

D7.2 Standardised Data Measurement and Processing Protocol



WeGenerate

PEOPLE-CENTRIC SUSTAINABLE NEIGHBOURHOODS



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LIST OF ABBREVIATIONS

AC	Alternating Current
CO ₂	Carbon Dioxide
COP	Coefficient of Performance
DC	Direct Current
DHW	Domestic Hot Water
EV	Electric Vehicle
GDPR	General Data Protection Regulation
GHG	Greenhouse Gas
HP	Heat Pump
IAQ	Indoor Air Quality
ICT	Information and Communication Technologies
IEQ	Indoor Environmental Quality
IP	Internet Protocol
KPI	Key Performance Indicator
NGOs	Non-Governmental Organizations
NPV	Net Present Value
NZEB	Nearly Zero-Energy Building
PMV	Predicted Mean Vote
PPD	Predicted Percentage Dissatisfied
PV	Photovoltaic
RER	Renewable Energy Ratio
RES	Renewable Energy Sources
RH	Relative Humidity
UHI	Urban heat island

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EXECUTIVE SUMMARY

The main objective of Deliverable 7.2 is the development of a Standardised Data Measurement and Processing Protocol to ensure the consistency, reliability and comparability of data collected across the Demo and Fellow Cities. This protocol clearly defines how data should be measured, collected, processed, and used for further calculations in all Demos and Fellow Cities.

According to Deliverable 7.1 “WeGenerate Impact Model for Sustainable Inclusive Neighbourhood (Initial)”, the KPIs in the WeGenerate project are divided into 6 main categories. These are: a) Energy, b) Environment, c) Social inclusion & citizens participation, d) Socio-economics, e) Sustainable mobility and f) Integrated urban regeneration. The 6 categories include 20 core and 13 optional KPIs.

The Deliverable 7.2 contains:

1. **The determination of the type and methods to collect data.** In the WeGenerate project, data is divided in 3 types: 1) Quantitative, 2) Qualitative and 3) Combination of quantitative and qualitative. According to the method, data are divided into “Primary” and “Secondary”.
2. **The development of a measurement protocol.** The protocol includes specific guidelines for the development of a measurement protocol for the WeGenerate project. The collected data will be used for calculating the set of KPIs as described in D7.1, for the evaluation of Sustainable Inclusive Neighbourhoods. The data will be collected in 3 different ways:
 - Measurement equipment.
 - Social surveys via questionnaires.
 - Statistical data and databases.
3. **The determination of measurement equipment.** The installation of monitoring system for the measurement of specific factors is crucial for effectively managing the operation and maintenance of different systems. Several types of sensors, technical instruments and monitoring systems will be used for monitoring reasons. A summary of the devices, technical characteristics of the devices, methods and procedures that

should be used by the demo sites for collecting data in order to calculate several indicators is presented.

The measuring devices should be connected with proper data-loggers for data recording and storage. The data-loggers should be compatible with measuring devices and in agreement with the frequency of data recordings.

High time variability can be noticed, especially when examining several factors, making it impossible to characterize the specific parameters using a single measured value. Data collection for these parameters should be performed with a frequency of 15 minutes to 1 hour. In order to collect representative data for all seasons, the duration of the monitoring should be at least 1 year after the implemented interventions. A longer monitoring duration can lead to more reliable data by preventing inconsistent measurements due to unusual climate conditions. A proposed structure for the data collection is presented.

Years 2022, 2023 or 2024 are suggested for collecting data “pre” interventions and years 2026 or 2027 for collecting data “post” interventions. However, these might vary depending on data availability and might be different for each specific variable and/or each demo site.

4. **The methodology to conduct social surveys via questionnaires.** For the collection of various social, socio-economic, mobility and urban regeneration data will be conducted social surveys via questionnaires. The exact methodology, as well as the questionnaire is included. In most circumstances, social surveys via questionnaires will be performed pre and post interventions.

The timings for the data collection should be harmonised across categories, KPIs and the different demo sites. Years 2022, 2023 or 2024 are suggested for collecting data “pre” interventions and years 2026 or 2027 for collecting data “post” interventions. However, these might vary depending on data availability and might be different for each specific variable and/or each demo site. If, for any reason (e.g., data availability, etc.), different timings need to be used for KPIs and their specific variables, this should be clearly explained.

5. **The determination of external data.** Various energy, environmental, social, socio-economic, mobility and urban regeneration data will be collected by external data and their potential sources. These data could be from: 1) energy certificates, 2) official

national or municipality / province/ regions databases, 3) EU databases, 4) Eurostat, 5) official local registries, 6) maps, 7) websites, etc. Before using external data, the validity and reliability should be examined.

1. INTRODUCTION

The Project 'WeGenerate' seeks to infuse the elements of people and co-creation in the urban regeneration processes. It fully embraces the paradigm shift from building for the people to building with the people. We – cities, citizens, communities, businesses, researchers, and practitioners – take ownership of the urban regeneration processes and co-create together sustainable, resilient, people-centric, inclusive, accessible, and beautiful neighbourhoods. This project is based on the stories of four neighbourhoods and their communities located in different parts of Europe. Although they are at different stages of development and are facing different challenges they share the same vision of positive change. WeGenerate will help them to reinvent themselves and in the process find new values and opportunities.

One of the main objectives of the WeGenerate project is to create an 'Urban WeGeneration Model' setting out a common methodological approach to guide sustainable and inclusive urban regeneration processes. Specifically, we will develop and test Demo-specific urban regeneration concepts integrating energy, building, mobility, social, and economic perspectives. Furthermore, we will define and adopt a set of metrics to quantify the impacts of climate-neutral transformation across the Demos.

In this context, the main objective of Deliverable 7.2 is the development of a Standardised Data Measurement and Processing Protocol to ensure the consistency, reliability and comparability of data collected across the Demo and Fellow Cities. This protocol clearly defines how data should be measured, collected, processed as detailed in the following sections, and used for further calculations in all Demos and Fellow Cities. This is crucial for the monitoring/reporting of the Demo progress and for cross-Demo analysis.

Deliverable 7.2 is divided in two main sections. The first one is "Data collection" and the second one is "Protocol". The first section includes the type and methods for collecting data. The second section presents the specific protocol that was developed for the data collection within the WeGenerate project. The collected data will be used for calculating the set of KPIs as described in D7.1 "Impact model". All these indicators will be employed for the evaluation of Sustainable Inclusive Neighbourhoods.

2. DATA COLLECTION

2.1 General information

According to Syed Muhammad Sajjad Kabir, data collection is “the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes” [1]. The data collection as component of research is common to all fields of study [1, 2].

One of the most crucial phases of implementing a research project is data collection. The choice of the data collection method can increase the quality of the results by reducing the possible errors that might arise during a research project. As a result, a significant amount of quality time for the collection of data is required in order to have suitable results since incomplete and inaccurate data make it impossible to ensure the accuracy of the results [3].

The determination of the type of data is required as a first step, before selecting the appropriate data collection method. Data can be divided into two main categories [3]:

1. Quantitative.
2. Qualitative.

Quantitative data are defined as numerical data that are produced and computed mathematically. There are various scales to measure quantitative data, such as nominal, ordinal, interval, and ratio scale. Many times, such type of data measures something. The "what" of the study is addressed by quantitative methods [1].

Qualitative data are non-numerical data and they are either nominal or descriptive. Qualitative data are in words or sentences. Many times, such type of data express feelings, emotions and perceptions of something. This type of data answers to "how and why" questions and usually use unstructured methods of data collection [1].

Mixed methods combine qualitative and quantitative data, techniques and methods under the same research framework [1].

Data collection methods can be divided into two main categories [3]:

1. Primary data collection methods.
2. Secondary data collection methods.

Primary data is defined as the data that has not been published yet and has been collected from first-hand-information. This kind of data is more reliable, genuine and objective and is more valid than secondary data because it has not been modified by anyone [1]. There are many different methods to collect primary data. Some of these methods are: a) experimental methods, b) surveys (questionnaires, instruments and inventories, interviews), c) case analysis, d) recordings by equipment, e) observations, f) process analysis, g) focus group interviews, h) case-studies, i) statistical methods, j) combination of different methods, etc. [1,3,4].

Secondary data is defined as the data that has been previously published. Secondary data is crucial since a new survey cannot fully capture prior change and innovations. Most of the time, desk-based research is used to collect this data. Before using secondary data, the validity and reliability should be examined. It should be noted that literature review is based on secondary data. There are many different methods to collect secondary data. Some of these methods are: a) books, b) statistical data, c) journals, d) newspapers, e) websites, f) databases, etc. [1, 3].

2.2 Data collection for WeGenerate project

According to Deliverable 7.1 “WeGenerate Impact Model for Sustainable Inclusive Neighbourhood (Initial)”, the KPIs in the WeGenerate project are divided into 6 main categories. These are: a) Energy, b) Environment, c) Social inclusion & citizens participation, d) Socio-economics, e) Sustainable mobility and f) Intergrated urban regeneration. The 6 categories include 20 core KPIs and 13 optional. Both categories and KPIs are presented in Table 1.

Table 1. Core and Optional KPIs per category

Category	Core KPI	Optional KPI
 Energy	Total primary energy balance	
	Renewable Energy Ratio (RER)	
	Net Energy/Net Power	
		Grid Delivered Factor
 Environment	GHG Emissions Performance	
	Air Pollution	
		Indoor Air Quality
		Thermal Comfort
		Overheating Risk
 Social inclusion and citizen participation	Democratic Process	
	Sociability	
	Social Engagement	
	Demographic composition	
	Safety and Security	
	Energy and Environmental Consciousness	
		Cultural Sustainability
 Socio-economics	Access to services and Amenities	
	Investments Triggered	
		Affordability of Energy
		Energy Renovation Rate
		Global Cost
 Sustainable mobility	Transport Behaviour	
	Urban Accessibility	
	Cycling path supply	
	Renewal of Walking and Open Spaces	
		Multi-modality
		Physical activity
 Integrated Urban Regeneration	Recycling and circular economy initiatives	
	Urban Heat Island	
	Uptake of Digital Applications in Urban Regeneration Processes	
		Resource Recovery
		Percentage change in Flood Risk Area
		Digital Competence

The first step is to determine the type of data. In the WeGenerate project, data is divided into: 1) Quantitative, 2) Qualitative and 3) Combination of quantitative and qualitative. Next step is to define the methods for collecting data. The data are divided into “Primary” and “Secondary”. Table 2 presents the type and methods of the data that should be collected in order to calculate the KPIs.

Table 2. Type and method for data collection

Category	Quantitative	Qualitative	Combination of quantitative and qualitative	Primary	Secondary
 Energy	Total primary energy balance			✓	✓
	Renewable Energy Ratio			✓	
	Net Energy/Net Power			✓	
	Grid Delivered Factor			✓	
 Environment	GHG Emissions Performance			✓	✓
	Air Pollution				✓
	Indoor Air Quality			✓	
	Thermal Comfort			✓	
	Overheating Risk			✓	
 Social inclusion and citizen participation			Democratic Process	✓	✓
			Sociability	✓	✓
			Social Engagement	✓	
	Demographic Composition				✓
			Safety and Security	✓	✓
			Energy and Environmental Consciousness	✓	✓
	Cultural Sustainability				✓
 Socio-economics	Access to services and Amenities			✓	
	Investments Triggered			✓	
	Affordability of Energy			✓	
	Energy Renovation Rate			✓	✓
	Global Cost			✓	
 Sustainable mobility	Transport Behaviour			✓	
		Urban Accessibility		✓	
	Cycling path supply				✓
	Renewal of Walking and Open Spaces				✓
		Multi-modality		✓	
	Physical activity			✓	
 Integrated Urban Regeneration	Recycling and circular economy initiatives			✓	
	Urban Heat Island			✓	
			Uptake of Digital Applications in Urban Regeneration Processes	✓	
	Resource Recovery			✓	
	Percentage change in Flood Risk Area				✓
		Digital Competence		✓	

All necessary data will be collected in excel files. A proposed structure for the data collection is presented for each KPI.

3. PROTOCOL

This section includes specific guidelines for the development of a measurement protocol for the WeGenerate project. The collected data will be used for calculating the set of KPIs as described in D7.1, for the evaluation of Sustainable Inclusive Neighbourhoods. The data will be collected in 3 different ways:

- Measurement equipment.
- Social surveys via questionnaires.
- Statistical data and databases.

Measurement equipment

Several types of sensors, technical instruments and monitoring systems are used for monitoring purposes.

High time variability can be noticed, especially when examining several factors, making it impossible to characterize the specific parameters using a single measured value. Data collection for these parameters should be performed with a frequency of **15 minutes**. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year** after the implemented interventions. A longer monitoring duration can lead to more reliable data by preventing inconsistent measurements due to unusual climate conditions.

Years 2022, 2023 or 2024 are suggested for collecting data “pre” interventions and years 2026 or 2027 for collecting data “post” intervention. However, these might vary depending on data availability and might be different for each specific variable and/or each demo site.

Members of each demo site that carry out the monitoring are in charge of ensuring that the overall methodology is correct, acquiring the necessary equipment, and collecting the necessary data.

Social surveys via questionnaires

For the collection of various social, socio-economic, mobility and urban regeneration data will be conducted social surveys via questionnaires.

The demo sites are responsible for the conduction of the surveys and for the collection of the results. A contact person for the management of the survey should be responsible in each demo site.

It should be noticed that the social surveys will be anonymous and it won't be possible to identify the respondents (name, email, IP address, etc.). The participation in the study will be voluntary. By completing the questionnaire, the respondent agrees to participate. The respondent can withdraw at any time.

The methodology to perform the social surveys via questionnaires includes:

- Selection of the appropriate target population: The social survey will be conducted in people living in each demo site neighbourhood, such as residents, students, etc. Only people older than 18 years should participate.

Table 3. Reference population in each demo site of the WeGenerate project

WeGenerate Demo	Population ¹
Cesena, Italy	13,000 inhabitants
Cascais, Portugal	600 inhabitants
Bucharest, Romania	4,000 inhabitants
Tampere, Finland	41,000 inhabitants

- Sample selection: Each demo site should select an appropriate sample, which will be randomly selected and will be representative of the target population in terms of gender and age.
- Creation of the questionnaires: The questionnaire was developed by CRES, IREC, NovaSBE, VTT and FHF. For the determination of each KPI a set of questions was created. The specific questions are presented for each KPI. The whole questionnaire is presented in ANNEX I.
- Translation of the questionnaires: The questionnaires should be translated in the local language, keeping the tracking code of each question.
- Conduction of the survey: The survey could be conducted either by a professional public opinion surveying company or by a responsible team from each demo site. The survey can be carried out using several different methods: a) by post or e-mail, b) online, c) face to face interviews (the stakeholders can be asked directly, either on the street, at their house, or at their place of work) and d) by phone.

¹ Total population of the affected neighbourhood. Source: Table 3, page 13, We Generate Part B documentation.

In case a demo site selects a responsible team for the conduction of the survey, the transposition of the questionnaires in an online survey creator (e.g., SurveyMonkey, Microsoft Forms, Google Forms) will be very useful. In an online survey creator a data line is created for each respondent answer for each question into an Excel file (the creator will do this automatically) with each respondents answers. At the end of the survey, the data can be downloaded directly into an Excel file.

- Collection of the results: The overall results will be collected in an excel spreadsheet.
- Sharing the results: The results will be shared with other partners.
- Elaboration of the results, calculation of the related KPIs and reporting.

In most circumstances, social surveys via questionnaires will be conducted in two different phases of the WeGenerate project:

- **Pre** demo site interventions.
- **Post** the implementation of demo site interventions.

The timing for the data collection should be harmonised across categories, KPIs and the different demo sites. Some of the KPIs have specific variables that are calculated and assessed based on data pre and post demo sites interventions. Years 2022, 2023 or 2024 are suggested for collecting data “pre” interventions and years 2026 or 2027 for collecting data “post” interventions. However, these might vary depending on data availability and might be different for each specific variable and/or each demo site.

If, for any reason (e.g., data availability, etc.), different timings need to be used for KPIs, this should be clearly explained. In case it is not possible to collect data pre and post interventions, this should also be justified and, as possible, at least one set of information (either pre or post intervention) should be presented for each specific variable.

Statistical data and databases

Various energy, environmental, social, socio-economic, mobility and urban regeneration data will be collected by external data and their potential sources. These data could be from: 1) energy certificates, 2) official national or municipality / province/ regions databases, 3) EU databases, 4) Eurostat, 5) official local registries (e.g., police, fire brigade, ambulance services), 6) local electricity and gas distribution companies, 7) project documentation, 8)

demo implementation, 9) digital maps, 10) maps, 11) urban maintenance services, 12) academic research at the local level, 13) websites, 14) NGOs, 15) scientific publications, etc.

Before using external data, the validity and reliability should be examined.

3.1 Quantitative data

3.1.1 Energy

The main objective of monitoring the produced energy is to determine the efficiency during the operation phase. Any decrease in the efficiency can be caused by a variety of factors, such as lack of maintenance, failure of some components, etc. That means that the collected data will not be reliable.

Furthermore, the monitoring should provide all the necessary information in order to ensure the calculation of the KPIs as defined in D7.1.

The installation of the monitoring system for the measurement of specific factors is crucial for effectively managing the operation and maintenance of energy systems. This section provides the devices, methods and procedures that should be used by the demo sites for collecting data in order to calculate energy indicators.

Table 4 presents the general technical specifications of the monitoring devices for electrical energy.

Table 4. General technical specifications of the monitoring devices for electrical energy

Type	One way or bidirectional
Rated voltage	0-600 V
Frequency	50 Hz $\pm$ 5%
Accuracy class	Class A certified
Phases	1 phase or 3 phases
Operating temperatures	- 10 °C to 50 °C
Operating humidity	10% - 95%
Current range [A]	Compatible with the technical characteristics of the installation
Power range [kW]	Compatible with the technical characteristics of the installation
Energy [kWh]	Compatible with the technical characteristics of the installation
Cables connections diameter [mm]	Compatible with the technical characteristics of the installation
Applicable standards	IEC 61000-4-1, IEC 61000-4-7, IEC 61000-4-30, IEC 61010-1, EN 50160, IEC 61557-12 (IEC 62053-22, IEC 62053-24), EMC, IEC 61326-1, EN IEC 63000: 2018, IP Degree of protection IEC 60529
Connection with data logger	Each device should have a suitable connection output

Table 5 presents the general technical specifications of the monitoring devices for heating/cooling energy.

Table 5. General technical specifications of the monitoring devices for heating/cooling energy

Type	Heating or heating and cooling
Flow rate range [m ³ /h]	Compatible with the technical characteristics of the installation
Temperature inlet range [°C]	Compatible with the technical characteristics of the installation
Temperature outlet range [°C]	Compatible with the technical characteristics of the installation
Heating/cooling power [kW _{th/c}]	Compatible with the technical characteristics of the installation
Heating/cooling energy [kWh _{th/c}]	Compatible with the technical characteristics of the installation
Pipes connections diameter [mm]	Compatible with the technical characteristics of the installation
Applicable standards	EN 1434-1: 2022
Connection with data logger	Each device should have a suitable connection output

All measuring devices should be compatible with the technical characteristics of the installation (electrical, hydraulic) and their measurement range should also be compatible with the size of the installation.

The measuring devices should be connected with proper data-loggers for data recording and storage. The data-loggers should be compatible with measuring devices and in agreement with the frequency of data recordings.

All energy indicators should be calculated **pre and post interventions** except from RER indicator.

3.1.1.1 Total primary energy balance

Description

This indicator takes into consideration all types of energy consumed and produced by the system, and the exchange with the energy networks. It is calculated using an equation, which sums up all delivered and exported energy for all energy carriers into a single indicator with the corresponding total primary energy weighting factors. Therefore, this indicator considers differences as well in the energetic effort within the supply chain of different energy carriers, e.g. domestic gas versus electricity [5].

Unit

Building: kWh/(m² y)

Neighbourhood: kWh/(m² y).

Buildings

The monitoring should focus on the net final energy demands of the building. The primary energy consumptions from electrical energy will be calculated using energy conversion factors specific for the country where the case study is located. The primary energy consumptions from heating, cooling and DHW will be calculated using primary energy conversion factor for each energy carrier.

It is noticed that for the calculation of the total primary energy the surface (m^2) of the building should be taken into consideration.

Electrical energy

For the purposes of the WeGenerate project, kWh meter or energy analyser can be installed (here labelled as M1). M1 (see Figure 1) is a bidirectional/one way meter that is installed in the delivery point and measures the energy that is exported to or imported from the external electrical grid. For the calculation of the primary energy consumptions from electrical energy, only the energy that is imported from the external electrical grid will be used.

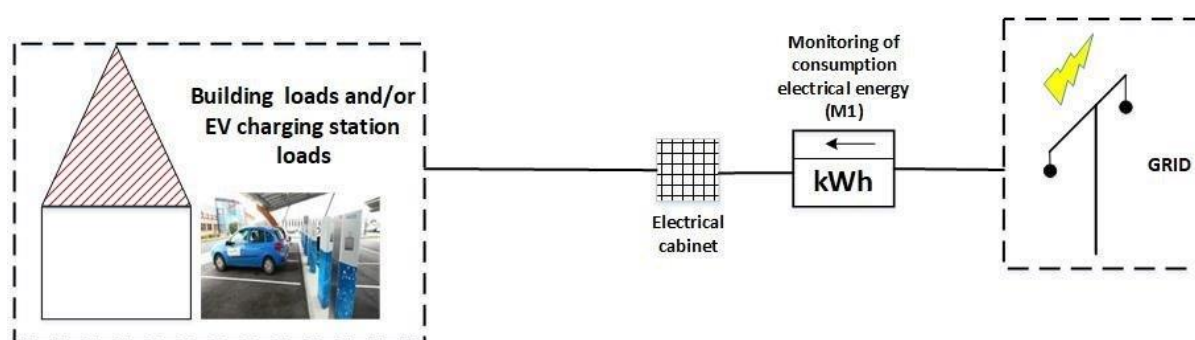


Figure 1. Configuration of the monitoring system for the measurement of electrical energy consumption

The **minimum frequency** for the data collection should be **15 minutes**, but data with at least a 5 minutes resolution is recommended, especially in the case of optimization. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year** after the implemented interventions. A longer monitoring duration can lead to more reliable data by preventing inconsistent measurements due to unusual climate conditions. The **unit of measure** adopted for the electrical energy consumption is **kWh_e** (electrical kWh).

Table 6. Proposed structure for the data collection related to the electrical energy consumption pre interventions

Date	Time	Electrical energy imported from the grid [kWh _e]
01/01/25	00:15:00	...
01/01/25	00:30:00	...
...	...	...
...	...	...
21/12/25	23:45:00	...
National conversion energy factor		

After the interventions, the PV system and the battery storage will produce renewable electrical energy. The produced renewable electrical energy should be deducted for calculating the electrical energy consumption. Table 7 presents the proposed structure for the data collection related to the electrical energy consumption post interventions.

Table 7. Proposed structure for the data collection related to the electrical energy consumption post interventions

Date	Time	Electrical energy exported from the grid [kWh _e]	Electrical energy imported to the grid [kWh _e]
01/01/25	00:15:00	...	...
01/01/25	00:30:00	...	...
...	...	...	...
...	...	...	...
21/12/25	23:45:00	...	...
National conversion energy factor			

Heating/cooling and DHW

The thermal energy production by a conventional system for space heating and/or cooling and the heating energy for domestic hot water should be monitored using heat meters or heat meters analyzers.

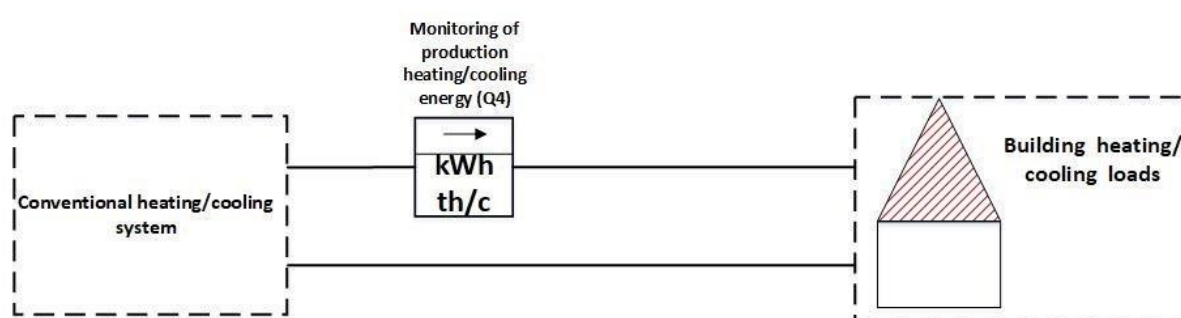


Figure 2. Configuration of the monitoring system for conventional system

Figure 2 presents the configuration of the monitoring system for a conventional system. The device Q4 is a heat meter or a heat meter analyser that is installed after the conventional system and before the building heating and cooling loads.

The **minimum frequency** for the data collection should be **15 minutes**. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year**. The **unit of measure** adopted for the thermal/cooling energy production is **kWh_{th/c}** (thermal or cooling kWh).

Table 8. Proposed structure for the data collection related to the heating and cooling production

Date	Time	Thermal/cooling energy production by conventional system [kWh _{th/c}]	Energy carrier
01/01/25	00:15:00	...	e.g. electrical, oil, gas, natural gas/etc.
01/01/25	00:30:00	...	...
...	...	...	...
...	...	...	...
21/12/25	23:45:00	...	...
Type of fuel for conventional system			
Primary energy factor of fuel			
Efficiency of the conventional system or the COP in case of heat pump			

Figure 3 presents the configuration of the monitoring system for DHW production. The device Q3 is a heat meter or a heat meter analyser that is installed after the conventional system and before the buffer tank. In case the conventional system for the DHW production is a heating element, the device Q3 should be a kWh meter or energy analyser.

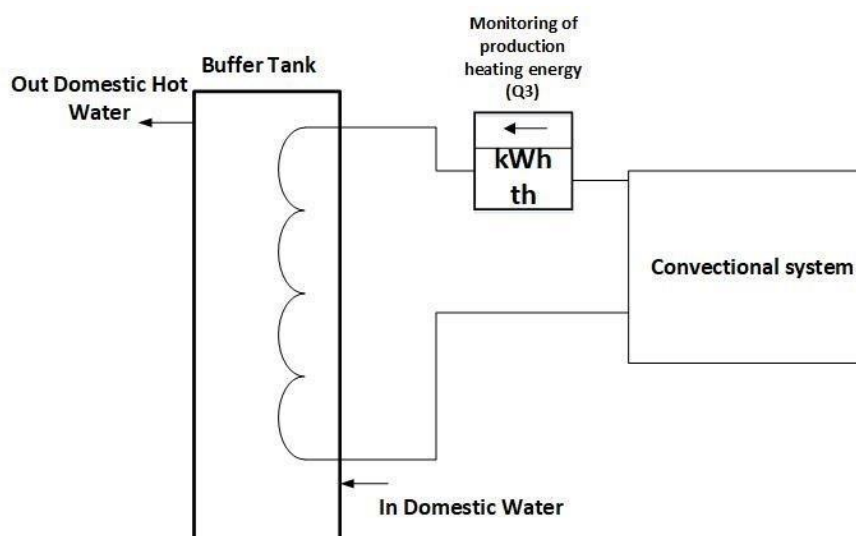


Figure 3. Configuration of the monitoring system for DHW production

The **minimum frequency** for the data collection should be **15 minutes**. The **duration** of the monitoring should be at least **1 year**. The **unit of measure** adopted for the thermal energy of DHW production is **kWh_{th}** (thermal kWh).

Table 9. Proposed structure for the data collection related to the DHW production

Date	Time	Thermal energy production by conventional system [kWh _{th}]	Energy carrier
01/01/25	00:15:00	...	e.g. electrical, oil, gas, natural gas/etc.
01/01/25	00:30:00	...	...
...	...	...	...
...	...	...	...
21/12/25	23:45:00	...	...
Type of fuel for conventional system			
Primary energy factor of fuel			
Efficiency of conventional system			

Neighbourhood

The primary energy in neighbourhoods will be calculated by collecting data from: a) energy certificates (if applicable), b) official national or municipality databases and/or c) simulations. The specific number for each type of building in each neighbourhood should be recorded. In case there isn't any energy renovation in buildings (demo sites in Cesena and Tampere), the data will be determined by simulations, assumptions and available data. The data will be collected **pre and post interventions**. Table 10 presents the proposed structure for the data collection related to the primary energy in the neighbourhoods.

Table 10. Proposed structure for the data collection related to the primary energy in the neighbourhoods

Building typology	# of buildings	Primary energy [kWh/m ²]	Source of information
Single family house	...	...	...
Block of flats	...	...	...
Shops	...	...	...
Office buildings	...	...	...
Education buildings	...	...	...
Industrial buildings	...	...	...
Sport center	...	...	...
.....	...	...	...

3.1.1.2 Renewable Energy Ratio (RER)

The proposed intervention actions in 2 out of 4 demo sites include the installation and operation of different renewable energy generation systems. More specific, in Cascais demo site (Portugal) will be installed Photovoltaic systems on five public buildings that will generate electricity to the energy community. In Bucharest demo site (Romania) will be installed Photovoltaic systems on the UTCB canteen that will provide lighting, heating input, space cooling and space ventilation. The produced energy will be shared in the dormitory and the school nearby the canteen.

Description

Renewable Energy Ratio (RER) is the percentage of energy from renewable sources in the total primary energy consumption [5].

Unit

Dimensionless.

PV system

The exact position of photovoltaic panels, batteries storage and electrical loads in the electrical circuit is of great importance for the installation point of the measuring equipment. For the purposes of the WeGenerate project, kWh meters or energy analysers can be installed (here labelled as M1, M2 and M3). M1 is a bidirectional kWh meter that is installed in the delivery point and measures the energy that is exported to or imported from the external electrical grid. M2 is a bidirectional kWh meter that measures the produced energy from renewable energy systems (PV panels and battery storage) and is installed after the inverter (DC to AC). This configuration is presented in Figures 4 and 5. When a battery storage is installed on the production side (Figure 4 and Figure 5), the effect of the storage system is taken into account. M3 is a bidirectional kWh meter that measures the charging and discharging current of the battery storage system when it is installed after the production side (Figure 6).

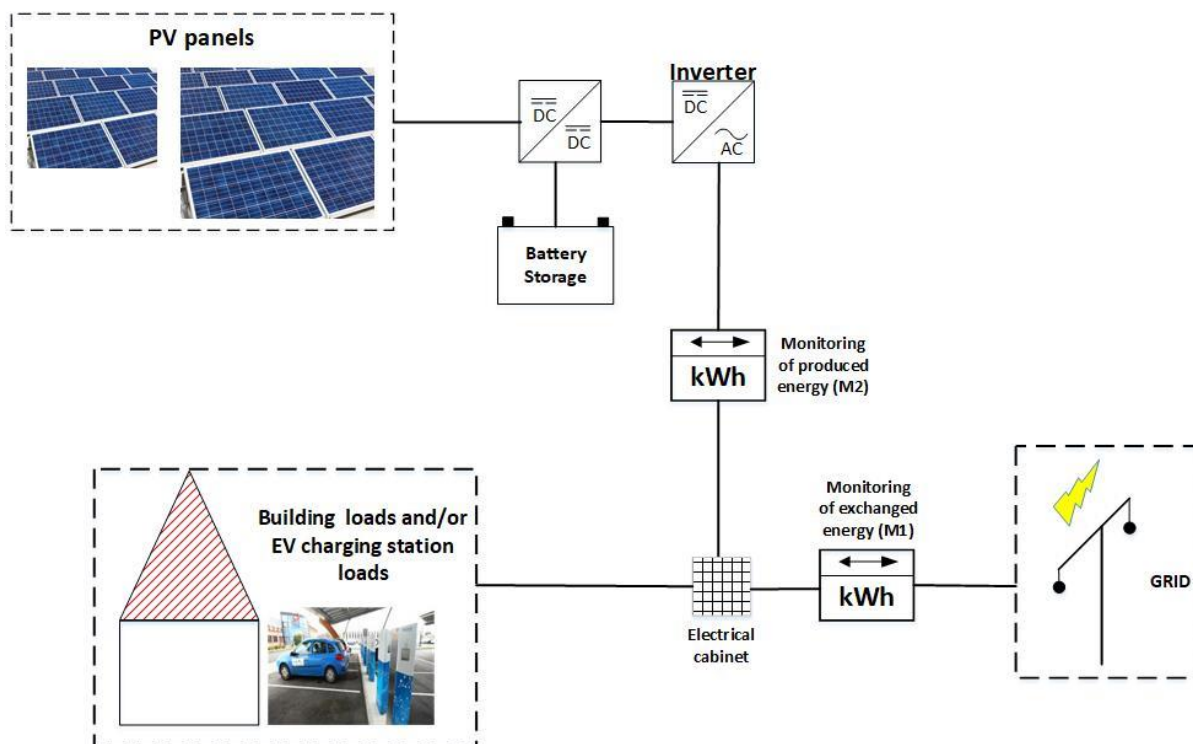


Figure 4. Configuration of the monitoring system for PV installation & battery storage on the production side in Direct Current (DC)

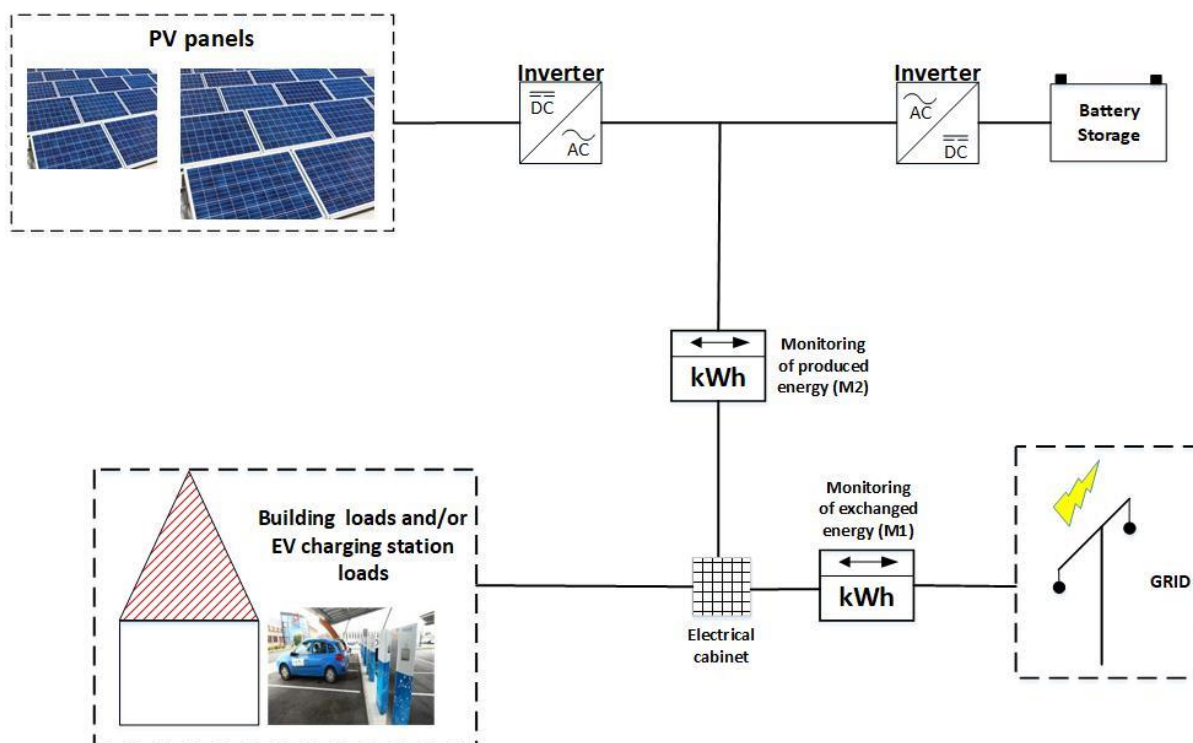


Figure 5. Configuration of the monitoring system for PV installation & battery storage on the production side in Alternating Current (AC)

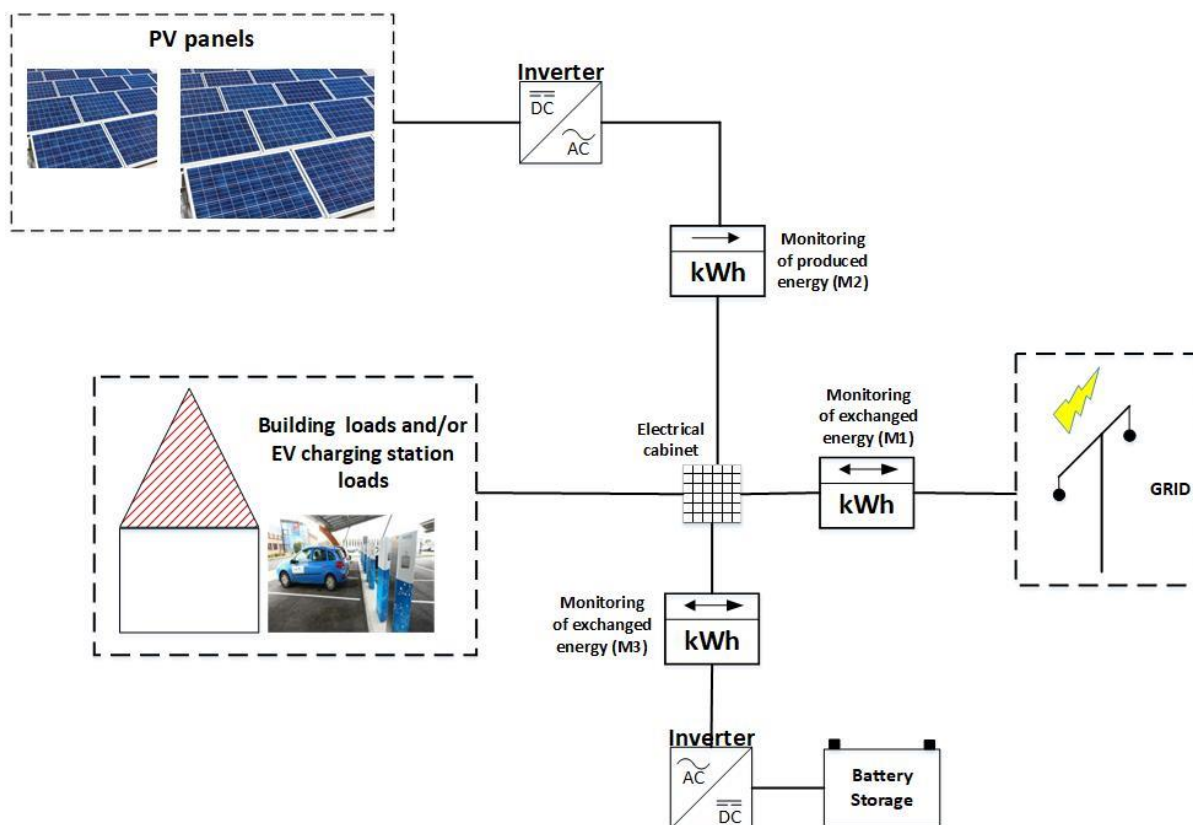


Figure 6. Configuration of the monitoring system for PV installation & battery storage after the production side

The **minimum frequency** for the data collection should be **15 minutes**, but data with at least a 5 minutes resolution is recommended, especially in the case of optimization. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year** after the implemented interventions. A longer monitoring duration can lead to more reliable data by preventing inconsistent measurements due to unusual climate conditions. The **unit of measure** adopted for the renewable energy production is **kWh_e** (electrical kWh).

Table 11. Proposed structure for the data collection related to the renewable energy monitoring

Date	Time	Energy production [kWh]	Energy imported [kWh]	Description	Energy exported [kWh]	Energy imported [kWh]	Description
01/01/25	00:15:00	...	...	PV/battery storage	...	...	Electricity grid
01/01/25	00:30:00	...	...	PV/battery storage	...	...	Electricity grid
...	...	...	...	PV/battery storage	...	...	Electricity grid
...	...	...	...	PV/battery storage	...	...	Electricity grid
21/12/25	23:45:00	...	...	PV/battery storage	...	...	Electricity grid

Heating/cooling and DHW

The thermal energy production by air-to-air heat pump for space heating/cooling, and the heating energy for domestic hot water should be monitored using heat meters or heat meters analyzers. These devices are based on the following equation:

$$E_{th}(t) = q * cp * (T_{in} - T_{out})$$

where:

$E_{th}(t)$ = heating power (W)

q = flow rate (kg/s)

cp = specific heat capacity of the fluid (J/kg K)

T_{in} = inlet temperature (°C)

T_{out} = outlet temperature (°C)

Figure 7 presents the configuration of the monitoring system for air-to-air heat pump. The device Q1 is a heat meter or heat meter analyser that should be installed after the heat pump and before building heating and cooling loads. Q1 should measure the loads in heating and cooling mode. M4 is a one-way kWh meter that is installed to record the energy consumption from the heat pump.

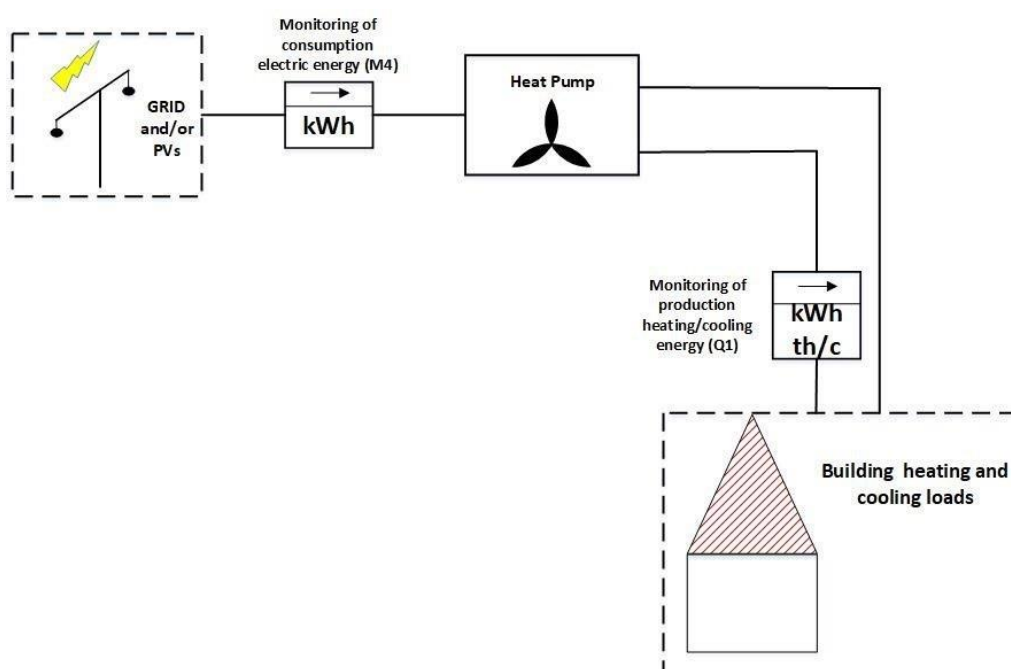


Figure 7. Configuration of the monitoring system for the heat pump

By using the COP (Coefficient of Performance) of the heat pump (datasheet), the thermal energy by the environment, which is a renewable source of energy, can be calculated. COP of the heat pump is calculated using the following equation.

$$COP = \frac{\text{heating or cooling energy production}}{\text{electricity energy consumption}}$$

The **minimum frequency** for the data collection should be **15 minutes**. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year** after the implemented interventions. The **unit of measure** adopted for the thermal energy production is **kWh_{th/c}** (thermal or cooling kWh) and for the energy consumption is **kWh_e**.

Table 12. Proposed structure for the data collection related to the thermal/cooling energy monitoring

Date	Time	Thermal energy production [kWh _{th/c}]	Energy consumption [kWh _e]	Mode (Heating or cooling)
01/01/25	00:15:00	...	...	...
01/01/25	00:30:00	...	...	...
...	...	...	...	...
...	...	...	...	...
21/12/25	23:45:00	...	...	...
COP				

Figure 8 presents the configuration of the monitoring system for DHW production. The device Q2 is a heat meter or heat meter analyser that is installed after the solar thermal panels and before the buffer tank. Q2 measures the thermal energy production by the sun, which is a renewable source of energy. Q3 is a heat meter or heat meter analyser that is installed after the conventional system and before the buffer tank. It should be noticed that the devices Q2 and Q3 should measure only in heating mode.

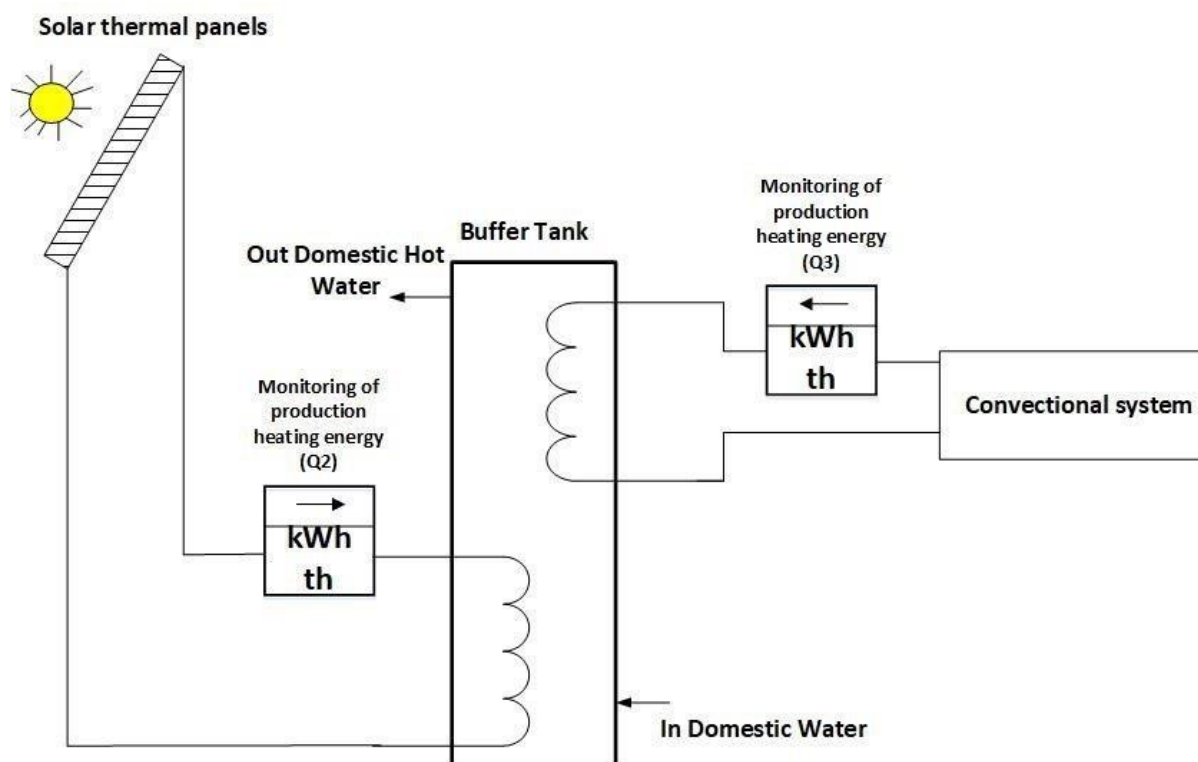


Figure 8. Configuration of the monitoring system for DHW production

The **minimum frequency** for the data collection should be **15 minutes**. The **duration** of the monitoring should be at least **1 year** after the implemented interventions. The **unit of measure** adopted for the thermal energy of DHW production is **kWh_{th}** (thermal kWh).

Table 13. Proposed structure for the data collection related to the DHW production

Date	Time	Thermal energy production by solar panels [kWh _{th}]	Thermal energy production by conventional system [kWh _{th}]
01/01/25	00:15:00	...	...
01/01/25	00:30:00	...	...
...	...	...	...
...	...	...	...
21/12/25	23:45:00	...	...
Type fuel for conventional system			
Performance of fuel			
Efficiency of conventional system			

3.1.1.3 Net Energy/Net Power

Description

Net energy or net power is the sum of delivered and exported energy per energy carrier in each of the calculation time steps, where negative values represent energy/power exported to the grid, whereas positive values demonstrate energy/power delivered from the grid.

Unit

kWh (energy) or kW (power).

For the purposes of the WeGenerate project, kWh meter or energy analyser can be installed (here labelled as M1). M1 (see Figures 4, 5 and 6) is a bidirectional meter that is installed in the delivery point and measures the energy that is exported to or imported from the external electrical grid.

The **minimum frequency** for the data collection should be **15 minutes**, but data with at least a 5 minutes resolution is recommended, especially in the case of optimization. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year** after the implemented interventions. The **unit of measure** adopted for the net energy/net power is **kWh_e** (electrical kWh)/ **kW**.

Table 14. Proposed structure for the data collection related to the net energy/power

Date	Time	Energy/Power exported [kWh _e /kW]	Energy/Power imported [kWh _e /kW]	Description
01/01/25	00:15:00	...	...	Electricity grid
01/01/25	00:30:00	...	...	Electricity grid
...	...	...	...	Electricity grid
...	...	...	...	Electricity grid
21/12/25	23:45:00	...	...	Electricity grid

3.1.1.4 Grid Delivered Factor (Optional)

Description

Grid delivered factor or grid purchase ratio is the ratio between the energy delivered from the grid and the total energy used by the system. Grid delivered factor should be computed

in terms of final energy and is commonly used for electricity as energy carrier but can be extended to other energy carriers as for example thermal energy from a district heating and cooling system [5].

Unit

Dimensionless.

For the purposes of WeGenerate project, kWh meters or energy analysers can be installed (here labelled as M1, M2 and M3). The devices M1, M2 and M3 are the same with those used in section 3.1.1.2.

The **minimum frequency** for the data collection should be **15 minutes**. In order to collect representative data for all seasons, the **duration** of the monitoring should be at least **1 year** after the implemented interventions. The **unit of measure** adopted for the energy imported from the grid and the total energy consumption of the system is **kWh_e** (electrical kWh).

Table 15. Proposed structure for the data collection related to the grid delivered factor

Date	Time	Total energy consumption [kWh _e]	Description	Energy imported [kWh _e]	Description
01/01/25	00:15:00	...	Building and/or EV station	...	Electricity grid
01/01/25	00:30:00	...	Building and/or EV station	...	Electricity grid
...	...	...	Building and/or EV station	...	Electricity grid
...	...	...	Building and/or EV station	...	Electricity grid
21/12/25	23:45:00	...	Building and/or EV station	...	Electricity grid

3.1.2 Environment

3.1.2.1 GHG Emissions Performance

Description

The total GHG emissions of the People-Centric Sustainable Neighbourhoods are the balance between the total GHG generated emissions and the total GHG offsets in the use-stage of an urban area [5].

Unit

kg CO₂eq/y.

Calculation:

$$GHG_{PCSN} = B_U + M_U + W_C + WS - RES_U - U_G - U_T$$

Where:

GHG_{PCSN} – total GHG emissions in People-Centric Sustainable Neighbourhoods [kg CO₂eq/y];

B_U - emissions in the use stage (buildings) [kg CO₂eq/y];

M_U – emissions in the use stage (mobility) [kg CO₂eq/y];

W_C – emissions from water consumption, deducting the avoided emissions from rainwater collection and grey water reuse [kg CO₂eq/y]; (*optional*)

WS – emissions from waste management [kg CO₂eq/y]; (*optional*)

RES_U – emissions offsets in the use stage (on-site RES) [kg CO₂eq/y];

U_G – emissions offsets from green areas and green roofs [kg CO₂eq/y];

U_T – emissions offsets from trees in the street [kg CO₂eq/y].

B_U - Emissions in the use stage (buildings) [kg CO₂eq/y]

B_U will be calculated by collecting data from: a) energy certificates (if applicable), b) official national or municipality database and/or c) simulations. The collected data will be used in the equation of the related KPI as presented in D7.1. The data will be collected **pre and post interventions**. Table 16 presents the proposed structure for the data collection related to the emissions in the usage stage (buildings).

Table 16. Proposed structure for the data collection related to the emissions in the usage stage (buildings)

Building typology	# of buildings	Surface [m ²]	Type of energy	Delivered non-renewable primary energy [kWh/m ²]	Exported non-renewable primary energy [kWh/m ²]	Carrier	Emission coefficient for energy carrier [kg CO ₂ eq/kWh]	Source of information
Single family house			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....
Block of flats			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....
Shops			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....
Office buildings			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....
Education buildings			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....
Industrial buildings			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....
.....			Electrical	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....

M_U - Emissions in the use stage (mobility) [kg CO₂eq/y]

M_U will be calculated by collecting data from: a) EU database, b) official national or municipality database and c) social surveys. The collected data will be used in the equations of the related KPI as presented in D7.1. Reference data for the determination of the GHG emissions from mobility operation in the use stage are presented in “Appendix B – GHG Emissions in Mobility” of D7.1. The data will be collected **pre and post interventions**. Table 17 presents the proposed structure for the data collection related to the emissions in the usage stage (mobility).

Table 17. Proposed structure for the data collection related to the emissions in the usage stage (mobility)

Type of vehicle	Total number of people	Total travelling days/y
Private car		
Bus		
Tram, train, underground		
Bicycle and walking		

The calculation of the **total number of people/vehicle type** and the **total travelling days/y** should be carried out, using the question [WeGenQ_1_tb] in section 3.1.5.1.

W_C - Emissions from water consumption [kg CO₂eq/y]

W_C will be calculated by collecting data from: a) EU database, b) official national or municipality database and c) project documentation. The collected data will be used in the equation of the related KPI as presented in D7.1. Table 18 presents the proposed structure for the data collection related to the emissions from water consumption.

Table 18. Proposed structure for the data collection related to the emissions from water consumption

	Value	Source of information
Amount of water consumption per inhabitant [l/person·y]	.....	.....
Total number of inhabitants [person]	Cesena: 13,000	Table 3, page 13, WeGenerate Part B documentation.
	Cascais: 600	
	Bucharest: 4,000	
	Tampere: 41,000	
Emission coefficient for water consumption [kg CO₂eq/l]	.....	.....

W_S - Emissions from waste management [kg CO₂eq/y]

W_S will be calculated by collecting data from: a) EU database, b) official national or municipality database and c) project documentation. The collected data will be used in the equation of the related KPI as presented in D7.1. Table 19 presents the proposed structure for the data collection related to the emissions from waste management.

Table 19. Proposed structure for the data collection related to the emissions from water consumption

	Value	Source of information
Amount of waste generated per inhabitant [kg/person·y]	.....	.....
Total number of inhabitants [person]	Cesena: 13,000	Table 3, page 13, WeGenerate Part B documentation.
	Cascais: 600	
	Bucharest: 4,000	
	Tampere: 41,000	
Emission coefficient for waste management [kg CO₂eq/kg]	.....	.....

RES_U - Emissions offsets from on-site RES, e.g. a PV system in the use stage (on-site RES) [kg CO₂eq/y]

RES_U will be calculated by collecting data from: a) EU database and b) official national or municipality databases. The collected data will be used in the equation of the related KPI as

presented in D7.1. Table 20 presents the proposed structure for the data collection related to the emissions offsets from on-site RES.

Table 20. Proposed structure for the data collection related to the emissions offsets from on-site RES

	Value	Source of information
Installation power from PVs systems in neighbourhood [kWp]		
Solar electricity production [kWh/kWp]		Photovoltaic Geographical Information System (PVGIS) https://joint-research-centre.ec.europa.eu/photovoltaic-geographical-information-system-pvgis_en [6]
Emission coefficient for electricity [kg CO ₂ eq/kWh]		

U_G - Emissions offsets from green areas and green roofs [kg CO₂eq/y]

U_G will be calculated by collecting data from: a) EU databases, b) official national or municipality databases, c) urban maintenance services and d) maps. The collected data will be used in the equation of the related KPI as presented in D7.1. Table 21 presents the proposed structure for the data collection related to the emissions offsets from green areas and green roofs.

Table 21. Proposed structure for the data collection related to the emissions offsets from green areas and green roofs

	Value	Source of information
Green surface area [m ²]		
Green Roofs surface area [m ²]		
Total green surface area [m ²] (Sum = green area + roofs area)		
Emission absorption factor for green surface area [kg CO ₂ eq/m ² y].		
Emission absorption factor for green roofs surface area [kg CO ₂ eq/m ² y].		

U_T - Emissions offsets from trees in the street [kg CO₂eq/y]

U_T will be calculated by collecting data from: a) recording the number and the type/species of trees in the street (one by one tree), b) urban maintenance services, c) EU databases and d) official national or municipality databases. The collected data will be used in the equation

of the related KPI as presented in D7.1. Table 22 presents the proposed structure for the data collection related to the emissions offsets from trees in the streets.

Table 22. Proposed structure for the data collection related to the emission offsets trees in the streets

Type of trees	Number of trees	Emission absorption factor for type of tree [kg CO ₂ eq/unit·y]	Source of information
Deciduous trees	*****	*****	*****
Evergreens	*****	*****	*****
Fruit trees	*****	*****	*****
Coniferous trees	*****	*****	*****
Bushes	*****	*****	*****

3.1.2.2 Air Pollution

Description

Air pollution from energy consumption (Built Environment and Transport sectors) is an indicator that measures the total annual amount of air pollution (PM_{2.5}, NO_x, SO₂) produced by combustion processes [5].

Unit

Building sector: kg/m² y

Transport sector: g/y.

Building sector

Annual air pollution of different pollutants will be calculated by collecting data from: a) energy certificates (if applicable), b) official national or municipality databases and/or c) simulations. The collected data will be used in the equation of the related KPI as presented in D7.1. The data will be collected **pre and post interventions**. Table 23 presents the proposed structure for the data collection related to the annual air pollution of different pollutants (buildings).

Table 23. Proposed structure for the data collection related to the annual air pollution of different pollutants (buildings)

Building typology	# of buildings	Surface [m ²]	Type of energy	Primary energy consumption [kWh/m ²]	Carrier	Emission factor for energy carrier [g PM2.5/kWh]	Emission factor for energy carrier [g NOx/kWh]	Emission factor for energy carrier [g SO ₂ /kWh]	Source of information
Single family house			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....
Block of flats			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....
Shops			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....
Office buildings			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....
Education buildings			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....
Industrial buildings			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....
.....			Electrical	.....	.....	.....	.....	.....	.....
			Thermal	.....	.....	.....	.....	.....	.....

Transport sector

The annual air pollution of each pollutant from the road transport will be calculated by collecting data from: a) EU database, b) official national or municipality databases and c) scientific publications. The collected data will be used in the equations of the related KPI as presented in D7.1. Reference data for the determination of the GHG emissions from mobility operation in the use stage are presented in “Appendix C– Emission Factors for Air Pollutants per Energy Carrier” of D7.1. The data will be collected **pre and post interventions**. Table 24 presents the proposed structure for the data collection related to the annual air pollution of PM2.5 and NOx from the road transport.

Table 24. Proposed structure for the data collection related to the annual air pollution of PM_{2.5} and NO_x from the road transport

Vehicle category	Number	Fuel type	Consumption of fuel/category/y [Kg]	Emission factors for PM _{2.5} [g/Kg fuel]	Emission factors for NO _x [g/Kg fuel]	Source of information
PC*		Petrol	.....	.....	.....	.....
		Diesel	.....	.....	.....	.....
		LPG	.....	.....	.....	.....
LCV*		Petrol	.....	.....	.....	.....
		Diesel	.....	.....	.....	.....
HDV*		Diesel	.....	.....	.....	.....
		CNG	.....	.....	.....	.....
L-Category*		Petrol	.....	.....	.....	.....

* PC = Passenger car

LCV = Light commercial vehicles (trucks) < 3.5 t

HDV = Heavy-duty vehicles > 3.5 t and buses

L-Category = Moped, motorcycles, micro-cars

Table 25 presents the proposed structure for the data collection related to the annual air pollution of SO₂ from the road transport. In order to calculate the air pollution of SO₂, the equation from Appendix C of D7.1 should be used.

Table 25. Proposed structure for the data collection related to the annual air pollution of SO₂ from the road transport

Number of vehicle for all categories	Fuel type	Average consumption of fuel/y [kg]*	Emission factors for SO ₂ [g/Kg fuel]	Source of information
.....	Petrol	.....	.....	.....
.....	Diesel	.....	.....	.....

* Average consumption = the average consumption for all vehicles categories (only petrol and diesel)

3.1.2.3 Indoor Air Quality (Optional)

For the determination of the indicators indoor air quality, thermal comfort and overheating risk, CO₂ concentration, air temperature and humidity will be measured. Nevertheless, in case of designing building energy systems, the two most important factors that should be taken into consideration are temperature and relative humidity. On the other hand, the concentration of CO₂ is a reliable indicator of indoor air quality.

Description

Indoor Air Quality (IAQ) KPI indicates the percentage of time that air quality is in each category during occupied hours. The Carbon Dioxide (CO₂) concentration range is used to

assess IAQ according to the four quality categories listed below. In addition, IAQ assessment can be complemented with surveys [5].

CO₂ concentrations per category based on a standard CO₂ emission of 20 l/h per person [7,11]

Category	Carbon Dioxide concentrations above outdoors during full occupancy (outdoor level assumed to be equal to 400 ppm)
IEQ _I	≤ 550 ppm
IEQ _{II}	>550 and ≤ 800 ppm
IEQ _{III}	>800 ppm and ≤1350 ppm
IEQ _{IV}	>1350 ppm

Unit

%, based on time in each category (ppm).

Indoor CO₂ may rise, if ventilation isn't possible to refresh space air that is produced by the building occupants. The number of people living in the building, the ventilation rate and the CO₂ level in the surrounding environment affect the indoor CO₂ concentration.

The levels of CO₂ in the indoor environment [8, 9, 10] are presented in Table 26:

Table 26. The levels of CO₂ in the indoor environment

CO ₂ concentration [ppm]	Symptoms
400	Average outdoor air level
400–1,000	Normal indoor CO ₂ concentrations
1,000–2,000	Complaints of drowsiness and poor air quality.
2,000–5,000	Headaches, sleepiness, and stagnant, stale, stuffy air. Poor concentration, loss of attention, increased heart rate, nausea.
5,000	Workplace exposure limit (as 8 hour total weight average) in most jurisdictions.
5,000-40,000	Increase the risk of: losing consciousness, blurred vision, sweating, shaking, high heart rate, asphyxiation, death.
40,000	Immediately harmful due to oxygen deprivation.

The EN 16798-1:2019 [11] indicates four quality categories for CO₂ concentration in the indoor environments regardless of the outdoor concentration as being presented in D7.1.

For the determination of indoor air quality, CO₂ meters can be used to measure CO₂ levels in specific areas of the demo building. Alternatively, a device that measures CO₂ concentration, air temperature and relative humidity can be used in order to determine thermal comfort and

overheating risk KPIs. Table 27 presents the technical characteristics of the monitoring devices.

Table 27. Technical characteristics of the monitoring devices

Technical parameter	Description
Temperature range	-40-70 °C
Humidity range	0-100%
CO ₂ range	0-2000 ppm
CO ₂ measurement error	± 50 ppm
Calibration certificate	Required
Product standards	EN 60730-1, EN 60730-2-9, EN 61000-6-2, EN 61000-6-3

The measures should be performed when the indoor space is occupied, and the heating and conditioning systems are continuously operating. The devices to be installed inside the building should avoid being:

- Close to heating and/or cooling systems.
- Close to humidity sources (e.g. kitchen, bathroom, etc.).
- Close to devices that produce CO₂ (e.g. fireplace, stove, etc.).
- Close to doors and windows.
- Close to ventilation systems.

Additionally:

- The devices should not be exposed to direct sunlight.
- The devices should be installed at an average height of 1.60-1.80 m.

The minimum frequency for the data collection of CO₂ should be **1 hour**. In order to collect representative data for all seasons, the duration of the monitoring should be at least **1 year** after the implemented interventions. The **unit of measure** adopted for CO₂ concentration is **ppm**.

Table 28. Proposed structure for the data collection related to CO₂ concentration

Date	Time	CO ₂ concentration [ppm]	Description (zone, # of measuring device)
01/01/25	00:00:00	...	
01/01/25	01:00:00	...	
...	...	...	
...	...	...	
21/12/25	23:00:00	...	

The final report concerning indoor air quality should also include:

- A description of the devices used.
- A description of the ventilation system that characterizes the building.
- A map with the selected rooms, where the monitoring is to be performed, explaining the reasons for their selection.
- A dataset with the values of CO₂ measured in the selected rooms of the demo (pre and post interventions).

3.1.2.4 Thermal Comfort (Optional)

Description

Thermal comfort KPI indicates the percentage of time that air temperature is within certain categories during occupied hours. Operative temperature ranges are used to assess thermal comfort for buildings according to four quality categories. Alternatively, thermal comfort can be assessed using the predicted mean vote (PMV) and the predicted percentage dissatisfied (PPD) indexes. Recommended PMV and PPD ranges are defined in EN16798-1-2019 [5, 11].

Unit

%, based on time in each category (°C, PMV or PPD).

The EN 16798-1:2019 [11] indicates four quality categories for operative temperature ranges for summer and winter in buildings with and without mechanical cooling systems as presented in D7.1.

For the determination of thermal comfort, temperature sensors can be used to measure indoor temperatures in specific areas of the demo building. Alternatively, a device that measures CO₂ concentration, air temperature and relative humidity might be used in order to determine indoor air quality and overheating risk KPIs.

The measures should be performed when the indoor space is occupied, and the heating and conditioning systems are continuously operating. The devices is installed inside the building avoiding the situations as described in section 3.1.2.3.

The minimum frequency for the data collection of CO₂ should be **1 hour**. In order to collect representative data for all seasons, the duration of the monitoring should be at least **1 year** after the implemented interventions. The **unit of measure** adopted for the indoor temperature is °C.

Table 29. Proposed structure for the data collection related to the indoor temperature

Date	Time	Indoor temperature [°C]	Description (zone, # of measuring device)
01/01/25	00:00:00	...	
01/01/25	01:00:00	...	
...	...	...	
...	...	...	
21/12/25	23:00:00	...	

The final report concerning thermal comfort availability should also include:

- A description of the devices used.
- A description of the ventilation system that characterizes the building.
- A map with the selected rooms, where the monitoring is to be performed, explaining the reasons for their selection.
- A dataset with the values of temperature measured in the selected rooms of the demo (pre and post interventions).

3.1.2.5 Overheating Risk (Optional)

Description

The Humidex describes how hot the weather feels to the average person, by combining the effect of temperature and humidity, derived from the dew point. The Heat Index, also known as apparent temperature, represents the human-perceived equivalent temperature in shaded areas when relative humidity (RH) is combined with the air temperature. This KPI indicates the percentage of time that Heat Index is in each discomfort band or Heat Index is in each category during occupied hours [5].

Unit

Heat Index: % of time in each category, based on °C.

For the determination of overheating risk, temperature sensors and humidity sensors can be used to measure indoor temperatures and humidity in specific areas of the demo building. Alternatively, a device that measures both CO₂ concentration, air temperature and relative humidity can be used in order to determine as well as indoor air quality and thermal comfort KPIs.

The measures should be performed when the indoor space is occupied, and the heating and conditioning systems are continuously operating. The devices is installed inside the building avoiding the situations as described in section 3.1.2.3.

The **minimum frequency** for the data collection of the temperature and humidity should be **1 hour**. In order to collect representative data for all seasons, the duration of the monitoring should be at least **1 year** after the implemented interventions. The **units of measure** adopted for indoor temperature is **°C** and for humidity is **%**.

Table 30. Proposed structure for the data collection related to indoor temperature and humidity

Date	Time	Indoor temperature [°C]	Humidity [%]	Description (zone, # of measuring device)
01/01/25	00:00:00	...	...	
01/01/25	01:00:00	...	...	
...	...	...	...	
...	...	...	...	
21/12/25	23:00:00	...	...	

The final report concerning overheating risk should also include:

- A description of the devices used.
- A description of the ventilation system that characterizes the building.
- A map with the selected rooms, where the monitoring is to be performed, explaining the reasons for their selection.
- A dataset with the values of indoor temperature and humidity measured in the selected rooms of the demo (pre and post interventions).

3.1.3 Social inclusion and citizen participation

This section outlines the protocol to collect the data and evaluate the KPIs of the Social inclusion and citizen participation category of the WeGenerate impact model.

Table 31. Summary of the KPIs covered in the category and their specific variables

KPI	Specific variable
Democratic process	Share of the affected population consulted
	People's perception that their voices were heard
	Election participation rate change
Sociability	Actions to increase local participation accounting for vulnerable groups
	People's perception of the inclusiveness of the community
	People's participation in local groups/networks
Social engagement	Relative participation rates
	Relative response rates
	People's perception of the Demo's activities
Demographic composition	Age group
	Gender
	Income category
	Education level
	Nationality
	Employment status
	State benefit status
Safety and security	Traffic incidents rate change
	Fire-related incidents rate change
	Crime rate change
	People's perception of safety in the community
	People's perception of security in the community
Energy and environmental consciousness	People's energy and environmental consciousness
	Recycling rate change
	Electricity consumption intensity change
	Gas consumption intensity change
	Water consumption intensity change
	Share of 'green' products sales (Optional)
Cultural sustainability (Optional)	Cultural events
	Events participation
	Diversity and inclusion in events

Table 32. Summary of data to be collected during Demo implementation

Parameter	Description
Absolute number of people consulted	Data on the number of people consulted during the implementation of the Demo.
Absolute number of actions taken to increase local participation accounting for vulnerable groups	Data on the number of actions (e.g., number of events, number of community spaces, number of forums, etc.) taken to increase local participation of groups who are vulnerable to e.g., gentrification effects and/or who have special needs including women, elderly people, those with reduced mobility, persons with disabilities, low-income households, single parent families and youth.
Number of responses	Data on the number of questionnaire responses.
Absolute number of participants	Data on the number of participants in Demo activities (e.g., workshops, forums, events, digital tools).
Total number of invitees to Demo activities	Data on the number of people invited to Demo activities.
Absolute number of respondents	Data on the number of the consultation instruments respondents.
Total number of invitees to respond to consultation instruments	Data on the number of people invited to respond to the Demo consultation instruments.

Table 33. Summary of external data (databases, etc.) to be collected and their potential sources

Parameter	Description and Source
Voter turnout	Data on voter turnout for the polling stations that are relevant for the Demos' affected population. Potential sources: national statistics and/or elections commission registries and websites.
Number of participants in local groups/networks	Data on the number of participants in relevant local groups/networks.
Statistical data on the demographic composition of the affected population	The demographic composition of a neighbourhood is the proportion or number of people in the area who can be identified according to a certain characteristic such as gender, age, social mix, etc. Potential data sources can include: official municipality / province / region databases, Eurostat, local offices, academic research at the local level, NGOs, etc.
Number of traffic incidents	Data on the number of traffic incidents in the region. Potential sources: Eurostat or official local registries (e.g., police, fire brigade, ambulance services)
Number of fire-related incidents	Data on the number of fire-related incidents in the region. Potential sources: official local registries (e.g., police, fire brigade, ambulance services)
Number of crimes	Data on the number of crimes registered in the region. Potential sources: Eurostat or official local registries (e.g., police, fire brigade, ambulance services)
Recycling rates/volumes	Data on recycling rates (percentage of waste that is recycled) or the recycling volume (volume of waste that is recycled). Potential sources: Local waste management companies, Eurostat or local registries.
Electricity consumption intensity	Data on the kWh electricity consumption intensity in the neighbourhood. Potential sources: Local electricity distribution companies, Eurostat or official local registries.
Gas consumption intensity	Data on the kWh gas consumption intensity in the neighbourhood. Potential sources: Local gas distribution companies, Eurostat or official local registries.
Water consumption intensity	Data on the volume of water consumption intensity in the neighbourhood. Potential sources: Local water distribution companies, Eurostat or official local registries.
Share of green products sold	Statistics on the sales of 'green' products in the affected region. Potential sources: local businesses and retailers.
Number of cultural events held in a year	Data on the number of cultural events held in a year in the region.
Number of participants of cultural events held in a year	Data on the number of participants of cultural events held in a year in the region.
Number of event participants from vulnerable or minority groups	Data on the number of participants of cultural events from vulnerable or minority groups.

Boundaries. For all the KPIs covered in this category and their specific variables, the boundaries to be considered in the assessment are the areas selected for Demo implementation. If, for any reason (e.g., data availability), different boundaries need to be used for KPIs and their specific variables, this should be clearly explained.

Table 34. Boundaries

WeGenerate Demo	Land area	Population
Cesena, Italy	Area around train station and residential neighbourhood in the vicinity but not connected (65 hectares).	Residents of a deprived neighbourhood, students and public gravitated around the train station area (13,000 inhabitants).
Cascais, Portugal	Social housing neighborhood and buildings where the PV panels will be installed, (40 hectares).	Social housing residents, school and kindergarten communities, users of the buildings where the PV panels will be installed (2,500 inhabitants).
Bucharest, Romania	University campus and the residential neighbourhood around (3 hectares).	Residents of a mixed neighbourhood (students, young families, elderly, Romani and refugees), university and school communities (4,000 inhabitants).
Tampere, Finland	Mixed residential, retail, school and work area, including historical buildings, parks and cultural facilities (600 hectares)	Residents of a mixed neighbourhood, local businesses, visitors of city centre (41,000 inhabitants).

Timing. As possible, the timings for the data collection should be harmonised across categories, KPIs and the different Demos. Particularly, some of the KPIs have specific variables that are assessed based on data from before and after Demo implementation. 2022, 2023 or 2024 are suggested as the years for assessing the ‘before’ and 2026 or 2027 as the years for assessing the ‘after’. However, these might vary depending on data availability and might be different for each specific variable and/or each Demo.

If, for any reason (e.g., data availability, etc.), different timings need to be used for KPIs and their specific variables, this should be clearly explained. Furthermore, if it is not possible to collect data before and after the implementation to estimate rate changes, this should also be justified and, as possible, at least one set of information (i.e., either before or after the implementation) should be presented for each specific variable, as relevant.

Causality. Some specific variables are calculated by comparing data before and after Demo implementation. These are meant to assess, compare and provide a potential indication of the impact of the project on social inclusion and citizen participation in the regions and populations affected by the Demo. However, there might not necessarily be a causal relation between the project implementation and any effects on these specific variables and KPIs and further investigation beyond the scope of this impact model might be required to assess this relation.

References. All the data used to support the assessment of the KPIs should be properly referenced.

More information concerning the calculation of each KPI in this section is presented in ANNEX II.

3.1.3.1 Demographic composition

Description

The demographic composition of a neighbourhood is the proportion or number of people in the area who can be identified according to a certain characteristic such as gender, age, social mix, etc., and relates to their needs, as well as the potential for increases in social capital.

The set of specific variables can support an assessment of the Demo's effects on demographic composition. The ranges and categories for each variable will depend on the data sources to be used and how the information is available to support calculations.

Unit

% of the neighbourhood population in each category (age group, gender, income category, education level, nationality, employment status, state benefit status).

The demographic composition will be evaluated by collecting data from: a) official municipality / province / region databases, b) Eurostat, c) local offices, d) academic research at the local level, e) NGOs, etc. The data will be collected **pre and post interventions**. Table 35 presents the proposed structure for the data collection related to the demographic composition.

Table 35. Proposed structure for the data collection related to the demographic composition

	BEFORE	AFTER	VARIATION
Age group			
Less than 15 years			
From 15 to 29 years			
From 30 to 49 years			
From 50 to 64 years			
From 65 to 84 years			
85 years or over			
Gender			
Female			
Male			
Income category			
Less than minimum wage			
Between 1 and 2 times the minimum wage			
Between 2 and 3 times the minimum wage			
Between 3 and 4 times the minimum wage			
More than 4 times the minimum wage			
Education level			
Pre-primary, primary and lower secondary education (levels 0-2)			
Upper secondary and post-secondary non-tertiary education (levels 3 and 4)			
First and second stage of tertiary education (levels 5 and 6)			
Nationality			
Demo country national			
Foreign national			
Employment status			
Employed			
Unemployed			
Other			
State benefit status			
State benefit recipient			
Not state benefit recipient			

3.1.3.2 Cultural Sustainability (Optional)

Description

Measures the number of cultural events and initiatives held in the community, and the engagement level of different cultural groups, reflecting the project's effectiveness in fostering cultural diversity and participation.

The following specific variables can support an assessment of the Demo's effects on cultural sustainability [5].

Unit

Cultural events (CE): # of events.

Events participation (EV): # of participants.

Diversity and inclusion in events (DIE): % of vulnerable / minorities participants.

Cultural events

The cultural events will be calculated by collecting data from: a) event organisation teams and b) administration of local establishments, etc. The data will be collected **pre and post interventions**. Table 36 presents the proposed structure for the data collection related to the cultural events.

Table 36. Proposed structure for the data collection related to the cultural events

	Value	Source of information
Number of cultural events held in a year		

Events participation

The events participation will be calculated by collecting data from: a) event organisation teams and b) administration of local establishments, etc. The data will be collected **pre and post interventions**. Table 37 presents the proposed structure for the data collection related to the events participation.

Table 37. Proposed structure for the data collection related to the events participation

	Value	Source of information
Number of participants of cultural events held in a year		

Diversity and inclusion in events

The diversity and inclusion in events will be calculated by collecting data from: a) event organisation teams and b) administration of local establishments, etc. The data will be collected **pre and post interventions**. Table 38 presents the proposed structure for the data collection related to the diversity and inclusion in events.

Table 38. Proposed structure for the data collection related to the diversity and inclusion in events

	Value	Source of information
Number of event participants from vulnerable or minority groups		
Number of participants of cultural events held in a year		

3.1.4 Socio-economics

3.1.4.1 Access to services and Amenities

Description

The accessibility score for services and amenities indicates the equitable access in the People-Centric Sustainable Neighbourhood to services and amenities, where the normative target is 100%, and measures whether there is any service or amenity of the type within reach. Higher accessibility indicates that the population has more equitable access to valued amenities and services in People-Centric Sustainable Neighbourhood compared to others, while lower scores indicate that people would have to spend a disproportionate amount of time or a different mode of transport to reach certain amenities.

The accessibility score for services and amenities signals equitable access to all population segments, where the normative target is 100%. Lower values indicate that more people would have to spend a disproportionate amount of time, or a different mode of transport to access certain services [5].

Unit

Accessibility score for services and amenities: % of population.

The calculation of the access to services and amenities KPI will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_as] Think about your access to amenities in your neighbourhood during a regular week (from Monday to Sunday). Do you visit the following places? Please give your answer for each type of amenity.

		Yes	No
[WeGenQ_1_aa] Sports facility	[WeGenQ_1_aaA] Playing fields	☐	☐
	[WeGenQ_1_aaB] Outdoor – indoor gyms	☐	☐
	[WeGenQ_1_aaC] Pools	☐	☐
	[WeGenQ_1_aaD] Jogging tracks	☐	☐
	[WeGenQ_1_aaE] Extreme sports parks	☐	☐
	[WeGenQ_1_aaF] Other [What amenity]	☐	☐
[WeGenQ_2_aa] Waterfront	[WeGenQ_2_ssA] Creeks	☐	☐
	[WeGenQ_2_aaB] Publicly accessible riverbanks	☐	☐
	[WeGenQ_2_aaC] beaches	☐	☐
	[WeGenQ_2_aaD] Lakes	☐	☐
	[WeGenQ_2_aaE] Ponds for recreational purposes	☐	☐
	[WeGenQ_2_aaF] Other [What amenity]	☐	☐
[WeGenQ_3_aa] Spectator entertainment	[WeGenQ_3_aaA] Cinemas	☐	☐
	[WeGenQ_3_aaB] Stadiums	☐	☐
	[WeGenQ_3_aaC] Theatres	☐	☐
	[WeGenQ_3_aaD] Concert halls	☐	☐
	[WeGenQ_3_aaE] Other [What amenity]	☐	☐
[WeGenQ_4_aa] Thematic parks	[WeGenQ_4_aaA] Zoos	☐	☐
	[WeGenQ_4_aaB] Amusement parks	☐	☐
	[WeGenQ_4_aaC] Museums,	☐	☐
	[WeGenQ_4_aaD] Archaeological sites	☐	☐
	[WeGenQ_4_aaE] Galleries	☐	☐
	[WeGenQ_4_aaF] Other [What amenity]	☐	☐
[WeGenQ_5_aa] Hospitality	[WeGenQ_5_aaA] Hotels	☐	☐
	[WeGenQ_5_aaB] Hostels	☐	☐
	[WeGenQ_5_aaC] Camping	☐	☐
	[WeGenQ_5_aaD] Cafés	☐	☐
	[WeGenQ_5_aaE] Restaurants	☐	☐
	[WeGenQ_5_aaF] Bars	☐	☐
	[WeGenQ_5_aaG] Other [What amenity]	☐	☐
[WeGenQ_6_aa] Library	[WeGenQ_6_aaA] Libraries	☐	☐
	[WeGenQ_6_aaB] Archives	☐	☐
	[WeGenQ_6_aaC] Other [What amenity]	☐	☐
[WeGenQ_7_aa] Nature	[WeGenQ_7_aaA] Wildlife parks	☐	☐
	[WeGenQ_7_aaB] Forests	☐	☐
	[WeGenQ_7_aaC] Other [What amenity]	☐	☐
[WeGenQ_8_aa] Places of worship	[WeGenQ_8_aaA] Churches	☐	☐
	[WeGenQ_8_aaB] Mosque	☐	☐
	[WeGenQ_8_aaC] Juice temples	☐	☐
	[WeGenQ_8_aaD] Monastery	☐	☐
	[WeGenQ_8_aaE] Other [What amenity]	☐	☐

[WeGenQ_2_as] Think about your access to services in your neighbourhood during a regular week (from Monday to Sunday). Do you visit the following places? Please give your answer for each type of services.

		Yes	No
[WeGenQ_1_as] Education	[WeGenQ_1_asA] Kindergarden	o	o
	[WeGenQ_1_asB] Primary School	o	o
	[WeGenQ_1_asC] Secondary school	o	o
	[WeGenQ_1_asD] High school	o	o
	[WeGenQ_1_asE] University	o	o
[WeGenQ_2_as] Stores	[WeGenQ_2_asA] Supermarket	o	o
	[WeGenQ_2_asB] Grocery store	o	o
	[WeGenQ_2_asC] Bakeries	o	o
	[WeGenQ_2_asD] Bucher shops	o	o
	[WeGenQ_2_asE] Malls	o	o
	[WeGenQ_2_asF] Other [What amenity]	o	o
[WeGenQ_3_as] Health	[WeGenQ_3_asA] Hospitals	o	o
	[WeGenQ_3_asB] Health centre	o	o
	[WeGenQ_3_asC] General practitioner	o	o
	[WeGenQ_3_asD] Other [What amenity]	o	o
[WeGenQ_4_as] Financial services	[WeGenQ_4_asA] Bank	o	o
	[WeGenQ_4_asB] ATM	o	o
	[WeGenQ_4_asC] Exchange	o	o
	[WeGenQ_4_asD] Other [What amenity]	o	o
[WeGenQ_5_as] Post services	[WeGenQ_5_asA] Post office	o	o
	[WeGenQ_5_asB] Courier centre	o	o
	[WeGenQ_5_asC] Other [What amenity]	o	o
[WeGenQ_6_as] Transport services	[WeGenQ_6_asA] Local public transport node (bus, tram, underground, etc.)	o	o
	[WeGenQ_6_asB] Transfer station (intercity bus, train, intermodal stations, etc.)	o	o
	[WeGenQ_6_asC] Taxi services	o	o

3.1.4.2 Investments Triggered

Description

An investment is defined as the action of capital outlay for an asset or item that is purchased or implemented, with the aim to generate revenues or savings/benefits over time. The investment in a newly constructed system is defined as cumulative payments until the initial operation of the system. The investment in the regeneration of an existing system is defined as cumulative payments until the initial operation of the system after the regeneration (grants are not subtracted). The indicator estimates all EU funding contributions to project interventions, including all aspects of project investments in terms of technology, i.e. energy, mobility, ICT. The indicator also reports the total amount of investments [€] required and mobilised by the project. Regarding the urban solutions, total

investments apply to the sustainability aspects of the system (e.g., highly efficient envelope in a building) and exclude non-sustainable related investments (e.g., regeneration of non-sustainable road transports' infrastructures). It is recommended to also consider the share of investment for sustainable solutions to the total investment of urban regeneration [5].

Unit

€/m²

€ (total).

The total investment for all the interventions will be calculated by collecting data from: a) invoices and b) demosite documentation. The data will be collected **only post interventions**. The investments triggered KPI will be calculated **only post interventions**. The invoices should correspond to the purchase cost of the equipment and the installation cost. Table 39 presents the proposed structure for the data collection related to the total investment.

Table 39. Proposed structure for the data collection related to the total investment

Date of invoice	Amount of investment [€]	Description
DD/MM/YY		e.g. PV panels, batteries, equipment, etc.
.....		
.....		
.....		
Total floor area of the system regenerated [m ²]:		

3.1.4.3 Affordability of Energy (Optional)

Description

Affordability of energy as indicated by composition of household expenditure could be assessed as the proportion of respondents with “True” answers in Question 1 to the total number of respondents. A “True” answer corresponds to higher energy costs in household expenditures compared to the previous residence. Similarly, affordability of energy as indicated by arrears in utility can be assessed as the proportion of residents with “True” answers to the total number of respondents from the surveys [5].

Unit

% of respondents.

The calculation of the affordability of energy KPI will be performed by evaluating the answers of the following questions. The collected data will be used in the equations of the related KPI as presented in D7.1. The data will be collected **pre and post interventions**.

Related to affordability of energy as indicated by composition of household expenditure.

[WeGenQ_1_ae] Compared to your last residence: Have you spent more on expenses connected to the total annual energy consumption?

- ☐ True
- ☐ False

Related to affordability of energy as indicated by arrears in utility bills.

[WeGenQ_2_ae] Has your household been at any time unable to pay utility bills on time due to financial difficulties for the last year?

- ☐ True
- ☐ False

3.1.4.4 Energy Renovation Rate (Optional)

Description

The energy renovation rate is an indicator that shows the percentage of useful floor area of renovated buildings that achieved the NZEB or another national/local target [5].

Unit

%.

The energy renovation rate KPI will be calculated by collecting data from: a) demo site implementation, b) official databases from local authorities, c) national land registry, etc. The collected data will be used in the equation of the related KPI as presented in D7.1. The data will be collected **only post interventions**. Table 40 presents the proposed structure for the data collection related to the energy renovation rate.

Table 40. Proposed structure for the data collection related to energy renovation rate

	Surface [m ²]	Source of information
Useful floor area of renovated buildings that achieved the NZEB or another national or local target		
Total useful area of a Sustainable Inclusive Neighbourhoods		

3.1.4.5 Global Cost (Optional)

Description

The global cost for urban interventions and construction/technology elements is a sum of the different types of costs and applying to these the discount rate by means of a discount factor to express them in terms of value in the starting year (Net Present Value (NPV)). When applied to the building/urban facilities' life cycle, global cost is associated with the building/urban facilities design and intervention costs (Stage A: product stage and intervention process stage), operation and maintenance of the building/urban facilities (Stage B: Use stage), and the cost of disposing of the building/urban facilities at the end of its life cycle (Stage C: End of life) [5].

Unit

€/m².

The global cost KPI will be calculated using data from: a) invoices, b) bills (energy, communication services, etc.) and c) demo site documentation. The collected data will be used in the equation of the related KPI as presented in D7.1. The data will be collected **pre and post interventions**. Table 41 presents the proposed structure for the data collection related to the global cost.

Table 41. Proposed structure for the data collection related to the global cost

Type of investment	Initial investment costs [€/m ²]	Annual running cost * [€/m ² y]	Residual value at the end of the calculation period [€/m ²]	Replacement cost [€/m ²]	Disposal cost (if applicable) [€/m ²]	Source of information
e.g. PV, batteries, heat pump, urban furniture, EV-charger, etc.						
.....						
.....						
Real discount rate						

* Annual running cost includes operational cost (property tax, building insurance, security, supplies, communication, etc.), energy cost (cost for heating/cooling) and maintenance cost (cleaning, adjustments, repair)

3.1.5 Sustainable mobility

3.1.5.1 Transport Behaviour

Description

Passenger mobility behaviour is mainly assessed through the modal split, which is defined as the percentage share of each mode of transport (walking, cycling, public transport, car transport (driver or passenger) in total transport, expressed in number of trips), and, secondly, through an inventory of sustainable mobility enablers.

The modal split shows the percentage of trips made using a particular mode of transport compared to the ratio of all trips made in defined area during a certain period. In case of multimodal journeys, the main mode of transport (i.e., most kilometres covered during the journey) is considered.

The descriptive variable of the indicator can be described as the list of sustainable mobility enablers present/absent from the evaluated neighbourhood.

Unit

% share of each mode of the total number of trips starting or ending within the demonstration area (based in number of trips).

The calculation of transport behaviour KPI will be performed by evaluating the answers of the following question. The data will be collected **pre and post interventions**.

[WeGenQ_1_tb] Think about your mobility during a regular week (from Monday to Sunday). How many trips do you usually make with the following modes of transport in the demo area? Please give your answer in each category.

	Number of trips during a week
[WeGenQ_1_tbA] Private car (driver or passenger)	
[WeGenQ_1_tbB] Public transport (bus)	
[WeGenQ_1_tbC] Public transport (tram, train, underground)	
[WeGenQ_1_tbD] Bicycle	
[WeGenQ_1_tbE] Walking	
[WeGenQ_1_tbF] Shared e-scooter	
[WeGenQ_1_tbG] Other, what mode?	

3.1.5.2 Urban Accessibility

Description

This indicator is qualitative, measuring the perception of how accessible urban facilities and transport service are within the demonstration area.

Alternatively, a simplified indicator alternative (adopted from ISO 21542:2011), gathering some of the more common, and urgent barriers for urban accessibility is proposed. This indicator is not comparable with a thorough universal design audit (which is not in the scope of the WeGenerate project).

The indicator is proposed at neighbourhood scale, with data being collected for four types of units: transport, public urban facilities, road segments, and junctions. Facilities refer to any public infrastructure/building, together with its site, and outdoor public destinations, such as parks and squares. Road segments refer to any pedestrian paths on streets, between two junctions. For each assessment, a checklist criterion must be defined. For a unit to pass the assessment, all criteria must be met. The assessment is concluded by plugging in the assessment results to equation corresponding to % of barrier-free units (*UDarea*).

Unit

Neighbourhood scale, % of barrier-free units (*UDarea*) is calculated.

The urban accessibility KPI will be calculated using the equation of the related KPI as presented in D7.1. The number of barrier-free accessible units in the neighbourhood (U_{pass}) and the total number of units within neighbourhood (U_{tot}) should be recorded.

The data will be collected for four types of units: transport services, public urban facilities, road segments, and junctions. All necessary data will be collected by recording the number of units in each type or from official municipality databases. For the assessment, a checklist criteria for each one of the four types is proposed. **For a unit to pass the assessment, all criteria must be met.** The urban accessibility KPI will be calculated **pre and post interventions**.

Public urban facilities

The type public urban facilities refers to public buildings, public parks (playgrounds and public spaces) and squares. Table 42 presents the proposed structure for the data collection related to the public urban facilities.

Table 42. Proposed structure for the data collection related to the public urban facilities

Unit	Number	Source of information
Buildings		
Parks		
Squares		

Table 43 presents the criteria checklist for the assessment of the public urban facilities. It is noticed that table 43 should be filled in for each one of the unit.

Table 43. Criteria checklist for the assessment of the public urban facilities

Criterion	Evaluation format
Passenger lift, capable of accommodating wheelchair, or stairway wheelchair lift in multi-storey building	True or False
Existing public buildings or 50% workspaces meeting wheelchair design standards	True or False
On-site movement is provided for by wheelchair-compliant ramps, or by motorised means (where height difference is larger than a storey)	True or False
Illuminated, covered entrances with level access over the threshold	True or False
Doorways and hallways width accommodate wheelchair, opportunities to turn are provided within eyesight	True or False
Wheelchair accessible bathrooms available on all public buildings	True or False
Windows, fixtures, and fittings at accessible height	True or False

Transport services

The type transport services refers to bus, metro, tram and train stations. Table 44 presents the proposed structure for the data collection related to the transport services.

Table 44. Proposed structure for the data collection related to the transport services

Unit	Number	Source of information
Bus station and stop		
Metro station		
Tram stop		
Train station		

Table 45 presents the criteria checklist for the assessment of the transport services. It is noticed that table 45 should be filled in for each one of the unit.

Table 45. Criteria checklist for the assessment of the transport services

Criterion	Evaluation format
Passenger lift, capable of accommodating wheelchair, or stairway wheelchair lift	True or False
Combined audio-visual information regulating pedestrian flow	True or False
Publicly accessible areas meeting local wheelchair design standards	True or False

Road segments

The type road segments refers to any pedestrian paths on streets, between two junctions. Table 46 presents the proposed structure for the data collection related to the road segments.

Table 46. Proposed structure for the data collection related to the road segments

Unit	Number	Source of information
Pedestrian paths		

Table 47 presents the criteria checklist for the assessment of the road segments. It is noticed that table 47 should be filled in for each one of the unit.

Table 47. Criteria checklist for the assessment of the road segments

Criterion	Evaluation format
Combined audio-visual information regulating pedestrian flow	True or False
Publicly accessible areas meeting local wheelchair design standards	True or False

Junctions

Table 48 presents the proposed structure for the data collection related to junctions.

Table 48. Proposed structure for the data collection related to junctions

Unit	Number	Source of information
Junctions		

Table 49 presents the criteria checklist for the assessment of junctions. It is noticed that table 49 should be filled in for each one of the unit.

Table 49. Criteria checklist for the assessment of junctions

Criterion	Evaluation format
Combined audio-visual information regulating pedestrian flow	True or False
Publicly accessible areas meeting local wheelchair design standards	True or False
Windows, fixtures, and fittings at accessible height	True or False

For reporting, Table 50 should be filled in.

Table 50. Checklist for reporting urban accessibility

Type	U _{pass}	U _{tot}
Public urban facilities		
Transport services		
Road segments		
Junctions		
Total		

3.1.5.3 Cycling path supply

Description

The length of cycling infrastructure in the area.

Unit

Km.

The length of cycling infrastructure for each 1 of the 4 demonstration neighbourhoods will be calculated by collecting data from: a) digital maps or b) maps presentation or c) official databases from local authorities. The data will be collected **pre and post interventions**. Table 51 presents the proposed structure for the data collection related to the cycling paths.

Table 51. Proposed structure for the data collection related to the cycling paths

Street name	Length [Km]	Source of information
.....		
.....		
.....		
Total		

3.1.5.4 Renewal of Walking and Open spaces

Description

This KPI determines size and share of open and walkable spaces being renewed or improved as a result of the WeGenerate project. In addition, urban public space for pedestrians is measured separately (sidewalks, squares, parks, recreational areas and other walkable public open spaces).

In this assessment, walkable and open spaces include but are not limited to [5]:

- Public parks, gardens, and green spaces.
- Pedestrian zones, squares, promenades, street spaces.
- Playgrounds.
- Outdoor sport grounds.
- Educational and health trails.
- Rainwater management areas.

Unit

Share of renewed open and walkable space areas (in %).

The size of renewal of walking and open spaces for each 1 of the 4 demonstration neighbourhoods will be calculated by collecting data from: a) digital maps or b) maps or c) official databases from local authorities. Table 52 presents the proposed structure for the data collection related to the available open spaces. The data will be collected **pre and post interventions**.

Table 52. Proposed structure for the data collection related to the available open spaces

Type	Total area [km ²]	Walkable or Open Space (choose one)	Source of information
Public parks			
Gardens			
Green spaces			
Pedestrian zones			
Squares			
Promenades			
Street spaces			
Playgrounds			
Outdoor sport grounds			
Educational and health trails			
Rainwater management areas			
.....			
.....			
Total			

Table 53 presents the proposed structure for the data collection related to the renewed open and walking spaces. The data will be collected **only post interventions**.

Table 53. Proposed structure for the data collection related to the *renewed open and walking spaces*

Type	Total area [km ²]	Walkable or Open Space (choose one)	Source of information
Public parks			
Gardens			
Green spaces			
Pedestrian zones			
Squares			
Promenades			
Street spaces			
Playgrounds			
Outdoor sport grounds			
Educational and health trails			
Rainwater management areas			
.....			
.....			

Total	
-------	-------

3.1.5.5 Physical activity (Optional)

Description

The average time spent walking/cycling per week for people working in the area, residents and other regular visitors of the demo area [5].

Unit

Minutes (scale: <20, 20-60, 61-90, 91-120, >120).

The calculation of physical activity KPI will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_pa] Think about the last three months. On average, how many minutes per week did you spend walking in the demo area?

- ☐ <20
- ☐ 20-60
- ☐ 61-90
- ☐ 91-120
- ☐ >120

[WeGenQ_2_pa] Think about the last three months. On average, how many minutes per week did you spend cycling in the demo area?

- ☐ <20
- ☐ 20-60
- ☐ 61-90
- ☐ 91-120
- ☐ >120

3.1.6 Integrated Urban Regeneration

3.1.6.1 Recycling and circular economy initiatives

Description

The R-Strategies are often used as a framework for the circular economy, there are currently different R-Strategy frameworks and the one used in this KPI is adapted from the Circular City Actions Framework developed by the Circle Lab for Cities program. The KPI aims to capture the number and level of R-strategies considered in the Demo's 'Action Plan and Implementation Roadmap' [5].

Unit

Number and level of R-Strategies deployment.

For each proposed action in the demo sites, the R-strategies that have been considered, (section 5.6.1 of D7.1) are to be identified and briefly described. Overall, the number of the R-strategies considered (0-5) should be counted, listed which of Rs and level were included (R1-R5). The Recycling and circular economy initiatives KPI will be calculated **only post interventions**. For the reporting, Table 54 should be used.

Table 54. R-strategies – Data collection reporting table

R1	R2	R3	R4	R5	Total number of Rs
Rethink	Regenerate	Reduce	Reuse	Recover	
Y/N	Y/N	Y/N	Y/N	Y/N	0-5

3.1.6.2 Urban Heat Island

Description

Urban heat island (UHI) is classified in four main types based on different underlying atmospheric processes and for the purpose of urban design and planning, the canopy layer urban heat island is the most relevant. The UHI intensity (UHII) is defined as a synchronous air temperature difference between one or more urban and rural measurement sites. The air temperature difference can be expressed in different metrics but for the purpose of evaluating the impacts of urban design interventions, measurement of the maximum UHII at night (with low wind speed and low cloud cover) and the daily mean UHII over designated periods are deemed appropriate. This KPI measures the change in the maximum UHII and daily mean UHII by comparing the measurements before and after the inventions introduced by the Demos [5].

Unit

% change.

For the purposes of the WeGenerate project, weather stations can be installed in different areas of the neighbourhood. Data can also be collected from National Meteorological Services databases. The collected data will be used in the equations of the related KPI as presented in D7.1. It is noticed that the percentage change in UHII will be calculated **only post interventions**.

The **frequency** for the data collection of temperature should be **1 hour**. In order to collect representative data for all seasons, the duration of the monitoring should be at least **1 year pre and post interventions implementation**. The **unit of measure** adopted for the temperature is **°C**. Table 55 presents the proposed structure for the data collection related to the air temperatures for each weather station.

Table 55. Proposed structure for the data collection related to the air temperatures in urban (a) and rural areas (b)

a)	Date	Time	Temperature in urban areas [°C]
	01/01/25	00:00:00	...
	01/01/25	01:00:00	...
	...	...	...
	...	...	...
	21/12/25	23:00:00	...
b)	Date	Time	Temperature in rural areas [°C]
	01/01/25	00:00:00	...
	01/01/25	01:00:00	...
	...	...	...
	...	...	...
	21/12/25	23:00:00	...

3.1.6.3 Resource Recovery (Optional)

Description

This KPI determines the share (%) and amount (in kg) of materials recovered through reuse and recycling during the implementation of actions within the WeGenerate project.

Unit

Share of recovered materials % (from WeGenerate urban interventions).

The resource recovery KPI will be calculated **only post interventions**. All necessary data should be recorded during interventions. Table 56 presents the proposed structure for the data collection related to the resource recovery.

Table 56. Proposed structure for the data collection related to the resource recovery

Resource Recovery	
Total amount of waste materials generated during the implementation process (kg)	.....
Total amount of materials recovered during the implementation process (kg)	.....

3.1.6.4 Flood Risk (Optional)

Description

The Flood risk KPI measures the percentage change in flood risk areas within the Demo neighbourhood. The estimation of flood risk areas is based on a flood risk assessment. There are different approaches that cities can take to assess flood risk, from lesser to great value and complexity. The C40 Cities Climate Leadership Group summarises the main approaches commonly used. The selection of an appropriate approach can be influenced by factors such as relevant national/regional standards or guidance, availability of local data and the capacity and skill level of the municipality staff. The Demo allows the freedom to use an approach that is most suitable for them [5].

Unit

% change.

The surface of flood risk areas will be determined by collecting data from: a) digital maps or b) maps presentation or c) databases from local authorities. The data will be collected **pre and post interventions**. It is noticed that the flood risk KPI will be calculated **only post interventions**. Table 57 presents the proposed structure for the data collection related to the flood risk area.

Table 57. Proposed structure for the data collection related to the flood risk area

Flood risk area (before) [m ²]	Flood risk area (after) [m ²]	Source of information
.....		

3.2 Qualitative data

3.2.1 Sustainable mobility

3.2.1.1 Multi-modality (Optional)

Description

This indicator captures how the different mobility subsystems, i.e. different transport modes, function together, evaluating the quality of intermodal transfers within urban mobility. This indicator is qualitative, measuring the perception of the quality of interchanges within the demonstration area [5].

Unit

Likert scale.

The determination of multi-modality KPI will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_mm] Switching between transport modes* is convenient in the demo area.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

** Transport modes: Private car (driver or passenger), Public transport (bus, tram, train, underground), Bicycle, Walking, Shared e-scooter, Other*

[WeGenQ_2_mm] The transport system and urban facilities cover the destinations I want to travel/move to within the area.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.

- Strongly Agree.

3.2.2 Integrated Urban Regeneration

3.2.2.1 Digital Competence (Optional)

Description

According to the European Council, digital competence involves the "confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It is defined as a combination of knowledge, skills and attitudes". In order to improve citizens' digital competence and help policymakers formulate policies that support digital competence building, an EU-wide Digital Competence Framework for Citizens (also known as DigComp) was developed to provide a common language to identify and describe the key areas of digital competence. Based on DigComp, the Joint Research Council of the European Commission developed the Digital Skills Indicator (DSI) to monitor the progress of digital skills of the EU population. The DSI defines a selection of activities that can be measured as proxies for digital skills. They are activities that individuals carry out using digital technologies, particularly on the internet. The DSI collects data through the EU Survey on the use of ICT in Households and by Individuals, which is targeted to the EU population between the ages of 16 and 74 [5].

Unit

Dimensionless

The determination of digital competence KPI will be performed through a social survey via questionnaires. The necessary data will be collected **only post interventions**.

Considering that the digital applications, which will be developed in WeGenerate intend to serve specific purposes, a general assessment of digital competence might not be sensible for all demos. In this regard, tailor-made survey on digital competence fitting to the specific objectives of each demo site is recommended. The specific questions for the determination of digital competence KPI will be developed during project implementation in cooperation with consortium partners and demo site partners.

3.3 Combination of Quantitative and Qualitative data

3.3.1 Social inclusion and citizen participation

3.3.1.1 Democratic Process

Description

This indicator evaluates community engagement and trust in local governance. By assessing the consultation elements of Demo implementation, measuring trust levels through survey responses, and quantifying democratic participation via election rates, the goal is to provide a comprehensive view of civic involvement. This approach highlights the community's confidence in its leaders and also reflects active participation in democratic processes, which is essential for fostering a responsive and inclusive governance model.

The set of specific KPIs can support an assessment of the Demo's effects on democratic process through: (i) providing an assessment on whether citizens' voices were heard for the implementation of the Demo; and (ii) indicating whether the democratic process been strengthened locally [5].

Unit

Share of the affected population consulted (SPC): % of the affected population that was consulted.

People's perception that their voices were heard: Likert scale.

Election participation rate (EPR): %.

Share of the affected population consulted

The share of the affected population consulted will be calculated by collecting data from: a) demo implementation and b) project documentation. The data will be collected **only post interventions**. Table 58 presents the proposed structure for the data collection related to the share of the affected population consulted.

Table 58. Proposed structure for the data collection related to the share of the affected population consulted

	Value	Source of information
Absolute number of people consulted		Demo implementation data.
Total population of the affected neighbourhood		Project documentation data.

People's perception that their voices were heard

The determination of the People's perception that their voices were heard will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_ppv] I feel that the community's voice was heard in the context of the design and implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppv] I feel that my voice was heard in the context of the design and implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Election participation rate

The election participation rate will be calculated by collecting data from: a) national statistics and b) elections commission registries and websites. The data will be collected **pre and post interventions**. Table 50 presents the proposed structure for the data collection related to the election participation rate.

Table 59. Proposed structure for the data collection related to the election participation rate

	Value	Source of information
Voter turnout		

3.3.1.2 Sociability

Description

This indicator measures the frequency, quality, and diversity of interactions within the community, assessing how these interactions contribute to a sense of belonging, mutual support, and community identity. It reflects the community's strength in fostering an inclusive environment where all members feel valued and connected.

The set of specific KPIs can support an assessment of the Demo's effects on sociability through: (i) indicating what actions have been taken to increase local participation and to make the community more inclusive; and (ii) providing an assessment on whether the region has become a more inclusive and interactive place [5].

Unit

Actions taken to increase local participation accounting for vulnerable groups (AP): # of actions.

People's perception of the inclusiveness of the community: Likert scale.

People's participation in local groups/networks (PPGN): Likert scale.

Actions taken to increase local participation accounting for vulnerable groups

The actions taken to increase local participation accounting for vulnerable groups will be calculated by collecting data from demo implementation. The data will be collected **pre and post interventions**. Table 60 presents the proposed structure for the data collection related to the actions taken to increase local participation accounting for vulnerable groups.

Table 60. Proposed structure for the data collection related to the actions taken to increase local participation accounting for vulnerable groups

	Value	Source of information
Absolute number of actions taken to increase local participation accounting for vulnerable groups		Demo implementation data

People's perception of the inclusiveness of the community

The determination of people's perception of the inclusiveness of the community will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_ppi] I feel that this is an inclusive community that promotes interactions between individuals and groups.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppi] I feel that this is a community that aims to ensure access, participation and representation for all individuals and groups.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

People's participation in local groups/networks

The determination of people's participation in local groups/networks will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_ppl] I am familiar with local groups/networks.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppl] I am motivated to participate in local groups/networks.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_3_ppl] I am an active participant of local groups/networks.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

3.3.1.3 Social engagement

Description

It quantifies community engagement by tracking participation in workshops, forums, social media interactions, use of digital tools, and feedback mechanisms, emphasizing both the breadth (how many participate) and depth (how meaningful the participation is) of engagement. The level of successful inclusive digitalisation in neighbourhood transformation processes can be measured through the evaluation of citizens' engagement in digital tools for urban regeneration.

The set of specific variables can support an assessment of the Demo's effects on social engagement through providing an assessment on the level of engagement and participation of the community [5].

Unit

Relative participation rates (RPR): % of invitees that participated in a given activity.

Relative response rates (RRR): % of invitees that responded to surveys.

People's perception of the Demo's activities: Likert scale.

Relative participation rates

The relative participation rates will be calculated by collecting data from demo implementation. The data will be collected **pre and post interventions**. Table 61 presents the proposed structure for the data collection related to the relative participation rates.

Table 61. Proposed structure for the data collection related to the relative participation rates

	Value	Source of information
Absolute number of participants		Demo implementation data
Total number of invitees to Demo activities		Demo implementation data

Relative response rates

The relative response rates will be calculated by collecting data from demo implementation. The data will be collected **pre and post interventions**. Table 62 presents the proposed structure for the data collection related to the relative response rates.

Table 62. Proposed structure for the data collection related to the relative response rates

	Value	Source of information
Absolute number of respondents		Demo implementation data
Total number of invitees to respond to consultation instruments		Demo implementation data

People's perception of the Demo's activities

The determination of people's perception of the Demo's activities will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_ppd] I have participated in the activities (e.g., events, workshops) promoted in the context of the implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppd] I am satisfied with the activities promoted in the context of the implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.

- Neither Agree nor Disagree.
- Agree.
- Strongly Agree.

[WeGenQ_3_ppd] I felt comfortable expressing my opinion and actively participating in the activities promoted in the context of the implementation of the Demo.

- Strongly Disagree.
- Disagree.
- Neither Agree nor Disagree.
- Agree.
- Strongly Agree.

3.3.1.4 Safety and security

Description

The set of specific variables can support an assessment of the Demo's effects on safety and security through combining crime and traffic incident data with community perceptions of safety and security. The units for each variable might change depending on the data sources to be used and how the information is available [5].

Unit

Traffic Incident Rate (TI): # of traffic incidents per thousand population.

Number of fire-related incidents (FI): # of fire-related incidents per thousand population.

Crime rates (CR): # of crimes per thousand population.

People's perception of safety in the community: Likert scale.

People's perception of security in the community: Likert scale.

Traffic incidents rate change

The traffic incidents rate change will be calculated by collecting data from: a) Eurostat and/or b) official local registries (e.g., police, fire brigade, ambulance services). The data will be collected **pre and post interventions**. Table 63 presents the proposed structure for the data collection related to the traffic incidents rate.

Table 63. Proposed structure for the data collection related to the traffic incidents rate

	Value	Source of information
Number of traffic incidents		

Fire-related incidents rate change

The fire-related incidents rate change will be calculated by collecting data from official local registries (e.g., police, fire brigade, ambulance services). The data will be collected **pre and post interventions**. Table 64 presents the proposed structure for the data collection related to the fire-related incidents rate.

Table 64. Proposed structure for the data collection related to the fire-related incidents rate

	Value	Source of information
Number of fire-related incidents		

Crime rate change

The crime rate change will be calculated by collecting data from: a) Eurostat and/or b) official local registries (e.g., police, fire brigade, ambulance services). The data will be collected **pre and post interventions**. Table 65 presents the proposed structure for the data collection related to the crime rate.

Table 65. Proposed structure for the data collection related to the crime rate

	Value	Source of information
Number of crimes		

People's perception of safety in the community

The determination of people's perception of safety in the community will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_pps] I feel the traffic conditions are safe with respect to walking or using a bicycle in my neighbourhood.

- ☐ Strongly Disagree.

- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_pps] I feel well informed on fire prevention measures.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

People's perception of security in the community

The determination of people's perception of safety in the community will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_ppsc] My neighbourhood is free of crime, violence, and vandalism.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppsc] I feel safe walking alone at night in my neighbourhood.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

3.3.1.5 Energy and Environmental Consciousness

Description

Measures the overall engagement and awareness levels regarding energy and resource conservation, and participation in environmental sustainability efforts within the community.

The set of specific variables can support an assessment of the Demo's effects on energy and environmental consciousness. The units for each variable might change depending on the data sources to be used and how the information is available [5].

Unit

People's energy and environmental consciousness: Likert scale.

Recycling rates: % of waste collected that is disposed as recyclable.

Electricity consumption intensity (ECI): kWh / year per person.

Gas consumption intensity (GCI): kWh / year per person.

Water consumption intensity (WCI): l / year per person.

Share of 'green' products sales (GPS): Share of green products sold.

People's energy and environmental consciousness

The determination of people's energy and environmental consciousness will be performed by evaluating the answers of the following questions. The data will be collected **pre and post interventions**.

[WeGenQ_1_pe] I am aware of my own energy consumption pattern and composition.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_pe] I aim to live an environmentally friendly lifestyle.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.

- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_3_pe] I actively optimize my energy consumption and select appliances to reduce my carbon footprint.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Recycling rate change

The recycling rate change will be calculated by collecting data from: a) local waste management companies, b) Eurostat and/or c) official local registries. The data will be collected **pre and post interventions**. Table 66 presents the proposed structure for the data collection related to the recycling rate.

Table 66. Proposed structure for the data collection related to the recycling rate

	Unit [% or #]	Source of information
Recycling rates/volumes		

Electricity consumption intensity change

The electricity consumption intensity change will be calculated by collecting data from: a) local electricity distribution companies, b) Eurostat and/or c) official local registries. The data will be collected **pre and post interventions**. Table 67 presents the proposed structure for the data collection related to the electricity consumption intensity.

Table 67. Proposed structure for the data collection related to the electricity consumption intensity

	Unit [kWh/year]	Source of information
Electricity consumption		

Gas consumption intensity change

The gas consumption intensity change will be calculated by collecting data from: a) local gas distribution companies, b) Eurostat and/or c) local registries. The data will be collected **pre and post interventions**. Table 68 presents the proposed structure for the data collection of the gas consumption intensity.

Table 68. Proposed structure for the data collection related to the gas consumption intensity

	Unit [kWh/year]	Source of information
Gas consumption		

Water consumption intensity change

The water consumption intensity change will be calculated by collecting data from: a) local gas distribution companies, b) Eurostat and/or c) official local registries. The data will be collected **pre and post interventions**. Table 69 presents the proposed structure for the data collection related to the water consumption intensity.

Table 69. Proposed structure for the data collection related to the water consumption intensity

	Unit [l/year]	Source of information
Water consumption		

Share of 'green' products sales (Optional)

The share of 'green' products sales will be calculated by collecting data from local businesses and retailers. The data will be collected **pre and post interventions**. The parameter share of 'green' products sales will be calculated **only post interventions**. The Table 70 presents the proposed structure for the data collection related to the share of 'green' products sales.

Table 70. Proposed structure for the data collection related to the share of 'green' products sales

	Unit [%]	Source of information
Share of green products sold		

3.3.2 Integrated Urban Regeneration

3.3.2.1 Uptake of Digital Applications in Urban Regeneration Processes

Description

This indicator measures the number of digital applications developed to support the urban regeneration planning and the quality of their integration as part of the design and management phases, i.e. the effectiveness with which the digital tools facilitate the decision making processes. Because the process quality in the development phase has a permanent effect derived from the digital application design phase, it requires defining a well-thought-out operation from an early conceptualisation stage. Suitable communication structures between stakeholders and related agreements are the basic components for successful exploitation of digital applications in decision making processes [5].

Unit

Number and quality of digital applications developed to support the urban regeneration processes. post

The data for the number of digital applications will be collected from demo site project documentation. For the determination of the quality of digital applications, the data will be collected using a questionnaire. The questions will be developed during project implementation in cooperation with consortium partners and demo site partners. The Uptake of Digital Applications in Urban Regeneration Processes KPI will be calculated **only post interventions**.

4. CONCLUSIONS

The Deliverable 7.2 “Standardised Data Measurement and Processing Protocol” based on Deliverable 7.1 “WeGenerate Impact Model for Sustainable Inclusive Neighbourhood. The objective of this document was to develop a data measurement protocol in order to define how data should be measured, collected, processed, and used for further calculations in all Demos and Fellow Cities.

This document provides all the necessary information concerning the types and methods for collecting data, the monitoring system (devices, configurations, technical specification of the equipment, frequency of the measurements, etc.) that should be used and the methodology to conduct the social surveys via questionnaires (target population, questionnaire, etc.) within the WeGenerate project.

The demo sites and fellow cities will use D7.2 as a guide on how to collect data for calculating the set of KPIs as presented in D7.1. The evaluation of these indicators will support the urban regeneration process leading to Sustainable Inclusive Neighbourhoods.

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ANNEX I - Questionnaire

Introduction

You are being invited to participate in a research study about social, mobility and urban regeneration aspects. This study is part the project called WeGenerate, which tries to co-create People-Centric Sustainable Neighbourhoods through Urban Regeneration. The WeGenerate project is funded by the European Union under the Horizon Europe funding programme (Grant agreement ID: 101123546). Project website: <https://wegenerate.eu/>.

There are no risks if you decide to participate in this research study. There are no costs to you for participating in the study. The information you provide will be used for **statistical purposes** related to the scopes of the project.

This survey is anonymous. Do not write your name on the questionnaire. In the case of web-based answers, we will not collect your IP address. No one will be able to identify you or your answers, and no one will know whether you participated in the study.

Your participation in this study is voluntary.

If you have any questions about the study, please contact
(Name, mailing address, phone number of the local contact person).

Only people older than 18 should participate.

General information

[WeGenQ_1_gi] How old are you?

- ☐ 18-29
- ☐ 30-49
- ☐ 50-64
- ☐ over 65

[WeGenQ_2_gi] Which is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

[WeGenQ_3_gi] What is your highest level of completed education?

- ☐ No education/elementary school
- ☐ Primary education
- ☐ Upper secondary education
- ☐ University/University college

[WeGenQ_4_gi] What is your professional/employment status?

- ☐ Employee in public sector
- ☐ Employee in private sector
- ☐ Self-employed
- ☐ Unemployed
- ☐ Retired
- ☐ Student
- ☐ Other

[WeGenQ_5_gi] What is your total monthly income?

- ☐ Less than 500 €
- ☐ Between 500 and 1000 €
- ☐ Between 1000 and 1500 €
- ☐ Between 1500 and 2000 €
- ☐ Between 2000 and 2500 €
- ☐ Between 2500 and 3000 €
- ☐ More than 3000 €
- ☐ Don't answer

[WeGenQ_6_gi] What is your nationality?

- ☐ Demo country national
- ☐ Foreign national

Social inclusion and citizen participation

Democratic Process

People's perception that their voices were heard

[WeGenQ_1_ppv] I feel that the community's voice was heard in the context of the design and implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppv] I feel that my voice was heard in the context of the design and implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Sociability

People's perception of the inclusiveness of the community

[WeGenQ_1_ppi] I feel that this is an inclusive community that promotes interactions between individuals and groups.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppi] I feel that this is a community that aims to ensure access, participation and representation for all individuals and groups.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.

- ☐ Agree.
- ☐ Strongly Agree.

People's participation in local groups/networks

[WeGenQ_1_ppl] I am familiar with local groups/networks.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppl] I am motivated to participate in local groups/networks.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_3_ppl] I am an active participant of local groups/networks.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Social engagement

People's perception of the Demo's activities

[WeGenQ_1_ppd] I have participated in the activities (e.g., events, workshops) promoted in the context of the implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppd] I am satisfied with the activities promoted in the context of the implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_3_ppd] I felt comfortable expressing my opinion and actively participating in the activities promoted in the context of the implementation of the Demo.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Safety and security

People's perception of safety in the community

[WeGenQ_1_pps] I feel the traffic conditions are safe with respect to walking or using a bicycle in my neighbourhood.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_pps] I feel well informed on fire prevention measures.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

People's perception of security in the community

[WeGenQ_1_ppsc] My neighbourhood is free of crime, violence, and vandalism.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_ppsc] I feel safe walking alone at night in my neighbourhood.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Energy and Environmental Consciousness

People's energy and environmental consciousness

[WeGenQ_1_pe] I am aware of my own energy consumption pattern and composition.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_2_pe] I aim to live an environmentally friendly lifestyle.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

[WeGenQ_3_pe] I actively optimize my energy consumption and select appliances to reduce my carbon footprint.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Socio-economics

Access to services and Amenities

[WeGenQ_1_as] Think about your access to amenities in your neighbourhood during a regular week (from Monday to Sunday). Do you visit the following places? Please give your answer for each type of amenity.

		Yes	No
[WeGenQ_1_aa] Sports facility	[WeGenQ_1_aaA] Playing fields	☐	☐
	[WeGenQ_1_aaB] Outdoor – indoor gyms	☐	☐
	[WeGenQ_1_aaC] Pools	☐	☐
	[WeGenQ_1_aaD] Jogging tracks	☐	☐
	[WeGenQ_1_aaE] Extreme sports parks	☐	☐
	[WeGenQ_1_aaF] Other [What amenity]	☐	☐
[WeGenQ_2_aa] Waterfront	[WeGenQ_2_ssA] Creeks	☐	☐
	[WeGenQ_2_aaB] Publicly accessible riverbanks	☐	☐
	[WeGenQ_2_aaC] beaches	☐	☐
	[WeGenQ_2_aaD] Lakes	☐	☐
	[WeGenQ_2_aaE] Ponds for recreational purposes	☐	☐
	[WeGenQ_2_aaF] Other [What amenity]	☐	☐
[WeGenQ_3_aa] Spectator entertainment	[WeGenQ_3_aaA] Cinemas	☐	☐
	[WeGenQ_3_aaB] Stadiums	☐	☐
	[WeGenQ_3_aaC] Theatres	☐	☐
	[WeGenQ_3_aaD] Concert halls	☐	☐
	[WeGenQ_3_aaE] Other [What amenity]	☐	☐
[WeGenQ_4_aa] Thematic parks	[WeGenQ_4_aaA] Zoos	☐	☐
	[WeGenQ_4_aaB] Amusement parks	☐	☐
	[WeGenQ_4_aaC] Museums,	☐	☐
	[WeGenQ_4_aaD] Archaeological sites	☐	☐
	[WeGenQ_4_aaE] Galleries	☐	☐
	[WeGenQ_4_aaF] Other [What amenity]	☐	☐
[WeGenQ_5_aa] Hospitality	[WeGenQ_5_aaA] Hotels	☐	☐
	[WeGenQ_5_aaB] Hostels	☐	☐
	[WeGenQ_5_aaC] Camping	☐	☐
	[WeGenQ_5_aaD] Cafés	☐	☐
	[WeGenQ_5_aaE] Restaurants	☐	☐
	[WeGenQ_5_aaF] Bars	☐	☐
	[WeGenQ_5_aaG] Other [What amenity]	☐	☐
	[WeGenQ_6_aaA] Libraries	☐	☐

[WeGenQ_6_aa] Library	[WeGenQ_6_aaB] Archives	o	o
	[WeGenQ_6_aaC] Other [What amenity]	o	o
[WeGenQ_7_aa] Nature	[WeGenQ_7_aaA] Wildlife parks	o	o
	[WeGenQ_7_aaB] Forests	o	o
	[WeGenQ_7_aaC] Other [What amenity]	o	o
[WeGenQ_8_aa] Places of worship	[WeGenQ_8_aaA] Churches	o	o
	[WeGenQ_8_aaB] Mosque	o	o
	[WeGenQ_8_aaC] Juice temples	o	o
	[WeGenQ_8_aaD] Monastery	o	o
	[WeGenQ_8_aaE] Other [What amenity]	o	o

[WeGenQ_2_as] Think about your access to services in your neighbourhood during a regular week (from Monday to Sunday). Do you visit the following places? Please give your answer for each type of services.

		Yes	No
[WeGenQ_1_as] Education	[WeGenQ_1_asA] Kindergarden	o	o
	[WeGenQ_1_asB] Primary School	o	o
	[WeGenQ_1_asC] Secondary school	o	o
	[WeGenQ_1_asD] High school	o	o
	[WeGenQ_1_asE] University	o	o
[WeGenQ_2_as] Stores	[WeGenQ_2_asA] Supermarket	o	o
	[WeGenQ_2_asB] Grocery store	o	o
	[WeGenQ_2_asC] Bakeries	o	o
	[WeGenQ_2_asD] Bucher shops	o	o
	[WeGenQ_2_asE] Malls	o	o
	[WeGenQ_2_asF] Other [What amenity]	o	o
[WeGenQ_3_as] Health	[WeGenQ_3_asA] Hospitals	o	o
	[WeGenQ_3_asB] Health centre	o	o
	[WeGenQ_3_asC] General practitioner	o	o
	[WeGenQ_3_asD] Other [What amenity]	o	o
[WeGenQ_4_as] Financial services	[WeGenQ_4_asA] Bank	o	o
	[WeGenQ_4_asB] ATM	o	o
	[WeGenQ_4_asC] Exchange	o	o
	[WeGenQ_4_asD] Other [What amenity]	o	o
[WeGenQ_5_as] Post services	[WeGenQ_5_asA] Post office	o	o
	[WeGenQ_5_asB] Courier centre	o	o
	[WeGenQ_5_asC] Other [What amenity]	o	o
[WeGenQ_6_as] Transport services	[WeGenQ_6_asA] Local public transport node (bus, tram, underground, etc.)	o	o
	[WeGenQ_6_asB] Transfer station (intercity bus, train, intermodal stations, etc.)	o	o
	[WeGenQ_6_asC] Taxi services	o	o

Affordability of Energy

Related to affordability of energy as indicated by composition of household expenditure.

[WeGenQ_1_ae] Compared to your last residence: Have you spent more on expenses connected to total annual energy consumption?

- ☐ True
- ☐ False

Related to affordability of energy as indicated by arrears in utility bills.

[WeGenQ_2_ae] Has your household been at any time unable to pay utility bills on time due to financial difficulties for the last year?

- ☐ True
- ☐ False

Sustainable mobility

Transport Behaviour

[WeGenQ_1_tb] Think about your mobility during a regular week (from Monday to Sunday). How many trips do you usually make with the following modes of transport in the demo area? Please give your answer in each category.

	Number of trips during a week
[WeGenQ_1_tbA] Private car (driver or passenger)	
[WeGenQ_1_tbB] Public transport (bus)	
[WeGenQ_1_tbC] Public transport (tram, train, underground)	
[WeGenQ_1_tbD] Bicycle	
[WeGenQ_1_tbE] Walking	
[WeGenQ_1_tbF] Shared e-scooter	
[WeGenQ_1_tbG] Other, what mode?	

Multi-modality

[WeGenQ_1_mm] Switching between transport modes* is convenient in the demo area.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

** Transport modes: Private car (driver or passenger), Public transport (bus, tram, train, underground), Bicycle, Walking, Shared e-scooter, Other*

[WeGenQ_2_mm] The transport system and urban facilities cover the destinations I want to travel/move to within the area.

- ☐ Strongly Disagree.
- ☐ Disagree.
- ☐ Neither Agree nor Disagree.
- ☐ Agree.
- ☐ Strongly Agree.

Physical activity

[WeGenQ_1_pa] Think about the last three months. On average, how many minutes per week did you spend walking in the demo area?

- ☐ <20
- ☐ 20-60
- ☐ 61-90
- ☐ 91-120
- ☐ >120

[WeGenQ_2_pa] Think about the last three months. On average, how many minutes per week did you spend cycling in the demo area?

- ☐ <20
- ☐ 20-60
- ☐ 61-90
- ☐ 91-120
- ☐ >120

ANNEX II – Information for calculating Social inclusion and citizen participation KPIs

Annex II prepared by NovaSBE

1. Social inclusion and citizen participation

This document outlines the protocol to collect the data and evaluate the KPIs of the Social inclusion and citizen participation category of the WeGenerate impact model.

1.1 Democratic Process

1.1.1. Share of the affected population consulted

Description. Quantification of the number of people that were consulted about the Demo's implementation as a percentage of the total population that is estimated to be affected by the implementation.

Unit. % of the affected population that was consulted.

Data sources. Data from Demo implementation + data from project documentation.

Calculation.

$$\text{Share of the affected population consulted} = \frac{\text{Absolute number of people consulted}}{\text{Total neighbourhood population}}$$

Parameter	Unit	Description and Source
Share of the affected population consulted	%	Calculated.
Absolute number of people consulted	Numeric value	Demo implementation data. Data on the number of people consulted during the implementation of the Demo.
Total population of the affected neighbourhood	Numeric value	Project documentation data. ¹

1.1.2. People's perception that their voices were heard

Description. Responses to be collected via questionnaire.

- *I feel that the community's voice was heard in the context of the design and implementation of the Demo.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

- *I feel that my voice was heard in the context of the design and implementation of the Demo.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

Unit. Likert-type scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's perception that their voices were heard} = \frac{\sum \text{Individual scores attributed}}{2 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People's perception that their voices were heard	Numeric value between 1 and 5	Calculated.
$\sum$ individual scores attributed	Numeric value	Calculated based on questionnaire. Sum of all responses to these 2 particular statements.
Number of responses	Numeric value	Data on the number of questionnaire responses.

1.1.3. Election participation rate change

Description. Quantification of the share of the local population that participated in elections before and after the implementation of the Demo.

Unit. %

Data sources. External data.

Calculation.

$$\text{Election participation rate change} = \frac{\text{Voter turnout after implementation} - \text{Voter turnout before implementation}}{\text{Voter turnout before implementation}}$$

Parameter	Unit	Description and Source
Election participation rate change	%	Calculated.
Voter turnout	%	Data on voter turnout for the polling stations that are relevant for the Demos' affected population. External data. Potential sources: national statistics and/or elections commission registries and websites.

Additional guidance for calculation:

- Identify the polling station(s) that are most relevant for the Demos' affected population.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on when elections happened in the region and might be different for each Demo.
- Relevant sources are generally: national statistics and/or elections commission registries and websites.
- If possible, data should be collected for the election of local (e.g., council, city, region) parliament representation, instead of presidential and/or EU elections. If there is insufficient data on local elections or if local elections did not happen close to the beginning/conclusion of the project, the use of presidential and/or EU elections is acceptable. However, the comparison should necessarily focus on the same type of election before and after implementation.
- If voter turnout information is available for the relevant polling station(s), this data should be used in the calculations. Alternatively, if voter turnout information is not available per polling station, higher level data (e.g., voter turnout in the region) can be used as a proxy.
- In case there is a single relevant polling station, the calculation should be done for this polling station. However, if more than one polling station is identified as relevant, the calculation should be made for each of them and reported individually.
- If no statistical data is available to support the calculation of the election participation rate, alternative sources (e.g., articles, studies, pieces of news) can be used to estimate the change in election participation rates in the region after the implementation of the Demos, as long as they are properly referenced.

1.2 Sociability

1.2.1 Actions to increase local participation accounting for vulnerable groups

Description. Actions taken throughout the Demo implementation process to increase local participation and make the community more inclusive for vulnerable groups (e.g., events, community spaces, forums, etc.). Potentially, other quantitative (e.g., number of participants to events, square meters of community spaces created, participation statistics, etc.) and qualitative (i.e., description of the actions) information can also be included.

Unit. Number of actions.

Data sources. Data from Demo implementation.

Calculation.

Parameter	Unit	Description and Source
Absolute number of actions taken to increase local participation accounting for vulnerable groups	Numeric value	Demo implementation data. Data on the number of actions (e.g., number of events, number of community spaces, number of forums, etc.) taken to increase local participation of groups who are vulnerable to e.g., gentrification effects and/or who have special needs including elderly people, those with reduced mobility, persons with disabilities, low-income households, single parent families and youth.

Additional guidance for calculation:

- As part of the implementation of the Demos, actions to increase local participation and make the community more inclusive should be taken.
- For each Demo, the specific vulnerable groups that will be targeted through these actions should be defined (e.g., youth, woman, elderly, etc.).
- The number of actions taken to increase local participation accounting for woman should be specified as part of this variable for all Demos.
- Data on the number of such actions should be collected during the implementation of the Demo. For example, if 1 forum was created, 1 community space was regenerated and 2 events were delivered, the number of actions would be 4.
- Additionally, qualitative and descriptive information about these actions should be collected and presented together with the number of actions.
- Finally, depending on the type of actions, additional quantitative data should also be collected, where possible, and presented together with the number of actions. For example: number of forum participants, area of community space regenerated, and number of event participants.

1.2.2 People's perception of the inclusiveness of the community

Description. Responses to be collected via questionnaire.

- *I feel that this is an inclusive community that promotes interactions between individuals and groups.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*

- Agree.
- Strongly Agree.
- *I feel that this is a community that aims to ensure access, participation and representation for all individuals and groups.*
 - Strongly Disagree.
 - Disagree.
 - Neither Agree nor Disagree.
 - Agree.
 - Strongly Agree.

Unit. Likert-type-scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's perception of the inclusiveness of the community} = \frac{\sum \text{Individual scores attributed}}{2 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People's perception of the inclusiveness of the community	Numeric value between 1 and 5	Calculated.
$\sum$ individual scores attributed	Numeric value	Calculated based on questionnaire responses. Sum of all responses to these 2 particular statements.
Number of responses	Numeric value	Data on the number of questionnaire responses.

1.2.3 People's participation in local groups/networks

Description. Responses to be collected via questionnaire.

- *I am familiar with local groups/networks.*
 - Strongly Disagree.
 - Disagree.
 - Neither Agree nor Disagree.
 - Agree.
 - Strongly Agree.
- *I am motivated to participate in local groups/networks.*
 - Strongly Disagree.
 - Disagree.
 - Neither Agree nor Disagree.
 - Agree.
 - Strongly Agree.

- *I am an active participant of local groups/networks.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

Unit. Likert-type-scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's participation in local groups or networks} = \frac{\sum \text{Individual scores attributed}}{3 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People's participation in local groups/networks	Numeric value between 1 and 5	Calculated.
$\sum$ individual scores attributed	Numeric value	Calculated based on questionnaire. Sum of all responses to these 3 particular statements.
Number of responses	Numeric value	Demo implementation data. Data on the number of questionnaire responses.

1.3 Social Engagement

1.3.1 Relative participation rates

Description. Number of people that participated in Demo activities (e.g., workshops, forums, events, digital tools) as a proportion of the number of people that were invited to participate.

Unit. % of invitees that participated in a given activity

Data sources. Data from Demo implementation.

Calculation.

$$\text{Relative participation rates} = \frac{\text{Absolute number of participants}}{\text{Total number of invitees}}$$

Parameter	Unit	Description and Source
Relative participation rates	%	Calculated.
Absolute number of participants	Numeric value	Demo implementation data. Data on the number of participants in a given activity of the Demo (e.g., workshops, forums, events, digital tools).
Total number of invitees to Demo activities	Numeric value	Demo implementation data. Data on the number of people invited to a given activity of the Demo.

Additional guidance for calculation:

- If the invitation was directly sent to the people to participate in the Demo activity, the total number of invitations should be considered as the number of invitees.
- In case the invitation was public (e.g., banner, radio, social media, etc.), the number of invitees should, when possible, be estimated based on traffic/outreach data for the specific media used to circulate the invite. For example, number of views of a social media post, number of listeners of a specific radio program, etc.
- Alternatively, if none of the options above are viable, the total population of the affected neighbourhood could be considered as the number of invitees. In case the invites were directed to a specific group of people (e.g., single parents, elderly people, etc.), an estimated number that represents this group in the affected neighbourhood population should be considered as the total number of invitees (e.g., estimated number of single parents in the neighbourhood, estimated number of elderly people in the neighbourhood, etc.).
- The relative participation rates should be calculated and reported individually for each relevant Demo activity.

1.3.2 Relative response rates

Description. Number of people that responded to Demo questionnaires as a proportion of the number of people that were invited to respond.

Unit. % of invitees that responded to the questionnaire.

Data sources. Data from the Demo implementation.

Calculation.

$$\text{Relative response rates} = \frac{\text{Absolute number of respondents}}{\text{Total number of invitees}}$$

Parameter	Unit	Description and Source
Relative response rates	%	Calculated.
Absolute number of respondents	Numeric value	Demo implementation data. Data on the number of the consultation instruments respondents.
Total number of invitees to respond to consultation instruments	Numeric value	Demo implementation data. Data on the number of people invited to respond to the Demo consultation instruments.

Additional guidance for calculation:

- Invitations should be directly sent to the people to respond to the consultation instrument, digitally or in person. The total number of individuals invited to respond should be considered as the number of invitees.
- The relative response rates should be calculated and reported individually for each relevant Demo consultation instrument.

1.3.3 People's perception of the Demo's activities

Description. Responses to be collected via questionnaire.

- *I have participated in the activities (e.g., events, workshops) promoted in the context of the implementation of the Demo.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*
- *I am satisfied with the activities promoted in the context of the implementation of the Demo.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*
- *I felt comfortable expressing my opinion and actively participating in the activities promoted in the context of the implementation of the Demo*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

Unit. Likert-type-scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's perception of the Demo's activities} = \frac{\sum \text{Individual scores attributed}}{3 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People's perception of the Demo's activities	Numeric value between 1 and 5	Calculated.
$\sum$ Individual scores attributed	Numeric value	Calculated based on questionnaire. Sum of all responses to these 2 particular statements.
Number of responses	Numeric value	Demo implementation data. Data on the number of questionnaire responses.

1.4 Demographic composition

Description. The demographic composition of a region is the proportion or number of people in the area who can be identified according to a certain characteristic such as gender, age, social mix, etc., and relates to their needs, as well as the potential for increases in social capital.

Unit. For each category within the specific variables of this KPI, the information for should, if possible, be presented in absolute terms (i.e., the number of inhabitants within a group) before and after the implementation. Alternatively, percentages are also acceptable (i.e., the share of inhabitants within a group). The variation should be presented as a percentage.

Calculation. For each category under the 8 specific variables covered in this KPI, the variation should be calculated as follows:

$$\text{Variation} = \frac{\text{Number/Share of individuals within a category after the implementation} - \text{Number/Share of individuals within a category before the implementation}}{\text{Number/Share of individuals within a category before the implementation}}$$

Additional guidance for calculation:

- Table 5 presents suggested categories for each specific variable. These suggestions are broadly aligned with data from Eurostat but they can be changed and tailored to the data that is available.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation.

- If possible, data should be collected before and after the implementation to fill in the table 'before' and 'after' fields and to allow for the calculation of the 'variation'. In case it is not possible to collect data before and after the implementation to estimate rate changes, this should also be justified and, as possible, at least one set of information (i.e., either before or after the implementation) should be presented.
- Potential external data sources can include: official municipality / province / region databases, Eurostat, local offices, academic research at the local level, NGOs, etc.
- It might be challenging to obtain data at the level of the Demo's affected region. If different boundaries are used, this should be clearly indicated and justified.

Table 5. Demographic composition variables

	BEFORE	AFTER	VARIATION
Age group			
Less than 15 years			
From 15 to 29 years			
From 30 to 49 years			
From 50 to 64 years			
From 65 to 84 years			
85 years or over			
Gender			
Female			
Male			
Income category			
Less than minimum wage			
Between 1 and 2 times the minimum wage			
Between 2 and 3 times the minimum wage			
Between 3 and 4 times the minimum wage			
More than 4 times the minimum wage			
Education level			
Pre-primary, primary and lower secondary education (levels 0-2)			
Upper secondary and post-secondary non-tertiary education (levels 3 and 4)			
First and second stage of tertiary education (levels 5 and 6)			
Nationality			
Demo country national			
Foreign national			
Employment status			
Employed			
Unemployed			
Other			
State benefit status			
State benefit recipient			
Not state benefit recipient			

1.5 Safety and Security

1.5.1 Traffic incidents rate change

Description. Statistics on traffic accidents in the region to be calculated using data available for example through Eurostat or local registries (e.g., police, fire brigade, ambulance services).

Unit. %

Data sources. External data.

Calculation.

$$\text{Traffic incidents rate change} = \frac{\text{Number of traffic incidents after the implementation} - \text{Number of traffic incidents before the implementation}}{\text{Number of traffic incidents before implementation}}$$

Parameter	Unit	Description and Source
Traffic incidents rate change	%	Calculated.
Number of traffic incidents	Numeric value	Data on the number of traffic incidents in the region. External data. Potential sources: Eurostat or official local registries (e.g., police, fire brigade, ambulance services) ¹

Additional guidance for calculation:

- Identify the most reliable data source related to traffic incidents for each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- If data is not available online or in open sources, it is possible to engage directly with local offices (e.g., via email, phone, in person) to request for information.
- If no statistical data is available to support the calculation of the number of traffic incidents, alternative sources (e.g. articles, studies, pieces of news) can be used to estimate the change in the rate of traffic incidents in the region after the implementation of the Demos, as long as they are properly referenced.

1.5.2 Fire-related incidents rate change

Description. Statistics on fire-related incidents in the region to be calculated using data available for example through Eurostat or local registries (e.g., police, fire brigade, ambulance services).

Unit. %

Data sources. External data.

Calculation.

Fire related incidents rate change

$$= \frac{\text{Number of fire related incidents after the implementation} - \text{Number of fire related incidents before the implementation}}{\text{Number of fire related incidents before the implementation}}$$

Parameter	Unit	Description and Source
Fire-related incidents rate change	%	Calculated.
Number of fire-related incidents	Numeric value	Data on the number of fire-related incidents in the region. External data. Potential sources: official local registries (e.g., police, fire brigade, ambulance services). ¹

Additional guidance for calculation:

- Identify the most reliable data source related to fire-related incidents for each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- If data is not available online or in open sources, it is possible to engage directly with local offices (e.g., via email, phone, in person) to request for information.
- If no statistical data is available to support the calculation of the number of fire-related incidents, alternative sources (e.g. articles, studies, pieces of news) can be used to estimate the change in the rate of fire-related incidents in the region after the implementation of the Demos, as long as they are properly referenced.
- Additionally, qualitative information about the fire-related incidents in the region, such as the cause (e.g., misuse or poor installation of electrical system and equipment, candles, human error, etc.) and type (e.g., primary, secondary, etc.) of fire, can be included, if available.

1.5.3 Crime rate change

Description. Statistics on crimes in the region to be calculated using data available for example through Eurostat or local registries (e.g., police).

Unit. %

Data sources. External data.

Calculation.

$$\text{Crime rates} = \frac{\text{Number of crimes after the implementation} - \text{Number of crimes before the implementation}}{\text{Number of crimes before the implementation}}$$

Parameter	Unit	Description and Source
Crime rates	%	Calculated.
Number of crimes	Numeric value	Data on the number of crimes registered in the region. Data on any type of crime must be considered. ¹ External data. Potential sources: Eurostat or official local registries (e.g., police, fire brigade, ambulance services)

Additional guidance for calculation:

- Identify the most reliable data source related to crime rates for each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024 and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- If data is not available online or in open sources, it is possible to engage directly with local offices (e.g., via email, phone, in person) to request information.
- If no statistical data is available to support the calculation of the number of crimes, alternative sources (e.g. articles, studies, pieces of news) can be used to estimate the change in the crime rate in the region after the implementation of the Demos, as long as they are properly referenced.
- Statistical data on any type of crime should be considered. Additionally, qualitative and/or quantitative information about the types of crime committed in the region (e.g., robbery, theft, drug-related offenses, homicide, etc.) can be included and presented with the rate change, if available.
- All the offences in a crime event should be counted.

- Multiple offences of the same type should be counted as more than one.
- Offences committed by more than one person should be counted as one offence.

1.5.4 People's perception of safety in the community

Description. Responses to be collected via questionnaire.

- *I feel the traffic conditions are safe with respect to walking or using a bicycle in my neighbourhood.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*
- *I feel well informed on fire prevention measures.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

Unit. Likert-type-scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's perception of safety in the community} = \frac{\sum \text{Individual scores attributed}}{2 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People's perception of safety in the community	Numeric value between 1 and 5	Calculated.
$\sum$ individual scores attributed	Numeric value	Calculated based on questionnaire. Sum of all responses to these 2 particular statements.
Number of responses	Numeric value	Demo implementation data. Data on the number of questionnaire responses.

1.5.6 People's perception of security in the community

Description. Responses to be collected via questionnaire.

- *My neighbourhood is free of crime, violence, and vandalism.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*
- *I feel safe walking alone at night in my neighbourhood.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

Unit. Likert-type-scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's perception of security in the community} = \frac{\sum \text{Individual scores attributed}}{2 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People's perception of security in the community	Numeric value between 1 and 5	Calculated.
$\sum$ individual scores attributed	Numeric value	Calculated based on questionnaire. Sum of all responses to these 2 particular statements.
Number of responses	Numeric value	Demo implementation data. Data on the number of questionnaire responses.

1.6 Energy and Environmental Consciousness

1.6.1 People's energy and environmental consciousness

Description. Responses to be collected via questionnaire.

- *Shared energy management improves energy efficiency.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*

- *Strongly Agree.*
- *I am aware of my own energy consumption pattern and composition.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*
- *I aim to live an environmentally friendly lifestyle.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*
- *I actively optimize my energy consumption and select appliances to reduce my carbon footprint.*
 - *Strongly Disagree.*
 - *Disagree.*
 - *Neither Agree nor Disagree.*
 - *Agree.*
 - *Strongly Agree.*

Unit. Likert-type-scale of 1-5.

Data sources. Questionnaire responses.

Calculation.

$$\text{People's energy and environmental consciousness} = \frac{\sum \text{Individual scores attributed}}{4 \times \text{Number of responses}}$$

Parameter	Unit	Description and Source
People' s energy and environmental consciousness	Numeric value between 1 and 5	Calculated.
$\sum$ individual scores attributed	Numeric value	Calculated based on questionnaire. Sum of all responses to these 4 particular statements.
Number of responses	Numeric value	Demo implementation data. Data on the number of questionnaire responses.

1.6.2 Recycling rate change

Description. Statistics on local households' recycling rates to be calculated using data available for example through Eurostat or local registries (e.g., local waste management company).

Unit. %

Data sources. External data.

Calculation.

$$\text{Recycling rate change} = \frac{\text{Recycling rates/volumes after the implementation} - \text{Recycling rates/volumes before the implementation}}{\text{Recycling rates/volumes before the implementation}}$$

Parameter	Unit	Description and Source
Recycling rate change	%	Calculated
Recycling rates/volumes	% or Numeric value	Data on recycling rates (percentage of waste that is recycled) or the recycling volume (volume of waste that is recycled). External data. Potential sources: Local waste management companies, Eurostat or local registries.

Additional guidance for calculation:

- Identify the most reliable data source related to local households' recycling rates or volumes in each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- The same unit of measurement should be used for all the parameters. In case the recycling volume is used in the calculations, it is recommended to use tonne as the unit of measurement.
- If data is not available online or in open sources, it is possible to engage directly with local offices and waste management companies (e.g., via email, phone, in person) to request for information.
- If no statistical data is available to support the calculation of the recycling rate changes, alternative sources (e.g. articles, studies, pieces of news) can be used to

estimate the change in the recycling rate in the region after the implementation of the Demos, as long as they are properly referenced.

1.6.3 Electricity consumption intensity change

Description. Statistics on electricity consumption per household or per capita to be calculated using data available for example through Eurostat or local registries (e.g., local electricity company).

Unit. %

Data sources. External data.

Calculation.

Electricity consumption intensity change

$$= \frac{\text{Electricity consumption intensity after the implementation} - \text{Electricity consumption intensity before the implementation}}{\text{Electricity consumption intensity before the implementation}}$$

Parameter	Unit	Description and Source
Electricity consumption intensity change	%	Calculated
Electricity consumption intensity	kWh/year	Data on the kWh electricity consumption in the neighbourhood. External data. Potential sources: Local electricity distribution companies, Eurostat or official local registries.

Additional guidance for calculation:

- Identify the most reliable data source related to local electricity consumption in each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- The same unit of measurement should be used for all the parameters. For the electricity consumption intensity this should be kWh/year or similar (e.g., MWh/year, kWh/month, kWh/day).

- The electricity consumption intensity data can be presented per person, per household, or aggregated for the relevant region depending on how the data is available. This should be clearly identified.
- If data is not available online or in open sources, it is possible to engage directly with local offices and electricity distribution companies (e.g., via email, phone, in person) to request for information.
- If no statistical data is available to support the calculation of the electricity consumption rate change, alternative sources (e.g. articles, studies, pieces of news) can be used to estimate the change in the electricity consumption rate in the region after the implementation of the Demos, as long as they are properly referenced.

1.6.4 Gas consumption intensity change

Description. Statistics on gas consumption per household or per capita to be calculated using data available for example through Eurostat or local registries (e.g., local gas company).

Unit. %

Data sources. External data.

Calculation.

$$\text{Gas consumption intensity change} = \frac{\text{Gas consumption intensity after the implementation} - \text{Gas consumption intensity before the implementation}}{\text{Gas consumption intensity before the implementation}}$$

Parameter	Unit	Description and Source
Gas consumption intensity change	%	Calculated
Gas consumption	kWh/year	Data on the kWh gas consumption intensity in the neighbourhood. External data. Potential sources: Local gas distribution companies, Eurostat or official local registries.

Additional guidance for calculation:

- Identify the most reliable data source related to gas consumption (per household or per capita) for each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or

2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.

- The same unit of measurement should be used for all the parameters. For the gas consumption intensity this could be kWh/year or similar (e.g., MWh/year, kWh/month, kWh/day, GJ/year, m³/year).
- The gas consumption intensity data can be presented per person, per household, or aggregated for the relevant region depending on how the data is available. This should be clearly identified.
- If data is not available online or in open sources, it is possible to engage directly with local offices and gas distribution companies (e.g., via email, phone, in person) to request information.
- If no statistical data is available to support the calculation of the gas consumption rate changes, alternative sources (e.g. articles, studies, pieces of news) can be used to estimate the change in the gas consumption rate in the region after the implementation of the Demos, as long as they are properly referenced.

1.6.5 Water consumption intensity change

Description. Statistics on water consumption per household or per capita to be calculated using data available for example through Eurostat or local registries (e.g., local water company).

Unit. %

Data sources. External data.

Calculation.

$$\text{Water consumption intensity change} = \frac{\text{Water consumption intensity after the implementation} - \text{Water consumption intensity before the implementation}}{\text{Water consumption intensity before the implementation}}$$

Parameter	Unit	Description and Source
Water consumption intensity change	%	Calculated
Water consumption intensity	l/year	Data on the volume of water consumption in the neighbourhood. External data. Potential sources: Local water distribution companies, Eurostat or official local registries.

Additional guidance for calculation:

- Identify the most reliable data source related to local water consumption (per household or per capita) in each Demo. Local registries or primary sources are preferable to non-official and secondary sources.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- The same unit of measurement should be used for all the parameters. For the water consumption intensity this could be L/year or similar (e.g., L/month, L/day, m³/year).
- The water consumption intensity data can be presented per person, per household, or aggregated for the relevant region depending on how the data is available. This should be clearly identified.
- If data is not available online or in open sources, it is possible to engage directly with local offices (e.g., via email, phone, in person) to request information.
- If no statistical data is available to support the calculation of the water consumption rate changes, alternative sources (e.g. articles, studies, pieces of news) can be used to estimate the change in the water consumption rate in the region after the implementation of the Demos, as long as they are properly referenced.

1.6.6 Share of 'green' products sales (OPTIONAL)

Description. Statistics on the sales of 'green' products in the affected region.

Unit. %

Data sources. External data.

Calculation.

Change in the share of green products sold

$$= \frac{\text{Share of green products sold after the implementation} - \text{Share of green products sold before the implementation}}{\text{Share of green products sold before the implementation}}$$

Parameter	Unit	Description and Source
Change in the share of green products sold	%	Calculated.
Share of green products sold	%	$\text{Share of green products sold} = \frac{\text{number of green products sold in the region}}{\text{number of total 'similar' products sold in the region}}$ External data. Potential sources: local businesses and retailers.

Additional guidance for calculation:

- For each Demo, depending on the local businesses and context, and the availability of data, a set of 'green' products should be selected. These could be, for example: electric vehicles, green electricity tariffs, lower emission fuels, etc.
- For each 'green' product, a set of 'similar' or a broader category of products should be defined. For example: any vehicle, any type of electricity tariff, all fuels, etc.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation, but will depend on data availability and might be different for each Demo.
- Data on the sales of the 'green' products and the 'similar'/broader category products should be collected. Potential data sources can be local businesses and retailers (e.g., gas stations, electricity distribution company) but will depend on the products selected. Alternative sources of data can be used when properly referenced.
- The share of green products sold should be calculated considering the proportion of 'green' sales of the broader category products.

1.7 Cultural Sustainability (Optional)

1.7.1 Cultural events

Description. Quantification of cultural events held in the region.

Unit. %

Data sources. External data.

Calculation.

$$\text{Cultural events change} = \frac{\text{Number of cultural events held in a year after implementation} - \text{Number of cultural events held in a year before implementation}}{\text{Number of cultural events held in a year before implementation}}$$

Parameter	Unit	Description and Source
Cultural events change	%	Calculated.
Number of cultural events held in a year	Numeric value	Data on the number of cultural events held in a year in the region. External data. Potential sources: event organisation teams, administration of local establishments, etc.

Additional guidance for calculation:

- The boundaries to be considered should be defined for each Demo and correspond to the region affected by the Demo.
- Determine the years that will be used in the calculation. These should be just before the beginning (e.g., 2022, 2023 or 2024) and around the conclusion (e.g., 2026 or 2027) of the Demo implementation.
- Relevant sources of information could be: the event organisation teams, the administration of local groups/networks, the administration of local establishments where events take place, news, and social media.
- If available, external data on the number of events held can be used directly. Alternatively, a research across multiple relevant sources can be performed to estimate the number of events held.

1.7.2 Events participation

Description. Quantification of the number of participants of cultural event held in the region.

Unit. %

Data sources. External data.

Calculation.

$$\begin{aligned} &\text{Events participation change} \\ &= \frac{\text{Number of participants of cultural events held in a year after implementation} - \text{Number of participants of cultural events held in a year before implementation}}{\text{Number of participants of cultural events held in a year before implementation}} \end{aligned}$$

Parameter	Unit	Description and Source
Events participation change	%	Calculated.
Number of participants of cultural events held in a year	Numeric value	Data on the number of participants of cultural events held in a year in the region. External data. Potential sources: event organisation teams, administration of local establishments, etc.

Additional guidance for calculation:

- For each event held and accounted for in 1.7.1, the number of participants should be quantified and added up to calculate the 'number of participants of cultural events held in a year' parameter.
- Relevant sources of information could be: the event organisation teams, the administration of local groups/networks, and the administration of local establishments where events take place.

1.7.3 Diversity and inclusion in events

Description. Data on the number of participants from vulnerable/minority groups in the events and general qualitative information about diversity and inclusion in the events.

Unit. % or qualitative information

Data sources. External data.

Calculation.

Diversity and inclusion in events

$$= \frac{\text{Number of event participants from vulnerable or minority groups}}{\text{Number of participants of cultural events}}$$

Parameter	Unit	Description and Source
Diversity and inclusion in events	%	Calculated.
Number of event participants from vulnerable or minority groups	Numeric value	Data on the number of participants of cultural events from vulnerable or minority groups. External data. Potential sources: event organisation teams, administration of local establishments, etc.
Number of participants of cultural events held in a year	Numeric value	Data on the number of participants of cultural events held. External data. Potential sources: event organisation teams, administration of local establishments, etc.

Additional guidance for calculation:

- If available, data should be collected on vulnerable/minority participants for each event held and accounted for in 1.7.1. The specific vulnerable/minority groups considered should be harmonised with the groups considered in 1.2.1.
- Women should be one of the groups considered and if data is available, the number (or percentage) of female participants in the events should be reported.
- The formula and parameters provide a suggestion for calculating diversity and inclusion in the events. However, if information is not available at this level of detail or if this formula is not applicable for the data available, alternative calculation methods can be used or qualitative information about diversity and inclusion in the events can be presented to gauge diversity and inclusion in events.
- Relevant sources of information could be: the event organisation teams, the administration of local groups/networks, and the administration of local establishments where events take place.

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Partners Logos

