HOW TO MODERNIZE PUBLIC LIGHTING

A COMPLETE STEP-BY-STEP GUIDE BASED ON THE CASE OF THE CITY OF POLOTSK

CONTENTS

INTRODUCTION

Would you like your city to be well-lit, safe and eco-friendly?

This is one of the aims of Belarusian cities that have joined the global movement known as the Covenant of Mayors for Climate and Energy (CoM). CoM signatories commit to reduce CO2 emissions by at least 40% by 2030 (by 30% for the Eastern Partnership countries) and to develop a common approach to climate change mitigation and adaptation. Modernization of public lighting is one of the measures aimed at tackling this ambitious challenge.

Bright, modern and energy efficient public lighting is indispensable to a city that wants to be convenient for its residents and guests. Today, most Belarusian cities have street lighting systems that are outdated and consume a lot of energy. The most advanced and sustainable way of dealing with this problem would be to conduct a comprehensive energy efficient modernization of street and decorative lighting, with integration of an automatic control system and usage of self-sufficient street lights. It was with this proposal that Polotsk District Executive Committee and Interakcia Foundation succeeded in getting grant funding from the European Union in 2015 as part of the EU4Energy initiative and Covenant of Mayors – Demonstration Projects (CoM-DeP) Programme.

The PubLiCity (Energy Efficient Modernization of Public Lighting in the city of Polotsk) project will be over in March 2020 and will become the largest public modernization project in Belarus for the time being, with almost two thousand LED lights installed in central streets and major arterial roads, and decorative lighting of city buildings and other sites modernized.

A large-scale public lighting modernization project like this one is a complicated step-by-step process with lots of nuances and hidden agendas. Over these four years, we have explored this process in considerable detail; now, we would like to share our experiences and recommendations in this booklet. It would make us happy to know that our experience has helped other Belarusian cities to avoid common mistakes while planning and implementing similar projects.

May all cities in Belarus be bright and energy efficient!

Siarhei Leichanka,
first Deputy Mayor of the Polotsk District Executive Committee

and PubLiCity project team

PUBLICITY PROJECT IN NUMBERS

Project in brief

Implementation period:	**August 2015 – March 2020**
Budget:	**1,630,521 euro.** **Funding of the European Union: 1,304,417 euro (80%)**

This is what appeared in Polotsk

1904 new LED lights in **28** streets

310 new street light poles

12 self-sufficient solar-powered street lights

34 automatic light control boxes with PLC control systems

>30 km of self-supporting insulated wires and **≈20** km of various cabling

26 New decorative lighting on 26 city objects that include buildings, memorials, bridge across the Zachodniaja Dźvina River, stairs to the St.Sophia Cathedral, and a pedestrian promenade along the Francyska Skaryny Avenue.

Impact on the environment

Energy consumption reduced by **265** MWh

CO_2 emissions reduced by **120** tons per year

This amount of CO_2 emissions would require **600** trees to offset per year*

This is how we engaged local residents

In 2016, 40 students from all over Belarus, supported by 19 well-known designers and architects, came together to work on creative solutions for public lighting in Polotsk

More than 2,000 people from Polotsk and the Polotsk district took part in annual Energy Days from 2016 to 2019

Over 10,000 people took part in public opinion surveys as part of the project

In 2018, Polotsk hosted a 3-day Light Festival, with 11 light installations in the city streets, 13 light-centred events and more than 30,000 visitors. This was the first city-level light festival to ever take place in Belarus

Over the three years, the number of Polotsk residents who try to save energy in their daily life increased by 6.56% (based on the results of the public opinion surveys as part of the project: 79.4% respondents in 2016 vs. 85.96% respondents in 2019)

* http://www.carbonify.com/carbon-calculator.htm

LED LIGHTING IN URBAN ENVIRONMENT: THE CASE OF BELARUS

Andrei Leonovich
LED lighting department
OAO Svyazinvest

MAIN STAGES OF PUBLIC LIGHTING MODERNIZATION IN BELARUS

Integration of LED lighting into industrial processes and urban environment in Belarus has been going on for more than 10 years. Still, the share of LED lighting measured as a per cent of total lighting is quite small. It is only over several recent years that large-scale infrastructure projects with modernization of public lighting in separate parts of the city and integration of a smart control system started to emerge in Belarus.

Looking at the five past years, we can trace the evolution of outdoor LED lighting in Belarus step by step.

1 /stage **Point-for-point replacement** is replacement of conventional light sources with LEDs. This type of modernization allows for immediate reduction of energy consumption and, given high-quality equipment, considerable savings on maintenance.

2 /stage **Offline light control** is when you replace conventional light sources with LEDs that have built-in offline dimmers. With this technology, you can set a timetable to automatically switch to the reduced consumption mode during night time. Lighting with offline controllers helps to save energy.

3 /stage **Smart lighting** is a complex solution that includes replacing lights and introducing an intelligent lighting control system. This technology helps to create an effective, flexible and cost-effective infrastructure which is linked to a specific object, city or region.

4 /stage **Smart City solutions** stand for the integration of the intelligent lighting control system with a Smart City system. The Smart City System creates synergies and effective cross-operation between all major components of urban infrastructure, including transport, lighting, urban information systems, video surveillance, operation of emergency services, waste disposal, environmental monitoring and many other sectors.

As of today, modernization of public lighting in Belarus is mostly at stages 1 to 3, while integration with the Smart City systems is just starting to unravel. Introduction of smart lighting is a solution with most potential and relevance for Belarus in terms of available infrastructure, investment opportunities and relative ease of implementation.

Now, let us look into some major aspects of smart lighting.

HOW SMART LIGHTING WORKS

What differs smart lighting from point-for-point replacement is a need to install a head controller into an existing or a new light control box, as well as presence of a light controller for two-way data exchange.

For communication between the head controller and light controllers, you can use either wireline or wireless protocols. At the moment, the most widely used protocols are wireline PLC (power line communication) and wireless RF (radio frequency). RF protocol allows greater performance with fewer costs. However, both protocols have their distinctive features; we recommend running a comprehensive analysis of the object before choosing the best fitting option.

Due to its flexibility and capacity to adapt to the characteristics of a particular object, the smart lighting system can be quite impactful. While being convenient and safe to use, it significantly reduces energy consumption and maintenance costs, and helps to cut CO2 emissions and use resources in a sustainable way.

Main characteristics of the intelligent lighting control system:

/ energy saving, monitoring of energy consumption

/ ability to control lights individually or in groups (on/off, dimming) with reference to geolocation

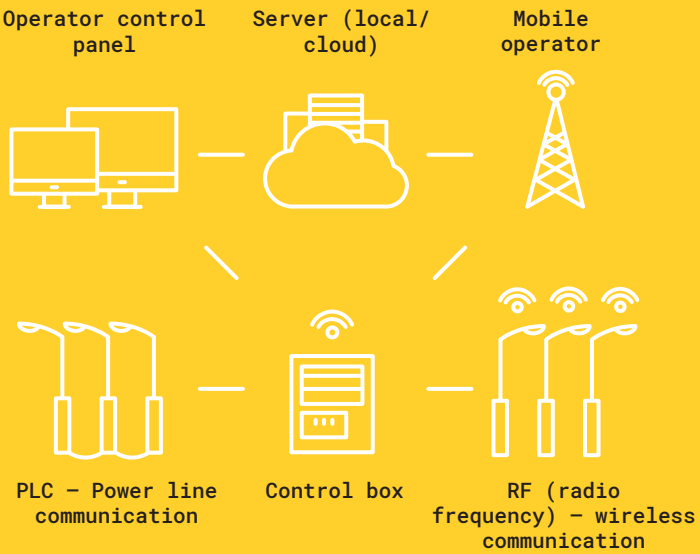
/ ability to create, save and modify various operating scenarios

/ monitoring of major electricity parameters, control of performance capacity and online identification of troubles

/ can be connected to and integrated into the system of various measuring devices and detectors (illuminance, movement, weather conditions, etc.)

/ access to a secure cloud server from any device with Internet connection by login and password

Main components of the intelligent street lighting system:



EXAMPLES OF SMART LIGHTING PROJECTS IN BELARUS

In the recent years, several projects in Belarus have been dealing with modernization of large-scale objects with introduction of smart lighting; some of these projects have already been implemented, others are still in progress.

The first Belarusian case of comprehensive street lighting modernization with introduction of the intelligent light control system was completed in summer 2019 in Novogrudok. The project included replacement of 400 street lights and 25 light control boxes in the city center and along its main arterial roads.

According to the feasibility study, lighting modernization will result in energy savings of 146,218 kWh per year and will reduce CO2 emissions by 129 tons. During the first month of its operation, actual savings have already exceeded calculations by 22%.

A similar lighting modernization project is nearing completion in Polotsk. The scale of the PubLiCity project is several times as big as the one in Novogrudok.

In addition to the public lighting modernization, the Polotsk project included a component on self-sufficient lighting, which is unique for Belarus. The installed self-sufficient lighting system includes a light source, a solar panel and battery and can operate with zero energy consumption.

Lighting modernization projects are also being implemented in Minsk. Modernization of lighting along the Nezavisimosti (Nezaliezhnasci) Avenue is currently in progress, while smart lighting in the square near the Central Railway Station and in the Babrujskaja, Andrejeuskaja, and Karastajanavaj streets has been operating for over a year already. In 2016, lighting was modernized in the Platonava street. What made this project special was the use of motion detectors that automatically switch the lights from the dimming mode to the 100% lighting mode only when they detect moving vehicles. Motion detectors allow compliance with required illuminance standards and help to save energy when there is no movement.

CHALLENGES OF INTRODUCING SMART LIGHTING IN BELARUS

Every task on introduction of smart lighting should be regarded as a part of complex system, from technical appraisal of the project, energy audit and analysis of possible solutions to the search for funding sources.

Modernization of public lighting in Belarus is financed primarily from public budget funds, which may result in certain challenges. The planning timeframe for republican budget funds is one year, while modernization of public lighting has the payback period of four to seven years. So it makes sense not to rely on public budget funds and property developers' own funds only, but to try and raise funding from international financial institutions. Many large-scale projects in Belarus have been implemented with grant funding.

Nearest future may see the emergence of legal framework for energy service agreements where return of investments spent for modernization is gradually paid out by instalments using savings that result from energy efficiency measures. Legal framework for energy service agreements has been successfully operating in the neighbouring countries for some years and turns out to be an effective instrument.

Another challenge has to do with harmonization of standards. Legal framework in Belarus is part Soviet heritage and part localized European standards, which often do not correlate. In many cases, regulatory documents do not address actually existing issues; for instance, dimming levels and time intervals exist only in the form of recommendations. Accurate and up-to-date legal framework will help to present the market in a structured way and formulate precise rules of game, while the customer will be able to compare different options using objective criteria.

OPPORTUNITIES OF SMART LIGHTING DEVELOPMENT IN BELARUS

We are going to see more and more intelligent lighting control systems integrated into urban environment. Public lighting has close links to urban mobility. Urban cycling is booming, as is the use of electric vehicles; cities are already facing the need to safely integrate alternative means of transport into the existing system. Another aspect that will always be relevant for cities is safety on accident-prone road sections.

One successful example of smart lighting integration would be a program for modernization of accident-prone pedestrian crossings in Minsk. With additional illumination, use of another colour temperature, and new display panels, accident rate on the pilot road sections has diminished to zero.

With the NBIoT protocol coming to Belarus, Internet of Things is starting to develop. In the years to follow, we might see new Smart City solutions, and some pilot practices are already underway. For instance, at the moment OAO Svyazinvest and a certain mobile operator collaborate on the upcoming modernization of the Niakrasava street in Minsk. There are plans for installation of motion detectors and video surveillance cameras with integration of all these systems into a common network.

MAIN STEPS OF PUBLIC LIGHTING MODERNIZATION: POLOTSK CASE STUDY

STEP 1.
INVENTORY AND ENERGY AUDIT

WHAT IS IT AND WHY DO IT?

Inventory and energy audit are the very first steps of public lighting modernization. Inventory is when you count all street lights in the city, along with relevant equipment that comes with them. Energy audit is when you find out how much energy is consumed by public lighting and calculate the city's losses.

When you know the exact energy consumption figures, your next step would be to come up with specific measures that will become a basis for the project design documentation.

HOW DID WE DO IT IN POLOTSK?

Producing a street light inventory for Polotsk was the task of the GorSvet department of the municipal unitary enterprise "Municipal Utility Board of Polotsk". To decide on the contractor to conduct energy audit, we held an open tender.

WHAT WERE THE CHALLENGES?

Inventory

Our main challenge during inventory had to do with the fact that street lights in Polotsk belonged to different entities; their owners could be Polotsk Municipal Utility Board, Polotsk Electric Networks, or other organizations. There was no common database; information we had was fragmentary or even missing.

Another thing that we revealed during the inventory was that existing documentation did not always reflect the reality. There were street lights that had no documentation and street lights that differed from their description in the documents. As a result, experts of the GorSvet department had to spend quite a lot of time cross-checking the actual quantity of the street lighting equipment, its condition, as well as reliability of the street lighting documentation.

Energy audit

Initial results of the energy audit did not correspond to European standards and had to undergo several revisions. The contractor for energy audit services proposed conventional solutions that are common for Belarus and did not incorporate any recent European trends. The contractor lacked experience in the area of public lighting and came up with measures that aimed to reduce energy consumption but did not address the issue of lighting quality improvement.

To harmonize the results of the energy audit with European standards, we sought help from the technical experts of the CoM-Dep Support Programme.

Monument to Euphrosyne of Polotsk
before public light modernization

Monument to Euphrosyne of Polotsk
after public light modernization

OUR RECOMMENDATIONS TO OTHER CITIES

Our main recommendation is to concentrate on the quality of energy audit as your first priority. Before you can proceed with procurement and installation, you will need to produce terms of reference (ToR) for development of the relevant project design documentation; it is the results of the energy audit that will provide the basis for the ToR.

We recommend that you deal with the inventory development yourself, without subcontracting it. To do this, you will need to create a working group that will include representatives of organizations that have city street lights on their balance sheets. Then, you will need to develop a common data collection template and assign data collection responsibilities to the working group members.

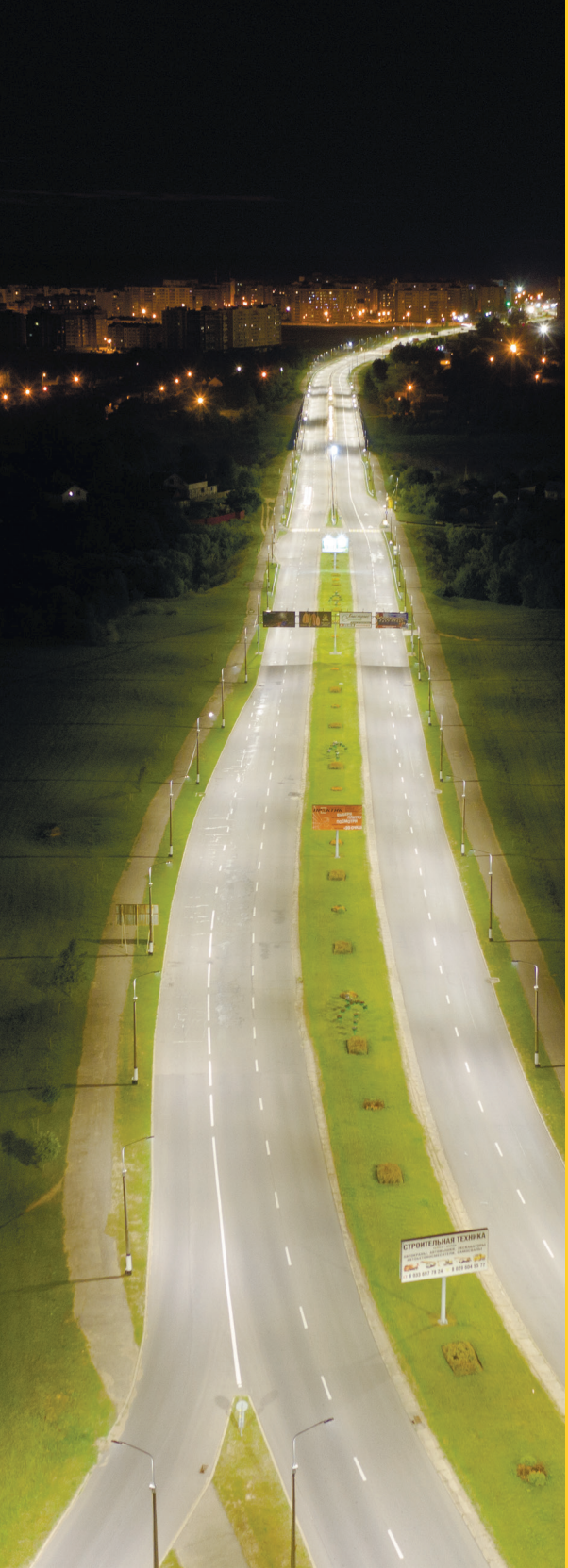
Energy audit is a service that needs to be rendered by qualified experts, so make sure to allocate enough funding for this task. It might make sense to address experienced organizations that used to conduct energy audit as part of international projects. Apart from Polotsk, other cities that have already conducted energy audit of public lighting are Novogrudok, Beryoza, and Baranovichi.

While you are still at the planning stage, it might be a good idea to research modern solutions for public lighting modernization. You can either address the equipment suppliers yourself or delegate this assignment to your energy auditors. This will give you a chance to incorporate advanced technical solutions and modern equipment into the measures that will become part of your public lighting modernization plan.

Modern technical solutions are quite expensive, so make sure to bear in mind your funding sources. If you plan to use public (municipal or district) budget funds, your modernization budget may be at risk of not getting approval during the state expert appraisal of your project design documentation. In accordance with Belarusian legislation, lowest price should be your primary selection criterion when you use state funds. This means that you will have to choose older solutions that cost less. If you intend to go with modern expensive solutions, you may want to use own funds or grant funds (international technical assistance).

STEP 2.
DESIGN PLANNING

MAIN STEPS OF PUBLIC LIGHTING MODERNIZATION:
POLOTSK CASE STUDY



WHAT IS IT AND WHY DO IT?

Design planning stands for the development of the project design documentation (PDD) that should outline the intended volume of works, materials to be used, procurement procedures to be applied and rules to be used when installing all types of equipment.

You start the PDD development with elaboration of the terms of reference (ToR) based on the energy audit results.

Your ToR should include the following information:

- streets to be modernized
- power lines to be replaced
- technical characteristics of the desired equipment
- requirements to the street lighting control system
- technical calculations with 3D models

With terms of reference ready, you can now announce a tender for selection of the organization that will develop project design documentation. Ask the contractor to submit project design documentation for your approval section by section, as soon as each section is ready. After your final approval of the whole document, the contractor needs to submit the project design documentation to the state expert appraisal and state environmental expert appraisal.

More on the state expert appraisal:

More on the state environmental expert appraisal:

HOW DID WE DO IT IN POLOTSK?

Polotsk Sustainable Energy Group (PSEG), which includes representatives of various city departments and subordinate organizations, worked on the ToR for the development of the project design documentation. Next, we conducted an open tender to select a contractor for development of the project design documentation.

Originally, we had planned that the design planning step would take six months; in fact, it took us almost a year to overcome all challenges and receive all required approvals.

WHAT WERE THE CHALLENGES?

Contractors who were developing the project design documentation were not completely ready to work with EU standards in the area of public lighting and thus were not familiar with the relevant legal framework.

A major mistake of the contractor was skipping the state environmental expert appraisal and submitting the documents directly for the state expert appraisal. The contractor also failed to seek the approval of other governmental bodies such as Energonadzor (Electric Inspection Service), Energosbyt (Electricity Supply Company), Beltelecom (telecommunication company), as well as organizations that regulate road traffic. Besides, there were certain drawbacks and errors in the submitted documents; no wonder that the state expert appraisal did not grant their approval. All in all, approval of the project design documentation took more than two months – much longer than we had originally hoped for.

One more cause for delay had to do with external appraisal of our project design documentation. External experts commissioned by the Covenant of Mayors – Demonstration Projects (CoM-DeP) Programme examined our lighting designs and 3D models and ruled out that the quality of public lighting in Polotsk is suffering due to the lack of street lights. To improve the quality of public lighting, the experts recommended that we included more street lights in the project design documentation than we had originally planned. Once again, the deadline for the submission of the project design documentation had to be moved to accommodate these changes.

Another challenge had to do with the fact that public lighting modernization was to take place in the centre of Polotsk, which is a historical and cultural heritage area. Any works in these areas called for additional approval procedures, which was also time-consuming.

OUR RECOMMENDATIONS TO OTHER CITIES

As we mentioned before, we recommend making every effort to produce high-quality terms of reference for the development of the project design documentation. Participatory approach is of great help here: apart from the experts from the GorSvet department, make sure to engage architects, economists, department of traffic control and other stakeholders.

Be very mindful when choosing a contractor who will develop your project design documentation. An experienced organization with good references might be slightly more expensive, but it will be worth the money.

Make sure that your terms of reference for the development of the project design documentation include all characteristics of the equipment to be purchased; these characteristics need to correspond to the EU standards.

Finally, make sure to appoint responsible persons who will supervise public lighting modernization works and adjust this process, if and when needed.

NB! If you use grant funding to modernize public lighting, take time to study the donor's procurement rules. For example, some donors forbid to procure equipment produced in specific countries.


PIATRUS BROUKA STREET

STEP 3.
PROCUREMENT OF EQUIPMENT AND CONSTRUCTION WORKS

MAIN STEPS OF PUBLIC LIGHTING MODERNIZATION:
POLOTSK CASE STUDY

WHAT IS IT AND WHY DO IT?

Once the project design documentation has been approved, you can start with the procurement. The first thing to do is to develop terms of reference. The terms of reference has to comply with the legislation of the Republic of Belarus or, in case you use grant funding to finance street lighting modernization, with the rules of the donor.

There are two ways to conduct procurement. The first one is to hire a general contractor who will be responsible for providing all of the equipment and installation services necessary for the street lighting modernization project. The second way is to conduct two independent procurement procedures – one for the purchase of equipment and another for construction and installation services.

HOW DID WE DO IT IN POLOTSK?

In Polotsk, we had to go with a second variant because we used different types of financing for our street lighting modernization project. We had EU funding to procure lighting equipment, while construction and installation works were financed from the district budget.

Because we used EU funding to purchase lighting equipment, we conducted an international open tender procedure in accordance with the Practical Guide to Contract Procedures for EU External Actions (PRAG). The procedure took more than three months but resulted in cancellation. The number of bids was low; some of the bidders did not pass administrative check, while others submitted financial proposal that was far higher than our available budget.

After a failed attempt at conducting the procedure according to the PRAG, we discussed the situation with the donor and received authorization for conducting the procurement procedure in accordance with Belarusian legislation, through publication on the e-procurement platform www.icetrade.by.

As for the construction and installation works, we had initially procured them in line with Belarusian legislation.

All in all, we spent almost a year finalizing all procurement procedures in Polotsk.

WHAT WERE THE CHALLENGES?

It took us seven attempts to successfully finalize all procurement procedures. All previous tenders had to be cancelled due to the insufficient number of bidders or inflated financial proposals.

What was the reason? First of all, our procurement was of a particularly large scale, with more than 1,500 street lights to purchase, along with light poles, brackets, automatic light control boxes, miles of cabling and many other items. Next, we wanted the equipment to have high technical standards and included these requirements into the project design documentation. Finally, one of our requirements was that the bidder should supply both street lights and the lighting control system, so that we have fewer problems integrating the new street lights into a common automated system. Some of the smaller-sized companies, including those from Belarus, could not undertake these obligations and therefore did not take part in the tender.

Still, our main challenge was the rule of origin. The rule of origin is a requirement of the European Union that prohibits purchasing equipment produced in certain countries, including China and Russia. It turned out that most of the lighting equipment present on the Belarusian market is of either Chinese or Russian origin. Even large European companies like Philips, Osram and Schneider Electric work with Belarus through their branches and factories in Russia.

OUR RECOMMENDATIONS TO OTHER CITIES

If you opt for modern equipment with high technical standards, finding a supplier might pose a problem.

It is always a good idea to invite potential suppliers for an information meeting so that you can go through each and every requirement and explain the specifics.

If you procure different types of the street lighting equipment separately, give some thought to what you will include in each lot. For example, street lights and cables might look like they should go in one lot, but in fact they are produced by different companies, so better split them up into different lots.

We also recommend that your equipment supply contract should contain a condition that gives you a right to randomly choose a certain amount of equipment items from the batch and send them for independent laboratory testing in Belarus. This will give you chance to cross-check whether actual characteristics of the equipment to be supplied correspond to those declared by the supplier.

During the procurement, you may realize that you are running out of money. If this happens, we recommend dividing the modernization procedure into several implementation phases and start to procure equipment and services for those implementation phases which fit into your budget. This might be relevant for grant projects where you usually have to estimate the budget for the equipment and construction services before you conduct inventory and energy audit. After you conduct these steps and develop the project design documentation, you might find that you need more equipment and services, which will result in greater costs.

STEP 4.
INSTALLATION OF EQUIPMENT

MAIN STEPS OF PUBLIC LIGHTING MODERNIZATION:
POLOTSK CASE STUDY

WHAT IS IT AND WHY DO IT?

When you have a general contractor for the supply and installation of equipment, you can start the works right away. However, if you have procured lighting equipment separately, now you have to conduct another tender to select subcontractors who will perform construction and installation works.

Construction and installation works will be different for each object; however, in most cases they will include removing old lamp posts and street lights, installing new ones, laying the wires, setting up automatic control boxes, and commissioning.

Construction and installation works are subject to three types of supervision:

/ **technical supervision.** To select a subcontractor for this type of supervision, you will need to conduct a tender

/ **on-site designer supervision.** This type of supervision is usually performed by the organization that had developed the project design documentation

/ **construction supervision.** This type of supervision is a responsibility of a structural subdivision of the Department for Construction Control and Supervision in the Republic of Belarus

HOW DID WE DO IT IN POLOTSK?

Construction and installation works for modernization of public lighting in Polotsk started in April 2019. The works took longer than expected because it turned out that the project design documentation required addenda and adjustments.

WHAT WERE THE CHALLENGES?

Once the works had started, it turned out that the project design documentation did not include all works and materials required for the task, such as works for disassembly and removal of traffic lights and road signs. Not only do these works require time and money; to conduct them, you need to get an approval from the State Department of Traffic Control and introduce adjustments to the project design documentation. Authors of the project design documentation also failed to include all lining and support materials, so we had to conduct a separate procurement procedure for those.

Another challenge was that while we were working on the project design documentation and procurement procedures, the location of certain underground pipelines had changed. As a result, there were cases when the workers would start digging the ground to install the lamp post and would discover a number of unaccounted cables that had not been mentioned whatsoever in the project design documentation. The subcontractor had to put the works on hold to identify what those cables were and who they belonged to.

Finally, at times the weather presented a challenge and affected our installation time schedule. Heavy rain or frost would keep the subcontractor from installing street lights, laying the cables and planting lamp posts.

OUR RECOMMENDATIONS TO OTHER CITIES

We have said it before, and we will say it again – keep a watchful eye on your project design documentation and make sure it comes out well. The better your project design documentation, the fewer problems you will have during the installation phase.

Make sure to check whether the company whom you subcontract for construction and installation works has enough technical and financial capacities to keep up with the time schedule and meet all deadlines. At times, when subcontractors have too many commissions and lack current assets, they might fail to meet the deadlines.

Always be in charge of the installation process; make sure to monitor and supervise the works on-site.

We do not recommend scheduling construction and installation works for autumn and winter due to the weather risks.

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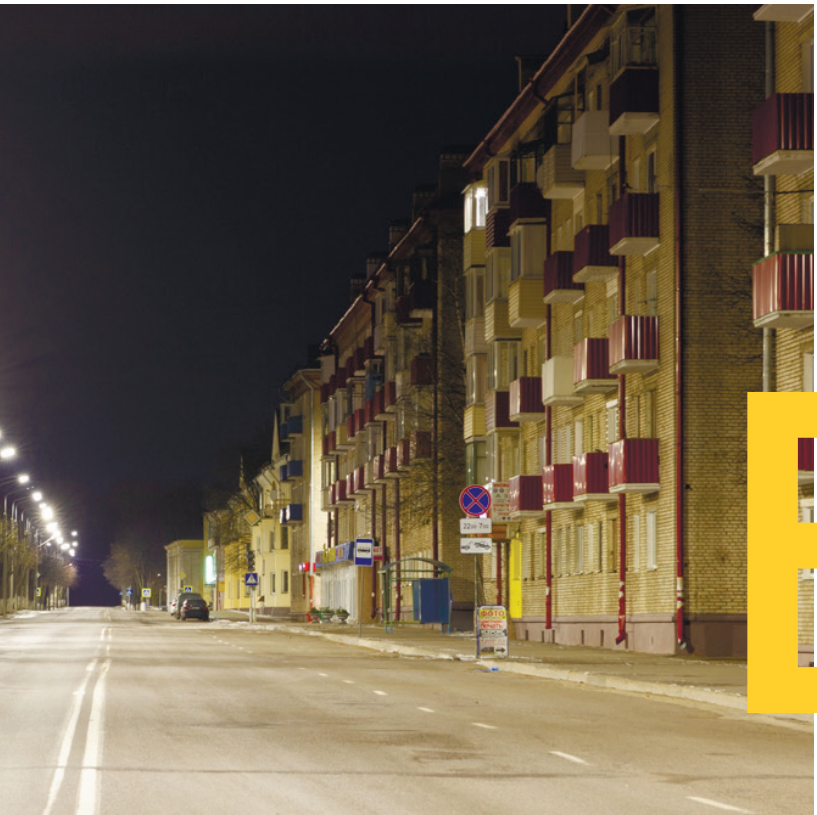

A. BEFORE PUBLIC LIGHT MODERNIZATION

B. AFTER PUBLIC LIGHT MODERNIZATION

STEP 5.
MONITORING PERFORMANCE OF PUBLIC LIGHTING

MAIN STEPS OF PUBLIC LIGHTING MODERNIZATION:
POLOTSK CASE STUDY

WHAT IS IT AND WHY DO IT?

This is where you monitor how your new lighting equipment works by measuring the intensity of illumination, energy consumption, uniformity of light distribution, colour rendering index and other indicators. The best way to monitor public lighting performance is through an automated lighting control system. Do not forget to make baseline measurements before modernization; comparing baseline figures with newly collected measurements will let you evaluate to what extent the quality of public lighting has improved and energy consumption has decreased.

HOW DID WE DO IT IN POLOTSK?

Before we started modernization, we collected baseline measurements of the quality of lighting and energy consumed by public lighting as part of the energy audit. To measure these indicators after the installation, we will use the automated lighting control system which appeared in Polotsk thanks to the PubLiCity project. The system will make it possible to monitor and adjust various lighting parameters of each particular street light in the network.

WHAT WERE THE CHALLENGES?

We had planned that we would monitor new public lighting for at least one year within the PubLiCity project in order to test the new equipment in real life, introduce necessary adjustments and finish the project with a new street lighting system that is completely tailored and tuned. But since we spent more time on the development of the project design documentation and installation of equipment, we had only two months left for monitoring as part of the PubLiCity project. The only thing we could evaluate in a time so short was to see to what extent the level of illumination had increased and the amount of energy consumed by public lighting had decreased in comparison to the baseline pre-modernization measurements. With the PubLiCity project coming to an end, detailed monitoring of the public lighting performance becomes the task of the GorSvet department of the municipal unitary enterprise “Municipal Utility Board of Polotsk”.

OUR RECOMMENDATIONS TO OTHER CITIES

Our main recommendation is to make as many baseline measurements as you can during the inventory and energy audit phase. If you do not have this information, you will have nothing to compare new lighting parameters with. Even if you do not plan to introduce the automated lighting control system, we strongly suggest that you at least use a lux meter and measure the level of street illumination before modernization. Take measurements and calculate the minimum, mid and maximum level of illumination on a particular street segment. Then, when you have your new lighting equipment installed in this street, repeat the measurements and compare the results.

A.

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A. BEFORE PUBLIC LIGHT MODERNIZATION

B. AFTER PUBLIC LIGHT MODERNIZATION

Monument to architect John of Polotsk

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B.


ПОЛО

ROUNDABOUT NEAR MANEZH SHOPPING CENTER AND BAHDANOVIČ STREET

STEP 6.
COMMUNITY OUTREACH AND AWARENESS RAISING

MAIN STEPS OF PUBLIC LIGHTING MODERNIZATION:
POLOTSK CASE STUDY

WHAT IS IT AND WHY DO IT?

Community outreach is vital on every stage of the public lighting modernization process. At the end of the day, the reason you modernize public lighting is to make your city brighter, safer and more comfortable for its residents.

We recommend commencing community outreach early during the inventory. Start by analysing requests and complaints filed by citizens in relation to public lighting, or better engage in a dialogue to find out how people assess the state and quality of public lighting. This information will help you to identify “soft spots” and exact locations where new lighting is most needed.

Modernization of public lighting is much more than just replacing the street lights; it implies close interaction with urban environment. Does the new lighting fit well into the existing urban environment? Does it change this environment? Does it make the streets safer and more convenient for people? You will not be able to answer these questions without asking people first. And what is even better is to reach out to people and propose that they join you in search of answers.

Finally, if your aim is not only to modernize the quality of public lighting but also to reduce CO2 emissions, you should engage in awareness raising activities to inform people how they can help to decrease the carbon footprint of their city.

HOW DID WE DO IT IN POLOTSK?

At the early stage of the project, during the inventory and energy audit phase, we conducted a public opinion survey in Polotsk to find out whether the residents are content with the quality of public lighting. The survey ran for a whole month; the respondents had an option of either taking part in the survey online or filling in a printed questionnaire. Residents of the streets that would be subject to the lighting modernization got printed questionnaires in their mailboxes with a pre-paid envelope and a request to send the filled-in questionnaire back to the city administration; we also distributed the printed questionnaires through the city organizations and businesses. We managed to collect more than 3,000 responses, analyzed the results and used them to inform development of the technical and project design documentation.

Results of the survey:

The survey helped us to identify the streets that were in desperate need of new lighting and the streets where the number of street lights was not enough. After the modernization, we ran the survey again in order to assess whether the people of Polotsk had become more content with the quality of public lighting.

To engage residents of Polotsk into urban environment planning, we cooperated with the Centre for Urban Studies and Design, a local community of young architects, to conduct a student architecture forum Arkh.Pro.Svet in 2016. As a result of the forum, 40 students from all over Belarus, with 19 well-known architects as their mentors, developed concepts for creative lighting of the city's downtown area, tourist sights, city entrances, and suburban neighbourhoods. Thanks to the forum, now the city authorities have a portfolio of model projects that they can use to develop actual public lighting projects and pitch for investors and donors. Later, in 2018, we held a nation-wide call for ideas and a Light Hackathon for students to collect concepts for light installations that could appear in the city's public spaces. Some of the ideas came to life as part of the project in September 2018, during the Polotsk Light Festival.

Results of the student forum Arkh.Pro.Svet:

Every June since 2012, Polotsk has been hosting Energy Days as part of the EU Sustainable Energy Week. Energy Days are annual city-wide series of creative events to promote energy efficiency and transition to clean energy among local residents, businesses and organizations. Each year we made our best to come up with completely new and original events, ranging from quests, quizzes and social media contests to thematic workshops and field trips to the Polotsk Hydro Power Plant. In 2016, we celebrated Energy Days during a city picnic in a park, which we decorated with Light Spheres made from recycled materials. To create these unique decorative street lights, we partnered with the Novopolotsk Centre for Urban Studies and Design, and in 2017 we continued our cooperation to hold a summer architectural school for young people interested in energy saving and eco-friendly mode of life.

In 2018, our brightest Energy Days took place in the form of the Polotsk Light Festival – a 3-day celebration of urban light art with focus on energy efficiency, which was the first event of this kind in Belarus. To gather ideas for this event, the project team visited the world famous Lyon Light Festival for inspiration. Polotsk Light Festival gathered more than 30,000 guests who came to see light installations in public spaces and take part in city-wide events dedicated to the topic of light.

Here you can read more about the Polotsk Light Festival in 2018:

ENERGY DAYS IN POLOTSK

WHAT WERE THE CHALLENGES?

Although we managed to collect quite a lot of responses during the public opinion survey, certain dissemination methods proved to be less effective than the others. Mailbox dissemination of questionnaires was costly and time-consuming but yielded the least number of responses. We collected more responses through an online survey tool, but dissemination through city businesses and organizations ensured an even bigger return rate, so we recommend considering this dissemination channel if you decide to run a public opinion survey.

In terms of stakeholder engagement, it was not always easy to create a meaningful dialogue between local authorities and community activists who are enthusiastic about improving urban environment. Even though local authorities responded well to the creative ideas put forth by young architects, they would sometimes forego or change these ideas due to the lack of finances or dubious technical feasibility of such projects. To avoid mutual disappointment and frustration, it is extremely important to keep up the dialogue.

As for awareness raising, our main challenge was that energy efficiency is not something that people are particularly passionate about. Not everyone believes that saving energy in everyday life has long-term impact on the state of environment. For most people, an opportunity to cut on energy bills is the most compelling argument for saving energy, so you might consider using this argument when planning your communication campaigns.

Conduction of the Polotsk Light Festival was a major challenge, too. It was too ambitious a plan given the extremely low budget that we had, which was about 100 times less than the budgets of well-known European light festivals.

OUR RECOMMENDATIONS TO OTHER CITIES

Our first advice is to engage in a meaningful dialogue with the residents of your city through public opinion surveys, information meetings, public discussions, and exchange of opinions in social networks. The benefits of this activity are twofold: you will collect a lot of useful and pressing information, and the citizens will feel that their voice is being heard. Try to engage your community through social media and cooperate with local mass media, such as online magazines and city news portals.

For those of you who want to hold a light festival in your city, we recommend learning from the experience of other cities and relying on young local architects and designers. If you want to know more about how to organize a light festival, follow this link for our detailed list of recommendations that we prepared based on our experience in Polotsk:

LIGHT FESTIVAL IN POLOTSK

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