TOWARDS SMART ZERO CO_2 CITIES ACROSS EUROPE

VITORIA-GASTEIZ ✣ TARTU ✣ SØNDERBORG

Deliverable 7.4: City impact evaluation procedure

WP7, Task 7.1

28/01/2017

M12

Deliverable Version:	D7.4, V1.0
Dissemination Level:	PU[1]
Author(s):	Ana Quijano (CAR), Julia Vicente (CAR), Ignacio Gomis Paya (TEC), Koldo Urrutia Azcona (TEC), Patxi Hernández (VIS), Aitor Albaina (CEA), Jaanus Tamm (TAR), Martin Kikas (TREA), Pilleriine Kamenjuk (UTAR), Simon Stendorf Sørensen (PLAN), Nicolas Bernhard (ZERO)

[1] PU = Public

This project has received funding from the European Union' s Horizon 2020 research and innovation programme under grant agreement No 691883

Document History

Project Acronym	SmartEnCity
Project Title	Towards Smart Zero CO2 Cities across Europe
Project Coordinator	Francisco Rodriguez Tecnalia francisco.rodriguez@tecnalia.com
Project Duration	1st February 2016 - 31st July 2021 (66 months)

Deliverable No.	D7.4 City impact evaluation procedure	
Diss. Level	Public	
Deliverable Lead	*CAR*	
Status		Working
	X	Verified by other WPs
		Final version
Due date of deliverable	31/01/2017	
Actual submission date		
Work Package	WP 7 - Monitoring and Evaluation	
WP Lead	*CAR*	
Contributing beneficiary(ies)	*CAR, TEC, VIS, CEA, TREA, TAR, UTAR, PLAN, ZERO*	

Date	Version	Person/Partner	Comments
05/12//2016	0.1	Ana Quijano (CAR)	First draft for comments
03/01/2017	0.2	Ana Quijano (CAR)	First merge of partner contributions
17/01/2017	0.3	Julia Vicente (CAR)	Version for 1st revision with sections 1 to 5 consolidated. Section 6 improved from previous version.
17/01/2017	0.4	Julia Vicente (CAR)	Version including improvements on sections 1 to 5 due to 1st revision (TEC, UTAR) outputs. Section 6 ready for revision.
28/01/2017	1.0	Julia Vicente (CAR)	Consolidated final version including improvements on whole document due to 2nd revision (TEC) comments, and cross check with latest version of D7.3. Document ready for final revision from coordinator.

Copyright notice

Table of content:

Table of Tables:

Table of Figures:

Abbreviations and Acronyms

Abbreviation/Acronym	Description
CITYKEYS	Smart City performance measurement system (project funded by the European Union HORIZON 2020 programme)
CONCERTO	European Commission initiative within the European Research Framework Programme (FP6 and FP7) supervised by the DG Energy of the European Commission
EC	European Commission
ECM	Energy conservation measures
EV	Electric Vehicle
ICT	Information and communication technologies
ISO	International Organization for Standardization
ITU	International Telecommunication Union
KPI	Key performance indicators.
LH	Lighthouse
PLEEC	Planning for Energy Efficient Cities (project funded by the European Union Seventh Framework Programme – FP7)
PO	Project Officer
RES	Renewable Energy Source
SCIS	EU Smart Cities Information System project. Continuation of the CONCERTO series of projects
SmartEnCity	Towards Smart Zero CO2 Cities across Europe
STEEP	Systems Thinking for Efficient Energy Planning system (project funded by the European Union Seventh Framework Programme – FP7)

Table 1: Abbreviations and Acronyms

0 Publishable Summary

As the name of this document indicates, the objective of this deliverable is to define a procedure which integrates all the evaluation protocols in order to estimate the overall impact and performance of the actions at city level by means of high level indicators that allow explaining the impact of the integrated actions in the common area of the energy, transport and ICT sectors. This procedure will be then used on the assessment phase and the results will be integrated under deliverable D7.13 “Evaluation: Assessment of the overall performance” in which the joint effect and synergies of all the interventions (i.e. building retrofitting, integrated infrastructures, smart mobility and citizen engagement actions) will be considered for the assessment of the impacts produced due to the implementation of SmartEnCity project at city level.

In addition, this procedure can be considered in the regeneration strategy to be defined in the project and that will be collected on deliverables D.2.7 and D2.8, as well as being part of the knowledge from WP7 to be transferred to the follower cities in WP9.

The indicators will be mainly defined based on the indicators and KPIs previously identified within the tasks and deliverables of city diagnosis and evaluation of the performance of the interventions, respectively, (for more details see reference documents D2.4[2], D3.1[3], D4.1[4], D5.1[5], and D7.3[6]).

This deliverable describes first the evaluation plan defined which has been constructed on indicators as tool for evaluating the city diagnosis, the performance of the interventions and the overall impacts produced at city level. Then they are depicted the set of impacts that could be generated in the cities after the execution of the types of interventions carried out in SmartEnCity project, that have been selected for further analysis. Four blocks of indicators for city impact have been considered: environmental, economic, employment and city plans impacts.

The core of this document is made up of the general procedure proposed for the evaluation of the city impacts in the LH cities as well as the specific procedure that will be implemented in each city for the quantification of the impacts attributed to SmartEnCity.

[2] D2.4: City needs and baseline definition process and methods
[3] D3.1: Vitoria-Gasteiz Diagnosis and Baseline
[4] D4.1: Tartu diagnosis and baseline report
[5] D5.1: Sonderborg Diagnosis and Baseline
[6] D7.3: Evaluation protocols

1 Introduction

1.1 Purpose and target group

The aim of this deliverable is the definition of a procedure which integrates all the evaluation protocols in order to estimate the overall impact and performance of the actions at city level by means of high level indicators that allow explaining the impact of the integrated actions in the common area of the energy, transport and ICT sectors. Such indicators will be mainly defined from the indicators and KPIs previously identified for making city diagnosis and evaluating the performance of the interventions, respectively (for more details see D2.4, D3.1, D4.1, D5.1, and D7.3).

The procedure established in this deliverable will be taken into account in the D7.13 “Evaluation: Assessment of the overall performance” in which the joint effect and synergies of all the interventions (i.e. building retrofitting, integrated infrastructures, smart mobility and citizen engagement actions) will be considered for the assessment of the impacts produced due to the implementation of SmartEnCity project at city level. In addition, this procedure can be considered in the regeneration strategy to be defined in the project (D.2.7 and D2.8) as well as part of the knowledge from WP7 to be transferred to the follower cities in WP8 (D8.7). In a wider sense and going beyond the scope of the project, another target group could be those cities out of SmartEnCity project willing to monitor their interventions towards carbon neutrality.

1.2 Contributions of partners

The following Table 2 depicts the main contributions from participant partners in the development of this deliverable.

Participant short name	Contributions
CAR	General structure and coordination of the deliverable. Main responsible of sections 3, 4, 5 and 6. Final revision of the document.
TEC	Contributions for the procedure to be established in Vitoria (Section 6.1). 1st & 2nd Revision of the document.
CEA	Contributions for the procedure to be established in Vitoria (Section 6.1)
VIS	Contributions for the procedure to be established in Vitoria (Section 6.1)
TAR	Contributions for the procedure to be established in Tartu (Section 6.2)
TREA	Contributions for the procedure to be established in Tartu (Section 6.2)
UTAR	1st Revision of the document.

PLAN	Contributions for the procedure to be established in Sonderborg (Section 6.3)
ZERO	Contributions for the procedure to be established in Sonderborg (Section 6.3)

Table 2: Contribution of partners

1.3 Relation to other activities in the project

The following Table 3 depicts the main relationship of this deliverable to other activities (or deliverables) developed within the SmartEnCity project and that should be considered along with this document for further understanding of its contents.

Deliverable Number	Contributions
D2.4 (M6)	The indicators selected from the cities to make the diagnosis of the cities from the set provided in D7.3 can be found in this deliverable
D3.1 (M9)	The indicators used for the diagnosis of Vitoria-Gasteiz have been considered in the establishment of the procedure for evaluating the city impacts due to interventions executed in the framework of SmartEnCity Project
D4.1 (M9)	The indicators used for the diagnosis of Tartu have been considered in the establishment of the procedure for evaluating the city impacts due to interventions executed in the framework of SmartEnCity Project
D5.1 (M9)	The indicators used for the diagnosis of Sonderborg have been considered in the establishment of the procedure for evaluating the city impacts due to interventions executed in the framework of SmartEnCity Project
D7.3 (M12)	This deliverable defined the KPIs to be used in the evaluation of the performance of the interventions carried out in the three LH cities
D7.9 (M18)	Data collection approach will identify the procedure to collect the information for evaluating the impacts in each city
D7.13 (M66)	City impacts will be evaluated following the procedure described in this deliverable
D2.7 (M18), D2.8 (M45)	The integrated methodology developed in these deliverables D2.7 and D.2.8 could take into account this procedure of evaluation of impacts at city level
D8.7 (M66)	The evaluation methodology could be transferred to the follower cities and through Smart Cities Network as knowledge acquired in WP7

Table 3: Relation to other activities in the project

2 Objectives and expected Impact

2.1 Objective

SmartEnCity aims to contribute to create Smart Zero CO_2 Cities across Europe through urban regeneration strategies, integrated urban plans and district integrated interventions.

WP7 will help to support cities for reaching this objective by providing a holistic methodology for assessing the performance achieved in the sustainable interventions and quantifying the impact generated in the cities as a result of their implementation. The task T7.1, where this report takes part, is specifically focused in the creation of an evaluation plan constructed on indicators collection process. This Deliverable D7.4 “City impact evaluation procedure” is contributing with the establishment of a comprehensive evaluation procedure for the integration of all the evaluation protocols and estimation of the overall impact and performance of the actions at city level.

2.2 Expected Impact

The set of indicators identified can be used for the evaluation of the effects of SmartEnCity in each of the LH cities with the purpose to promote and extend the execution of this type of actions carried out in the project among the stakeholders, making decisions agents and citizens. In addition, these indicators can be used as tool for the quantification of environmental, economic, employment and city plans impacts in those cities which intend to deploy retrofitting actions in buildings with energy conservation measures (ECM) and sustainable mobility actions.

3 Overall Approach

The content of this deliverable is structured as follows:

- Introduction, objectives and expected impacts: Previous sections introduce the purpose of the report, the relation with other tasks of the project and contributions from different partners.
- Section 4: This section describes the evaluation plan defined in WP7 which has been constructed on indicators as tool for evaluating the city diagnosis, the performance of the interventions and the overall impacts produced at city level.
- Section 5: This chapter covers the set of impacts that could be generated in the cities after the execution of the types of interventions carried out in SmartEnCity project.
- Section 6: This section includes the procedure proposed for the evaluation of the city impacts in each LH city as well as the specific procedure that will be implemented in each city for the quantification of impacts attributed to SmartEnCity.
- Section 7: This section contains a comparative summary of the indicators selected by each city for their impact evaluation as main conclusion of the document.
- Final general sections include the potential deviations to the plan (none mayor in this case) as well as the documents to come in further stages of the project that will be fed with the information contained in this deliverable,

4 SmartEnCity evaluation plan

The four deliverables comprised within task T7.1 “Evaluation plan” provide a set of indicators which will be used by the LH cities to evaluate the improvements achieved due to SmartEnCity, but they could also be utilized for other cities which intend to implement sustainable actions in the sectors of energy, transport and ICT. This chapter describes the three types of indicators identified in the project and how these indicators are the basis for the evaluation of the overall impacts of the interventions carried out for the district renovation and implementation of sustainable vehicles at city level.

Figure 1 below details the three types of indicators and the deliverables where they are defined and used by the three LH cities in the framework of SmartEnCity and the information flow among them.

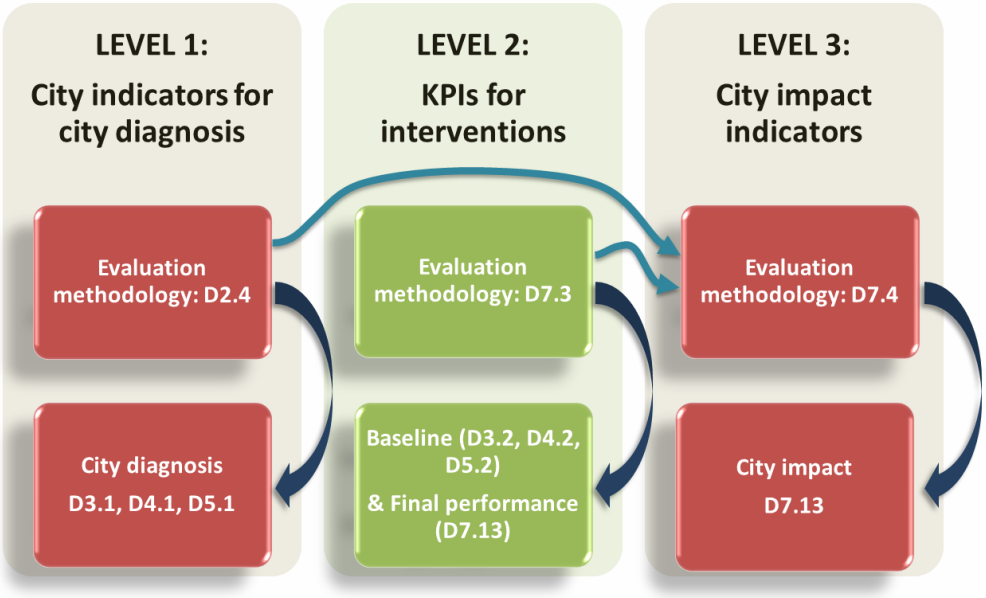

Figure 1: SmartEnCity Indicators levels

- Indicators for city diagnosis (Level 1): They were identified in D7.1 for a posterior selection by the cities in D.2.4 and being used for the city diagnosis made in D3.1, D4.1 and D5.1.
- KPIs to evaluate the interventions performance (Level 2): They were identified in D7.2 for a posterior update and selection by the cities in D7.3. They will be also used for the evaluation of the baseline in D3.2, D4.2 and D5.2 and the assessment of the final performance in D7.13.
- Indicators to quantify the impacts of the whole interventions at city level (Level 3): They are identified in this deliverable D7.4 fed by information coming from levels 1 and 2 and will be used for the assessment of the joint effects of all the interventions in D7.13.

Following sections describe in more detail each one of this type of indicators (the indicators for city diagnosis on 4.1, the KPIs to evaluate the interventions performance on 4.2 and the indicators for the city impacts on 4.3).

4.1 Indicators for city diagnosis

A set of indicators was selected with the purpose to identify the main features, strengths and weaknesses of the cities which allow knowing their needs and consequently setting the objectives to be considered in their strategy to transform them into Smart Zero Carbon cities.

The indicators chosen came from initiatives which have worked previously on getting a consensus for an indicator system among a wide sample of stakeholders: SCIS/CONCERTO, CITYKEYS, ISO 37120, ITU, PLEEC and STEEP, and were classified in the domains and subdomains described below.

Domain	Subdomain
City characterization	Key features of the city Land use characterization Socio-economic features of the city Environmental features of the city
Energy supply network	City energy profile Potential local energy resources in the city Environmental impacts in the city due to energy consumption
Transport and mobility	Mobility city profile City statistics for mobility Environmental impact of the mobility
Urban infrastructures	Available infrastructures in the city for managing transport, waste, water and environment Existing transport utilities Existing environment monitoring infrastructure Existing city monitoring infrastructure Communication infrastructure in the city
City plans & regulation and governance	City plans and strategies Public procurement procedures & regulations and normative Governance
Citizens	Existing actions for citizen engagement Channels used for citizen engagement Current scenarios of citizen engagement

Table 4: Domains of classification of indicators

Three criteria were considered by the LH cities for the selection of the indicators: familiarity, availability and relevance. A kind of questionnaire compiling al possible selections was sent to the three cities. They were not forced to adopt them all, but to select among all proposed those adequate or relevant for each city due to diverse reasons and based on the criteria

mentioned (familiarity / availability / relevance). As a result of the feedback collected, two types of indicators were defined to make the diagnosis of the three LH: “mandatory indicators” which correspond with those indicators that were selected by the three cities and “optional indicators” being those which were selected only by one or two of the cities.

The number of indicators in each domain is shown in Table 5 below in terms of common and optional indicators.

Domain	Common indicators	Optional indicators	Total indicators
City characterization	9	14	23
Energy supply network	18	13	31
Transport and mobility	14	34	48
Urban infrastructures	0	19	19
City plans & regulation and governance	9	6	15
Citizens	6	7	13
TOTAL	56	93	149

Table 5: Number of indicators per domain.

As reference, more details can be found for the different indicators in D2.4 (without description) and D 3.1, 4.1 and 5.1 (with descriptions of the indicators).

4.2 KPIs for the evaluation of intervention performance

Key Performance Indicators (KPIs) are the tool for evaluating the performance obtained in the three types of interventions/actions defined in the project: district renovation, urban mobility and citizen engagement actions. The performance will be measured in terms of achieving different technical, environmental, social and economic objectives. As a result, four categories of KPIs are defined as it is shown in Figure 2 below.

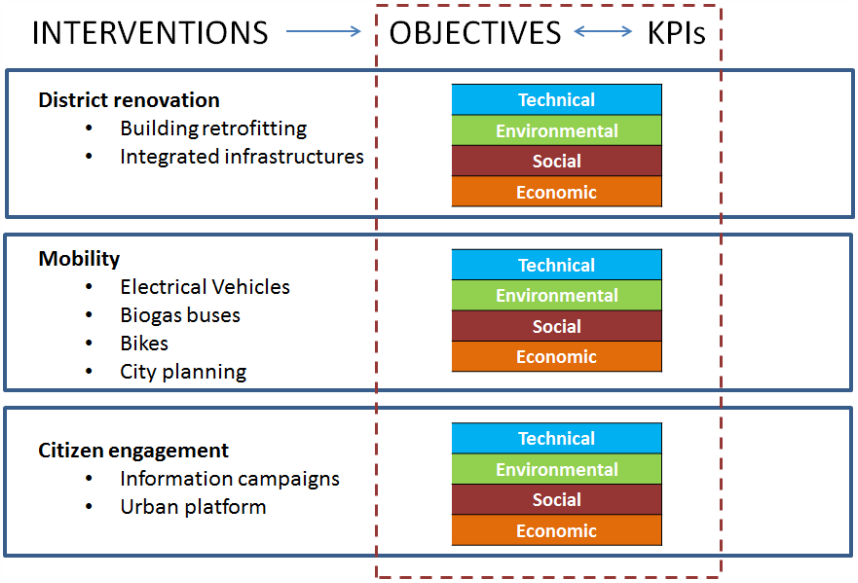

Figure 2: Interventions KPIs categories.

Through these KPIs, the objectives of each intervention and action of the project will be evaluated, as Table 6 points below.

Type of intervention	Technical objectives	Environmental objectives	Social objectives	Economic objectives
DISTRICT RENOVATION: Building retrofitting Integrated infrastructures	Reduction of the energy demand of buildings Savings of energy consumptions with desired comfort in dwellings Improvement of the energy efficiency in the district Higher use of RES and self-sufficient energy consumption in the district	Savings of CO_2 emissions generated in the district Reduction of the environmental impact in the district	Improvement of the residents quality of life (thermal comfort) Higher the acceptance of the project by residents of renovated district	Reduction of the energy costs of residents Decrease in the payback of the district renovation intervention
SUSTAINABLE MOBILITY Electrical Vehicles Biogas buses City mobility planning	Reduction of the traffic congestion Improvement of the efficiency of urban transport systems Savings of energy consumption in the vehicles	Reduction of the CO_2 emissions generated in the vehicles	Improvement of the quality of life for vehicle users Higher acceptance of the project by vehicle users	Reduction of the energy costs of drivers Decrease in the payback of the mobility intervention
CITIZEN ENGAGEMENT STRATEGY Information campaigns Urban platform/ Web applications	Achieve the engagement of city communities	Contribute with citizen engagement strategy to improve the environmental awareness of the citizens	Higher acceptance of the project by citizens	Contribute with citizen engagement strategy to the reduction of the energy costs of the citizens

ICT Urban platform Web applications	Reduce home thermal energy consumption within desired comfort level, combining the data analysis findings with recommendations offered through HMI solutions. Reduce building energy consumption combining the findings for collective consumption with recommendations given to the energy provider (i.e.: thermostat set point) Evaluate the impact of the HMI and the social networks on energy consumption behaviour.		Citizens empowerment	

Table 6: Objectives to be evaluated on the interventions.

It has to be indicated that objectives related to the Sustainable Mobility interventions are subject to change depending on the final interventions adopted after the current Amendment is solved to this regard.

Numerically speaking, Table 7 below summarizes the quantity of indicators proposed for each type of intervention and category of KPI.

Actions	Technical KPIs	Environmental KPIs	Social KPIs	Economic KPIs
District renovation	18	7	26	8
Mobility	9	3	13	8
Citizen engagement	23	3	10	3
TOTAL	50	13	49	19

Table 7: Number of indicators per KPI category.

4.3 Indicators for city impacts

The indicators previously described in sections 4.1 and 4.2 are the basis for the definition of a high level of indicators that will be considered for evaluating the impacts of the integrated actions in the areas of energy, transport and ICT after a process of which the categories of such indicators and KPIs have been grouped.

Table 8 below is the result of mixing the categories of indicators (for city diagnosis) and KPIs (for interventions) with the idea that the difference among features of the cities before the

execution of interventions (measured through indicators) and the effect of such interventions (measured through KPIs) is the impact achieved in the city. As a result, four types of indicators for city impacts can be considered: environmental, economic, employment and city plans impacts.

Indicators to evaluate impacts in the environment		Indicators to evaluate impacts in the economy		Indicators to evaluate impacts in the employment		Indicators to evaluate impacts in the city plans and governance	
Indicators for city diagnosis	*KPIs*	*Indicators for city diagnosis*	*KPIs*	*Indicators for city diagnosis*	*KPIs*	*Indicators for city diagnosis*	*KPIs*
Environmental features of the city City energy profile Potential local energy resources in the city Mobility City profile Transport energy and RES use	Technical objectives Environmental objectives	Socio-economic features of the city	Economic objectives	Socio-economic features of the city	Any	City plans and strategies Public procurement procedures & regulations and normative Governance	Any

Table 8: Indicators & KPIs cross information

The types of domains/subdomains from the indicators and the types of KPIs that cannot be included in any of the categories of city impacts indicators are shown below.

Categories of indicators/KPIs		Comments
Domains/Subdomains of indicators	Key features of the cities (e.g. size, inhabitants, etc.)	The profile of the cities in terms of size and inhabitants are not affected by the interventions, hence these indicators are not included in previous table
	Urban infrastructures for managing, monitoring and communication	These indicators correspond with KPIs and they are already evaluated through ICT protocol so that any difference can be evaluated among indicators and KPIs
	Actions and channels for citizen engagement	KPIs that are used in the protocol for citizen engagement do not match with this type of indicators used in the city diagnosis

Type of KPIs	KPIs for social objectives	There is any link among these KPIs with any domain/subdomain from indicators

Table 9: Indicators/KPIs not included.

In addition, other indicators for evaluating the impacts of the interventions have been identified in the same categories of city impacts. In this case, they need from other data sources such as questionnaires. This will be further explained in the section 6 of this deliverable.

5 Potential list of impacts due to SmartEnCity

In this section, a list of potential impacts that could generate the actions implemented in the project SmartEnCity (district renovation, mobility actions and citizen engagement actions) is provided.

These impacts can be considered for any city which intends to promote the execution of interventions carried out in the framework of this project as information to be transferred to making decisions agents, citizens and stakeholders to promote and extend the renovation of districts with Energy Conservation Measures (ECMs) and the implementation of sustainable vehicles.

Table 10 below gathers the type of impacts selected and suggested for their consideration to the LH cities that can be attributed to the interventions carried out in the framework of the project taking into account the joint effect and synergies of all the interventions of the project.

Impacts in the environmental	Impacts in the economy	Impacts in the employment	Impacts in plans and governance
Energy savings due to district renovation and sustainable mobility actions	Investment mobilized for the renovation of the district and the implementation of the sustainable mobility actions	Creation of jobs due to district renovation, mobility actions and citizen engagement actions	New plans/programs to promote energy efficient districts and sustainable mobility actions
Lower emissions of CO_2 due to district renovation and sustainable mobility actions	Business generated during the project linked with the district renovation and the sustainable mobility actions	New companies (Knowledge/ innovation-based companies with high added value for local society) created due to district renovation, mobility actions and citizen engagement actions	New regulations for development of energy efficient districts and sustainable mobility actions
Lower emissions of other pollutants due to district renovation and sustainable mobility actions	Expected business beyond the project linked with the district renovation and the sustainable mobility actions (e.g. exploitation of solutions, replicability of project in other cities or in the own cities)		New economic incentives for promoting energy efficient districts and sustainable mobility actions
Reduction of the noise pollution in the city due to sustainable actions		New services offered by the companies involved in the project due to district renovation, mobility actions and citizen engagement actions	More involvement of the administration on smart city projects
Increase in the use of RES in the city due to district renovation	Lower heating bills for residents		
Increase the production of RES in the city due to district renovation	Lower fossil-fuels imports	Acquisition of training skills due to the coordination, management and execution of the tasks of a smart city project	More collaboration among different authorities from different levels
Increase in the number of dwellings and buildings retrofitted or which demand to include ECMs			More collaboration among public-private stakeholders

Increase in the number of sustainable vehicles in the city Increase of the demand of new smart vehicles in the city Increase of the number of EV charging infrastructures in the city Increase in the use of EV charging infrastructures			More collaboration among different expertise and departments within public administration in urban regeneration projects.

Table 10: Summary of impacts types suggested

6 Procedure for the evaluation of the city impacts in each LH city

The procedure that each city will follow for evaluating the impacts attributed to SmartEnCity are included in this section with a previous introduction. This introduction compiles some explanations to help the cities in the process of identifying the indicators that better fit for their objectives of evaluation as well as the means of collecting the information required.

6.1 Overview of the procedure for the evaluation of the city impacts in the framework of the project

In this section, the impacts suggested in the previous section have been firstly divided in three groups according to the data sources and availability for their calculation and have been marked in different colours with the purpose of facilitating cities to define their own procedure of evaluation.

Thus,

- **Green cells** correspond to impacts to be potentially evaluated as a result of the difference between the value of the indicators used in the city diagnosis made in D3.1, D4.1, D5.1 and the value of the intervention performance to be evaluated by the relevant KPIs.
- **Blue cells** correspond to those impacts which require collecting new data by the consortium (maybe not available through the current or foreseen infrastructure).
- **Red cells** are associated to those impacts which require involving companies or other type of entities, from the consortium or hired from consortium, in charge of the district renovation, mobility actions and citizen engagement actions in order to gather the information needed. In this case, the distribution of questionnaires or doing interviews will be required.

Impacts in the environmental	Impacts in the economy	Impacts in the employment	Impacts in plans and governance
Energy savings due to district renovation and sustainable mobility actions	Investment mobilized for the renovation of the district and the implementation of the sustainable mobility actions	Creation of jobs due to district renovation, mobility actions and citizen engagement actions	New plans/programs to promote energy efficient districts and sustainable mobility actions
Lower emissions of CO_2 due to district renovation and sustainable mobility actions	Business generated during the project linked to the district renovation and the sustainable mobility actions	New companies created due to district renovation, mobility actions and citizen engagement actions	New regulations for the development of energy efficient districts and sustainable mobility actions

Lower emissions of other pollutants due to district renovation and sustainable mobility actions	Expected business beyond the project linked to the district renovation and the sustainable mobility actions (e.g. exploitation of solutions, replicability of project in other cities or in the own cities)	New services offered by the companies involved in the project due to district renovation, mobility actions and citizen engagement actions	New economic incentives for promoting energy efficient districts and sustainable mobility actions
Reduction of the noise pollution in the city due to sustainable actions	Lower heating bills for residents	Acquisition of training skills due to the coordination, management and execution of the tasks of a smart city project	More involvement of the administration on smart city projects
Increase in the use of RES in the city due to district renovation	Lower fossil-fuels imports		More collaboration among different authorities from different levels
Increase the production of RES in the city due to district renovation			More collaboration among different expertise and departments within public administration in urban regeneration projects.
Increase in the number of dwellings and buildings retrofitted or which demand to include ECMs			
Increase in the number of sustainable vehicles in the city			More collaboration among public-private stakeholders
Increase of the demand of new smart vehicles in the city			
Increase of the number of EV charging infrastructures in the city			
Increase in the use of EV charging infrastructures			

Table 11: Impacts categorized according to data sources and availability

In addition, all the possible indicators as well as the possible data source to be used for the cities in the quantification of almost all these impacts have been added in tables below (Table 12, Table 13, Table 14 and Table 15), which correspond to each type of impact: environmental, economic, employment and city plans/governance.

Concerning the indicators, all the indicators used during the diagnosis of the three cities have been considered in these tables (mandatory and optional ones) so that cities can select those whose data were considered more reliable in the diagnosis made, or are more feasible to be collected and also which are more interesting for their own city needs. In some cases, it

would be needed to align the units used in the city diagnosis and the units utilized in the KPIs calculation.

For the data sources, they have been included all the reports or tools where to collect the required information: city diagnosis before the execution of the interventions, intervention performance achieved after the interventions, final diagnosis of the city to be carried out by means of the same indicators used for the first city diagnosis and questionnaires.

Finally, LH cities must select the frequency for the evaluation of the impacts (final impacts could be evaluated once at the end of the project or being quantified every year).

The idea of these next tables (Table 12, Table 13, Table 14 and Table 15) is to set the basis for a common framework of evaluation for the three cities but at the same time allowing that the quantification of impacts is aligned with the interests and possibilities of the cities, taking into account that the same framework of evaluation for the three cities is not possible since only the mandatory indicators were used in the three city diagnosis, not all these mandatory indicators were found for the three cities, or at least with the same units, and not all the diagnosis contain the same optional indicators. Thus, taking into account that the starting point is not the same for the three cities, it is not possible to conclude with a same framework of evaluation for the city impacts.

EVALUATION OF ENVIRONMENTAL IMPACTS

Impacts of this category can be evaluated for those indicators which are grouped in green cells making use of the city diagnosis and intervention performance. But in addition, for those indicators grouped in blue cells there are two options:

a) The performance of a final diagnosis through the use of the indicators utilized for the city diagnosis before the implementation of any intervention. However, for some cases the result obtained cannot be directly linked to the intervention so that it could not have any sense to measure this indicator since changes in the indicator can be associated to other reasons out of the project and not directly to the SmartEnCity interventions.

b) The collection of data from the consortium.

The text shown in last column “Instructions” in Table 12 below corresponds to the specific instructions that were provided for some indicators in order to be considered for the cities in their process of selection of the indicators and impacts to be evaluated.

Indicator for evaluating the impacts	Process of evaluation (data sources)			Instructions
	City diagnosis	Intervention performance	Final diagnosis	
Energy savings in the city due to district renovation	Residential buildings energy consumption per year Total building energy consumption in the city per capita *(including residential and non-residential uses)*	Energy savings due to district renovation *(Energy Assessment Protocol)*		*Select the two indicators proposed for city diagnosis or the indicator that was considered as more reliable in the city diagnosis already made*
Energy savings in the city due to sustainable mobility actions	Transport energy use	Energy savings due to sustainable mobility actions *(Mobility protocol)*		
Lower emissions of CO_2 in the city due to district renovation	Emissions of residential and non-residential sectors (CO_2 equiv.)	CO_2 emissions savings due to district renovation *(Energy Assessment Protocol)*		
Lower emissions of other pollutants in the city due to district renovation	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	*It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*
Lower emissions of CO_2 in the city due to sustainable mobility actions	Transport greenhouse gas emissions *(It will be needed to match the units of the indicator with the Transport CO_2 emissions KPI)*	CO_2 emissions savings due to sustainable mobility actions *(Mobility protocol)*		
Lower emissions of other pollutants in the city due to sustainable mobility actions	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	*It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*

Reduction of the noise pollution in the city	Noise pollution	*Up to now, it is not expected to evaluate the reduction of noise pollution as KPI*	*Will be needed to evaluate the final diagnosis of the city*	*It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*
Increase in the use of RES in the city due to district renovation	Percentage of total energy consumed in the city derived from renewable sources	Share of renewable energy *(Energy Assessment Protocol)*		*Select the two indicators proposed for city diagnosis or the indicator that was considered as more reliable in the city diagnosis already made*
	Total renewable energy consumption in the city			*Select the two indicators proposed for city diagnosis or the indicator that was considered as more reliable in the city diagnosis already made*
Increase in the production of RES in the city due to district renovation	Final Energy produced in the city per year	Share of renewable energy *(Energy Assessment Protocol)*	*In the case it is not evaluated through the protocols, this indicator could be integrated in the final diagnosis*	*It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*
Number of dwellings/buildings retrofitted due to SmartEnCity project			*Should be reported the number of dwellings and buildings retrofitted in the project*	
Number of new buildings/dwellings in the city that demand a retrofitting or to include energy efficient measures			*Should be reported the number of buildings/dwellings that claim an energy retrofitting*	
New sustainable vehicles (EV) in the city due to SmartEnCity project	Electric Vehicles by category (cars, taxis, motorbikes, e-bikes, last mile logistic, bus)		*Should be reported the number of new EV in the city acquired by the project and the total EV in the city also from other initiatives since the project could influence in promoting these actions*	

New sustainable vehicles (Biogas buses) in the city due to SmartEnCity project	Biogas buses		*Should be reported the number of new Biogas buses in the city acquired by the project and the total biogas buses in the city also from other initiatives since the project could influence in promoting these actions*	
Increase of the number of EV charging infrastructures in the city (only public or public & private infrastructures) due to the project	Number of public EV charging stations *(Initially it was required to count only public EV charging stations)*		*Should be reported the number of new EV charging infrastructures acquired by the project and total EV infrastructures in the city also from other initiatives since the project could influence in promoting these actions*	
Increase in the use of EV charging infrastructures due to the project	Total number of recharges per year	Total number of recharges per year (biogas and EV) Total kWh recharged in the EV charging stations (biogas and EV) *(Mobility Protocol)*	*In the case it is not evaluated through the protocols, other option would be to find this indicator in statistics but It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*	*Select the two indicators proposed for city diagnosis or the indicator that was considered as more reliable in the city diagnosis already made*
	Total kWh recharged in the EV charging stations			

Table 12: Evaluation of environmental impacts.

EVALUATION OF ECONOMIC IMPACTS

The impacts of this category will not use the results obtained from the city diagnosis or the interventions performance, being thus required the collection of new data. Questionnaires could be the tool used for gathering the data required.

Indicators for evaluating the impacts		Data source proposed
Investment mobilized for the renovation of the district	Total investment made in the renovation of the district from local and regional public funding, EC funding and private funding" (e.g. dwellings' owners, energy companies, social housing companies, etc.). It should be specified for each type of fund.	*A questionnaire to be distributed to the partners of the consortium*
Investment mobilized for the implementation of the sustainable mobility actions	Total investment used for the implementation of the sustainable mobility actions from local and regional public funding, EC funding and private investment (e.g. EV' owners, companies, etc.). It should be specified for each type of fund.	
Business generated during the project linked with the district renovation	Revenues of the companies involved in the district renovation	*Through a questionnaire performed to actors involved with district renovation, mobility actions and citizen engagement although it is expected that this indicator cannot be evaluated due to the difficulty to collect data from companies*
Business generated during the project linked with the sustainable mobility actions	Revenues of the companies involved in the mobility actions due to the project	
Expected business beyond the project	Revenues of the partners involved in the project once the project is ended (e.g. by the exploitation of solutions in the market and the market competitiveness gained in the retrofitting of new buildings, implementation of urban platforms, assessment of municipalities for transforming in Smart Zero Carbon cities, etc)	
Lower heating bills for residents	Savings obtained by the residents on their heating bills due to the project	
Lower fossil-fuels imports	Amount of fossil-fuels imports reduction obtained by companies/municipalities due to the project	

Table 13: Evaluation of economic impacts.

EVALUATION OF EMPLOYMENT IMPACTS

The impacts within this category will not use the results obtained from the city diagnosis or interventions performance, being thus required to collect new data. Questionnaires could be the tools used for gathering the data required.

Indicators for evaluating the impacts		Data source proposed
Number of jobs created due to district renovation, mobility actions and citizen engagement actions (*)	*Number of jobs created:* Total number of jobs created	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement (e.g. companies or entities which can belong or not to the consortium)
	Number of jobs created: Total number of jobs created and a posterior link with the city unemployment rate	
Profile of employment created due to district renovation, mobility actions and citizen engagement actions (*)	*Local jobs:* Total number of jobs created for citizens living in the city	
	Local jobs: Number of employers hired who are residents from the district renovated	
	Temporary jobs: Number of temporary jobs created	
	Stable jobs: Number of stable jobs created	
	Professional specialization: Number of jobs created as higher education and non-higher education jobs	
	Professional specialization: Number of jobs created as higher education and non-higher education and a posterior link with city indicator “working age population with higher education”	
	Age of workers: Number of employees hired in each range of 18-30 years, 31-45 years, older than 46 years	
	Age of workers: Number of jobs created in terms of range of ages and a posterior link with city indicator “youth unemployment rates”	
	Workers hired with low incomes: Number of employees hired which perceived previously low incomes	
New companies created or new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	*New companies created:* Total number created due to district renovation, mobility actions and citizen engagement actions during the whole project	
	New services offered: Total number of services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	

Acquisition of training skills due to district renovation, mobility actions and citizen engagement actions during the whole project	*Acquisition of training skills by partners involved in SmartEnCity:* Through Likert scale to be fulfilled by partners	Questionnaire to be distributed to the consortium
	Acquisition of training skills of workers by training activities in the project (e.g. workers in the district can need to receive some training courses to realize certain works)	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement (e.g. companies or other entities which can belong or not to the consortium)

Table 14: Evaluation of employment impacts.

(*) It should be needed to specify the number of jobs or the type of job created per each category of intervention/action (district renovation, sustainable mobility actions and citizen engagement actions)

.

EVALUATION OF CITY PLANS/GOVERNANCE IMPACTS

The impacts of this category will not use the results obtained from the city diagnosis or the interventions performance being thus needed to collect new data. This new data needs to be collected during a final diagnosis based partially in the indicators used in the city diagnosis. Although the indicator is the same more information is needed, as while for the city diagnosis it was required only to indicate if the city was having/or not having a plan, and now it would be required to detail the type of plan developed as a result of the implementation of the SmartEnCity project.

	Process of evaluation (data sources)	
Indicator for evaluating the impacts	City diagnosis	Final diagnosis
New plans/programs in the city linked with the project	Existence of plans/programs to promote energy efficient buildings (YES/NOT)	To be collected by the partners
	Existence of plans/programs to promote sustainable mobility (YES/NOT)	
New regulations in the city linked with the project	Existence of regulations for development of energy efficient districts (YES/NOT)	
	Existence of regulations for development of sustainable mobility (YES/NOT)	
New economic incentives in the city linked with the project	Existence of public incentives to promote energy efficient districts (YES/NOT)	
	Existence of public incentives to promote sustainable mobility (YES/NOT)	
More involvement of the administration on smart city projects	Involvement of the administration on smart city projects. The evaluation will be made by the work team working in the city diagnosis (LIKERT SCALE)	The evaluation will be made by the work team working in the city diagnosis (LIKERT SCALE)
More collaboration among different authorities from different levels	Multilevel government. The extent to which the city cooperates with other authorities from different levels. The evaluation will be made by the work team working in the city diagnosis (LIKERT SCALE)	
More collaboration among different expertise and departments within public administration in urban regeneration projects.	Collaboration among different expertise and departments within public administration in urban regeneration projects. The evaluation should be made by the work team working in the city diagnosis (LIKERT SCALE)	
More collaboration among public-private stakeholders	Collaboration among public-private stakeholders. The evaluation should be made by the work team working in the city diagnosis (LIKERT SCALE)	

Table 15: Evaluation of city plans/governance impacts

6.2 Procedure for the evaluation of the city impacts in Vitoria-Gasteiz

This section contains Table 16, Table 17, Table 18 and Table 19 compiling the indicators selected for the evaluation of environmental, economic, employment and city plans & governance impacts for Vitoria-Gasteiz LH, as well as the data sources to be used for the evaluation of impacts. Those tables are based on the indicators depicted in Table 12, Table 13, Table 14 and Table 15. The options for the frequency to collect the information to calculate such indicators were “once at the end of the project when all the interventions have concluded” or “each year in order to know the impacts annually” and the option preferred has been “once at the end of the project”.

In summary, in the case of the indicators, for Vitoria-Gasteiz will be compiled those selected from the ones with data in D3.1 (please refer to this document for more information on Vitoria-Gasteiz indicators). The collection frequency varies from indicator to indicator, being provided the closer (temporal) data values.

Regarding the KPIs, as the mobility KPIs are still to be defined (after Amendment revision by PO) it is not possible to give complete information; however the idea is to install the needed monitoring devices as part of the procurement process thus the data should be available when required.

The questionnaires to be done for some indicators will be designed in task T7.3 and compiled in D7.9.

ENVIRONMENTAL INDICATORS FOR EVALUATING THE CITY IMPACTS

Indicator for evaluating the impacts in the district	Data sources			Will this indicator be evaluated in the city? (YES, NO)
	Indicator from city diagnosis	KPI for intervention	Final diagnosis	
Energy savings in the city due to district renovation	Residential buildings energy consumption per year	Energy savings due to district renovation *(Energy Assessment Protocol)*		YES
	Total building energy consumption in the city per capita *(including residential and non-residential uses)*			YES
Energy savings in the city due to sustainable mobility actions	Transport energy use	Energy savings due to sustainable mobility actions *(Mobility protocol)*		YES *(but as stated in D3.1 refers only to within municipality trips and is based in questionnaires that are not performed annually)*

Lower emissions of CO_2 in the city due to district renovation	Emissions of residential and non-residential sectors (CO_2 equiv.)	CO_2 emissions savings due to district renovation *(Energy Assessment Protocol)*		YES *(it can be calculated for district renovation). The Global Warming Potential (GWP) per capita (Tn equi. CO2 / year capita) is available but it does not include (data not available) the industrial sector as stated in D3.1*
Lower emissions of other pollutants in the city due to district renovation	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	NO
Lower emissions of CO_2 in the city due to sustainable mobility actions	Transport greenhouse gas emissions	CO_2 emissions savings due to sustainable mobility actions *(Mobility protocol)*		YES *(but as stated in D3.1 refers only to within municipality trips and is based in questionnaires that are not performed annually). It can be redundant with the second indicator.*
Lower emissions of other pollutants in the city due to sustainable mobility actions	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	NO
Reduction of the noise pollution in the city	Noise pollution	*Up to now, it is not expected to evaluate the reduction of noise pollution as KPI*	*Will be needed to evaluate the final diagnosis of the city*	NO

Increase in the use of RES in the city due to district renovation	Percentage of total energy consumed in the city derived from renewable sources	Share of renewable energy *(Energy Assessment Protocol)*		NO via indicator, YES via KPI *(indicator not available -see D3.1-)* *we could use the new renewable energy added as an indicator here, if the total renewable in the city is not available*
	Total renewable energy consumption in the city			NO *(not available -see D3.1-)*
Increase in the production of RES in the city due to district renovation	Final Energy produced in the city per year	Share of renewable energy *(Energy Assessment Protocol)*	*In the case it is not evaluated through the protocols, this indicator could be integrated in the final diagnosis*	NO *(not available -see D3.1-)*
Number of dwellings/buildings retrofitted due to SmartEnCity project			*Should be reported the number of dwellings and buildings retrofitted in the project*	YES
Number of new buildings/dwellings in the city that demand a retrofitting or to include energy efficient measures			*Should be reported the number of buildings/dwellings that claim an energy retrofitting*	YES
New sustainable vehicles (EV) in the city due to SmartEnCity project	Electric Vehicles by category (cars, taxis, motorbikes, e-bikes, last mile logistic, bus)		*Should be reported the number of new EV in the city acquired by the project and the total EV in the city also from other initiatives since the project could influence in promoting these actions*	YES
New sustainable vehicles (Biogas buses) in the city due to SmartEnCity project	Biogas buses		*Should be reported the number of new Biogas buses in the city acquired by the project and the total biogas buses in the city also from other initiatives since the project could influence in promoting these actions*	NO

Increase of the number of EV charging infrastructures in the city (only public or public & private infrastructure) due to the project	Number of public EV charging stations *(initially it was required to count only public EV charging stations)*		*Should be reported the number of new EV charging infrastructures acquired by the project and total EV infrastructures in the city also from other initiatives since the project could influence in promoting these actions*	YES
Increase in the use of EV charging infrastructures due to the project	Total number of recharges per year	Total number of recharges per year (biogas and EV)	*In the case it is not evaluated through the protocols, other option would be to find this indicator in statistics but It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*	YES *(but only in the stations purchased by the project as other data will not be available –see D3.1-)*
	Total kWh recharged in the EV charging stations	Total kWh recharged in the EV charging stations (biogas and EV) *(Mobility Protocol)*		YES *(but only in the stations purchased by the project as other data will not be available –see D3.1-. The monitoring devices for this purpose have to be demanded in the procurement process)*

Table 16: Evaluation of environmental impacts for Vitoria-Gasteiz

ECONOMIC INDICATORS FOR EVALUATING THE CITY IMPACTS

For the case of Vitoria-Gasteiz the business generated will potentially be measured as shown in Table 17Table 21 below. The initial idea is to have some data, but in the case there would finally be lack of information or data from the companies, those calculation could be dismissed.

Indicator for evaluating the impacts in the district	Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
Total investment of the district from local and regional public funding, EC funding and private funding" *(e.g. dwellings' owners, energy companies, social housing companies, etc.). It should be specified for each type of fund.*	YES	*To be collected by the partners*
Total investment of the district from local and regional public funding, EC funding and private investment *(e.g. EV' owners, companies, etc.). It should be specified for each type of fund.*	YES	
Business generated during the project linked with the district renovation *through the indicator "Revenues of the companies involved in the district renovation"*	POTENTIALLY YES	*To be asked to the companies*
Business generated during the project linked with the sustainable mobility actions *through the indicator "Revenues of the companies involved in the mobility actions due to the project"*	POTENTIALLY YES	
Expected business beyond the project *through the indicator "Revenues of the partners involved in the project once the project is ended" (e.g. by the exploitation of solutions in the market and the market competitiveness gained (e.g. retrofitting of new buildings, implementation of urban platforms, assessment of municipalities for transforming in Smart Zero Carbon cities))*	POTENTIALLY YES	

Table 17: Evaluation of economic impacts for Vitoria-Gasteiz

EMPLOYMENT INDICATORS FOR EVALUATING THE CITY IMPACTS

There are various methodologies for estimating or calculating job creation. Depending on the methodologies, more or less resources might be needed, particularly on surveying and questionnaires or on supply chain assessment.

It is difficult to compromise at the moment what will be evaluated without having more details on how will be evaluated, and who will have the resources to do it.

Indicator for evaluating the impacts in the district		Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
Number of jobs created due to district renovation, mobility actions and citizen engagement actions	Total number of jobs created	*POTENTIALLY YES*	Supply chain assessment or questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement
	Total number of jobs created and a posterior link with the city unemployment rate	*POTENTIALLY YES*	
Employment profile created due to district renovation, mobility actions and citizen engagement actions	Number of jobs created for citizens living in the city	*POTENTIALLY YES*	
	Number of jobs created for citizens not living in the city (i.e. indirect jobs)	*POTENTIALLY YES*	
	Number of temporary jobs created	*POTENTIALLY YES*	
	Number of stable jobs created	*POTENTIALLY YES*	
	Number of jobs created in terms of professional specialization (higher education and non-higher education)	*POTENTIALLY YES*	
	Number of jobs created in terms of professional specialization (higher education and non-higher education) and a posterior link with city indicator “working age population with higher education”	*POTENTIALLY YES*	
	Number of employees hired who are residents from the district	*POTENTIALLY YES*	
	Number of employees hired in each range of 18-30 years, 31-45 years, older than 46 years)	*POTENTIALLY YES*	
	Number of jobs created in terms of range of ages and a posterior link with city indicator “youth unemployment rates”	*POTENTIALLY YES*	
	Number of employees with low incomes hired	*POTENTIALLY YES*	

New companies created or new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	New companies created due to district renovation, mobility actions and citizen engagement actions during the whole project	*POTENTIALLY YES*	Supply chain assessment or questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement
	Total number of new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	*POTENTIALLY YES*	
Acquisition of training skills due to district renovation, mobility actions and citizen engagement actions during the whole project	Acquisition of training skills by partners involved in SmartEnCity (Likert scale)	*POTENTIALLY YES*	Questionnaire to be distributed to the consortium
	Acquisition of training skills of workers by training activities in the project (e.g. workers in the district need to receive some training courses)	*POTENTIALLY YES*	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement

Table 18: Evaluation of employment impacts for Vitoria-Gasteiz

CITY PLANS AND GOVERANCE INDICATORS FOR EVALUATING THE CITY IMPACTS

Indicator for evaluating the impacts in the district	Indicators for the city diagnosis	Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
New plans/programs (intended actions) in the city linked with the project (they will be identified)	Existence of plans/programs to promote energy efficient buildings (YES/NOT)	YES	To be collected by the partners
	Existence of plans/programs to promote sustainable mobility (YES/NOT)	POTENTIALLY	
New regulations in the city linked with the project (they will be identified)	Existence of regulations for development of energy efficient districts (YES/NOT)	YES	
	Existence of regulations for development of sustainable mobility (YES/NOT)	POTENTIALLY	
New economic incentives in the city linked with the project (they will be identified)	Existence of public incentives to promote energy efficient districts	YES	
	Existence of public incentives to promote sustainable mobility	POTENTIALLY	
More involvement of the administration on smart city projects	Involvement of the administration on smart city projects. The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)	YES	The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)
More collaboration among different authorities from different levels	Multilevel government The extent to which the city cooperates with other authorities from different levels. The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)	YES	

Table 19: Evaluation of city plans and governance impacts for Vitoria-Gasteiz

6.3 Procedure for the evaluation of the city impacts in Tartu

This section contains Table 20, Table 21, Table 22 and Table 23 compiling the indicators selected for the evaluation of environmental, economic, employment and city plans & governance impacts for Tartu LH, as well as the data sources to be used for the evaluation of impacts. Those tables are based on the indicators depicted in Table 12, Table 13, Table 14 and Table 15. The options for the frequency to collect the information to calculate such indicators were “once at the end of the project when all the interventions have concluded” or “each year in order to know the impacts annually” and the option preferred has been “once at the end of the project”.

In summary, in the case of the indicators, for Tartu will be compiled those selected from the ones with data in D4.1 (please refer to this document for more information on Tartu indicators). The collection frequency varies from indicator to indicator, being provided the closer (temporal) data values.

Regarding the KPIs, as the mobility KPIs are still to be defined (after Amendment revision by PO) it is not possible to give complete information.

The questionnaires to be done for some indicators will be designed in task T7.3 and compiled in D7.9.

EVALUATION OF ENVIRONMENTAL IMPACTS

<table>
<tr><th rowspan="2">Indicator for evaluating the impacts</th><th colspan="3">Process of evaluation (data sources)</th><th rowspan="2">Will this indicator be evaluated in the city? (YES, NO)</th></tr>
<tr><th>City diagnosis</th><th>Intervention performance</th><th>Final diagnosis</th></tr>
<tr><td rowspan="2">Energy savings in the city due to district renovation</td><td>Residential buildings energy consumption per year</td><td rowspan="2">Energy savings due to district renovation (Energy Assessment Protocol)</td><td rowspan="2"></td><td>YES</td></tr>
<tr><td>Total building energy consumption in the city per capita (including residential and non-residential uses)</td><td>NO</td></tr>
<tr><td>Energy savings in the city due to sustainable mobility actions</td><td>Transport energy use</td><td>Energy savings due to sustainable mobility actions (Mobility protocol)</td><td></td><td>NO</td></tr>
<tr><td>Lower emissions of CO_2 in the city due to district renovation</td><td>Emissions of residential and non-residential sectors (CO_2 equiv.)</td><td>CO_2 emissions savings due to district renovation (Energy Assessment Protocol)</td><td></td><td>YES (will be calculated on the basis of energy consumption)</td></tr>
</table>

Lower emissions of other pollutants in the city due to district renovation	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	NO
Lower emissions of CO_2 in the city due to sustainable mobility actions	Transport greenhouse gas emissions	CO_2 emissions savings due to sustainable mobility actions *(Mobility protocol)*		YES
Lower emissions of other pollutants in the city due to sustainable mobility actions	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	NO
Reduction of the noise pollution in the city	Noise pollution	*Up to now, it is not expected to evaluate the reduction of noise pollution as KPI*	*Will be needed to evaluate the final diagnosis of the city*	NO
Increase in the use of RES in the city due to district renovation	Percentage of total energy consumed in the city derived from renewable sources	Share of renewable energy *(Energy Assessment Protocol)*		YES
	Total renewable energy consumption in the city			NO
Increase the production of RES in the city due to district renovation	Final Energy produced in the city per year	Share of renewable energy *(Energy Assessment Protocol)*		YES
Number of dwellings/buildings retrofitted due to SmartEnCity project			*Should be reported the number of dwellings and buildings retrofitted in the project*	YES
Number of new buildings/dwellings in the city that demand a retrofitting or to include energy efficient measures			*Should be reported the number of buildings/dwellings that claim an energy retrofitting*	YES

New sustainable vehicles (EV) in the city due to SmartEnCity project	Electric Vehicles by category (cars, taxis, motorbikes, e-bikes, last mile logistic, bus)		*Should be reported the number of new EV in the city acquired by the project and the total EV in the city also from other initiatives since the project could influence in promoting these actions*	YES
New sustainable vehicles (Biogas buses) in the city due to SmartEnCity project	Biogas buses		*Should be reported the number of new Biogas buses in the city acquired by the project and the total biogas buses in the city also from other initiatives since the project could influence in promoting these actions*	YES
Increase of the number of EV charging infrastructures in the city (only public or public & private infrastructure) due to the project	Number of public EV charging stations *(initially it was required to count only public EV charging stations)*		*Should be reported the number of new EV charging infrastructures acquired by the project and total EV infrastructures in the city also from other initiatives since the project could influence in promoting these actions*	YES
Increase in the use of EV charging infrastructures due to the project	Total number of recharges per year	Total number of recharges per year (biogas and EV) Total kWh recharged in the EV charging stations (biogas and EV) *(Mobility Protocol)*	*In the case it is not evaluated through the protocols, other option would be to find this indicator in statistics but It is not clear whether for the LH cities make sense to evaluate this indicator at the end of the project. Changes in the indicator could not be only associated to SmartEnCity*	*NO*
	Total kWh recharged in the EV charging stations			YES *(For the new chargers to be installed in the project, a requirement for the operator to provide needed data will be added in the procurement conditions)*

Table 20: Evaluation of environmental impacts for Tartu

EVALUATION OF ECONOMIC IMPACTS

For the case of Tartu the business generated is not measured as shown in Table 21 below. The reason in this case is the lack of information and complexity to gather such a data from the companies.

Indicator for evaluating the impacts in the district	Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
Total investment of the district from local and regional public funding, EC funding and private funding" *(e.g. dwellings' owners, energy companies, social housing companies, etc.). It should be specified for each type of fund.*	YES	*To be collected by the partners*
Total investment of the district from local and regional public funding, EC funding and private investment *(e.g. EV' owners, companies, etc.). It should be specified for each type of fund.*	NO	
Business generated during the project linked with the district renovation *through the indicator "Revenues of the companies involved in the district renovation"*	NO	*To be asked to the companies*
Business generated during the project linked with the sustainable mobility actions *through the indicator "Revenues of the companies involved in the mobility actions due to the project"*	NO	
Expected business beyond the project *through the indicator "Revenues of the partners involved in the project once the project is ended" (e.g. by the exploitation of solutions in the market and the market competitiveness gained (e.g. retrofitting of new buildings, implementation of urban platforms, assessment of municipalities for transforming in Smart Zero Carbon cities))*	NO	

Table 21: Evaluation of economic impacts for Tartu

EVALUATION OF EMPLOYMENT IMPACTS

For the case of Tartu to measure the employment profile in other aspects different to the professional specialisation is not possible due to the complexity to gather such information as is reflected in Table 22 below.

Indicator for evaluating the impacts in the district		Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
Number of jobs created due to district renovation, mobility actions and citizen engagement actions	Total number of jobs created	YES *(Measured for the three activities, district renovation, mobility and citizen engagement)*	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement
	Total number of jobs created and a posterior link with the city unemployment rate	NO	
Employment profile created due to district renovation, mobility actions and citizen engagement actions	Number of jobs created for citizens living in the city	NO	
	Number of jobs created for citizens not living in the city (i.e. indirect jobs)	NO	
	Number of temporary jobs created	NO	
	Number of stable jobs created	NO	
	Number of jobs created in terms of professional specialization (higher education and non-higher education)	NO	
	Number of jobs created in terms of professional specialization (higher education and non-higher education) and a posterior link with city indicator “working age population with higher education”	YES	
	Number of employees hired who are residents from the district	NO	
	Number of employees hired in each range of 18-30 years, 31-45 years, older than 46 years)	NO	
	Number of jobs created in terms of range of ages and a posterior link with city indicator “youth unemployment rates”	NO	
	Number of employees with low incomes hired	NO	

New companies created or new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	New companies created due to district renovation, mobility actions and citizen engagement actions during the whole project	NO	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement
	Total number of new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	YES *(Evaluated for the three activities, district renovation, mobility and citizen engagement)*	
Acquisition of training skills due to district renovation, mobility actions and citizen engagement actions during the whole project	Acquisition of training skills by partners involved in SmartEnCity (Likert scale)	YES	Questionnaire to be distributed to the consortium
	Acquisition of training skills of workers by training activities in the project (e.g. workers in the district need to receive some training courses)	YES	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement

Table 22: Evaluation of employment impacts for Tartu

CITY PLANS AND GOVERANCE INDICATORS FOR EVALUATING THE CITY IMPACTS

Indicator for evaluating the impacts in the district	Indicators for the city diagnosis	Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
New plans/programs (intended actions) in the city linked with the project (they will be identified)	Existence of plans/programs to promote energy efficient buildings (YES/NOT)	YES	To be collected by the partners
	Existence of plans/programs to promote sustainable mobility (YES/NOT)	YES	
New regulations in the city linked with the project (they will be identified)	Existence of regulations for development of energy efficient districts (YES/NOT)	YES	
	Existence of regulations for development of sustainable mobility (YES/NOT)	YES	
New economic incentives in the city linked with the project (they will be identified)	Existence of public incentives to promote energy efficient districts	YES	
	Existence of public incentives to promote sustainable mobility	YES	
More involvement of the administration on smart city projects	Involvement of the administration on smart city projects. The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)	YES	The valuation will be made by working team working in the city diagnosis (LIKERT SCALE)
More collaboration among different authorities from different levels	Multilevel government The extent to which the city cooperates with other authorities from different levels. The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)	YES	

Table 23: Evaluation of city plans and governance impacts for Tartu

6.4 Procedure for the evaluation of the city impacts in Sonderborg

This section contains Table 24, Table 25, Table 26 and Table 27 compiling the indicators selected for the evaluation of environmental, economic, employment and city plans & governance impacts for Sonderborg LH, as well as the data sources to be used for the evaluation of impacts. Those tables are based on the indicators depicted in Table 12, Table 13, Table 14 and Table 15. The options for the frequency to collect the information to calculate such indicators were "once at the end of the project when all the interventions have concluded" or "each year in order to know the impacts annually" and the option preferred has been "once at the end of the project".

In summary, in the case of the indicators, for Sonderborg will be compiled those selected from the ones with data in D5.1 (please refer to this document for more information on Sonderborg indicators). As the collection frequency varies from indicator to indicator, it will be provided the closer (temporal) data values.

Regarding the KPIs, as the mobility KPIs are still to be defined (after Amendment revision by PO) it is not possible to give complete information.

The questionnaires to be done for some indicators will be designed in task T7.3 and compiled in D7.9.

EVALUATION OF ENVIRONMENTAL IMPACTS

Indicator for evaluating the impacts in the district	Data sources			Will be this indicator evaluated in your city? (YES, NO)
	Indicator from city diagnosis	KPI for intervention	Final diagnosis	
Energy savings in the city due to district renovation	Residential buildings energy consumption per year	Energy savings due to district renovation *(Energy Assessment Protocol)*		YES *(but will be calculated globally, thus maybe not only attributable to the district renovation)*
	Total building energy consumption in the city per capita *(including residential and non-residential uses)*			*YES (but will be calculated globally, thus maybe not only attributable to the district renovation)*
Energy savings in the city due to sustainable mobility actions	Transport energy use	Energy savings due to sustainable mobility actions *(Mobility protocol)*		NO
Lower emissions of CO_2 in the city due to district renovation	Emissions of residential and non-residential sectors (CO_2 equiv.)	CO_2 emissions savings due to district renovation *(Energy Assessment Protocol)*		YES

Lower emissions of other pollutants in the city due to district renovation	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	NO
Lower emissions of CO_2 in the city due to sustainable mobility actions	Transport greenhouse gas emissions	CO_2 emissions savings due to sustainable mobility actions *(Mobility protocol)*		YES *(although It is estimated as nearly negligible compared to the rest of emissions)*
Lower emissions of other pollutants in the city due to sustainable mobility actions	NOx emissions Fine particulate matter emissions Air quality index Days PM10 > 50 µg/m3	*Up to now, it is not expected to evaluate the savings of any pollutants as KPI*	*Will be needed to evaluate the final diagnosis of the city with those pollutants each LH is interested in*	NO
Reduction of the noise pollution in the city	Noise pollution	*Up to now, it is not expected to evaluate the reduction of noise pollution as KPI*	*Will be needed to evaluate the final diagnosis of the city*	NO
Increase in the use of RES in the city due to district renovation	Percentage of total energy consumed in the city derived from renewable sources	Share of renewable energy *(Energy Assessment Protocol)*		YES *(but will be calculated globally, thus maybe not only attributable to the district renovation)*
	Total renewable energy consumption in the city			YES *(but will be calculated globally, thus maybe not only attributable to the district renovation)*
Increase the production of RES in the city due to district renovation	Final Energy produced in the city per year	Share of renewable energy *(Energy Assessment Protocol)*		YES *(but will be calculated globally, thus maybe not only attributable to the district renovation)*
Number of dwellings/buildings retrofitted due to SmartEnCity project			*Should be reported the number of dwellings and buildings retrofitted in the project*	YES
Number of new buildings/dwellings in the city that demand a retrofitting or to include energy efficient measures			*Should be reported the number of buildings/dwellings that claim an energy retrofitting*	NO
New sustainable vehicles (EV) in the city due to	Electric Vehicles by category (cars, taxis,		*Should be reported the number of new EV in the city acquired by the*	YES

SmartEnCity project	motorbikes, e-bikes, last mile logistic, bus)		*project and the total EV in the city also from other initiatives since the project could influence in promoting these actions*	
New sustainable vehicles (Biogas buses) in the city due to SmartEnCity project	Biogas buses		*Should be reported the number of new Biogas buses in the city acquired by the project and the total biogas buses in the city also from other initiatives since the project could influence in promoting these actions*	YES
Increase of the number of EV charging infrastructures in the city (only public or public & private infrastructure) due to the project	Number of public EV charging stations *(initially it was required to count only public EV charging stations)*		*Should be reported the number of new EV charging infrastructures acquired by the project and total EV infrastructures in the city also from other initiatives since the project could influence in promoting these actions*	YES
Increase in the use of EV charging infrastructures due to the project	Total number of recharges per year	Total number of recharges per year (biogas and EV)	*(In case it was not evaluated through protocols, other option would be to find this indicator in statistics but I don't know if you find the sense to evaluate this indicator at the end of the project since changes in the indicator could not be only associated with SmartEnCity)*	NO
	Total kWh recharged in the EV charging stations	Total kWh recharged in the EV charging stations (biogas and EV) *(Mobility Protocol)*		YES

Table 24: Evaluation of environmental impacts for Sonderborg

EVALUATION OF ECONOMIC IMPACTS

For the case of Sonderborg the business generated will neither be measured as shown in Table 25 below. The reason in this case is again the lack of information and complexity to gather such a data from the companies.

Indicator for evaluating the impacts in the district	Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
Total investment of the district from local and regional public funding, EC funding and private funding" *(e.g. dwellings' owners, energy companies, social housing companies, etc.). It will have to specify by each type of funds.*	*YES*	*To be collected by the partners*
Total investment of the district from local and regional public funding, EC funding and private investment *(e.g. EV' owners, companies, etc.)*	*NO*	
Business generated during the project linked with the district renovation *through the indicator "Revenues of the companies involved in the district renovation"*	*NO*	*To be asked to the companies*
Business generated during the project linked with the sustainable mobility actions *through the indicator "Revenues of the companies involved in the mobility actions due to the project"*	*NO*	
Expected business beyond the project *through the indicator "Revenues of the partners involved in the project once the project is ended" (e.g. by the exploitation of solutions in the market and the market competitiveness gained (e.g. retrofitting of new buildings, implementation of urban platforms, assessment of municipalities for transforming in Smart Zero Carbon cities))*	*NO*	

Table 25: Evaluation of economic impacts for Sonderborg

EVALUATION OF EMPLOYMENT IMPACTS

For the case of Sonderborg none of the employment selected impacts will be evaluated as it's reflected on Table 26 below. Apart from the complexity to gather the data to compile those impacts, looking at the overall numbers for the city, it has been considered difficult to establish for Sonderborg a good argument that there is correlation between SmartEnCity actuations and the development in the local job market. As the job market there is likely to be influenced by many other and probably more significant factors, the risk of getting incorrect conclusions made dismissing the calculation of any of these impacts.

Indicator for evaluating the impacts in the district		Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
Number of jobs created due to district renovation, mobility actions and citizen engagement actions	Total number of jobs created	*NO*	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement
	Total number of jobs created and a posterior link with the city unemployment rate	*NO*	
Employment profile created due to district renovation, mobility actions and citizen engagement actions	Number of jobs created for citizens living in the city	*NO*	
	Number of jobs created for citizens not living in the city (i.e. indirect jobs)	*NO*	
	Number of temporary jobs created	*NO*	
	Number of stable jobs created	*NO*	
	Number of jobs created in terms of professional specialization (higher education and non-higher education)	*NO*	
	Number of jobs created in terms of professional specialization (higher education and non-higher education) and a posterior link with city indicator "working age population with higher education"	*NO*	
	Number of employers hired who are residents from the district	*NO*	
	Number of employers hired in each range of 18-30 years, 31-45 years, older than 46 years)	*NO*	
	Number of jobs created in terms of range of ages and a posterior link with city indicator "youth unemployment rates"	*NO*	
	Number of employers with low incomes hired	*NO*	

New companies created or new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	New companies created due to district renovation, mobility actions and citizen engagement actions during the whole project	*NO*	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement
	Total number of new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	*NO*	
Acquisition of training skills due to district renovation, mobility actions and citizen engagement actions during the whole project	Acquisition of training skills by partners involved in SmartEnCity (Likert scale)	*NO*	Questionnaire to be distributed to the consortium
	Acquisition of training skills of workers by training activities in the project (e.g. workers in the district need to receive some training courses)	*NO*	Questionnaire to be distributed to actors involved with district renovation, mobility actions and citizen engagement

Table 26: Evaluation of employment impacts for Sonderborg

EVALUATION OF CITY PLANS AND GOVERNANCE IMPACTS

For the case of Sonderborg none of the city plans and governance selected impacts will be evaluated as it's reflected on Table 27 below. The reason is that for Sonderborg many plans have already been developed in advance of being part of SmartEnCity (as the Smart mobility strategy and the Strategic Energy Plan). This has conducted to dismiss measuring these impacts as only new plans are being evaluated with them and the results risks misleading on the real status of the city.

Indicator for evaluating the impacts in the district	Indicators for the city diagnosis	Will this indicator be evaluated in the city? (YES, NO)	Data source proposed
New plans/programs (intended actions) in the city linked with the project (they will be identified)	Existence of plans/programs to promote energy efficient buildings (YES/NOT)	*NO*	To be collected by the partners
	Existence of plans/programs to promote sustainable mobility (YES/NOT)	*NO*	
New regulations in the city linked with the project (they will be identified)	Existence of regulations for development of energy efficient districts (YES/NOT)	*NO*	
	Existence of regulations for development of sustainable mobility (YES/NOT)	*NO*	
New economic incentives in the city linked with the project (they will be identified)	Existence of public incentives to promote energy efficient districts	*NO*	
	Existence of public incentives to promote sustainable mobility	*NO*	
More involvement of the administration on smart city projects	Involvement of the administration on smart city projects. The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)	*NO*	The valuation will be made by working team working in the city diagnosis (LIKERT SCALE)
More collaboration among different authorities from different levels	Multilevel government The extent to which the city cooperates with other authorities from different levels. The valuation will be made by work team working in the city diagnosis (LIKERT SCALE)	*NO*	

Table 27: Evaluation of city plans and governance impacts for Sonderborg

7 Conclusions: comparative summary of the three cities

Looking back into section 0, we can see how the three LH cities have chosen different sets of impacts to be evaluated. As it is summarized in Table 28 below all three cities have selected impacts from the proposed for the environmental and economic aspects while for the other two (employment and city plans & governance), and due to different reasons, not all cities have considered as adequate to measure impacts.

	City of Vitoria-Gasteiz	City of Tartu	City of Sonderborg
Type of impacts to be evaluated	Environmental, Economic, Employment and City Plans and Governance	Environmental, Economic, Employment and City Plans and Governance	Environmental, Economic
Frequency to evaluate the city impacts	Once at the end of the project	Once at the end of the project	Once at the end of the project

Table 28: Type of impacts and frequency of evaluation selected for the LH's.

More in detail, different environmental impacts have been selected by Vitoria-Gasteiz, Tartu and Sonderborg depending on the interest of each city and the data availability prevision. Their selections are the result of considering the joint effect of all the interventions, and the final purpose of this deliverable. This type of impacts is the one on which there were more options for selection and the one with more variability in the answers coming from the cities as has been reflected in Table 16, Table 20 and Table 24.

The economic impacts in terms of business generated have resulted difficult to be evaluated due to lack of data and complexity to gather the information. This is the reason why they are not included in the evaluation process of Tartu and Sonderborg. In the case of Vitoria-Gasteiz, despite foreseeing to have some data, the calculations could also be dismissed due to lack of information from private companies.

Some of the employment impacts have been considered as interesting to be evaluated in the city of Tartu. For the case of Vitoria all should be potentially calculated although it seems difficult to have a compromise at the moment on their evaluation before having more details on the resources available at the time of calculating them. For the case of Sonderborg, in spite of being considered interesting, such employment impacts are difficult to be evaluated due to lack of data and complexity to gather the information.

Has to be stated that the amount of existing plans and governance processes vary in the LH cities. Thus, the need for developing new plans varies greatly in the three cities depending on their current status. For this reason, the evaluation of city plans/governance impacts is not envisaged for all LH cities in the same way. As has been already mentioned, in Sonderborg

many plans have already been developed leading up to SmartEnCity (e.g. the Smart mobility strategy and the Strategic energy plan), and this has led to dismiss measuring these impacts as those indicators could risks misleading the reader on the real status of the city as only new plans are being evaluated. For the case of Tartu and Vitoria-Gasteiz, the city plans/governance impacts will be measured in both cities because for them they could provide relevant information.

As has been seen in sections 6.2, 6.3 and 6.4 not all impact indicators have been homogeneously selected and some indicators have been chosen by two or just one of the cities, but there is a set of common impacts that will be measured. Table 29 summarizes the common indicators selected by the three cities, all belonging to the environmental and economic areas. Note that for some cases even being a same indicator the definition will not be the same since the parameters or boundary conditions are different among cities.

ENVIRONMENTAL IMPACTS	
Impact to be evaluated	*Indicator for the evaluation*
Energy savings in the city due to district renovation	Residential buildings energy consumption per year
Lower emissions of CO_2 in the city due to district renovation	Emissions of residential and non-residential sectors (CO_2 equiv.)
Lower emissions of CO_2 in the city due to sustainable mobility actions	Transport greenhouse gas emissions
Increase in the use of RES in the city due to district renovation	Percentage of total energy consumed in the city derived from renewable sources
Number of dwellings/buildings retrofitted due to SmartEnCity project	Total number of dwellings and buildings retrofitted in the project
New sustainable vehicles (EV) in the city due to SmartEnCity project	Electric Vehicles by category (cars, taxis, motorbikes, e-bikes, last mile logistic, bus)
Increase of the number of EV charging infrastructures in the city (only public or public & private infrastructure) due to the project	Number of public EV charging stations
Increase in the use of EV charging infrastructures due to the project	Total kWh recharged in the EV charging stations
ECONOMIC IMPACTS	
Impact to be evaluated	*Indicator for the evaluation*
Investment mobilized for the renovation of the district	Total investment made in the renovation of the district from local and regional public funding, EC funding and private funding" (e.g. dwellings' owners, energy companies, social housing companies, etc.). It should be specified for each type of fund.

Table 29: Common impact indicators selected by the three cities

Apart from those described before, there are some other common indicators selected by Vitoria-Gasteiz and Tartu for the employment and city plans & governance impacts, bearing in mind that they would not be measured for Sonderborg. Those are listed in Table 30 below.

EMPLOYMENT IMPACTS	
Impact to be evaluated	*Indicator for the evaluation*
Number of jobs created due to district renovation, mobility actions and citizen engagement actions (specified per category of intervention/action - district renovation, sustainable mobility actions and citizen engagement actions-)	*Number of jobs created:* Total number of jobs created
	Number of jobs created: Total number of jobs created and a posterior link with the city unemployment rate
Profile of employment created due to district renovation, mobility actions and citizen engagement actions	*Professional specialization:* Number of jobs created as higher education and non-higher education and a posterior link with city indicator "working age population with higher education"
New companies created or new services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project	*New services offered:* Total number of services offered by companies due to district renovation, mobility actions and citizen engagement actions during the whole project
Acquisition of training skills due to district renovation, mobility actions and citizen engagement actions during the whole project	*Acquisition of training skills by partners involved in SmartEnCity:* Through Likert scale to be fulfilled by partners
	Acquisition of training skills of workers by training activities in the project (e.g. workers in the district can need to receive some training courses to realize certain works)
CITY PLANS AND GOVERNANCE IMPACTS	
Impact to be evaluated	*Indicator for the evaluation*
New plans/programs in the city linked with the project	Existence of plans/programs to promote energy efficient buildings (YES/NOT)
	Existence of plans/programs to promote sustainable mobility (YES/NOT)
New regulations in the city linked with the project	Existence of regulations for development of energy efficient districts (YES/NOT)
	Existence of regulations for development of sustainable mobility (YES/NOT)
New economic incentives in the city linked with the project	Existence of public incentives to promote energy efficient districts (YES/NOT)
	Existence of public incentives to promote sustainable mobility (YES/NOT)

More involvement of the administration on smart city projects	Involvement of the administration on smart city projects. The evaluation will be made by the work team working in the city diagnosis (LIKERT SCALE)
More collaboration among different authorities from different levels	Multilevel government. The extent to which the city cooperates with other authorities from different levels. The evaluation will be made by the work team working in the city diagnosis (LIKERT SCALE)

Table 30: Common employment and city plans & governance impact indicators selected by Vitoria-Gasteiz and Tartu.

Through the set of high level indicators gathered in this document the main objective initially set has been covered, providing the procedure to estimate the overall impact and performance of the actions at city level. The indicators will allow describing the impact of the integrated actions in the areas of energy, transport and ICT integrating all the evaluation protocols.

The indicators defined in this document will be taken into account in the D7.13 “Evaluation: Assessment of the overall performance”, in which the joint effect and synergies of all the interventions (i.e. building retrofitting, integrated infrastructures, smart mobility and citizen engagement actions) will be considered for the assessment of the impacts produced due to the implementation of SmartEnCity project at city level.

8 Deviations to the plan

No main deviations have to be reported.

Otherwise, must be reminded that some of the indicators, mainly among those related to mobility could not be selected as so far there's not a final decision on the actions that will be considered part of SmartEnCity once the current Amendment process is closed.

Can be remarked here also the possibility of having no evaluation about business generated impacts (under the economic impacts) in none of the cities due to lack of data and complexity to gather the information. So far none Tartu or Sonderborg will be able to calculate such impacts while in Vitoria-Gasteiz, despite foreseeing to have some data, the calculations could also be furtherly dismissed due to lack of information from private companies.

9 Outputs for other WPs

This document provides output for the following future deliverables out of WP7:

WP2 D2.7 (M18), D2.8 (M45)	The integrated methodology developed in these deliverables D2.7 and D.2.8 could take into account this procedure of evaluation of impacts at city level
WP8 D8.7 (M66)	The evaluation methodology could be transferred to the follower cities and through Smart Cities Network as knowledge acquired in WP7

Table 31: Outputs for future SmartEnCity deliverables out of WP7

The questionnaires to evaluate the employment indicators or other indicators that could require them will be included on the document D7.9 “Data collection approach” at M18 since this deliverable deals with the collection procedure.

The units of the common indicators and KPIs to be calculated for the three cities will be also set within document D7.9 “Data collection approach” as well as the final identification of the data sources to be used if that is the case.

Also repeat that this procedure will be used on the assessment phase being the results integrated under deliverable D7.13 “Evaluation: Assessment of the overall performance” where the joint effect and synergies of all the interventions will be considered for the assessment of the impacts at city level after the implementation of SmartEnCity project.