

Interreg

CENTRAL EUROPE



Dynamic Light

European Union
European Regional
Development Fund

TAKING
COOPERATION
FORWARD



CitiEnGov - Final Conference
Ferrara, Italy 3rd - 4th April 2019



**Dynamic Light - Implementation of Dynamic Lighting
Pilot System in Town of Čakovec**



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BASIC INFORMATION



Project Dynamic Light

1st call of the Interreg Central Europe programme

17 project partners, 7 Central European countries

Croatian partners: MENEА and the Town of Čakovec

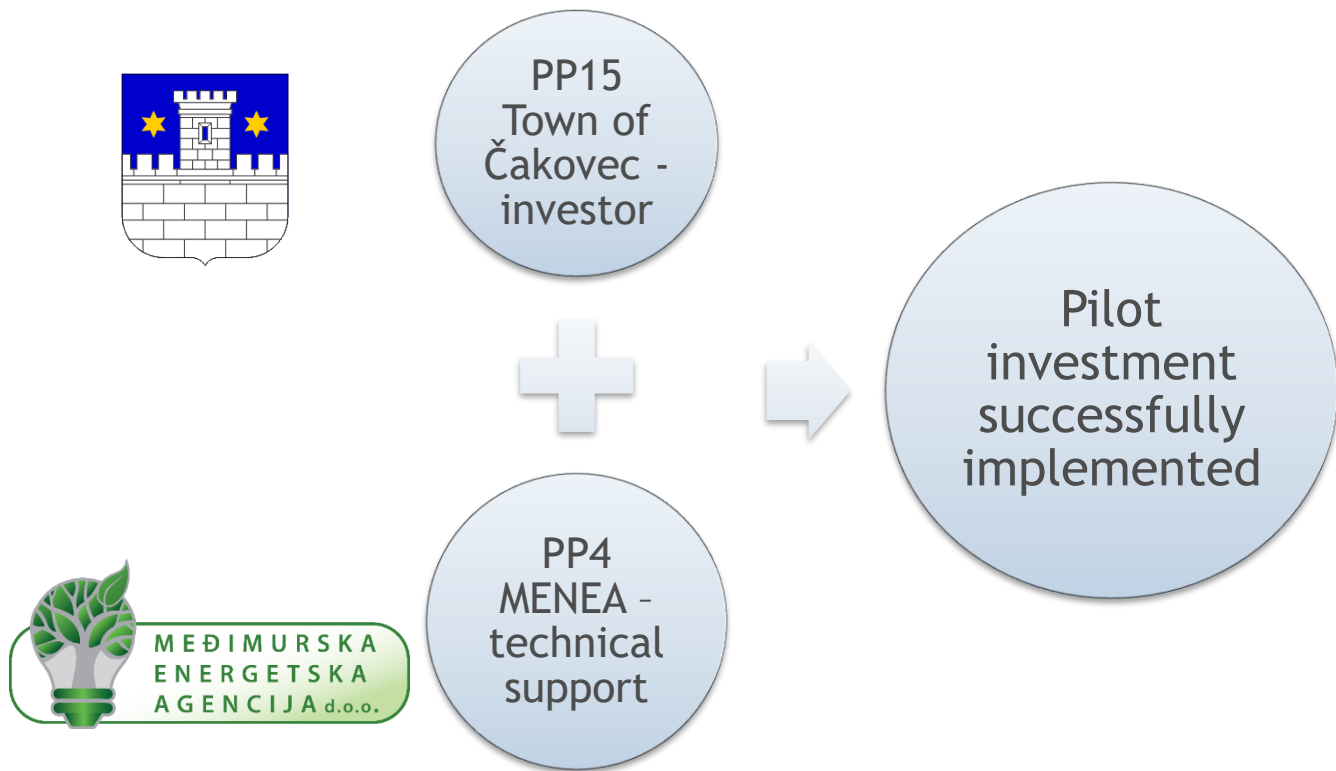
Budget: 3.501.660,97 €; Croatian partners: 242.280,00 €

Timeline of project implementation: 1.6.2016. - 31.5.2019.



BASIC INFORMATION

Project partners involved



BASIC INFORMATION

The Town of Čakovec

- North Croatia
- Bordering Slovenia and Hungary



- 15,200 inhabitants
- Area of 10 km²

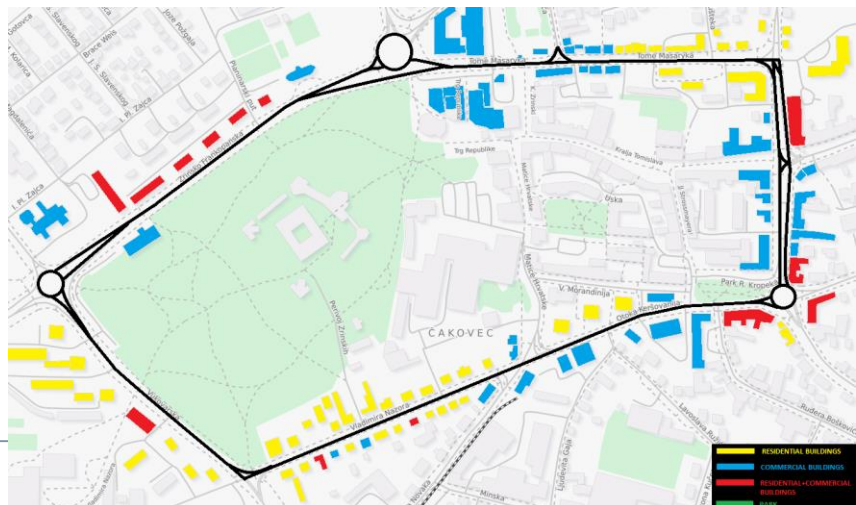


PREPARATORY STEPS FOR THE PILOT IMPLEMENTATION

Field survey of current state of public lighting - comparison with Energy audit

Stakeholder analysis

Area functionality - land use and zoning



GIS - based database developed for two districts in the Town of Čakovec

Strategy of the public lighting modernisation and decrease of light pollution in the Town of Čakovec

Action plan of the public lighting modernisation in the Town of Čakovec

PREPARATORY STEPS FOR THE PILOT IMPLEMENTATION



Analysis of the global lighting situation

Analysis of the specific lighting situation

Planning of intelligent light concepts for the pilot area



PILOT AREA IN THE TOWN OF ČAKOVEC

„Ring Čakovec” - Ivan Mažuranić Street, Eugen Kvaternik Square, Otokar Keršovani Street, Vladimir Nazor Street, Vukovar Street, Zrinski-Frankopan Street and Toma Masaryk Street



Hiring external experts

Coordination with external experts and
Town of Čakovec

Market research

Creating project documentation

Final meeting with Town of Čakovec
regarding project documentation

Technical support to Town of Čakovec for
process of public procurement





Intelligent light concept

Current geometry of the streets and lightning infrastructure

LED luminaires

System for control and management of public lighting

Wireless communication

Weather sensors (rain and fog)



Technical framework - lumminaires

TYPE 1

- 160 W
- 67 pieces
- 3000 K
- ≥ 90 lm/W
- 50,000 h
- IK 08, IP 66
- From -25°C to 35°C

TYPE 2

- 130 W
- 75 pieces
- 3000 K
- ≥ 110 lm/W
- 50,000 h
- IK 08, IP 66
- From -25°C to 35°C

TYPE 3

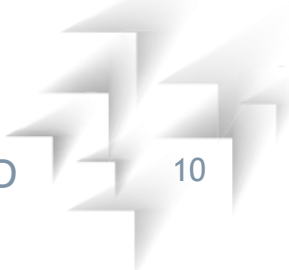
- 120 W
- 8 pieces
- 3000 K
- ≥ 110 lm/W
- 50,000 h
- IK 08, IP 66
- From -25°C to 35°C

Technical framework - control and management system requirements

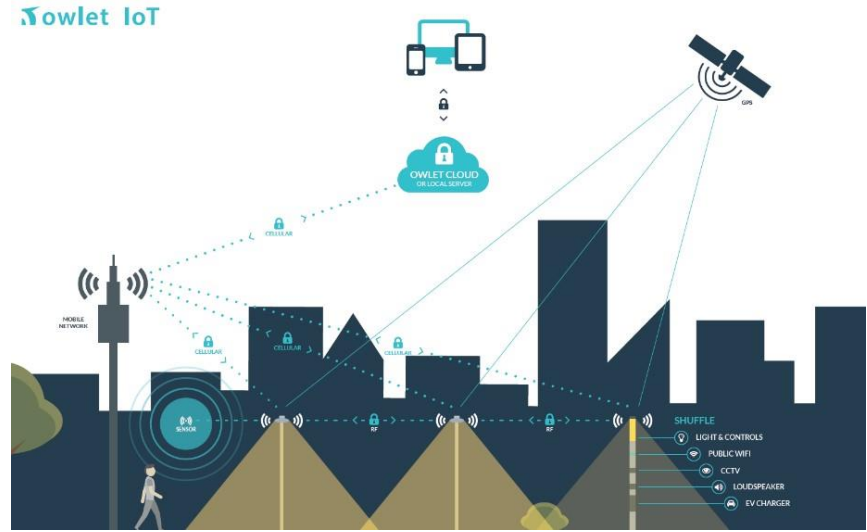
Cloud based platform

Wireless communication

Openness of the system to other manufacturers



PILOT INVESTMENT - TOWN OF ČAKOVEC



Schreder Axia 2.2

OWLET IoT

Rain and fog weather sensors

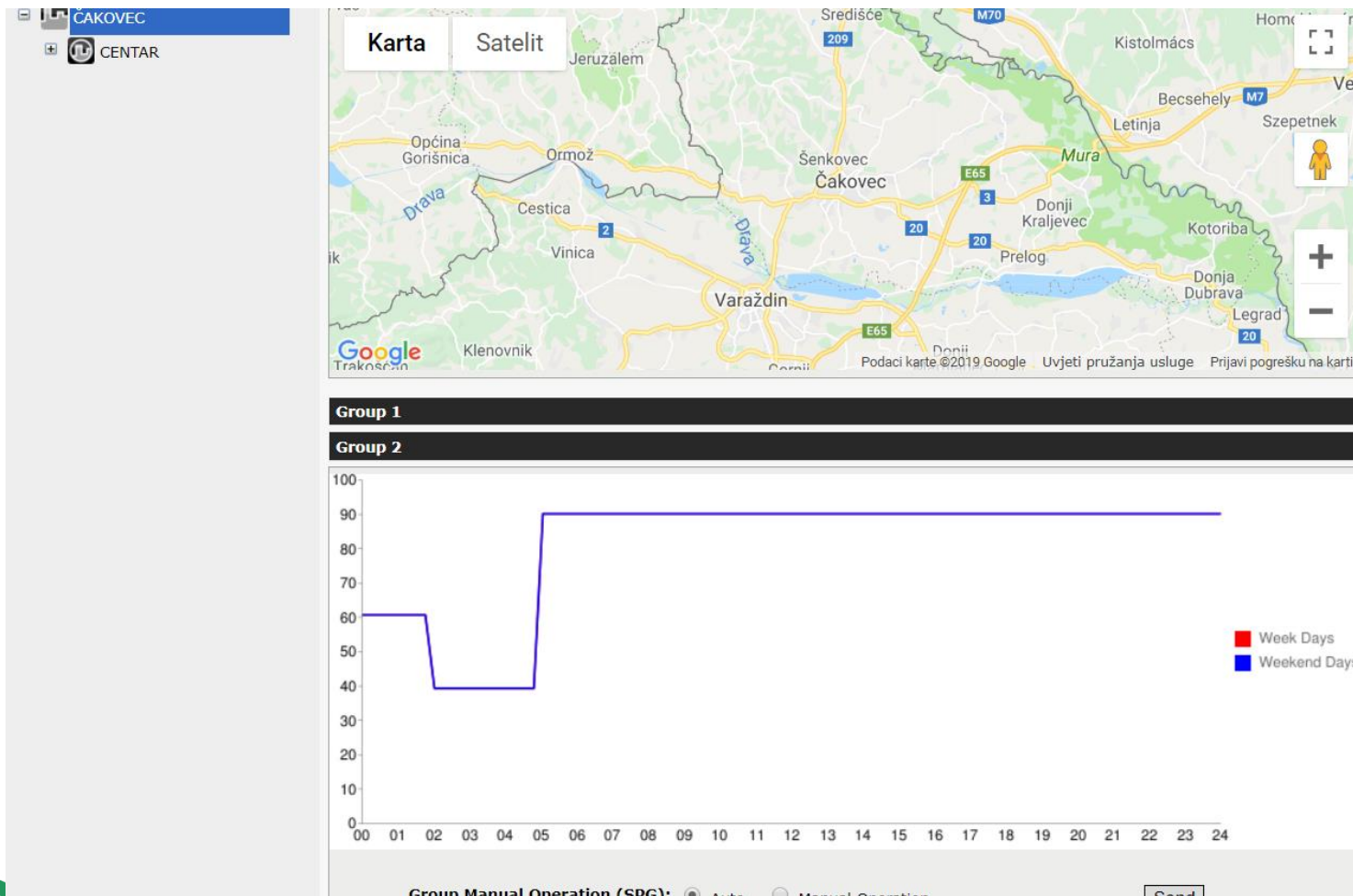


Implementation of works

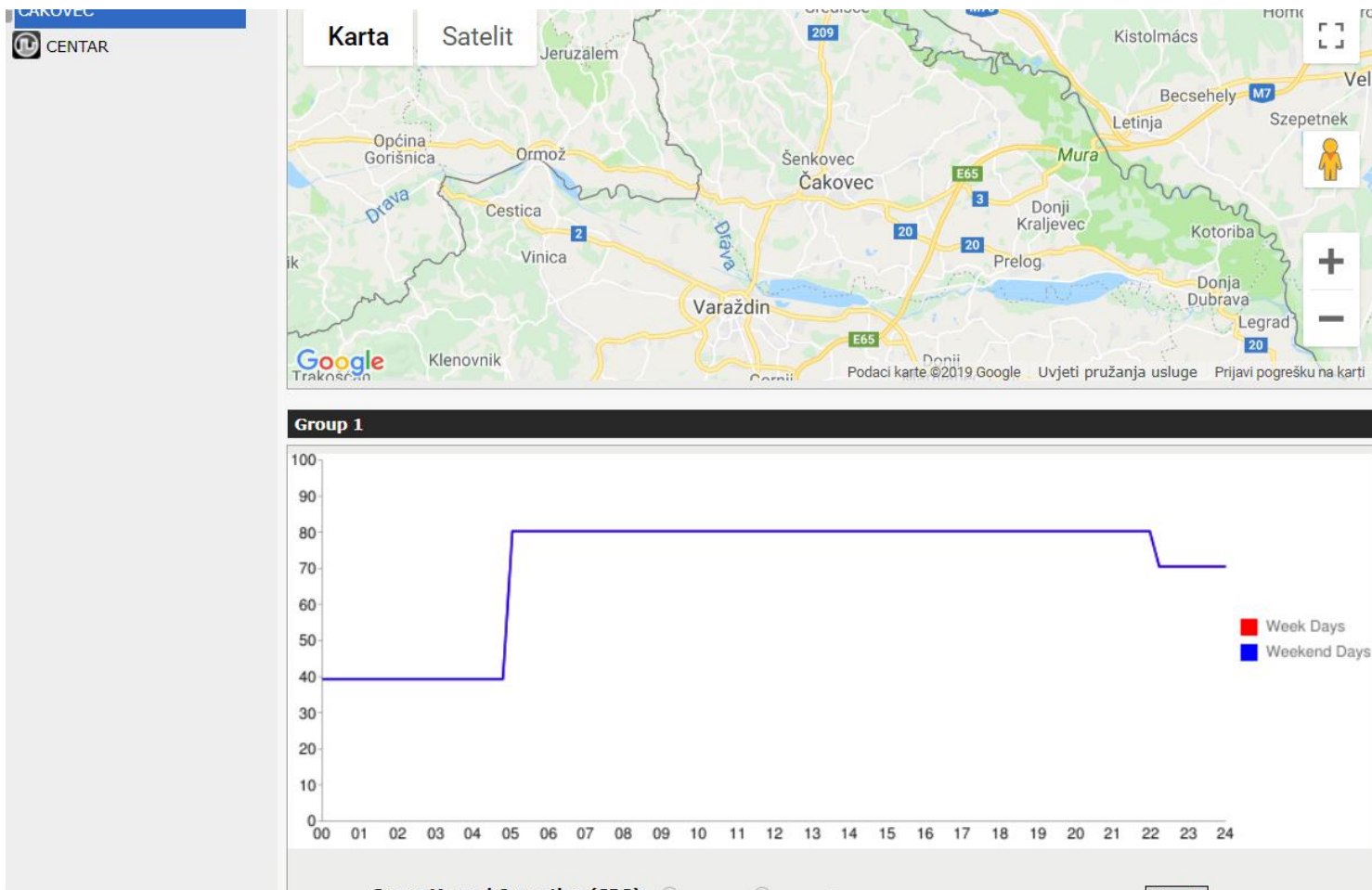


PILOT INVESTMENT - TESTING REGIMES

OWLET IoT interface - regime No.1



OWLET IoT interface - regime No.2



PILOT INVESTMENT - FIELD TESTING

Toma Masaryk Street

40%



70%



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PILOT INVESTMENT - FIELD TESTING



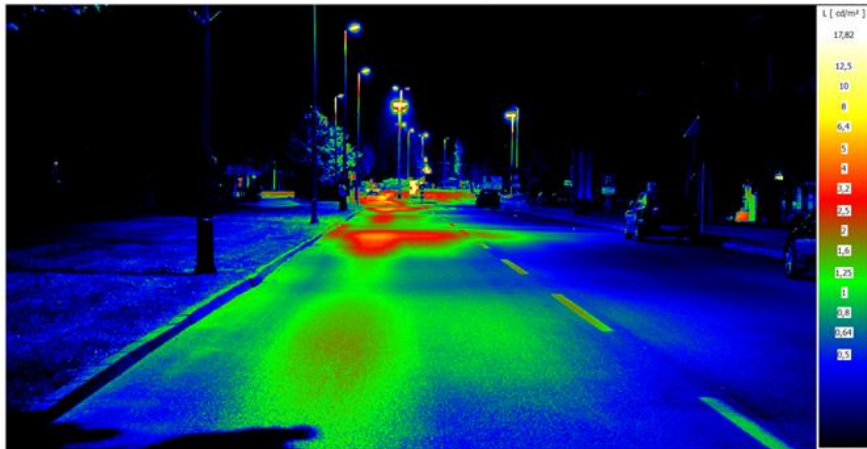
PILOT INVESTMENT - TOWN OF ČAKOVEC

Before

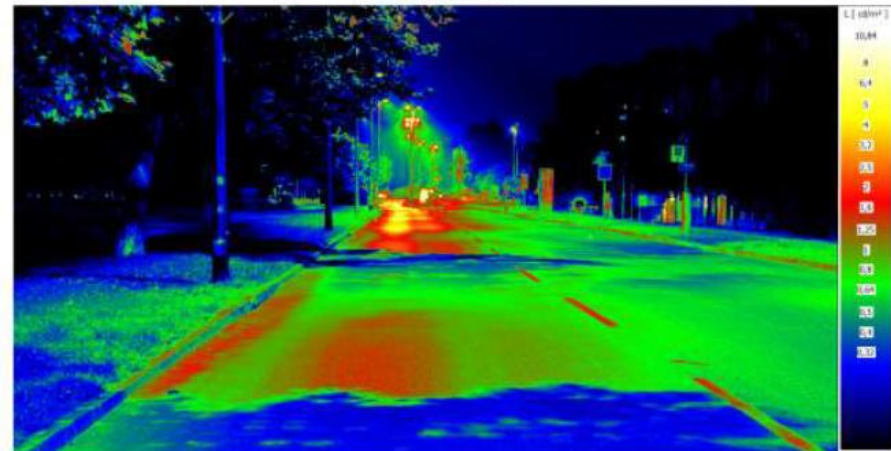
Measurements

After

Luminance image



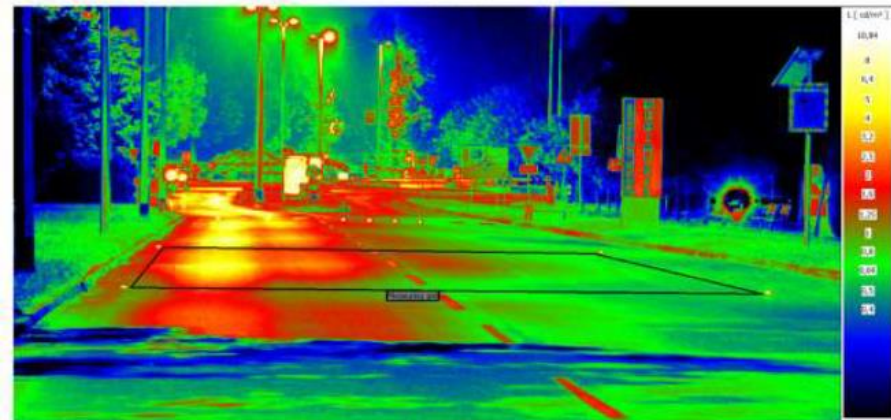
Luminance image



Measurement field



Mjerno polje



Comparative overview and expected results

	<u>Before</u>	<u>After</u>
Number of luminaires	160	150
Installed power kW	58.23	19.86
Annual consumption (kWh)	238,743.00	81,438.30
Annual costs (€)	28,070.00	9,574.50
CO ₂ emissions (tCO ₂ /a)	89.77	30.60



Financial overview

Actual investment

- 79.816,66 € (VAT included)

Annual savings

- 18.500,00€

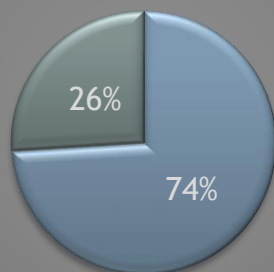
Return of investment

- 4,3 years



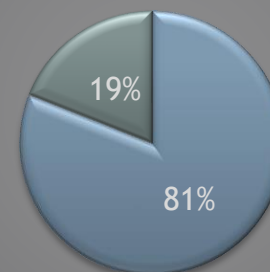
Satisfaction of end users of pilot area

Informed about light pollution concept?



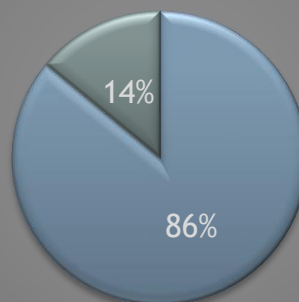
Yes No

Awareness on Dynamic Light pilot installation?



Yes No

Better illumination with LED lighting?

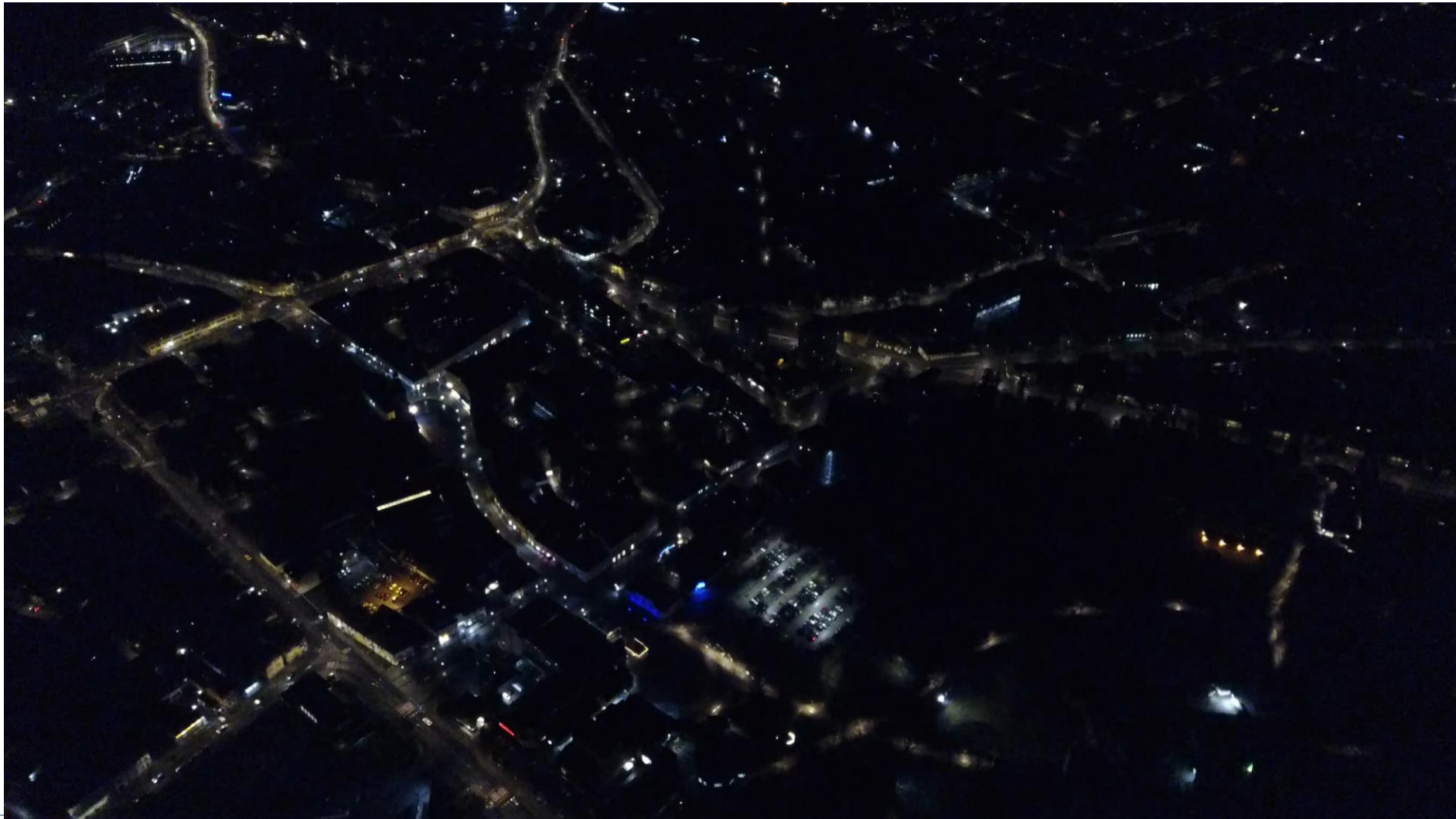


Yes No



PILOT INVESTMENT - TOWN OF ČAKOVEC

Aerial view



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