

Workshop 1:

TO OPTIMIZE THE ENERGY CONSUMPTIONS: FOCUS ON THE STREET LIGHTING

1. Welcome

Good morning, welcome you warmly.

It is a great honor to be here and talk about how to optimize the energy consumption.

My name is Dariusz Makowski.

I'm working as Deputy Head of Investments at the Town Hall in Rabka-Zdrój.

Today I would like to tell you a few words about street lighting in our city.

2. A few words about Rabka...

Rabka-Zdrój is a town in the Małopolska province, district of Nowy Targ, the municipality of Rabka-Zdrój. It is located in the Rabka Valley, at an altitude of 500-560 meters above sea level at the outlet of streams Poniczanka, Słonka and Skomielnianka to Raba.

The name was first mentioned, citing a document of Boleslaw the Shy from 1254, Jan Długosz in the form of "Sal in Rabschycza", suggesting that also then Rabka brine were known and probably used for the Cistercian monastery's needs, in which areas were Rabka.

Rabka is called the "City of Children of the World". This title in 1996 at the request of the International Chapter of the Order of the Smile gave the city the Governor of Małopolska. In the same year created in Primary School No. 2 in Rabka Museum of the Order of Smile, now moved to new premises in the area of family amusement park "Rabkoland". There is also the Museum of Records and Curiosities.

3. Legal Aspects

Street lighting as own task of municipality:

Art. 18 paragraph. 1 Energy Law states that to the own tasks of the municipality in terms of energy supply should be planning public lighting and roads located within the municipality.

Financing of that lighting, according to the Act, need to be construed as financing the costs of electrical energy consumed by lighting points and the cost of their construction and maintenance.

Lighting costs of the roads in the municipality, the municipality shall be borne entirely from its own budget. At the same time is obliged to take care of street lighting cost rationalization (ie. the costs associated with the modernization and the relevant technical and operational quality).

Duty of funding of street lighting is associated with:

- The need to ensure the financing of electricity supply for lighting purposes;
- Financing the maintenance of the lighting in the right condition.

4. Strategic objectives

Tasks related to the modernization of the lighting were included in the Municipal Development Strategy of Rabka-Zdrój for 2014-2020 under the operational objectives and tasks of the group within the area of spatial planning.

Operational objective: Public space is high quality and has a tourist and spa features through the implementation of tasks:

- Modernization and development of the lighting of roads and squares;
- Improving the safety of routes (construction of sidewalks, street lighting).

Expected results: Modernization of street lighting on the section approx. 2 km per year.

5. Plans for street lighting

Lighting retrofit is expensive and exceeds the financial capacity of municipality. The basic system modernization involves the exchange of existing fixtures and energy-efficient light sources.

Fixtures of this type allow a much larger amount of light with reduced electricity consumption.

The most important argument in favor of modernization is the ability to reduce costs for electricity and maintenance of lighting points.

The basic objectives of the project to modernize street lighting are as follows:

- Increase the safety of vehicular traffic and pedestrians on the road,
- The delivery of measurable financial savings by reducing the installed capacity of the lighting,
- Reduction of energy consumption in the entire city street lighting system,
- Upgrading lighting
- Improvement of the quality and standard, improving external image of the city.

Aside from the obvious economic benefits, the rationalization of the use of energy for street lighting also gives significant, visible on a global scale ecological effects.

The overall size of the ordered electric power for the needs of street lighting in the country a few hundred MWh and energy consumption is calculated in millions of MWh.

Thus, the reduction of the size by nearly half is a significant reduction in emissions resulting from the production of electricity and reduce the consumption of primary fuels.

According to the National Fund for Environmental Protection and Water Management in our country is currently about 3.3 million street lights, of which 65% are sodium lamps. Others are mercury, incandescent, neon lamps, and more.

All of these light sources have a capacity of only 40%, so 60% of the energy used by them is lost "on the way".

Replacing the lighting of the LED can this completely avoided as has much better performance. Investments in energy-efficient LED lights are also very cost effective due to the fact that it has a very short period of cost reimbursement.

Currently, under the care of the Municipality Rabka-Zdrój is 2285 street lighting luminaires.

In 2001, the municipality Rabka-Zdrój exchanged all mercury lamps to sodium lamps.

Municipality Rabka-Zdrój has luminaires mounted on poles Belonging to the company's current distributor TAURON DISTRIBUTION SA, leases 1142 posts.

Since 2009, the municipality of Rabka-Zdrój had added 624 lamps, which accounted for nearly 37.5% of all the lamps, which the municipality had in 2009.

6. Plans

Modernization of street lighting is already yielding savings.

Energy savings up to 24 thousand showed the first utility bills received after the modernization of street lighting in municipality. Modernization of street lighting took place in December 2011.

857 oldest lamps were replaced with energy-efficient, with limited energy consumption during the night, 46 lamps was built, where there was no lighting, and 101 lamps have been liquidated from roads where there were too many of them.

These actions were aimed at systematizing lighting, improving quality, mainly electricity savings. Achieving the last target - confirm the electricity bills for January and February of this year.

It is scheduled to be replaced with energy-saving light bulbs.

The proposed replacement of the sodium street light bulbs.

LED ST street light bulb 60W (E40 thread) - in terms of light distribution and spectral analysis is the most suitable replacement for 250W sodium bulbs.

Technical Specifications

- Nominal power: 60 W
- Real power consumption: 64 W
- Voltage: 230 V
- Brightness: 5200 Lm
- Light output: 86.7 Lm / W
- Viewing angle: 150 °
- Dimensions: Ø105x280
- Weight: 1.375 kg
- Certificates: CE, RoHS
- Warranty: 2 years

The assumptions underlying the calculation:

- Daily average burn time: 11.83 h
- The cost of 1 kWh of electricity: 0,48 zł gross - having regard to the night rate of the operator, administrative fees, and transmission of energy,
- Two replacement bulbs sodium in 10 years of calculation (every 5 years)

In the energy consumption of the sodium vapor lamps consists of a collection of light sources (250) and the gland (30).

Total 280 W. LED replacement for consumption is 64 W.

Calculations:

Burn time: 365 days x 11.83 h = 4 318 h.

Annual consumption of sodium bulbs: 4 318 h x 280 x 100 pcs. = 120 904 kWh

The annual cost of lighting operating of sodium bulbs: 120 904 kWh x 0,48 zł = 58 033.92 zł

Annual consumption of LED bulbs: 4 318 h x 64 x 100 pcs. = 27 635.20 kWh

The annual cost of operating LED: 27 635.20 kWh x 0,48zł = 13 264.90 zł

Annual savings: 93 268,80 kWh which is 44 769.02 zł per year.

We obtain approx. 70% reduction in energy consumption, thereby reducing costs.

With the unit price of 709 zł gross - the purchase cost of 100 pcs. LED lighting will be:

70 900,00 zł gross.

With an annual savings of 44 769.02 zł return on investment will be already in the 2nd year of use.

Warranty is 24 months - the risk the investor is therefore eliminated.

7. Footnotes

<http://www.parowozy.pl/skansen/>

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Municipal Development Strategy of Rabka-Zdrój for 2014-2020

www.leduj.pl

www.wikipedia.pl