CASE STUDY

Flexalen® for heating network

Thermaflex supports energy transition using thermal springs in southern Bulgaria

A new green energy heating network, built with the Flexalen® 600 pre-insulated piping system, has transformed the region's heating infrastructure and driven economic transition.

Turning Mountain Springs into Sustainable Heat

Nestled at the foot of the Rhodope Mountains in southern Bulgaria, the town of Septemvri holds great geothermal potential. The thermal springs are located approximately 13 kilometres from Septemvri and about 4 kilometres from the nearest village, Varvara. The municipality decided to turn these **natural geothermal springs** into a clean, sustainable heating network. The challenging rugged terrain left limited infrastructure space, however, with flexible pre-insulated pipes Flexalen® 600 from Thermaflex, it was possible to overcome tough terrain and deliver reliable, environmentally friendly district heating to local homes and public buildings.

Project Goal

Despite the geographical complexity, the Septemvri thermal energy project evolved into one of the region's most strategic infrastructure investments. The goal was to capture and use the natural potential of the thermal springs for a heating network to **increase the quality of life for residents** through clean, affordable heating. Beyond its environmental benefits, the initiative aimed to position Septemvri as a future hub for tourism and wellness facilities, which would stimulate **long-term economic growth**.

Solution

Due to the extreme challenges posed by the mountainous landscape, the municipality of Septemvri selected **Flexalen® 600 polybutene-1 (PB-1)** as the only viable solution. The area's steep elevation changes, narrow roads and riverbanks made traditional pipe systems impossible or cost-prohibitive to install. Flexalen®'s 600 lightweight coils enabled transportation efficiency and high flexibility allowing long, continuous pipe runs; with up to 100 times fewer joints than with traditional materials. This was a key advantage taken into consideration the demanding remote location of the installation. This not only simplified logistics but also significantly reduced installation time and future maintenance risks and costs.

Moreover, in geothermal applications, pipe materials must endure harsh conditions, including high mineral and gas content. **Flexalen® 600** pipes excel in these environments thanks to:

- Outstanding chemical resistance.
- Fast and easy installation, even in hard-to-reach or inaccessible areas.
- Increase in system reliability and integrity thanks to minimal connection points.
- Minimal environmental disruption, with fewer trenches and less machinery required.
- A strong track record in geothermal systems.

These benefits enabled the creation of a highly reliable water transport network that meets the resort's high standards.

Project Process

Thermaflex's Cradle to Cradle Certified® Flexalen® 600 pre-insulated piping system has been chosen as a solution for the whole project. This big enterprise was delivered in three phases. It commenced in spring 2017 and successfully ended in autumn 2024.

The project overview:
Phase 1 - The main pipeline was installed from the mountain springs to the village of Varvara - 4,200 metres of 125/200 mm diameter pipe.
Phase 2 - Installation of a heating network in Varvara village network for kindergarten, school, library, cultural house and future connection for municipal buildings - 1,100m of 90/160 mm and 420m of 75/160 mm diameter pipes including some smaller diameters for house connections.
Phase 3 - The main pipeline was placed connecting Varvara with the town of Septemvri - 10,000 m of 125/200 mm diameter pipe and city network with an additional 3000 meters.

Phases 1 and 2 were completed by **Megainvest Holding** and Phase 3 by **Buildkom**. The whole installation process was managed by **MILOV** and **MEKOM**. This project enabled the utilisation of the energy potential for a sustainable heating network in this region.

Results & Benefits

The project resulted in efficient, ecological energy heating networks in Septemvri and Varvara. Compared to conventional heating infrastructure, the new network yielded significant environmental and operational benefits. Main contributors to the long-term return on investment include:

- **Green energy adoption: thermal springs energy transformed the heating infrastructure of public buildings and residences connected to the new network.**
- **Reduced CO2 emissions: switching to geothermal energy from traditional fuels such as coal, oil and wood pellets significantly reduced CO2 emissions.**
- **Boost to the local economy: new heating infrastructure lays the foundation for thermal SPA tourism, attracting investments and creating job opportunities.**

Conclusion

This project is a shining example of the sensible use of natural energy sources that would otherwise be lost. When energy in a modern heating network is captured and distributed efficiently, it can reduce traditional fuel consumption and shift towards sustainable living. Beyond its environmental benefits, the initiative enabled the transition of the local economy towards eco-friendly tourism with wellness and SPA facilities. Success and great project benefits lay the foundation for long-term plans to enlarge the scale of investment in the geothermal potential of the Septemvri area with the usage of Flexalen® 600 pre-insulated piping system.

Contractor quote

"Some installation locations were very inaccessible, but Flexalen's® 600 flexibility and lightweight enabled coils transportation without machinery for hundreds of metres, or even float them down small rivers. Any other material would have taken three years to install. With Flexalen®, we finished in months."

Anton Tcholakov, Installer and Technical Coordinator, MEKOM

www.thermaflex.com
international@thermaflex.com

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