

Title: **RESUME - Geothermal energy from mining sources**

„Study on geothermal energy and underground mining water usage in undermined territories of Sokolov region”

No: 4.2.6



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1.0 IDENTIFICATION

1.1 Customer

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1.3 Subject of the study

Subject of the study – Exploitation of geothermal energy and groundwater in undermined areas in Sokolov region

Additional part of the study – Heating of buildings in Dolní Rychnov municipality using heat potential of the mine water from the undermined areas

2.0 INITIAL SITUATION

This pre-investment study was elaborated within international project “ReSource” (Central Europe Programme) which focuses on exploring and utilisation of post-mining potentials in Central Europe mining regions.

Microregion Sokolov-East as a member of ReSource project and its Work Group Natural Potentials studied the possibility of future use of geothermal energy from mining groundwater in Sokolov region. We can consider it as a pilot study since there are no previous studies / researches focusing on geothermal potential in Sokolov region available.

Dolní Rychnov municipality lies south of the town of Sokolov which it adjoins. There are plots in the Dolní Rychnov cadastral area under which old mining works are situated. It is supposed that these have been flooded by mine water. A detailed description of this part of the study is the subject of a separate geological report comprising of two parts. The first part focuses on the situation in the immediate vicinity of the municipality, while the subject of the second part is the possibility of building a geothermal energy in the industrial zone within the Dolní Rychnov cadastral area.

This study has been requested in order to examine the assumption that the old mining works have been flooded and to determine the possibilities of exploitation of the mine water heat potential for building heating purposes in Dolní Rychnov municipality. To achieve this goal it was suggested to drill a prospect hole close to the residential area, whose purpose was to examine the qualitative and quantitative attributes of the saturation of the old coal slopes. The findings resulting from the prospect hole should be used to evaluate the possibility of construction of a geothermal heating plant that would feed the objects within the industrial area.

The results of this pre-investment study will serve as a starting point for follow-up investment studies for future investors, spatial planners and other target groups interested in groundwater utilisation for different purposes.

3.0 OBJECTIVE OF THE STUDY

The objective of the study is to evaluate the possibility of exploiting geothermal energy in undermined areas of the Sokolov region. Dolní Rychnov municipality was selected as there are locations in its cadastral area that are suitable for this purpose. The task has been divided into two parts, based on the means of exploitation of these locations. One of the locations is the residential area of the municipality, the other is the industrial zone located within its cadastral area. In both cases, the aim was to assess the possibility of exploitation of the geothermal energy contained within the flooded coal stopes for building heating purposes – both for residential objects or public facilities and for industrial properties.

3.1 Exploitation of geothermal energy for building heating purposes in Dolní Rychnov municipality

The objectives of the study on exploitation of geothermal energy for building heating purposes in Dolní Rychnov municipality were the following:

- To examine the assumption – using a prospect hole – that the old mining works contain enough mine water to be used for building heating purposes in the Dolní Rychnov municipality
- To design technology for exploitation of the heat potential of the mine water in the Dolní Rychnov area for building heating purposes and to assess the alternative solutions
- To determine the impacts of the technology used on the landscape stability, to perform the necessary researches and balance analyses
- To create project documentation for heating of three specific buildings in Dolní Rychnov municipality with geothermal energy using heat pumps, including a hydrology survey project

3.2 Exploitation of geothermal energy for the construction of a geothermal heating plant in Dolní Rychnov industrial area

The objectives of the study on exploitation of geothermal energy for the construction of a geothermal heating plant in Dolní Rychnov industrial area were the following:

- Analysis of the possibility of construction of a geothermal heating plant
- Concept of a working design of a geothermal heating plant
- Preliminary estimate of the initial and operational costs of the geothermal heating plant
- Balance analysis
- Creating a project on hydrogeology survey of the exploitation of geothermal energy for building heating purposes within the protective zone; assessing the impact of the chemical status of the water on its suitability for the proposed technology

3.3 Legal analysis

The objectives of the study in this field were the following:

- Legal analysis of the construction of a geothermal heating plant in Dolní Rychnov municipality
- Legal analyses of planned and prepared works in accordance with waste management legislature

4.0 WORK PROGRESS

The following progress of tasks was devised to accomplish the given objective. The sequence in which the works are carried out is important in order to maintain the flow of the particular tasks.

- Initially, it was necessary to point out and map the areas under which old mining works were located. There are both current and historical sources that can be used but exact plans of these mining works are not usually available. That is why a mining expert opinion was necessary that would determine the areas where the old mining works were located.
- Concurrently with the first step a legal analysis was done whose purpose was to determine all the legal impacts of utilization of the areas for exploitation of geothermal energy for building heating purposes.
- Based on the mining expert opinion, the next step was to create a project for a prospect hole situated close to the municipal residential area.
- The prospect hole was drilled in accordance with the project documentation and a pumping test was performed, based on which the quantitative and qualitative attributes of the mine water were determined.
- Based on the mining expert opinion and information obtained from the bail test a geological survey project was made, focusing on the possibility of construction of a geothermal heating plant in the industrial area.
- The next step was to design technology for building heating purposes in Dolní Rychnov municipality and for the geothermal heating plant in the industrial area.
- Three public facilities in Dolní Rychnov municipality were selected – a kindergarten, a nursing home for the elderly people and the local town hall. Project documentation on the heating of these buildings was created.
- Finally, the results of the researches were evaluated and, based on these, recommendations have been set for the next phase of the research.

5.0 CONCLUSION

5.1 Building heating in Dolní Rychnov municipality

5.1.1 Geological part

Dolní Rychnov – HDR1 bore

The objective of the “Dolní Rychnov – HDR1 bore” subtask was to assess the possibility of exploitation of geothermal energy for the purpose of heating of three specific buildings located in the undermined area within the cadastral area of Dolní Rychnov. Before the prospect works could start, it was necessary to obtain a mining expert opinion that would suggest the best locations for the bores in order to exploit thermal energy of groundwater from the deep-mined “Anežka” brown coal seam in Dolní Rychnov (Tertiary Sokolov formation) and to evaluate the potential risks resulting from the realization of the bores. Based on the opinion of the mining expert a project of the geological works was created. The geological survey itself comprised of the following steps:

- Filing the geological task with the ČGS-Geofond, informing the municipality on the project,
- Obtaining information from the ČGS-Geofond archives on the previous prospect works in the area,
- Terrain reconnaissance with the participation of a geologist and a representative of the investor, particularly aiming to set a location for the prospect hole,
- Solving potential conflict of interests (property-related claims, infrastructure, water wells in the area, opinion of the Regional Authority of the Karlovy Vary Region, reporting the planned works to the Sokolov District Mining Authority, etc.),
- Creating the project and presenting it to the investor for approval,
- Drilling the HDR1 prospect hole,
- Field hydrogeology survey within the scope of related legislation based on the conditions set out in the project,
- Geodetic surveying of the bore,

- Hydrodynamic tests (13 days of pumping with three depressions while continuously increasing the amount of water from 0.2 to 0.45 liters per second, collecting samples of groundwater, 8-day recovery test),
- Lab analyses of the groundwater recovered at the end of the first and third drawdown in an attested laboratory,
- Compiling the results into a final report.

The survey verified that a coal seam "Anežka" (Sokolov formation) is located in the area of interest 24.3 meters below the surface. Contrary to the expectations and the results of the previously performed works, aquiferous clay has been found in the roof of the coal seam. There is a possibility that a communication route exists between the Tertiary aquifer and the Quaternary groundwater body related to the fluvial gravel or that there is an affluent of surface water from the nearby stream.

The hydrodynamic tests and subsequent calculations have shown that the aquiferous environment is – in the location of the bore – slightly pervious. The temperature of groundwater slightly exceeds 10°C and the quality of the water itself is a quite problematic and changes with the amount of water recovered. The HDR1 bore allowed for 0.33 liters per second, i.e. 28.5 m³ per day, to be recovered. That would result in a drawdown of 10.2 m and the radius of the corresponding depression would be 24.71 m. This demonstrates, among other things, that if a network of geothermal bores is to be constructed, they should be located minimum 50 m apart (2xR). On the other hand, it is likely that recharge wells could be constructed within the cone of depression, which would allow for the (cool) waste water to return to the rock mass.

In the "Anežka" coal seam there have been significant problems with saturation for a long time in the past. Because of that, Johann Anton Edler von Starck had a drainage adit built – the so-called St. Anthony Adit – that lead 2820 meters towards the Ohře river. The adit is now defunct because of many caving falls and about 50 meters of it that pass through the chemical works in Sokolov are sealed with concrete. The water has always been a concern when mining in this area and the mines have been flooded several times. The flowing water sometimes still causes caving falls of a so-far caving-free mining works. The above-mentioned facts indicate that it is likely the HDR1 prospect was located in a locally less pervious and less saturated part of the deep-mined seam (in a local caving fall), and that we may expect higher (at least by an order

of magnitude) permeability of the coal seam and yield of the waterworks in other areas of the municipality. Therefore, the values of these parameters as they have been measured by the research may be considered minimum.

If – in the future – a detailed hydrogeology survey is conducted, it will be necessary to focus on the entire thickness of the seam, the possibility of water recharge, the communication route between the Tertiary and Quaternary aquifer, the groundwater quality from the view of waste water disposal and on possible effects on the stability of the area from the perspective of current building and mining works.

5.1.2 Heating part

Heat balance

As a part of the study, the three following objects were selected by the customer to be assessed on the possibility of heating with geothermal energy of mine water:

- Town Hall (Obecní úřad), Revoluční 303, Dolní Rychnov, plot number 174/1, cadastral area Dolní Rychnov
- Kindergarten (Mateřská škola), Šafaříkova 17, Dolní Rychnov, plot numbers 519 and 520, cadastral area Dolní Rychnov
- Nursing home for the elderly (Dům pro seniory), Zahradní 234, Dolní Rychnov, plot number 650, cadastral area Dolní Rychnov

Project documentation was created for these objects that included a calculation of heat loss of the objects, assessment of the heating surfaces from the view of decreasing the temperature fall from 90°C/70°C to 5 5°C/45°C, value that is suitable for heat pumps. Also, the current heat distribution systems were recalculated to meet the new parameters. In all cases measures have been taken into account so that the heating systems would be able to ensure thermal comfort with new technical parameters.

Preliminary research on the heat balance of the objects along the heat distribution route between the supposed locations of the bores and the selected heat consumption sites (town hall, kindergarten, nursing home) was conducted.

The result of these steps are two heat balances that have been used further to determine the technical possibilities of the capacity of the mining water pumping:

- Overall heat consumption of the objects selected by the customer – 90 to 100 kW
(Note: These are the objects selected by the customer to be used in the geothermal heating project, i.e. the local Town Hall, the kindergarten and the nursing home for the elderly.)
- Overall heat consumption of the potential consumption sites including the objects selected by the customer – approx. 740 kW
(Note: Potential consumption sites include all objects located along the heat distribution route between the expected location of the bores for mine water pumping and the terminal consumption sites, i.e. the Town Hall, the kindergarten and the nursing home for the three separate heating branches. The total heating demand of these three objects including the objects along the distribution route (potential consumption sites) is approx. 744 kW.)

Location of the bores for mine water pumping

As a result of the geological surveys and calculations, the following preliminary conditions for the location of the new bores have been set:

- The bores shall be located in undermined areas,
- The bores shall be located minimum 50 m from the built-up areas in order to eliminate possible negative effects of the depression basin
- The distance between the pumping bores shall not be less than 50 m (to eliminate mutual interference),
- The bores shall be situated minimum 50 m from the current groundwater sources (wells),
- The locations of the bores shall be accessible for boring machinery
- All potential conflicts of interest shall be solved at the location of the bores (approval of the property owner, collisions with underground infrastructure, etc.)

These conclusions have been made based upon a single prospect well and cannot be generalized to recommend placing the bores in the middle of built-up areas, even when the limiting conditions are met. There is a significant risk that it could jeopardize the stability of the environment and static safety of the buildings.

For these reasons it has been considered to situate the bores for mine water pumping outside of the built-up areas, to where the prospect well is located.

As the measured capacity of the prospect well was only 0.33 liters per second, which makes for maximum temperature drop of about 8°C, the useful heat capacity is approximately 11 kW. This makes it impossible to cover the consumption of 740 kW with a sufficient amount of bores. In reality it is also improbable that all the potential customers would be interested in joining the project. An assumption was made that approximately 40% of the potential customers will show interested in the project, therefore, the maximum heat output was determined to be 360 kW.

In both cases (connecting only the selected objects or including other potential consumption sites) a system of pumping bores and recharge wells will have to be constructed outside of the built-up areas. That also presumes that a distribution network between the bores and the consumption sites is built.

How the heat is generated

The drilling of the prospect hole and a subsequent pumping test have shown that there is mine water available in the selected area, however, the yield of the prospect hole was quite low – only 0.33 liters per second. The temperature of the mine water slightly exceeded 10°C. The chemical and physical properties of the water change throughout the process of pumping and it is not possible to accurately guarantee certain quality of the mine water due to limited time frame of the pumping test.

The findings lead to the following conclusions:

- The yield of the prospect hole is quite low. Counting on the temperature fall of 10°C/2°C, one bore can provide approximately 11 kW of heat output.
- Physical and chemical properties of the water change over time and the use of groundwater directly in the heat pump circuit cannot be recommended.

Based on these facts, the only possibility to exploit the mine water is with a circuit that would be separated from the heat pump circuit by an external heat-exchanger.

Thus, the mine water pumped will exchange heat through the external heat-exchanger to an intermediate circuit between the exchanger and the heat pump.

Possible locations of the heat sources (heat pumps)

Two possible locations of the heat sources (heat pumps) were assessed:

- The central source of heat situated in the location of pumping bores; subsequent distribution of the heating water of the temperature of 55°C to the particular consumption sites – Option A
- Heat pumps situated at the consumption sites (decentralized sources); distribution of the source water of the temperature of 10°C from the bores to the consumption sites – Option B

In both cases the system is the same from the point of mine water pumping to the external heat-exchanger. The main difference lies in the ownership of the heat pumps. Option A means that the purchase price of the heat pumps will be covered by the investor, while in case of option B the costs will go to the consumer of the heat which can cause a decrease of the interest in this technology. On the other hand, there is a possibility of obtaining public subsidies for construction of a central heat source that exploits geothermal energy. The decreased necessary investment for potential consumers of the heat creates good premise for optimizing the size of the system.

5.2 Geothermal heating plant in the Dolní Rychnov industrial area

5.2.1 Geological part

Dolní Rychnov – Heating plant

The objective of the “Dolní Rychnov – Heating plant” subtask was to perform a geological survey focusing on the possibility of exploitation of geothermal energy in the undermined areas for the use of the energy in the industrial zone at Dolní Rychnov. Before the survey was conducted, an expert opinion had been created that had suggested the best locations for the bores in order to assess the possibility of exploitation of thermal energy of groundwater from the deep-mined “Anežka” brown coal seam in Dolní Rychnov. The expert opinion had shown potential risks connected with these bores. Also, demarcation of the undermined locations within the selected area was included in the expert opinion, which has thus defined the range of interest (locally, globally and depth-wise) of the geology survey. In accordance with the recommendation of a mining expert and taking into account the possible risk of the impact on the stability

of the area, the project also takes into account returning of the pumped water back into the aquifer.

The following technical and geological works are part of the project:

- 4 supported vertical pumping bores – HDR2 – HDR5 – with planned depth around 30 m (based on the real geological situation). The drilling should be done using the core drilling method. Given the expected geological profile and the presence of pressurized groundwater the bore will have to be cased.
- 4 supported shallow vertical observation wells – PDR 2 – PDR5 (up to 8 m deep according to the local geological development – always on the Quaternary basis) – that will help to monitor the impact of the water pumping on the Quaternary aquifer. These wells shall be located close to the pumping bores (approx. 5 m).
- 4 supported vertical recharge wells – ZDR2 – ZDR5 – with planned depth around 30 m (based on the real geological profile) located in the depression basins close to the pumping bores (approx. 20 m). These wells shall help the recharge of the water that would be pumped out during pumping tests or the waste water from the operation of the heating plant.
- Geodetic surveying of the bore.
- Pumping tests with expected yield up to 2 liters per second (21 days of pumping with a total of three depressions while continuously increasing the amount of water being pumped), ending with a 7-day recovery test. The pumped-out groundwater shall be recharged into the rock mass using the ZDR recharge well located close to the pumping bore. These tests shall be subsequently performed on all four pumping bores. The outcome of the tests will determine whether an additional group pumping test shall be performed.
- Monitoring the groundwater level in the surrounding pumping bores, recharge wells and prospect holes for the duration of the pumping test and the recovery tests. The HDR1 bore from the previous stage of the project shall be used as well.
- Monitoring the groundwater level in the surrounding water sources (wells) for the duration of the hydrodynamic testing.

- Lab analysis of the physical and chemical properties of the groundwater (pH, temperature, mineralization, water hardness, contents of sulfates, chlorides, acid carbonates, iron, sodium, potassium + a complex chemical analysis according to Ministry of Health regulation No. 252/2004 Coll.).
- Geological evaluation of the results in the form of a final report.

5.2.2 Heating part

Heat balance

For the study the customer has selected area within the industrial zone of Dolní Rychnov adjacent to the Chebská and Bergmannova streets. Various industrial objects and estates are located there, most of them now heated by a steam pipeline from the Tisová power plant. The steam is conducted into heat-exchangers at the consumers' sites where heating water is created for building heating purposes. This water is used to heat both the industrial estates and the office buildings and also to generate hot tap water.

As a part of the study, several potential consumers of the thermal energy from the geothermal heating plant have been asked for cooperation in order to specify the real heat consumption needs of the particular consumers. Only VISHAY ELECTRONIC spol. s.r.o. have responded to the repeated calls for cooperation and has provided us with relevant technical data. The company runs two industrial estates at Bergmannova 392 and Bergmanova 399, Dolní Rychnov. No other companies have responded to the appeal. Therefore, the heat consumption of the selected area was determined to be 7.37 MW.

Maximum heat output of both estates of VISHAY ELECTRONIC spol. s.r.o. is 1.97 MW. However, almost 1.44 MW is the output required for air-conditioning and only 0.33 MW is used for central heating and 0.2 MW for water heating.

At the moment the only basis for any conclusions is the information gained from the HDR1 prospect well in Dolní Rychnov. The detected pumping capacity of the bore makes it practically impossible to even think about construction of a geothermal heating plant with outputs in megawatts.

Boundary conditions for the construction of a geothermal heating plant

To set the real boundary conditions for the constructions of a geothermal heating plant we can use the heat balance of VISHAY ELECTRONIC spol. s.r.o. and the assumption of the pumping bore yield of at least 2 liters per second.

The whole area in question consists of industrial objects that work with temperature fall of 90°C/70°C. As it seems unrealistic to expect that all industrial systems would be rebuilt to work with temperature fall that is normal for common heat pumps, it would be necessary to use heat pumps that work with at least 70°C. Even then it must be taken into account that geothermal energy would only be useful with certain devices and just for a part of the heating season. The only application of geothermal energy that is available year-round is water heating.

In the case of VISHAY ELECTRONIC spol. s.r.o. it would be possible to achieve full-fledged heating of the objects using geothermal energy till the outside temperature reaches -3°C. The necessary output of the source would then be 1.16 MW. In lower temperatures the source would be only partially applicable for building heating but it could still be used for water heating. This would require the use of a bivalent source and thus preservation of the current heat-exchange stations.

Geothermal heating plant technology

The technology used for the construction of the geothermal heating plant will be similar to the building heating technology in Dolní Rychnov municipality.

The mine water pumped will exchange heat through the external heat-exchanger to the secondary circuit. The secondary circuit will be the source of thermal energy for heat pumps. The heating water of a temperature of 70°C will then be distributed to the existing heat-exchange stations at the consumers' sites.

5.3 Legal Analysis of the Possibilities of Exploitation of Energy and Mine Water

Legal analysis of the possibility of exploitation of geothermal groundwater in Sokolov region

The subject of the analysis is the legal regulation of the possibility of exploitation of thermal groundwater in the Czech Republic. This legal analysis is a part of the extensive “Study on Exploitation of Geothermal Energy and Groundwater in Undermined Areas in Sokolov Region” that is one of the outcomes of the broad **ReSource** project.

In the Czech Republic, the legal aspects of exploitation of groundwater are governed by four main legal acts:

Act no. 183/2006 Coll. on plot planning and construction (Construction Law)

Act no. 254/2001 Coll. on waters (Water Law)

Act no. 44/1988 Coll. on protection and exploitation of mineral resources (Mining Law)

Act no. 62/1988 Coll. on geological works (Geological Law)

The aspects of exploitation of mineral groundwater in spas are particularly governed by Act no. 164/2001 Coll. on natural curative springs, natural mineral water sources, natural spas and spa locations (Spa Law).

The exploitation of groundwater in Sokolov region will be executed using deep bores. Water pumping with the intention to use the energetic potential of the water using deep bores is considered water treatment. According to the Water Law, drilling bores for groundwater pumping is considered **water construction** and is subject to an approval in proceedings under the Water Law. In order to be able to execute the drilling, the developer must obtain three administrative permits:

- **plot planning permit** according to § 79 and 92 of the Construction Law
- **water treatment permit** according to § 8 art. 1 section d) of the Water Law
- **construction permit for water constructions** according to § 15 of the Water Law.

The first of the above permits is issued by the local construction authority and the latter two are issued by the responsible water authority – in our case it is the Department of the Environment of the Sokolov Municipality.

Based on the attributes of the bore, several other statements and permissions need to be obtained before the above mentioned permits are issued. If the bores are more than 30 m deep, a permit to execute mining works issued by the Mining Authority and a statement of the regional authority on the geological project based on Geological Law, are needed.

The so-called prospect holes offer an important possibility to significantly simplify and speed-up the entire process. The prospect holes are used for less than 14 days and the water consumption during this period does not exceed 1 liter per second. For these bores neither the plot planning permit, the water treatment permit or the construction permit for water constructions are required, as these are subject to the Geological Law only.

Utilization of mineral groundwater for spa purposes is a separate legal area. In order to be able to exploit mineral groundwater for spa purposes, two administrative permits issued by the Ministry of Health are required:

- **Spring Certification** according to § 5 of the Spa Law
- **Spring Utilization Permit** according to § 12 of the Spa Law

Large amount of documents need to be supplied in order to obtain these permits, such as a report on geological works results or an expert opinion on the exploitability of mineral waters. When these permits are received, the construction of the water pumping device can commence. Again, the construction authority performs plot planning proceedings and the water authority acts according to the Water Law.

6.0 EVALUATION

The prospect well has shown there is groundwater located in the undermined areas in the Dolní Rychnov municipality. The measured yield, however, was significantly lower than what was expected based on historical evidence. The facts described in chapter 5.1.1 indicate that the HDR1 prospect well might well have been located in a locally less pervious and less saturated part of the deep-mined seam (a local caving fall), and that we may expect higher (at least by an order of magnitude) permeability of the coal seam and yield of the waterworks in other areas of the municipality. Therefore, the values of these parameters as they have been measured by the research may be considered minimum.

If – in the future – a detailed hydrogeology survey is conducted, it will be necessary to focus on the thickness of the seam, the possibility of water recharge, the communication route between the Tertiary and Quaternary aquifer, the groundwater quality from the view of waste water disposal and on possible effects on the stability of the area from the perspective of current building and mining works.

In order to confirm the feasibility of the intention to exploit mine water from the undermined areas for the purpose of building heating in Dolní Rychnov municipality and to construct a geothermal heating plant within the Dolní Rychnov industrial area, it will be necessary to verify the following facts:

Building heating in Dolní Rychnov municipality:

- Construction of at least two groups of bores (pumping bores, recharge wells and observation wells) close to the HDR1 prospect hole.
- Perform a long-term pumping test to verify higher pumping capacity, to ensure stability of the chemical and physical properties and the efficiency of the recharge.
- Using gathered data verify the possibility of bore drilling in the built-up area, with regard to the building stability, the effect on the landscape and the environmental impact evaluation.
- Perform a detailed research on the interest of potential consumers of heat from the geothermal source in Revoluční, Zahradní and Šafaříkova streets.

Geothermal heating plant in Dolní Rychnov industrial area:

- Following the project documentation construct PDR2, HDR2, ZDR2 bores on the plot number 711/1; PDR3, HDR3, ZDR3 bores on the plot number 837; PDR4, HDR4, ZDR4 bores on the plot number 839; and PDR5, HDR5, ZDR5 bores on the plot number 845.
- Perform a long-term pumping test to verify higher pumping capacity, to ensure stability of the chemical and physical properties and the efficiency of the recharge.
- Commence negotiation with VISHAY ELECTRONIC spol. s r.o. on technical and economic conditions of connecting the company estates onto the geothermal heating plant (performing an energetic audit).

Next steps

Microregion Sokolov-East as well as the mayor of Dolní Rychnov consider the results of the study important and extremely interesting. The study helped to identify the possibility and feasibility of geothermal heating plant in the municipality of Dolní Rychnov. The results of the study also confirm the feasibility of mining groundwater utilisation for heating of municipal buildings.

For this purpose both Microregion Sokolov-East and Dolní Rychnov will make the necessary steps to prepare follow-up detailed research incl. hydrogeology survey, drilling with long-term pumping test in respective places of Dolní Rychov municipality and project documentations incl. building permit. In relation to this ways for ensuring funds for own implementation will be jointly sought.

7.0 TRANSNATIONAL RELEVANCE

This pre-investment study represents an initial step in research of geothermal energy usability from mining resources in Sokolov lignite region. No similar study has been prepared in the past on which we could build on. This shows the extraordinary significance of this study.

By means of close cooperation with other ReSource partners, we were able to create this starting point of the large geothermal energy usage issue. Very important and useful advices were obtained from more experienced partners during both regular Work Group Natural Potentials meetings, which are held within Progress Workshops of ReSource project every 6 months, and optional additional meetings among partners.

Altogether 4 complementary pre-investment studies on geothermal energy from mining sources in 4 different places in Central Europe are being elaborated as ReSource outputs – in Aue (Germany), Mansfeld (Germany), Zasavje (Slovenia) and Sokolov region. Moreover the lead partner – District of Zwickau – is going to make a reconnaissance drilling into the mine galleries of the mining district Zwickau for extracting geothermal energy as one of ReSource Core Outputs. The comparison of different approaches, technologies, minewater characteristic and potentials will be the main aim of the Thematic WG Natural Potentials Report, which will be elaborated by Natural Potentials WG Leader for Geothermic PP3 - Educational Institution of Employers Association Saxony-Anhalt (registered Association).

Hereby the Sokolov region as a newcomer in geothermal energy field had outstanding opportunity to draw experience from project partners for its own study and took this opportunity especially with PP3. Microregion Sokolov-East will stay in close contact with ReSource project partners for follow-up cooperation as the next steps in geothermal energy utilisation from mining sources are planned to be implemented in Sokolov region.

On the other hand, methodology and approach developed in this pre-investment study are transferable and can be used as a guide for any other mining region which intends to embark on geothermal energy issue. Complete version of the study is delivered in Czech and Executive Summary in both Czech and English language.

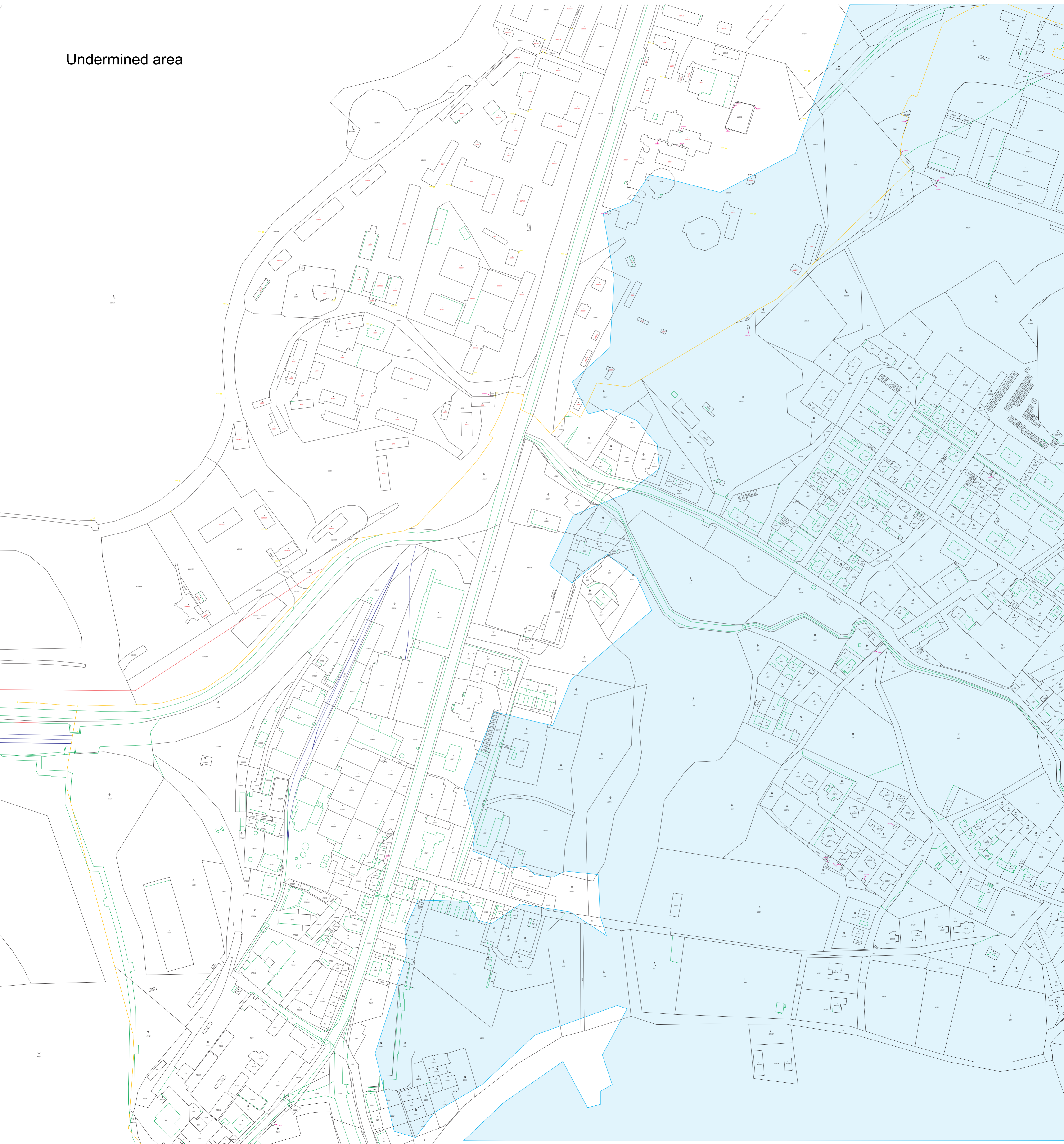
Documents will be accessible electronically on ReSource web page: www.resource-ce.eu and physically at the Microregion Sokolov-East seat (Town Hall of Královské Poříčí, Czech Republic).

8.0 ANNEXES

8.1 Undermined area

8.2 Situation – Dolní Rychnov

Undermined area



SITUATION - DOLNÍ RYCHNOV

