GRADSKA TOPLANA

District Heating Utilization of Geothermal Energy Potential in the City of Karlovac

May 2022
DH in Karlovac – long tradition

- Start: 1968
- Gradska toplana: 2012
- # of customers: ~7,800
- Heated surface: 503,000 m², ~50% of urban
- Production: 87 MW (CTS) i 2 MW (ZTS)
- Pipeline: >60 MW
- Pipeline length: 21 km trench (42 km pipes)
- # of substations: 176 (indirect type) + 9
- Energy delivered: 55 GWh (2021)
- # of employees: 43
Projekt je sufinancirala Europska unija iz Europskog fonda za regionalni razvoj.
Main Challenges – Improvements Under Way

- Production: to be modernized
- K1: 29 MW (HO), K3: 58 MW (NG, HO)
- Automation, optimization
- Pipeline: to be renewed
- Age: up to 50 yrs, avg 30 yrs
- Ruptures (~80 p.a.), media losses
- Hydraulic unbalance, DH pumps control
- Working regime: 6-22, summer standstill
- CO$_2$ units cost <-> RES
- Energetic zoning
- Legal framework
ITU Karlovac – Goals

- **Reliability**: DH network renovation, leaking detection system
- **Energy efficiency**: Reduction of heat losses from 15% to below 8%
- **RES**: Ready to receive RES/waste heat
- Hydraulic balance
- Efficient DH control
- Higher comfort: 24hrs heating service

**HIGHER QUALITY, HAPPIER CUSTOMER**
ITU - Project Overview – New Distribution

- Renovation of 15.7 km (74%) DH pipeline
- Heating SS modernization
- SCADA introduction
- Distribution facility modernization
- Supervision, project managing, visibility

- Total project value: 133.9 mln kn
- Eligible costs: 128.2 mln kn
- EU funds: 103.6 mln kn
- State funds: 10.0 mln kn
DH in Karlovac – Bright Future

- Energy prices rise:
  - Going green (CO₂ ...)
  - NG price exploded (5x)
  - Chance for DH growth

- RES introduction
  - Strategic RES: geothermal
  - CHP Ilovac: biomass (∼8,5 MW)
  - Central sewage system, rivers... (Heat pump)
  - Challenges: time, CO₂ cost
DH in Karlovac – Bright Future

- RES driven projects:
  - Heat storage tanks – 70 MWh/tank
  - PVT system (100 kW_e, 300 kW_t)
  - Domestic hot water introduction – pilot
  - Integration of solar (building’s roof or facade panels in existing DH substantions)

NEW CUSTOMERS, LOWER PRICE
Geothermal in Karlovac = The Greenest City

- Unique opportunity:
  - Geothermal (~10 MW)
  - Biomass (~8.5 MW)

100% RES DH SYSTEM!!

- Customer advantages:
  - Energy independence
  - Stabile prices
  - Clean air, high comfort, safety, redundancy
Geothermal in Karlovac: Challenges

- Usual geothermal risks:
  - Temperature
  - Sourcing stability over years
- Connecting pipeline:
  - ~7 km
  - 7 mln€
- Time, CO₂ cost
- Summer consumption (4+ months)
- Financing (EU, own share, ...)

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https://www.gradska-toplana.hr