

# TVILIGHT

EMPOWERING INTELLIGENCE



2020

## Smart Street Lighting for Smart(er) Cities

CityManager



Manage your entire lighting infrastructure with **Tvilight CityManager**  
– an open, secure and scalable software platform



# EMPOWERING INTELLIGENCE

Lighting is responsible for a staggering 19% of global electricity usage. Powering streetlights account for 30% - 50% of a typical city's energy bill. Europe alone pays over €10 billion annually to power its streetlights. According to UN, 68% of the total world population will live in urban areas by 2050. This puts enormous pressure on limited city resources. The question is, how can municipalities create safer spaces for the existing and forthcoming citizens, while being energy-efficient and keeping the environment clean and liveable? Intelligent lighting offers practical answers to many of these questions. With smart street lights, cities can save energy, cut CO<sub>2</sub> emissions, limit light pollution and lower operations and maintenance costs, all while keeping citizen feel safe and satisfied.

*\* Sources: United Nations (UN), European Commission (E-street), the Climate Group (Lighting the Green Revolution)*

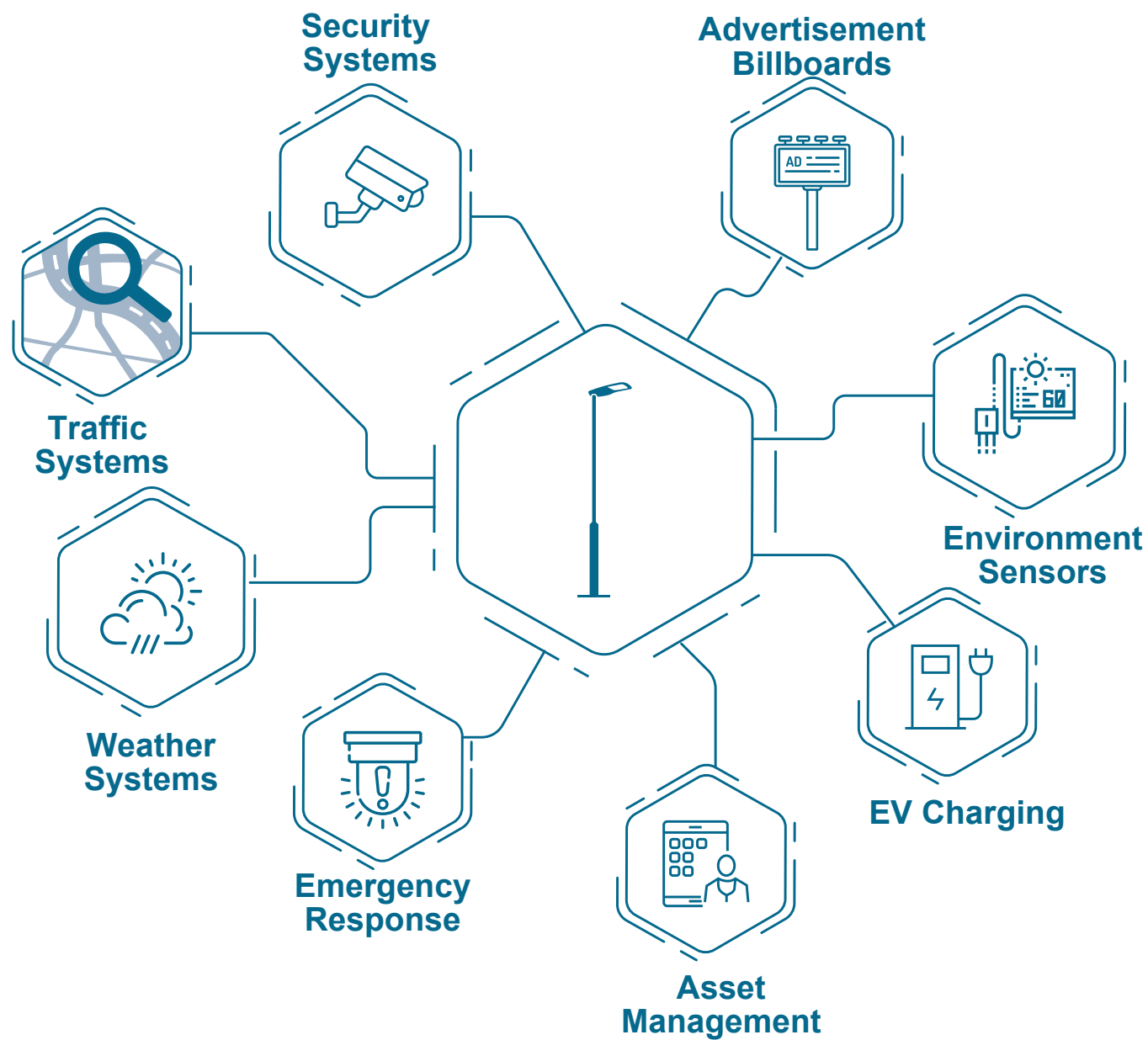


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# Open secure & Future ready



Our Open Architecture gives you a full future-ready solution to interconnect applications that fit your city's needs in a secure manner

## Smart Cities begin with Smart Lighting

We believe that it is easier to begin a smart city journey with smart streetlights. Public lighting represents one of the finest powered grids – spread across towns and cities throughout the globe. It is a nervous system of a city that connects over 360 million streetlights worldwide with access to 24x7 power. Street pole is therefore an ideal spot for mounting smart city systems. For example, it is feasible to mount a security camera, an environmental sensor, a traffic counter or an EV charger on a street pole, only when the connected streetlight stays-off during the day time, while the power still flows through to the street pole mounted equipment.

Likewise, cities can benefit from the inter-connection between smart streetlights and other smart city systems. For example, street lights of the future will adapt colour on the path of an emergency vehicle – so that traffic ahead can start moving aside even before hearing the siren of an emergency vehicle. Twilight's secure DigiHub platform is designed to help cities to be future-ready and leverage such interoperability. Through our Open API approach, we enable multiple devices, systems and assets to be inter-connected.

Further good news is that unlike most smart city applications, intelligent lighting saves you money from day one. Besides a lower energy bill and reduced operational expenses, they offer exciting revenue generating opportunities e.g. leasing space for smart advertisement billboards.

### Successful integration with 3<sup>rd</sup> parties

- ✓ Cisco Kinetics (Global)
- ✓ Siemens/ Atos (Europe)
- ✓ Dynniq ImCity (Europe)
- ✓ Bee Smart City (Europe)
- ✓ Osram Lumindent (Europe)
- ✓ Sixdata assets (Germany)
- ✓ Yotta Alloy (UK)
- ✓ Montad Moon (Netherlands)

# Tvilight SmartLighting

Are you looking for open, flexible and scalable smart lighting solution? Yes. Then you are at the right place. Whether you need – Group control, Individual light control, or simply an Asset Management tool – we have the right solution for you.

No two cities are alike, and each neighbourhood is unique. This requires great flexibility. Tvilight's smart lighting platform combines a complete software suite (including 3rd party tools) and hardware portfolio to enable full control over your citywide lighting infrastructure. Our solution provides excellent flexibility to decide the right solution fit per neighbourhood. We have the right toolset to help you manage infrastructure through its complete lifecycle (from planning to post-installation services).

Our solution has a proven track record of accelerating energy savings, optimising maintenance, generating cost savings and improving citizen safety. Recognised as one of the best solution providers in Europe, our solution is already in use by over 300 towns and cities spread across 20 countries around the globe.



## Take full control of your Lighting Infrastructure with a single platform

Connected + non-Connected public lighting

### 1. Asset Management platform

- Asset registration (lighting + beyond)
- Day-to-day task allocation
- Workflow/ process management



### 2. Group Control

- Switching controlled centrally
- Cabinet with power monitoring
- Group analytics/alerts/notifications

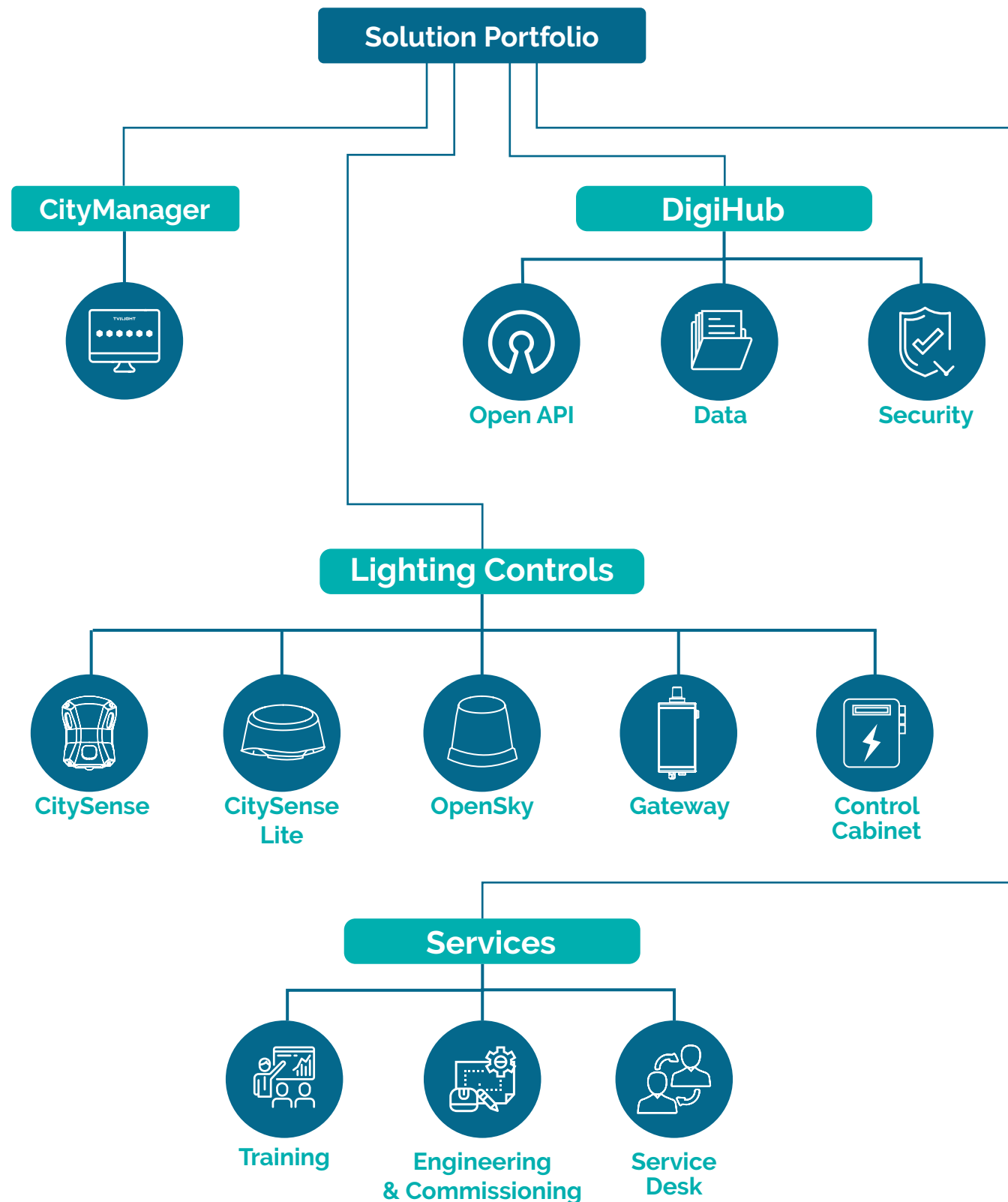
### 3. Individual Control

- Rule based dimming/ switching
- Power monitoring
- Analytics/ alerts/ notifications

- Each city is different with unique needs. We offer a complete range of in-house and 3rd party solutions to meet diverse citywide lighting infrastructure needs
- Our team can help you choose the right solution to meet your needs



# Solution portfolio



We are here to help you from planning to post-installation services

## CityManager

Our CMS platform is designed to manage, monitor and control citywide lighting, providing you near real-time insight and analysis on the behaviour of your lighting infrastructure

## DigiHub

Our IoT cloud platform (DigiHub) collects data from all the devices and gateways, analyses it in real-time and makes it available to CityManager as well as third-parties via open APIs

## Lighting Control

We offer a full range of hardware control products & outdoor motion sensors to connect your streetlight on an individual (OLC) or a group level (feeder pillar)

## Services

You do not need to be an expert on connected lighting. We offer optional managed services from pre-installation planning & training, engineering & commissioning to post-installation service desk.



# Smart benefits for smart people

Cities everywhere are growing. Estimates indicate that by 2050 about 68% of the total population will be living in urban areas. It is a priority to find solutions on how to manage costs and logistics, while creating a liveable and attractive environment for citizens to live. Thanks to new solutions, today's smart public lighting offers many ways to contribute to these goals and generate benefits for all stakeholders.



## For Cities

Smart Lighting can help cities to realise cost savings on energy, operations and maintenance, while at the same time help to create a more attractive and safer environment. It allows to remotely monitor, manage and control the entire lighting infrastructure and get insight on its performance – through a single platform.

## For Citizens

Consider a student travelling back home late night or a child crossing the street with her mother. Dark streets caused by lack of fault notifications and slow repair can be dangerous. Auto-notifications generated by the CMS system can help you overcome this and take prompt corrective actions (e.g. replace a broken LED driver).



## For Lighting Operators

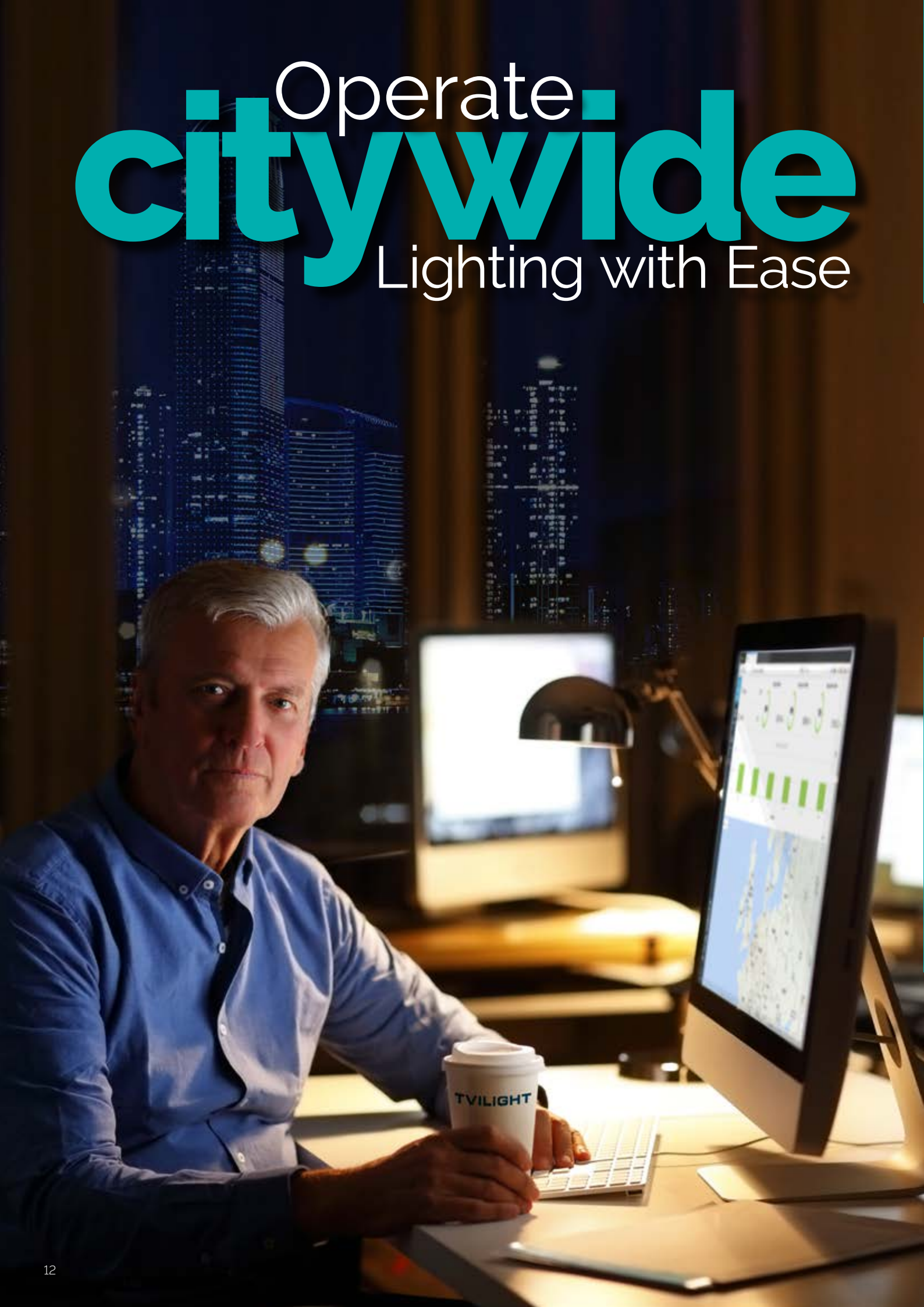
The largest benefit of Smart Lighting is the increased insight in performance and automated status & fault reporting. In combination with the asset management tool, this allows the system integrators/ installation contractors to automate maintenance and repair services, optimise workflow and generate significant cost savings.



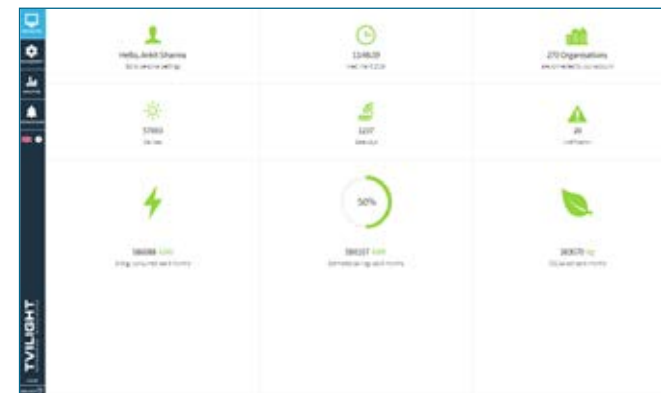


# Operate citywide

Lighting with Ease



Our **CityManager** light management platform enables you to completely manage all your connected street lights via a user-friendly and secure web-application using any standard web browser. You gain remote access to all your devices and a near real-time status and performance information.

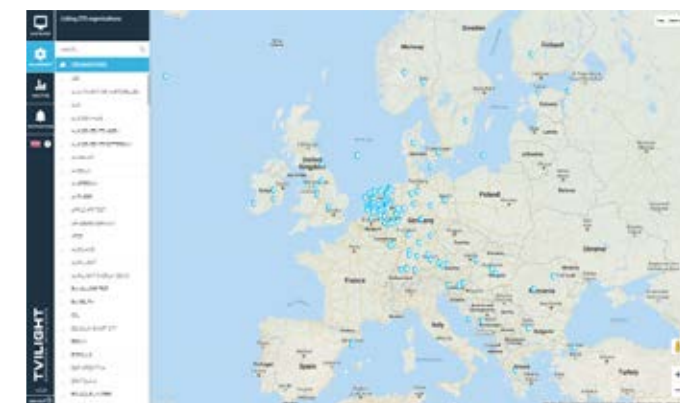


## Manage

Control and define light levels for a specific streetlight, a street, or an entire region. Boost light levels to improve safety and visibility as the situation demands, or reduce the light levels to save energy, thereby cut carbon emissions and lower light pollution.

## Monitor

Receive automatic status and fault reporting straight to your mailbox, thereby enabling you to promptly initiate a repair/replacement process. The system can identify several lighting-related faults, so that you can exactly identify why a particular luminaire had failed.



## Gain insight

Insightful data on energy usage and savings through metering or calculation of each individual luminaire or cabinet can help you optimise your entire lighting infrastructure. Accurate data also helps make actionable plans for the future.

# Adequate Light always

Meeting the shifting demands of citizens, businesses and visitors is a top priority for the city administration. At the same time, complying with the new laws and regulations cannot be neglected. Our CityManager platform offers a multitude of control options and flexibility to meet your specific needs.

## Dim Profiles

You can specify an exact dimming profile for a single streetlight or a group, with our intuitive CityManager interface. For example, you can ensure that busy streets have more light during rush hours than residential areas, and you can reduce the light levels in the business districts when the working day is over.



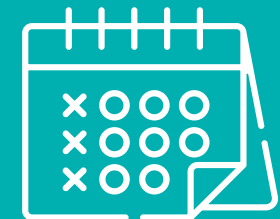
## Light on demand

By adopting CitySense streetlight motion sensors, you can make your lighting infrastructure dynamic and responsive to human presence, maximising energy saving and optimising the availability of light when and where it is needed. Research shows that sensor-based lighting has a positive effect on citizen perception on safety.



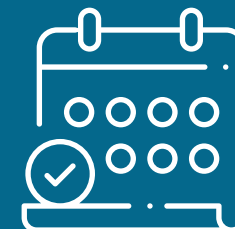
## Calendar based

The Light Planner application allows for specific weekdays and weekends scheduling. This allows you to set individual profiles per day for each individual or group of luminaires. For example, you can keep the lights on higher levels on shopping nights or reduce light levels on specific occasions (e.g. when enjoying public fireworks) or during holidays.



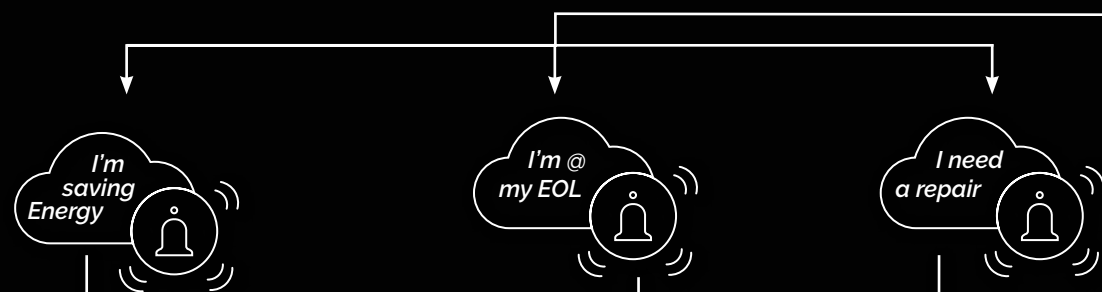
## Event based

We also offer a unique ability to control your lighting based on events, whether that is a central ALS system in your city, an external trigger (e.g. noise sensor), extreme weather conditions (e.g. heavy rain or fog), or traffic density based adaptive light levels. Such events, when opted, will temporarily overwrite the default profile. Light will return to its normal profile when the event has passed or when the event is switched-off.





# OPTIMISE Operation & Maintenance



CityManager allows you to monitor citywide lighting status – via a single CMS dashboard. The performance and behaviour of the streetlights are recorded in customised reports for you. The platform automatically generates notifications in case of errors or faults, thereby enabling you to take prompt well-informed actions as well as reducing the need for night patrols.



## Status Information

CityManager gives you near real-time information of every individual or group of luminaires. Faults and outages are automatically registered, and notifications are sent to the assigned person to undertake action.

## Reporting

The platform allows you to track your city's lighting performance, status, energy consumption and savings over different locations and customisable periods of time.



## Improve Efficiency

Automatically receive your daily reports on behaviour and performance of the lighting infrastructure and use analytics to improve the efficiency and use of your city's lighting.

## Workflow Optimisation

CityManager allows you to improve your city's lighting management further, by integrating with your preferred asset management application. Seamlessly integrated, it provides detailed insights about your lighting infrastructure, helping you to manage repairs better and improve the efficiency of all lighting-related workflows.





# Increase PUBLIC Safety

Citizen safety is a comprehensive concept that is deeply ingrained into everything we do. From state-of-the-art motion-sensor based dynamic lighting to smart notifications & alerts by email, we aim to combine energy savings with improved citizen safety perception. We believe in the principle of **right light at right place & right time** – thereby balancing energy usage without compromising citizen comfort.



## Safe Circle of Light

What if there was a way to cut energy waste and at the same time ensure public safety? We have designed an amazing motion-sensor based light-on-demand solution. This solution is currently used across the globe and has attracted major media attention from CNN to the tweets of Avenger Hulk.

This is how it works: as soon as a sensor detects human presence, the neighbouring lights brighten up to a pre-defined level. Whether it is a pedestrian, a cyclist or a driver, they will be surrounded in a safe, warm circle of light. By adopting this solution, you can prevent the overwhelming waste of electricity that occurs when the lights burn for nobody, without affecting the citizens' comfort.

## Safe Streets and Safe Cities

Turning off the street lights completely during the night is undesired and, in most cases, not allowed, as it would compromise public safety and go against municipal guidelines. By setting right light levels depending on time and street specifics, cities can beautifully balance between energy usage and citizen comfort. Better lit streetlights also help security cameras capture images of higher quality, thereby improving citizen safety perception and keep the criminals away.

Furthermore, automatic failure alerts and notifications help achieving swifter response to repair or replacement of a failed lamp, thereby avoiding dark streets for a longer period.





# Minimise Environmental IMPACT OF YOUR CITY

The need for change is clear. Many reports all over the world support the fact that climate is changing. We have a joint responsibility to act and change the way we live. One of the key factors in this change is the use of energy. Apart from the change from fossil fuels to renewable energy, we urgently need to cut on the amount of energy being used.

With the expected growth of energy usage by 35% in 2030\*, the fact that lighting accounts for 19% of the total global usage\* and that lighting accounts for 30-50% of an average city's energy bill\*, there is a great opportunity to improve by adopting Smart Lighting.

\*Source:  
www.eib.org; Energy Efficient Street Lighting report by European Expertise Centre



## Cut Energy Use

Our smart street lighting solutions allow energy savings of up to 80%. In absence of human presence, smart streetlights burn at a predefined level of brightness, for instance, at 20% of the full capacity. This stops unnecessary wastage of energy. When the presence of a pedestrian, cyclist, or a car is detected, the smart streetlights will adjust their brightness according to a pre-defined level. Other alternative is simply putting the lights to a pre-defined dimming schedule.



## Lower CO<sub>2</sub> Emissions

Our intelligent street lighting solution significantly lowers CO<sub>2</sub> emissions. CO<sub>2</sub> or carbon dioxide occupies the largest share of today's greenhouse gases (the air pollution). This is bad for all living beings. Street lights waste a lot of energy, which contributes significantly to the increase in CO<sub>2</sub>. Smart street lighting solutions from Twilight save energy radically, thereby lowering the CO<sub>2</sub> emissions considerably and creating a healthier, more sustainable living environment.



## Curb Light Pollution

Our state-of-the-art street lighting solutions reduce light pollution. Regular streetlights keep on burning at their full brightness, even when there is no one around. This negatively affects nocturnal animals as well as human biorhythm. Smart streetlights burn at a pre-defined level of brightness, for example, 20% of the full capacity, during off-peak hours. This feature lowers the unwanted light pollution and in turn offers a healthier environment, soothing ecosystem, and unspoiled aesthetic setting.



# CityManager

*Your Smart City Lighting Platform*



**Open,  
Secure & Scalable**



CityManager platform is a complete suite of web-based software applications that provides full remote management for your entire lighting infrastructure, both on an individual light and group level. Open architecture and Open API allow secure integration to any of your preferred 3rd party application.



## Commissioning Export

This tool helps you to download a complete report about the commissioned lighting infrastructure based on a particular organisation or project. Using this report, you can gain an in-depth insight, such as device type, software version, luminaire wattage, etc. on each of the luminaire that has been commissioned. You can import this data to your preferred BI (business intelligence) or asset management tool for further analysis.



## Passport

Passport is a dedicated identity and access management tool. This application helps you to create, manage and delete users and groups. As an admin, you can allocate various levels of access rights based on the role of a specific user. For example, you can offer different types of access to the installer, system integrator, maintenance personnel and asset manager. .



## Scan & Go

The Scan & Go app enables fast, easy commissioning and maintenance of the extensive Twilight intelligent lighting solutions using the phone's internet connection. Available for both Android and iOS platforms, this easy-to-use tool simplifies the installation, maintenance and repair of the products on the field. The tool is specifically useful for streetlight installers, system integrators and maintenance crew.



## Analytics

A part of the Command Centre software, Analytics tool helps you to track your city's lighting performance, status, energy consumption and savings over different locations and customisable periods of time. Specific luminaire data, for example, grid voltage and driver temperature, can be tracked over a period of time. Device network analytics is also an integral part of this tool.



## Notifications

Proactive and selective notifications to help take prompt actions. An application designed for the local asset manager/maintenance crew, the Notifications tool offers near real-time status information of every individual or group of luminaires. Faults and outages are automatically registered, and notifications are sent to the assigned person to undertake action.



## Command Centre

Command Centre is the central application for network configuration, tele-monitoring and tele-management of the entire street lighting infrastructure. It provides an in-depth near real-time analysis and monitoring of the state of assets, networks and sensors. Command Centre supports the system administrator during the installation and operation of the intelligent lighting network. It is used for the management of the luminaires/ devices, commissioning of the network and the identification of faults or errors during and after the installation.



## Light Planner

Light Planner allows operators to program, change and adapt the level of urban lighting from the point of view of urban plan (city grid). Operators can set the light levels based on hours of sunset/ sunrise, daily/ weekly schedules, event-based calendars, and advanced schedules. Variable night illumination profiles per lamp allow the light intensity to be modulated according to the street location, time, environment or current situation (traffic density, weather and so on \*\*).



## City Cabinet (group control)

City Cabinet is a web-based software for tele-management of the electric cabinet (feeder pillar). This platform allows for the control and analysis of a group of around 150 luminaires at the same time. It is also useful for replacing the traditional 'tone frequency' based switching function. City Cabinet delivers various group level functions such as: lamp switching based on in-built astronomical-clock/ central ALS/ photocell/ override mode, cabinet-based power-metering, and group analytics/ alerts/ notifications.



## City Services

City Services is an asset management platform to help the local system integrators in their day-to-day operations of physical infrastructure (including streetlights, grid cables, feeder pillars as well as other street furniture and outdoor assets). This software is used to manage inventories, allocate daily tasks, perform inspections and plan projects to maintain connected as well as non-connected lighting. This platform currently manages over 1 million light points.





# Secure Solution

We take customer data protection seriously. That is why we invest diligent efforts in making end-to-end infrastructure and data connections highly secure. Furthermore, our inbuilt multilevel back-up system ensures that the lights default to safety mode in an unlikely case of system failure.



## Data Security & GDPR

Tvilight fully complies to the European GDPR Legislation. Access to data is limited by our authorisation and access rights management tool. Only those that have explicitly been granted permission will have access to the information within their organisation.

The storage of personal information is limited to storing the email address of the user accounts in the system. Users to the system are invited to join by colleagues from within their own organisation.

The information they receive through email from DigiHub is limited to password resets, email notifications and reports. The latter two are opt-in registrations by the user and can likewise be disabled by the user. Password resets are, of course, only by request of the user.

Both our hosting partner and the data centres have the ISO 27001 certification, which ensures proper handling of data.



# Data Centres

Our servers are hosted at top data centres in the Netherlands. Achieving 99,9999% availability since 2001, our partners are renowned players in the data centre market. Critical components, including connections to the power grid, have at least N+1 redundant.

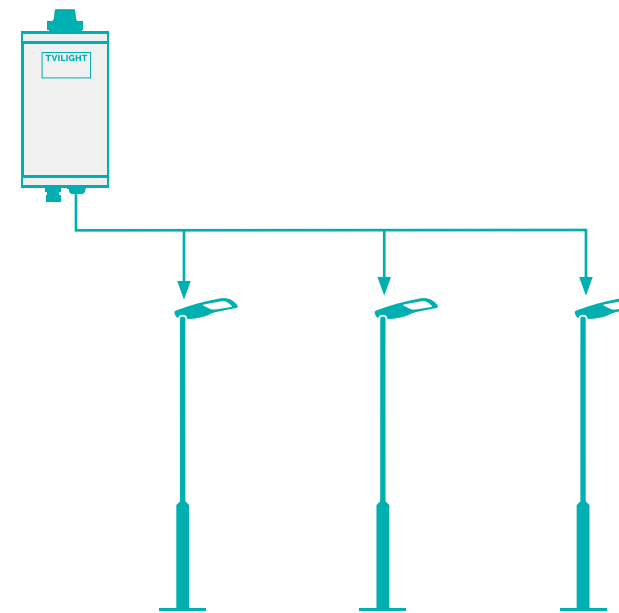
Furthermore, the data centres are self-sufficient: in case main power supply fails, the entire energy supply can be provided by UPS and emergency power systems. Security is given top priority, so outsiders are kept out and authorised users have controlled access inside. Physical security is on duty 24/7/365 days of the year and is supported by smart CCTV systems, electronic access systems, and an advance facilities management system.

The table below provides an overview of our security infrastructure

Security group	Security Application	Security Measures
Physical environment	Access control	• High-security data centre with ISO 27001 certification
	Redundancy	• Multiserver environment with automatic roll-over
Connectivity layer	API	• Account and access control
	3rd Party integration	• Connected devices and applications require pre-authorisation
Software	Point-to-point encryption	• AES 256 encryption & VPN
		• Resistant to man-in-the-middle attacks
Hardware	Devices	• 3-level back-up system in case of system failure
		• Autonomous default mode; 100% light level in case of communication as well as RTC failure
	Between devices	• AES 128 message encryption
		• Multidevice failure resistant mesh network
		• Jammer-resistant signaling



# Secure Data Connection



## Device communication

Tvilight outdoor lighting controllers (OLCs) are available with two communication options:

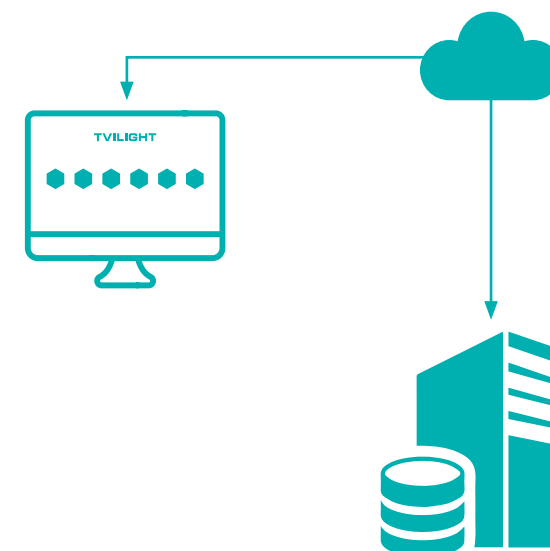
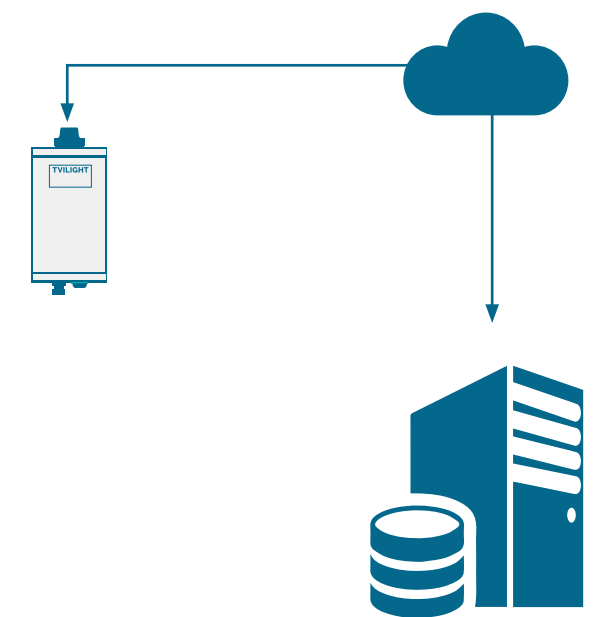
(1.) IEEE 802.15.4 open standard based wireless communication. Here the devices communicate with each other through 2.4 GHz wireless mesh network that is self-configuring and self-healing. This network allows high bandwidth data with AES128 bit encryption. The mesh network is particularly useful when using motion-sensor based light-on-demand.

(2.) Global 3GPP telecom standard based NB-IoT/ Cat-M1\*\* network. Here the device connects directly to the local telecom tower (M2M) with in-built high telecom security standard.

For either of the above, in an unlikely case of an OLC failure, the specific lamp automatically switches back to the safety mode. Other OLCs in the network are not affected.

## Gateway - Server communication

Tvilight IoT Gateway (applicable only when using mesh network) is connected to the server through a Secure WebSocket (WSS Protocol RFC 6455). To guarantee integrity, we also use OAuth 2.0 alongside the Secure Sockets Layer. This way, the Gateway communication remains secure, even when a non-encrypted connection is used. In an unlikely case of Gateway failure, all lights automatically switch to the pre-determined fall-back level of brightness.



## Server (DigiHub) to CityManager connection

CityManager uses REST API. The OAuth 2.0 protocol is used for the communication between the CityManager and DigiHub. The HTTPS ensures further security of the connection. In an unlikely case of server failure or loss of connection, the Gateway and the OLCs keep operating in their pre-defined dimming profile. Remote management of light would not be possible during this period.



# Universally Compatible

We believe that publicly available open interoperable standards promote the development of new technologies. Open standards support a vendor-neutral ecosystem, enable interoperability, and provide the city with the freedom to choose among different solution providers. We believe that the customer should be able to choose from the best products available on the market, instead of being restricted to a single provider (the lock-in strategy).

## Market Standards & Open API



Tvilight is a pro-active member of the TALQ 2.0 consortium, and contributes to the industry dialogue on standardisation. Our products are also compliant to ASTRIN Lighting Interoperability Standard (ALiS). Furthermore, our native Open API is used by major smart city and asset management platforms across the globe.

## ZHAGA / NEMA Connectors



When it comes to streetlights and public lights, Zhaga (book 18) and NEMA (7-pin, ANSI C136.41 dimming receptacle) are the industry-wide standardised sockets for OLCs. That's why, we have adopted both these standards, Zhaga as well as NEMA\*\* in our portfolio.

## Device communication



Each city has its own unique requirement. That is why we offer robust hardware that can work on RF Mesh and NB-IoT\*\* communication technologies.

RF Mesh is a 2.4 GHz based wireless self-configuring, self-healing network technology, which uses broadband signal for optimal results in both outdoor and tunnel-like environments. It is stable and secure network, and can be used globally without specific licensing permit.



NB-IoT (Narrow-Band IoT)/ CAT-M1\*\* is a low power area (M2M) network solution, which uses a subset of the 3GPP LTE global standard for a long range, low power and low-cost communication. It creates a star wireless network, allowing devices to be deployed in the field without the need of a gateway device

## Universal Lamp & Driver Compatibility

For maximum applicability, our outdoor lighting controllers (OLCs) are compatible with all lamp types that allow intelligent controlling (dimming). Tvilight offers Internal, External, Zhaga and NEMA\*\* controllers for optimal flexibility in luminaire selection.

We also support the key industry standards for lamp controls: SR (Smart Driver), DiiA, DALI, DALI 2.0\*\* and 1-10V (0-10V with CS). The selected driver, to a certain extent, determines the available features within the CMS software.

	Smart Driver Philips SR/Osram Dexal	DALI	0-10V	1-10V
Protocol type	Digital	Digital	Analogue	Analogue
Dimming	✓	✓	✓	✓
Switching on/off	✓	✓	✓	✗
Status issue	✓	✓	✗	✗
Power Data <sup>1</sup>	✓	✗	✗	✗
Driver Data <sup>2</sup>	✓	✗	✗	✗
Power Metering <sup>3</sup>	✓	✗	✗	✗
Advanced Data <sup>4</sup>	✓	✗	✗	✗

1. Load side data: Voltage Current, Power Power Factor; Calculated Power Usage

2. Driver temperature; Lamp load; Internal overheat; LED overheat; Internal driver diagnostics; Total working hours

3. Power metering details on line & load side. ANSI C136.52 compliant

4. GTIN & OEM ID; Hardware Identification; Fixture Identification; Driver health; LED diagnostics; LED performance; Operating performance; Software management



# 3<sup>rd</sup> Party Integration



Thanks to the open system architecture, Tvilight Smart City lighting platform allows the integration of 3rd party hardware and software.

## Software

Through Open API interface, we offer option to fully integrate Tvilight's smart lighting applications into your preferred Smart City dashboard or Asset Management software

This way, you can use your preferred software platform, without losing any smart lighting functionalities. For example, Cisco integrated Tvilight smart lighting platform into 'Cisco Kinetics' smart city dashboard.

## Hardware (sensors & controls)

There are multiple ways to integrate 3rd party hardware to the Tvilight Smart Lighting Solution: on the light control level (hardware), on the application level (dashboard) or on the data integration level (DigiHub).

The uniqueness of our system architecture lies in its openness, which enables simple, standardised communication between all integrated hardware and software. The (OLCs) or other hardware components can therefore be easily connected to software applications.

## GPIO hardware interface into SkyLite Prime

SkyLite Prime comes with in-built innovative LSI (logical signal input) pin. This interface can be used to connect a motion sensor. Once a sensor trigger is detected, our mesh network would also simultaneously trigger pre-selected neighbouring lights, thereby creating the light-on-demand experience similar to CitySense. The LSI pin can also be programmed to an output mode\*\* wherein a low voltage signal can be sent to a connected relay. This relay in turn can trigger an externally connected object, for example, Christmas lights or an advertisement billboard

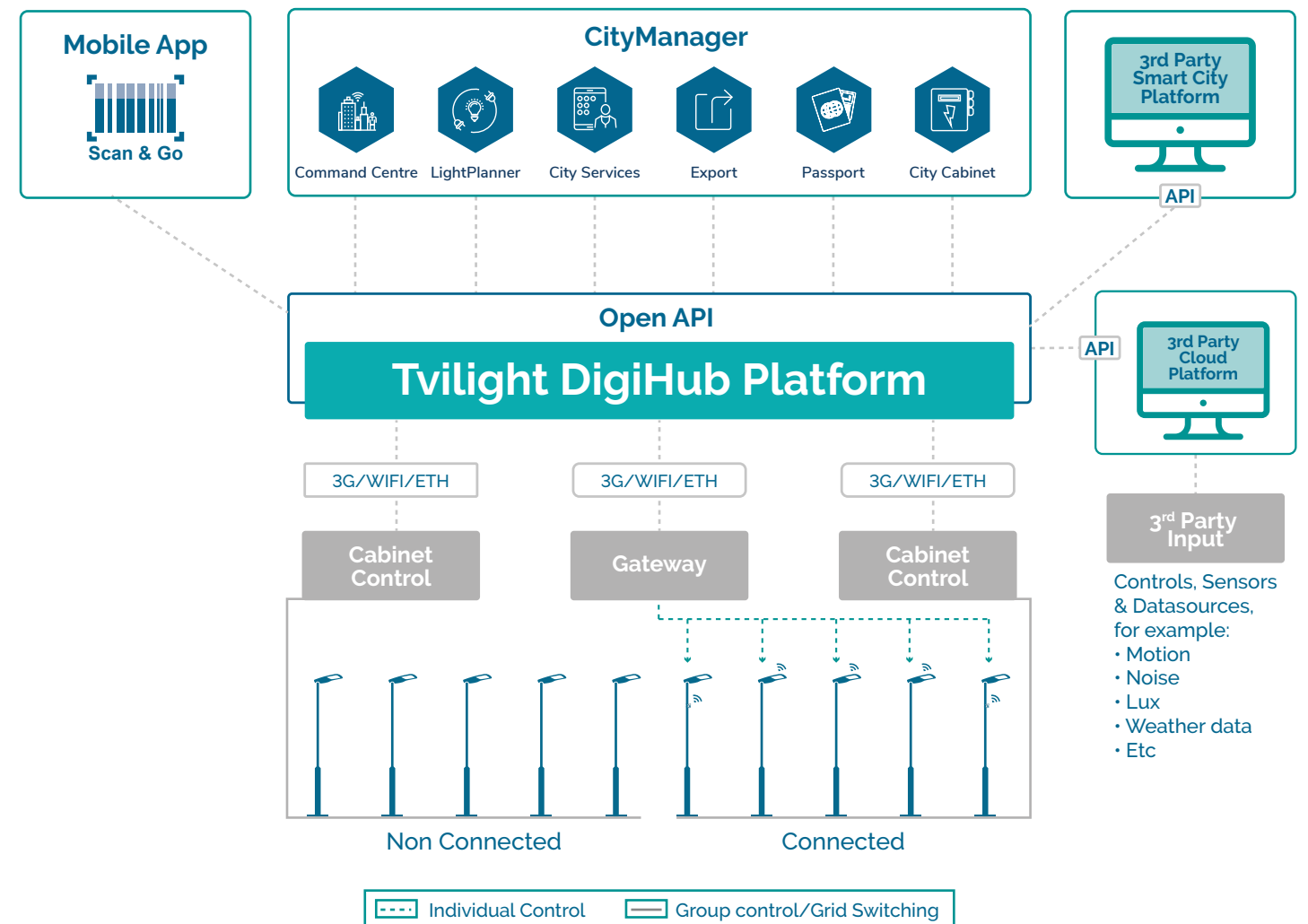
## API integration into CityManager dashboard (application integration)

Are you looking for a single dashboard to manage multiple software applications? For example, do you want to manage street assets, cabinets and streetlights, but also façade lighting, smart camera or advertising billboards – all via a single dashboard?

Please feel free to contact us and we might be able to help you. Upon request, we can enable access to multiple applications via single CityManager dashboard. You can also host the application to your preferred domain, for example: <https://www.smart-city.citymanager.amsterdam.com>.

## API data integration with DigiHub

Are you looking for interoperability between streetlights and other smart city systems within your city? For example, do you want to integrate central ALS/ photocell in your city to simultaneously switch all connected streetlights? Or connect local noise sensors to trigger local streetlights? Please feel free to contact us and we might be able to help you. Upon request, we can create a custom interoperable design to interconnect objects specifically for your city.





# Hardware Portfolio

## Lighting Controls - Mesh RF

Our wireless mesh-communication based products are specifically designed for outdoor infrastructure environment. The 2.4 GHz wireless self-configuring, self-healing networks use broadband communication for optimal results. Real-time communication between the devices helps enable the light-on-demand application. A local area network, typically comprising of 100 to 250 devices, connects to the DigiHub server via a local IoT Gateway.



## Lighting Controls - M2M (LPWA)

Built on global telecom standard that securely connects billions of devices today, NB-IoT (Narrow-Band IoT) / LTE CAT-M1 offers long range, low data rate, high availability, high security and managed communication. M2M communication allows the devices to connect directly to the local cell phone tower. In other words, the devices do not need a local Gateway. Our OpenSky NEMA and Zhaga devices\*\* are available with this option.



## Group Lighting Control (City Cabinet)

With an experience of managing over a million streetlights through smart streetlight cabinets (feeder pillar), we offer best-in-class cabinet control solution in Europe and Asia. Each cabinet can typically control a group of 100 to 200 luminaires. Group control functions include: lamp switching based on in-built astronomical-clock/ central ALS/ photocell/ override mode, cabinet-based power-metering, and group analytics/ alerts/ notifications.





# CitySense Plus









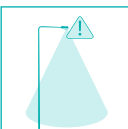

CitySense Plus is a revolutionary integrated wireless motion sensor for the presence-based monitoring and control of outdoor lighting. CitySense Plus integrates motion sensors, wireless communication and the lighting control – all in one single housing. It delivers on-demand dynamic lighting, making the lights adjust their brightness based on the presence of pedestrians, bicycles, or cars. As a result, the lights automatically dim-down during the off-peak hours when there is nobody in the vicinity. Upon detection of the human presence, all lights in the surrounding area return to the brightness levels previously defined by the user, thereby creating a safe circle of light. Adaptive lighting reduces the energy consumption by up to 80% without compromising public safety and citizen comfort.

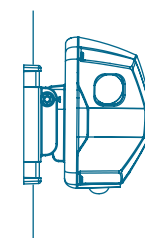
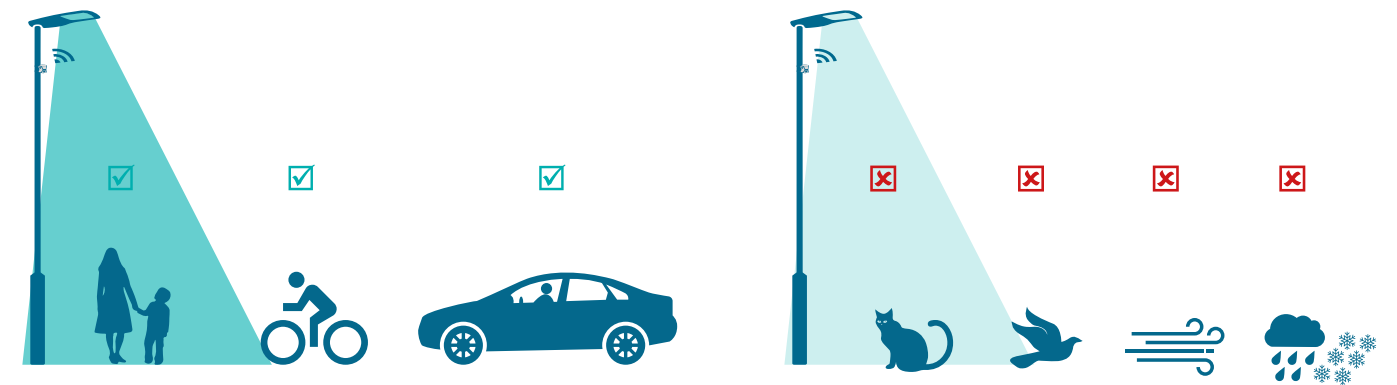


Designed in the Netherlands   
Made in Europe 

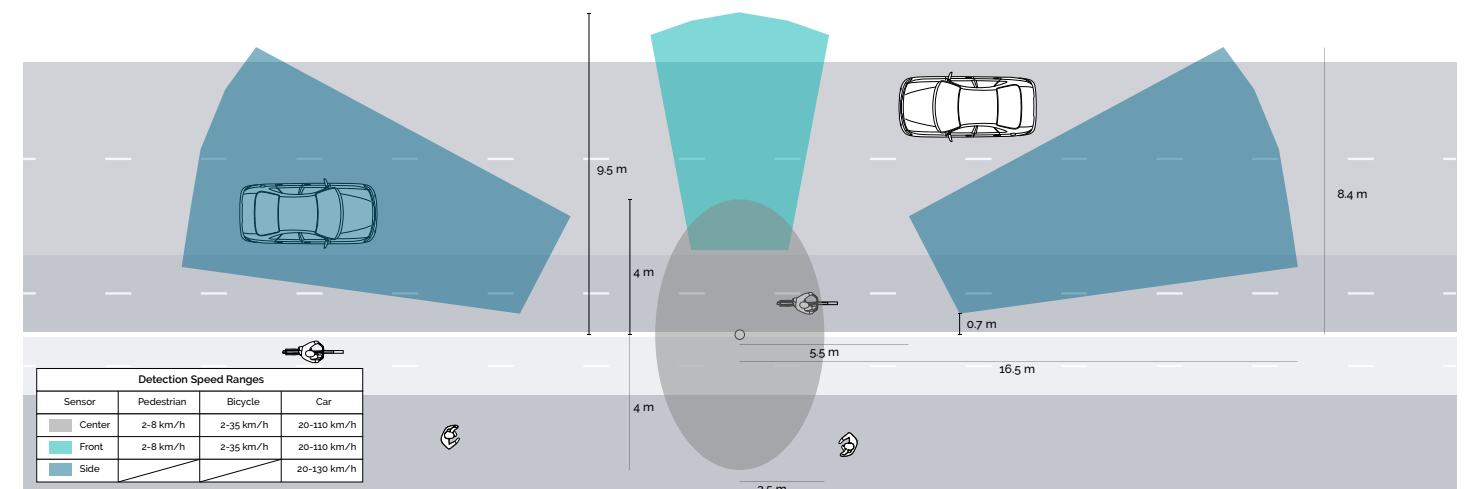


## Features

-  Revolutionary outdoor sensor designed specifically for street lighting application
-  Advanced detection technology with ultra-wide area coverage
-  Patented real-time neighbour trigger functionality
-  Heatmaps to track occupancy levels and traffic intensity in the area
-  Integrated product including wireless controls – plug & play Installation
-  Inbuilt Astronomical Clock
-  Energy Monitoring
-  Universal Lamp Compatibility
-  Fail Proof: 3-Level Back-Up System
-  Full Remote Management & Control via CityManager and 3rd Party Software



CitySense Plus - Indicative Sensor Detection Zones  
Mounting Height: 5 meters  
Tilt: 0 degrees



## Benefits

-  Up to 80% energy savings
-  Reduce light pollution and CO2 emissions
-  Up to 50% maintenance cost reduction
-  True Light-on-demand



# CitySense Lite






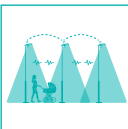




CitySense Lite is an innovative smart city street lighting solution, which comprises of D4i-based street light motion sensors and intelligent street light controllers.

Ensuring that luminaires are future-proof and ready to host diverse smart city and IoT applications, the CitySense Lite solution complies with the standardized Zhaga Book 18 smart interface.

The connected street light system CitySense Lite carries all the benefits of our SkyLite Prime street lighting controller as well as the native features the third-party Zhaga street light sensor has to offer. Additionally, the system also brings the light-on-demand and neighbor triggering functionality, which offers illumination only during the human presence and creates a safe circle of light around an occupant.

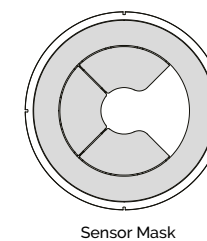
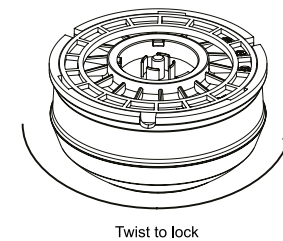
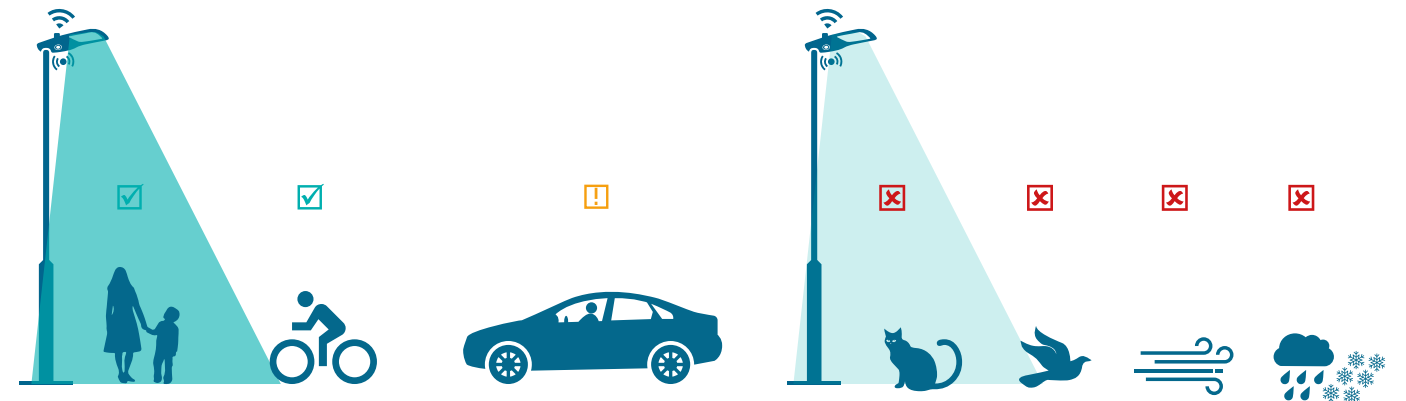
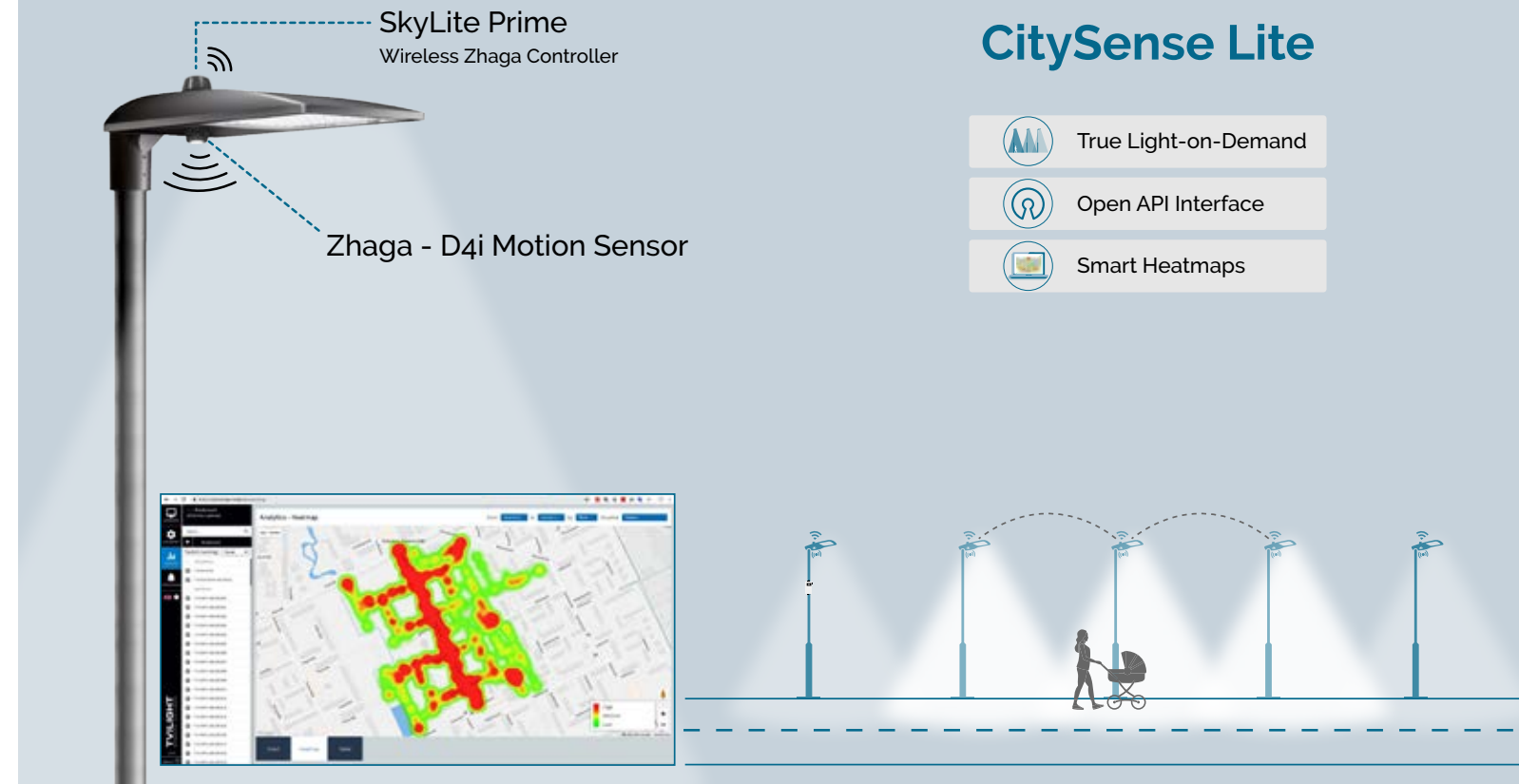


## Features

- |  |  |
|--|--|
|  <b>Zhaga compatible</b>  |  <b>Accurate power metering</b>                         |
|  <b>Advance luminaire health information and monitoring</b>            |  <b>Asset management support</b>                       |
|  <b>Rapid tool-free installation</b>                                  |  <b>Neighbour light triggering</b>                    |
|  <b>Integrated ambient light sensor</b>                               |  <b>Open API for 3rd party software compatibility</b> |
|  <b>Heatmaps to track occupancy and traffic intensity in the area</b> |  <b>Full remote management</b>                        |

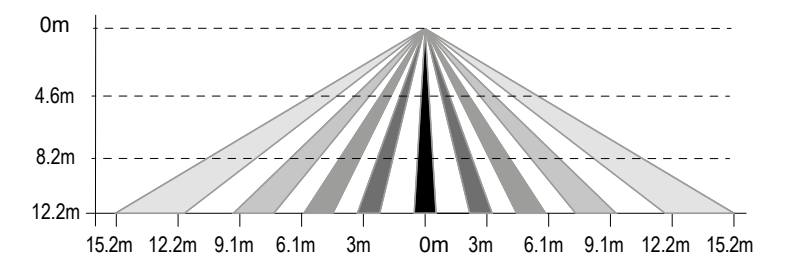
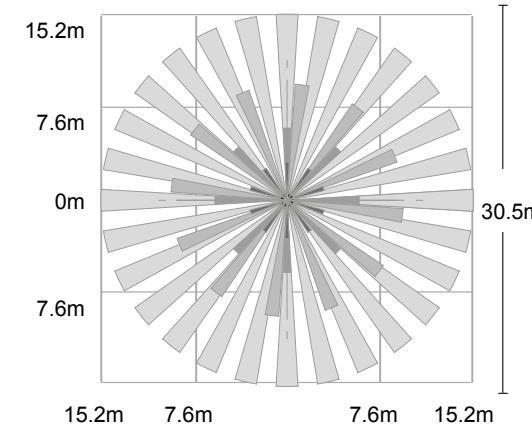
## Benefits

- |   |  |
|---|--|
|  <b>Up to 80% energy savings</b>             |  <b>Lower CO2 emissions &amp; light pollution</b> |
|  <b>Up to 50% maintenance cost reduction</b> |  <b>True Light-on-demand</b>                      |



Dimension: 41mm x 83mm  
Mounting Height: 2.4 to 12.2 meters  
Pattern: 45/90/135/180

## Top and side coverage patterns





# SkyLite Prime

With our next-generation Smart City lighting controller SkyLite Prime, cities can effortlessly upgrade their streetlights with intelligent controls turning them into smart city connectivity hubs. When combined with a smart driver, SkyLite Prime delivers advanced system health analytics, power metering and asset management support. A standardised Zhaga (book 18) interface ensures a quick installation and universal luminaire compatibility.



Designed in the Netherlands   
Made in Europe 

# SkyLite

SkyLite is a plug-and-play wireless lighting controller (OLC) for the monitoring and control of the outdoor lighting fixtures. It creates a smart, energy-efficient and safe environment, and serves as an idea, foundation for Smart City applications. SkyLite is available in two variants: internal mount (inside a luminaire) and external (for pole mounting).

SkyLite supports seamless communication with other Twilight products such as CitySense and Twilight Gateway and can be managed remotely via CityManager.

Remotely programmable lighting schedules allow users to reduce energy consumption by up to 80% in a safe and comfortable manner. The in-built monitoring tools notify users (via CityManager) about lighting-related faults such as a lamp or ballast failure. This greatly reduces both the need for expensive visual inspections as well as operation and maintenance costs.

Internal

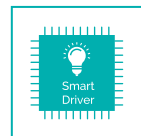


External



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Made in Europe 

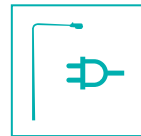
## Features



Smart Driver ready  
(Philips SR/ Osram Dexal)



Adaptive, autonomous,  
AstroClock and  
calendar-based dimming



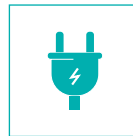
Lighting control via  
0-10V / DALI / DALI 2.0 / SR



IP65 + UV Stabilized



Controls up to 4 drivers



Compatible with all existing  
TVILIGHT products

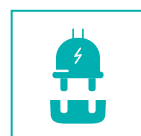


Lux sensor to measure  
ambient light levels



2.4 GHz communication

## Benefits



Universal luminaire  
compatibility via standard  
Zhaga (book 18) socket



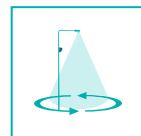
Open API for third party  
software compatibility



Advanced luminaire health  
information and monitoring



High accuracy power metering;  
ANSI 136.52 compliant for  
supported drivers



External sensor input; trigger  
surrounding lights, creating a  
safe circle of light around the  
road user



## Features



Wireless outdoor lighting  
controller (OLC)



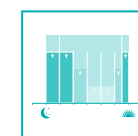
Native interoperability with  
CitySense



Remote management & control  
via CityManager and 3rd party  
software



Automatic failure and status  
reports via CityManager and  
3rd party software



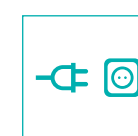
Advanced dimming & adaptive  
lighting schedule



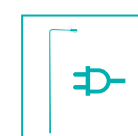
Inbuilt astronomical clock with  
backup battery



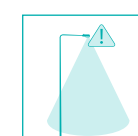
Energy monitoring



Plug & play installation

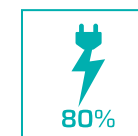


Universal lamp compatibility

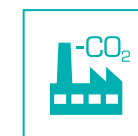


Fail Proof  
3-level back-up system

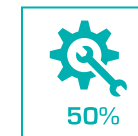
## Benefits



Up to 80% energy savings



Reduce light pollution  
and CO2 emissions



Up to 50% maintenance cost  
reduction through automatic  
notifications



Open Interfaces for third-party  
compatibility (API) via DigiHub



# IoT Gateway

Tvilight IoT Gateway is a state-of-the-art network interface device which bridges the outdoor lighting controller network (CitySense/SkyLite) to the CMS platform (CityManager or similar third-party software).

The IoT Gateway has an in-built radio module for wireless network configuration, commissioning, and maintenance. It acts as a data concentrator to reliably communicate with a large number of devices spread across large distances. Several internet connectivity options offer robustness and flexibility. Our IoT Gateway encloses advanced industrial components for optimised performance worldwide.



Designed in the Netherlands   
Made in Europe 

# City Cabinet










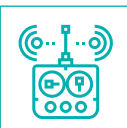
City Cabinet is a must have group control solution to safeguard your LED street lighting investment. The smart CPU, which is installed inside the control cabinets (feeder pillar), offers advanced grid monitoring and outdoor group lighting control functions.

With the CPU as the central building block, the cabinet control solution can be easily upgraded by adding optional modules such as earth leakage detector, 3-phase current sensor, connector for authorised energy meter, analogue photocell, overvoltage protector and external relays. The CPU can be installed inside the existing street cabinets without requiring new cabling. It can be used to complement the tone-frequency based lamp switching.


You can monitor and control all the streetlight cabinets in your city through our centralised streetlight management (CMS) system, accessible via any device with internet connection. Trusted by cities across Europe and Middle-East, this solution is already used to manage over 1 million streetlights.








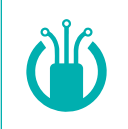
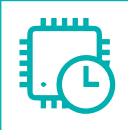


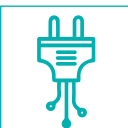
## Features

-  Supports up to 200 devices
-  High inbuilt surge protection
-  Secure end-to-end communication
-  IP65 Casing Design + UV protection
-  Simple installation
-  Contains advanced industrial components for optimised performance
-  3G, WiFi & Ethernet connection
-  All-in-one housing (wireless communication, internet communication and antennas)
-  Over-the-air firmware updates
-  Easy remote configuration

## Benefits

-  In-built SIM card (optional) for plug-and-play application
-  Pay for only 1 SIM card for up to 200 devices
-  Manage 100 to 200 network devices with a single Gateway
-  Auto-network configuration without manual intervention

## Features

-  Complete burn hour reports, fault monitoring and load balancing functions
-  Simplified maintenance – through automation, remote control and advanced field tools
-  Compatible to existing cabinets (feeder pillar) without new cabling
-  Additional functions, via optional modules, include alarm notifications, power metering, and switching external relays
-  Detecting power failures, cable breakages, leakages, theft detection, etc. using optional modules
-  Wireless (e.g. GSM/ GPRS) and wired (e.g. fiber optics) communication options
-  In-built real-time clock to send alarm in case of power failure
-  A-bus interface (RS-485) to auto-discover all connected optional modules and meters
-  MODBUS connectivity for authorised smart meters; So interface for traditional pulse meters
-  Switch 3 Phases independently per Phase (via intermediate breaker)

## Benefits

-  Excellent return-on-investment
-  Complement the 'tone frequency' system to switch the streetlights on or off
-  Easily scalable from small single cabinet to citywide all street cabinets
-  Simplify maintenance through automated alarm notifications via email



# OpenSky M2M NEMA

Built on the global telecom standard (NB-IoT/ LTE CAT-M1/ EGPRS) that securely connects billions of devices today, OpenSky streetlight controller offers long range, deep coverage, high availability, high security and managed LPWA network.

OpenSky help cities to easily upgrade their regular streetlights to intelligent streetlights – In turn, creating an ideal foundation for a Smart City. M2M communication enables the streetlights to connect directly to the local cell phone tower, thereby significantly improving the security and reliability, as well as eliminating the need for a local gateway.

OpenSky delivers advanced system health analytics, power metering and asset management support. A standardised NEMA interface combined with an in-built GPS ensures universal luminaire compatibility and a quick installation. This is ideal for large-scale citywide deployment wherein high installation speed is preferred.

Luminaires with OpenSky controllers can be remotely monitored, managed and controlled using Twilight CityManager or a third-party open API compliant CMS.



# OpenSky M2M Zhaga

Built on the global telecom standard (NB-IoT/ LTE CAT-M1/ EGPRS) that securely connects billions of devices today, OpenSky streetlight controller offers long range, deep coverage, high availability, high security and managed LPWA network.

OpenSky help cities to easily upgrade their regular streetlights to intelligent streetlights – In turn, creating an ideal foundation for a Smart City. M2M communication enables the streetlights to connect directly to the local cell phone tower, thereby significantly improving the security and reliability, as well as eliminating the need for a local gateway.

When combined with a smart driver, OpenSky Zhaga delivers advanced system health analytics, power metering and asset management support. A standardised Zhaga (book 18) interface combined with an in-built GPS ensures universal luminaire compatibility and a quick installation. This is ideal for large-scale citywide deployment wherein high installation speed is preferred.

Luminaires with OpenSky controllers can be remotely monitored, managed and controlled using Twilight CityManager or a third-party open API compliant CMS.



## Features

- LTE Cat M1/ Cat NB1/ EGPRS communication
- Revenue grade energy metering
- Universal luminaire compatibility via standard NEMA interface
- Autonomous, astro-clock and calendar-based dimming
- Remote switch on/ off/ dimming
- Last Gasp - No data lose in case of unexpected power failure
- 0 – 10V dimming interface / DALI support
- IP66 + UV stabilized
- Ambient light sensor / In-built GPS
- Remote management & control via CityManager and third-party software (Open API)

## Features

- LTE Cat M1/ Cat NB1/ EGPRS communication
- Lighting control via DALI / SR/ DALI 2.0/ D4I
- Universal luminaire compatibility via standard Zhaga (book 18) socket
- Smart Driver ready
- Advanced luminaire health information and ANSI 136.52 compliant power metering
- External motion sensor input; light-on-demand
- IP66 + UV stabilized
- Adaptive, autonomous, astro-clock and calendar-based dimming
- Ambient light sensor / In-built GPS
- Remote management & control via CityManager and third-party software (Open API)

## Benefits

- Up to 60% energy savings
- Up to 50% maintenance cost reduction
- Substantial reduction in light pollution and CO2 emissions
- Wireless platform for Smart City

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- Up to 50% maintenance cost reduction
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- Wireless platform for Smart City





## Safer bicycle highway in Mechelen & Bonheiden through Zhaga motion sensor based smart street lighting

Zhaga motion sensor-based intelligent streetlights and smart city lighting management software from Twilight allow the municipality of Mechelen and the municipality of Bonheiden (Belgium), to make their street safer for the cyclists and pedestrians at night. In addition to minimizing operational and maintenance costs, the solution enables the cities to cut energy wastage, carbon emissions and light pollution. The versatile solution also enables the cities to create a foundation for smart city applications.

### Smart bicycle highway lighting welcomes cyclists and pedestrians

“Many youngsters visit the cinema, the skating ring, sports facilities and pubs around transit M (Mechelen) during late evening hours. Sometimes they move in group, but often alone, and then good lighting is essential for a better sense of safety. This is an excellent initiative for the bicycle highway.”

*Abdrahman Labsir, ships (Mechelen) of Youth and Prevention*

### Challenge

The N15 bicycle path between the city of Mechelen and Bonheiden is frequently used by young people during the late evening hours. Poor lighting and dark spots along the path entailed unpredictability and a sense of insecurity among the youths. The city council wanted to address these issues through a smart solution, which is both effective and future-proof.

### Solution

The city councils were searching for a lighting solution that would offer right amount of light, at the right place, at the right time – thereby saving energy without compromising public comfort. The councils wished to have a future-proof and an open solution that would allow them to monitor the infrastructure and offer better public services.

Twilight, together with Fluvius, one of the three largest network operators in Belgium and the main contractor for this project, offered the municipalities with a revolutionary intelligent lighting solution, CitySense Lite, which includes Zhaga motion sensors and light controllers. The solution offers 'Light-on-Demand' creating 'safe circle of light' around the road occupant. Because of the standardized Zhaga (book 18) interface, installation of the solution is quick and easy.

In addition to the smart controls (OLC), Twilight provided open smart lighting management software, CityManager, which allows the operator to collect valuable statistics, such as road usage. Furthermore, due to the openness of the Twilight software platform and open API, the cities were able to integrate 3rd party asset management software and open ways to host diverse smart city IoT systems, which would help improve public services.

### Benefits

- Increased safety for road users during late evening hours
- Standardized Zhaga and DALI D4I interface for quick, tool-free upgrade to smart street lighting
- Lower operating costs through proactive and selective notifications and automatic reports tracking luminaire health and performance
- Significant reduction in energy wastage, CO2 emissions and light pollution
- User-friendly web application to remotely monitor, manage and control public lighting
- Open API for seamless integration with other smart city applications, such as asset management, weather system and traffic system among others

“Sensor data are securely stored and processed. That way, the lamps themselves 'learn' to adjust their brightness levels. For example, if a lot of people visit every day around a certain hour, the lighting system will already automatically adjust to 100%. Even when there is something to do on Transit M, the lamps would know and light-up.”

*Marina De Bie, City Council Member, Green Mechelen*

SkyLite Prime

Zhaga - D4i Motion Sensor



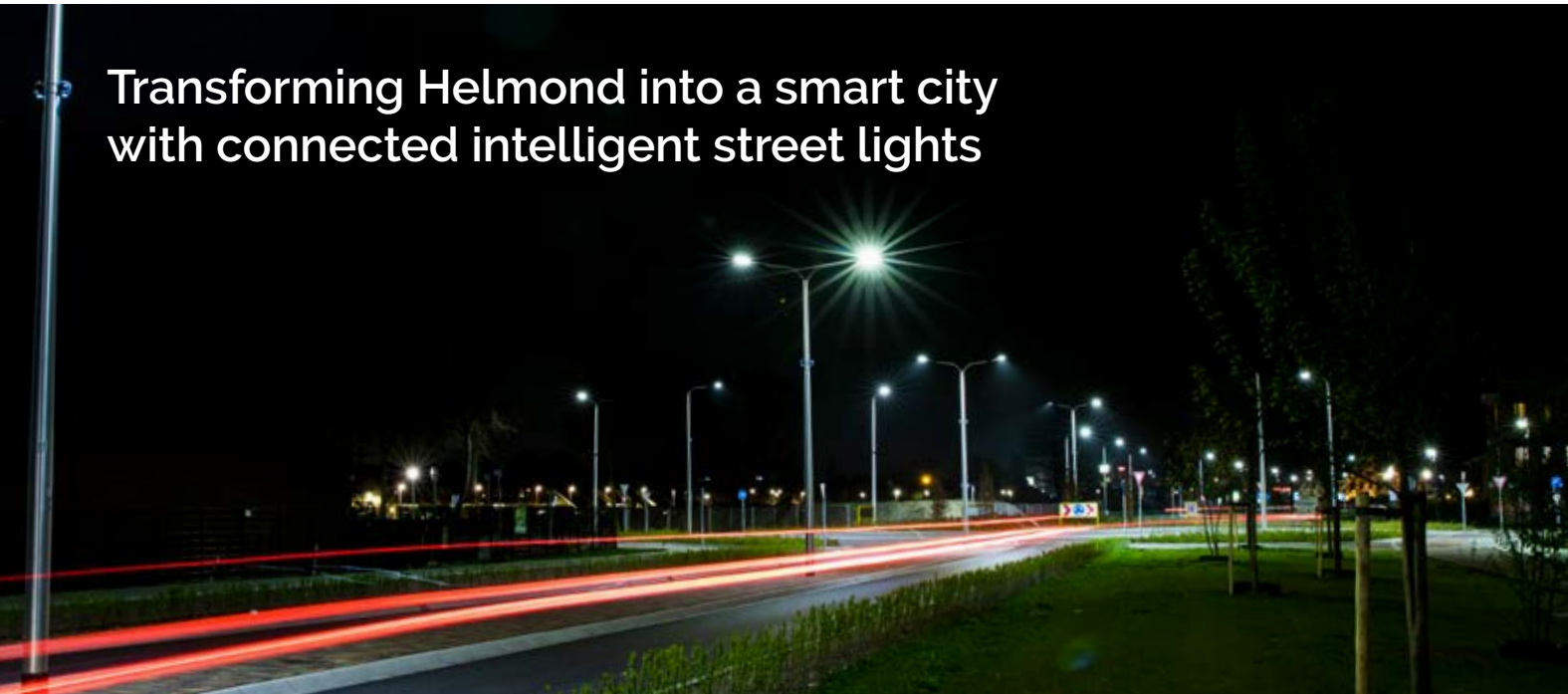
### Project Details

Location	Bicycle highway N15 (opposite the Nekkerhal)
Client	Cities of Mechelen & Bonheiden
Application area	2.2 kilometer bicycle path
Streetlight height	4m and 8m
Products	SkyLite Prime, CitySense Lite & CityManager



# City of Helmond

## Transforming Helmond into a smart city with connected intelligent street lights



Motion-based intelligent street lighting and a smart, intuitive light management software from Tvilight enables the city of Helmond, the Netherlands, reduce its carbon footprint, save energy, increase public safety and comfort, and take a leap towards becoming a smart city in Europe.

*“We are interested in sensor applications and Big Data analytics. We see connected lighting networks as a gateway to this. We are already testing several sensors and exploring the possibilities to interconnect smart streetlights and traffic lights. To achieve all of this you need a system that is open and ready for the future. With Tvilight, we can.”*  
Alfred Groot, Public Lighting Manager, Municipality of Helmond

### Challenge

The city of Helmond is a knowledge hub and a living lab for the automotive industries. As the growing industrial city with traditional lighting infrastructure, Helmond was facing several challenges. Because the city was growing, the energy consumption was increasing. The negative impacts on public safety and comfort were also rising due to street crimes, especially in the poorly lit areas of the city.

### Solution

Helmond wanted an effective solution that could provide adequate street illumination, to make citizens feel safer, and at the same time, conserve energy, to cut heavy public lighting costs. The municipality wanted a connected lighting solution that would also uplift the aesthetics of the city and become an ideal platform for the additional smart city devices and IoT applications.

“We want to make Helmond a smart city and a great place for people to live and work,” says Alfred Groot, Public Lighting Manager, at the Municipality of Helmond. For that reason, “Connected intelligent lighting is a logical step (for us) towards this goal.”

Tvilight provided the city of Helmond with its cutting-edge connected intelligent lighting solution, which includes award-winning street light sensors and wireless lighting controllers capable of adjusting the level of illumination based on real-time human presence. In addition to innovative smart lighting solution, Tvilight offered intuitive, feature-rich light management software, CityManager, which allows the

Helmond municipality to collect valuable statistics, such as citizens activity and energy consumption, and create light profiles that match the illumination requirements of each particular location in the city. Furthermore, because Tvilight's solutions use Open API, Helmond city has the ability to integrate multiple third-party sensors, software and applications, enabling it to accelerate towards becoming a smart city.

### Public Safety & Energy Savings

With Tvilight's CitySense, there is always the right level of illumination to make the citizens feel safe and comfortable. In the absence of human presence, streetlights dim to a predefined level, creating exceptional energy savings.

### Smart City Ready

Tvilight's intelligent lighting solutions, which use Open APIs, allow Helmond to integrate multiple third-party sensors, software and applications.

### Adaptive Lighting

The versatile light management software, CityManager allows setting the right levels of illumination for each street light based on time, road type and citizens' needs.

### Luminaire Independence

The city uses a variety of luminaires, yet they all can be monitored, managed and controlled via the Tvilight's smart system.



### Project Details

<b>Location</b>	Helmond, the Netherlands
<b>Client</b>	Municipality of Helmond
<b>Application Areas</b>	Main and secondary roads, residential neighbourhoods, industrial terrain, pedestrian zones, bicycle paths
<b>Products</b>	CitySense, SkyLite & CityManager (a variety of LED streetlights)





# Exceptional Energy Savings & Reduction In Light Pollution

with Tvilight's Adaptive Lighting Solution

Tvilight offered ProRail with its state-of-the-art, adaptive lighting solution, which includes lighting controllers with smart motion sensors capable of adjusting the brightness of lamps based on real-time human presence. Along with innovative smart lighting solution, Tvilight provided intuitive and feature-rich light management software, CityManager, which allows ProRail to collect useful statistics, including energy consumption/ savings and passenger activity insight, based on which, the railroad operator can create light profiles that match the illumination requirements of each particular station.

Tvilight's sensor-based adaptive lighting solutions and a smart, feature-rich light management software platform enables several train stations in the Netherlands, reduce energy consumption and lower light pollution, all while ensuring public safety.

“We wanted to accomplish a few things, namely reducing energy consumption at the stations and lowering light pollution for people living in the area. At the same time, we wanted to ensure public safety. Tvilight's solution combined this beautifully”.

*Eelco Krakau, Contract Manager, Dutch Railways*

### Reduced Energy Wastage

With the Tvilight's intelligent lighting solution, the lights automatically dim (to 40%) when no one is around. This enables significant energy savings and improves the lamp runtime

### Green Railroad Stations

Intelligent connected lighting helps these stations reduce CO2 emissions and curb light pollution, making them some of the most sustainable stations in Europe.

### Improved Safety

As soon as any human presence is detected, Tvilight's smart lighting system triggers all the lights around the occupant to glow at full brightness. This makes the occupants feel safe and comfortable at all times.

### Complete Remote Control

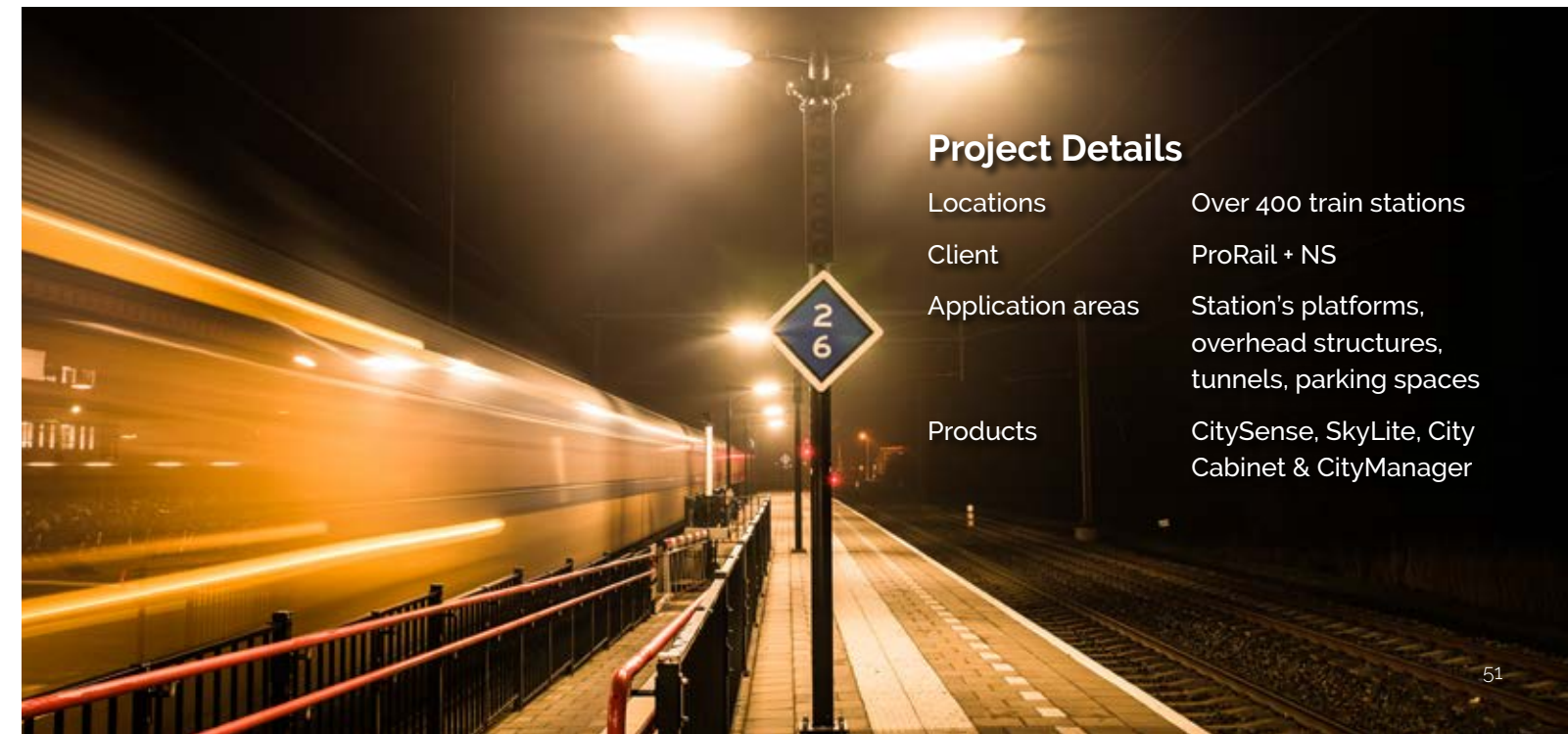
Tvilight's smart lighting management software, CityManager, enables the Dutch Railways to monitor, manage and control its entire lighting infrastructure remotely.

### Challenge

Majority of the Dutch railroad stations had a regular lighting infrastructure due to which the lights were fully lit throughout the night, even when they experience limited activity. Local residents also complained about the excessive light levels and suggested to turn off lights during off-peak hours. Turning off the lights would indeed reduce energy usage, but the resulting darkness would make the stations unsafe.

### Solution

ProRail, the Dutch railway operator, wanted a solution that could reduce the energy consumption and curb light pollution, and at the same time, provide a sense of security to the passengers and railway personnel. The railway operator wanted an intelligent, motion sensor-based lighting system that would maintain the overall safety of the stations and improve the quality of life of the locals living in the vicinity by offering an adequate light only when necessary.



### Project Details

Locations	Over 400 train stations
Client	ProRail + NS
Application areas	Station's platforms, overhead structures, tunnels, parking spaces
Products	CitySense, SkyLite, City Cabinet & CityManager



# Largest Sensor-Based Smart Lighting Project in India



## Jaipur becomes a Smarter & Safer City with Tvilight's Intelligent Lighting Solution

Revolutionary smart street light sensors and versatile lighting controllers from Tvilight enable the 'Pink City' Jaipur (India) to reduce energy consumption, lower maintenance costs, improve safety and quality of life of the citizens, and take a leap towards becoming one of the forefront smart cities in the country.

**“Jaipur** is a historical city that attracts tens of millions of tourists annually from all over the world. We aim at becoming a Digital City with greater connectivity and information access for the citizens as well as the tourists. With intelligent lighting

solution, this vision became a reality. Our city is benefiting in every aspect – from safety and security, to easy access to information, to overall improvement of our image and a stepping into the “Smart City” arena.”

*Shikhar Agrawal, Government of Rajasthan*

### Challenge

A city almost 300 years old with rich cultural heritage, Jaipur, also known as the 'Pink City,' has become one of the top tourist destinations in recent years, attracting over 40 million domestic and foreign visitors each year. With the massive number of visitors, the city administration was under pressure to improve the quality of services it provided to both the visitors and residents. The city wanted to not only increase the quality of public services, but also improve the safety of residents and visitors alike. In addition, Jaipur wanted to realize all these by being cost-effective and manageable.

### Solution

While the city desired to implement a number of smart city solutions, public lighting was a priority. Streetlights are the largest consumer of electricity. In addition, they are also major contributors to CO2 emissions and light pollution. On the flip side, street lights illuminate the dark pathways at night and offer a sense of security to the occupants. For that reason, Jaipur wanted a smart lighting solution that could save energy and address environmental challenges, all while keeping citizen safety and contentment at the center.

# Seamless Integration with Cisco Kinetic



## Open API-Based Smart Street Lighting

Tvilight provided Jaipur with its innovative intelligent lighting solution, which includes award-winning motion sensors and wireless controllers capable of adjusting the brightness levels of streetlights based on real-time human presence. Tvilight's smart street lighting works on **Open API**; hence, the integration with third-party

smart city management software (Cisco Kinetic) and luminaries (Bajaj Electricals) was also easy. Using the collaborative solution, Jaipur can now collect valuable data and create lighting profiles that match the unique illumination requirements of a particular location in the city.

### Benefits

- 72% energy savings and thereby reduced costs, CO2 emissions and light pollution
- Better maintenance and accountability, as it doesn't require around the clock manual intervention or night patrols
- User friendly web-application helps to remotely monitor, manage and control entire public lighting infrastructure
- Open API allow integration with other Smart City applications
- Automatic reports and diagnosis help tracking luminaire health and performance, thus saving time and achieving faster services
- Better electrical infrastructure extends asset lifetime
- Improved public safety perception as streetlights illuminate automatically to a higher level upon detection of human presence
- Enhances city aesthetics through better lighting quality

### Project Details

Location	Jaipur, India
Client	Jaipur Development Authority (JDA)
Application Areas	Main and Secondary roads
Products	Tvilight's CitySense and SkyLite





- Save Energy
- Cut CO<sub>2</sub> Emissions
- Lower Light Pollution



# About us

**600 PROJECTS ACROSS**

With over 600 projects across 20+ countries worldwide, TVILIGHT is a European market leader in the intelligent street lighting solutions. Headquartered in the Netherlands, with offices in Groningen, Amsterdam and Ahmedabad (India), we specialise in outdoor lighting management software, wireless lighting controls and sensors.

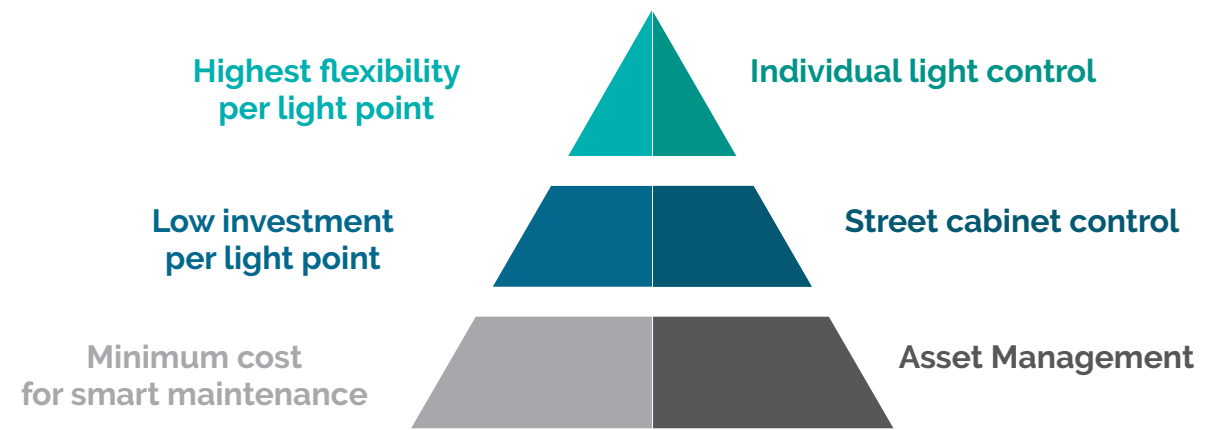
We believe in improving the lives of citizens globally and contribute to the creation of sustainable and connected cities. To achieve this, we use state-of-the-art outdoor lighting control systems and IoT platform. Our patented sensor-based presence detection technology enables dynamic on-demand lighting, and our light management platform provides full remote management of the entire lighting infrastructure in real-time.

**20+ Countries worldwide**

We drive the adoption of networked connected lighting, to help our customers save energy, prevent CO<sub>2</sub> emissions, improve citizen safety, reduce installation complexity, and minimise infrastructure maintenance costs. Our smart lighting platform and Open API allow integration to city's preferred software systems and thus constitute an open, secure and future-proof base for Smart Cities and the Internet of Things.

In summary, we seek to unleash the full potential of sensor technology and wireless communication, offering an enhanced lighting experience that goes beyond regular lighting. We envision a world where data is collected and managed effortlessly, for the betterment of cities and citizens.

**Open, secure and affordable smart city lighting – is our motto**



### One-Stop Solution

- Complete end-to-end hardware and software control portfolio for your city
- From managing standard LED streetlights to Group (street cabinet) and Individual lamp control
- Software catalogue to meet your needs and your budget

### Open System

- We truly believe in open and interoperable smart city and IoT systems, so that you can achieve the true benefit of smart cities.
- All our products, software and systems are designed with native open interfaces to prevent vendor lock-in.

### Managed Services

- Service Desk for online support
- Over-the-air software update (no field activities needed)
- Project Management support for the entire project
- Network Design and commissioning support
- Training

### True Light-On-Demand

- Our network architecture offers sensors a central role, so that citizens can experience real-time light-on-demand and feel safe (i.e. having neighbouring lights triggering instantaneously)
- CityManager software interface is designed to help you achieve this with ease



**Like it.**  
**Why not give it a try?**

**We are here to help**

EMEA & Americas (HQ)  
TVILIGHT Projects B.V.  
Beechavenue 162-180  
1119 PS Schiphol Rijk  
The Netherlands (Europe)  
sales@tvilight.com

Asia Pacific branch  
Intellikonnnect Solutions (Tvilight India)  
A-902, Dev Aurum, Commerce House,  
Anandnagar Road, Prahladnagar,  
Ahmedabad - 380015, Gujarat, INDIA  
sales-india@tvilight.com

[www.tvilight.com](http://www.tvilight.com)