark International, a global standard setting organization whose aim is excellence in interoperable integration solutions.



Our partnership with APANET Green Technology Systems allows us to offer the most interoperable capabilities in the industry. With this partnership, SunView LEDs can marshal designs for customized efficient lighting solutions. We offer our customers the advantage of immediate reduction in energy usage, immediate savings in electricity costs, a range of customized networking solutions, and the ability to move into the future with platforms that can tier networking solutions able to integrate smart energy use. These can be and be applied to interoperable Smart Street Lighting, Smart Building, Smart City, and, eventually, Smart Grid demands.

What Does SunView LED Lighting Deliver?

SunView's LED Lighting Retrofit Energy Savings Program (ESP) is a unique effective energy efficiency program that guarantees our customers savings and allows our customers to upgrade their facilities to state-of-the-art LED lighting technology. This ESP is designed to:

- ❖ Provide a real actual reduction in total cost of lighting including the electrical power cost attributable to lighting
- ❖ Offer the option of a no advance cost program as well as various financing options that can include payment at time of agreement
- ❖ Management of installation and provision of extra bulbs as per agreement over the warranty period at no extra cost
- ❖ Provide financing solutions that typically average five years and include a five year product warranty plan
- ❖ Provide a lock-in savings plan
- ❖ Offer a payment plan based on energy savings only
- ❖ Offer the highest technologically developed LED lighting in the industry with the lowest energy use enabling the highest return on investment



How does SunView LED Lighting Provide an ESP?

Once a potential customer expresses real interest to our trained professional sales Representatives, SunView begins the process of an analysis and audit for that customer. We prepare an ESP option that demonstrates the customer's immediate savings with the installation of our retrofitted LED lighting. Each situation and each customer's needs are different, so SunView takes the necessary time to work with customers to assure their needs are met completely and their financial concerns are addressed accordingly.

Using sophisticated proprietary computer software, our trained Engineering Team will design lighting solutions specific to the customer's facility requirements. This analysis will be based on several factors that include an actual physical inspection of the facility, square footage of the building or area to be lit, hours of operation, current energy use, and any other associated factors.



The current energy use is determined by a general audit of previous cost per month of electric use and includes seasonal variance if applicable.

Once the LED lighting retrofit has been designed, SunView works with the customer to determine the specifics of the ESP that accommodates the customer's desired needs. As a unique funding mechanism, the ESP allows SunView to collect our fees in several ways that do not involve the customer placing money up front for the lighting and installation process. One of SunView's typical funding mechanisms is a percentage sharing of the savings the customer realizes due to the increased cash flow from more efficient energy use. Our ESP is designed on a one-to-one basis with consideration to the scope of the project details and the products involved. SunView works diligently to provide an ESP that is fully compliant with the needs of the customer.

Another reason why SunView LED distinguishes itself from our competitors is that we assist our customers with any applicable incentives or rebates given to them for upgrading to environmentally safe and more energy efficient systems. We also never keep any percentage of those rebates or incentives. That money goes directly to our customers adding more financial incentives for you to use only SunView LED Lighting!





SAVE MONEY + SAVE ENERGY

Start of the New Lighting Era

In 2007, the United States Congress passed the bipartisan Energy Independence and Security Act (EISA) establishing a 25% reduction in lighting energy use nationwide and requiring the use of bulbs that meet the new efficiency standards beginning in 2012 and in use by the end of 2014. Due to these new standards, replacements for the previous common light bulbs sold in the USA now use about 25% to 80% less energy than the traditional incandescent bulbs. This new lighting era has introduced energy efficient light bulbs such as halogen incandescent bulbs, compact fluorescent lamps (CFLs), and light emitting diodes (LEDs) as the choice of lighting alternatives for general, residential, commercial, and industrial use. These lighting choices are not all equal as reflected in the above percentage of range for energy use.

Although all three of the above save energy, their use, life span, cost efficiency, safety, and disposal are very different. The halogen incandescent bulbs are initially

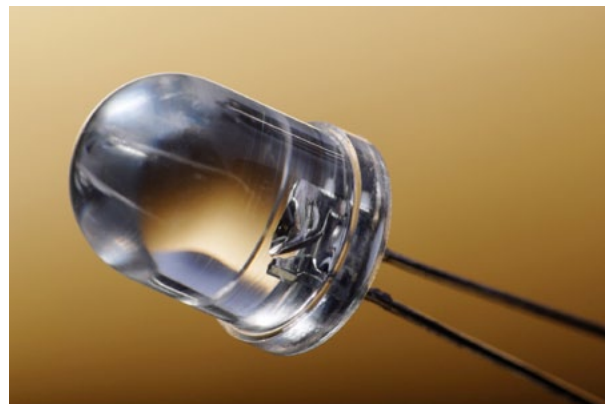
inexpensive. They look and function similar to traditional incandescent bulbs. Overall, their energy efficiency is only about 25% better than traditional outdated bulbs and that percentage of energy efficiency enables them to barely meet the EISA standards. Their life span is slightly longer than traditional incandescent bulbs and general recycling is the sustainable end to their replacement which occurs almost as often as replacing traditional bulbs.

LED bulbs are close to a perfect technology and are called a 'solid state lighting' technology or SSL

CFLs are small curly versions of the long tubular fluorescents to which we are accustomed that often illumine our work spaces, office environments, commercial, educational, industrial, and medical facilities. Being initially inexpensive to purchase, CFLs use about one quarter less electricity than traditional incandescent bulbs and last about ten times longer. That same CFL has about one third of the energy usage of a similar light output halogen incandescent bulb. However, CFLs contain a small amount of toxic mercury which is released if the bulb breaks. Because of this potential hazard, all CFLs should be handled and disposed of carefully with a special recycle program specific to their mercury content. CFLs take a few seconds to 'warm up' to full light potential, whereas halogen and LEDs are immediately illuminated once the light is switched to on. Switching CFLs on and off quickly can cause the bulbs to burn out. Some people claim that CFLs produce an unpleasant color thus creating headaches with long exposure to that lighting. Also, like traditional incandescent bulbs, CFLs get hot to the touch and emit heat that can alter room temperature and affect air conditioning and heating function. This heat creates wasted energy that consumers simply throw away. Although CFLs are energy savers, they have served their purpose as a buffer between the past and the future needs of lighting. LEDs are the lights blazing the roadways and illuminating our world into the future.



In the past, LEDs have been used in digital clocks, holiday lights, flashlights, traffic signals, and the alert light in cell phones signaling a new voicemail message. The potential technology contained within these light-emitting diodes (LEDs) has exploded into a range of use that offers the least use of energy, the safest form of lighting, and the longest lifespan of light provision. LEDs use about one-sixth the energy of a traditional incandescent bulb. Research has indicated that LED light bulbs are close to a perfect technology and are called a “solid state lighting” technology or SSL. Instead of emitting light in the format of a vacuum, as in a traditional incandescent light, or in the format of a gas, as in a CFL light, an SSL is able to emit light from a piece of solid matter which is also a semiconductor and produces light when electrons move around that semiconductor structure. This process creates reduced energy usage, produces less heat, and is more efficient than the vacuum filament method of incandescent bulbs and CFLs plasma tube design. LED lighting provides immediate illumination, the bulbs stay cool to touch, and they emit far less heat while in use.



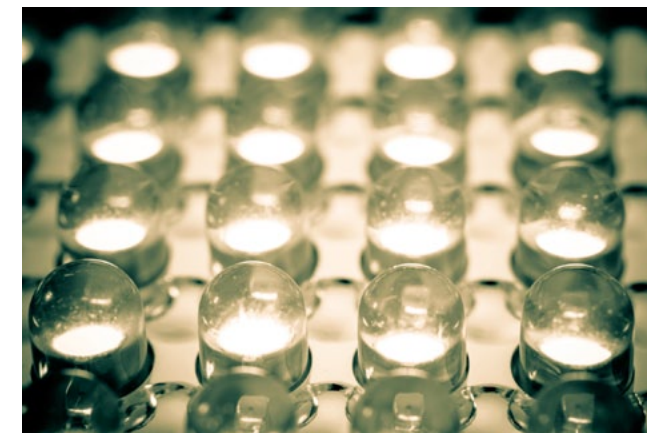
LEDs are a more stable light source that lasts far longer than other light bulbs. They often last 75,000 hours over the CFLs 10,000 maximum hours of lifespan, thus requiring less replacement. LEDs are environmentally safe to use, dispose, and recycle, because they are made of aluminum and do not contain any toxic elements. Depending on usage, LEDs can last for 20 years once installed. Therefore, replacement and recycling are minimized. The reduced kilowatt hours using just one LED bulb versus a traditional incandescent bulb can reduce hundreds of pounds of carbon dioxide emission and create a healthier future environment. LED lighting can be adjusted to a full spectrum of color for consumer use.

Because LEDs are potentially electronic components, they are programmable and can be connected efficiently with radio and sensor chips to create wide span wireless networks. Wi-Fi connected LEDs can be operated using a smart phone. The development of this technology is not only ecologically and environmentally safe, it also opens multiple possibilities for use that includes monitoring crime, power outages, water main breaks, and coordination for disaster relief. In some installations, LEDs can be computer monitored instead of being manually checked, thus further reducing maintenance costs. Finally, because LEDs produce more light per watt and last longer than CFLs and traditional incandescent lighting, they also provide savings of 30% to 70% in the cost of electricity use annually. LEDs have the capacity to be dimmed down. Because of the intense bright light that they are designed to provide, dimming is often unnoticed. This feature provides the advantage of further cost savings in reduced electricity usage.



LEDs produce more light per watt and last longer than CFLs and traditional incandescent lighting = 30 to 70% savings in electricity costs annually.

LEDs come with longer warranties than the two prior lighting systems and usually last far longer than the warranty, therefore saving replacement costs. Although LED lighting may cost more initially, rebate and incentive programs can assist consumers. Over long term use, the



reduced energy, replacement, and maintenance costs, as well as the increased ecological and environmental benefits, demonstrate that using LED lighting is not only a wise decision, it is economically the most effective and efficient solution to today's lighting needs.

Smart Street Lighting, Smart Buildings, Smart City, Smart Grid

Smart Street Lighting

The definition of SMART reflects technology that is intelligent, adaptable, energy efficient, and has the potential for interoperability between and among devices and systems. This technology also has the capacity to allow for advanced layers of computerized programmable platforms designed to address the specific needs of the operator, to allow for remote management and control, to improve information communication for the reduction of wasted energy and resources, and to develop specific responses that meet a community's expectation of a secure, safe living environment. Can this all be achieved with the use of lighting? At what price and from what funding source? Smart Street Lighting can answer those questions.

Picture this scenario: You are driving alone in an urban business section late at night. You are lost and all of the retail and business establishments are closed. Your cell phone is dying and you forgot your car phone charger. Your vehicle's engine acts in a peculiar manner, disrupting your travels. You quickly leave the roadway to pull over and find help. The car has just come to a stop for no reason. Thankfully, you chose to pull into a lighted parking lot near the roadway, so you are not stranded on the road itself. You analyze your present situation to choose the most immediate response. There is no one around. The temperature is dropping, and you only have a light jacket with you. Your gasoline is low, so you cannot keep the car on for long. You hope the cell power in your phone lasts until you can secure a tow truck or call someone to come get you. Your sleeping child in the back car-seat starts to stir from stopping and the temperature change drop. You search your phone for a help connection, but you really do not know exactly where you are...

Now picture this scenario: You are driving alone in an urban business section late at night. Your GPS is not working and you are lost. All of the retail and business establishments are closed. Your cell phone is dying and you forgot the car phone charger. Your vehicle's engine acts in a peculiar manner, disrupting your travels. You quickly leave the roadway to pull over and find help. The car stops for no reason. Thankfully, you pulled into a lighted parking lot near the road and are glad to be off the roadway. As you analyze your present situation, you notice the lighted pole lamps near your vehicle have grown brighter. You can see the immediate area better. You may be alone, but you feel a bit safer in the brighter illumination. The temperature outside of the



SAFE. SECURE.
EFFICIENT. RELIABLE.

car is dropping and you only have a jacket. You exit the vehicle to check the car, and you notice at a nearby intersection, a red alert arrow pointing in your direction. It is blinking continually. One of the pole lights in the lot near your vehicle has a small red beacon that begins to blink in concert with the arrow across the intersection.

Before you can even make a phone connection with your dying cell phone, an emergency vehicle pulls into the parking lot and drives towards you. You are very grateful to see help arrive and the occupants provide assistance and directions to allow you to continue safely and warmly on your journey. Your child sleeping soundly in the back car-seat never stirs. You are able to drive on, get fuel, and keep the car warm. The sensors in the street lights alerted central command station that there was a presence in an otherwise unoccupied area. Therefore, the illumination in the programmable light emitting diode (LED) lights automatically increased. The remote viewer installed on the pole pictured a stranded motorist with a disabled vehicle. The networked street lighting system in the roadway activated the emergency directional assistance modality built into the system to identify exact emergency locations. Help was dispatched to your exact location immediately. There was no wasted time or immediate danger. The problems were addressed accordingly and you are happy to continue safely on your journey. This is one probable resultant scenario from a Smart Street Lighting installation.

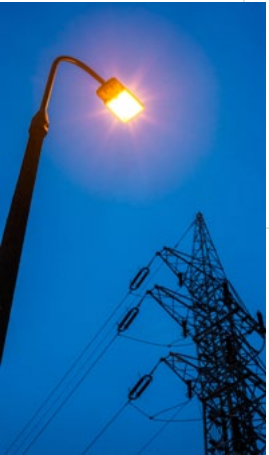


Traditional Street Lighting

Those tall lonely street lights that run for miles across a town, a city, and a nation attached by power lines are for lack of a better term, at the present time, dumb. They are programmed to come on at a certain time of day and stay on at the same full power for an average of about twelve hours over the dusk, into the night, and into the early morning hours despite the time of year, light span during the day, weather changes, or night time visibility or need. Some more modern lights have photocells that activate when the sunlight is gone or when it arrives, thus turning the bulbs on and off. In either case, the lights have no way to relate their status, whether they are truly on or burned out, or if they are wasting energy by continually burning all through the daylight hours. They all waste tremendous amounts of energy and are incredibly inefficient.

The lamp bulbs used for conventional lighting systems are mercury based or high pressure sodium (HPS) and metal halide (MH). The former emit toxic gasses and all are expensive to replace, have low life spans of approximately five years or less, offer no insight for maintenance, and contribute a limited range of light that can only be turned on or off. Further, some of these older lights can take minutes to hours to fully come to optimum lighting power. Studies estimate that using these forms of street lighting are a municipality’s highest expense ranging from 19% to 40% or more of the overall electricity usage cost. In average situations, there is a yearly 20% replacement need for these traditional bulbs. Replacements are costly and this expense does not include the maintenance operation costs.

Each of these legacy or traditional lighting systems is expensive to operate. The lights themselves use intensive and excessive energy whose cost is increasing yearly. Use and disposal of the mercury based lamps is hazardous to the environment. These lights have no alert system for replacement. Typically, the municipality’s light center is alerted by a phone call from a citizen or a full time road crew patrolling areas at night for bulbs that have burned out to record a maintenance need for the day crew to replace that bulb. These routine checks and repair responses are expensive in man hours and equipment use. If the street lights are not maintained adequately, a municipality can experience increased crime due to low or no lighting, traffic accidents due to bad visibility, and



Waste tremendous amount of energy and are incredibly inefficient



increased liability exposure due to irresponsible or untimely lighting replacement. None of the preceding is advantageous for municipalities wanting to reduce energy use for environmental reasons and for energy savings cost. All of the preceding can be rectified by the use of LED lighting and an integrated networking system.

Intelligent LED Street Lighting

Changing to the use of LED bulbs reduces a municipality's expense from a 30% to an 80% decrease for electricity consumption just due to changing the bulbs alone. Many places in the world are still using the lighting solutions from the 1960's. These systems are energy wasting,

Lower power consumption and immediate cost savings

electricity intensive, and contribute nothing but light to community life. Artificial lighting, especially at night, is an essential aspect of city life and a safe assurance for smaller municipalities. The use of such light impacts the sense of community safety and greatly influences business and tourism flow. Studies indicate that the current use of LED lighting worldwide is at 10% and that this figure will increase to 80% by

the year 2020. Municipalities world wide are looking to reduce their energy costs, decrease environmental pollution, protect resources, and obtain more savings within their budgets. They are also looking for alternative ways to use energy in smarter, better ways. Using LED lighting moves consumption and cost into the direction of more efficient effective intelligent lighting solutions.

LED lights have many advantages over traditional lighting. They can be switched on without a pre-heat or dim-to-full light capacity wait. LEDs turn on instantly. They can also be turned off many times and not have their on/off capacity compromised or fail. They have a very high lighting capacity and efficiency. The

exceptional quality of LED lighting can be dimmed without a noticeable difference in the overall lighting. LEDs have lower wattage and still have enhanced lighting better than traditional bulbs. Combine this with their lower power consumption and immediate cost savings occurs. LEDs are hardy in that they are less sensitive to transient phenomena like weather changes. Finally, LEDs have a superior life span and in some applications can last twenty or more years thus saving on replacement costs, hardware, and maintenance related expenses. SunView LEDs have the highest lumens and the lowest wattage in the lighting market industry.

Although the price of a LED bulb is still more than a traditional street light bulb, the inherent benefits in using LEDs, overtime, enable a municipality to save money in several important ways. Lower electricity usage cost, better management, less maintenance costs, and longer life spans offer a municipality a savings that could never be seen with traditional lighting. The small to vast amount of light bulbs needed for street light systems that waste energy at high electricity costs can be adjusted to environmentally clean and lower cost lighting solutions. The decision to simple change the type of light bulb used in a street lighting situation can save any municipality money and conserve energy. However, there is more to this street lighting ability. The change to LED lighting is the first step to reducing energy cost and increasing energy conservation. It is also the first step to future interoperable applications.

A municipality can save money by changing their street lights to cost effective LED bulbs. Many municipalities are doing this primarily to gain these energy use savings and to eliminate toxic greenhouse emissions from traditional lighting. Because LED bulbs contain computer program ability, they can be used for much more than mere energy effective

lighting. More efficient cost savings can be realized from utilizing a street lighting system with network systems that add alternative and additional energy cost savings, maintenance savings, and operation costs savings while improving the sustainable lifestyle and safety of the community it serves. The future of public lighting, the networking of street lights, and the use of existing power line communication (PLC) as the connective system for a totally new adaptable network that links street lighting to many other beneficial resources for the community at an affordable cost is now within the ability and budget of many municipalities small or large.

Because the life span of an LED bulb averages twenty years, network systems built using this technology can be assured of savings in years to come. This allows full advantage to that technology use dictated by a municipiaity's needs and desires. Studies show that networked LED street lighting can save an additional 10% to 20% beyond the savings of replacing traditional bulbs to LEDs. This percentage is further increased by related savings in operational and maintenance costs associated with the networked management system. Welcome to Smart Street Lighting! We have come far from dumb lights on isolated poles connected by power line wires. Now, the ability to have intelligent computer programmable lights that can supply not just varying forms of light, but can contain and maintain other programmable abilities, on two way communication network systems enabled by interconnected poles that reach across a community collecting data and distributing it back for analysis and response is here to stay. The focus from simply lighting streets to keeping streets safe, keeping maintenance and operation costs down, and keeping data specific information directed for specific community cost saving use is the focus for Smart Street Lighting.

The life span of an LED bulb averages twenty years



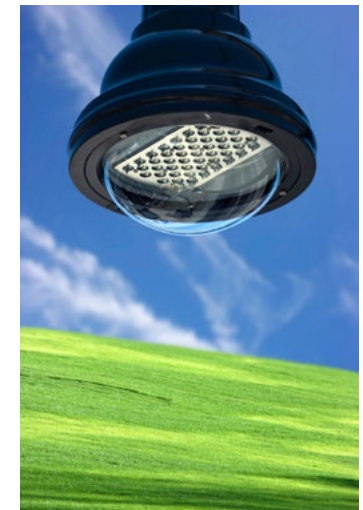
Traditional lighting systems need visual inspection by night workers who must be paid for the hours of searching for damaged or burned out bulbs. Smart Street Lighting (SSL) automatically reports problems with bulbs and targets exact location for immediate maintenance. Traditional lighting systems require mappings and paper files of work orders plus a system for management of replacement stock. SSL keeps an ongoing record of bulb usage, replacement time, bulbs available or needed to be ordered for replacement, proactive maintenance schedules, and plans for route repair directives. Traditional lighting burns at the same intensity for a set number of hours. SSL can be programmed to adjust to weather conditions, enhanced for problem areas or



circumstances, set to blinking, adjusted for color, and dimmed according to traffic flow or night time activity. SSL can also have the potential to optimize emergency directive alerts at selected and necessary times.

Traditional lighting cost is usually controlled and estimated by a utility company and specific breakdowns of individual usage are not easy to render. SSL accurately calculates every aspect of consumption including the details of time, amount, varying rates, and individual users. Bills can also be automatically generated and sent based on that information. These abilities, and more, are directed by the operations center which is able to see into the workings of the system to predict problems, calculate usage, and avoid system failures. There are also alert check systems that activate when an individual lamp is tampered with or altered without authorization. Because of this feature, electric energy theft, an expensive and difficult to identify energy waste concern, can be virtually eliminated.

The most fascinating part of the Smart Street Lighting systems is remote management. These intelligent light lamp posts send their data information to a central command system, or operations center, constantly. There, this information can be controlled, adjusted, analyzed, manipulated, and researched which simplifies management overall, provides more comprehensive information, and makes maintenance more effective and less costly. These abilities enable the development of a total comprehensive interoperable system able to enter further into the SMART world stepping into Smart City applications and eventual alignment with Smart Grid systems. One of the other exciting aspects of the development of Smart Street Lighting is financial assistance in forms of local and national rebates and incentives to replace old energy wasting technology and encourage movement into the efficient internet based network.



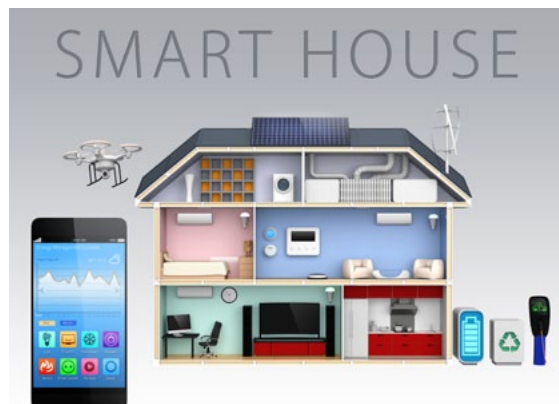
SunView LED Lighting has designed the finest, updated, most efficient, energy effective bulb in the industry. APANET Green Systems Technology has devised the most energy efficient, cost effective networking system utilizing power line communication (PLC) worldwide. Combining these two products and services offers tremendous savings now and into the future while simultaneously building a platform for network connections that can adapt as consumer needs change.

Please Note: For more detailed information please download our Smart Lighting Technology and Interoperability brochures.

Smart Buildings

Globally, human history begins with common categories: food, sleep, companionship, work relations, worship, and protection. The protection category involves an environment into which occupants gather, exchange ideas and sustenance, keep comfortable, perform essential daily tasks, and sleep in safety. These features are fundamental to the concept of a building and have not altered much since the dawn of civilization. Where humans gather to live, to work, to enjoy, or to worship, a building represents humans working with and/or against a natural environment that either supports their needs or must be managed to supply those needs.

Modern building architecture can astound us with its complexity and dazzle us with the technologies necessary to provide comfortable occupancy. However, the truly amazing ability of buildings is still to be demonstrated in the ongoing development of Smart Building concepts. Common features like lighting, heating, air conditioning, security, and ventilation are all being threaded together into compatible information sharing intelligent system networks. These networks are built on applications that can be layered onto one another over time, and eventually lead to interaction with the Smart Grid.



How do you define ‘Smart Buildings?’ Because each building is different and each owner requires a definition that explains their particular need, defining a smart building can only be accomplished by citing what application capacities can be used in a building. The foundations of these capacities are intelligent automation, analytics, and integration. Automation is programmed into the building function for more efficient building operation and management. Analytics that include sensors and controls that can be remotely managed are used to improve energy efficiency, lower operating and maintenance costs, and provide asset reliability. Integration of the building with current connection to smart energy systems within and beyond the building completes a general definition.

Smart Building technology can be installed during building planning and construction or retrofitted to address existing building needs. Intelligent technology (IT) can provide intelligent control to manage connected devices, equipment, or groups of equipment with networked systems and an overall supervisory system. Many of these systems involve machine-to-machine (M2M) communication. This communication requires open system responses to accommodate connectivity

between all of the equipment and the systems in the building. Applications can be designed for intelligent control of electricity to manage lighting and general electric use, heating and air conditioning systems, security systems, telecommunication systems, loading dock delivery areas, parking garages, exterior parking and building campus areas, and architectural lighting. The list is defined by the building owner’s needs.

Quick detection of any system malfunction is another asset of Smart Buildings. Maintenance response is exacting and no labor time is wasted for necessary replacements or repairs. Maintenance can be proactively planned and not reactively performed. Fundamentally, smart buildings will provide services that make all occupants and visitors comfortable and productive. Lighting, thermal comfort, air quality, safety, security, refuse removal, sanitation, and bridging to the world beyond the building walls will allow integration of data gleaned from many sources to provide energy efficient and cost effective building management through systems that share information and optimize building performance.



In 2015, the US Government Services Administration (GSA) plans to cut the energy level use in all government buildings by 30%. This reduction can not happen with technology alone, but must involve human understanding, acceptance, and participation. Building occupant’s responses and suggestions to these changes add to the information data used to improved efficiency into the future. The ideal approach to Smart Building functions contains the following connected components:

- ❖ Integrated building systems
- ❖ Technological and human intelligence
- ❖ Addressing bottom line expenses
- ❖ Awareness of global environmental issues
- ❖ Connection to the Smart Grid
- ❖ Development of future enabled intelligence solutions

The practical approach to Smart Building contains elements that work with the people using the facility, facility owners, and considerations beyond the facility. Using an office building as an example of the interconnection of the three aforesaid elements, the intelligent use of office light can be analyzed and redefined. The small electron voltage in the sensitized coating of electromagnetic windows will allow those windows to darken or to lighten in direct response to the outside sunlight. These windows darken when the sun is brilliant upon the outside of the window and reduce the solar heat within the room. Conversely, if the sun is setting or the day cloudy, the windows react to become transparent to allow maximum light into the room. These features, automatically and remotely controlled, alleviate light and room temperature fluctuations, thus reducing costs. Automatic controlled shading can be combined to contribute to balanced room temperatures and cost free lighting.

LED Lighting and Smart Building Efficiency

LED lighting can provide dimmable light fixtures that use efficient electronic ballasts and allow for sensor control. SunView LEDs are the finest bulbs on the market with the highest lumens and the lowest wattage. Using these LEDs will further reduce electricity power consumption and lower electricity costs. Rooms can be fitted with occupancy sensors that reduce lighting, heating, or air conditioning needs as a room is filling or emptying of occupants. These sensors can also be integrated to security systems.

These same practical principles can be applied to residential Smart Building use. Smart Electric Meters will be a critical link between the intelligent home network and the Smart Grid. These meters will calculate energy use in 15 minute or less intervals and record usage over time periods. Customers will be able to view their energy and time use and compare this to the peak and off-peak energy use rates. This will allow them to choose using electricity at a lower cost time period. In cases of power outages or malfunctions, the necessary repair location

information can be exactly pinpointed thereby alleviating excessive downtime or wasted maintenance detection time. This 'Smart Building' function will give home owners more efficient, effective electricity service and allow them to chart and choose their price points for service. In certain applications, a home owner will be able to collect energy, share it, or sell it back to the utility company for discounts, refund, and/or payment directly to the home owner.

Just as an office building intelligently connects its systems and equipment for remote control and efficient management, a homeowner will be able to perform similar tasks through use of their 'Smart Appliances.' These appliances are already on the consumer market. They contain computerized programmable chips with wireless and remote capabilities that will allow an owner to remotely switch on/off their appliances to take advantage of peak and low energy use rates. Plug in switches at a residence that are connected to the Smart Grid will allow an owner to plug in their electric vehicle to charge batteries at optimum times. The goal of residential

Smart Building is essentially the same for any other building. The end user can monitor energy consumption, in-place or remotely, adjust their energy use for personal preferences or needs, and save on electricity power costs. Distribution operators will be able to program a customer's devices, limit peak hour consumption, and, if necessary, switch a device to off. A consumer becomes proactive with the energy distributor and can decide how their energy will be consumed. Through this dynamic power consumption, a consumer's role changes from one who merely receives energy, to one who is able to choose the lowest energy cost and the possibility to become a 'prosumer' or one who can sell excess energy back to the utility grid.

Intelligent network systems must be created with the interoperability of open systems in order to accommodate the multiplicity of devices, the maximum choices, and the full functional integration of the system. Because APANET Green Technology Systems utilizes only LonWorks technology, we can offer the interoperability that will allow a customer to develop layers of programs that will adapt and allow future technological upgrades. Financial budgets require technology that people who use, operate, and manage a building can understand and utilize with ease. LonWorks technology is that choice. Many people learning to use LonWorks technology become easily proficient as the technology is designed with people in mind. A building may be smart, but it is the people managing the intelligence who really define the level of intelligence.

Global Environment and Functional Connection

Building management systems have historically focused only on function, meeting comfort and safety standards, and providing security for occupants in whatever roles required by the building's activity. Until recently, the tracking and reduction of pollutants was not a primary focus. The sustainability for buildings, cities, and nations is now fundamentally tied to sustaining the environment by the reduction of CO2 and Greenhouse Gas Emissions (GGE). Smart Building intelligence systems can capture this data and develop operational systems that can reduce environmental pollution and decrease energy power use. These systems allow an organization to participate actively in global environmental sustainability efforts and manage their own carbon footprints for the future. The Smart Building will ultimately connect to the informational data and knowledge base beyond the building complex walls and into the Smart Grid. This connection will allow building owners and managers dynamic participation in their own electricity consumption. It will also provide occupants and the public with information on a variety of levels to create a future sustainable environment.

On a functional level, Smart Buildings are able to impact the security and safety of both human and capital resources. Equipment can be maintained more efficiently and effectively. Humans can experience better health and safety. The building itself becomes a source of accessible information that can be utilized for public welfare. With large building complexes, connection to the Smart Grid allows that building the potential to become a virtual power generator by which owners are able to sell excess electricity back into the market. This process can assist



the electric grid to offset electrical outages due to malfunctions, brown or blackouts, or natural disasters. Smart Buildings become contributors to social well being and not simply consumers of energy.

These real benefits for the building and for society are not temporary solutions, but are resources that extend over the building's lifetime. Therefore, the building is not just a structure of concrete, stone, and metal. It becomes animated with intelligent purpose and able to provide an information infrastructure that is connected to the intelligent system network of the future.

Smart City

The basis of the Smart City system is a well functioning infrastructure with data coverage of the entire city that allows integration of new services and functionality in the future. The aim of the Smart City is to reduce CO2 emissions and reduce the level of noise and air pollution, as well as to gain experience and knowledge on how to integrate elements of public space with new logistical applications. The concept and development of the Smart City is so new that finding a fully working city system is difficult.

The Smart Metering of electricity consumption and data gleaned from media recording devices from public buildings can be combined to create a city database. This information can be enlarged to include data derived from the monitoring of school buildings and other municipal facilities. This infrastructural information can be the basis for carrying out retrofitting work for LED lighting and improving the energy costs for many properties. Entire Smart City systems will eventually be integrated to the Information and Control Technologies (ICT) networks of public buildings, which will allow for remote management of facilities, and, in concept designs, will be part of the Smart Grid, the

modernized electricity network of the future. Many cities worldwide are working to implement intelligent energy power systems combined with intelligent logistics to develop intelligent resource efficiency. This is the idea behind what is called Smart City or Smart Region. One of the first implementation examples for a Smart City is in Boulder, Colorado, USA. This particular Smart City concept consists of four main components: Power Smart Grid Infrastructure, Smart Electric Meters, Smart Home Devices, and a Public Website.

One of the driving concepts behind Smart City is to create a sustainable way of life, work, mobility, and public space that utilizes new cost effective technologies and supplies more efficient, less expensive, energy use. However, implementing technology alone will not bring about these sustainable changes. The real motivation for the change will come from adjusting the behavior of the residents and promote partnerships among multiple entities like companies, manufacturers, municipalities, and other urban organizations to achieve a common goal. Not

only will citizens from all walks of life be asked to change and to do more to implement these technological advances, but non-entities like simple outdoor street lights will be required to do more.

Along with their capacity to provide lighting for roadways, residential, business, and public space areas, outdoor lighting is increasingly being targeted for the implementation of smart technology. This smart technology includes the reduction of energy consumption, improved citizen safety, and interfacing with the expanding Internet of Things (IoT) for an ultimate connection to the Smart Grid. Some of these changes will include connecting Smart Street Lighting with the facades of buildings that have photovoltaic panels to collect energy and sensor panels to gather data to broadcast selected information to the public. Other concepts include urban planning that engages electric vehicles on programmed runs for automated refuse disposal aligned with distribution of goods to centralized city locations. This eliminates polluting and unnecessary vehicle presence on roadways, reduces traffic congestion, and integrates mandatory city maintenance like water runs for street cleaning. Even towering skyscrapers will be used in this process. They will be equipped with methods to measure and analyze energy consumption and evaluate CO2 emission. Intelligent Tower Offices (ITO) will provide a testing ground from which information will be used to develop future efficient energy solutions citywide.

By the year 2050, two-thirds of the world's population will live in cities. As a result of this increasing population and the resultant demands upon the urban environment, Smart City is a solution that addresses the need to provide a livable, safe, and comfortable future urban environment. Creating a resilient city plan that provides a decrease in energy consumption, the efficient use of resources, improved citizen safety, a reinvigorated urban area, an ensured healthy future environment, and integration with the growing connectivity of regional and national Smart Grids is the basis of the Smart City concept. Each city has the opportunity to design its own Smart City plan. Eventually, all cities will be connected to the ultimate system of systems, the Smart Grid.

Please Note: For more detailed information please download our Smart Lighting Technology and Interoperability brochures.



The Smart Grid

The US Dept of Energy is charged under the Energy Independence and Security Act of 2007 (EISA 2007) with modernizing the nation’s electricity grid to improve its reliability and efficiency. The act mandates modernization of the electricity grid policy of the United States to support

Affordable Electricity,
Efficient Distribution,
Protected Environment

effective, efficient, and reliable upgrading of the nation’s electricity transmission and distribution systems to maintain a secure electricity infrastructure than can meet future demand growth and achieve the ultimate goals that define a Smart Grid (Title XIII Sec 1301).

This Smart Grid will become the main platform for the nation’s future energy grid. It will be the backbone of power nationwide. This Smart Grid must ensure resilience, identify and prevent cyber attacks, and incorporate innovations and controls to provide affordable, safe, reliable power for all citizens. Reaching these goals requires new business models, regulatory models, and new responsibilities, as well as obligations, for grid operators, consumers, and new providers who will all help develop further innovative solutions.

The details of the elements of Title XIII of the EISA 2007 are as follows:



- ❖ Increased use of digital information and control technology
- ❖ Optimization of grid operations and resources with full cyber security
- ❖ Deployment and integration of distributed resources and generation that include renewable resources
- ❖ Incorporation of demand response, demand-side resources, and energy-efficient resources
- ❖ Deployment of ‘smart’ technologies for metering, communications concerning grid operations and status, and distribution automation
- ❖ Integration of ‘smart’ appliances and consumer devices
- ❖ Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning
- ❖ Provision to consumers of timely information and control options
- ❖ Development of standards for communication and interoperability of appliances and equipment connected to the electric grid
- ❖ The lowering of unreasonable or unnecessary barriers to adoption

The American Council for an Energy-Efficient Economy (ACEEE) defines the Smart Grid as an umbrella concept describing electricity transmission and distribution systems that employ a full array of advanced electronic metering, communications, and control technologies. These technologies provide detailed feed-back to customers and system operators on energy use and

allow precise control of the entire energy flow in the nation’s grid. Distribution networks and consumers will gradually switch from being passive managers and receivers, to active managers and empowered, engaged consumers. The changes the Smart Grid brings will affect everyone. Electricity will no longer merely be provided by professional energy suppliers, it will be controlled by end users. These end users will be connected to distribution networks which will replace simple electric reception through connection to transmission lines. Ultimately, state and local projects will be absorbed into the functional elements of the Smart Grid with emphasis on interoperability and cyber security.

In the absence of standards, the development of the Smart Grid technologies may produce diverse technological investments that will become prematurely obsolete or be implemented without adequate security measures. Therefore, the National Institute of Standards (NIST) has developed a series of standards that form the roadmap and framework to support state efforts in modernizing the nation’s electricity grid. Interoperability is one of the key objectives in these standards. SunView LED Lighting and APANET Green Technology Systems are compliant with these standards.

Reasons for the Smart Grid

There are several important reasons for the need to develop a national Smart Grid. The nation’s current electricity grid is not equipped to meet the collective demands of current or future needs with the efficiency required to maintain citizen comfort and national security. Some studies claim that the present electricity generation and

Outages cost
America \$150
billion each year



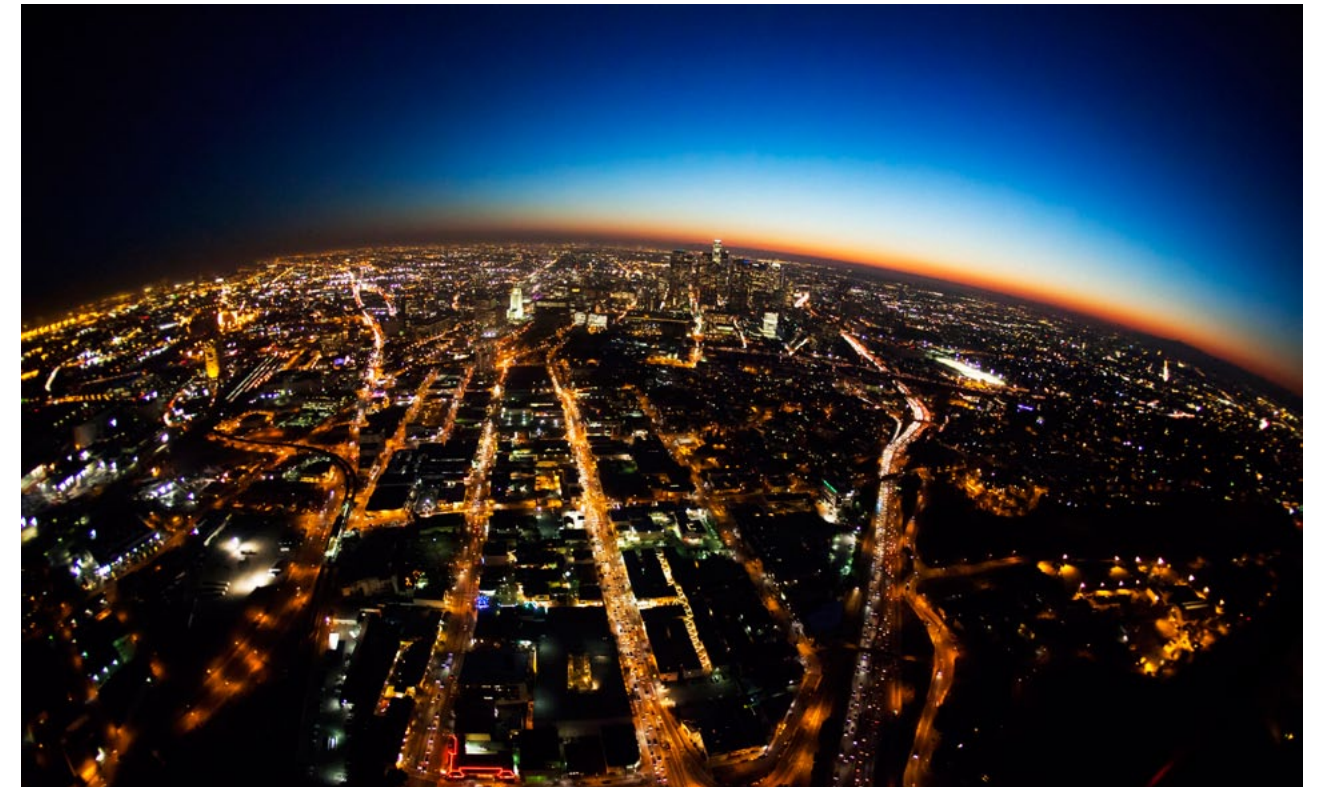
transmission system of the United States is ineffectual and wastes approximately two-thirds of the energy used to meet national electricity demands. With the current inefficient and often unreliable electricity system, the national economy loses approximately \$250 billion annually. Outages alone cost America \$150 billion each year. The price for electricity is rising steadily and in ten years it is predicted to increase over 30% of its present cost. When the rate increases, so does the cost of the losses.

Globally, utility fraud is second only to credit card fraud and costs about \$85 billion worldwide. Billions of dollars are stolen from national grids, because it is easy to do and difficult to detect. The United States loses \$200 billion in electricity loss and theft due to inefficient monitoring and the arduous efforts required to pinpoint the exact cause of loss. Overlooked transformers, illegal by-passes, and metering errors, coupled with aging technological equipment, contribute to this inefficient loss.

Brownouts and blackouts occur due to the slow reset time of mechanical switches, lack of automated analytics, poor overall system visibility, and a lack of situational awareness on the part of grid operators. These outages move beyond simply waiting for lights to turn back on. Industrial production plants stop. Perishable food spoils. Traffic lights and credit card transactions become inoperable. These forms of outages cost American businesses on the average of \$100 billion yearly. Anyone who has experienced a lengthy electricity outage due to a natural disaster understands the inconvenience, discomfort, and fear that results from an entire system breakdown. During recent national weather disasters, the fortunate, who still had homes, sat in the cold, wet, and dark waiting for the power to come back. Some had the comfort of kerosene generators as they waited. Teams of professional electricians were summoned from far away states to assist in finding and repairing the cause of the outages. We all remember their tired expressions of frustration as they toiled endless hours over massive lines searching for the source of the power damage in inhospitable weather. With the Smart Grid, malfunctions are noted immediately and locations pinpointed exactly. No time and expense is wasted.

Our current electric generation system annually produces 4.03 million tons of sulfur dioxide (SO₂) and 2.1 million tons of mono-nitrogen oxide (NO_x) which is transferred into our environment. These, coupled with other pollutants, add \$125 billion to annual healthcare costs, cause 18,000 premature deaths, 27,000 cases of bronchitis, and 240,000 cases of respiratory distress. The noxious effects of rampant air pollution create approximately 2.3 million lost days of work nationwide due to illness. Adding to these dismal statistics are findings by the US Environmental Protection Agency (EPA). They state that nationwide there are 200,000 premature deaths per year due to combustion emissions especially from changes in particulate matter concentrations and 10,000 deaths occur per year due to changes in ozone concentration. From economic to environmental warnings, the development and implementation of the Smart Grid is critical to America.

The Smart Grid is a Visible Network System



The Smart Grid technology will make clearly visible what has been up to now an invisible power producing and delivery network. It will improve the ability to predict overloads and avoid outages by distribution methods that include renewable, non-renewable, and distributed energy resources (DER). These systems include natural gas fueled generation, combined heat and power plants (CHP), electricity storage, solar photovoltaics (PV), solar-thermal energy, wind energy, hydropower, geothermal energy, biomass energy, fuel cells, municipal solid waste, waste coal, coal-mine methane, and other forms of distributed generation (DG). In using megabytes of data to move megawatts of electricity, the delivery of electricity will be more reliable, efficient, and affordable. This process will create an electric system for the United States that will move from a centralized producer controlled network to less centralization and a more proactive consumer response network.

The Smart Grid will empower consumers to participate and choose using a public two-way communication between utilities and consumers. This will enable consumers to accurately view the electricity they use, when they use it, and how much that use costs. Through a sort of social behavior modification, consumers will be able to self-manage their own electricity use by investing in intelligent, energy-saving end-user devices or selling energy back to the utility company as excess stored energy in exchange for discounts, rebates, incentives, or revenue. This social behavior modification applies to utilities as well. Due to proactive customer participation in electric consumption, utilities will be able to use consumer demand as another

alternative to alleviating the need to search for additional power generation. For the first time, residential customers will be on the same playing field and have the same discount options and demand responses presently offered to commercial and manufacturing customers.

Studies have been made that report over the past twenty years if the Smart Grid already was in place, the nation would have saved from \$46 billion to \$117 billion dollars by not constructing obsolete power plants, inefficient transmission lines, and ineffective sub-stations. The goal of the Smart Grid is to reduce utility costs, maximize efficiency system-wide, and prevent outages from natural, human actions, and cyber attacks.

The Smart Grid Provides Affordable Energy Cost

What will matter most to the consumer is effective delivery of electricity at an affordable cost. This is the realm of dynamic pricing which reflects hourly variations in retail power costs and gives consumers timely information to choose low cost hours of use. Consumers will be able to refuse to use or reduce their use during peak electric use hours. Demand responses will be created to allow all electric consumers from industry to residential to use energy in a rational manner by cutting energy use at peak times or when power reliability is at risk. Advanced Metering Infrastructure (AMI) will provide real time monitoring of power usage to consistently inform all consumers of their use and options. Distributive energy generation will allow

customers to use the generation of energy on their premises to offset their consumption costs by actually turning meters backward when they generate more electricity than they have demanded or simply providing them a credit for the excess energy in their next bill cycle.

For the reduction of toxic carbon, the Smart Grid's ranks the potential in providing cost effective clean energy using plug-in electric vehicles (PEVs), including plug-in hybrid electric vehicle (PHEVs), as the main response to this environmental threat. Although the vehicles by themselves will not

produce the savings, the Smart Grid technology will allow them to generate their fundamental potential. The present idle production capacity of the nation's electric grid could supply 73% of the energy needs of the vehicles on the road with the use of existing power plants. Integrating idle production would put that power back into the national grid. The use of electric vehicles would reduce 52% of net oil imports or about 6.7 million barrels daily, reduce CO2 emissions by 27%, and cut Greenhouse Gas Emission (GHG). To achieve this goal, vehicle charging must be done during off-peak hours. This



peak time considerations will apply to electronically controlled appliances including ranges, dishwashers, refrigerators, microwaves, washers, and dryers. The Smart Grid will allow remote control of these devices using compatible global interoperable standards to transmit signals to and receive signals from devices while away from home. The benefits to consumers include their ability to make choices that save money, improve their personalized energy convenience, and impact the environment in a positive way.

The Smart Grid is the Future of America

Up to the present time and for most of us, energy use has been a passive purchase, unclear in exact cost, and confusing to consider. We receive bills. We pay them and hope there is not an outage especially in extreme weather conditions. Controlling the consumption, distribution, and generation of electricity by using the technologies of the Smart Grid will contribute to national and global environmental protection. If we choose to do nothing, polluting emissions will rise, electric rates will increase substantially, consumers will be forced to pay excessively higher rates. We will have no choice or options. Brown/black outs will become a norm. This is not a future option for America.



When the nation implements fully the Smart Grid, it will change and hopefully enhance every aspect of the electric delivery system from generation, to transmission, to distribution, to storage. This implementation will create utility initiatives that will encourage and provoke consumers into new patterns of electricity usage. The modernization to the Smart Grid is central to national efforts to improve and increase the reliability of energy efficiency, transition to renewable sources for energy use, reduce greenhouse and carbon pollutants, and provide a sustainable, comfortable, safe environment for future generations. The Smart Grid will have requisite levels of interoperable standards that will enable innovative changes, some yet unknown. This interoperable system will exchange meaningful actionable information in a safe, efficient, and reliable manner. This System of systems will provide information sharing with flexibility, fidelity, and security to allow our nation to prosper and perform into the future.

REDUCE ENERGY USE + REDUCE COST

The Energy Savings Plan (ESP)

There is no need for extra sensory perception to fully understand and appreciate the Energy Savings Plan (ESP) offered by SunView to our customers.

SunView is committed to combining the latest green technology, updated engineering and analytics, and foremost economic savings in all of our services that provide upgraded, retrofitted, and unique design lighting solutions. We are dedicated to innovative, practical, and intelligent solutions for lighting, power, and environmental conservation. Our ESP delivers customized efficient green energy answers that guarantee operating expense reduction in the first month after implementation and for the following years.

SunView's ESP helps our customers reduce the high cost and wasted energy associated with outdated incandescent, fluorescent, and halogen lighting without the huge expense of an upfront investment. We manage installation issues. Customer's long term maintenance worries are almost eliminated. We plan with our customers a timely lighting solution that fits their needs. We install the next-generation light emitting diodes (LEDs) system using programs that offer no initial cost to our customers and then share in their guaranteed savings. The installation process is scheduled at the most convenient time for the customer's needs. Through this process, our customers receive professional lighting design projects, increased cash flow, and guaranteed energy savings. In many cases, sales, work performance, and employee satisfaction are measurably increased. This is a win-win situation for all involved. Our customers reduce operating costs, upgrade their facilities with efficient energy saving LED lighting, and provide ecological benefits to their community environment.

Some lighting solution companies add a percentage of the customer's rebates to their own profit package, not SunView LED! Our customers keep 100% of any rebates or financial incentives associated with the new energy efficient and environmentally beneficial installation. SunView LED offers a lock-in rate savings payment plan that is calculated with information from the audit analysis. This rate does not change over the payment term period. The payment rate is based on the customer's energy savings only. The calculation is derived from the expense difference of the energy savings of changing from costly high maintenance fluorescent or outmoded lighting to the new retrofitted energy efficient LED lighting. This is why the audit analysis is so critical to the ESP.

Beyond these savings, our customers see other immediate financial benefits from two other sources of saving. Because our LED lighting is so efficient and we utilize the finest technology



in the industry, our bulbs are cost-effective, their light lasts longer, and they use less energy than any other bulbs. Therefore, our customers will see an immediate reduction in their cost of lighting use and post installation maintenance costs will be minimal to none. Lower monthly electric bills and little or no maintenance costs give our customers additional immediate savings. These savings are added on top of the SunView ESP program.

Electric energy costs change and increase over time. Some companies project this rise in electricity cost and add a percentage of this amount to their projected monthly profit margins over the payment period. SunView LED keeps the payment rate the same over the payment period. A customer's electric rate for kilowatt hours used may rise due to the general increase for electricity cost, but our lock in payment rate stays the same. There are no company hidden increased costs due to natural rate hikes for electric consumption that are passed from us to our customers. At SunView LED, we try to consider every vantage point from our customer's perspective.



SunView's ESP begins with:

- ❖ NO cost up front for capital investment.
- ❖ NO cost for the initial lighting audit.
- ❖ NO cost for the lighting design.
- ❖ NO cost for the installation.
- ❖ NO cost for the five year product warranty..

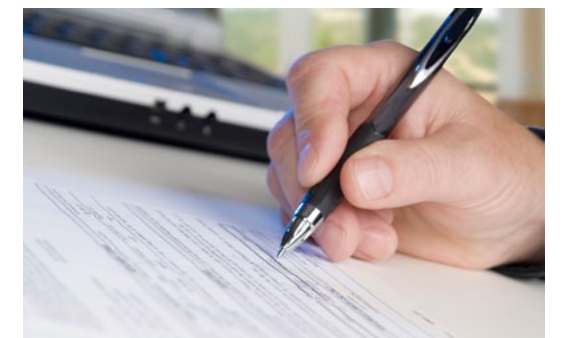
SunView's ESP continues with:

- ❖ Customized audit analysis demonstrating your savings
- ❖ Lock-in savings payment plan
- ❖ Customer keeps 100% of applicable rebates or financial incentives
- ❖ Lighting retrofit program tailored to your needs and budget
- ❖ Timely customized designed lighting where necessary
- ❖ Immediate post-installation maintenance savings
- ❖ Typical project financing averaging five years
- ❖ Available financing programs
- ❖ Provision to customer of additional replacement stock of each type of bulb used in installation at no extra cost
- ❖ Replacement bulbs stocked and available for purchase if ever needed after warranty expiration



SunView's ESP provides:

- ❖ Immediate customer savings due to lower electric usage bills
- ❖ Payment plan based on energy savings only
- ❖ Immediate customer savings due to less maintenance for LED lighting
- ❖ Replacement of outdated mercury based and incandescent lighting
- ❖ fixtures and outmoded ballasts where indicated
- ❖ Reduction in electricity costs attributable to lighting
- ❖ Guaranteed 30% to 80% savings in electricity cost
- ❖ Guaranteed reduction in HVAC overall cost and improved climate control
- ❖ High color efficiency providing the color of light you need
- ❖ Custom designed lighting for unique locations
- ❖ Dramatic reduction in overall operating costs
- ❖ Local skilled licensed professionals for installation
- ❖ Facility enhancement and appearance with sustainable energy goals
- ❖ Use of the finest industry technology from Japan, Korea, and the USA
- ❖ Installation of the finest LED lighting available
- ❖ Installation of the most reliable efficient systems available worldwide
- ❖ Installation of interoperable systems for future upgraded applications





VISION
THE FUTURE

The Benefits of LED Lighting

Since the EISA decision of 2007, the USA decided to use energy in a manner that is clean, green, and mean. In other words, there is a national commitment and a global awareness that conserving energy, saving the environment, and protecting our country's natural resources while lessening our dependence on outside energy sources are key elements to the future of America. This decision can be applied to any country on the globe. Collectively, humans must learn to conserve, save, and protect the earth upon which we exist. The use of LED lighting contributes to those three goals.

SunView is committed to those same goals. Listed here are some of the reasons to install retrofitted and custom designed LED lighting solutions enabling your company, facility, and community to go clean, green, and mean. These categories can be interchangeable, but are listed here in a general topical manner.

**“Clean” is conserving energy in all forms for current and future use.
To enable this, LEDs have the following characteristics:**

- ❖ have 5 times the luminosity and 8 times longer litespan over traditional bulbs
- ❖ do not need to be replaced often
- ❖ robust performance with light usage that exceeds halogen and CFLs
- ❖ are cool to the touch producing almost no noticeable heat
- ❖ have no extra heat to create excess cooling or heating adjustments
- ❖ are easily retrofitted into existing fixtures costing less for installation
- ❖ avoid wasting 90% of their energy in heat loss as do traditional bulbs
- ❖ do not need to be replaced or recycled as often as CFLs or halogens
- ❖ can have a color temperature which is equivalent to warm white incandescent lighting
- ❖ can have a software system for maintenance checking to avoid manual inspection
- ❖ reduce dust and insect accumulation thereby reducing maintenance
- ❖ utilize a cooler technology which reduces strain on current HVAC units
- ❖ reduce air conditioning expense due to no to low heat from LED bulbs
- ❖ SunView LED bulbs have the lowest temperature, lowest wattage, and highest lumens in the industry
- ❖ have 5 times the luminosity and 8 times longer litespan over traditional bulbs
- ❖ **SunView LED bulbs have the lowest temperature, lowest wattage, and highest lumens in the industry**



“Green” is saving energy and reducing pollutants to assure a sustainable future.

To facilitate this, LEDs provide the following benefits:

- ❖ pose no health hazard in production, installation, maintenance, or disposal
- ❖ provide immediate light when activated
- ❖ life span of SunView LED bulbs are 50,000 to 75,000 hours (75,000 hours equals 9 years at 24 x 7)
- ❖ bulbs can be custom designed by SunView’s expert R&D manufacturing team
- ❖ their use avoids carbon emission
- ❖ no extra EPA costs to dispose of toxic bulbs
- ❖ reduce greenhouse gas emission helping to offset global warming
- ❖ have no ultraviolet or infrared radiation emission
- ❖ contain no mercury, cadmium, or lead components
- ❖ made from aluminum and are 100% recyclable
- ❖ compliant with ‘International Dark Sky Association’ lighting
- ❖ our bulbs are Design Lights Consortium (DLC) certified
- ❖ reduce carbon footprint
- ❖ contain full light color spectrum closest to natural sunshine
- ❖ **SunView LED bulbs have the highest power factor in the industry with a lengthy lifespan**



“Mean” is protecting the cultural, economic, and social environment in a manner that enables all people to enjoy the benefits of using resources wisely and becoming more independently sustainable. For this, LEDs contribute to the following:

- ❖ reduce the growth of the U.S. energy demand because LEDs last from 25 times to 75 times longer than CFLs, halogens, or incandescent bulbs
- ❖ using LEDs reduces monthly energy bill costs and lowers energy usage
- ❖ saving nearly \$6 billion dollars in 2015 alone using EISA standards for the 10% nationwide household electricity usage
- ❖ reduction of 14% for electricity cost and less energy use for business lighting nationwide
- ❖ using EISA limitation on the import or manufacture of inefficient bulbs
- ❖ reduction in annual operation cost over past use cost of traditional incandescent bulbs, halogen, or CFLs
- ❖ usually have a ten year warranty and will last 15 to 25 years depending upon use
- ❖ have associated financial programs to make initial installation affordable
- ❖ available federal, state, and utilities benefits, rebates, and/or incentives for energy conservation
- ❖ increase the value of business and real estate assets with proven decreased utility costs
- ❖ in some cases fire insurance premiums can be reduced
- ❖ reduces maintenance costs by eliminating consistent bulb and ballast replacement
- ❖ produces light without heat, UV, or infrared damage
- ❖ can be used with light sensitive objects or in special environments without causing damage or deterioration
- ❖ can render true daylight and other lighting color needs
- ❖ provides enhanced, comfortable lighting for employees and occupants of facility
- ❖ ensures the health of facility occupants and visitors due to no emission of harmful gasses
- ❖ create work for local skilled professionals in installation and maintenance needs
- ❖ work effectively and efficiently in every weather condition
- ❖ can be Wi-Fi-connected and operated from a smartphone
- ❖ are programmable as electronic components to create wireless networks for crime prevention, safety, and emergency response situations
- ❖ have interoperability for use in Smart Street Lighting, Smart City, and Smart Grid future applications
- ❖ **SunView’s LED lighting has the highest output to assure a long life span which saves money and energy**

THE LED LIGHTING INSTALLATION

Planning and Presentation of the Retrofit Process

SunView LED uses several distinct and practical steps to carefully guide our customers through the initial planning phase of a retrofitting project. This time is necessary to establish the close customer relationship upon which our detailed plans are developed and our presentations of lighting solutions presented. We try our best to accommodate the time constraints of the work schedule for our customers while providing a timely response to the needs of the forthcoming project. After a customer has spoken with one of our trained professional sales representatives and expresses a strong interest in completing an installation program, we ask that customer to submit past electric bills for analysis to begin phase one of the program development. This process will be explained in the chapter on audit and analysis.

SunView will utilize a trained representative to walk with the customer through a physical audit of the facility to ascertain the current lighting situation and the desired changes to a more efficient energy savings LED lighting solution. Notes on these details are made and returned to our offices for evaluation by our engineers and further proposal development.

SunView will take the time to respond to the project needs with detailed descriptions of the proposed changes. This proposal is generated with the customer's needs as paramount and the customer's means as imperative. The proposal is explained and presented to the customer for review and approval. Should there involve specific custom designed lighting for the retrofit process, our Research and Design Team responds with an appropriate solution in a timely manner to keep the retrofitted project plans moving forward.

After the retrofitted proposal and the financial payment plan are fully accepted by the customer, SunView will begin the actual retrofitted installation with state of the art LED lighting solutions. An installation schedule will be created based on the execution of the agreement, the needs of the customer, and the anticipated time for the regular and custom designed equipment to be delivered and ready for use. This installation will be scheduled according to the customer's convenience and be performed as to not disrupt routine daily operations and the ability to fully and safely install the required lighting solution. SunView will contract with qualified licensed and insured local professionals to perform the required work and oversee each aspect of that work to assure compliance with the project specifications.

Once the installation is complete, the customer will immediately see a return on their investment and financial savings in lower electric costs, less electricity usage, less cooling adjustment needs, more balanced temperatures seasonally, and an improvement in the facility's environment that will make a positive healthy impact on all of the people associated with working or being in that particular facility.

After the completed installation, SunView will provide a limited amount of replacement stock of all bulb types used in installation to the customer. This option of SunView's retrofitting program will last for the duration of the warranty. Post warranty, bulbs can be purchased if needed. We will always be available should any questions or issues arise.



Project Analysis, Program Audit, and Payment Plan

SunView LED and the customer will complete a itemized project analysis and a fiscal audit for the proposed LED lighting solution plan using the details compiled from a physical inspection of the facility, square footage of the area, area use and environment, hours of operation, details for a projected lighting solution, as well as the evaluation of the past six months of electric and utility bills related to the lighted areas.

SunView will utilize proprietary software that is designed to analyze the pertinent information of past lighting expenditures and the changes created by using energy efficient LED lighting. One to one interviews with corporate principals and representatives, as well as the inclusion of any additional pertinent documentation, will complete this analysis-audit process.

The resultant conclusion of the combination of physical and expense evaluation combined with the engineering/ computerized projection will provide a report containing detailed customized calculations of before/after savings. This information will be used as a basis for the development of an analysis-audit that will help itemize the details of the essential funding for the project. SunView can provide several adaptable programs to accommodate the financial needs of their customers. Each program is individually tailored to that customer and their particular situation, circumstance, and lighting solution needs. Warranty details will also be included in the finalized program. Environmental impact estimation will be added as an addition to the program analysis report.

This report will contain details explaining the following:

- ❖ Payment Method Option
- ❖ Cash Payment Savings and R.O.I.
- ❖ The Payment Plan
- ❖ The Compatible Warranty Plan
- ❖ The Privilege Program Analysis
- ❖ Environmental Impact of the Proposed Retrofitted Solution



CUSTOMIZED
SERVICE

DETAILED CONSISTENT PERFORMANCE

Performance Specifications

SunView LED Lighting provides the most efficient energy savings LED lighting solutions to resolve our customer's needs. Therefore, SunView strives to do the following:

- ❖ We will comply with all applicable local, state, and U.S. laws, regulations, and the necessary logistics to perform and maintain our installations with the highest degree of integrity.
- ❖ We are a drug free work place and assure that our representatives and those with whom we contract agree and maintain that status.
- ❖ Our employees, representatives, and associates will carry and present proper identification when and where required.
- ❖ Our work is performed in a safe, professional, and considerate manner as we keep in mind the daily operational needs of our customers and do our best to not interfere with the usual routine work schedules, activities, facility area locations, and the flow of employees or people utilizing the facility. We work closely with our customers to find the appropriate work hours for installation.
- ❖ Because certain projects and locations often qualify for rebates and incentives for installation of energy efficient lighting, we will help our customers in completing the essential documentation to facilitate their rebate and/or incentive revenues at no cost to the customer.



CLEAN. SAFE. SMART.

Safety and Cleanup Specifications

SunView LED understands that safety in the workplace is paramount. All of the required local, state, and federal regulations are followed where applicable. Working in a safe, clean, and orderly environment is important and we try to maintain high standards for all of our representatives, engineers, and contracted skilled licensed professionals. All of our technicians understand that safety and an orderly workplace is essential to an efficient installation completion. Therefore, our working professionals follow the following criteria:

- ❖ Are skilled professionals who know their work and have the appropriate licensing or certification where and when required
- ❖ Wear the regulated and appropriate safety attire during work hours
- ❖ Carry appropriate personal and company identification which will be shown when requested
- ❖ Restrict their use of and movement in our customer's facility to the work area that requires their attention unless there is an installation related issue elsewhere for them to review
- ❖ Maintain extra care and attention to keeping their work area clean during work hours
- ❖ The disposal of the existent lighting and related equipment will be discussed with the customer



Product, Work, and Warranty Specifications

SunView LED Lighting will design an acceptable warranty for products, the work of the installation, and maintenance issues. The warranty is part of the ESP and will be fully explained to our customer prior to installation. Our warranty development, like all of our services, is tailored to our customer's needs. We offer several options:

- ❖ Length of Term Warranties
- ❖ Optional Extended Protection Warranties
- ❖ Workmanship Warranties
- ❖ Product Warranties

Please note that all of our warranty options commence from the date of the start of the installation agreement unless otherwise specified and agreed to by the customer and SunView LED Lighting.



TIMELY WORK
DONE ON TIME



CONFIDENCE.
SECURITY.
DEPENDABILITY

SunViewLED - Industry Leader

Our technology challenges our competitors. The lumens, wattage, temperature range, and power factors of SunView LED bulbs far surpass any others on the market. Our Research, Design, and Testing Laboratories perform their work daily to keep improving our products. We own the factory and control the manufacturing process. We have the partnership with interoperability technology of APANET Green Technology Systems. We are committed to the daily progression of innovative, dependable, energy efficient LED lighting solutions.

- ❖ We have the **highest lumens per wattage** in the Industry
- ❖ We have the **lowest wattage** in the Industry
- ❖ We have the **lowest LED light source temperature** in the Industry
- ❖ We have the **highest power factor** in the Industry
- ❖ We **manufacture and develop** our own products
- ❖ We have the most **interoperable capabilities** in the Industry

This is why SunView LED Lighting is an Industry Leader.

SunView LED Lighting is a unique company that offers state of the art technologies, environmentally sound applications, and customized affordable energy efficient solutions. Our payment programs offer **zero capital investment for implementation** with realized expense reduction immediately upon installation. We strive to give our customers the finest solutions for the most reasonable cost that will save money even in years to come.

SunView LED has the best of both worlds in our beneficial partnership of being the manufacturer as well as the representative of all of our distinctive products and programs. As the Manufacturer, we utilize only the highest quality LED technology available in the Industry. LED (Light Emitting Diodes) are not all equal. The Diodes is the chip inside the bulb or tube that makes the magic of this very special technology. This technology was perfected in Japan. Most companies are using the Diodes from China, because the cost is a third less than Japanese components. However, these diodes do not have the same quality of light, have a limited life span, and have been known to have flickering problems. As the Manufacturer of our lighting products, we control the technology we utilize and correct any problems to obtain the finest lighting solutions available.

SunView LED's Research & Development Laboratory is continuously analyzing technology worldwide and only chooses the current leadership technology for the components in our lighting solutions. Worldwide the finest state of the art technologies come from Japan, Korea, or the USA. We assure that our Research and Development Engineering Technicians incorporate only the lighting components that have the highest level of efficiency, the greatest reliability, and the lowest level of energy use.



SunView LED's Research and Development Laboratory develops products for our customer's specific needs. Most LED providers use off the shelf LED lights, because they have no other source. Therefore, they have a limited amount of bulb sizes and shapes. They can not replace the existing light bulbs and must offer the replacement of the entire fixture. This fixture replacement adds unnecessary and extra cost for the customer.

However, SunView LED can customize and design your solution with unique bulb replacements whether they are U tubes, CFL, or for example, customized light bulbs that look like Edison's original bulbs. Our advanced technology can also customize to the lumens and color required. If new fixtures are desired SunView LED has numerous options to fit your unique environment. These products are only available exclusively from SunView LED.



SunView LED's first objective is to design the proper lighting for the facility. Our LED Lights can be custom made to duplicate the existing fluorescents or provide alternatives if desired. Our bulbs do not have harmful toxins such as lead, mercury, and/or cadmium and do not emit UV Rays as do other bulbs that are on the market. We are conscious of the importance of the environmental impact of reducing energy use and the importance of the well being of the people using the facility environment. Therefore, we choose green technology for our customers.

SunView LED is also unique in providing no capital investment for a retro-fitted installation solution designed to meet our customer's needs and vision. We are truly committed to producing the finest LED lighting solutions to provide our customers with enhanced environments as well as energy efficient savings with reasonable cost effective programs.

SunView LED Lighting's partnership with APANET Green Technology Systems and their global focus adds the finest network installation solutions in the industry to what we already offer to our customers. APANET's work and expertise with Smart Street Lighting utilizing LonWorks interoperable technology assures our customers that they are receiving installations that work now and will work to adapt to future technological developments. From Smart Street Lighting, to Smart Buildings, to Smart Cities, to connection with the Smart Grid System, our partnership provides the finest technology available.

With SunView LED Lighting, the customer receives the best savings over time, the finest product on the market, and one hundred percent of the benefit of our manufacturing and technology expertise. We have

- ❖ **The best of LED light bulbs**
- ❖ **The best of LED lighting solutions**
- ❖ **The best of interoperable installations**
- ❖ **The best of the above combinations**

SunView LED not only offers the best, we are the best in the industry. Contact our Representatives today and let us demonstrate to you the effective, efficient, affordable, flexible, and reliable SunView LED Lighting difference. Allow us to give YOU the best the market offers. You will not regret the inquiry!

SUNVIEW LED LIGHTING FLEXIBLE INNOVATIVE INTEROPERABILITY



Reference Credits

Argell, David "Everything You Need To Know About LED Light Bulbs" 28 February 2014 www.popularmechanics.com/home/improvement/energy-efficient/everything-you-need-to-know-about-led-light-bulbs-16542040

American Council for an Energy-Efficient Economy (ACEEE). Policy Toolkit. "Local Government Energy Management Goals: Best Practices and Platforms," October 2014.

Caillet, Frederic. "LonMark, The Open Streetlight Platform," May 2013.

Department of Energy (US): "Future of the Grid: Evolving to Meet America's Needs, Final Report, Industry Driven Vision of 2030 Grid and Recommended Path Forward," GridWise Alliance, December 2014.

— "Guide to Community Energy Strategic Planning," March 2013.

— "Building Energy Efficiency Frontier and Innovation Technologies Benefit," Golden Field Office, 2013.

— "Smart Grid: An Introduction How Smart Grid Promotes a Greener Future."

"Frequently Asked Questions: Lighting Choices to Save You Money" <http://energy.gov/energysaver/articles/frequently-asked-questions-lighting-choices-save-you-money>, 9 August 2012.

Greer, Christopher, et.al. "NIST Framework and Roadmap for Smart Grid Interoperability Standards," Release 3.0, NIST SP – 1108r3, September 2014.

International Organization for Standardization. "ISO 9001 What Does It Mean In The Supply Chain" ISBN: 978-92-67-10575-8.

— "Selection and Use of the ISO 9000 Family of Standards," 2009, ISBN: 978-92-67-10473-7.

LaMonica, Martin "How to Choose an LED Light Bulb" MIT Technology Review, 9 March 2013. <http://www.technologyreview.com/view/512346/how-to-choose-an-led-light-bulb>

Layton, Julia "How LED Light Bulbs Work," HowStuffWorks.Com, 23 July 2009 <http://science.howstuffworks.com/environmental/green-tech/sustainable/led-light-bulb.htm>

Laitner, John A. "Skip." Matthew T. McDonnell, Karen Ehrhardt-Martinez. "The Energy Efficiency and Productivity Benefits of Smart Appliances and ICT Controlled Networks: An Initial Assessment," Report Number F1407, ACEEE, November 2014.



“Lighting Choices to Save You Money” 28 July 2014, <http://energy.gov/energysaver/articles/lighting-choices-save-you-money>

LonMark International. White Paper. “Open Streetlight Control System for Smart Cities: Market, Challenges, Solutions, and Next Step ” Document # -357-Version 3.0, May 2014.

LonMark International. I – “LonMark Layer 1-6 Interoperability Guidelines,” Version 3.4, September 2005

National Institute of Standards. Special Publication 1108R2, “NIST Framework and Roadmap for Smart Grid Interoperability Standards,” Release 2.0, 2013, <http://dx.doi.org/10.6028/NIST.SP.1008r3>

— Special Publication 1108R2, “NIST Framework and Roadmap for Smart Grid Interoperability Standards,” Release 2.0, February 2012

“New Lighting Standards Began in 2012” 28 July 2014, <http://energy.gov/energysaver/articles/new-lighting-standards-began-2012>

Russell, Christopher. “Multiple Benefits of Business Sector Energy Efficiency: A Survey of Existing and Potential Measures,” Report Number IE1501, American Council for an Energy Efficient Economy, January 2015.

St. John, Jeff. “Will Street Lights Become the Nodes of the Networked City?,” Green Tech Media, April 11, 2013.

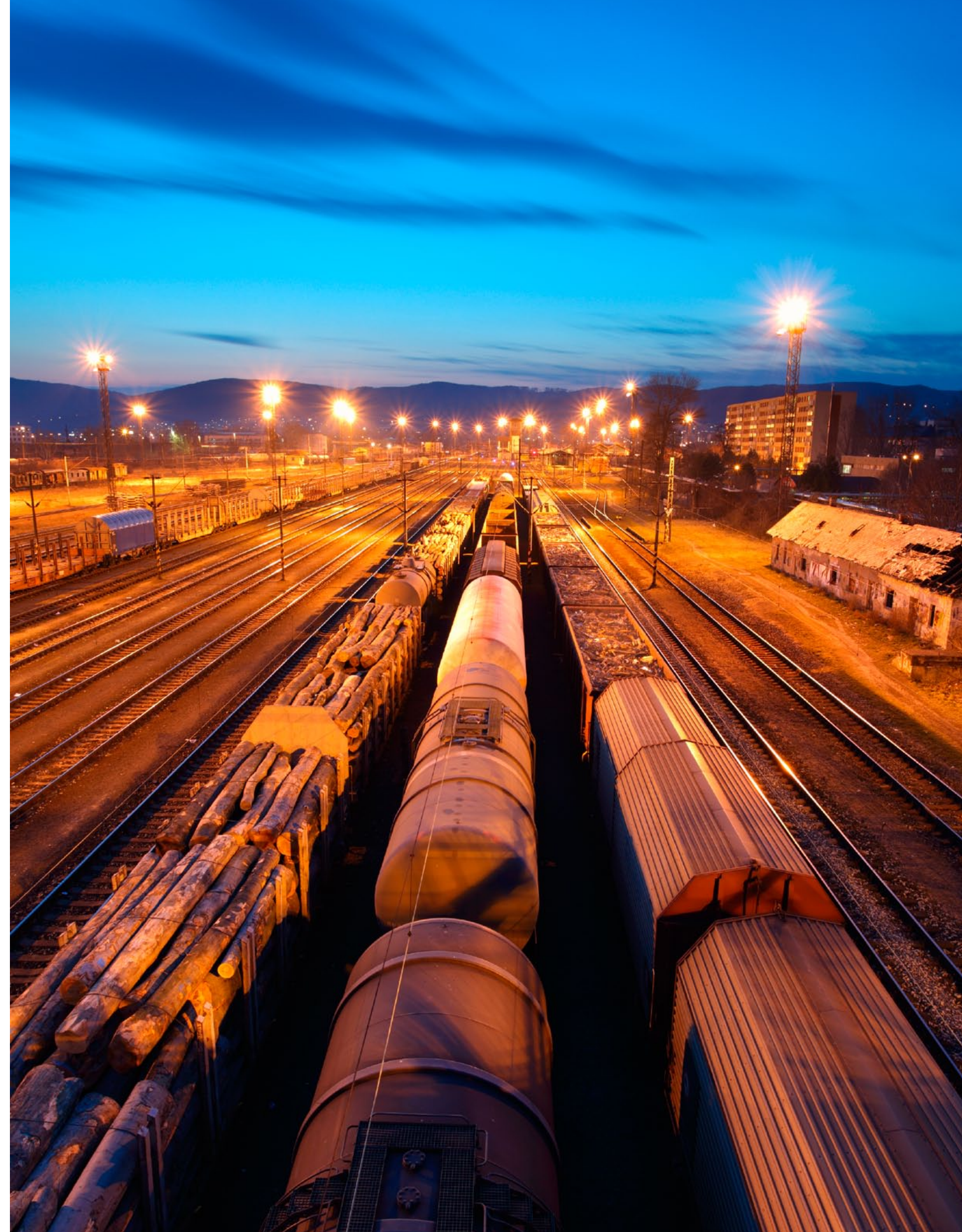
Trent, By. The Light Bulb Showdown: LEDs vs. CFLs vs. Incandescent Bulbs – What’s the Best Deal Now...And In The Future?,” 29 July 2014. www.TheSimpleDollar.com

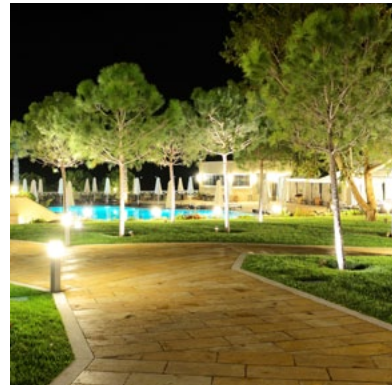
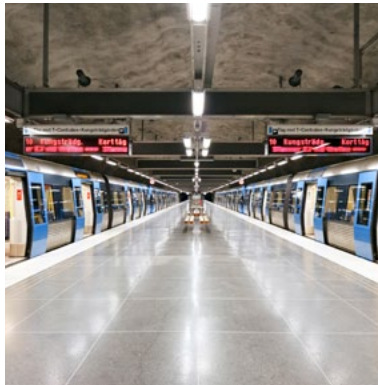
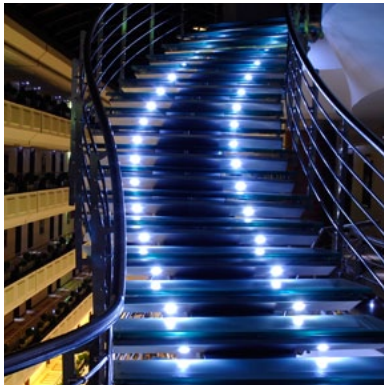
United Nations. “Kyoto Protocol to the United Nations Framework Convention on Climate Change,” 1998.

US Demand Response Coordination Committee. “National Committee on Electricity Policy: Electric Transmission Services for State Officials,” Fall 2008.

Wang, Uclia “How LEDs Are Going To Change The Way We Look At Cities” 10 September 2014, <http://www.forbes.com/sites/uciliawang/2014/09/10/bright-lights-big-profits.htm>

Content Editor: LM Victoria, Ph.D.
Design: Chrysanthé Longman





COMPANY LOCATIONS

MANUFACTURING FACTORY:

SunView LED Lighting, LLC
No. 4 Changsheng Road
South District
Zhongshan City, Guangdong, 528400 China

CORPORATE HEADQUARTERS:

SunView LED Lighting, LLC
Suite 204, 106 Allen Road
Basking Ridge, NJ 07920 USA
Toll Free: (877) 7-SUNVIEW or (877) 778 - 6843
Local: 908-367-9050

FRANCHISE LOCATIONS:

New England
Nevada
Northern California
Southern California