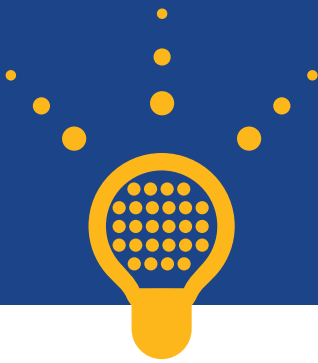# sensus

a **xylem** brand

LIGHT
BEACON
MOTION
DETECTION
TRAFFIC-AWARE
DIMMING
TRAFFIC
MAPPING
FLOOD
DETECTION
ICING
AWARENESS
COLLISION
ALARMS
GUNSHOT
MONITORING
PARKING
VACANCIES
AIR QUALITY

Illuminate your city in more ways than one.

Outdoor lighting consumes

19%

of global energy use.

International Energy Agency. Light's Labour's Lost: Policies for Energy-efficient Lighting, 2006.

Look beyond the bulb.

We're beginning to see our cities in a new light (literally). As an an electric utility decision-maker or a municipality leader, you are laser-focused on reducing costs, increasing revenues and improving customer service. These smart business objectives call for smart lighting solutions.

Proper lighting where we live, work and play has become an expectation of all citizens. Whether you manage an IOU, cooperative, campus or city, smart lighting provides more control of your lighting system, saving energy, reducing maintenance costs and improving safety. And streets, parking lots and public gathering spaces become more inviting spaces.

This new level of control also results in improved efficiency and greater revenue. Investing in smart lighting today will also reduce greenhouse gas emissions tomorrow. These bright ideas play a major role in unlocking the benefits of a smart city.

A timeline of lighting.

As long as there have been cities, planners have pondered ways for outdoor lighting to make streets safer for all citizens.

"History of Lighting," *History of Lighting*, accessed May 10, 2016, http://www.historyoflighting.net.

Bamboo pipes funneled natural gas to street lamps in Beijing and ancient Rome, illuminating city streets all night long.

500 B.C.

London courts passed a law requiring residents to hang lanterns outside their homes at night.

1417

Baltimore stole the spotlight as the first city in America to use gas street lamps.

1816

Buffalo, NY, lit up the world with electric streetlights on Gannon Street—the first public road to be lighted that way in the United States.

1881

The solutions are clear.

Streetlights are expensive to operate and maintain. Because of this, some cities, businesses and retail stores, as well as medical and educational campuses, have converted from High Pressure Sodium (HPS) or Mercury Vapor Lights (MVL) to more efficient Light Emitting Diode (LED) fixtures.

Estimates from the Smart Outdoor Lighting Alliance indicate that LEDs accounted for 50% of all new public outdoor lighting installed in 2015. Clearly, even this simple change impacts energy load. But, to see significant changes in efficiency, safety and revenue, smart lighting solutions must go beyond the bulb.

Up to

40%

of a city's energy load is attributed to streetlights.

Charlie Nobles, "Streetlights may be the next bright idea in demand response," *Intelligent Utility,* December 23, 2015, http://community.energycentral.com/community/intelligent-utility/streetlights-may-be-next-bright-idea-demand-response.

Smart Lighting

A new look for light poles.

An essential building block of a smart grid plan, the smart lighting transformation starts with a makeover for light poles. When sensors are added, light poles become smart assets that help monitor everything from the weather and air quality to traffic.

Smart lighting sensors greatly improve safety as well. Not only can lighting adjust for pedestrian traffic, but sensors can detect and locate gunshots, assisting police in emergency situations.

Smart Lighting Benefits

1 Upgrade grid operations.

Did you know that there's an electrical system that can access real-time data, allowing for better grid management and rapid response? Many lighting control solutions monitor voltage levels, outages and overall power quality, ensuring quick alarms—and even quicker dispatch—for more efficient operations.

Sunrise/sunset management features allow for light dimming throughout inactive areas, as well as for controlled brightening of areas during business hours or for a public event. Flashing capabilities also alert the public and emergency responders to safety issues, so citizens feel more secure.

Smart lighting has never been smarter. As a public service provider or municipality leader, you can manage many functions from one central control, including lighting levels and energy use, maintenace scheduling, repair crew dispatch and resource management. In fact, electrical system operators can pinpoint potential problems and proactively address customer needs even before reports come in. It doesn't get any smarter than that.

Smart lighting, smarter utilities

Voltage management

Improve distribution, help to avoid spikes and provide better service. Monitor voltage levels from substations to the farthest metering point—in real time.

Asset inventory

Granular data on legacy equipment and new streetlights improves billing accuracy.

Better maintenance

Proactively predict power outages and streetlight replacement needs for improved field efficiency.

New revenue streams

Installing a technological backbone enables you to provide additional services for your business, your campus or your customers.

Smart Lighting Benefits

2 Safer streets create a better community.

Streetlights help pedestrians and drivers see better and be safer at night. They also provide a more secure feeling in neighborhoods and assist police patrols.

Smart lighting solutions offer more security. Now police officers responding to suspicious activity can flash or brighten streetlights from patrol car laptops. With the right two-way communication network as part of the smart lighting solution, first responders can instantly set flashes. Emergency dispatchers can also improve response times by flashing the streetlights near the reported incident. In high-crime areas, communities can create "safety zones" where lighting levels are increased to deter criminals.

While streetlights are not the complete answer for reducing crime, many communities have reported improvements after increasing lighting in key areas. According to a review by the Campbell Collaboration spanning four decades of streetlighting intervention in the United States and United Kingdom, crime decreased by 21% in areas that improved lighting, compared to similar areas that did not. Researchers believe improved lighting signals increased surveillance, deterring potential offenders. It also signifies community investment and pride.

For retail, office, medical and education campus managers, upgrading to smart lighting also means that parking lots and exterior areas get the right level of lighting based on the time of day and level of traffic. This gives staff more control and provides customers, visitors and residents with a greater feeling of security.

Driver and
pedestrian safety

Crime
deterrence

Neighborhood and
public space security

Community connectivity
and pride

6

Smart Lighting Benefits

3 Campuses get smart about lighting.

Can campus outdoor lighting be more than just, well, lighting? The answer is yes—especially when it's smart.

A smart lighting solution provides an integrated network throughout a university or college. It's lighting with a purpose, generating a ripple effect across the institution that impacts safety, cost and energy use.

With lighting accounting for over 30% of energy use at the typical college facility, smart lighting can go a long way in reducing energy costs. A smart lighting network can also cut maintenance costs by up to 30%.

$25K **was saved** over the summer with a smart lighting network used in campus parking decks

Moving to LED plus smart lighting controls can **cut maintenance costs by** **80%**

25% **of campus outdoor lighting cost can be saved** with a smart lighting network

Adding smart lighting controls to LED lighting can **reduce energy costs by** **30%**

Improved lighting can **decrease nighttime crime by** **21%**

4

Control the network.
Maximize revenue.

The shift to LED streetlights is reducing energy use and generating savings—as much as 60% or more.* But this shift to passive LED is just the beginning of smart lighting benefits. In fact, retrofitting lights alone may increase future deployment costs and extend the upgrade payback period.

Adding smart lighting control modules that easily plug into all National Electrical Manufacturers Association (NEMA) standardized socket fixtures is a simple upgrade that allows you to control the type of light and easily adjust capabilities.

By installing the control modules along with smart lighting software and the right communication network, you have the capability to manage both LED and legacy bulbs.

Market research has shown that the increased level of control and real-time feedback provided by a smart lighting network can cut maintenance costs by 80% or more. The data supplied by smart lighting empowers informed energy decisions—with immediate results that boost your bottom line.

Smart lighting opportunities for the IOU

If you're an investor-owned utility (IOU), smart lighting technology lets you provide services that generate new revenue streams not solely dependent on consumption. As more communities deploy LED bulbs, more pressure will be placed for streetlight tariffs. Electric systems will need to achieve maintenance cost reductions while offering valuable data, services and benefits.

* "Commercial and Municipal LED Street and Area Lighting," Ameresco, accessed on 4/13, 2016, http://www.ameresco.com/page/commercial-and-municipal-led-street-and-area-lighting#sthash.DhoFc1a5.dpuf.

5 Smart cities start with smart lighting.

Smart lighting is the cornerstone of any smart city and the ideal strategic approach for cities wanting to go smart.

Plus, a smart lighting communication network can be leveraged to support other smart devices and utilities.

See the (smart) light.

Sustainability

Strategically control lighting levels, reducing energy use and your carbon footprint.

Public safety

Decrease nighttime crime and improve citizen peace of mind. Police, fire and emergency teams can increase lighting levels when needed and force lights to blink in emergencies.

Economic growth

Smart cities create a better quality of life, enticing new residents and businesses.

6 Illuminate a better quality of life—for everyone.

With smart lighting as an obvious value-producing solution because of its visibility and immediate impact, it's imperative that it brings value to all residents and groups within the community.

Although utilities are mandated to provide public goods to every resident, many smart city services being promoted by vendors are targeted to specific areas within a town or to just the largest cities. Most often, these smart city boundaries are located where the highest class citizens work and reside.

Closing the digital divide

" The benefits of smart utilities and solutions within a city should not be limited to certain classes. The advantages of a smart city should reach the entire community. "

CHARLIE NOBLES
Director of lighting product marketing
Sensus

7 Smart and sustainable lighting.

With increased environmental awareness comes the need to reduce energy consumption and greenhouse gas emissions in every community. Smart streetlighting provides a natural solution, as streetlights consume a significant share of the electricity consumed by most municipalities. Smart lighting allows electric utilities, co-ops and cities to have the controls to make decisions to meet actual conditions. There's no longer a need to have lights at maximum capacity from sundown to sunrise.

This need-driven use of streetlights reduces energy demand and significantly cuts carbon dioxide emissions. Streetlights can also host monitors to help measure traffic density, control traffic lights and even guide vehicles to available parking spaces. Saving money and the environment—now that's a true win-win.

No truck-roll wasted.

The move to LED is becoming a no-brainer. But in the quest for sustainability, consider installing smart lighting controls along the way—for no additional installation cost. The move to an LED fixture might save you 50% on energy consumption and maintenance costs, but when you add controls, your savings jump by another 30%.

Move to LED lighting plus smart lighting controls and save:

80% on energy consumption

on maintenance costs

Create your smart city, community or campus.

Smart cities attract more businesses and residents. And smart lighting can play an integral role in creating your smart grid. With the right communication network, you can add lighting applications to existing Advanced Metering Infrastructure (AMI) applications for minimal infrastructure costs compared to other options.

As a utility provider or city leader, think about streetlights less as a necessity and more as an asset. Smart lighting controls can be added to streetlights for actionable insight to improve community safety, quality of life, environmental conditions and financial performance.

And, finally, for municipalities, big data means big savings. The need for smart lighting analytics joins energy, water, communications and transportation systems. More data means more opportunities to impact essential services for those who live, work and play in urban communities.

The future is evolving in ways we could never have predicted. With advances in analytics, we will continue to evolve. It's time to reach further with technology and insights that improve your efficiency and responsiveness to the community you serve.

Streetlighting serves every facet of your community, benefiting citizens, employers and visitors. And its wide diversity of constituents makes smart lighting a winning proposition for everyone.

VantagePoint: The lighting solution that gives you control.

VantagePoint® Lighting Control is an intelligent solution from Sensus that uses a lighting control module, lighting software and our FlexNet® communication network to give you greater command of your lights. Our solution helps you achieve all the benefits of going smart.

- Conserve energy
- Manage your assets
- Assess consumption
- Program light schedules
- Reduce maintenance costs
- Promote public safety

VantagePoint also provides the ability to quickly determine whether an outage is due to a power, communications or equipment failure. And, with remote management from our intuitive interface and dashboard, you have more control over daily operations to make every decision a little bit smarter.

See your infrastructure in a new light.

The VantagePoint® Lighting Control Module gives you real-time access and control for streetlights. And it works for both LED and legacy lights, so you can update at your own pace.

The module enables you to set on/off times to reduce energy consumption. Plus, it delivers alerts when it senses a problem—saving up to 75% in system maintenance costs.

Mounting directly on the light fixture, the module, along with VantagePoint Lighting Software, provides a full range of control options.

Program light levels for individual streetlights
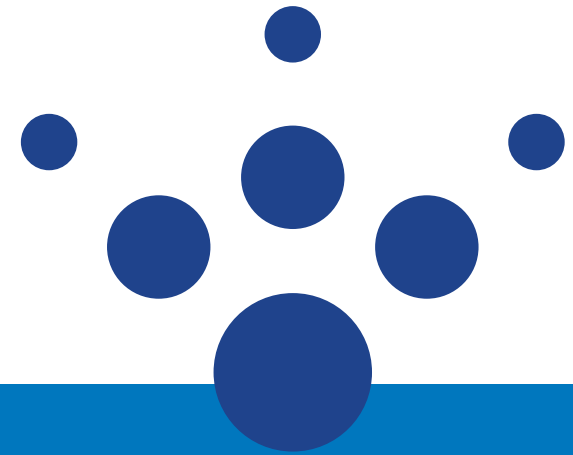
Flash, dim and trim

Report alarms

13

FlexNet

The FlexNet communication network: stronger, faster, better

VantagePoint uses the Sensus FlexNet™ communication network, giving you more benefits than mesh, cellular or powerline communications. Using a private, point-to-multipoint network,

FlexNet provides low data latency, high security, faster speed and greater reliability. It's a utility-grade communication network that powers the critical applications for your smart city.

Why is FlexNet the smarter choice for smart lighting?

1 **FlexNet performs at three times the speed of a mesh network.** Mesh operates in unlicensed spectrum, which means you are competing with other data for the same bandwidth.

2 **Other wireless networks have hidden costs,** requiring more than 10 times the amount of infrastructure and offering half the redundancy of FlexNet.

3 **FlexNet provides twice the redundancy of competitive networks.** Each base station is designed with overlapping coverage to provide coverage when needed.

4 **CapEx is minimized,** as FlexNet requires just 5% of the infrastructure buildout as compared with mesh. Five FlexNet base stations can cover up to 20,000 endpoints. With mesh, the operator would need to install 50 collectors to cover 15,000 endpoints.

5 **By using a private communications band, FlexNet system operators enjoy higher security.** We offer two-way encrypted communication to all devices and rely on AES-256 encryption protocol. It's also Achilles Communications Certified.

6 **FlexNet is FCC-licensed spectrum**—a private network with no competing data traffic. This dedicated data flow means low noise. Mesh shares spectrum with everything from baby monitors to garage door openers. And with cellular solutions, you face peak usage periods. FlexNet allows for prioritization of mission-critical data like alarms.

Ask the right questions

Knowing the right questions to ask about smart lighting equips you with the information you need to determine your best solution.

Who is included in the local ecosystem of influence around smart lighting?

Which other smart city initiatives might be complemented by smart streetlighting?

Who owns the existing streetlights, and who pays for their operation and maintenance?

Who is responsible for making local decisions and managing budgets?

Contact Us

Learn more about providing smart lighting solutions for your community.
Visit **sensus.com/smartlighting** and get illuminated.