

# D7.13: Reporting to the SCIS System 7

+CityxChange | Work Package 7, Task 7.3 & 7.4

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## *Article 29.5 Disclaimer*

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## List of Acronyms

<b>API</b>	Application Programming Interface
<b>BCV</b>	Bold City Vision
<b>CEM</b>	Common Energy Market
<b>DPEB</b>	Distributed Positive Energy Block
<b>DPED</b>	Distributed Positive Energy District
<b>DER</b>	Distributed Energy Resource
<b>DST</b>	Decision Support Tool
<b>EC</b>	European Commission
<b>eMaaS</b>	eMobility as a Service
<b>FC</b>	Follower City
<b>FoA</b>	Fields of Action
<b>GHG</b>	Greenhouse Gases
<b>GWh</b>	Gigawatt hour
<b>ICT</b>	Information and Communication Technology
<b>IPD</b>	Integrated Planning and Design
<b>KPI</b>	Key Performance Indicator
<b>KPMG FA</b>	KPMG Future Analytics
<b>LCCC</b>	Limerick City and County Council
<b>LHC</b>	Lighthouse Cities
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MERT</b>	Monitoring and Evaluation Reporting Tool
<b>MWh</b>	Megawatt hour
<b>€M</b>	Euro in Millions
<b>NOX</b>	Nitrous Oxides
<b>OV</b>	Officinæ Verdi Group
<b>PEB</b>	Positive Energy Blocks
<b>QDWG</b>	Qualitative Data Working Group
<b>RES</b>	Renewable Energy Sources



<b>ROI</b>	Return on Investment
<b>SCIS</b>	Smart Cities Information System
<b>SCM</b>	Smart Cities Marketplace
<b>SRT</b>	Self-Reporting Tool
<b>UFA</b>	Usable Floor Area
<b>UI</b>	User Interface
<b>WP</b>	Work Package

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## Executive Summary

This report, *Deliverable 7.13: Reporting to the SCIS System (7)*, is part of a series of bi-annual reports and is the seventh iteration in the series; being the subsequent revision of the previous version, *Deliverable 7.12: Reporting to the SCIS System (6)*<sup>1</sup> which provided an overview of KPI performance as of Month 36 of the +CityxChange project.

During the reporting period, Work Package (WP) 7 has seen further engagement between all relevant Key Performance Indicator (KPI) owners and KPMG FA towards the refinement of KPI calculations, the resolution of data reporting issues, the pursuit of alignment in KPI data for the purposes of Self-Reporting Tool (SRT) reporting, and the further enhancement of Monitoring and Evaluation Reporting Tool (MERT) features and functionality - as feedback emerges through use.

As with prior periods, it has become necessary for KPI descriptions, scope and calculations to be reviewed and adjusted as and where necessary. This is due to changing circumstances in data availability and adapting to challenges encountered in aligning this data to reporting standards on an ongoing basis. This process has been facilitated within WP7, and is ongoing so that all KPIs can be captured and reported to the MERT and/or the SRT where possible.

The MERT has seen further KPI calculations confirmed by the KPI Owners and data being submitted mainly for the Common Energy Market (CEM) theme. Furthermore, the MERT has undergone a number of updates and refinements to front- and back-end processes. This includes updates to the database structure to improve data collection for additional KPI metadata. Work on the MERT has included adjustment to the visualisation for better representation of the KPI data within the MERT. As of writing of this deliverable, data for 19 KPIs had been submitted to the MERT, with a total of 23 KPIs having monitoring data reported.

Within the reporting period, two KPIs were classified as potentially incompatible for reporting to the SRT given their data issues and two KPIs were deemed theoretically compatible should data come on stream. Other KPIs are still subject to review. This collaborative process continues with KPI owners, however, WP7 may consider assessing the overall viability of aligning with SRT reporting in the next reporting period. A follow up workshop will then be conducted with each of the partners to verify the calculations and translation of data.

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<sup>1</sup> D7.12 available here: [D7.12: Reporting to the SCIS System 6 - +CityxChange](#)



# 1 Introduction

The description of Task 7.3 (as set out below) and the framework for Monitoring and Evaluation (M&E) developed in Task 7.1 provides the basis for data capturing and reporting within WP7.

**Task 7.3 - The monitoring data harvested according to the methods developed in T7.1-7.3 will be collected in a data repository as part of the M&E system. Where self-reporting features or automation are not implemented, data will be collected via data collection sheets, online surveys, or other appropriate measures.**

In accordance with the task description, the MERT offers a central repository where KPI data is captured, processed, and displayed. To ensure KPI data is captured efficiently and accurately, WP7 has been facilitating a collaborative process with KPI/data owners to refine and confirm KPI calculations. As more data becomes available throughout the project's timeline, this process will enable increased data submission to the MERT and eventual transfer of data to the SRT. Due to interventions in the Lighthouse Cities (LHC) and Follower Cities (FC) being implemented at different stages the flow of KPI monitoring data has been periodic due to the nature of when KPIs were brought online. As the implementation phase of the project continues, it is expected that more data which will inform the confirmation of KPI data capturing processes and the calculation of KPIs will be available.

This report provides an update on D7.12<sup>2</sup>, and the ongoing collaboration with KPI and data owners for the refinement of KPI calculations and the submission of KPI data to the MERT and the SRT. This report also provides an overview of the KPIs' performance as of Month 42, as reported by KPI/data owners, and sets out further enhancements made and planned to the operation and usability of the MERT platform.

The following updates have been made to the D7.13 version:

- Updates to Section 3 ([Section 3](#))
- Data submission to the MERT ( [Section 3.2.1](#))
- Addition of WP7 M&E Roadmap ([Section 3.4](#))
- Work on data input field configuration of the SRT ([Section 4.1](#))
- Refinement of KPI calculations through ongoing KPI workshops ([Section 4.2.1](#))
- Updates to MERT features and functionality ([Section 4.2.2](#))
- Update on KPI performance ([Section 4.3](#))

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<sup>2</sup> D7.12 available here: [D7.12: Reporting to the SCIS System 6 - +CityxChange](#)



- Review of data availability ([Section 4.4](#))

## 2 M&E in +CityxChange

This section provides a summary of the KPI type and definitions detailed in the KPI Framework (developed in D7.1<sup>3</sup>), with the baseline and expected impact over the 5-year period.

As of M42, there have been no changes to KPI targets or baselines. This will be revisited again in the next reporting period.

### 2.1 Recording impact in +CityxChange

The KPI framework provides a detailed breakdown of the definition, calculation methodologies, intended scope and scale of monitoring and other relevant information for the M&E process, and remains the main reference point for information on KPIs used to measure progress and performance of certain interventions in the project.

The table below provides an overview of KPI definitions and types and Baseline.

Table 1: KPI Overview with Expected Impacts and Baselines

Theme	KPI ID	KPI Type	KPI Definition	Expected / Targeted Impact	Base-line
Integrated Planning and Design (IPD)	1	Decision/ planning support	No. of APIs and systems connected to the Decision Support Tool (DST)	20	0
	2	Decision/ planning support	Number of use case stories in the Information, Communication Technology (ICT) Ecosystem repository	15	0
	3	Training and skills development	No. of municipal staff trained to use the DST	40	0
	4	Enabling DPEB/DPEDs <sup>4</sup>	No. of new DPEB/DPED-enabling prototypes	30	0

<sup>3</sup> D7.1 available here: : <https://cityxchange.eu/knowledge-base/approach-and-methodology-for-monitoring-and-evaluation/>

<sup>4</sup> DPEBs/DPEDs - Distributed Positive Energy Blocks / Distributed Positive Energy Districts

Theme	KPI ID	KPI Type	KPI Definition	Expected / Targeted Impact	Base-line
	5	Enabling DPEB/DPEDs	No. of study visits by regulatory authorities	60	0
	6	Enabling DPEB/DPEDs	No. of politically approved Bold City Visions (BCV) with guidelines, roadmaps, and action plans	7	0
	7	Impact on regulation	No. of changes in regulation	15	0
Common Energy Market	8	Greenhouse gas (GHG) emissions	Tonnes of CO <sub>2</sub> -equivalent emission reduction per year	12.801 tonnes/year	0
	9	Air quality	Tonnes per year Nitrogen Oxides (NOX) emissions reduction	6.2 tonnes/year	0
	10	RES share	The percentage of total Renewable Energy Sources (RES) self-supply	Limerick: 100 Trondheim: 75	0
	11	RES Integration	Increase in new renewable energy system integration	4.538 GWh/year	0
	12	District level optimised self-consumption	Percentage district level production versus total energy consumption	47.7 % new production	TBD
	13	Replication	No. of new DPEBs realised	7	0
	14	Energy efficiency	kWh/m <sup>2</sup> usable floor area (UFA) per year improved energy efficiency (final energy demand)	62 kWh/m <sup>2</sup> / year	TBD
	15	RES efficiency	Net useful thermal recovery/year (GWh)	2.134 (GWh) net increase / year	TBD



Theme	KPI ID	KPI Type	KPI Definition	Expected / Targeted Impact	Base-line
	16	Reduction in energy grid investment	€million reduction compared to planned investment	€20M	0
	17	RES curtailment	Percentage of energy grid failures	<1%	0
	18	RES traded	Percentage of the total Distributed Energy Resources (DER) capacity traded	10%	0
	19	RES flexibility	Percentage of peak load reduction (<30 hours)	20%	TBD
	20	RES storage	Increase in installed RES storage capacity	1.15 MWh	0
	21	Increased uptake of e-mobility solutions	Percentage modal shift from fossil-fuel vehicles to eMobility as a Service (eMaaS) (vehicles/bikes)	24 % increase	TBD
	22	Replication	No. of new or existing buildings participating in the energy markets	60	0
	23	Investment	Total new investments generated (€M)	€40M	0
	24	Investment	Percentage reduction in simple payback periods (years)	20% decrease	0
	25	Investment	Annual return on investment (%)	10% annual ROI	0
	26	Investment	No. of new jobs created	900	0
CommunityXChange	27	Community participation	No. community participation events organised across all +CityxChange cities	15	0
	28	Community participation	No. citizen observatories established	5	0



Theme	KPI ID	KPI Type	KPI Definition	Expected / Targeted Impact	Base-line
	29	Community participation	No. of community participation events/actions	55	0
	30	Innovation	No. of innovation labs/playgrounds contributing to the creation of DPEB	5	0
	31	Training and skills development	No. of Positive Energy Champions trained	20	0
	32	Behaviour influence	No. of organisations with new sustainable energy approaches	60	0
	33	Replication	No. of demonstration projects implemented in Follower Cities	35	0

\*Where baselines have not been established/finalised yet they have been left as TBD (to be determined), pending updates from applicable KPI owners.

## 2.2 Evaluating approaches for KPIs with existing and new baselines

As noted in [Table 1](#) above, existing baselines for KPIs #12, 14, 15, 19, 21 are subject to revision, pending clarifications from KPI owners. This will be further discussed with relevant KPI Owners in the next reporting period.



## 3 Data Capturing, Submission & Validation Processes

All relevant project partners who are involved with KPIs (either as KPI owners or data owners) as defined in the project<sup>5</sup> are responsible for the capturing and submission data. The KPI owner ultimately takes the lead in the implementation, testing and monitoring of the interventions implemented through the intended 11 Demonstration Projects. These KPI owners have existing access to the online platform MERT where data measurements can be submitted for analysis and reporting.

The MERT consists of KPI specific data fields for capturing relevant data including thematic fields defined within the SRT. The partners are able to select the project demonstration area, the timeframe of the demonstration and KPI specific metrics for the data being reported on. In the DoA, the project has defined 33 KPIs (as listed in [Table 1](#)) which will be used to measure the impact of Demonstration Projects and interventions over the 5 years of the project and beyond<sup>6</sup>.

Engagement with the KPI owners over the months preceding this deliverable has focussed on further refinement of KPI calculation variables and methods, KPI data capturing and data validation. For KPIs with active reporting, new data that has been generated is submitted to the MERT. This reporting period saw KPI calculation workshops being undertaken to work on the KPI calculations and at the same time ensure that the reported data was accurate. [Section 3.3](#) provides further detail on this.

A specific focus was put on KPIs in Theme 2: Common Energy Market, to determine if and how a selection of the KPIs in this theme could be configured appropriately to be able to report data to the SRT. The result is a list of KPIs that could potentially report the data to SRT (see [Table 3](#)).

### 3.1 Data Capturing Process

During the period, partners continued to capture applicable KPI data through the implementation of project interventions.

KPI Owners must ensure that any personally identifiable data or tracking information is removed before being ready for reporting to the MERT or for WP7 to report to the SRT.

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<sup>5</sup> D7.1 available at: [D7.1 Approach and Methodology for Monitoring and Evaluation - +CityxChange](#)

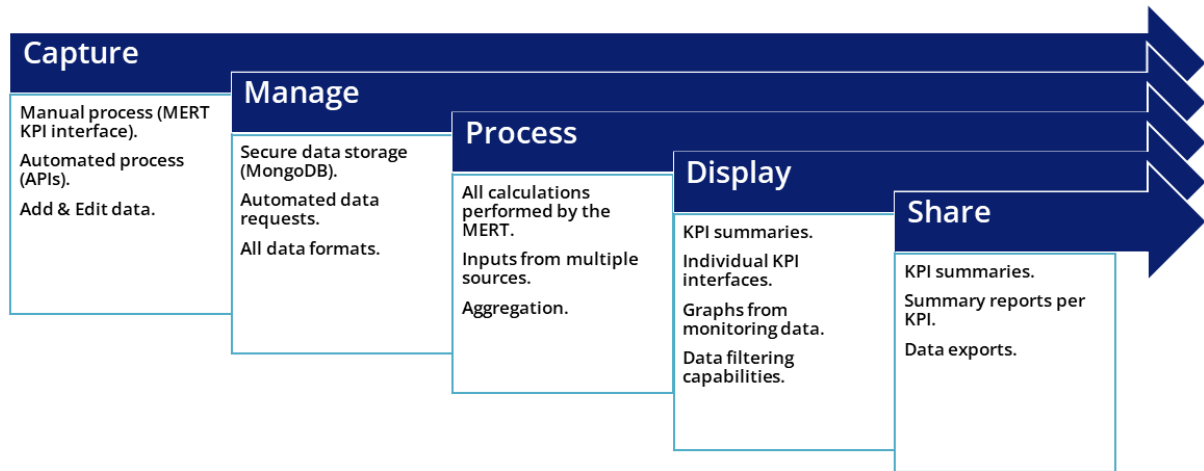
<sup>6</sup> D7.2 (Page 6) available at: [D7.2-Reporting-to-the-SCIS-system.pdf \(cityxchange.eu\)](#)



### 3.1.1 MERT Data Capturing Process

The data capturing process is demonstrated graphically below with key points.

Figure 1: Process of Data Capturing



#### Capture

The KPI owners generate the data based on the demo project(s) implemented within their LHC. Once the data has been generated from the demo projects by the KPI Owner, it is then reviewed and aggregated at source (by the KPI owner). The data reported to the MERT is based on the frequency as set out in D7.1. Due to the varied nature of the KPI data there is a variability in how frequently the data can be processed and reported to the MERT and SRT. The ways in which the KPI Owners can report data is detailed in [Section 3.2](#)

#### Manage

Partners are able to submit the data to the MERT via a login which has been provided by KPMG FA. Partners have the ability to submit data based on the reporting frequency (monthly, bi-annual, annual) of the KPI. The MERT also provides an option to record any additional comments/notes that the partners wish to submit against the data for a specific reporting month. The submitted data is stored in the database for processing in the next step.

#### Process

The stored data undergoes the calculation steps as defined per KPI. The calculations are performed when new data is submitted to the MERT. The calculated values are then stored in the database to be displayed on the KPI dashboard.

#### Display

The MERT was developed to have a dashboard-style look and was split into 3 stages: i) Landing ii) KPI Highlights and iii) KPI info. The submitted data and calculated fields are

displayed on the KPI information page with additional graphics. Viewers of this page have the option to filter the graph data based on the City and Date range.

## Share

The end user has the capability to download the content from the KPI display page on the MERT into a formatted PDF file. This allows the user to share or reuse the data. On Page 2 of the PDF file there is a table that lists the data as filtered for the graphs. All the current formats are available to download under Attribution-ShareAlike 4.0 (CC BY-SA 4.0).

### 3.1.2 SRT Data Capturing Process

As stated in D7.12, the data capturing configurations of the SRT are designed in a standardised way to accommodate data capturing across multiple European Commission (EC) Smart City projects using common themes in an effort to provide comparable results. As such, tailoring of the SRT FoA to fit all the +CityxChange KPI data requirements is a key objective of the project.

WP7 has facilitated within the MERT the ability to capture data as per the FoA designed for SRT compatible KPI to allow KPI Owners to record data and WP7 to report it to the SRT. Further details on data submission, specifically in regards to the SRT, can be found in [Section 3.2.2](#) below.

## 3.2 Data Submission

KPI Owners and Data Owners have the capability to login into the MERT and submit data as it becomes available for their KPIs across the reporting period. This mechanism is in place in order to ensure that the timely reporting of data is possible by KPI owners. The quality and origin of the data is linked to this action in the first instance.

The reporting of data is two-fold. Firstly, reporting to the MERT and secondly, reporting to the SRT (as undertaken by KPMG FA).

WP7 has set out the KPI data capturing fields in the MERT that need to be submitted by the KPI Owners. The KPI owners have two options to submit the data to the MERT, either manually, or automatically via API.

### 3.2.1 MERT Data Submission

The monitoring data of KPIs captured by partners is submitted to the MERT where it is processed and displayed in the individual MERT KPI interfaces. The data can be submitted in two ways - manually, or through an automated process - both of which are described in





more detail in the sections below. Where applicable, data will be transferred manually by KPMG FA to the SCM SRT.

### 3.2.1.1 Automated Data Submission to the MERT

**Data submission is automated through the use of Application Programming Interfaces (API). An API is an Application Programming Interface, which is a software intermediary that allows two applications to communicate with each other using a set of definitions and protocols<sup>7</sup>. APIs enable a link between the MERT and live systems or online project data repositories specified by project partners (KPI/Data owners) from where data can be pulled and stored in the MERT repository.**

This communication is in the form of requests from a web application or server and receiving a response from a dataset. An example of the use of an API could be a weather application that uses an API to pull in data from a repository which contains the raw data. API endpoints are the specific digital location where the requests are sent by the requestee, and the server provides the requested data.

#### 3.2.1.1.1 API Specification and API Endpoint

As data submission through API is the primary intended means for data to be submitted to the MERT, further work in finalising the operation of the provisional API structures for the capturing and sharing of KPI data was undertaken by KPMG FA during the reporting period.

The API specification previously provided in [Annex I](#) of D7.12 (KPI 18 for example) has now evolved into an 'API endpoint'. An API endpoint is a point at which an API - the code that allows two software programs to communicate with each other - connects with the MERT. APIs work by sending requests for information from a web application or web server and receiving a response<sup>8</sup>. This API Endpoint is ready for utilisation within the +CityxChange ICT Ecosystem. Partners, both KPI and Data owners, can use these API Endpoints to load the data available from the MERT into their own systems.

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<sup>7</sup> What is an Application Programming Interface (API) | IBM

<sup>8</sup> What Is an API Endpoint? (kinsta.com)



### 3.2.1.2 Manual Data Submission to the MERT

**Manual data submission process where KPI/data owners access data capturing sheets through the online MERT interfaces where monitoring data from each intervention is captured and stored to the specific KPI in the MERT repository.**

The work on the API specification and automated data sharing is in addition to the standard manual data sharing functionality of the MERT. As previously reported, the MERT still allows manual submission of data by the KPI/data owners through a dedicated data capturing form available through each KPI's individual MERT interface.

The primary reason for opting to use the manual data submission is attributed to the fact that automated data submission (through API), without the proper training is less efficient. In addition to necessary training, the creation of automated data submission for a single value of KPIs is a time consuming and labour intensive task which involves having to insert the values in a system (other than MERT) and providing an API endpoint that can be consumed by MERT and other ICT systems within the +CxC ICT ecosystem. Hence, it is a much more straightforward process to record the values in a system which has the capability to record these values per KPI and provide them for utilisation within the +CxC ICT ecosystem.

KPI calculations performed in the MERT are reviewed by KPMG FA as and when data submissions are made and relevant KPI/data owners are engaged with in order to ensure that data is captured and processed accurately. See Section [4.2.2](#) for further details on calculation refinements that are associated with KPI data reporting.

### 3.2.1.3 Analysing the Benefits and Challenges of Automated and Manual Submission Processes

To achieve the automation of data submission to the MERT, KPMG FA will obtain the data from the Key Performance Indicator/Data owners (server) through APIs – this consists of creating an API endpoint (client) that will send requests to the KPI/Data owners API. These requests will specify what data is to be gathered. For an effective request to be carried out, the client must provide a Uniform Resource Locator (URL), a method – HTTP request i.e., GET<sup>9</sup>, a list of 'headers' and 'body'. KPMG FA will request the information on a weekly or monthly basis depending on how often the data is updated. Once the data is provided it will be uploaded and processed to the MERT.

While it is more efficient to have an automated data submission platform, there will always be a need for manual data submission. The need for manual data submission stems from

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<sup>9</sup> GET - HTTP | MDN (mozilla.org)

the fact that KPIs within the IPD theme require a once-off implementation or recording of the values. This differs when compared to KPIs within the CEM theme which qualify for automated data submission as they generate data on a continuous basis and provide monthly reports. As each of the KPI's have different reporting periods and data, it is necessary to have a manual submission approach. In addition, some partners may feel more comfortable using a manual submission process due to the fact that it requires less technical expertise.

Having a manual data submission also acts as a backup in the case of any unforeseen technical issues that may occur with an automated system. Having an option for manual data submission is crucial in a scenario such as if it is not possible to provide any updates beyond the lifespan of the project or if the data sharing system is attacked and needs to be repaired. Manual data submissions also allows the MERT to record data for the KPIs and ensures continuity in terms of collecting and providing visualisation of the data.

While automatically submitting KPI data to the MERT can be more efficient than manual submissions, it is also a highly technical process. It is recommended that partners receive training in how to automatically submit data to the MERT which will allow for a smoother process in recording the data throughout the lifespan of the project. For future projects and as a learning tool, this training can be included in a Work Package that deals with defining and creation of an overall ICT architecture and service-based ecosystem.

### 3.2.2 SRT Data Submission

The latest proposals for Fields of Action (FoA)<sup>10</sup> have been configured to capture data at city level. Testing of data capturing will commence once FoA inputs and KPI calculations have been confirmed as fully accepted by all KPI owners.

As noted in D7.12, the SRT can only accommodate annualised data, so the data submitted to the MERT is processed (*if necessary, where KPIs reporting frequency is more regular*) and then transferred to the SRT in 12-month cycles from submission. The transfer of data to the SRT does not accommodate automated data sharing through means such as API connections, therefore KPMG FA will perform this summarisation when the reporting cycle is due.

#### 3.2.2.1 Thematic focus of engagement

A focus was put on KPIs in Theme 2: Common Energy Market, in order to determine if and how a selection of the KPIs in this theme can report data to the SRT.

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<sup>10</sup> FoA - the criteria used in the creation of data collection fields in the online SRT manual



Ongoing engagement with KPI owners by KPMG FA has highlighted challenges for SRT reporting; including the provision of the required inputs (availability, format), the spatial scale, and the frequency in which data might be available. Section [4.1.1](#) provides further detail on the selection of KPIs being considered for reporting in the SRT, the proposals presented to KPI owners and the status of ongoing engagement.

### 3.3 Data Validation

Data validation is a critical element of the monitoring and evaluation carried out by WP7. As data availability varies across different KPIs, the WP7 team works closely with KPI owners to secure the refinement of the calculations and their successful translation into the MERT. The quality assurance process is handled on a KPI by KPI basis to ensure that submitted data is accurate and offers a precise snapshot of project progress.

Adjustments through the course of the reporting period to data-values in the MERT are often made to contextualise each data point and to ensure that it is adequately represented in the dashboard. These adjustments can be made by KPI owners directly, and with the support of KPMG FA.

#### Validation Exercises

Existing processes for incrementally checking the status of KPI values submitted (or pending) have been identified for enhancement, and in this reporting period KPMG FA embarked on a series of validation exercises.

A summary of these exercises undertaken and progress made on Data Validation within this reporting period and particular findings points discussed in the refinement process are provided in Table 2. Please note that the below table does not include discussions on KPIs that have been actioned and reported in the previous reporting period.

*Table 2: Summary of Data Validation Actions conducted during the reporting period.*

November 2021 (Exercise)
<ul style="list-style-type: none"> <li>• KPMG FA had conducted a data validation exercise with all the partners having submitted their data to MERT.</li> <li>• A small change was requested by the partner during the activity, and it was subsequently updated within the MERT by KPMG FA.</li> <li>• Where required, KPI data was split to reflect their annual reporting frequency so as to ensure that data consistency was achieved and the KPI's annual targets were</li> </ul>



reflected accurately.

#### Lessons Learned -

- It is important from a visualisation and as well data point of view that the data is entered at regular intervals and not aggregated to just have a single value.

#### **28th January 2022 (status) (Exercise)**

- KPMG FA sent requests to all of the partners to verify if there was any new data generated.
- Partners confirmed there was new data available but not ready to be shared.
- WP7: We held a partner session (workshop) to help the partners understand the new data generated and how it could be helpful for a number of the unconfirmed KPI calculations.
- Partners were requested to review these suggested calculations based on the data generated and to review them before the next reporting period

#### **4th and 17th May 2022 (Exercise & update)**

- KPMG FA sent requests to all of the partners to verify if there was any new data generated.
- Various partners shared the new data which was available.
- Data visualisations misrepresentation for KPI 23 was identified and corrected by KPMG FA. Further detail on the exercise has been outlined in [Section 4.5](#).
- Partners also confirmed that there was some data generated for certain KPIs that they would first like to confirm the calculation before submitting it to MERT. These meetings were then held based on the data generated.

#### **RP3 June (Exercise and update)**

- Partners had updated the RP3 document with the latest data.
- Following validation requests from the coordinator and EB, KPMG FA updated the MERT with the latest data generated at partners end and requested for partners to verify its inclusion on the MERT.
- FC – VORU had confirmed the completion of their target for KPI 6.
- KPMG FA confirmed that all reporting KPI on the MERT was in sync with the latest data available and this was reflected in the RP3 report as well.

### **Enhancements**

The series of data validation exercises conducted across the period and particularly for the RP3 inputs has highlighted where additional enhancements to validation processes are needed. These fall into two areas:



1. The timely communication of updates (monitoring of anticipated data submissions).
2. The timely reporting of data to the MERT by KPI owners (as part of their workflows).

### 3.4 WP7 M&E Roadmap

Over the next reporting period, WP7 will request partners to continue to report any new data generated to the MERT as part of their processing workflows.

KPMG FA will continue to work with partners to ensure that all the monitoring data submissions are done directly to the MERT. As we approach the final phase of ongoing reporting from Month 48 to Month 60; KPMG FA are continuing to support all partners in providing data directly to the MERT and ensuring that all of the relevant data since the commencement of the M&E phase in M6 has been updated appropriately and actively.

In the build up to the start of the last phase of the M&E phase for the remaining outstanding demonstrations, KPMG FA will be conducting KPI workshops with KPI owners as a way of finalising KPI calculations, KPI data headers for reporting to the SCM/SRT, KPI definitions and identify any potential issues in gathering and reporting data before the beginning of the M&E phase in M48 (November 2022). If there are any potential issues/delays in reporting data to the MERT due to external roadblocks in implementing +CxC initiatives these will be flagged and highlighted in the next iteration of this deliverable (D7.15).

Once the last stage of the M&E phase (M48-M60) has started, KPMG FA will continue to coordinate with +CxC KPI owners and establish a more direct line of communication in regard to the submission of KPI data. This line of communication will build on the KPI workshops held prior to the M&E phase and will be based on the frequency of KPI reporting and will be hosted by WP7. These meetings will enable KPI owners to submit data to the MERT and highlight any ongoing or potential challenges in gathering and submitting this data to the MERT. These KPI meetings will also help in preparing the final reports for WP7 and identify further lessons learned for replication of the project's initiatives.

The table below highlights the engagement and expected results from the KPI workshops and meetings:



Table 3: M&amp;E Approach

WP	Specific Engagement and Expected Results
WP4	<p>KPI Workshop Meetings to be conducted from M42-48 with WP4 and WP5:</p> <ul style="list-style-type: none"> <li>• Finalisation of KPI calculations</li> <li>• Finalisation of KPI definitions</li> <li>• Finalisation of KPI data headers for reporting to the SCM/SRT</li> <li>• Mitigation measures for partners who have experienced external roadblocks in implementing KPI measures</li> </ul> <p>KPI Meetings to be conducted from M48-M60 with KPI owners:</p> <ul style="list-style-type: none"> <li>• Continuous submission of data based on KPI reporting frequency</li> <li>• Identification of continuous external roadblocks for partners which can be flagged and highlighted in deliverables/reports.</li> </ul>
WP5	
WP6	



## 4 Reporting Data to the SRT and MERT

Data generated by +CxC partners' interventions is captured by KPI owners and is submitted to the MERT for further processing and display through various interfaces. This is intended to be done in a manner that is consistent with reporting to the SRT (by WP7). An update on the usage of these data portals is provided in the subsections below:

### 4.1 SCM / SRT reporting

A number of KPIs record only a single data point, and as such there is no availability or means for this quantitative data to be recorded in an SRT compatible manner. On the other hand, several other KPIs which record multiple factors, such as RES and DER hosting capacity, peak load level, flexibility from energy providers, etc. are more compatible, as they feed into further analysis of the implementation of interventions that are helping in achieving the targets for energy KPIs. KPIs which contribute to achieving KPI energy targets in this manner are more likely to be compatible for alignment with SRT requirements.

Efforts to ensure KPI alignment with reporting to the SRT have resulted in only a selection of KPIs that can potentially be reported to the SCIS SRT.

KPMG FA has undertaken further engagement with KPI owners in this reporting period, with a view to finding appropriate methods to configure the SRT data reporting fields to best align with project KPIs. Tables [3](#) and [4](#) provide an overview of ongoing work regarding these efforts.

Engagement with partners has included recurring online workshops to discuss and refine the calculation of KPIs, which is conducted to confirm an agreed calculation methodology of each KPI and who/when/what data is required for the calculation. Numerous workshops were held with various partners and KPI owners to discuss KPI calculation refinement, the results of which have fed into the further improvement of the MERT and various WP7 deliverables related to Tasks *7.2 - Development of a Data Collation, Management and Analysis Approach*, *7.3 - Data Collection and Management* and *7.4 - Developing Practical Recommendations and Guideline Reports based on +CityxChange Results*.

Based on workshop engagements, KPMG FA understands that the KPIs agreed in principle for SRT/SCM submission have no data generated to be reported to MERT and allow KPMG FA to further submit it to the SCM/SRT. The KPI workshops held with partners helped in confirming KPI data headers (which are the input values of the KPI that the partners submit under to support the calculations within MERT) and as well a few for SCM/SRT. Following on from these KPI workshops which have been discussed in [Table 4](#) and [Table 6](#), in the next





iteration of this deliverable D7.15, KPMG FA will confirm the viability of the KPI data headers once the data is available from the relevant partners.

KPMG FA has liaised with the SCM/SRT group in order to find viable options if such reporting is possible at a KPI level. An alternative option to allow for data submission to the SCM/SRT via the BEST table on a PED level is currently being developed and will be further evaluated in D7.15.

In addition to this quantitative effort, KPMG FA also hosts a series of Qualitative Data Working Groups (QDWG) workshops. These workshops focus on qualitative data evaluation and are used to highlight lessons learned from LHC and FC within this reporting period, including the collation of information from direct interviews, feedback evaluation forms and deliverables review. Regular interactions with project partners were held to follow up on the progress of city-specific tasks and as a means of a support mechanism where challenges and solutions are discussed. Building on the engagement that takes place through the QDWG, which meets every three weeks, specific progress has been captured and discussed with project partners.

#### 4.1.1 KPI feasibility for SRT reporting

A number of KPIs are under examination by KPMG FA and KPI Owners for reporting to the SRT. In [Table 3](#) below, the 'Status for SRT Reporting' column refers to the potential feasibility of capturing KPI data in a manner that is compatible for SRT reporting.

If marked as 'Potentially, TBC', a review of the KPI's calculation methods in the MERT and SRT are still actively underway, and that the final KPI calculation method and variables are still to be confirmed by all parties. Overall, there are eight KPIs which are in view of being made reportable to the SRT.

*Table 4: KPIs to potentially report to the SRT, and agreed in principle*

KPI	KPI Definition	KPI owner	Status for SRT Reporting	Action and Request
12	Percentage district level production versus total energy consumption	MPOWER, SV, TE	Potentially, TBC	KPMG FA will be connecting with KPI owners in the next reporting period based on data that was generated in LHC - Trondheim and evaluate the data headers that are available to bring them in line with the SRT FoA.



KPI	KPI Definition	KPI owner	Status for SRT Reporting	Action and Request
14	kWh/m <sup>2</sup> (UFA) per year improved energy efficiency (final energy demand)	MPOWER, SV, TE	Agreed in principal	SRT FoA are to be revisited once the KPI Owners have started generating data.
15	Net useful thermal recovery/year (GWh)	MPOWER, SV	Agreed in principal	SRT FoA are to be revisited once the KPI Owners have started generating data.
16	€M reduction compared to planned investment	MPOWER, SV, TE	Potentially, TBC	KPMG FA has proposed further reporting options for consideration by KPI Owners and is awaiting responses.
17	Percentage of energy grid failures	MPOWER, SV, TE	Agreed in principal	SRT FoA are to be revisited once the KPI Owners have started generating data.
19	Percentage of peak load reduction (<30 hours)	MPOWER, NTNU, SV, TE	Agreed in principal	SRT FoA are to be revisited once the KPI Owners have started generating data.
20	Increase in installed RES storage capacity	TE, MPOWER	Potentially, TBC	KPMG FA has proposed further reporting options for consideration by KPI Owners and is awaiting responses. No specific agreement was reached with the KPI Owners.
21	Percentage modal shift from fossil-fuel vehicles to eMaaS (vehicles/bikes)	LCCC, ABG, TK	Potentially, TBC	KPMG FA has proposed further reporting options for consideration by KPI Owners and is awaiting responses.

[Table 4](#) provides more information on the calculation gaps and ongoing work on the KPI calculations.

Workshops were undertaken with KPI owners for each of the KPIs listed above, resulting in proposed options for SRT reporting which were issued for consideration by KPI owners. KPMG FA will move to conclude these options with partners in the next reporting period; as



the finalisation of which KPIs can feasibly report to the SRT platform is pressing. For further details on KPI Workshops and their progress, refer to [Table 6](#).

#### 4.1.2 Identified gaps and outcomes for SRT reporting

Throughout the engagement undertaken in this period with KPI owners, KPMG FA and partners have identified various gaps and challenges in aligning KPI data flows with the reporting input requirements for SRT.

[Table 4](#) below, sets out a summary of the identified gaps and latest outcomes for each KPI under examination for integration and reporting to SRT:

*Table 5: Engagement on KPIs to report to SRT - showing identified gaps and latest outcome*

KPI	KPI Definition	Calculation Gaps	Update (M42)
12	Percentage district level production versus total energy consumption	KPI/data owner inputs required: Need to confirm whether proposed calculation (from D7.1 and further revisions proposed) is viable, i.e. can they provide the data inputs required to perform the calculation; Need to confirm whether the calculation is accurate and provides the correct output; Need to consider the proposed SRT option, i.e. can they provide the data inputs required in the SRT FoA	Ongoing engagement with KPI owners (LCCC and TK, and involvement of MPOWER and TE) on data availability and subsequent calculation methods. Awaiting input from KPI owner for finalisation of capturing fields in MERT/SRT. SRT option presented, currently under review by KPI/data owners. Impact of potential changes to LCCC PEB and Gloschaugen PEB on KPI description / scope / targets being reviewed.
14	kWh/m <sup>2</sup> (UFA) per year improved energy efficiency (final energy demand)	KPI/data owner inputs required: Need to confirm whether proposed calculation (from D7.1 and further revisions proposed) is viable, i.e. can they provide the data inputs required to perform the calculation; Need to confirm whether the calculation is accurate and provides the correct output; Need to consider the proposed SRT option, i.e. can they provide the data inputs required in the SRT FoA	As per the KPI Workshop, which was held on the 23 <sup>rd</sup> of May, both TK and LCCC, have confirmed that it will be possible to provide the data inputs required to perform the calculations, thermal energy demand, electrical energy demand, measured energy demand and serviceable floor area of the building.

KPI	KPI Definition	Calculation Gaps	Update (M42)
15	Net useful thermal recovery/year (GWh)	<p>KPI/data owner inputs required: Need to confirm whether proposed calculation (from D7.1 and further revisions proposed) is viable, i.e. can they provide the data inputs required to perform the calculation; Need to confirm whether the calculation is accurate and provides the correct output; Need to consider the proposed SRT option, i.e. can they provide the data inputs required in the SRT FoA</p>	<p>Ongoing engagement with KPI owners. KPI owners confirm preliminary acceptance of the proposed calculation method, pending confirmation once data variables become available (no monitoring data available yet).</p> <p>Potential discrepancy in description of KPI is currently under review - calculation of 'net useful' energy needs to be defined, as all thermal energy generated is useful, but is not the 'net figure' as thermal systems consume energy. Proposal by TK on the change in KPI criterion to "useful thermal energy" should be reviewed, considered, and agreed upon by all KPI owners.</p> <p>There has been no update from TK in regards to KPI 15 at this time. This will be addressed in the next iteration of this deliverable.</p> <p>LCCC confirmed that they will be in a position to provide the required data headers for calculating KPI 15 by the next reporting period.</p>
16	€M reduction compared to planned investment	<p>KPI/data owner inputs required: Need to confirm whether proposed calculation (from D7.1 and further revisions proposed) is viable, i.e. can they provide the data inputs required to perform the calculation; Need to confirm whether the calculation is accurate and provides the correct output; Need to consider the proposed</p>	<p>As per the KPI Workshop, which was held on the 23<sup>rd</sup> of May, MPOWER has indicated that based on the current legislation, it will not be possible to provide the data inputs required to align with SRT requirements. MPOWER is evaluating probable alternative solutions to start collecting data as required by the KPI requirements.</p>

KPI	KPI Definition	Calculation Gaps	Update (M42)
		SRT option, i.e. can they provide the data inputs required in the SRT FoA	TE is evaluating the data headers shared at the meeting to align with SRT.
20	Increase in installed RES storage capacity	<p>KPI/data owner inputs required:</p> <p>Need to confirm whether proposed calculation (from D7.1 and further revisions proposed) is viable, i.e. can they provide the data inputs required to perform the calculation;</p> <p>Need to confirm whether the calculation is accurate and provides the correct output;</p> <p>Need to consider the proposed SRT option, i.e. can they provide the data inputs required in the SRT FoA</p>	<p>Ongoing engagement with KPI owners. MPOWER confirms preliminary acceptance of the proposed calculation method, pending confirmation once data variables become available (no monitoring data available yet). Awaiting input from other KPI owners for finalisation of capturing fields in MERT/SRT.</p> <p>LHC Trondheim (TE) – The partner had planned to perform test runs on their implementations beyond the reporting period. There will be confirmation in the next iteration of this deliverable whether this KPI can be aligned with SRT requirements.</p> <p>LHC Limerick (MPOWER) – Data can be provided to perform calculations and to be discussed further with IES to understand the level of data available. To be finalised in the next reporting period.</p>
21	Percentage modal shift from fossil-fuel vehicles to eMaaS (vehicles/bikes)	<p>KPI/data owner inputs required:</p> <p>Need to confirm whether proposed calculation (from D7.1 and further revisions proposed) is viable, i.e. can they provide the data inputs required to perform the calculation;</p> <p>Need to confirm whether the calculation is accurate and</p>	<p>Ongoing engagement with KPI owners on suitable calculation methods. New mobility partner, GoCar, is included in the engagement for LCCC. Awaiting input from KPI owner for finalisation of capturing fields in MERT/SRT. Options for SRT presented, currently under review</p>

KPI	KPI Definition	Calculation Gaps	Update (M42)
		provides the correct output; Need to consider the proposed SRT option, i.e. can they provide the data inputs required in the SRT FoA	by KPI/data owners. Option to calculate the KPI as presented by 4C is to involve the PTA (using their passenger statistics), get traffic data and car sales data (el/fossile shares) from NRA and get data from bicycle and pedestrian counters from the municipality, plus any other source that could give time-series on transport modal shifts.

### 4.1.3 Reporting to SRT

Between M36 and M42, KPMG FA has worked with KPI owners to develop and propose different KPI data reporting templates that reflect data field configurations which may be compatible for reporting to the SRT. These are based upon alignment with the SRT's FoA and have been reviewed and discussed with KPI owners through workshops throughout the reporting period, to determine the best way in which KPI data can be captured and integrated. Alignment seeks to better match available data with the reporting input fields sought by the SRT system. Please refer to [Annex II](#) for reference.

As agreed with the partners of KPI 14, 15, 17, 19 FoA have been agreed upon. At present there is no data being uploaded to the MERT and SRT since there has been no data generation. This is due to ongoing challenges in regard to the energy system and installation of alternative equipment. The partners are having ongoing discussions with relevant stakeholders regarding these challenges in order to finalise a solution for the M&E phase. The KPIs will go through another round of adjustments post data availability.

KPMG FA continues to collaborate and engage with the relevant KPI owners to confirm data input configurations to align with both SRT and MERT.

### Risk

Given the extent of ambiguity across all eight KPIs being considered for reporting to the SRT, KPMG FA must note the increasing risk in relation to the overall viability of pursuing further SRT integration. This is due to the continued use of resources that this task requires and what appears to be significant divergence in how data for the KPIs can be collected in a manner that would be suitable for SRT reporting requirements.



Despite the evolving nature of the KPIs throughout the lifespan of the +CxC project, it has not proved possible to align the KPIs with reporting to the SRT to the point of being able to report as of yet. KPI 16 is an example where serious doubts exist as to the feasibility of data capture.

With all of these concerns in mind, KPMG FA will review the appropriateness of making a final decision in regard to the continued development and utilisation of resources towards SRT integration in the next reporting period - should resolutions to the outstanding KPIs not be possible. KPMG FA will seek input from the project coordination team in respect to this evolving risk.

## 4.2 The +CityxChange MERT

As developed by WP7 (and described in D7.4<sup>11</sup>) the MERT provides an online dashboard where the performance of the 33 +CxC KPIs are calculated and disseminated.

Changes in this reporting period have been highlighted under sub-section [4.2.1.1](#) and [4.2.2](#) with respect to the previous version of this deliverable (D7.12).

WP7 has facilitated several collaborative workshops and calls with KPI and data owners in an effort to refine KPI calculations that would measure project intervention performance.

These workshops have aimed to confirm KPI calculations that facilitate data capturing and processing in the MERT (and, where relevant, the SRT). KPMG FA has engaged and collaborated with relevant partners on ongoing WP7 tasks to ensure the successful implementation of the wider M&E framework. Effort consisted of designated workshops and meetings focusing on KPI calculations, stakeholder engagement and the formulation of best practice, recommendations, etc., from the project's collective knowledge. The outputs from these consultations allowed WP7 to monitor ongoing activities and to facilitate replication across FCs. The results are fed into periodic reports which are produced biannually (T7.3) and annually (T7.4).

### 4.2.1 KPI Calculations

Engagement with partners during the period has included multiple recurring online workshops to discuss and refine the calculation of KPIs which are not yet finalised. This was conducted to develop agreed calculation methodologies and clarify what data is required for the calculation. Numerous workshops were held with various partners and KPI owners

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<sup>11</sup> D7.4 available here: <https://cityxchange.eu/knowledge-base/monitoring-and-evaluation-dashboard/>



to discuss KPI calculation refinement, the results of which have fed into the further improvement of the MERT.

WP7 has coordinated KPI calculation workshops specifically for KPIs in the Common Energy Market theme (KPI 8 - 26). In these workshops KPI and data owners have discussed the various challenges, variables, and calculation approaches of KPIs, in an effort to get alignment on the calculation methods and clarity on the data requirements for each calculation.

The proposals, comments and discussions have been noted by KPMG FA in [Table 6](#), which informs the refinement of the KPI calculation methodologies. Agreed changes and refinements to calculations and descriptions are subsequently brought to the MERT, to ensure that partners' data inputs are correctly processed and displayed on the MERT dashboard.

#### 4.2.1.1 KPI Calculation Status and Updates

As illustrated in the previous deliverable of this series, the table below provides the latest calculation refinement status of all the KPIs. The table below confirms which KPI calculations have been agreed and confirmed since the prior deliverable, and which KPIs are still undergoing review and refinement by KPI/data owners. Data Headers are the parameters that the partners submit under to support the calculations within MERT.

*Table 6: KPI Calculations Status (changes/updates highlighted in green and orange as underlined)*

KPI	Status	KPI	Status	KPI	Status
1	Confirmed	12	<u>Confirmed, pending review once data is available</u>	23	<u>Confirmed, pending review of data headers</u>
2	Confirmed	13	Confirmed	24	<u>Confirmed, pending review once data is available</u>
3	Confirmed	14	<u>Confirmed, pending review once data is available</u>	25	<u>Confirmed, pending review once data is available</u>
4	Confirmed	15	<u>Confirmed, pending review once data is available</u>	26	<u>Confirmed, pending review of data headers</u>
5	Confirmed	16	<u>Under review</u>	27	Confirmed





KPI	Status	KPI	Status	KPI	Status
6	Confirmed	17	<u>Under review</u>	28	Confirmed
7	Confirmed	18	<u>Confirmed, pending review once data is available</u>	29	Confirmed
8	Confirmed	19	<u>Under review</u>	30	Confirmed
9	Confirmed	20	<u>Confirmed, pending review once data is available</u>	31	Confirmed
10	<u>Confirmed, pending review once data is available</u>	21	Under review	32	Confirmed
11	<u>Confirmed, pending review once data is available</u>	22	Confirmed	33	Confirmed

Recent engagement and collaboration with partners through multiple KPI workshops have addressed questions regarding the refinement of KPI calculations. The KPI calculations that are still 'under review' will systematically undergo a refinement process with relevant KPI/data owners.

Table 7: Summary of KPI Progress

Summary of Progress
<b>KPI 10 - The percentage of total Renewable Energy Sources self-supply</b> <b>KPI 11 - Increase in new renewable energy system integration</b> <b>KPI 12 Percentage district level production versus total energy consumption (GWh)</b>
<p>TK</p> <ul style="list-style-type: none"> <li>Discussed on the data headers based on previous and KPI intervention data available.</li> <li>Discussed the calculation methodology for each KPI.</li> <li>KPMG FA proposed calculation was accepted by the partner.</li> </ul> <p>KPI 10</p>



- The thermal and electric energy values are to be combined to reflect the total value before CxC interventions.
- TK may be able to provide data for consumption for some heat pumps but not all. TK can get data directly on the number of kWh NET production of thermal energy, and this is in fact the values needed for this KPI.

#### KPI 12

- The electric consumption from running the heat pump is subtracted from the overall value of district level production.
- A heat pump will consume some electric energy when in operation so the total consumption will have to include both types of energy consumption (electric and thermal). However, only the consumption for heat pumps is embedded in the cross value of KPI 12, which means that in the current setup of building-integrated heat pumps it is mostly not possible to separate the consumption per asset from building consumption.
- These values for KPI 12 are annual values rather than monthly values.
- The consumption per building in the PEBs has been separated from the existing Renewable Energy Sources.

#### Actions carried out:

- Based on the calculation methodology accepted, data headers were accepted by TK and an understanding of the generated data was provided.
- WP7 was able to align the data for all the 3 KPI within MERT.
- Calculated new values were generated and updated in the MERT.

#### Action for next reporting period:

- Planned next actions for a meeting with the partner in September 2022 for necessary updates, details concerning KPI reporting, inputs to MERT and other finer details.

### **KPI 13 - The number of new DPEBs realised**

#### General

- The target of 7 for this KPI is distributed over all 7 cities (2xLHC and 5xFC). WP7 does not expect LCCC to have a target of 3 and TK to have a target of 4 PEDs. It is anticipated that each city will have a target of one PED each; but this is in the process of being updated and will be reflected in the next deliverable and on the MERT.
- Based on the target distribution among LHCs and FCs, TK is expected to overachieve their target by 1.

### **KPI 14 - kWh/m2 (UFA) per year improved energy efficiency (final energy demand)**

### **KPI 15 - Net useful thermal recovery/year (GWh)**



## General

- KPI 15 - Clerical error corrected. Expected impact (target) for MPOWER was previously stated as 1.43GWh, but now corrected to 0.143GWh. Overall KPI target is not affected.

## MPOWER

- To review the mismatch in KPI target.
- Able to submit the data as per the proposed calculation in D7.1
- SRT viability has been agreed in principle. Partners agree that these KPIs may need to be revisited on the FoA once the data is available and are made aware that before M48 is when this needs to be decided.

## TE

- Able to submit the data as per the proposed calculation in D7.1
- SRT viability is agreed but once data is made available we need to revise FoA if required.

## Actions for next reporting period:

- WP7 will continue to liaise with partners to resolve outstanding items.
- Proposal by TK on the change in KPI criterion to "useful thermal energy" will be reviewed, considered, and agreed upon by all KPI owners.

**KPI 16- €M reduction compared to planned investment****KPI 17 - Percentage of energy grid failures**

## MPOWER

- Issue with getting access to data from the Grid company.
- Although there is partial data available, the partners believe that due to the lack of data access from the grid company, it is not enough to perform the defined calculations, hence the KPI needs to be re-evaluated.
- Ongoing partner discussions with WP4.

## TE

- Partner has noted a need to review further when data is available
- Partner will be re-evaluating KPI based on the implementation starting in July (still in testing phase).

## Actions for next reporting period:

- Workshop with the partners to confirm the KPI data availability.

**KPI 18 - Percentage of the total installed DER capacity traded**

## TE

- Energy Market (Beta) is planned to start from approx. 30th June 2022.

**KPI 19 - Percentage of peak load reduction (< 30 hours)**

## MPOWER

- Lack of access to grid company systems has impacted the KPI. Further clarification is required to identify at what stage the Peak load needs to be measured.
- MPOWER is exploring ways to detect peak loads and intervene through virtual demonstration instead of simulations. In the first phase MPOWER will only send a warning message. In the second phase MPOWER will explore the possibility of installing additional digital control devices that will allow us to intervene physically inside the prosumers' premises (all behind the metre).

## TE

- Partner identified minimal improvement through ICT implementation.
- At the start, a small deviation to the percentage of peak load reduction was recorded but was not consistent later on.

## Actions for next reporting period:

- Workshop with the partners to understand progress on the KPI data availability.
- Partner (TE) will consider alternate actions that can be taken and revert back to WP7 lead in the next reporting period.

**KPI 20 - The increase (MWh) in installed RES storage capacity (including batteries)**

## MPOWER, TE

- IES has the data for MPOWER. TE/TK data is straightforward.
- Need to review the data from IES before finalising data headers for calculations
- SRT FoA will follow-up post decisions on data headers.
- SRT viability is strong.

## Actions for next reporting period:

- Connect with IES in the next reporting period.
- Workshop to be held with partners to confirm if the KPI's data headers are viable for submission to the SRT and include IES for integration with MERT.

**KPI 23 - Value of total new investment triggered by the project****KPI 26 - Number of new jobs created**

## R2M

- Discussed KPI data headers that can be submitted to the MERT
- Understanding by WP7 of various data headers available in the existing internal replication tracker sheet
- Discussed the creation of a Pivot table to enable ease of understanding relevant data for submission to the MERT.
  - Discussed segregating the data based on partners. *There are ongoing discussions to identify a better way of classifying the data based on city.*
- The aggregate project-level values can be reported as per KPI definition, they are built on internal individual tracking. The aggregate does not just sum up from only the individual



city-level values, but also outside of city limits replication is taking place. The MERT is not designed to handle this and will see a further change in the next period.

- Demonstrated data submission to MERT
- Planned to meet in the 1st week of June 2022 approx.

Actions for next reporting period:

- KPMG FA to conduct review of data submission headers.

#### **KPI 24 - Percentage reduction in simple payback periods (years)**

#### **KPI 25 - Annual Return on Investment (ROI)**

OV

- Data Headers was re-evaluated and updated upon further consultation with another member from OV
- Discuss on the Average weighted method for calculations
- Discussion on other metadata that could be reported for the KPI and it's relevance
- The calculation was set as subject to change, considering data availability.

Actions for next reporting period:

- To review the calculations once the data is available to the partners.

### 4.2.2 Refinement of MERT functionality/features

The MERT prototype released as part of D7.4 has undergone numerous updates. Recent updates to the MERT in this reporting period have seen improvements to data visualisation and filtering capabilities in the KPI interfaces, as well as updates to how the KPI descriptions are displayed.

The improvements made to the MERT and those in progress are listed in Table 7 below.

Table 8: Improvements to the MERT

Modification Type	Theme	Improvement	Status
Front-end	UI	To improve the way the dashboard is viewed on a mobile device.	Ongoing (recurring based on further updates to UI) [M48]
Front-end	Fix designs	Features added for filtering data based on City and Year need further revision.	Decision was made around prioritisation of KPI calculations and data quality checks. Work in Progress[M48]

Modification Type	Theme	Improvement	Status
Front-end	Update	<ol style="list-style-type: none"> <li>1. Add a combination chart to represent the target line for each KPI.</li> <li>2. Update data representation/visualisations</li> <li>3. Ensure complete data is shown.</li> <li>4. Update a number of visualisation issues.</li> </ol>	Decision was made around prioritisation of KPI calculations and data quality checks. Ongoing [M42-48]
Front-end	Fix Errors	Fix PDF Download	Completed. The KPI data PDF download is fixed
Front-end	Add	Add FAIR data availability to data exports	Data download option to be added. All public downloads will have this as a note at the bottom of the page in the next update to the MERT [M48]
Front-end	Update	Update notification text for KPI with no data for clearer description of reasons (including data (partly) available, but processing not yet defined)	Completed. Updated the webpage to reflect the new suggested wording.
Back-end	Add	Integrate KPI calculations as confirmed by partners. KPI 10, 11, 12, 13, 14, 22, 23, 24, 25, 26	Completed. Calculations within MERT are working for the said KPI. Confirmation of non-calculation relevant data fields for KPI 23, 26 pending.
Back-end	Add	Provision of SRT fields to partners for data submission. KPI 14, 15	Completed. KPI data fields are updated.
Back-end	API	Provisional API for Data accessing from MERT.	Provisional API Endpoints available since M36 - Completed
Back-end	API	Connecting to other ICT systems like DST within the +CxC ICT ecosystem	Work in Progress [M48-54]



## Roadmap

To best plan for and coordinate the undertaking of identified and requested enhancements to the MERT, KPMG FA set out and shared a development roadmap to track the status of enhancements to the MERT and serve as a 'live document' through their undertaking. This roadmap provides an accessible window into timelines, status and delivery and reflects our implementation of feedback received.

WP7 has engaged with WP 4, 5, 8, 10 and 11 to discuss the operation, interface, and functionalities of the MERT to deliver a dashboard that is easy to use for project partners and the public. Whilst some urgent adjustments were carried out during the period, larger elements had to be rescheduled for resolution in the next period, due to prioritisation required elsewhere. WP7 will ensure that the refinements noted in [Table 7](#) will be progressed and resolved as set out, with regular communication as to status relayed.

## Ongoing

As with any live-system that is in use, requests for adjustments raised will be assessed and scheduled at the next available time, depending on the assessed level of urgency.

Anticipated refinements to KPIs when data becomes available or when calculations are fully agreed, as well as corresponding updates to the MERT User Interface (UI) for some, will be undertaken in a similarly scheduled manner.

Existing gaps in data, KPI calculations, and functionalities within the MERT will be addressed as and when more data becomes available from KPI owners, and as KPI calculations are resolved with partners.

## 4.3 KPI Performance Status at Month 42

During this period, many KPI owners have been submitting data to the MERT. KPI data has been captured for 23 KPIs as of M42. The number of data submissions for each KPI are included in [Table 8](#) below. The data for these KPIs are processed and compared to the KPI target on the MERT to provide performance information for each KPI.

The table below provides an overview of the KPI performance as of M42:

*Table 9: Expected impact and current achievement and preparation status as of M42 (KPI reporting).*



KPI ID	KPI Definition	Expected Impact (Target) / KPI Owner	Measured data	Performance vs Target (%) per partner	Overall Target	Overall Achievement	Overall Performance
1	No. of APIs and systems connected to the Decision Support Tool (DST)	IESRD: 20	IESRD: 20	IESRD: 100%	20	20	100%
2	No. of use case stories in the ICT Ecosystem repository	NTNU: 15	NTNU: 17	NTNU: 113%	15	17	113%
3	No. of municipal staff trained to use the DST	LCCC: 15; TK: 15; MAI: 2; MP: 2; SB: 2; SMO: 2; VORU: 2	LCCC: 20; TK: 29; MAI: 0; MP: 0; SB: 0; SMO: 0; VORU: 0	LCCC: 133.33%; TK: 193.33%; MAI: 0; MP: 0; SB: 0; SMO: 0; VORU: 0	40	49	123%
4	No. of new DPEB/DPED-enabling prototypes	LCCC: 13; TK: 13; MP: 2; SMO: 2	LCCC: 11; TK: 13; MP: 0; SMO: 0	LCCC: 84.62%; TK: 100%; MP: 0; SMO: 0	30	24	80%
5	No. of study visits by regulatory authorities	LCCC: 20; TK: 20; MAI: 4; MP: 4; SB: 4; SMO: 4; VORU: 4	LCCC: 22; TK: 11; MAI: 0; MP: 0; SB: 0; SMO: 0; VORU: 0	LCCC: 110%; TK: 55%; MAI: 0; MP: 0; SB: 0; SMO: 0; VORU: 0	60	33	55%
6	No. of politically-approved Bold City Visions (BCV) with guidelines, roadmaps, and action plans	LCCC: 1; TK: 1; MAI: 1; MP: 1; SB: 1; SMO: 1; VORU: 1	LCCC: 1; TK: 1; MAI: 0; MP: 0; SB: 0; SMO: 0; VORU: 1	LCCC: 100%; TK: 100%; MAI: 0; MP: 0; SB: 0; SMO: 0; VORU: 100%	7	3	43%
7	No. of changes in regulation	LCCC: 5; TK: 6; MP: 2; SMO: 2	LCCC: 5; TK: 0; MP: 0; SMO: 0	LCCC: 100%; TK: 0; MP: 0; SMO: 0	15	5	33%
8	Tonnes of CO <sub>2</sub> -equivalent emission reduction per year	LCCC: 1.188; TK: 11.613	LCCC: 0; TK: 1.171	LCCC: 0; TK: 10%	12.801	1.171*	9%*
9	Tonnes per year	LCCC: 1.5; TK:	LCCC: 0;	LCCC: 0; TK:	6.2	1.3*	21%*





KPI ID	KPI Definition	Expected Impact (Target) / KPI Owner	Measured data	Performance vs Target (%) per partner	Overall Target	Overall Achievement	Overall Performance
	Nitrogen Oxides (NOX) emissions reduction	4.7	TK: 1.3	28%			
10	The percentage of total Renewable Energy Sources (RES) self-supply	LCCC: 100%; TK: 75%	LCCC: 0; TK: 48%	LCCC: 0; TK: 64%	LCCC: 100%; TK: 75%	-	LCCC: 0; TK: 64%
11	Increase in new renewable energy system integration	MPOWER: 1.29GWh; SV+TE: 3.27GWh;	MPOWER: 0 SV + TE: 2GWh	MPOWER: 0; SV + TE: 62%	4.56	2	44%
12	Percentage district level production versus total energy consumption	MPOWER: 11.8.7%; SV+TE: 35.9%	MPOWER: 0; SV+TE: 39%	MPOWER: 0; SV+TE: 39%	47.7%	39%	82%
13	The number of new DPEBs realised	LCCC: 1; TK: 1; MAI: 1; MP: 1; SB: 1; SMO: 1; VORU: 1	LCCC: 0, TK: 0	LCCC: 0, TK: 0	7	-	-
14	kWh/m2 (UFA) per year improved energy efficiency (final energy demand)	MPOWER: 130, SV: 25, TE: 32	MPOWER: 0, SV: 0, TE: 0	MPOWER: 0, SV: 0, TE: 0	62	-	-
15	Net useful thermal recovery/year (GWh)	MPOWER: 0.143GWh; SV: 1.99GWh	MPOWER: 0; SV: 1.634	MPOWER: 0; SV: 82%	2.134	1.634*	77%*
16	€M reduction compared to planned investment	MPOWER: 2.5, SV: 2.5, TE: 15	MPOWER: 0, SV: 0, TE: 0	MPOWER: 0, SV: 0, TE: 0	20	-	-
17	Percentage of energy grid failures	MPOWER: <1, SV: <1, TE: <1	MPOWER: 0, SV: 0, TE: 0	MPOWER: 0, SV: 0, TE: 0	1	-	-
18	Percentage of the total installed DER capacity traded	MPOWER: 10, POW: 10	MPOWER: 0, POW: 0	MPOWER: 0, POW: 0	10	-	-



KPI ID	KPI Definition	Expected Impact (Target) / KPI Owner	Measured data	Performance vs Target (%) per partner	Overall Target	Overall Achievement	Overall Performance
19	Percentage of peak load reduction (< 30 hours)	MPOWER: 15, NTNU: 15, SV: 15, TE: 55	MPOWER: 0, NTNU: 0, SV: 0, TE: 0	MPOWER: 0, NTNU: 0, SV: 0, TE: 0	20	-	-
20	Increase in installed RES storage (MWh)	MPOWER: 0.15, TE: 1.5	MPOWER: 0, TE: 1.08	MPOWER: 0, TE: 72	1.15	1.08*	65%*
21	Percentage modal shift from fossil-fuel vehicles to Electric Mobility as a Service (eMaas)	LCCC: 10, TK: 35	LCCC: 0, TK: 0	LCCC: 0, TK: 0	24	-	-
22	Number of new/existing buildings participating in the energy markets	MPOWER: 30, POW: 30	MPOWER: 0, POW: 18	MPOWER: 0, POW: 60%	60	18	30%
23	Total new investments generated (€M)	Total contribution from multiple partners: 40	Sum of total contributions: 151	377.5%	40	151	377%
24	Percentage reduction in simple payback periods (years)	Total contribution from multiple partners: 20%	ABG: TBC, GKIN: TBC, MPOWER: TBC, TE: TBC, SV: TBC, NHP: TBC	-	20	-	-
25	Annual Return on Investment (ROI)	Total contribution from multiple partners: 10%	ABG: TBC, GKIN: TBC, MPOWER: TBC, TE: TBC, SV: TBC, NHP: TBC	-	10	-	-



KPI ID	KPI Definition	Expected Impact (Target) / KPI Owner	Measured data	Performance vs Target (%) per partner	Overall Target	Overall Achievement	Overall Performance
26	Number of new jobs created	Total contribution from multiple partners: 900	Sum of total contributions: 1458	162%	900	1458	162%
27	No. community participation events organised across all +CityxChange cities	LCCC: 8; TK: 7	LCCC: 6; TK: 4	LCCC: 75%; TK: 57%	15	10	677%
28	No. citizen observatories established	LCCC: 1; TK: 4	LCCC: 1; TK: 6	LCCC: 100%; TK: 150%	5	7	140%
29	No. of community participation events/actions	LCCC: 30; TK: 25	LCCC: 49; TK: 48	LCCC: 163%; TK: 192%	55	97	176%
30	No. of innovation labs/playgrounds contributing to the creation of DPEB	LCCC: 1; TK: 4	LCCC: 1; TK: 11	LCCC: 100%; TK: 275%	5	12	240%
31	No. of Positive Energy Champions trained	LCCC: 20	LCCC: 20	LCCC: 100%	20	20	100%
32	No. of organisations with new sustainable energy approaches	LCCC: 30; TK: 30	LCCC: 26; TK: 21	LCCC: 87%; TK: 70%	60	47	78%
33	Number of demonstration projects implemented in Follower Cities	MAI: 6, MP: 9, SB: 6, SMO: 7, VORU: 7	MAI: 0, MP: 0, SB: 0, SMO: 0, VORU: 0	MAI: 0, MP: 0, SB: 0, SMO: 0, VORU: 0	35	-	-

\* Data as reported by Month 42, but since April 30, 2022 the KPI calculations have been subject to further review and refinement. Therefore, they are expected to change once calculations have been confirmed. Hence they are not actively shown or visualised in the Online System - MERT.

A number of KPIs have reached their expected impact (target). These are listed in [Table 9](#) below, accompanied by explanatory notes:

Table 10: KPIs that have attained their Expected Impact (Target)



KPI	KPI ID	Notes (on hitting expected impact to target)
KPI 1	No. of APIs and systems connected to the Decision Support Tool (DST)	Following the amendments in KPI description and scope, the number of connections to the DST could accurately be represented, and has achieved the target of 20 connections.
KPI 2	No. of use case stories in the ICT Ecosystem repository	<p>The initial target has been exceeded, with a higher number of scenarios developed.</p> <p>Due to the nature of the work - i.e. descriptions of ICT ecosystems to realise a service or a part of an ICT system, the ecosystems could be described as one complicated use case and/or as several smaller use case stories.</p> <p>Based on feedback by partners it was decided that multiple use case stories should be developed to explain ecosystem services in order to simplify the descriptions.</p> <p>An overall use case story for the whole project was also developed, combining the 3 thematic areas, as advised by the project management.</p>
KPI 3	# of municipal staff trained to use the DST	<p>The KPI Expected Impact (Target) had been met and exceeded in Year 3.</p> <p>There has been no update on the KPI during this reporting period.</p>
KPI 6	# of politically-approved Bold City Visions (BCV) with guidelines, roadmaps, and action plans	The KPI has reached 43% (3/7) of its Expected Impact (Target). FC - Voru has reached their target in this reporting period.
KPI 23	Total new investments generated (€M)	This KPI target has been exceeded, including spin-off, replication and scale-up projects from LHCs and FCs. The number is likely to increase with upcoming replication projects specifically in FCs.
KPI 26	Number of new jobs created	This KPI target has been exceeded with a combination of direct and indirect jobs that have been created.



KPI	KPI ID	Notes (on hitting expected impact to target)
KPI 28	No. of citizen observatories established	As seen in <a href="#">Table 8</a> , TK has exceeded its share of KPI target for creation of additional observatories due to a separation of some functions into multiple locations (see D5.8 <sup>12</sup> ).
KPI 29	No. of community participation events/actions	<p>TK and LCCC have exceeded their share of the KPI target, as more events than initially anticipated were held. There were numerous other meetings, workshops, conferences, community events, etc. that +CityxChange decided to join or co-host to engage additional stakeholders and further promote the project.</p> <p>More events are also being planned to deepen the cooperation with and increase the impact on participating stakeholders.</p>
KPI 30	No. of innovation labs/playgrounds contributing to the creation of the DPEB	<p>TK has exceeded its share of the KPI target by quite some margin.</p> <p>TK has exceeded the number of innovation labs and playgrounds which contribute to the creation of the DPEB. Trondheim wanted each "Playground" to have at least one location (physical or digital) where activities could be located. TK has established 5 physical playgrounds in Trondheim and 6 digital playgrounds. There are 5 physical innovation labs and the 6 "Playable Trondheim" digital innovation labs.</p>
KPI 31	No. of Positive Energy Champions Trained	The number of Positive Energy Champions trained currently stands at 20, which was achieved in April 2021 (M30). Due to the situation regarding Covid-19, all meetings and the training had to take place online and the network operated partly hybrid.

## 4.4 Data Availability

As mentioned in previous iterations in this series of reports, as the project progresses more KPI data becomes available through project interventions being implemented. It is expected

<sup>12</sup> D5.8 available here: <https://cityxchange.eu/wp-content/uploads/2021/11/D5.8-Trondheim-Citizen-Observatory.pdf>



more of this data will become available as the project moves through the monitoring and evaluation phase.

A collaborative effort will see WP7 and KPI owners review data and refine KPI calculations to ensure accurate measurement of the KPI performance. WP7 has maintained its intensity and frequency of online engagement with KPI owners to refine KPI calculations and updates and improvements to the MERT and SRT that would assist in efficient data capturing and processing in the coming months and years of the project. This process will continue for KPIs still under review; the number of interventions enacted and quantity of data being captured for the KPIs will increase in the next reporting period which will require a greater degree of engagement from +CxC partners until all KPI configurations are able to capture and process the data.

KPI Owners are working with the LHC and their national organisations to ensure that the required data is sourced in order to validate the project interventions that have taken place within the reporting period. This approach has led to the confirmation of 11 KPIs within this reporting period.

Notwithstanding this, there are also KPIs which are awaiting confirmation due to external factors beyond the control of WP7 or the KPI owners.

For example KPI 16, there is a requirement for regulatory approval for sharing of information around blackouts. This regulatory issue is an example of the type of external factors which have been a barrier in being able to progress some KPIs and their respective calculations. Partners, along with the support from LHC, are working through this barrier in order to find an intermediary path to progress. Evidence of this work is present in the 'playbook of regulatory recommendations' established by Trondheim which deals with regulatory barriers such as those experienced by the owners of KPI 16. As a result of this work, Trondheim has established a 'Stepwise Regulatory Process' for LHC and FCs in establishing a PEB which is detailed further in D5.9: Playbook of regulatory recommendations for enabling new energy systems<sup>13</sup>.

The data captured and disseminated through the MERT will be made available to the public through a link to the MERT from the official [+CityxChange website](#). This is in accordance with data sharing guidelines developed in the project's data management plan.

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<sup>13</sup> D5.9 available at: [D5.9: Playbook of regulatory recommendations for enabling new energy systems - +CityxChange](#)



## 4.5 Reporting Insights and Additional Information

As mentioned previously in this series of deliverables, the data and information generated by the project is shared through various platforms, such as the +CityxChange web page, the MERT and will be shared on the Smart Cities Marketplace (SCM/SRT). The initial KPI Field of Actions (FoA) designed on a per KPI basis for submitting data to the SCM/SRT is not deemed viable for many KPIs. WP7 lead will initiate with the SRT Owner in the next reporting period and provide a more viable solution to resolve this. The MERT and SRT provide a platform for the majority of the data captured which is quantitative. However, the MERT also allows partners to add internal comments (shared only with KPI and Data Owners) on data submissions, and the SCM provides a 'Insights' section<sup>14</sup> where solutions and stories on different project interventions can be shared.

In conjunction with the quantitative data captured for KPIs, WP7 is in regular collaboration with partners through the QDWG to source qualitative information from partners regarding their feedback, insights, experience, lessons learnt, and recommendations on different project interventions.

This process is supported through the Qualitative Evaluation Framework developed in D7.8<sup>15</sup> and aims to provide insights and guidelines from experience, consolidated into suitable categories such as DPEBs, Community Engagement, Governance, etc. (categories are not yet defined and under development by the QDWG). Quantitative and qualitative data will be used in conjunction to provide additional context and insights on information reported for the project as well as guide future actions.

The insights and actions taken within the reporting period for D7.13 include:

- WP7 carried out an internal data audit as of M37, which aligns with the results presented in D7.12 report<sup>16</sup>.
- During this reporting period WP7 undertook a further round of data validation with partners and found that the total achievement for KPI 23 was not appropriately visualised. Upon further consultation with the relevant KPI Owners, it came to light that the value for this particular KPI was only submitted (by KPMG FA on behalf of the partner) as a single data entry instead of being split as per reporting frequency. Since then to reflect correct visualisation, KPMG FA has resolved this visualisation misrepresentation in the MERT.
- Similarly, there were additional visualisations that were corrected and where no data was reported the text was updated to reflect appropriately.

<sup>14</sup> [Insights | Smart Cities Marketplace \(europa.eu\)](https://cityxchange.eu/knowledge-base/d7-8-data-collection-and-management-guideline-report/)

<sup>15</sup> D7.8 available here: <https://cityxchange.eu/knowledge-base/d7-8-data-collection-and-management-guideline-report/>

<sup>16</sup> D7.12 available here: [D7.12: Reporting to the SCIS System 6 - +CityxChange](#)

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- As more data came on stream, WP7 undertook extensive email communication, data checking across partner reports, especially in relation to the RP3 data, and increased partner interaction to ensure the MERT was updated and represented with the most up to date KPI data available.
- The system is self-sufficient in handling new data submissions by the partners. WP7 engaged with the partners on regular intervals to ensure an accurate representation of data .
- Extensive work was carried out, both in the MERT and through communication with partners, to resolve any ambiguities in how data was/would be provided, if data needed further refinement and developing data streams to integrate these with the MERT directly from data sources from the partners, this was explored and completed. .
- At present, not all project interventions have been implemented and therefore not all KPIs therefore have available data to be shared on the MERT. Preparations are, however, made to accommodate the data once available.
- Ongoing engagement with KPI owners has indicated that a better understanding of KPI calculation requirements will only be possible once partners have reviewed data generated and can inform WP7 accordingly.
- Given that some project interventions are yet to be implemented, and that some will be operational later in the project (mid to latter parts of year 4 and onwards), some KPIs do not have data available yet.
- Despite the refinements mentioned above, the KPI framework developed in Deliverable 7.1 is still regarded as the reference point for KPI calculations and is used as the main reference in the further refinement of KPIs. KPMG FA, as WP7 lead, may examine whether an update to this is necessary in the future to account for variances once all KPI calculations have been agreed.

## 4.6 Summary Outlook and Actions

A number of key actions for the next reporting period have been identified across the preceding sections of this deliverable. [Table 10](#) below provides a summary outlook of the principle action areas that WP7 will be addressing over the coming 6-month period toward the next iteration of this reporting deliverable.

*Table 11: Points to be addressed*





Topic	Points to be addressed	Actions needed
KPI description or target variation	Partners are to confirm if they are able to achieve the targets or require any variation in KPI description based on their learnings throughout the project	There is an ongoing discussion planned around changes to KPI descriptions similar to KPI 1 in the last reporting period.
MERT	Refinement of MERT data headers to allow data capturing formats in line with the SRT	Updates to the manual data submission pages of the MERT according to SRT data requirements as soon as SRT configurations have been agreed.
	Modelling of data points in the MERT to display the KPI data in the MERT interfaces	Ensure that the MERT performs KPI calculations and visualisations as per agreed calculations. Ongoing process with KPI/data owners as more data becomes available.
	KPI calculation refinements	Ongoing engagement planned with KPI owners to confirm suitable calculations. Following calculation confirmation, the MERT's data processing will be updated accordingly.
	KPI data sharing via API with IES	KPMG FA and IES (+CxC partner) are exploring the possibility of connecting their system - DST with the MERT to enable/provision data sharing for some KPIs.
	Front-end and UI improvements Including complete and/or updated or corrected visualisations, filters, data availability and export in open formats and under FAIR principles	KPMG FA will be focusing on improvement of data visualisation via graphs and data filtering capabilities of the MERT.



Topic	Points to be addressed	Actions needed
SCM	General collaboration	Engagement with KPI owners over the months has focussed on further refinement of KPI calculation variables and methods (such as KPI 14 and 15 as noted in Section 4.2.1.1). There are significant challenges in matching the data available to the data fields required by the SRT FoA - as raised by KPI owners and acknowledged by KPMG FA. KPMG FA will continue to engage further on developing options for partner consideration with respect to SRT integration and will continue to discuss improvements in the SCM data monitoring capabilities, changes to KPI data capturing fields, reconfiguration of SRT data input fields (FoA), and data visualisation options within the SCM.
	SRT data capturing	Ongoing engagement with project partners to get alignment on the SRT FoA and the proposed calculation method of KPIs in the MERT. Review of the proposed PED FoA with LHCs.
	KPI calculation and SRT viability confirmations	<p>Partners along with WP7 support are to confirm the data headers required by the SRT/MERT.</p> <p>There is ongoing engagement with KPI/data owners to confirm whether they are able to provide the data required for KPI calculation in the SRT.</p> <p>KPMG FA will reflect on the viability of continuing to pursue SRT integration and will liaise with the coordination team in this respect.</p>



## 5 Conclusion and Outlook

Since the publication of D7.12, the number of KPIs reporting data to the MERT has increased from 19 to 23. An ongoing process over this period has seen multiple KPI calculations being reviewed and confirmed, which includes the calculations for KPIs 10, 11, 12, 14, 15, 20, 23, 24, 25 and 26. This represents a substantive increase in the number of KPIs which are now confirmed.

WP7 will continue to facilitate close engagement and collaboration between KPI/data owners in order to get agreement and confirmation on the calculation of KPIs still outstanding. Once confirmed, the agreed methodology will be set up in the MERT, and partners will be able to submit data for processing. Engagement with KPI/data owners will also focus on the alignment of the project's KPIs and suitable configurations of the SRT's data capturing fields in order to get KPI data submitted to the SCM.

The MERT has undergone various updates to improve efficiency of use, processing and display of KPI data as highlighted in [Table 7](#). These updates will continue to be made in a phased approach as more KPI calculations and SRT configurations are confirmed and updates are applied.

WP7 will continue to work closely with KPI/data owners to ensure any issues related to the capturing or sharing of KPI data are addressed, and will ensure that the MERT and SRT data capturing systems are developed and in place when data becomes available. However, considerable challenges experienced in aligning KPIs to the SRT and resources that have been allocated requires a review of the SRTs future viability which will be decided upon in the next reporting period after appropriate discussions have taken place with the project coordinator.



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## Annex I

This Annex contains a copy of the associated KPI 21 SRT Fields of Action (FoA). Note where significant divergence is present in terms of the particular data fields sought. Alignment with data captured for KPI 21 is subject to further discussions.

### +CityxChange Limerick: Kpi 21 Percentage Modal Shift From Fossil Fuel Vehicles To Emaas Vehicles Bikes (VEHICLES cluster)

#### General data

##### Technology used

Electrical vehicles



##### Description of the intervention

##### Date of commissioning

#### KPIs

##### Number of biofuel/electric/hydrogen vehicles deployed in the area

Title	Unit	Baseline situation	After intervention	Improvement (%)
Number of cars	<input type="text" value="number"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>



Title	Unit	Baseline situation	After intervention	Savings (%)
Final Energy Consumption	kWh/a	xxxxxxx		

### Environmental KPI

Title	Unit	Baseline situation	After intervention	Savings (%)
Total CO2 Emissions	kgCO2eq/a			
Total Primary Energy Demand	kWh/a	xxxxxxx		

### Economic KPI for the mobility action

Title	Unit	Intervention
Total Investments (excl. VAT)	€	xxxxxxxxx
Grants	€	xxxxxxxxx
Net energy savings/value of improvements	€/a	xxxxxxxxx
Total Operating costs	€/a	xxxxxxxxx
Dynamic Payback Period	a	
Return on Investment	%	xx

### Social KPIs

Citizens directly involved



Title	Unit	Baseline situation	After intervention	Improvement (%)
Number of buses	<input type="text" value="number"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Bikes	<input type="text" value="number"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Others	<input type="text" value="number"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### Clean mobility utilization

Title	Unit	Baseline situation	After intervention	Improvement (%)
Number of kms	<input type="text" value="km/a"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Number of trips	<input type="text" value="trips/a"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

### Modal split

Title	Unit	Baseline situation	After intervention	Improvement (%)
Public and collective transport	<input type="text" value="%"/>	<input type="text" value="xx"/>	<input type="text"/>	<input type="text"/>
Private vehicles	<input type="text" value="%"/>	<input type="text" value="xx"/>	<input type="text"/>	<input type="text"/>
Biking and walking	<input type="text" value="%"/>	<input type="text" value="xx"/>	<input type="text"/>	<input type="text"/>
Average occupancy	<input type="text" value="%"/>	<input type="text" value="xx"/>	<input type="text"/>	<input type="text"/>

### Energy consumption





## Annex II

This Annex reflects the data submission page on the MERT, available to all partners to submit their KPI data as per the reporting frequency.


KPI 20							
Actions	Partner	Month	Maximum charging / discharging power	Storage volume	Electrical storage capacity	Roundtrip efficiency	Energy density



 Search

Discharge time (in use)	Cycles in lifetime	Total CO2 emissions	Total Primary Energy Demand	Volume of storage	Installed capacity	Set temperature of fluid at feed-in in storage	Storage power
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	Total amount of heating energy fed into the thermal storage	Total amount of cooling energy fed into the thermal storage	Total amount of heating energy extracted from the thermal storage	Total amount of cooling energy extracted from the thermal storage	Total CO <sub>2</sub> emissions	Total Primary Energy Demand
Set return temperatures of fluid from storage						

