#### **CITYkeys**



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## 1. Introduction

### 1.1 About CITYkeys

The current transition to low carbon, resource-efficient cities is moving slowly. Innovative and smart solutions are available but uptake in other cities is low, because the impacts of the smart city solutions are not objectively verified and because of lack of confidence that the solutions can also be applied in other contexts and cities. This project aims to speed up the transition by facilitating and enabling stakeholders in projects or cities to learn from each other, create trust in solutions, and monitor progress, by means of a common performance measurement framework.

The aim of CITYkeys is to develop and validate, with the aid of cities, key performance indicators and data collection procedures for the common and transparent monitoring as well as the comparability of smart city solutions across European cities.

The tangible objectives of the CITYkeys project are to:

- 1) Develop and validate a transparent performance evaluation framework: including KPIs definition, guidelines for data collection, performance system prototype and testing in case-cities
- 2) Develop recommendations for the implementation of the performance system into the cities' decision-making process and recommendations for the development of new business
- 3) Engage stakeholders in identifying and exploiting opportunities for synergy and replicability; and establish a collaboration platform for European cities.

CITYkeys is funded by the European Commission under HORIZON 2020 programme and runs from February 2015 to January 2017.

## 1.2 Purpose of this document

The purpose of "Deliverable D4.2: Exploitation plan" is to define and establish suitable exploitation actions that CITYkeys will undertake in order to ensure the success and sustainability of its outcomes and results.

The document sets an exploitation plan which includes:

- Description of the CITYkeys "product": outcomes of the project
- Description of the exploitable components of the CITYkeys "product"
- Target audience and stakeholders
- General exploitation plan (all consortium partners)
- Individual exploitation plan (per partner)

## 1.3 Contribution of partners

The exploitation plan strategy is the project's guidance document for all exploitation of the project and has been developed by EUROCITIES with the contribution of all project partners. The document will be updated and presented at its final form in the last month of the project.

## 2. EXPLOITATION PLAN

## 2.1 The CITYkeys "product"

CITYkeys is a "Coordination and Support Action", therefore no technical implementations or technical products will be delivered. Nevertheless, the consortium will produce an "End Product" comprising the following outcomes.

#### 2.1.1 Smart city KPIs and related methodology

The project will harmonise existing environmental, technological, economic and social indicators (KPIs) for smart cities and specify missing indicators. The description of the KPIs includes definition, ontology, general description, data requirements, assessment method as well as a first evaluation of its applicability in different contexts. Apart from the list of indicators, all relevant information needed to integrate them in a framework will be included.

#### 2.1.2 Definition of data sets

CITYkeys will define the needed data sets to be collected with regard to the smart city KPIs definitions. Description of all data sets that will be needed as input for the Smart City data collection system and their aggregation levels as well as available data sources, their reliability, data access methods and existing data formats will be examined. In addition, potential privacy and security issues will be studied.

#### 2.1.3 Specifications for the collection and calculation systems

The project will specify the methodology to collect the needed data and to calculate the performance measurement indicators. It will analyse existing systems and available open platforms in order to integrate these, and build on top of, these current available systems. The final result will be the specifications for the collection and calculation of the key performance indicators.

#### 2.1.4 Prototype of the performance measurement system

The main outcome of the project will be the development of a conceptual first draft of the framework, linking indicators and data flows/data collection mechanisms in an overarching structure. A demo prototype of the smart city performance measurement system will integrate requirements for needed inputs, calculation methodologies and visualisation of output results in an intuitive and user-friendly interface.

# 2.1.5 City handbook for the implementation of the performance measurement system

CITYkeys will compile a city handbook including guidelines for implementation of the smart city performance measurement framework, and a summary of the main project recommendations.

#### 2.1.6 User handbook for city representatives

The project will compile a user handbook for city representatives containing recommendations for the deployment of the performance measurement system in policy decision making process.

#### 2.1.7 New business opportunities report

CITYkeys will identify new business opportunities based on the use of the developed KPIs, smart city performance measurement system, data collection methods, and/or user interfaces. The business models underlying the existing smart city KPI systems will be mapped and their applicability with the CITYKEYS performance measurement system analysed. Possible new business opportunities will be identified for providers of services and technologies required by the development of smart cities and deployment of the CITYKEYS KPIs.

## 2.1.8 Recommendations for a Smart City Index

The project will draft concepts for a European certification scheme and for a smart city index. This includes: (i) presentation of existing efforts for smart city indexes, (ii) definition of a standardisation system that enables the comparability of smart city projects between European cities, and (iii) elaboration of a recommendation for a smart city index that aggregates project KPI's to an overall score.

#### 2.1.9 Website

CITYkeys website is the online communication and dissemination space where the project aims, developments and results are presented. A forum facility allows for the exchange of views among cities and experts.

#### 2.1.10 Report on the ITU-T L.1440 methodology

The project will prepare a report on the piloting, by selected partner cities, of the ITU-T L.1440 methodology.

## 2.2 Target audience

For the proper exploitation of the CITYkeys outcomes, the following main groups and key stakeholders have been identified as the final end-users to adopt or apply the results of the project, and potentially benefit from the knowledge produced.

#### 2.2.1 European (smart) cities

At the core of CITYkeys stands the aim to help European (smart) cities to better measure, evaluate and compare smart projects/solutions as well as their progress towards becoming "smart". European cities are the main final user of the project outcomes. That's why CITYkeys has been designed in a way that tries to maximise the involvement of cities in all tasks and activities.

#### 2.2.2 (Smart) cities and regions

(Smart) cities outside Europe and regions that design and implement smart policies are a desired final user of the CITYkeys project. The successful application of the CITYkeys framework to European cities can pave the way and make the CITYkeys performance

measurement framework a recognised method outside Europe or in different levels of governance (smear regions, smart countries).

#### 2.2.3 Industry and research community

Although many industry and academic stakeholders have proposed performance measurement methodologies and frameworks for smart cities and projects, CITYkeys aspires to be the one that combines the research state-of-the-art with on-the-ground testing and validation to European smart cities. In this frame, CITYkeys framework and recommendation can serve as a future benchmark for the industry (smart cities market) and the research community (starting point for further research).

#### 2.2.4 European Commission

In the frame of integrated policies like the European Innovation Partnership on Smart Cities and Communities (EIP SCC) or the Energy Union, the different services of the European Commission will benefit from a common and holistic performance measurement framework and a common set of KPIs when evaluating the results of policies and projects.

#### 2.2.5 European projects and initiatives

Many European projects and initiatives that span more than one "traditional" sector will benefit from the holistic approach of the CITYkeys outcomes. Some indicative examples of cross-sectoral approaches include:

- Smart cities (ICT, mobility, energy, etc.)
- Digital inclusion (ICT, social affairs)
- Creative entrepreneurship (Culture, social affairs, economic development)
- Green economy (Environment, economic development)

## 2.3 General exploitation plan

The CITYkeys consortium has already engaged in a number of exploitation activities, the majority of which aim at promoting the project outcomes by means of presentations at related events, and publications to general and scientific publications, as well as creating the necessary synergies for the use of the project outcomes by European cities and stakeholders. More exploitation options will be investigated as soon as the first key outcomes of the project are released. Thus, these options will be described in the final exploitation plan of the project.

This paragraph describes the aspirations and objectives of the whole consortium with regard to the exploitation of the CITYkeys "product".

#### 2.3.1 Use of the CITYkeys brand

All partners will have the right and are obliged to use CITYkeys name and brand when reffering to the project's deliverbales and outputs. Although some of the partners may use the project's results to develop new products and services, reference to the original results of CITYkeys will be clearly made, if possible.

#### 2.3.2 Use of the CITYkeys project data

During Work package 2, partner and contributing cities will be asked to provide data sets in order for the framework to be tested. Alternatively, they will be asked to run tests locally in their urban platforms and analyse the results with the help of CITYkeys partners.

In the first case, cities will provide to CITYkeys consortium "open" data from the available city data sets which are expected to be available through well-defined user licenses for the open and transaparent use of data. In the case that cities need to provide data that are not yet publicly available, the data either will be accompanied by a similar open data license or will be provided under an explixit license that will protect and regulate their use beyond the scope of CITYkeys.

In the second case, CITYkeys partners will handle and analyse the results of the locally performed tests without permanently storing or using for other reasons the data sets that cities will use for those tests.

In any case, data gathered, handled and provided by European cities need to be in accordance with the respective legislation that regulates use of public or personal and sensitive data. Thus, CITYkeys doesn't need to tackle the issue of protection or handling of data that will be provided by cities in a different or additional way.

After the end of CITYkeys all project files, data and deliverables will be uploaded in the project's file depository so that all partners can use them under the consition that CITYkeys is mentioned whenever necessary.

#### 2.3.3 Exploitation of the CITYkeys "product"

#### 2.3.3.1 European (smart) cities

The consortium has been active in promoting the project to European cities that design and implement smart projects and solutions. Through the network of EUROCITIES, national, regional or project city networks, all partners are promoting the results of CITYkeys and the advantages that a city can have by using its performance measurement framework.

Until now, apart from the five partner cities, another fourteen European cities<sup>1</sup> have expressed their interest to follow the project, test and evaluate its outcomes and potentially use the framework. More cities are expected to follow after December 2015 – February 2016 when the first concrete results (KPIs) will be made publicly available.

#### 2.3.3.2 (Smart) cities and regions

The consortium will promote and exhibit the advantages of the CITYkeys methodology and results for cities outside Europe or for different levels of governance like smart regions or even smart countries. To do that, development and testing of the project "product" is needed, thus, promotion and exploitation under this category is expected after the spring of 2016.

The consortium has started making preliminary contacts and presentations of the expected results with bodies like the Committee of Regions. Also, it is keen to propose and use the CITYkeys methodology in international cooperation initiatives like the (proposed and under development) EU-China network under the Green Digital Charter.

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<sup>&</sup>lt;sup>1</sup> Amsterdam, Barcelona, Burgas, Dresden, Heraklion, Manchester, Munich, Newcastle, Preston, Rzeszow, Syracuse, Terrassa, Thessaloniki, Utrecht

# 2.3.3.3 Standardisation organisations, research community and industry stakeholders

The current transition to low carbon, resource-efficient cities is moving slowly. Innovative and smart solutions are available but uptake in other cities is low, because the impacts of the smart city solutions are not objectively verified and because of lack of confidence that the solutions can also be applied in other contexts and cities. Development of a holistic framework fits well with the rest of standardisation and monitoring efforts that are being developed and tested across Europe at the moment.

CITYkeys is developing synergies with standardisation organisations (CEN/CENELEC and ETSI) as well as academic organisation (e.g. University of Manchester, University of Aarhus and University of Newcastle) in order to bring together ideas and efforts and promote the use of the CITYkeys "product" by all major stakeholders in both the smart cities market and the academic and research community.

Finally, CITYkeys is developing synergies with smart city stakeholders, mainly through the EIP SCC Marketplace in order to showcase how the development of a smart city market benefits from the existence of a neutral and community-driven performance measurement framework.

#### 2.3.3.4 European Commission

At least four Directorates of the European Commission<sup>2</sup> have been recently involved in the identification and development of sectoral performance indicators. Through the organisation or participation in targeted forums and workshops, CITYkeys partners try to promote the advantages of a holistic approach in the performance measurement of smart city activities. This way, projects and solutions from different sectors can be more easily compared, promoted and replicated in different cities and under different conditions.

#### 2.3.3.5 European projects and initiatives

CITYkeys project addresses one of the horizontal challenges of the EIP SCC approach to the development of smart cities. The consortium will try to take advantage of this fact and create advanced synergies with the lighthouse projects that EC co-funded through the 2014 and 2015 H2020-SCC-01 calls. Communication and synergies have already been established with the three lighthouse projects that started in February 2015<sup>3</sup> and the same is expected to happen with the new projects that will start in February 2016.

The project has also created synergies with the "Smart Cities Information Platform" project and has offered to provide the tools to evaluate and benchmark the smart city projects that will be included in the platform.

Finally, CITYkeys has developed synergies with two important European initiatives, the Covenant of Mayors and the Green Digital Charter in order to harmonise or make compatible, in the wider possible extent, the monitoring and performance measurement methodologies that are used.

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<sup>&</sup>lt;sup>2</sup> DG CNECT, DG ENER, DG MOVE and DG ENV

<sup>&</sup>lt;sup>3</sup> Triangulum, Remourban, Grow Smarter

## 2.4 Individual partner exploitation plan

Besides the CITYkeys vision and mission as a project, each one of the consortium partners has its own, distinct exploitation opportunities and perspective.

#### 2.4.1 VTT

VTT has worked for several decades in developing building and city level assessment schemes as well as key performance indicators. VTT will present and promote CITYkeys framework both in the national and international events and networks. The current (September 2015) exploitation actions are:

VTT has following specific activities to exploit the CITYkeys performance framework and KPIs:

- Integration of CITYkeys performance framework and KPIs in EERA smart city joint program where VTT of the leader of KPI work package
- Promoting CITYkeys framework and KPIs in EC smart city stakeholder platform
- Promotion and integration of CITYkeys in Finnish national smart city network including wide city network in Finland
- Discussions and promotion of the CITYkeys main principles to Finnish city development in discussion with the Ministry of Environment
- Usage of the testing results of CITYkeys framework in discussions of industrial and other stakeholders in city development
- Usage of the testing results of ITU-T L.1440 methodology in discussions of city and industrial partners
- VTT will exploit the results of CITYkeys in its previously developed city progress monitoring tools
- VTT is play active role in discussion of monitoring smart city performance and further in discussion of recommendations of "smart city index".

#### 2.4.2 AIT

AIT is involved on several smart city and urban development projects in Austria, the EU, Asia and Latin America. The performance measurement framework developed in CITYkeys will be highly relevant for many of these ongoing projects as well as for similar projects yet to be developed. AIT intends to use the CITYkeys in these projects, test its suitability and, if needed, develop the indicators further according to the local conditions and the specific conditions of the project.

Two of the running projects are specifically focused on indicators: The European tender "Smart City Information System" (SCIS) and "Smart.Monitor", an Austrian project aiming at developing a monitoring framework for Vienna's Smart City Framework Strategy. AIT will try to create synergies with these projects and communicate the results of CITYkeys to the project partners.

Also, AIT coordinates the EERA Joint Programme Smart Cities and Communities (EERA JPSC). One of the work packages of EERA JPSC is specifically focused on KPIs and monitoring. As the JP coordinator, AIT will disseminate the results of CITYkeys within the European Smart City research community assembled in the EERA JPSC.

#### 2.4.3 TNO

TNO considers CITYkeys to be a strategic project within its Smart Cities roadmap. The CITYkeys project itself builds upon previous projects in which TNO was involved (such as Climate-KIC project Eurbanlab), just as the body of knowledge generated within the CITYkeys project will in turn contribute to future projects. Project developments so far have been mainly disseminated informally through contacts with interested parties, besides a press release at the start of the project (see: <a href="https://www.tno.nl/nl/over-tno/nieuws/2015/2/smart-city-oplossingen-die-werken/">https://www.tno.nl/nl/over-tno/nieuws/2015/2/smart-city-oplossingen-die-werken/</a>). Our main target groups would be cities/regions (inside and outside of Europe) and industry and research community.

Regarding cities, contact has been made with several cities in the Netherlands. These include among others Delft (in the context of their smart city strategy), Utrecht (in the context of the Deep Dive in the Climate-KiC project Smart Sustainable Districts) and Almere (in the context of their policy ambitions for a more circular economy). TNO will integrate the CITYkeys performance measurement framework in these as well as other projects. This also makes sense from a content perspective: if CITYkeys is to be the European state of the art, then alignment with CITYkeys will be a must for the cities. And vice versa: for CITYkeys to become the leading smart city performance measurement framework in Europe, it must be well aligned with KPIs already commonly in use in European cities. We will therefore also participate actively in discussions for the creation of a Smart City Index.

We specifically expect to exploit the Smart City KPIs and related methodology, and the city and user handbook; building upon existing and new contacts (to be forged at networking events). The ITU methodology that will be tested in CITYkeys provides an interesting opportunity to investigate synergies with industry partners. Of course, we will also actively participate in contacts with standardisation organisations such as the ISO 37... and the European Commission.

#### 2.4.4 EUROCITIES

EUROCITIES considers CITYkeys as a very important part of its "smart cities" work. Thus, it presents and promotes and will keep doing so the project developments through its forum and working groups meetings and electronic media channels. EUROCITIES cannot and won't develop further the technical findings of CITYkeys but will promote the project results to its members and use it in current and future project work. In the time of the current document (September 2015) this individual exploitation can be described as follows:

- It will try to integrate the performance measurement framework in other "smart city" activities like:
  - The Covenant of Mayors/Mayors Adapt monitoring methodologies
  - The Green Digital Charter methodologies that are recommended to be used by the signatories cities
  - Future participation in projects related to standardisation and/or lighthouse city projects
- It will specifically promote and use the two handbooks (user and city) and the "new business opportunities" report that CITYkeys will compile to member city practitioners. Meetings of all six forums4 will be used for this purpose.
- It is already trying to promote the use of the CITYkeys KPIs by standardisation organisations (CEN/CENELEC and ETSI) or European services (DG CNECT and DG

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<sup>&</sup>lt;sup>4</sup> Culture, Economic development, Environment, Knowledge society, Mobility and Social affairs

ENER) that are interested for a holistic approach to "smart cities performance measurement".

- It will keep alive and updated the CITYkeys website long after the end of the project so that information and project results are accessible to interested stakeholders.
- It will use the "ITU-T L.1440 methodology testing report":
  - in conjunction to the Green Digital Charter "ICT carbon footprint measurement tool" to support and promote the greening of the ICT equipment by cities
  - in future participation in projects related to the greening of the ICT equipment of European cities
- It will participate in the discussions for the creation of a "smart city index", based on the project's recommendations, in order to ensure that the opinions and preferences of cities will be adequately counted in.

#### 2.4.5 City of Rotterdam

The City of Vienna hasn't yet elaborated a detailed exploitation plan for CITYkeys results. Nevertheless, it expects to strongly use the CITYkeys performance measurement framework in conjunction with its current performance measurement system that works both in city and district level, the work that Rotterdam is doing in the frame of ISO 37120:2014 and the WCCD and the results from the numerous smart city projects that the city is implementing (http://www.rotterdam.nl/smartcity).

#### 2.4.6 City of Tampere

CITYkeys-project is an important part of Tampere's ambition to become a smart city. Tampere will use the framework for assessing its status as a smart city and for identifying what kind of smart city projects should be implemented in the future. It will also be used to assess and compare different smart city projects that the city is implementing. The possibility to integrate the framework to our next city strategy process will be assessed.

Tampere will disseminate the results of the project through the network of the six biggest cities in Finland and through the Innovative Cities (INKA) network. Tampere will also promote the project and its results in the Smart City related events where City of Tampere is participating.

## 2.4.7 City of Vienna

The City of Vienna hasn't yet elaborated a detailed exploitation plan for CITYkeys results. Nevertheless, it expects to strongly use the CITYkeys performance measurement framework in conjunction with its Smart City Programme and the results from other projects in the areas of open data, measurement, etc. like the EU-funded TRANSFORM or the numerous smart city projects that Wien is implementing (<a href="https://smartcity.wien.gv.at/site/en/projekte/">https://smartcity.wien.gv.at/site/en/projekte/</a>).

#### 2.4.8 City of Zagreb

The City of Zagreb shall take part in dissemination and awareness raising activities through providing information of the project CITYKEYS at the Zagreb energy week, participating at conferences and workshops and through the networks such as: Croatian Covenant of Mayors Club <a href="http://www.crocom.hr/">http://www.crocom.hr/</a>, The Associations of Croatian Cities, the Covenant of Mayors Capital Cities of Southeast Europe Club etc.

#### 2.4.9 City of Zaragoza

Zaragoza plans to play an active role in the dissemination and exploitation of the Citykeys project. Several target groups have been identified, and thus different channels selected to specifically address them.

Social media campaigns will be used to reach the broad group of digital citizens (Digizens). The LinkedIn group "Zaragoza Smart City" will be used to address the industry and other stakeholders around the smart initiatives of the city. This LinkedIn group was activated as a result of the initial surveys of the project and can be considered a direct outcome of the CITYkeys project.

The City Hall organizes annually "Smart Zaragoza", a one-day event that gathers external and internal stakeholders from the "smart city" milieu. It is an adequate venue to further engage citizens and stakeholders around Citykeys progress.

A web space will be opened under the existing Open Urban Lab website (openurbanlab.es/CITYkeys). The Open Urban Lab is the program where smart city projects acquire a new participatory dimension and its audience and participants are citizens engaged in city affairs.

Finally, one of the overall goals of the Citykeys project is to encourage the adoption of smart city policies within the city administration. For that purpose, the internal City Hall newsletter will be used, so that project progress can be communicated to internal project leaders.

## 3. CONCLUSIONS

CITYkeys is expected to deliver an array of results and recommendations around the holistic performance measurement framework for smart cities and smart projects.

All partners agree that they plan to use the results of the project well after its end. More specifically, the three research technical institutes that participate in the project (VTT, AIT and TNO) foresee, among others, to use these results in further services and products they research and develop. EUROCITIES is mainly interested to use the results of the project as an additional tool in its smart city "toolkit" for European cities. The five cities that participate in the project (Rotterdam, Tampere, Vienna, Zagreb and Zaragoza) will try to incorporate the results in their operation and reap the full benefit from their utilisation.

All partners will especially try to promote the CITYkeys approach to other cities, private stakeholders and European institutions as a tool that can help in the holistic, uniform and transparent evaluation of smart projects and solutions.