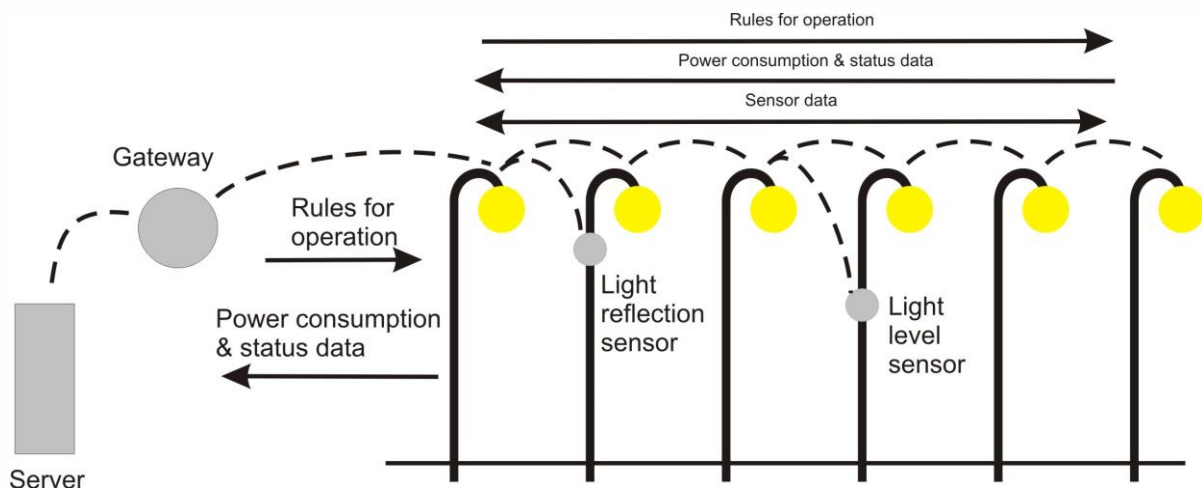


LED lights with smart controllers



Main sector

- Smart street lighting

Overview

The smart street light control system developed by Cityntel OU is based on a wireless mesh technology. Smart controllers, capable of network and device-related decision-making, are installed in each of the new 312 LED street lights in Tartu and rely on wireless communication for exchanging information between the controllers and sensors. Unlike competing solutions where all control commands are issued from a server or network controller, this smart control solution requires no permanent server connectivity as operational rules are stored directly in the luminaire controller. The aim is to bring intelligence and data processing to the device level and build networks of locally collaborating self-aware devices – sensors and luminaire controllers – which take into account local weather and traffic conditions and adjust street lights without any central server data processing.

The street light network of the demo area will be supplied with the following sensors and detectors:

- PIR movement detector – capable of detecting people and vehicles and computing the overall human presence and traffic flow level;
- Movement detector with cameras – detects people and vehicles using picture analytics and is capable of differentiating between vehicle types (passenger cars, buses, trucks etc.);
- Light reflection sensor – measures the rate of reflected light from road surface for analyzing road conditions (dry, wet, snowy etc.);
- Noise sensor – capable of detecting noise level and source (human speech, traffic etc.);
- Environmental sensor – measures pollution (CO₂, NO_x), air temperature, humidity etc.

All in all, the smart controller system is expected to result in up to 80% energy savings when combined with LED luminaires, up to 70% savings from maintenance costs, significantly lower carbon emissions, much less light pollution and longer luminaire lifetime.

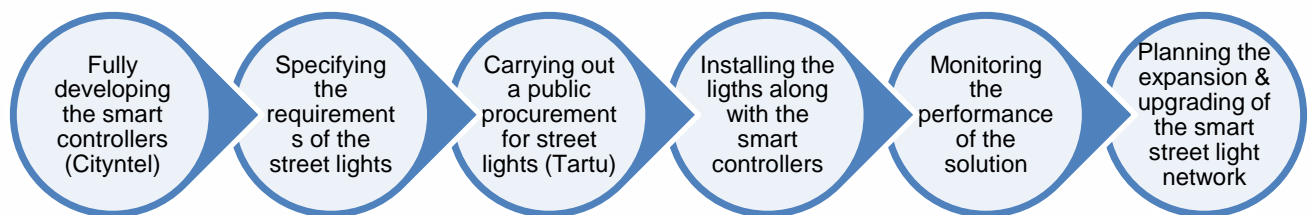
Business model

The LED lamps (altogether 312) will be obtained and installed through a public procurement by the City of Tartu. The smart controllers, sensors, detectors and related software and devices which will be added to the LED lamps will be further developed and provided by Cityntel OU, an SME offering smart street light systems. Once installed, the system will be maintained by the City.

Citizen engagement

The smart street light system will be integrated with the City Information Open Platform (CIOP) that will be developed in the course of the SEC project (see more under [ICT solutions](#)). The smart street lights will send data from luminaires (energy consumption) and sensors to the CIOP for monitoring and analysis purposes. Weather and traffic information that the smart street lights have collected will then be demonstrated in the pilot apartments through the smart home system (see more under [ICT solutions](#)). The citizens will also be engaged through the CIOP in form of a poll that explores the outdoor lighting comfort level. Based on the feedback received from the residents, the brightness level of the street lights will be adjusted.

Process



Benefits

- Easy adoption by both luminaire manufacturers and end users
- No need for engineering personnel for deployment and maintenance
- Dynamic control of luminaires based on real-time local information
- High reliability and accurate power consumption measurements
- Future proof (i.e. easy to add other devices providing smart city services to the same network)
- Increased resource and energy efficiency
- Smaller carbon footprint and light pollution
- More efficient delivery of city services
- Increased comfort and better living environment
- Better (evidence-based) planning (e.g. traffic)

Stakeholders

Owner of the solution	City of Tartu
Service/technology provider	Cityntel, LED lamps tbs.
Users	Citizens
Investors	H2020, City of Tartu, Cityntel

Investment/Finance

Ca. 180,000 € (LED lamps) + 126,000 € (smart controllers)

Potential for replication

The smart street light solution that will be implemented in Tartu is simple and can be deployed quickly even on a large scale. The solution enables municipalities to start saving right from the moment of introducing the solution without having to worry about the payback period. Furthermore, as savings are instant, it will also reduce the payback period of the LED luminaire. The successful installment of the solution will also enable other smart city innovations based on the same technology and principles, such as smart parking, smart traffic management and smart waste management.

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