City of Ljubljana

Funded by the European Union

GreetGeo

Project EOL and the Energy Efficiency in City of Ljubljana

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- Zagreb – GreetGeo Final Conference
- 29. 10. 2026

Ljubljana is one of 100 Climate – Neutral and smart cities



LJ LJUBLJANA ON THE PATH TO CLIMATE NEUTRALITY BY 2030

Ljubljana is very centralised

Total average energy use in Ljubljana is

7.847.087 MWh/year

of which …

→ Electricity

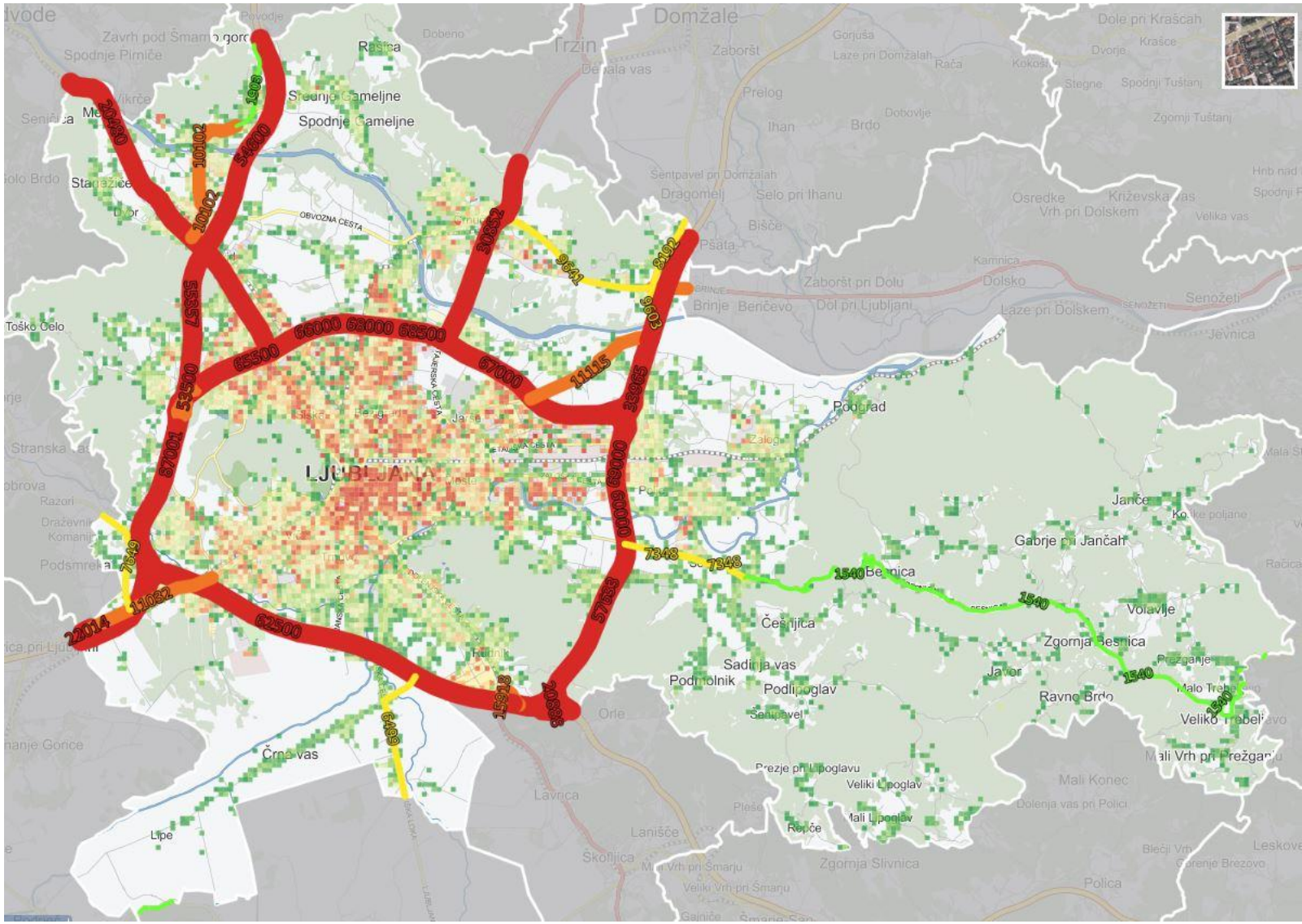
- 1.704.682 MWh/year (21,7%),

→ Heat

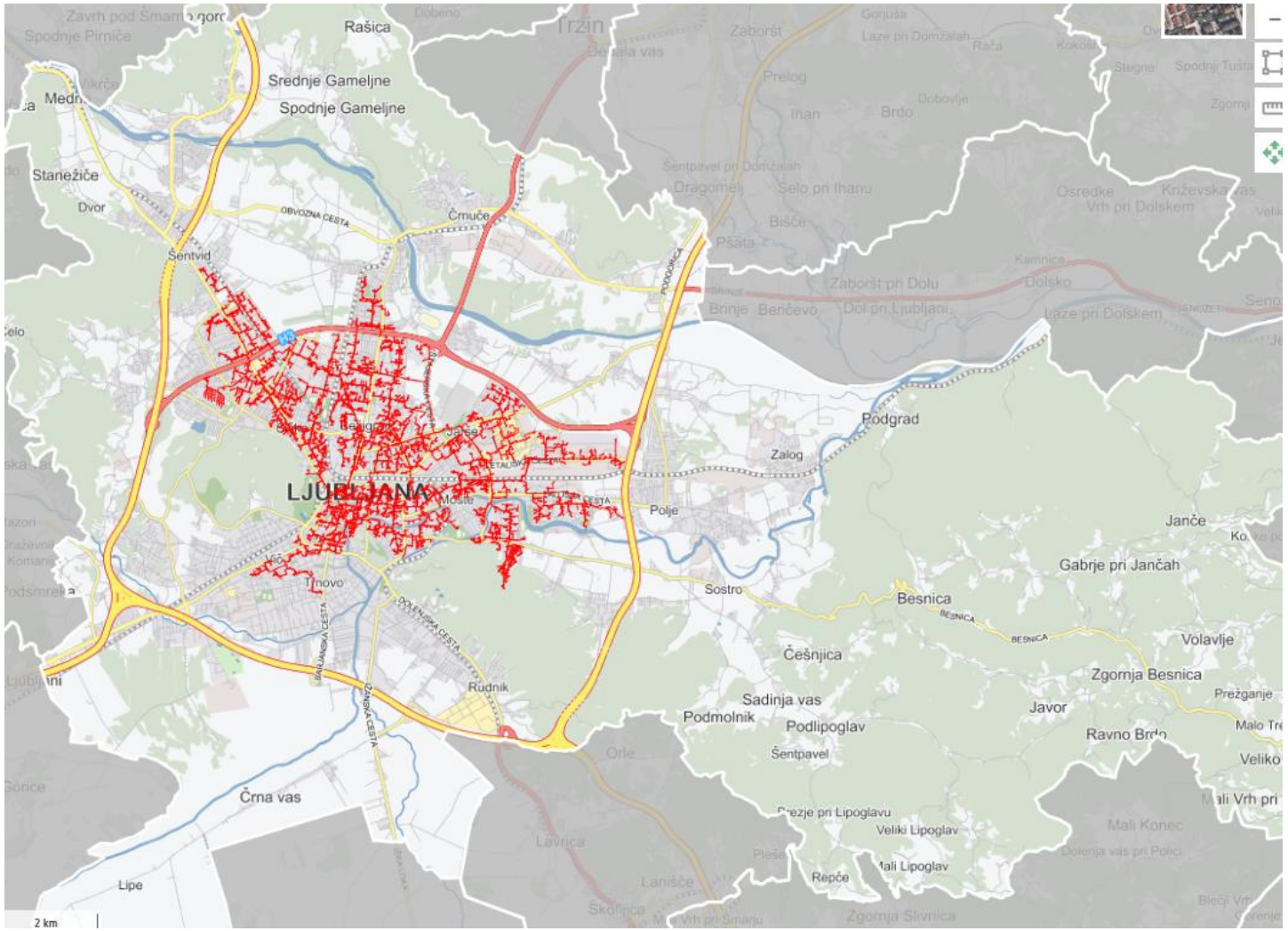
- 3.150.309 MWh/year (40,2 %)

→ Traffic

- 2.992.097 MWh/year (38,1 %).


LJUBLJANA
Domžale
Trzin
Dobeno
Rašica
Spodnje Pirniče
Spodnje Gameljne
Stanežiče
OBVOZNA CESTA
Toško Čelo
Podgrad
Zaloge
Stranska vas
Razori
Podsmreka
Janče
Gabrje pri Jančah
Češnjica
Sadinja vas
Podmolnik
Podlipoglav
Javor
Zgornja Besnica
Volavlje
Ravne Brdo
Prežganje
Mali Vrh pri Prežganju
Črni vas
Lipe
Lavrica
Škofljica
Zgornja Slivnica
Mali Konec
Polica
Dolenja vas pri Polici
Reber
Veliki Lipoglav
Mali Lipoglav
Prezje pri Lipoglavu
Senožeti
Jevnica
Laze pri Dolskem
Dol pri Ljubljani
Brinje
Beričevo
Zaboršt pri Dolu
Dragomelj
Šentpavel pri Domžalah
Selo pri Ihanu
Ihan
Brdo
Prelog
Zaboršt
Dobovlje
Osredke
Vrh pri Dolskem
Križevska vas
Dolsko
Kamnica
Velika vas
Dole pri Kraščah
Krašce
Dvorje
Stegne
Spodnji Tuštanj
Zgornji Tuštanj
Pšata
Bišče
Orle
Ihanje Gorice
Zavrh pod Šmarno gorc
Spodnje Pirniče
Pevodje
Dobeno
Rašica
Spodnje Gameljne
Stanežiče
Dvor
Toško Čelo
Razori
Podsmreka
Stranska vas

District heating in Ljubljana

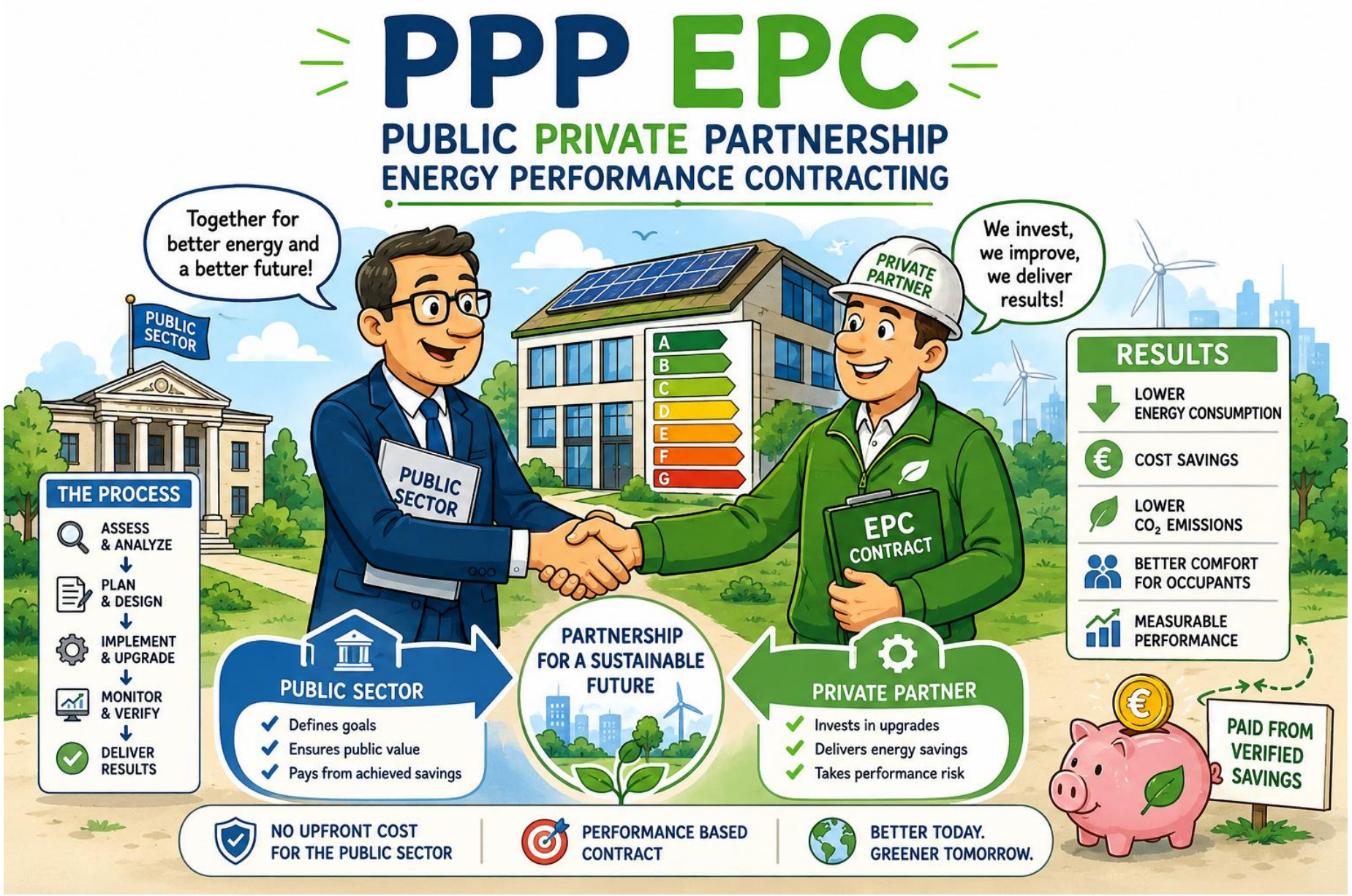


Lenght: 278 km

Power: 1.173 MW

Production – distribution: 1.100.000 MWh

EOL projects



The road was long….



- 2013 – TA ELENA Project, co-financed by the EIB: 90% funding for pre-investment documentation and services;
- 2014, 2015 –foundations and basis for the EOL tender;
- December 2015 –first public-private partnership tender published based on the energy performance contracting model (PPP EPC EOL 1);
- June 2016 – April 2017 – competitive dialogue for EOL 1; contracts signed in April 2017
- EOL 2: 2018; EOL 3 2020; EOL 4.1 2022; EOL 4.2 2023



Advantages and dissadvantages of EPC

- Greater savings
- Faster and cheaper implementation
- Better technical solutions
- Guaranteed savings, payments based on achieved savings
- Lower maintenance costs or no maintenance costs during the contract period
- Defined comfort standards
- The investment is recorded off-balance sheet on the public partner's side and has no impact on public debt and deficit

- More complex process of selecting a private partner
- Ignorance of the field of EPC and distrust of the public sector
- Perception of public partners regarding the high costs of the ESCO (usually an inappropriate comparison with the traditional model)

Cultural heritage, structural renovations, fire safety, accessibility for persons with reduced mobility, installation upgrades, and energy renovations









Renovation or new construction?





ILIRIJA – Latterman avenue - Lorenz ateliers & Elea iC

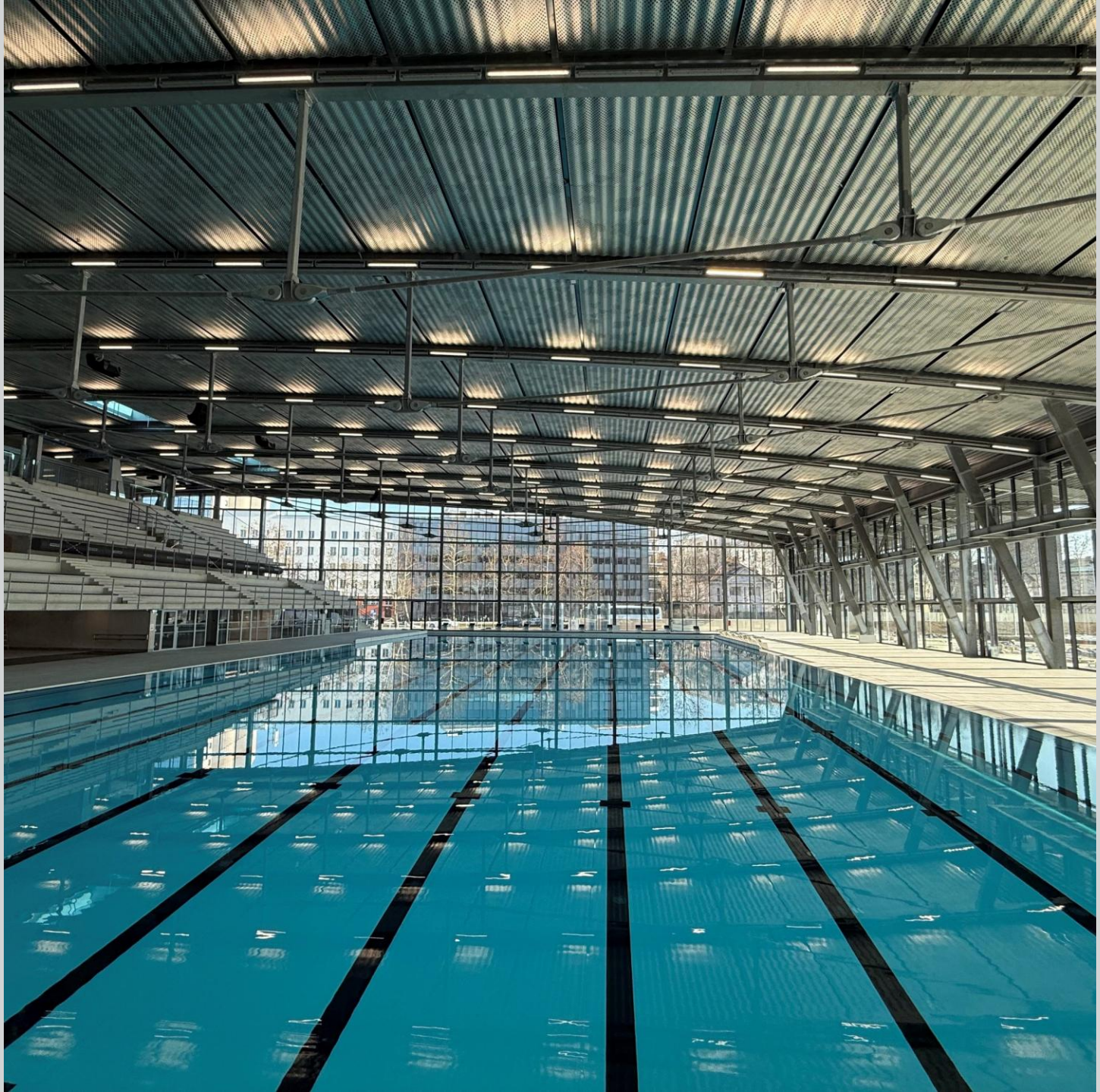





LIRIJA GYM

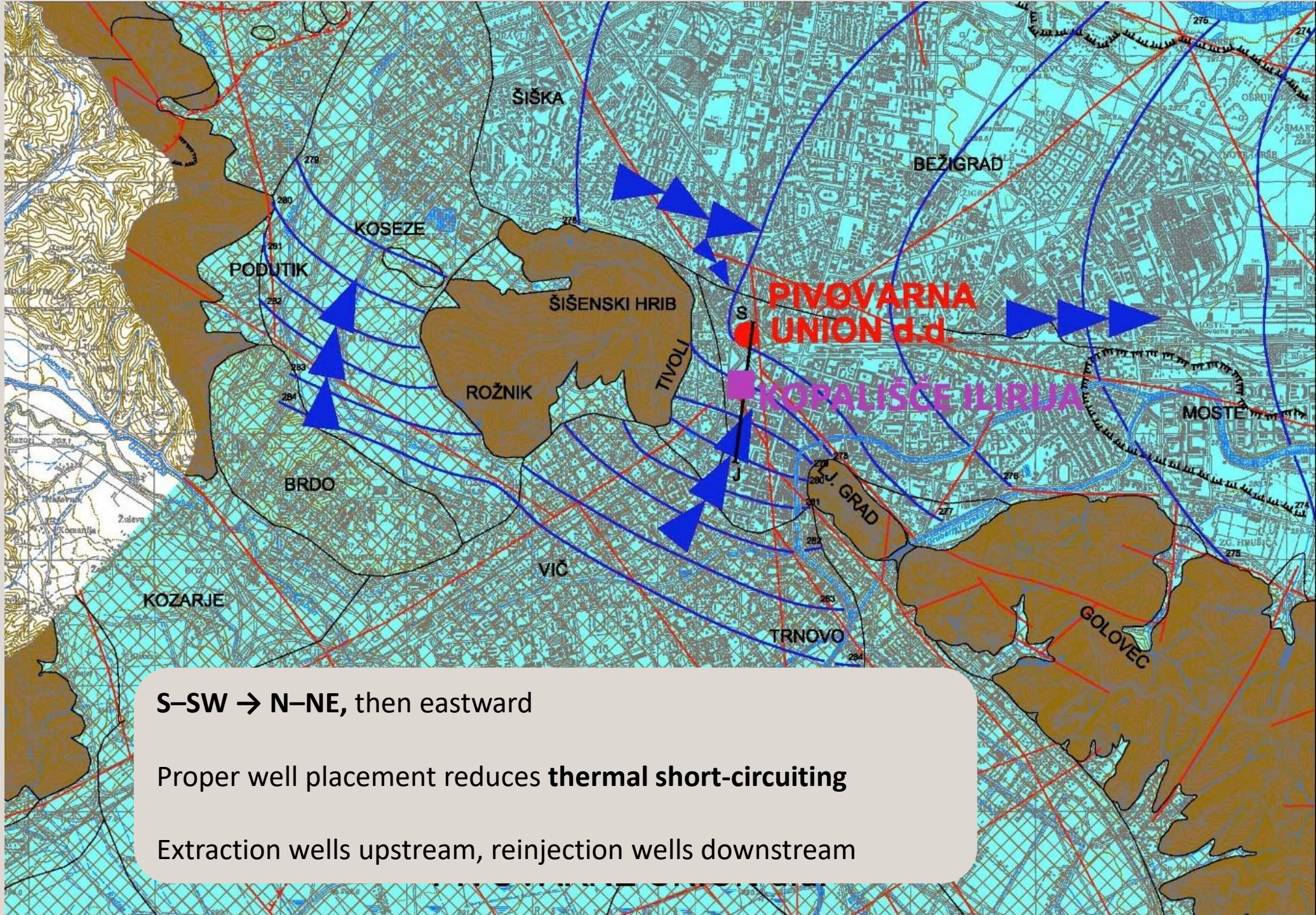

KOPALIŠČE
ILIRIJA





ELEA

GROUNDWATER FLOWS



S–SW → N–NE, then eastward

Proper well placement reduces **thermal short-circuiting**

Extraction wells upstream, reinjection wells downstream

WELLS LOCATION

Natural groundwater temperature: **11–13 °C**

Urban effects increase temperature to **12–14 °C**

Stable temperatures improve heat pump efficiency



GROUNDWATER DEPTH

Groundwater level approx. **25 m below surface**

Seasonal fluctuations: **1–3 m**

Influenced by urban extraction and reinjection



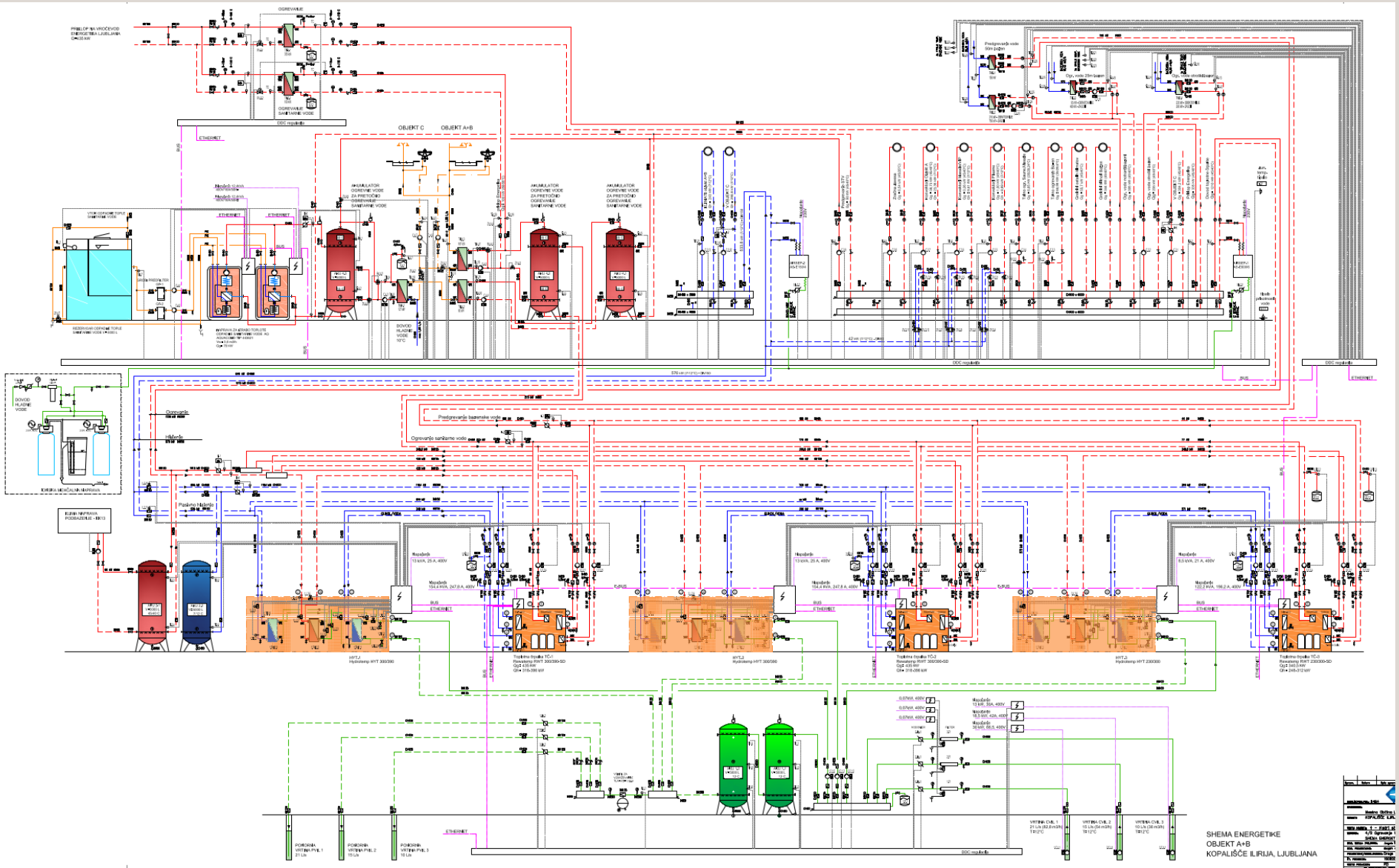
ELEA

EXTRACTION WELLS

3 extraction wells
supply groundwater

Total designed flow rate:
46 L/s





Groundwater temperature:
12 °C → 7 °C

Groundwater Pump
Stainless steel construction (AISI 304)
Flow capacity: up to
82.8 m³/h
Motor power: **30 Kw**

Heat transferred through a **heat exchanger**

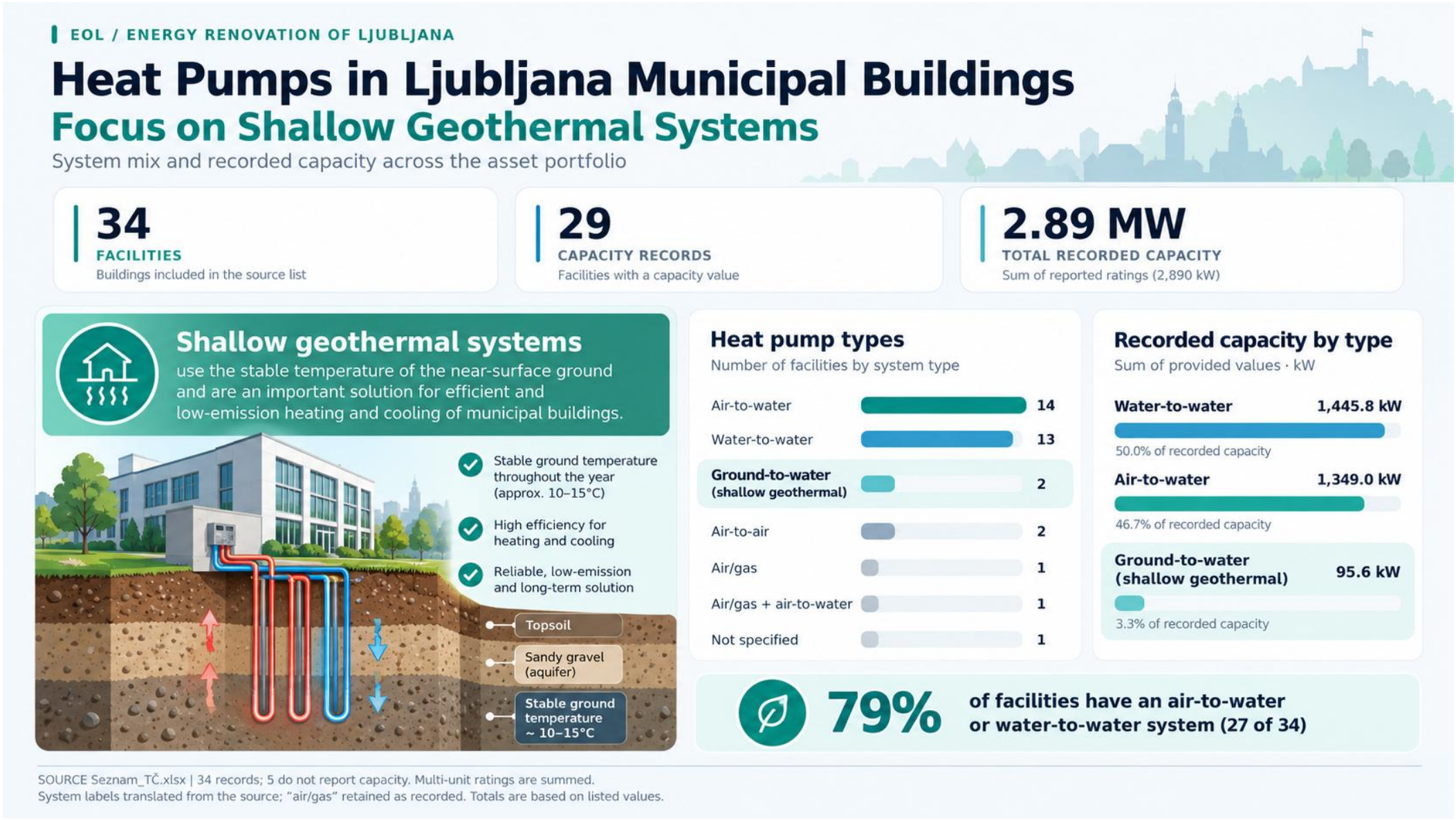
Intermediate circuit uses **glycol/water mixture**

heating, active cooling, and passive cooling



gradbena parcela	**24.560 m2**
ZU	**19.500 m2**
OBJEKTI	**32.000 m2**
plavalni + vstopni	14.000 m2
dvoranski	3.950 m2
pokrita plaza	3.300 m2
garaža	10.750 m2

We also recieved awards for the project



We also recieved awards for the project

- **2018:** Award for Energy Efficient Project of 2018, selected by the expert jury and readers of the newspaper Finance.
- **2019:** Covenant of Mayors Investment Forum – Energy Efficiency Finance Market Place at the Berliner Energieagentur – awarded “Best Energy Service Project 2019.”
- **2023**: At the 7th International UNECE PPP Forum, projects EOL 1–4 achieved an excellent second place.







The most sustainable and cheapest energy is the energy we don’t use!

