



RĪGAS  
PLĀNOŠANAS  
REĢIONS



SMARTGREEN

**REPORT ON INTEGRATING MODERN  
LIGHTING SOLUTIONS IN URBAN PLANNING  
PROCESS AND APPLICATION OF GREEN PUBLIC  
PROCUREMENT IN THE MUNICIPALITIES OF RIGA  
PLANNING REGION**

**LUCIA**

 **Interreg**  
Baltic Sea Region



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**LUCIA**

 **Interreg**  
Baltic Sea Region



This report has been prepared as part of the Interreg Baltic Sea Region Programme 2014-2020 project “Cities accelerate implementation of sustainable and smart urban lighting solutions” - LUCIA ([www.lucia-project.eu/](http://www.lucia-project.eu/)). LUCIA helps municipalities in the Baltic Sea region to unlock the enormous potential of energy efficient urban lighting solutions. It provides decision makers and experts with knowledge of state-of-the-art lighting, covering aspects of environment, technology, economy, social acceptance, planning and green public procurement.

Urban lighting plays an important role in the urban design of the Baltic Sea region. In fact, 60% of the overall energy consumed in urban areas is attributed to street lighting and other kinds of urban lighting infrastructure.

Modern LED lighting technology allows to significantly reduce the levels of energy consumption (up to 50% compared to conventional systems). Introduction of additional functions, such as automatic brightness adjustment, help to further increase this potential. LUCIA attempts to facilitate the introduction of modern lighting solutions into urban planning, and promotes application of green public procurement with the ultimate goal to reduce energy consumption in urban areas.

# 1 Integration of urban lighting solutions in urban development planning documents and practices in the municipalities of Riga Planning Region

## 1.1 Regulation

Development planning in the municipalities in Latvia is governed by the “*Law on Development Planning System*”, which defines the hierarchy of development planning documents, and the “*Law on Territorial Development Planning*” that necessitates that local municipalities are the competent public authorities responsible for the development and implementation of local long-term development strategies, medium-term development programmes, territorial development plans, local plans, detailed plans and thematic plans. These laws have been further detailed in a series of regulations passed by the Cabinet of Ministers of Latvia, among which the most important document is the Regulation Nr. 628 of the Cabinet of Ministers “*Regulations on the local spatial development planning documents*”. This by-law lists and describes all binding municipal or regional development documents, such as:

- Municipal Sustainable Development Strategy (a long-term development document - up to 25 years), which must reflect the strategic development vision, goals, priorities and spatial development perspective of a municipality;
- Municipal Development Programme (a medium-term document - up to 7 years) is a development planning document that includes medium-term priorities and lists measures and instruments that allow to implement the long-term goals set in the sustainable development strategy;
- Territorial development plan of the municipality defines regulations for the use of urban land and lists major construction requirements, including functional zoning, public infrastructure, as well as other conditions that relate to the use of the territory;
- Local Plan is a long-term spatial development planning document prepared for a particular part of a city, town or its part, a village or its part or a rural area in order to solve a certain planning task, elaborate or amend a spatial plan;
- Detailed plan is a plan developed for a part of the territory of a local municipality in order to determine the requirements for the use of certain land plots, densities and dimensions of the buildings, as well as to specify the boundaries of these land plots.

In addition, the municipal sustainable development strategy must be consistent with the sustainable development strategy of the respective planning region (the same rule applies to the local / regional development programmes). All territorial development planning documents must be published on the websites of planning regions and municipalities, as well as placed on the National Spatial Development Documents Portal - <https://geolatvija.lv/geo/>.

By law, most of the duties and rights related to the planning and development of public outdoor space have been delegated to the local municipalities. This assignment is described in the “*Law on Local Municipalities*”, which specifies the autonomous functions of local municipalities. The lighting of streets, squares and other public areas is one of the 23 autonomous functions.

The general definition of the public outdoor lighting is given and its elements are described in the Regulation Nr. 240 of the Cabinet of Ministers “*Regulation for planning procedures, use of land and building regulations*”.

There are also a number of certain standards, which categorize elements and set the requirements for outdoor lighting. Some of them (EN-12665 “*Light and lighting - Basic concepts and specification of lighting requirements*” and EN 60598-2-3 “*Luminaires, Part 2-3: detailed requirements - Luminaires for street and street lighting*”) define the essential elements of an outdoor lighting system, such as the source of light, types of luminaires and auxiliary devices.

## 1.2 Outdoor lighting in Riga Planning Region

According to the “*Law on Regional Development*” of Latvia, the planning regions function as derived public authorities responsible for development planning and monitoring on regional level. There are 5 planning regions in Latvia that can also be viewed as platforms for cooperation of local municipalities. The most important responsibilities of the regions include elaboration and monitoring of regional development planning documents, cooperation with local municipalities located in the region and the promotion of entrepreneurship. Riga planning region is by far the largest planning region in Latvia in terms of both population and the amount of economic activity – there are 30 local municipalities located in the territory of Riga Planning Region, including the capital city Riga, and the region produces about sixty per cent of the national gross domestic product.

The Sustainable Development Strategy of Riga Planning Region 2014-2030 does not specifically address issues related to outdoor lighting. However, the strategic part of the Development Programme of Riga Planning Region 2014-2020 brings attention to the strategic objective No. 3 “Environmentally tolerant lifestyle and places” (priority “Sustainable living environment”), which encourages the introduction of municipal strategies for the development of public space in urban neighbourhoods.

Among certain priority activities that are listed in the regional development programme one can mention and Activity 7.5.3 “Renewable energy in public outdoor lighting – introduction of intelligent lighting solutions”. This set of actions directly emphasize the importance of environmentally friendly outdoor lighting solutions.

All municipalities of Riga Planning region, including the capital city Riga and the LUCIA partner Jūrmala, have elaborated and updated their Sustainable development strategies, Development programmes and Territorial development plans that, to a greater or lesser extent, include requirements and specific activities in the field of outdoor lighting. In the following section, some examples are described in more detail.

## 1.3 The case of the city of Riga (population 633,000)

The Sustainable Development Strategy of Riga 2030 ([https://www.rdpad.lv/wp-content/uploads/2014/11/ENG\\_STRATEGIJA.pdf](https://www.rdpad.lv/wp-content/uploads/2014/11/ENG_STRATEGIJA.pdf), approved in 2014) does not

address the issue of street lighting as an urban function. However, it explicitly states that a comprehensive, sustainable system of public outdoor lighting and corporate design must be developed for the historical (central) part of the city. As a result, a research study "[Proposals Riga central part of public open space structure of the basic conditions for development](#)" (in Latvian) was developed, which attempted to co-relate the qualitative and quantitative indicators of lighting to the safety in the city. As an instrument that allows to improve the safety of the population, the study proposed to upgradeimprove the quality of lighting system in the historic centre of Riga, in certain parts of the Old Town, on pedestrian paths and in the inner yards and passages in the residential districts or city blocks. However, only 2.9% of respondents of the survey conducted as part of the research study believed that lighting was the most important priority for investment in urban engineering infrastructure.

The Territorial Development Plan of Riga for 2006-2018 provides only general requirements for outdoor lighting. However, the Plan also takes a critical look at the existing Riga outdoor lighting infrastructure.

At the time of development of the Plan, there were 1,510 lighted streets, parks, squares, inner yards of residential blocks and 44 thousand light points. Due to insufficient financing, 25% of lamp posts, 14% of brackets, 24% of power distribution cabinets, and 42% (512 km) of underground cable lines were in an emergency condition, having been in operation for over 40 years without an adequate level of investment.

The urban lighting network of Riga is managed and maintained by the municipal agency "*Rigas Gaisma*", which is responsible for lighting in all municipal streets, squares, parks and other urban objects owned by the municipality.

The lighting system in Riga is controlled by a computerized automatic system via radio and an in-built scheduling device. The existing management system does not provide for the collection of data on traffic flow, noise levels, electric energy consumption and other functions that are usually attributed to smart urban lighting systems.

Only since 2018, the municipality has started a massive reconstruction of the existing urban lighting system by removing the older bulbs and introducing modern LED lighting solutions. More than 5,000 LED light bulbs have recently been installed in Riga, mostly in the central part of the city. Compared to other cities, Riga has 13 inhabitants per luminaire, which compares well to other European cities.

Although the scene is changing, significant technological components of the lighting system are still outdated and therefore disadvantageous from the economic and ecological perspectives. The city consumes 20.5 million kWh of electricity per year to provide urban lighting to its inhabitants. However, there are still 202 unlit streets in Riga, of which 3 in the Central District, 31 in the *Latgale* (South-Eastern) district, 30 in the *Vidzeme* (Eastern) district, 41 in the *Zemgale* (Southern) district, 49 in the *Kurzeme* (Western) District and 48 in the Northern District.

Figure1. Typical street lighting solution in central Riga.



Several studies commissioned by the Riga City Council indicate that the lack of adequate lighting is still a major drawback. The study “Proposals for the Framework Conditions for the Development of the Public Outdoor Space in Central Riga” states that “...*the dysfunctionality of Riga's public outdoor space and its inability to fulfil its function of social integration is largely attributable to the notion that people are afraid. Poorly maintained and socially stigmatized underground connections (tunnels), the disorderly issue of the Riga Central Market, the number of crimes in the centre of Riga are just some of the symptoms of a level of public outdoor security.*” Another research study - “[Guidelines for the development of green urban structure and public territories of Riga](#)” (2014, in Latvian) points to the necessity to improve lighting quality by developing a single modern lighting plan. The quality of the lighting was found to be insufficient in 13 of 45 local districts of Riga. Most of these neighbourhoods are located on the outskirts of Riga and have relatively low population densities.

However, the results of the survey that was conducted in Riga in 2019 to explore what were residents’ opinions in relation to the quality of municipal services, including public lighting, demonstrated that urban lighting was not among the most important factors that worried the residents of Riga, as only 3.5% of all respondents named lighting as one of the three most important issues that should be tackled first and immediately in their neighbourhood. At the same time, only 1.1% of respondents ranked the improvements in the quality of outdoor lighting among as the top three achievements they have noticed in Riga in the previous year.

Figure 2. Central Riga at night.



To cope with the existing outdoor lighting problems, the Territorial development plan of Riga lists a series of actions or measures:

- 11.4.4. the replacement of obsolete energy inefficient lamps with modern energy efficient luminaires, thus reducing power consumption;
- 11.4.5. immediate reconstruction or replacement of the older aerial power cables that are in a state of emergency with underground cables, thus reducing operating costs;
- 11.4.6. elaboration of an investment plan for the installation of urban lighting in the unlit streets of Riga;
- 11.4.7. development of the lighting system in new suburban growth areas.

The most important medium-term economic development and action plan - the Development Programme of Riga 2014–2020 - also lists a number of activities in the field of outdoor lighting:

- installation of lighting in the streets of the city which have not been lit yet;
- installation of lighting in the inner yards of residential districts;
- introduction of a joint urban lighting management system;
- priority to LED technology.

In addition to strategic goals and directions, this action names the priority districts or streets where modern urban lighting systems are to be developed. In 2018, to give an example, 602 LED lighting units were installed (replaced) in various neighbourhoods.

## 1.4 Case of the municipality of Mārupe (population 22,000)

[The Sustainable Development Strategy of Mārupe Municipality 2013 - 2026](#) (in Latvian only) does not address the issues of outdoor lighting. These topics, including certain investment proposals, have been covered in the other two most important development planning documents of the municipality of Mārupe - the Territorial development plan and the Development programme.

The SWOT analysis that was carried out during the elaboration of the [Mārupe Development Programme 2013 - 2019](#) (in Latvian) demonstrated that pedestrian safety in the municipality was low due to the insufficient length of pavements, few illuminated bus stops and poor accessibility to these stops. Pedestrian paths and a number of streets were not lit, which led to other problems associated with insufficient public outdoor lighting. Based on this background information, the Development Programme listed actions and activities to address these challenges:

- action RV2.2 – necessity to reconstruct inner yards of multi-storey apartment buildings, including installation of modern lighting systems;
- action RV4.1 – improvement of traffic and pedestrian safety by constructing rainwater drainage systems along the streets and pavements and illuminating bicycle tracks and pedestrian paths;
- action RV4.2 - installation of lighting at all bus stops.

There is also a detailed [Action Plan 2017 - 2019](#) (in Latvian) attached to the Development programme that lists certain priority outdoor lighting projects scheduled to be implemented in the short term. According to the monitoring report on the implementation of the Development programme, most outdoor lighting projects either have been or are being implemented in accordance with the timeline. Only a few urban lighting projects have been postponed and lined up to be implemented during the next EU funds programming period (2021-2027).

More specifically, the Action Plan included a number of green requirements for outdoor lighting:

- 4000K light colour temperature for street and public lighting and 3000K light temperature for residential areas;
- dimmable LED lights should be preferred;
- installation angle of the luminaires in the range of 0° - 5° range to minimise light pollution;
- LED lighting solutions with motion sensors should be preferred for bicycle tracks and pedestrian paths;
- corporate design for poles and luminaires that follows the environmental design guidelines.

At present, the municipality of Mārupe is drafting the new [Development Programme 2020 - 2026](#), (in Latvian) that includes a retrospective evaluation of the development plans and actions. Although street lighting is provided in all districts of the municipality, there are still certain neighbourhoods where public lighting is poor. In recent years, street lighting has been constructed both separately and in conjunction with road and street reconstruction works. The introduction of LED lights started in 2016 and since then more than 400 LED luminaires have been installed in Mārupe



(the total number of street lighting luminaires almost two thousand). As much as 95% of all installed luminaires that were installed in 2019 used LED technology.

Figure 3. Modern street lighting systems at Mārupe



The strategy toward the introduction of modern lighting systems in Mārupe is clear – the municipality plans to install up-to-date lighting solutions on all major streets within a time span of 5-7 years and integrate these local lighting systems into a joint municipal management and control network.

Within the broader process of development monitoring, the municipality have conducted several citizen surveys to find out the opinions of the residents for their perspectives on local issues, including urban lighting. The results of the most recent survey carried out in 2019 showed that citizen satisfaction with the quality of street lighting has increased by more than 20% since 2012, although still mostly evaluated as “satisfactory”.

### 1.5 Case of the municipality of Jurmala (population 50,000)

Jurmala municipality is a “LUCIA” partner and detailed information on the implementation of pilot project in Jomas Street is therefore available from the responsible experts at Jurmala. This short review focuses on the issues that are related to the inclusion of urban lighting in the strategic planning documents only.

Improvement of urban lighting systems in Jurmala stands as one of the important development priorities (priority J5 - “Safe City”) of the long-term development strategy 2010-2030. There is a clear priority given to these issues and the need for the improvement of public space lighting - streets, roads, parks, urban greenery, reconstruction of lighting systems in public areas and extension of existing networks – has also been clearly indicated. The achieved progress is monitored by the

indicators that relate to the length of the lit streets in kilometres and by the level of public satisfaction.

According to the City Development Programme 2014-2020, in 2012 there were 57 kilometres of unlit streets in the administrative territory of Jurmala. Urban lighting systems have been installed on most streets that are located in the densely populated areas of the city and only streets in sparsely populated areas are still unlit. The municipality has also acknowledged that in order to comply with the European quality standards, the replacement or renovation of cables, poles and luminaires must be done in a number of urban districts.

The Development Programme has set an ambitious goal to install urban lighting in all streets that are still unlit by 2025 and has been following its plans purposefully. By the end of 2015, the total length of unlit streets had been reduced to 51.12 km and to 36.82 kilometres in in the end of 2018.

In addition, the development programme also provides for:

- the installation of coastal lighting in certain areas where public beaches are located;
- the installation of lighting system on the most popular bicycle tracks and pedestrian paths;
- the introduction of a joint City street lighting management system.

Figure 4. Street lighting on Jomas Street in Jurmala



Within the monitoring process of major development policy documents, the municipality have conducted several citizen surveys that produced some interesting facts related to the quality of the existing street lighting system. For instance, in 2016 almost a third of respondents complained that they avoided cycling in the evening hours because they believed there was insufficient amount of artificial light.

The municipality has also developed the Guidelines for the design of public outdoor space where urban lighting is considered as an important element of the urban design that respects the cultural and historical heritage and architectural style and illumination of small-scale architectural structures or historic buildings during the dark hours of the day. The concept of the design of the public outdoor space in the centre of Jūrmala also provides that different intensities of luminaires should be used to further differentiate between public and private spaces, but the lighting at street crossings must be bright enough to avoid endangering pedestrians and cyclists.

The Action Plan also foresees the development and implementation of a plan for the installation of smart lighting on city streets by the end of 2020, as well as the gradual replacement of old luminaires with innovative and energy-efficient lighting solutions. The LUCIA pilot project on Jomas Street is one of these avant-garde projects. The next step in the improvement of the lighting infrastructure will be the implementation of the smart urban street lighting management systems, which will allow for continuous and automatic monitoring of the city lighting and provide accurate data on the amount of electricity required to provide street lighting in the city.

#### 1.6 The main preconditions and factors for successful integration of urban lighting in the urban planning process in the municipalities of Riga Planning Region

Outdoor lighting is largely viewed from a perspective of energy efficiency, public safety and urban design in municipal planning documents but environmental aspects, such as light pollution and the greenhouse effect have been given a lower priority.

There are a number of exceptions to this trend and some local municipalities have paid due attention to how individual elements of outdoor lighting impact natural environment but it is not a common practice yet.

Most municipalities have developed their sustainable development strategies for the period of time up 2030 or later. These planning documents are usually of general nature and set broad development priorities rather than examine development of urban infrastructure in detail. It is the municipal development programmes that provide the best basis for the introduction of modern lighting solutions and their integration into the development planning process and municipal investment programmes.

The Ministry of Environmental Protection and Regional Development of Latvia has recently initiated a municipal reform in Latvia and recommended all local municipalities not to elaborate new medium-term development documents before 2021 when the reform is supposed to be finished. This provides good opportunities for all local municipalities to pay more attention to modern and green (energy efficient and environmentally friendly) urban lighting solutions, especially given that climate change mitigation is now a top priority on both national and the European levels. Similarly, territorial development plans that some municipalities will have to revise in the near future also provide good chances for the inclusion of certain requirements for

the development of energy-efficient, renewable energy outdoor lighting in the building regulations.

Several barriers have been identified that prevent successful integration of modern lighting solutions into the overall municipal planning process:

- some smaller municipalities lack both knowledge and financial resources to develop modern outdoor lighting systems. As an urban development priority, lighting ranks lower in comparison with other major municipal functions and the municipalities opt for investment in other kinds of urban infrastructure, such as street resurfacing or water supply;
- one of the negative consequences of the processes of urban sprawl in the territory adjacent to the city of Riga was the rapid and, in some cases, even chaotic development of new communities and villages, which has resulted in poor lighting solutions for these new suburban communities;
- insufficient knowledge about the environmental and health problems that can be caused by light pollution. As a consequence, public consultation, which is a compulsory process during the elaboration of any municipal development documents, does not pay enough attention to the importance of strict planning conditions for outdoor lighting.

Key recommendations for the improvement of the planning process and regulatory framework that would facilitate the introduction and integration of modern urban outdoor lighting solutions into the development planning documents of strategic and operational importance and implementation of these planning documents in the municipalities of Riga Planning Region include:

- a necessity to improve planning procedures for outdoor lighting in urban areas; this can be done by clearly defining and including green energy efficient lighting into the municipal development programmes. In most cases the replacement of the older systems should be a gradual process that would allow both the municipal servants and the citizens appreciate the benefits that modern lighting solutions can bring in the short and the medium term and simultaneously allocate moderate but still sufficient funds to finance such activities. Smart systems should be introduced on a pilot project basis by replacing the existing luminaires with more energy-efficient ones and testing / monitoring these solutions.
- Budget constraints can be overcome by developing smarter outdoor lighting that reduces investment in the long run and allows to save funds on maintenance. As examples of such solutions one can mention installation of sensor luminaires. In addition, modern luminaires come with the dimming function, which significantly reduces maintenance costs. Not only are LED luminaires more energy-efficient, but they also have a much longer lifespan, with an industry-standard 5-year warranty and an estimated lifetime of ~100,000 hours. As a result, the overall life cycle cost of lighting is significantly reduced. In order to understand the total cost of outdoor lighting, it is advisable to consider not only the initial investment needed to install or replace the luminaires but also the energy and maintenance costs. Several Life Cycle Costing Calculators are already available to facilitate this; the most popular of them was developed by The Ministry of Environmental Protection and Regional Development:

[http://www.varam.gov.lv/lat/darbibas\\_veidi/zalais\\_publiskais\\_iepirkums/kalkulators/?doc=25445](http://www.varam.gov.lv/lat/darbibas_veidi/zalais_publiskais_iepirkums/kalkulators/?doc=25445) (in Latvian).

- The most typical energy-saving options for public outdoor lighting are related to the use of LED luminaires and a range of control methods such as planning and adaptive control. Another promising approach to reduce energy consumption is to make use of the reflective properties of road surfaces. This approach can become especially useful in underground tunnels.
- The colour temperature of luminaires should also be included in the planning terms or building regulations for outdoor lighting. Nordic cities, for instance Stockholm and Copenhagen, mainly use the warm light spectrum of 2700K, which contributes to higher comfort levels in the city. However, it is also important to ensure the necessary illumination intensity from 8 to 20 lux on the pavements and 30 lux on the streets.
- Certain requirements for the reduction of light pollution can also be included in the building regulations. For instance, planning authorities can necessitate that the luminous intensity of the luminaires equals zero at an angle above 90°.
- The municipal planning authorities can also call the public lighting agencies and their suppliers for the installation of solar battery-powered outdoor luminaires or use only green electricity to provide outdoor lighting.

## 2 Green public procurement - the existing regulatory framework

### 2.1 Legislation

The concept of green public procurement first appeared in the legislation of the Republic of Latvia on 6 September 2014, when amendments to the “*Law on Public Procurement*” were adopted by the Parliament of Latvia. In 2017, the Parliament passed a new Law, which fully respected two EU public procurement directives (2004/18/EC, 2004/17/EC) that entailed the introduction of conditions that respect environmental issues in public procurement procedures.

In the Law, green public procurement is defined as “*the purchase of goods, services and works whose environmental impact is less than that of goods, services and works with the same purpose of use acquired without applying the green public procurement principles.*”

The Law stipulates that the Cabinet of Ministers of Latvia determines the principles, requirements and the procedures for practical application of green public procurement, as well as the groups of products, services and construction work subject to the requirements of green public procurement, evaluation criteria that should be used as part of public tenders, the contents and conditions of the procurement contract and the procedures for the supervision of how these conditions are applied in practice. On this basis, the Ministry of Environmental Protection and Regional Development elaborated the draft Regulation 353 of the Cabinet of Ministers “[Requirements for Green Public Procurement and the procedures for application](#)” (in Latvian) that were adopted by the Cabinet in 2017). These regulations set the overall objective of the green public procurement in Latvia - “*to reduce the environmental impact of the goods, services and works purchased in*

*public procurement throughout their life cycle, while promoting the development of the market for environmentally friendly goods and services and increasing the competitiveness of the local economy”.*

Regulation No. 353 defines the groups of goods and services where green procurement is mandatory<sup>1</sup>:

1. Office paper.
2. Printing equipment.
3. Computers and information and communication technology (ICT) infrastructure.
4. Food and catering services.
5. Cleaning products and services.
6. Indoor lighting.
7. Street lights and traffic signals.

Street lights and traffic signals is one of the mandatory categories of green public procurement. As a result, the share of green public procurement in this category has increased significantly in recent years from 3% in 2016 to 66% of all purchases in 2018.

The energy efficiency requirements of the EU Directive 2012/27/EU on energy efficiency may apply to the replacement of luminaires and the implementation of automatic lighting control and management systems. Luminaires are also subject to the EU energy labelling requirements, while control and management systems may be subject to eco-design requirements. However, it should also be noted that these requirements are mandatory only for the state authorities and their agencies, i.e. when the contracting authority is a ministry or a state agency, and for purchases above a certain threshold set in the Law on Public Procurement. As a result, these rules can have a lesser impact when purchases are made by municipal agencies or other public bodies who opt for contracting service providers in smaller quantities.

## 2.2 Criteria for Green public procurement in outdoor lighting

The EU have developed guidelines for green public procurements in street lighting and traffic signals that describe the recommended requirements and criteria for green public procurement. These guidelines list both the basic and the advanced criteria. The basic criteria include the most important environmental factors and the application of these criteria is relatively simple. The more advanced criteria, which allow to further reduce the environmental impact, can also be applied but it may also

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### ***Most significant environmental impacts of the outdoor lighting:***

- *Energy consumption;*
- *depletion of natural resources and waste generation;*
- *Air, land and water pollution (for instance, mercury);*
- *Light pollution;*
- *Behavioural disturbance to nocturnal animals (for instance, bats).*

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<sup>1</sup> In addition, lists of certain products and services for which the application of green public procurement is voluntarily, for instance, office buildings, electricity and road construction.

imply a more complex and costly procurement procedure.

The Latvian regulation for green public procurement in the field of street lighting and traffic signals is almost fully taken over from the EU guidelines. The EU defined basic criteria are compulsory for street lighting and traffic signals and contracting authorities can also apply other advanced green public procurement criteria.

For instance, the advanced requirements for green street lighting can relate to the replacement of lamps and other lighting equipment and systems, lighting controls and traffic signals. However, these rules do not apply to private car parks, commercial or industrial outdoor lighting, sports lighting and decorative lighting, such as lighting of monuments, buildings or trees.

In 2018, the European Commission revised the criteria for green street lighting and traffic signals and published an updated set of criteria that are now different from those listed in the regulation of the Cabinet of Ministers of Latvia. The new criteria propose to redesign the energy efficiency criteria for light bulbs to better integrate the characteristics of LED lighting and to emphasize the importance of light pollution. A number of criteria have also been removed, for instance, those that related to the efficiency of inductors, the packaging of the luminaires, limitation for the presence of mercury in the luminaires since they were not relevant for the use of LED lights, which has become the most widespread modern solution used in lighting systems. The new EU guidelines also do not consider the energy labels, such as *Energy star*, the *EU energy efficiency label*, as a means of verification because their role has gradually decreased with the transition to LED lighting.

### 2.3 Practical application of green public procurement in Riga Planning Region

According to the database of the Procurement Monitoring Bureau of Latvia, in the period of time from 1 January 2015 to 1 November 2019 a total of 126 public procurements have been performed in Latvia in the following four outdoor lighting categories (also see Table 1 below):

- street lighting (34993000-4)<sup>2</sup>,
- installation of road lighting equipment (45316110-9)
- public lighting equipment operation (50232110-4)
- street lighting maintenance services (50232100-1).

The largest part of purchases (72) have been made in the field of street lighting maintenance services, but only 11% of them have been marked by the contracting authority as green purchases (the contracting authorities are allowed to mark the procurements themselves as either “green” or “standard”). The largest percentage of green purchases (32%) is related to the procurement of road lighting equipment. Despite the fact that street lighting and traffic signals are included in the mandatory green public procurement group, only 44% of all purchases in this category were marked as green in 2019.

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<sup>2</sup> Grouped according to the Common Procurement Vocabulary - CPV.

However, it should also be acknowledged that significant progress has been achieved in the field of green procurement in comparison with previous years, taken into account the fact that there were no procurements marked as green in 2015 and only one in 2016. Installation of street lighting appears to be the most successful procurement category - in 2019 all five implemented procurements were marked as green. Procurements in the category of street lighting maintenance services produced the lowest rates - only 11% of all purchases in the last five years have been green. However, it must be accentuated that in absolute (fiscal) terms, the green public procurement in the field of outdoor lighting by far exceeded the total contracted amount of other procurements in both 2018 and 2019 (80 v 20 per cent).

**Table 1. Green public procurement in outdoor lighting in Latvia**

		2019	2018	2017	2016	2015	TOTAL
<b>Number of procurements</b>	<b>Total</b>	18	25	30	27	26	126
	<b>including GPP</b>	8	8	3	1	0	20
	<b>in Riga planning Region (including GPP)</b>	8 (2)	9 (3)	9 (1)	6 (0)	11 (0)	43 (6)
<b>The total contract price (excluding VAT)</b>	<b>Total (thousand euros)</b>	852	1610	553	550	784	4349
	<b>including GPP (thousand euros)</b>	665	1284	254	10	0	2212
<b>GPPs as percentage</b>	<b>As percentage of procurements executed</b>	44%	32%	10%	4%	0%	16%
	<b>As percentage of total contracted value</b>	78%	80%	46%	2%	0%	51%

Forty-three procurements or 34% of all listed outdoor lighting procurements that were implemented in the municipalities of Riga Planning Region (Riga, Jurmala, Tukums, Ogre and Limbazi) during the period from 2015 to 2019 were marked as green. This ratio is lower than, for instance, the percentage of economic activity that takes place in the region (nearly 60 per cent of all economic potential of Latvia is located in Riga planning region). This can be possibly explained by the investment-intensive reconstruction of the (national) arterial public roads and the installation of lighting systems associated with these works. Local municipalities of the region have not yet actively applied green public procurement approach in their procurements. Only 4 out of 30 local municipalities marked their outdoor procurements as green in 2019.



## 2.4 Examples of practical application of green public procurement in the municipalities of Riga Planning region

### *Renovation of street lighting in Jurmala*

In 2017 and 2018, the municipality of Jurmala elaborated and implemented the project “Anthropogenic pressure and climate change mitigation by installation of renewable energy-powered lanterns in five exits (streets) that lead to the public beach in Majori, Jurmala”, which was funded from the European Maritime and Fisheries Fund and included the installation of wind and sun energy-powered lanterns in five exits to the public beach with the purpose to improve the quality of urban lighting and energy efficiency indicators.

The key criteria that were attributed to the procurement and were applied as the qualification criteria for tenderers included the necessity that the tenderer had previously successfully completed at least 3 street lighting renovation or reconstruction projects of similar complexity and tender price. The tenderer had to certify that their staff were qualified and experienced in the implementation of street lighting projects.

Major technical parameters and performance requirements:

Requirements for solar panels:

- Power (W) - 250W x 2;
- Temperature variation resistance: - 20 to + 40 °C.

Requirements for wind generators:

- Power (W) - 100 W;
- Temperature variation resistance (°C) - no - 20 to + 40 °C;
- Starting wind speed (m/s) - 3 m/s;
- Operational range (m/s) - not less than 40 m/s

Requirements for lamps:

- Light source type - LED diode;
- Power (W) - 27 - 35W;
- Light tone (K) - from 4000 to 5000 +/- 300K;
- Luminous flux (lm) - from 3000 lm;
- Light beam angle (degrees) - 170° +/- 2.5%;
- Life cycle at the average temperature of + 5°C - 50 000h;
- Luminaire dustproof / waterproof rating, all luminaire compartments - IP 65.

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### *Procurement details*

*a) Description: The project was implemented by applying a public procurement procedure "Purchase and installation of solar and wind powered autonomous lighting lanterns in five exits on the beach in Jurmala".*

*b) Contracted price: 77,438.44 € (excluding VAT), contractor - "EC SYSTEM" Ltd.*

*c) Method of procurement: the competitive dialogue (negotiated price)*

*d) CPV code: 45316110-9.*

*e) the contracting authority has not marked the procurement as green procurement.*

*f) Total project budget – 93,260.56 EUR, of which 10% co-financing from the municipality of Jurmala.*

*g) Funded by the European Maritime and Fisheries Fund.*

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Requirements for energy accumulators (batteries):

- Battery Type - Li-ion;
- Battery Capacity - 24V / 100Ah;
- Discharge - charge cycle - not less than 1,500 times;
- Battery reserve capacity - not less than 3 days;
- Battery dustproof / waterproof rating- IP68.

**Conclusion:** Application of green public procurement in the field of outdoor lighting in local municipalities of Riga Planning Region to a high degree depends on the availability of EU programmes or other financial documents that aim at the introduction of environmentally-friendly and energy efficient solutions. In the Jurmala example, energy-efficient (LED) luminaires were combined with the use of renewable energy sources (solar and wind energy). The technical specification that was developed by the municipal specialists included only the most important energy efficiency and quality requirements; it is recommended that more advanced requirements are introduced in the future that allow for maximum quality of the luminaires and reduction of light pollution.



*Figure 5. Solar and wind powered autonomous lighting lanterns in Jurmala.*

### *Maintenance and repair of electrical equipment in the municipality of Sigulda*

In March, 2019 the municipality of Sigulda announced an open e-procurement for the maintenance and repair of the electrical equipment in the municipality that included maintenance and repair of public outdoor lighting in the territory of Sigulda town for 24 months.

Key selection criteria that were attributed to this public procurement and were applied as the qualification

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#### *Procurement details*

- a) Description: the project was implemented by applying a public procurement procedure "Maintenance and repair of electrical equipment in Sigulda municipality."*
  - b) The contracted price: 140,000.00 € (excluding VAT), contractor - "Phase Sigulda" Ltd.*
  - c) Type of procurement: eProcurement, open tender (2019)*
  - d) CPV code: 50232110-4*
  - e) the contracting authority has marked this procurement marked as green*
  - f) Award criteria: lowest offered price.*
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criteria for tenderers included the requirement that the tenderer had previously successfully completed at least 1 similar contract with a contracted worth of EUR 100,000.00 (excluding VAT) or higher. In addition, all participants were asked to submit information on the expertise of their staff and at least one positive feedback from a similar contracting authority to which the tendered had previously supplied similar products and/or services.

There were no explicit Green public procurement criteria included in the rules of the procurement but the technical specification still required that tenderers respect several environmental requirements, for instance:

- The equipment supplied must comply with the Regulation No. 353 of the Cabinet of Ministers “*Requirements for Green Public Procurement and their Application Procedure*”, Annex 1, Section 6.1. green public procurement requirements and criteria for indoor lighting equipment; and requirements of Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).
- Sorting and recycling of used lighting equipment must be performed in accordance with the Regulation No.388 of the Cabinet of Ministers “*Requirements and Procedures for Electrical and Electronic Equipment Categories and Labelling and Waste Management Requirements*” (2014); a monthly report to certify that was required.
- Elaboration of work plan for modernization of lighting solutions in the municipality.

Figure 6. Winter street lighting in Sigulda town.



**Conclusion:** The procurement method that allows to award contracts to the bidder who submits the lowest offered price for the maintenance and repair of electrical equipment in a municipality cannot always result in the most economically feasible result in the case of outdoor lighting. To avoid situations like these, the technical specifications should clearly identify detailed LED lighting parameters.

## *Installation of street lighting systems in the municipality of Mārupe*

In the beginning of 2019, the municipality of Mārupe announced an open tender for the installation of street lighting systems in the territory of the municipality.

The key selection criteria that were attributed to this public procurement and were applied as the qualification criteria for tenderers included the necessity that the tenderer had previously successfully completed at least two similar projects (comparable by the amount and type of work). In addition, there was a fixed requirement for the life time of LED luminaires - 20,000 hours.

The technical specification of the procurement documentation explicitly stated that all installation works should be carried out in accordance with the Regulation No. 353 of the Cabinet of Ministers “Green Public Procurement Requirements and Procedures for their Implementation” and all possible price bidders were supposed to provide luminaires that met high energy efficiency parameters, for instance, there was a clear requirement for the purchase of LED luminaires ISKRA LED ALFA or equivalents and Urbino Premium LED or equivalents and provide a 2-year guarantee.

The suppliers were also asked to guarantee that the new or refurbished lighting systems and controlling devices do not consume more energy than stated in the technical specification. Regular calibration of daylight controlling sensors (time relays) was also required to correspond to the changing daytime length.

In addition, the eventual suppliers were obliged to take appropriate environmental measures to minimize and recover waste generated during the installation of a new or refurbished lighting system. Sorting and recycling of used lighting equipment must be executed in accordance with the Regulation No. 388 of the Cabinet of Ministers “Requirements and Procedures for the Disposal and waste management of Electrical and Electronic Equipment” (2014).

**Conclusion:** The procurement respects the Regulation No. 353 of the Cabinet of Ministers “Green Public Procurement Requirements and Procedures for their Application”, however, the exact requirements were not specified. In the future procurements, the technical specification should be further detailed by including certain technical parameters - is not enough just to specify the type and the warranty period for the luminaires.

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### *Procurement details*

*a) Description: the project was implemented by applying a public procurement procedure " Installation of street lighting systems in the municipality of Mārupe."*

*b) The contracted price: 77,393.74 € (excluding VAT), contractor - "EDS", Ltd*

*c) Method of procurement: lowest offered price*

*d) CPV code: 45316100-6*

*e) the contracting authority has marked this procurement as green*

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Figure 7. Street lighting in the municipality of Mārupe.



## 2.5 Existing barriers

The application of Green public procurement for outdoor lighting in Latvia and Riga Planning Region is slowly increasing. However, several obstacles, which can be divided into three groups, still exist that hinder the implementation of Green public procurement in everyday practice:

**1. Information barriers.** Municipal officers who are in charge of public procurement procedures lack motivation and knowledge to incorporate the Green public procurement criteria in the procurement documents for the installation of or maintenance of existing outdoor lighting systems. Most public servants do not have enough quality information about Green public procurements, how to apply the Regulation No. 353 of the Cabinet of Ministers “Green Public Procurement Requirements and Procedures for their Application” and even how to fill in the form that is required by the National Procurement Office in case the contracting agency attempts to include the green criteria in the procurement documents. Some municipal specialists have not even heard of these options or avoid applying them assuming that it may complicate the contracting process. Contractors also lack information on the most environmentally friendly solutions and their public benefits, as well as good practices and knowledge and information on:

- environmental/climate change problems in general and the environmental impact of consumption in particular;
- environmental protection and climate change mitigation policy in Latvia and the EU;
- use of public procurement as a tool to promote purchase of environmentally friendly goods and services;
- the availability of alternative products;

- environmental impact assessment tools for outdoor lighting solutions.

**2. Economic barriers.** These barriers can for the most part be attributed to the price differences between the high-quality LED lighting and more conventional alternatives. Modern lighting solutions often require larger amount of initial investment. On the other hand, the demand for energy-efficient lighting solutions has gradually increased, thus changing the patterns of supply and competition, ultimately making both approaches economically comparable. Application of Green public procurement can also contribute to the selection of the most energy efficient and environmentally friendly offers and this procedure allows to either include or neglect certain selection criteria thus favouring environmental rather than economic criteria. Public procurement procedures that focus on conventional lighting solutions generally disrespect the social and environmental costs that are associated with the full life cycle of luminaires, which are not normally integrated into the prices of these goods. Consequently, the real long-term cost of outdoor lighting cannot be fully evaluated in standard public procurement. This is another important aspect why the contracting authorities should be encouraged to make use of the so-called life-cycle cost calculators, which are also provided in the by-laws of the existing Law on Public Procurement of Latvia. These calculators allow to consider both the economic aspects (bid prices at the moment of purchase) and the costs associated with the exploitation of luminaires in the long run.

Unfortunately, although several calculators have already been developed, including the one elaborated by the Ministry of Environmental Protection and Regional Development of Latvia - [http://www.varam.gov.lv/lat/darbibas\\_veidi/zalais\\_publicais\\_iepirkums/kalkulators/?doc=25445](http://www.varam.gov.lv/lat/darbibas_veidi/zalais_publicais_iepirkums/kalkulators/?doc=25445) (in Latvian only), available evidence suggests that this instrument has to date been rarely used in practice.

Another important socio-economic barrier is the unwillingness to invest adequate amount of municipal funds in modern lighting solutions. Some local municipalities may even lack these funds and so they opt for cheaper lighting solutions.

**3. Technical barriers.** These are to a large extent related to the technical characteristics of modern LED luminaires. As an example it can be mentioned that the technical specifications of existing public outdoor lighting procurements rarely include the relatively simple option of dimming, i.e. purchase of dimmable LED lamps that can help to significantly reduce the amount of energy needed for outdoor lighting and reduction of light pollution.

## 2.6 Recommendations

In order to improve the quality of public outdoor lighting in the municipalities of Riga Planning region and to reduce the amount of investment necessary for the installation and maintenance of quality lighting systems in the long term (by probably investing more at earlier stages), it would be necessary to integrate a number of key factors in public procurement documentation:

1. Abandon or minimize the use of the lowest price criteria and the defining criteria in public procurement procedures and instead apply the procurement methods that allow to select the most economically advantageous offer based on offered price and other criteria, for instance, product life-cycle.
2. Some of the key technical indicators that should be included in the technical specifications for installation of outdoor lighting in public areas are:
  - LED bulb colour temperature should be  $3500\text{K} \pm 500\text{K}$ ;
  - LED lighting energy efficiency should be around 100 lum / w;
  - Lighting colour rendering index of at least 70;
  - Luminaire induced total harmonic distortion (THD) shall not exceed 20%;
  - Light intensity at an angle of more than  $90^\circ$  (vertical) must be zero;
  - Total power factor of LED lighting of not less than 0.9;
  - Luminaire Protection class (P - dust and moisture protection) must be at least IP65;
  - Luminaire impact resistance class (IK) must be not less than IK10;
  - Luminaires must be tested by accredited laboratories;
  - 5-year warranty on LED luminaires should be provided by suppliers, the life cycle of not less than 70,000 hours (L70F10) with a failure rate of 10% or less.

It should also be noted that:

- the contracting authorities should consider the fact that the degree of luminous intensity may vary from place to place or from street to street thus affecting luminous efficiency (lum / W);
- availability of dimmers and intelligent control systems can contribute to significant reduction in energy consumption and can have a positive environmental effect.

To be able to select environmentally friendly outdoor lighting solutions, municipal authorities are recommended to:

- organize a public meeting or a series of meetings with service providers (lighting companies) before the calls for the bids are announced to discuss different alternatives;
- document all cases where lighting companies fail to meet their contractual obligations. Such approach can be used to impose contractual penalties and/or terminate the contracts;
- develop an internal (organizational) instruction to guide the implementation of Green public procurement. Some public institutions have already started to apply internal regulation, for instance, the municipality of Riga and the Ministry of Interior;
- Random laboratory testing should be applied in certain cases to verify product quality compliance.

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