



European Bank  
for Reconstruction and Development



This project is funded  
by the European Union

C/M/S/

Law . Tax

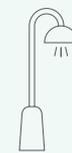


# Public lighting ESCO project

[www.wb-reep.org](http://www.wb-reep.org)



At the beginning of 2017, the city of Ludbreg in Croatia modernised its street lighting system by replacing 733 lamps – 60% of all street lights in the city – with LED luminaires. Following an energy service company (ESCO) approach, the city outsourced the technical risks and financing of the project to the private bidder with the most economical bid proposal. Technical assistance from the EBRD, as part of its EU-funded Regional Energy Efficiency Programme (REEP), supported the investment, which was also co-financed by the Croatian Environmental Protection and Energy Efficiency (EPEE) fund.



NUMBER OF LIGHT  
POINTS REPLACED

733



ENERGY SAVINGS

69%

(360,800 kWh/year)

## Regional Energy Efficiency Programme

The EBRD's REEP helps public and private organisations to identify, prepare and finance their energy efficiency investments. Technical assistance and grant elements under REEP are funded by the EU's Western Balkans Investment Framework (WBIF). REEP follows a pragmatic operational and financing approach and is built on a combination of the following pillars:

- 1. Policy dialogue** to support the development of an enabling regulatory framework and of contract templates that facilitate sustainable energy efficiency investments.
- 2. Technical assistance** to support project identification, preparation and implementation and to help build the capacity of public authorities (ESCO clients).

- 3. Financing instruments and grant elements** for specific energy efficiency or renewable energy investments with clear estimates of energy savings and of reductions in carbon emissions.

More information and examples of these activities and REEP contact details are available here: [www.wb-reep.org](http://www.wb-reep.org)

## Ludbreg, Podravina

Ludbreg is a small city in Croatia, located in the Varazdinska county, consisting of 13 villages. Religious tourism and agriculture are the main activities, and the local economy is well positioned for ongoing development, thanks to its favourable geographical position close to the motorways and vicinity of central European countries such as Austria and Hungary. Moreover, local taxes and land costs are relatively low. The municipality already has three established entrepreneurial zones for business development, while the fourth zone is under preparation.

In total, the city of Ludbreg has 1,239 street lights in use. The oldest fixtures date back to the second half of the 20th century. Most of the current lights were installed before the 1990s and use mercury and old sodium technology.



## Project description

Ludbreg's old and inefficient street lighting system meant high energy and maintenance costs. In 2016, the municipality decided to modernise the system, opting for an ESCO model via public tender. The city authorities used technical assistance from the EBRD to provide support for the tender process, as part of an EU-funded REEP. The project was co-financed by the Environmental Protection and Energy Efficiency (EPEE) fund in the form of a capital expenditure (capex) grant of €123,142, representing 34% of the capital expenditure.

The technical specifications included the replacement of 733 old luminaires (of which 489 were equipped with inefficient mercury lamps and 244 with old sodium lamps) with 910 new LED lamps. The additional 177 new LED luminaires were installed on existing columns on which no luminaires were mounted previously, in order to meet the street illumination norms HRN EN 13201 required by the EPEE. The old fixtures covered 22 metering points, located

across the city area of Ludbreg. Nominal capacities of the new lamps are ranging from 15W to 92W, with a nominal lifetime of 50,000 hours. The project included the replacement of the entire luminaire; columns, cables, cabinets were not part of the works.

Total energy savings from the replacement of the lanterns including the additional ones was calculated at 360,800 kWh per year (or 69% on previous usage), in addition to annual CO<sub>2</sub> savings of 136 tonnes. Given a street lighting tariff of €0.087/kWh, the cost savings on energy use and maintenance combined were calculated at about €56,800 per year. Estimated capex has been €360,000. The new lanterns, with high efficiency optics, improve overall lighting quality and simultaneously reduce light pollution.

ENERGETSKA UČINKOVITOST – CEMENTARA and ENERGY PLUS, a local ESCO firm and a local LED manufacturer entering the ESCO market for the first



time, won the tender in a joint bidding. The energy performance contract (EnPC) period is 103 months (8.6 years) in total. The contract length is a result of a reduction in operation costs for the municipality of 49% already during the contract period. The project will use ENERGY PLUS luminaires with LED technology.

PROJECT IMPACT		
	Before project implementation	After project implementation
Light source	High pressure sodium/mercury	LED
Number of light points	733	910
Installed capacity	128 kW	40 kW
Energy consumption	524,800 kWh/year	164,000 kWh/year
Energy costs	€45,657/year	€14,268/year
Energy savings		69% (360,800 kWh/year)
Energy cost savings		€31,390/year
Maintenance savings		€24,400/year
Total cost savings (energy and maintenance)		€55,790/year
Contract duration		8.6 years
Reduction in CO <sub>2</sub> emissions		136 tCO <sub>2</sub> /year