CEEGEO
Central and Eastern European Geothermal Initiative

# Slovakia Geothermal DH City Readiness project: Context and Methodology

Nolan Theisen, GreetGEO Final Conference, Zagreb, 29 October 2026

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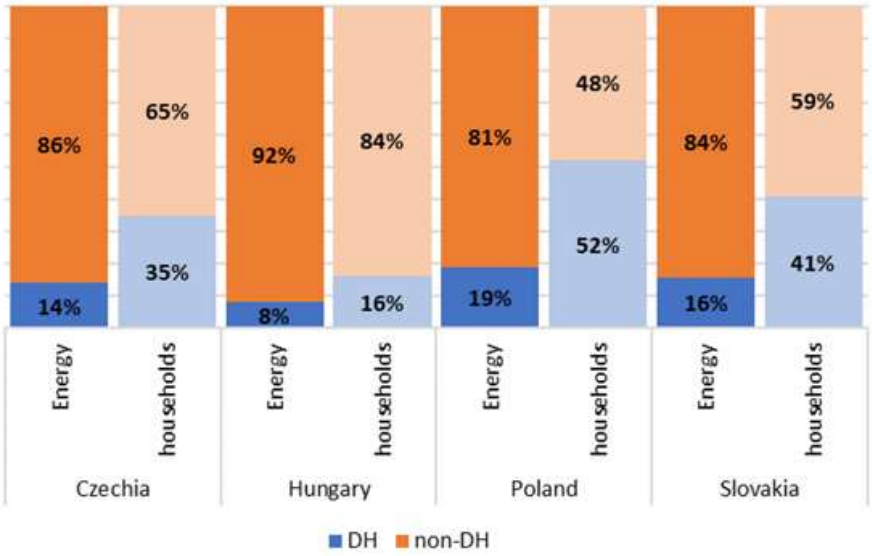
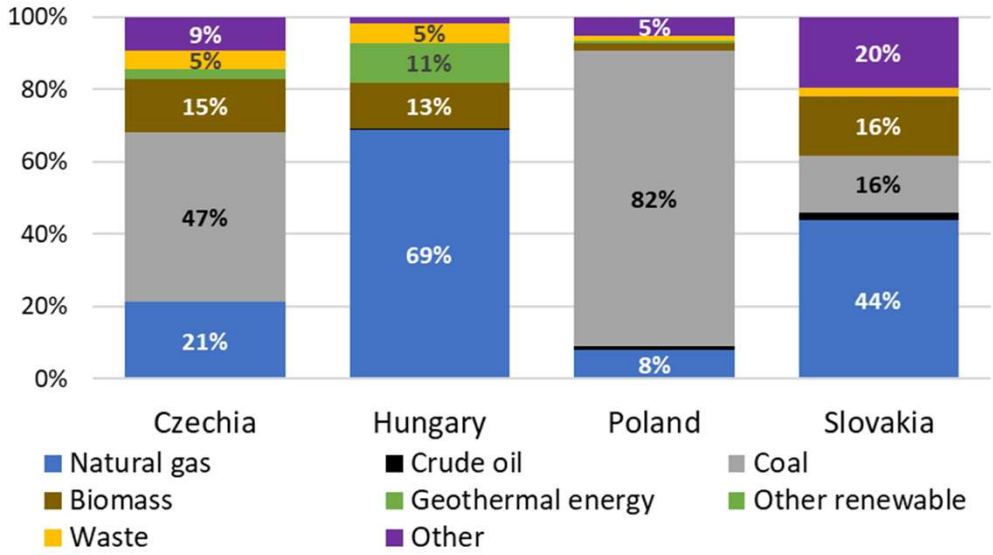
# District Heating in V4 countries

## DH share of final energy consumption (2021)



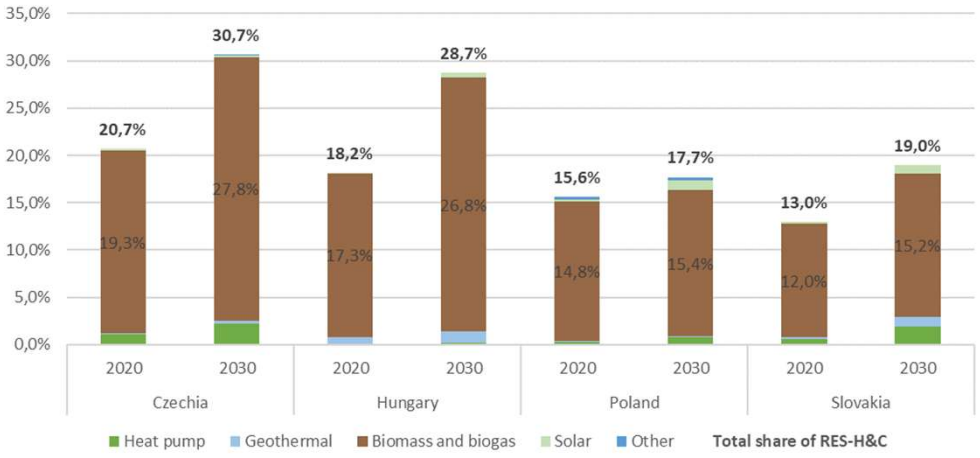

## DH fuel mix (2021)




Source: V4ETTP project

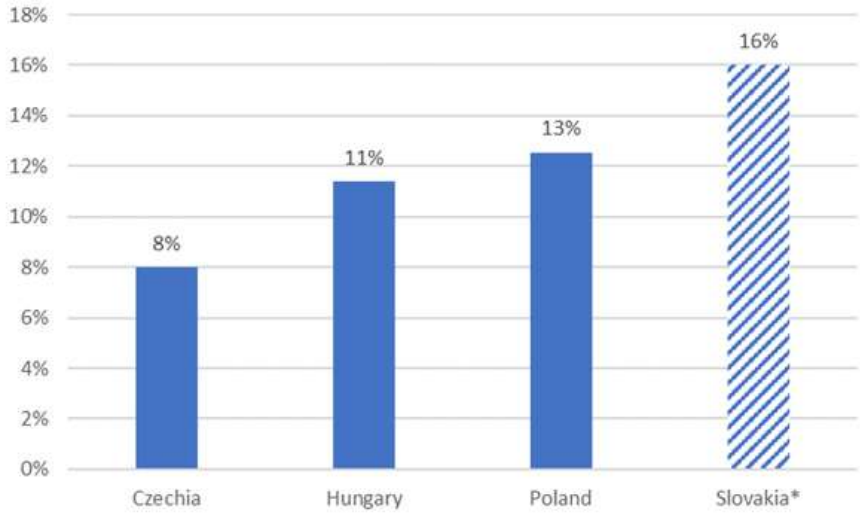
# District Heating in V4 countries

RES share in H&C (2020 vs 2030)




Approx. 90% of RES in heat is from biomass

DH network losses (2021; Slovakia 2017)




Source: V4ETTP project

METHODOLOGY

# Four dimensions — different roles in readiness

Opportunity (dimensions 1–2) is assessed separately from implementation conditions (dimensions 3–4).

## 01 GEOTHERMAL OPPORTUNITY

Resource areas and reservoir evidence
Wells, existing use, project proposals

## 02 HEAT-MARKET RELEVANCE

Existing DH infrastructure
Heat demand now and 2030–2035 context

## 03 PLANNING ALIGNMENT

Municipal and operator heat strategies
Projects, permits and investments

## 04 POLICY & FINANCING PATHWAY

National measure and territorial fit
Call/applicant evidence or award

**Assessment output: WHAT is promising, WHAT is missing, and WHAT action follows?**

SCOPE

# What exactly enters the screening?

The common unit is the municipality. We retain differentiated case types instead of forcing a single score.

**21** municipalities

Full desk review: geothermal evidence, DH, planning, policy and financing.

**19** PETA observations

Modelled urban demand available; two municipalities have no comparable extraction.

**3** pilot fiches

Nitra, Poprad and Trebišov illustrate contrasting development pathways.

## The screening does not assume every place is a new geothermal DH project.

Existing geothermal DH and individual direct-use sites are retained as reference cases; incomplete evidence is not scored as zero.

**PETA gaps: Podhájska and Diakovce. Values from PETA are urban-area estimates, not operator heat sales.**

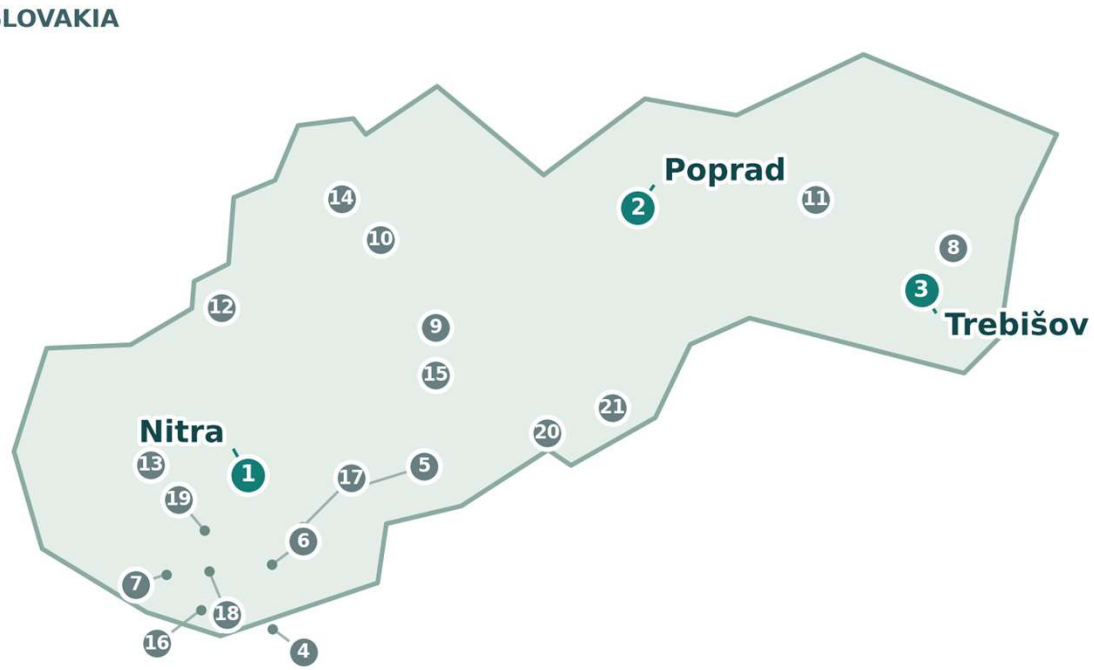
GEOGRAPHICAL COVERAGE

# The 21 municipalities in the study

Original-style Slovakia outline, mapped at correct geographic proportions; numbered markers are not a readiness ranking. Grouping is by region for navigation only. Every municipality is assessed using the same four-dimensional evidence framework.

**WESTERN SLOVAKIA · 11**

| | |
|---|---|
| 01 | **Nitra** |
| 04 | Komárno |
| 05 | Levice |
| 06 | Nové Zámky |
| 07 | Dunajská Streda |
| 12 | Trenčín |
| 13 | Trnava |
| 16 | Veľký Meder |
| 17 | Podhájska |
| 18 | Topoľníky |
| 19 | Diakovce |




**CENTRAL SLOVAKIA · 6**

| | |
|---|---|
| 09 | Banská Bystrica |
| 10 | Martin |
| 14 | Žilina |
| 15 | Zvolen |
| 20 | Lučenec |
| 21 | Rimavská Sobota |

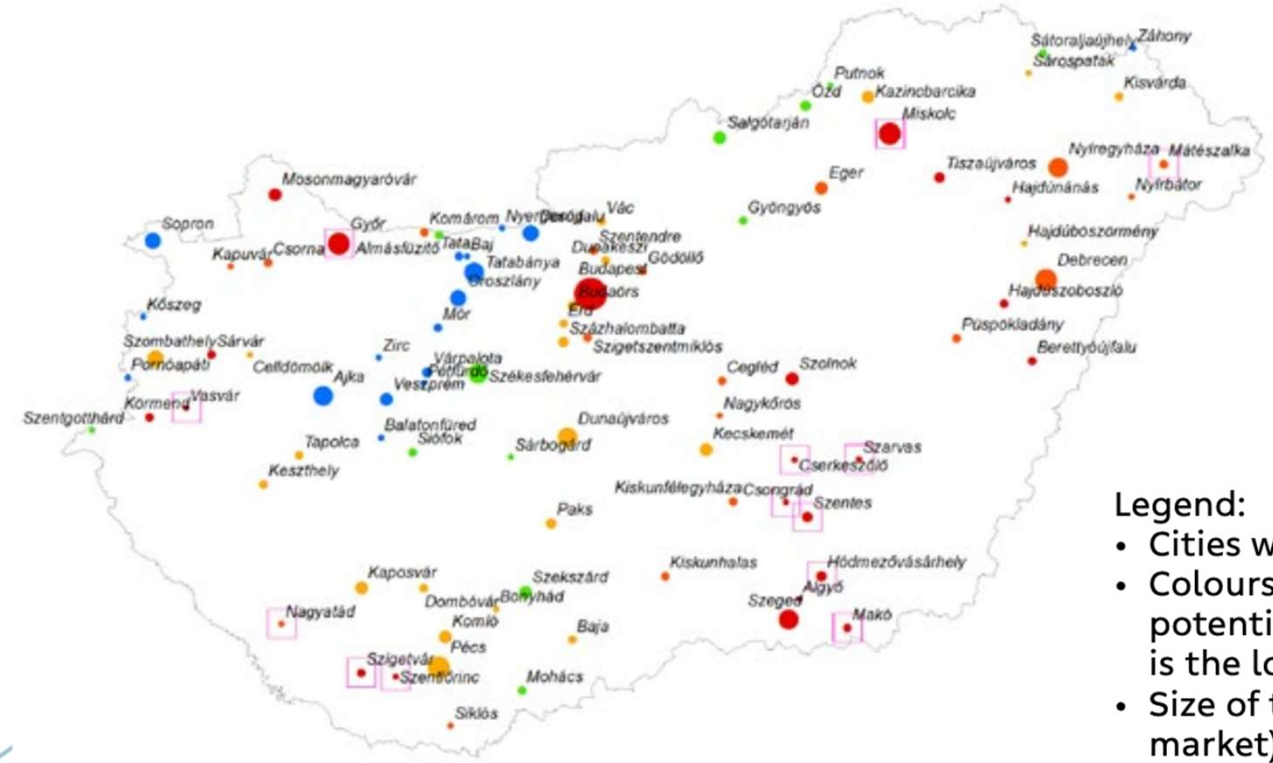
**EASTERN SLOVAKIA · 4**

| | |
|---|---|
| 02 | **Poprad** |
| 03 | **Trebišov** |
| 08 | Michalovce |
| 11 | Prešov |

**3 pilot fiches: Nitra · Poprad · Trebišov**

18 other municipalities — common screening

# Hungary geothermal DH map




Legend:

- Cities with existing DH system are shown
- Colours represent the (known or assumed) geothermal potential. (red is the highest > orange > yellow > green > blue is the lowest)
- Size of the circle represents the size of the DH system (heat market)
- Purple squares mark the already existing geothermal DH systems.

Source: Arctiv Green Engineering

SCREENING PROTOCOL

# Screening is a research process — not a ranking

All 21 municipalities follow the same evidence steps. Each identified gap leads to a concrete verification or research task.

**01**

## DOCUMENT THE BASELINE

Geothermal wells & uses · existing DH · PETA demand · city strategies · policy instruments

→

**02**

## TEST RESOURCE–MARKET FIT

Look for credible geothermal supply and a durable local heat sink; flag spatial or technical uncertainties

→

**03**

## VALIDATE WHAT IS MISSING

Ask ŠGÚDŠ, municipalities and DH operators for geological, demand, network and project evidence

→

**04**

## DEFINE THE NEXT DECISION

Produce municipal evidence fiches: opportunity, obstacle, policy/finance route and action required

**RESEARCH OUTPUT** **21 municipal evidence profiles + cross-case findings on obstacles and enabling conditions**

ILLUSTRATIVE PILOT FINDINGS

# Three pathways — three different bottlenecks

The same four dimensions give different follow-up questions for each case.

## NITRA

RESOURCE CHECK

HEAT-MARKET-LED

**748.9**

GWh/year · PETA modelled 2015 urban demand

### OPPORTUNITY

Established gas-based DH and substantial modelled urban demand.

### CRITICAL GAP

Local well / resource-to-network match and investment plan unverified.

### POLICY / FINANCE

2.2.4 exploration could be relevant; funding unconfirmed.

## POPRAD

EVIDENCE CHECK

STRATEGY-LED

**469.8**

GWh/year · PETA modelled 2015 urban demand

### OPPORTUNITY

Geothermal appears in city heat planning; local geothermal use exists.

### CRITICAL GAP

Access to an existing well and DH temperature compatibility remain unresolved.

### POLICY / FINANCE

General RES/DH support; no verified project award.

## TREBIŠOV

EVIDENCE CHECK

PROJECT-LED

**208.0**

GWh/year · PETA modelled 2015 urban demand

### OPPORTUNITY

Closed-loop reuse of former gas wells proposed for city heat.

### CRITICAL GAP

Permitting progression documented; output and heat offtake unverified.

### POLICY / FINANCE

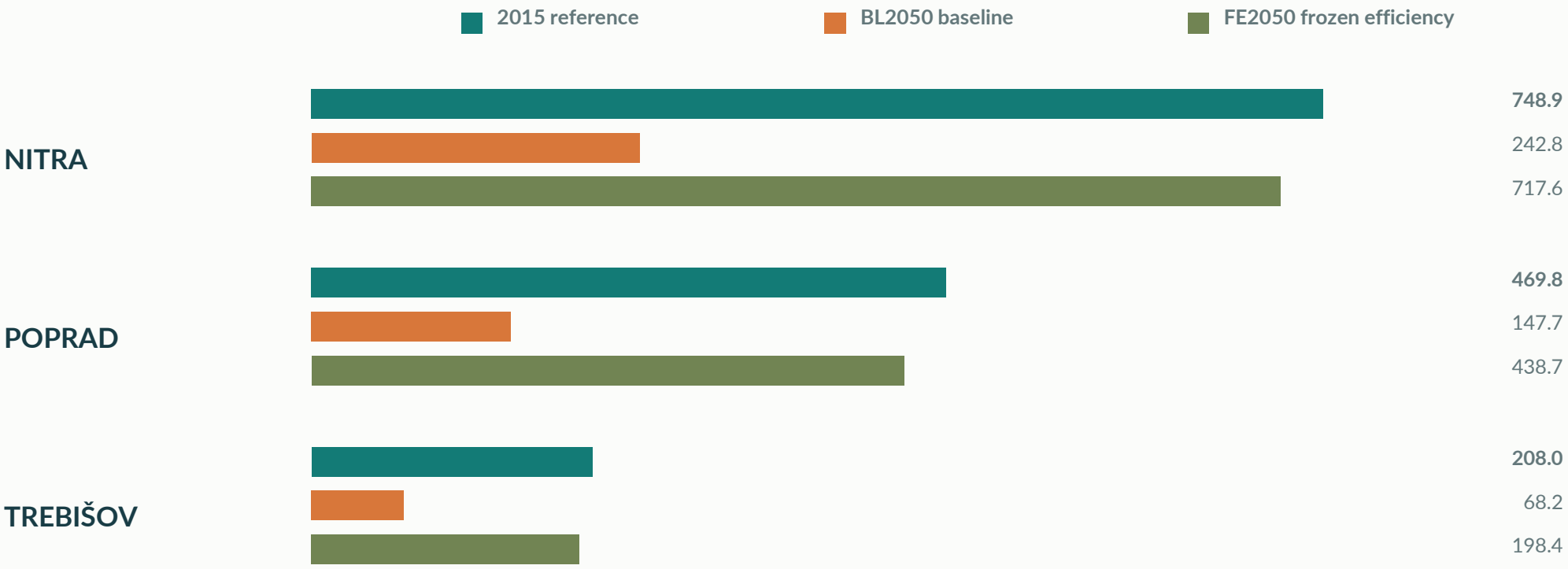
Project-level financing eligibility not established.

**These pilots test contrasting hypotheses and evidence needs; they do not rank the rest of the sample.**

PETA COMPARISON

# Three modelled demand observations per municipality

PETA 5.2 estimates modelled annual building heat demand in each urban area; units are GWh/year.




**19 of 21 municipalities have extracted observations; Podhájska and Diakovce remain without comparable PETA values.**

WHAT THE PETA INDICATORS MEAN

# What can we infer—and what must we still verify?

Scenario sensitivity is useful for screening market continuity, not for sizing geothermal wells.

## 2015

**REFERENCE DEMAND**

Existing modelled urban residential/service-building heat demand.

## BL2050

**BASELINE 2050**

A future-demand scenario including stronger building-efficiency improvements.

## FE2050

**FROZEN EFFICIENCY**

2050 demand without the same additional efficiency improvements; the built environment can still change.

**Across the three pilots, BL2050 is about 67–69% below 2015, while FE2050 remains much closer to 2015.**

### USEFUL

Relative demand magnitude and sensitivity to building renovation.

### NOT SUFFICIENT

No DH heat sales, no network area, no plant capacity, no 2030 forecast.

### VERIFY

Actual connected load, operator plans, network temperature and losses.

sEEnergies D5.7 (2022), §§2.1.3 and 3.1.1; manually extracted PETA 5.2 indicators.

POLICY AND FINANCING

# Policy alignment is a route to preparation—not a grant

Relevant Programme Slovakia measures cover different project-preparation stages.

## 2.1.3

### Regional / local energy planning

Energy centres, analytical capability and identification of projects.

## 2.2.4

### Geothermal exploration

Surveys, resource verification, wells and hydrodynamic testing.

## 2.2.2

### Renewable heat integration

Renewables in efficient DH and associated heat infrastructure.

## EVIDENCE OF FINANCING MATURITY

| | |
|---|---|
| 1 | Programme |
| 2 | Territory / project |
| 3 | Call + beneficiary |
| 4 | Award |

**Code 052: €137.2m indicative allocation for “other renewables including geothermal” — NOT an exclusively geothermal fund.**

Named transition-plan districts within the sample: Zvolen, Michalovce and Rimavská Sobota. Eligibility remains call-specific.

RESEARCH IMPLICATIONS

# From screening to better-targeted municipal dialogue

The evidence review identifies the strongest next question for each municipality; it does not produce a feasibility score.

**1 GEOLOGICAL VALIDATION**

Specific hydrogeothermal play, nearby tested wells and uncertainties.

**2 REAL DH HEAT MARKET**

Heat delivered, grid boundaries, supply/return temperatures, renovation plans.

**3 PLANNING COMMITMENT**

Actual municipal/operator investment intentions, ownership and project stages.

**4 FUNDING ROUTE**

Specific call, eligible applicant, project costs and award status.

**Next output: validated 21-municipality evidence fiches, comparative barriers and targeted municipal dialogue.**

RESEARCH LIMITATIONS

# Evidence register and interpretive safeguards

A transparent preliminary screen is more useful than an unjustified numerical ranking.

| | |
|---|---|
| GEOLOGICAL | Fričovský et al. (EGC 2025); ŠGÚDŠ geothermal review; AtlasGE resource maps, EGC 2025 Slovakia Country Update. |
| DISTRICT HEATING | CEEGEO Mapping; municipal heat concepts; operator information where available. |
| MODELLED DEMAND | PETA 5.2 and sEEnergies D5.7 (2022); original manual data extraction. |
| POLICY / FINANCE | Programme Slovakia 2021–2027 v4.1 (2026), especially pp. 155–169 and territorial plan. |
| MUNICIPAL CASES | Poprad heat strategy; city planning documents; Trebišov municipal proceedings. |

**Regional resource ≠ well output • PETA ≠ DH sales • programme ≠ grant • permit ≠ operation**

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*From geothermal potential to municipal readiness*

We are looking for local partners to further develop the methodology and apply in the other CEE countries,

Thank you!

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