



COLLECTiEF

FIRST PROJECT PROGRESS REPORT

Project acronym: COLLECTiEF

Project title: Collective Intelligence for Energy Flexibility

Call: H2020-LC-SC3-EE-2020-2



This project has received funding from the European Union's H2020 research and innovation programme under Grant Agreement No 101033683

Disclaimer

This document contains description of the main findings and deliverables of COLLECTiEF project within the first period of four months. COLLECTiEF project has received research funding from European Union's H2020 research and innovation programme under Grant Agreement No 101033683. The contents and achievements of this deliverable reflect only the view of the partners in this consortium and the European Commission Agency is not responsible for any use that may be made of the information it contains.

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Project no.	101033683
Project acronym:	COLLECTiEF
Project title:	Collective Intelligence for Energy Flexibility
Call:	H2020-LC-SC3-2018-2019-2020
Start date of project:	01.06.2021
Duration:	48 months
Deliverable title:	Management and Quality Plan, with updates at M12, M24, M36
Deliverable No.:	D1.4
Document Version>	4.1
Due date of deliverable:	30 November 2021
Actual date of submission:	30 November 2021
Deliverable Lead Partner:	Partner No. 1, NORGES TEKNISK-NATURVITENSKAPELIGE UNIVERSITET NTNU
Work Package:	1
No of Pages:	59
Keywords:	Project summary, Activities performed, Action plan, Internal project progress report.

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Dissemination level

PU	Public
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History

Version	Date	Reason	Revised by
1.0	18.10.2021	First version	Mohammadreza Aghaei NTNU
1.1	22.10.2021	Document review	Amin Moazami, NTNU
1.2	01.11.2021	Document review	Silvia Erba, NTNU
2.0	02.11.2021	Second version	Mohammadreza Aghaei NTNU
2.1	10.11.2021	Document review	Jelena Lazic GEO
3.0	19.11.2021	Third version	Mohammadreza Aghaei NTNU
3.1	22.11.2021	Document approval	Jelena Lazic GEO
4.0	23.11.2021	Final version	Mohammadreza Aghaei NTNU
4.1	29.11.2021	Final approval	Amin Moazami, NTNU



Executive Summary

The main purpose of this deliverable is to report the progress of COLLECTiEF project within the first six months. The first phase of the project ran from June to November 2021 (M01-M06) and dealt with the preliminary development of COLLECTiEF project focusing on preparation of the quality plan and quality assurance assessment procedure, data management plan as well as initiation of technical and dissemination activities among all work packages.

This report aims to present the key achievements and the fulfilled works as well as the status of each work package by the end of M04. Furthermore, the upcoming activities planned for M05-M06 as well as the next period (M07-M12) are reported.

The activities of COLLECTiEF project have been initiated on 1st of June 2021 and the defined milestones, tasks and deliverables have been successfully completed for this period (M01-M04), thanks to all COLLECTiEF partners who actively participated in the project and closely collaborated to achieve the targeted goals and progresses.

During the first phase of the project, the partners have had several meetings (internally, WPs, EB etc.) to perform the tasks and to complete the foreseen deliverables. For better follow up and coordination of the consortium, an action plan based on the objectives and milestones of COLLECTiEF has been structured and prepared. This allowed us following step-by-step the expected work progress and monitoring the activities of each partner in relation to the tasks as well as engaging the working packages and partners to achieve the targeted objectives. The action plan includes the foreseen activities aligned with the tasks and the responsible person/organization who must complete and deliver the works by defined milestones as described in the Grant Agreement. This progress report is structured as follows:

- Chapter 1 summarizes the project overview and objectives, work packages.
- Chapter 2 describes the project implementation strategy including the action plan, engagement strategy and project progress report.
- Chapter 3 expresses engagement strategy, full timeline and involved tasks.
- Chapter 4 reports the dissemination, promotion, and exploitation activities by M04.
- Chapter 5 explains the activities performed by the beneficiaries, progress overview per work package as well as the dissemination, and exploitation activities according to the action plan for the first phase of the project. Moreover, the project deviations, difficulties and solutions are discussed in this chapter.
- Chapter 6 updates the project risks and the related statements.



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List of Acronyms

CI	Collective Intelligence
D	Deliverable
DoA	Description of Action
D&C	Dissemination and Communication
DMP	Data Management Plan
DYK	Did You Know
EB	Executive Board
DET	Dissemination and Exploitation Team
GA	Grant Agreement
GDPR	General Data Protection Regulation
IPPR	Internal Project Progress Report
KPIs	Key Performance Indicators
M	Month
MS	Milestone
M&V	Measurement & Verification Protocol
NSD	Norwegian Center for Research Data
Partner	Beneficiary in the COLLECTIEF Project
PM	Person Month
QA	Quality Assurance
QC	Quality Control
SDG	Sustainable Development Goal
TRL	Technology Readiness Level
WP	Work Package



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1. Project overview

1.1. The project summary and objectives

The European Union (EU) has been at the forefront of international efforts to tackle the global challenge of climate change and emissions of carbon dioxide (CO₂) impacts, and to deploy affordable, reliable, and modern energy services as well as to increase the share of renewable energy, according to the 7th and 13th Sustainable Development Goal (SDG7¹ & SDG13²).

COLLECTiEF research project commits at addressing the reliable and practical solutions for the challenges of climate change impacts and renewable energy penetration, by enhancing the energy flexibility and climate resilience through a collective intelligence (CI) approach.

COLLECTiEF is an EU-funded H2020 project, running for 4 years – from 2021 to 2025. COLLECTiEF aims to enhance, implement, test, and evaluate an interoperable and saleable energy management system based on CI that allows easy and seamless integration of legacy equipment into a collaborative network within and between existing buildings and urban energy systems with reduced installation cost, data transfer and computational power while increasing data security, energy flexibility and climate resilience. To achieve this goal, COLLECTiEF consortium develops software and hardware packages to install and smart up buildings and their legacy equipment on large scale, meanwhile, to maintain simple and robust communication with the energy grid, see Figure 1.

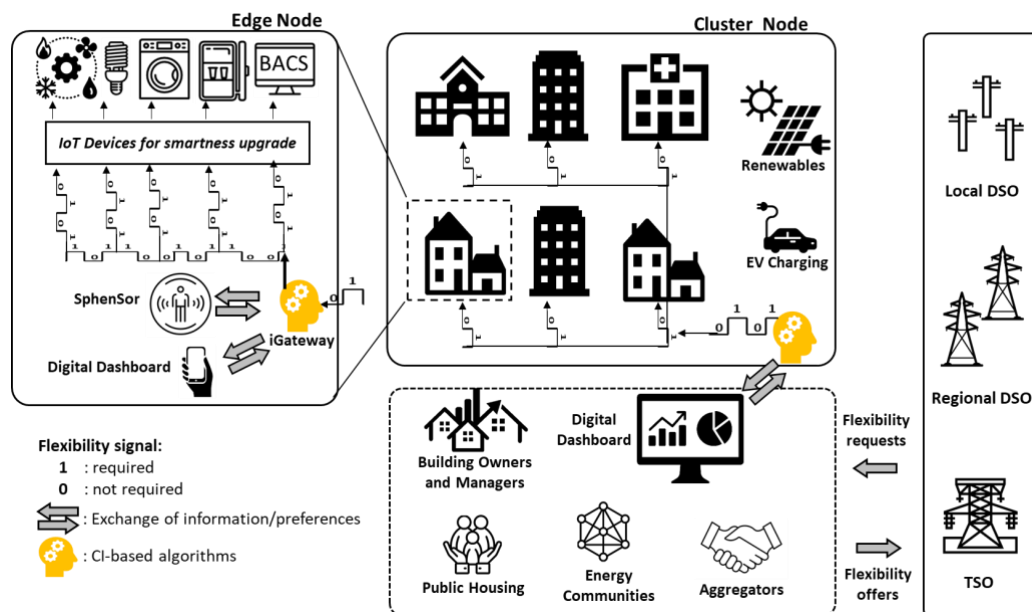


Figure 1 The conceptual design of COLLECTiEF

¹ EU. (2015). 7th Sustainable Development Goal (SDG7). https://ec.europa.eu/international-partnerships/sdg/clean-energy_en

² EU. (2015). 13th Sustainable Development Goal (SDG13). https://ec.europa.eu/international-partnerships/sdg/clean-energy_en



COLLECTiEF project has six main objectives (presented in Table 1) which assure a step-by-step progress over four years to accomplish the project.

Table 1 COLLECTiEF objectives

Objective	Description
1	Enhancement and adaptation of algorithms for creating a CI-based energy flexible network
2	Realization of CI-based cost-effective system components with easy deployment and maintenance
3	Demonstration and testing of a CI-based energy network in the real environment
4	Testing and implementing a scalable and customizable occupant-centric fusion sensor network for accurate and non-invasive environmental monitoring
5	Designing and implementing a smart, user-centric, and user-friendly digital platform for interacting with users and controlling technical building systems
6	New business model for energy services including a clear model for commercialization of COLLECTiEF system.

The main core of COLLECTiEF project is related to enhance existing and to develop further the CI algorithms for control strategies of COLLECTiEF system. The CI algorithms (Obj.1) will shape the design of the sensor network (Obj.4), the user inputs/interactions and the digital dashboards (Obj.5), and the system components at the edge and cluster nodes (Obj.2). The solutions will be tested in the pilots and ameliorated during the demonstration phase (Obj.3). The final goal is to have the system qualified (TRL8) and ready for commercialization with a new business model (Obj.6). Objective's relations are depicted in Figure 2.

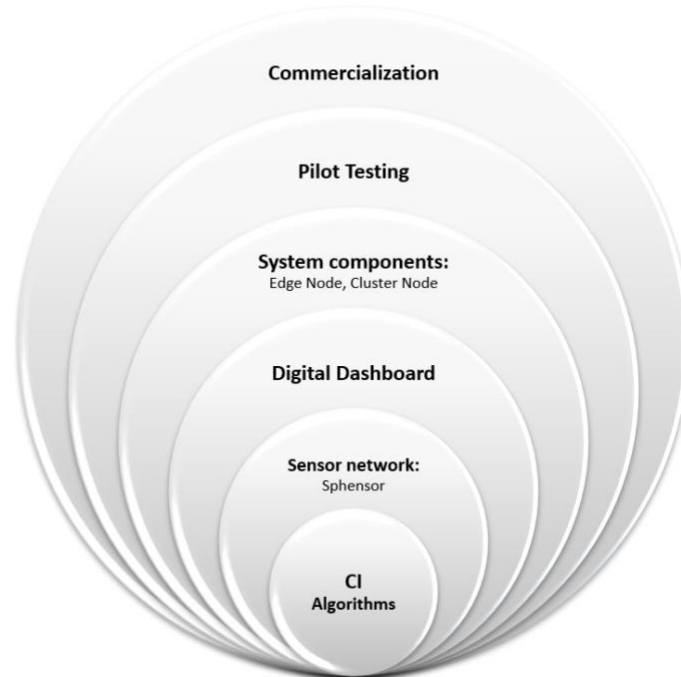


Figure 2 The objectives relations in COLLECTiEF project

COLLECTiEF consortium consists of 14 beneficiaries from universities, institutions, manufacturing/construction companies, and municipal sectors from six countries across Europe. The



detailed information and competences of the COLLECTiEF project's beneficiaries are briefly presented in deliverable D1.1. Figure 3 shows the value chain of COLLECTiEF and the involved partners in each stage.

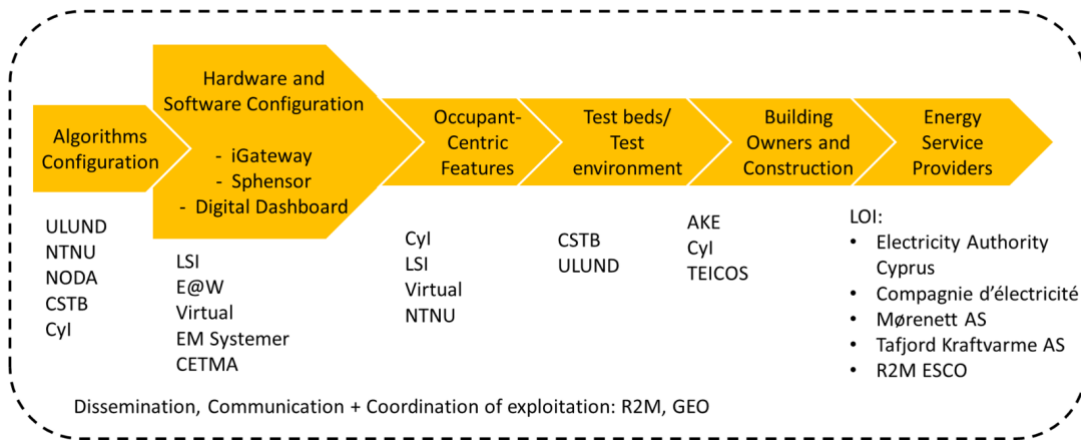


Figure 3 COLLECTiEF value chain

1.2. The work packages

COLLECTiEF comprises seven work packages (see Figure 4) aligned with each other which aim at developing, implementing, testing, and evaluating the proposed energy management system based on Collective intelligence (CI). The detailed information about the work packages is provided in section 5.

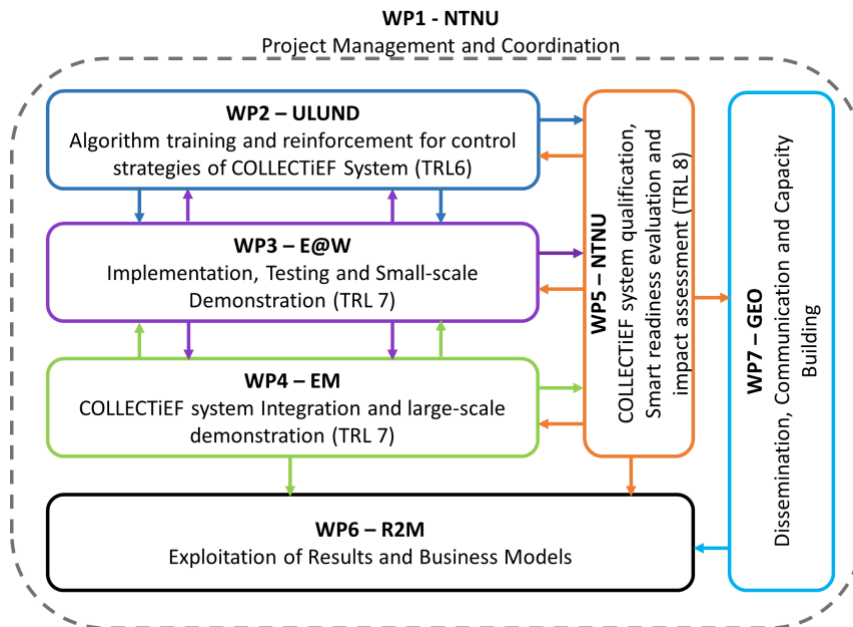


Figure 4 The overview of work packages

The Gantt Chart of COLLECTiEF project is covering tasks and milestones within 48 months conceived in various phases to carry out the defined tasks as well as ensuring to achieve the expected outcomes, see Figure 5.



2. Project structure

COLLECTiEF project originates from the identification of available technologies within the consortium that have been validated and demonstrated in previous projects and which fall under technology readiness level (TRL) 5/6. These technologies allow creating a complete CI-based energy network and within the 4-year timeline of the project, the main aim is to qualify COLLECTiEF solutions in four real applications, hereafter called “DEMO”, which will bring the overall TRL to 8. Therefore, the project management is divided in two main phases see Figure 6 and Figure 7:

- Before the start of DEMO
- After the start of DEMO

This classification aims at organizing and monitoring the defined tasks as well as at providing a better overview of the project progress. The main activities can be summarized as follows:

Milestones: Before The Start of DEMO (M1-M24)

- General project management concept defined
- Project communication kit developed
- Data management plan
- Control algorithms ready for testing
- Edge Node, Cluster Node, human-building interface, and occupant-centric sensor network ready for testing
- Installation in pilots completed
- Market and stakeholder analysis and regulatory framework analysis completed

Milestones: After The Start of DEMO (M24-M48)

- Testing in small-scale test bed completed
- Stakeholder workshops conducted
- Demonstration phase in large-scale
- Business model defined, showing commercial feasibility
- Capacity training material ready for use
- Demonstration phase in large-scale pilots completed
- System complete and qualified (TRL8)
- Project completed



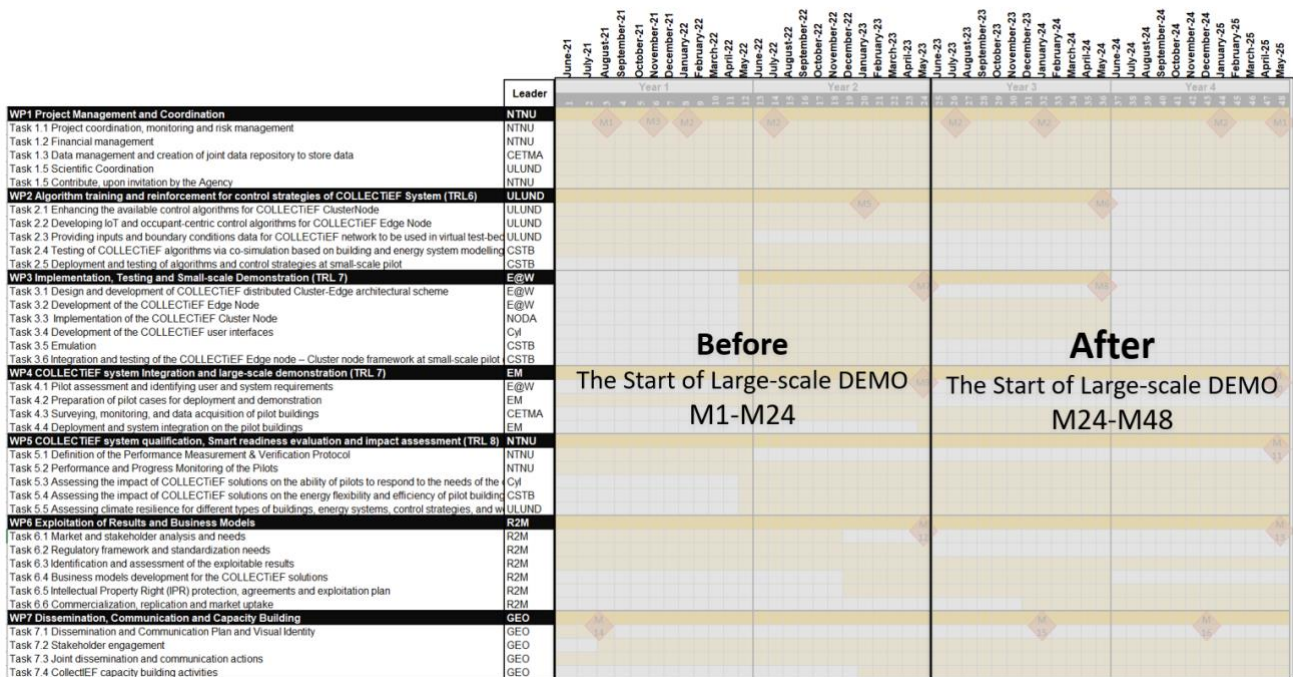


Figure 6 The project implementation based on the development of large-scale DEMO

The two periods have been through further breakdown to better identify the main activities within each time section:

- **Before the start of Large-scale DEMO 1st Year (M01-M12)**

Objective: Complete TRL 5 for COLLECTiEF solutions — technology validated in relevant environment

The technologies will be tested in co-simulation environment DIMOSIM.

- **Before the start of Large-scale DEMO 2nd Year (M13-M24)**

Objective: Complete TRL 6 for COLLECTiEF solutions — technology demonstrated in relevant environment

The technologies will be tested in the small-scale real environment (G2Elab).

- **After the start of Large-scale DEMO 1st Year (M25-M36)**

Objective: Complete TRL 7 for COLLECTiEF solutions — System prototype demonstration in operational environment

The technologies will be tested in three real applications (overall 12 pilot buildings in Norway, Italy and Cyprus).

- **After the start of Large-scale DEMO 2nd Year (M37-M48)**

Objective: Complete TRL 8 for COLLECTiEF solutions — System complete and qualified

The COLLECTiEF system will be qualified for all the expected impact criteria.



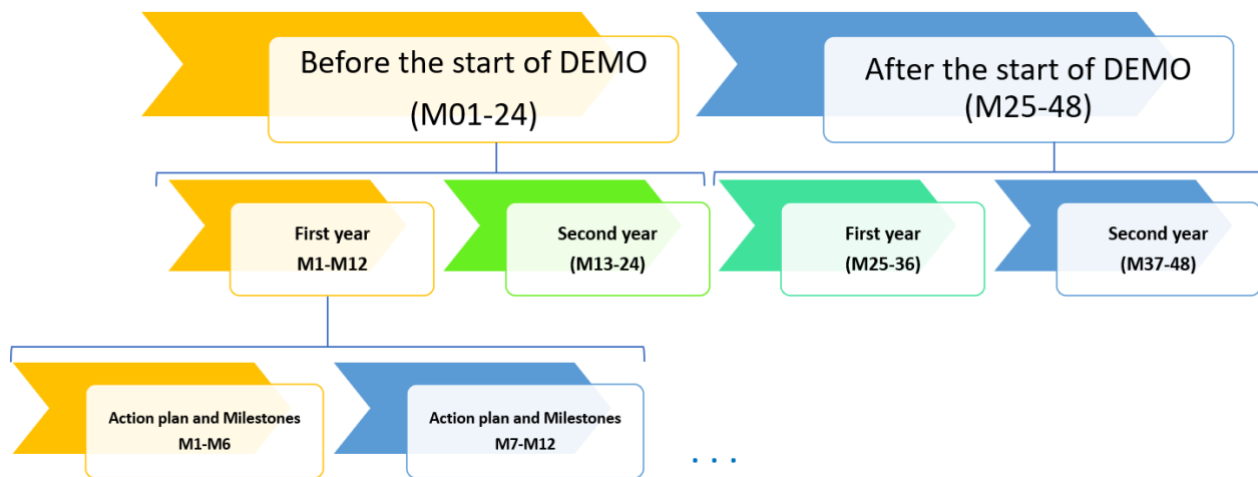


Figure 7 COLLECTiEF implementation procedure

Pursuing the above-mentioned objectives and milestones for the project, the management team focused on the first year and developed an action plan for the first six month of the project. The action plan details the activities per work package, per task, per partner. In the following sections the logics and strategies for the development of the action plan for M1-M6 are elaborated. The team is currently working on the action plan for the second semester of first year (M7-M12).

2.1. Project period: Before the start of Large-scale DEMO Year 1 (M01-M12)

In the first year of the COLLECTiEF project, the consortium focuses on developing the general scheme of the project management, communication and dissemination, data management plan, control algorithm development and testing, performance and progress monitoring of the pilots, definition of the performance measurement & verification protocol, market and stakeholder analysis, regulatory framework, standardization, and exploitation.

Figure 8 depicts the information flow and the interconnection between the tasks up to M12 (WP1 management is excluded). As shown in Figure 8, the first three tasks of WP2 are related to the boundary conditions which are defined as inputs for co-simulation platform (Task 2.4). Subsequently, the simulation is executed, and then provides the feedbacks for the algorithm development procedure. This process will be reiterated to improve the control algorithms. In WP5, metrics, Key Performance Indicators (KPIs) and Measurement & Verification (M&V) protocol are defined to evaluate the simulation outputs and the algorithms improvement. Therefore, the output of simulation (Task 2.4) is monitored by the KPIs and then returns to WP2 for improving the algorithms. In Task 5.2, the defined KPIs are computed based on the data provided from WP2 and the performance and progress monitoring of the pilots is evaluated. The regulatory framework, which is presented in WP6, influences on the definition of KPIs and the M&V protocol. Moreover, the results and exploitable outcomes are assessed and exploited by Task 6.3. Market stakeholders and their needs as well as stakeholder engagement are analysed in Task 6.1 and Task 7.2. The project dissemination and communication plan are defined in Task 7.1 and also discussed in section 4.



At the end of first year (M12), the technology of COLLECTiEF system (TRL 5) will be validated in relevant environment. This means, the algorithms will be enhanced, developed, and tested in the simulation environment as well as their overall concept will be validated.

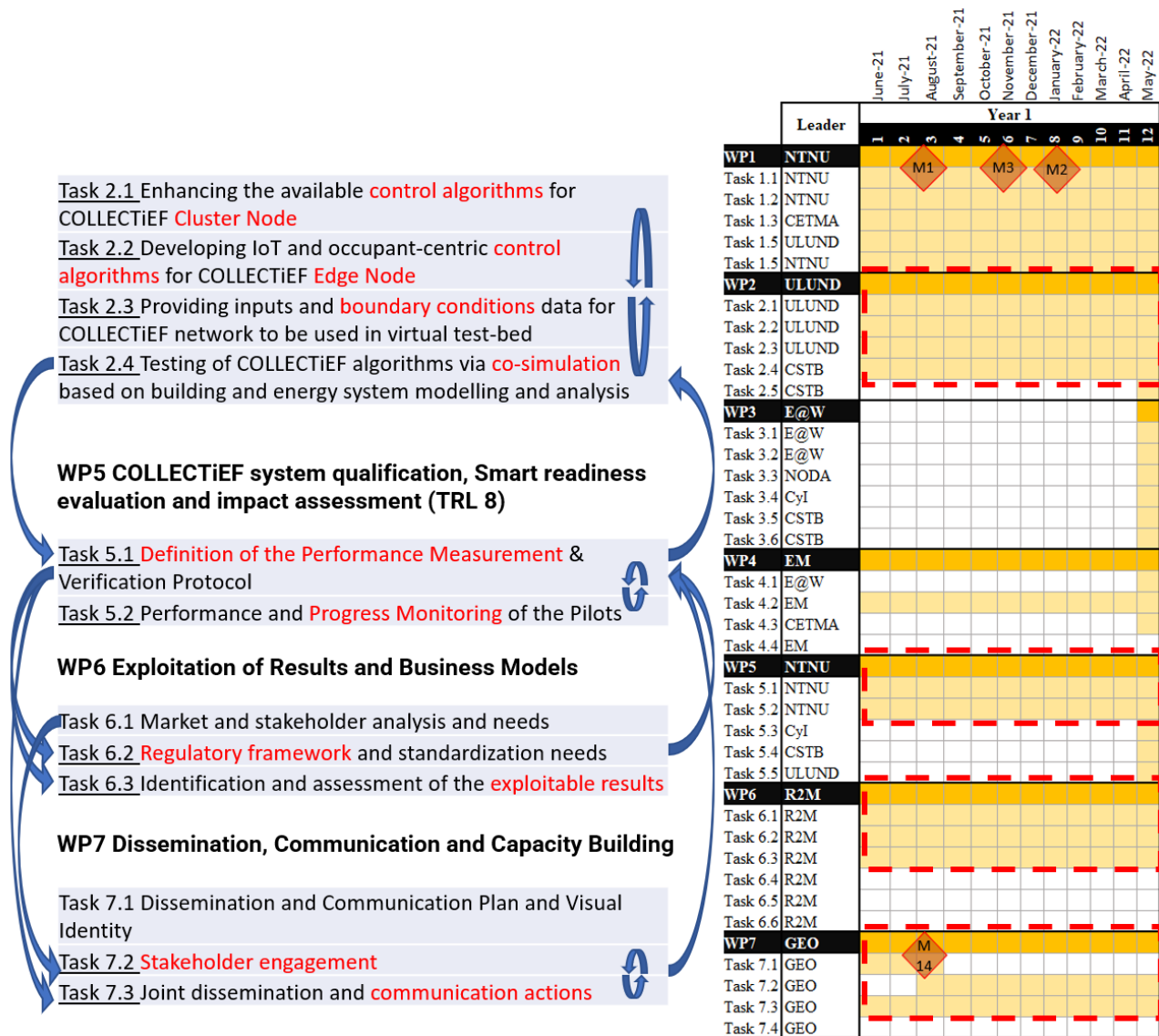


Figure 8 Detailed action plan and the involved tasks – Before the Start of Large-Scale DEMO 1st Year (M1-M12)

During the first six months of the project, the consortium focused on defining the management and organization schemes, understanding the system requirements, initiating the algorithm development, preparing the first round of simulation on a simplified cluster of typical buildings to be tested in the Web service of DIMOSIM, describing the pilot inventory, identifying the stakeholder engagement plan including informed consent procedure with data management plan, identifying parameters, measurement, and monitoring protocols and drafting the list of KPIs, developing and launching the website, preparing the communication materials. According to the Grant Agreement (GA), the deliverables D1.1, D1.2, and D7.1 have been submitted by M03 and D1.3 and D1.4 are submitted by M06.



2.2. Action plans and milestones M1-M6

At the beginning of COLLECTiEF project, an action plan was structured based on the project implementation strategy and milestones for a runtime of six months to follow up and coordinate the whole consortium. This aims at following step-by-step the expected work progress and monitoring the activities of each partner in relation to the tasks as well as engaging partners to achieve the targeted objectives. The action plan includes the foreseen activities aligned with the tasks and the responsible person/organization who must complete and deliver the works by defined milestones as described in the Grant Agreement. Table 2 summarizes the milestones for the reporting period from M1 to M6.

Table 2 List of milestones by M6 according to GA

Milestone number	Milestone title	WP number	Lead beneficiary	Due date
MS1	General project management Concept defined	WP1	NTNU	3
MS2	First progress report submitted	WP1	NTNU	6
MS3	Data management plan	WP1	CETMA	6
MS14	Project communication kit developed	WP7	GEO	3

In addition, a list of internal milestones was created and shared with the partners to follow up the progress expectations by M6, see Table 3. It should be noted that the partners were requested to report their progress by M4 for progress report preparation, hence a separate milestone was also created for the first four months.

Table 3 List of internal milestones by M6

Working package no.	Milestone by M6
WP1	<ul style="list-style-type: none"> D1.1 and D1.2 including internal project progress report, internal financial reporting and internal review process for deliverables including templates and schedules are completed. The special issue is finalized and announced. Data Management Plan (DMP) is complete.
WP2	<ul style="list-style-type: none"> Reaching a good level of understanding of the system requirements. Working in the Python environment has been started. First round of simulations on a simplified cluster of typical buildings is ready to be tested in the Web service of DIMOSIM
WP5	<ul style="list-style-type: none"> Pilot description inventory is available as v2. A stakeholder engagement plan including informed consent procedure with DMP in accordance with General Data Protection Regulation (GDPR) is ready. Relevant parameters and a preliminary list of KPIs to be updated according to WP2 developments have been identified.
WP6/WP7	<ul style="list-style-type: none"> The structure of the measurement and verification protocol has been defined. A stakeholder first draft database is completed / or: first version of the stakeholder database is completed.
WP7	<ul style="list-style-type: none"> Participation plan to ENLIT is complete and the dissemination materials are ready.



2.3. Internal Project Progress Report (IPPR)

The management team has created a system of monitoring and reporting activities using Internal Progress Reports (IPPR). IPPR gives the coordinator a good understanding of the status and progress of the work and allows to detect any possible, risks, delays, or deviations well in advance. The partners share information about the ongoing and planned work and can assess the percentage of the completed task. Furthermore, the cumulative report serves as a helpful basis for the creation of technical periodic reports.

The IPPRs will support the quality assurance within the COLLECTiEF project and will help monitor the project's process along and towards its objectives. Table 4 lists the schedule plan of IPPR submission due by the project partners. Detailed description of IPPR process has been provided in D1.1.

Table 4 Schedule for Internal Project Progress Report (IPPR)

Number	Title	Due Date (in months)	Delivered for review
IPPR1	Internal Project Progress Report - M4	4	30-Sep-21
IPPR2	Internal Project Progress Report - M7	7	31-Dec-21
IPPR3	Internal Project Progress Report - M10	10	31-Mar-22
IPPR4	Internal Project Progress Report - M13	13	30-Jun-22
IPPR5	Internal Project Progress Report - M16	16	30-Sep-22
IPPR6	Internal Project Progress Report - M19	19	31-Dec-22
IPPR7	Internal Project Progress Report - M22	22	31-Mar-23
IPPR8	Internal Project Progress Report - M25	25	30-Jun-23
IPPR9	Internal Project Progress Report - M28	28	30-Sep-23
IPPR10	Internal Project Progress Report - M31	31	31-Dec-23
IPPR11	Internal Project Progress Report - M34	34	31-Mar-24
IPPR12	Internal Project Progress Report - M37	37	30-Jun-24
IPPR13	Internal Project Progress Report - M40	40	30-Sep-24
IPPR14	Internal Project Progress Report - M43	43	31-Dec-24
IPPR15	Internal Project Progress Report - M46	46	31-Mar-25

Table 5 demonstrate the IPPR schedule in relation to the 5 Project Progress Reports that will be delivered EU commission during the project.



Table 5 Schedule and period of activities for project progress report

Number	Due Date (in months)	Collected IPPR	Period Activities Covered
First Progress Report	M6	IPPR1 (M1-M4)	M1-M4
Second Progress Report	M12	IPPR2 (M5-M7), IPPR3 (M8-M10)	M5-M10
Third Progress Report	M24	IPPR4 (M11-M13), IPPR5 (M14-M16), IPPR6 (M17-M19), IPPR7 (M20-M22)	M11-M22
Fourth Progress Report	M30	IPPR8 (M23-M25), IPPR9 (M26-M28)	M23-M28
Fifth Progress Report	M42	IPPR10 (M29-M31), IPPR11 (M32-M34), IPPR12 (M35-M37), IPPR13 (M38-M40)	M29-M40

Through IPPR template, the project partners have been asked to prepare their inputs according to the defined IPPR template (see Table 6) and report the difficulties and problems faced during project implementation over the reporting period as well as provide their solutions and opinion to the coordinator based on the planned Description of the Action (DoA). Section 5 provides the overview of work progress according to the first semester action plan (M1-M6) based on IPPR1 collected from project partners.

Table 6 Structure of COLLECTiEF's IPPR table for each WP

WPX – [The title of WPX]
Overview of Tasks in WP X: Copy those tasks from the DoA that you are involved in
<i>Explain the work carried out in WPX during the reporting period for your beneficiary!</i> <fill in>
Explain also the overall assessment on percentage complete of your tasks within WPX and the planning of next steps. <fill in>
Explain the reasons for deviations from the DoA, the consequences and the proposed corrective actions. Include explanations for tasks not fully implemented, critical objectives not fully achieved and/or not being on schedule and the impact on other WP/tasks. <fill in if applicable>
- Difficulties – Problems – Solutions – Lessons Learned <ul style="list-style-type: none"> • Outline and provide the necessary explanation of any difficulties/problems (internal or external) you faced during project implementation over the reporting semester/period. • How did you manage to address / solve those problems (if you have managed to do so)? What were the corrective actions you took and/or plan to take? • What was the outcome of your corrective action(s)?
- Changes in the project team <ul style="list-style-type: none"> • Outline changes (if any) in: • the legal status of your organisation; and • the project team from your organisation (i.e. those people involved in project activities)
- Additional comments or requests for the coordinator.



3. Engagement strategy

To maximize the exploitation potential of the COLLECTiEF project under WP7, the consortium will actively reach out to the relevant stakeholders and end-users. As part of the overall strategy, a stakeholder database, which will be actively maintained and updated throughout the project, will consist of relevant stakeholders and end-users such as public authorities, policymakers, energy efficiency practitioners, smart energy storage companies, as well as umbrella and multiplier organizations. The stakeholder database will be confidential and will serve as a contact base for the capacity building activities; interested parties will be duly informed as to when the industry workshops and educational training start. The stakeholder database will be compiled through: a) **Partner contributions**, b) **“Associated Partners”** and c) **Newsletters**.

As the project progresses, its achievements and results will be actively conveyed to the target groups with a view to stimulating exploitation; the list of stakeholders will facilitate this task as it will contain names of institutions interested in contributing to COLLECTiEF research and commercial activities or are interested in knowing more technical details on the application of COLLECTiEF solutions.

Within the COLLECTiEF stakeholder engagement strategy, an important part plays the **engagement of building and flat owners** in pilot sites. Relations between property and facilities managers and occupants contribute towards meeting compliance obligations and the achievement of wider project objectives. Our strategy involves a) clarifying the needs and expectations of occupants, b) explaining the functionality of our solutions, c) providing clear timelines for agile installation of the sensor and monitoring system, and d) explaining the benefits of COLLECTiEF solutions. It is also important to establish communication and engagement methods that can be used to share information and evaluate the way in which these needs can be met.

In the first period, the building owner’s engagement activities will consist of:

- Preparing printed communication materials – project materials have been translated in Norwegian and Italian by NTNU and TEICOS
- Preparing general presentation of the project
- Preparing a project video to be displayed
- On-site meeting for presentation of the project - December 2021 in Milan and Ålesund.
- Call for nomination – collecting interested flat owners to participate
- Setting up the installation plan

The full timeline can be seen in Figure 9 and the involved tasks are presented in Figure 10.



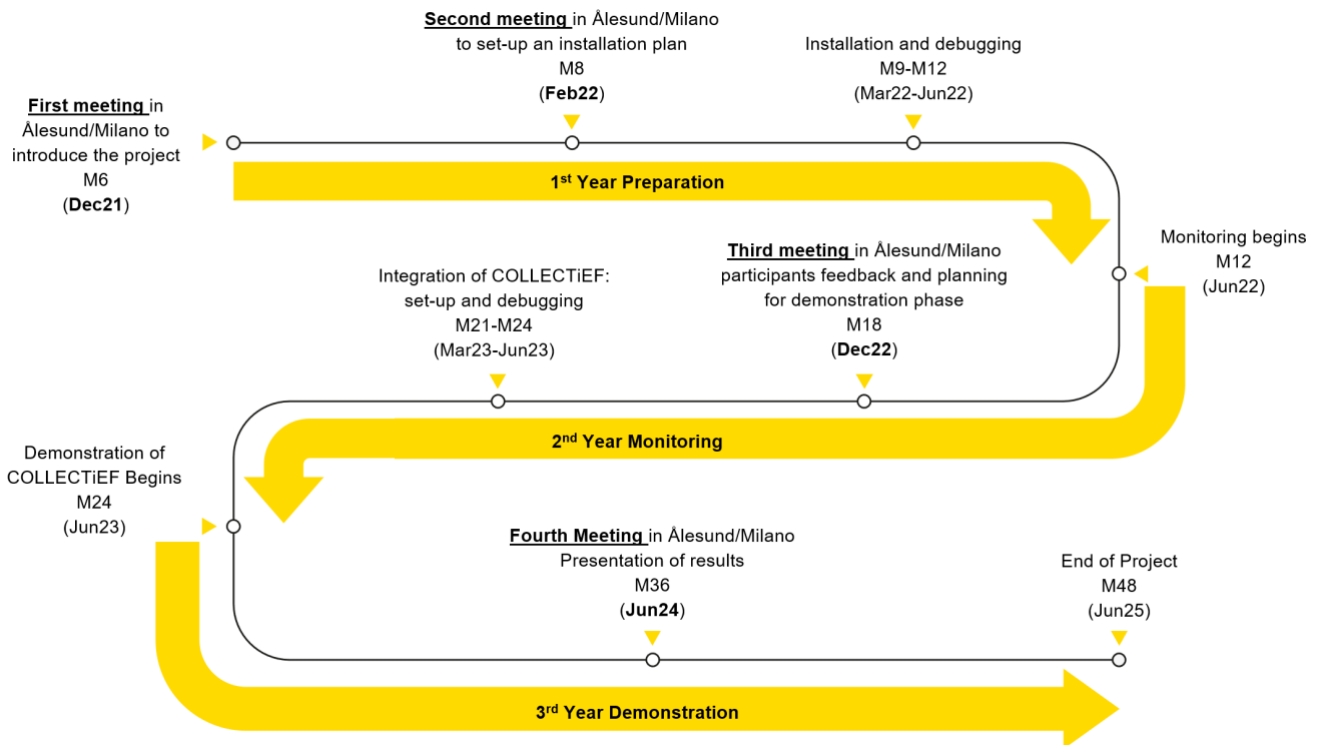


Figure 9 Timeline of engagement strategy

Future ad-hoc stakeholder engagement strategies will be similarly co-created with relevant partners. The engagement of stakeholders and database development will start in M3 and continue until the end of the project (M48).

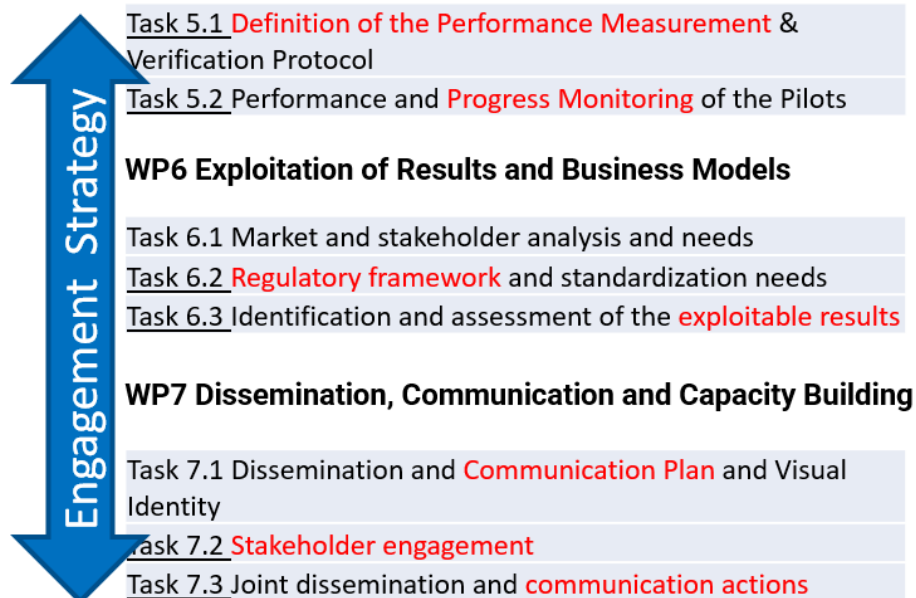


Figure 10 Engagement strategy and involved tasks



4. Dissemination, promotion, and exploitation activities

At the early stage of the project, dissemination, communication, and exploitation activities have been planned by the DET in order to involve all partners to be committed to create impacts via providing promotion and exploitation actions for COLLECTiEF project. The detailed information of dissemination and communication plan and visual identity has been reported in deliverable D7.1.

In the first period of the project (M1-M4), since there are no tangible and exploitable outputs yet, many efforts have been devoted to promoting the project and its expected innovative solutions through various dissemination and communication tools, namely, the website, social media posts and campaigns, articles, a press release, videos, and initial contacts with EU sister projects. The partners have initiated the dissemination and communication activities, see section 5.7. In this section, the main joint dissemination activities related to Task 7.3, are reported.

4.1. Scientific publications

The following scientific publication have been published as a dissemination activity prior to project start.

Title	Climate change and energy performance of European residential building stocks – A comprehensive impact assessment using climate big data from the coordinated regional climate downscaling experiment
Author(s)	Yuchen Yang, Kavan Javanroodi, Vahid M.Nik
Journal/conference info.	Applied Energy IF: 9.746
DoI	10.1016/j.apenergy.2021.117246
Date of publication	September 2021
Volume	298
Access link	https://doi.org/10.1016/j.apenergy.2021.117246

A joint Special Issue (SI) on "Enhancing energy flexibility and climate resilience of urban energy systems" has been designed and announced according to the key points of COLLECTiEF project, in the journal of Applied Energy & Advances in Applied Energy. The submission period will be on 15th January-15th August 2022 and will be completed by the end of the 2022.

4.2. Workshops, conferences, and events

As early mentioned, all the partners have started to promote and introduce the COLLECTiEF project in various events, see Table 7. Besides the attendance and participation in the events, the DET has also planned to organize two workshops in pilot sites in Italy and Norway during December and January for the building owners' engagement.



Table 7 The events, seminars, workshop, conferences attended by the partners.

Name of event, seminar, etc.	Date of participation	Venue	Partner	Action and statement
DCH+ Summer School: Customer engagement in energy systems	08.21	Virtual	NODA	-
Webinar: Swedish Energy Office of East Sweden "The role of district heating in a flexible energy system"	09.21	Virtual	NODA	-
Webinar: Netport Energy Breakfast - "Intelligent District Heating in Karlshamn"	09.21	Virtual	NODA	-
Webinar: Blekinge AI Arena- Intelligent heating from Blekinge to Beijing	09.21	Virtual	NODA	-
Seminar: Sustainable Places 2021	09.21	Rome, Italy	R2M	Participation in the session related to energy flexibility and controls in buildings.
Applied Energy Symposium on "Low Carbon Cities & Urban Energy Systems", (CUE2021)	09.21	Matsue, Japan	ULUND	Given a panel discussion on "COLLECTiEF"

4.3. Collaboration and synergies with sister research projects

COLLECTiEF project is intensively looking to collaborate with the sister research projects and other related EU projects and initiatives. In the first period of the project (M1-M4), we targeted to approaching the sister EU-project (e.g., 2ISECAP, ActlonHeat, ARISE, BundleUP NEXT, CEES, crossCert, NEEM, PEER, REGENERATE, SER, SMART2B, Sun4All, etc.) for research collaboration and synergies. The detailed information about the targeted sister projects were provided in deliverable D7.1.

We have initiated the preliminary collaboration with SMART2B- Smartness to existing Buildings, the sister research project of COLLECTiEF. In the first stage, the coordinator was invited by coordinator of SMART2B EU-project to give a presentation about the concept of COLLECTiEF project.

SMART2B is an EU-funded H2020 project coordinated by CNET – Centre for New Energy Technologies SA in Portugal, running for 3 years – from 2021 to 2024. "SMART2B provides new business models for the building energy market combining the savings from energy efficiency measures and gains from the active contribution of the building through flexibility services by exploiting the maximum level of smartness³.

³ SMART2B - Smartness to existing Buildings, EU-H2020 project (Grant agreement ID: 101023666), <https://cordis.europa.eu/project/id/101023666>.



4.4. Newsletter, press releases and campaigns

The GEO has planned to release periodic newsletters and press releases in concomitance of important events and achievements. The first press release (see Figure 11) has been published and distributed with the partners in June 2021. DET has also planned to design and organizing several campaigns (e.g., DYK, World Environmental Day, Energy Efficiency Day, World Cities Day) for promotions of the project and partners. The DYK campaign has been announced recently, see Figure 12. COLLECTiEF joined the World Environment Day 2021 using the dedicated hashtags (#WorldEnvironmentDay, #GenerationRestoration, #energyefficiency) acknowledging the importance and objectives of the global initiative and connecting with relevant followers and organizations in the field. For further detail about the newsletter and campaigns, referred to deliverable D 7.1.

7 June 2021

Press release

COLLECTiEF: COLLECTIVE INTELLIGENCE FOR ENERGY FLEXIBILITY

The H2020-funded project aims to implement an interoperable and scalable energy management system to smart up buildings and their legacy equipment on large scale.

COLLECTiEF was officially launched on 1 June 2021, with its virtual kick-off meeting taking place on 7-8 June 2021. The project will run for four years and will be implemented by a consortium of 14 partners from six European countries. Coordinated by the Norwegian University of Science and Technology (NTNU), COLLECTiEF brings together innovative SMEs, academic institutions, building owners and energy providers.

Enhancing the energy flexibility on both supply and demand sides can boost the movement towards sustainable and resilient urban energy solutions, especially in high-energy dense and heterogeneous urban areas. Climate change and increasingly frequent extreme climate events will likely affect two-thirds of the European population by 2100¹¹. Proper climate change adaptation demands for more innovative and feasible approaches, especially in urban areas where malfunctioning of buildings and energy systems can negatively affect people's lives. There is, thus, an urgent need to review existing buildings' energy strategies to make them more sustainable and climate resilient.

To respond to these needs, the COLLECTiEF consortium will enhance, implement, test, and evaluate an interoperable and scalable energy management system based on Collective Intelligence (CI) that will be integrated into existing buildings and urban energy systems aiming to reduce installation cost, data transfer and computational power while increasing data security, energy flexibility and climate resilience. Over the course of four years, the COLLECTiEF system will be installed in four pilot sites (France, Italy, Norway, Cyprus), with a total of 13 buildings and one living laboratory representing 40% of different building archetypes in Europe with different uses, scales, markets, and climatic contexts to demonstrate replicability and scalability of the solution.

Specifically, COLLECTiEF aims to achieve the following six objectives:

- Enhancement and adaptation of algorithms for creating a CI-based energy flexible network.
- Realization of cost-effective system components with easy deployment and maintenance.
- Demonstration and testing of a CI-based energy network in the real environment.
- Testing and implementing a scalable and customizable occupant-centric fusion sensor network for accurate and non-invasive environmental monitoring.

¹¹ IPCC, 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1132

- Design and implementation of a smart, user-centric and user-friendly digital platform for interacting with users and controlling technical building systems.
- Development of new business models for energy services, including a clear model for commercialization of the COLLECTiEF system.

"Collective Intelligence is when intelligent entities are connected, so that collectively they act more intelligent than any individual entity. This is how the consortium is going to work and this is the core of the technology that is going to be tested in the pilot buildings of COLLECTiEF." – Amin Moazami, Project Coordinator.

By improving energy performance in buildings, the COLLECTiEF project is contributing to the energy and climate goals set by the Paris Agreement and the "Clean Energy for all European" package, including the Communication "Accelerating Clean Energy Innovation" (COM (2016) 736) and the SET-Plan priorities.

Additional information on the project can be found at the [European Commission's CORDIS page](#). The project website will be launched in August 2021.

The COLLECTiEF consortium

- Norwegian University of Science and Technology (Norway)
- Lund University (Sweden)
- The Cyprus Institute (Cyprus)
- Energy@Work (Italy)
- R2M Solution SRL (Italy)
- EM Systemer AS (Norway)
- NODA Intelligent Systems AB (Sweden)
- Geonardo Environmental Technologies Ltd. (Hungary)
- Scientific and Technical Center for CETMA - Technologies Design and (France)
- (Italy)
- LSI Lastem (Italy)
- Ålesund Municipality (Norway)
- Teicos UE SRL (Italy)
- Virtual Manufacturing AB (Sweden)



Contacts:

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- Dissemination and Communication Manager: Jelena Lazic / jelena.lazic@geonardo.com

Figure 11 A photograph of front page of the first press



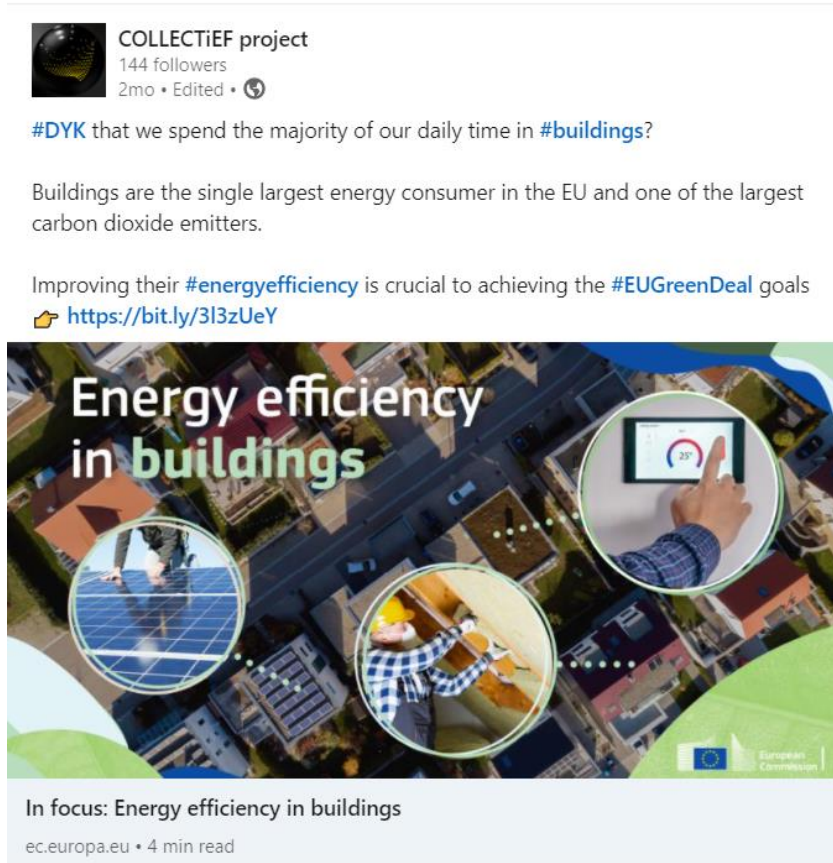


Figure 12 A snapshot of the DYK campaign page

4.5. Visual identity, dissemination, and communication materials

At early stage of the project, the visual identity, dissemination, and communication materials have been designed and prepared for COLLECTiEF project to promote the consistent visual style of the project among its target audience. The visual identity includes the major branding elements (logo, colour palette) and design of selected promotional materials for the project. The dissemination and communication materials consist of flyers, leaflets, roll-up, posters, a word project reporting template, a power point presentation template, and a general presentation of the project. All the dissemination materials are uploaded on the project website in PDF format, and more information on dissemination materials can be found in D7.1.

4.6. COLLECTiEF's webpage and social media

At the beginning of the project, GEO started to design a user-friendly and interactive website for COLLECTiEF project to build a virtual dissemination land providing coherent and updated information about the project both to the general audience and the industry experts through clear text and appealing visuals. Moreover, the website describes the project's methodology and objectives and presents the partners in the consortium. To this end, the domain name (<https://collectief-project.eu>) has been opted among of several suggested names by GEO and the webpage officially has been launched in August 2021. The detailed information of webpage has been provided in deliverable D7.1.



GEO has set up the COLLECTiEF's social media from the beginning of the project, providing major updates on the project's key objectives and future activities. The core goal of social media is to enhance the visibility of COLLECTiEF online, namely its activities, research findings and solutions. Table 8 summarizes the list of dissemination and communication (D&C) KPIs and the status by M4.

In order to reach out to a wider audience, but also to our core target groups, two social media channels have been established: Twitter and LinkedIn. In addition, a YouTube channel was created with the purpose to host project's promotional videos, recorded webinars and interviews made by the consortium with experts explaining the benefits and utilization of the COLLECTiEF solutions.

The website and social media channels are continuously fed with the most recent and relevant information and posts, assisting key objectives of international/European campaigns.

Table 8 The list of dissemination and communication (D&C) KPIs and the status by M4

D&C Item	Target for the project	Status by M4
Presentations at scientific conferences	At least 2 presentations (during the project)	-
Publications in scientific journals	At least 4 scientific articles (submitted during the project duration)	1 journal article
Exhibitions	4 exhibitions (1 per demo site)	-
Stakeholder/industry workshops	4 workshops (1 per demo site)	-
eLearning materials	4 eLearnings modules	-
Articles in local languages	At least 6 articles	-
Dissemination materials	Number of types of materials printed: 2 types of flyers (initial and midterm); 1 general poster; 1 banner	1 flyer, 1 poster, 1 leaflet and 1 rollup
Participation in events (external, not organized by CLF)	At least 10 events attended	-
Website	6000 hits	1, 305 hits by M4/1329 by mid M6
Social Media	Number of posts, followers, engagement rate: at least 200 posts in all project's accounts, 600 followers in total, 1.5 engagement rate	282 followers in total 93 posts in total Engagement rate: TW 1,3% LinkedIn: average 6%
Press release	6 press releases	-
Video	Up to 2 videos	-
Interviews	Up to 5 interviews	-



4.7. Upcoming events

The consortium has already identified relevant upcoming European and international events, the first of which will be ENLIT Europe, happening in Milan from November 30 to December 2, 2021. ENLIT is a series of energy events bringing together established players, external disruptors, innovative start-ups, and the increasingly engaged end-user in the energy sector to address every aspect of Europe's energy transition. COLLECTiEF will participate through the online presence and prepare a 5-minute video pitch about the project. Furthermore, Milano-based partners will attend the event in presence through the "Exhibitor Staff Pass".

Other following events have been identified by the partners: IBPSA Building Simulation; International Building Physics Conference (IBPC); IEEE International Energy Conference (ENERGYCon); International Conference on Applied Energy (ICAE); Nordic Symposium on Building Physics (NSB); World Sustainable Energy Days; European Sustainable Energy Week; Annual ManagEnergy Conference.



5. Action plan and activities performed per working package/task

As early mentioned, the IPPRs were collected from the partners in accordance with the description of IPPR which is presented in section 2.3. In this section, a brief description of the activities performed, per working package and task as well as based on the activities of each individual partner during the first period of the project (M1-M4) are provided with regards to the action plan defined by the coordinator using a given colour codes:

- Green: if they are completed.
- No colour: If they are ongoing with no deviation.
- Yellow: if they are ongoing with minor deviation.
- Red: if they have stopped or ongoing with major deviation.

5.1. WP1: Project Management and Coordination

This work package aims at coordinating the COLLECTiEF project management and administration as well as supervising the activities carried out by all partners according to the defined tasks and the action plan to ensure the consortium implements the activities effectively, produces and submits the deliverables and reports on time and with high quality.

During the first period of the project (M01-M04), we have designed the Quality Plan as a common framework for effective communication, documentation, deviation identification and correction. Furthermore, the Quality Assurance assessment procedure has been defined for deliverables including the Internal Project Progress Reports (IPPRs), clear responsibilities and regular clearly guided web conference as well as a well-defined internal review process. Moreover, the Quality Control was established for focusing on feedback through internal processes (internal review process) which further monitors on how feedback is implemented and assures the project outcomes through proactive risk management.

CETMA and NTNU have drafted the Data Management Plan (DMP) by M04, and all the partners have commented on it. The final version of DMP is reviewed by R2M partner and then CETMA will revise and deliver it by M06.

ULUND in collaboration with NTNU and Cyl has designed, arranged and announced a joint Special Issue (SI) on "[Enhancing energy flexibility and climate resilience of urban energy systems](#)" according to the key points of COLLECTiEF project, in the journal of Applied Energy & Advances in Applied Energy. The submission period will be on 15th January-15th August 2022 and will be completed by the end of the 2022.

NTNU has organized a series of meetings during the first period of the project (M01-M04), to concrete the relation and communication among the beneficiaries in order to discuss the pre-requisites for initiating the technical activities as well as following up and monitoring the tasks progress. All partners have actively participated in the following project meetings:



- Kick-off meeting and General of Assembly meeting (07-08/06/2021)
- Executive Board n.1 (21/06/2021)
- Executive Board n.2 (26/07/2021)
- Executive Board n.3 (08/09/2021)
- Executive Board n.3 (06/10/2021)
- Executive Board n.3 (03/11/2021)

Besides, the consortium members have also arranged several internal/WPs meetings and they have actively participated in the draft/preparation of the sub-tasks and other technical-related works.

Due to pandemic Covid-19, we could not be able to hold any physical meeting and all the meetings were organized virtually. Once in-person meetings become feasible based on safety considerations, the project partners might still use the option to attend remotely, depending on travel schedules, thus creating “hybrid” meetings with a proportion of the attendees being on site (i.e., in-person meeting) and virtual attendance of the remainder of the attendees. The consortium plans to have a hybrid meeting for the second general assembly meeting in February 2022.

5.1.1. Task 1.1: Project coordination, monitoring and risk management

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Establishing schedule for internal project progress report and internal review process for deliverables including templates	Completed	-
NTNU	Submitting deliverable D1.1 and D1.2	Completed	-

Activities performed by partners

Task Leader: NTNU

Task Contributors: -

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task for M4 are completed and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • NTNU has arranged the kick-off and general assembly and five executive board meetings. • NTNU has defined the Action Plan and IPPR. • NTNU has prepared and delivered Management and Quality Plan (Deliverable D1.1 - M03). • NTNU has prepared and delivered Risk Management Plan (Deliverable D1.2 - M03). • GEO has reviewed the final version of Management and Quality Plan (Deliverable D1.1 - M03).



	<ul style="list-style-type: none"> R2M has reviewed the final version of Risk Management Plan (Deliverable D1.2 - M03). NTNU has been invited by the sister EU project (SMART2B) to present the concept of COLLECTiEF project. NTNU has drafted the first project progress report (Deliverable D1.4 - M06). All partners have internally organized the planning and allocation of resources.
Deliverables	D1.1: Management and Quality Plan (M03) D1.2: Risk Management Plan (M03)

5.1.2. Task 1.2: Financial management

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Establishing schedule for internal financial reporting.	Completed	-

Activities performed by partner

Task Leader: NTNU	
Task Contributors: -	
Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task for M4 are completed and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> NTNU has prepared and developed the financial routines/framework for controlling the project finances and resources on a quarterly reporting period basis. The financial manager at NTNU together with the administrative project manager have established the routines/templates for financial reporting and following-up the preparation of cost statements. NTNU has transferred the pre-financing EU contribution funds to the beneficiaries. All the partners have internally planned for project financial resources, allocation of hours and the resource monitoring process.
Deliverables	-

5.1.3. Task 1.3: Data management and creation of joint data repository to store data

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Establishing a connection between Norwegian Center for Research Data (NSD), NTNU and CETMA to set up a framework to ensure abundance of data management plan with EU regulations and GDPR. --> Task 5.1	The process is established, CETMA provided first scheme of DMP, and the scheme is presented to NSD	Completed



E@W CETMA	Assisting CETMA by providing specification of iGateway for the development of DMP	Completed
CETMA	Collaborate with NTNU to set up a framework to ensure abidance of data management plan with EU regulations and GDPR.	The process is established, CETMA provided first scheme of DMP, and the scheme is presented to NSD Completed
LASTEM	Finalize and deliver D1.3 Data Management Plan	The process is established, CETMA provided first scheme of DMP, and the scheme is presented to NSD Completed
LASTEM	Assisting CETMA by providing specification of Sphensor for the development of DMP	Completed

Activities performed by partner

Task Leader: CETMA

Task Contributors: NTNU

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • CETMA has developed the draft of data management plan foreseen at M6 of the project. To achieve this goal, several virtual meetings were held during M01-M03, both with the project coordinator (NTNU) and with the project partners (specifically LASTEM and Cyl). • CETMA has collaborated with NTNU and other partners (LASTEM and Cyl) to set up a framework to ensure abidance of data management plan with EU regulations and GDPR. • CETMA has collaborated with NTNU and other partners (LASTEM and Cyl and E@W) to design a data flow (from sensors) to a data storage and ensure abidance to GDPR. • CETMA had meetings with specific partners (LASTEM and CYI). They were necessary to acquire information and technical specifications on the data flow underlying the project. These meetings were very fruitful to define within the flow the roles and responsibilities in the process, and to ensure the compliance of the data processing in line with the GDPR regulation: <ul style="list-style-type: none"> ○ With the LASTEM partner, information on the Sphensor™ sensors was exchanged with the aim of defining the characteristics of the data coming from the sensor network within the data management plan ○ With the Cyl, information was acquired on the specifics of the post-occupancy evaluation questionnaire according to the structure provided in the plan, i.e. architecture of the data flow, type of data generated, application of GDPR where necessary, access and security procedures, etc. ○ Moreover, the relevant partners have discussed to identify the tentative data flows within the COLLECTiEF ecosystem from the occupant-centric sensors network to the edge node and cluser node, contributing to identify



	<p>suitable solutions for the storage and access rights to the gathered data for model development</p> <ul style="list-style-type: none"> ○ With E@W, the preliminary specification of iGateway and the exchanging data was discussed for the definition of DMP • All partners have reviewed the first draft of DMP and commented on it. • R2M reviews the final version of DMP by M05 for final validation which consist of the processes of review, update, approval, final check and release. • CETMA will finalize the DMP and deliver it by M06.
Deliverables	D1.3: Data Management Plan (M06)

5.1.4. Task 1.4: Scientific Coordination

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Assisting with scientific coordination and setting up Special Issue	The editors list is discussed and completed	Completed
ULUND	Coordinating scientific publication. Setting up Special Issue	The editors list is discussed and completed	Completed

Activities performed by partner

Task Leader: NTNU

Task Contributors: NTNU

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan have been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • ULUND in collaboration with NTNU and Cyl has designed, arranged and announced a joint Special Issue (SI) on "Enhancing energy flexibility and climate resilience of urban energy systems" according to the key points of COLLECTiEF project, in the journal of Applied Energy & Advances in Applied Energy. The submission period will be on 15th January-15th August 2022 and will be completed by the end of the 2022. • One journal article has been published (it is a dissemination activity prior to project start) by collaboration of ULUND and NTNU: <ul style="list-style-type: none"> ○ Yang Y, Javanroodi K, Nik VM. "Climate change and energy performance of European residential building stocks – A comprehensive impact assessment using climate big data from the coordinated regional climate downscaling experiment", Applied Energy, 2021, (Link). • ULUND has given a panel talk/discussion on "COLLECTiEF: Collective Intelligence for Energy Flexibility" in Applied Energy Symposium on "Low Carbon Cities & Urban Energy Systems", (CUE2021) in Matsue, Japan on 6th of September 2021. • NTNU has presented COLLECTiEF in ITU-T Focus Group on "Environmental Efficiency for Artificial Intelligence and other Emerging Technologies" (FG-AI4EE)



	<i>[ITU is the United Nations specialized agency for information and communication technologies.]</i> www.itu.int/go/fqai4ee
Deliverables	-

5.1.5. Task 1.5: Contribute, upon invitation by the Agency

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Finalizing attendance of COLLECTiEF in ENLIT event in Milan	The registration is complete in August	Completed

Activities performed by partner

Task Leader: NTNU

Task Contributors: -

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> NTNU has finalized the attendance of COLLECTiEF in ENLIT event in Milan.
Deliverables	-

5.2. WP 2: Algorithm training and reinforcement for control strategies of COLLECTiEF System (TRL 6)

This work package focuses on the algorithms and communication logics of the COLLECTiEF system. The partners will test and enhance existing and new solutions using virtual testbed, DIMOSIM, and in a real environment at G2Elab.

During the first period of the project (M01-M04), the WP2's beneficiaries have initiated communicating and researching relevant aspects of WP2 tasks in order to assess the requirements and possibilities.

ULUND in cooperation with NTNU and CSTB, has organized the following meetings to plan the tasks activities and the implementation procedure. The partners of WP2 and other beneficiaries who are involved in the relevant activities of WP2, have actively participated in the following meetings:

- DEMOSIM and WP2 discussion (06/07/2021)
- API Dimosim presentation (03/09/2021)
- API Dimosim (data exchange) (28/09/2021)



The preliminary actions were carried out for developing a virtual testbed using DIMOSIM for algorithms and controls of the pilot buildings in France (G2Elab) as well as of the pilot buildings in Norway, Cyprus, and Italy.

CSTB has created a git repository namely gitlab.com for COLLECTiEF, in Github. Currently, this repository contains the Dimosim documentation, an article about Dimosim and also an example of Dimosim for a simulation period of less than one year with resolution of one week per default. The Dimosim API has been developed and successfully tested by the project partners.

ULUND has announced a new post-doctoral position about "[algorithm training and reinforcement for control strategies of COLLECTiEF System](#)". The work to extract RCM climate data and synthesize future weather data sets for the case studies has been started.

5.2.1. Task 2.1: Enhancing the available control algorithms for COLLECTiEF ClusterNode

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Defining objectives based on dynamic pricing, demand-response schemes for the initial test at DIMOSIM platform --> Task 2.3 and Task 5.1	A list of demand-response schemes, dynamic pricing, etc. is drafted for all pilot sites	First draft completed
ULUND NODA	Understanding the system requirements and boundaries.	Ongoing	Reaching a good level of understanding the system requirements.
	Adaptation of solutions by NODA Heat Network to start testing in simulation with DIMOSIM platform	Ongoing	The first set of solutions is ready to be tested at DIMOSIM
CSTB	CSTB to collaborate with ULUND, NODA and NTNU to enable running the first round of simulation on a reference case study for Cluster Node --> Task 2.4	Specification of a first set of control variables that must be available in the simulations of the web service on the Cluster Node.	A first test case (simplified) is available on the web service allowing the partners to start developing and testing their algorithms.



Activities performed by partner

Task Leader: ULUND

Task Contributors: NODA, NTNU, CSTB

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan have been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • ULUND as WP leader has organized several meetings with the relevant partners for planning the activities in WP2. • ULUND has announced a new post-doctoral position about “algorithm training and reinforcement for control strategies of COLLECTiEF System”. • An open-source platform in Github (version < 1.0) has been published by NODA partner. This offers a possible solution on how to structure the research and software development efforts in a way that permits co-simulation with the DIMOSIM platform as well as execution against a live environment. • CSTB has led several activities on understanding the first set of control variables that are required to be available at DIMOSIM according to the objectives of the project. • The preliminary identification of objectives based on dynamic pricing, demand-respond schemes for the initial test at DIMOSIM platform has been drafted by NTNU.
Deliverables (M01-M04)	-
Updated Risk (M01-M04)	<ul style="list-style-type: none"> • Running the energy simulation at cluster level based on CI control algorithms is time consuming. This is due to the nature of these algorithms (at each time-step the results must be read and feedback to the model for next time-step), which can cause the simulation run time to reach to unfeasible levels.

5.2.2. Task 2.2: Developing IoT and occupant-centric control algorithms for COLLECTiEF Edge Node

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Assist ULUND in setting up the logic and technical approach to implement CI-based algorithms in DIMOSIM	Ongoing	Working in the Python environment has been started.
Cyl	Preparing first round of occupant-centric control algorithms to be tested in DIMOSIM	Ongoing	The first set of algorithms is ready to be tested at DIMOSIM
Cyl	Identification of user needs and health requirements (i.e. thermal, visual, acoustic, indoor air quality requirements)	Ongoing	Completed (deliverable due extended)
E@W/LASTEM	Identification of Smart plugs and Smart Thermostat available in the market, which are suitable for the Edge Node.	Ongoing	Completed



E@W	sharing experience and challenges of interoperation for appliances using iGateway from the EU project ReCognition.	Ongoing	Completed
NODA	Adaptation of solutions by NODA Buildings to start testing in simulation with DIMOSIM platform	Ongoing	The first set of solutions is ready to be tested at DIMOSIM
CSTB	CSTB to collaborate with ULUND, NODA, Cyl and NTNU to enable running the first round of simulation on a reference case study for Edge Node --> Task 2.4	Specification of a first set of control variables that have to be available in the simulations of the web service on the Edge Node.	A first test case (simplified) is available on the web service allowing the partners to start developing and testing their algorithms.

Activities performed by partner

Task Leader: ULUND

Task Contributors: NODA, NTNU, CSTB, Cyl, R2M, E@W, Virtual, EM

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • Cyl has reviewed the guidelines and standards for identification of the needs of users and health requirements (i.e. thermal, visual, acoustic, indoor air quality requirements) for occupants. The reference for strategies and instructing dynamic thermal control in building where non-fragile and adult people are in sedentary activity (e.g., offices, residencies), were identified. The framework for the development of post occupancy evaluation (POE) surveys based on the occupant type and purpose, has been prepared. • E@W has had several discussions with LSI-LASTEM in order to define a consolidated list of smart plugs and smart thermostats and actuators available in the market, which are suitable for the Edge Node. E@W has also performed the preliminary activities for the definition of the lightweight control algorithms to be embedded directly on the iGateway and/or Bourder Router. • NTNU has assisted ULUND in setting up the logic and technical approach for implementation of CI-based algorithms in DIMOSIM. • CSTB has assisted ULUND in the preliminary development for enable testing the upcoming developed algorithms at DIMOSIM and their implementation in a real environment at G2Elab. • EM participated in DIMOSIM discussions and demonstration, and investigation into DIMOSIM simulation results
Deliverables	-
Updated Risk (M01-M04)	<ul style="list-style-type: none"> • The diversity of users type in within the pilot buildings (children at schools, elderlies in the health care centres, athletes at the sport centres,...) make the POE process very complicated.



5.2.3. Task 2.3: Providing inputs and boundary conditions data for COLLECTIEF network to be used in virtual testbed

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Initiating a datasets and information on dynamic price, tariffs, and demand response programs --> Task 2.1 and Task 5.1	A list of demand-response schemes, dynamic pricing, etc. is drafted for all pilot sites	First draft completed
ULUND	Preparing the first set of future climate data	Ongoing	The first set of future weather data for simulations.
Cyl	Providing inputs on modelling occupant behaviour in buildings (e.g. operation of windows, operation of blinds, adjustment of setpoint temperature, clothing level adjustment, light switching, use of appliances) for simulation in DIMOSIM	Ongoing	The first set of occupant behaviour models is ready to be tested at DIMOSIM

Activities performed by partner

Task Leader: ULUND	
Task Contributors: NTNU, Cyl	
Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • ULUND in cooperation with NTNU and Cyl have started to extract RCM climate data and synthesize future weather data sets for the case studies. • NTNU has Initiated to prepare a datasets and information on dynamic price, tariffs, and demand response programs. • Cyl has reviewed the standards and guidelines to identify models of occupant behaviour actions in buildings (e.g., operation of windows, operation of blinds, adjustment of setpoint temperature, clothing level adjustment, light switching, use of appliances).
Deliverables	-



5.2.4. Task 2.4: Testing of COLLECTiEF algorithms via co-simulation based on building and energy system modelling and analysis

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
ULUND	Initiate working with the DIMOSIM web service and preparing for the first round of simulation.	Ongoing	The first set of logics and climate data is ready to be tested at DIMOSIM
Cyl	Initiate working with the DIMOSIM web service and preparing for the first round of simulation.	Ongoing	The first set of logics and occupant behaviour models is ready to be tested at DIMOSIM
NODA	Initiate working with the DIMOSIM web service and preparing for the first round of simulation.	Ongoing	The first set of solutions is ready to be tested at DIMOSIM
CSTB	Providing a web service for DIMOSIM for the partners to be able to plug in and run simulation	The web service is up and running as a v0. A dummy example and API are ready to allow partners to connect.	A first test case (simplified) is available on the web service allowing the partners to start developing and testing their algorithms.
CSTB	Set-up the first case study for both Edge Node and Cluster Node simulation	A first simple test case is available on the web service with only a part of all control variables defined in 2.1 and 2.2.	A first test case (simplified) is available on the web service allowing the partners to start developing and testing their algorithms.
CSTB	Set-up simulation case studies representing pilot buildings in Norway, Cyprus and Italy based on the input data collected from Cyl, ÅKE, TEICOS in the inventory provided by NTNU.	The work on modeling pilot case studies has started	At least one pilot building has been modeled and calibrated

Activities performed by partner

Task Leader: CSTB

Task Contributors: NODA, ULUND, ÅKE, Cyl, TEICOS, Virtual

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing and two of the actions are completed by M4. There is a deviation in one of the activities, where the work on modelling the pilot cases had to be started by M4 but the work will be started by M5. The main reason is underestimation of preparation time required for delivering a comprehensive inventory template to the Pilot partners, and also the time required for the pilot partners to fill in the templates. The information provided by filled template, the
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	inventory, will be used to initiate modelling of pilot case studies. Currently, the initial work for data collection of the pilot buildings has been started as part of Task 5.2
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • CSTB has prepared the primary requirement for developing a virtual testbed using DIMOSIM. • CSTB has created a Gitlab repository on gitlab.com for COLLECTiEF. This repository contains the Dimosim documentation, an article about Dimosim and an example for a simulation period of less than one year with resolution of one week per default. • CSTB has developed and implemented the DIMOSIM API. The webservice is running and has been successfully tested by the project partners. • Virtual has been actively participating in the meeting regarding the DIMOSIM and discussions on the data provided for display • NODA has compiled a presentation of the NODA commercial platform and how it relates to COLLECTiEF architecture, outlining challenges and possible solutions.
Deliverables	-
Updated Risk (M01-M04)	<ul style="list-style-type: none"> • The time required to create calibrated model of the pilot buildings might take longer than expected.

5.3. WP 3: Implementation, Testing and Small-scale Demonstration

This work package aims at developing and implementing the prototype of COLLECTiEF network including hardware and software technologies for demonstration at a small-scale real environment in G2Elab.

In the first period (M01-M06) of the project, we have initiated the integration analysis of Sphensors with different kind of field devices (e.g., smart plugs) and edge node inside the border router.

Moreover, we have studied the technical feasibility, with the aim to optimize the data communication and avoiding any eventual redundancies and/or problems related to the data congestion and transmission delays. The market study was also initiated to find smartplugs with Wi-Fi connection and, also with open communication protocols (preferably http RESTful) to permit the communication with the border router. Most consumer smartplugs have indeed closed communication protocols due to the availability of specific software (cloud based or as App inside smartphone) provided from the same device constructor; these products are not compatible with COLLECTiEF project needs; hence these are not considered in the list of compatible smartplugs the pilots. Each smartplug model identified in this phase will be purchased and functionally verified with the border router to assure that the solution is really feasible with respect to the project needs. Here some commercial smartplugs identified:

- SONOFF: identified as DIY; RESTful API and IFTTT protocols.
- NETIO: high level and quite expensive products.
- SHELLY: Shelly 1 V3, Shelly 1 PM models.

The preliminary work was performed for the identification of optimal temporal resolution and spatial localization of sensing units for effective data sampling and the optimal thermo-physical



characterization of the testing rooms. We also have started to study the relevant studies of user-friendly Human-Building interface.

5.3.1. Task 3.2: Development of the COLLECTiEF Edge Node and integration with field devices

Action plan by coordinator

Originally no action plan was foreseen for this task.

Activities performed by partner

Task Leader: E@W	
Task Contributors: CETMA, EM, NODA, CSTB, Cyl, Virtual, LASTEM	
Overall progress and deviations from the action plan (M01-M04)	Some activities of Task 3.4 have already started in the first four months (rather than at M12).
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • LASTEM started to analyse the integration of Sphensors with different kind of field devices (smart plugs, etc...). • LASTEM and E@W proposed and analysed the integration of the edge node inside the border router and studied the technical feasibility, with the aim to optimize the data communication and avoid any eventual redundancies and/or problems related to data congestion and transmission delays. • LASTEM has performed a market research activity to find smartplugs with Wi-Fi connection provided with open communication protocols (preferably http RESTful) to permit the communication with the border router. Each smartplug model identified in this phase will be purchased and functionally verified with the border router to assure that the solution is really feasible with respect to our needs. • Cyl has worked on the identification of optimal temporal resolution and spatial localization of sensing units for effective data sampling and the optimal thermo-physical characterization of the testing rooms.
Deliverables	-

5.3.2. Task 3.4: Development of the COLLECTiEF user interfaces

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
Virtual/Cyl	Virtual to initiate collaboration with CSTB (existing App at G2ELab) and Cyl on occupants' feedbacks and interaction through digital dashboard	On going	The work on a demonstrative dashboard is started
Virtual	Virtual also creates demonstrative dashboards to visualize/interact with data coming in Task 2.4.	On going	The work on a demonstrative dashboard is started



Activities performed by partner

Task Leader: Cyl	
Task Contributors: CETMA, LSI-LASTEM, CSTB,Virtual, NTNU	
Overall progress and deviations from the action plan (M01-M04)	Some activities of Task 3.4 have already started in the first four months (rather than at M12) to provide a seamless development of the digital dashboard and design of the COLLECTiEF ecosystem (hardware, software, user engagement).
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • Cyl has collected and studied the relevant literature on and examples of user-friendly Human-Building interface. • Virtual started to investigate technical solutions and initiated the discussion with other partners. They initiated with a rough outlay of the project and will focus on the customer centric approach for visualization. Virtual has started a demo dashboard for communication and feedback on the work.
Deliverables	-

5.4. WP4: COLLECTiEF system integration and large-scale demonstration

In work package 4, the actual systems namely Edge Node, Cluster Node, occupant-centric fusion sensor network, IoT Operating System, Human-Building interface are demonstrated in an operational environment at large-scale.

During the first phase of the project, the activities for the involvement and engagement of stakeholders in the process for the definition of the task requirements were prepared. Furthermore, the general administration has been organized by the involved partners.

The data collection procedure from the installed TBSs (legacy equipment) in the pilot buildings, have been started.

The technical evaluation of the pilots and initial communication/meetings with their manager/owners in Italy and Norway started.

5.4.1. Task 4.2: Preparation of pilot cases for deployment and demonstration

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
Cyl	Cyl provide information about its technology and solutions on building automation and control systems and fill in the inventory template that is provided by NTNU with specification of available measurements at DEMO building in Cyprus	A first draft inventory is available to be refined in a v2.	Pilot description inventory is available as v2.
EM/ÅKE	EM provide information about its technology and solutions on building automation and control systems and fill in the inventory template that is provided by NTNU with specification of	A first draft inventory is available to be refined in a v2.	Pilot description inventory is available as v2.



	available measurements at DEMO building in Norway		
TEICOS	TEICOS provide information about its technology and solutions on building automation and control systems and fill in the inventory template that is provided by NTNU with specification of available measurements at DEMO building in Norway Provide information about available measurements at DEMO buildings in Cyprus using the inventory templates (by NTNU)	A first draft inventory is available to be refined in a v2.	Pilot description inventory is available as v2.

Activities performed by partner

Task Leader: EM	
Task Contributors: Cyl, ÅKE, TEICOS, LSI	
Overall progress and deviations from the action plan (M01-M04)	There is deviation in the actions that are planned for M4 of this task. This was due to under estimation of the time required for the partners to fill in . inventory templates. The delay is not imposing any major risk to aimed milestones since the partners has started filling in the information and the templates v1 should be filled by end of M5 instead of M4.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • EM has done a technical evaluation of the Norwegian pilots. Documentation still in norwegian and needs to be made “presentable” for the other members of the work package. • Cyl has started to collect the data from installed TBSs (legacy equipment) in the pilot buildings. • TEICOS has initiated the work related to the collection of the simulation and existing measured data for the pilot buildings in Italy. • TEICOS in cooperation with R2M has organized the meeting with the pilots’ owners in Milan and also has contributed on analysis on the Italian pilot change. • ÅKE has initiated the work related to the collection of the simulation data for the pilot buildings in Norway. • R2M and NTNU have contributed on analysis on the Italian pilot change.
Deliverables	-

5.5. WP5: COLLECTiEF system qualification, Smart readiness evaluation and impact assessment

Work package 5 aims to qualify the COLLECTiEF system assessing the following main impacts: (1) the ability of the buildings to optimize operation for health and comfort of the occupants, (2) the ability to maintain energy efficiency performance and operation of the building through the adaptation of energy consumption, (3) the ability of the buildings for demand response and interoperability to provide energy flexibility, and climate resilience of buildings and energy systems. In this work package, the smart readiness level of the pilot buildings before and after installation of the COLLECTiEF system is evaluated based on SRI.



In the first phase of COLLECTiEF project (M01-M04), NTNU as leader of this working package, has organized the following meetings in contribution of the WP5's partners in order to coordinate and develop the tasks and related activities.

- M&V Protocol (09/07/2021)
- Objectives and metrics (10/09/2021)

All partners have actively participated in the meetings for the definition of the Performance measurement & verification protocol and the identification of metrics on the energy flexibility, energy efficiency, indoor environmental quality, and climate resilience. Moreover, several discussions about the M&V protocol and data collection template have been done during executive board meetings because of the relevance of the task for the whole consortium.

5.5.1. Task 5.1: Definition of the Performance Measurement & Verification Protocol

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Identification of parameters, measurement, and monitoring protocols to be monitored	Ongoing	First list of KPIs is ready
NTNU	Creating an inventory template with specification for available measurements at DEMO buildings (Thermal/electrical energy metering, room conditions, outdoor conditions)	The template is sent out, a first draft inventory is available to be refined in a v2.	Pilot description inventory is available as v2.
NTNU	Creating an inventory template to collect data for simulation of pilot buildings (Geometrical data, energy management, thermal properties of envelope, technical systems: boiler, ventilation, district heating substation, historical climate data for pilot sites)	The template is sent out, a first draft inventory is available to be refined in a v2.	Pilot description inventory is available as v2.
NTNU	Description of Smart Readiness Assessment (SRI) procedure for pilot buildings	The report on SRI is studied and the procedure is understood, and a description is drafted	The first drafted is completed based on info in inventory from pilots
NTNU	Providing input on the local demand-response schemes based on data acquired from local energy service providers at the pilot sites --> Task 2.3 --> Task 2.1	A list of demand-response schemes, dynamic pricing, etc. is drafted for all pilot sites	First draft completed
NTNU	Establishing a procedure for identify/recruit research participants with the help of TEICOS, ÅKE, GEO and NSD --> Task 1.3 and Task 7.2	The procedure is established, and discussion is ongoing with all involved partners	Completed



NTNU	Designing the informed consent procedure with the help of CETMA, TEICOS, GEO and NSD --> Task 1.3 and Task 7.2	a draft of consent form is created and shared with NSD	Completed
ULUND	Identification of suitable RCMs to synthesize future weather scenarios --> Task 2.3 and Task 2.4	Ongoing	Ongoing
ULUND	Identification of KPIs for assessing climate resilience of buildings and energy systems	Ongoing	First list of KPIs is ready
Cyl	to identify a set of relevant parameters able to provide optimal information about health and comfort of occupants	Ongoing	Ongoing
Cyl	Identification of Suitable measurement and monitoring protocols and methods for post-occupancy evaluation (POE), such as walk-throughs, observations, and user satisfaction questionnaires to assess the impact of the implemented products and services.	Ongoing	Ongoing
CSTB	Identification of KPIs for assessing energy flexibility and efficiency of buildings and energy systems	Ongoing	First list of KPIs is ready

Activities performed by partner

Task Leader: NTNU

Task Contributors: ULUND, Cyl, CSTB

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • NTNU has defined the structure of the Measurement & Verification Plan for the COLLECTiEF project according to the existing M&V Protocols available in literature and standards. With reference to the M&V planning phase: <ul style="list-style-type: none"> ○ (1) a preliminary list of metrics and KPIs has been identified with the support of the contributing Partners ○ (2) a comprehensive 'Template for Pilots' has been created, with the aim to collect data about the COLLECTiEF pilot buildings, their service systems, energy and IEQ monitoring systems and smart readiness functionality levels. • NTNU is collecting a list of definitions about the terminology used in the M&V plan, according to the reference international standards, to create a common ground for exchange and communication among the Partners and with the whole research community. • NTNU is also developing the informed consent procedures that will be implemented for the participations of occupants/users. • Cyl and CSTB have contributed to development of the Performance Measurement & Verification Protocol and to the identification of metrics.



	<ul style="list-style-type: none"> • ULUND has contributed to identify the parameters to be monitored. • NTNU is providing input on the local demand-response schemes based on data acquired from local energy service providers at the pilot sites. • NTNU has established a procedure for identify/recruit research participants with the help of TEICOS, ÅKE, GEO and Cyl.
Deliverables	-

5.5.2. Task 5.2: Performance and Progress Monitoring of the Pilots

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Coordinate the actions in Task 5.2 by ÅKE, TEICOS, Cyl and CSTB	The specification of sensors, and the parameters to be collected in pilot buildings, is completed, and used for the informed consent form	A plan of actions, protocols for monitoring of the pilot buildings is ready and completed
CETMA	As part of DMP, collaborate with NTNU to design a data flow (from sensors) to a data storage and ensure abidance to GDPR --> Task 1.3	The process is established, CETMA provided first scheme of DMP, and the scheme is presented to NSD	Completed

Activities performed by partner

Task Leader: NTNU

Task Contributors: CSTB, Cyl, TEICOS, ÅKE, CETMA

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan have been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • NTNU has prepared the template for Pilots and related guidelines have been distributed among the Partners, which are in charge of the Pilots. • EM, ÅKE, TEICOS, R2M, CSTB and Cyl are collecting information to complete the templates. • NTNU is supporting Pilots responsible in the compilation of the templates. • NTNU is organizing the activities to engage occupants, which include the first in-person meeting with the inhabitants of the pilot buildings. • NTNU and R2M have supported TEICOS in the identification of the new Italian pilot, due to the change of the demonstration site. • CETMA in cooperation with NTNU has designed a data flow (from sensors) to a data storage and ensure abidance to GDPR.



	<ul style="list-style-type: none"> R2M supported by NTNU is studying the devices and system for electrical energy demand monitoring.
Deliverables	-

5.6. WP6: Exploitation of Results and Business Models

Work package 6 sets the foundation for effective development and exploitation of the project results, with a special emphasis on replicability and upscaling across Europe. It also includes the coordination of the exploitation activities of the IP generated in the COLLECTiEF project.

During the first four months of the project, we have studied the stakeholder groups and organizations as well as their needs. The preliminary framework and criteria for market analysis and the list of competitors in the market, were prepared. In addition, we are developing the identification of relevant regulatory frameworks and standardization needs at EU, French and Norwegian level. The requirements for smartness and automatic controls in buildings, the methods, and requirements to assess the implication of smart controls respect to the buildings energy performance, the RES integration, the grid & smart grid related legislation, the directives and regulations about the energy communities, are being studied and drafted.

The initial analysis of the exploitable results has been carried out by R2M and the preparation of template for the description of stakeholder database, is under progress. Furthermore, the application of the distributed intelligence has been studied in relation with needs of the clients/stakeholders.

5.6.1. Task 6.1: Market and stakeholder analysis and needs

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
R2M	Identification of stakeholder groups and organizations --> Task 6.2 and Task 7.2	first draft is ready	Completed
R2M	Initiating analysis of main stakeholders	On going	On going
R2M	Framework and criteria for market analysis	On going	first draft is ready
R2M	Creating a list of competitors in the market	On going	first draft is ready
All Partners	Assisting R2M in identifying main stakeholders and their needs --> Task 7.2	first draft is ready	Completed

Activities performed by partner

Task Leader: R2M

Task Contributors: GEO + all partners

Overall progress and	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
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deviations from the action plan (M01-M04)	
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • R2M has initiated the analysis of project stakeholders. • R2M has prepared the template to gather information on stakeholders. • R2M has drafted the preliminary framework and criteria for market analysis as well as the list of competitors in the market. • All partners have assisted R2M in identifying main stakeholders for the market analysis. • R2M participated into a webinar on energy communities for information on market context and opportunities.
Deliverables	-

5.6.2. Task 6.2: Regulatory framework and standardization needs

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
All Partners	Assisting R2M in identifying relevant regulatory frameworks and standardization needs at EU and country level, specifically on the electric safety and electronic operation	On going	On going
R2M	Identifying main stakeholders and their needs --> Task 6.1 and Task 7.2	first draft is ready	Completed
R2M	Identification of the requirements for smartness and automatic controls in buildings, the methods, and requirements to assess the implication of smart controls respect the buildings energy performance, the RES integration, the grid & smart grid related legislation, the directives, and regulations about the energy communities.	On going	On going
CSTB/CETM A	Assisting R2M in identifying relevant regulatory frameworks and standardization needs at EU and French level, specifically: the requirements for smartness and automatic controls in buildings, the methods and requirements to assess the implication of smart controls respect the buildings energy performance, the RES integration, the grid & smart grid related legislation, the directives and regulations about the energy communities.	On going	On going



Activities performed by partner

Task Leader: R2M	
Task Contributors: all partners	
Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • R2M has initiated the work to identify relevant regulatory frameworks and standardization needs at EU and French level. • R2M has studied the requirements for smartness and automatic controls in buildings, the methods, and requirements to assess the implication of smart controls respect to the buildings energy performance, the RES integration, the grid & smart grid related legislation, the directives and regulations about the energy communities. • E@W has investigated on the regulatory framework and standardization needs for the iGateway installation. • All partners have assisted R2M in identifying the relevant regulatory frameworks and standardization needs at EU and Norwegian level.
Deliverables	-

5.6.3. Task 6.3: Identification and assessment of the exploitable results**Action plan by coordinator**

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
R2M	initial list of exploitable results and template for description	On going	first draft is ready

Activities performed by partner

Task Leader: R2M	
Task Contributors: all partners	
Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • R2M has initiated the first analysis of the exploitable results. • R2M and GEO have prepared the first draft of template for the description of stakeholder database. • TEICOS has studied the application of the distributed intelligence in relation with needs of the clients/stakeholders.
Progress percentage	
Deliverables	-



5.7. WP7: Dissemination, communication, and capacity building

This work package aims to assure the project's proper visibility, spread pertinent information on its goals, activities and results to the relevant stakeholders and scientific communities.

During the first period (M1-M4), the DET met once (19.07.2021) to plan and develop initial communication activities to introduce COLLECTiEF objectives, progress and results to the relevant target audiences as well as implement tailored campaigns to engage relevant stakeholders.

By M4, the first and second D&C Plan has been prepared and approved by the DET. The visual identity at proposal stage has been finalized and a brief visual guideline document was shared with the project partners. Dissemination and communication plan and visual identity as Deliverable 7.1 has been submitted to EU by M3. The website and communication materials were designed; the website is available online (by M3).

The stakeholder engagement process has been initiated and the stakeholder map was prepared. The newsletter has been adjusted in order to collect the information on stakeholders for the building database and the first draft of stakeholder database was drafted. The social media channels have been set up and the first press release was published. The dissemination materials, namely, power point template, letterhead and deliverable templates, flyer, rollup, poster and leaflet have been developed. The social media activities including promotion of partners, the Did You Know (DYK) campaign, and continuous newsfeed have been planned and are under development by GEO. A joint special issue on "[Enhancing energy flexibility and climate resilience of urban energy systems](#)" has been designed according to the key points of COLLECTiEF project and accepted by the scientific Journals Applied Energy and Advances in Applied Energy.

5.7.1. Task 7.1: Dissemination and Communication Plan and Visual Identity

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
NTNU	Assist in dissemination and communication plan and creation of project's visual identity	Completed	
GEO	Submitting deliverable D7.1 "Dissemination and Communication Plan and Visual identity"	Completed	
GEO	Project Website is set-up	Completed	



Activities performed by partner

Task Leader: GEO	
Task Contributors: -	
Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • GEO has prepared the first (June-August) and second (September-December) D&C Plan which was approved by DET. • GEO has finalized the visual identity initiated at proposal stage and a brief visual guideline document was shared with the project partners. • GEO has finalized the dissemination and communication plan and visual identity and submit it by M03 as deliverable D7.1. • GEO has designed the website and communication materials, now available online (milestone achieved by M03). Currently, website under development for small adjustments and technical issues (interactive map) • The project partners have checked the website and commented on it, e.g. CETMA has checked the privacy statement and cookie policy and recommend the use of inexpensive and very efficient services such as lubenda to make the site compliant with the law (also in different languages and legislations). • NTNU and R2M have assisted the GEO for preparation of dissemination and communication plan and visual identity. • NTNU has reviewed the dissemination and communication plan and visual identity before submission.
Deliverables	D7.1: Dissemination and Communication Plan and Visual Identity (M03)

5.7.2. Task 7.2: Stakeholder engagement

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
All partners	Assisting GEO in creating a stakeholder database for the project	The first round of data requested by GEO is sent	
GEO	Creating a stakeholder database with the help of all partners --> Task 6.1	first draft is ready	Completed
GEO/NTNU/ R2M/TEICOS /ÅKE	Collaborate with NTNU, ÅKE and TEICOS on setting up a stakeholder engagement strategy as part of informed consent procedure	The procedure is established, and discussion is ongoing with all involved partners and a draft of consent form is created and shared with NSD	A plan of actions, protocols for monitoring of the pilot buildings is ready and completed



Activities performed by partner

Task Leader: GEO	
Task Contributors: all partners	
Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan have been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • GEO has initiated the process of stakeholder engagement. • GEO has contacted the associated partners and sister projects. • GEO has adjusted the newsletter to collect the information on stakeholders for the building database. • GEO in synergies with R2M has prepared stakeholder map and drafted first version of stakeholder database. • ÅKE and TEICOS have collaborated with NTNU, and GEO on setting up a stakeholder engagement strategy as part of informed consent procedure. • E@W, ÅKE, CETMA has assisted R2M and GEO to identifying relevant stakeholders and their needs for the creation of the project stakeholder's database. • GEO in cooperation with all partners has prepared the first draft of the stakeholder database. • Cyl has initiated the preliminary contacts with the stakeholders in Cyprus (RIF, ETEK, CYS).
Deliverables	-

5.7.3. Task 7.3: Joint dissemination and communication actions

Action plan by coordinator

Responsible Partner	Actions	Expected Progress by M4 (30-Sep-21)	Expected Progress by M6 (30-Nov-21)
All partners	Active participation in dissemination and communication actions	On going	On going
GEO	Social Media Accounts are launched and maintained	Completed	
GEO	Coordinating dissemination and communication actions by all partners	On going	On going
GEO	Set up a plan for participating in ENLIT event including dissemination materials (flyers, roll-up, etc.)	Registration is complete and preparation of dissemination materials is started	Completed



Activities performed by partner**Task Leader: GEO****Task Contributors: all partners**

Overall progress and deviations from the action plan (M01-M04)	The main planned activities of this task are ongoing by M4 and no deviation with regards to the work plan has been identified.
Activities performed by partner (s) – (M01-M04)	<ul style="list-style-type: none"> • GEO has developed and set up the social media channels. • GEO has published and released the first press and distributed with the partners. • GEO has prepared the dissemination materials namely: power point template, letterhead, and deliverable templates. • GEO have initiated and planned the social media activities including promotion of partners, DYK campaign, continuous newsfeed. • ULUND in collaboration with NTNU and Cyl has designed, arranged and announced a joint SI on "Enhancing energy flexibility and climate resilience of urban energy systems" in the journal of Applied Energy. • ÅKE has assisted NTNU to translate the first press release to Norwegian. • TEICOS has assisted GEO to translate the dissemination materials in Italian. • NODA has participated in the following events to introduce the COLLECTiEF and assist into the dissemination activities. <ul style="list-style-type: none"> • DCH+ Summer School, "Customer engagement in energy systems", on-site lecture, 26.08.21. • Swedish Energy Office of East Sweden "The role of district heating in a flexible energy system", webinar, 09.09.21. • Netport Energy Breakfast - "Intelligent District Heating in Karlshamn", webinar, 14.09.21. • Blekinge AI Arena: "Intelligent heating from Blekinge to Beijing", webinar, 30.09.21. • R2M has participated in a conference: "Sustainable Places 2021", particularly to the session related to energy flexibility and controls in buildings. • LSI LASTEM has created a blog page regarding the project in its website. In addition, LSI LASTEM has created the social media contents on Facebook, LinkedIn, Twitter at the beginning of the project. • All partners promoted the project on social media after the kick-off, and published the press release on their institutional websites
Deliverables	-



5.8. Project difficulties, problems, solutions – lessons learned

The coordination team has asked the partners to provide the statement of any difficulties or problems (internal or external) which the partners encountered during project implementation over the first period of four months. This includes the explanation on how the partners have managed to address and solve the reported problems as well as on what were the corrective actions in which they have planned to take and what was the outcome of your corrective action(s).

Broadly speaking, the consortium has not reported any serious problem in the first period of the project. By the following, the stated comments, problems and difficulties by the partners are listed:

CETMA partner has stated a general comment about the deliverable D1.3, WP6 and WP7:

At the submission time of deliverable D1.3 (DMP) by M6, many activities have not been fully defined yet, meaning that the type and structure of the required/generated data or should be described by the pilots' owners/managers. To have a meaningful description of the data, in relation with the DMP guidelines requirement, that will be necessary to deliver the updated versions of DMP in the months 24 and 36 of the project. The same statement may be applied for the tasks in WP 6 and WP 7.

GEO partner has commented on its efforts and additional activities by period of M1-M4:

GEO has expressed the additional activities that were not planned by DoA at the proposal stage/initial discussions, such as the Associated Partners section on the website, participation to ENLIT, having a youtube channel for webinars and expert discussions, etc.

GEO partner has commented on the COLLECTiEF project video:

There will be minor delays concerning the project video. The delivery of this task does not affect the DoA as GEO did not provide exact months for the delivery of the first video and deadlines were only discussed internally with project partners. GEO will need support of COLLECTiEF partners for translation of dissemination materials and pilot section on the website.

LSI LASTEM partner has commented on its position as task leader of Task 4.1:

At the beginning of the project, LSI LASTEM has recommended the following amendments to apply best its competences in the project.

- **Change of the leadership of Task 4.1 from LSI to E@W**

LSI LASTEM has proposed to swap the leadership role of Task 4.1 from LSI to E@W, with shifting of 6 PM from LSI to E@W, since E@W has a consolidated experience in the identification of user and system requirements, proven by the leadership of similar tasks and involvement in the related work packages in previous H2020 Projects (i.e. Integrity – GA n. 731268; eDREAM – GA n. 774478).

- **Integration of iGateway and border router into one single hardware device (the T3.2 and T4.4 might be affected).**

With the aim to optimize the data communication and avoid any eventual redundancies and/or problems related to the data congestion and transmission delays, the edge node and border router devices will be integrated into a single hardware platform based on Raspberry 4 open hardware, enabling also a further level of flexibility in installations.



The functionalities for the management of communications with the Cluster Node and the application of algorithms based on the developments in WP2 will be developed by E@W while LSI LASTEM will develop the features for the management of hardware resources and for the communication with the field integrated on the same Hardware platform. The proposed change is expected to improve the final hardware result, since the proven expertise of LSI on hardware development.

The necessity to better manage hardware resources and communication with the field that will be handled entirely by this single device leads to an increase of LSI LASTEM effort of 3PM in this task. This increase will not affect the total effort of the project and of this particular task as it is proposed to shift 3 PM from E@W to LSI LASTEM. Since LSI LASTEM will be responsible for the development of the edge hardware device, LSI LASTEM will also take care of the installation support on Task 4.4 (3PM from E@W to LSI, 1PM of shifting for each subtask). The changes proposed in Tasks 3.3 and 3.4 will not affect the overall effort of both partner E@W and LSI LASTEM, therefore they will not affect their total allocated budget, see Table 9.

Table 9 Summary of the changes in effort proposed by LSI-E@W

Task	Proposed changes	
	E@W	LSI
Partner	E@W	LSI
Task 3.2	-3PM	+3PM
Task 4.1	+6PM (new lead)	-6PM
Task 4.4	-3PM	+3PM

NODA partner has commented on its role at co-simulation with the DIMOSIM, in Task 2.4:

The commercial NODA platform is built to execute in near real time, and it is not practical to update the commercial NODA platform to execute in simulated time. This challenge will be addressed by leveraging an open-source platform (<https://github.com/self-host/self-host>), under active development by NODA. The open-source platform facilitates the management of time series data, and the scheduling of containerized processes acting on the corresponding metadata and data.

NODA partner has suggested to early access to the pilots data:

NODA has raised concerns pertaining to aspects of the project plan based on past experiences from similar projects, in particular, the need for early access to detailed building data to facilitate research and software development, the need to acknowledge this in the project plan for budgeting purposes, and the challenge to coordinate the radically different challenges pertaining to building and installation work contrasted with research and software development.

VIRTUAL partner has suggested to early access to the pilots data:

The most activities of VIRTUAL in the project depend on the source of data and platform from where they can get data. Besides the role of individual participants, VIRTUAL can focus on specific goals.



5.9. Changes in the project team

In the first period of the COLLECTiEF project, among all partners, only the following minor change in the project team of GEO was reported.

- GEO has informed that the same team who mentioned in the partner profile from the proposal, is still working from GEO in the project. However, the communication manager of GEO, Evdokia Bairampa, got maternity leave. Gloria Bevilacqua is responsible on behalf of her in the project.



6. Risk updates and mitigation plan

Risk No.	Risk	WPs	Mitigation Plan	Likelihood (1-3)	Impact (1-3)	Risk Category	Contingency Plan	Progress on action	Status (open – waiting – closed)
R1	One of the partners leaves the consortium	all	Partner's expectations will be continuously verified in order to ensure their commitment to the project	1	3	medium	Depending on project progress, finish project with remaining partners or add new partner	<i>Update 01/11/2021:</i> Partner Virtual was lagging behind at the beginning of the project due to leave of the employee who was the main contributor in the proposal writing phase. Therefore, extra efforts were put with several meetings to clarify tasks and expectations for the newly assigned personnel of Virtual.	Open
R2	Tools and methodologies do not work for all cases/applications: e.g., trained on a specific pool of data	2, 3	Close monitoring of project progress for that aspect	2	2	medium	Train the model again, find another modelling approach	<i>Update 01/11/2021:</i> Extra needed efforts and tools has been identified. For example, upgrading of BMS systems in some of the pilot buildings in Norway. Required actions to access hourly energy metered data for the pilots in Italy and Cyprus.	Open
R3	Implementation phase: <ul style="list-style-type: none"> • Waiting for building permission (administrative and procedural) • Risks of damage to the building/the building management during installation • Decisions of owner take too long (regulatory) 	3, 4	<ul style="list-style-type: none"> • The COLLECTiEF partners will work closely with the building partners to foresee any complications. • Engaging pilots partners and involved stakeholders in time during the project actions. 	2	3	high	Replace the demo building if necessary. However, the plan of activities entails sufficient time for implementing the innovative solution before the implementation in the pilot cases.	<i>Update 01/11/2021:</i> Extra meetings with building managers/owners have taken place to clarify expectations and required helps/access for the monitoring and demonstration phase of the project. In addition, two workshops are planned for building owners/users who are going to contribute in the project to ensure a strong engagement and therefore reduce implementation risks	Open



R4	Delays in the implementation in the pilots due to restrictions for the COVID situation	4	The coordinator and the involved partners will monitor COVID situation at the context.	1	3	medium	If necessary, some implementation actions could be anticipated respect others, for example to reduce the contacts with the buildings occupants.	<u>Update 01/11/2021:</u> COVID restrictions has been reduced or removed in the pilot sites. This created the chance to visit the buildings and meet in person with building managers and establish the connection that will facilitate future communication if the COVID restrictions return.	
R5	Monitoring: <ul style="list-style-type: none"> • The data from the buildings may not be correctly acquired; lack of data; missing data • Failure in placing the sensors at appropriate locations in buildings. • Damages or faults of the installed components. 	5	<ul style="list-style-type: none"> • The Sphensor™ system has a Border-Router with data logging features to solve on-line data communication issues. • The sensors and the electronic components will be placed following mounting guidelines and recommendations in published literature. 	2	2	medium	For missing building data: use trend analysis/extrapolation to close the gaps; compare to historical values.	<u>Update 01/11/2021:</u> An extensive effort has been put in place in the first semester of the project with involvement of all the relevant partners to plan in detail the data acquisition during the monitoring period. This included communication protocols for devices, type of sensors, number of sensors, placement of sensors, zones to be monitored, methods for post occupancy evaluation (POE), technical and physical limitations, user interface, data management and storage, etc.	Open
R6	Evaluation: KPIs and methods for assessment not being adequate	5	Our experts from academy and industry in the consortium will ensure development of appropriate KPIs and assessment methodologies	2	2	medium	KPIs will be adjusted based on the feedback from small-scale test period at living lab as well as during large-scale demonstration phase.		Waiting
R7	Data protection <ul style="list-style-type: none"> • Low participation of occupants in the surveys. • Low internal validity of survey responses 	5	Standardized and already tested questionnaires will be used.	2	2	medium	For lack of response to surveys or low validity of survey data: select interview candidates instead and conduct structured interviews.	<u>Update 01/11/2021:</u> POE questionnaire has been planned to be used for thermal comfort assessment before and after implementation of COLLECTiEF solutions. In this regard, the POE process has been introduced to the building managers and with their help, potential participants have been identified whom will facilitate filling of the POE questionnaires. For example,	Open



								certain teachers for the school buildings, and certain nurses for the elderly health care centers are identified and invited to join the engagement workshop in December and February.	
R8	Failure to demonstrate a sustainable business model for the COLLECTiEF system due to equipment costs/willingness to pay or high customization costs based on the climatic situation or the occupants' needs	6	In the demo projects different climate zones will be taken into account, and the variety of buildings on which the solutions will be demonstrated will reflect a good representation of occupants' needs.	2	3	high	The business models can take these aspects into account, and can be adapted, e.g. to specific building typologies, thus reducing the need for customization.		Waiting
R9	Conflicts in intellectual property rights (IPR)	6	Proper analysis will be conducted in the dedicated task 6.5, starting from the background declarations from the Consortium Agreement and basing on the contributions and activities performed during the projects.	2	2	medium	Support for IPR strategies and agreements will be delivered in the framework of the task 6.5.		Waiting
R10	Failure to reach and engage a sufficient number of stakeholders at the COLLECTiEF events	7	All consortium partners have extensive professional networks in their respective countries that will be engaged. The dissemination plan will set several verification moments to early identify deviation and develop contingency plans.	1	2	low	Work with "multipliers" in the respective countries (e. g., associations) and equip them with the material needed to inform the stakeholders via their channels; discuss metrics to track attention	<u>Update 01/11/2021:</u> The engagement strategy described in section 3, is used to mitigate this risk.	Open

