



DELIVERABLE D.T3.4.2 SUMMARY REPORT

New local financing and support tools

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A.T4.3 Design and implementation of new local financing and support schemes for renewable district heating

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1. Introduction

The aim of the activity "Design and implementation of new local financing and support schemes for renewable district heating" is to support the development of local projects through innovative support and financing schemes. The challenge for the project partners was to find solutions in their respective target regions under the given conditions and already existing financing models in order to promote the local transformation of the heating system and to push the expansion of renewable heating networks. In some places, it was possible to link up with existing support programmes, feed in recommendations via local governments or even continue previous efforts. In other regions, ENTRAIN was used as an opportunity to further report on already good available support programmes and to demonstrate possibilities for the operation of new heating networks.

The approaches were varied and differed from region to region. For example, in Croatia the focus was on financial support for possible geothermal plants and in Italy the established "QM Heizwerke Italy" is to be included in the funding requirements. The result is a lot of communication with interested and involved companies, authorities, governments and individuals, preparation of recommendations and dissemination to the public.

2. New local financing and support tools - Croatia

The potential of geothermal energy needs to be stimulated through new tenders for exploration and exploitation of geothermal water for energy purposes at existing known sites. It is necessary to additionally encourage research in areas where a high geothermal gradient is predicted, and where geothermal potential should be additionally confirmed by research activities, and to find models of research support and research risk reduction in such areas.

The geothermal gradient of the Republic of Croatia (0.49 °C/m) is significantly higher than the European average (0.03 °C/m). Therefore, geothermal energy is considered a renewable energy source of high potential, both at the level of the Republic of Croatia and at the level of Karlovac County. Karlovac County is in the central geothermal area of the Republic of Croatia with medium-high heat flux density values of 30-50 mW/m² and geothermal gradients of 20-40 °C/km.

The City of Karlovac recognized the geothermal potential and founded the company GeotermiKA d.o.o. for energy from Karlovac for research and exploitation of geothermal water for the needs of the existing heating system and to produce electricity for the needs of public facilities, such as hospitals, schools, kindergartens, city administration facilities, public lighting, etc.

Exploration works and activities for the purpose of determining the possibility of exploitation of geothermal waters for energy purposes can be performed in the entire area of Karlovac County. Exploration areas of geothermal waters for energy purposes are "Karlovac 1" and "Karlovac 2". Construction of buildings and plants to produce electricity and / or heat can be planned at the locations of geothermal wells within the exploration area of geothermal waters "Karlovac 1" and "Karlovac 2".

Pursuant to the provisions of the Law on Exploration and Exploitation of Hydrocarbons, in 2019 the Decision on issuing a permit for exploration of geothermal waters in the exploration area "Karlovac 1" (Figure 4.4.) was issued to the company GeotermiKA d.o.o. During the five-year permit for exploration activities on an area 7,800 meters long and 5,700 meters wide, east of Karlovac



and partly on the territory of Draganić Municipality, the quantities and qualities and the actual thermal potential of geothermal waters should be examined and determined in order to obtain an expert basis for creating new wells and their preparation for exploitation. GeotermiKA d.o.o. is in the process of developing business cooperation and exploring opportunities for cooperation with various companies and works closely with ministries and public administration bodies. A tender was conducted for the analysis and interpretation of existing seismic data and a contract was concluded with the contractor. The analysis and interpretation determined the locations for two pairs of wells (two production KaGT-1, KaGT-3 and two injection KaGT-2 and KaGT-4) and the geological basis for the exploration well Karlovac Geothermal 1 (KaGT-1).

Also, it is important to mention that the company GeotermiKA, together with the City of Karlovac and the City Heating Plant for 2021, received funds for the preparation of part of the documentation for the EU tender European City Facility (EUCF). In 2021, it is planned to complete the remaining necessary documentation for the construction of the first exploration well KaGT-1, and to obtain a location permit for the said well.

Given that the use of geothermal energy is a renewable and environmentally friendly energy source that also encourages job creation and energy security of the local community, its use is extremely important for Karlovac County. Geothermal waters can be used for heating residential buildings, but also in agricultural production and industry, and for electricity production.

Also, Gradska Toplana d.o.o. reported a project of revitalization of district heating network in the tender to the Ministry of Regional Development and EU funds. The project was successfully approved by signing the Agreement on March 31, 2021, and grants for this project will be awarded under the Operational Program "Competitiveness and Cohesion 2014-2020".

The realization of this project will replace parts of hot water pipes, manholes and equipment at the transmission part of thermal substations, modernize the pumping plant and chemical water treatment plant and implement the SCADA system.

After the company GeotermiKA d.o.o. complete the testing of wells and determine the quality and temperature of water, it is necessary based on the obtained data to determine which is the best way to exploit geothermal energy in the Karlovac County. If the possibility arises, Karlovac County should start the process of installing a heating plant on geothermal energy and connecting to the existing district heating system, but, if possible, start expanding the existing district heating system. Furthermore, it is necessary to consider whether the temperature of geothermal water will be high enough to produce economically viable electricity and to determine the possibility of starting the installation of the plant. In this way, thanks to geothermal energy, Karlovac County could become energy independent.

The implementation of such an investment project in the Karlovac County will require the mobilization of significant financial resources. For the successful implementation of the measures, the budgets of the city of Karlovac and the County are not enough and it is necessary to find an appropriate combination of loans, private capital and non-refundable opportunities to finance their implementation. The successful use of grants will require significant involvement of city and county employees as well as subcontracting by external experts.

It is important to note here that the drafting of this document coincides with the end of the European Union's long-term budget for 2014-2020 and the adoption of the new European Union Long-Term Budget for 2021-2027. On 21 July 2020, the European Council agreed on a



comprehensive package of € 1,824.3 billion which includes the future multiannual financial framework (MFF) of € 1,074.3 billion and the new Next Generation Instrument EU (NGEU) totaling € 750 billion. The main goal of the EU's Next Generation Instrument is to help rebuild the European Union following the COVID-19 pandemic, and to support investment in a green and digital transition.

In the new long-term budget, 22 billion euros are intended for the Republic of Croatia. Once the budget has been adopted, Member States should approve the Own Resources Decision as soon as possible in accordance with their constitutional provisions, draw up a national recovery and resilience plan to withdraw funds from the EU's Next Generation Instrument, and compose development strategies and operational programs, based on which funds will be withdrawn from the multiannual financial framework.

The project is cost-effective in the case of increasing the percentage of the grant (ESI funding), which should preferably start to implement the project using the following steps:

- Application for potential tenders for cohesion, resilience and values, Union Programs, financial instruments, alternative funding sources and national public calls and tenders for the purpose of obtaining grants for the preparation of project documentation (Karlovac County or Gradska toplana d.o.o. as the applicant).
- Creating project documentation.
- Obtaining the necessary permits (location permit, building permit, subdivision of cadastral parcels through which the heating pipeline passes, etc.).
- Application to ESI funds for the purpose of obtaining grants for construction and mechanical works and equipment.
- Construction work.

Important stakeholders in the implementation of this project are:

- Citizens (citizens' associations, energy cooperatives, energy efficiency cooperatives, community cooperatives),
- Karlovac County and the city of Karlovac,
- Public services (Gradska Toplana d.o.o., Geotermika d.o.o.),
- Energy and Development Agencies (REGEA and Karlovac County Development Agency),
- Local associations.

There is already a good connection between the above-mentioned participants, which is already achieving positive results and activities in the implementation of the project.

The City of Karlovac and the REGEA together with the City of Velika Gorica, signed an agreement on cooperation in the preparation and implementation of a project to increase energy efficiency in the building and heating sector and increase the share of renewable energy sources. The aim of the agreement is to cooperate in the preparation and joint application to the EU call for assistance for project development under Horizon 2020. REGEA will support public and private promoters of investment projects in preparing the technical, economic and legal basis for developing energy efficiency investments and renewable energy sources, which are planned to be realized in the area of Karlovac and Velika Gorica in the sectors of buildings and heating and related in the part of integration of renewable energy sources.



There is also a strong cooperation between the Development Agency of Karlovac County and the company Geotermika d.o.o. in the realization of the project of research and exploitation of geothermal water of the geothermal field Karlovac for the needs of the existing thermal system of the city.

Further cooperation was agreed, professional assistance from the Public Institution and the Regional Development Agency in the preparation of the project for possible financing of certain activities from EU funds.

The resources offered by this study and other reports assist in the implementation of the project of introduction of geothermal energy in existing district heating system, and all promotional activities and cooperation with international partners on the project ENTRAIN.

Communication and education should flow from the very beginning in order to achieve the maximum effect and so that everyone can be involved and understand the importance of the project. This will be achieved through the involvement of all stakeholders is necessary for successful implementation of this project.

Based on all the above, but also the experience gained so far on projects, this study provides the following recommendations:

- It is necessary to establish grant schemes for projects under the energy performance contracting model (EPC) in the district heating sector through investment loans and the European Recovery Plan, as well as financial instruments, which include grants for projects under the energy performance contracting model (EPC) and public-private partnership (PPP) in buildings. It is necessary to co-finance the fee for a private partner (ESCO or private partner in the PPP model).
- The challenges facing member states, including Croatia, are the harmonization of all available sources of funding, strategic documents and the level of readiness of projects for funding. Involving experts from the research and business sector, as well as raising awareness of the opportunities provided by EU programs should be a priority when planning and implementing projects in the coming period.
- The mechanism of integrated territorial investments represents a great potential in the domain of integrated energy and energy-climate projects. In the programming period 2021-2027. It is necessary through the dialogue of all stakeholders in the system (competent ministries, ITU Cities and their supporting institutions) to put emphasis on their planning and implementation.

Different options for investment in geothermal district heating system in City of Karlovac have been considered. Generally, the basic conclusion was that the inexistence of state subsidies for investments in district heating for heat production is a significant barrier for this type of project. The choice of the financial model according to which the project will be realized, depends on the mutual relations and the strength of the motives of the stakeholders.

An obstacle in the construction of DH for solar collectors, geothermal energy and heat pumps is the low representation of such systems in Croatia and potential consumers are unable to see the practical application and benefits of these systems and thus do not want to risk such investments. Continuing to encourage the installation of such systems and providing grants to future users, as well as educating them on the possibilities of the RES heating systems, will reduce the investment risk for users, making them more willing to participate in such projects.



In such perspective areas, a great interest of the investors has recently been seen in investing in exploration and use in other purposes of geothermal water (from Karlovac City Administration to Private investment, EU funds and Public-private partnership.) During the RSAG meetings the local authorities have shown their interest to invest in geothermal district heating in the near future and they are also engaged to access funds from national government and EU programs.

Finally, we sincerely hope that in the near future even the largest energy companies in Croatia - HEP (national electric company) and INA (national oil company) - will reach for the hot water from Croatian depths as an opportunity to expand their portfolio, each of them in their own way. HEP has already shown the willingness to enter the world of renewable energy by intensive investments into RES projects last year, so it is likely that in case of interesting opportunities they will be ready to join the initial wave of development of Croatian geothermal resources. INA, on the other hand, already has significant reserves of hot water among its current resources: some producing oil and gas fields have aquifers with temperature ranging from 120 to 190 degrees Celsius. There is also a large number of oil and gas wells which have watered out over time, so they have actually become better candidates for producing geothermal energy than hydrocarbons. Considering the long and extensive experience of INA petroleum engineers and geologists, as well as many similarities between petroleum and geothermal operations, their move towards geothermal transition should not be too dramatic.

To ensure project's success and to increase the degree of commitment of the involved parties REGEA will work on continuous research of available and eligible funding options (public, EU funds and private) to match the requirements of the identified project in Karlovac.

Geothermal energy cannot solve all energy problems, but it can significantly improve the energy balance in Croatia. The approach to project development needs to be harmonized with the priorities and economic interest of the county, as well as the purpose and manner of using geothermal energy in the mentioned area, because this harmonization will certainly lead to the economic justification of the project. Geothermal energy certainly deserves a systematic approach and requires multidisciplinary and serious work for final solutions. With these efforts, we want to emphasize the need for refinement and clear implementation of the existing strategy for the use of geothermal energy, which will certainly help the overall energy development of the City of Karlovac and the Republic of Croatia as a whole.

Due to the extremely demanding and ambitious energy and climate targets by 2030 and 2050, it is necessary to step up efforts in implementing the energy-climate projects and start implementing innovative and advanced financial models that can be viewed as a necessary (and only) option to make a significant step forward in the field of energy and climate.



3. New local financing and support tools - Germany

In Germany and Baden-Württemberg, the design, construction and, in some cases, operation of renewable heating networks are supported by the public sector with investment grants and low-interest loans. Politicians have recognised that more speed is needed in climate protection than before and have therefore both tightened up the climate targets and revised the instruments for promoting the expansion of renewable generation capacities and infrastructure measures. While the general funding situation at both federal and state level is good, there are still hurdles to the successful financing and implementation of RES heating network projects. ENTRAIN attempted to counter these hurdles by establishing the necessary expertise and providing support in the target region.

In order to secure financing for a project together with a credit institution, extensive and time-consuming preparatory work is necessary. In addition to a detailed presentation of the technical project concept and the possible collateral, the planned investment costs for the generator units and the heating network as well as future income from the sale of heat must be presented. An optimal financing structure must be worked out from the available funding programmes, depending on the operator model, the technical concept and the financing resources. The financing is decisively influenced by the amount of equity capital contributed, the subsidies and the debt capital still to be raised, which covers the necessary remaining investment sum. The conditions for obtaining debt capital can be influenced by factors such as collateral and liquidity of the company and the resulting interest rate as well as the repayment amount.

Company law defines various possible company forms that can be used as operator models for the planning, investment and operation of a heating network. Depending on the size of the project and the requirements of the actors involved (e.g. liability, profit-making intentions, objectives), the possible operator models are suitable in different ways. However, the biggest challenge is often to find a possible operator for a heating network. While, for example, the operation of wind or PV parks has become an interesting business field for utilities, the financing and operation of infrastructure for heat generation and distribution falls into the monetarily less attractive area of municipal services of general interest. Municipal utilities, which have so far mainly profited from the natural gas business, should be increasingly sensitised and motivated as important market participants to develop their activities in the direction of heat grids. Many projects also show that citizens are taking responsibility into their own hands: Especially in rural regions, heating network cooperatives are founded or existing cooperatives (e.g. photovoltaic cooperatives) are used to transform heat generation in municipalities and invest in renewable and climate-neutral heating networks.



4. New local financing and support tools - Italy

Currently, regional financing of RES DH projects work with a yearly call for projects, which will be ranked by intervention type and then funded until the total sum set that year allows.

These calls are open to municipalities or to municipality unions. There are no support schemes for private projects.

The interventions are ranked by priority:

1. New connections of end users on existing biomass-based DH networks;
2. Expansion of existing biomass-based DH networks;
3. Repowering of existing biomass boilers, plus the construction or expansion of the DH network, including new user connections;
4. Installation of new biomass boilers, with related network construction and user connections.

The regional financing covers 70 % of the total intervention costs and up to:

- 100'000 euros for interventions in class 1;
- 250'000 euros for interventions in class 2;
- 450'000 euros for interventions in class 3 and 4.

Expenses that are not covered by the funding are: the purchase of land and buildings, the purchase of second-hand goods, ordinary maintenance, non-monetary costs and other extraordinary expenses that are not listed in eligible costs list.

The goal of APE FVG for the near future is not to change the structure of the funding, but rather to link it to the QM procedure and standards. This means that in order to receive the funds or a share of it, the application of QM, and therefore the obtainment of certain environmental and economic results, is mandatory.

With the establishment of the RSAG, the local trainings and other QM events with the RSAG and other QM events, APE FVG is raising awareness across multiple sectors about the necessity of a standardized approach which guarantees the quality of the interventions like QM does. Representatives from local and regional public authorities, technology suppliers, forestry companies and engineers have participated in these events. This new approach can be a game changer for a new funding regulation based on the QM principles.

Next steps for the future might consist in reducing the share of costs covered and to offer a loan with no interest and a time span adequate to a long-term project like a DH network project requires.



5. New local financing and support tools - Slovenia

In general, DH network operators are facing the following challenges in decarbonization and improvement of their networks:

- Better insulation of the connected buildings to reduce the heating load;
- Lower network temperatures to enable more renewable energy sources to be integrated in the system;
- How to ensure profitability also with decreasing heat demand of connected buildings;
- Dealing with uncertainty regarding the availability and cost of climate-neutral gas (syngas);
- Lack of a legal framework for systematic decarbonisation of DH networks;
- Permanent development of new technologies requires continuous education at increased levels, thus ensuring the competence of staff.

In Slovenia, the following key success factors, which have been demonstrated as drivers to a high quality, efficient and sustainable DHC service, are considered the most relevant:

1. The coherent national policy and regulatory environment which provides stable ground and incentives for the development of DHC systems (e.g. by setting ambitious CO₂ targets, establishing specific fiscal measures promoting the use of renewable energy, etc.).
2. Direct or indirect subsidies (e.g. investment grants, support schemes to CHP and RES, access to competitive debt funding, fossil fuel taxes, ...) and/or dedicated financial instruments supported by the long-term Cost-Benefit-Analysis approach can enhance (price) competitiveness of DH. Relevant tax incentives (increased taxes on electricity and fossil fuels) are essential to promote EE and support the energy transition.
3. Coherent urban municipal (local) heat supply planning, supported by the promotion of DHC as part of municipal energy supply and climate strategy, where heat planning is integrated in their urban development projects (e.g. undertaking a long-term cost-benefit analysis for heat planning, establishing DH zones or specific environmental requirements for buildings, promoting compact and mixed-use new districts, etc.).
4. Alignment of interests through cooperation and efficient communication between the national (public authorities, regulating bodies) and local actors (municipal authorities, DHC company, final users), all aiming at good quality service and a sustainable and cost-efficient heat and cold supply.
5. Competitive DHC prices comparing to the alternative energy solutions available in the market. This price competitiveness can be enhanced through an optimised system design, through competitive procedures for the market or by allowing competition between different heat/cold supply solutions.
6. A flexible production that allows better cost-efficiencies (mainly through a dynamic optimisation of the supply) can be achieved through a diversified and complementary energy mix, the use of CHP and enhanced management practices, connecting the electricity and heating markets.



Transparency of the prices, comparison at national level through benchmarking and clear visibility of future prices have a positive impact on a client's choice of DHC. Transparency is a necessity to gain the trust of all stakeholders and consumers in particular.

As part of the support for the utilization of renewables subsidies for DHS within the framework of the operational programme for the implementation of the European Cohesion policy for the period 2014 - 2020, where the support for investments in the production of heat from biomass DH and integration of solar collectors were also included.

In the period 2014 - 2020 there were public tenders for the co-financing of the construction of RES DHS with boiler capacity of up to 10 MW or construction of micro DHS systems with boiler capacity of up to 1 MW, including expansion of the existing DH networks. Besides there were tenders for the financing of environmental investments, which included the installation of heat stations or substations for connection to the DH network and incentives for new investments in the use of RES, including, inter alia, the connection of a one- or two-storey building to RES DHS. The implementation of these measures is anticipated to be extended in 2022 and on in the future.

The running scheme for financing the DHSs are:

- Eko sklad (Slovene environmental public fund)

Loans to legal entities (municipalities and/or providers of public utility services, enterprises and other legal entities) and sole traders for investments in environmental infrastructure, environmentally sound technologies and products, energy efficiency, energy saving investments, and use of renewable energy sources;

Loans to individuals (households) for conversion from fossil fuels to renewable energy sources, energy saving investments, investments in water consumption reduction, connections to sewage system, small waste water treatment plants, replacement of asbestos roofs;

Grants to individuals (households) for investments in electric cars and for investments in residential buildings (energy efficiency and use of renewable energy sources);

Grants to legal entities (municipalities and/or providers of public utility services, enterprises and other legal entities) for investments in electric cars and buses for public transport on compressed natural gas or biogas;

Grants to municipalities for investments in buildings where public education takes place (schools, kindergartens, libraries etc.), newly constructed as low energy and passive buildings or renovated in passive standard.

- Ministry of infrastructure (cohesion funds):

The subject of co-financing is financial incentives designed to invest in new DHS on RES. Investors are also eligible for financial incentives, which are aimed at expanding the existing DHS of RES or building a new boiler room with wood biomass boilers as a source for the existing DHS in the following content:

- building DHS with a boiler capacity of up to 10 MW or the construction of micro systems of RES systems with a boiler capacity of up to 1 MW;
- Extension of the remote network with the existing DOE system with or without the addition of additional wood biomass boilers;



The total amount of the financial incentive in the form of grants for carrying out an individual operation is up to 35 % of the value of the eligible investment costs if the applicant is a large enterprise. In the case of medium-sized enterprises, the financial support is granted and could increase by 10 percentage points and by 20 percentage points for small enterprises. A system that have a unit for cogeneration of electricity and heat from which heat is delivered to the DHS, the amount of incentives can be increased by 10 percentage points.

Future financial mechanisms for DHSs

In Slovenia's National Energy and Climate Plan (NECP), heating networks are considered as an important element of the future energy system. In densely populated areas, DHSs have proven to play a key role in the decarbonisation of the heating and cooling sector. The most important role will be held by 4th generation DH systems, characterized by low operating temperatures, flexibility of operation, the possibility of cogeneration of heat and electricity, storage of heat, integration with sectors of electricity generation, transport, as well as integration of RES and excess heat.

The Action Plan sets out actions which need to integrate with wider policy development so these actions need to be further taken in a coordinated way.

| NO. | ACTION | TIMING | RESPONSIBLE STAKEHOLDER |
|-----|--|------------------|--|
| 1. | The national (government) and local (municipal) authorities to support the development of new business models for the delivery, refurbishment and financing of heat networks. One of possible business models is ESCO, which can be developed as a not-for-profit Energy Service Company which can tackle fuel poverty, cut carbon emissions and create new jobs. | 2020-2022 | Ministry of infrastructure / Ministry of finance / Municipalities |
| 2. | Provide necessary funding for the sustainable retrofitting of DH systems aiming at increase of efficiency and competitiveness (optimization of operation, expansion of networks), increasing the use of RES and excess heat, promotion of CHP in DO systems; sectoral integration (e.g. by energy storage and "power2heat"), etc. (<i>Remark: This action was included in the draft NECP. January 2020</i>). | 2020-2022 (2030) | Ministry of infrastructure / Government Office for Development and European Cohesion Policy (SVRK) |
| 3. | An incentive framework is needed that supports investments in climate-neutral heat, allowing adequate (quantitatively limited) support for the remaining heat generated by CHP that can't be ensured by RES or waste heat in a short term. (<i>Remark: Related actions were included in the NEEAP</i>) | 2020-2030 | Ministry of infrastructure / Government Office for Development and European Cohesion Policy (SVRK) / |



| NO. | ACTION | TIMING | RESPONSIBLE STAKEHOLDER |
|-----|--|-----------|------------------------------|
| | | | EkoFund (EkoSkład) |
| 4. | Co-financing programme (financial incentives) for investments in new DH using wood biomass (DHWB) systems and micro-systems, as well as the expansion of existing DHWB systems and the construction of new boiler rooms containing wood biomass boilers or solar systems as a source for existing DH. <i>(Remark: This action was included in the NEEAP)</i> | 2020-2030 | Ministry of infrastructure / |



6. Development of pilot heat planning - Poland

Although in Poland the ENTRAIN actions focus on the Płoński District, which is interested in increasing the share of RES in their energy mix, the project envisages also actions targeting whole regions or whole the country. Thus one of the key activities is the improvement of existing or development of new support and financing schemes that would support the development of small district heating systems using renewables. Such investments are of key importance, as they not only support energy transition of the Polish energy sector but also ensure secure and clear energy replacing individual, often old and inefficient individual boilers contributing to the improvement of air quality and consumers comfort. But such investments are also costly, with long payback periods. Thus they require adequate support and financing schemes. Within the project following three key actions have been proposed to help to ensure them:

Action 1: Participation in the public consultation of the new FENiKS funding programme

Status in October 2021: finalized

The FENiKS programme is a continuation of the Operational Programme “Infrastructure and Environment” implemented in the financing perspectives 2007-2013 and 2014-2020. It will be the main funding programme for projects and initiatives in the area of energy, environment, transportation, health and culture. The ENTRAIN project took part in the public consultation of the programme taking place in July 2021. Based on the experiences from the project, as well as in cooperation with some of the Regional Stakeholder Group members, relevant comments and requests have been prepared and submitted via the on-line consultation system. They highlight the urgent need for the development of distributed, renewable based heat energy production, as well as indicate what could be improved or included in the new funding programme so that it could better support DH systems based on renewable.

Action 2: Preparation of recommendations for the funding programme operators and other financing institutions

Status in October 2021: ongoing

Another action aiming to ensure wider and more efficient support for the development of district heating systems using renewables is preparation of relevant recommendations for national and regional authorities (often being operators of different funding programmes), as well as other financing institutions (national and regional funds, banks, etc.). The recommendations will be developed in cooperation with the representatives of district heating sector, as well as the representatives of the Regional Stakeholder Group established within the ENTRAIN project. Therefore, two parallel sub-actions are planned:

- Sub-action 1: Survey among the representatives of district heating utilities throughout Poland, including questions concerning their state-of-the-art and development plans, barriers hindering development and causing systematic reduction of generation and sale of district heat, actions necessary to increase RES share in district heating generation and the support that is needed to achieve this.
- Sub-action 2: Gathering recommendations from the members of the Regional Stakeholder Group. During the 3rd RSAG meeting held in Płoński on the 9th of September one of the sessions was devoted to the development of recommendations for: (1) national and regional



authorities concerning the development of more favourable frameworks, conditions and support schemes for DH systems using RES; (2) financing institutions concerning the development of concrete financing instruments and schemes supporting expansion of DH systems using RES. The recommendations will be presented at the vertical workshop planned afterwards and foreseeing participation of all interested parties.

Action 3: Organisation of vertical workshop with the participation of the representatives of national, regional and local authorities, financing institutions and the district heating sector

Status in October 2021: ongoing

The workshop - to be held either online or as a hybrid event - aim at presenting preliminary project recommendations concerning the support (including financial support) that is necessary to ensure efficient development of existing and new district heating systems using renewable. It will also be an opportunity to continue multi-stakeholder and vertical dialogue on the key barriers faced by the district heating sector, as well as its needs. The conclusions reached and collected will be summarised and sent to all the participants of the event, as well as other relevant institutions.

Key conclusions:

- Polish district heating sector urgently needs modernisation, including increasing share of RES in the heat production. There is also a need for the expansion of existing and the development of new district heating systems (preferably using local, renewable energy sources), which will replace highly emissive, individual heat sources. Such investments, however, are very costly, often not possible to be financed only from the investor's (self-government, private investor) own funds. Therefore, it is necessary to implement at all levels relevant support and financing schemes, as well as to improve existing ones that are planned to be continued.
- The ENTRAIN project is implemented in a very specific period - change of the financial perspective of the EU and thus development of new financing programmes to be launched at the national and regional level. There are opportunities to pass the project recommendations and attempt to influence these schemes and engage in dialogue with their operators. Also the decisions on the continuation of the previous programmes are taken also here there are opportunities for launching discussions on the possible improvements, if considered necessary.
- Ensuring efficient support for the development of local district heating systems using renewables requires collaboration and dialogue among all interested parties: representatives of the district heating sector, local authorities, national and regional authorities and the representatives of the financing sector. Especially the two latter groups should be familiarized with the most important barriers faced by the district heating sector, as well as with its most important needs. Only then they will be able to ensure adequate support. Therefore, it is necessary to develop relevant recommendations with the representatives of all relevant stakeholders and share them during common events (such as vertical workshop) that would also give room for further discussions.