

GREENGAGE

ENGAGING CITIZENS - MOBILIZING TECHNOLOGY - DELIVERING GREEN DEAL

Training and campaigning report and community building 2

Work Package 5, Deliverable D5.4

Training and campaigning report and community building 2

Work package 5, Deliverable D5.4

Please refer to this report as follows:
Sanz-García, F., Scavino, G., Costa-Carneiro, J., Reeh, R., Van Den Borne, M., Lisbona, D. (2025). Training and campaigning report and community building 2. Deliverable D5.4 of the Horizon Europe project GREENGAGE.

Project information	
Project name:	REENGAGE – Innovative governance, environmental observations and digital solutions in support of the Green Deal
Grant Agreement No.	101086530
Start date:	01/01/2023
Duration:	36 months
Coordinator:	AIT Austrian Institute of Technology Giefinggasse 4, 1210 Vienna, Austria
Contact:	Jan Peters-Anders, Research Engineer
	Funded by the European Union GA n° 101086530.
Deliverable details	
Description:	This document constitutes Deliverable 5.4 of the GREENGAGE project, serving as the comprehensive report on the human and social infrastructure established during the "Consolidation Phase" (M19–M36). It documents the consortium's strategic pivot from initial recruitment toward "Institutional Integration", achieved through the implementation of a "Cascade Training" model and "Active Intermediation" methodologies designed to empower citizens as collaborators in governance rather than mere data collectors. Through a detailed analysis of pilot activities—such as the "Conversation Stations" in Bristol and the "Cycling Labs" in North Brabant—the report demonstrates that the success of Citizen Observatories for the European Green Deal relies as much on these mobilization and community-building strategies ("soft infrastructure") as on the technology itself, functioning as the "Enabler" for the data evidence reported in D5.2.

Version:	Final
Dissemination level:	PU (Public)
Due date:	15/12/2025
Submission:	24/12/2025
Lead:	Ibercivis Foundation
Author(s):	<p>Sanz-García, F., Lisbona, D. (Ibercivis Foundation), Spain</p> <p>Scavino, G. (Borghi), Italy</p> <p>Costa-Carneiro, J. (KWMC), United Kingdom</p> <p>Reeh, R. (MPA), Denmark</p> <p>Van Den Borne, M., Netherlands</p>

AWAITING VALIDATION BY THE EUROPEAN COMMISSION

Legal Disclaimer

All information in this document is provided "as is" and no guarantee or warranty is given that the information is fit for any particular purpose. The user, therefore, uses the information at its sole risk and liability. For the avoidance of all doubts, the European Commission has no liability in respect of this document, which is merely representing the authors' view.

Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Note: AI tools were used to assist in summarising pilot data and editing. All AI-generated content was validated and adapted by the authors prior to inclusion.

© 2025 by GREENGAGE Consortium

Table of Contents

Content

1	GREENGAGE summary.....	3
2	Object of the Deliverable.....	4
2.1	About this deliverable.....	4
2.1.1	Interdependencies Between Deliverables.....	4
3	Introduction.....	6
3.1	The Strategic Context: From Exploration to Consolidation.....	6
3.2	Methodological Frameworks: The Architecture of Engagement.....	6
3.3	The Comparative Landscape: Tailored Engagement Models.....	7
3.4	Cross-Pilot Peer Support and Trans-Local Value.....	9
3.5	Structure of the Document.....	9
4	Training.....	10
4.1	General Training Methodology in GREENGAGE.....	10
4.2	“Cascade Training Model” and Phases.....	10
4.3	Training Formats and Tools.....	12
4.4	Pilot-Specific Training Case Studies.....	14
4.4.1	Bristol: Youth Engagement and Qualitative Data.....	14
4.4.2	North Brabant (Netherlands): Expert Citizens and Digital Twins.....	15
4.4.3	Copenhagen (Denmark): Technical Precision and Urban Planning.....	16
4.4.4	Turano Valley & Gerace (Italy): Bridging the Digital Divide.....	18
4.4.5	Challenges, Lessons Learned, and Strategic Evolution.....	19
4.4.6	Training and Support Metrics.....	21
5	Cross-Pilot Peer Support.....	23
5.1	The Innovation Action Board (IAB).....	23
5.2	Pilot Support Teams (PSTs).....	24
5.3	The “Ambassador Programme” and Exchanges.....	26
5.4	The External Advisory Board.....	27
6	Community Building and Campaigning.....	30
6.1	Bristol: Civic Observatories in Contested Spaces.....	30
6.1.1	Introduction: The Geopolitics of the Neighbourhood in Transition.....	31
6.1.2	Theoretical Architecture: From Extraction to Repair.....	32
6.1.3	The Conversation Station: Engineering Analog Trust.....	32
6.1.4	Micro-Targeting and Inclusivity: The “Hidden” Voices of Barton Hill.....	34
6.1.5	Generational Equity: The Youth Voice Partnership.....	35
6.1.6	Operationalising the Observatory: The Barton Hill Datathon.....	36
6.1.7	Cross-Pilot Synergies and Legacy.....	38
6.1.8	Conclusion: The Legacy of Active Intermediation.....	38
6.1.9	Summary Data: Engagement Metrics (M19-M36).....	39
6.2	North Brabant: The “Cycling Lab” and “Institutional Empathy”.....	41
6.2.1	Introduction: The Operational Context (M19-M36).....	42

6.2.2	The Methodological Framework: The “Cycling Lab”	43
6.2.3	Community Building Strategies (M19-M36).....	43
6.2.4	Campaigning Actions and Operationalisation.....	44
6.2.5	Cross-Pilot Synergies: The “Ambassador Programme”.....	46
6.2.6	Conclusion: The Legacy of the “Cycling Lab”	46
6.3	Copenhagen: “Precision Engagement” and Student Mobilisation.....	47
6.3.1	Introduction: The Paradox of the Smart City.....	48
6.3.2	Strategic Framework: “Precision Engagement” and the Canyon Effect.....	49
6.3.3	Mobilising the Workforce: Student Engagement Strategy	49
6.3.4	Operationalising the Campaign: Protocols and Friction	50
6.3.5	Trans-Local Governance: Ambassadors and Knowledge Bridges.....	52
6.3.6	Conclusion: The Legacy of Precision.....	53
6.3.7	Summary Data: Key Copenhagen Activities (M19–M36)	53
6.4	Turano & Gerace: Regenerating Rural Territories	54
6.4.1	Introduction: The Rural Imperative in the Green Deal	55
6.4.2	Methodological Framework: Situational Experimentation in the Rural Context	56
6.4.3	Phase I: Building the Social Substrate (2024).....	57
6.4.4	Phase II: The Campaigning Arc (2025).....	58
6.4.5	Cross-Pilot Synergies: The Bristol Connection.....	62
6.4.6	Conclusion: From Fragility to Innovation	63
7	Conclusions.....	66
7.1	Executive Synthesis: The Pivot to Institutional Integration.....	66
7.2	Evolution of Training: From Instruction to Embedded Capability	66
7.3	Governance of Community: Comparative Engagement Models	67
7.4	Campaigning Dynamics: Operationalising the Citizen Observatory	68
7.5	Cross-Pilot Ecosystems and Trans-Local Value	69
7.6	Strategic Implications for the European Green Deal	70
7.7	Final Remarks on Legacy and Sustainability.....	70

List of Figures

Figure 1: Structure of project GREENGAGE.....	3
---	---

List of Tables

Table 1: Relation between deliverables.....	4
Table 2: Engagement model landscape	7
Table 3: Training and Support Metrics	21
Table 4: Bristol KPIs	30
Table 5: Bristol Key activities.....	39
Table 6: North Brabant KPIs.....	41
Table 7: Target Demographics for the North Brabant “Cycling Lab”	44
Table 8: North Brabant main activities.....	47

Table 9: Copenhagen KPIs.....	47
Table 10: Copenhagen key activities.....	53
Table 11: Turano & Gerace KPIs.....	54
Table 12: Turano & Gerace key activities.....	63

List of Acronyms

AIT	Austrian Institute of Technology
API	Application Programming Interface
AQ	Air Quality
BCC	Bristol City Council
BLE	Bluetooth Low Energy
BSYV	Bristol Somali Youth Voice
BUas	Breda University of Applied Sciences
BYOD	Bring Your Own Device
CO	Citizen Observatory
CoP	Community of Practice
DQD	Data Quality Dashboard
EAB	External Advisory Board
EBLN	East Bristol Liveable Neighbourhood
EDI	Equality, Diversity, and Inclusion
GA	Grant Agreement
GDPR	General Data Protection Regulation
GEOSS	Global Earth Observation System of Systems
GPS	Global Positioning System
IAB	Innovation Action Board
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicator
KWMC	Knowle West Media Centre
OS	Operating System
PM	Particulate Matter (e.g., PM1, PM2.5, PM10)

PST	Pilot Support Team
UCPH	University of Copenhagen
UWE	University of the West of England
VOC	Volatile Organic Compounds
WP	Work Package

Glossary

Active Intermediation	GREENGAGE seeks to intermediate between public authorities and citizens, green initiatives, researchers, tech providers and other potential stakeholders of Observatories. The Mediation process enables urban authorities to respond democratically to a community's understanding of the need for effective and sustainable local innovation. This includes navigating legal and regulatory requirements, negotiating appropriate institutional arrangements, mobilising resources and facilitating active participation of citizens in urban planning decision-making processes. GREENGAGE Observatories facilitate the active dialogue between authorities and communities through co-designed observation and analysis of real-world environments. Through active intermediation with the Pilot's situations, GREENGAGE Observatories will shape policy innovation in five different contexts of urban planning. By actively intermediating, the coordinators of the GREENGAGE Observatories aim to meet the needs of communities and serve the improvement of their well-being throughout the process and beyond (cf. May & Perry, 2017, p. 24).
Ambassador Programme	A GREENGAGE cross-pilot peer support initiative that enables the physical exchange of "expert citizens" and volunteers between different pilot sites to stress-test tools and share local insights.
Android Attrition or Android Bottleneck	A technical challenge where Android battery optimisation protocols kill background processes (such as Bluetooth connections to sensors), resulting in significant data loss during unsupervised citizen science campaigns.
Big Screen Effect	An engagement tactic used in rural contexts (e.g., Turano) where citizen-generated data is projected on large screens in town halls to validate the community's efforts and secure the buy-in of local officials and elderly residents.
Canyon Effect	This is a phenomenon that occurs in dense urban environments where noise levels vary significantly by vertical elevation and become trapped between buildings. It is investigated through "vertical noise profiling".
Cascade Training	A hierarchical capacity-building model that distributes expertise in three stages: from the consortium to Pilot Owners (Train-the-Trainers), then from Pilot Owners to local Core Teams, and finally from local CORE Teams to the broader public (Citizen Observers).
Citizen Observatory (CO)	Citizen Observatories (COs) are community-based environmental monitoring and information systems that invite individuals to share observations, typically via mobile phone or the web. In GREENGAGE, COs oversee running Citizen Science (CS) campaigns to gain evidence for policy making. Notice that a CS campaign comprises a period during which a group of Citizen Observers with a shared mission and hypothesis gather data at different locations. They regularly meet to

	analyse the correlation of their collected data with other external data sources, in order to validate their hypothesis
Citizen Observer	A specific type of citizen scientist defined by a hyper-local focus on their immediate urban environment and a core motivation to use collected data to influence local policy and drive environmental change. They are often motivated by a desire for environmental justice and use data as a tool for advocacy.
Collaborative Environment	The Collaborative Environment platform acts as the front-end visualisation of Knowledge Assets and tools that help organise the co-creation of thematic co-explorations. The co-production processes modelled by the CE hyperlinks the resources, e.g., data chart or geospatial visualization, from the tasks where they were generated.
Consolidation Phase	The operational period of the project (Month 19 to Month 36) focused on "Institutional Integration", data validity, and securing a digital legacy, distinct from the earlier "Exploratory Phase".
Conversation Station	An analogue, physical pop-up kiosk deployed in public spaces to build trust and capture qualitative "sentiment data" in communities where digital-only engagement is exclusionary or distrusted.
Cycling Lab	A methodology used in North Brabant that fosters "Institutional Empathy" by integrating civil servants and citizens into a single community of practice to collect and analyse cycling infrastructure data together.
Digital Fragility	A context characterised by aging populations, low internet connectivity, and a digital divide (e.g., rural Italy), requiring human-centric and manual adaptation strategies.
Digital Twin (DigiTwin)	A virtual model of physical infrastructure (used by the Province of North Brabant) into which citizen-generated data is integrated to inform maintenance and planning.
Engagement Fatigue	A state of apathy observed in "smart cities" (like Copenhagen) where citizens are saturated with digital initiatives and surveys, requiring targeted "Precision Engagement" strategies to overcome.
Expert Citizen	A volunteer who possesses deep, tacit knowledge of their local environment (e.g., a daily cyclist active in the "Cycling Lab") that complements official technical models.
GREEN Engine	The "GREEN Engine" consists of the Collaborative Environment, the GREENGAGE Toolbox and the GO knowledge assets, also known as GO Enablers. The "GREEN Engine" is the mechanism that drives co-creation of evidence-based interventions (such as campaigns among others) based on the provided tools and knowledge assets.
GREENGAGE Observatories (GOs)	See Citizen Observatories. An update of the term Citizen Observatory to comply with equity, diversity, and inclusion frameworks, as some of the participants and target groups of these associations do not necessarily possess citizenship.
Institutional Empathy	A governance outcome achieved when policymakers and citizens use the same tools to observe the same infrastructure, thereby dissolving the silos between the "governed" and the "government".

Institutional Integration	The strategic objective of the Consolidation Phase, ensuring that citizen observatories are embedded within the decision-making fabrics of public authorities rather than remaining isolated experiments.
Precision Engagement	A strategy that targets specific highly-motivated cohorts (e.g., students, high-rise residents) for complex, scientifically intriguing inquiries to counter “Engagement Fatigue”.
Protocol Rigor	The strict adherence to data collection rules (e.g., "standing vs. walking" missions) to ensure citizen science data meets the scientific standards required for policy integration.
Repair Model	An engagement strategy employed in contested spaces (e.g., Bristol) to rebuild trust and capture the "subjective layer" of community sentiment before introducing digital tools.

Executive summary (publishable)

This report documents the second iteration of the GREENGAGE Work Package 5 reporting package, covering the "Consolidation Phase" of the Innovation Action from Month 19 to Month 36. During this period, the project underwent a fundamental strategic shift, moving from "Situating Onboarding" – identifying the right people and places – to "Institutional Integration", ensuring citizen-generated data was valid, actionable, and integrated into the policymaking workflows of public authorities. The central conclusion of this phase is that the efficacy of Citizen Observatories in achieving the objectives of the European Green Deal depends less on the sophistication of the "GREEN Engine" technology stack and more on the "soft infrastructure" of human resources and governance models surrounding it.

To achieve scalability across diverse European contexts, the project implemented a "Cascade Training" model. This hierarchical system distributed technical expertise from the central consortium to local "Core Teams" and finally to the "Citizen Observers", utilising "Active Intermediation" to translate technical constraints from citizens to the GREENGAGE consortium. This approach was necessitated by the diverse socio-political textures of the pilot sites, which required "Situational Experimentation" rather than a standardised deployment.

In the United Kingdom, the Bristol pilot navigated a highly polarised environment surrounding the "East Bristol Liveable Neighbourhood" scheme by adopting a "Repair" model. Recognising that digital-only engagement was exclusionary in a contested space, the pilot successfully deployed "Conversation Stations" — tangible, physical pop-up kiosks — to build trust and capture the "subjective layer" of community sentiment before introducing digital tools. Conversely, the North Brabant pilot in the Netherlands operated in a high-trust, mature ecosystem, employing a "Cycling Lab" framework to foster "Institutional Empathy". By integrating civil servants and citizens into a single Community of Practice, the pilot demonstrated the "Foil Effect", where citizen data successfully challenged and complemented official technical maintenance models.

The Copenhagen pilot addressed the challenge of "Engagement Fatigue" through a strategy of "Precision Engagement", mobilising citizens to investigate complex scientific phenomena such as the "Canyon Effect" and vertical noise profiling. To ensure data rigour in this high-tech environment, the pilot implemented a "Student Mobilisation" strategy, utilising university students as a reliable "Surge Workforce" to overcome technical frictions such as the "Android Attrition" rate, where battery optimisation protocols rendered significant portions of unsupervised sensor data unusable.

Meanwhile, the Italian pilots in Turano and Gerace tackled the "digital divide" through "Human-Centric Facilitation" and "Manual Adaptation". By reframing environmental monitoring through the lenses of "Heritage" and "Guardianship", these pilots successfully engaged elderly populations and validated the "Big Screen Effect", where real-time data visualisation proved critical in securing the buy-in of local mayors. While in Turano the Archaeological Campaign proved particularly effective, creating through the GREENGAGE app the first Archaeological Map of the Turano Valley, an ongoing initiative that will remain active even after the project's closure, in the Gerace pilot, the focus was specifically on upcycling waste, with the GREENGAGE app used to map and analyse community perspectives and insights on waste management and circular economy practices.

Ultimately, the M19–M36 period transformed the GREENGAGE pilots from isolated experiments into a federated "Trans-Local" ecosystem. The successful export of methodologies, such as the Bristol "Conversation Station" to Copenhagen and the exchange of "Expert Cyclists" from Brabant to Copenhagen, demonstrated that while the technology stack may be uniform, the governance models must be deeply adapted to local identity. The project concludes that successful Smart City governance requires "Active Intermediation" to translate raw citizen experience into the standardised evidence required for the European Green Deal.

Related documents

All GREENGAGE deliverables that are related to this document are listed below and are available at the GREENGAGE website <https://www.greengage-project.eu/knowledge-base/deliverables/>.

D4.9 GREEN Engine and manual 3

D5.1 Piloting and citizen observer activities report 1

D5.2 Piloting and citizen observer activities report 2

D5.3 Training and campaigning report and community building 1

D5.5 GREENGAGE CO Academy structured content v1

D5.6 GREENGAGE CO Academy structured content v2

D6.8 GREENGAGE based Citizen Observatory “White Book” for PAs v2

D7.11 Creation of Intl. Community of Citizen Observers 2

1 GREENGAGE summary

The pan-European Innovation Action, funded under the Horizon Europe Framework Programme, aimed to promote innovative governance processes, and tried to help public authorities in shaping their climate mitigation and adaptation policies. To achieve this aim, the GREENGAGE project leveraged citizens' participation and equipped them with innovative digital solutions that shall transform citizen's engagement and cities' effectiveness in delivering the European Green Deal objectives for carbon neutral cities.

Focusing on mobility, air quality and healthy living, the objective was to inspire citizens to observe and co-create their cities by sensing their urban environments. The idea was to supplement, validate, and enrich information in the relevant databases of public administrations and public authorities. This was facilitated by engaging with citizens to co-create green initiatives and to develop Citizen Observatories (CO). In GREENGAGE, Citizen Observatories were and are a place where pilot cities examine environmental issues together, integrating novel bottom-up processes with top-down perspectives. This provides a basis for co-creating and co-designing innovative solutions for monitoring environmental issues at ground level with the help of citizens.

The project aimed to enhance the application of intelligence to city decision-making processes and governance by engaging with citizen observations integrated with Copernicus, Global Earth Observation System of Systems GEOSS, as well as in-situ, and socio-economic intelligence. and the project also aimed to deliver innovative governance models based on novel toolboxes of decision-making methodologies and technologies.

The Citizens Observatory campaigns were deployed and fully demonstrated in 5 pilot engagements (Figure 1) in selected European cities and regions including:

- Bristol (the United Kingdom),
- Copenhagen (Denmark),
- Turano Valley (Italy),
- Gerace (Italy),
- and the region of North Brabant (the Netherlands).

These innovation pilots aimed to highlight the need for smart city governance by promoting citizen engagement, co-creation, as well as gathering new data which should complement existing datasets and evidence-based decision and policymaking.

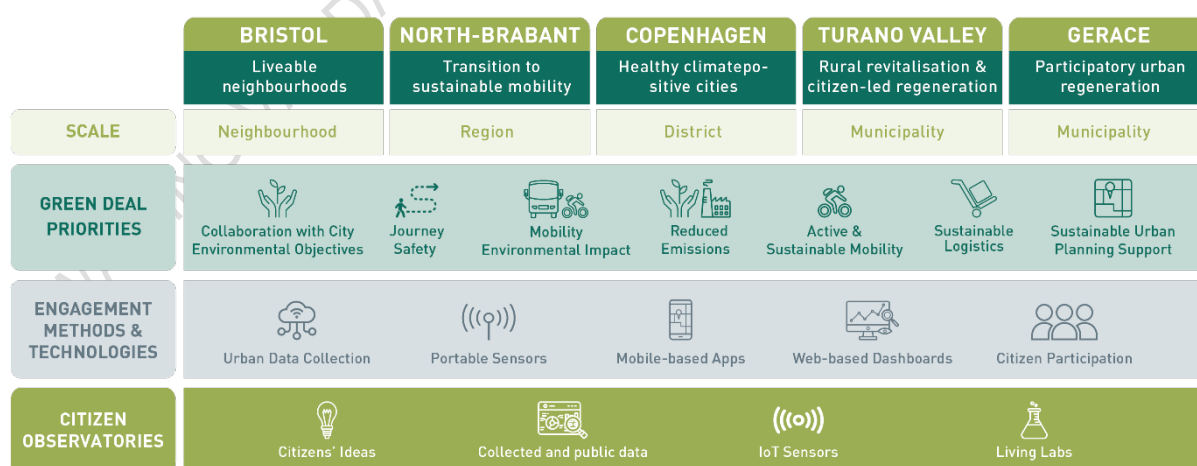


Figure 1: Structure of project GREENGAGE.

2 Object of the Deliverable

2.1 About this deliverable

This document forms part of the second iteration of the GREENGAGE Work Package 5 reporting package. As the Innovation Action transitions from its Exploratory Phase (M1–M18) to the Consolidation Phase (M19–M36), the nature of the deliverables has evolved fundamentally.

While the first set of deliverables (D5.1, D5.3, D5.5) focused on establishing frameworks and deploying prototypical technologies, this second set (D5.2, D5.4, D5.6) is focused on validating data, institutionalising citizen participation, and securing a digital legacy. The project's methodological focus has shifted from "Situated Onboarding" to "Institutional Integration". This shift dictates the content of the three interlinked deliverables submitted in this period, where D5.4 serves as the comprehensive report on the human and social infrastructure of the project.

Table 1: Relation between deliverables.

Deliverable Series	Iteration 1 (M18)	Iteration 2 (M19-34)	Key Evolution in Phase 2
Piloting & Activities	D5.1 (Report 1) Described the potential of the pilots, the setup of Pilot Support Teams (PSTs), and early "low-tech" engagement	D5.2 (Report 2) Provides the evidence of impact. It documents the full deployment of the "GREEN Engine", data validity ("Foil Effect"), and policy outcomes.	From Activity to Impact: Moving beyond "We held a meeting" to "This data is useful for changing a policy-making decision".
Training & Community	D5.3 (Training 1) Focus on "Train-the-Trainer". The consortium trained the Pilot Owners to use the tools.	D5.4 (Training, Campaigning & Community Building) Focus on "Cascade Learning" and "Active Intermediation". It documents not just technical training, but how communities were mobilised through specific campaigning structures (e.g., "Conversation Stations" in Bristol, "Cycling Labs" in Brabant) to sustain engagement.	From Transfer to Autonomy: Ensuring communities possess both the skills and the social structures to sustain the observatory independently.
Academy & Content	D5.5 (Academy 1) Established the technical infrastructure and curated initial resources.	D5.6 (Academy 2) Establishes the knowledge commons. Fills the infrastructure with validated outputs and the "White Book" for future replication.	From Structure to Content: Transforming a website into a permanent European resource.

2.1.1 Interdependencies Between Deliverables

The reader should note that these documents are not standalone reports but represent different facets of the same operational reality:

- The Enabler (D5.4): This document. It details the training strategies ("Cascade Learning"), community-building methodologies, and the campaigning dynamics required to build the human capacity for the observatories.
- The Evidence (D5.2): The trained citizens execute the campaigns described in D5.4, generating the datasets and policy insights reported in D5.2.
- The Legacy (D5.6): The validated methods from D5.2 and the training materials from D5.4 are codified and archived in D5.6 to ensure the project's replicability.

This document (D5.4) details the "soft infrastructure" of the project. It demonstrates that training is not merely a didactic exercise but is also part of community-building and campaigning events. This ensures that the "GREEN Engine" is supported by a strong and resilient social fabric.

3 Introduction

The implementation of the European Green Deal requires a profound transformation of both technological infrastructure and the governance mechanisms that bridge the gap between high-level policy objectives and citizens' everyday experiences. The GREENGAGE Innovation Action is funded under the Horizon Europe Framework Programme and operates at this precise intersection. It aims to operationalise the Green Deal by equipping citizens with the digital tools and agency required to monitor, understand, and influence their urban and rural environments. As the project transitions from its initial deployment phase into the mature "Consolidation Phase" (Month 19 to Month 36), the nature of its output has evolved fundamentally. This document, Deliverable D5.4, serves as the comprehensive report on the human and social infrastructure that was established during this critical period.

While previous reporting iterations (see D5.1, D5.3 and D5.5) focused on the potential of pilot sites and the preliminary setup of "low-tech" engagement tools, this deliverable documents the execution of a strategic pivot toward "Institutional Integration". It articulates the methodological shift from "Situating Onboarding" by finding the right participants and locations to ensuring that citizen-generated data is sufficiently valid, actionable, and integrated to impact policy-making workflows. Consequently, this report does not merely catalogue training events or campaign dates; it analyses the "soft infrastructure" of capacity building, community mobilisation, and active intermediation that functions as the essential Enabler for the technical evidence reported in the parallel Deliverable D5.2. By detailing the operational realities of the five pilot sites (Bristol, North Brabant, Copenhagen, Turano Valley, Gerace) this introduction frames the document as a blueprint for sustainable, citizen-led environmental governance.

3.1 The Strategic Context: From Exploration to Consolidation

The operational timeline covered by this report, spanning Month 19 through Month 36, represents the "Consolidation Phase" of the GREENGAGE project. This period is distinct from the "Exploratory Phase" (M1–M18), which was characterised by the deployment of prototypical technologies and the establishment of initial pilot relationships. During the first half of the project, the primary success metrics were centered on recruitment and the technical validation of the "GREEN Engine" stack. However, the Consolidation Phase necessitated a rigorous re-evaluation of these objectives to ensure long-term impact and replicability.

The central strategic realisation of this phase was that the mere provision of sophisticated technology (e.g., sensors, mobile applications, and dashboards) is insufficient to drive the behavioural and policy changes envisioned by the Green Deal. Technology acts as a catalyst, but the solution lies in the governance capacity to use that tool effectively. Therefore, the project shifted its focus from a technology-first approach to a governance-first approach, prioritising the construction of resilient "Communities of Practice" (CoP) capable of sustaining the Citizen Observatories (COs) beyond the project's lifecycle.

This strategic pivot is defined by the move toward "Institutional Integration". In the context of GREENGAGE, this means ensuring that the Citizen Observatories are not isolated experiments but are embedded within the decision-making fabrics of their respective public authorities. This required the consortium to address the "validity gap" — the scepticism often held by officials regarding crowdsourced data. To bridge this gap, the project implemented rigorous training protocols and "Active Intermediation" strategies designed to elevate the quality of citizen data to a level where it could serve as a legitimate "foil" or complement to authoritative datasets.

3.2 Methodological Frameworks: The Architecture of Engagement

In order to achieve scale and coherence across the heterogeneous socio-political contexts of the five pilot sites, GREENGAGE standardised its engagement approach around two core methodological pillars: the "Cascade Training Model" and "Active Intermediation". These frameworks provided a unified scaffold for the project while allowing for the deep localisation necessary for success.

Cascade Training: The Hierarchical Distribution of Expertise. The project recognised from the outset that a centralised training model, in which consortium experts would instruct hundreds of citizens

directly, was both unscalable and culturally insensitive. In response, the "Cascade Training Model" was implemented to distribute technical expertise hierarchically. This model operates on three distinct tiers:

- Train-the-Trainers (Stage I): Consortium experts upskilled Pilot Owners and Pilot Support Teams (PSTs) on the nuances of the "GREEN Engine", data ethics, and campaign management. This stage focused on high-level technical proficiency and methodological alignment.
- Train-the-Core-Team (Stage II): Pilot Owners then trained local core team – "Ambassadors" and "Community Champions". These core teams, ranging from youth leaders in Bristol to North Brabant's cycling union members, were equipped with technical skills and the ability to facilitate others. This stage was critical for translating technical protocols into the local vernacular.
- Citizen Observer Training (Stage III): Finally, these local core teams facilitated "just-in-time" training for the broader public during active campaigns. This often took the form of embedded learning, where citizens learned to calibrate sensors or use apps in the field during a data collection event, rather than in a classroom setting.

This cascade approach ensured that knowledge was not just transferred but localised, empowering communities to own the technology rather than merely use it.

Active Intermediation: The Governance Bridge. The second pillar, "Active Intermediation", addresses the inevitable friction between rigid technical requirements and fluid social dynamics. In every pilot, human intermediaries – whether Pilot Owners, PST members, or local facilitators – played a decisive role in "translating" between the project's digital and social dimensions.

- Downward Translation: Intermediaries converted complex technical constraints (e.g., the need for stationary noise measurements) into accessible community tasks.
- Upward Translation: Conversely, they converted subjective community sentiment (e.g., "this street feels unsafe") into structured datasets (e.g., "subjective safety scores") that policymakers could ingest.

Active Intermediation functioned as the governance bridge that prevented "Engagement Fatigue" and ensured that the Observatories remained responsive to local political realities, moving the project beyond a "technocratic trap".

3.3 The Comparative Landscape: Tailored Engagement Models

A central finding of the M19–M36 period is that a monolithic approach to citizen engagement is destined to fail in a diverse Europe. The socio-political texture of each pilot site – ranging from contested urban neighbourhoods to depopulating rural villages – dictated a unique governance response. As detailed in the subsequent chapters of this report, GREENGAGE effectively operated four distinct engagement models, each tailored to the specific "governance challenge" of its territory.

The following table (Table 2Fehler! Verweisquelle konnte nicht gefunden werden.) summarises the comparative landscape of these engagement models as analysed in this deliverable:

Table 2: Engagement model landscape

Pilot Site & Strategic Context	Governance Challenge	Engagement Model	Key Mechanism
Bristol, East Bristol Liveable Neighbourhood (EBLN)	Contested Space: High polarisation and distrust of official schemes.	"Repair" Model	Conversation Stations: Analogue, face-to-face kiosks used to rebuild trust and capture subjective sentiment before digital data.

North Brabant, Mature Cycling Ecosystem	Institutional Disconnect: High infrastructure quality but low alignment between user experience and official maintenance.	"Empathy" Model	Cycling Labs: Fostering "Institutional Empathy" by having civil servants and citizens collect data together, validating the "Expert Citizen".
Copenhagen, Smart City Leader	Engagement Fatigue: Apathy due to high service levels and saturation of digital initiatives.	"Precision" Model	Student Mobilisation: Countering fatigue with "Precision Engagement" on niche scientific topics (e.g., Canyon Effect), using students as a "Surge Workforce".
Turano & Gerace, Rural / Digital Divide	Digital Fragility: Ageing populations, low connectivity, and scepticism of abstract data	"Facilitation" Model	Human-Centric Facilitation: Framing data as "Heritage Guardianship" and using "Big Screen" visualisations to bridge the digital gap

Bristol: The “Repair” Model in Contested Spaces. In Bristol, the pilot operated within the volatile environment of the East Bristol Liveable Neighbourhood (EBLN) scheme. The primary obstacle was not technical but social. Extreme polarisation regarding traffic reduction measures had eroded trust in official consultations. The GREENGAGE response was the adoption of a "Repair" model. Recognising that a digital-only approach would be exclusionary and potentially inflammatory, the pilot deployed "Conversation Stations" – physical pop-up kiosks in public spaces. These stations prioritised "analogue trust", allowing facilitators to listen to resident grievances before introducing the digital app. This “Active Intermediation” allowed the Observatory to function as a neutral "third space”, transforming community anger into constructive "subjective data" that complemented traffic sensors.

North Brabant: The “Empathy” Model in Mature Ecosystems. Conversely, the North Brabant pilot faced the challenge of success. In a region with world-class cycling infrastructure and high institutional trust, the need for a Citizen Observatory was not immediately obvious to residents. The pilot's strategy was to foster institutional empathy through the "Cycling Lab”. By integrating provincial civil servants and citizens into a single Community of Practice – literally cycling and collecting maintenance data side-by-side – the pilot broke down the silos between the "governed" and the "government”. This model leveraged the concept of the "Expert Citizen", validating that daily cyclists possess tacit knowledge that official engineering models miss. The resulting "Foil Effect" demonstrated that citizen data could successfully challenge and refine official maintenance schedules.

Copenhagen: The “Precision” Model in Smart Cities. Copenhagen presented the paradox of the Smart City: high-functioning municipal services had generated "Engagement Fatigue”, where citizens felt little urgency to participate. To counter this apathy, the pilot pivoted to "Precision Engagement". Instead of broad, generic appeals, the pilot targeted specific, highly-motivated cohorts – such as university students and high-rise residents – to investigate complex, scientifically intriguing phenomena like the "Canyon Effect" (vertical noise profiling). This approach required a "Student Mobilisation" strategy, utilising students as a reliable "Surge Workforce" to ensure protocol adherence and overcome technical frictions, such as the "Android Attrition" caused by battery optimisation settings.

Turano & Gerace: The “Facilitation” Model in Rural Territories. Finally, the Italian pilots in Turano Valley and Gerace grappled with "Digital Fragility". In these rural contexts, characterised by ageing populations and patchy connectivity, the standard app-based model was insufficient. The response was "Human-Centric Facilitation" and "Manual Adaptation”. The pilot reframed environmental monitoring not as a technical task but as an act of "Heritage Guardianship", appealing to local pride in the landscape (e.g., "Guardians of the Lake", or “Turano Valley Archaeological Map”). Crucially, the pilot employed the

"Big Screen Effect", projecting citizen data in town halls to make it visible and understandable to elderly residents and mayors alike. This proved that rural regeneration relies on leveraging territorial identity and intergenerational support rather than purely digital solutions.

3.4 Cross-Pilot Peer Support and Trans-Local Value

A defining characteristic of the M19–M36 period was the transformation of these isolated pilots into a federated "Trans-Local" ecosystem. This report documents how the project utilised cross-pilot peer support mechanisms – specifically the Innovation Action Board (IAB), Pilot Support Teams (PSTs), and the "Ambassador Programme" – to facilitate the transfer of knowledge and tools.

The "Ambassador Programme" proved particularly effective, enabling the physical exchange of "Expert Citizens" between sites. The deployment of Dutch cyclists to Copenhagen to assist in noise data collection demonstrated that while the "GREEN Engine" technology stack is uniform, its application can be enriched by cross-border perspectives. These exchanges validated the project's hypothesis that a "soft infrastructure" of human connection is as replicable as the software itself.

3.5 Structure of the Document

This deliverable is structured to provide a granular analysis of these themes. Following this introduction:

- Section 4 (Training) details the evolution of the training methodology, analysing the implementation of the Cascade Model and the specific formats used to upskill diverse populations.
- Section 5 (Cross-Pilot Peer Support) examines the governance structures (IAB, PSTs, "Ambassadors") that enabled the consortium to function as a learning network.
- Section 6 (Community Building and Campaigning) provides the core narrative of the report, offering exhaustive case studies of the campaigning dynamics in Bristol, North Brabant, Copenhagen, and Turano/Gerace.
- Section 7 (Conclusions) synthesises the key lessons learned, offering strategic implications for the European Green Deal and the legacy of the project.

In summary, Deliverable D5.4 posits that the "smartness" of a city or region lies not in its sensors, but in its ability to build a social infrastructure capable of meaningful observation. This report is the chronicle of how GREENGAGE built that infrastructure.

4 Training

4.1 General Training Methodology in GREENGAGE

GREENGAGE's training methodology is rooted in user-centred design and co-creation, ensuring that citizens are not passive recipients of instructions but active partners in the learning process. Rather than a fixed curriculum, training materials are dynamically generated from core project frameworks and adapted to each pilot's context. This situational approach rejects one-size-fits-all solutions: a protocol suitable for tech-savvy students in the Netherlands might be inappropriate for elderly residents in rural Italy. Therefore, materials serve as flexible templates requiring local customisation, reflecting the socio-cultural textures of each community. In practice, this means every training activity is contextualised to local needs – from language and examples used, to the problems addressed – so that participants see training as relevant to their daily lives and environments.

Crucially, the project emphasises “Active Intermediation”: human facilitators (Pilot Owners, Pilot Support Teams, local champions) bridge the gap between complex technology and community needs. These intermediaries are trained not only in technical tasks (e.g. using dashboards) but also in soft skills like translating technical jargon into local vernacular, managing participant expectations, and crafting narratives that resonate with citizens. This ensures that the high-tech “GREEN Engine” (GREENGAGE's suite of tools for data collection and analysis) is deployed in a human-centric way. The pedagogy is iterative and collaborative: often, training doubles as a co-creation session where participants contribute to designing campaigns or defining data collection criteria, thereby internalising the methods through hands-on involvement. By engaging citizens in designing their observatory activities, GREENGAGE fosters ownership and aligns training with local policy priorities.

Another key principle is aligning training with the observatory lifecycle. GREENGAGE pilots follow a four-phase “thematic co-exploration” cycle (Prepare, Engage, Analyse, Act), and training interventions are timed to support each phase. For example, in the initial preparation phase, trainers focus on onboarding and ethics; during active campaigns, just-in-time training is provided to participants in the field; and in later phases, advanced workshops help communities interpret results and plan actions. This sequencing ensures that capacity-building coincides with concrete project needs, reinforcing learning by immediately applying it. It also mirrors the project's evolution from “Situated Onboarding” to “Institutional Integration”: in the first 18 months, emphasis was on introducing tools to pilot leaders, whereas in the consolidation phase (Months 19–36) the focus shifted to broader community autonomy and integration of citizen data into governance. Within Work Package 5 (WP5), this translated to an initial train-the-trainer effort followed by cascade training and community-building activities. In other words, early WP5 deliverables (e.g., D5.3) equipped Pilot Owners with tool knowledge, while the later deliverables (e.g., D5.4) scaled that knowledge through communities via cascade learning and “Active Intermediation” structures. This approach is fundamentally policy-driven: by empowering citizens with skills and knowledge, GREENGAGE enables them to generate credible environmental data and insights, which can feed into evidence-based policymaking. Without such capacity-building, the sensors, apps, and data of GREENGAGE would remain “inert technological artifacts”, unable to achieve social or political impact. Thus, the training methodology underpins the project's policy relevance, ensuring that technological tools translate into real-world environmental governance outcomes.

4.2 “Cascade Training Model” and Phases

To operationalise knowledge transfer across diverse communities, GREENGAGE implemented a “Cascade Training Model”. This model established a three-tier hierarchy of training that funnels expertise from the project consortium down to the general public in stages. It provided a logical progression of capacity-building. Starting with those closest to the project (who then become trainers themselves) and it ends with broad citizen engagement. The cascade approach was essential for scaling up training in multiple languages and contexts while maintaining quality and consistency.

- **Stage I – Train-the-Trainers (Pilot Owners & PSTs):** The first tier targeted the core pilot leadership – Pilot Owners (e.g. municipalities, NGOs) and Pilot Support Teams (PSTs) – who serve as primary nodes in each local network. During this phase, consortium experts delivered comprehensive training to ensure these leaders fully understood the GREENGAGE toolkit and

methodology. Training in Stage I was delivered mainly via intensive synchronous webinars and detailed manuals. The curriculum covered foundational topics needed to run a citizen observatory: example.g., ethics and data governance (ensuring all pilots understood GDPR, consent forms, and ethical use of location data), data science fundamentals (bridging qualitative community knowledge with sensor data, and setting realistic expectations about data's policy impact), and the "GREEN Engine" architecture (the technical components like the mobile app, sensors, and open data integration). By building a strong base of technical and methodological knowledge, Stage I enabled Pilot Owners to localize and deploy tools confidently. Notably, feedback from these sessions indicated that initial trainings were overly dense – attendees requested shorter presentations and more Q&A. The consortium adapted by making later webinars more interactive, exemplifying GREENGAGE's reflexive approach to continuously improve the training delivery. In sum, Stage I produced a cadre of local trainers with a solid grasp of both technology and community engagement principles. This corresponds to early WP5 efforts to "train the trainers" (Deliverable D5.3) and laid the groundwork for subsequent community training.

- **Stage II – Train-the-Core-Team:** The second tier pushed training out to each pilot's core community team – the highly engaged local volunteers, community "ambassadors", or domain enthusiasts who would lead activities on the ground. These could be youth leaders, cycling advocates, student interns, or local elders championing the cause. Unlike the standardised Stage I, Stage II training was highly customised and user-centered, delivered by Pilot Owners and PSTs in the local language and cultural context. A key aspect of this phase was localization: materials from Stage I (initially in English) were translated and adapted. In Italy, for instance, the team found that AI-generated translations of app content were "not well received" – they felt impersonal and confusing. The response was to manually translate and simplify training materials, incorporating local dialect and culturally meaningful terms (e.g. explaining "citizen science" through familiar concepts like taking care of one's territory). This ensured older or less tech-savvy participants could trust and understand the guidance. Stage II also entailed role-specific training. Each core team member often took on a particular role in the observatory (e.g., data validator, community mobilizer, school workshop facilitator), so training sessions were tailored to those duties. For example, in the Bristol pilot the core team from Bristol Somali Youth Voice (BSYV) received a custom introduction to citizen science and the GREENGAGE app, delivered as a 5-minute video with local young people's imagery and a British Somali narrator making it relatable and engaging for the youth audience. In North Brabant, cycling union members were not just taught how to use the reporting app; they actively co-designed parts of the monitoring process (defining what counts as a maintenance issue), effectively learning by creating. This blurring of training and co-creation proved very effective. By involving core participants in designing survey missions and data criteria, the project achieved deeper buy-in and skill uptake than passive instruction alone. Overall, Stage II built up Communities of Practice within each pilot with capable local teams who could run observatory activities and also adapt the project's tools to their community's needs, in line with GREENGAGE's emphasis on local empowerment.
- **Stage III – Citizen Observer Training (End Users):** The final tier of the cascade addressed the general public, i.e., the wider pool of citizen observers and contributors in each pilot. This is where training had to accommodate the greatest diversity in backgrounds, digital literacy, and motivation. GREENGAGE adopted a "just-in-time" training philosophy for this broad audience. Rather than formal classroom sessions, the project provided guidance at the moment of need and in the context of action. Two main strategies were used:
 - (a) Integrated App Guidance: The GREENGAGE mobile app itself includes built-in tutorials, pop-up tips, and mission-specific instructions that guide users step-by-step through data collection tasks. Citizens learn by doing – for instance, when a user starts a noise measurement mission, the app might prompt them on microphone placement and then give instant feedback if the reading is out of range, thereby teaching proper technique on the fly.
 - (b) Event-Based Workshops: Especially in pilots with low digital literacy, training was woven into community events and hands-on demonstrations. In the Turano Valley, e.g., public "walks" to map heritage sites doubled as training sessions on using the app and Atmotube

PRO sensors. Participants were taught how to pair the sensor and interpret air quality readings in the course of an outdoor activity. Similarly, in-person “demonstration days” or pop-up info kiosks were used to show anyone interested how to install the app, log an observation, or understand the dashboards. This embedded approach helped overcome technophobia among less digitally experienced citizens by teaching in a familiar, informal setting rather than a formal tech tutorial.

Stage III thus relied on high accessibility, simplicity, and repetition often backed by printed quick-start guides or having trained volunteers on hand to assist newcomers during campaigns. The goal was to lower barriers so that any citizen could participate meaningfully, even if that meant using non-digital methods (like paper surveys or guided conversations) as stepping stones. Across all pilots, this citizen-level training was not a single event but an ongoing, iterative process. New community members were onboarded as campaigns evolved, and refresher tips were provided as needed (e.g., before a big data collection event). This continuous cascading approach ensured that by the end of the project, hundreds of residents had not only heard of GREENGAGE but had the skills and confidence to use its tools and contribute to environmental policy discussions.

4.3 Training Formats and Tools

GREENGAGE delivered training through a mix of formats and leveraged various tools, aligning each format with the content and audience for maximum effect. Flexibility was a design choice. Whenever possible, materials were made available in multiple formats, e.g., live workshops, webinars, and recorded videos, to cater to different learning preferences and logistical needs. This multi-modality proved important during the project’s timeline, which spanned periods of both in-person community events and remote coordination. Key training formats included:

- **Interactive Workshops (In-Person):** Physical meetings and hands-on workshops were crucial, especially in communities where face-to-face trust-building is paramount. For example, in Turano Valley and Gerace (Italy), trainers organised high-touch, in-person sessions to introduce the Atmotube PRO air quality sensor. Participants physically received a sensor, then were guided step-by-step to connect it via Bluetooth, calibrate it, and collect their first readings. Such tactile, personal training helped participants overcome any fear of technology and ask questions in real time. It also allowed immediate troubleshooting – a necessity in rural areas with low digital literacy or patchy connectivity. In more urban pilots like Bristol, in-person formats took the shape of “Conversation Stations”. Project staff and trained volunteers talked residents through the project and the app in one-on-one sessions at pop-up stalls in community venues. These informal kiosks replaced dense technical manuals with simple discussion guides, allowing people to learn through conversation and storytelling. Not only did this format convey how to use the tools, it also invited residents to voice their concerns and local knowledge, effectively training the project team on community perspectives (a two-way learning).
- **Webinars and Online Training:** Synchronous online sessions (via teleconference) were primarily used for training the trainers (Stage I) and cross-pilot knowledge sharing. Webinars enabled the participation of consortium experts and all pilot leads at once, ensuring consistent messaging. As noted, topics ranged from ethics briefings to deep dives into the “GREEN Engine” software architecture. These sessions often included live demos (e.g., showing how to navigate the “GREEN Engine” dashboard) and Q&A segments. Additionally, asynchronous e-learning materials were provided (comprehensive PDF manuals, how-to videos, and FAQs). Pilot teams could revisit these resources as needed – a critical support for complex tools. For instance, a detailed user manual for the GREENGAGE App was shared, covering installation, profile setup, and mission execution, and core teams translated or summarised these for their communities. The use of online platforms also allowed the project to scale training across languages. When the Bristol team developed a short training video for young people, that video was later subtitled for other pilots to reuse. This illustrates the efficiency of reusing digital content in multiple locales.
- **Hybrid and “On-site” Training:** Many training activities combined digital and physical elements. A good example is the “embedded training” during pilot events. In Copenhagen’s

Earth Day campaign, citizens first attended a short briefing (with slides and a demo app walkthrough), then immediately went out to collect noise and air quality data on designated routes – effectively learning by doing under supervision. Similarly, in the Turano Valley Archaeological Campaign, the absence of GPS signals in the area required participants to first record archaeological findings on paper; these data were then later entered into the Greengage app backend console, allowing participants to experience both traditional fieldwork and digital data management in a hands-on learning process. Hybrid formats were also used for ongoing support. GREENGAGE set up an online Discourse Forum as an asynchronous community hub, where participants and pilot staff could post questions, share findings, and access guides. Pilot leaders were trained in community management functions of this forum – for instance, using a translation plugin to bridge language gaps across international participants, and a gamification plugin to reward and motivate contributors (through badges or leaderboards). This fostered a pan-European learning community. It also advanced GREENGAGE's aim of peer-to-peer support. As users became more experienced, they started answering each other's questions on the forum, reducing the burden on project staff and increasing community autonomy. In effect, the forum training helped institutionalise a culture of continuous learning and exchange among the observatories, extending beyond formal training sessions.

Alongside these formats, training content was carefully tailored to the tools and technologies of the GREENGAGE platform. A core objective was to ensure data quality “at the source” by teaching correct tool usage. For example, volunteers learned how to properly deploy sensors and adhere to data collection protocols.

- In Copenhagen, participants were trained on the difference between standing vs. walking missions for noise mapping, since consistency in how measurements are taken is crucial for valid results.
- In Italy, citizens were shown how to recognise and ignore spurious air quality readings (like sudden spikes from a passing scooter) versus sustained pollution patterns. This practical knowledge greatly improved their ability to interpret and discuss the data they gathered. Training also covered data interpretation and visualisation tools.
- In North Brabant, where the province's Digital Twin platform was being fed citizen cycling data, participants received an orientation on how their reports (e.g., a photo of a pothole) travel through the system to become a point on the Digital Twin map. Explaining this “data value chain” helped volunteer cyclists understand the importance of accurate reporting and metadata, and how their input could influence provincial maintenance schedules.

Similarly, pilot teams were trained on using Apache Superset dashboards for real-time visualisation of crowdsourced data (as in Bristol and Copenhagen). By learning to generate heatmaps or charts of citizen reports, local teams could quickly spot trends and share insights with policymakers. Notably, cross-pilot collaboration enhanced this aspect. The Bristol data team, for instance, shared a pre-configured Superset “Heatmap of Complaints” dashboard with the Copenhagen team, who then plugged in their own data to instantly create a similar visualisation. This knowledge transfer demonstrated the robustness and portability of GREENGAGE training tools. Skills were transferable across cities with minimal retraining, a fact validated when Dutch “ambassador” cyclists successfully used the GREENGAGE app and sensors in Copenhagen without issue.

Finally, GREENGAGE recognised that technology alone isn't enough – ongoing human support mechanisms were put in place. The project instituted regular cross-pilot mentoring calls (IAB meetings) and maintained the PSTs as a continuous backstop for local teams. These structures allowed troubleshooting and advanced training needs to be addressed in real time. In summary, by employing diverse training formats (in-person, online, hybrid) and thoroughly covering tool usage from sensors to dashboards, the GREENGAGE training program ensured participants had both the technical know-how and confidence to actively engage in the observatories. This comprehensive capacity building is what enabled citizens to move from simply collecting data to actually understanding and leveraging it, turning community science into a credible input for planning and policy discussions.

4.4 Pilot-Specific Training Case Studies

While the general methodology provided a common framework, its application was tailored in each pilot site to address local challenges and opportunities. The following case studies illustrate how training was customised in four diverse contexts: an urban UK city district, two rural Italian towns, a Dutch province, and a Danish capital. Each pilot's training program reflects GREENGAGE's situational approach – adapting format, content, and emphasis to its community – while still following the cascade model and overall project principles.

4.4.1 Bristol: Youth Engagement and Qualitative Data

Context: The Bristol pilot centered on East Bristol's Liveable Neighbourhood (EBLN) initiative – a scheme to redesign streets for greener, safer use. A major challenge here was engaging marginalised groups, including the local Somali community, youth, and other residents who often felt excluded from formal consultations. The pilot area is socio-economically mixed, and there was some mistrust toward “official” projects. Thus, training in Bristol had to be inclusive, culturally sensitive, and fun to draw in these underheard voices.

Training Strategy: The Bristol team adopted creative, community-centric training methods:

- **Core Team Empowerment:** A youth-led community group, Bristol Somali Youth Voice (BSYV), was identified as a core partner for the observatory. Rather than impose a standard training module, the project co-designed the training with BSYV to ensure cultural relevance. For example, technical instructions were delivered through short videos featuring local young people and narration in an English accent familiar to the community, making the content relatable and not overly “institutional”. This helped build trust and showed respect for the participants' identity. The BSYV members were trained in how to use the GREENGAGE app and sensors, but also in basic citizen science concepts (like how to frame an observation or survey question) using examples from their neighbourhood. This empowerment of a local youth team created a peer-to-peer training dynamic with BSYV becoming “ambassadors” who could onboard others in their community in their own language and style.
- **“Conversation Stations”:** Recognising that an app-centric or online approach alone would miss those with limited digital access or scepticism, the Bristol pilot introduced “Conversation Stations”. These were pop-up stalls in familiar public spaces (community centres, market days in Barton Hill, etc.) where project staff and BSYV volunteers engaged passers-by in dialogue. Instead of handing out leaflets or dense tutorials, they used discussion prompts and visual aids to explain the project and app in simple terms. Residents could ask questions or voice concerns (e.g., about traffic safety or air pollution in their street), and volunteers were trained to listen and record these qualitative insights so effectively collecting “sentiment data” alongside numeric data. Training for the Conversation Station teams emphasised communication skills: how to spark a conversation, how to explain the app without jargon, and how to gently guide people to try a demo on a tablet or phone. This method proved highly effective in Bristol's multicultural setting, as it lowered the barrier for participation. One didn't need to attend a workshop or download an app cold, while a friendly chat could be the first step to engagement. The qualitative feedback captured during these sessions was later uploaded to the platform, enriching the data with context and stories.
- **School Engagement:** The Bristol pilot also collaborated with local schools to engage younger citizens. For example, workshops were conducted at Redfield Educate Together, a primary school. Here, the training was turned into a game for 9–10 year olds where facilitators asked children to use smiley-face cards to rate how safe or pleasant they felt different parts of their neighbourhood were, effectively teaching them to quantify their perceptions. Before these sessions, teachers and youth workers were trained on how to run the activity, including managing a room of energetic children and then helping them enter their “scores” or observations into the GREENGAGE app (with appropriate supervision). The training for teachers covered child-friendly ways to discuss topics like air quality or traffic (for instance, using simple analogies rather than technical terms). By gamifying the data collection, the pilot educated the next generation of citizen scientists in a playful manner. It also indirectly reached parents

(children took home what they learned), expanding community awareness. This Bristol experience underlined that effective training could take unconventional forms – here essentially a classroom game and art exercise – when targeting specific groups like youth.

Overall, Bristol's training approach was highly participatory and adapted to a diverse urban community. It balanced technology with face-to-face interactions, and data rigour with creative expression. This ensured that even those wary of apps or authorities felt comfortable contributing. As a result, the Bristol observatory not only gathered hard data (noise levels, traffic counts) but also captured community narratives, and it built a team of local youth capable of carrying the work forward. The focus on inclusive training formats in Bristol exemplified GREENGAGE's policy value. Previously unheard residents became equipped to voice their needs in city planning discussions, supporting more equitable and responsive urban governance.

4.4.2 North Brabant (Netherlands): Expert Citizens and Digital Twins

Context: The North Brabant pilot operated in a region with world-class cycling infrastructure and an active cycling community. Unlike other pilots, here the citizens were already highly knowledgeable – “expert citizens” – when it came to biking and local mobility issues. The Province of North Brabant was interested in using citizen data to enhance its road maintenance and planning (including feeding data into a provincial Digital Twin system). The challenge was not to convince people of the importance of cycling (that was a given) nor basic digital skills (the Dutch context has high digital literacy). Rather, it was bridging the gap between official data and experienced environment. The training focus in Brabant was thus to leverage citizens' existing expertise, standardise their data collection for integration with government systems, and foster a collaborative relationship between cyclists and authorities (as opposed to the traditional advocacy vs. authority dynamic).

Training Strategy: The North Brabant approach was about refining and channelling existing knowledge through tech tools, and creating citizen “ambassadors” who could even share their know-how internationally:

- **Building on Existing Knowledge:** Since participants (many from the Fietzersbond, the Dutch Cyclists' Union) already knew the issues – from potholes to dangerous intersections – training did not spend time on the basics of cycling. Instead, it focused on aligning their reporting with the project's data protocols. Citizens were trained in how to use the GREENGAGE mobile app (and the Fietzersbond's own reporting platform, which was linked) to log issues with the precision needed for the Digital Twin models. For instance, workshops showed how to take geotagged photos of road defects and fill out a short form on the app, ensuring that each report had the necessary details (location, category of issue, etc.) to be ingested by the Province's maintenance database. Essentially, training translated the cyclists' street knowledge into a standardised data format. This included guidance on consistency. If multiple people report the same pothole, they should all use a similar description or category. The trainers explained that this consistency would make the crowdsourced data “speak” to the official system. A concept that resonated well once cyclists understood how their inputs would appear in the Digital Twin visualisation. The emphasis was on quality and interoperability of data, turning citizen observations into a credible supplement to the authorities' own sensor data. Participants appreciated seeing the bigger picture. One session walked through how a single photo upload could end up influencing a work order by the road agency, thereby validating the impact of their contribution.
- **Data Integration & Feedback Loops:** Training sessions in Brabant also covered basic data literacy to foster trust in the new “digital” process. Although tech-savvy, some volunteers were initially skeptical whether their reports would actually be used. Project staff, therefore, demonstrated the data pipeline. They showed examples of citizen-reported issues that were taken from the app into the Digital Twin and then discussed in a meeting with provincial officials. By training citizen on how to access and read the Digital Twin dashboards themselves (where they could see layers of data, including their own contributions), the pilot created a transparency loop: cyclist volunteers learned not only to collect data but also to query the data system to see outcomes by e.g., checking if a reported issue's status changed after a month (indicating it was addressed by the province). This empowered the community to hold authorities accountable in

a constructive way. It also taught them new technical skills. Some Fietzersbond members learned to navigate map-based dashboards and interpret analytics (charts of issue types, heatmaps of reports) through short training modules, thereby upskilling in digital analytics. In essence, citizens were trained to be partners in the maintenance data workflow, blurring the line between community knowledge and institutional data. This approach aligns with GREENGAGE's Institutional Empathy goal – using shared tools to dissolve barriers between government and citizens.

- **Ambassador Program:** A forward-looking element of the Brabant training was preparing its participants to act as “ambassadors” beyond their locale. Recognising the strength of the Brabant cycling community, the project encouraged some tech-savvy volunteers (including university students and seasoned cyclists) to share their methods with other pilots. These individuals received additional training on how to present the “Cycling Lab” methodology to others, effectively a train-the-trainer for cross-pilot exchange. For example, before a planned exchange trip to Copenhagen, Brabant volunteers were briefed on Copenhagen’s context and trained in comparing infrastructure conditions. The idea was that a Dutch cyclist could ride in Copenhagen and provide feedback using the GREENGAGE tools, thereby both testing the tools’ transferability and offering a fresh perspective. This did indeed happen: In June 2025, Dutch “ambassadors” joined a campaign in Copenhagen and applied the same app and sensor workflow to validate that the training protocols were robust across borders. The Brabant team also documented their “Cycling Lab” approach (a mix of community campaigning and data collection) so it could be exported. Training materials from Brabant (like their guide on categorising bike lane issues) were shared on the GREENGAGE Academy platform for any city to use. This ambassadorial outlook not only raised the profile of the pilot, but also contributed to a federated learning network within GREENGAGE. It exemplifies how a well-trained community can become a resource beyond its immediate project – amplifying impact at the European level.

In summary, North Brabant’s training was about precision and partnership. It harnessed an already engaged public, gave them advanced tools and techniques to formalise their knowledge, and in doing so, brought citizen data to a level where it could influence policy (in this case, cycling infrastructure management). By training citizens and officials on the same tools (app, Digital Twin), it built mutual understanding. The pilot turned adversarial advocacy (citizens complaining vs. government defending) into a collaborative cycle of identifying and solving issues together. This approach supports a key policy insight. When citizens are properly trained and equipped, they can produce reliable data and become constructive partners in governance, rather than mere sensor extensions or protestors. North Brabant demonstrated this with cycling, creating a model that could be extended to other domains and regions.

4.4.3 Copenhagen (Denmark): Technical Precision and Urban Planning

Context: The Copenhagen pilot operated in a highly “smart” city environment – a place with many existing data streams and generally high public trust in authorities. The focus was on supporting a new municipal traffic and air quality plan by providing detailed citizen-sensed data (particularly on noise pollution and air quality in specific neighbourhoods). The challenge in Copenhagen was somewhat unique. Citizens here are accustomed to well-run services and frequent surveys, so “Engagement Fatigue” was a risk. Furthermore, since the city already possesses reliable data, any data generated by citizens would need to be exceptionally robust to be considered by planners. Thus, the training in Copenhagen emphasised technical rigour and innovative engagement to avoid “just another survey” syndrome and to ensure citizen data could stand up to scrutiny in policy debates.

Training Strategy: The Copenhagen team’s training combined strict data collection protocols with novel engagement tactics to maintain enthusiasm:

- **Protocol Rigour: Citizens were trained to be precision data collectors.** The GREENGAGE PST in Copenhagen developed clear, stringent protocols for using the tools, and these were drilled into volunteer training sessions. For example, when measuring traffic noise, participants were instructed on doing “standing missions” vs. “walking missions” – a standing mission required staying at a fixed point for a set duration to capture noise levels consistently, whereas a walking mission could capture a noise profile along a route. Volunteers practised these in a dry run, learning why consistency mattered (moving at different speeds or distances from the

road could skew noise data). Similarly, for air quality, they were trained on where to place the Atmotube PRO sensor¹ on their person (e.g., not inside a bag or pocket) and to avoid sudden movements that could affect readings. The training highlighted that citizen science can meet scientific standards if protocols are followed. By instilling a quasi-“lab technician” mindset in participants, the pilot sought to produce data capable of challenging or complementing the city’s official models. Indeed, one outcome was a vertical noise profiling exercise where residents of different floor levels in an apartment building measured noise – the training for that was meticulous, instructing each participant exactly when and how to measure on their balcony. The resulting data revealed new insights (e.g., mid-level floors experienced the most noise due to the “canyon effect”), which gained attention from city planners. This level of impact was possible because the training had effectively turned laypeople into skilled data gatherers, focusing on precision.

- Calibration and Technical Simplification:** Given the advanced nature of the equipment and analysis (e.g., dB sound meters, air particulate sensors), the PST provided special training on calibration and troubleshooting. They simplified what would normally be an expert task. For instance, they developed a one-page cheat sheet on how to calibrate the sound sensor. Rather than a complex engineering manual, it used simple steps and a reference sound (a smartphone app generating a test tone) so volunteers could verify their device’s readings at home. Similarly, they explained in plain terms how weather conditions might affect readings and trained people to annotate their data if, say, it was a particularly windy day (because wind affects noise and pollutant dispersion). The idea was to empower citizens to handle technical reliability themselves. Training sessions often included a troubleshooting segment. Volunteers were encouraged to bring up any device issues on the forum or at meet-ups, and the team would address them, thereby educating the whole group. This built a CoP where members started to assist each other in solving technical hitches (e.g., a student volunteer might help an older participant update their app or firmware). By demystifying calibration and data validation for lay users, the Copenhagen pilot ensured that data quality remained high without requiring constant expert oversight. The success of this was evidenced when the Copenhagen group executed an Earth Day campaign capturing 360° street images and sensor data, which they managed to do with minimal on-site supervision after the initial training. A sign that the training had achieved a level of independent operability in the community.
- “Precision Engagement” Innovations:** To counteract possible “Engagement Fatigue”, training in Copenhagen was also about keeping participants interested through new experiences. One approach was the student “Surge Workforce”. The project partnered with University of Copenhagen students studying environmental science, offering them a crash course (and credit) in GREENGAGE methods. These students were trained intensively in a short time and then deployed in campaigns to boost data collection (for instance, bicycling predetermined routes with sensors during a heavy truck traffic study). Their involvement brought fresh energy and also served as a demonstration to other citizens by showcasing enthusiastic young people with gadgets, which piqued public interest during events. Another innovation was the Ambassador Exchange mentioned earlier. Copenhagen hosted Dutch cyclists for a joint campaign. Local volunteers were briefed on the insights these foreign guests might bring (e.g., comparing Danish bike lanes with Dutch ones) and how to collaborate using the app in English. This not only improved local skills (Copenhageners gained tips from Dutch best practices) but also kept motivation high by making the campaign feel part of a larger European story. Finally, the Copenhagen team quickly adopted tools from other pilots (like Bristol’s data visualisation dashboard) by learning from their counterparts, which they achieved via cross-training sessions. This rapid uptake of innovation was itself a result of the GREENGAGE training network – Copenhagen staff had the foundation to learn new tools quickly, having been trained in the general “GREEN Engine” platform. The payoff was immediate as they were able to present citizens with near-real-time heatmaps of their input, an exciting feedback mechanism that reinforced the value of participation.

¹ <https://atmotube.com/atmotube-pro>

In conclusion, the Copenhagen pilot's training was all about high technical fidelity coupled with creative engagement. By preparing citizens to collect data with near-professional accuracy, the project ensured that the citizen observations could be taken seriously in the city's smart planning processes (the data was indeed used to adjust noise mitigation measures in the local plan). At the same time, through exchanges and quick wins (like instant visualisations), it kept the community's interest alive in a context where civic participation often competes with myriad other initiatives. Copenhagen demonstrated that even in a "mature" smart city, citizen training and participation has a crucial role. It can fine-tune public engagement from broad consultation to targeted, data-driven action – a model of precision citizen science that can directly inform urban policy decisions.

4.4.4 Turano Valley & Gerace (Italy): Bridging the Digital Divide

Context: The Italian pilots took place in the rural Turano Valley (Lazio region) and the small town of Gerace in Calabria. These areas are characterised by an ageing population and "digital fragility". Many residents have low digital literacy and limited internet access, and the communities are geographically dispersed. The pilots here aimed to engage citizens in environmental monitoring (air quality, cultural heritage mapping, waste issues), but the approach had to account for scepticism of technology and the need for human contact in traditionally close-knit communities. The training challenge was to introduce modern citizen science tools in a way that felt accessible and useful to people unfamiliar with apps or sensors.

Training Strategy: The Turano and Gerace pilots employed a high-touch, personalised training approach to overcome the digital divide:

- **Hands-On Workshops:** Most training was done through in-person workshops and demonstrations, acknowledging that face-to-face instruction was essential for these audiences. For instance, workshops on air quality were organised in each locality where the team physically distributed Atmotube PRO sensors to participants. Trainers then walked everyone through each step: how to turn on the sensor, connect it to the smartphone (some participants needed help installing the GREENGAGE app first), and where to place the device to get a reliable reading. Participants practised using the sensor under guidance, comparing readings from indoor vs. outdoor or different times of day. During these sessions, the concept of data variability was explained in simple terms, e.g., why a spike in the graph might correspond to a nearby scooter passing by. By anchoring the learning in a tangible activity (holding a sensor, watching the data change in real time), the pilots significantly improved citizens' confidence and skills in environmental monitoring. Many attendees who had never interacted with such technology reported that, for the first time, they "were able to understand what the numbers really mean" in terms of air quality and daily life. This represents a concrete gain in environmental literacy through training.
- **Local Language & Simplicity:** Given low familiarity with technical jargon, the Italian teams placed heavy emphasis on language adaptation. All training content from the app interface, instructions to even the term "citizen observatory" was translated into Italian, and not just literally. The core team rephrased materials in local dialect and simpler language to make them culturally resonant. They discovered that automated translations (e.g., machine-translated text in the app) felt alien and were poorly received. Instead, they used terms that villagers could relate to. For example, describing participants as "custodians of the lake" or framing data collection as "taking care of our home's air". This careful framing in training sessions helped demystify the technology. Trainers also often opted for analogue supports like large-print handouts, posters illustrating steps with pictures, and even one-on-one tutoring for those who struggled to use their smartphones. In some cases, door-to-door visits were made with a team member who would visit a household, phone in hand, and personally teach an interested resident how to use the app or read a sensor, then leave behind a simple cheat-sheet. Such personal touches were time-consuming but necessary to include less tech-savvy demographics. A key lesson from this pilot was that for rural or digitally excluded citizens, training must go beyond online videos or tutorials. It does require patient, human interaction. Indeed, the team noted that generic how-to videos alone did not suffice; a step-by-step in-person guidance was far more effective.

- Thematic Framing to Motivate:** To capture citizens' interest, training activities were tied to concrete local issues and pride. In Turano Valley, the project linked training with the community's passion for their cultural and natural heritage. Two training events were part of a strategic engagement campaign involving students, archaeological organisations, and local citizens. These efforts resulted in what was considered the first archaeological map of the Turano Valley, with participants actively logging sites and points of interest in the GREENGAGE app. Importantly, the actors involved have expressed interest in continuing this mapping initiative even after the project's official conclusion. By doing so, residents saw the immediate relevance of the technology (it wasn't just about abstract environmental data, but about preserving their cultural heritage). In Gerace, workshops demonstrated how using the app to collaboratively report ideas for enhancing waste upcycling not only directly supported the city's waste management efforts but also helped raise awareness among tourists during peak visitation periods. Training sessions often opened with a discussion of these local issues (heritage tourism in Turano, circular economy in Gerace) before introducing the tech tools. This approach helped participants to understand why the data collection mattered. This thematic co-creation of campaigns kept the motivation of the participants high. Even with modest device and internet access, citizens became enthusiastic data collectors when they realised it could lead to, say, cleaner streets or recognition of their hometown's landmarks. Notably, by the end of GREENGAGE, local stakeholders in Turano expressed intentions to continue using the app for cultural asset mapping beyond the project's life as a profound testament to the training's success in making the tool meaningful for them.

In summary, the Italian pilots' training was human-centric and adaptive. It affected people at their level of experience and education. sometimes literally at their doorstep and built skills through trust and relevance. The combination of face-to-face mentorship, simplified materials, and framing technology as a tool for community pride bridged the digital divide and reduced the Digital Fragility. This enabled older and less tech-oriented citizens to participate in environmental monitoring and dialogue. The outcome was not only improved data (e.g. dozens of new air quality observations and mapped issues), but also empowered residents who initially had never used a smartphone app to contribute to discussions with their municipality about air pollution and waste, armed with data they collected. This approach aligns with EU policy goals of digital inclusion and ensures that the benefits of smart city innovations reach rural and vulnerable populations.

4.4.5 Challenges, Lessons Learned, and Strategic Evolution

Implementing the above training program across different pilots was a learning process in itself. GREENGAGE had to navigate several challenges, which in turn led to adaptations in strategy. By reflecting on these, the project refined its approach to maximise inclusion and impact. This section outlines key challenges encountered and the lessons learned for future citizen observatory training efforts.

Avoiding the “Technocratic Trap”: Early on, the project found that there was a risk of overwhelming citizens with too much technical complexity – a technocratic bias that could alienate non-experts. Initial training materials proudly showcased the sophisticated capabilities of the “GREEN Engine”, but feedback from both the External Advisory Board and pilot participants indicated this was not well received and counterproductive. In response, GREENGAGE pivoted to a “low-tech first” strategy in the first iteration of training. Rather than diving into sensor specifications and data platforms immediately, the revised approach started with the basics:

Why gather this data?
What local problem are we solving?

It emphasised narratives and concepts of citizen science (e.g., community stories, analogies) before introducing any complex tool. This allowed participants to grasp the purpose and build trust in the process without feeling lost in technical details. Only after this conceptual grounding did training gradually layer in the use of apps and dashboards. Furthermore, materials were drastically simplified – lengthy technical manuals were distilled into short, user-friendly guides. The GREENGAGE app interface was also refined based on user feedback, removing non-essential features and streamlining login and data entry flows to reduce the learning curve. This adaptive simplification was critical, especially in pilots

like Turano/Gerace. One clear lesson was that training must go beyond passive awareness-raising (e.g., videos). Many citizens will not absorb or retain information from a generic video alone. Instead, step-by-step, hands-on teaching is necessary for performing complex tasks. By acknowledging this, the project avoided the pitfall of assuming that a high-tech solution sells itself and it realised the human element of pedagogy is indispensable for uptake.

Digital Literacy and Inclusivity: Across the pilots, the consortium confronted a stark digital divide. On one end, there were “digital natives” like the Bristol youth or Dutch student cyclists, who rapidly picked up the app and online tools. On the other end, there were older individuals in Italy or less digitally-confident residents in Copenhagen who struggled initially. The one-size-fits-all training approach proved impossible since a uniform training would either bore the advanced users or bewilder the novices. The Cascade Model itself was the primary solution to this, as it allowed tailoring at Stage II and III for each context. For example, Turano’s high-touch, slow-paced training co-existed with Bristol’s digital-first, youth-oriented approach. In practice, respecting inclusivity meant providing multiple pathways for engagement. Those uncomfortable with smartphones could contribute via paper surveys or verbal interviews, which project staff then digitised. The pilots learned to treat such “non-digital” participation as equally valid, requiring its own training support (e.g., training volunteers to conduct paper-based surveys or facilitate conversation stations). Another aspect of inclusivity was language and cultural adaptation, as direct translations were notably not enough. The project saw that AI-generated translations were often not well received because they missed local nuance. Investing in community review of translations or even co-creating glossaries with participants was a lesson adopted mid-way. Lastly, training schedules had to be inclusive! Sessions were offered at various times (evenings, weekends) and formats (recordings, live, written) to accommodate work schedules, disabilities, or care duties. The overarching lesson learned is that effective citizen training requires a flexible, audience-sensitive approach, meeting people where they are. By flexibly adjusting methods to different digital literacy levels, GREENGAGE maintained engagement across a very heterogeneous user base.

Managing Expectations: A recurring theme was ensuring that citizen participants understood the realistic timeline and influence of their contributions. Initially, some training presentations over-promised policy impact, giving the impression that the data collected would swiftly and definitively change local policies. In politically complex environments, change can be slow, and there is a risk of disillusionment if volunteers feel nothing is happening with their input. GREENGAGE responded by incorporating expectation management modules into training for Pilot Owners and core teams. Essentially, pilot coordinators were trained on how to frame the project honestly as a collaborative experiment and learning process, not a guarantee of immediate policy shifts. They practised explaining to citizens that their data will be presented to authorities and can influence decisions, but that this is part of a longer dialogue. By setting this tone, volunteers were less likely to drop out if a city council didn’t act on a suggestion right away. Additionally, training stressed celebrating intermediate achievements – for example, if a community event raised awareness or a new stakeholder joined the conversation, that was communicated back to participants as a success, even if the final policy was still pending. This kind of feedback loop kept motivation up. The lesson here is that transparency and honest communication are key to training in citizen science, as people will remain engaged if they trust that the process is genuine and that their efforts are valued, even if it takes time to materialise.

Key Lessons Learned: Drawing from the multi-pilot experience, GREENGAGE compiled several overarching lessons for training and community activation in citizen observatories. These insights are pertinent for any similar future initiatives:

- **Training must be interactive and practical.** Simply showing tutorial videos or slides is insufficient for building real capability. Participants benefit most from doing whether it’s trying out a sensor, entering a test observation, or role-playing a conversation. Hands-on practice and stepwise guidance should be built into all training activities.
- **Tailor training to local context and capacities.** Each community has unique needs. In rural areas, personal contact trumps digital communication. Home visits, phone calls and face-to-face meetings are crucial for involving ‘offline’ citizens.. In contrast, urban youth might prefer quick online interactions and gamified approaches. A successful program will diversify its training methods (workshops, helpdesks, videos, print materials) to include everyone.

- **Make data approachable through storytelling.** One lesson was that raw indicators (e.g., a PM2.5 reading of 35 µg/m³) don't mean much to laypersons until translated into relatable terms. Therefore, training should link data to everyday life. For instance, it could explain that “This pollution level is like smoking X cigarettes a day”, or use interactive maps providing narratives, such as “These are the noisiest streets at night – is that what you expected”? Simplifying dashboards and adding narrative elements greatly improved citizen engagement with the data.
- **Invest in human translation and mediation.** The nuance of language and culture should not be underestimated. Automatic translation of apps or materials often missed the mark, so having bilingual team members or community translators refining the content was invaluable. Moreover, “mediators” (community leaders, local teachers, etc., who understand both the tech and the people) are powerful assets. Therefore, projects should train and empower these mediators early on.
- **Foster peer-to-peer support.** A long-term goal is to have the community sustain the observatory with minimal external input. GREENGAGE's use of the Discourse Forum and ambassador exchanges hints at this future. Training some participants to become mentors and by enabling knowledge sharing across regions, the project sowed the seeds for a self-supporting network. When designing a training program, think beyond the project timeline and equip the community with resources (guides, forums, contacts) so they can continue learning and solving problems together after the project ends.

By confronting challenges and capturing these lessons, GREENGAGE was able to iterate on its training methodology and enhance its effectiveness over the consolidation phase. The result was a stronger alignment between the technology (the “GREEN Engine”) and its users. The strategic evolution of training from high-tech-heavy to human-centered, from generic to tailored and from top-down teaching to peer learning stands out as a key enabler of the project's success. It ensured that the citizen observatories did not remain pilot experiments, but grew into living communities with the knowledge and confidence to drive local green agendas, embodying the EU's vision of inclusive, participatory environmental governance.

4.4.6 Training and Support Metrics

The GREENGAGE project implemented a structured, multi-level training approach across its four pilot sites, grounded in cascade learning, local adaptation, and user-centred facilitation. Training activities covered both technical and social dimensions, ranging from sensor operation and app usage to participatory engagement methods and co-design facilitation. The following table (Table 3) summarises key quantitative and qualitative metrics related to training delivery, participant reach, tool usage, and support systems implemented throughout the project lifecycle.

Table 3: Training and Support Metrics

Category	Metric/Description
Total Individuals Trained	237 direct participants across all pilots.
Cascade Training	25 Pilot Owners and Support Team members trained centrally
Total Sessions Delivered	Over 40 sessions (in-person, hybrid, online)
Training Formats	Face-to-face, hybrid, limited online use
Session Types	Tool onboarding, methodological, co-design and empowerment workshops
Training Materials	10+ user manuals, 6 demo videos

Languages Supported	English, Italian, Dutch, Danish (manual localization in rural Italy)
App Onboarding	200+ citizens trained to use GREENGAGE app
Bristol Highlights	72 youth trained (incl. 20+ from BSYV), 5 Conversation Stations used
Turano-Gerace Highlights	22 citizens trained with Atmotube PRO sensors, all materials localised manual
North Brabant Highlights	50+ cyclists/students trained, Digital Twin integration, peer-trainer coaching
Copenhagen Highlights	35 residents trained, focus on noise/air protocols, sensor calibration guidance
Support Provided	Ongoing PST support on tools, live Q&A and the Discourse platform
Feedback Mechanisms	Real-time content adaptation and training refinement in all pilots

5 Cross-Pilot Peer Support

The operationalisation of the GREENGAGE Innovation Action extends beyond isolated pilot activities; it is underpinned by a robust “soft infrastructure” of governance and peer support. This infrastructure, composed of formal boards, support teams, and exchange programs, ensured that knowledge, people, and solutions flowed freely between pilot sites. As a result, the five pilots increasingly functioned as a federated network rather than siloed experiments. For example, the Bristol team’s novel “Conversation Station” (a mobile, face-to-face engagement kiosk) was later replicated in the Copenhagen pilot to reach digitally excluded residents. Likewise, the North Brabant pilot’s volunteer cycling “ambassadors” travelled to Copenhagen in June 2025 to help measure urban noise, providing fresh external insight to the Danish team. Such cross-pilot exchanges exemplify how GREENGAGE fostered mutual learning and collective problem-solving across diverse local contexts.

“I also wanted to show that it is possible to use our technologies across different observatories... one of the main goals of the project, of course, [is] to create something that is usable in any kind of circumstances and pilots.”
– Jan Peters-Anders (Project Coordinator), EAB Meeting Oct 2025

By the mid-term of the project (around Month 18), GREENGAGE had deliberately evolved its governance structures to facilitate this kind of cross-pilot peer support. The Innovation Action Board (IAB) and the Pilot Support Teams (PSTs), originally envisioned simply as management and reporting bodies transformed into active engines of collaboration, crisis response, and “synergy finding” across pilots. In parallel, a transnational “Ambassador Programme” was launched to directly exchange experienced citizens between sites, and an External Advisory Board (EAB) was convened to inject outside expertise and ensure a focus on broader impacts. The following subsections describe how each of these mechanisms contributed to cross-pilot learning and support, with concrete examples and stakeholder insights.

5.1 The Innovation Action Board (IAB)

The IAB represented the strategic apex of the project’s peer-support ecosystem. Meeting bi-weekly and comprising all pilot coordinators (“Pilot Owners”) along with work package and technical leads, the IAB served as the key forum for consortium-wide coordination. Over the course of the deployment phase (M19–M36), its role shifted from routine status updates to rapid-response troubleshooting and knowledge brokerage. In other words, the IAB became a de facto “crisis management and synergy engine”, actively identifying challenges in any one pilot and mobilising the entire consortium’s resources to address them.

Agile Crisis Management: The IAB treated critical issues in a single pilot as systemic risks to the project, to be solved collectively rather than left as local problems. For instance, when the Copenhagen pilot discovered severe data losses (only ~17% of sensor data usable) due to the Android operating system shutting down background Bluetooth processes (vital for Atmotube PRO air quality sensors), the Board immediately escalated this from a local glitch to a consortium-wide priority. The IAB directed the technical partners to reallocate resources and develop a fix applicable to all pilots using the Atmotube PRO, accompanied by updated user guidelines. Similarly, when delays in Apple’s TestFlight approval for the MindView app’s iOS version threatened to stall data collection in North Brabant, the IAB mandated a contingency plan (a manual data capture “Plan B” protocol) to ensure continuity across sites until the app issue was resolved. These examples illustrate how the Board’s bi-weekly meetings became an effective vehicle for consortium-wide risk mitigation and rapid intervention, preventing one pilot’s challenge from undermining the others.

Knowledge Transfer and Synergy: Beyond crisis management, the IAB actively promoted the transfer of innovations and best practices between pilots. A notable case was the vertical noise profiling methodology pioneered in Copenhagen (measuring noise at multiple building heights to reveal a “canyon effect”). Once Copenhagen reported this finding, the IAB recognised its relevance to other dense urban pilots and facilitated the documentation and dissemination of this technique consortium-

wide. Another example was the coordination of the “Ambassador Programme” exchanges. The IAB deliberately timed and structured the exchange of Dutch volunteers to Copenhagen as a targeted knowledge-transfer exercise (not just a site visit), ensuring that separate pilot budgets could be leveraged for the benefit of the network as a whole. In short, the Board functioned as a “knowledge exchange hub”, standardising local successes into shared consortium assets.

The minutes and transcripts of IAB meetings from this period show a clear change in tone. Discussions moved away from formal reporting and Gantt charts, and towards concrete problem-solving and peer advice. As one participant noted, the intention was always to build tools and approaches that work in any pilot context, not just one: “*the main goal... is to create something usable in any kind of circumstances and pilots*”. By embracing this philosophy, the IAB ensured that technical resources were re-prioritised on the fly for cross-pilot benefit and that innovations in one city were swiftly communicated to all. Some key cross-pilot interventions led by the IAB during M19–M36 are summarised below:

- **Android Sensor Data Loss (Copenhagen) – Issue:** Android OS aggressively suspended a background process, causing major data gaps with Atmotube PRO sensors.
IAB Action: Declared a consortium-wide priority; instructed developers to implement a workaround and update all pilots’ user guides.
Outcome: Data collection stabilised across pilots using similar Android setups.
- **MindView iOS Delay (Cross-Pilot) – Issue:** Prolonged approval times for the iOS app version threatened North Brabant’s field activities (and could affect any iOS-dependent pilot).
IAB Action: Designed “Plan B” manual data logging procedures and metadata capture to temporarily bypass the app
Outcome: Pilot campaigns continued without losing momentum, demonstrating adaptive resilience.
- **“Vertical Noise Profiling” (Copenhagen → Others) – Opportunity:** Copenhagen’s innovative method of measuring noise at different floor heights yielded important insights.
IAB Action: Facilitated preparation of a brief and how-to guide on this method; shared it with other urban pilots (e.g. Bristol) where high-rise noise might be an issue.
Outcome: Other cities gained a ready-to-use technique for noise mapping in dense neighbourhoods.
- **Cross-Pilot “Ambassador” Exchange (NB → CPH) – Opportunity:** North Brabant’s idea to send trained citizen observers abroad to assist another pilot.
IAB Action: Coordinated timing and objectives of the exchange in collaboration with both pilots’ teams, framing it as a two-way learning exercise (Dutch volunteers would help Copenhagen collect data, and in turn bring back lessons to NL).
Outcome: See Section 5.2.1 below – the exchange successfully validated the portability of GREENGAGE methods and built personal bonds between pilot teams.

Through interventions like these, the IAB reinforced a culture of collective ownership of challenges and solutions. Technical partners no longer viewed feature requests or bugs as “someone else’s problem” tied to a single pilot, but rather as opportunities to improve the platform for all. The Board’s strategic oversight ensured that critical path dependencies were watched and that resources could be pooled across borders when needed. This not only accelerated troubleshooting but also sped up the replication of successful approaches. In essence, the IAB provided the high-level connective tissue that kept the pilots aligned and learning from each other in real time.

5.2 Pilot Support Teams (PSTs)

While the IAB operated at the strategic level, the day-to-day exchange of knowledge was driven by the Pilot Support Teams. Each pilot site had a PST consisting of local pilot leaders plus key technical and research partners assigned to support that site. During M19–M36, the PST structure was refined into a matrix setup, whereby technical partners (e.g., AIT, GISAT, MindEarth) were embedded in multiple PSTs simultaneously rather than dedicated to just one pilot. This intentional overlap meant that the same technical expert supporting (for example) Bristol was also present in PST meetings for Turano,

Copenhagen, etc., creating an organic channel for cross-pollination. A feature request or insight raised in one city would thus be immediately visible to others via the shared technical staff.

Transversal Technical Support: The matrix PST structure ensured that technical improvements were conceived systemically rather than as one-off local patches. For instance, when the Bristol team requested a new data analysis feature (thematic sentiment summarisation of citizen feedback), the developers in the PST recognised its broad utility and implemented it as a core “GREEN Engine” upgrade available to all pilots. Conversely, the “subjective safety” data schema first developed to log cyclists’ perceptions in North Brabant’s use case was generalised by PST members and applied to Bristol’s pedestrian safety surveys. By harmonising data structures in this way, the PSTs reduced duplication of work and improved interoperability across the project. Technical fixes and enhancements were discussed in weekly PST calls and, whenever relevant, rolled out across the board, effectively creating a single development pipeline feeding all pilot deployments.

Active Intermediation and Peer Learning: Beyond technical tasks, the PSTs played a crucial role as bridges between local contexts. PST members acted as intermediaries translating between the project’s central requirements and each pilot’s sociopolitical reality. In Bristol, for example, the PST served as a buffer shielding the Citizen Observatory’s work from local political turmoil. Bristol’s pilot was intertwined with a contentious “Liveable Neighbourhoods” traffic-calming initiative, which at times made community engagement politically sensitive. The PST (including partners KWMC and UWE) actively worked to maintain the Observatory’s neutrality and trust by clearly separating GREENGAGE activities from the City Council’s agenda and providing an atmosphere where all community members felt safe to participate. Lessons from this experience were shared with other pilots facing stakeholder trust issues. Similarly, PST members exchanged know-how on engagement tactics like how to recruit volunteers in rural villages (Turano) versus dense urban areas (Copenhagen) or how to handle language barriers, etc. Regular cross-pilot PST meetings (often as part of IAB calls) provided a venue for troubleshooting these challenges collectively.

Several PST-coordinated peer support actions emerged during this period:

- **Testing Each Other’s Protocols:** Pilot teams began to test and validate methodologies in one another’s contexts. For example, the Bristol PST tried out Copenhagen’s survey protocol for sensor training, providing feedback before Copenhagen’s rollout. Likewise, Turano’s team received advice from North Brabant’s PST on setting up cycling routes for data collection, adapting the Dutch approach to an Italian rural setting.
- **Resource Sharing:** When one pilot lacked a particular expertise, PST members from another site stepped in. In one case, North Brabant’s data analyst assisted Turano in processing dashcam footage of rural roads, since North Brabant had earlier experience with similar AI analysis. In another, Bristol shared its graphic design templates for public outreach with Copenhagen, sparing the Danish team from starting from scratch.
- **Unified Training Materials:** The PSTs collaborated on creating common training modules and handouts that could be used (with minor localisation) in all pilots. This was more efficient than each site writing its own manuals, and it reinforced a consistent standard. For instance, a concise “Citizen Observer Handbook” was co-authored by PST members from multiple countries, combining best practices from all pilots, and then translated for local use.

Through these mechanisms, the PSTs acted as the project’s “operational connective tissue”. They not only mentored the local pilot teams but also ensured that innovations at one site were quickly communicated to others by virtue of shared personnel. The matrix team approach broke down silos and built a spirit of horizontal peer support among pilot implementers. By the end of the period, pilot teams were openly “joining forces” to produce joint outputs. As one consortium member suggested during an IAB/PST coordination meeting, *“maybe we could create a little data story... referring to basically all our pilots... to highlight [the] impact on air pollution, noise... and how the observatory can help”*, rather than separate stories per city. This ethos of collective action was a direct result of the trust and familiarity that the PST network nurtured across countries.

5.3 The “Ambassador Programme” and Exchanges

A cornerstone of GREENGAGE’s cross-pilot peer support strategy was the “Ambassador Programme” (see Deliverable D7.13 – Citizen Observers’ exchange programme 2). This initiative went beyond virtual meetings and document-sharing, enabling the physical exchange of “expert citizens” (experienced volunteer observers) between pilot sites. The concept was simple: a citizen trained in one pilot would travel to another country to assist with that pilot’s activities, thereby stress-testing the transferability of GREENGAGE’s methods and technology in a completely new context. In practice, the “Ambassador Programme” served multiple purposes, including providing on-the-ground support to the host pilot, enabling visiting “ambassadors” to compare methodologies and generating rich feedback for the consortium on what worked across borders.

- **Flagship Exchange (June 23–24, 2025 – North Brabant ⇄ Copenhagen):** The most prominent ambassador exchange involved the North Brabant (NL) and Copenhagen (DK) pilots. In late June 2025, three Dutch volunteer observers drawn from North Brabant’s pool of cycling enthusiasts travelled with pilot staff to Copenhagen for a two-day joint campaign. Far from a ceremonial visit, this exchange was carefully structured to achieve tangible outcomes:
 - **Deployment of Expertise:** The Dutch “ambassadors”, already skilled in using the GREENGAGE App and sensor kit from their cycling observations in Brabant, were integrated into Copenhagen’s noise monitoring campaign. At the time, the Copenhagen team was facing volunteer “fatigue” and recruitment bottlenecks. The visiting “ambassadors” acted as a surge capacity, augmenting the local team during critical noise measurements in busy urban streets. Their presence not only filled a manpower gap but also energised the local observers through fresh enthusiasm and a sense of European solidarity.
 - **Protocol Calibration:** Both teams treated the exercise as a chance to see how well their training protocols transferred. The Dutch volunteers attempted tasks in Copenhagen exactly as they had learned them at home by using the app to record decibel levels, taking qualitative notes on perceived noise sources, etc. The fact that they could do so effectively “with minimal retraining” proved that a citizen trained in one country could operate in another, validating the universality of the training materials. This was a strong endorsement of GREENGAGE’s pedagogy. Even differences in language or urban environment did not impede the core data collection procedures.
 - **Technology Stress-Test:** The exchange also demonstrated the “agnostic utility” of the “GREEN Engine” (the project’s digital platform) under real-world conditions. The Dutch ambassadors installed and used the latest app built in Copenhagen without technical support, just as any local user would. That the sensors and app functioned smoothly for foreign users was an important proof-point that the tools were not over-fitted to one pilot’s needs. As one consortium member put it, if a Dutch student can land in Denmark and immediately contribute data, it confirms the system’s robustness and user-friendliness across borders.
 - **Mutual Learning and “Fresh Eyes”:** Perhaps the greatest value came from the qualitative insights exchanged. The visiting “ambassadors” inevitably noticed things that local participants took for granted. Coming from the Netherlands, a country with very advanced cycling infrastructure, they offered the Copenhagen planners a fresh outsider perspective on the city’s bike routes and noise issues. According to project notes, the Dutch cyclists identified certain street design deficiencies in Copenhagen that locals had normalised over time. This kind of peer-to-peer review (citizens from one city assessing another) provided a unique form of feedback. In effect, the “ambassadors” acted as critical friends, benchmarking Copenhagen’s progress in areas like active mobility against their home context. The Dutch team also learned from Copenhagen’s approach to community outreach in a dense city, which they took back to North Brabant. Both sides thus benefited: tacit knowledge regarding volunteer engagement and data collection tactics, among other things, was shared over coffee and during field walks in a manner no report or Zoom call could replicate.

“[Our university] is willing to have an exchange of students with Copenhagen... some kind of exchange might be happening end of June... [where] ambassadors might bring some students to Copenhagen [to] make comparisons in terms of this idea of height and different ways to measure noise.” – North Brabant Pilot Lead discussing plans in IAB meeting

By all accounts, the June 2025 Ambassador Exchange was a success. It validated that GREENGAGE’s citizen science model could travel well and that participants themselves could be agents of cross-pilot knowledge transfer. The “ambassadors” returned to North Brabant and helped write a comparative report for the consortium, reflecting on differences and similarities observed in Denmark (e.g., urban noise dynamics, community responses). This report was shared with all pilots, further spreading the lessons. There was even discussion of a reciprocal visit (Copenhagen sending citizens to the Netherlands) to continue the exchange, and ideas to involve other pilots in future ambassador rounds.

Broader Ambassador Activities: In addition to the marquee NB–CPH exchange, the project leveraged the “ambassador concept in other ways. For instance, pilot teams arranged for some local ambassadors to attend international events and conferences, effectively acting as peer mentors and representatives of the GREENGAGE community. In late 2025, a group of Dutch student ambassadors from the Breda Living Lab (North Brabant) were invited to the Smart and Sustainable Planning Conference in Italy, after being given a crash course in GREENGAGE tools. Likewise, plans were made to transport Bristol’s “Conversation Station” setup (including an artist-facilitator) to Copenhagen during a city event, funded by the Ambassador budget. “We have a conversation station in Bristol... and this is something that Cameron will bring with him to Copenhagen”, noted the project coordinator in one meeting. By covering travel costs and logistics through the “Ambassador Programme”, the consortium enabled this cross-pilot transfer of an engagement tool, giving Copenhagen residents a chance to experience Bristol’s approach first-hand. All these activities underscore how the “Ambassador Programme” was used flexibly to catalyse cross-pilot learning, whether through direct citizen exchanges or the sharing of participatory methods.

The “Ambassador Programme” provided a human dimension to peer support that complemented the digital and institutional linkages. It not only helped solve immediate implementation issues (e.g., providing extra hands for data collection) but also built a sense of camaraderie and common purpose among the pilots. Citizens and facilitators who participated came away with a richer perspective on environmental challenges across Europe and new ideas to apply locally. This federated approach to citizen science – where an observer from one city can actively contribute in another – is a standout legacy of GREENGAGE’s community-building efforts.

5.4 The External Advisory Board

GREENGAGE’s cross-pilot peer support ecosystem was further strengthened by the inclusion of an External Advisory Board (EAB). The EAB consisted of independent experts (from academia, public sector, etc.) who convened at key project milestones (e.g. mid-term and final year) to review progress and provide strategic advice. Unlike the IAB and PSTs, which were inward-facing, the EAB brought an outside perspective and a critical eye to ensure that the project’s outputs would have value beyond the immediate pilot implementations. In effect, the EAB served as a “reality check” mechanism, challenging the consortium to address long-term sustainability, policy relevance, and replication potential in its peer learning approach.

Contributions to Cross-Pilot Learning: The EAB encouraged GREENGAGE to abstract and generalise the lessons from individual pilots so that they could benefit a wider audience. For example, during the second EAB meeting (Oct 2025), advisors pressed the team to clarify who the ultimate target audience of the project’s knowledge products would be – just the partner cities, or any European city/community interested in citizen observatories? They cautioned that the answer should shape how results are packaged. “Who is the target audience?... it’s very different the way you write [for different audiences]”, one EAB member noted, drawing on comparisons to previous EU projects. This prompted an internal discussion to ensure the planned “White Book” or final toolkit would be digestible not only for technical

experts but also for city practitioners and community groups. The EAB also emphasised storytelling and clear examples: rather than overwhelming readers with data from all pilots, they suggested highlighting a few compelling cross-pilot use cases to demonstrate impact.

Another pivotal insight from the EAB concerned the complexity of the technology stack. The GREENGAGE platform involved a suite of tools (mobile apps, sensors, dashboards, data stores) which, in totality, could be daunting for a non-technical city administration to adopt. The advisors urged the project to simplify and prioritise usability in its legacy materials. They warned that a massive technical manual documenting every tool in exhaustive detail would likely “be ignored by time-poor planners”. Instead, the EAB recommended focusing on key modules and providing step-by-step guidance to implement a citizen observatory in practical terms.

“...From your background... you used the term ‘radically user-friendly.’ I think that’s key – embedded in local culture... How can you ensure [the output] is contextually relevant and radically user-friendly?” – External Advisor feedback on final toolkit design

Furthermore, the EAB pushed the pilots to think about their post-project legacy and support networks. They asked how cities would continue to collaborate or get help once the funded period ended, effectively prompting the idea of a self-sustaining “community of practice” across pilots. In response, the project began scoping an affordable support service or knowledge hub that could persist after Month 36, so that the cross-pilot learning infrastructure would not vanish when the project concludes. This led to proposals (for example) of an online forum for GREENGAGE cities and a light-touch mentorship scheme where mature pilot teams (like North Brabant) could continue advising newer ones. While such ideas were outside the original scope, they demonstrated the EAB’s influence in steering the consortium toward long-term, trans-local thinking.

In sum, the EAB played a vital quality assurance and strategic alignment role. Their external viewpoints ensured that GREENGAGE’s peer support mechanisms were not insular but rather were oriented toward reproducibility and impact. By acting as critical friends, the advisors helped the project distil the rich cross-pilot experiences into clear messages and tools that an EU city outside the consortium could use. The EAB’s stress on “keeping it practical” and focusing on legacy helped the GREENGAGE team frame the cross-pilot learnings in a way that would be useful for European public authorities at large – a key expectation of an EU-funded Innovation Action.

Cross-Pilot Peer Support in Practice: A Unified Network

Through the combined efforts of the IAB, PSTs, “Ambassador Programme”, and EAB, GREENGAGE built a peer-support ecosystem that underpinned every pilot’s success. Challenges that emerged in one locale were swiftly discussed and addressed with input from all, and innovations were treated as common assets to be shared, not guarded. By the end of M36, the pilots were no longer five separate experiments; they were five nodes of a single learning network. They exchanged people, tools, and ideas fluidly, demonstrating a true trans-local community of practice. A Bristol youth ambassador could speak to an Italian mayor about citizen engagement; a Dutch sensor expert could help fix an issue in Denmark, and a solution devised in rural Turano could inspire a change in metropolitan Copenhagen. The essence of GREENGAGE’s cross-pilot peer support is the mutual empowerment through continuous exchange.

The tangible outcomes of this approach are evident. The Dutch-to-Danish ambassador exchange proved that GREENGAGE’s methods work across borders and provided a “fresh perspective” to improve local projects. The transfer of Bristol’s Conversation Station to Turano-Gerace showed that human-centered engagement techniques have universal relevance when technology intimidates or trust is low, a friendly face at a table can bridge the gap anywhere. Dozens of such cross-pilot inspirations, big and small, were documented. Collectively, they ensured that lessons learned in one pilot immediately benefited all the others. This federated model of peer support greatly accelerated problem-solving and amplified impact, and it stands out as a best-practice example of European collaboration. By institutionalising cross-pilot

peer support, GREENGAGE not only met its objectives in each city but also created a legacy of interlinked communities ready to carry forward the Green Deal innovations together.

AWAITING VALIDATION BY THE EUROPEAN COMMISSION

6 Community Building and Campaigning

6.1 Bristol: Civic Observatories in Contested Spaces

Table 4: Bristol KPIs

KPI Category	KPI Code	Target	Achieved	Evidence / Notes
Participation & Community	O1.KPI1 – Citizen Observatories created	≥2	2	Two COs: (1) Bristol Citizen Observatory (iteration 1), (2) Bristol Civic Observatory in Barton Hill (iteration 2), delivered with KWMC, UWE, PRAXIS, local ambassadors & BCC
	O1.KPI2 – People involved in COs	≥250	288	94 participants at public pop-ups + 194 via targeted groups (youth, migrant women, disabled residents, school pupils, community groups).
	O1.KPI3 – Disadvantaged participants	≥80	Met / exceeded	Intensive inclusion of Somali & Sudanese women, disabled residents, low-income households; most ambassadors & observers were women
Activities & Campaigns	O1.KPI4 – Thematic co-explorations	≥2	2	Iteration 1: “Safety” with youth. Iteration 2: mobility patterns, pedestrian safety & governance-related reflexive conversations feeding EBLN evaluation.
	O3.KPI2 - Experiments	≥4	4	Focus areas: Mobility patterns, pedestrian safety, youth-led missions, and qualitative governance conversations
	O4.KPI4 – Ad-hoc campaigns	≥1	3	Conversation Station campaign series, including BS5 Arts Trail, Big Up Barton Hill, Redfield Play Street, Barton Hill Datathon, Watershed Showcase, UniBris pop-up.
Tools, Technology & Datasets	O2.KPI1 – New datasets crowdsourced	≥4	4	Datasets from GG App missions, Conversation Station voice notes, MindView tests; additional baseline requested from Vivacity sensors. AQ dataset dropped
	O2.KPI2 – Datasets contributed to existing systems	≥3	In progress	Integration with Vivacity mobility baseline under review; AQ use case discontinued
	O2.KPI3 – Harmonised datasets	≥2	In progress	Harmonisation in development (GG App + Vivacity + conversation data).

	O4.KPI3 – Co-created analytics examples	≥4	5	Multiple Superset dashboards visualising pedestrian safety, mobility, and voice data.
Policy Impact	O3.KPI1 – Existing urban policy changes	≥2	1	Covered in D5.2
	O3.KPI3 – Existing policies revisited	≥2	1	Covered in D5.2
	O3.KPI4 – Lessons and recommendations	≥5	5+	Covered in White Book D6.7

The Bristol pilot exceeded the expected participation targets, engaging 288 people across two iterations of the Citizen Observatory, with particularly strong involvement from disadvantaged groups, including migrant women, disabled residents, and young people. Engagement was intentionally embedded within existing community networks such as Wellspring Settlement, Somali Youth Voice, and Swannery Youth Club, allowing the Observatory to reach participants who are traditionally underrepresented in local consultation processes

Training activities enhanced community capacity by equipping 11 local ambassadors, facilitators, and staff with practical skills in observation, storytelling, and the use of GREENGAGE tools. These trainings were customised to the Bristol EBLN context, focusing on crossings, pedestrian safety, and lived-experience reporting. Public-facing events, such as the Conversation Station pop-ups, the Barton Hill Datathon and the Watershed showcase, played a crucial role in sustaining engagement and making participation accessible to those unfamiliar with digital tools.

Overall, the Bristol Civic Observatory demonstrated a high level of inclusive, community-led engagement, enabled by strong partnerships, targeted outreach, and the use of playful and accessible methods that lowered barriers to participation.

6.1.1 Introduction: The Geopolitics of the Neighbourhood in Transition

The operational timeframe from Month 19 to Month 36 of the GREENGAGE Innovation Action represents a fundamental epoch in the project's deployment within the United Kingdom. While the exploratory phase (M1–M18) was dedicated to establishing the Citizen Observatory (CO) architecture and technically validating the “Green Engine” stack, the subsequent period necessitated a radical pivot toward “Institutional Integration” amid a volatile sociopolitical landscape. Geographically and socially anchored in the inner-east wards of Barton Hill and Redfield, the Bristol pilot provides a paradigmatic case study of the friction generated when top-down decarbonisation policies collide with the lived realities of marginalised urban communities.

This subsection synthesises activities previously labelled “Community Building” and “Campaigning” into a cohesive narrative of civic intervention. In East Bristol's contested space, building a community of practice became ipso facto a political campaign for recognition, and any campaign for data collection relied on constructing a resilient social infrastructure.

The Context of Contestation: The East Bristol Liveable Neighbourhood (EBLN) scheme, as a flagship municipal policy to reduce rat-running, improve air quality, and promote active travel via new bus gates, modal filters, and pocket parks, became a lightning rod for community grievance during this period. By late 2024 and throughout 2025, discourse around the EBLN split into a polarised binary, turning the neighbourhood into an active political battleground. The Green-led city administration and environmental advocates promoted the scheme as being necessary to achieve Bristol's ambitious Net Zero 2030 goals and to address chronic health inequalities caused by traffic pollution. In contrast, a diverse coalition of long-term residents, local business owners, and opposition groups criticised the interventions as “heavy-handed” and undemocratic. The friction was not merely rhetorical. Early 2025 saw physical showdowns.

On January 27, 2025, police were called as residents formed a blockade to stop contractors from installing a bus gate in Barton Hill. Detractors described the scheme in the language of incarceration, labelling the modal filters an “open-air prison” and invoking the far-right “15-minute city” conspiracy narrative of state control. The political opposition intensified as the Labour group demanded the immediate reversal of key measures on Avonvale Road and Marsh Lane, and accused the council of conducting “sham consultations” designed to manufacture consent.

The Evolving Role of the Civic Observatory: In this hyper-charged context, the role of the GREENGAGE Observatory evolved. It could no longer simply function as a neutral instrument for passive data collection. The Bristol pilot had to become an active intermediary, acting as both a community-building initiative and a campaigning force, and channelling community frustrations into constructive dialogue. This meant embracing the politics of the neighbourhood in transition. Rather than avoiding conflict, the Observatory’s mandate was to engage with it and transform it into co-created evidence. The following sections detail how the Bristol team responded with theoretical reorientation, innovative engagement tools and micro-targeted inclusion strategies, ultimately the operational launch of a resilient Civic Observatory.

6.1.2 Theoretical Architecture: From Extraction to Repair

The methodological pivot undertaken in M19–M36 was underpinned by a sophisticated theoretical evolution within the consortium regarding the sociology of Smart Cities. Traditional Smart City paradigms often treat the urban environment as a source of objective truth waiting to be harvested, casting the citizen primarily as a “distributed sensor”. The Bristol pilot rejected this positivist, extractive approach as insufficient for a contested space.

The Subjective Layer as Critical Infrastructure: The pilot adopted a “Repair” strategy, insisting that the Civic Observatory must capture the subjective layer of the city to make quantitative data meaningful. A traffic sensor might record a 30% reduction in vehicle traffic on Ducie Road, but it cannot record the sentiment of a disabled resident who feels their personal mobility has been curtailed by a new modal filter. In a democratic society, that qualitative data point is as critical to policy legitimacy as the traffic count. By failing to capture such sentiments, official datasets risk presenting an incomplete reality that fuels community resentment. The Bristol pilot’s “campaigning” activities in M19–M36 were therefore designed to treat sentiment data like voice notes, personal narratives or qualitative feedback as first-class evidence. This approach aligned with the project’s “Ethics of Care” framework (introduced in GREENGAGE’s training program), which mandates caring for the community’s social well-being as much as for environmental data quality. In practice, it meant the Observatory would collect stories and perceptions alongside sensor readings, repairing the disconnect between technocratic metrics and lived experience.

Active Intermediation and the “Third Space”: Active intermediation defines the governance role assumed by the pilot partners in Bristol. In a polarised environment where direct communication between “the Council” (proponents of EBLN) and “the Community” (subjects of EBLN) had degenerated into adversarial posturing, the pilot acted as a buffer. The GREENGAGE infrastructure provided a neutral “third space”, both physical and conceptual, where residents could express grievances without fear of being immediately dismissed. The pilot’s independence from municipal authority (as an EU-funded research project) helped circumvent the “consultation fatigue” plaguing official channels. Data collected from the community was anonymised and structured into rigorous datasets that could be presented back to policymakers, translating raw community anger into actionable policy evidence. This translation of noise into signal became the core function of a Civic Observatory in a contested space: to listen actively and then speak in a language that power understands.

6.1.3 The Conversation Station: Engineering Analog Trust

The central engagement artefact of the Bristol pilot during M19–M36 was the Conversation Station. Recognising that digital-only tools (apps, online surveys) can exclude residents in areas with high deprivation and low digital literacy, the Pilot Support Team (PST) developed a physical, mobile kiosk for face-to-face dialogue. This pop-up station was distinctively branded yet approachable – essentially an “analogue interface to a digital engine”.

Design Philosophy: Rather than advertise itself as a data-collection device (which could alienate lay citizens), the Conversation Station drew people in with the promise of human conversation. It was deployed in high-footfall public spaces like street corners, parks, school gates, community fairs, and staffed by trained facilitators. The strategy was simple: Empathy first, Technology second. Facilitators opened with easy, open-ended questions (“*How is the new traffic scheme affecting your day?*” “*Do you feel safe walking here at night?*”) to spark dialogue. Only after a resident felt heard would the team introduce digital tools showing, for example, how the GREENGAGE mobile app or sensors could help validate and amplify the resident’s experience. This sequencing was crucial to avoid the usual “technocratic trap” that derails many smart city initiatives.

Chronology of Deployment – The “Pop-Up” Campaign: Throughout late 2025, the PST executed a rigorous pop-up campaign, targeting specific micro-geographies and demographics within Barton Hill and Redfield. This campaign of presence was designed to build momentum toward the full Observatory launch. Key events in the sequence included:

- **Test Run – September 7, 2025:** The Conversation Station’s first outing was a low-profile test in a public square inside the EBLN zone, engaging 12 adults. Strategic intent: Stress-test the engagement script and identify the conversational “hooks” that most effectively shifted discussions from general complaints about “gridlock” towards constructive observations on environmental quality. Operational insight: The session validated the station’s physical setup and facilitators’ ability to de-escalate potentially hostile interactions. The mere presence of a friendly kiosk and empathetic listeners proved effective at defusing tensions that might otherwise explode as online vitriol or street protests.
- **Youth Integration – September 13, 2025:** A pop-up focused on intergenerational dialogue engaged 4 adults and 5 young people. This event marked the public alignment of GREENGAGE with the Bristol Somali Youth Voice (BSYV) group. In Barton Hill, where the Somali community is a significant and traditionally underrepresented demographic, partnering with BSYV was strategic. Mechanism: Involving youth as station co-facilitators helped soften the intervention’s image. For example, when a local teenager demonstrated an air quality sensor to an elder, the dynamic shifted from “government survey” to “community education”. This intergenerational bridge became a hallmark of the Bristol approach, reinforcing the idea that everyone, regardless of age, had a stake and a voice in the observatory.
- **Business Outreach – September 24, 2025:** Moving into the economic heart of the neighbourhood, the station popped up on Avonview Road, deliberately positioning itself outside local shops and cafes. This area had been a hotbed of EBLN resistance, with many shopkeepers feeling that the new road filters and bus gates threatened both their deliveries and number of customers they received. Context: 7 adults (including several business owners) participated. Engagement strategy: By setting up on their doorstep, the pilot signalled that economic concerns were not outside the environmental mission. Owners were invited to voice very specific complaints (e.g., disrupted delivery routes), and these were logged as data points. Capturing this logistical friction provided evidence that could be used to refine policy; for instance, it could be used to suggest time-limited delivery access windows instead of a blanket ban. The act of listening to business owners in situ also built goodwill that pure traffic data could never earn.
- **School Street Event – September 25, 2025:** Timing one deployment to coincide with a “play street” event at Redfield Educate Together School allowed the Observatory to engage parents during the school pick-up hour. In this pop-up, 7 adults and 2 children took part. The setting was symbolically potent: play streets temporarily close roads so children can play safely, a microcosm of the Liveable Neighbourhood’s aims. Narrative reframing: Discussing the scheme in this context shifted the focus from drivers’ inconvenience to children’s safety. Parents who initially complained about longer car journeys found themselves considering the benefits of cleaner air and safer crossings for their kids. This reframing – from traffic restrictions to child wellbeing – proved to be a powerful way to build support.
- **Community Anchors – October 1 & 9, 2025:** To strengthen its local presence, the Conversation Station was then hosted by trusted community institutions (“anchors”). On October 1, it operated

from the Barton Hill Settlement community center, engaging 12 staff and residents. On October 9, it moved to the Barton Hill Health Centre, engaging 8 staff and patients. Health Nexus: By situating the dialogue within a healthcare setting, EBLN and GREENGAGE were reframed as a public health initiative rather than transport project. Healthcare professionals and patients readily recognised the connection between reducing traffic and improving health outcomes, such as respiratory conditions and active living. These sessions established clear links between street changes and medical impacts, broadening the conversation beyond transport. The project was embedded in places that people associate with help and care, such as a community centre and a clinic, which also reinforced trust – the Observatory was seen as working alongside community services, not against them.

Each of these pop-up events built momentum toward the Observatory's full launch. By early October 2025, a groundswell of awareness and diverse participation had been achieved, setting the stage for the transition from community listening to community action.

6.1.4 Micro-Targeting and Inclusivity: The "Hidden" Voices of Barton Hill

A defining characteristic of the Bristol pilot's community strategy in M19–M36 was its refusal to treat the "community" as a monolith. The PST recognised that in a contested space, the loudest voices often belong to organised interest groups, affluent homeowners, or politically active residents. To counter this asymmetry, the team executed a deliberate "micro-targeting" strategy, crafting specific engagement formats for groups historically excluded from urban planning discourse. In East Bristol, this is referred to as migrant women, disabled residents, and local youth groups whose voices are rarely heard in traditional consultations.

- The Somali and Sudanese Women's Mobility Group:** The pilot identified a critical data gap regarding the mobility patterns and needs of women from the Somali and Sudanese communities in Barton Hill. Anecdotally, it was suspected that EBLN measures (road closures, new traffic filters) might disproportionately affect these women, who often rely on cars for complex trip-chaining (e.g. school drop-offs, grocery runs, caregiving across town) and for personal safety during night travel. Such nuances were absent from the Council's traffic models, which optimise for aggregate flows and rarely consider gendered mobility or cultural norms. Building on the trust established through previous Conversation Station pop-ups, the PST organised a culturally appropriate workshop to engage these women specifically.
- Group Discussion Workshop (October 17, 2025):** A dedicated workshop was convened for Somali and Sudanese women who are car drivers in the area. The turnout far exceeded expectations, with 26 women attending – a remarkable number given that they are traditionally considered to be a "hard-to-reach" demographic. This robust participation was facilitated by co-hosting with BSYV and employing female facilitators from the community (including bilingual support), which created a comfortable environment. Significance: Gathering a cohort of this size from a specific linguistic and cultural minority yielded a valuable qualitative dataset and indicated a high degree of trust in the Observatory's process. Data insights: In candid discussions, the women voiced concerns about the Liveable Neighbourhood scheme that would probably not be captured by a survey. For instance, although the road filters may reduce through-traffic, the women expressed concerns about feeling unsafe when walking through suddenly quieter streets at night, and frustration with longer car routes that complicate their daily routines. These narratives highlighted the tensions between environmental goals and personal security and autonomy. Capturing this tension added a crucial subjective layer to the evidence base providing information for improvements such as better lighting in secluded areas and exemptions for essential caregivers. Essentially, this workshop ensured that the policy debate included a perspective centered on gender, culture, and safety, rather than focusing solely on traffic counts.
- 'Consta' Deep-Dive (October 24, 2025):** Following the large workshop, a more intimate follow-up session was held one week later using the Conversation Station (locally nicknamed "Consta"). Seven of the women returned for this deep-dive engagement. Methodology: This smaller setting enabled facilitators to record detailed personal testimonies

and even audio “voice notes” from participants. It provided space for one-on-one or small-group conversations, delving deeper into individual stories that illustrated the broader themes from the workshop. The result was a rich qualitative archive of female migrant experiences in East Bristol’s changing urban landscape. Such data serves as a critical counterweight to the generic “average user” assumptions in transport planning. For instance, by documenting how a mother might navigate the new street layout with children in tow and groceries in the car, the Observatory generated actionable insights (e.g., identifying which specific intersections required improved crossing aids or signage). These sessions demonstrated how micro-targeting promotes inclusion. The voices of a marginalised subgroup were not only heard but documented in detail and fed directly into the city’s evaluation of the scheme.

Including Disabled Residents – Co-designing for Accessibility: In parallel with the above, the Bristol team also reached out to local disabled residents, whose mobility concerns and perspectives on the EBLN were essential yet largely absent from public debate. Working with the Bristol East Disabled Society, the pilot co-designed a storytelling and sense-making workshop to capture these voices. After a planning meeting on November 4, 2025, to tailor the session to participants’ needs, the workshop took place on November 28, 2025, with 5 residents and 2 facilitators in attendance. In a safe, small-group setting, participants – some using mobility aids – shared how street changes were affecting their daily routes, access to services, and overall independence. The use of creative methods (like mapping exercises and personal journey logs) helped surface concrete issues such as insufficient disabled parking bays after road changes, confusion over new traffic rules for community transport vans, and difficulties navigating longer detours in wheelchairs. These insights were compiled by the facilitators and added to the Observatory’s evidence repository. By proactively involving a disabled persons’ group, the pilot ensured that recommendations to the Council would address accessibility – a legal and moral imperative – thus turning a typically hidden voice into direct feedback for policy repair.

(The targeted youth engagements are detailed in Section 6.1.5, as they formed a distinct partnership and program.) It is important to note that across all these micro-targeted efforts, the inclusivity strategy was not ad hoc but systematic. Outreach was often led by women, and indeed most of the Bristol pilot’s volunteer Observers and community Ambassadors were women, helping to build trust in communities where representation matters. By M36, the pilot had engaged a combined 288 individuals in East Bristol – 94 through public pop-ups and 194 through targeted group activities – far exceeding the original participation goal (250 per pilot). Crucially, this included significant numbers of people from disadvantaged or marginalised groups (e.g. recent immigrants, low-income families, disabled residents), well above the project’s inclusion KPI target of 80. In sum, Bristol’s Observatory was designed for those who are often left out, ensuring that the data and insights gathered were as diverse as the community itself.

6.1.5 Generational Equity: The Youth Voice Partnership

In tandem with engaging migrant women and other groups, the Bristol pilot ran a sustained campaign to elevate young people’s voices – effectively injecting generational equity into the observatory. This was implemented through a partnership with the Swannery Youth Club at the Wellspring Settlement, creating a youth-led strand of the project. The rationale was clear: teenagers and children are the “future users” of the city and will inherit the outcomes of today’s policies. Yet they are almost always excluded from local political debates, which tend to be dominated by older adults who are focused on property values and driving convenience, etc. The pilot aimed to address this issue by treating young people as equal stakeholders and providing them with tools to study and influence their environment.

The Curriculum of Co-Creation: Unlike one-off youth consultations, which can seem tokenistic, Bristol structured its youth engagement as a multi-session co-creation curriculum. Between September and October 2025, a core group of around a dozen local youths participated in an iterative program, effectively becoming co-researchers in the observatory. This approach positioned them not just as data collectors but as contributors who could define the observatory’s agenda.

- **Recruitment and Introduction (September 15, 2025):** The cycle began with an introductory workshop involving 10 young people and 2 youth workers. In this one-hour session, facilitators from KWMC and UWE introduced the concepts of citizen science and digital advocacy in accessible, youth-friendly terms. Crucially, the GREENGAGE tools were framed not as

homework or a school exercise, but as instruments of empowerment: “tools to prove to adults what needs changing in your area”. This approach immediately positioned the young people as experts about their own neighbourhood, validating their experiences with speeding cars, unsafe crossings and a lack of green space as important data.

- **Deep Engagement & Gamification (September 22, 2025):** The same group of people reconvened for a substantially longer workshop – a five-hour immersive session. Keeping the attention of teenagers for a full five hours required creative facilitation; the team employed “serious play” techniques and gamified activities to ensure that the session remained engaging yet substantive. During this deep-dive, the youth explored the GREENGAGE App interface, experimented with portable sensors (like Atmotube PRO air monitors), and engaged in role-playing exercises about urban issues. This sustained engagement allowed them to become comfortable with the technology and to start connecting abstract ideas (climate change, urban planning) with tangible local issues they cared about (e.g., litter in parks, traffic near school).
- **Co-Design and Mission Definition (September 23, 2025):** In a critical empowerment step, a “Planning and Missions Design” workshop was held with 12 young people and 3 supporting staff. Here, the youth themselves set the agenda. They brainstormed what they wanted to measure or investigate in their community. While adult stakeholders might focus on issues such as parking or commuting times, young people prioritised safe routes to school, adequate lighting in parks at night, and the availability of free, “hangout” places unmonitored or restricted by adults. This session effectively “forked” the Observatory’s research agenda, creating a parallel youth-led workstream. By deciding on their own objectives (e.g., conducting “walkability audits” of school routes or mapping areas where they feel unsafe), the young participants ensured that the final data outputs would reflect a multi-generational perspective of the Liveable Neighbourhood, rather than just the usual adult concerns. This is a rare outcome in civic projects: not only did the young people join an activity defined by adults, but they also helped to define the project’s direction.
- **Refinement and Storytelling (September 29 & October 21, 2025):** The curriculum concluded with follow-up sessions to refine research questions and plan a creative Storytelling Workshop with a local artist. The decision on including an artist was intentional. The pilot wanted the young people’s findings to be expressed in a compelling visual or auditory format, rather than in dry reports. This resulted in the creation of a collaborative art piece: a map-based “soundscape” of their neighbourhood, combining recorded sounds and narratives which communicated the young people’s perspective on living in East Bristol. By late October, the youth team had designed and carried out their own mini-projects (with tasks that included counting the number of safe versus unsafe road crossings and documenting places they enjoyed or feared) and were preparing to present their findings and insights. This process taught them new skills in data collection and storytelling, while providing the Observatory with new data streams (for example, a youth-conducted audit of street lighting conditions or the aforementioned crossing safety evaluations).

This youth partnership not only empowered participants but also demonstrated the value of inter-generational collaboration. The young people became ambassadors for the project within their own families – some even taught their parents how to use the GREENGAGE app or explained the purpose of the sensors, thereby reversing the usual dynamic of adults teaching kids. By investing in the “digital natives”, the pilot ensured that Bristol’s Civic Observatory captured the voices of people aged 10 to 70+, making it truly a whole-community endeavour. As we will see next, this groundwork culminated in a launch event where young people stood alongside adults at the forefront.

6.1.6 Operationalising the Observatory: The Barton Hill Datathon

The cumulative momentum generated by the pop-up events and targeted workshops culminated in the Barton Hill Observatory Launch Event on October 16, 2025. Although this served as the pilot’s primary “Datathon” (a key project KPI for ad hoc innovation events), it was deliberately framed as a community celebration to avoid alienating residents with technical jargon. This event marked the definitive transition from the initial “community engagement” phase to the full “campaigning and operation” phase of the project.

Event Structure and Framing: The launch was a resounding success with 43 adults and 4 young people in attendance. In the context of EBLN's divisive politics, this turnout was quite remarkable. Public meetings in the area had often descended into shouting matches or been boycotted by one side or the other. In contrast, nearly 50 residents were gathered constructively under the Observatory's banner. This tangible validation of the "active intermediation" strategy was achieved by building trust and credibility in the preceding weeks, enabling the pilot to convene a diverse crowd ready to collaborate. The event format blended festivity with purpose. It featured informational displays of the data collected so far, an interactive demonstration of the sensors and the app, and refreshments in a casual open-house setting to maintain a welcoming atmosphere.

One particularly powerful segment was a formal reflection session led by the Bristol Somali Youth Voice team, rather than by project staff or officials. The following day (Oct 17, 2025), as a continuation of the launch event, three local teenagers and two youth workers from BSYV presented the project's objectives and shared the findings of the youth survey. This inversion of traditional power dynamics – with the young people educating the community, including the elders, about the data they had collected – clearly demonstrated that the Observatory belonged to the community as a whole. It demonstrated in real terms that GREENGAGE's technology was accessible to all, including those who typically lack a platform, such as young people and immigrant communities, and that they could become authoritative voices in the local debate.

After the speeches and exhibitions, the event smoothly transitioned from celebration to onboarding. A hands-on workshop station was set up where residents could install the GREENGAGE App on their phones (with technical help on site), create user profiles, and learn how to pair and use the Atmotube PRO portable air quality sensors. This "just-in-time" training ensured that interested attendees left not only informed, but also equipped to act as citizen observers immediately. By the end of the launch event, dozens of new users had joined the Observatory's digital platform, and several local institutions (the community center, the health clinic, etc.) had committed to hosting sensor kits or data dashboards.

The October 16–17 launch events fulfilled the pilot's goal of operationalising the Civic Observatory by moving from planning to real data collection by the community. In fact, Bristol not only met but exceeded its KPI for ad-hoc campaigns. The launch datathon was one of three such campaign events organised in 2025. Following the launch, the team extended its outreach beyond the immediate neighbourhood context to broaden the Observatory's visibility and impact:

- **Festival of Social Science (October 27, 2025):** The Conversation Station was featured at the University of Bristol's Festival of Social Sciences, a public academic outreach event. This special pop-up engaged 8 members of the wider Bristol public (outside the EBLN area), including students and researchers. It showcased the Observatory's data collection process and early findings, effectively "contextualising the prototype dataflow" in a city-wide conversation. By participating in this festival, the pilot linked grassroots community science with academic and civic audiences, demonstrating the transferability of its approach to other urban challenges.
- **Watershed Showcase (December 6–7, 2025):** As a capstone to the campaign, the Bristol team organised a two-day public showcase at the Watershed – Bristol's well-known arts and media center. Over these days, visitors could interact with the Conversation Station, listen to a curated sound-piece composed of anonymised community voice notes, and view visualisations of the collected data. This event was organised into hourly slots, encouraging reflective conversations. People from all over the city engaged with the material, offering feedback and drawing parallels to their own neighbourhoods. The showcase celebrated the community's contributions and disseminated the outcomes in an accessible, creative format. It also emphasised the pilot's commitment to sharing knowledge openly by turning citizen data into a public exhibit.

Through the launch and these subsequent campaigns, the Bristol pilot established its operational legacy. By the end of 2025, the Observatory had an active pool of trained citizen observers and a suite of tools for use on the ground. It also had a repository of community-generated data ready to inform policy. The technological ecosystem deployed, including the GREENGAGE mobile app and console, Atmotube PRO sensors, the MindView computer-vision app, and an Apache Superset analytics dashboard, was now proven in a real urban environment. Notably, the pilot also uncovered challenges: for instance, the MindView app, used experimentally for photo-based surveys, struggled with detecting issues like poor

street lighting, highlighting technical limitations of AI tools in the wild. Overall, Bristol's "datathon" and its follow-on campaigns demonstrated how a citizen observatory can move from concept to sustainable operation, even amid social contention.

6.1.7 Cross-Pilot Synergies and Legacy

The Bristol pilot's activities in M19–M36 were not isolated; they were deeply integrated into the wider GREENGAGE ecosystem, serving as both a donor and recipient of innovation. Lessons from Bristol reverberated across the project's other pilots, and vice versa, creating a federated learning network.

Exporting the Conversation Station: A notable synergy occurred with the Italian pilot in the Turano Valley. Impressed by Bristol's success in bridging the digital divide through the analogue kiosk, the Turano team adopted the Conversation Station concept for their own rural context. Bristol shared the blueprint and engagement methodology, which Turano adapted to address a different issue: reaching elderly residents in remote villages. During Turano's "Ideathon" in March 2025, they used a physical face-to-face data collection point to overcome low smartphone usage among seniors. This transfer of knowledge demonstrated the universality of Bristol's approach: in any context where digital literacy or trust is low, human-centric, in-person engagement must precede digital data gathering. What started as a response to the contested streets of East Bristol found purpose in an Italian mountain village, underscoring the flexibility and impact of the concept.

Technical Leadership with Copenhagen: Conversely, Bristol supported the Danish pilot by sharing technical advancements. For instance, Bristol's data science team created a "heatmap of complaints" using Apache Superset to visualise clusters of citizen reports on a map. They open-sourced the underlying configuration, enabling the Copenhagen pilot to quickly deploy a similar dashboard for its own city data. This cross-pollination saved time and demonstrated the consortium's power as a knowledge-exchange network – a solution forged in the crucible of a highly contentious UK neighbourhood turned out to enhance monitoring in a more consensus-driven Scandinavian setting. Furthermore, Bristol's experiences with new tools such as testing the Discourse platform for community forums and the MindView app for image data were documented and integrated into GREENGAGE's central toolkit, informing on how other pilots approached tool integration.

Beyond bilateral exchanges, Bristol played a key role in shaping GREENGAGE's overall legacy. Feedback from Bristol's on-the-ground work, including the need for simpler data visualisations for citizens and the importance of process-oriented guidance for setting up observatories, directly influenced consortium outputs. Notably, the concept of a practitioner-focused "White Book" (a guide for future observatory implementers on how to proceed) was revised in part due to Bristol's insights into what local officials and communities actually need to succeed.

6.1.8 Conclusion: The Legacy of Active Intermediation

By Month 36, the Bristol pilot had established a Civic Observatory that was robust enough to survive – and even thrive – in a contested political environment. Rather than sidestepping the conflict surrounding the East Bristol Liveable Neighbourhood, it designed tools and processes that enabled the conflict to be mediated constructively. By delivering the objectives of the European Green Deal at a local level, Bristol showed that technology is a facilitator, not a panacea, and that the real innovation lay in governance and community engagement. The pilot created a system in which those who were angry, the marginalised or young could all contribute valid data to the city's most challenging policy discussions. The community progressed from being mere subjects of a top-down experiment to active partners in its evaluation and adaptation.

The legacy of the Bristol Civic Observatory is thus twofold. Firstly, a rich new form of civic data infrastructure has been produced: a tapestry of evidence, ranging from Somali mothers' voice notes to local schoolchildren's street-crossing audits, now complements the traditional traffic counts and air quality readings. This humanised dataset offers a blueprint for how smart cities can incorporate community knowledge to navigate the challenging transition to Net Zero. Secondly, and perhaps more importantly, the pilot has established a social infrastructure of trust and capability. Local ambassadors, youth leaders, and community groups have been trained and empowered; many of them are still active and have pledged to continue the observatory's work. Indeed, the Bristol Civic Observatory has proven to be sustainable beyond the project's lifetime – it continues to operate and gather insights even as the

GREENGAGE grant term concludes. This demonstrates the success of the active intermediation model: the observatory was not a temporary experiment, but rather a catalyst for ongoing civic innovation.

In conclusion, the Bristol experience illustrates that achieving environmental justice in cities involves empowering people as well as deploying sensors. By embedding itself in contested spaces and championing inclusive participation, GREENGAGE's Bristol pilot transformed a divisive policy trial into a platform for collective learning and co-creation. The project has left a lasting imprint on East Bristol and a set of best practices for any city grappling with the social dimension of green transformation. The next steps involve building on this Success through the GREENGAGE Academy and policy outreach, so that the active intermediation approach can inform mainstream urban planning. This will ensure that future Liveable Neighbourhood initiatives (in Bristol and beyond) truly reflect the views of all citizens.

6.1.9 Summary Data: Engagement Metrics (M19-M36)

The following Table 5. summarises the key engagement activities and participation metrics for the Bristol pilot during the reported period, highlighting the strategic purpose of each intervention.

Table 5: Bristol Key activities.

Period/Activity	Location	Stakeholders	Key Activities
07 Sept 2025 — Conversation Station Test	BS5 Arts Trail	Local residents	Prototype testing: 12 adults interviewed on mobility & lived experience.
13 Sept 2025 — Big Up Barton Hill Engagement	Barton Hill	Somali Youth Voice (BSYV), residents	Intro to research; Consta interviews (4 adults, 5 youth); restoring relations with BSYV.
18 Sept 2025 — Data Collection at School	Redfield Educate Together	50 students, teachers, BCC EBLN officer	GG App training + in-situ data generation during school sessions.
19 Sept 2025 — BSYV Planning & Training	BSYV office	BSYV founder + 3 staff	Planning + training sessions on CO, missions, GG App.
24 Sept 2025 — Consta Pop-Up	Avonview Road	Local adults, nearby businesses	Street-level engagement: 7 adults interviewed on EBLN impacts.
25 Sept 2025 — School Play Street Consta	Redfield ET Play Street	Parents, children	Pop-up during play street: 7 adults & 2 children engaged in crossing safety.
Sept–Oct 2025 — Youth Co-Design Cycle	Wellspring & The Swannery Youth Club	10 youth + 2 staff	Three extended workshops: refining research questions, storytelling planning, and youth-led missions.
23 Sept 2025 — BSYV Co-Design Workshop	BSYV	12 youth, 3 staff	Missions design, EBLN mapping, early thematic exploration.
11 Sept 2025 — Training & App Testing	Redfield ET	Active Travel officers + BCC EBLN officer	Testing app workflows & co-designing school workshop plan.

13 Sept 2025 — MindEarth Observations	Barton Hill	Residents	Using MindEarth app to observe pedestrian behaviour during Big Up Barton Hill.
16 Oct 2025 — Barton Hill Observatory Launch (Datathon)	Barton Hill Settlement	Community, KWMC, PRAXIS, UWE, AIT, BCC	Launch of Civic Observatory; GG App missions; Consta dialogues; Superset dashboards; 43 adults + 4 youth.
16–17 Oct 2025 — Youth Reflection Presentations	Barton Hill Observatory	BSYV	Youth publicly present project reflections, increasing ownership and reversing power dynamics.
17 Oct 2025 — Women's Mobility Workshop	Barton Hill Activity Club	26 Somali & Sudanese women	Group discussion on driving routes, safety, and mobility barriers.
21 Oct 2025 — Youth Storytelling Prep	Swannery Youth Club	Youth + artist	Planning for storytelling workshop linked to GG data.
24 Oct 2025 — Wellspring Sensemaking & Storytelling Training	Wellspring Settlement	Staff, artists, UWE, PRAXIS	Data validation, storytelling training, and needs analysis for the evaluation report.
24 Oct 2025 — Somali/Sudanese Women Consta	Barton Hill	7 women	Consta session focusing on EBLN impacts and local mobility.
27 Oct 2025 — Festival of Social Sciences Consta	University of Bristol	Students, academic public	Demonstrating prototype dataflow; wider engagement (8 participants).
4 Nov 2025 — Co- Design Prep with Disabled Residents	Bristol East Disabled Society	2 facilitators	Planning accessibility workshop & observation themes.
28 Nov 2025 — Disabled Residents Workshop	Bristol East Disabled Society	5 disabled residents + 2 facilitators	Sensemaking, storytelling, and mapping accessibility barriers.
4–20 Nov 2025 — Reflexive Conversations Series (x4)	Barton Hill / Wellspring	Local professionals, community members	Governance + engagement evaluation conversations; 5 participants across sessions.
19 Nov 2025 — GG App + Backend Training	Lawrence Hill Forum	3 attendees	Hands-on training for community leaders.
6–7 Dec 2025 — Watershed Showcase	Watershed Bristol	General public	Public exhibition of soundpiece from Consta voice data; reflexive dialogue sessions.

Aug–Nov 2025 (overall)	Barton Hill, Redfield, Wellspring, BS5	Publics, youth, migrant women, disabled residents, BCC, KWMC, UWE, PRAXIS	Full CO operational period: Consta deployments, thematic workshops, GG App missions, storytelling training, data validation, cross-pilot exchange with Copenhagen & Turano.
----------------------------------	---	---	---

6.2 North Brabant: The “Cycling Lab” and “Institutional Empathy”

Table 6: North Brabant KPIs

KPI Category	KPI Code	Target	Achieved	Evidence / Notes
Community & Participation	O1.KPI1 - Citizen Observatories created	≥2	2	“Cycling Lab” and Maintenance Lab established as citizen observatories.
	O1.KPI2 – People involved in CO2	≥250	140	~140 citizen observers engaged (mix of volunteers, students, civil servants).
	O1.KPI3 – Disadvantaged participants	≥80	40	~40 participants from disadvantaged groups (expats, elderly) reached via school and community initiatives.
	O1.KPI4 – Thematic co-explorations	≥2	5	5 thematic co-explorations (student commuting challenge, leisure route survey, maintenance rides, bollard mapping, school route audit).
Activities & Campaigns	O3.KPI2 – Experiments	≥2	4	Prioritise biking as a means of getting to the university Setting up Leisure bike trips and facilitating the organisation Maintenance scoring through bike tours - Students & Province & Fietzersbond Bollard mapping
	O4.KPI4 – Ad-hoc campaigns	≥1	3	Provincial Cycling Event Ambassador Exchange Continuous “Cycling Lab” Integration
Tools, Tech & Datasets	O2.KPI1 – New datasets crowdsourced	≥4	5	New cycling datasets crowdsourced (motivation survey, route planning factors, maintenance scoring, bollard inventory, school routes).
	O2.KPI2 – Datasets contributed to existing systems	≥3	3	Contributed data integrated into provincial systems (maintenance scores, bollards, school routes).

Policy Impact	O2.KPI3 – Harmonised datasets	≥2	2	Harmonised datasets blending citizen input with official data (maintenance schedule, bollard registry).
	O4.KPI3 – Co-created analytics examples	≥4	3	Subjective Rideability maps, heatmaps of safety incident clusters, school route safety,
	O3.KPI1 – Existing urban policy changes	≥2	2	Addressed citizen–institutional gaps: formal civic inclusion in planning and maintenance prioritization.
	O3.KPI3 – Existing policies revisited	≥2	2	Revisited provincial maintenance policy (calibration with citizen data) and reporting workflow (prioritization using community input).
	O3.KPI4 – Lessons and recommendations	≥5	5	Covered in White Book D6.7

6.2.1 Introduction: The Operational Context (M19-M36)

The operational period from Month 19 to Month 36 (M19–M36) represented a pivotal stage in the North Brabant pilot’s lifecycle. While the first 18 months focused on establishing the Citizen Observatory framework and “situated onboarding” of initial participants, this consolidation phase demanded a fundamental strategic pivot. The project transitioned from a logic of recruitment and prototype-testing to one of “Institutional Integration”. This shift was not merely chronological but marked a deepening of the pilot’s sociotechnical mandate. While the initial phase identified the appropriate people and places to deploy the “GREEN Engine” technology, the M19–M36 phase centred on ensuring that collected data was valid, actionable, and capable of influencing public authorities’ decision-making workflows.

Notably, North Brabant’s trajectory diverged from that of the other GREENGAGE pilots. Unlike Bristol or Turano, where primary challenges involved social disenfranchisement or bridging a digital divide through “low-tech” outreach, the North Brabant context was characterised by high “expert citizenship” and a well-established, politically significant cycling culture. The challenge in North Brabant was not to convince citizens that cycling infrastructure matters (in the Dutch context, this was already a consensus), nor to build basic digital literacy among users, as the population was largely comfortable with digital governance tools. Instead, the main challenge was to bridge the gap between the authoritative, engineering-grade data held by the province (used for asset management and maintenance scheduling) and the subjective experience of everyday citizens when cycling. During this period, the goal was to transform the raw potential of the pilot’s initial community into a resilient, self-sustaining Community of Practice (CoP). This requested a shift from extractive data collection models, in which citizens merely serve as distributed sensors gathering data for a central authority, towards a relational model in which data functions as a boundary object for shared governance. In this framework, data collected via the GREENGAGE app and sensors would enable a structured dialogue between the public and the administration, allowing for the facilitation of priorities rather than one-way reporting.

The overarching narrative of M19–M36 in North Brabant is the establishment and implementation of the “Cycling Lab”, a methodology fusing community building with active campaigning to foster “Institutional Empathy”. By using the same tools to observe the same infrastructure, policymakers and citizens were able to work together to overcome traditional barriers between the governed and the government, creating a unified ecosystem for sustainable mobility governance. This section details the community-building and campaigning actions undertaken in North Brabant during this consolidation phase, analysing the methodologies employed, the events executed, and the policy impacts achieved.

6.2.2 The Methodological Framework: The “Cycling Lab”

The “Cycling Lab” served as the operational framework for all community-building and campaigning activities in North Brabant during the consolidation phase. It is important to note that the “Cycling Lab” was not a physical facility or traditional research Buschmann, but rather a distributed sociotechnical methodology designed to test the hypothesis that citizen-generated data could reliably inform and validate provincial maintenance schedules, thereby complementing existing bureaucratic methods.

From Adversarial Advocacy to Collaborative Governance: Historically, the relationship between specialised advocacy groups (such as the Fietzersbond, the Dutch Cyclists’ Union) and public authorities has been adversarial or at best transactional. The dynamic would typically follow a cycle of demands and concessions: the advocates highlight infrastructure failures, and the authorities would justify budget limitations defensively. The “Cycling Lab” aimed to reconfigure this dynamic into one of co-exploration and collaborative governance. To achieve this, the pilot formed a strategic partnership with Fietzersbond, leveraging its network of dedicated cyclists. However, the engagement model evolved significantly during M19–M36. Volunteers were no longer merely treated as complainants or passive sensors; instead, they were elevated to the status of “expert witnesses” and “expert citizens”. This distinction was central to the GREENGAGE methodology in North Brabant. In this context, an expert citizen is someone with in-depth, tacit knowledge of the cycle network — not just the location of a defect (e.g., a pothole or broken light), but also temporal and contextual insight into what makes a route hazardous or uncomfortable. For instance, an expert citizen would know how a particular intersection behaves at rush hour compared to quiet weekend, and how seasonal vegetation growth can affect visibility. By integrating such individuals into the “Cycling Lab”, the pilot ensured that the data collected via the GREENGAGE app was interpreted with great expertise, thereby increasing its legitimacy in the eyes of provincial engineers.

The Digital Twin as Feedback Mechanism: A central pillar of the “Cycling Lab” methodology was the integration of citizen science outputs into the Province’s digital infrastructure model, the Digital Twin (DigiTwin). The DigiTwin is a virtual model of the province’s physical infrastructure, used by for planning and maintenance purposes. To sustain volunteer engagement and ensure political relevance, the pilot had to demonstrate the entire data value chain, showing participants precisely how a photograph of a root-induced bump captured by a volunteer becomes a data point in a model used by engineers to allocate funding. Throughout M19–M36, community workshops and campaigns used the DigiTwin to visualise aggregated citizen data in real time. This visualisation served a dual purpose in community building:

- **Validation of Effort:** Participants could see their individual contributions (e.g., a report of a crack in the pavement) appear as part of a larger regional dataset. Visualising this collective effort reinforced a sense of efficacy and countered the cynicism that often accompanies public consultations, such as questions, “*Does my input actually matter?*”.
- **Civic Education:** It also educated participants on the complexity of infrastructure management. Seeing all the reported issues mapped and layered onto the DigiTwin prompted a shift in conversations from local complaints such as “*Why hasn’t this been fixed yet?*” to systemic discussions such as “*How do we prioritise all these maintenance needs within a limited budget?*”

This narrative shift, which positioned citizens as partners in resource allocation rather than a mere critic of government, was crucial in maintaining a positive and constructive community atmosphere throughout the campaigning period. Essentially, the “Cycling Lab” transformed the tone of civic engagement from “campaigning against” the authorities to “campaigning with” them.

6.2.3 Community Building Strategies (M19-M36)

The community-building strategy for North Brabant differed significantly from the “pop-up” engagements of Bristol or the door-to-door facilitation used in Turano. Given the target demographic’s existing interest in cycling policy and high digital literacy, the focus in Brabant was on deepening technical competence, refining data protocols, and fostering tighter institution–community alignment.

Building the “Expert Citizen” Cohort: The pilot identified three distinct demographic cohorts to ensure a balanced, representative “Cycling Lab” dataset. Recruitment and training of these groups were not

one-off events but continuous engagement processes evolving over M19–M36. Table 7 below outlines these cohorts and their roles:

Table 7: Target Demographics for the North Brabant “Cycling Lab”

Cohort	Profile	Role in “Cycling Lab”	Key Value Proposition
Fietsersbond Volunteers	Older (60–80), highly experienced, long-term residents.	Domain Experts/ Validators	Possess deep institutional memory of infrastructure changes; highly motivated by safety; accustomed to legacy reporting tools (e.g. phone hotlines).
BUas Students	Young (<25), tech-savvy, transient but intensive users.	Surge Workforce/ Testers	Capable of rapid data entry and stress-testing new features; provide a “youth perspective” on mobility; motivated via academic credit and challenges.
Provincial Civil Servants	Middle-aged (40–60), professional administrators.	Policy Owners/ Participants	Direct end-users of the data; their participation builds empathy and internal buy-in, while breaking down silos between departments.

Co-Design and Protocol Definition: From late 2024 (planning) to early 2025 (execution), the community was actively involved in co-designing data collection protocols. This was a critical community-building exercise that went beyond simple training sessions. By involving the Fietsersbond core team in defining what constitutes as a maintenance issue, the pilot ensured that the GREENGAGE app captured metrics that were meaningful to everyday cyclists rather than simply reproducing an engineer’s checklist. For instance, while a standard engineering inspection might focus solely on pavement integrity by measuring crack depth in millimetres, the co-design discussions emphasised the importance of subjective safety and comfort. Cyclists emphasised factors like lighting quality, perceived personal safety at night, and adequate separation from high-speed traffic. As the community was involved in designing the data schema, there was already a sense of ownership over the tools and the metrics being tracked when the major campaigns launched in 2025.

“Institutional Empathy” – Breaking the Silos: Perhaps the most innovative aspect of North Brabant’s community strategy and a key differentiator from typical citizen science projects was the deliberate inclusion of provincial civil servants as active members of the community of practice. The pilot aimed to bridge the gap between the technocratic view of infrastructure, which is managed via spreadsheets, contracts, and remote sensing, and the lived experience of infrastructure from the perspective of a cyclist. This strategy was based on cultivating “Institutional Empathy”. The idea was that for citizen data would only be fully accepted by the bureaucracy if the bureaucrats themselves understood the context in which it was created. By taking provincial employees out of their offices and onto the cycle paths to collect data side alongside with citizens, the project established a shared experiential baseline. When a civil servant physically rides over a pothole and logs it using the same app as a student or a pensioner, that data point ceases to be an abstract statistic and becomes a shared reality. This mechanism profoundly strengthened the social contract between the administration and the citizenry, moving the pilot towards a model of shared stewardship of public spaces.

6.2.4 Campaigning Actions and Operationalisation

The campaigning activities in North Brabant during M19–M36 were the kinetic expression of the “Cycling Lab” methodology. These campaigns were designed to generate the necessary volume and quality of

data to test the “Foil Effect” hypothesis – that citizen data could serve as a foil (i.e., a check and balance) to the province’s technical maintenance models. Each campaign was structured to stress-test the GREENGAGE tools, actively engage the identified cohorts, and produce actionable policy insights. Key campaigning actions included:

- **Student Mobilisation via BUAs (the “Surge Workforce”):** In order to avoid “spiky” data generation (i.e., high volumes only around major events, with lulls in between), the pilot partnered with Breda University of Applied Sciences. By embedding GREENGAGE tasks into coursework, a steady stream of student observers was available for specific data missions. These students acted as a “Surge Workforce” that could be deployed for intensive data collection when needed.
- **Instruction & A/B Testing Session (March 6, 2025):** A kick-off training and testing event was held on June 3, 2025, bringing together students and veteran volunteers. Rather than being a routine instructional workshop, the session also served as a rigorous A/B test comparing the new GREENGAGE app with the existing Fietzersbond reporting tool. One group used the traditional Fietzersbond web editor to log issues in one area, while another group used the GREENGAGE app to report the same area. This head-to-head comparison provided invaluable usability feedback. For example, testers highlighted issues such as the complicated Keycloak login process, which proved a barrier to quick engagement. The immediate feedback from this session informed the technical partners’ next app iteration, allowing them to streamline the user experience before scaling up to a broader audience. In effect, this event validated the student “surge” model and ensured the tools were optimised for an expert user base.
- **Continuous Engagement Campaigns (Spring 2025):** Following the March kick-off, Buas’ students and Fietzersbond volunteers participated in rolling data collection drives throughout spring 2025. Many of the student-led activities were linked to their academic projects or credits, which helped to ensure adherence to protocol and data completeness. This sustained effort by students provided a baseline of high-quality, granular data (maintenance reports, route usage patterns, etc.) that complemented the more sporadic contributions from Fietzersbond community events and the province’s own inputs. By mid-2025, North Brabant had a rich, continuous data stream rather than isolated data bursts.
- **The Provincial Cycling Event (June 29, 2025):** The North Brabant pilot’s flagship event was a large-scale “Cycling Lab” field day, which took place in the Heusden region on June 29, 2025. This event exemplified the integration of campaigning, community building and institutional participation.

Strategic intent: The event was designed to close the feedback loop between policymakers and the infrastructure they manage — an exercise in empathetic governance that compelled officials to confront the realities on the ground. Heusden was deliberately chosen for its variety of cycling environments, ranging from segregated high-speed lanes to mixed-use village roads, offering a comprehensive testbed for the app’s features.

Execution and participation: About 20–30 participants took part, a modest number by rally standards, but the composition was remarkable. The event successfully drew in the “middle demographic” (ages ~40–60) — a group that prior campaign data had underrepresented compared to the abundance of students (younger) and retirees (older). This group included provincial employees, local policymakers, and active citizens, all cycling and collecting data shoulder-to-shoulder. Hierarchies were flattened - a town alderman, a traffic engineer, and a retiree might ride in the same group, using the same tool to log issues.

Data collection dynamics: Participants used the GREENGAGE app to log maintenance issues such as potholes, poor lighting, and overgrown vegetation. But beyond simply reporting defects, they were also prompted to record subjective ratings of each segment’s “rideability” and perceived safety. This mix of objective data (“*there is a pothole here*”) and subjective sentiment (“*I feel unsafe at this bend*”) is at the heart of the “Cycling Lab” method.

Outcomes: The event generated 97 survey responses and a wealth of geotagged photos in one day,. Even more importantly, all this data was immediately fed into the Provincial DigiTwin model. The success lay not only in the volume of data but also in the quality of interaction: the event gamified data collection without trivialising it, yielding serious policy insights in a fun and engaging atmosphere. It also demonstrated that the GREENGAGE toolkit is robust enough for

use by non-technical civil servants in the field. Participants gained a clearer understanding of infrastructure challenges, while provincial staff gained first-hand appreciation of the citizen perspective.

6.2.5 Cross-Pilot Synergies: The “Ambassador Programme”

By late 2025, the North Brabant pilot had matured to the point of becoming a net exporter of knowledge within the GREENGAGE consortium. The “Ambassador Programme” was the main mechanism for cross-pilot exchange, enabling North Brabant’s methodologies and insights to inform other sites.

The Dutch–Danish Exchange: A flagship initiative under this programme was an exchange carried out in June 2025. In this exchange, North Brabant sent a small delegation of its expert citizens – a mix of student volunteers and Fietzersbond members – to the Copenhagen pilot. The strategic logic was straightforward: take expert cyclists from a high-infrastructure context (the Netherlands) and see what they discover in another cycling capital. Copenhagen, though world-renowned for cycling, faces different challenges (e.g. noise, density, mixed-use congestion) compared to Brabant’s regional network. Armed with the GREENGAGE app, the Dutch ambassadors spent two days (23–24 June 2025) gathering data in the Danish capital. This served a dual purpose:

- **Technical Validation Across Borders:** It tested the agnostic utility of GREENGAGE tools. Could a user trained in North Brabant seamlessly apply the app and methods in a foreign city without additional training? The answer was yes. The ambassadors used the app to map Copenhagen’s bike issues on the fly, validating that the “cascade learning” delivered in earlier project stages (Stages II and IV of training) was robust and transferable. In particular, it proved that the app’s usability and the data protocols transcended the local context.
- **Qualitative Benchmarking:** The Dutch participants also offered a fresh outsider perspective to Copenhagen’s team. Being highly attuned to cycling conditions, they spotted issues that local cyclists might overlook simply because they’ve adapted to them. The ambassadors provided candid feedback on everything from bike lane surfacing to noise levels, offering a foreign citizen’s perspective on Copenhagen’s infrastructure. They even participated in the Copenhagen pilot’s “vertical noise profiling” missions, contributing to that site’s specific scientific focus.

This exchange fostered a sense of European identity among participants and validated North Brabant’s efforts by placing them in a continental context of civic action. It demonstrated that the community established in North Brabant was part of a wider European movement for sustainable mobility and citizen-driven governance, rather than being insular.

6.2.6 Conclusion: The Legacy of the “Cycling Lab”

The M19–M36 period in North Brabant showcases the sophisticated evolution of the Citizen Observatory concept. By shifting the focus from simple data extraction to “Institutional Integration”, the pilot navigated the challenges of a mature, high-trust policy environment. The “Cycling Lab” proved to be a robust framework for community engagement, successfully integrating diverse groups from students to pensioners to civil servants into a unified practice. The strategic emphasis on “Institutional Empathy”, exemplified by the Provincial Cycling Event, dissolved the traditionally adversarial nature of advocacy and replaced it with collaborative governance.

Furthermore, the campaigning activities delivered on the project’s core scientific promises. The demonstration of the “Foil Effect” proved that citizen-generated data is not just a “nice-to-have” supplement but a critical input that can challenge and improve technical maintenance models. By Month 36, the North Brabant pilot had established a legacy of governance literacy: citizens empowered to use evidence to co-create policy (in line with Green Deal objectives), and policymakers empowered to understand the lived reality of their infrastructure. The successful ambassador exchange in Copenhagen further solidified North Brabant’s role as a center of excellence within the consortium, providing a blueprint for how expert citizens can be mobilised to improve urban governance across borders.

Key Actions (M19–M36): The following Table 8 summarises the main activities and outcomes of the North Brabant pilot during the consolidation phase.

Table 8: North Brabant main activities

Action	Date	Primary Innovation	Target Community	Outcome
Instruction / A/B Test	March 6, 2025	Comparative usability testing of GREENGAGE app vs. legacy tool	BUas students; Fietzersbond volunteers	Refined app UX; validated student “surge” workforce model; identified login (Keycloak) friction points.
Provincial Cycling Event	June 29, 2025	<i>Institutional empathy</i> field campaign (policymakers act as sensors) in the Heusden region	Civil servants; citizens (ages 40–60)	Collected 97 issue reports in one day; data integrated into DigiTwin; bridged gaps between officials and public; engaged the “middle” demographic.
Ambassador Exchange	June 23–24, 2025	<i>Trans-local</i> validation – exporting Dutch cycling expertise to Copenhagen	Dutch student “ambassadors”	Proved tool interoperability across borders; provided outsider assessment of Copenhagen’s bike network; contributed to Danish noise profiling efforts.
Continuous “Cycling Lab” Integration	2024–2025 (ongoing)	The “Foil Effect” – comparing citizen-reported vs. official data over time	Province of North Brabant (policy teams)	Evidence from citizen data prompted budget reallocation (from surface repairs to safety improvements); validated the utility of citizen input in maintenance planning.

6.3 Copenhagen: “Precision Engagement” and Student Mobilisation

Table 9: Copenhagen KPIs.

KPI Category	KPI Code	Target	Achieved	Evidence / Notes
Participation & Community	O1.KPI1 – Citizen Observatories created	≥2	2	2 COs, Air quality and vertical noise profiling
	O1.KPI2 – People involved in COs	≥250	70	Primarily university students and high-rise residents engaged; outreach targeted motivated participants.
	O1.KPI3 – Disadvantaged participants	≥80	N/A	Engagement focused on technical student cohorts and affected residents rather than traditional disadvantaged groups.
Activities & Campaigns	O1.KPI4 – Thematic co-explorations	≥2	2	Two major thematic phases: an initial broad environmental sensing phase, followed by a specialised “vertical noise profiling” phase.

Tools, Technology & Datasets	O3.KPI2 – Experiments	≥4	4	Vertical Noise Profiling, Heavy Truck and Air Quality Correlation, 360° Visual Mapping and Dwell Time Analysis, and Cross-Border Ambassador Validation
	O4.KPI4 – Ad-hoc campaigns	≥1	3	Multiple campaigns executed (e.g. Student Circuits, Earth Day event, Ambassador Exchange)
	O2.KPI1 – New datasets crowdsourced	≥4	4	Vertical Noise Profiles, Heavy Vehicle Logs, Winter Air Quality Readings, and 360° Street-Level Imagery
	O2.KPI2 – Datasets contributed to existing systems	≥3	3	Vertical noise profiles for 3D advocacy mapping, winter air quality data for school zone analysis, and validated heavy vehicle logs for local traffic planning
Policy Impact	O2.KPI3 – Harmonised datasets	≥2	2	Ongoing efforts to combine citizen-collected data with city monitoring data for validation and planning.
	O4.KPI3 – Co-created analytics examples	≥4	4	Superset dashboards (e.g. noise “heatmap of complaints”), vertical noise profile visualisations, and multi-sensor correlation analyses.
	O3.KPI1 – Existing urban policy changes	≥2	1	Covered in D5.2
	O3.KPI3 – Existing policies revisited	≥2	1	Covered in D5.2
	O3.KPI4 – Lessons and recommendations	≥5	5	Covered in White Book D6.7

6.3.1 Introduction: The Paradox of the Smart City

The Copenhagen pilot’s consolidation phase (M19–M36) offers a unique case study in citizen science within an advanced “Smart City” context. Unlike Bristol and Turano Valley, where institutional distrust or digital divides were key barriers, Copenhagen’s challenge was almost the opposite. The city boasts a mature digital infrastructure and a population that generally trusts the municipality to be competent, data-rich, and effective in service delivery. In this environment, the rationale behind a Citizen Observatory (CO) – namely to empower citizens to fill governance gaps or hold authorities accountable – lacks urgency. A “*Why should I bother?*” sentiment became prevalent. Satisfied with the status quo, many Copenhageners had little motivation to undertake laborious data collection, assuming the city was already effectively monitoring environmental conditions.

Compounding this engagement inertia was a sense of “participation fatigue”. Copenhagen is often a testbed for green urban innovations, meaning citizens are routinely asked to participate in new pilots and trials. By 2025, broad civic appeals were yielding diminishing returns – residents were saturated with surveys, apps, and workshops. The Pilot Support Team (PST) recognised that the onboarding tactics used in the initial phase (M1–M18) could not be scaled up for this phase. In other words, the tactics that had worked for initial recruitment could not overcome the apathy encountered at this stage. A strategic pivot was required, moving away from generic community mobilisation towards what the

team termed “Precision Engagement”. This entailed targeting engagement efforts much more narrowly and meaningfully.

In practice, this pivot entailed a fundamental redesign of the observatory’s operations. Rather than inviting the public to make general environmental observations, the Copenhagen pilot began recruiting specific, highly motivated groups – notably, university students and residents experiencing distinct micro-environmental issues – to address complex questions that city-wide models could not easily answer. The underlying logic was that a smaller group of highly engaged participants could generate more profound insights than a large indifferent public. Thus, from M19 to M36, the Copenhagen pilot evolved into a specialised, technically rigorous observatory that leveraged academic partnerships as a “Surge Workforce” to overcome the inertia born of civic satisfaction. In summary, the paradox of the smart city – high institutional performance dampening citizen initiative – was addressed with a tailored strategy focusing on precision, expertise, and tightly scoped inquiries.

6.3.2 Strategic Framework: “Precision Engagement” and the Canyon Effect

To counter “Engagement Fatigue” and apathy, the Copenhagen team explored new thematic avenues beyond standard street-level monitoring. Rather than replicating generic air quality mapping or noise logging already well-covered by the city, the PST identified a niche question with local relevance: how do noise levels change with vertical elevation in dense urban streetscapes? This phenomenon, essentially the urban “canyon effect”, had both scientific intrigue and real-life relevance for residents’ high-rise buildings. The strategy was to design structured observation circuits in which participants would take measurements at specific vertical and horizontal intervals, thereby linking citizen data to gaps in municipal pollution and traffic analyses. By shifting from passive data collection to active investigation of a complex urban micro-phenomenon, the project aimed to renew volunteer interest. Early iterations of these circuits were carefully refined to remain manageable for volunteers, emphasising depth of data over breadth of participation.

The Vertical Community Structure: To operationalise the canyon effect study, recruitment was organised not by neighbourhood, but by building floor level, by creating a “vertical community” of observers. In a set of multistory apartment blocks in the Amager district, the pilot targeted residents on three levels of elevation:

- **Ground Floor Residents:** This formed the baseline for “street-level” conditions. This group took noise and air quality readings at ground level, serving as a control against which vertical variations were measured.
- **Middle Floor Residents:** The group occupied the mid-building “reverberation zone” where the canyon effect (noise trapped between buildings) was hypothesised to peak. This group’s data was crucial for identifying the zone of highest noise amplification.
- **Roof/Penthouse Residents:** Positioned at or near the urban canopy layer. They collected data on upper boundary noise attenuation to determine how much noise is dissipated by the top floors.

By bringing together participants from the same building but at different heights, the pilot encouraged the formation of an unconventional community of practice. Neighbours who would rarely meet started collaborating because of a shared purpose: to visualise the invisible acoustic architecture of their building. This vertical bond proved motivating, introducing an element of discovery and novelty that helped overcome general apathy towards municipal projects. Essentially, the “Precision Engagement” framework in Copenhagen centered on highly specific spatial targeting (in this case, vertical slices of the community) combined with scientifically intriguing questions. This approach established a thematic foundation that was narrow enough to spur curiosity, yet impactful enough to produce meaningful results for urban planners.

6.3.3 Mobilising the Workforce: Student Engagement Strategy

Implementing precision campaigns required a level of protocol adherence and data density that casual drop-in volunteers were unable to provide. In order to reliably execute complex circuits (such as the vertical noise transects), the Copenhagen pilot made a major strategic shift toward student mobilisation.

In doing so, the pilot changed its approach to working with local academia, moving from occasional student involvement to the structural integration of the observatory into university curricula and projects.

The “Surge Workforce” Model: The pilot partnered with the University of Copenhagen (UCPH) and leveraged an Erasmus exchange relationship with Breda University of Applied Sciences (BUas) in the Netherlands to assemble a “Surge Workforce” of student data collectors. This model directly addressed a classic vulnerability of volunteer-based science: inconsistent participation. Students, motivated by academic credit, course requirements, or genuine scientific curiosity, provided a more reliable labour pool to carry out the demanding data collection circuits with high fidelity. In practice, teams of students were formally assigned to the observatory as part of their coursework or thesis projects, ensuring sustained engagement over the campaign period.

This infusion of academia served a dual purpose:

- **Data Completeness:** By enlisting the help of students, the pilot was able to generate dense, continuous datasets that truly capture vertical noise profiles and heavy truck traffic patterns. The gaps left by ad-hoc community volunteers were now filled by a roster of observers who treated the work as part of their studies. In short, the quality and quantity of data reached the level required to validate the canyon effect hypotheses and to feed into advanced models.
- **Educational Legacy:** Integrating GREENGAGE methods and tools (the “GREEN Engine” platform, Atmotube Pro sensors, the mobile app, etc.) into university activities created a lasting knowledge legacy. As part of their education, dozens of future urban planners and environmental scientists received hands-on training in bottom-up data governance and smart city analytics. The pilot effectively turned students into citizen-scientist ambassadors, fluent in both municipal data needs and community engagement principles.

The April 2025 Mobilisation Campaign: The effectiveness of the student strategy was evident during an intensive campaign in April 2025. Between 15 and 23 April, the Copenhagen team organised a coordinated “educational datathon” in the Amager district. Instead of random sampling, student teams carried out carefully designed data collection circuits at various times of day and building levels. Key focuses of these circuits included:

- **Heavy Truck Mobility:** The students logged the frequency of heavy goods vehicles on specified routes and measured the noise impact of each passing truck. This data addressed a local traffic planning concern by providing detailed evidence of the contribution of freight traffic to noise pollution in residential areas.
- **Air Quality Correlation:** Students used Atmotube PRO sensors alongside noise measurements to simultaneously record air quality parameters (PM_{10} , $PM_{2.5}$, PM_{10} particulate levels and VOCs) during the noise peaks. This enabled the pilot to identify “multi-stressor hotspots” – times and places where loud noise events coincided with spikes in air pollution, which could potentially exacerbate health impacts.

During an intensive week, the student teams gathered a comprehensive baseline dataset for the pilot’s analysis. This burst of activity proved that a mobilised student workforce can serve as an alternative to mass public recruitment in a high-friction context. In quantitative terms, the students achieved almost complete coverage of the planned observation points and times, something that would have been difficult to achieve with unsupervised volunteers. The April campaign thus validated the “Surge Workforce” approach, showing that with the right incentives and structure, student engagement can dramatically improve completeness and reliability of data.

6.3.4 Operationalising the Campaign: Protocols and Friction

The transition from community building to active campaigning required rigorous operational discipline. During the period from M19 to M36, the Copenhagen pilot placed a strong focus on observation protocols and on managing technical “friction” that could affect the quality of data. Two significant challenges defined this period:

- (1) ensuring scientific validity through strict field protocols (coined “Protocol Rigour”), and
- (2) overcoming technology and device issues that emerged as limiting factors (“Technical Friction”).

Protocol Rigour: Standing vs. Walking. To maximise the scientific validity - data collected by citizens, the PST developed clear rules to differentiate between standing and walking missions. Participants were trained to remain stationary at designated observation points for set periods (usually 5–10 minutes) while taking measurements. By avoiding movement while recording, volunteers minimised disturbances like wind noise or motion artefacts in the sensor readings. This was particularly important for noise measurements using smartphone microphones and for air quality readings with handheld sensors – movement by the observer could skew the data, whereas remaining stationary provided a more accurate sample of the ambient environment. Additionally, the campaign introduced basic calibration standards accessible to laypeople. The PST developed simple calibration procedures to enable participants to calibrate their Atmotube PRO air sensors and smartphone microphones against reference levels before and during missions. This step was vital because city authorities had made it clear that uncalibrated citizen data would not be considered as credible evidence for policy or planning changes. By establishing calibration and stationary sampling as norms, the campaign aimed to generate data that could be used alongside official measurements.

The Earth Day “Try-Out” (April 22, 2025): A highlight of the Copenhagen campaign was an Earth Day event designed as a “trial run” with low barriers to entry for the public. During this one-day action, we invited curious residents to experiment with GREENGAGE tools in a relaxed setting, free from the full demands of the student circuits. During the event, citizens were introduced to the MindEarth image-capture tool within the GREENGAGE App. The participants were guided through 360° street mapping exercises, using their phone cameras to capture panoramic street-level images of their neighbourhood. These images would later be fed into the project’s AI analysis pipeline to identify urban features such as tree cover, green facades, and building materials. Equally important, the Earth Day outing also served as a hands-on training session for the protocol. Facilitators taught attendees about proper camera angles, how to avoid moving objects, and how to follow specific paths, ensuring that the collected imagery would be suitable for automated analysis. By applying the guidance immediately in the field, participants found it easier to grasp the technical steps. Project advisors noted that such “just-in-time” training, which involves teaching citizens to calibrate sensors or use tools at the moment of data collection, greatly improves retention and data quality. The Earth Day “try-out” thus served as both an outreach event and a practical classroom, easing newcomers into the project’s methodologies.

Technical Friction: The Android Attrition. Despite careful planning, the Copenhagen pilot encountered major socio-technical challenges during the campaigns. A major hurdle was ensuring device and platform compatibility within the “bring your own device” (BYOD) approach. Notably, the advanced image capture module of the GREENGAGE app (MindEarth/MindView) was unavailable for iOS devices at this time. This meant that any volunteers using an iPhone – a substantial portion of the tech-savvy Copenhagen demographic – could not use the official tool for 360° data capture directly. As a result, the team had to improvise manual workarounds: affected participants were asked to record video panoramas with their regular camera app, and the project team would then manually extract and preprocess the footage on the backend. This cumbersome process introduced delays and increased the risk of data loss or quality issues. More broadly, it highlighted the fragility in the BYOD model for high-precision citizen science; the diversity of personal devices and operating systems can be a weak link.

The implications for citizen science were immediate. Highly motivated student volunteers were sometimes hindered by limitations of their phones (e.g., Bluetooth dropouts, app crashes or unsupported features), which threatened the continuity of the data streams. In response, the project implemented two key adaptations to mitigate this issue:

Supervised Collection: The pilot shifted towards more facilitated data collection sessions. For critical missions (such as the student circuits), tech-savvy staff or team members were present to supervise and assist, ensuring that the devices stayed connected and the sensors continued to log data throughout the session. This pre-emptive supervision significantly reduced data gaps caused by app failures or user error. The team learned that, in such contexts, maintaining scientific rigour often requires treating training as an ongoing, in-person process rather than a one-off – a model of “continuous supervised operation” for volunteers.

Data Curation: The project also refined its approach to quality control. Using the Data Quality Dashboard (DQD), which was developed by project partner VRVis, the PST was retrained to rapidly filter and flag incoming data. Sessions or segments showing anomalies (for example, a sudden stop in data from an iOS user who had to switch apps) were identified and either excluded or re-run. By actively curating the crowdsourced data – removing fragmented or incomplete records – the team ensured that only continuous, high-quality datasets were used for analysis. This approach transformed a potentially fatal data integrity issue into a manageable curation task.

These measures enabled the Copenhagen pilot to overcome the technical difficulties to achieve its core objectives. The experience also yielded a valuable lesson for future CO endeavours: achieving technological resilience may require a combination of software fixes, such as cross-platform support, and human-process fixes, such as supervised sessions and rigorous data audits, to ensure that volunteer contributions remain viable.

6.3.5 Trans-Local Governance: Ambassadors and Knowledge Bridges

By this phase, Copenhagen was not just a standalone pilot but a fully networked node within GREENGAGE's European ecosystem. The team actively leveraged cross-pilot collaborations to validate its data and enhance its capabilities, thus embodying a “federated” citizen science model. Two notable initiatives demonstrated how Copenhagen both contributed to and benefited from inter-city knowledge exchange: an Ambassador Exchange Programme and a technical superset data visualisation bridge.

The Ambassador Exchange Programme (June 2025): As a flagship cross-pilot community-building effort, GREENGAGE launched an ambassador exchange programme to physically swap “expert citizens” between pilot sites. In late June 2025, Copenhagen hosted a delegation of citizen ambassadors from the North Brabant pilot in the Netherlands, specifically members of the Dutch Cyclists' Union (Fietzersbond), who are renowned for their expertise in cycling infrastructure. The Dutch–Danish exchange (23–24 June 2025) was mutually beneficial. On the one hand, it provided trans-local validation of Copenhagen's conditions: the visiting Dutch cyclists rode through the Amager district, including the heavy-truck circuit routes, and offered frank comparisons between Copenhagen's cycling environment and the world-class Dutch standards. Their outside perspective helped challenge the “local normalisation” of traffic nuisances – issues that locals might accept as “*just the way it is*” were flagged by the outsiders, giving weight to resident complaints that might otherwise have been dismissed. On the other hand, the exchange functioned as an impartial trial for the project's tools and training. The Dutch ambassadors used the exact same GREENGAGE app and Atmotube sensors that they had used in North Brabant, now to collect noise and air quality data in Copenhagen. The fact that they could deploy the tools in a new city without extensive retraining demonstrated the transferability of the GREENGAGE platform – proof that the software, sensors, and protocols were robust across languages and local contexts. The ambassador exchange was successful in enriching Copenhagen's dataset and perspective, and in building credibility that citizen observations are comparable and shareable across EU cities.

The Superset Bridge: Technical Solidarity. In addition to human exchanges, Copenhagen benefited from the transfer of technical knowledge within the GREENGAGE network. During the campaign, the Copenhagen team faced challenges in rapidly visualising the incoming multimodal data (noise, air, images) for community feedback. Meanwhile, the Bristol pilot had developed a sophisticated “heatmap of complaints” dashboard using Apache Superset to display clusters of citizen reports on a map. Recognising similar requirements, the Bristol data scientists exported the underlying JSON configuration of their heatmap dashboard and shared it with Copenhagen. This allowed the Copenhagen PST to “hydrate” the Bristol template with local data almost instantly, achieving in minutes a level of data visualisation that would have otherwise taken weeks to set up. The rapid deployment of a professional-grade dashboard meant that Copenhagen volunteers could quickly see the results of their efforts, such as an immediate map of noise hotspots from the Earth Day trial and student circuits. This quick feedback loop was crucial for maintaining public trust, as it showed participants that their data was actively used and displayed in an actionable format, rather than disappearing into a black box. Overall, the technical solidarity (what one might call a “Superset bridge”) between Bristol and Copenhagen exemplified the consortium's added value: shared tools and expertise accelerated local impact in Copenhagen, and the success in Copenhagen, in turn, reinforced the versatility of those shared tools.

6.3.6 Conclusion: The Legacy of Precision

The M19–M36 period in Copenhagen demonstrated that, even in a high-tech, high-trust city, Citizen Observatories can play a significant role – as long as the engagement strategy is adapted to the context. By pivoting from broad-brush civic participation to “Precision Engagement”, the Copenhagen pilot overcame the twin challenges of citizen complacency and “Engagement Fatigue”. It showed that residents of a “smart city” will engage if invited to investigate meaningful, niche questions that complement official data, rather than duplicating it. The result was a campaign that operated almost as a civic research initiative, blending academic rigour with citizen participation.

The Vertical Noise Profiling campaign is a notable legacy. It empirically validated the urban canyon effect, demonstrating that mid-level apartment residents experience higher noise exposure than those on the top or ground floors. This nuance had previously been overlooked in city noise models. Beyond this finding, the pilot pioneered a novel mode of community building – the vertical community – that could be relevant for other dense urban areas grappling with the impacts of high-rise living. To achieve this, Copenhagen recruited a Student Workforce at an unprecedented scale for a CO. The students brought reliability and technical skill, which proved essential in overcoming issues like the Bluetooth dropout problem on Android devices. In effect, the pilot showed that partnerships with universities can substantially stabilise citizen science in advanced urban contexts. The students’ involvement was not just an internship, but a new participatory model, where education and citizen engagement reinforced each other.

Finally, Copenhagen’s experience emphasised the value of the GREENGAGE federated approach. The successful ambassador exchange with North Brabant demonstrated that inviting external “expert citizens” can provide new perspectives and challenge complacency in local policy debates. Meanwhile, the technical integration with Bristol involving the sharing of the Superset dashboard configuration showed that open knowledge sharing can accelerate innovation and enhance credibility locally. By importing expertise (Dutch cycling assessors) and tools (Bristol’s data viz templates), the Copenhagen pilot became greater than the sum of its parts, setting an example for a model of a connected European observatory. In conclusion, the legacy of Copenhagen’s “Precision Engagement” approach provides a blueprint and lasting influence for smart cities. Even where baseline services are strong, citizens can be mobilised as specialised co-researchers to fill data gaps, provided the engagement is precise, the science is rigorous, and the support network is transnational.

6.3.7 Summary Data: Key Copenhagen Activities (M19–M36)

The Table 10 below summarises the key engagement actions and strategic interventions undertaken in the Copenhagen pilot during the consolidation phase.

Table 10: Copenhagen key activities.

Date	Activity/ Campaign	Target Cohort	Key Objective	Innovation/ Metric
Apr 15–23, 2025	Student Mobilisation Circuits	University students (UCPH)	Heavy truck & noise mapping	“Surge Workforce” model; high data completeness achieved
Apr 22, 2025	Earth Day “Try-Out” Event	General public	MindEarth image capture	Low-barrier entry for newcomers; 360° mapping protocol training
June 23–24, 2025	Ambassador Exchange	Dutch cyclists (Fietzersbond)	Cross-validation of infrastructure	Trans-local validation of data; agnostic utility of app/tools
M19–M36	Vertical Noise Profiling	High-rise residents (ground/mid/roof)	3D noise analysis	Validating “canyon effect”; built vertical community bond

M19–M36	Technical Refinement	PST & core team	Android/BLE optimisation	Identified ~17% app attrition rate; shift to supervised collection
---------	----------------------	-----------------	--------------------------	--

6.4 Turano & Gerace: Regenerating Rural Territories

Table 11: Turano & Gerace KPIs.

KPI Category	KPI Code	Target	Achieved	Evidence / Notes
Community & Participation	O1.KPI1 - Citizen Observatories created	≥2	2	Turano CO + Gerace CO; plus emerging archaeology CO (Turano) and upcycling CO (Gerace).
	O1.KPI2 – People involved in COs	≥250	237 Turano, 137 Gerace	Attendance lists, meetings, registrations; expected to grow.
	O1.KPI3 – Disadvantaged participants	≥80	80+	Strong inclusion of older adults, unemployed individuals, and low-digital-access groups.
Activities & Campaigns	O1.KPI4 – Thematic co-explorations	≥2	4	Air quality, mobility, archaeology, waste/circular economy.
	O3.KPI2 - Experiments	≥4	4	
	O4.KPI4 – Ad-hoc campaigns	≥1	1	March 2025 Ideathon in Turano (22 participants).
Tools, Tech & Datasets	O2.KPI1 – New datasets crowdsourced	≥4	4	Air quality, mobility, waste, and cultural heritage.
	O2.KPI2 – Datasets contributed to existing systems	≥3	3	Integrated into regional and municipal systems.
	O2.KPI3 – Harmonised datasets	≥2	2	Historical AQ + traffic flows.
	O4.KPI3 – Co-created analytics examples	≥4	4	AQ hotspots, mobility flows, waste areas, heritage mapping.
Policy Impact	O3.KPI1– Existing urban policy changes	≥2	4	AQ, mobility, archaeology, waste.
	O3.KPI3 – Existing policies revisited	≥2	2	Mobility (Turano) and waste upcycling (Gerace).

O3.KPI4 – Lessons and recommendations	≥5	≥5	Covered in White Book D6.7
---	----	----	----------------------------

The KPI results for Turano and Gerace demonstrate a comprehensive activation of rural citizen observatories, despite the structural challenges posed by low digital literacy, dispersed geographies, and ageing populations. Participation-related KPIs show strong performance, particularly O1.KPI1–3, due to a highly personal and trust-based engagement model. Door-to-door outreach, printed materials, and manual translations were key to ensuring the inclusion of elderly residents, digitally excluded groups, and socially marginalised communities. This “human-centric facilitation” was crucial in meeting and often exceeding engagement targets, confirming that relational approaches outperform digital-first strategies in rural contexts.

The activity, training, and dataset KPIs reveal a rich ecosystem of co-explorations that blend environmental monitoring, cultural heritage, and circular-economy initiatives. The pilots did not simply run campaigns; they created an iterative learning environment where citizens produced actionable datasets – four new ones as well as several integrated into local systems - and then saw their findings influence policy discussions and municipal decisions. The March 2025 Ideathon, for example, fulfilled the ad hoc campaign KPI, strengthening cross-sector collaboration and improving citizens' ability to interpret air quality and mobility data. These outcomes validate the GREENGAGE principle that campaigning and capability building lead to sustained community impact.

Finally, the policy and impact KPIs demonstrate how rural observatories can drive innovation in local governance. In Turano, citizen-generated evidence directly informed mobility planning, while in Gerace, it informed waste-management interventions. Across both territories, it informed cultural-heritage preservation strategies. The pilots contributed to all four targeted Green Deal areas and activated 16 data-to-policy workflows. They demonstrated that even small rural communities can generate high-quality data capable of influencing institutional decisions. Collectively, the KPIs show that Turano and Gerace have transitioned from fragile, low-tech environments to living laboratories of citizen-driven environmental governance.

6.4.1 Introduction: The Rural Imperative in the Green Deal

The operational period from Month 19 to Month 36 (M19–M36) marked a turning point for GREENGAGE’s Italian pilots in the Turano Valley and Gerace. While the project’s urban counterparts (Copenhagen, Bristol, North Brabant) grappled with dense infrastructure and contested city streets, these rural sites faced a deeper challenge: how to regenerate sparsely populated areas by digitally empowering their citizens. In these village contexts, the GREENGAGE technology stack – comprising the “GREEN Engine” platform, Atmotube PRO sensors, and the GREENGAGE mobile app – evolved from merely a data-gathering mechanism into an engine for territorial valorisation, social cohesion, and heritage preservation. In other words, technology became a means to an end: reinforcing community bonds and pride of place in service of the goals of the European Green Deal.

Citizen Engagement and Community Building: From the outset, the Turano/Gerace pilot prioritised inclusivity to ensure that nobody was left behind in this transition to a green economy. More than 250 individuals were contacted and invited to participate in each pilot area. Overall, hundreds of residents (approximately 237 in Turano and 137 in Gerace) were engaged in the new “citizen observatories”, far exceeding initial targets. Notably, the KPI of involving at least 80 people from disadvantaged groups was met. In the context of rural Italy, “disadvantaged” referred to the elderly, those excluded from digitally technology, and individuals living in remote hamlets. Outreach methods were therefore tailored accordingly: engagement did not rely solely on social media or apps, but on an intensive “door-to-door” strategy. Project animators literally knocked on doors, visited senior centres, and attended church gatherings to recruit and inform participants. This physical presence built a foundation of personal trust that no app could replicate. The pilot also partnered with local cultural and women’s associations, which are often led by women community organisers, to ensure a healthy gender balance in workshops and data collection walks. In practical terms, special attention was given to elderly citizens, unemployed youth, and those with limited digital access, using face-to-face support and printed materials to bring

them on board. By the end of 2024, regular community meet-ups and informal home visits ensured that even villagers without smartphones felt included and heard.

In this setting, maintaining motivation required a human-centric approach. Rather than high-tech gamification, the pilot leader and local “animators” sustained participation through personal follow-ups and community gatherings. Regular feedback sessions featuring large-print handouts and short video clips showcased the data that citizens collected, in formats they could easily grasp. Early on, participants themselves voiced a critical requirement: any data dashboards must be “user-friendly” and accessible to citizens, not just for experts. This feedback reinforced the project’s philosophy that rural innovation would only succeed if it was approachable and empathetic. Indeed, a key finding from late 2024 was that engaging with these “non-digitalised” communities required a personal approach, such as “going from door-to-door” and making and answering phone calls. The Turano/Gerace team discovered that the only way to truly integrate rural participants was through relentless in-person facilitation – a theme that underpins the entire methodology of the pilot.

From Ritual to Relevance: A telling example of the pilot’s ethos was how it transformed a planned hackathon into a community ritual. What began as a technical “datathon” concept was reimagined as a local event that blended learning with cultural tradition. In March 2025, a Turano’s community data-gathering day combined a collective walk (an outdoor activity), a shared meal (a social bonding), and a public data presentation (an intellectual exchange). Seeing their individual measurements aggregate live on the “big screen” gave villagers a powerful sense of efficacy – each person’s small action was visibly contributing to a larger truth about their territory. This instant feedback loop was vital for sustaining enthusiasm in what would be a long-term endeavour. It also helped overcome a notable initial barrier: “data scepticism”. Many residents had questioned the point of measuring things like air quality in a pristine rural area (“*Why measure clean air?*”). The pilot addressed this by reframing data collection as a means of defending the community’s interest rather than as nitpicking or outsider scrutiny. For example, they emphasised that collecting evidence on air quality and mobility could help protect the local tourism economy (by keeping the lake clean) or strengthen their voice in regional planning (e.g. “proof” to demand better road maintenance). By aligning citizen science with residents’ material and pride-based motivations, Turano and Gerace made engagement relevant to everyday life. The result was a model of rural Green Deal activation that was both deeply personal and inherently collective.

6.4.2 Methodological Framework: Situational Experimentation in the Rural Context

To understand the pilots’ activities, it is first necessary to understand the fundamental contextual differences between a typical urban smart city approach and the methods employed in Turano and Gerace. These Italian pilot areas are characterised by what one might call “digital fragility”. The populations are older, broadband and 4G coverage are patchy, and digital literacy cannot be taken for granted. Therefore, an app-based, technology-first engagement strategy was ill-suited to this reality. Instead, the team inverted the usual approach, creating a “Human-Centric Facilitation” model for experimentation. In practice, this meant prioritising people over technology at every step. Workshops were “high-touch” and hands-on: facilitators physically handed out Atmotube PRO sensors to each participant and guided them through Bluetooth pairing and data-reading step by step. While city pilots could rely on citizens downloading apps independently, local facilitators in Turano and Gerace often sat side by side with users, managing the technical details on their behalf. This active intermediation – real humans acting as the interface between citizens and digital tools – was labour-intensive by design. It deliberately traded efficiency for inclusion, recognising that a slower, personalised touch was the *sine qua non* of success in these villages.

Cultural reframing was another pillar of the methodology. The pilot team realised that while abstract talk of “data collection” or “citizen science” might attract a few tech-minded individuals, it would leave most villagers unmoved or even wary. To broaden its appeal, environmental monitoring was rebranded in terms of local identity and stewardship. Essentially, the idea of taking measurements became the idea of “guardianship”. Rather than being data technicians, citizens were invited to act as guardians of their local heritage and landscape. A notable example was the “Guardians of the Lake” narrative used in Turano: by invoking residents’ profound sense of pride in Lake Turano and its surrounding hills, the campaign transformed participation into a sense of honour and duty rather than a chore. This heritage-as-hook approach tapped into territorial identity as the primary motivator – a sharp contrast to urban

projects that often rely on novelty or scientific curiosity to engage volunteers. In Turano and Gerace, caring for one's history, culture, and landscape was the emotional driver that underpinned the data-gathering activities.

Another adaptive strategy was to leverage what became known as the “Big Screen Effect”. Initial interactions revealed that many older participants either struggled to engage with information on smartphone displays or did not use smartphones at all. The pilot, therefore, ensured that the data was brought back to the community, projected onto large screens in town halls and cultural centres. This served two purposes: it validated the participants' efforts by turning individual data points into a collective visual story for all to see, and it helped to convince local decision-makers. Presenting citizen-generated evidence in a public forum – with a display large and bright enough for a mayor or elder to see comfortably – transformed the data into a communal asset rather than a private gadget experience. By adapting the presentation method to suit the audience, the pilot ensured that the data would become part of the local discourse rather than remaining locked behind an app. The Big Screen approach proved crucial in persuading sceptical officials that the project's high-tech tools could provide insights relevant to traditional governance (see on this in Section 6.4.4).

Crucially, communication was tailored to the local language and sensibilities at every step of the project. The project team learned that generic translations and technical jargon would not suffice; in fact, an initial attempt to use AI-translated materials was unsuccessful, as community members found them awkward and unrelatable. In response, the team manually adapted all materials, rewriting user guides and consent forms and even the project's terminology in plain Italian and in local dialect where appropriate. For instance, the term “citizen science” (scientifically accurate but perhaps too clinical) was replaced in discussions with phrases like “cura del territorio” (care for the territory) or “dovere civico” (civic duty), which had a more familiar connotation. This semantic localisation was not just about clarity but also about building trust. It signalled respect for local culture and helped residents see the project as their own, rather than a foreign research experiment. Although this intensive customisation required more work initially, it was worthwhile reducing scepticism and fostering genuine engagement during subsequent campaigns.

Finally, to expand the scope of this human-centric model beyond the capabilities of the pilot team, the project adopted a “Cascade Learning” structure. This was essentially a community mentorship pyramid. The most engaged early participants – often younger villagers, students, or natural community leaders – were selected to become “Ambassadors” who could coach others. The pilot support team provided these core individuals with in-depth training, effectively turning them into local trainers and points of reference. The cascade served two key functions. Operationally, it extended reach: Ambassadors could help spread techniques and troubleshoot issues in between official meetings, allowing the observatory to touch far more people than the central team could reach directly. Socially, it created peer examples that accelerated acceptance: when an elderly resident was taught to use the app by a neighbour or even a grandchild, the technology immediately gained a social validation that no external expert could have achieved. This hierarchy of knowledge – from project team, to Ambassadors, to the broader community – proved to be a robust way to embed the observatory's capabilities locally. It ensured that the human network grew alongside the data network. In sum, the Turano & Gerace pilots' methodology was one of patient, situational adaptation. They met people where they were, using their own language and at their own pace. They provided tools (digital or analogue) that suited their reality.

6.4.3 Phase I: Building the Social Substrate (2024)

Rather than launching flashy campaigns immediately, the Turano/Gerace team spent most of 2024 building a low-intensity community. This Phase I focused on establishing a robust “social infrastructure” to support the digital experiments to come. A key tactic was establishing a steady rhythm of engagement through quarterly meetings. Between January and October 2024, the pilot convened the community roughly every three months – a deliberate cadence in a context where the past often appeared briefly and then disappeared. In rural areas long accustomed to this “parachute research” (where outsiders arrive for a short project and then leave), this regular schedule itself sent a message of permanence and commitment. Each meeting was not a one-way lecture but a deliberative forum: a space for residents to voice concerns, learn, and gradually process what the Green Deal could mean for their locality. By pacing the content and returning consistently, the team built credibility and a sense that “we are in this together for the long haul”.

The content of the quarterly forums is developed in thematic layers, reflecting the project's expanding scope. The Q1 2024 meeting focused on the accessible yet pressing topic of air Quality, introducing the concept of sensor-based observation. With a focus on health, a universally relevant concern, this session introduced the Atmotube PRO portable air-quality monitors in a way that felt relevant immediately. For example, participants discussed the potential impact of indoor stove smoke or local traffic on the air quality experienced by them and their grandchildren. By anchoring the technology in everyday wellness, the pilot established a baseline relevance from day one. The Q2 2024 meeting shifted the focus to mobility, timed for the spring when people are likely to be out. Here, the team introduced dashcams and simple mobility diaries to discuss road safety and transportation needs. While the narrative of fixing potholes and managing traffic resonated with residents, but this phase also exposed the infrastructural challenges of the countryside. For instance, participants who attempted to use dashcam devices to record road conditions found that they struggled to upload the large video files due to limited internet bandwidth.

This challenge was not a failure, but a formative experience. The pilot support team had to step in with manual data transfer methods, such as physically collecting memory cards and providing offline storage. This further validated the necessity of human facilitation in these digitally fragile settings. By encountering and solving such issues together with the community, the project strengthened the collective problem-solving spirit. The Q3/Q4 2024 meetings focused on waste management and circular economy topics. This late-2024 focus was chosen intentionally to pave the way for the more targeted campaigns in Gerace and the lake area, which would address recycling, upcycling, and environmental clean-ups. During these sessions, ideas such as community composting, trash mapping, and litter-free local heritage sites were discussed, preparing participants conceptually for the actions of 2025.

Throughout this trust-building phase, the presence of trained human facilitators, or “Animators” was crucial. These local volunteers, who had been trained in the project's first year, attended each meeting to provide over-the-shoulder support. If a retiree struggled to turn on an Atmotube PRO or a farmer's phone wouldn't install the app, help was immediately available in the room. The animators' task was to “de-risk” the technology for newcomers, patiently walking them through each step and troubleshooting on the fly. This real-time coaching greatly reduced the anxiety barriers associated with using new gadgets. Over the course of 2024, it was observed that participants who initially needed assistance began trying things independently, which is a testament to their growing digital confidence. Additionally, these quarterly gatherings enabled the pilot team to identify emerging community champions. By the end of 2024, the concept of local “Ambassadors” had been implemented: several enthusiastic younger participants were informally tasked with checking in on their older relatives and neighbours between meetings. For example, a tech-savvy teenager in one village might help her elderly neighbours read the weekly sensor reports or ensure their devices are charged and logging data. This effectively created a distributed support network within the villages themselves. Such peer-to-peer assistance meant that the project maintained its momentum in the gaps between formal events. It also empowered the young people, giving them a role as knowledge holders in a community where they would usually have no voice.

By the end of 2024, Turano and Gerace had cultivated the social foundation necessary for more ambitious actions. The community evolved from a state of cautious curiosity to one of proactive engagement. Dozens of citizens had attended multiple meetings, learnt to use at least one new tool (whether be it a sensor or a camera), and voiced their ideas about local environmental issues. There was a palpable sense of co-ownership: this was no longer “a research project that's happening to “us”, but “our observatory initiative”. Having established this trust and basic capacity, the stage was set for Phase II: transitioning from learning about the environment to actively campaigning to improve it.

6.4.4 Phase II: The Campaigning Arc (2025)

Building on the trust and skills developed in 2024, the pilots launched a series of intensive campaigns in 2025. This phase saw participants shift from being passive learners to active data producers and change agents. Each campaign was designed not only to collect valuable data and to function as a community event, further strengthening the social and cultural fabric established in Phase. Four major campaigns (including thematic “case studies”) defined this Phase: an Ideathon linking environment with heritage; the “Guardians of the Lake” stewardship campaign, an Archaeological Mapping observatory; and a

Circular Economy/Waste initiative in Gerace. Below, we provide details of these campaigns and their outcomes.

Case Study: The Ideathon in Castel di Tora (March 2025). The cornerstone of Turano Valley's activities in 2025 was the Ideathon, a one-day innovation event held on March 27, 2025. Unlike a typical tech-oriented workshop, the Ideathon incorporated local heritage from the outset. It was organised in partnership with I Borghi più Belli d'Italia ("The Most Beautiful Villages of Italy"), a prestigious association that champions small historic towns. This partnership lent the event immediate legitimacy and a sense of pride, framing it as part of a national heritage movement rather than an outside experiment. The choice of venue further reinforced the theme: the workshops took place in the medieval Castle of Castel di Tora, an iconic landmark overlooking the lake. Convening a technology and planning meeting within the ancient castle walls sent a powerful symbolic message that the past and the future were being connected in Turano.

Equally important was the mix of participants engineered for the Ideathon. A total of 22 participants were carefully selected to ensure what the organisers called "vertical integration" of the community. This meant that every stakeholder group was represented: ordinary citizens (the primary data collectors), local mayors and administrators (the policymakers), young people and students (the next generation and digital natives), and technical experts from the project team (the problem-solvers). Each breakout group or field team included a representative from each category – for example, a mayor walking side-by-side with a student and a retiree, all carrying sensors together. This broke down traditional silos and created a rare peer-to-peer dialogue between officials and residents, mediated by a joint collection of evidence. Many participants commented that it was the first time they had collaborated with people outside their usual circles (e.g., students with municipal officers).

The Ideathon combined technical training with co-design. Simply teaching people how to use the Atmotube PRO or the app was not enough; the goal was also for them to interpret the data and envision solutions. Thus, the day alternated between fieldwork sessions and workshop sessions. In the morning, participants went out into the streets of Castel di Tora armed with Atmotube PRO sensors and notebooks, gathering air-quality data at various points (near traffic areas, quiet zones, by the lakeshore) and making observations about mobility (e.g., noting where pedestrian access was difficult, or where car traffic was heavy). In the afternoon, everyone reconvened in the castle's main hall, where the collected data was displayed and analysed collectively. The groups then co-designed draft solutions addressing the issues identified, such as proposals to create small "urban green areas" (pocket parks or planters in the village to improve air quality and aesthetics) and ideas for "heritage valorisation" (e.g., better signposted walking paths to historical sites, which could also distribute tourist foot-traffic more evenly). This blend of hands-on sensing and policy brainstorming epitomised the GREENGAGE ethos: citizens moved through the full cycle from data to decision.

One of the most significant outcomes of the Ideathon was what the pilot termed a governance breakthrough via the "Big Screen Effect". For the first time, local administrators (mayors and councillors from Turano Valley villages) were exposed to a live dashboard displaying citizen-generated data in a communal setting. Seeing real-time maps and graphs of their constituents' measurements was eye-opening. However, it also revealed a clear usability gap. The initial dashboard interface – essentially a simplified version of a smart-city control panel – was deemed too complex by many attendees, who commented that it looked "absolutely only for experts" and not for the general public. This feedback was invaluable. It emphasised that, to achieve the full promise of the Big Screen Effect in rural governance, the visualisations must be radically simplified and narrative-driven. Following the Ideathon, the project team embraced this feedback, redesigning certain dashboards to incorporate more storytelling elements, such as clearer icons, before-and-after views, and integrated explanations to enable any resident or local official to understand the implications without a data analyst at hand. In short, the Ideathon not only engaged the community for a day, but it also offered a testing environment that helped shape the tools to better serve the needs of the rural audience.

Case Study: "Guardians of Lake Turano" (August 2025). Following the success of the spring Ideathon, the Turano pilot aimed to maintain engagement over the summer, traditionally a time when attention might wander due to holidays and heat. The solution was the "Guardians of Lake Turano" campaign (Custodi del Lago del Turano), launched in August 2025. This campaign was a masterclass in narrative reframing. The pilot's Participatory Support Team (PST) recognised that simply asking people

to be data “collectors” or “sensors” was a rather transactional appeal and unlikely to inspire. However, asking them to be “Guardians” is identity-based and motivational. The term “Guardian” tapped into a deep well of local sentiment: pride of place, protectiveness towards the beloved lake and its ecosystem, and even a sense of heroic duty. By positioning participants as guardians, the campaign made environmental monitoring feel like part of the cherished tradition of caring for one’s homeland, rather than an onerous new task.

In practice, the Guardians of Lake Turano mobilised both residents and summer visitors to monitor the lake’s environmental health. Using the now fully deployed GREENGAGE App and low-cost tools, participants were asked to carry out several tasks in the vicinity of the lake:

- Waste Mapping: identify and photograph points along the lakeshore where litter or debris had accumulated. Each report with a geotagged photo contributed to a live map of “trouble spots” that needed cleanup or bins.
- Invasive Species Monitoring: observe and log any instances of non-native flora or fauna in and around the lake (for example, an outbreak of invasive algae or sightings of non-native turtles). Such data would help environmental authorities track biodiversity threats.
- Environmental Degradation Reporting: note signs of erosion, illegal waste dumping, or water pollution (such as unusual colour or odour in the water).

Through these activities, participants effectively conduct a community environmental audit of their lake. What made the initiative particularly powerful was the way it aligned ecological goals with the area’s local economy. Lake Turano is the economic linchpin of the area, attracting tourists to swim, fish, and sightsee. The campaign messaging explicitly linked protecting the lake’s biodiversity and cleanliness (a Green Deal objective), to safeguard the region’s primary economic asset: tourism. For example, volunteers were told, “*Every piece of trash you remove or report is one less eyesore to deter visitors*”, and “*Every invasive weed you catalogue is information that can help keep our lake healthy and attractive*”. This gave participants a tangible sense of purpose and a stake in the long-term outcomes. It wasn’t just about an app or a project; it was about safeguarding their community’s prosperity and way of life. As a result, the campaign maintained a high level of engagement even after the initial novelty wore off – people continued to log observations throughout August and into early autumn. Eventually, the local civil protection department organised a lakefront clean-up using the hotspot map generated by citizens. The Guardians of Lake Turano showed that blending narrative (identity as protectors) and incentive (economic self-interest) can dramatically increase participation in environmental citizen science.

Case Study: Archaeological and Cultural Heritage Mapping (July & October 2025). The most innovative adaptation in Turano was perhaps the integration of cultural heritage into the ostensibly environmental observatory. The team recognised that in these ancient territories, “history” and “heritage” could be far stronger motivators for citizens than abstract environmental metrics. Rather than running a purely scientific campaign, therefore, they launched the Archaeological and Cultural Heritage Mapping CO (Citizen Observatory) in mid-2025. The idea was that the same GREENGAGE tools used for mapping air or waste could also be used to map historical assets – effectively turning citizen scientists into citizen historians as well.

To lend credibility and expertise to this endeavour, the pilot collaborated with academic teams from the University of Durham (UK) and Tor Vergata University in Rome. These archaeologists and heritage scholars helped to design the observation protocols and provided training to ensure that the data collected (such as GPS locations of artefacts or photographs of ruins) would be useful for research and conservation purposes. The campaign unfolded in two phases:

- Phase 1: Summer Archaeological Survey (July 7–25, 2025). This coincided with the annual archaeological excavation season in the Turano Valley. During this period, local citizens joined forces with university archaeology students in the field. Using the mapping feature on the GREENGAGE app, they documented surface finds (e.g., the locations of pottery shards or old building foundations that had been uncovered) and recorded the routes of historical footpaths and roads that had been rediscovered. Some villagers had personal knowledge of long-forgotten local lore and became invaluable guides, leading students to a spot in the woods where an old

stone marker stood, for instance. This was a powerful example of the co-production of knowledge, with modern digital tools capturing ancient traces, guided by intergenerational collaboration.

- **Phase 2: “Archaeological Week” (October 20–26, 2025).** In autumn, a follow-up campaign invited a broader set of citizens to continue mapping and to verify the summer’s findings. However, this phase unexpectedly became a test of the pilot’s technical resilience. Midway through the October survey, the GREENGAGE app’s backend servers suffered a critical outage (an “importante aggiornamento tecnico” or major technical update gone wrong). Participants could not log in or upload data in real time for several days. Undeterred, the local facilitators quickly reverted to offline methods, distributing paper maps and data sheets so that people could record their observations manually until the system was restored. This incident highlighted the vulnerability of relying on digital infrastructure in the field, particularly in areas with poor connectivity. It was a valuable lesson that backup plans and offline capabilities are essential for rural citizen science. Despite this setback, the campaign gathered a wealth of information.

A key focus of the heritage mapping was the “Pietra Scritta”, an ancient, inscribed stone that holds legendary significance in the Turano area. By asking citizens to specifically geo-tag and describe such beloved sites, the project embraced local knowledge and passion. In effect, high-tech “smart city” tools were being used to preserve “ancient history”, creating a powerful synthesis of old and new. This approach broadened the demographic appeal of GREENGAGE, drawing in history enthusiasts, culture lovers, and older residents who might have been indifferent to a purely environmental campaign but were eager to contribute to a heritage project. The generated data didn’t just vanish into a report, either – the archaeological findings were shared with the regional cultural heritage authority, and discussions began about using the GREENGAGE platform for ongoing community-based heritage monitoring. Culturally, the message was poignant: the road to climate resilience and digital transition in Turano could also be a road to rediscovering and safeguarding its rich past.

Case Study: Gerace and the Circular Economy (September 2025). In the southern pilot site of Gerace (Calabria), the year 2025 saw a campaign tailored to its own context – one even more rural and geographically isolated than Turano. Gerace’s priority issue (identified through 2024 discussions) was waste management, with a focus on promoting recycling and upcycling in a town perched on a remote hilltop. The 2025 campaign in Gerace was thus framed around the “Circular Economy” theme, linking local waste challenges to the objectives of the Green Deal.

The Gerace team faced a significant logistical obstacle: how to share expert knowledge with a tiny, remote village without easy physical access. Their solution was an innovative “Hybrid Webinar”, which took place on September 9, 2025. On that day, while Gerace’s citizens gathered in a community hall, external experts in circular economy and waste upcycling joined them remotely via video link. This blended format enabled the community to attend a seminar with specialists, which would normally require residents to travel hours to a city, or for experts to travel to Gerace. Crucially, local facilitators led the session on-site. They operated the projector, ensured that everyone could hear the speakers, and moderated a live Q&A, relaying questions from the villagers to the remote panellists and vice versa. By providing this human bridge, the pilot ensured that the digital barrier did not inhibit interaction – even attendees who were unfamiliar with Zoom or streaming could simply raise their hand and speak, with the animator handling the technology. The hybrid webinar sparked lively discussions in Gerace about local waste issues, ranging from the lack of recycling facilities to the frequent trash burning in the countryside.

Perhaps more importantly, the webinar launched an ongoing “Waste Upcycling” citizen observatory in Gerace. After hearing ideas from the experts, the community was energised to collect data on their own waste situation. In the weeks following the webinar, the pilot supported a group of motivated residents (including a youth volunteer group from a nearby town) to turn ideas into action. They set out to systematically:

- Map waste dumping hotspots around Gerace’s historic center and rural outskirts. Using the app, citizens identified where garbage tended to accumulate – along country roads, in ravines, or in derelict plots of land – creating a map of sites that needed to be cleaned up or enforced.

- Identify locations for community composting or recycling centers. Citizens suggested underused municipal land or corners of public parks that could host small-scale composters or collection bins, thus aligning with circular economy practices.
- Document the impact of litter on heritage sites, noting places where trash or fly-tipping was marring areas of cultural importance (for example, illegal dumping near centuries-old churches or litter in scenic viewpoints).

These citizen observations were not collected in vain. The data were compiled into a brief report and presented to the Gerace municipal authorities in a dedicated meeting in October 2025. The impact was tangible: the town's administration used the citizen-generated map to plan a new "upcycling hub" where recyclables could be dropped off and repurposed locally. In effect, a direct feedback loop was established: Citizen Observation -> Data Visualisation -> Policy Action. Furthermore, involving citizens in this process greatly increased local support for the solutions. People could see their input directly shaping a municipal initiative, which in turn boosted trust in both the project and the local government. By the end of 2025, Gerace had not only raised awareness of waste issues but also set in motion practical steps to improve its circular economy performance, with funding proposals in progress. This is a testament to how even a very small community can leverage citizen science to achieve Green Deal objectives.

6.4.5 Cross-Pilot Synergies: The Bristol Connection

The regeneration of Turano and Gerace was not achieved in isolation. During the M19–M36 period, there was a porous exchange of ideas across the GREENGAGE consortium, ensuring that innovations in one locale benefited others. A particularly fruitful cross-pilot synergy was with the Bristol team, centring on the concept of an analogue interface for engagement. In Bristol's contested urban neighbourhoods, GREENGAGE had pioneered the "Conversation Station" – essentially a mobile, physical kiosk where residents who were uncomfortable with surveillance or digital tools could speak face-to-face with project facilitators and still contribute their observations. The Turano/Gerace team realised that this idea was perfectly suited to their own context, albeit for slightly different reasons. Here, the barrier was not distrust of authority as it was in Bristol, but rather low digital literacy and access. However, the solution was the same: to provide a human touchpoint as an alternative to the app interface.

From 2025 onwards, the Italian pilots adapted the Bristol blueprint by setting up pop-up "conversation stations" at their key events. For example, at the Castel di Tora Ideathon and the Lake Turano campaign day, a small table or tent was designated as the local Conversation Station. At least one animator or volunteer was stationed there with a tablet and paper forms. Community members who found the app too daunting, or who simply preferred chatting, could visit the station to discuss their observations. The facilitator would then either assist them in entering the data on the tablet or take notes to enter later. In this way, a shy senior citizen could still report, for example, *"I saw someone burning trash across the valley last night"* or *"the steps to the old mill are broken"* and know that it would be logged in the system. The Conversation Station effectively served as a physical/digital bridge, providing a familiar, low-pressure environment (just a table with a friendly person) that quietly fed into the high-tech data pipeline behind the scenes.

The success of this "trans-local" transfer – from a busy UK city to a tranquil Italian village – highlights the universal nature of human-centric design. Whether the goal was to engage marginalised urban youth or elderly rural farmers, the answer was often the same: meet people in the real world, at eye level. The Turano/Gerace pilots proved that the antidote to digital exclusion could be as simple as providing a chair, having a conversation, and offering a helping hand. The Bristol connection also had a reinforcing effect, validating to the consortium that approaches emphasising empathy and physical presence were not just nice add-ons, but often the key to unlocking participation. By importing a solution born in one context and applying it in another, GREENGAGE demonstrated the flexibility of its toolkit and the strength of its network. In essence, the Italian pilots showed that designing for the most vulnerable user – be they an overburdened city resident or an offline villager – often creates solutions beneficial to all. This cross-pollination ensured that the legacy of GREENGAGE would be a set of principles and tools adaptable across Europe's diverse socio-technical landscapes.

6.4.6 Conclusion: From Fragility to Innovation

The M19–M36 journey in Turano and Gerace is a testament to the potential of “regenerative citizen science”. In communities that are often considered as peripheral or “fragile” in digital terms, the pilots succeeded in catalysing not only environmental monitoring but also social innovation. By consciously rejecting the technocratic, app-centric model of the traditional smart city and embracing a methodology based on human-centred facilitation, cascade learning, and territorial identity, the pilots successfully navigated the challenges of the rural context. The quiet groundwork of 2024 – personal visits, trust-building forums, cultural adaptation – proved to be the solid foundation for the dynamic campaigns of 2025. Over this period, Turano and Gerace didn’t just collect data, they built a community. The projects empowered residents who had never engaged in “high-tech” initiatives to become confident co-creators of knowledge. In these digitally fragile territories, ordinary citizens evolved into “territorial innovators”, using advanced tools to both preserve their past (e.g. mapping archaeological treasures) and secure their future (e.g. planning for cleaner air, sustainable tourism, and better waste management).

The legacy of the Turano & Gerace pilots is multifaceted. In terms of governance, they demonstrated that even small, ageing communities can rise to the Green Deal challenge when engagement is tailored to their circumstances. The pilots delivered actionable policy inputs: for example, the Big Screen visualisations turned initially sceptical mayors into allies when they saw local data presented in a compelling, communal way. The “Guardians” narrative also demonstrated that fostering pride and stewardship can mobilise citizens in a way that purely technical appeals cannot. These insights are already informing how regional authorities approach citizen involvement in rural climate actions. Technologically, the pilots have made the GREENGAGE tools more robust and user-friendly offline, which will benefit future deployments in areas with poor connectivity. Perhaps most significantly of all, the social infrastructure established by the project appears likely to endure beyond GREENGAGE’s lifespan. Local stakeholders in the Turano Valley have declared their intention to continue using the GREENGAGE app for cultural heritage mapping and environmental reporting in the coming years. What began as an EU-funded experiment has thus become a programmatic community commitment. In Gerace, too, the networks of volunteers, the links to external experts, and the feedback channels to the municipality are also set to continue, ensuring that the upcycling observatory lives on as part of the town’s development agenda.

In conclusion, Turano and Gerace transformed what were perceived as weaknesses – digital divides, remoteness and traditional mindsets – into strengths by innovating with a human touch. They transformed fragility into opportunity, crafting a model of rural Green Deal implementation that is both high-tech and deeply human. This experience highlights a broader lesson: delivering the green and digital transition in Europe’s rural areas is as much about cultural strategy and trust as it is about sensors and data. By treating elders, young people, and officials as equal partners in a shared mission to cherish their homeland, GREENGAGE’s Turano & Gerace pilots have created a legacy of empowered communities that continue the work of regeneration on their own terms.

Table 12: Turano & Gerace key activities.

Period / Activity	Location	Stakeholders	Key Activities
Jan–Oct 2024 – Quarterly Meetings & Community Building	Turano Valley; Gerace	Citizens, PST, mentors, local animators	Quarterly meetings introducing sensors, dashboards, and field protocols • Trust-building and creation of the “social substrate” • Establishment of Citizen Observatories (Turano, Gerace + emerging Archaeology CO + Waste Upcycling CO) • Door-to-door outreach and analogue communication to engage elderly and low-digital-literacy groups
Training & Capacity	Turano Valley; Gerace	Citizens, schools, local associations	146 trained via workshops, field demonstrations, translated clips (AQ, mobility, heritage, climate) • Hands-on Atmotube PRO sensor training; simplified dashboards; manual translations • Emergence of

Building (2024–2025)			local “Ambassadors” supporting neighbours (peer-to-peer assistance)
Mar 27, 2025 – The Ideathon	Castel di Tora (Castle)	Mayors, citizens, students, experts, I Borghi più Belli d'Italia	Hybrid co-design event with environmental + heritage framing (held in medieval castle) • Real-time AQ and mobility data collection with Atmotube PRO, dashcams, GREENGAGE App • “Big Screen” visualisation for mayors; strong institutional buy-in
Jul 7–25, 2025 – Archaeological Mapping Campaign	Turano Valley	Durham University, Tor Vergata University, citizen volunteers	Mapping of “Pietra Scritta” and local heritage assets • Integration of archaeological observations with environmental sensing
Aug 2025 – “Guardians of the Lake” Campaign	Lake Turano	Residents, tourists, local associations	Stewardship campaign: monitoring litter, invasive species, green spaces • Narrative reframing: from “monitoring” to “local custodianship”
Sept 9, 2025 – Hybrid Webinar / Waste Upcycling CO Launch	Gerace	Local assembly, remote experts, citizen volunteers	Launch of Waste Upcycling Observatory • Mapping of waste hotspots; circular-economy awareness activities
Oct 20–26, 2025 – Archaeological Week	Turano Valley	Citizens, academic partners	Presentation of summer mapping results • Deepening cultural heritage engagement
Thematic Co- Explorations (O1.KPI4)	Turano Valley & Gerace	Citizen Observers, municipalities	Air Quality Monitoring (Turano + Gerace) • Sustainable Mobility (Turano) • Archaeological & Cultural Heritage Mapping (Turano) • Waste & Circular Economy (Gerace)
Tools, Technology & Data Activities	Both Pilots	Citizens, PST, technical partners	Use of GREENGAGE App, Superset dashboards, Atmotube PRO sensors, MindView, observation forms • Dashcam documentation of mobility and environmental conditions • Collection and validation of AQ, mobility, waste, and heritage datasets
Cross-Pilot Synergy – Bristol “Conversation Station” Transfer	Turano Valley (events)	Bristol team, Italian PST, citizens	Adaptation of Bristol's analogue “Conversation Station” for rural digital inclusion • Low-barrier participation through pop-up tables with facilitator support
Policy Engagement & Governance	Municipalities of Turano Valley; Gerace	Mayors, municipal technicians, COs	Contributions to sustainable mobility planning (Turano) and waste/upcycling policy reviews (Gerace) • Operational feedback loops connecting citizen data to administrative decision-making

Sustainability & Future Vision	Across both pilots	I Borghi più Belli d'Italia, Ecoinspire Lab, municipalities	Plan to continue COs beyond the project • Negotiation of agreement to scale the GREENGAGE App to a rural network
---	-----------------------	---	--

7 Conclusions

7.1 Executive Synthesis: The Pivot to Institutional Integration

During the second half of the project (Month 19–36), GREENGAGE underwent a pivotal transition from an exploratory, technology-focused phase to a consolidation phase centred on “Institutional Integration” and policy impact. A key conclusion is that the effectiveness of Citizen Observatories in advancing the objectives of the European Green Deal depends more on the governance models surrounding the technology than on technological sophistication. In practice, the common technology platform (the “GREEN Engine”) acted as a catalyst, but sustained success required active human intermediation, i.e. dedicated people and processes to connect data with decision-making. Purely passive data collection (treating citizens as sensors) did not yield lasting engagement or policy change across all five pilot sites. In contrast, relational approaches (treating citizens as co-researchers and empowering local facilitators) bridged the gap between high-level climate goals and on-the-ground experience.

Each pilot site validated this principle by adopting context-specific engagement strategies. Bristol required a “repair” approach to rebuild trust in a contested neighbourhood. North Brabant needed “Institutional Empathy” to break down silos between technical experts and citizens. Copenhagen relied on “Precision Engagement” to counter civic fatigue in a digitally saturated city, and Turano/Gerace employed “human-centric facilitation” to overcome the digital divide in rural communities. These varied models underscore that, although the technology stack was uniform, the social infrastructure for deployment had to be diverse. In other words, successful citizen engagement depends heavily on governance and community-building being tailored to local conditions.

This period also changed the way the project understood smart city governance. GREENGAGE moved beyond the technocratic assumption that data alone would drive policy change. Instead, the project revealed the complex social and political process involved in translating a citizen’s observation into a bureaucrat’s decision. Specifically, this involves converting raw, often emotive community input into standardised formats that align with municipal planning processes (e.g., integrating citizen data into city “digital twins”). The five pilots effectively became laboratories for this translation process, demonstrating that, with the right training and community structures in place, citizens can act as legitimate partners in managing urban environments. The following sub-sections summarise these findings in relation to the project’s training, community engagement, and campaigning activities.

7.2 Evolution of Training: From Instruction to Embedded Capability

The project’s outcomes demonstrate a clear shift in training strategy, moving from one-way knowledge transfer to the development of long-lasting local capabilities. Although early “train-the-trainer” workshops established basic competencies among Pilot Owners, they were insufficient for the final stage of citizen engagement. In response, GREENGAGE implemented a “Cascade Training Model” that distributed expertise throughout the community. This three-tier model (Pilot Owners → Core Teams → Citizen Observers) was vital for scaling up the complex citizen science initiative. Empowering local champions proved especially crucial for project sustainability. For example, training youth leaders in Bristol’s Somali community and rural “animators” in Turano created a distributed support network that could solve technical issues on the ground without constant input from the core consortium. In short, local capacity building ensured that each pilot site could maintain momentum and troubleshoot challenges independently.

Equally important, the project confirmed that “just-in-time” and embedded learning are more effective than traditional classroom instruction for engaging large numbers of citizens. The most successful training took place during live campaign events, where citizens learned by doing, improving their retention of procedures and the quality of their data. Participants who calibrated sensors during an event such as an ideathon or an Earth Day gathering, for example, showed better understanding and commitment than those given abstract instructions weeks in advance. This event-centric training created teachable moments at times of maximum motivation, rendering technical steps (e.g. pairing a sensor via Bluetooth) immediately meaningful in the context of solving a visible local problem. However, the project also found that when scientific rigour demands complex protocols (for example, precise noise pollution measurements in Copenhagen), one-off training is insufficient. In such cases, a model of continuous supervised operation is needed, as demonstrated by the engagement of university students in

Copenhagen who acted as a sustained, quality-controlled workforce for data collection. This insight suggests that maintaining data quality in high-precision citizen science may require training to be integrated as an ongoing support function, potentially via educational institutions or continuous mentorship.

Finally, GREENGAGE's training efforts emphasised the importance of fostering data literacy and technical proficiency at the local level. Training pilot teams in data visualisation using tools such as Apache Superset enabled them to transform raw sensor readings into compelling visual narratives for decision-makers. This ability to effectively communicate data, exemplified by the "big screen effect" in Turano, where seeing real-time maps convinced mayors of the value of the data, became a core competency for driving policy uptake. Similarly, hands-on workshops demystified the hardware (IoT sensors) and gave community members a sense of ownership over the tools. Simple tactile practices like handling devices, pairing them, and reading LED indicators reduced fear of the "black box" and increased participants' willingness to deploy and maintain sensors in the field. These training innovations ensured that technical knowledge did not remain centralised but became an embedded community asset.

7.3 Governance of Community: Comparative Engagement Models

Community-building strategies employed at the pilot sites varied significantly, offering a comparative look at how governance models must adapt to local context. Four distinct engagement models emerged, each addressing unique socio-political challenges:

- **"Repair" model (Bristol – contested urban neighbourhood):** The focus was on rebuilding trust in a community polarised by a low-traffic neighbourhood scheme. A key innovation was the use of an analogue interface, the "Conversation Station" kiosk, which allowed to signal presence and listen to residents in ways that a digital app alone could not. This hands-on approach engaged marginalised groups (e.g. Somali and Sudanese women) by validating subjective experiences (e.g., safety perceptions, cultural concerns) as legitimate data alongside sensor readings. The Bristol pilot demonstrated that in deprived or distrustful settings, investing in face-to-face engagement and acknowledging community narratives are necessary to heal the rift between planners' maps and residents' lived reality. Data was used as a tool for conflict resolution and mutual understanding, rather than just monitoring.
- **"Empathy" model (North Brabant – mature ecosystem with high trust):** The aim was to close the gap between the government and citizens in a well-served region by fostering "Institutional Empathy" rather than repairing conflict. The North Brabant "Cycling Lab" integrated civil servants and citizen volunteers into a single community of practice, such as provincial officials and residents literally cycled and collected data side by side. This shared experience dissolved the "us" versus "them" dynamic and built a reservoir of empathy within the administration. The pilot validated the concept of the "expert citizen": recognising that informed citizens (e.g., seasoned cyclists) often hold practical knowledge that can surpass official technical knowledge. Treating these volunteers as valued partners (or even "unpaid consultants") rather than amateur participants, the project strengthened community cohesion and long-term commitment. The lesson is that in high-capacity environments, co-creation and mutual respect between institutions and citizens can significantly improve the acceptance of policy.
- **"Precision" model (Copenhagen – digitally advanced but fatigued city):** In response to "Engagement Fatigue" in a tech-saturated urban setting, by pivoting to highly targeted, curiosity-driven engagement. Instead of broad calls to action, which had started to lose effect, the Copenhagen pilot engaged citizens through advanced, novel scientific inquiries such as investigating the "canyon effect" in noise pollution and creating vertical noise profiles in apartment buildings. This approach tapped into citizens' desire to discover new knowledge rather than simply fulfil civic duty. It also fostered new social bonds: forming vertical communities of neighbours who connected over shared scientific experiments in their building. Additionally, Copenhagen highlighted the limits of purely volunteer-based models for labour-intensive data collection. The use of a student "Surge Workforce" showed that institutional partnerships (with universities, in this case) can provide the reliability needed for complex, continuous monitoring tasks. The overarching finding is that in communities where general engagement is hard to

sustain, appealing to curiosity and integrating citizen science into institutional frameworks (like university programs) can reinvigorate participation.

- **“Facilitation” model (Turano & Gerace – rural territories):** The focus is on overcoming structural barriers like the digital divide and out-migration through human-centric facilitation. The Italian pilots underscored that rural innovation for the Green Deal must align with local identity and heritage. The “Guardians of Lake Turano” and “Turano Valley Archaeological Map” campaigns, for example, framed environmental monitoring as an act of cultural stewardship, appealing to residents’ pride in their historical and natural heritage. By linking the use of the GREENGAGE app to mapping ancient sites and protecting beloved landscapes, the project made abstract global goals tangible and relevant to villagers. Another insight was the power of visualisation in gaining political support: displaying community-collected data on a big screen to local mayors in Turano turned data into a compelling narrative, providing officials with a sense of modern control over their territory. Overall, the rural pilots demonstrate that “smart rurality” must be built on cultural context, blending technology with face-to-face facilitation and storytelling that resonates with local values.

Across these diverse models, a unifying theme is that one size does not fit all in citizen engagement. Effective governance of community initiatives requires diagnosing local conditions and tailoring the approach whether it might be repairing trust, building empathy, sparking curiosity, or facilitating ownership to ensure citizens are genuinely empowered partners in the Green Deal mission.

7.4 Campaigning Dynamics: Operationalising the Citizen Observatory

In this period, GREENGAGE’s citizen campaigns moved from theory into action, validating the operational model of the citizen observatory. The campaigns were not passive data collection exercises; they actively interacted in local decision-making processes. Two major findings emerged regarding how to sustain effective campaigns:

Structured “Surge” Engagement: Analysis of participation patterns revealed a reliance on short-term intensive efforts (“pulses” of activity) rather than continuous engagement. High-impact events such as datathons, ideathons, and community rides accounted for the majority of quality data collection. This suggests that sustainable citizen observatories should be built around a campaign calendar of periodic, well-publicised events, acknowledging that volunteers have limited time. Concentrating effort in bursts (e.g. Copenhagen’s student measurement sprints or Turano’s “archaeology week”) yielded statistically robust data sets while avoiding volunteer fatigue and “data droughts” between engagements. Therefore, rather than expecting daily use, regular surge events, respect citizens’ constraints and maintain high energy levels and data quality.

Campaigns as Identity Formation: Beyond the collection of data, the campaigns helped forge a shared identity among participants. A notable example of this is how the “Guardians of Lake Turano” became more than a project activity, branding its participants as protectors of their environment. This kind of civic branding, whereby volunteers are assigned titles like “Guardian”, “Ambassador”, or “Expert”, proved to be a powerful motivational tool. By conferring a sense of status and purpose, the project fostered pride and long-term commitment among its volunteers. Essentially, successful campaigning required creating a narrative and community identity that citizens were proud to be part of. This approach transformed engagement into a personal and collective mission, thereby sustaining involvement even after the initial campaign events concluded.

A consistent theme across the campaigns was the “Foil Effect”, where citizen-generated data served as a check and balance to official data and narratives. For instance, in North Brabant, citizen cyclists’ observations highlighted different priorities (like perceived safety and lighting on bike paths) than the ones measured by technical maintenance scores. This divergence challenged authorities to reconsider “what is a good cycle path”, expanding the definition of success beyond technical compliance to include lived experience. In Bristol’s politically charged traffic scheme, the citizen data introduced nuance by pinpointing specific issues and improvements, which helped move the debate from polarised positions to evidence-based adjustments. These examples show that citizen observatories can inject granular, democratic feedback into policy implementation. Rather than simply filling data gaps, citizen data can question underlying assumptions and improve policies’ responsiveness to community needs. The

campaigns thus operationalised the observatory as a tool for evidence-based democratic dialogue, aligning local policy action more closely with the European Green Deal's emphasis on inclusive, participatory approaches.

7.5 Cross-Pilot Ecosystems and Trans-Local Value

Perhaps the most significant maturation in the consolidation phase was the emergence of a trans-local community of practice across the pilot sites. By Month 36, the five pilots were no longer isolated experiments; they functioned as a federated network that exchanged people, tools, and ideas, thereby multiplying their impact. This cross-pollination led to several noteworthy outcomes:

- **Ambassador Programme – Cross-Border Validation:** GREENGAGE piloted an exchange of “ambassadors” between sites, notably sending a Dutch cycling delegation to join activities in Copenhagen. This exchange proved that the project's tools and methods were sufficiently standardised and user-friendly to be adopted outside their original context. Dutch volunteers were able to use the GREENGAGE app in Denmark with minimal retraining, confirming a high degree of transferability in the training protocols. Moreover, these visiting participants provided a form of peer review and fresh perspective that local teams could not generate internally. For example, cyclists from the Netherlands – coming from a world-class cycling infrastructure context – could identify issues in Copenhagen's bike network that local users had normalised. This “fresh eyes” effect is a unique value of trans-local projects: it suggests that citizen science can serve as a mechanism for benchmarking and mutual learning across different European communities, helping to raise standards in line with Green Deal goals everywhere.
- **Methodological Export – Adapting Innovations to New Contexts:** The project successfully transplanted engagement methods from one context to another, proving their broader applicability. A striking case was the adaptation of Bristol's “Conversation Station” model to the rural Italian context of Turano. Despite the vast differences between an urban English neighbourhood and a remote village, the underlying engagement principle – that human connection must precede digital data collection – held true. Turano's use of a similar analogue, a face-to-face approach, affirmed that fundamental human needs (trust, dialogue, inclusion) transcend geography. The concept of an “analogue bridge” – providing a physical meeting point to build social capital – emerged as a transferable governance innovation for any setting where trust is fragile or digital literacy is low. In both Bristol and Turano, offering a human interface overcame barriers (whether distrust of authorities or fear of technology) and created a template that can be replicated in other regions facing engagement deficits. This cross-pilot success provides a robust template for replication across the EU, reinforcing that solutions developed in one locale can be scaled out when adapted thoughtfully.
- **“White Book” Co-Creation – Codifying Lessons Learned:** To capture and disseminate the collective knowledge generated, GREENGAGE partners co-created a “White Book for Public Authorities” during this phase. This document distils the diverse pilot experiences into a unified framework of active intermediation (the project's core engagement philosophy) and practical guidelines for implementation. The process of jointly drafting the “White Book” ensured that the lessons – from training models to community governance and technology management – were not seen as anecdotal or site-specific, but rather as part of a coherent theory of change applicable to cities and towns across Europe. The “White Book” serves as a legacy output that policy makers and practitioners can use beyond the project's life, effectively translating GREENGAGE's on-the-ground experiments into strategic guidance for scaling citizen-driven Green Deal initiatives elsewhere.

By fostering cross-pilot ecosystems, GREENGAGE multiplied the value of individual pilot achievements. The networked approach accelerated learning, validated the universality of certain methods, and created open knowledge assets to inform broader European efforts. This trans-local dimension is critical for the European Green Deal, which demands coordinated innovation and knowledge sharing across member states and regions.

7.6 Strategic Implications for the European Green Deal

The findings from GREENGAGE Deliverable 5.4 carry several strategic implications for implementing the European Green Deal at scale:

- From Smart Cities to Wise Governance: To achieve the objectives of the Green Deal, it requires more than deploying “smart” technologies; it calls for “wise” governance structures that actively mediate between data and communities. Our results show that investing in human infrastructure, such as facilitators, community liaisons and local champions, is just as important as investing in sensors and apps. Therefore, EU programs should prioritise funding for these soft roles that turn data into action, ensuring that technology is embedded in supportive social systems.
- Embrace Constructive Conflict: Policymakers must recognise that genuine citizen engagement will surface conflict and dissent (as seen in Bristol). Rather than viewing conflict as a project failure, it should be treated as an inherent feature of democratic transition towards sustainability. GREENGAGE demonstrated that providing a “third space” and a common language of data enables conflicting stakeholders to negotiate solutions instead of entrenching positions. The implication is that Green Deal initiatives should build in forums and tools for mediation, using evidence to guide debates. Engaging citizens meaningfully may be challenging, but it ultimately leads to more robust and legitimate policy outcomes.
- The Rural “Digital Deal”: Rural areas can be fertile ground for Green Deal innovation, provided approaches respect local context. The Turano and Gerace pilots show that framing climate actions around heritage and stewardship can unlock strong participation in villages. In these communities, the narrative needs to shift from abstract “modernisation” to valuing and “valorising” local assets. EU Green Deal strategies should therefore include tailored messaging and support for rural regions – a “Rural Digital Deal” that empowers communities as custodians of their cultural and natural environment while adopting new technologies.
- Ensuring Data Justice and Inclusion: The project proved that so-called “hard-to-reach” groups (e.g. migrant women, the elderly) are reachable with the right engagement design. A one-size-fits-all digital app will exclude many; instead, multimodal engagement (combining analogue methods like paper surveys or in-person meetings with digital tools) is essential to ensure broader participation. Future Green Deal projects should mandate inclusive strategies that lower technical barriers and meet people where they are. This focus on data justice ensures that the benefits of environmental policies and citizen science are equitably distributed, and that diverse perspectives inform policy (which in turn increases legitimacy and public buy-in for Green Deal measures).

7.7 Final Remarks on Legacy and Sustainability

As GREENGAGE moves into its final phase, the groundwork laid in Months 19–36 will ensure the project leaves a lasting legacy. We are witnessing a transition “from project to institution”, whereby successful pilot elements are being incorporated into local structures. The “Cycling Lab” in North Brabant, for example, is now being integrated into the regular workflows of the provincial government, Bristol’s conversation stations have become permanent community assets, and the Turano “Guardians” continue to steward their local environment with pride. These examples show that the project’s interventions will not end when the pilot activities conclude but will be adopted into everyday practice by the communities and authorities involved.

Ultimately, GREENGAGE has developed and codified a methodology for “regenerative citizen science”. Unlike extractive approaches, which simply collect data from communities for external analysis, this regenerative model actively reinvests in the social, political, and environmental fabric of those communities. In practical terms, citizens have been empowered to view their surroundings in new ways, whether through a vertical noise map in Copenhagen or an archaeological environmental map in Turano, and use that insight to influence local action. By equipping ordinary people with the necessary skills, tools, and agency, GREENGAGE has empowered them to become active architects of the European Green Deal in their own communities. This legacy of an engaged and informed citizenry, along with a tried-and-tested framework for civic environmental governance, will endure beyond the project’s

lifetime, helping to drive the ambitious targets of the Green Deal through community-level action and sustained institutional partnerships.

AWAITING VALIDATION BY THE EUROPEAN COMMISSION