Associated with document Ref. Ares(2022)7698261 - 08/11/2022

Work package WP1 – Project Management

Work Package Number	WP1	Lead Beneficiary	1. AIT
Work Package Name	Project Management		
Start Month	1	End Month	36

Objectives
O1.1: Provide efficient and effective management of the project O1.2: Management of the WPs and coordination between participants O1.3: Exchange of information with the project team and a communication channel for the EC

Description
Task 1.1 Administrative project management (Duration: M1–M36). [AIT]. Includes development and maintenance of project wiki, monitoring partner activities & deliverables status, organisation of meetings (internal and review meetings) and audio/video conferences, acting as point of contact to EC, updating partners about project progress, ensuring the adoption of quality plan, managing actions against partners in default, conflict resolution, reporting to EC services and contacting them for administrative purposes, coordinating periodic report on months 12, 24, and 36, preparing internal activity reports every 3 months, preparation of the final report. The reporting period documents (annually) will be delivered, following Horizon Europe rules, within 60 days following the closure of the reporting period. The final report will be presented after project ends (month 38). Task 1.2 Financial management (Duration: M1–M36). [AIT]. Includes monitoring of the effort spent by partners in various activities, with the aim of verifying the adherence of the work profile to the initial planning and to formulate updated forecasts for the successive periods. It also includes collecting and submitting cost statements, monitoring expenses, audit certificates on financial statements whenever needed and transferring funds to the partners after each payment by the EC as per the terms of the consortium agreement and schedule. Task 1.3 Quality Assurance and risk management (Duration: M1–M36). [DEUSTO, UWE, AIT]. Includes activities for preparing, maintaining and implementing the quality and risk management plan. The quality management plan will include procedures for: a) Document issue and change control; b) document and deliverable reviews; c) Software issue and change control; d) Reporting and communication; e) Corrective actions; f) Tracking of action items; and g) Conflict resolution. For each deliverable a quality review will be performed. Risk assessment will take place at any time of the project and will aim at early identification of risks. Risk control will contribute to monitor identified risks and take necessary actions. Task 1.4 Legal, innovation and knowledge management (Duration: M1–M36). [AIT, VRVis]. Includes negotiation and monitoring of the consortium agreement and the Intellectual Property Rights (IPR) of partners as specified in the Consortium Agreement. Unclear situations with respect to property rights will be identified in the early stages before they create an obstacle for the project. In complicated legal matters a sub-contracted lawyer, specialised in IPR law will be counselled. This task will provide recommendations to manage ownership of the data, innovation potential and knowledge produced during the project lifetime. The following key arrangements have been preliminary made by the project partners as per the IPRs: (i) Foreground (project result) will be owned by the partner(s) who carried out the work that generated it; (ii) if a Foreground is generated by two partners who contributed to it, and if the contributions to or the features of the result form an indivisible part thereof, such that under applicable law it is not possible to separate them for the purpose of applying for, obtaining, maintaining and/or owning the relevant patent protection or any other IPR protection method, the contributors agree that all the patents and other registered IPRs issued thereon shall be jointly owned by the contributors. Task 1.5 Ethics Management & Data Management Plan (Duration: M1–M36). [UWE, Pilots, AIT]. A primary deliverable will be the formation of an Ethics Board consisting of representatives of Pilot cities to ensure culturally appropriate and inclusive recruitment, informed consent from a diverse population sample and adherence to EU and National data protection regulations (EU GDPR 2016/679), protection of personal details with anonymity, and the application of rigorous ethical protocols and GEP plans. This board will be led by UWE and will start with the adoption of the ethics procedures defined by the UWE Research Ethics Committee. Ethical protocols for the project will be defined that will be followed by all consortium members. The board will advise partners for ethical procedures, consents for young/vulnerable people, participant information sheets, the data management plan, ethics applications and will monitor compliance to ethical protocols. This task will also give place to a data management plan (DMP), identifying

the data (research data including both public/private, publications etc.) that will be handled in GREENGAGE and its management, complying with the applicable regulation (EU Data Governance Act – 2020/767) and following a Creative Commons licence model, as stated in the Article 29.2 of the H2020 Grant Agreement. Importantly, this DMP will include a Data Quality Plan section stating the QA/QC measures put in place in every new or enhanced dataset provided by the project.

Work package WP2 – Citizen Observatory governance framework, stakeholder engagement and requirements analysis

Work Package Number	WP2	**Lead Beneficiary**	14. UWE BRISTOL
Work Package Name	Citizen Observatory governance framework, stakeholder engagement and requirements analysis		
Start Month	1	**End Month**	30

Objectives
O2.1: Define a multidisciplinary citizen observatory methodological framework and city governance models that promotes inclusive and egalitarian approaches for citizen participation in citizen environmental monitoring O2.2: Identify key needs and requirements to profile stakeholders (citizens, businesses, domain experts – mobility, air quality, climate change from public authorities), SMEs, NGOs and social science experts O2.3: Co-design, define and analyse domain-specific use cases to address the identified environment governance needs O2.4: Consolidate requirements to provide basis to design the GREENGAGE platform.

Description
Description of work (broken down into tasks, lead partner and role of participants) T2.1 GREENGAGE citizen observatory methodological framework; (Duration: M1–M3). [KWMC, IBERCIVIS, UWE, BUAS, DEUSTO, Pilots]. Designs GREENGAGE citizen observatory methodology and guidelines that promote inclusive, egalitarian participation and supportive socio-technical approaches and challenges including ethical issues, data ownership, e-literacy and training. Inclusive recruitment will be informed by EDI (Equity, Diversity and Inclusion) principles drawing on the experience of partners in this field (KWMC, IBERCIVIS, UWE). The methodology will be suitable for the needs of the pilot cities taking into account current knowledge of existing barriers and the reinforcement of inequalities the technology can bring about. We will use partners' prior citizen science experience (KWMC's Bristol Approach to Citizen Sensing and IBERCIVIS's EU.Citizen.science experience and resources) and build on the best CO practices from related EU projects: WeObserve, LandSense, GroundTruth2.0, Making Sense and Fotoquest Go. By bringing the best practices and partner experience alongside pilot local knowledge and context, we'll create coherent and comprehensive engagement methodology and guidelines for the development of Citizen Observatories. T2.2 Co-designing pro-environmental use cases with public authorities; (Duration: M1–M4). [UWE, BUAS, AIT, DEUSTO, Pilots]. Identifies and analyses the technical feasibility and effectiveness of pro-environmental use cases with public authorities, associations, public bodies and private sector. These uses cases will include: liveable neighbourhoods, post-pandemic working/living in village, healthy & eco-friendly mobility i.e., walking, cycling, co-designing alternate solutions impacting environment/climate change with ways of creating air quality baselines that allow to design campaigns and experiments that will facilitate pre-post analysis. This will cover: What research questions are covered and who are the key users? What is the expected outcome of the piloting e.g., collective intelligence by using Copernicus/ in-situ data for decision making/urban policymaking? What new data will be collected through Citizen Observations? The aim here is to co-design and select/adjust use cases which are relevant to cities and their stakeholders overall those which are more likely to provide and mix in-situ data, from portable sensors, and earth observations towards shaping environmental policies (new and existing). T2.3 Analysis of stakeholder requirements and implied socio-technical challenges; (Duration: M1–M26). [UWE, AIT, DEUSTO, BUAS, KWMC, IBERCIVIS, Pilots]. Applies CoReS method to develop groundwork and context using questionnaires, diary studies, cultural probes and scenario development followed by requirements workshops in pilot cities (e.g., with civil servants from different departments, local businesses, etc.). In these workshops, we will apply a 3-stage process: i) a non-technological perspective to understand the underlying problems in the context of the use cases, and which factors (societal, environmental, governance, economic, individual behaviour/attitude) are perceived as highly relevant with the objective to raise awareness; ii) design fiction methods to examine how stakeholder would use (fictive)

GREENGAGE to fill in the temporal and spatial data gaps. Customer journey maps can also be used to understand barriers and intrinsic feelings and emotions while participating in the process; iii) introduce available GREENGAGE tools (WP4 - T4.1/T4.2) to examine how these solutions can be applied to solve relevant issues and learn from the obstacles to create final products that will shape CO to feed evidence-based policies.

T2.4 Smart urban governance model and pathways to adoption; (Duration: M1–M30). [UWE, Pilots]. Aims to model the governance processes followed by the pilot cities to identify how COs or bottom-up and top-down participatory governance can be effective through GREENGAGE tools and provide essential inputs for agenda setting, policy-making and decision-making. Using back casting approach aspects will be covered: i) a scenario-based approach to define governance processes will be followed and scenarios will be illustrated using Business Process Modelling Notations (BPMN), and ii) using extensive review of other selected European cities to identify commonalities, citizen observatory based participatory practices and integrated approaches in their governance processes, a smart governance model will be identified for wider adoption by EU cities.

T2.5 GREENGAGE platform requirements specification; (Duration: M1–M26). [DEUSTO, VRVis, BUAS, MindEarth, GISAT, AIT, Moondial, SushiDev, DSR, UWE, HOPU]. This task will analyse use cases, user requirements, identified data gaps, and governance approaches and translate them into technical specifications. It will define a full specification of the GREENGAGE platform requirements (e.g., Volere), both from a functional and non-functional perspective with a special focus of defining the means for measuring them to later provide assessment trough credible, rigorous and well-defined KPIs. In addition, a high-level architecture will be designed by using micro-services architectural pattern , to share interface and data between GREENGAGE front-end and back-end layers and with the plethora of identified data sources that needs some curation and harmonisation before to be fused to obtain knowledge of environmental issues associated to mobility, air quality and healthy living.

Work package WP3 – GREENGAGE Citizen Observatory Academy

Work Package Number	WP3	**Lead Beneficiary**	16. KWMC
Work Package Name	GREENGAGE Citizen Observatory Academy		
Start Month	4	**End Month**	12

Objectives
O3.1: Prepare GREENGAGE CO approach and training materials for the GREENGAGE CO Academy O3.2: Reach out to required citizen segments and policy makers and recruit, train and build pilot city Citizen Observer (CObs) teams O3.3: Introduce the pilot city CObs teams to scientific work principles and processes, available data processing tools and methods, and the respective frameworks and environmental use cases

Description
Description of work (broken down into tasks, lead partner and role of participants) Task 3.1 Mapping GREENGAGE CO-enabling solution to Pilots context. (Duration: M4–M7). [IBERCIVIS, KWMC, AIT, UWE, BUAS, DEUSTO, Pilot Cities]. Each pilot city has its own unique characteristics, and it is very hard to make completely replicable outcomes to other contexts, cities, regions and/or countries. Therefore, this task maps GREENGAGE CO methodology and associated platform to pilot specific needs and to makes sure ethical, environmental, social, cultural, political, privacy, data ownership guidelines are adhered to. To this endeavour, this task will define KPIs for ensuring egalitarian participation and non-discrimination in the process of conducting CS-based experiments and a GREENGAGE roadmap i.e., how CO initiatives will be carried out for each pilot city and what lessons learned can be obtained on them identifying which are the peculiarities of the pilots and which are the common actions that favour the applicability of the outcomes in other venues. Each planned pilot to be performed in the GREENGAGE project is located in a different EU Member State, presenting substantial contextual differences between them in terms of population (demographic factors, immigration, distribution), political and other socioeconomic/sociological factors. Furthermore, the objectives, and potentially the scientific methodology to be applied in each pilot also vary. For that reason, to measure the impact of the actions to be undertaken of each pilot, ethical, environmental, social, cultural, policy, methodological, privacy and data ownership aspects should be related with Key Performance Indicators (KPIs) that take into account the contextual realities of each pilot. Thus, conclusions obtained in this task will be based on an

ample overview of relevant contextual information. T3.1 will relate the GREENGAGE CO methodology and selection of tools (made available through the project website/platform) to the gathered contextual information, establishing KPIs accordingly to measure the impact of planned actions, and thus extracting proper conclusions in terms of how replicability should be designed. On the other hand, the engagement strategy is designed in Task 3.2, and will also consider the contextual factors analysed in Task 3.1 – by having a profile of the citizens inhabiting the area of study, an increase of the engagement in all its relevant dimensions - effectiveness, equity, diversity and inclusion - is expected, designing an engagement strategy according to the different citizens' profiles and other information about the local context. The task is oriented to study contextual factors from the pilots, being suitable for WP3 and not for WP4, which deals with the ICT and technical-related issues of the project.

Task 3.2 Prepare recruitment and training material (Duration: M7–M10). [KWMC, All Partners]. Takes the necessary preparatory steps to build sufficiently trained and motivated COb team for each Pilot City. We will use, adapt and extend the wide range of useful data quality and visualization training material available in WeObserve toolkit . Firstly, recruitment methods will be prepared for each pilot context, and these will include but are not limited to reaching out to people and existing networks/channels with clear communication that asks 'calls for action' and highlight the 'need for participation'. This will be followed by a recruitment survey that will provide a profile of the citizens and clarify rewards/benefits to potential participants, and enable the citizen to confirm sign up. The recruitment survey will focus on pro-environmental and mobility behaviour, attitudes, interest in research, community activism, experience, and skills of potential participants, and collect information such as age, ethnicity and gender to ensure inclusive recruitment and diversity in the COb teams. The survey will be available online (including social media) and, in some cases, will be sent as a paper version. Where appropriate and to be inclusive, local language, sign language or a language more familiar to local groups (e.g., immigrants' group in Bristol case study area) with the help of visuals and animations will be used. Secondly, training material and manuals will be developed to educate and support the Citizen Observers in their research activities and offered as MOOCs. Where appropriate local language will be used, e.g., a pre-recorded training online material or videos in English, Dutch, Italian and Danish languages. The training material includes:
- Scientific Work Training: general principles of scientific work (for all Pilots)
- Toolbox introduction: explanation of available tools and methods on how to use them (for all Pilots)
- State of knowledge and problem statement (specific for each Pilot City)

Task 3.3 Recruit teams of Citizen Observers for Pilots(Duration: M9–M12). [IBERCIVIC, KWMC, BUAS, Pilot Cities]. Using the recruitment methods in T3.2 prepared for each Pilot City, teams of potential COb will be identified and invited to become a participant/local champion. This includes a general introduction to the respective Pilot City project, expected contributions and benefits/motivations both extrinsic (outside rewards like monetary or DLT based coin time compensation, non-monetary incentives, e.g., social recognition, exclusive access to events, visibility) and intrinsic ones (to sustain the actions being carried out e.g., pride, self-satisfaction, feel of community contribution, responsibility, duties drawing all of them form self-determination theories and collective agency). In each Pilot City, teams of about 60 COb will be formed to ensure a sufficient group size in case of dropouts. Each CO team will be split up in smaller groups and tasks and responsibilities will be assigned according to the participants' competences and interests.

Task 3.4 Educate and Train Teams of Citizen Observers (Duration: M10–M12). [KWMC, IBERCIVIS, UWE, DEUSTO, BUAS, AIT, Pilot Cities]. The local COb teams will get to know each other, and creative approaches will be used to educate them in the basic rules of scientific work, data capture, use and visualization, available tools, the respective problem statement and related state of knowledge. Groups will be introduced to their specific tasks and expected outcomes and group members will be able to define their involvement in one or more of the different groups. Together with the COb team, a timeframe will be defined and (intermediate) goals will be specified. Ethics and collaboration rules will be committed to by all members and communication channels (according to the preferences of the participants) will be installed. In total, the task will provide various event type activities (face-to-face/online) for the participants in Pilot Cities: team-building events, training sessions, tool and methods exhibitions, and problem statement workshops.

Work package WP4 – Citizen Observatory enabling infrastructure and interoperable toolbox

Work Package Number	WP4	**Lead Beneficiary**	8. UDEUSTO
Work Package Name	Citizen Observatory enabling infrastructure and interoperable toolbox		
Start Month	1	**End Month**	30

Objectives

O4.1: Configure, adapt, and transform a proven data quality, data curation and exploitation environment for citizen observations and authoritative/Copernicus data into a Citizen Observatory enabling Knowledge Hub.
O4.2: Create a suite of interoperable tools to cover the whole urban analytics data to policy workflow lifecycle.
O4.3: Define the appropriate participation channels, an online platform with easy-to-use frontend interfaces aligned with the motivations, drivers, and willingness of the citizens to participate in citizen observatory projects.
O4.4: Create a continuous integration platform in which technical and domain consultants support and elicit the deployment and interoperability of different existing tools customised to the specific use-cases based on the needs of stakeholders and citizen observers.

Description

Description of work (broken down into tasks, lead partner and role of participants)
Task 4.1 Pro-environmental Citizen Observatory-enabling Thematic Exploitation Platform (Duration: M1 – M10) [GISAT, AIT, DEUSTO, Sushi Dev, GISAT, MindEarth, VRVis, BUAS, HOPU]. This task will adopt and adapt ESA's Urban-TEP (Thematic Exploitation Platform) to leverage current services and generate a dedicated instance of the platform, named 'GREEN Engine' to enable GREENGAGE CO activities. This will enable the configuration of data value chains combining authoritative data (Copernicus data plus pilots' sensor network data) with crowdsourced data (provided by citizens through wearables or proprietary devices and tools from the members of the consortium) to give place to improved models that help governance processes, decision-making and policy design and validation. By means of the interoperable tools resulting from T4.2, the GREEN Engine will provide holistic support to the whole data-mining cycle, based on CRISP-DM and abiding to "privacy-by-design", consisting of data gathering, validation and quality control, as well as data-analysis and interpretation to deliver interpretable and actionable knowledge. The original features supported by the Urban-TEP leveraged by GREEN Engine are: i) Management of relevant big data from remote sensing/space; ii) Computing resources and hosted processing; iii) A developing environment that allows for users to integrate, test, run, and manage applications without the need to build and maintain their own infrastructure; iv) Standard platform services and functions including collaborative tools, data mining and visualization applications, development tools (e.g., Python, IDL), communication tools (e.g., social networks, storylines), as well as documentation, accounting and reporting tools; and, v) Repositories of advanced processing applications (including those developed by other users). To make GREEN Engine a CO enabler, the following functionalities will be added: i) a common data model will be defined to publish and exchange data in an interoperable manner. Existing Linked Data vocabularies (e.g., JSON-LD, ETSI NGSI-LD, W3C Linked Data, SAREF) will the basis of the GREENGAGE data-model; ii) Homogenous Open API 3.0 documented RESTful API connectors will be defined and developed to extend and customize Urban-TEP current functionalities with a plethora of data management tools (resulting from T4.2) and a more user-friendly front-end to configure and manage Citizen Observation co-created projects on top of it (as result of T4.3). Consequently, this task will deliver a ready-made extendable CO-enabling environment.
Task 4.2 GREENGAGE interoperable toolbox for scalable and flexible Citizen Observatories (Duration: M1–M30) [AIT, DEUSTO, GISAT, VRVis, Sushi Dev, DSR, BUAS, MindEarth, HOPU]. This task will deliver a range of tools provided by consortium members to support the whole data value chain in Citizen Observations (see concept figure in section 1). For Data Capture, e.g., sensors (wearables) from Moondial and portable crowd air quality and environmental variables sensors from HOPU, street-view imaging devices from MindEarth and mobile apps HotCity or MODE (AIT) will be leveraged and corresponding information will be properly (pre-) processed and harmonizingly integrated into the GREEN Engine. Data quality and structure dashboards from VRVis and citizen contribution validation, accounting and rewarding DLT-based solutions compliant with EBSI (DEUSTO & Sushi Dev) will support data curation process and again will be integrated into the GREEN Engine. Data harmonisation will be carried out based on the standard vocabularies approach of the Urban-TEP which currently allows it to manage EO imagery, statistics, surveying, and volunteered geographic information. If needed, adaptors for new data sources will be created for the intended GREEN Engine. Besides, Data Analytics will be supported by CO2 analytics engine (AIT); Mobility footprint monitoring (AIT, BUAS) or AI models of environmental conditions that impact public health (HOPU). These tools range from TRL 4-8 - see figure in section 1). These tools will be tailored to CO experiments needs in the Pilot cities in T4.4. Additionally, based on the requirements driven in the task 2.5, some new features or CO tools will be provided or implemented by adapting existing open-source tools. We will start early and continue during piloting phase through T4.4. Through the CO Academy front-end provided by T4.3 users will easily access the resulting reusable GREENGAGE tools documentation (Sphinx), open-source code and deployment instructions facilitated by module bundling as Docker containers. T4.2 will implement the adaptor and connector of the digital twin of Noord-Brabant with the GREEN Engine, following the vocabularies and standard API defined in T4.1. The work on Digital Twin Noord Brabant is embedded in all the tasks of this work package. One of the key ambitions for the North Brabant is to ensure that proper methods and mechanisms of citizen-crowdsourced data inclusion into the digital twin are well stablished. Within WP4 the configuration of the data value chains for the North Brabant Digital Twin, combining authoritative data with crowdsourced data, will be organised (T4.1).

Task 4.3 Citizen observatory initiative and monitoring system (Duration: M1 – M30). [DEUSTO, AIT, GISAT, SushiDev, DSR, VRVis, UWE, HOPU, BUAS, MindEarth]. Provides a collaborative system, based on the public service co-creation collaborative environment produced at INTERLINK project, with an easy to use front-end where; (i) CO initiatives can be defined, (ii) guides on how to perform experiments will be available, (iii) teams can be defined and (iv) citizen observers can upload/gather experiment data. Such collaborative environment will be built as an additional feature in the GREEN Engine and provide a web front-end for the GRENGAGE Academy. The system will adhere to ethical and data protection guidelines defined in Data Management Plan (WP1). Through this front-end, citizen observers will be able to seek help from consortium domain experts (climate, pollution) and/or guidance for their experiments and receive training through videos and tutorials. Each pilot will be able to configure different Citizen Science experiments, where different data workflows, analytical processes, metrics and KPIs may be established that will be populated by the heterogenous urban data flows and processing pipelines enabled by the GREEN Engine. The defined KPIs will also be used for evaluation and impact assessment in WP6. From this interface, users will be able to arrange visualizations and storylines that streamline the interpretation of the results of the citizen observation experiments. Indeed, storylines will be showcased and leveraged to democratize and support the interpretation of the insights gained from CO experiments and their communication back to society. A social voting & ranking mechanism will engage people to dispute with other experiments and their results and rank them based on their impact to address Green Deal challenges and their prioritization in the urban agenda.

Task 4.4 Continuous integration of bespoke features to CO pilot needs & technical support (Duration: M7–M30) [VRVis, AIT, DEUSTO, Sushi Dev, DSR, BUAS, MindEarth, GISAT, HOPU, Moondial]. Deals with the deployment, integration, and customization of the GREEN Engine in pilots (as result of T4.1, T4.2 and T4.3) through the support of a network of ICT and domain coaches from GREENGAGE to run a help desk for pilots CO experiments. In essence, technical and domain support will be offered to those who want to engage on new CO initiatives through the GREEN Engine, including a Wiki, a Forum, support email addresses and an issue tracking software, linked to the front-end facilities developed in T4.3. A central technical support and assistance will communicate and coordinate its activities through the Pilot's local tech support representative (help desk). To respond to emerging co-designing needs (T5.1, T2.5), GREENGAGE adopts a flexible approach and hence will respond to new evolving requirements of CObs by implementing new features or improving existing ones, giving place to new interoperable tools, corresponding to new data adaptors or domain-specific analytical processes incorporated into GREENGAGE toolbox and fully operational with GREEN Engine. For example, Crowd AirQuality sensors from HOPU will be adapted to new or particular sensorial needs of each pilot, adding or suppressing some sensor inputs (NO2, O3, CO2, PM, noise).

Work package WP5 – GREENGAGE Campaigning and Piloting

Work Package Number	WP5	**Lead Beneficiary**	12. IBERCIVIS
Work Package Name	GREENGAGE Campaigning and Piloting		
Start Month	5	**End Month**	34

Objectives
O5.1: Coordinate CO activities during piloting including stakeholder engagement, citizen observers' recruitment and training, new requirements for new features in GREENGAGE tools and data collection. O5.2: Co-create, co-design experiments and monitor the ongoing CO activities O5.3: Coordinate required support of GREENGAGE scientific experts, technology experts and pilot cities' COb teams during CO experiments.

Description
Description of work (broken down into tasks, lead partner and role of participants) Piloting brings CO in action by co-creating experiments in pilot cities. It builds on CO Academy (WP3). Task 5.1 Co-designing experiments and coordinating the implementation of CO experiments (Duration: M10-M34). [IBERCIVIS, All]. Coordinates the implementation of CO activities in the respective 4 pilot cities and ensures that piloting activities are started and running smoothly. Co-creation workshop(s) per pilot city will be organised at the start with the relevant quadruple helix stakeholders mapped in Task 3.1/3.2 and their purpose will be to define the specifics of each pilot, including aspects such as the geographical scope, governance (participant roles and duties), mechanisms for a continuous engagement and motivation fostering of the participants, including the co-definition of the timeframes

of the projects, intermediate milestones and the bases and responsibilities for shared communication actions, in which participants will be invited to create creative communication content (storytelling). Reward mechanisms will be also co-defined (e.g., certificates acknowledging the participants' degree of involvement in the projects). Furthermore, required tools and training materials will be landed to each pilot specific requirements, providing feedback to the technical partners and KWMC as leader of the GREENGAGE CO Academy. As a result, technical specifications for the GREENGAGE toolbox will be delivered to Task 2.5 & 4.4 and the training materials and guidelines (Task 3.2) will be adapted to each specific pilot experiment. These refined tools and resources will be used as a part of the GREENGAGE methodology to ensure that all activities in the pilot cities are aligned, follow the project timeline and that the implementation risks are addressed in a timely manner. Particular attention will be paid to engaging and inviting women and marginalised groups, such as ethnic minorities and disabled persons (identified in T3.1), in the co-creation workshops. This task builds on the WP3 activities and outcomes and ensures that a smooth handover of CO preparation activities to WP5 takes place. Besides, it complements T6.3 and T6.4 where user evaluation and impact assessment of pilots will take place. A retrospective analysis of piloting activities will be performed at half stage i.e., Month 18, so that actions can be taken to improve piloting activities and tools.

Task 5.2 Continuous Campaigning and Training (Duration: M10-34). [IBERCIVIS, KWMC, Pilot Cities, UWE, AIT, DEUSTO, BUAS]. Ensures recruitment of new CObs and their training continues during piloting. This task will leverage outcomes of T3.1-3.3. Pilot cities will ensure that (1) new members of the pilot city teams are trained (webinars, online pre-recorded training material, online textual documentation, training events) and equipped to engage with citizens and their stakeholders have access to the GREENGAGE platform, and (2) that citizens recruitment campaigns (at least 250 participants per pilot) will continue throughout the piloting phase to involve more CObs; (3) that motivation mechanisms to keep participants engaged are enabled; specifically feedback mechanisms for communicating intermediate experiments' results and for the refinement of the GREENGAGE training resources and technologies, bi-directional communication mechanisms through the CO initiative and technical support developed in Task 4.4, qualitative and quantitative impact assessment of the experiments and of mutual learning of participants (T6.3/T6.4). Pilot cities will use various communication channels to promote CO campaigns including social media (Facebook, Twitter, Instagram), city council website, local newspapers. Using DMP (T1.5), research datasets generated in the pilots (citizen observations) will be deposited in open repositories (e.g., Zenodo) and make available to the European Citizen Science community, fostering its use and uptake by different stakeholders. The European Citizen Science community will be enlarged in the European Citizen Science winning project (101058509) from the WIDERA-2021-ERA-01-60 call, in which IBERCIVIS coordinates the WP related to the enlargement of the citizen science community in Europe (GA under preparation).

Task 5.3 Pilots community building and knowledge sharing (Duration: M5-M34). [IBERCIVIS, Pilot cities]. Contributes to establishment of a broad citizen observers' community and promote mutual learning among the former and new members of the local communities, as well as between communities of different pilot cities until the project end. In short, to create a cascade learning mechanism. To this end, a quarterly meeting with the local communities will be organised to foster knowledge sharing and mutual learning from others' experiences. A total of 5 meetings will be organised per pilot (excluding a meeting at the end of the project), with the local communities of citizen observers undertaking activities for the project. The meetings will be organised in a hybrid format (in-person and online), inviting all citizen observers from other pilot cities to join them virtually in order to foster knowledge sharing and mutual learning from each pilot's experiences. These meetings will also provide inputs for T7.6. Project partners will promote pilot community building through an online system (T4.3) where experiences and knowledge can be shared between citizen observers across the pilot cities through the GREENGAGE Academy resulting from WP3 and more specifically Ambassador exchange (ref. T7.3 and T7.4).

Task 5.4 Creating and structuring the contents for the GREENGAGE CO Academy (M5 – M34). [IBERCIVIS, Pilot cities, KWMC, AIT, UWE, BUAS, DEUSTO]. The main aim of this task is to create a microsite within the GREENGAGE website, indexing and listing an assortment of methodologies, best practices, guidelines related to the use of GREENGAGE tools and approaches towards creating and implementing citizen observatories, as well as success stories (to be created in T7.1) and conclusions obtained from the experiences gathered in the GREENGAGE pilots. All the content of the GREENGAGE CO Academy will be stored in open platforms such as EU-Citizen.Science (specifically narrative content such as MOOCs, educational resources or methodologies) and Zenodo (specifically data repositories). To that end, this task will process all the conclusions gathered in T5.1, T5.2 and T5.3, as well as the ones from WP3 and expose it in an educational manner, i.e. simplifying and structuring contents as a story that links with each resource quoted and simplifying the contents for a better understanding. Additionally, the current task will also explore connections (similarities on how to deal with specific barriers between COs - e.g., those hindering collaborative decision-making between citizens and public administrations, engagement of marginalised groups of citizens, those hindering the widespread use of specific GREENGAGE support tools, among others) with the final aim of creating of Commons for cities and encourage a wide uptake of the GREENGAGE resources. All the work will be documented in D5.3.

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Work package WP6 – Evaluation and Continuous Impact Assessment

Work Package Number	WP6	Lead Beneficiary	1. AIT
Work Package Name	Evaluation and Continuous Impact Assessment		
Start Month	6	End Month	36

Objectives
Objectives O6.1: Define a coherent evaluation methodology and design pathways to perform impact assessment against well-defined key performance indicators (KPIs). O6.2: Evaluate and asses impact of the GREENGAGE CO approach against criteria: beneficial, usable, privacy and relevant to CO for environmental monitoring, data validation and fulfil needs of different city governance models; O6.3: Generate a retrospective report on the findings of results.

Description
Description of work (broken down into tasks, lead partner and role of participants) T6.1 Evaluation and Impact Assessment Methodology and Design (Duration M6-M36). [AIT, UWE, BUAS, DEUSTOs]. The CIM method (from previous FP6/7 H2020 projects) will be applied and criteria, indicators and metrics will be enhanced based on the known practices, challenges and lessons learned for CO evaluations such as Open framework for evaluating citizen science , guide on building and evaluating environmental citizen science by Natural History Museum, London . The CIM uses ISO 25010 for designing the evaluation (i.e. assessment criteria, key indicators, metrics) and will also use Unified Theory of Acceptance and Use of Technology (UTAUT) model for impact assessment. It will also define various tools and techniques (e.g. focus groups, In-System statistics, survey/questionnaires, etc.) that are suitable for GREENGAGE and provide a sound mechanism to gather data needed to generate evidence-based impact assessment. The assessment methodology will be revisited in M21-36. T6.2 Data Privacy Impact Assessment (Duration M13-M30). [UWE, AIT, DEUSTO, VRVis, BUAS, DSR, MindEarth, GISAT, Pilot Cities, BUAS, SushiDev, HOPU]. A thorough data privacy impact assessment will be performed e.g. by following the Regulation (EU) 2016/679 (General Data Protection Regulation), Regulation (EC) No 45/2001 on the protection of processing personal data by the Community institutions and bodies and on the free movement of such data; other national regulations such as UK's ICO, with the aim to identify potential risks and strategies to handle those risks in GREENGAGE. The guidelines will be defined as part of the data management plan Task 1.5 and will analyse the data to assess potential data breaches, etc. T6.3 User Evaluation – Cities (Duration M8-M30). [AIT, Pilot cities, UWE, BUAS, DEUSTO, KWMC, IBERCIVIS]. An early evaluation with users will identify potential complications in the citizen observatory process as well as help in developing better and usable software products to support citizen observatories. Different tools e.g. EUSurvey portal will be used so that inputs can be obtained from users of different pilot cities. CO teams and public authorities' city partners and city stakeholders e.g., different departments will be involved to experience GREENGAGE platforms' feature-set and provide feedback on suitability, usability, and relevance so that these applications can be rapidly improved for piloting (T4.3). More specifically user evaluations will be carried out as follows: User centred design (UCD) evaluations before piloting phase (M8-M12): the development and adaption of GREENGAGE tools, in-situ and Copernicus data will be supported by several evaluation exercise by conducting small and focused stakeholder feedback studies from pilot cities. User evaluations during pilot phases (M13-M28): First user pilot evaluation exercise will be carried out together with the piloting workshops. Both paper-based and online questionnaire (closed and open-ended) will be used. Different city users including citizens with different demographics and social characteristics (e.g. age, gender, education, employment, etc.) – mainly recruited in–WP3 and WP5 - will be engaged to gain their perspective and feedback. Where appropriate, questionnaire will be translated in local language by pilot partners. This feedback will include effectiveness or potential benefits, suitability, usability and shortcomings of GREENGAGE methods and tools. T6.4 Results Interpretation and Continuous Impact– Assessment - (Duration M10-M36). [DEUSTO, Pilot cities, UWE, AIT, IBERCIVIS, BUAS, KWMC]. Aims to interpret piloting experiment results and assess what is the impact of GREENGAGE on different stakeholders including citizens, environment, and city administrations. This task complements T6.3 by assessing effectiveness of the GREENGAGE CO platform, tools and in-situ & Copernicus data in the pilots (ex-post assessment). A set of overall impacts (or criteria) of GREENGAGE (e.g., environmental, social, behavioural, ethical, economic, cultural, process efficiency, technology acceptance) that need to be assessed based

on their relevance for the perspective of the different stakeholders (e.g., citizens, public servants, decision makers, local businesses, tourists) will be identified. Each criterion then is evaluated either quantitatively (through Key Impact Indicators (KII) e.g., In-system event-based statistics for trend-analysis and closed-ended questions) or qualitatively (through Key Elements to Cover (KEC) & open-ended questions) e.g., identification of critical aspects related to GREENGAGE CO that cannot be known a priori and will emerge during the project, such as the potential risks of the GREENGAGE CO alignment and gaps with governance processes perceived by each stakeholder through focus groups using applied approach .

T6.5 White book on GREENGAGE citizen observatory approach for Public Authorities: Lessons learnt/ Recommendations. Duration: M18-M36. [UWE, All partners]. This task will synthesize outcomes and lessons learned from GREENGAGE CO framework-based piloting, evaluation, and impact assessment activities in the project. The document will include, among other aspects: i) Synthesis of best practices in methodologies and strategies for engagement; ii) Experience reports of the pilots and their use cases (challenges, opportunities, Dos and Don'ts); iii) Various pathways to adapt the GREENGAGE CO-enabling infrastructure to tackle Green Deal challenges with the support of citizen observers as well as by public administration for potential benefits such as efficiency gains, economic gains, environmental effectiveness, evidence-based decision making, etc; iv) Role of GREENGAGE tools in training, data collection, analysis, visualization and interpretation; and, v) Uptake & scalability plan and replicability guidelines grounded from transferring use-cases between cities and the results obtained, feedback from the citizens, and city administrators vi) an analysis of R&I needs for Citizen Observatory implementation (for DG RTD).

Work package WP7 – Communication, Dissemination, Valorisation and Exploitation

Work Package Number	WP7	**Lead Beneficiary**	11. VRVIS
Work Package Name	Communication, Dissemination, Valorisation and Exploitation		
Start Month	1	**End Month**	36

Objectives
Objectives O7.1: Set up communication channels and dissemination assets to ensure visibility and wider outreach. O7.2: Enhance/encourage citizens' engagement in piloting via recognition and acknowledgement. O7.3: Collaborate with existing citizen observatory initiatives and multipliers to build on existing skills. O7.4: Boost awareness/engagement levels through international communication and promotion. O7.5: Support the exploitation & sustainability of the project through replication and upscaling activities.

Description
T7.1 Communication, Dissemination and Exploitation plan (M1-M36). [VRVis, IBERCIVIS, All Partners]. Project identity and branding: Project's visual identity and a portfolio of promotional tools (images, document templates, etc.) for its use (suite of logos, branding, a style guide). Project website and knowledge/experience sharing platform: Project website will be setup from month 1. Core communications tool with interactive multimedia, online scientific output archive and a knowledge-sharing platform, international forum for citizen members to exchange experience (T4.3). Ongoing CO initiatives will be promoted here. Additionally, success stories will be created and shared in the project website, parting from the conclusions obtained through the work done in T5.1 and T5.2 (and conclusions gathered in D5.1 and D5.2) as part of the project's communication and dissemination efforts. Success stories will include the following aspects: description of the specificities of the pilots, methods used to study the local context, relation with the engagement methods used, GREENGAGE tools selected for the pilot, description of the activities and campaigns designed and implemented in each pilot, data gathered, challenges encountered and solutions to counteract them – or non-existence of any solution and recommendation of further research should be performed to overcome them - and final impact of the pilot, including the training materials developed and used in each pilot, related to the tools, sensors or other devices used, taken from the GREENGAGE toolbox. However, they will be adapted and written down in a storytelling style, simplifying the contents (circa 4-5 pages per success story) and providing links with all the resources used and made available in the project website. Communication channels, co-creative dissemination assets: Content in diverse multilingual multimedia formats (audio-visual, webinars, masterclasses) for delivery via website, public talks (keynotes) and social media channels. Target the co-creation of audio-visual materials with relevant influencers from

alternative spheres (art, fashion and sport industry, climate activists). Exploitation: conceptualizing a suite of Business Models to commercialize the resulting technical/domain services.

T7.2 Measurable criteria for effective evaluation of project dissemination output and value (M1-M6). [VRVis, AIT, UWE, DEUSTO, BUAS, Pilot Cities]. Evaluation metrics for diss. quality: calendar for scheduling diss. assets; list of relevant non-scientific events and scientific publishers; seek large no. of followers on social media for visibility/ engagement; conduct interviews with local communities to assess public knowledge on GREENGAGE.

T7.3 Clustering and outreach activities (M6-M36). [IBERCIVICS, AIT, All Partners]. International (Citizen-led Community of Citizen Observers (CoCO): Create & run a dynamic online international (Citizen-led) CoCO for connection, co-creation & collaboration between project cities and its citizens. Such CoCO will be created following the know-how from relevant communities (e.g., EU.Citizen-Science, WeObserve). After the project end, this may become an independent living platform. Cluster with other CO initiatives and communities: Establish contact with relevant CO initiatives and communities and invite them to participate in the CoCO and be included in project's knowledge/ experience sharing platform. Some networks are already engaged through Advisory Board (WeObserve). Members of the Advisory Board will be invited annually (communication will be maintained regularly via emails/invitations to workshops) to review GREENGAGE progress and provide advice accordingly. The AB members will be extended an invite to join a dynamic online international (Citizen-led) Community of Citizen Observers (CoCO), developed within GREENGAGE, to exchange experiences, initiate discussions, coordinate efforts and maximize impact. They will also be extended an invite to join planned promotional events and public talks, either in person or virtually. The idea of bringing WeObserve representative as an AB member is to seek other suitable networks (not necessarily WeObserve) and invite them to join CoCO, due to their existing large networks of collaborators and communities of practice. Additionally, each project partner will reach out to their local citizen science networks (if existing) so as to establish synergies and potential collaborations (e.g., establishing presence for GREENGAGE on their local websites). This is especially important for project partners where pilot areas are located, e.g. Citizen Science Netværket (Danish Citizen Science Network), Extreme Citizen Science (ExCiteS) (established at UCL, UK), Citizen Science Lab (coordinated by Leiden University, Netherlands), and the Italian organizations Scienza Collaborativa (Collaborative Science) and The Globe Program (Global Learning and Observations to Benefit the Environment).

Cluster with related EU projects: GREENGAGE partner's current participation in projects associated to the related topic "LC-GD-10-3-2020 - Enabling citizens to act on climate change, for sustainable development and environmental protection through education, citizen science, observation initiatives, and civic engagement", e.g. SOCIO-BEE, will be leveraged to learn and benefit from lessons learnt from these previous projects. GREENGAGE approach and results will also be shared with projects of LC-GD-10-3-2020 and those that have been granted in the same topic.

Outreach activities: Online outreach by publishing materials, via project website, social media, influencers/climate activists, public talks, scientific publishers. Offline activities consider assigning Citizen Observer Ambassadors – selected citizens from CO initiatives to promote know-how to other audiences, targeting also hard-to-reach people who rarely engage in participatory processes. They will be given a 'Certificate of outstanding achievements', as a non-monetary incentive.

CO exchange programme: Project will support a small-scale CO exchange programme (cc. 10 members from each city). The most active citizen observers and/or Citizen Observer Ambassadors will be invited to visit other pilot cities to meet other CO and learn from each other's experiences and knowledge.

Influencing and shape policies at the local level through pilot studies: Partners Borghi and MPA will effectively influence and shape policies at local level through Urban Local Groups (ULGs), local stakeholder groups that co-produce city strategies and actions together with the municipal administration according to the URBACT methodology (developed by the URBACT, European Territorial Cooperation programme). Partner #6 will implement and share with the other pilot cases this methodology developed to help cities to develop new and sustainable pragmatic solutions that integrate urban economic, social and environmental issues. Successfully tested by Borghi during the SUSTOWNS project (co-funded by INTERREG MED), this methodology allows to bring together a group of at least 20 people representing a diversified set of local stakeholders with the principle of producing local policies through stakeholder consultation.

ULGs may include officials from the local authority itself (including different departments within the local administration), beneficiaries/users, NGOs, academics, the private sector (companies, local shopkeepers, local entrepreneurs, etc.) as well as society civilian (citizens/ inhabitants). The idea is to avoid making one-way policies by the city administration without any stakeholder consultation. Evidence has shown that participatory-built policies are more relevant, more efficient, and better designed than those implemented without any co-creation, participation or at least any consultation.

T7.4 Replication and upscaling strategy (M25-M36). [VRVis, IBERCIVIS, KWMC, Pilot Cities]. Replication/reaching out to new interested cities & their citizens on how to: (1) set-up/design citizen-led initiatives/respected topics; (2) train/inform citizens on best scientific practices, analytical methods, data collection procedures; (3) motivate citizens to get & remain engaged; (4) reach out to a wider community. This task will provide feedback to T6.5. Planned Datathons/Summer School (T5.4) will further facilitate the uptake of COs.

T7.5 Sustainability of project assets (M7-M36). [AIT, DSR]. This task will identify options to sustain assets developed by GREENGAGE. These will include but are not limited to: i) Sustainable stakeholder (Public Administration, Citizens Observers) working consortia during the project and establish sustainable communications channels to continue collaboration after project ends; ii) Investigating the options to continue awareness raising through publishing training assets and experiment results through partner cities web portals; iii) Establishing service interfaces to publish CO data through cities open data portals and GEOSS, etc; iv) Facilitating an open CO idea exchange platform hosted by the Citizen Observers; v) Where appropriate GREENGAGE tools and their feature documentation will be released under a MIT open source license (e.g., through GitHub); vi) Engaging local community organisations to continue using GREENGAGE assets after project lifetime; vii) SMEs in consortium will define business plans for assets that they may exploit.

Task 7.6 Advocacy activities to foster the uptake of Citizen Observations (Duration: M10-36). [KWMC, All]. Advocating actions will serve to identify and overcome barriers, while pursuing greater change and project impact by encouraging engagement in the debate on the uptake of citizen observations by policymakers and other relevant stakeholders for the development of new regulations and policies and other purposes such as R&I, training and more. To this end, the following advocacy activities are envisioned: i) Pilot cities will identify suitable stakeholder engagement events with the objective to boost the citizen observatory activities; ii) Local Datathons will be organised in pilot cities (at least 1 per pilot) to foster the use of the generated datasets (by citizens) to tackle issues related to urban mobility, air quality and healthy living. Multidisciplinary experts will be invited together with local city council technicians to ensure that the solutions generated are in line with the expectations of the city councils, thus fostering their uptake. One of the categories of the Datathon will be to generate cultural/artistic solutions by making use of the GREENGAGE datasets, that contribute to the New European Bauhaus initiative, e.g., by applying innovative visualisation techniques; iii) Celebrate events together with politicians and civic servants acting in the areas of the GREENGAGE project to present them the White Book on GREENGAGE citizen observatory approach for Public Authorities created in WP6; and, iv) To attend and present the project results in events organised by relevant initiatives and their working groups in the domains addressed in GREENGAGE, such as EIT Urban Mobility, the European Citizen Science Association and European Environment Bureau Working Groups on Air Quality or the Covenant of Mayors' events. These activities will align with WP7 and serve to promote the project results and foster their replicability by raising awareness throughout European cities.