

MID-TERM REPORT OF THE HUC PILOT ACTION IN CUNEO

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1. SUMMARY

The inclined lift energy efficiency pilot project of the City of Cuneo is intended as a case study and local, as well as wide range, benchmark for further energy efficiency projects exploiting storage systems installed in city centres.

The inclined lift involved in this project is a form of local transport widely used by the population of Cuneo as it connects the large parking area of Piazzale Cavallera with the historic and commercial centre of the city. Therefore, the related energy efficiency project is configured as a measure totally in line with the strategy aimed at strengthening sustainable mobility that is currently supported and promoted by the Municipality of Cuneo. It will also provide greater security of continuous use as the system will work as a "stand alone" model independent from the traditional power supply network.

As it could not be inferred from the electricity bills, which are not calculated on a daily basis, the current electricity consumption has been calculated by means of dedicated analysis with a view to maximize energy efficiency of the system and provide detailed information to assist the planning and design of this pilot.

Due to the pandemic situation that has severely affected Italy work progress is now behind the schedule. This has been mainly caused by the slowdown of project actions for the pilot team in Cuneo. Difficult is still to meet both, the internal project team and the other stakeholders and external consultants who e.g. conducted the monitoring analyses and outlined the project phases. In addition, several construction companies have encountered difficulties in procuring the materials necessary to carry out the works due to the total lockdown that Italy has experienced for several weeks.

The combination of these factors has led to a significant postponement of the timeline of the works, which have not yet been started up to now, but there are good indications to go ahead pretty soon.

Despite of this, it was possible to bring all stakeholders together through a Deployment Desk that was held on July 9, 2020 - partially in person and partially online - and that was attended by nearly 110 participants, thanks to the combination with the Interreg Europe project "SHREC- Shifting towards Renewable Energy Transition to Low Carbon Energy" event. During this event the stakeholders were updated on the progress of the pilot project and ideas were collected on the best approaches to accelerate its implementation. The involvement of stakeholders has been equally constant over time thanks to periodic communications about the progress of Store4HUC with newsletters and other dissemination activities.

The pilot project is a novelty in the urban and regional panorama and although it is a rather unique case, it has stimulated the interest of the event participants and of other parties involved in this matter. The administration of the City of Cuneo is strongly committed to this project and sees in the development of the pilot project, realized thanks to Store4HUC, an opportunity to demonstrate the feasibility of initiatives of this type and to provide an example of good practice to be replicated throughout the region.



2. INTRODUCTION

This document describes the reporting activities of the pilot actions foreseen in the STORE4HUC project.

It describes the monitoring activities that the involved PPs will conduct on the pilot implementation and the indicators (KPIs) to be monitored at different stages:

- Intermediate stage (Mid-term report) - September 2020
- Final stage (Final report) - September 2021
- Transnational evaluation stage - November 2021

It also provides (chapter 3) a summary of the aspects to be included at the feasibility study and pre-investment stages, as a memorial for the responsible of pilot actions.

The document in particular has two specific objectives:

- Report on the investment process foreseen for each pilot.
- Monitor other aspects related to the positive impacts and successfulness of pilots, such as:
 - Results of application in the operation modus and monitoring tools.
 - Adaptations of energy and urban policy frames that are needed.
 - Mapping and adaptation of HUC regulations for the authorization of building integration.
 - Energy storage promotion and replication activities.
 - Follow up - recommendations and improvements.
 - Evaluation of the sustainability of the pilot and risk reduction measures.



3. ASPECTS AND KPIS TO BE MONITORED AT DIFFERENT STAGES

Aspects and Urban KPIS	Chapter in the template	Feasibility study	Pre - investment stage	Mid-term report	Final report	Transnat. evaluation
Technical specifications and performance requirements of the identified storage system		X	X			
Strengths, Weaknesses, Opportunities, Threats (SWOT Analysis)		X				
Initial situation: energy consumption, CO ₂ emissions and energy costs			X			
Procurement procedure	4.1		X	X	X	
Installation and integration process	4.2		X	X	X	
Impact of the investment on energy and overall costs	4.3		X	X	X	
Energy management	4.4		X	X	X	
Energy and urban policy frames	4.5	X		X	X	X
Stakeholders' involvement	4.6	X		X	X	X
Transferability of the pilot action	4.7	X		X	X	X
Impact of the pilot action	4.8	x		X	X	X
KPI ₁ - External energy needs of the pilot system	4.9.1		X		X	X
KPI ₂ - External energy costs of the pilot system	4.9.2		X		X	X
KPI ₃ - Average yearly CO ₂ abatement	4.9.3		X		X	X
KPI ₄ - Autarky rate	4.9.4		X		X	X
KPI ₅ - Use of energy from RES	4.9.5		X		X	X
KPI ₆ - Security of energy supply	4.9.6		X		X	X
KPI ₇ - Power peak	4.9.7		X		X	X
KPI ₈ - Profitability	4.9.8		X		X	X
KPI ₉ - Stimulation of local economy	4.9.9		X		X	X
KPI ₁₀ - Other pilot specific KPIS	4.9.10		X		X	X



4. PROGRESS REPORT OF THE PILOT ACTION

According to what is described in the former chapters, in the sub-chapters below the progress of the pilot implementation is described.

The pilot action identified by the City of Cuneo for the Store4HUC project for the energy efficiency of the city inclined lift is now at start-up stage due to the delay resulting from the 2020 pandemic situation and to a failure in the public procurement procedure launched in December 2020. This section of the document details the current status of each task in the pilot project with reference to those aspects for which monitoring is required in this phase of the project.

Given this delay, some aspects will not be addressed as they are closely related to the execution of the works and therefore their progress is not verifiable.

This document will provide updates on:

- Procurement (tender process);
- Energy and urban policy frames;
- Stakeholders' involvement.

4.1. Procurement procedure

4.1.1. Type of tendering procedure

The contractor for the works was appointed in March 2020 via a direct award procedure in accordance with art. 1 -paragraph 2, letter a) - of the Decree Law n. 76/2020, after a request for proposals sent to three economic operators, previously identified as included in a special list in the acts of the Municipality, with final awarding according to the criterion of the lowest price.

This procedure was made possible by the enactment of the Decree Law no. 76/2020, temporarily amending the Decree Law no. 50/2016, which normally regulates public contracts at a national level, for the purpose of dealing with emergency in the Covid-19 pandemic. According to the new decree, in fact, works may be contracted out on a direct basis for amounts below €150,000. However, it was decided to proceed through an invitation to tender addressed to three economic operators to ensure full transparency in the contracting procedure.

4.1.2. First call for tenders - December 2020

The first tender for the assignment of the energy efficiency works of the Cuneo panoramic elevator was published in December 2020, in line with the procedure mentioned above inviting three economic firms having the requirements to carry out the works. The deadline for the submission of bids was set on December 15, 2020 and the entire procedure was carried out on the online platform Sintel e-Procurement. This first tender was not successful as no bids could be received by the municipality.

The main reason for such outcome is to be found in the fact that the contracting authority - based on the indications provided by the project designer in the Special Tender Specifications - had specified "Plant for the production of electrical power" as the main category of the works to be carried out. Indeed, in the process of preparing the quotations, some companies had mentioned that the requirements of the specifications would involve also works of a different category whose economic value could be prevalent with respect to those of the main category indicated. Consequently, a new procedure was started having the same specifications of the first tender but with "Building works" mentioned as the prevailing category.



4.1.3. New call for tender- February 2021

Acknowledging the issue that had compromised the successful outcome of the previous procedure, the main category of the works included in the new tender documents were modified to “Civil and Industrial Buildings”, and new companies meeting the necessary requirements were invited to tender.

The Municipality of Cuneo finally identified the contracting company (Pianfei Costruzioni) and assigned the works to be carried out as a matter of urgency, pursuant to art. 153, paragraph 1, second sentence, of the General Regulations on Public Procurements (D.P.R. 207/2010). In this case, the Contract Manager expressly indicates in the minutes those works that must be started immediately. This procedure has been put in place to ensure the execution of all works by July 2021 at the maximum, by allowing the contracting company to start ordering the materials in due time and to make all necessary arrangements to set up the worksite.

An initial preliminary meeting between the contracting company, the Contract Manager and the City of Cuneo took place on March 12, 2021 and will be followed by further visits to the pilot site and meetings. The final awarding will take place following the verification of the requirements, which takes about a month and is therefore completed by mid-April. As we expect all works, including final testing, procedures for connection to the power supply grid, adjustment of the electrical components of the system, to be completed by July 2021 as a latest, the pilot will respect the deadline of O.T2.1 “Pilot actions in Historical urban centres” established in the Application Form.

Timetable for Cuneo pilot

Activity/Phase	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21
Tender procedure									
Execution of works									
Connection to the grid									
Final testing									
Verification of performance									

4.1.4. Technical specifications of the procurement

The project includes the realisation of a new system for the production and storage of electrical power, integrated with the drive of the inclined elevator, as well as the construction of a small photovoltaic field along the system runway to supplement the amount of electrical energy that is produced by the elevator during related operating phases. This is actually a single integrated system, made up of several distinct elements, which also require some construction works for support. The individual functional units can be described as follows:

- **Storage and inverter:** a specific storage unit consisting of a battery pack will be supplied and installed in order to enable the storage of the electrical power produced by the inclined lift with the photovoltaic area, and to make it available to the elevator system supply when necessary. The storage unit will be equipped with a hybrid inverter for DC to AC conversion. The battery pack will use long-life Lithium-Iron-Phosphate batteries and the storage unit will be composed of 7 modules for a total capacity of 19.32 kWh;
- **Photovoltaic system:** the solar panels chosen for the PV field consist of "monocrystalline" modules that allow for the maximum energy efficiency, each sizing 1.690x1.000 mm. All oriented in the same direction, 26 panels will cover a surface of 45 m² and will generate an electric power of 8,84 KWp. The



panels will be divided into two different strings independently connected to the inverter. Having two independent strings of panels should allow the system to be more energy efficient. The PV area will be installed along the runway of the inclined lift on a metal frame fixed to the concrete wall already on site;

- **Underground cable ducts:** underground cable ducts will be installed for electrical cables running from the photovoltaic field to the technical compartment and from there to the underground engine room of the inclined lift. The ducts will have different colours, thus guaranteeing the safety for those who will do the system maintenance;
- **Technical room:** a new room will host the storage unit, the electric devices and all other equipment needed and will be constructed at the top station of the inclined lift, directly connected to the machineries' room already present on site. The dimensions of the room are the following: 6.399 mm length, 2.700 mm width and 2.400 mm internal height;
- **Monitoring system:** a monitoring system for the energy consumption, production, input and auto-production of the lift will be installed at the premises of the electric panel. The registered data will be automatically sent by email and on a set time basis in a .csv format in order to be analysed and stored. The monitored parameters are: energy consumption, environmental sustainability measured as CO2 emissions and energy costs.

Related costs are given in the following table:

Costs categories	Costs
Technical room	31.435,44 €
Photovoltaic plant	23.053,32 €
Electrical Installations	16.333,12 €
Safety measures	1.461,88 €
Sum available for unexpected events	2.512,18 €
Project planning	9.148,05 €
Tender	972,83 €
Analysis and testing procedures	2.854,80 €
VAT on works (10%)	7.228,38 €
TOTAL	95.000,00 €

Table 1: Cuneo pilot costs

4.2. Installation and integration process

The installation and integration process has not started yet.

4.3. Impact of the investment on energy and overall costs

According to the minimum project targets set in the investment specification document, a reduction of the energy consumption of 6000 kWh/year is expected, with a costs reduction of 1.180 Euro/year.

However, the real impact of investment on energy and overall costs cannot be assessed yet.

4.4. Energy management

No energy management activity has been implemented yet.



4.5. Energy and urban policy frames

The pilot project for the energy efficiency of the inclined lift of Cuneo is a special case of its kind although there are other installations of this type in some cities of Piedmont. In Cuneo, the lift is a means largely used by the citizens. They use it to reach the city centre, after leaving their cars in a large free parking area at the base of the lift, or to reach the nature cycle trails of the River Park Gesso and Stura, situated a few hundred meters from the lower station of the lift.

For the City of Cuneo, this is therefore a means of public transportation that is widely used and has therefore an impact if performed energy efficiently. The project is therefore part of the strategy of the Municipality of Cuneo aiming at strengthening sustainable mobility and of the “Cuneo for Sustainable Development” Strategic Plan that will be detailed below. Its replicability on the territory may be difficult due to the lack of lift facilities of this kind, although the same can be taken up for other types of facilities of some Piedmont’ cities.

4.5.1. SECAP, PUMS and “Cuneo for Sustainable Development” Strategic Plan

The Municipality of Cuneo is highly committed to the reduction of emissions and has demonstrated this commitment by engaging several actions such as:

- adhering to the New Covenant of Mayors for Energy and Climate - an initiative promoted by the European Commission aimed to directly involve governments and local administrations in the fight against climate change - in which participating cities committed to reduce greenhouse gases emissions in their territory by at least 40% by 2030;
- approving the Sustainable Energy and Climate Action Plan (SECAP) which comprises both an energy strategic plan and corresponding Action Plan for the adaptation of the territory to the effects of climate change;
- issuing the PUMS (Urban Plan for Sustainable Mobility) which constitutes the reference framework for optimal mobility management strategies for the City of Cuneo and plans to systematise a set of strategic actions for sustainable mobility;
- endorsing the Strategic Plan “Cuneo for Sustainable Development” which directs local policies towards the implementation of the 17 sustainable development goals contained in the Agenda 2030.

In this framework, the pilot project fits as one piece to the strategic plan of the city and as an example of good practice that could be replicated in the region.

4.5.2. Building, monument and heritage protection regulation

The investigations carried out on the environmental, hydro-geological, and archaeological feasibility and on urban compatibility of the project did not reveal any significant elements that might hinder the execution of the works. The public land on which the infrastructure will be built already hosts a permanent transport system on which the photovoltaic panels will be integrated on the existing fencing, with no changes to the layout of the transport system.

The impact resulting from the presence of photovoltaic panels is inherent in the choice of the technological system, which however allows optimising the use of energy needed to operate the inclined lift, with positive implications on the environmental sustainability of the infrastructure. However, an attempt has been made to mitigate the visual impact by reducing the original size of the photovoltaic array and limiting it to an area along the lower part of the runway, thus significantly reducing the cone of visual perception of the panels from the areas located on the right bank of the River Gesso.



The building site is located beyond the 150 m buffer zone from the River Gesso, but falls within the boundaries of the River Park Gesso and Stura (Galassini), so it is within a nature conservation area under Legislative Decree 42/2004. In this regard, in the course of the preliminary investigation of the final project, the landscape authorisation n. 35 has been required and obtained on July 2, 2020, and the number of photovoltaic panels to be installed has been reduced in order to limit the impact on the landscape (see the following figures 1 and 2).

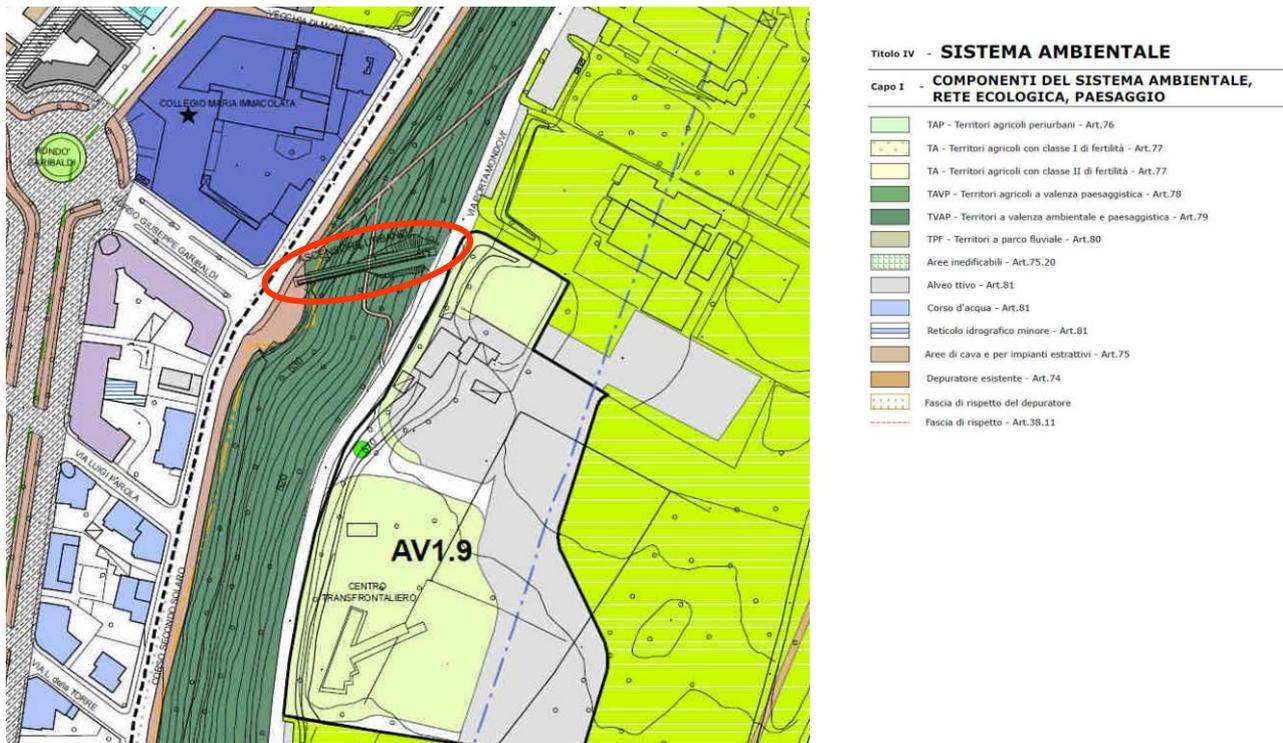


Figure 1: Excerpt from the zoning plan for the focus area of the pilot in Cuneo

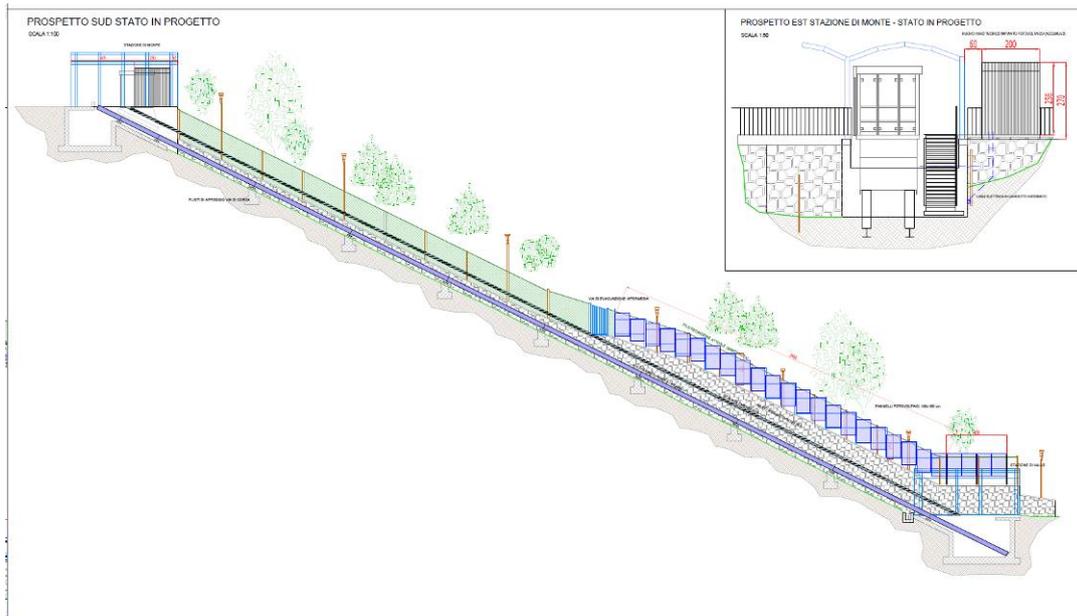


Figure 2: Draft plans of the implementation of the pilot



4.5.3. Energy production license legislation

Pursuant to Legislative Decree no. 112 of 31 March 1998 and Regional Law no. 44 of 26 April 2000, the Provinces have been delegated authorisation to build and operate plants for the production of electricity with a capacity of less than 300 MWh, including plants powered by renewable sources as per Legislative Decree 387/2003. Not all plants powered by renewable sources, however, are subject to the single procedure of provincial jurisdiction. Interventions below certain thresholds or with characteristics such as to be considered "free building activities" can, in fact, be carried out through the Simplified Qualification Procedures (PAS) of municipal competence pursuant to Legislative Decree 28/2011 or after simple notification to the municipality responsible for the territory.

4.5.4. General constraints and opportunities of energy storages installation in HUC

The results of the first Deployment Desk showed that there are not barriers and regulatory constraints concerning protection of architectural and environmental heritage that prevent the installation of energy storages in HUC but new regulations and law at national level must be developed in the sector of energy trading. The lack of regulations on energy market, based on energy decentralisation and peer to peer energy trading, prevents the spread of energy storages.

The diffusion of energy storages in historical centres is the opportunity to improve some of the services like the urban public transport and consequently the environmental quality of cities (e.g. air quality). Moreover, this technology could help overcoming the historical and architectural constraints in HUC and give the opportunity to develop energy communities in urban areas. A strong boost to the installation of energy storages could be given by new incentive policies implemented at regional and national level.

The Cuneo pilot project is fully integrated in the strategy of the city of Cuneo in favour of sustainability and protection of environmental resources (PUMS - Sustainable Urban Mobility Plan and SECAP - Sustainable Energy and Climate Action Plan). The strong interaction between the energy efficiency intervention on the pilot site and the Municipality strategy in terms of sustainability has contributed to quickly and constructively overcome some constraints that would have made the authorisation and constructive process longer.

In spite of the current regulation of the energy market that does not provide for peer to peer trading opportunities - this way slowing down the deployment of storage devices - a new system of rules and regulations is currently under study that is likely to change the situation in the short to medium term, promoting the development of Energy Communities in the Piedmont Region. For the Cuneo area, the presence of a pilot project already implemented to connect to the historic centre is an important element to be considered as part of the decision-making process of the municipality.

With the realisation of the pilot project, a first experimental phase will be completed that will open to further interventions of energy efficiency measures combined with storage systems that will, among other things, contribute to the supply of some public services and to the increase of energy production from renewable sources for improving the air quality and de-carbonization processes.

The policy recommendation:

- Involvement of all stakeholders from the beginning of the project
- Strong interactions between local and regional strategic plan for sustainability and the pilot action to create shared interest and greater synergies
- A strong boost to the installation of energy storages could be given by new incentive policies implemented at regional and national level



- To carry out upstreaming activities, such as meeting with the national public authorities (bodies) to influence on the strategy integration.

4.6. Stakeholders' involvement

Stakeholders have been involved since the early stage of the Store4HUC project by organising Deployment Desks and sharing updates on the progress of the pilot project and of the whole Store4HUC project.

Two Deployment Desks have been held up to today, the first on September 12, 2019, in conjunction with the kick-off event, and the second on July 9, 2020, while a third is planned for Spring 2021, according to the timeline of the Application Form.

The participants in the working groups come from different realities of the territories of Cuneo and Turin, since the groups have been jointly organised by the Municipality of Cuneo and Environment Park. The participants in the working groups belong to the following categories:

- Various departments of the Municipality of Cuneo
- Piedmont Region
- Regional and local agencies
- Other local authorities
- Private entities such as bus companies, electricity distributors
- Environmental consultants.

The scope addressed during the Deployment Desks has been always focused on the pilot project and also triggering a broader debate on the opportunity to disseminate good practice such as the one demonstrated by the energy efficiency of the inclined lift in Cuneo and the potential constraints arising in the attempts to replicate them at an extended level. Further topics addressed during the meetings include, for example: the opportunities and challenges of installing energy storages in historic city centres, their contribution to the municipal strategy towards sustainable mobility and the Agenda2030, or what incentives are available to encourage the spread of such good practice.

Both meetings addressed the economic, regulatory and institutional barriers that could affect the dissemination of these technologies, while it is also exploring the opportunities that the implementation of the pilot project can offer and how the adaptation and mitigation strategies undertaken by various local authorities can promote the dissemination of such a good practice. For example, the adoption of energy storage systems could help to improve certain public services, such as urban transport, or could encourage the creation of intermodal charging stations for bicycles and electric vehicles.

From the point of view of identified challenges, there are not many impediments to the installation of storage systems in historic city centres from an architectural and landscape point of view, except in the case of buildings listed as cultural assets to be safeguarded. Indeed, as the installation of renewable energy sources in these areas is often difficult or even forbidden, storage systems could provide a solution to the decarbonisation of city centres. However, one of the challenges that we identified, which severely limits the deployment of storage systems, is the lack of laws regulating the trade of self-generated energy. This factor greatly affects the dissemination of these technologies and also has a negative impact on the establishment of Energy Communities, which are a very effective tool for promoting storage systems.

The opportunity to integrate the installation of storage systems in historic city centres into the SECAP under preparation for the Municipality of Cuneo, was also discussed during the Deployment Desks, involving adaptations to the city plan or defining incentives for the installation of these technologies.

Finally, the opportunity offered by the Piedmont Region to set up Energy Communities - supported by economic contributions, in which oil-free areas are being developed - was also discussed.



The meetings, which were attended by various local and regional parties, is a starting point to develop useful synergies for the future creation of an energy community in Cuneo. However, the regulatory framework is still being finalised and the current state of affairs does not encourage the spreading of energy exchange systems like the envisaged.

4.7. Transferability of the pilot action

The transferability of the pilot action cannot be assessed yet.

4.8. Impact of the pilot action

The impact of the pilot action cannot be assessed yet.

However, the involvement of the stakeholders at the Deployment Desks, and the experience gained so far within the Municipality of Cuneo on the feasibility of integrating energy storage systems in historic city centres, have fostered a discussion on these issues that could be continued even after the conclusion of the project. Once the pilot intervention has been implemented and the benefits assessed, the possibility of replicating the experience in other contexts can be made.

The contribution of the SECAP and the commitment of the Administration of Cuneo to the sustainable development of the city can serve as a driver for further changes towards sustainability.

4.9. KPIs (Key Performance Indicators)

Not due for Mid-term report.

4.9.1. KPI: External energy needs of the pilot system

Not due for Mid-term report.

4.9.2. KPI: External energy cost of the pilot system

Not due for Mid-term report.

4.9.3. KPI: Yearly CO₂ emission

Not due for Mid-term report.

4.9.4. KPI: Autarky rate

Not due for Mid-term report.

4.9.5. KPI: Use of energy from RES

Not due for Mid-term report.



4.9.6. KPI: Security of energy supply

Not due for Mid-term report.

4.9.7. KPI: Power peak

Not due for Mid-term report.

4.9.8. KPI: Profitability

Not due for Mid-term report.

4.9.9. KPI: Stimulation of the local economy

Not due for Mid-term report.

4.9.10. Other pilot specific KPIs

Not due for Mid-term report.



5. CONCLUSIONS

Despite of the delayed start of the pilot action compared to what was forecasted, the preliminary planning has been carried out and the ground was prepared for all related activities to take place unhindered and as quickly as possible. An urgency approach was also adopted for the delivery of the works in order to further shorten the timeframe and to conclude the works in due time for the dissemination of the project results.

In the meantime, meetings were held among stakeholders, creating a working network on the following topics:

- energy storage systems and their integration in historical urban centres;
- opportunities for the dissemination of this technology;
- opportunities and limitations of its dissemination, with particular reference to historical urban centres;
- Energy Communities, benefits and limitations from a legislative point of view.

These meetings proved to be very useful in laying the foundations for future collaboration involving different actors, from institutions to private companies operating in the energy sector, creating an even wider network thanks to the cross-fertilization events that have been or will be held during the project.

It can therefore be said that the Store4HUC project has made it possible to raise a very topical issue in the context of the Municipality of Cuneo that fits well into the city's strategy for achieving the sustainable development objectives set out in the "Cuneo for Sustainable Development" Strategic Plan, as well as is contributing to the city's engagement to reduce emissions by 40% by 2030, as indicated in the SECAP and as demonstrated by the commitment made by joining the New Covenant of Mayors.