iskraemeco
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Elumia – Smart lighting management system

Illuminate your world the smart way

Discover the market dynamics

Cities are shaped by the triumvirate of safety, economic vibrancy, and quality of life, all of which are profoundly influenced by street lighting.

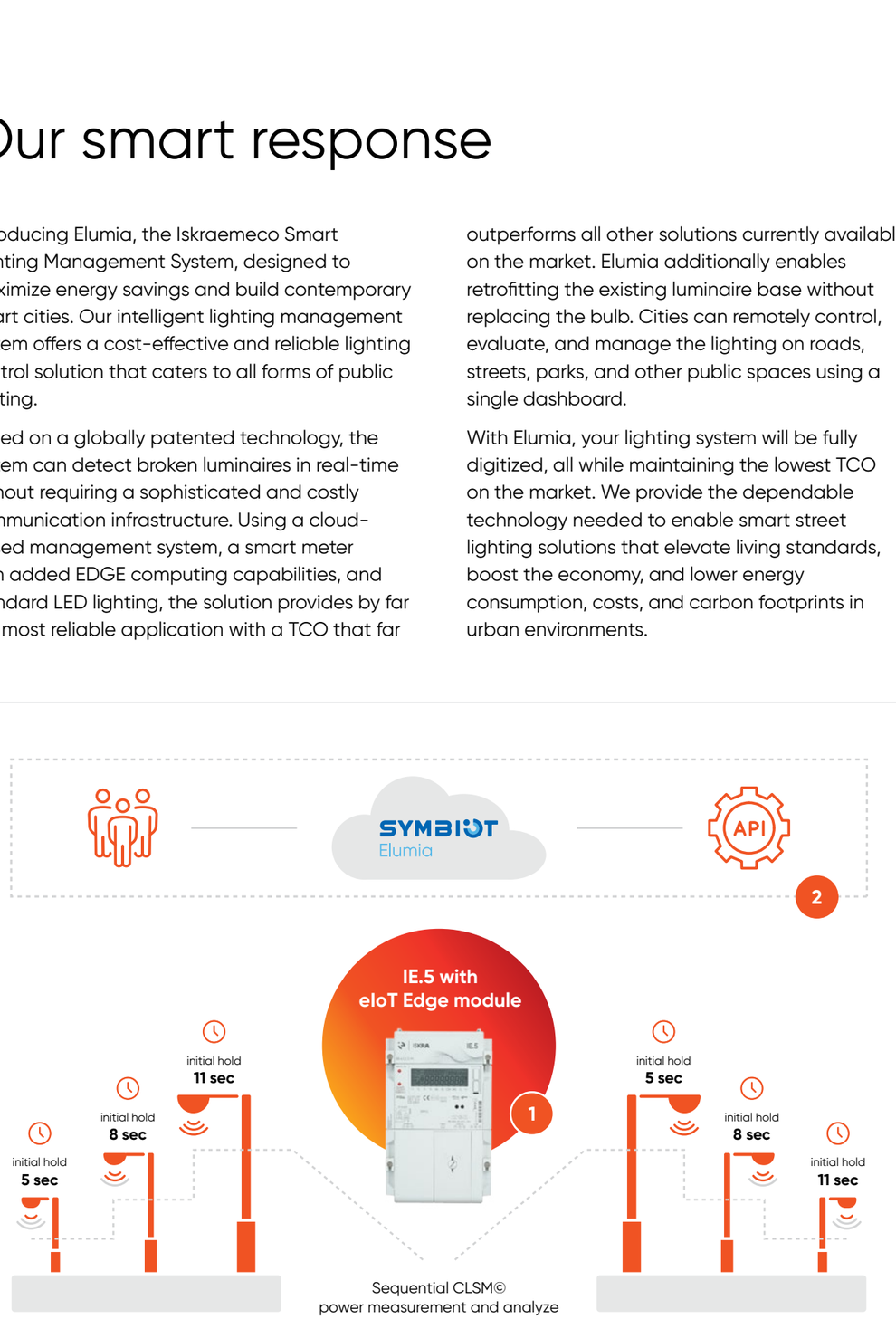
However, the energy consumed by street lighting has far-reaching implications, as it can consume up to 65% of a city's electricity budget and constitute 10% of its total expenditure, as revealed by the World Bank. Rapid urbanization increases the demand for illumination, consequently increasing energy consumption and financial expenditure unless more intelligent solutions are swiftly adopted.

Our smart response

Introducing Elumia, the Iskraemeco Smart Lighting Management System, designed to maximize energy savings and build contemporary smart cities. Our intelligent lighting management system offers a cost-effective and reliable lighting control solution that caters to all forms of public lighting.

Based on a globally patented technology, the system can detect broken luminaires in real-time without requiring a sophisticated and costly communication infrastructure. Using a cloud-based management system, a smart meter with added EDGE computing capabilities, and standard LED lighting, the solution provides by far the most reliable application with a TCO that far outperforms all other solutions currently available on the market. Elumia additionally enables retrofitting the existing luminaire base without replacing the bulb. Cities can remotely control, evaluate, and manage the lighting on roads, streets, parks, and other public spaces using a single dashboard.

With Elumia, your lighting system will be fully digitized, all while maintaining the lowest TCO on the market. We provide the dependable technology needed to enable smart street lighting solutions that elevate living standards, boost the economy, and lower energy consumption, costs, and carbon footprints in urban environments.



SYMBIOT
Elumia

Utilities have the potential to fully modernize their methods of controlling city lights by utilizing our innovative cloud-based technology. Through a single dashboard the Symbiot Elumia enables secure remotely control and instant insights into the status of every streetlight in the city. Real-time identification of faulty luminaires ensures quick and cost-effective repair while minimizing Total Cost of Ownership (TCO).

Benefits of smart street lighting

Smart lighting management systems offer cities a multitude of advantages. Today's public lighting systems go beyond illumination, offering a wide array of services thanks to smart lighting technology. Streetlights have evolved into intelligent, connected devices within the Internet of Things (IoT) framework. They collect and transmit data through smart metering devices, resulting in the creation of smart cities.

Lower investment costs

- At least 25% savings compared to other IoT solutions.
- Eliminates the need for additional electronics in each street luminaire.
- Streamlines street control cabinets, requiring only an electricity meter.

Reduced monitoring and maintenance costs

- Requires no site inspections.
- Automatically detects broken luminaires in real-time, eliminating the need for manual inspections.
- Provides comprehensive energy consumption supervision and anomaly detection.

Dynamic street light operation

- Automatic on-off schedules based on geographical location and time of year.
- Supports external on-off control.

Advanced energy management

- Real-time monitoring of power consumption for each streetlight, per phase, and per street.
- Theft detection capabilities.
- Remote power control is based on calendar schedules.
- Protects the grid and luminaires from inrush current.
- Centralized street light management system based on Geographic Information Systems (GIS).
- Significant reduction in energy consumption and CO2 footprint.

Freedom from vendor lock-in for streetlights

- Compatible with various luminaire vendors, including Inventronics, Osram, Philips, and more.

Elevated security standards

We have meticulously crafted Elumia with the latest in cutting-edge security technologies and industry best practices to protect customer data and prevent cyber threats. Elumia provides a comprehensive set of security features to protect data during transfer, storage, and use. It employs a variety of encryption techniques, including AES-256 encryption, to ensure that data remains impervious to unauthorized access. It also includes role-based access control, an audit logging system, and an intrusion detection system, ensuring your data remains untampered with. Our devices undergo rigorous penetration testing to provide you with the ultimate assurance of cyber resilience.

Why Elumia is unique?

01 World-wide patented technology of sequential measurement of street lightning.

02 No Radio Frequency (RF) technology.

03 Compatible with all existing luminaires, both LED and other older technology.

04 Investments are much lower (at least 25%) compared to existing IoT solutions.

Discover Elumia's powerful features

Elumia is more than just smart street lighting; it's an intelligent solution packed with features that revolutionize the way you manage and control your lighting infrastructure. Explore the impressive array of capabilities Elumia brings to the table.

- **Luminaire health monitoring:** Elumia detects malfunctioning luminaires in real-time, eliminating the need for manual site inspections and ensuring timely replacements.
- **Energy supervision:** Keep a watchful eye on energy consumption and quickly identify anomalies to optimize energy usage. Gain real-time insights into the power consumption of each streetlight, broken down by phase, street, and more.
- **Certified metering:** Elumia is using an MID certified device for power and energy measurement.
- **Supported energy inspection:** Due to the MID approved device, Elumia can provide all data for energy inspection.
- **Theft detection:** Elumia includes theft detection features to safeguard your valuable assets.
- **Intelligent lighting control:** Elumia automatically adjusts luminaires based on their geographical location and the time of year, optimizing energy efficiency. In addition, Elumia supports external on-off control such as a lux meter or similar.
- **Flexible scheduling:** Create custom on-off schedules based on the calendar, allowing for efficient energy management.
- **External luminaire control:** Seamlessly control external luminaires, all from within the Elumia ecosystem.
- **Multiple control options:** Turn lights on and off internally or through external switches, all effortlessly operated through Elumia; other devices can also be controlled.
- **Retrofitting made easy:** Upgrade your existing luminaire base without the hassle of replacing the entire fixture, saving time and resources.
- **Remote firmware updates:** Effortlessly update fixtures in the field remotely, including the option to perform downgrades if necessary.
- **Grid and luminaire protection:** Elumia ensures there are no inrush current issues, protecting both the grid and luminaires. Centralized management: Utilize Elumia's central street light management system based on GIS for efficient oversight.
- **Global connectivity:** Enjoy out-of-the-box global connectivity via the LTE Cat-1 cellular network, keeping you connected wherever you are.
- **Redundant connectivity:** Benefit from two independent connections, each with four endpoints, ensuring robust communication.
- **Security focus:** Elumia prioritizes security, ensuring your smart street lighting system remains protected from potential threats.
- **Built-in security:** Elumia includes a state-of-the-art VPN for security right out of the box.
- **Effortless installation:** With zero-configuration installation, getting started with Elumia is a breeze.

We believe in green initiatives: efficiency, savings, and sustainability

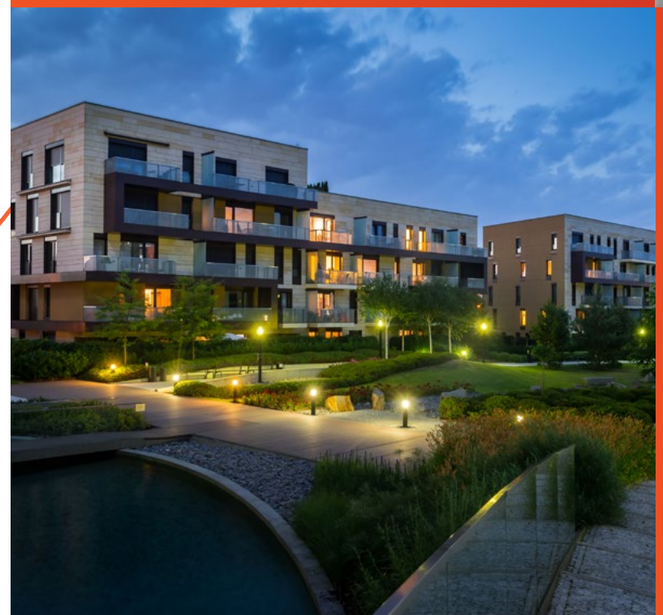
Experience the future of smart street lighting with Elumia. Our feature-rich solution empowers you with unprecedented control, energy efficiency, and peace of mind.

Maximum energy savings

Utilize intelligent systems to reduce the installation's operating costs by adjusting the luminance in the most productive ways.

Easy management

By designing a smart lighting system, it is possible to control, monitor, and respond to the system remotely in real-time.



Respect the planet

Developing eco-sustainable lighting system for public areas also means protecting the environment and lowering CO_2 emissions.

Mastering the art of efficient execution

Discover how the CLSM algorithm and the Elumia solution revolutionize your street lighting, ensuring efficiency, reliability, and precision in every aspect.

CLSM algorithm

The CLSM algorithm operates by sequentially activating luminaires and monitoring their power consumption. When a luminaire is in good condition, its power consumption increases upon activation, while a faulty luminaire's power remains unchanged. By observing the power profiles over time, the system can accurately and cost-effectively identify malfunctioning luminaires.

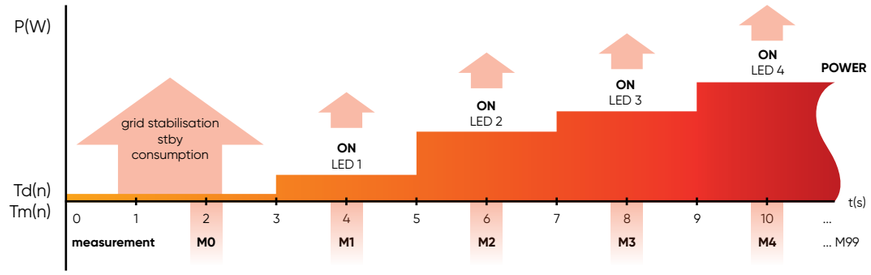


Figure 1 - depicts the power profile when all luminaires are functioning correctly.

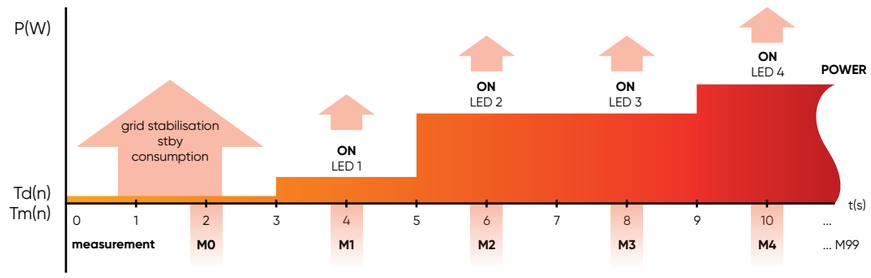


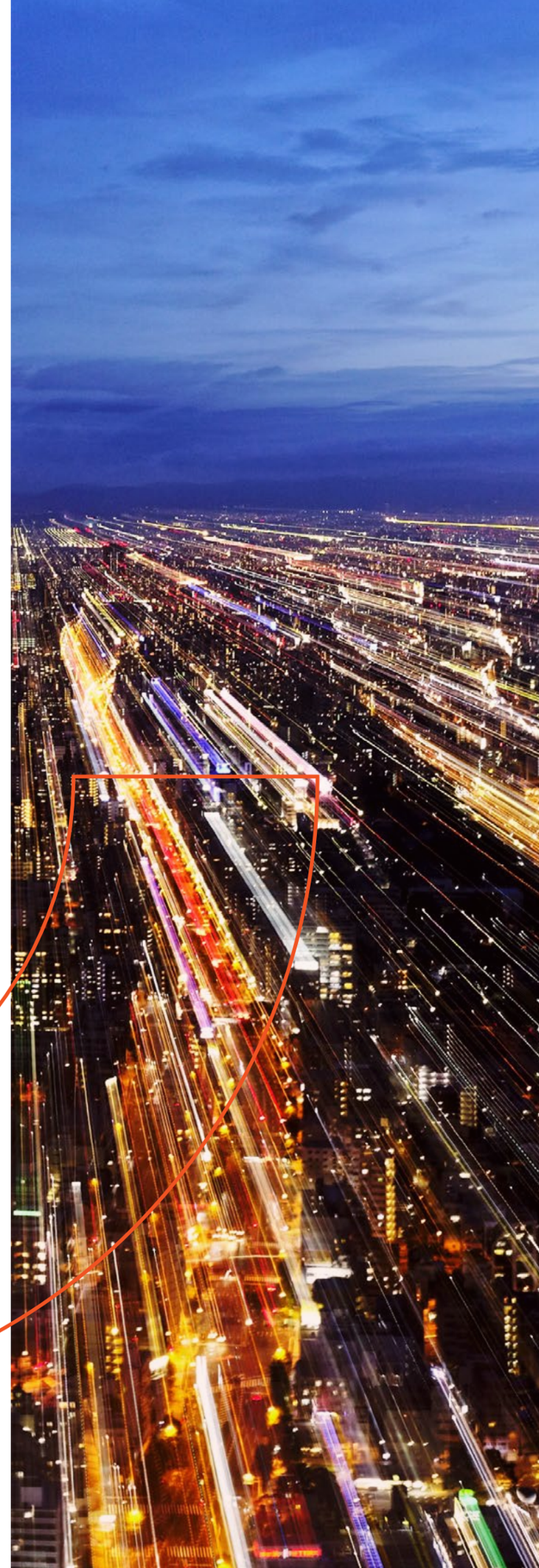
Figure 2 - showcases the power profile when luminaire No. 3 is broken.

Within Figure 1 and Figure 2, we present power profiles illustrating two scenarios: one featuring perfectly functioning luminaires and the other highlighting a scenario with a single malfunctioning luminaire. Notably, in the latter case, there is an absence of a power step at position M3. Our advanced algorithm swiftly detects this anomaly and accurately identifies luminaire 3 as the culprit.

For optimal operation, all luminaires are initially powered at reduced levels (10-50% of maximum power) and are sequentially powered to 100%. This approach ensures immediate illumination of the street while allowing the CLSM algorithm to identify issues through sequential power increases.

Measurement

Elumia relies on the IE.5 smart meter, which is MID certified and serves as a dependable data source for energy inspection without the need for additional external devices.



Elumia components

The Elumia solution requires three essential components:

1. Luminaire with delayed ON capability

We offer flexibility with a choice of standard luminaires from various vendors.

Optimal efficiency is achieved if the luminaire's power supply supports initial delay and power control, enabling seamless integration with the CLSM algorithm.

For luminaires without this capability, external sequencers can be used to introduce necessary delays in the power supply, ensuring compliance with the CLSM algorithm. These sequencers can also retrofit existing installations for CLSM functionality.

2. Elumia lighting controller

The Elumia lighting controller is the central component of the Elumia solution, offering a range of features:

- Power measurement
- Street lighting control
    - Power switching using internal breakers or external devices over internal relays
- Build on IE.5 meter and enhanced with EDGE compute capability
- Plug-and-play installation with zero configuration connectivity

Elumia's comprehensive functionalities include:

- Metering
    - Utilizes the standard IE.5 meter
    - Achieves Class 1 measurement accuracy
    - Rated current 85A per phase
    - Equipped with an internal breaker for light control
    - Provides I/O functionality, including 2 high voltage inputs and 2 output relays with 230V/5A capacity
- Street lighting control
    - Autonomous executes ON/OFF switching of luminaires
    - Utilizes precision timing based on an astronomical clock by taking into account the geographical position and precise time of Elumia
    - Responds to external control devices like lux meters
- Detection algorithm
    - Runs the CLSM algorithm for faulty lamp detection
- Communications
    - Supports seamless connectivity through a cellular modem employing 4G Cat-1 technology
    - Employs an eUICC with eSIM support, facilitating extensive Machine-to-Machine (M2M) deployment with global coverage
    - Utilizes dual eSIM functionality for supporting 2 communication contracts and 8 endpoints (4 endpoints per contract)
- Security
    - Subjected to rigorous DNV penetration testing to ensure robust security
    - Utilizes state-of-the-art VPN technology, namely Wireguard, for enhanced data protection
    - Implements a comprehensive key management system for enhanced security measures

3. Symbiot Elumia cloud-based software solution

Symbiot Elumia software suite acts as a central access point for all Elumia lighting controllers.

It provides connectivity and security services, data analytics, street lighting project design, and user-friendly interface.

Offers a simple GIS with graphical representation of luminaire statuses and seamless integration with external software systems.

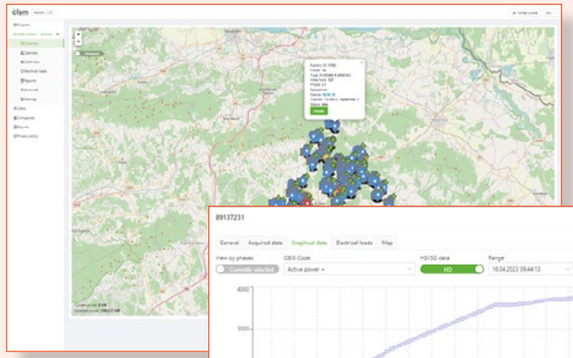


Figure 3 - GIS visualization of luminaire statuses

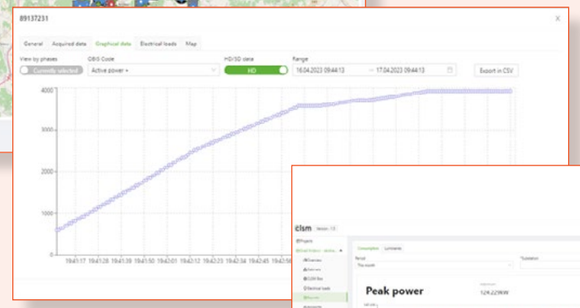


Figure 5 – Graphical representation of recorded measurements

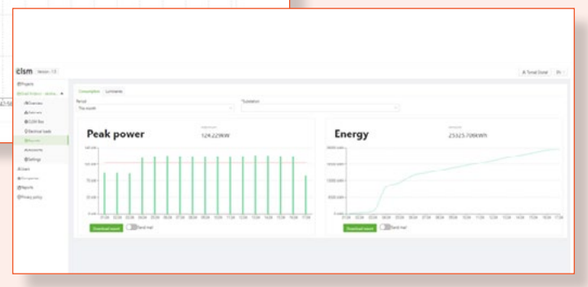


Figure 4 - Power profile report

Ready to transform your city with cutting-edge smart lighting solutions?

Embrace efficiency, cost savings, and sustainability today. Contact us to embark on a brighter, smarter, and more connected future for your community. Illuminate the path to progress with smart lighting. Your journey begins now.

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Illuminate your world the smart way.

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