



Deliverable 4.4

Final communication and dissemination report and updated exploitation plan

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RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1. PUBLISHABLE EXECUTIVE SUMMARY

Funded by the European Union HORIZON 2020 programme, the aim of CITYkeys was 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 purpose of ‘Deliverable D4.4 Final communication and dissemination report and updated exploitation plan is to report on all the project communication activities – written communication, events and synergies - held during the second year of the project and to describe in detail future opportunities to keep promoting CITYkeys performance measurement framework beyond the end of the project in January 2017.

The document includes:

- PART 1: Report on the communication activities of CITYkeys held between m13 and m24
- PART 2: Description of the exploitation plan after the end of the project in January 2017

The overall objective for all communications and dissemination efforts within CITYkeys was to enable key stakeholders, in particular cities, to benefit from the results of the project. Also to enable their active participation to the project main aim, namely to develop and validate key performance indicators and data collection procedures for the common and transparent monitoring as well as the comparability of smart city solutions across Europe.

The communication tools and events deployed during the project have allowed a meaningful number of cities and stakeholders to participate and give input to the technical deliverables of CITYkeys. Evidence are to be found in the number of interested cities and stakeholders and in the number of inputs received to the main technical deliverables of CITYkeys: in addition to the 5 cities which participated as full partners in the project, over 60 additional cities have given input, feedback or have been interviewed in various stages of the project.

2. INTRODUCTION

2.1 About CITYkeys

Funded by the European Union HORIZON 2020 programme, the aim of CITYkeys was 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 were 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.

One of the key factors of the CITYkeys work methodology lies in the extensive collaboration and communication with European cities: on a first level with the five project partner cities (Rotterdam, Tampere, Vienna, Zagreb and Zaragoza), on a second level with the contributing cities of the project and finally with all cities interested in contributing and using the framework.

2.2 Purpose of the document

The purpose of 'Deliverable D4.4 Final communication and dissemination report and updated exploitation plan' is to report on all the project communication activities – written communication, events and synergies - held during the second period (m13-m24) of the CITYkeys project and to describe the future exploitation opportunities brought by smart city-related initiatives as well as synergies and collaboration established during the whole duration of the project.

The document follows the project communication strategy as set in the 'D4.1 - CITYkeys Dissemination and communication plan for m3-m12, including nomination of the Advisory Board' 'D4.2 – Exploitation plan' and 'D4.3 – Communication and dissemination report for m3-m12 and plan for m13-m24', the public versions of which are available in the CITYkeys website¹.

The main objectives of the project dissemination strategy were to:

- ensure effective communication and information dissemination with stakeholders;
- guarantee the maximum visibility of the project;
- inform key stakeholder at local, regional, national, European and international level on the project results and outcomes;
- cooperate with other initiatives, projects and networks focused on smart cities;
- support and encourage cities' cooperation.

Within WP 4, the high level dissemination and deployment aims just described were translated into the following operational actions:

- Define target groups for disseminating the progress and outputs of CITYkeys to ensure the widest possible dissemination;
- Organisation of events at local, national, European and international level;

¹ http://citykeys-project.eu/citykeys/cities_and_regions/Project-deliverables

- Ensure the collaboration with EU and international initiatives related to smart cities and key performance indicators;
- Develop a varied set of innovative and high quality, online and printed communication tools;
- Ensure wide visibility of the project results through networking activities linked to both project specific and external events;
- Monitor the impact of the communication activities.

3. CITYKEYS COMMUNICATION ACTIVITIES M13-M24

3.1 Overall achievements

The overall objective for all communications and dissemination efforts within CITYkeys was to enable key stakeholders, in particular cities, to benefit from the results of the project. Also to enable their active participation to the project main aim, namely to develop and validate key performance indicators and data collection procedures for the common and transparent monitoring as well as the comparability of smart city solutions across Europe.

In this report, different ways have been used to measure the effort and overall achievements of this primary objective:

- Engagement of key stakeholders, at local, regional, national, European and international level on the project results and outcomes;
- Involvement of European cities, beyond the partner cities and cities that were represented in the advisory board, in the development of the deliverables, in particular the key deliverables for this project period: D.2.3 (Prototype of the performance measurement framework), D.3.1 (User handbook), D.3.3 (Recommendations for the Smart City Index) and D.4.6 (City handbook);
- Number of tweets, engagement in forum discussion, LinkedIn engagement;
- Number of articles mentioning the CITYkeys project;
- Number of events and attendance where CITYkeys was presented.

The project has been able to reach a substantial number of European cities, research institutes and stakeholders. Nevertheless, reaching citizens proved a difficult task, an objective that in CITYkeys would be supported only through the running of a social networks campaign and social networks tools.

3.2 Timeline and project deliverables m13-m24

The following table depicts the timeline of the main communication and dissemination activities of CITYkeys during the second reporting period.

Table 10. CITYkeys activities related to WP4 between month 13 and 24

WP4: Communication and dissemination													
T4.1: Collaboration of cities													
Workshops organisation		W4				W5				W6			W7
T4.2: Stakeholders and cooperation													4.4
T4.3: Dissemination and exploitation	4.3												4.6
Workshops						W5-City handbook				W6-City handbook			W7-City handbook
Dissemination & exploitation strategies	*Report for m3-m12 *Plan for m13-m24												*Report for m13-m24 *Final exploitation plan
Social media	"Best new app idea" contest	Contest + campaign											
Material			Webinar				Webinar				Webinar		City handbook
Project month	12	13	14	15	16	17	18	19	20	21	22	23	24
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan

List of submitted deliverables under WP4, between m13 and m24 of the project:

1. D4.4: Final communication and dissemination report and updated exploitation plan

The purpose of ‘Deliverable D4.4 Final communication and dissemination report and update exploitation plan’ is to report in details on all the project communication activities – written communication, events and synergies – held during the second part (m13-24) of the CITYkeys project; and to describe future communication opportunities brought by synergies and collaboration established during the whole duration of the project.

The updated exploitation plan 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)

2. D4.6: City handbook

The City handbook includes guidelines for implementation of smart city performance measurement framework, and a summary of the main project recommendations.

All the deliverables are available on the CITYkeys website².

3.3 CITYkeys communication tools

3.3.1 Identity and style

A detailed communication matrix and the CITYkeys project identity and style were developed by EUROCITIES as part of the project communication strategy during the first part of the project.

The communication matrix describes the main communication actions and the best use of the CITYkeys communication tools. The matrix was used throughout the project to define which communications actions to implement with the most adequate communication tool.

The project identity and style document, which includes the CITYkeys graphic charter, define the unique identity of the CITYkeys project (logo, colours and writing style).

Following the project identity and style throughout the project communication activities ensured that the CITYkeys “product” is immediately recognisable by its audience.

3.3.2 Power point

CITYkeys power point template has been updated in m14 of the project (see Annex 1 of this document) in grounds of a better graphic design.

3.3.3 Poster

² http://citykeys-project.eu/citykeys/cities_and_regions/Project-deliverables

The CITYkeys poster was updated by EUROCITIES (see Annex 2 of this document) to include QR codes directing to CITYkeys website, and in particular the tools developed for cities.

The poster graphics reflects the leaflet and website icons and writing style (see section 3.3.4 leaflet). The poster is one of the main communication tools to use during events with a high number of attendees (such as Barcelona Smart City Expo World Congress, as seen in the events section).

3.3.4 Leaflet

In m15 of the project, EUROCITIES, in cooperation with the other partners, updated the project leaflet (Figure 1). The leaflet follows the CITYkeys graphic styles and explains in simple and clear terms the main objectives of the project, its results and how cities and stakeholders can get involved.

The leaflet has been printed in 1000 copies and distributed to all partners and interested stakeholders during the main project events and smart city events at European level.



Figure 1. The CITYkeys leaflet



3.3.5 Publication template

On m17, EUROCIITIES designed a second template to be used for CITYkeys guidebooks, namely the D3.1: 'CITYkeys Experience – Recommendations from cities to cities' and the D4.6: 'City handbook'. This second template is enriched with more colour and graphic elements and aims to offer a more modern and pleasant reading experience compared to the drier template of the deliverables.

3.3.6 Contact database

For the project dissemination purpose and in order to collect cities and stakeholder input on the key technical deliverables of the project, EUROCIITIES is making use of its existing contact database, consisting of around seven thousand city officials contacts from almost 180 cities in Europe.

The EUROCIITIES database also includes an extensive list of stakeholders, mainly acting at European level. In addition to use EUROCIITIES and partner contacts, a project contact database was created starting in project m2 (March 2015). The database includes city officers and policy-makers active in the field of smart cities and related departments, as well as relevant contacts in the European Union institutions and at national level.

At the end of the project, the list includes around 270 contacts from cities interested in the project, contacts working in 34 cities EU offices and around 200 contacts from stakeholders active in the field of smart city policy and technical research.

The contact database has been updated on a weekly basis with additional contacts made through the website (interested cities and stakeholder using the "contact us" button), and through the

project communication activities such as events, stakeholders engagement and synergies with relevant initiatives.

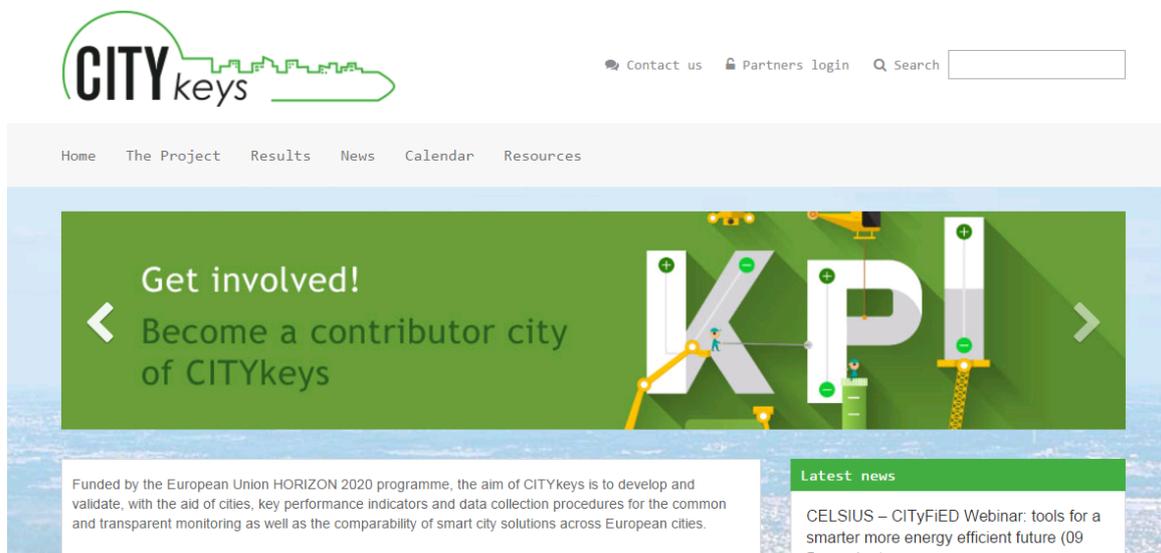


Figure 2. The “contact us” option is well visible on the CITYkeys website

3.4 Website

3.4.1 Description

The dedicated CITYkeys project website - www.CITYkeys-project.eu - is the project’s main gateway, providing information on the project objectives, partners, methodologies, results, publications and news. All the published project deliverables are available for download from the website.

The website is attractive, simple, easy to navigate and mobile friendly. The updating process is user friendly and does not require specialised skills. The content management system allows for the easy creation of new pages, inclusion of new text, image and video content.

News and events pages have been uploaded in a regular way in order to inform the public on the development of the project work, results and related initiatives.

The website currently contains the following sections/sub-sections:

- **Home**
- **The Project**
 - The project
 - About us
 - Partners of CITYkeys
 - Advisory Board
- **Results**
 - Results
 - Performance measurement framework

- Data sets & data collection
- Policy making recommendations
- Business models & opportunities
- Smart city index
- Project deliverables
- **News**
- **Calendar**
- **Resources**
 - Synergies
 - Downloads
- **Online Forum** (visible only to members logged in to the website)

One of the main communication and dissemination tool of the CITYkeys website is the “fast share buttons” which allow for easy and automatic share of news page through mail and main social media accounts - Twitter, Facebook, LinkedIn - (Figure 3).

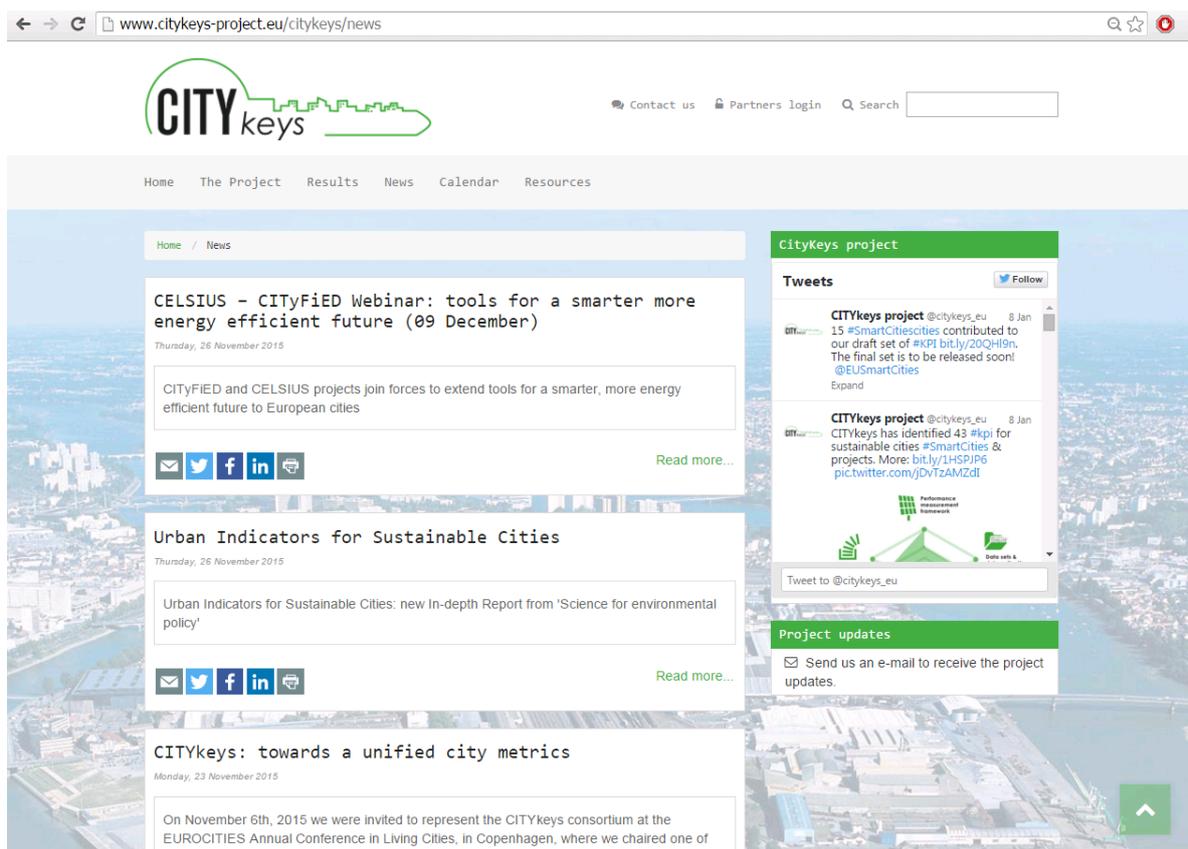


Figure 3 The sharing buttons of the CITYkeys website

3.4.2 Website analytics

A Google Universal Analytic tool has been added to the CITYkeys website allowing easy monitoring of the number of website users and their behaviour.

For the purpose of this deliverable the taken period of analysis is from 1 January 2016 to 15 January 2017. In this period the website had a total of 7,198 open sessions, with 4,763 users (34,7% are returning visitors and 66,3% new visitors). The total page view is 22,819 while the number of average page view per session is 3.17 (see figure 4).

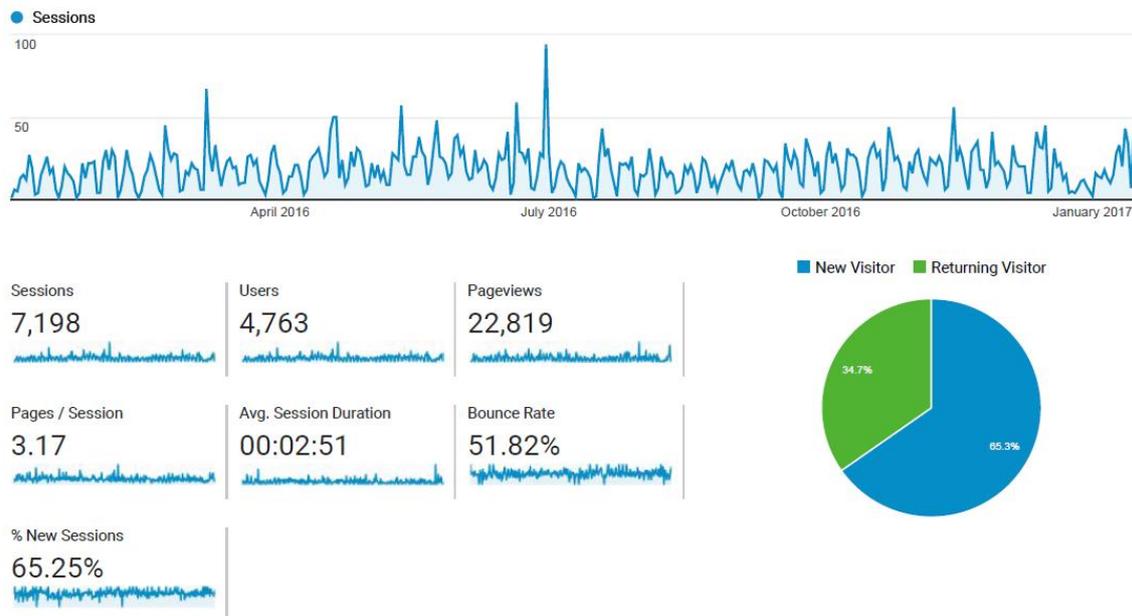


Figure 4. Number of sessions, users and page views of the CITYkeys website

The analytics contained in Figure 5 show the countries with the highest number of visits to the CITYkeys website. Understandably the first country is Belgium, followed by Spain, Germany, United Kingdom, France, Italy and The Netherlands. With the exception of Austria and Croatia, all the countries of residents of the CITYkeys partners are present in the list indicating an effective communication performed also at national and local level.

Country	Sessions	% Sessions
1. Belgium	824	11.45%
2. Spain	713	9.91%
3. Germany	533	7.40%
4. United Kingdom	522	7.25%
5. France	363	5.04%
6. Italy	354	4.92%
7. Netherlands	344	4.78%
8. Finland	304	4.22%
9. United States	304	4.22%
10. Norway	216	3.00%

[view full report](#)

Figure 5 The ten countries with the highest number of visits to the CITYkeys website

The presence of the United States, not specifically targeted by the CITYkeys communication activities is to be explained by the presence on the web of many initiatives, events and companies using names similar to CITYkeys.

Figure 6 shows the ten pages with the highest number of entry point to the CITYkeys website. Entry points are a tool to define the main interest of website users and what is their entry point to the CITYkeys website.

The URL addresses appearing in the figure below correspond to the following web pages:

1. CITYkeys home page;
2. CITYkeys page “Project” with the general description of the project and its aims;
3. “Results” page of the “Smart city index”;
4. CITYkeys home page (return to the home page, after further navigation);
5. CITYkeys “Results” page of the “Performance measurement framework”;
6. CITYkeys page listing all deliverables available for download;
7. CITYkeys page offering an insight on data sets and data collection methodology that have been necessary to the elaboration of the CITYkeys prototype platform;
8. Download page for the project deliverable “D1.4 Smart city KPIs and related methodology – final”;
9. News page describing the results of Deliverable 1.1 “Assessing the needs of cities and citizens”;
10. CITYkeys page on the Citykeys workshop which took place in Vienna (Austria) on 25 October 2016.

At the first place of the list is the home page of the CITYkeys website (54.53%). This indicates that more than half of the CITYkeys website users reached the website with the use of a search engine (Google research or similar) or by using a direct link to the website.

Landing Page	Acquisition			Behavior		
	Sessions	% New Sessions	New Users	Bounce Rate	Pages / Session	Avg. Session Duration
	7,198 % of Total: 100.00% (7,198)	65.25% Avg for View: 65.25% (0.00%)	4,697 % of Total: 100.00% (4,697)	51.82% Avg for View: 51.82% (0.00%)	3.17 Avg for View: 3.17 (0.00%)	00:02:51 Avg for View: 00:02:51 (0.00%)
1. /	3,925 (54.53%)	70.55%	2,769 (58.95%)	48.41%	3.42	00:02:59
2. /citykeys/project	660 (9.17%)	72.42%	478 (10.18%)	61.21%	2.74	00:02:26
3. /citykeys/cities_and_regions/Smart-city-index	306 (4.25%)	81.37%	249 (5.30%)	45.42%	3.07	00:02:32
4. /citykeys/home	301 (4.18%)	58.14%	175 (3.73%)	45.51%	3.42	00:03:17
5. /citykeys/cities_and_regions/Performance-measurement-framework	289 (4.02%)	56.06%	162 (3.45%)	40.14%	3.48	00:03:47
6. /citykeys/cities_and_regions/Project-deliverables	156 (2.17%)	50.64%	79 (1.68%)	29.49%	3.94	00:03:48
7. /citykeys/cities_and_regions/Data-sets-and-data-collection	128 (1.78%)	53.91%	69 (1.47%)	56.25%	2.79	00:03:34
8. /citykeys/resources/general/download/CITYkeys-D1-4-Smart-City-smart-project-KPIs-and-related-methodology-final-WSWE-A7LN3E	84 (1.17%)	34.52%	29 (0.62%)	71.43%	2.40	00:02:04
9. /citykeys/news/Assessing-the-needs-of-cities-and-citizens-WS-WE-9X4JW6	80 (1.11%)	86.25%	69 (1.47%)	53.75%	2.45	00:01:17
10. /citykeys/calendar/CITYkeys-Workshop-	79 (1.10%)	59.49%	47 (1.00%)	70.89%	1.75	00:01:59

Figure 6. The ten CITYkeys page with the highest number of entry points, followed by number of opened sessions

Figure 7 depicts the behaviour flow of the users of the project website. On the right side of the flow are the entry point pages of the website, followed by the second, third and fourth pages of choice from users. For every page the percentage of bounce rates is indicated (percentage of users who leave the website).

Jan 1, 2016 - Jan 15, 2017

Behavior Flow

All Users
100.00% Sessions

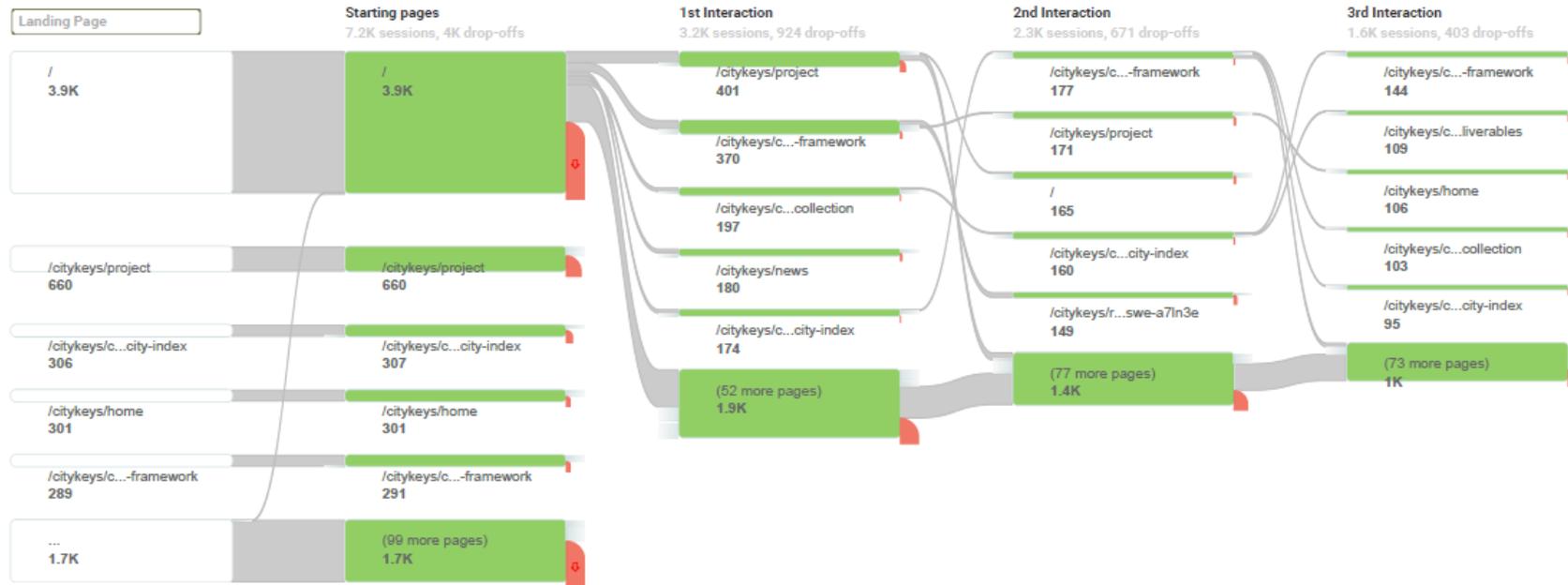


Figure 7. The behaviour flow of the CITYkeys website users

3.4.3 Website technology

The technology of the project backend website is based on Lotus Domino and Web Portal while the cloud managed system is an IBM based technology, identical to the one used for the EUROCIITIES website. All website templates are based on java scripts, CSS and html. The website contact database is shared with the EUROCIITIES contact database and is based on Lotus Domino technology.

The website is developed in HTML5 and is completely responsive to all kind of devices. The responsiveness is insured by the use of Bootstrap, one of the most popular HTML, CSS, and JS framework for developing mobile first projects on the web. The focus has been to keep as most as possible all standards elements of the framework, allowing easy maintenance and upgrade of the packages that are used.

The maintenance of the site is performed through PIX-PORTAL, a customized CMS developed on top of Domino, the IBM collaboration platform. The CMS heavily uses most of the application development standards such as web services and MVC model.

3.4.4 Website Partner Guide

WP leader EUROCIITIES has developed a website partner guide in order to allow project partners to make use of the facilities allowed by the backend of the project website (Annex 3). The guide explains in easy terms and with the use of images, the correct way of uploading documents, news and events to the website.

Partners can also refer to EUROCIITIES to create pages or upload articles, news and documents on their behalf.

3.4.5 Forum page of the CITYkeys website

The Online forum page of the CITYkeys website has been designed in order to have an additional place where interested stakeholders and partners could have the possibility to:

- showcase identified best solutions by cities
- exhibit the results of the framework
- A blog facility for cities to communicate and collaborate

As of today, the forum has not been used by the project partners or the stakeholders. Other communication means such as workshops, web meetings and e-mail have been proved more successful to discuss the project work with contributing cities and interested stakeholders.

3.5 Social media tools

The use of social media is nowadays fundamental to raise awareness on the work undertaken by the project. In particular, the CITYkeys twitter account has been proved successful in steering additional traffic to the CITYkeys website and providing additional visibility to the main CITYkeys deliverables.

3.5.1 Twitter

The CITYkeys Twitter account is: @CITYkeys_eu. The CITYkeys Twitter page can be found at https://twitter.com/CITYkeys_eu (figure 8).

Tweets talk about:

- The latest news from the project
- Direct links to the project deliverables
- News and pictures from meetings, workshops and events
- Retweets from related twitter accounts of initiatives, partners, cities and projects



Figure 8 The CITYkeys twitter account

The latest tweets of the project account are also visible through a Twitter feed on the CITYkeys website homepage. As of January 2017, a couple of days before the end of the project, the CITYkeys twitter account was counting:

- 433 Tweets
- 79 Followed accounts
- 263 Followers
- 68 Likes

In the table below some of the analytics provided by the CITYkeys twitter account are reported.

Table 2 Twitter analytics in the period February-December 2016

	Tweets	Tweet impressions	Profile visits	Mentions
January 2017	4	1,449	156	10
December 2016	3	3,684	182	10
November 2016	1	1,426	128	7
October 2016	0	637	172	18
September 2016	1	907	78	8
August 2016	0	855	55	1
July 2016	1	2,613	83	1
June 2016	3	3,935	137	4

	Tweets	Tweet impressions	Profile visits	Mentions
May 2016	9	7,807	275	15
April 2016	9	7,682	360	15
March 2016	3	2,219	90	4
February 2016	4	3,904	130	5

Figure 9 and 10 provide an overview of the general area of interests for the CITYkeys twitter account follower and their country of origin.

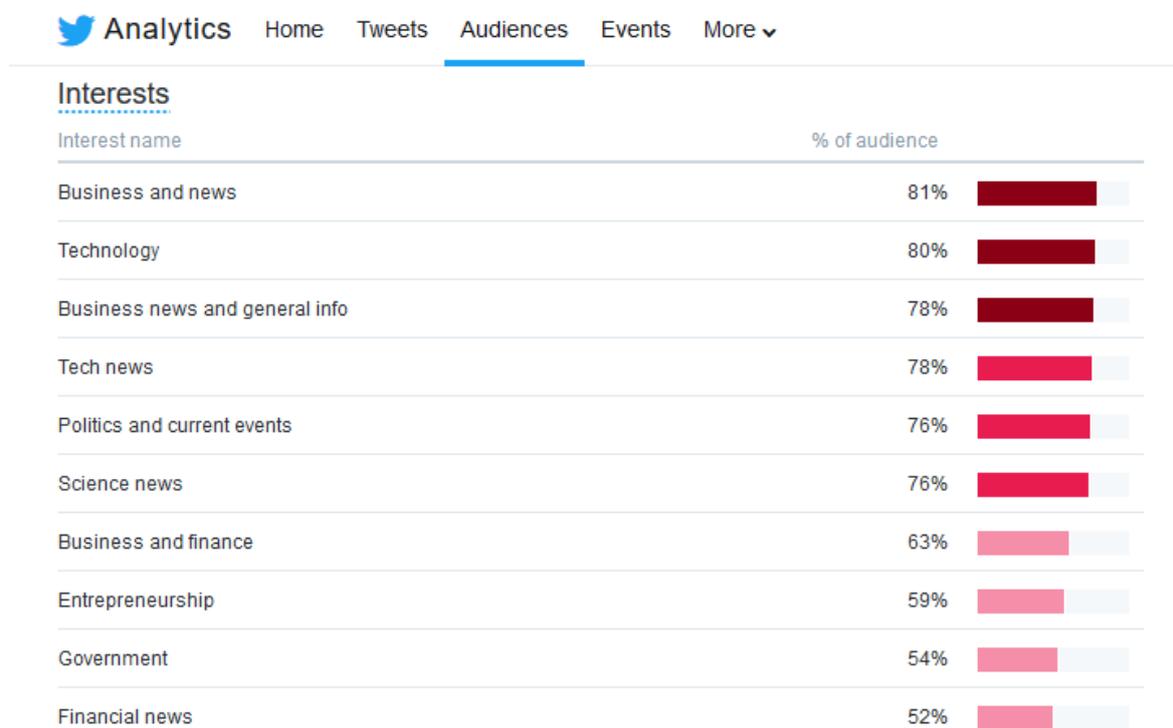


Figure 9 Areas of interest of CITYkeys twitter followers

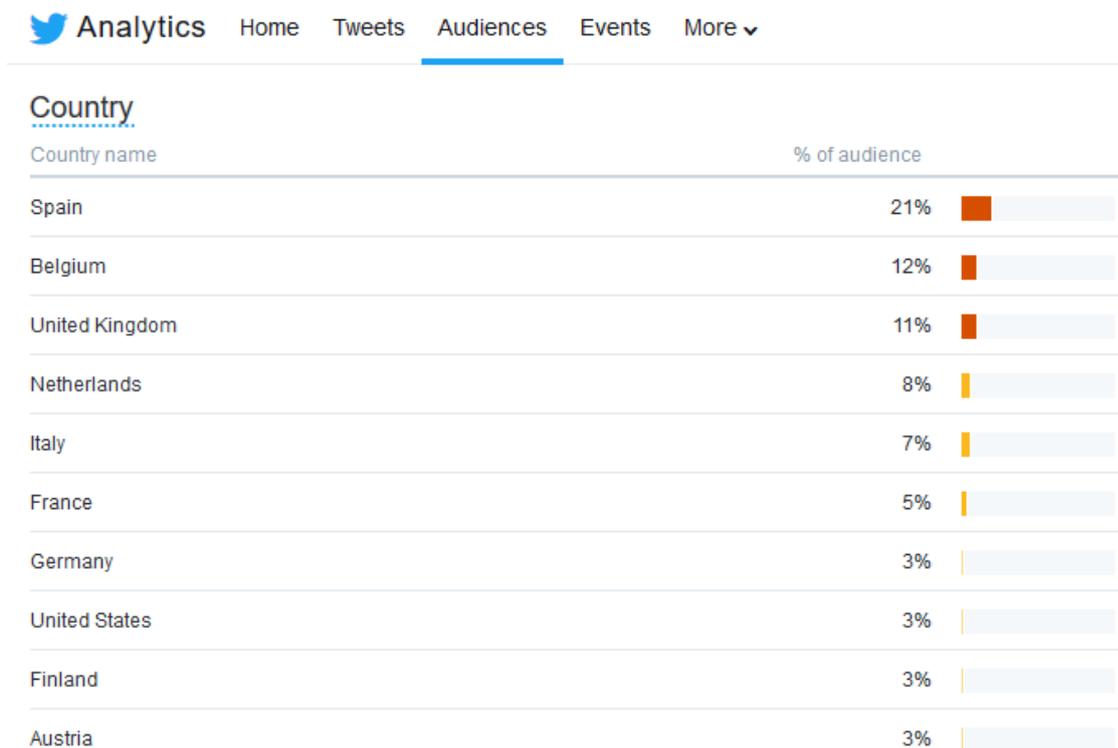


Figure 10 Country of CITYkeys twitter followers

3.5.2 LinkedIn

LinkedIn is a social networking website for people in professional occupations. The dedicated CITYkeys group that has been created on LinkedIn (figure 11) aims to create an expert community of cities and related stakeholders and provide a further tool for interested cities and stakeholders to discuss the project and its work.

The LinkedIn profile is available at <https://www.linkedin.com/groups/CITYkeys-project-8297057?home=&gid=8297057>.

The CITYkeys LinkedIn profile currently has 26 members, the majority of which are project partner or contributors of the project. This tool has been used as a relay of information on the project's activities to target a different audience.

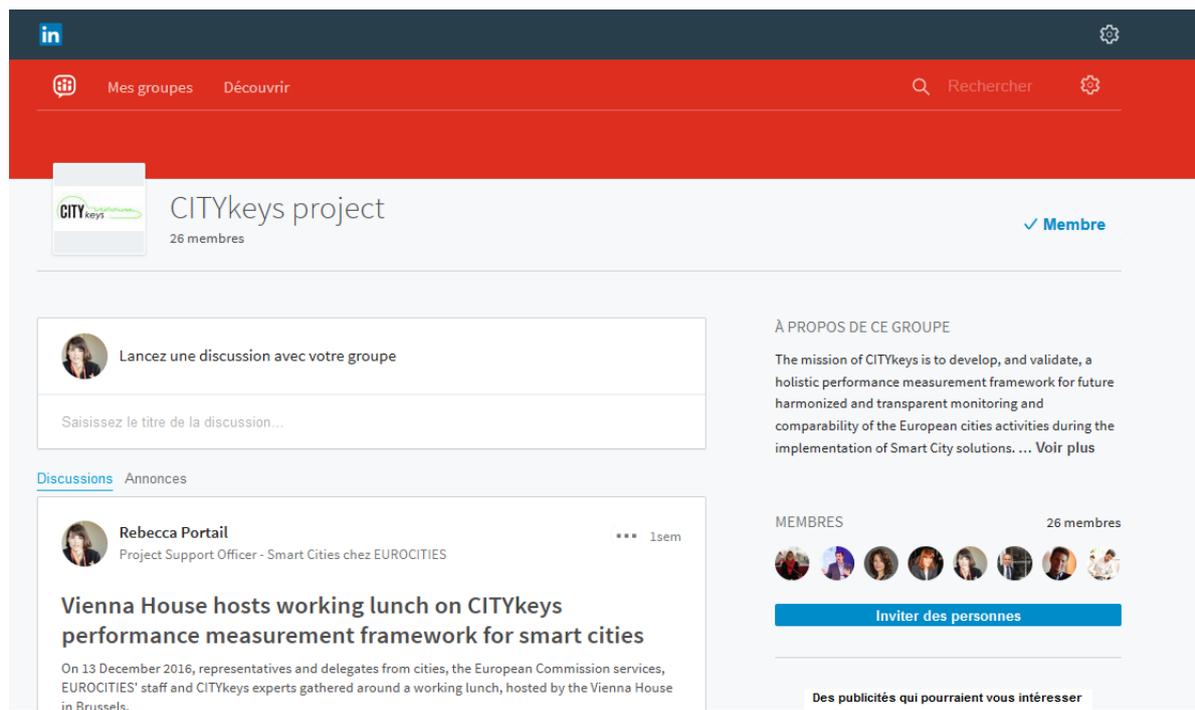


Figure 11 CITYkeys LinkedIn account

3.5.3 Social media campaign

One of the communication goals of the CITYkeys project was to get citizens involved in the development of the “smart cities” concept at European level.

A social media campaign was foreseen for m6 of the project (July 2015). The campaign would be titled “My city is smart” aimed at involving European citizens, in particular from the five city partners of CITYkeys, through a video and photo competition around their city.

After further discussion with the project city partners the idea of a photo and video contest was rejected, considering the difficulties in reaching out for citizens, financial constraints and required time and staff cost. It has to be mentioned that the grant was foreseeing *zero* additional effort and other direct costs for the implementation of such an ambitious campaign.

Partners instead opted for a campaign where a selected number of articles reporting on the topics of interest for CITYkeys (smart cities, open data, e-governance) would be published on the city magazine and website of the five CITYkeys city partners.

3.6 Articles and publications

3.6.1 Articles

An important communication tool of the CITYkeys project is the compiling and publishing of news articles which describe and promote the work of CITYkeys to a wider audience. EUROCIITIES has further promoted CITYkeys and its work on the:

- EUROCIITIES website³;
- EUROCIITIES “flash” newsletter, reaching over 3000 subscribers among European cities);

³ <http://www.eurocities.eu/>

- EUROCIITIES thematic newsletter (mobility, environment, culture, economic development and social affairs), dedicated to the more technical contacts among EUROCIITIES members;
- EUROCIITIES newsletter “Urban Voice”, reaching out to stakeholders active at the EU level and EUROCIITIES contacts in the European institutions;
- Green Digital Charter website⁴.

Table 3 lists the CITYkeys articles which are present in the website of CITYkeys project partner.

Table 3 list of CITYkeys articles

Date	Title of the article	URL/newsletter name/website name
22/03/2016	CITYkeys – one year of results	http://www.eurocities.eu/eurocities/news/CITYkeys-one-year-of-results-WSPO-A8AEHB
17/05/2016	Voila älvkkäiden kaupunkien suorituskykyä mitata?	http://www.vtt.fi/Impulssi/Pages/Voiko-alykkaiden-kaupunkien-suorituskyky-mitata.aspx
20/05/2016	CITYkeys: help us develop a transparent performance measurement system	http://www.eurocities.eu/eurocities/news/CITYkeys-help-us-develop-a-transparent-performance-measurement-system-WSPO-AA5EKW
09/06/2016	European Energy Innovation: CITYkeys – Measurement matters	http://www.eurocities.eu/eurocities/news/European-Energy-Innovation-CITYkeys-Measurement-matters-WSPO-AARK29
14/06/2016	Smart cities, can the performance be measured?	http://www.vttresearch.com/Impulse/Pages/Smart-cities,-can-the-performance-be-measured.aspx
20/06/2016	CITYkeys: test our smart city assessment methodology	http://www.eurocities.eu/eurocities/news/CITYkeys-test-our-smart-city-assessment-methodology-WSPO-AB4K7J
19/10/2016	CITYkeys workshop in Vienna	http://www.eurocities.eu/eurocities/news/CITYkeys-workshop-in-Vienna-WSPO-AEVKZM
14/12/2016	Handbook on CITYkeys performance measurement framework	http://www.eurocities.eu/eurocities/news/Handbook-on-CITYkeys-performance-measurement-framework-WSPO-AGMV8V
11/01/2017	CITYkeys event on performance measurement and indicators for smart cities	http://www.eurocities.eu/eurocities/news/CITYkeys-event-on-performance-measurement-and-indicators-for-smart-cities-WSPO-AHGCFY

CITYkeys project articles have been replicated by a variety of stakeholders. Thanks to the extensive work of promotion and creation of synergies with key initiatives at the European and local level the work of CITYkeys has been also promoted in a wide variety of website:

⁴ <http://www.greendigitalcharter.eu/>

- European Innovation Partnership on Smart cities and communities (<https://eu-smartcities.eu/content/citykeys-launches-kpis-set-monitor-implementation-smart-city-solutions> ; <https://eu-smartcities.eu/content/citykeys-workshop>)
- EU Smart Cities Information System (<http://www.smartcities-infosystem.eu/newsroom/news/nikolaos-kontinakis-cities-should-involve-citizens-soon-possible-if-they-want-have>)
- European energy innovation (<http://www.europeanenergyinnovation.eu/OnlinePublication/Summer2016/files/basic-html/page34.html>)
- Datos.gov.es (<http://datos.gob.es/en/noticia/citykeys-working-build-smart-cities-europe>)
- ESPRESSO project (<http://espresso.ru.uni-kl.de/2017/01/12/8th-espresso-webinar-on-19th-of-january-at-11-00-a-m-cet/>)
- LabCities (<http://smart.labcities.com/Story/Details/566/open-data-and-smart-city-kpis>)
- Digitalsme.eu (<http://www.digitalsme.eu/performance-indicators-smart-cities/>)
- Opendatacon.org (<http://opendatacon.org/opening-city-key-performance-indicators/>)
- Infrastructure & Mobility committee of ECTP (<http://infrastructure.ectp.org/news-events/events/event-detail/citykeys-workshop-25-october-vienna-at/>)
- Phys.org (<https://phys.org/news/2016-04-quality-life-smart-cities.html>)
- Openurbanlab.es (in Spanish) (<https://openurbanlab.es/2016/04/21/citykeys-apertura-de-indicadores-de-ciudad-inteligente/>)
- Urban Innovation blog OpenYourCity.com (<https://openyourcity.com/2015/11/citykeys-towards-a-unified-city-metrics/> - <https://openyourcity.com/2016/02/smart-city-research-highlights/> - <https://openyourcity.com/2016/04/open-data-smart-city-kpis/>)
- Spanish magazine for Municipal Urbanism (<http://www.eysmunicipales.es/actualidad/citykeys-trabajando-para-construir-ciudades-inteligentes-en-europa>)
- Basque Country Agency for Entrepreneurship (<http://www.spri.eus/es/actualidad-spri/noticias/tics-el-proyecto-europeo-citykeys-identifica-las-necesidades-de-la-smart-city>)

The CITYkeys project has also been featured in the November 2016 edition of Cities Today⁵. Cities Today is a global magazine containing analysis, comment and best practices on sustainable urban development, connecting local governments with public and private sector solutions.

The project has been featured in the article “How EURO CITIES is helping members become smart cities” an interview of Nikolaos Kontinakis, EURO CITIES project coordinator that works in the CITYkeys project.

⁵ <https://cities-today.com/how-eurocities-is-helping-members-become-smart-cities/>

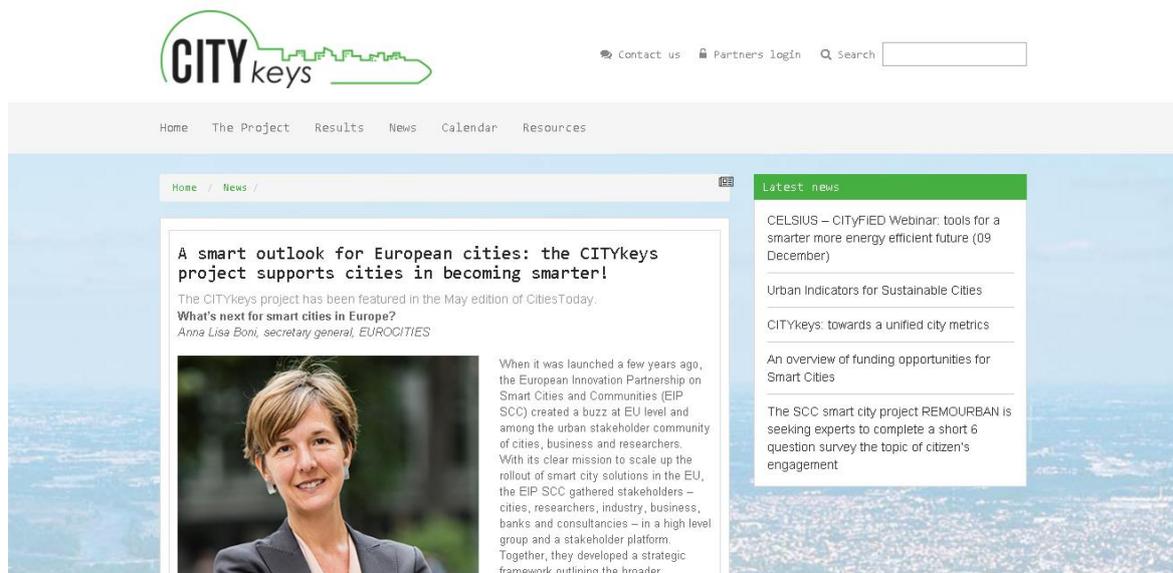


Figure 12 Interview of Anna Lisa Boni, EUROCITIES Secretary General

3.6.2 Scientific publications

A series of scientific conference papers have been published by the CITYkeys research partners:

- H. Neumann, E. Pangerl, M. Airaksinen, H. Ahvenniemi, P. Bosch, A. DeCunto, I. Homeier, A. Huovila, D. Jakutyte-Walangitang, S. Jongeneel, N. Kontinakis, E. Kotakorpi, S. Neralic, I. Pinto-Seppä, D. Sarasa, N. Tilie, S. Vielguth (2015): *Measuring the Performance of Smart Cities in Europe*; In: Proceedings of the first WBCSD and EMAN joint international sustainability accounting symposium, Geneva, 2015"
- H. Neumann, M. Airaksinen, N. Kontinakis (2016): *What do we mean when we talk about the "Smart City"? Insights from a European research project on performance measurement of Smart City Solutions.* RSA 2nd North America Conference. 14th – 17th June 2016, Historic Academy of Medicine, Atlanta, USA
- A. Huovila, M. Airaksinen, I. Pinto-Seppä, K. Piira, T. Penttinen, 2016. Smart city performance measurement system. Proceedings of 41st IAHS World Congress: Sustainability and Innovation for the Future, 13-16th September 2016, Albufeira, Algarve, Portugal. 10 pages

Other scientific journal papers are in preparation and expected to be submitted in spring 2017:

- "Needs of cities on smart city performance assessment: commonalities and differences between European cities". To be submitted to *CITIES The International Journal of Urban Policy and Planning*. Huovila, Kontinakis, De Cunto, Sarasa, Kotakorpi, Pangerl, Malnar, van der Heijden, Airaksinen.
- "CITYkeys smart city performance measurement framework". To be submitted to *CITIES The International Journal of Urban Policy and Planning*. Huovila, Bosch, Neumann, Kontinakis, Airaksinen.
- "Data availability and feasibility of smart city KPIs. To be submitted to *CITIES The International Journal of Urban Policy and Planning*. Huovila, Bosch, Sarasa, Kotakorpi, Pinto-Seppä, Airaksinen.

3.7 User handbook (D3.1)

The project compiled the user handbook “D3.1: CITYkeys experience – Recommendations from cities to cities”. The aim of the handbook is to highlight and share with city representatives the benefits of the developed framework; share the insights gained during the project; draw attention to the potential areas for the framework’s application; and identify the strengths and present shortcomings, while sharing the knowledge of city representatives.

The handbook includes:

- A presentation of the methodology (survey) that was used
- Key questions and answers
- Survey results
- Conclusions

3.8 City handbook (D4.6)

Starting from m14 (March 2016) EURO CITIES outlined the structure of the project deliverable “D4.6: City handbook”. This publication will collect some of the CITYkeys results and lessons learnt and will aim to explain in simple and clear terms the results of CITYkeys project.

The contents reply to questions that cities posed during the project and give important guidance:

- Why performance measurement?
- How to use this guidebook?
- What is performance measurement?
- Building a performance measurement framework
- Using a performance measurement framework
- Policy and decision making recommendations
- New business opportunities
- Smart city index and benchmarking

4. CITYKEYS EVENTS

4.1 Workshops

In the second period of the project, four CITYkeys workshops have been organised in Brussels and Eindhoven as well as the partner cities of Vienna. Vienna's workshop took place back-to-back with the respective project meeting.

Table 4. CITYkeys physical meetings and workshops of m13-m24

Workshop title	Date	Content	Participants
W4 – Final set of KPIs	23 March 2016, Brussels	<ul style="list-style-type: none"> • Presentation of the CITYkeys project results during m3-m12 (D 1.1; D1.2, D1.4; D2.1) • Discussion of T 2.2 methodology for data collection and indicators calculation 	<ul style="list-style-type: none"> • Projects partners
W5 – Consortium meeting	25 May 2016, Eindhoven	<ul style="list-style-type: none"> • Discussion over implementation and testing of the performance measurement system • Recommendations for deployment 	<ul style="list-style-type: none"> • Projects partners • All lighthouse projects • ESPRESSO project • European Commission
W6 – Consortium meeting Evaluation approach in REMOURBAN project	24-25 October 2016, Vienna	<ul style="list-style-type: none"> • Discuss implementation of the performance measurement system (T2.3) • Discuss the testing phase of CITYkeys (T2.4) • Discuss the policy and decision making (T3.1) • Discuss new business opportunities (T3.2) 	<ul style="list-style-type: none"> • Project partners • Advisory board • REMOURBAN lighthouse project
W7 – Final project event	13 December 2016, Brussels	<ul style="list-style-type: none"> • Presentation of the CITYkeys project results • Presentation of the project's deliverables • Discussion on possible exploitation actions 	<ul style="list-style-type: none"> • Project partners • European Commission • City offices representatives



Figure 13. Discussing CITYkeys final results in Vienna House, Brussels, Workshop 7

4.2 Webinars

Online meetings, or webinars, proved as particularly useful to further discuss key project deliverables between project partners and selected stakeholders. Each webinar was attended by CITYkeys technical partners in cooperation with cities partners and mainly targeted cities and interested stakeholders. Webinars were a way to present the key deliverables and results of the CITYkeys project to a wider audience. EUROCITIES made use of its WebEx platform.

Table 5. List of CITYkeys webinars

Webinar 1	7 March 2016	<ul style="list-style-type: none"> • D 1.4 “Smart city KPI and related methodology” • D 2.1 and D2.2 Definition of data sets and methodology for data collection
Webinar 2	30/05/2016	<ul style="list-style-type: none"> • D 3.1 Recommendations for deployment
Webinar with ESPRESSO project	19/01/2017	<ul style="list-style-type: none"> • Presentation of CITYkeys “performance measurement framework” and tools

4.3 Participation in external events

It was very important that CITYkeys had visibility at European-wide events so that its results can be further disseminated to a large number of stakeholders.

It was also crucial to present the project at such events to reach European-wide projects, associations and networks which can then pass on the information from the project to their partners and members. A list of events where the CITYkeys project was formally presented follows:

Table 5 List of CITYkeys events

Partner	Date	Event	Location	Target group	Level of participation in the event
EUROCITIES	16/02/2016	DG ENV workshop	Brussels, BE	Smart cities stakeholders	Contribution
EUROCITIES	03/03/2016	Urban Future	Graz, AT	Cities representatives, smart cities stakeholders	Presentation
City of Zagreb	10/03/2016	The Centralized training for supporting structure in the framework of the Project Mayors in Action	Zagreb, HR	Representatives of supporting structure of the Covenant of Mayors	Presentation
EUROCITIES	15/03/2016	Smart City Integrated Governance – Stakeholder workshop	Brussels, BE	Cities representatives	Presentation
EUROCITIES	16/04/2016	EUROCITIES Knowledge Society Forum meeting	Rennes, FR	Cities representatives	Presentation
EUROCITIES	26/04/2016	From smart to future cities conference	London, UK	Cities representatives, smart cities stakeholders, companies	Mentioned in presentation
EUROCITIES	11/05/2016	European Energy Award & EIP-SCC 2 nd workshop on KPIs and Dissemination	Brussels, BE	Cities representatives, smart cities stakeholders	Presentation
EUROCITIES	18-19/05/2016	ITU-T conference	Rome, IT	Cities representatives, smart cities stakeholders	Contribution

Partner	Date	Event	Location	Target group	Level of participation in the event
EUROCITIES, VTT	23/05/2016	Lighthouse projects meeting	Eindhoven, NL	Cities representatives, smart cities stakeholders	Presentation
EUROCITIES, VTT, TNO, AIT	24/05/2016	EIP-SCC General Assembly	Eindhoven, NL	Cities representatives, smart cities stakeholders	Presentations
TNO	26/05/2016	Indicators meeting	Almere, NL	Municipality staff	Presentation
EUROCITIES, TNO	06/06/2016	Green Digital Charter EUSEW workshop	Brussels, BE	Cities representatives, smart cities stakeholders	Presentation
EUROCITIES, VTT	07-10/06/2016	Smart City Event	Amsterdam, NL	Companies, cities representatives, researchers	Presentation
VTT	23-24/08/2016	RAIS 2016 Symposium	Hog Kong, CN	Researchers	Presentation
EUROCITIES	21-22/09/2016	Smart summit	London, UK	Companies, cities representatives, researchers	Mentioned in presentation
EUROCITIES	23/09/2016	INEA smart cities info day	Brussels, BE	Cities representatives, smart cities stakeholders, researchers, companies	Stand space
TNO	27/09/2016	CREATE/CIVITAS training session "Urban mobility data & performance indicators: How to collect them and make the most of them?"	Gdynia, PO	Data experts, city experts	Presentation
Zaragoza	06/10/2016	International Open Data Conference – Talk on Citykeys: opening Key Performance Indicators for Smart cities"	Madrid, ES		Presentation

Partner	Date	Event	Location	Target group	Level of participation in the event
EUROCITIES	12/10/2016	EIP-SCC Workshop on small giants - KPIs	Brussels, BE	Smart cities stakeholders	Contribution
TNO	13/10/2016	Climate KIC, Smart Sustainable Districts, network event	Gothenburg, SW	Cities representatives, companies, researchers	Presentation
Zaragoza	13/10/2016	Strategic Innovation Summit: Smart Cities Europe. Talk on "Measuring (openly) urban innovation"	Dublin, IR	Public officials, academics and researchers, companies and start-ups	
EUROCITIES	17-19/10/2016	EUROCITIES joint Knowledge Society and Mobility Forums meeting	Tampere, FI	Cities representatives	Presentation
EUROCITIES	15/11/2016	ETSI IoT/M2M Workshop	Nice, FR	Experts, researchers	Presentation
EUROCITIES	15-17/11/2016	Barcelona Smart City Expo World Congress (SCEWC)	Barcelona, ES	Companies, cities, researchers	Stand space, presentation
EUROCITIES	21/11/2016	Lighthouse projects meeting	Brussels, BE	Cities representatives, smart cities stakeholders	Workshop
EUROCITIES	22/11/2016	EIP-SCC action clusters meetings	Brussels, BE	Cities representatives, smart cities stakeholders	Presentation
TNO	23/11/2016	Helsinki/ ClimateKOC/ Smart Sustainable Districts/ Kalasamata challenge meeting	Helsinki, FI	Helsinki city, local organisations in sustainable development	Mentioned in presentation
EUROCITIES	02/05/2016	SET Plan 2016 – Central European Energy Conference	Bratislava, SK	Cities representatives, smart cities stakeholders	Mentioned in presentation
EUROCITIES	12/01/2017	OASC Connected smart cities conference	Brussels, BE	Smart city stakeholders	Presentation
EUROCITIES	24/01/2017	EUROCITIES Knowledge Society Forum meeting	Brussels, BE	Cities representatives	Presentation

Partner	Date	Event	Location	Target group	Level of participation in the event
EUROCITIES, TNO, VTT	25/01/2017	GDC/KSF conference	Brussels, BE	Cities representatives, smart city stakeholders	Workshop
EUROCITIES	31/01/2017	Nice Metropole meeting	Nice, FR	Cities representatives, smart city stakeholders	Presentation

4.4 Synergies with other initiatives & stakeholders

An important part of the project's communication effort was related to the synergies with other frameworks and initiatives but also projects that are involved in performance measurement and smart cities standardisation. During its second year CITYkeys managed to systematically work with a wide list of stakeholders:

- **European Commission:** CITYkeys has presented its results to various EC policy officers and units in an effort to raise awareness and create synergies with relevant projects and policy initiatives. More specifically, the project has been presented to policy officers from DG CNECT, DG ENER, DG MOVE, DG ENV, DG GROW and DG REGIO as well as project officers from the Innovation and Networks Executive Agency (INEA) and the Executive Agency for SMEs (EASME).
- **CEN/CENELEC/ETSI, ITU/ISO:** Following EUROCITIES' participation in the Smart and Sustainable Cities and Communities Coordination Group of the three standardisation organisations, the project has been presented and promoted as a necessary tool for the performance measurement of smart cities and the projects they design and implement.

In addition, CITYkeys has been presented and discussed with experts from ISO and ITU as an important European initiative that has a strong support by the European cities.

- **EIP Smart Cities & Communities:** CITYkeys is an integral part of the EIP SCC as it is one of the two projects that deal with “accompanying measures” within the EIP. In this frame, CITYkeys has been promoted during all the EIP-SCC statutory and technical meetings. Detailed discussions on using CITYkeys for medium sized cities took place with the Small Giants group.
- **EUROCITIES:** One of CITYkeys objectives is to provide a “holistic framework” that can be used across all activities of a city. EUROCITIES has been promoting CITYkeys and its results to member cities and experts in all its forums: knowledge society, economic development, environment, mobility, social affairs and culture. EUROCITIES has also invited its members to participate in all phases of the project:
 - Give input for the needs and requirements of cities
 - Provide feedback for the KPIs and data sets
 - Test the demo tool
 - Use and disseminate the guidebook and handbook
- **Covenant of Mayors:** CITYkeys has used CoM indicators in its framework so that cities can re-use their results in both frameworks.
- **SCIS (Smart cities information system):** SCIS is developing a database of smart city projects which will be classified using a set of performance indicators that is related

more to energy and its technologies. SCIS and CITYkeys have recognised the objectives they share and their complementarity and work very closely together: participation in one another's events, exchange of documents for review, regular meetings, etc.

- **RFSC (Reference framework for European sustainable cities):** In the same way, CITYkeys worked with RFSC under the shared objective of providing cities with monitoring and evaluation tools. CITYkeys has contributed to indicator descriptions for the update of the RFSC indicators.
- **Lighthouse projects:** CITYkeys has paid special attention in involving consistently and as soon as possible the H2020 lighthouse projects. Representatives from the lighthouse projects have participated in the CITYkeys workshops and have been invited to contribute with comments to the project's deliverables. Until now, the lighthouse projects REMOURBAN, Smarter Together, Sharing Cities, mySMARTLife, REPLICATE, TRIANGULUM and SmartEnergyCity has used in some degree the results of CITYkeys or have participated in the testing of the demo tool.
- **ESPRESSO project:** CITYkeys 'Performance Measurement Framework' has been endorsed by the ESPRESSO project for its cities' assessment and certification scheme that ESPRESSO is preparing.
- **Other European initiatives and projects:** During this second project year, CITYkeys has discussed and developed synergies with a number of initiatives and projects that are relevant to the smart cities' development. Indicatively:
 - **European Energy Award** that supports municipalities willing to contribute to sustainable energy policy and urban development through the rational use of energy and increased use of renewable energies;
 - **Green Digital Charter**, a EUROCITIES initiative committing cities to working together to deliver on the EU climate objectives through the use of Information and Communication Technologies (ICT);
 - **ICTfootprint.eu project** that aims to become the European platform promoting the adoption of carbon footprint methodologies in the ICT sector;
 - **URBIS project** that investigates vacant land potentials in urban areas, and the opportunities for previously developed land or brownfield to support urban regeneration safeguarding greenfield sites;
 - **DECUMANUS project** that aims to secure the more effective governance of the cities of Europe, targeting the needs of urban planners, policymakers and politicians to secure and apply enhanced intelligence in the decision-making process that underpins the management of cities.

5. UPDATED EXPLOITATION PLAN

5.1 Purpose of the exploitation plan

The purpose of exploitation plan is to define and establish suitable actions that CITYkeys partners will take in order to ensure the success and sustainability of its outcomes and results.

This chapter updates the draft exploitation plan that was compiled in m8 of the project and 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)

5.2 Contribution of partners

The exploitation plan is the project’s guidance document for all exploitation actions of the project and has been developed by EUROCITIES with the contribution of all project partners.

5.3 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.

5.3.1 Smart city KPIs and related methodology (D1.4)

The project has built upon existing environmental, technological, economic and social indicators (KPIs) for smart cities and has specified 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 performance measurement framework has been described.

CITYkeys KPIs have gained significantly in value after the endorsement of CITYkeys by ESPRESSO project and the adoption of the CITYkeys KPIs by ETSI in the definition of its TS 103-463 (Annex 3).

5.3.2 Definition of data sets (D2.1)

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

5.3.3 Specifications for the collection and calculation systems (D2.2)

The project has specified the methodologies to collect the needed data and to calculate the performance measurement indicators. After analysing existing systems and available open platforms it built on top of these currently available systems.

5.3.4 Prototype of the performance measurement system (D2.4)

The central outcome of the project has been 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, developed and tested by VTT with the help of a number of European cities, integrated requirements for inputs, calculation methodologies and visualisation of output results in an intuitive and user-friendly interface.

Cities that participated in the testing provided feedback and a second draft of the demo was released.

5.3.5 City handbook (D4.6)

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

5.3.6 User handbook for city representatives (D3.1)

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

5.3.7 New business opportunities report (D3.2)

CITYkeys identified 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 KPIs systems were mapped and their applicability with the CITYKEYS performance measurement system analysed. Possible new business opportunities were identified for providers of services and technologies required by the development of smart cities and deployment of the CITYKEYS KPIs.

5.3.8 Recommendations for a Smart City Index (D3.3)

The project analysed 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.

5.3.9 Website (D4.5)

CITYkeys website is the online communication and dissemination space where the project objectives, articles, communication material and results are presented.

5.4 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.

5.4.1 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.

5.4.2 (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 (smart regions, smart countries).

5.4.3 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).

5.4.4 European Commission

In the frame of integrated policies like the European Innovation Partnership on Smart Cities and Communities (EIP SCC), the Urban Agenda (Pact of Amsterdam) 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.

5.4.5 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)

5.5 General exploitation plan

The CITYkeys consortium 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.

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

5.5.1 Use of the CITYkeys brand

All partners will have the right and are obliged to use CITYkeys name and brand when referring to the project’s deliverables 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.

5.5.2 Use of the CITYkeys project data

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

In the first case, cities provided 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 transparent use of data. In the case that cities needed to provide data that were not yet publicly available, the data either were accompanied by a similar open data license or were provided under an explicit license that will protect and regulate their use beyond the scope of CITYkeys.

In the second case, CITYkeys partners handled and analysed the results of the locally performed tests without permanently storing or using for other reasons the data sets that cities used and provided for those tests.

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

In addition, VTT appointed an ethics advisor⁶ to assess the compliance of all CITYkeys deliverables with the ethic requirements.

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 condition that CITYkeys is mentioned whenever necessary.

5.5.3 Exploitation of the CITYkeys “product”

5.5.3.1 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 EURO CITIES, 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.

⁶ Details can be found in the periodic reports D5.3 and D5.4

Until now, apart from the five partner cities, another 33 European cities⁷ have expressed their interest to follow the project, test and evaluate its outcomes and potentially use the framework.

5.5.3.2 (Smart) cities and regions

The consortium has promoted 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. Nevertheless, a follow-up project or activity would be needed to test and prove how a framework like CITYkeys can change scale and scope and move from the city level to the regional or the national levels.

The consortium has made preliminary contacts and presentations of the expected results with bodies like the Committee of Regions. Also, it has proposed and used the CITYkeys methodology in international cooperation initiatives like the EU-China urbanisation partnership under the Green Digital Charter.

5.5.3.3 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 has developed synergies with standardisation organisations (CEN/CENELEC and ETSI, ISO and ITU) 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 has developed 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.

Some first tangible results have been:

- The endorsement of CITYkeys KPIs by ESPRESSO project;
- The adoption of the CITYkeys KPIs by ETSI in the definition of its TS 103-463 (Annex 3).

5.5.3.4 European Commission

At least four Directorates of the European Commission⁸ 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 have tries 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.

⁷ Aachen, Amadora, Amsterdam, Barcelona, Bordeaux, Bottrop, Brno, Brussels, Burgas, Chemnitz, Dresden, Espoo, Helsinki, Heraklion, Jyväskylä, Magdeburg, Manchester, Maringa, Milan, Munich, Newcastle, Prague, Preston, Reykjavík, Rostock, Rzeszow, Syracuse, New Taipei, Terrassa, Thessaloniki, Utrecht, Wrocław

⁸ DG CNECT, DG ENER, DG MOVE and DG ENV

The new Urban Agenda⁹ for EU will be implemented through a number of new partnerships that will start after 2017. EUROCITIES is already discussing with DG REGIO how CITYkeys can help in the monitoring and reporting of the various partnerships and projects that will be implemented in their frame.

5.5.3.5 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 has tried to take advantage of this fact and create advanced synergies with the lighthouse projects that EC co-funded through the 2014, 2015 and 2016 H2020-SCC-01 calls. Communication and synergies have already been established with all lighthouse projects that started in 2015 and 2016.

The lighthouse projects REMOURBAN, Smarter Together, mySMARTLife, REPLICATE, TRIANGULUM and SmartEnergyCity has participated in the testing of the CITYkeys KPIs or have expressed their will to use CITYkeys KPIs in the future.

The project has also created synergies with the “Smart Cities Information Platform” projects. The two performance measurement frameworks have discussed their scopes and complementary strengths and work together to help European cities and projects measure and evaluate their progress.

Finally, CITYkeys has developed synergies with four important European initiatives, the Covenant of Mayors, the European Energy Award, the Reference Framework for Sustainable Cities and the Green Digital Charter. The aim is to harmonise or make compatible, in the wider possible extent, the monitoring and performance measurement methodologies that are used from all these initiatives.

5.6 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.

5.6.1 VTT

VTT has worked for several decades in developing building and city level assessment schemes as well as key performance indicators. VTT works with several Finnish cities to develop strategies and implementations for sustainable and smart cities. In these projects the performance monitoring has a high importance. VTT will present and promote CITYkeys framework both in the national and international events and networks. The continuously ongoing 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 (EIP SCC)
- Promoting CITYkeys in CIB smart city task group, which VTT is leading
- Promotion and integration of CITYkeys in Finnish national smart city network including wide city network in Finland

⁹ <http://urbanagendaforthe.eu/>

- Promoting and integrating CITYkeys in Finnish Smart and Clean initiative in Metropolitan area
- 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”.

5.6.2 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.

5.6.3 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 results so far have been mainly disseminated informally through contacts with interested parties, besides a press release at the start of the project¹⁰. 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, Utrecht, Almere, Eindhoven, Rotterdam, Amsterdam, Enschede (mostly in the context of their smart city strategy). So far this has led to one assignment for the municipality of Almere. In 2017 we will continue establishing these contacts, also in the framework of a recently published National Smart City Strategy¹¹

¹⁰ <https://www.tno.nl/nl/over-tno/nieuws/2015/2/smart-city-oplossingen-die-werken/>

¹¹ http://www.platform31.nl/nieuws/nederlandse-steden-willen-steun-kabinet-voor-gezamenlijke-smart-city-strategie?utm_source=Platform31&utm_campaign=caf0702e8f-Platform31_Nieuwsbrief_26012017&utm_medium=email&utm_term=0_a4fff22241-caf0702e8f-77400089

TNO will integrate the CITYkeys performance measurement framework also in other projects. Specifically, in the Climate KIC project Smart Sustainable Districts the CITYkeys framework will be the basis for the assessment of the results in the various districts. 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 TNO has tested provides a basis for further projects on the footprint of ICT infrastructure. Finally, TNO will possibly actively participate in efforts of standardisation organisations in particular ISO TC268 which is currently discussing smart city indicators and resilient city indicators.

5.6.4 EUROCITIES

EUROCITIES considers CITYkeys as a very important part of its “smart cities” work. Thus, it presents and promotes and will keep doing so *even after the end of the project* CITYkeys’ 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:

- 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 signatory cities
 - Future participation in projects related to standardisation and/or lighthouse city projects
- It will specifically promote and use the two handbooks (user, D3.1 and city, D4.6) and the “new business opportunities” report that CITYkeys will compile to member city practitioners. Meetings of all six forums¹² 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, MOVE, ENV, REGIO, GROW and DG ENER, INEA, EASME) that are interested for a holistic approach to “smart cities/regions 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 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.

5.6.5 City of Rotterdam

The City of Rotterdam hasn’t yet elaborated a detailed exploitation plan for CITYkeys results. Nevertheless, it expects to 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. Further, within the European project 'Ruggedised' will be explored which KPI's can be useful for the project.¹³

¹² Culture, Economic development, Environment, Knowledge society, Mobility and Social affairs

¹³ <http://www.rotterdam.nl/smartcity>

5.6.6 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.

5.6.7 City of Vienna

The City of Vienna, in particular the Smart City Unit at the City of Vienna, is involved in various smart city, sustainability and urban development projects in Austria and the EU. CITYkeys could be of particular importance to the two projects "Smarter Together", the light house project of Lyon, Munich and Vienna funded by the EC (SCC) and Smart Monitor, a nationally funded project developing a monitoring concept for the Smart City Wien Framework Strategy. The suitability of CITYkeys will be tested in those projects. In most cases, however, it is expected that the indicators will need to be developed further according to the local conditions and the specific requirements of the activity and its purpose. Additionally, CITYkeys will be communicated to the numerous smart city projects that Vienna is implementing¹⁴, particularly to other projects in the areas of open data, measurement.

5.6.8 City of Zagreb

The City of Zagreb will continue dissemination and awareness raising activities through providing information of the project CITYKEYS at the Zagreb energy week, mentioning the project at conferences and workshops and through networks such as: Croatian Covenant of Mayors Club¹⁵, The Associations of Croatian Cities, the Covenant of Mayors Capital Cities of Southeast Europe Club, etc.

5.6.9 City of Zaragoza

Zaragoza has played an active role in the dissemination and exploitation of the CITYkeys project, both at the internal (inside the City Hall), local (the City of Zaragoza), national (Spain) and European level (in coordination with EUROCITIES, VTT and other international partners).

At the internal level, inside the City Hall Organization, our Smart City Department has exploited the fact that two of its flagship smart projects has been selected as test pilot to play a more central role as horizontal KPI providers to the organization. This will be further exploited through "Smart Zaragoza", our main Smart City event to be held in April, where CITYkeys framework will be presented as the baseline for a future city dashboard.

The use of CITYkeys as a means to identify gaps and opportunities alongside with other stakeholders (SMEs, civic associations, etc.) in co-creation activities has been validated along the project. A result that opens a greenfield for expanding its use to a wide variety of co-creation processes that the City Hall is developing (hackathons, participatory budgeting, open place making activities in public spaces, co-creation challenges of public services, etc.). A web space has been opened under the existing Open Urban Lab website (<https://openurbanlab.es/category/citykeys/>). (The Open Urban Lab is the program where smart

¹⁴ <https://smartcity.wien.gv.at/site/en/projekte/>

¹⁵ <http://www.crocom.hr/>

city projects acquire a new participatory dimension and its audience and participants are citizens engaged in city affairs.)

To encourage the adoption of smart city policies within the city administration, the internal City Hall newsletter has been used, so that CITYkeys achievements can reach internal project leaders.

At a national level, CITYkeys has been presented as an example of good practices in open data KPI monitoring at the Open Data International Conference organized in Madrid by the Spanish Government. The fact that the organizers of this event are also responsible for the national open data portal datos.gob.es and for the Smart City national policy paves the way for future exploitation of the framework to other Spanish cities.

At the European level, Zaragoza has presented CITYkeys as an example of unified framework to measure urban innovation in a series of Smart City events, generating close attention from many actors in the urban innovation arena. It has been requested, for instance, by the Technology and Entrepreneurship Center as an example of good practices.

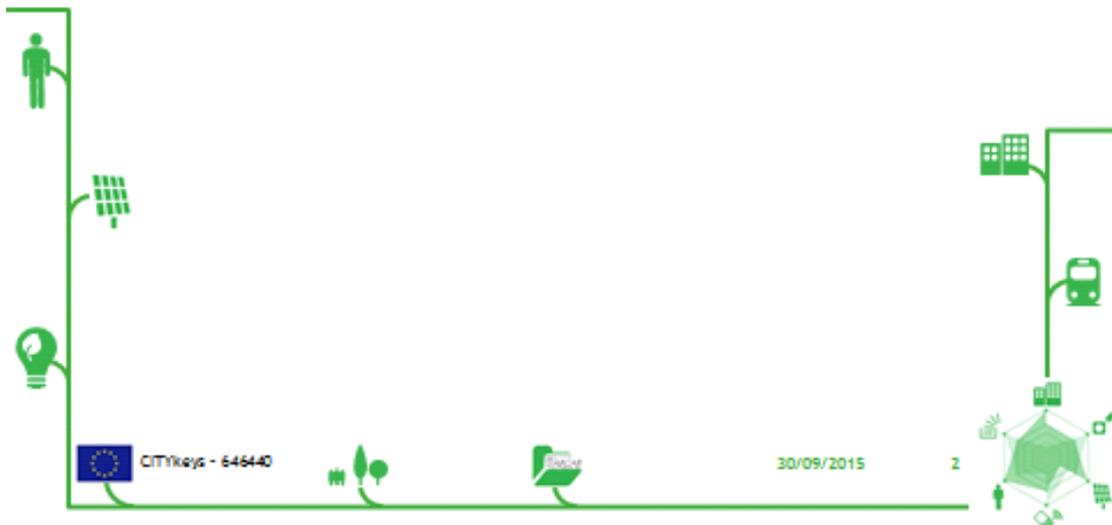
But the most decisive boost in the possibilities of further exploiting CITYkeys have resulted from the Green Digital Charter Awards 2016, where one of Zaragoza's test projects, the Citizen Card, won in the category of Societal Impact and Citizen Participation. This has not only triggered an intensive press campaign, but also has generated an internal flow of interest in further exploiting CITYkeys as a measurement framework for smart city projects. The positive feedback resulting from the implementation of the cycle “test – learn – improve” in projects will allow us to keep on exploiting CITYkeys and building services such as new open data, internal business analytics tools and co-creation activities on top of the CITYkeys framework and learning.

Social media campaigns have been used and will continue to be used to broaden the audience 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.

Finally, the City Hall European Project Office is presenting several European proposals on COCREATION, in which CITYkeys has been adopted as the reference framework to measure project impact.

6. ANNEXES

6.1 Updated CITYkeys power point template





Web: www.citykeys-project.eu
Twitter: @citykeys_eu

Supported by



The image contains a collection of logos for the project partners and supporters. On the left, there is a vertical line with icons for a person, solar panels, and a lightbulb. On the right, there is a vertical line with icons for a building, a bus, and a network diagram. The logos include: VT, AIT (Austrian Institute of Technology), TNO, City of Tampere, EURO CITIES, Gemeente Rotterdam, Viennal ahead, City of Warsaw, SMART CITY WIEN, Zaragoza Ayuntamiento, and the European Union flag.

6.2 CITYkeys poster

CITYkeys

Smart City performance measurement system

Download the tools for your city!

- Key performance indicators & the framework architecture
- Data sets you need & the methodologies to collect them
- Using performance indicators as a decision and policy tool
- Business models & opportunities with performance measurement
- Building your smart city index

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 101016440

Logos: European Union, VIT, AIT, TNO, Zaragoza, and other partners.

**OEU(16)000001****Security Aspects****No****Keywords** (at least 2 from those available athttp://webapp.etsi.org/ContextHelp/WorkProgram_help.asp?type=CODES_KEYWORDS)

MANAGEMENT;Sustainability

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