

OUTPUT FACT SHEET

Pilot actions (including investment, if applicable)

Version 3

Project index number and acronym	CE 1344 Store4HUC
Output number and title	O.T2.1.1: Pilot actions in Historical urban centers
Investment number and title (if applicable)	Central heat storage in Weizberg
Responsible partner (PP name and number)	PP3 Weizer Energie Innovationszentrum GmbH
Project website	Store4HUC - Interreg (interreg-central.eu)
Delivery date	November 2021

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

The aim of the pilot project is the implementation of a central thermal energy storage tank in the existing biomass heating plant in Weizberg.

Due to the lack of a central storage tank in the heating plant, the boilers were operating mainly in the disadvantageous partial or low load range. This led to increased fuel consumption and emissions (CO, NOx, dust and volatile unburned CnHm).

One of the main reasons for the absence of a storage tank is the location of the heating plant in the historical urban centre of Weizberg, which is a historic monument and landscape protection zone. At present, the integration of large storage tanks for local heating networks in historic monument and landscape protected districts and protected buildings poses a great challenge. The associated structural alterations must comply with the strict requirements of the local historic monument and landscape protection rules.

A possible solution to overcome this problem is demonstrated by the project in question through the innovative implementation of a central water buffer in the historic urban center of Weizberg. The constructional requirements for the adherence to the protection of the historic monument and landscape are to be fulfilled by the new solution concept. The chosen solution is to sink the buffer, keep its color in green to reduce visibility from the outside as well as its predominant underground implementation. The already existing buildings are used extended under given restrictions of the dimensions. The specially adapted design of the visible facades in terms of color and geometry have been implemented while complying with the requirements for weather resistance and minimally invasive integration in order not to influence existing natural conditions of the surrounding.

Due to the above-mentioned challenges, there is a need to catch up initiatives in terms of energy efficiency and the use of renewable energy sources, especially in those districts with listed buildings. The project in question intends to serve as an innovative good-practice example today and in future 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.

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

AT 2 Südösterreich, AT22 Styria, AT224 Eastern Part of Styria

Investment costs (EUR), if applicable

The whole investment costs for the storage are:

Costs categories	Costs [€]	Final costs[€]
Storage	55.633,75	53.336,52
Heating pipes	44.687,49	53.922,01
Regulation	18.961,07	27.917,98
Electrical installation	19.251,60	8.080,67
Emergency heating station and water treatment	15.466,15	6.349,30
Construction costs for boiler room construction according to service specification	116.174,56	115.000
Planning and tendering	22.227,90	11.878,25
Total excluding VAT	292.402,53	276.484,73

Metering Equipment was financed by Store4HUC with 9460, - Euro and the funding from the government of Austria is 107.000 EUROS.

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

Additional investments arise mainly due to the implementation of the storage tank in a historic urban center, the associated difficulties and cost-intensive structural requirements. However, all have been compared with the positive environmental effect achieved in this particular historic urban center supported by this additional investment.

In energy terms, the water buffer storage tank used is a proven technology and can be regarded as the most cost-effective solution in comparison with other storage technologies on the market due to the high number of charging cycles (almost daily complete charging and discharging of the storage facility). Essentially, due to the planned measures of load balancing and peak load coverage, the disadvantageous partial/weak load operation of the boiler plant is avoided or reduced and thus the following positive effects could be achieved:

- × Increasing the efficiency of the fuel boilers → Savings in primary energy (fuel savings) → CO₂ savings through lower energy expenditure for the provision of the wood chips (production, transport, etc.);
- × Lower pollutant emissions (carbon monoxide (CO), dust, NO_x and volatile organic carbon compounds (C_nH_m));
- × Increasing the service life of the plant components → Significant saving of ecological resources that would result from early complete renewal of the boiler plant;
- × Increase in sweeping intervals (due to on/off operation of the boiler system), more time windows are available → Increase in efficiency, reduction in pollutant emissions;
- × Extension of maintenance intervals → Lower maintenance costs;
- × More dynamic operation of the local heating network possible → Consumers can be served more quickly with the required flow temperature;
- × In addition, the use of the heating network as a thermal buffer is avoided as a result of the central storage in the heating plant and the associated increased heat losses are reduced.

The number of cities with a historical city center in Austria is currently 44 cities. In addition, 26 monuments are under protection in Weiz and 38,367 in Austria. Therefore, this innovative integration has a high market potential and replication potential. The system in question intends to serve as an innovative best-practice system and as a model for the simplified technical but above all economic implementation at these sites that are protected by the local image and listed, and by the way will lead to a significant increase in the proportion of renewable energy sources.

The integration of thermal energy storage and the fully integrated, intelligent load management in the existing biomass heating plant Weizberg, to increase flexibility and energy efficiency, is in addition completely and seamlessly integrated into the regional climate and energy targets.

The KEM Storage funds from the Government of Austria is made for high innovative thermal solutions, so the Storage of the Weizberg fits fully to this Funding line and was so subsidized with 45% of the costs.

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

Due to the chosen, innovative approach, it is possible to integrate the existing biomass heating plant as well as the planned water buffer tank into an overall vision of historic urban centres. This can show that large thermal energy storage systems are a technically and economically viable option for the supply of heat and cooling in buildings or districts that are protected by local and historical monumental restrictions, especially in regards to the integration of renewable energy sources. The result is that, according to the “model Weiz”, the integration of a biomass district heating plant including heat storage at numerous locations in the listed districts and thus in further districts of the city can be made possible by the used holistic construction method.

In Austria there are currently 44 cities with historic city centres. In addition, 26 monuments are listed in Weiz and 38,367 in Austria. In view of these figures, there is a broad agreement among the stakeholders involved to continue along the path taken. However, the most important critical points are the integration into the landscape and the resulting additional costs that are necessary due to the additional planning. Since the pilot plant is not supported by investment grants from Store4HUC, external grants for the planned plant are an important objective of the participants and will be further investigated. Hence, the replication planning phase is in progress.

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

HUCs are in Austria subject to the building and spatial planning laws of the provinces and the Austrian Historic Buildings Acts. Protection of the local historic sites and historic buildings is guaranteed by respective local historic buildings protection zones, which is executed by a local historic building expert within the framework of building approvals. Structural changes according to the respective zoning plan, as for example in Weiz, therefore require a building licence including a positive local landscape protection evaluation.

The Weizberg heating plant, as a pilot and best practice plant for Austria, was built below the existing site level due to the requirements for buildings within a HUC. The planned extension to accommodate a storage tank, a machine room, a control room, a retaining wall as well as the associated changes on the terrain thus has a direct impact on the existing landscape. Therefore, the following requirements and needs have to be fulfilled locally and also nationally:

- × Predominant implementation below terrain and surface level;
- × Utilization of existing buildings to cover the extension and associated restrictions regarding the dimensions of the new building;
- × Specially adapted design of the visible facades with regard to color and geometry while complying with the requirements for weather resistance;
- × Minimally invasive integration, in order not to influence existing natural conditions in the surrounding.

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 relevant Deliverables are:

- × [D.T2.1.1: Urban Performance indicators](#)
- × [D.T2.1.4: Investment specification](#)
- × [D.T1.2.3: Feasibility study](#)
- × [D.T2.2.7: Final report on pilot action](#)

All information can be found on the Website [Store4HUC - Interreg \(interreg-central.eu\)](http://Store4HUC - Interreg (interreg-central.eu))