

Bare-bone small and micro power plants for geothermal power production

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Situation

Worldwide – including in Hungary – numerous low-temperature and low-heat-flux heat sources (e.g., geothermal energy, industrial waste heat) remain unutilized, as they are used only for local heating due to economic or technical constraints.

Our proposed technological solution:

- Mini ORC power plants: capable of generating electricity even from heat sources as low as 80 °C.
- *(Mobile heat containers: enable heat transport over distances of up to 20 km without pipelines.)*

The key to the project: developing a complex methodology to identify the optimal utilization point, including source & consumers & grid connection

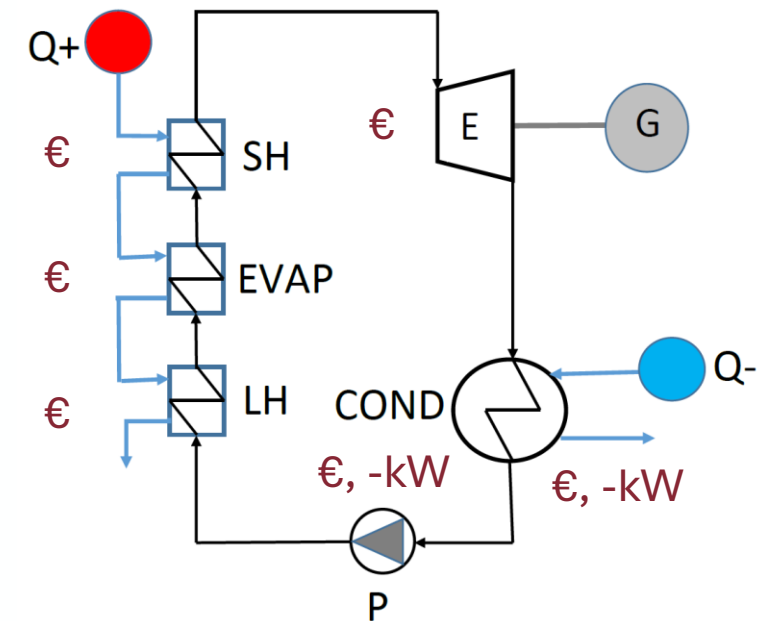
Bad Blumau example: In Austria, in Bad Blumau, a similar system (210 kW) operates as a premium spa facility since 2001. We aim to simplify this concept and adapt it to industrial and rural environments, enabling its widespread adoption in locations with geothermal potential similar to the Pannonian Basin.



Problem

Small- and micro ORC (Organic Rankine cycle) power plants are well known and widely used, but:

- A general ORC cycle consists of four heat exchangers, one turbine and one pump. Sometimes heat exchangers can take 80-90 % of the CAPEX. Additionally, pump and the chillers connected to the cooling heat exchanger have self-consumption, they can easily use 30-50% of the produced electricity (other units for the geothermal systems are not included).
- These problems can kill the financial viability of micro power plants (a few tens of kW to a very few hundreds of kW)



Solutions

Potential solution:

- Can we exclude some heat exchangers (to lower CAPEX) or exclude devices with self consumption (to increase net power production)?

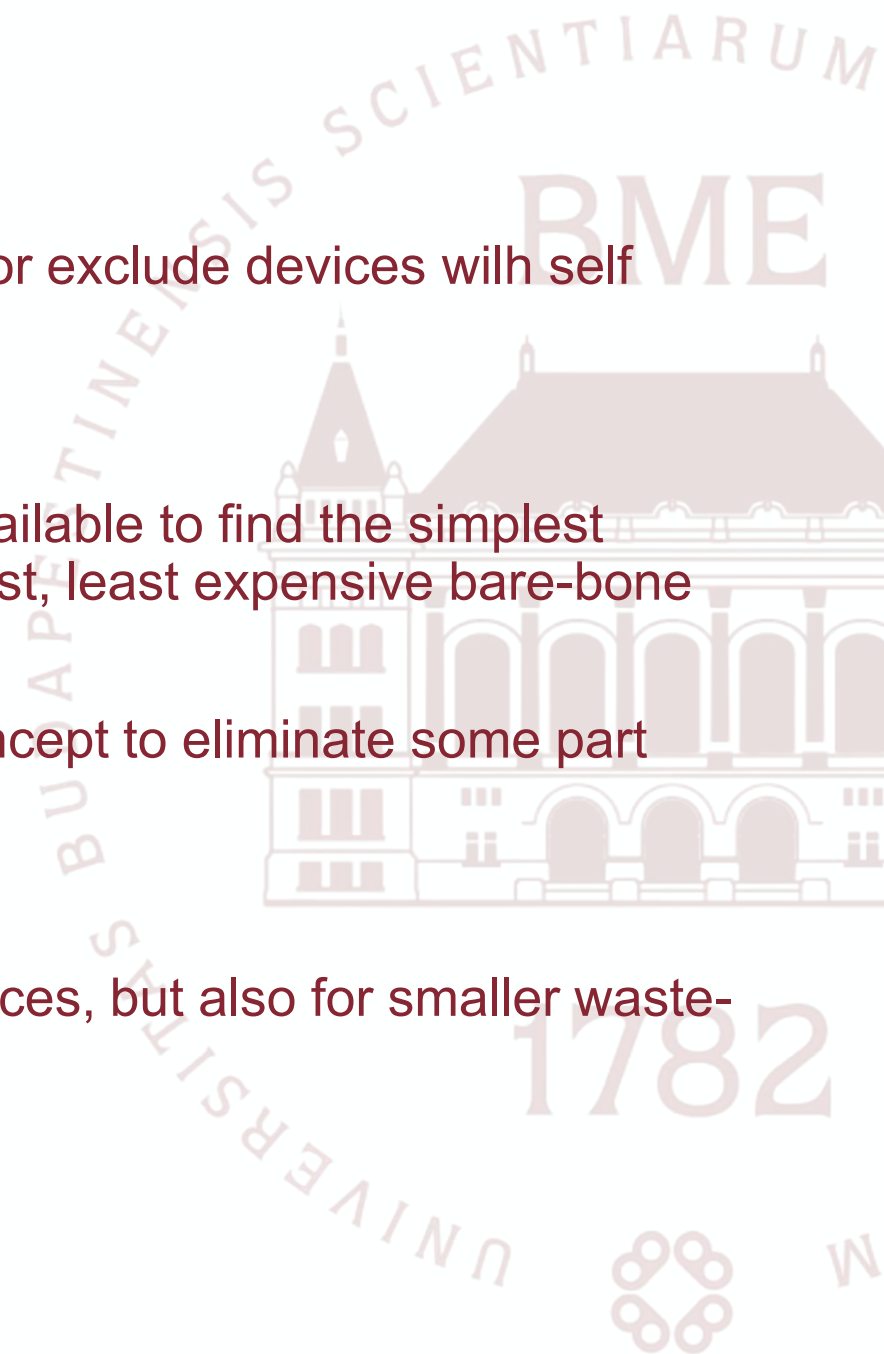
Options:

A working-fluid and equipment-optimization software tool is available to find the simplest design for a given heat source to enable us to build the simplest, least expensive bare-bone systems, still keeping acceptable efficiency (TRL 4-5).

Development of a novel (non-ORC based) pumpless cycle concept to eliminate some part (even half) of the self-consumption (TRL 2).

Extra:

The technology can be used not only for geothermal heat sources, but also for smaller waste-heat sources!



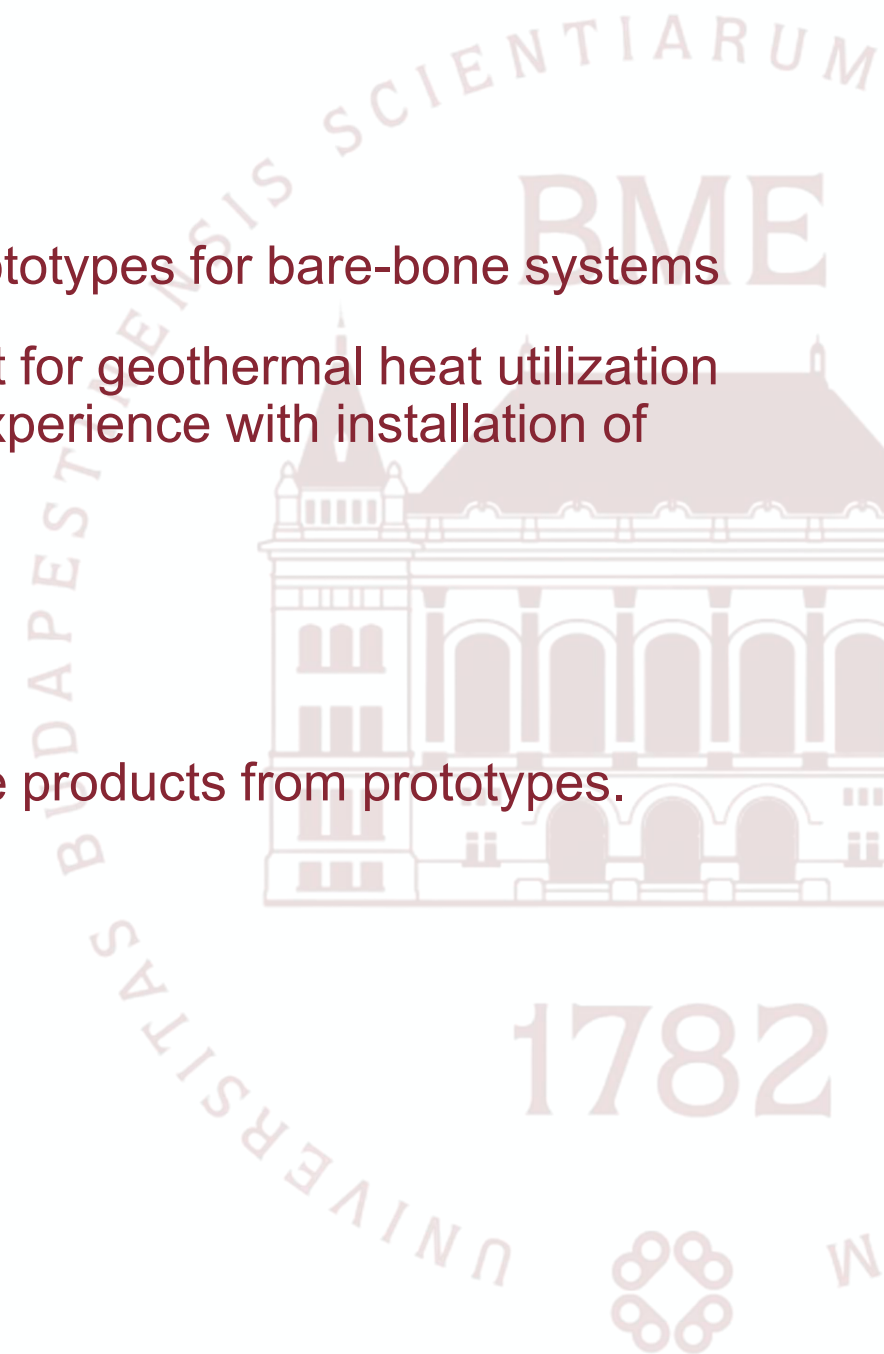
Partners

Potential partners:

- Wroclaw University of Technology, Poland – design and prototypes for bare-bone systems
- Arctic Green Terv Ltd. Hungary (former Mannvit Ltd.) expert for geothermal heat utilization in Europe and especially in the Pannonian Basin; having experience with installation of small geothermal power plants.

Seeking:

Further industrial partners with potential to develop marketable products from prototypes.



**Thank you for your
attention!**



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