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REHEATEAST

Improving energy efficiency of central heating in Pécs

Energy and cost savings at one of the substations of the University of Pécs

Accelerating the Future of District Heating: From Policy to Practice

REHEATEAST transnational workshop for Hungary, Slovakia and Slovenia

6th May, 2026

Judit Kis-Pongrácz, project manager, Pannon EGTC

CONTEXT

Renewable-based district heating – A large share of the heat supplied to the city, including the respective buildings of the University, is produced from renewable sources at the Pannon Power Plant, where two heating blocks operate primarily on biomass.

Multistakeholder implementation - Pilot implemented by the Pannon European Grouping of Territorial Cooperation in cooperation with its ASPs within Reheateast - the University of Pécs and with technical guidance from the PÉTÁV District Heating Company



PROBLEM

Problem – In one of the heating centres of the Faculty of Sciences and Faculty of Humanities (supplying several buildings as well as the botanical garden greenhouse), severely outdated heating circulation pumps (>20 years)—characterized by high electricity consumption and declining efficiency



GOAL

- Increase energy efficiency - to catalyze a measurable shift in energy efficiency and operational sustainability within the heating infrastructure of the University of Pécs.
- Reduce costs - mitigation of significant energy losses and the subsequent reduction of escalating utility costs associated
- Test low-cost intervention - total equipment replacement is not a prerequisite for achieving institutional energy goals
- Create replicable model - due to its low investment intensity and straightforward technical execution, this model is highly transferable to various institutional contexts



IMPLEMENTATION

In the heating centre of the Faculty of Sciences 4 pumps were replaced by high-efficiency smart pumps with minimal system changes ensuring redundant operation.

Hot stand-by redundant operation – only one item of each pair was replaced – the new pump has started active operation, the second pump remained ready for immediate activation and can instantly take over if needed.

Minimal system changes – a targeted intervention: selection of the least efficient pumps for replacement – new pumps were installed within the existing system instead of full redesign of the entire substation and the pipe networks.



CONCLUSION

1. Coordination is as important as technology

Success depended on:

- well-aligned stakeholders
- clear roles and responsibilities

2. Big results can come from small interventions

Achieved 42.41% energy savings (vs. 15% planned)

Focus on:

- upgrading old circulation pumps

No need for full system replacement –
high impact on low cost

3. Long-term benefits are significant

New pumps last ~10+ years

Continuous:

- energy savings
- cost reduction

4. The future is digital

Next step:

- smart metering
- AI-based control

Enables:

- predictive maintenance
- real-time optimisation

Move from hardware upgrades → intelligent energy management

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REHEATEAST

District Heating and Cooling System (DHC) in Heat Energy Communities (HEC)

The 2nd Pilot of Pannon EGTC

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PROBLEM

The problem is that heating systems in Hungary still depend on fossil fuels, and although we have policies for clean energy, we lack practical, scalable solutions to implement them. Also the study addresses the issue of heat energy communities which are not yet widespread in Hungary and not fully defined in regulation.

CONTEXT

Renewable Heating Communities - the study explores what are the present circumstances for establishing a heating energy community in Hungary based on renewable heat sources.

The study aims to examine how a renewable, community-based heating system can be developed that:

- reduces fossil fuel use
- improves local energy security
- supports EU and Hungarian climate goals

GOAL

design and test a new heating model
(Heat Energy Community – HEC)

based on **renewable energy**
(especially geothermal)

and show that it can work **in real**
conditions (e.g. Békéscsaba)

The study:

- ✓ It analyses laws, technologies, and examples
- ✓ It tests a **real pilot case**
- ✓ It creates a **replicable model for other cities**



IMPLEMENTATION

1. Regulatory analysis

Examined **Hungarian and EU legislation**

Focus on:

- district heating rules
- renewable energy policies (EED, RED III)

Goal: understand what is legally possible

2. Technology analysis

Reviewed **thermal energy storage solutions**

Types:

- sensible
- latent
- thermochemical

Also looked at:

- Power-to-Heat
- system flexibility

Purpose: identify **technical options for renewable heating**

3. International best practices

Analysed successful systems in:

- Denmark
- Germany
- Austria
- Netherlands

Focus on:

- community-based models
- real operation and governance

Purpose: learn **what already works**

4. Case study: Békéscsaba

Applied all findings to a **real Hungarian city**

Analysed:

- geothermal potential
- district heating system

Developed a **concrete implementation model**

Purpose: prove **feasibility in practice**

CONCLUSIONS

The study concludes that:

- Hungary has strong potential for renewable heat energy communities
- Community-based district heating is a sustainable and effective model
- The concept is technically feasible and replicable
- Further progress requires better regulation, investment, and coordination

1. Hungary has excellent potential

- Strong **geothermal resources**
- Existing district heating infrastructure
- Suitable conditions for Heat Energy Communities (HECs)

2. Community-based models work best

Examples from Europe show:

- higher public acceptance
- transparent costs
- long-term sustainability
- Non-profit/community ownership is a key advantage

3. Technology is available

Renewable heat + **thermal storage** can:

- balance supply and demand
- increase system flexibility

Can even support the **electricity system**

4. Real implementation is possible

The Békéscsaba case shows:

- 100% renewable heat supply is achievable
- system can be secure (with backup sources)

Not just theory → **practical model**

5. Main barriers remain

- Incomplete regulatory framework for HECs
- High upfront investment costs
- Need for better coordination between actors

6. Strong replication potential

Model can be applied in:

- other Hungarian cities
- the wider Danube Region

Especially where:

- heat demand is concentrated
- renewable resources are available

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THANK YOU FOR YOU ATTENTION!