



Tolna County, Hungary

Geothermal energy utilization and public utility installation at Tamási

DESCRIPTION OF THE ACTION

The aim of the project was to replace the gas heating of public institutions to geothermal heating. The core element of the system is the 830 meters deep production well on the campsite, providing 47 °C thermal water used for heating. The permissible yield is 75 m³ / h. This water is pumped through a 4.7 km long pipeline by high pressure pumps. The heat exchangers in the 17 connecting public buildings are installed on this piping system, where heat exchangers with low heat drop transfer the heat energy of thermal water to local heating systems. With intelligent remote control, the system is able to provide total heating energy up to an average outdoor temperature of 2 °C to 5 °C every day, back-up gas heating is only operating on colder days. The thermal water drawn through the city is transferred back to the ground and to the natural water stream by a 750 m deep reinjection well located about a thousand meters away from the production well. The production well provides 1200 litres of water at 47 °C per minute, and the capacity of the well is fully utilized during the peak heating period. The geothermal heating system operates under 8 bar pressure, so that hot water can be passed without heat loss. With thermal water, the city's kindergarten and schools (Würtz Ádám Elementary School, Béri Balogh Ádám Secondary School, Vályi Péter Vocational School), the medical center, land office, court, library, cultural center, mayor's office, Gyulaj Zrt. office building and the police station - a total of 17 buildings - are heated.

Time period: 12/2014 – 10/2015

Key results:

By exploiting geothermal energy, 60% of the natural gas consumption of local government institutions is saved, which means 16,000 GJ of heat each year. With this, the greenhouse gas emissions of the settlement is reduced by 570 tonnes of CO₂ annually. Non-governmental institutions spend 20% less on heating as a result of this system.



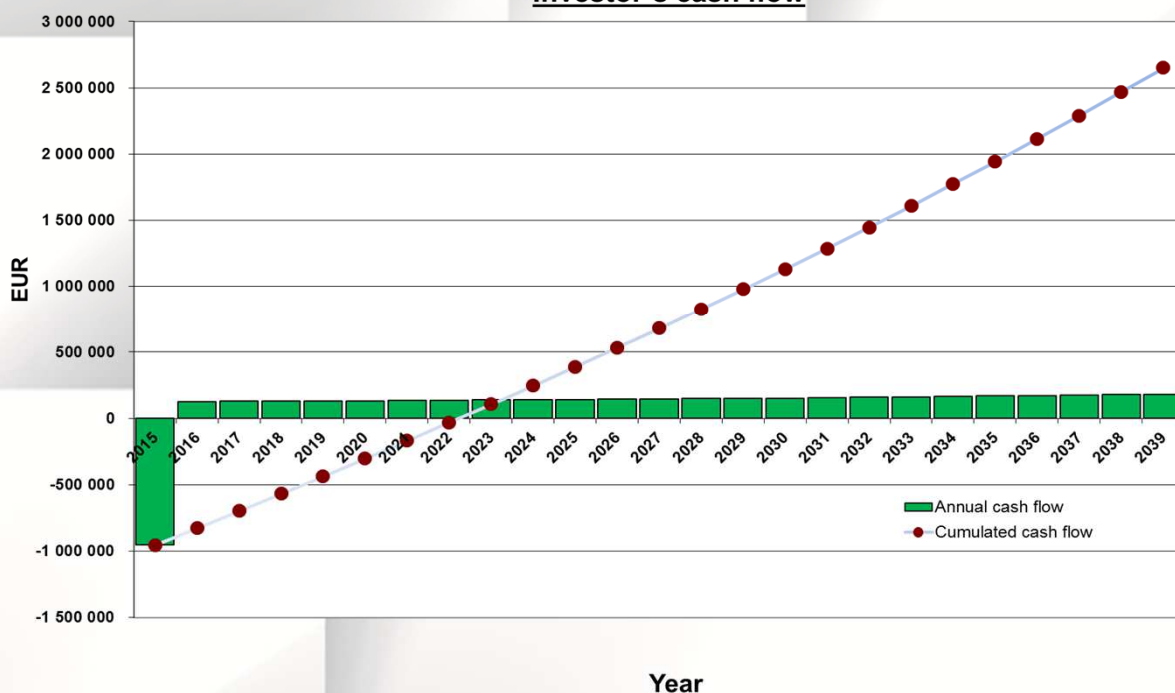


FINANCING

| | |
|---|----------------------|
| Investment costs | 4.635.917 EUR |
| - Own sources | 985.589 EUR |
| - Subsidies | |
| - Environment and Energy OP (EEOB) | 1.825.164 EUR |
| - State support for covering partly own contr. of EEOB | 1.825.164 EUR |
| - Loans | - |
| Lifetime (service life) | 25 years |
| Annual operational costs (salaries, repairs, maintenance etc.) | 45.240 EUR |
| Annual revenues – savings in natural gas supply | 172.492 EUR |

| Financial indicators | | |
|---------------------------|--------------|-----|
| Net present value - NPV | 1 042 391,40 | EUR |
| Internal rate ratio - IRR | 13,72% | |
| Payback period - simple | 8 years | |
| Payback period - discount | 10 years | |
| Evaluation year | 2015 | |
| Lifetime period | 25 years | |
| Discount | 5,00 % | |

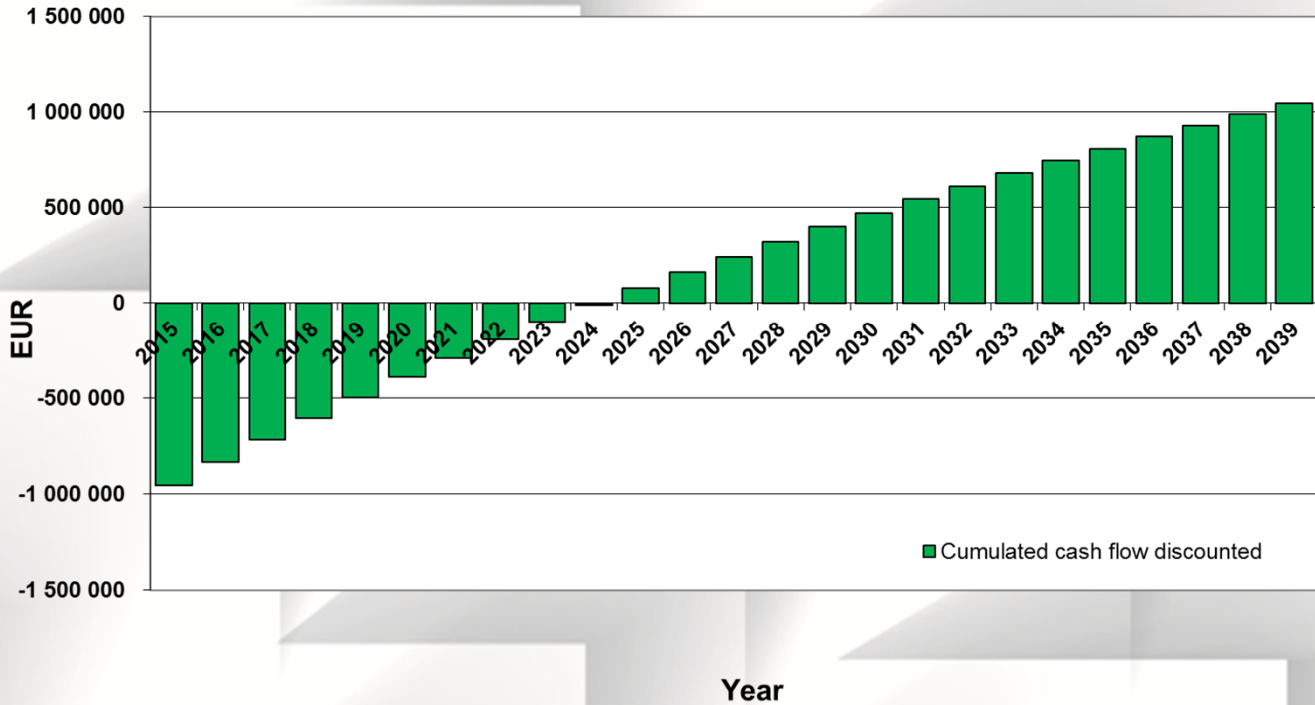
Geothermal energy utilization and public utility installation at Tamási
Investor's cash flow



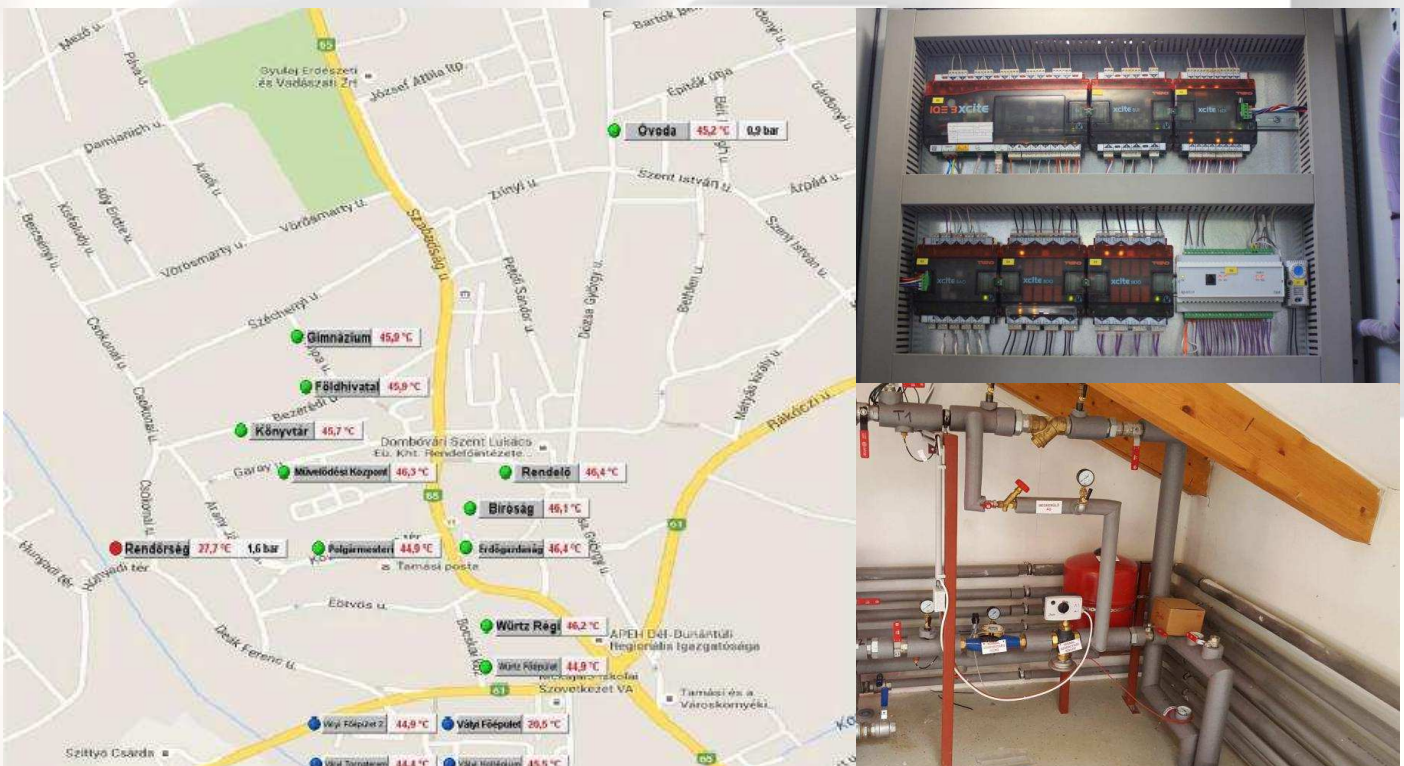


FINANCING

Geothermal energy utilization and public utility installation at Tamási
Cumulated cash flow discounted



MAP OF THE AREA





BARRIERS ENCOUNTERED

- Due to the relatively low temperature of the thermal water, the existing gas boilers of the building have to be kept as back-up boilers to support the heating system on colder days. The thermal water is able to heat up the buildings up to an outside temperature of 2 - 5 °C.
- At a too high secondary return temperature, there is a risk of reheating the thermal water.
- Big (expensive) heat exchangers are required for performance. DHW production from thermal water is not advisable

Ways to deal with barriers:

Existing boilers have been integrated in the control technology of the thermal system and can be put into operation if necessary.

Success factors

- Thermal water at 47 ° C available in Tamási.
- Public institutions are close to each other, which provides the possibility to transfer heat with minimal heat losses.
- The necessary call of the relevant operational programme was available to support the financing of the investment.
- Gas heating is a costly heating mode, thus replacing it to a renewable energy based system can generate remarkable savings.
- It is also possible to further develop the system: the transmission line has been constructed so that it can be extended later to the housing estates and is planned to use the thermal water later for heating greenhouses.

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