HORIZON – CL5-2021-D4-02-01

Innovation Action

CBDC powered Smart PerFORrmance contracTs for Efficiency, Sustainable, Inclusive, Energy use

D4.2 Engagement plan and social acceptance assessment

Report Identifier:	D4.2		
Work-package:	WP4	**Task:**	T4.2
Responsible Partner:	Smart Innovation Norway (SIN)	**Version Number:**	1.5
Due Date	31/01/2025	**Document Date**	29/01/2025
Distribution Security:	PU	**Deliverable Type:**	R – Document, report
Keywords:	FORTESIE pilots, common impact model, engagement plan, social acceptance, updated timeline		
Project website: http://www.fortesie.eu/			

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101080029.

Quality Control

	Name	Organisation	Date
Editor	Katariina Koykka	SIN	21/02/2024
Peer review 1	Aija Zucika	LEIF	27/03/2024
Peer review 2	Ilvija Asmane	MESH	02/04/2024
Authorised by (Technical Coordinator)	Alkiviadis Giannakoulias	ED	03/04/2024
Authorised by (Quality Manager)	Kostas Panagopoulos	ED	03/04/2024
Submitted by (Project Coordinator)	Anastasia Garbi	ED	03/04/2024
Updated version	Christos Kontzinos, Maria Flouri	NTUA	29/01/2025

Legal Disclaimer

FORTESIE is an EU project funded by the Horizon Europe (HORIZON) research and innovation programme under grant agreement No. 101080029. The information and views set out in this deliverable are those of the author(s) and do not necessarily reflect the official opinion of the European Union. The information in this document is provided “as is”, and no guarantee or warranty is given that the information is fit for any specific purpose. Neither the European Union institutions and bodies nor any person acting on their behalf may be held responsible for the use which may be made of the information contained therein. The FORTESIE Consortium members shall have no liability for damages of any kind including without limitation direct, special, indirect, or consequential damages that may result from the use of these materials subject to any liability which is mandatory due to applicable law.

Copyright notice

Table of Contents

List of Tables

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101080029.

Abbreviations

CIM	Common Impact Model
KPI	Key Performance Indicator
OSS	One Stop Shop

Executive Summary

FORTESIE aims to accelerate the Renovation Wave in Europe by designing and demonstrating innovative renovation packages in the building industry with Smart Performance-Based guarantees and financing. The renovation packages are demonstrated in 7 pilot sites across 6 countries.

Methodologies from social sciences and humanities are adopted for ensuring a human-centred approach throughout the development and implementation of the FORTESIE solutions. This process started with D2.1 "End-user and pilot requirements and use-cases description", which mapped each pilot's stakeholders and their roles, as well as the potential users of the demo services and their needs, preferences, and behaviours. This was followed by D2.2 "FORTESIE services co-creation M9", describing the FORTESIE renovation, digitisation, and engagement services for each specific target group. D2.2 addressed the added value provided and bottlenecks in the development, integration, deployment and validation for full-scale adoption.

This deliverable, entitled D4.2 "Engagement plan and social acceptance assessment", is part of WP4 "Pilots' Deployment and Validation". This deliverable presents the engagement plans and social acceptance assessment for all FORTESIE pilots, providing the FORTESIE pilots a clear timeline of activities for engaging with their end-users and other stakeholders and for measuring the success of these engagement activities.

The engagement plans are designed to ensure that end-users and other stakeholders feel incentivised and engaged throughout the execution of the pilots. They include various engagement activities, such as meetings, workshops, events, communication, and other relevant material and interaction. The engagement plans were co-created with the FORTESIE pilot leaders and are inspired by insights from D2.1 and D2.2.

The plans follow the timeline of the pilots' deployment presented in D4.1 "Pilots preparation, baseline analysis and planning". Since the finalisation of D4.1, some of the pilots' deployment timelines have changed, and this deliverable will provide updates to the timelines as well as justifications for these changes.

A key part of the engagement plans is onboarding the end-users to the FORTESIE digital tools, i.e., mobile app and one-stop-shop (OSS) marketplace as well as ensuring long-term engagement with the tools. Development of these digital tools is done in WP3, and the design of the components has been reported in D3.1 "Components' functional design".

Besides the engagement plans, this deliverable also presents the social acceptance measurement methodology adopted for the project, along with the relevant Key Performance Indicators (KPIs). Preliminary KPIs related to social acceptance and engagement activities have earlier been defined in D1.1 "Quality, risk and innovation handbook" and D4.1. These are further defined in this deliverable.

The engagement activities will be carried out as part of T4.2 "Engagement of citizens, stakeholders, and community" and the social acceptance measurement as part of T4.4 "Overall monitoring, evaluation and social acceptance assessment". As part of T4.4, it is important to continuously evaluate the performance of the stakeholder mapping and the engagement activities so that adjustments can be made as needed. Thus, the engagement plans presented in this deliverable should not be considered as static and final but should rather be adjusted throughout the FORTESIE project as the pilot teams' understanding of their end-users' and other stakeholders' reactions to the FORTESIE renovations and digital solutions increases.

The completed engagement activities as well as results of the social acceptance evaluation will be reported in future deliverables D4.3 and D4.4, "Pilots execution documentation and validation assessment at M28 / M34".

1 Introduction

As part of WP4 “Pilots’ Deployment and Validation”, this deliverable builds on D2.1’s findings and details the engagement plans for all FORTESIE pilots. The engagement plans are designed to ensure that end-users and other stakeholders feel incentivised and engaged throughout the execution of the pilots. The plans include various engagement activities, including digital tools, meetings, workshops, events, communication, and other relevant material and interaction. This deliverable also presents the social acceptance measurement methodology adopted for the project, along with the relevant Key Performance Indicators (KPIs) set to evaluate its success.

1.1 Project Introduction

FORTESIE aims to accelerate the Renovation Wave in Europe by designing and demonstrating innovative renovation packages in the building industry with Smart Performance-Based guarantees and financing. These renovation packages will combine state-of-the-art construction materials and technological components, such as prefabricated facades, building-integrated photovoltaics, and heat pumps. The renovation packages will be tailored to specific target groups' needs and optimised to improve the efficient, sustainable, and inclusive energy performance while also considering comfort.

Additionally, innovative digital technologies for measurement and verification will be developed and implemented to raise the overall energy performance contract value proposition. Especially relevant for this deliverable is the gamified mobile application for consumers, which will provide information about their energy use as well as feedback and suggestions for optimising energy use and comfort. Additionally, an online marketplace will be developed and implemented to offer advice and facilitate access to these renovation services.

The FORTESIE project will evaluate the effectiveness of these solutions and validate novel business models in real demonstrators in 6 countries, for 3 different target groups in 7 versatile pilot sites.

1.2 Deliverable Purpose

Engaging the end-users and other stakeholders throughout the pilots’ deployment is key to maximising the benefits of the renovations, promoting the correct and efficient use of the systems, and encouraging energy-efficient behaviours. In FORTESIE, stakeholders and communities are engaged through a variety of means, including digital tools, meetings, information, and other relevant material or interactions.

This deliverable presents the engagement methodology and engagement plans for each of the 7 FORTESIE pilots. It also presents the methodology and related KPIs for monitoring the success of these engagement activities and the overall social acceptance of the FORTESIE project. Additionally, roles and responsibilities in delivering the engagement activities and social acceptance assessment are defined.

In practice, this deliverable acts as a blueprint for the pilot leaders and other responsible FORTESIE partners to follow during the pilot execution. It outlines a timeline with specific actions and strategies designed to overcome barriers to participation and engage the end-users and other stakeholders with the FORTESIE project. The pilot leaders will monitor the success of the engagement plan using KPIs defined in this deliverable and can adjust the engagement plan as needed to ensure that all stakeholders feel incentivised and engaged throughout the pilot execution.

Thus, the engagement plans presented in this deliverable should not be considered static and final, but rather as first plans that are based on information that was available at the time this document

was written. The engagement plans should be adjusted throughout the FORTESIE project as the pilot teams' understanding of their end-users and other stakeholders' reactions to the FORTESIE renovations and digital solutions increases.

The objectives related to this deliverable have been achieved in full and as scheduled.

1.3 Structure of the deliverable

This deliverable starts with chapter 1 introducing the project, the purpose of the deliverable, and its interdependencies with other tasks and deliverables.

Chapter 2 introduces the engagement methodology and Common Impact Model, which was used as a framework for the development of engagement activities. The chapter also describes the collaboration process between SIN, pilot leaders, and other FORTESIE project partners in creating the engagement plans, as well as responsibilities in realising the plans.

Chapter 3 provides a detailed description of the engagement plans and social acceptance evaluation for each of the 7 pilots. To provide context for the engagement plans, each pilot's section starts with a description of the pilot site, renovation package, and digital FORTESIE services deployed along with an updated timeline of the pilot preparation and deployment. After that, goals for engagement activities and target groups are defined and participant recruitment is described. Finally, a plan and timeline for engagement activities is presented.

Chapter 4 describes the social acceptance evaluation methodology adopted in this project. It also provides an overview of the KPIs set for social acceptance and engagement activities.

Chapter 5 concludes the deliverable by summarising the key accomplishments and outcomes detailed in the deliverable and outlines how this work will be utilised throughout the progression of the FORTESIE project.

1.4 Interdependencies with other tasks and deliverables

This deliverable builds on the insights reported in D2.1 "End-user and pilot requirements and use-cases description", which mapped out each pilot's stakeholders and their roles, as well as the potential users of the FORTESIE services. The deliverable also presented personas, i.e., fictional characters, that represent the users' needs, wants, and behaviours. In addition, the deliverable included user stories, which describe the service features from the user's perspective. Additionally, D2.2 "FORTESIE services co-creation", which reports the specifications of the FORTESIE digital services and usage scenarios, informed the development of this deliverable.

Another key information source for the development of this deliverable was D4.1 "Pilots preparation, baseline analysis and planning", which describes the baseline situation, renovations and sensor measurements performed at each of the pilot sites, and the timeline for these activities. These activities' timeline forms the basis for the engagement activities and their timeline described in this deliverable. Some of the information regarding the pilots' timeline reported in D4.1 will be updated in this deliverable, as there have been some changes since D4.1 was completed.

A key part of the engagement plans is onboarding and continuously supporting the end-users with the FORTESIE digitals tools, i.e. mobile app and one-stop-shop (OSS) marketplace, developed in WP3. The progress on development of these tools has been reported in D3.1 "Components' functional design". Any delays in development of tools will also be reflected in the delivery of the engagement plans. This deliverable lays out the plans for engagement activities that are carried out as part of T4.2 "Engagement of citizens, stakeholders, and community", as well as social acceptance evaluation that is carried out as part of T4.4 "Overall monitoring, evaluation and social acceptance assessment". Progress on carrying out these plans and results of the social acceptance evaluation will be reported

in future deliverables D4.3 and D4.4, “Pilots execution documentation and validation assessment at M28 / M34”.

2 Engagement methodology

2.1 Common Impact Model

The Common Impact Model (CIM) is a methodology for facilitating community acceptance of new technical solutions. It was originally designed in the E-LAND project in the context of establishing decarbonised multi-vector local energy systems (Petrovich et al., 2021).

According to Petrovich et al. (2021), CIM has three goals:

1. Identifying local stakeholders who matter for the successful implementation of the solution and/or who are affected by it.
2. Ensuring that the solution is compatible with local values and priorities and considers local stakeholders' drivers and barriers for acceptance of the solution.
3. Developing a strategy to engage local stakeholders and thus facilitate long-term acceptance of the solution.

The CIM process consists of three phases: 1) data collection, 2) analysis, and 3) engagement strategy (Petrovich et al., 2021).

Phase 1: Data collection. In the first phase input from key stakeholders is gathered. This includes defining the potential solution, relevant stakeholders and their roles, and the community's and stakeholders' characteristics that influence acceptance of the solution (e.g., values, practices, rational and emotional reactions to the proposed solution).

Phase 2: Analysis. The findings from phase 1 are analysed and summarised. An overview of the community's readiness to accept the solution, their attitude and reactions towards the solution, and perceived benefits, concerns, and barriers related to the solution is created. Additionally, the stakeholders are segmented using a stakeholder matrix. The results of these first two phases in FORTESIE are presented in D2.1 and D2.2.

Phase 3: Engagement strategy. An engagement strategy is co-created with the local partner(s). In FORTESIE, this process and end-result are documented in this deliverable.

The CIM is a dynamic model. After phase 3 is completed, phases 1 and 2 can be repeated as needed to ensure the changing characteristics of the community are noted and considered in the execution of the engagement strategy. This means that the engagement plans presented in this deliverable should not be considered static and final, but rather as first plans that are based on information that was available at the time this document was written. They should be adjusted throughout the FORTESIE project as the pilot teams' understanding of their end-users and other stakeholders' reactions to the FORTESIE renovations and digital solutions increases.

2.2 Collaboration process in developing the engagement plan and social acceptance assessment

Following the Common Impact Model framework, the engagement plan and social acceptance measurement methodology were developed in close collaboration with the pilot leaders and other relevant project partners to ensure that they fit the local context and support the specific goals of each pilot site. The development process was iterative and included several sessions, which are described in Table 1.

Each of the sessions was planned and hosted by SIN and attended by the pilot leaders and in some cases also other pilot partners who have a significant role in the engagement activities. As the WP4 leader, representatives from NTUA also attended the sessions and supported with their insight.

Table 1 Co-creation activities to develop engagement plans per pilot

Timeline	Activity	Description
M10	In-person co-creation session during 1st FORTESIE plenary meeting	• Behavioural analysis to define behaviour changes that are needed from end-users to achieve full benefits of the project (e.g., optimal thermal comfort and indoor conditions while maintaining energy efficiency). • Brainstorming strategies to support and incentivise these changes both through the FORTESIE app and other engagement activities.
M12-13	Online workshops per pilot	• Introduction to engagement methodology. • Brainstorming engagement ideas for the pilot.
M13-14	Validation of the baseline survey	• SIN created a first draft of the baseline survey, supported by NTUA. • The pilots provided feedback on the survey and its content was adjusted accordingly.
M15	Online workshops per pilot	• Creating the first draft of the engagement plan, social acceptance measurement, and KPIs for engagement activities.
M16	In-person workshop during 2nd FORTESIE plenary meeting	• Pilots shared their initial engagement plans with all FORTESIE partners. • The whole consortium brainstormed ideas to further develop the engagement plans.
M17	Validation of D4.2 content per pilot for	• Based on the online and in-person workshops' input, SIN finalised and documented the engagement plan, social acceptance measurement, and KPIs for engagement activities. • Pilot leaders validated the plan and if needed, the plan was adjusted based on their feedback. • Validated versions of the plans were implemented to chapter 3 of this deliverable.

The co-creation process also included definition of roles and responsibilities in development, documentation, realisation, and monitoring of the engagement plans and social acceptance measurement. The result is presented in Table 2.

Table 2 Roles and responsibilities related to engagement and social acceptance measurement

Partner	Responsibilities related to engagement activities and social acceptance measurement

Pilot leaders	• Providing input and feedback on the engagement plan and social acceptance methodology. • Responsibility for participant recruitment and implementation of the engagement activities and social acceptance measurement. • Providing SIN and NTUA updates on the progress of these activities.
Other partners participating in pilot activities	• Supporting the pilot leaders in participant recruitment and implementing the engagement activities and social acceptance measurement.
SIN	• Leading the development of engagement plans, social acceptance measurement methodology, and engagement KPIs. Documenting the results in D4.2. • Support in participant recruitment and running the engagement activities. • Providing surveys to measure KPIs. Analysis of the results. • Documenting the implemented engagement activities and the progress on KPIs in D4.3 and D4.4.
NTUA	• WP4 leader. • Support in development and implementation of the engagement activities and social acceptance measurement as needed. • Running bi-weekly meetings with the pilots, where both technical implementation and engagement activities are followed up on.
INCL	• Providing communication material to support the pilots in presenting the project to end-users and other stakeholders.

3 Engagement plans

This chapter details engagement plans per pilot. To provide context for the engagement plans, each pilot's section starts with a description of the pilot site, renovation package, and digital FORTESIE services deployed along with an updated timeline of the pilot preparation and deployment. After that, goals for engagement activities and target groups are defined and participant recruitment is described. Finally, a plan and timeline for engagement activities is presented.

3.1 Pilot 1: Unleashing green cultural experience / The Museum of the Society of Hellenism and Philhellenism

3.1.1 Pilot description and timeline

The Museum of the Society of Hellenism and Philhellenism is located in central Athens, Greece. The museum presents the evolution of philhellenism from the Renaissance to the present day. It has 4500 visitors per year, including individuals, schools, academic institutions, researchers, and associations.

The renovation will include installation of smart windows with integrated PV panels, external thermal insulation of the north façade, and a ventilation system with advanced heat recovery technology. Additionally, the museum's roof will be transformed into a terrace with outdoor cafeteria and garden, including a pergola equipped with PV panels.

Table 3 Timeline for renovations and FORTESIE digital services implementation in pilot 1

Timeline	Activity
10/2022	Start date of FORTESIE and selection of the museum as the pilot building.
4/2023	Installation of temperature, humidity, air, and energy sensors.
6/2023-7/2023	Selection and procurement of renovations.
1/2024-2/2024	Finalisation of the north facade insulation.
1/2024	Finalisation of the 6-month period for the baseline data gathering (data sent to ED to integrate in the data sovereignty service). Delays regarding the procurement of the smart PV windows (to be resolved in the following months).
2-5/2024	Green roof renovation and installation of PVs
6/2024	Installation of Smart PV windows (expected).
6/2024	Deployment of FORTESIE digital services and mobile app.

Regarding pilot 1, there have been some delays compared to the timeline that was reported in D4.1. These delays mostly concern the procurement of the renovation materials. However, most of the renovation tasks in the pilot have been completed except for the green roof and the installation of

the smart windows, which will be completed in the following months. There are no further delays expected and the pilot building will be fully renovated prior to the deployment of the digital services (June 2024).

3.1.2 Goals for engagement activities

The goals for engagement activities for pilot 1 are:

- Building visitors' awareness of the FORTESIE renovations and their impact, by presenting the museums investments and achievements.
- Increasing the public's interest in the museum through the green museum concept.
- Increasing employee's awareness of the renovation's benefits and impact on their work. environment. Support to engage them in the building performance improvement options.
- Ensuring that the implemented technical solutions are used correctly, and that the museum gets maximum benefits out of the renovations.

3.1.3 Target groups and participant recruitment

There are two main target groups for the engagement activities in pilot 1: the **museum visitors** and **the museum employees.** The engagement activities for visitors will be especially targeted towards school groups. No specific recruitment activities will be done. Rather, visitors will be targeted with engagement activities when visiting the museum by dedicated screens for information and limited actions and through the museum's website and social media.

Secondarily, the pilot will also target the Greek government and local authorities with information about the impact of the renovation and the green museum concept.

3.1.4 Planned engagement activities

The planned engagement activities are presented in Table 4. Engagement activities targeted towards visitors will be carried out by the museum staff, whereas engagement activities targeted towards museum staff will be carried out by the pilot leader (ED).

Table 4 Engagement activity plan for pilot 1

Timeline	Activity	Target group	Description
3/2024	Communication	Visitors	• Communication about the renovations and the FORTESIE project on the museum website and social media
3/2024	Workshop	Museum employees	• Ideating strategies to promote the renovation to visitors
From 4/2024 until end of project	Information about renovations to visitors	Visitors	• Posters inside the museum, leaflets/fact sheets • Display/tablet showing meter data and analytics of achieved improvements in specific parameters, emphasizing the benefits in comfort and enjoyment during the visit. • Information on the website / social media • Screen at the entrance showing before and after photos of the museum and playing an interview of the museum owner.

6/2024	FORTESIE app onboarding session	Museum employees	• In-person meeting to introduce the FORTESIE app and support the museum employees in downloading and starting to use the app
From 6/2024 until end of project	Engagement for school groups' tours	School groups visiting the museum	• Sharing information about the renovation and its impact during the tour • Quiz at the end of the tour
From 6/2024 until end of project	Feedback from visitors	Visitors	• Short feedback survey on engagement activities and museum's indoor conditions • Distributed via a poster with a QR code
6/2025	Interviews	Museum employees	• Gathering qualitative feedback from the museum staff about improvement of comfort and experiences of the engagement activities

3.2 Pilot 2: Green, comfortable, and sustainable homes in Spain and France

Pilot 2 consists of four sub-pilots. Two of these pilots conduct renovations in single-family homes or apartment blocks: García Rama's sub-pilot in Spain and Oktave's sub-pilot in France. The third sub-pilot, run by Veolia in Spain, leverages FORTESIE digital tools in a residential area where some of the buildings have been renovated in a previous project, and now execute EPC contracts, which will be placed in a digital form, to validate the EPC digital module and mobile app.

Since all the sub-pilots have their own distinctive characteristics, they all require a tailored engagement plan. These plans for each of the sub-pilots are described separately in the following sections.

3.2.1 García Rama

3.2.1.1. Pilot description and timeline

The pilot site includes two residential buildings with a total of 36 housing units in El Entrego, Asturias, Spain. They were constructed in 1958.

The buildings suffer from inadequate thermal insulation and thermal bridges, causing heat loss and issues like condensation and lack of indoor comfort, resulting in high energy demands. The buildings' envelopes have pathologies due to age and inadequate maintenance and they lack sufficient acoustic insulation.

The planned renovations include insulating the building facades and under-roof space, replacement of windows in staircases and entrance doors of the buildings, and installation of PV panels with an annual production of 33,000 kWh/year in each building. The renovations will be funded by the property owners.

It's important to note that a different pilot site was originally proposed for García Rama's sub-pilot. However, this site was determined to be not eligible for being included in the FORTESIE project, and onboarding a new pilot site has delayed the schedule of this sub-pilot.

Table 5 Timeline for renovations and FORTESIE digital services implementation in pilot 2, García Rama's sub-pilot

Timeline	Activity
10/2022	Initial selection of the pilot building.
3/2023	Initially selected pilot building was found to be not eligible for participating in FORTESIE. Search for new pilot building.
7/2023	Preliminary commitment agreement from homeowners of a potential new pilot building.
10/2023	Selection of a new pilot building finalised.
9/2023-10/2023	Drafting technical reports for assessing the neighbourhood and its buildings. Ongoing communication with the municipal architect to align on technical matters.
11/2023-2/2024	The municipal architect's position remained vacant for 3 months, resulting in delays in commencing the drafting of the architectural projects, as the guidance of the municipal architect is crucial during this phase. Furthermore, the municipal architect's approval is necessary to obtain building permits.
1/2024	Budget drafted and revised by project coordination.
2/2024	New municipal architect was hired, and the pilot project can continue.
2/2024-6/2024	Drafting of the architectural project by the new municipal architect. The entire process requires a 3-month period to be completed.
6/2024	Start of renovations
11/2024	Completion of baseline data gathering
4/2025	Deployment of FORTESIE mobile app
6/2025	Finalisation of renovations

The pilot case of Garcia Rama has faced some unforeseen delays. Firstly, the initial pilot building site was found to be not eligible for participation in FORTESIE (there was an issue with the budget as the homeowners had already received a government grant to complete the renovations, which made them ineligible to also receive funding from FORTESIE). As such, the pilot leaders had to start over and search for a new pilot site which caused some delays. Further delays were caused (after the selection of the new pilot site) due to delays in administrative public processes, specifically for the hiring of the new municipal architect as the position was vacant for three months. The position of municipal architect was filled in February 2024. In addition, due to the change in the pilot site, the renovation period will take longer to complete compared to the initial plan. The FORTESIE digital services and the mobile application will be implemented as soon as a significant number of renovation tasks have been completed, after coordination with the pilot leaders. In addition, this pilot, in its new form, will allow us to measure the impact of specific individual renovations, given that the renovation tasks will run in parallel to the pilot execution. As such, and with the help of the FORTESIE digital services, we will be able to measure the impact of each renovation after it is completed.

3.2.1.2. Goals for engagement

The goals for engagement activities in García Rama's sub-pilot are:

- Motivate homeowners to participate in the FORTESIE project by carrying out a thermal envelope rehabilitation and other improvements in their homes.
- Secure homeowners' permission for García Rama to install measurement devices in their homes, ensuring this is accomplished in at least 10 residences. Additionally, motivate them to install and use the FORTESIE mobile application.
- Ensure that homeowners obtain the full benefits of the thermal envelope retrofit and the FORTESIE project, i.e., that the building achieves the energy improvements initially planned at the start of the renovation work, and the homeowners benefit from the associated advantages as established during the study phase.
- Ensure that homeowners are informed (through the mobile app hints, and challenges) about the benefits of thermal envelope rehabilitation, including thermal comfort and environmental quality of the dwelling, building energy efficiency, market value, emission reduction, and positive environmental impact.
- Increase homeowners' knowledge about energy efficiency habits and how they can impact the thermal comfort and air quality of their homes (e.g., temperature, CO2 levels) in an energy-efficient manner.

3.2.1.3. Target groups and participant recruitment

The target group includes all **homeowners** of the building blocks. They will be invited to join the FORTESIE project during the homeowners' meeting and the FORTESIE app workshop, as described in the engagement plan. As many of the homeowners are elderly, it is important to consider that some may not yet have smartphones or the skills to readily embrace new mobile applications. Additionally, some may be hesitant to participate in sensor-based monitoring within their homes, presenting a challenge in implementing the FORTESIE digitals services. The objective, nonetheless, is to enlist a minimum of 10 homeowners to install monitoring devices in their homes; however, greater participation will be encouraged.

The elderly homeowners' **next of kin and other caretakers** who can support them in learning about and using the FORTESIE solutions could be considered as a secondary target group. However, the feasibility of engaging them depends on the homeowners' personal situations and will be confirmed only once the engagement activities are initiated.

3.2.1.4. Planned engagement activities

The planned engagement activities are presented in Table 6. All engagement activities will be carried out by the pilot leaders.

Table 6 Engagement activity plan for pilot 2, GarcíaRama's sub-pilot

Timeline	Activity	Target group	Description
7/2023	Meeting with homeowners	Homeowners	• García Rama advises and informs about the benefits of the building retrofit and introduces the FORTESIE project, encouraging homeowners to agree to the rehabilitation of the building following FORTESIE guidelines.
10/2023-11/2023	Meetings with municipal	Municipal government	• Meetings with municipal architect to discuss technical aspects and progress with the

	architect		proposal.
12/2023-2/2024	Meetings with Mayor	Municipal government	• Face-to-face meetings with the mayor aimed at pushing forward the project.
2/2024	Meetings with homeowners	Homeowners	• Meeting with neighbourhood representatives to discuss the status of the proposal within the Municipality.
5/2024	Meeting with homeowners	Homeowners	• García Rama explains the project progress to homeowners and invites them to participate by installing measurement devices in their homes. • Information is provided on the FORTESIE app. • Conducting the pre-renovation survey
6/2024 - 6/2025	Ongoing communication during the renovation	Municipal government Homeowners Construction workers Property management	• Throughout the rehabilitation process, homeowners, construction workers, property management and García Rama maintain a constant exchange of information. • Property management serves as the primary link between homeowners and García Rama, providing information on the renovation schedule, among other aspects. • Homeowners also communicate with the construction workers and technicians present on-site during the rehabilitation process, informing them of any issues or queries. The workers convey this information to property management and García Rama, as necessary. • Given the pioneering and innovative nature of the project's rehabilitation, the municipal government has requested to be kept informed about the project's progress. Therefore, it will stay in direct contact with the project's key representatives, overseeing its development.
4/2025	FORTESIE app onboarding session	Homeowners	• In-person meeting to introduce the FORTESIE app and support homeowners in downloading and starting to use the app
6/2025	Meeting with homeowners organised by property management	Homeowners	• Sharing information about the improvements and benefits achieved through the renovation. • FORTESIE app users share their experiences and encourage others to start using the app. • Conducting the post-renovation survey.

3.2.2 Oktave

3.2.2.1. Pilot description and timeline

Oktave provides homeowners with technical, administrative, and financial consultation in renovation processes. They typically manage approximately 200 renovations per year. In the

FORTESIE project their goal is to install smart meters in 50 to 200 single-family homes that are already renovated to have large scale data.

The homes are typically built in 1940-1970. The exact renovation packages will depend on the selected houses. Indicatively, the renovations may include insulation, window replacement, and improved solutions for heating and ventilation.

Table 7 Timeline for renovations and FORTESIE digital services implementation in pilot 2, Oktave's sub-pilot

Timeline	Activity
2/2024	Selection of 50-200 houses for large scale monitoring.
3/2024-5/2024	Installation of sensors.
6/2024	Homeowners will be introduced to the FORTESIE mobile application to familiarise themselves prior to the finalisation of the baseline data gathering period.
9/2024-11/2024	Finalisation of measurement of baseline data. Start of pilot execution.

Initially, this pilot aimed to monitor 50 renovation projects (with sensors) and perform full renovations to 12 buildings that would have been selected by the list of 50. However, following comprehensive discussions between the project and pilot partners, it was decided to pivot the focus of the pilot to a large-scale monitoring pilot. The reason for this is that building renovations in France are very well subsidised (e.g., via zero-interest loans), which means that the available FORTESIE budget would be better used to buy sensors for a larger number of houses. The number of houses that will be monitored depends on the cost of the sensors. Oktave is considering to procure the sensors from partner MESH for the monitoring of the houses. MESH is completing development for a new series of commercial sensors (that do not require a gateway to work and send data), however the finalisation of the design /development and the estimation of the cost for the sensors will be done in April 2024, to match our requirements of ease installation and compatibility with Linky meter already installed in most households in France. When the cost is calculated, Oktave will be able to estimate the number of houses that will receive the sensors for monitoring purposes.

3.2.2.2. Goals for engagement

The goals for engagement activities in Oktave's sub-pilot are:

- Motivating homeowners to join the FORTESIE project, i.e., allow installation of meters in their home and start using the FORTESIE application.
- Ensuring that homeowners get full benefits out of their renovation and the FORTESIE project, i.e., use the new appliances and the FORTESIE app as intended.
- Ensuring that homeowners continuously monitor and learn about the renovation's benefits to their home's indoor conditions, energy efficiency, market value, and to the environment.
- Ensuring that homeowners learn about energy efficient habits and strategies to influence their home's indoor conditions (e.g., temperature, CO2 levels) in an energy efficient way.

3.2.2.3. Target groups and participant recruitment

The target group consists of Oktave's clients who have commissioned a renovation of their house. Houses with heat pump installations are prioritised. Oktave aims to include houses with different types of final performance levels (energy label A/B/C).

Clients who fit the target group are introduced to the FORTESIE project during their meetings with Oktave and asked if they want to become participants. As an incentive to homeowners, free monitoring systems will be installed, and data shared with Oktave and FORTESIE. Will be leveraged to develop targetted and personalised value-adding services.

3.2.2.4. Planned engagement activities

The planned engagement activities are presented in Table 8. All engagement activities will be carried out by the pilot leaders.

Table 8 Engagement activity plan for pilot 2, Oktave's sub-pilot

Timeline	Activity	Target group	Description
Onboarding period 6 months	Renovation planning	Homeowners	• During the renovation planning consultations, clients are introduced to the FORTESIE project and tools offered (smart meters, FORTESIE app) and the conditions for using them. • These meetings also include consultation on the renovation options and exploring the homeowners' preferences.
1st month of onboarding	Pre-renovation survey	Homeowners	• Invitation via e-mail to participate in a survey where they can share their experiences of the indoor conditions at their home
During the 12 following months	Ongoing communication during the renovation	Homeowners	• Oktave meets the clients approximately once a week for updates when the renovation is ongoing.
12 months after renovation finish	FORTESIE app onboarding and follow-up	Homeowners	• Homeowners are provided with information about the app and instructions for downloading and using it through a leaflet or via e-mail. • If the customers haven't downloaded the app within a certain timeframe, Oktave follows up with a phone call to ask if the customer needs help.
End of pilot, after 24 months	Meeting for clients to share experiences	Homeowners	• If enough clients participating in the FORTESIE project are in the same area, Oktave considers organising a meeting for them to share experiences of their renovations.
Approximately 1 year after onboarding	Post-renovation survey	Homeowners	• Invitation via e-mail to participate in a survey where they can share their experiences of the indoor conditions at their home after the renovation and participation in the FORTESIE

			project
Approximately 1 year after onboarding	Post-renovation engagement activities	Homeowners	• The exact format of the engagement activities depends on Oktave's resources, interest from the homeowners and location of their homes. • The events could include e.g. open house events to present the results of the renovations to others interested, creating testimonial videos to be shared, and/or announcing and rewarding the households that have achieved most savings.

3.2.3 Veolia

3.2.3.1. Pilot description and timeline

The pilot site is an urban residential district of 20 buildings called FASA, located in the southeast of Valladolid in Spain. It was constructed in the 1950's and 1960's. The buildings are considered an owner's community (condominium). All buildings except for one were renovated in 2018.

Veolia's sub-pilot does not include renovations. The main purpose of this sub-pilot is to leverage the FORTESIE digital services to measure improvements achieved through the 2018 renovations by comparing measurements between the renovated buildings and the non-renovated building. The analytics services will also be used for improved management of the district. New sensors will not be installed as the buildings already have sensors. Also, pre-renovation data collection period is not needed as the current sensors have collected data for 1,5 years.

Table 9 Timeline for FORTESIE digital services implementation in pilot 2, Veolia's sub-pilot

Timeline	Activity
10/2022	Selection of the district for the pilot
6/2024	Deployment of first version of FORTESIE mobile app

The timeline of the Veolia pilot has not changed compared to what was reported on D4.1. Veolia works in a specific district that was renovated in the past, except for one building, which received all renovations except for insulation. As such, Veolia will leverage the FORTESIE digital services to compare the energy efficiency of the non-renovated building to the renovated ones. Sensors have already been installed in the pilot building and the data gathering activities are completed (there are 18 months' worth of data for the pilot). As such, the pilot is progressing according to schedule and the FORTESIE digital services will be implemented as soon as the first version is developed (June 2024)

3.2.3.2. Goals for engagement

In Veolia's sub-pilot, the engagement activities are targeted towards homeowners living in the FASA district. The goals of end user engagement are:

- Motivating homeowners to join the FORTESIE project, i.e., start using the FORTESIE application.
- Ensuring that homeowners learn about energy efficient habits and how they can influence their home's indoor conditions (e.g., temperature, CO2 levels) in an energy efficient way.

- Motivating new renovations in the non-renovated building by highlighting the difference in energy use and comfort between the renovated and non-renovated buildings.

3.2.3.3. Target groups and participant recruitment

The main target group for engagement activities in Veolia's sub-pilot are the **homeowners** living in the pilot area. As many of the homeowners are elderly, it's important to note that the target group for the FORTESIE digital services only includes those homeowners who have a smartphone and sufficient skills to adopt new mobile applications. The elderly homeowners' **next of kin and other caretakers** who can support them in learning about and using the FORTESIE solutions could be considered as a secondary target group. However, the feasibility of engaging them depends on the homeowners' personal situations and will be confirmed only once the engagement activities are initiated.

The chair of the homeowners' association and the **property manager** are key contact persons between Veolia and the community of owners. They communicate the information from Veolia to the rest of the neighbours in the community and can also provide feedback from the community to Veolia.

The chair of the homeowners' association has various responsibilities, including leading community meetings, establishing meeting agendas, ensuring compliance with community regulations, representing the community in legal matters, maintaining open communication with owners and addressing their concerns, supervising the implementation of community decisions, coordinating with the property manager for the management of shared assets and services, and serving as a bridge between the community and external parties. The chair plays a vital role in guiding and overseeing the community to ensure its effective functioning and the satisfaction of its members.

The property manager manages and administers common assets and services, including maintenance and repairs, contracting, and overseeing external services, handling payments and collections from owners, organising and conducting community meetings, resolving conflicts and issues among owners, providing legal and financial advice to the community, ensuring compliance with regulations and rules, and overall, ensuring the smooth operation and well-being of the community.

3.2.3.4. Planned engagement activities

The planned engagement activities are presented in Table 10. All engagement activities will be carried out by the pilot leaders.

Table 10 Engagement activity plan for pilot 2, Veolia's sub-pilot

Timeline	Activity	Target group	Description
28/11/2023	Neighbourhood meeting	Homeowners	• Introducing the FORTESIE project.
06/2024	Survey	Homeowners	• Measuring satisfaction with indoor conditions to compare results between the renovated and non-renovated building.
09/2024	FORTESIE app onboarding	Homeowners, their next of	• In-person meeting to introduce the FORTESIE app. and support homeowners in

	session	kin	downloading and starting to use the app.
11/2024	Neighbourhood meeting	Homeowners	• Users of the FORTESIE app share their experiences. • Results of the measurements in the renovated and non-renovated house are presented. • Survey to gather feedback on the project.

3.3 Pilot 3: Green, comfortable, and sustainable homes in Portugal (energy poverty houses)

3.3.1 Pilot description and timeline

Just a Change renovates homes of people who suffer from housing deprivation and energy poverty. These homes can't provide safe or healthy living conditions, as they have many structural deficiencies. The renovations by Just a Change typically provide basic structures such as roofs, flooring, insulation, doors, and windows, but also other basic needs such as piped water and electricity.

The houses are renovated by a team of volunteers, with one experienced volunteer leading the team and one professional master builder overseeing and leading the renovation work.

Table 11 Timeline for renovations and FORTESIE digital services implementation in pilot 3

Timeline	Activity
10/2023-2/2024	Visits to 18 locations to gather information about possible houses to renovate.
2/2024-4/2024	Short-listing the houses visited, initial budgeting for each house/renovation.
3/2024-4/2024	Final decision taken; selection of 10 houses.
3/2024-4/2024	Initial measurements and renovations taking place in the first house, to serve as a prototype. Discussions with MESH as regards the sensors deployment.
2/2024-4/2024	Protocol for intervention with the local municipality. Planning dates of the intervention work. Planning other logistics, such as housing for volunteers, meals, local contractors to hire, local supply chain for building materials, etc.
5/2024-6/2024	Implementation of initial measurements for the collection of baseline data.

	Measurements of temperature, air quality, energy consumption etc will be implemented to have comparable data for each house, before and after the renovations.
7/2024-8/2024	Renovation work that takes about two weeks. Data collection immediately after the end of the renovation.
10/2024-12/2024 and possibly throughout 2025	Post-renovation data collection, to obtain data during the winter months as well.

No delays were reported during the implementation of pilot 3 timeline, compared to the timeline reported in D4.1.

3.3.2 Goals for engagement

Engagement activities' goals in demo 3 can be divided into two categories.

Firstly, the goals for engagement with the **beneficiaries** (homeowners) are:

- Making the renovation an empowering experience for them and enabling their active participation in the decision making and, if possible, in the renovation work.
- Facilitating the beneficiary's social inclusion and integration to society.

Secondly, the goals for engagement with the **volunteers** are:

- Enabling a successful renovation with positive contact with the beneficiary.
- Learning about the problem of energy poverty and strategies to alleviate it.
- Fostering a sense of contributing to society and documenting the costs and experiences of designing and implementing these renovations.

3.3.3 Target groups and participant recruitment

Pilot 3 has two main target groups for engagement activities: the beneficiaries, whose houses are renovated, and the volunteers who do the renovation work.

Beneficiaries

Recruitment of the beneficiaries is done with the support of the local municipality's employees, typically social workers. The municipality's employees create a shortlist of homeowners who need a home renovation to secure safe and healthy living conditions but can't manage the renovation on their own and are willing to join the program. Just a change and the municipality together plan the optimal combination of houses that can be renovated within the budget available.

Volunteers

Volunteers are recruited through an advertisement on a website. The only recruitment criterion for volunteers is that they must be 18 or older. When selecting volunteers to work in different sites, Just a change works to ensure diversity, e.g., gender balance and variety in levels of experience in volunteering.

Each volunteer team consists of 4-6 volunteers and a team leader who has previous experience of volunteering with Just a change. In addition, the volunteer team has a professional master builder leading and overseeing the renovation work.

3.3.4 Planned engagement activities

The planned engagement activities are presented in Table 13.

Table 12 Engagement activity plan for pilot 3

Timeline	Activity	Target group	Description
1-4/2024	First visit at the beneficiary's house	Beneficiary	• Just a Change's team visits the beneficiary with a municipality employee (typically social worker). • Creating an overview of the situation, renovation needs, and the beneficiary's preferences (e.g. for paint colour).
5-6/2024	Second visit at the beneficiary's house	Beneficiary	• Leader of the camp and Just a Change's central team visit the beneficiary to further their understanding of the location. • Installation of the sensors • First survey to the beneficiary (covers e.g., comfort and well-being, safety, health).
5-6/2024	Communication	Volunteers	• Communication via e-mail during the recruitment process
7-8/2024	Onboarding camp	Volunteers	• Before starting the renovation, volunteers attend an onboarding camp at the municipality where the renovation takes place. • Topics covered: briefing about the renovation, security training, training on Just a change's values, briefing on how to engage with the beneficiary.
7-8/2024	Start of the renovation	Beneficiary Volunteers	• Introducing the renovation team, master builder, and the beneficiary to one another • Sharing the construction plan with the beneficiary • Encouraging the beneficiary to join the renovation work if they can • Ensuring that the beneficiary will be around during the renovation
7-8/2024	Renovation	Beneficiary Volunteers	• Renovation work • Volunteers are encouraged to actively engage with the beneficiary and make sure that the beneficiary is aware of the renovation plan and progress and happy with the ongoing work.

8/2024	Finalisation of the renovation	Beneficiary Volunteers	• A small farewell party after the volunteers' work is completed
8-9/2024	Visits to finalise the renovation	Beneficiary	• Leading team typically visits the beneficiary a few times to finalise the renovation (e.g. doing small corrections, installing equipment that was delivered late). • They also ensure that the beneficiary is adapting to the new house and uses the new appliances correctly and ask for any issues or mistakes the beneficiary may have noticed.
9-10/2024	Survey	Beneficiary	• Just a Change's impact team completes a survey with the beneficiary to understand their satisfaction and impact of the renovation.
10-12/2024 and organically afterwards	Follow-up engagement	Beneficiary	• Just a Change keeps in touch with the beneficiary or their social worker. • The teams that worked in the house visit a few times throughout the year to understand what changes have happened. • Insights from the meter data are shared with the beneficiary.
One year after the renovation	Survey	Beneficiary	• Follow-up /Continuous assessment survey focusing on how permanent the changes were

3.4 Pilot 4: Green and comfortable households through prosumer engagement in Cooperatives

3.4.1 Description of the pilot

In pilot 4, ten single-family houses whose owners are prosumer members of Coopérnico are renovated. The houses are located in different regions of Portugal. The selected houses are aged 15 years or more and have not benefited from energy efficiency renovations. Nevertheless, there are the exception of 2 houses, one built in 2007 and the other in 2019. Houses that benefited from some renovation works were also selected which improvement measures implemented proved to be insufficient.

The renovations will mostly focus on passive measures, such as placing thermal insulation in the external envelope or replacing windows and doors.

Coopérnico is a renewable energy cooperative and the pilot leader. Just a Change supports them with selecting the houses for renovations, planning the renovations, and sub-contracting local renovation companies.

Table 13 Timeline for renovations and FORTESIE digital services implementation in pilot 4

Timeline	Activity
8/2023-11/2023	Initiation of the building selection process and reach out to the respective houses.
11/2023	Compiling initial list of applicants. Shortlist to 20 houses. Visits to the shortlisted houses.
12/2023-1/2024	Finalisation of buildings selection, selection of 10 houses, Communication activities with the homeowners on the proposed improvement measures.
2/2024	Drafting of contracts, finalisation of agreement on sensor deployment with MESH. Finalising the data collections to send to MESH.
3-4/2024	Installation of sensors for baseline data gathering.
4/2024-5/2024	Start of renovation work. Renovations can take from 15 days (in urban areas) up to 1-2 months (in rural areas) to complete.
5/2024-7/2024	Completion of renovations.
7/2024-8/2024	Deployment of FORTESIE mobile app.

For pilot 4, there is only a slight delay that needs to be reported, concerning the completion of the renovation work. In D4.1, it was reported that renovations will be finished in May 2024. In the new timeline, renovations are projected to be completed in July 2024 at the latest. This delay, however, will not cause any issues with the smooth execution of the pilot.

3.4.2 Goals for engagement

The goals for engagement activities in pilot 4 are:

- Ensuring that homeowners get full benefits out of their renovation and the FORTESIE project, i.e., use the new appliances and the FORTESIE app as intended.
- Ensuring that homeowners learn about the renovation's benefits to their home's indoor conditions, energy efficiency, market value, and to the environment.
- Ensuring that homeowners learn about energy efficient habits and how they can influence their home's indoor conditions (e.g., temperature, CO2 levels) in an energy efficient way.
- Creating a discussion space for exchanging ideas and sharing the renovation experience among FORTESIE beneficiaries to foster a sense of community.
- Optimise the self-consumption of the PV system by informing the prosumer of the best times to consume the energy it produces.

3.4.3 Target groups and participant recruitment

The target group are **prosumer members of Coopérnico**, living in a single-family building. To be eligible to participate in FORTESIE, the member must be the owner of the house and use the house as their permanent home. They also must allow installation of sensors and monitoring of their energy consumption and production and environmental parameters before and after the renovation.

Participants were recruited through advertisement in Coopérnico's channels (newsletters, social media, website). Those interested and eligible were asked to fill in an application. Coopérnico reviewed the applications and did house visits with 20 shortlisted houses to choose the final 10 households where FORTESIE renovations are carried out.

It is expected that among prosumers there will be people with more information than others when it comes to optimising their photovoltaic production system. Coopérnico therefore distinguishes 2 target groups of prosumers, the informed and the less informed. However, after technical visits to 20 houses, it was concluded that there is a common basis for understanding how a photovoltaic system works and optimising its production. As such, there is no need to differentiate engagement strategies for informed and less informed prosumers.

3.4.4 Planned engagement activities

Table 14 Engagement activity plan for pilot 4

Timeline	Activity	Target group	Description
8/2023-10/2023	Application period	All Coopérnico prosumer members	• Information about FORTESIE and possibilities for funding a renovation through the project is shared in all Coopérnico's channels (newsletters, social media, website). • Those interested and fitting the criteria are asked to fill in an application, detailing their house's specifications, energy consumption profile, habits, household characteristics.
11-12/2023	House visits + pre-renovation survey	Homeowners shortlisted from applications	• Coopérnico and Just a Change visit 20 shortlisted houses to better understand the renovation needs and to share more information about the project with the homeowners. • During the visit, more information regarding the homeowners' personal experiences of e.g. comfort level, Issues in the house and PV system characteristics are gathered through the pre-renovation survey. as Additionally, building architectural measurements were done. • Based on these visits, the final 10 houses to be renovated are selected.
2-3/2024	Pre-renovation information and installation of sensors	Homeowners chosen for FORTESIE renovations	• Details of the renovations are discussed with the homeowners. • Sensors are installed to start baseline measurements
From 2/2024 until the end of the project	Communication through Coopérnico	Homeowners chosen for FORTESIE	• Coopérnico has a newsletter, social media channels, and different online meetings, providing regular information and updates.

	channels	renovations	• If homeowners are not following these channels yet, they are recommended to do so.
3/2024	Mailing list for FORTESIE households	Homeowners chosen for FORTESIE renovations	• Coopérnico considers setting up a mailing list for FORTESIE households to share project updates.
4-7/2024	Communication during renovations	Homeowners chosen for FORTESIE renovations	• Regular communication between COOP and households regarding renovation and surveying works
6/2024	FORTESIE app onboarding session	Homeowners chosen for FORTESIE renovations	• Online meeting to introduce the FORTESIE app and support homeowners in downloading and starting to use the app
9/2024	Post-renovation survey	Homeowners chosen for FORTESIE renovations	• Invitation via e-mail to participate in a survey where they can share their experiences of the indoor conditions at their home after the renovation and their participation in FORTESIE.
From 9/2024 until the end of the project	Post-renovation engagement activities	Homeowners chosen for FORTESIE renovations Potentially other Coopérnico members	• The exact format of the engagement activities depends on Coopérnico resources, interest from the homeowners and location of their homes. • The events could include e.g. open house events to present the results of the renovations to others interested, creating testimonial videos to be shared, and/or announcing and rewarding the households that have achieved most savings.

3.5 Pilot 5: Green, comfortable working environment / General Secretariat of Information Systems for Public Administrations

3.5.1 Description of the pilot

The pilot site is the headquarters of General Secretariat of Information Systems for Public Administrations (G.S.I.S.D.G.), located close to the city centre of Athens, Greece. The building was originally in industrial use, but in 1995-1999 it was reconstructed into an office space. It consists of two basements and five floors and is used daily by approximately 930 employees.

The renovation of the building will include installation of sensors (temperature, humidity, CO_2), energy consumption meters and controlled switches or controllers on existing devices in building facilities (e.g. HVAC). Additionally, PV panels will be installed on the roof of the building and variable speed drivers will be installed to the HVAC system to control the speed of fan motors.

Table 15 Timeline for renovations and FORTESIE digital services implementation in pilot 5

Timeline	Activity

10/2022	Selection of the pilot site.
5/2023	Tender procedure. Deployment of sensors to measure the baseline situation.
8/2023	Final evaluation of the tender results.
10/2023	Confirmation and signatures have been received
11/2023	Deployment of renovations (electrical and mechanical installations).
2/2024	Installation of sensors has been completed. Installations of energy meters and VFD's are in progress.
03/2024	Delivery of all material to be completed
05/2024	Start of renovation deployment
6/2024	Completion of renovations Deployment of FORTESIE digital solutions

As regards Pilot 5 delays were reported in administrative public processes and on the installation of inverters, and the timely arrival of the material orders. The arrival of the material orders will also initiate the deployment of renovations. However, no other delays are expected.

3.5.2 Goals for engagement

Goals for these engagement activities in pilot 5 are to:

- Increase employees' knowledge about the indoor conditions at their workplace, how they can be optimised, and what impact that has on their wellbeing.
- Increase employees' knowledge about the benefits of energy efficiency, both from environmental and financial points of view.

3.5.3 Target groups and participant recruitment

The target group includes all **GSISDG staff** working in the building. Additionally, there are two important sub-groups that will play a role in FORTESIE project: a team of 6 employees who monitor the building through the BMS and the energy management team, required by Greek legislation, consisting of 3 employees.

3.5.4 Planned engagement activities

The planned engagement activities are presented in Table 17. All engagement activities are run by the GSISDG contact person with the support of the pilot leader.

Table 16 Engagement activity plan for pilot 5

Timeline	Activity	Target group	Description

11/2023	Communication and a survey	All employees	• Invitation to participate in a survey where they can share their experiences of the indoor conditions at the office • Communicating the renovations and the FORTESIE project
3/2024	Communication	All employees	• E-mail explaining the upcoming renovation work and its goals • Sharing results from the pre-renovation survey and how the issues identified in the survey will be addresses through the renovations
6/2024	Onboarding BMS users to FORTESIE app	BMS users	• Instruction on how to install and use the FORTESIE app • Active communication with the teams to gather feedback and learnings for office-wide roll-out of the app
7/2024	Co-creation session	Energy management team	• Introducing the FORTESIE project to the energy management team and ideating ways of engaging all employees in the project
9/2024	Event to onboard employees to FORTESIE app	All employees	• Presentation of the FORTESIE project and the app • Support in downloading and starting to use the app
From 9/2024 until the end of the project	Engagement activities	All employees	• Potential engagement activities co-created with the energy management team • These could include e.g. communication campaigns or events related to FORTESIE themes
11/2024	Survey	All employees	• Feedback regarding indoor conditions at the building after the FORTESIE solution installation • Social acceptance of the FORTESIE solutions and project activities
12/2024	Communication	All employees	• Sharing results of the post/renovation survey • Motivating continued use of the FORTESIE app

3.6 Pilot 6: Comfortable and sustainable (public) pools / Municipal swimming pool in Góra Kalwaria, Poland

3.6.1 Description of pilot

The pilot site is a public pool built in 1999, located in Góra Kalwaria, Poland. Around 20 people work daily in the building with opening hours from 06:00 AM to 9:45 PM. Approximately 110 000 tickets to the pool are sold per month.

The building needs renovation due to outdated technology and wear on its components. The renovation includes replacing ducts, insulation, and installing new equipment for air handling units and heating substation. The electrical board is also updated, and access control and user satisfaction measurement systems are installed, adjusted, and integrated with the data exchange system. Additionally, a PV plant will be installed on the pool's roof.

Table 17 Timeline for renovations and FORTESIE digital services implementation in pilot 6

Timeline	Activity
10/2022	Selection of the pilot site.
6/2023	Finalisation of contractor selection for the renovation project.
7/2023	Finalisation of the preparation of the renovation project and notification of the intention to carry out the renovation to the county office.
09/2023	Selection of the general contractor for the renovation.
10/2023-12/2023	Delays due to challenges with procurement. Delay with final submission of renovation project due to missing data from the pool operator regarding heating substation.
3/2024-4/2024	New tender announced by the municipality. Selection of contactor (construction company), one month after the tender announcement.
5/2024-10/2024	Renovation (duration 4-6 months). Pool will be out of service during the renovation.
10/2024	Finalisation of renovation
10/2024	Deployment of FORTESIE digital services

As regards the timeline implementation of Pilot 6 delays were reported due to the timely and bureaucratic procedures needed for the public procurement. These procedures require certain time periods for validation (e.g. after the selection of tender, one month is needed for the selection of contractors etc.). However, no other serious delays are expected.

3.6.2 Goals for engagement

The goals for engagement activities in pilot 6 are to

- Find an optimal balance between energy efficiency and comfort based on users' feedback.
- Build acceptance for the pool's energy efficiency actions among pool users.
- Build awareness of the improvements done at the pool and their impact on comfort as well as financial and environmental benefits.

3.6.3 Target groups and participant recruitment

Citizens of the municipality and **pool visitors** are the core target groups for the engagement activities. No specific recruitment activities will be done. Rather, citizens will be targeted with

engagement activities when visiting the pool and the pool's/municipality's websites and social media. The pilot's goal is to have 5-10% of pool users to use the FORTESIE mobile application.

The pool employees are another key target group, being responsible for implementing the engagement activities.

3.6.4 Planned engagement activities

The planned engagement activities are presented in Table 19. All engagement activities targeted towards the citizens and pool users are run by the pool employees with the support of the pilot leader. All engagement activities targeted towards the pool employees are run by the pilot leader.

Table 18 Engagement activity plan for pilot 6

Timeline	Activity	Target group	Description
3-4/2024	Survey	Pool visitors	• Opportunity to participate in a survey where they can share their experiences of the conditions at the pool. • Survey is shared through a QR code/link on a poster at the pool lobby. Paper surveys are also made available.
3-4/2024	Communication	Citizens of the municipality	• Communication on the municipality's channels about the renovation, its impact, and closing of the pool for the renovation period.
9-10/2024	Communication	Citizens of the municipality	• Information about the completion of the renovation, the survey results, and how the renovation improves the issues identified in the survey.
10/2024	Onboarding employees to new systems	Pool employees	• Introduction of the new system for managing conditions at the pool and instruction on using the new equipment.
10/2024	Onboarding visitors to FORTESIE app	Pool visitors	• FORTESIE app is promoted to the visitors by employees working at the counter as well as through posters and information on website and social media.
10-12/2024 1-3/2025	Experimentation with pool conditions	Pool visitors Pool employees	• Testing different conditions at the pool and gathering user feedback through the FORTESIE app.
3-4/2025	Feedback / evaluation session	Pool employees	• Evaluating the results of the renovation • Evaluating the engagement activities and results of experimentation with the pool conditions

3.7 Pilot 7: Comfortable, inclusive, and sustainable green schools

3.7.1 Pilot description and timeline

The pilot site is Riga 9th Secondary School, located in Riga, Latvia. The school was constructed in 1972 and a renovation of the façade and roof thermal insulation has been done in 2022.

The building has four floors with a total of 37 classrooms. The school is attended by 315 pupils. School employees consist of 38 teachers and 23 members of the technical staff.

In the FORTESIE renovation, a heating adjustment system will be installed, giving maximum possibilities for regulating heat in the building. New equipment will also be installed for ventilation as well as sensors and controllers that allow the school to manage and control its microclimate.

Table 19 Timeline for renovations and FORTESIE digital services implementation in pilot 7

Timeline	Activity
10/2022	Selection of pilot site.
8/2023	BMS system built, including: • MESH on-demand management platform for heating and ventilation system and each individual unit including all necessary licenses self-service panels with sensors CO2, VOC, Temperature, Humidity, Pressure (18.800) in classrooms and 232 microregulation points using Mesh RRC-030 controllers (12.500). • Regulating/balancing valves for heating system in order to allow microregulation per classroom (232 points, 10.900).
12/2023	Public tender completed. Installation of air handling units in 22 classrooms, wireless MESH infrastructure for sensor gateways and system management for the heating. Some issues with the ventilation observed.
1/2024-2/2024	Start of renovations
5/2024	Finalisation of renovation work
6/2024	Deployment of FORTESIE digital services

As regards the timely implementation of Pilot 7, no delays have been reported.

3.7.2 Goals for engagement

Engagement activities for pilot 7 have three key goals:

- Increase teachers', students', and parents' knowledge about the FORTESIE project and its benefits, especially related to better indoor air quality and comfort.
- Build acceptance for colder indoor temperature.
- Ensure a feedback loop between the end-users (school staff and students) and the project team.

3.7.3 Target groups and participant recruitment

The main target group for the engagement activities are the **school staff** and **the students**, whose daily work/study environment is affected by the project. **The school principal** is the main contact point to the school. By introducing the FORTESIE project and solutions to the teachers, they are expected to also engage their students in the project themes.

Another core target group are the **students' parents**, as their children's study environment will be improved, and they will have access to more information about the conditions at the school.

As the whole school is included in the target group, no other recruitment criteria are applied. All teachers will be invited to join the FORTESIE engagement activities by the principal using the school's communication channels (e-mail or teachers' meetings).

The building maintenance company is another core target group, as they will be responsible for maintaining the system and fixing issues. The school doesn't have dedicated maintenance personnel, but the maintenance company assigns staff as needed.

Once the project is completed, important decision makers in renovations of public building's will be engaged to share the results of the project and motivate future renovations. These include **Riga City Council's Property department** as well as different **Latvian ministries,** especially Ministry of education and science

3.7.4 Planned engagement activities

The planned engagement activities are presented in Table 21. All engagement activities targeted towards teachers, students, and parents are run by the school principal or other school employees. All other engagement activities are run by the pilot leader.

Table 20 Engagement activity plan for pilot 7

Timeline	Activity	Target group	Description
11/2023	Communication and planning	School management	• Explaining the installation plan • Creating an installation plan to match the school's schedule • Discussing benefits of the project • Planning ways to engage the teachers, students, and their parents
12/2023-1/2024	Communication and a survey	Teachers	• Communicating the renovations • Invitation to participate in a survey where they can share their experiences of the indoor conditions at the school
08/2024	Communication, instruction	Building maintenance	• Providing the building maintenance company with instructions on how to maintain the new equipment
9/2024	Co-creation and onboarding to FORTESIE app	Teachers	• Co-creation session with the teachers to plan how they can engage their students • Instruction on how to install and use the FORTESIE app

From 9/2024 until the end of the project	Engagement with the FORTESIE themes and content during classes	Students Teachers	• Teachers use the FORTESIE app's insights and other FORTESIE materials in their teaching to engage their students
9/2024	Communication	Parents	• Informing parents about the FORTESIE project, its benefits, data availability, and proper dressing at school via the school's communication channels.
From 10/2024 until the end of the project	Communication	Riga City Council's Property Department Latvian ministries	• Communicating the results of the project to relevant stakeholders
10-11/2024	Survey	Teachers, possibly students	• Asking teachers for feedback regarding 1) indoor conditions at the school after the FORTESIE solution installation, and 2) social acceptance of the FORTESIE solutions and project activities • If possible, asking students for feedback on the conditions at school

4 Social acceptance evaluation and key performance indicators

4.1 Social acceptance evaluation process

The Common Impact model, detailed in chapter 2.1, provides a systematic approach to assess different stakeholders' acceptance of the renovations and digital services implemented in the FORTESIE project. As described in chapter 2.1, the process started with identifying the relevant stakeholders involved in the project and gathering information about their views, preferences, and potential concerns regarding the project. The data collected was then analysed to identify patterns and trends. These results were reported in D2.1 and D2.2. Based on this analysis, the engagement strategies reported in previous chapter were created to increase social acceptance through different kinds of engagement activities.

Finally, social acceptance of the FORTESIE project and the effectiveness of the engagement strategies will be evaluated through feedback and continuous monitoring. Chapter 4.2 defines KPIs that are measured through surveying stakeholders and following other data sources, such as number of users and user activity in the FORTESIE app. This allows for adjustments and improvements to be made throughout the project timeline, ensuring that the FORTESIE project is socially accepted and successful. It's important to note that social acceptance is not a one-time event but a continuous process that needs to be managed throughout the entire project lifecycle.

4.2 Key performance indicators

Preliminary KPIs related to social acceptance and engagement activities have earlier been defined in D1.1 and D4.1. These preliminary KPIs are further defined in this deliverable.

4.2.1 Common KPIs across all pilots

KPIs common to all pilots are presented in Table 22. However, there are some individual deviations:

- In pilot 2, "Improvement of perceived comfort" and "Satisfaction with FORTESIE renovations" do not apply to ENERNALÓN's and Veolia's sub-pilots, as these sub-pilots do not include renovations.
- In pilot 3, KPIs related to the FORTESIE digital services do not apply, as the digital services are not used by the beneficiaries.
- In pilot 1, the data sources for some KPIs are slightly different for Pilot 1. These deviations are described in section 4.2.2.

Table 21 Horizontal social acceptance and engagement KPIs

KPI	Target	Data source
Improvement of perceived comfort	Improvement from baseline	Survey
Satisfaction with FORTESIE renovations	> 75% of end-users finds the renovation recommendable or highly recommendable.	Survey

Satisfaction with FORTESIE digital services (mobile app/OSS marketplace)	> 75% of end-users finds the solution recommendable or highly recommendable and the solution feasible for future deployment	Survey
Level of engagement in FORTESIE app	> 75% of target group* download the FORTESIE app > 50% of those who downloaded the app use it 1 month after download	App data
Amount of Green Euros awarded for the pilot	The amount will be dependent on the exact implementation of the Green Euro in the FORTESIE app (WP3).	App data

* Note that target group refers here to end-users who have a smart phone and sufficient skills to adopt new applications. In the case of pilot 6, the target group for FORTESIE app is 5-10% of pool visitors.

4.2.2 Pilot-specific KPIs

Because the FORTESIE pilots are very diverse in their settings and target groups, some pilots have specific KPIs in addition to the common FORTESIE KPIs and/or different ways of measuring the common KPIs. These KPIs are presented in this section.

4.2.2.1 Pilot 1: Specific KPIs and measurement methods

As the museum only employs a few people, the employees will be interviewed instead of running a survey to evaluate their experiences and satisfactions with the FORTESIE renovation and digital services. The small number of employees makes this type of qualitative feedback gathering possible and allows for more in-depth understanding of the topics of the KPIs.

Additionally, pilot 1's engagement plan includes activities designed to involve museum visitors with the FORTESIE themes. These activities are an important part of the pilot, and it is essential to measure their effectiveness. Therefore, additional KPIs have been included to track and evaluate the success of these engagement efforts.

Table 22 Pilot-specific KPIs for pilot 1

Topic	KPI	Target level	Data source
Renovation	Improvement of perceived comfort	Improvement from baseline	Interviews with employees
	Satisfaction with FORTESIE renovations	> 75% of end-users finds the renovation recommendable or highly recommendable.	Interviews with employees Visitor survey
FORTESIE digital services	Satisfaction with FORTESIE digital services	Minimum 75% of end-users finds the solution recommendable or highly recommendable and the	Interviews with employees

		solution feasible for future deployment	
Other engagement activities	Number of school groups participating in a tour where the FORTESIE project is discussed	Around 30-90 Students	Museum staff's notes
	Visitors' satisfaction with the information provided about the FORTESIE project	Minimum 75% of end-users finds the information interesting or highly interesting	Visitor survey

4.2.2.2 Pilot 7: Specific KPIs

In pilot 7, FORTESIE's themes are introduced to students by teachers and thus teacher engagement is very important. Therefore, additional KPIs have been included to track and evaluate the success of these engagement efforts.

Table 23 Pilot-specific KPIs for pilot 7

Topic	KPI	Target level	Data source
Other engagement activities	Number of teachers participating in co-creation and onboarding to FORTESIE app	60% of teachers	Pilot leader's notes from the session
	Number of teachers who have implemented FORTESIE themes and content during classes	60% of teachers	Data from school administration

4.3 Quantitative overview of involved stakeholders

In this subchapter we present an overview of all stakeholders that have been involved in the engagement activities and that will also be involved in the execution of the FORTESIE pilots. The latter includes the onboarding of stakeholders in the project's digital components, mainly the FORTESIE mobile application and the Green Euro application (for the pilots that this component applies to), as well as their active participation in tracking and following personalised recommendations that the mobile application generates for them. This overview focuses on the gender considerations of FORTESIE, as one of the project goals is to ensure that at least 35-40% of all pilot participants will be women. The specific numbers per pilot and per gender can be seen in Table 25 below:

Table 24 Overview of pilot participants

Pilot Case	Male Participants	Female Participants
Pilot 1: Museum	1 male employees (50%)	1 female employees (50%)
Pilot 2 (Garcia Rama): Households	1 male occupant (14,3%)	6 female occupants (85,7%)
Pilot 2 (Oktave):	73 male occupants (70,9%)	30 female occupants (29,1%)

Households		
Pilot 2 (Veolia): Households	11 male occupants (52.4%)	10 female occupants (47.6%)
Pilot 3: Energy poverty households	10 male occupants (62,5%)	6 female occupants (37,5%)
Pilot 4: Prosumer households	18 male occupants (53%)	16 female occupants (47%)
Pilot 5: Public office building	253 male employees (45%)	307 female employees (55%)
Pilot 6: Public pool	25 male employees (54%)	21 female employees (46%)
Pilot 7: Public school	18 male teachers (27%)	49 female teachers (73%)
Sum of all pilots	410 male participants (47,9%)	446 (52,1%)

As can be seen from the above table, 3/9 pilots that include end-user engagement have more potential female than male participants. In the cases of pilots 5-7, and specifically the public offices, the public pool, and the public school, the numbers correspond to the total number of employees/teachers. While not every employee will be engaged to participate in the execution of the pilot use cases, the current ratios as presented, make us confident that the actual participants will include at least 35% females. Concerning pilot 1 (museum) there is 1 male and 1 female employees, both of which will be engaged. Finally, for the household pilots (pilots 2-4), the gender ratios that are presented are in line with the requirement set in the FORTESIE GA, except for the Oktave sub-pilot. However, in the case of Oktave, the process of user engagement is ongoing, and the early numbers presented here are not final, as several additional households will be also engaged.

All in all, as can be seen also in the last row of Table 24, as of now, the total number of female participants is higher than the number of male participants. Even though these numbers will change in the future (as described above) we can say that the mix of participants will continue to be in line with the gender balance proposed by the project. The table will be updated in future deliverables to incorporate the actual numbers of the pilot participants, especially in the cases where the total number of employees was presented.

5 Conclusions

This deliverable detailed the engagement and social acceptance measurement plans for all FORTESIE pilots. The engagement plans were co-created with the FORTESIE pilot leaders and built on the insights reported in D2.1 “End-user and pilot requirements and use-cases description” and D2.2 “FORTESIE services co-creation”. Thus, the FORTESIE pilots now have a clear timeline and plan for engaging with their end-users and stakeholders and measuring the success of their engagement activities.

These engagement activities will be carried out as part of T4.2 “Engagement of citizens, stakeholders, and community” and the social acceptance measurement as part of T4.4 “Overall monitoring, evaluation and social acceptance assessment”.

It is key to follow the actual performance of the stakeholder mapping and the engagement plans so that adjustments can be made as needed. Thus, the engagement plans presented in this deliverable should not be considered as static and final, but rather as first plans that are based on information that was available at the time this document was written. The engagement plans should be adjusted throughout the FORTESIE project as the pilot teams’ understanding of their end-users’ and other stakeholders’ reactions to the FORTESIE renovations and digital solutions increases.

The engagement activities delivered as well as results of the social acceptance evaluation will be reported in future deliverables D4.3 and D4.4, “Pilots execution documentation and validation assessment at M28 / M34”.

6 REFERENCES

External references

Petrovich, B., Murphy, B., Mikkelsen, T., & Kuivalainen, M. (2021). The Common Impact Model: A standardized methodology for community acceptance of decarbonized multivector local energy systems. *Ecocity World Summit 2021 Proceedings*.

FORTESIE project deliverables

D2.1 End-user and pilot requirements and use cases description

D2.2 FORTESIE services co-creation M9

D3.1 Components' functional design

D4.1 Pilots preparation, baseline analysis and planning