

OUTPUT FACT SHEET

Pilot actions (including investment, if applicable) Final Version

Project index number and acronym	CE 1344- Store4HUC
Output number and title	O.T2.1- Pilot Actions in Historical urban centres
Investment number and title	I.3 - Paraffin based latent storages in connection with geothermal district heating system
Responsible partner	Municipality of Lendava - PP02
Project website	https://www.interreg-central.eu/Content.Node/Store4HUC.html
Delivery date	09.2021

Summary description of the pilot action (including investment, if applicable) explaining its experimental nature, demonstration character and transnational added value

The main aim of the pilot project was the replacement of the existing Oil-Fired Boiler in Lendava Library (public building) with a renewable energy source. The building was connected to the existing geothermal district heating network to increase the share of renewable in the public sector.

The building of Lendava Library is the last connection in the geothermal district heating network and the supply is not stable - the supply medium temperature is not constant. This was the main reason, why the owner did not change the fossil fuel in this building in the past - the storage selection in the pilot was crucial, to change into RES. The properly selected storage in this case ensures now the stable supply for end users.

An innovative solution of energy storing system has been installed in the basement of Lendava Library to increase the level of energy efficiency in public buildings (related to the higher efficiency of the heating system). Paraffin cells are modern and innovative buffer storages that have been developed to efficiently store heat and cold generated from small irregular energy sources such as solar energy, heat pumps etc. Thermal energy storage technologies and geothermal district heating systems have the potential to play a significant role in the transition towards 100% renewable energy systems through increasing system flexibility and overall efficiency and thus reduce CO₂ emissions and increase domestic energy security and additionally reduce the costs of heating. The advantage of paraffin used storages compared to regular water storages: requires less space, which is very important in case of Lendava Library.

The added value of transnational cooperation is the joint review of the pilot activity. The peer review partner (PP5) advised on pilot development and implementation. The technical partner (PP9) assisted in the implementation of monitoring and preparation of tools that will calculate the optimization of pilot performance. Thus, we successfully carried out a pilot activity through joint cooperation.

NUTS region(s) concerned by the pilot action (relevant NUTS level)

NUTS 1 - Slovenia
NUTS 3 - Pomurje region
Lau 2 - Municipality of Lendava

Investment costs (EUR), if applicable

Cost position	Costs [€]
1 New pipeline (construction and assembly work)	20.930,86
2 District heating substation with storage system	31.969,50
3 Peripheral regulation equipment	5.680,00
4 Electrical installations	11.624,50
5 Construction costs for boiler room preparation	1.762,00
6 Planning (technical documentation for machine installations)	2.700,00
7 Additional works (miscellaneous)	1.296,00
Total excl. VAT	75.962,86
VAT (22%)	16.711,83
Total incl. VAT	92.674,69

Expected impact and benefits of the pilot action for the concerned territory and target groups and leverage of additional funds (if applicable)

While the direct benefits of the intervention are meant for the Lendava public administration, thanks to the reduced energy costs of the newly renovated storage and the reduction of CO₂ emissions, also other stakeholders (for example the Consortium of Slovenian Local Energy Agencies) has benefited from the project by expanding their know-how (presentation and testing of tools developed in the frame of the project: Modul 1 and Model 2) and developing both specific skills and more general competence on the management of this type of activity within a European project.

We even suggest to include more stakeholders (experts from different sections) immediately at the start of the project/measure to avoid delays related to bureaucracy and also to market research in case of an innovative solution (to find a suitable product on the market). In any case we will continue with the cooperation in the frame of this new consortium on the one hand to present the pilot in Lendava and the experience as an innovative best-practice example over the next few years and as a model for simplified technical and, above all, economic implementation in protected historic monuments and landscapes and lead to a significant increase in the proportion of renewable energy sources in historic urban centers and on the other hand to set up new projects in the field of RES and RUE development - especially in historic urban centers.

Sustainability of the pilot action results and transferability to other territories and stakeholders

During the project preparation phase, public procurement process and construction phase, partnerships were established between Local Energy Agency Pomurje, Municipality of Lendava, regional Development Agency Sinergija, distributor Petrol - Geotherm, national Geological Survey of Slovenia, Institute for the Protection of Cultural Heritage of Slovenia and the Pomurje technology Park, which will hopefully be continued successfully in future projects and cooperation. Despite the delays due to the pandemic situation, there were no major problems during the construction phase, the monitoring and testing phase will continue independently from the project time plan/milestones and even after the formal project end.

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The investment in a pilot energy storage system in Lendava is now the first in the region and at national level. The storage, which have been installed in the cultural and historic protected building of public library of Lendava, is now representing a decentralized system of thermal energy advancement in the system with paraffin - latent storages. Municipality of Lendava is one of two Slovenian municipalities that has geothermal district heating, in parallel, the municipality also works on energy efficiency, where there are restrictions on cultural and historical protected structures. Pilot paraffin-based latent storages in connection with geothermal district heating system in Lendava is an innovative investment at the national level, such installation has not yet been built anywhere in Slovenia. Investment can serve as an example of good practice in the project area; example of innovative solution of storing renewable energy in an effective way and can be easily transferred to other municipalities/regions/countries.

If applicable, contribution to/ compliance with:

- relevant regulatory requirements
- sustainable development - environmental effects. In case of risk of negative effects, mitigation measures introduced
- horizontal principles such as equal opportunities and non-discrimination

Based on the *Register of Slovene Cultural Heritage*, which is under the jurisdiction of Ministry of Culture, the Lendava Library is classified as Profane Building. In 2018, based on the *Local Self-Government Act* (Official Gazette of the Republic of Slovenia, no. 94/07, 76/08, 79/09, 51/10 and 84/17) and the *Cultural Heritage Protection Act - ZVKD-1* (Official Gazette of the Republic of Slovenia, no. 16/08), the Municipality of Lendava has adopted an Ordinance on the proclamation of cultural monuments of local importance in the area of the Municipality of Lendava.

In accordance with the Slovenian Decree on the Classification of Facilities (*Official Gazette of the Republic of Slovenia, no. 37/18, according to Annex 2*) the installation of a thermal substation is classified as an intervention "Maintenance of facilities" for a number of works: installation of devices and installations in, on and next to the facility. This includes also: the installation of new appliances and related installations for heating, cooling, ventilation, domestic hot water and lighting, including the use of renewable energy sources.

Environmental-related EU legislations are not geothermal specific, they rather ensure that plans, programmes and projects likely to have significant effects on the environment are subjected to an environmental assessment prior to their approval or authorisation (Directive 2011/92/EU on Environmental Impact Assessment), not threatening the habitats (Directive 92/43 on the conservation of natural habitats and of wild fauna and flora), and establish the 'polluter-pays' principle to prevent and remedy environmental damages (Directive 2004/35/EC on environmental liability). According to the EIA Directive, the national authority determines whether and which geothermal projects should be subject to an environmental impact assessment.

Through the public procurement procedure, the Municipality of Lendava granted the respect of all non-discrimination opportunities, being the national legislation on those topics quite strictly.

References to relevant deliverables (e.g. pilot action report, studies), investment factsheet and web-links

If applicable, additional documentation, pictures or images to be provided as annex

The main deliverables related to the Lendava pilot action are:

- × D.T1.2.4- Feasibility study for implementing energy storages in Lendava (SI) (available [here](#))
- × D.T1.2.5- Assessment of the constraints for establishment of energy storages and action plan for further steps (available [here](#))
- × D.T2.1.5- Investment specification of the integration of an energy storage in HUC for Lendava (SI) (available [here](#))
- × D.T2.2.8- Mid-term report of the HUC pilot action in Lendava (SI) (available [here](#))
- × D.T2.2.9- Final report of the HUC pilot action in Lendava (SI)
- × D.T2.3.3- Transnational evaluation report on pilot actions (ongoing)
- × D.T2.3.4- Transnational strategy for the implementation and capitalization of energy storages in HUCs (ongoing)
- × D.T3.2.4- Validation report and establishment of the autarky rate tool & the checklist

The main deliverables are available [here](#) in the “Publications” section.



