

Improving the performance of District Heating Systems in Central and Eastern Europe

Pilot projects

Report on local working groups

Czech Republic

Horizon 2020 (H2020-EE-2017-PPI)
Project N°784966



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PROJECT INFORMATION

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List of Abbreviations

AT	Austria
CEE	Central and Eastern Europe
CoM	Covenant of Mayors for Climate and Energy
CZ	Czech Republic
DisComEx	Dissemination, Communication and Exploitation
DG	Directorate-General of the European Commission
DHS	District Heating System
EBRD	European Bank for Reconstruction and Development
EU	European Union
GHG	Greenhouse Gas
HR	Croatia
KPI	Key Performance Indicator
LV	Latvia
LWG	Local Working Groups
NGO	Non-Governmental Organisation
RES	Renewable Energy Source(s)
SI	Slovenia
SRB	Serbia
UKR	Ukraine
WP	Work Package

Summary of the project

The project “KeepWarm - Improving the performance of district heating systems in Eastern Europe” is funded under the EU Horizon 2020 programme. Its objective is to accelerate cost-effective investments in the modernisation of District Heating Systems (DHS) in Central and Eastern Europe (CEE). KeepWarm is most active in seven countries: Austria (AT), Croatia (HR), Czech Republic (CZ), Latvia (LV), Serbia (SRB), Slovenia (SI) and Ukraine (UKR). The project focuses on this region, and these particular countries, because in most cases DHSs are frequently still inefficient and for the most part overly reliant on fossil fuels (especially gas, coal or oil).

The aim of this initiative, launched in April 2018, is to modernise DHSs around the whole region in a more sustainable manner. By improving system operations and promoting a switch to less-polluting sources, like renewable energy sources (RES), KeepWarm will contribute to reducing greenhouse gas (GHG) emissions. The eleven project partners strive to ensure that best practices for environmentally-friendlier heating and cooling will be taken up across Europe, replicating KeepWarm’s approach in other countries and regions, even beyond the end of the project in September 2020.

Project objectives

KeepWarm’s specific objectives are:

- At least 450 relevant stakeholders with increased capacities on technical, organisational, financial and managerial aspects – includes 150 DHS operators;
- At least 95 **DHS operators** are able to **develop business plans** and to identify the most suitable **financial model** for modernisation of their own DHS;
- At least 23 **business plans for the modernisation** of DHSs have been developed and **sources for investment** have been identified;
- DHS network **retrofitting** is addressed in at least 10 local **energy plans** and 7 regional or **national strategies** or plans;
- At least 23,300 **relevant stakeholders** (directly) and 125,000 (indirectly) **reached** across Europe in order to **replicate the project outputs** in primary and secondary target regions and ensure the project’s impact;
- **Support EU policies and initiatives**, such as the Covenant of Mayors for Climate and Energy (CoM) and DecarbHeat, by exploiting key lessons from KeepWarm activities and pilots to disseminate best practices across Europe.

KeepWarm consortium partners

LOGO	PARTNER NAME	SHORT	COUNTRY
 <small>Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH</small>	Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH	GIZ	Germany
	University of Zagreb Faculty of Mechanical Engineering and Naval Architecture	UNIZAG FSB	Croatia
 <small>Landwirtschaftskammer Steiermark</small>	Landeskammer für Land- und Fortwirtschaft in Steiermark	LWK	Austria
 <small>REGIONALNA ENERGETSKA AGENCIJA NORTH-WEST CROATIA SJEVEROZAPADNE HRVATSKE REGIONAL ENERGY AGENCY</small>	Regionalna Energetska Agencija Sjeverozapadne Hrvatske	REGEA	Croatia
 <small>Jožef Stefan Institute, Ljubljana, Slovenia Energy Efficiency Centre</small>	Jožef Stefan Institute Energy Efficiency Centre	JSI	Slovenia
 <small>Local Governments for Sustainability</small>	ICLEI European Secretariat GmbH	ICLEI Europe	Germany
 <small>ASSOCIATION FOR DISTRICT HEATING of the Czech Republic</small>	Teplarenske Sdruzeni České Republiky	TSCR	Czech Republic
 <small>ZEMGALES REGIONALA ENERGETIKAS AGENTURA</small>	Biedriba Zemgales Regionala Energetikas Agentura	ZREA	Latvia
	Zavod Energetska Agencija za Savinjsko Salesko in Korosko	KSSENA	Slovenia
	LLC KT-Energy Consulting	KT-Energy	Ukraine
 <small>VINČA INSTITUTE OF NUCLEAR SCIENCES University of Belgrade NATIONAL INSTITUTE OF THE REPUBLIC OF SERBIA</small>	Institut za Nuklearne Nauke Vinca	VINCA	Serbia

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Executive summary

The switch from a fossil fuel and inefficient DH system to clean and renewable alternatives with low level of losses is a challenging task. Moreover, other competitive heating solutions in heating sector make it difficult for other heating alternatives, such as DH to compete. Besides DH systems often were not able to provide appropriate value of their services from technical, environmental, societal as well as economic perspective. In other words, DH systems often are often in a difficult position due to many reasons. As a results, they often lack of ambitious plans and performing relevant activities such as development of feasibility studies, complicated public procurement procedures, evaluation of RES potential, successfully negotiation with both existing and future end-consumers, identification and application to both local/regional/national and EU funds (lack of investment strategy). On the other hand, they often lack work force and capacity to achieve ambitious plans due to lack of financial funds or know-how. To foster modernization of above-mentioned DHSs, the KeepWarm project focuses on modernization of pilot DH systems in 7 partner countries (Austria, Croatia, Czech Republic, Latvia, Slovenia, Serbia and Ukraine).

Project partners committed to provide support to DHSs representatives throughout an interdisciplinary approach with the aim of achieving investments developed in previous activities of projects such as feasibility studies, business plans and selection of pilot DHSs. After identification of current state and barriers which hinder successful investments, KeepWarm consortium organized local working groups in each country the aim of providing tailor-made assistance to remove barriers. The goal of the local working groups was to include all relevant stakeholders, which can be identified through the stakeholder analysis, to provide input for business plan development and feedback on future retrofitting plans as well as on barrier removal for DHS. This report is created as country-by-country overview of organized local working group meetings with the aim of presenting systematic and continuous activities of KeepWarm partners toward DHSs representatives and other stakeholders with the aim of achieving investments. In addition to this, each project partner used a tailor-made KeepWarm approach which is a result of previously taken activities such as feasibility studies, business plans and selection of DHSs to be retrofitted.

In case of local working groups in the Czech Republic, 2 meetings took place which were attended by 14 stakeholders. The main outcome can be described as a decision-making process by the individual DHSs to invest in modernisation projects.

DHS Brno: Implementation of scenario 1 - Conversion of steam to hot water distribution grid

DHS Ceske Budejovice: Implementation of scenario 2 - Utilization of excess heat from nuclear power plant Temelín

DHS Pisek: Implementation of scenario 1 - Replacement of one coal boiler for biomass

Based on this decision, TSCR organized a series of meetings with relevant stakeholders in order to achieve investments. In other words, business partners and technology suppliers has been identified, contacted and successfully included, as well as public authorities which are essential stakeholders in terms of land usage, construction permits and potential public end-users which are the main focus of the DHSs. The decision to invest into renewable technologies is derived from the above mentioned KeepWarm approach. It should be mentioned that due to the pandemic situation (COVID-19), most of planned and already organized meetings have been cancelled and adjusted to virtual platforms which definitively hindered implementation of scenarios. An overview of conducted meetings is presented in the following table, while planned (and postponed) meetings have been presented in the last section (Future activities of local working groups)

LOCAL WORKING GROUP MEETING 1

Pilot: Brno, Ceske Budejovice, Pisek

Number of stakeholders: 7

Main topics:

- Trainings
- Proposals of pilot projects
- Data for feasibility studies
- Integration of DH retrofits to strategic plans

LOCAL WORKING GROUP MEETING 2

Pilot: Brno, Ceske Budejovice, Pisek

Number of stakeholders: 7

Main topics

- Business models
- Cooperation with municipalities
- Twinning program

Introduction

As defined in the Grant Agreement, this deliverable N°4.2 Report on local working groups is closely tight with the work package 4's objective – achieve at least 15 DHS investments in at least 5 countries, using suitable technical and financial approaches (developed in Work Package 3), which will lead to increased efficiency and RES use. Throughout the task 4.2 Support to DH operators/owners to remove barriers and achieve investments, it is stated in the Grant Agreement that the main objectives are to provide a tailor-made support, remove barriers and achieve above mentioned investments.

The specific topics and focus of the conducted meetings were defined based on the needs of each DHS operator/owner and related stakeholder which is defined throughout the Task 4.1 Selection of DHS for retrofitting, investments and working groups. Working groups are established for each DHS to be retrofitted and include at least representatives of DHS operators/owners, local government and end consumers (and possible other key stakeholders if needed). The local working groups are responsible for the implementation and monitoring of the DHS retrofits. KeepWarm partner were mainly facilitator, discussion leader and triggering reflections and provide support in planned actions

In addition, the working groups will consider results of the Work Package 3 in order to provide an adequate support to secure investments:

- Supporting choices in the optimal financial approach and business model (combination of public and private capital, financing schemes like on-bill financing and similar)
- Support and guidance in preparation and application for potential grants (for example, EU structural funds through the Integrated Territorial Investment mechanism, and others)
- Supporting negotiations with customers (joint meetings with project partners as facilitators)
- Support on specific technical issues (in addition to the ones analyzed in WP3)
- Support with legal issues (e.g. unclear ownership/responsibilities of heating substations)
- Exchange with twins – and including lessons learnt
- Conclusions for future scenarios – long-term orientation

The outcome of Task 4.2 is the realization of 15 actual investments in DHS retrofits. Therefore, this document presents steps taken towards the above-mentioned goal through the activity of local working groups in terms of identification of problems, discussions, exchange of knowledge, remove of barriers and proposing relevant solutions.

Local working group – meeting 1


General Info


SHORT INFORMATION ABOUT THE LOCAL WORKING GROUP MEETING	
Country	Czech Republic
Pilot city name	Brno, Ceske Budejovice, Pisek
Date	December 6, 2018
Location	Humpolec, hotel Fabrika
Number of participants/ Stakeholder groups	1 participant from DHS Brno, 2 participants from DHS ČB, 2 participants from DHS Písek, 2 participants from TSCR
twin	DHS Ternopil, Ukraine, DHS Zagreb, Croatia
Minutes by	Jolana Buganova

Agenda

TEPLÁRENSKÉ SDRUŽENÍ
Česká republika

Teplárenské sdružení České republiky Vás zve na další setkání nad projektem **KeepWarm**.
Tématem tohoto setkání bude seznámení s aktuálním stavem, postupem prací a dalším
programem, který nás v rámci projektu čeká. Dovolujeme si nabídnout termín **6. 12. 2018** od 10
do 14 hodin. Prosím o potvrzení Vaší účasti do 14. 11. 2018.


Renewing district energy

 Tento projekt získal finanční prostředky z programu EU pro výzkum
a inovace Horizont 2020 v rámci grantové dohody č. 784966.

**SETKÁNÍ PRACOVNÍ SKUPINY K PROJEKTU
KEEPWARM**

Program setkání:

6. prosince 2018

09:30 – 10:00 prezence, **coffee break**

10:00 – 10:15 hod.
• **SEZNÁMENÍ S AKTUÁLNÍM STAVEM PROJEKTU **KeepWarm****
Jolana Bugáňová, Teplárenské sdružení ČR

10:15 – 10:25 hod.
• **KONTROLA ÚKOLŮ A ROZVRH DALŠÍCH PRACÍ NA PROJEKTU**
Jolana Bugáňová, Teplárenské sdružení ČR

10:25 – 10:35
• Seznámení s **NAŘÍZENÍM EVROPSKÉHO PARLAMENTU A RADY (EU)**
2016/679 ze dne 27. dubna 2016 o ochraně fyzických osob v souvislosti se
zpracováním osobních údajů
Jiří Vecka, Teplárenské sdružení ČR

10:35 – 11:00
• **WP2 - VZDĚLÁVÁNÍ** – současný stav vzdělávacích aktivit, plán dalších seminářů
Jolana Bugáňová, Teplárenské sdružení ČR

11:00 – 11:30
• **WP3 - OBCHODNÍ A FINANČNÍ MODEL** – cíle a návrh řešení
Jiří Vecka, Teplárenské sdružení ČR

11:30 – 12:00
• **WP4 - PILOTNÍ PROJEKTY A WP5 - TVORBA VÍCEÚROVŇOVÝCH
AKČNÍCH PLÁNŮ** – cíle a úkoly
Jiří Vecka, Teplárenské sdružení ČR

12:00 – 13:00 společný oběd

13:00 – 13:30 **KOMUNIKAČNÍ A PROPAGAČNÍ AKTIVITY**, komunikační platformy
Jolana Bugáňová, Teplárenské sdružení ČR

13:30 – 14:00 **TWINNING PROGRAM** – nabídka spolupráce se zahraničními partnery
Jolana Bugáňová, Teplárenské sdružení ČR

14:00 hod. – diskuse, zakončení semináře

Setkání proběhne v Hotelu Fabrika, Školní 511, Humpolec, konferenční sál MALÝ HLINÍK
<http://fabrikahotel.cz/fabrika-hotel/fabrika-hotel>

Kontakt: Ing. Jolana Bugáňová, VP TS ČR, e-mail: buganova@ts-cr.cz, tel: 724 365 123
Ing. Jiří Vecka, Ph.D., VP TS ČR, e-mail: vecka@ts-cr.cz, tel: 607 825 270

Minutes and main Conclusions

The meeting took place on 6th December 2018 in the Hotel Fabrika in Humpolec. At the beginning, all participants introduced themselves and described their role in the project. TSCR informed participants about the current state and progress of the project works, reported on the procedures and agreements concluded at the last SCM in Graz. The schedule of work on the project tasks and future steps according to individual WPs were subsequently presented. TSCR informed that virtual meetings are held every month and invited representatives of DHSs to participate. TSCR will announce the dates.

Introduction to the General Data Protection Regulation

TSCR informed about the REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the protection of individuals with regard to the processing of personal data and on the free movement of such data. Personal data protection form was introduced. It will be used for joint activities within the KeepWarm project.

WP2- Training of district heating operators

The TSCR informed the participants about the results of the training needs assessment prepared by the Croatian partner UNIZAG FSB. Suggested topics for educational seminars were presented and discussed.

WP3 - Development of business and financial models

The data provided by the DHSs to the Task 3.1 Analysis of the current state of DHS was discussed. The Austrian partner LWK prepared two questionnaires to identify potential of RES use in DHS. Operators should fill it out until the end of the year. LWK provided template for Task 3.3. TSCR will interview pilot DHS operators on the topic of customer structure. The Task 3.4 "Technical, economic and sustainable feasibility of specific DHS" will start in April 2019. TSCR will conduct personal interviews to gain the requested data and information including sensitive data. The Task 3.5 "Development of business models for specific DHS systems" will start in August 2019 and will depend on the selection of DHS under WP4.

WP4 - Pilot projects

The content of WP4 was discussed. Pilot projects should achieve investments which will lead to the increase of energy efficiency and increase in RES use. The selection of individual scenarios will depend on the input given by DHS operators under WP3.

WP5 - Integration of DH retrofits in national, regional and local plans

Slovenian partner JSI prepared a first draft to review the existing regulatory and policy framework in the partner countries. It was agreed, that a summary of the main content of NECP or SECAPs documents will be provided. TSCR will prepare questionnaires for

DHSs under Task 5.2 “Identification of key barriers, opportunities and stakeholders for retrofitting of DHS”. This part will be done until the end of January.

WP6 - Dissemination, communication and exploitation activities, information about a twinning program

TSCR informed about the new logo of the project. KeepWarm slogan was changed from “Renewing district energy” to “Renewing district heating”. Participants were made aware of the opportunity to support the project website (country pages) and twitter account. TSCR offered to use marketing materials to promote the project. TSCR informed about twinning program and possibility of exchanging experience and obtaining feedback on strategies and procedures with related foreign partners. Twins shall participate in Inspire events. A study visit will be set up for twins as side-event. Inspire events will be hosted by main partner in each country. TSCR will inform about the activities in time.

Conclusion

We will be in telephone and e-mail contact until the next meeting. The next meeting should be attended by representatives of local or regional authorities to confirm their support in the DH modernization process. The TSCR will announce the date of the next joint meeting.

Twinning activities

Twinning partners will be Croatian and Ukrainian DHSs.

Monitor of retrofit implementation steps

Steam pipelines in many regions are further unusable, both morally and physically. Morally, because with the decline of industrial production in many regions, the supply of steam heat is no longer needed at all, because technological consumption has been eliminated. Hot or even warm water is much more suitable for heating and hot water in buildings, because its transport is associated with lower heat loss and brings better controllability to the consumer. Many steam pipelines are not able to survive even physically, which is mainly due to the corrosion to which condensate pipes are most susceptible. All the three participating DHSs address the need to replace steam pipelines with modern hot water system.

Coal-burning DHSs face the challenge of rising emission allowances prices and are looking for alternatives to replace fossil fuels with available local renewables. Strict emission limits force them to replace obsolete fossil fuel resources with more efficient and environmentally friendly ones. This problem is solved mainly by DHS České Budějovice and DHS Písek. DHS Brno would like to reduce its dependence on natural gas supplies and is therefore considering expanding its WtE capacity.

Nuclear power plants are operated in the region of South Moravia and South Bohemia. Thermal energy from these power plants could heat Brno and České Budějovice and many other smaller municipalities along the road where the feeder would lead. This solution would also save fossil fuels and at the same time reduce greenhouse gas emissions. In the KeepWarm project, we will analyse the economic and technical

feasibility of individual variants and will recommend the most effective ones for implementation.

Local working group – meeting 2

General Info

SHORT INFORMATION ABOUT THE LOCAL WORKING GROUP MEETING	
Country	Czech Republic
Pilot city name	Brno, Ceske Budejovice, Pisek
Date	February 11, 2020
Location	Humpolec, hotel Fabrika
Number of participants/ Stakeholder groups	1 participant from DHS Brno, 1 participant from DHS ČB, 2 participants from DHS Písek, 1 participant from Statutory City of Brno, 2 participants from TSCR
twin	DHS Ternopil, Ukraine, DHS Zagreb, Croatia
Minutes by	Jolana Bugarova

Agenda



TEPLÁRENSKÉ SDRUŽENÍ
České republiky

Vážení účastníci projektu KeepWarm,

11. 2. 2020 v hotelu Fabrika, konferenční sál ŽELIVKA, Školní 511, Humpolec, www.fabrikahotel.cz.

Název jednání: Setkání lokální pracovní skupiny projektu KeepWarm

Program jednání:

10:00-10:15 informace o stavu projektu KeepWarm - Jolana Bugáňová

10:15-10:45 Studie proveditelnosti – seznámení s konečnou verzí, zpětná vazba - *Jolana Bugáňová*

10:45-11:15 Obchodní modely, analýzy jednotlivých scénářů, rozvrh realizace, financování -

zástupci tepláren, Martin Hájek

11:15-11:30 Zpětná vazba k projektu od zástupce města Brna, budoucí podpora, záměry města -

Michal Piños

11:30:13:00 Twinning program – seznámení s projekty partnerů z Ukrajiny a Chorvatska -

Jolana Bugáňová

13:00 Závěr jednání, diskuse

14:00 společný oběd

15:00 ukončení a odjezd

Svoji účast, prosím, potvrďte na emailovou adresu buganova@tscr.cz nejpozději do **6. 2. 2020**.



Tento projekt získal finanční prostředky z programu EU pro výzkum a inovace Horizont 2020 v rámci grantové dohody č. 784966.

Minutes and main Conclusions

Introduction of the meeting was devoted to informing about the current state of the project. Based on feasibility studies, the current situation in the area of heating industry in the Czech Republic and in individual regions was discussed. Especially the conditions on the energy market in the Czech Republic and Europe - legislative environment, European climate targets, strategies for the transition from fossil fuels to renewable sources, opportunities for optimization and modernization of district heating systems, technical and economic feasibility and above all sustainability of measures adopted. DHSs Brno, České Budějovice and Písek presented their further modernization and implementation plans. Business models, implementation dates, methods of financing, expected savings and benefits for customers were discussed in detail. The issue of disconnecting customers and its possible solutions was also addressed. A representative of the City of Brno commented on the planned investments and expressed support for the upcoming projects.

The second part was devoted to explaining the functioning of the twinning program and familiarizing with the business models of twinning partners from Croatia and Ukraine. All representatives of participating DHSs have agreed to participate in the twinning program, are willing to provide data to the twinning partners, study their pilot project documents and give feedback.

Twinning activities

During the Steering Committee Meeting in Ljubljana, a group of partner organizations has been set up to cooperate in the twinning program. This group consists of DHS Brno (Czech Republic), DHS Zagreb (Croatia) and DHS Ternopil (Ukraine). This group was created based on the size and composition of production resources. KeepWarm's twinning program is intended as an implementation-support mechanism of the pilot projects. Each DHS develops its own business model, pilot project implementation plan and policy plan as part of the KeepWarm's WPs. The twinning programme is focused on exchanging drafts of the models and plans and refining these key documents already being planned in the WPs. By allowing DHSs to exchange feedback with each other on such draft documents, each DHS will be better prepared to revise their own documents based on valuable comments from their twins, thereby benefitting greatly from outside perspectives.

The participants agreed to provide the necessary data to their partners under the twinning program. Project partners will arrange visits to twinning cities to assess and provide feedback on the pilot projects.

Information about the twins

DHS Ternopil is a municipally owned enterprise that provides heat supply services to about 85 % of the residential and public buildings in the city. DHS of Ternopil city uses natural gas as the main fuel and there are no reserve fuels foreseen at most of the boiler houses. Municipal enterprise "Ternopilmiskteplokomunenergo" operates 38 boiler houses

with total installed capacity of 648 Gkal per hour (754 MW). The average efficiency of heat energy generation is 88 %. Connected heat load of the district heating system is 326,99 Gkal per hour (281 MW). The capacity utilization factor during the heating season is below 20 %, which demonstrate significant overcapacity of existing generation facilities. There are also 2 CHP units with a single capacity of 0,5 – 0,63 MW installed. Generated electricity is used for the own needs of the enterprise. The grid of district heating systems includes main pipelines and distribution pipelines of heat energy and hot water supply. Trench length of the grid is 173,88 km, total length of the pipelines is 347,8 km. The temperature mode of district heating system operation is 95 – 70 °C. DHS Ternopil supplies heat energy and hot water to 1 079 buildings with the total heating area of 2,514 million square meters.

Their modernization project includes a transition from natural gas to biomass. Implementation of the priority scenarios will contribute to energy efficiency improvements, increased utilization of renewable energy sources and greenhouse gases emission reductions.

DHS Zagreb (HEP Toplinarstvo Ltd) represents the biggest and the most complex DHS in Croatia consisting of 2 natural gas cogeneration power plants (EL-TO and TE-TO) which supply the city of Zagreb with around 800 000 inhabitants through 227 km long pipeline. Total output power of EL-TO Zagreb is 92 MWe/315,7 MWt. Fuel oil is rarely use, mostly as a replacement for natural gas in maintenance periods or in periods of peak demands. In average, EL-TO Zagreb produces around 530 000 MWh of heat, 230 000 MWh of electricity and 290 000 tonnes of steam on a yearly basis with an average total efficiency of 75,9 %. The total power/heat output of TE-TO is 440 MWe/508 MWt which mostly use Natural Gas as a primary fuel and Fuel Oil / Extra Light Fuel Oil as a back-up option. In average, TE-TO Zagreb produces 850 000 MWh of heat, 1 650 000 MWh of electricity and 190 000 tonnes of steam on a yearly basis with the average total efficiency of 65,22 %. Total energy input in DHS Zagreb is around 5 320 000 MWh which is used for both electricity and heat production. On a yearly basis, DHS Zagreb produces around 1 880 000 MWh of electricity and 1 385 000 MWh of heat. DHS Zagreb delivers heat through 227,3 km of hot water pipelines. Most of pipelines in DHS Zagreb were laid down in canals which is extremely inefficient since there is no thermal insulation. DHS Zagreb owns around 41 km of steam pipelines which is used to deliver steam, mostly to industrial zones in Zagreb. Regarding the heat losses, 32 % is due to water leakage, 68 % are transmission losses in pipeline. Total heat losses are 210,28 GWh (15,9 % of total energy). Therefore, increase of energy efficiency is a top priority in DHS Zagreb.

Their modernization project is focused on a revitalization of 68,5 km of hot water pipeline where old pipes would be replaced by pre-insulated steel pipes in order to reduce transmission heat losses and losses caused by water leakages.

Monitor of retrofit implementation steps

An important objective and task imposed by the investment plan is to reduce losses in heat distribution systems in terms of heat distribution efficiency. DHS Brno wants to fulfil this task primarily by converting steam distribution systems to hot water distribution systems. As part of the DH system development, expansion of networks in the area of the housing estate Kamechy v Bystrci is expected and further construction of heat connections and new local sources will continue. This scenario is directly supported by the Enterprise and Innovations for Competitiveness Operational Program, priority axis 3, specific goal 3.5 “Increase of the efficiency of the district heating systems”, which can be used for replacing steam with hot water pipelines.

The implementation of this scenario started in 2019. Brno should acquire a fully hot water network in 2023. In this project, 27 km of pipelines will be replaced, and 225 supply points will be switched from steam to hot water.

Reconstruction schedule					
Year	2019	2020	2021	2022	2023
Length of reconstructed pipeline	8,2	2,8	6,1	5,1	5,1
Number of supply points	53	13	18	56	85

The actual process of planning the implementation of each stage begins with the elaboration of a preliminary schedule drawn up at the site level in detail of the affected streets. This plan is confronted within the schedule of excavation works of the City of Brno, where the requirements of individual administrators of utility networks for interventions in roads in the city of Brno meet.

Subsequently, in the preparation of project documentation for the execution of individual constructions, a detailed definition of mutual limitations takes place both in technical and in terms of traffic or parking restrictions.

Laying of the new hot-water piping usually takes place in the routes of the existing steam pipeline, so according to the Building Act there is no need for zoning or building proceedings. In case of small deviations from existing steam pipeline routes a new zoning decision is issued (zoning permit)

Factors of tenders for building contractors may also enter the deadlines for implementation, which may bring a delay in the commencement of construction.

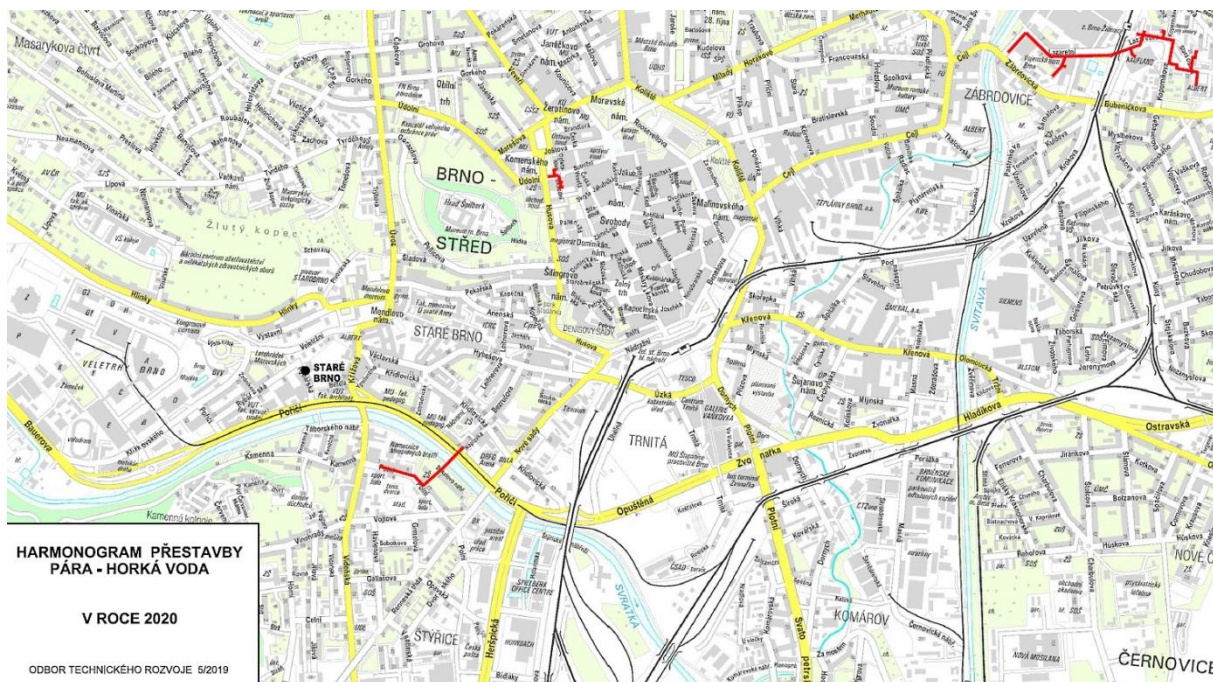
The project is financed partly from the DHS own resources and subsidies from OPPIK in the program “Energy savings in heat distribution systems” are also intensively used.

Most of the transfer stations are owned by customers and therefore, according to the Energy Act, DHS is obliged to send a notification letter on the change of the medium 1 calendar year before the switch to the new hot water medium.

Detailed schedule of the reconstruction

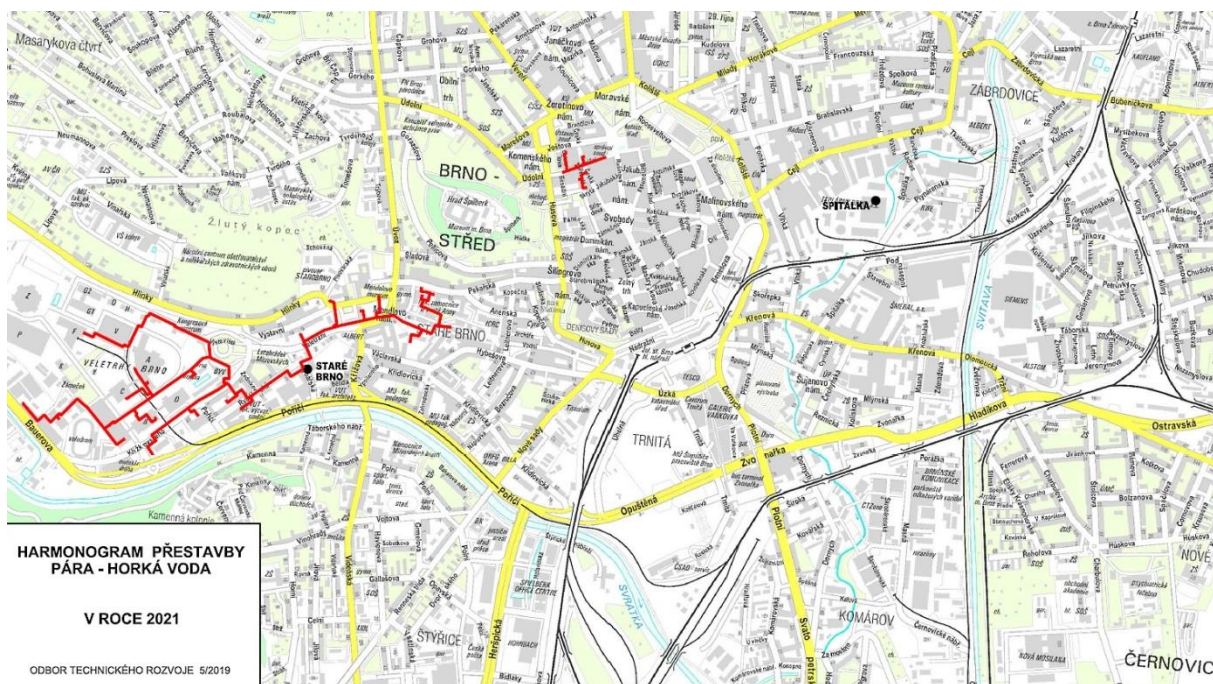
Year 2020

- Affected streets - Solniční, Besední, Lazaretní, Copernicus, Stará Osada, Poříčí, Polní, Bakalovo nábřeží
- number of supply points 13
- project documentation already prepared
- assumption of complete closures of Solniční, Lazaretní and Polní streets
- pre-coordinated at the level of the excavation work schedule of the City of Brno, the exact scope will be specified on the basis of the results of coordination meetings and the current state of preparation of the actions of other utilities
- length of reconstructed route 2,8 km
- expected reduction in distribution losses in the primary line – 49 300 GJ
- contractual heat consumption of all customers in the area - 25 940 GJ
- contractual winter heat input of all customers in the area - 5 MW



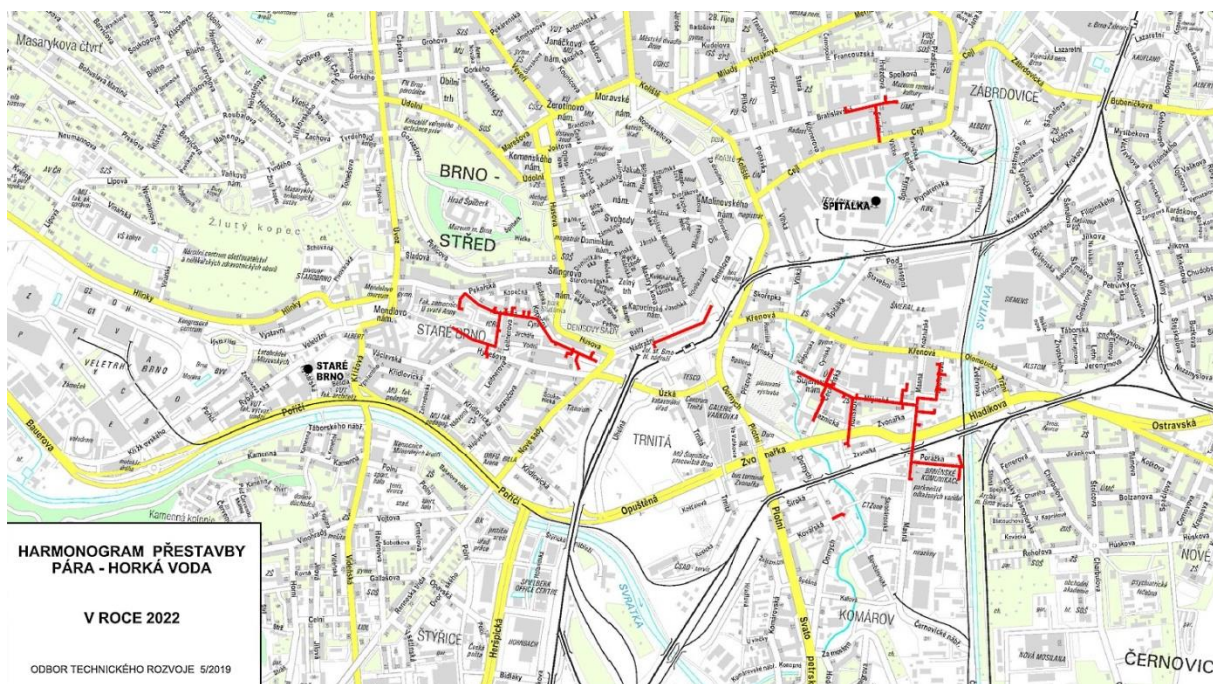
Year 2021

- Affected streets - Křížkovského, Rybářská, Veletržní, BVV grounds, Mendlovo náměstí, Exhibition, Veselá, Solniční, Opletalova
- number of supply points 18
- some project documentation has already been prepared
- assumption of complete closure of Rybářská and Solniční streets
- pre-coordinated at the level of the City of Brno, excavation schedule, the exact scope will be specified based on the results of coordination meetings and the current state of preparation of the actions of other utilities
- length of reconstructed route 6.1 km
- expected reduction in distribution losses in the primary line - 17,800 GJ
- contractual heat consumption of all customers in the area - 166 100 GJ
- contractual winter heat input of all customers in the area - 26.2 MW



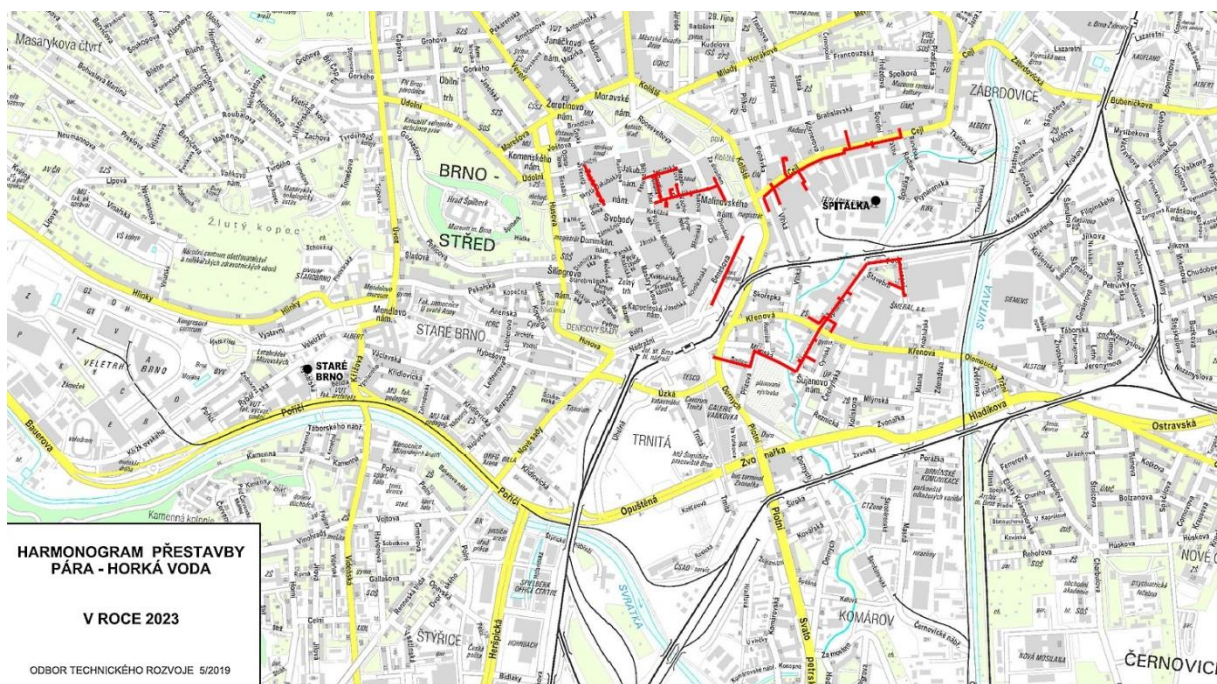
Year 2022

- Affected streets Kopečná, Anenská, FNUSA II area, Nádražní, Bratislavská, Soudní, Slaughter, Masná Mlýnská, Kolískova, Čechyňská
- number of supply points 56
- some project documentation has already been completed
- complete closure of Mlýnská, Soudní, Porážka, Anenská and Kopečná streets
- pre-coordinated at the level of the City of Brno, excavation work schedule
- the exact scope will be specified on the basis of the results of coordination meetings and the current state of preparation of the actions of other utilities
- length of reconstructed route 5.1 km
- expected reduction in distribution losses in the primary line - 26,800 GJ
- contractual heat consumption of all customers in the area - 158 900 GJ
- contractual winter heat input of all customers in the area - 29.5 MW



Year 2023

- Affected streets - Benešov, Jezuitská, Beethovenova, Mozartova, Dvořákova, Theater, Cejl, Špitálka, Podnásepní, Štěpánská, Mlýnská, Prova, Spálená
- number of supply points 85
- a study was prepared
- assumption of complete closures of Mlýnská, Štěpánská, Dvořákova, Beethovenova streets
- pre-coordinated at the level of the City of Brno, excavation work schedule
- the exact scope will be specified on the basis of the results of coordination meetings and the current state of preparation of actions of other utilities administrators
- length of reconstructed route 5.1 km
- expected reduction in distribution losses in the primary line - 77,700 GJ
- contractual heat consumption of all customers in the area - 112 300 GJ
- contractual winter heat input of all customers in the area - 22.6 MW



Future activities of local working groups

Next meeting	Topics of the meeting	Goals of the meeting
21.-22.4.2020 canceled due to coronavirus	Inspire event, meeting and site visit with twins in Croatia	Introduction of the retrofit project of DHS Zagreb, objective, schedule of the implementation, discussion about barriers, support of the national/regional/local authorities, financing method, experience, feedback from the twins.
27.-28.4.2020 canceled due to coronavirus	Inspire event, meeting and site visit with twins in the Czech Republic	Introduction of the retrofit project of DHS Brno, objective, schedule of the implementation, discussion about barriers, support of the national/regional/local authorities, financing method, experience, feedback from the twins.
13.-15.5.2020 canceled due to coronavirus, a virtual seminar was held on 6.8.2020	Inspire event, meeting and site visit with twins in Ukraine	Introduction of the retrofit project of DHS Ternopil, objective, schedule of the implementation, discussion about barriers, support of the national/regional/local authorities, financing method, experience, feedback from the twins.
08.09.2020	Inspire event, LWG meeting in Hradec Králové	Presentation of modernization projects within KeepWarm. Discussion on the progress of work on retrofit projects DHS Brno, DHS Písek and DHS České Budějovice. Analysis of barriers arising from the current situation regarding coronavirus, investment implementation schedule, support of the national/regional/local authorities. During the LWG meeting - plan for preparing a short video / film for twins about retrofit projects instead of a study visit.
October/November 2020	On-line seminar for twinning partners	National DH modernization action plan for Czech Republic. Presentation of retrofit projects, discussions with twinning partners, feedback.

With the end of the project period approaching, further meetings of local working groups will be organized online due to the extension of COVID-19. As all 3 DHSs are already in the phase of implementing investments in selected modernization projects, the topic of the meetings will only be of a control nature in order to find out whether the implementation of projects is proceeding according to the set plans.

DHS Brno is working on a project to replace steam pipelines with hot water pipelines according to the plan. The project will be completed in 2023.

DHS Písek is in the process of purchasing a new biomass boiler. The installation and commissioning will take place this year.

DHS České Budějovice is already building a hot water feeder from NPP Temelín to České Budějovice. It should be completed this year.