



Smart transformation of urban areas through
integrated actions in energy, mobility and ICTs

9th Annual Symposium on Architectural Research

CARTIF Technology Centre
Miguel Á. GARCÍA-FUENTES
REMOURBAN Project Coordinator



This project has received funding from the European Union's Horizon 2020
research and innovation programme under grant agreement No 646511



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www.remourban.eu



[@Remourban_EU](https://twitter.com/Remourban_EU)

Source: Geotagged cities. Wired Magazine January 2012



[...] For me, my city is imposed as an indisputable evidence: the environment of everything or almost everything that happens to me, the greatest place among all I can modify, of all those where I can influence actually, physically, and not only through the fiction of the vote. [...]

*Pasquall Maragal. Mayor of Barcelona (1982-1997)
Preface to "Cities for a Small Planet" Richard Rogers, 2000*

Source: Royalty exchange

data is the new Oil

we need to find it,
extract it, refine it,
distribute it and
monetize it.

David Buckingham

...but do we have the resource to refine it?

Source: Jason Hawkes. Valladolid: Cúpula del Milenio

the goal is providing a
model to make cities

smarter
and more
sustainable



Source: naturetime.wordpress.com



*[...] displaying or flashing a very bright light for the **guidance** of ships in avoiding dangerous areas, **in following certain routes**, etc.*



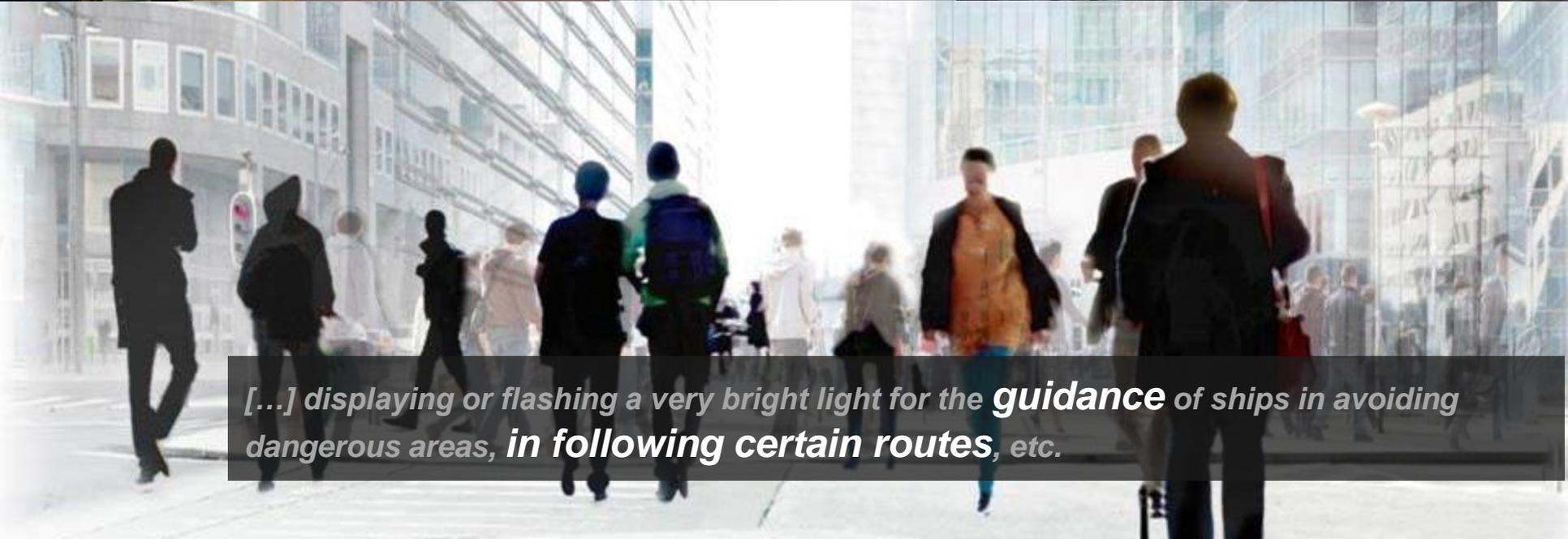
DECISION
MAKERS

PUBLIC
ADMINISTRATORS

INVESTORS

INDUSTRY

PEOPLE



[...] displaying or flashing a very bright light for the **guidance** of ships in avoiding dangerous areas, **in following certain routes**, etc.

EU roadmap of SCC Projects and Initiatives

EUROPEAN INNOVATION PARTNERSHIP ON SMART CITIES AND COMMUNITIES



CITYkeys (SCC2)
Smart City Indicators



ESPRESSO (SCC3)
Smart City Standards

SCC1-2014



triangulum
DEMONSTRATE DISSEMINATE REPLICATE



SCC1-2015

smar+
en
ci+y



SCC1-2016



RUGGEDISED
Designing smart
resilient cities for all

SMART CITIES INFORMATION SYSTEM (SCIS)



EU Smart Cities
Information
System



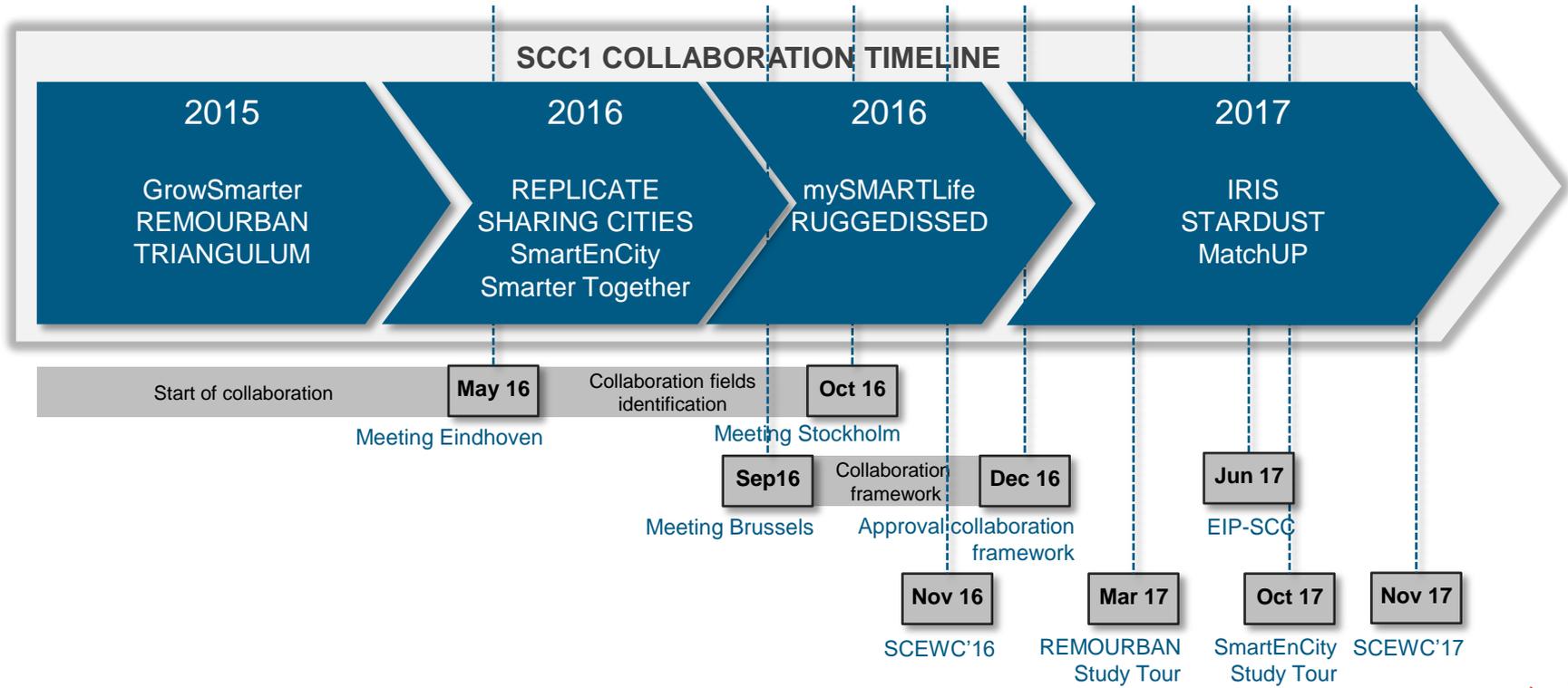
Lighthouse projects cooperation

57 cities paving the way towards a Smarter and more Sustainable Europa



The Smart Cities and Communities lighthouse projects are funded by the European Commission Research and Innovation Framework Horizon 2020 and managed by the Innovation and Networks Executive Agency INEA.

SCC1 lighthouse projects' cluster



SCC1 lighthouse projects' cluster

Lighthouse Projects Cooperation Manifesto

- Approved by all SCC1 coordinators and EC
- Signed by all SCC1 coordinators in Nottingham
(March, 23 2017)
- Establishes the basis for the cooperation

THE LIGHTHOUSE PROJECTS COOPERATION MANIFESTO

Shaping the market of Smart Cities in Europe through the cooperation of European lighthouse projects



<p>TRIANGULUM</p> <p>NO - Stavanger NL - Eindhoven UK - Manchester ES - Sabadell DE - Leipzig CZ - Prague</p> <p>SMARTER TOGETHER</p> <p>DE - München FR - Lyon AT - Wien ES - Santiago IT - Venezia BG - Sofia UA - Kiev JP - Yokohama</p> <p>REPLICATE</p> <p>ES - Donostia/San Sebastián IT - Firenze UK - Bristol DE - Essen TR - Nilüfer</p> <p>RÜGGEDISSED</p> <p>SE - Örebro UK - Glasgow NL - Rotterdam IT - Parma CZ - Brno PL - Odanski</p>	<p>REMOURBAN</p> <p>TR - Trabzon/Eskisehir ES - Valladolid UK - Nottingham BE - Serang HU - Miskolc</p> <p>GROWSMARTER</p> <p>DE - Köln ES - Barcelona SE - Stockholm BO - Cochaca IE - Cork MT - Valletta PT - Porto AT - Graz</p> <p>SHARING CITIES</p> <p>UK - London IT - Milano PT - Lisboa BG - Burgas FR - Bordeaux PL - Warszawa</p> <p>SMARTENCITY</p> <p>DK - Sønderborg ES - Vilanova/Gesúlviz EE - Tartu BG - Asenovgrad IT - Lecce</p> <p>mySMARTLife</p> <p>FR - Nantes FI - Helsinki DE - Hamburg ES - Valencia HR - Rijeka BG - Varna HU - Bymozoc</p>
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towards ensuring their replication potential in other cities.

These 9 projects represent a total of 27 lighthouse cities and 30 follower cities, working to demonstrate these processes, technologies and business models to transform their ecosystems into smarter and more sustainable places.

and sign this Lighthouse Projects Cooperation Manifesto in the Lighthouse City of Nottingham, on March 23rd of 2017

In representation of the signature hosting city



www.nottinghamcity.gov.uk



www.ntu.ac.uk

In representation of the lighthouse projects



http://triangulum-project.eu



www.grow-smarter.eu



http://smartencity.eu



http://www.sharingcities.eu



http://replicate-project.eu



http://smarter-together.eu





www.ruggedised.eu



www.remourban.eu

The Smart Cities and Communities lighthouse projects are funded by the European Commission Research and Innovation Framework Horizon 2020 and managed by the Innovation and Networks Executive Agency IREA.

• Provide joint ideas and evidence to support future policy and regulatory change in the lighthouse cities

• knowledgebase of the Smart Cities Information System (SCIS)





SCC1 lighthouse projects' cluster



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Miguel Á. GARCÍA-FUENTES | REMOURBAN Project Coordinator



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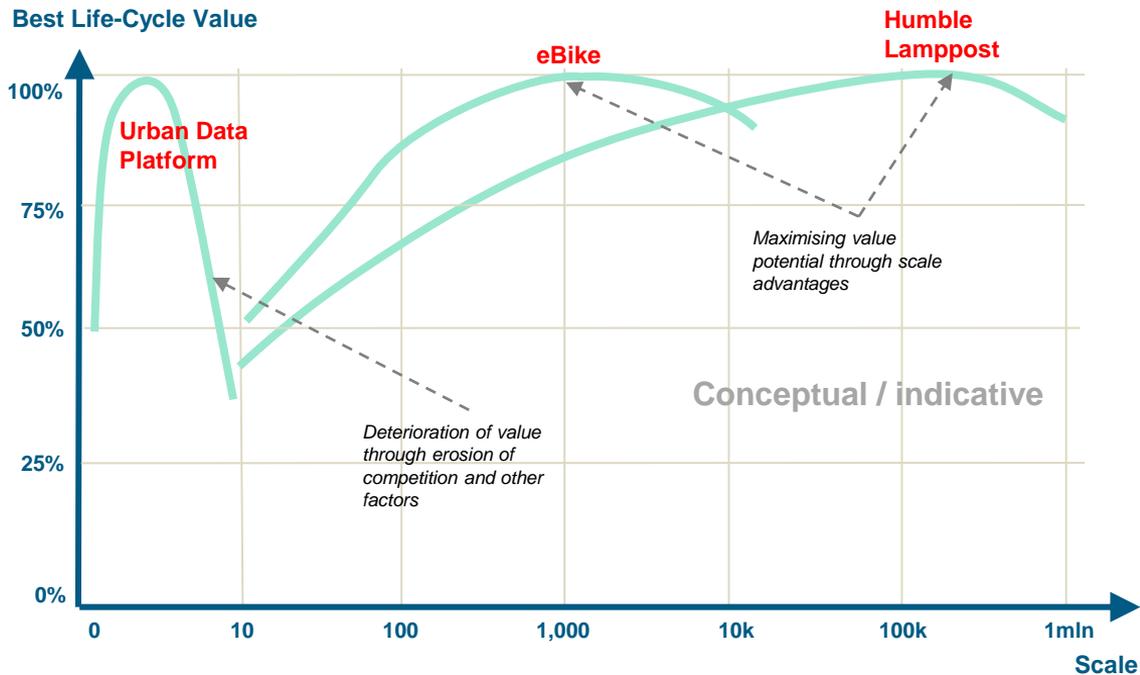
SCC1 lighthouse projects' cluster

Expected outcomes (the 5 collaboration pillars)

- Mapping of **smart technologies**
- **Shared knowledge** and capacity building
- **Foster scale of economy** (demand aggregation, replicability strategies, market creation)
- Create higher **Value for Money** through:
 - Greater internal efficiency of the projects
 - Demonstrate that the solutions implemented can create market
- **Identification of policies** to support the regulatory change needed to unlock the full potential of Smart Cities



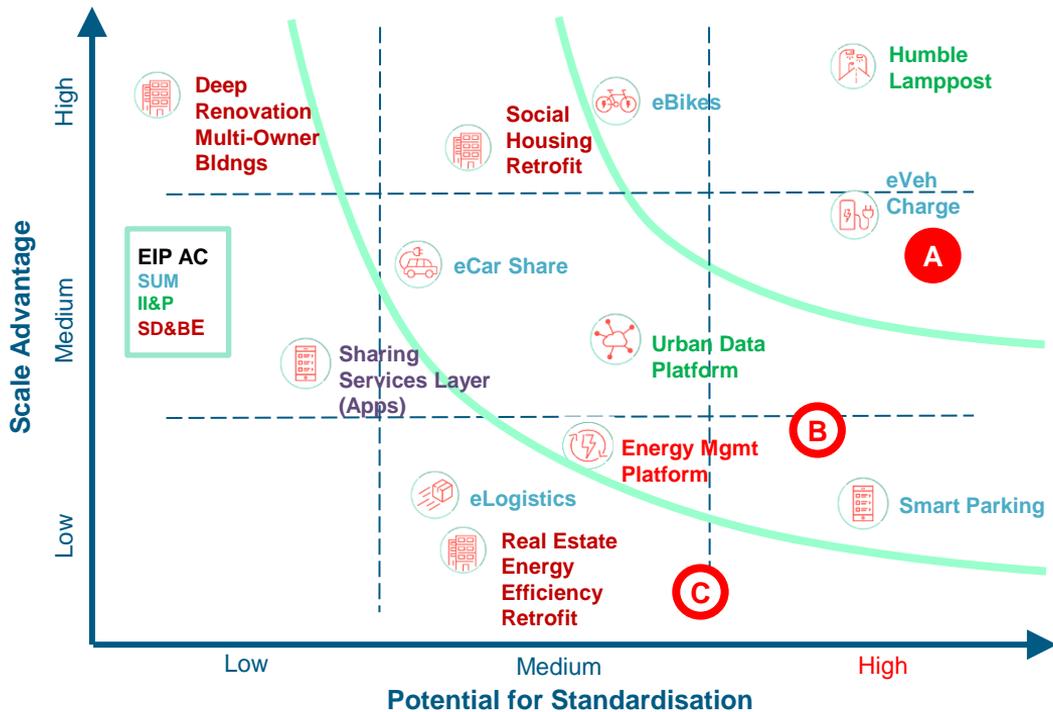
Economies of scale for different solutions



Source: Sharing Cities



Potential for replication and scaling



Source: Sharing Cities





Mapping of actions

eV and Charging points coarse analysis

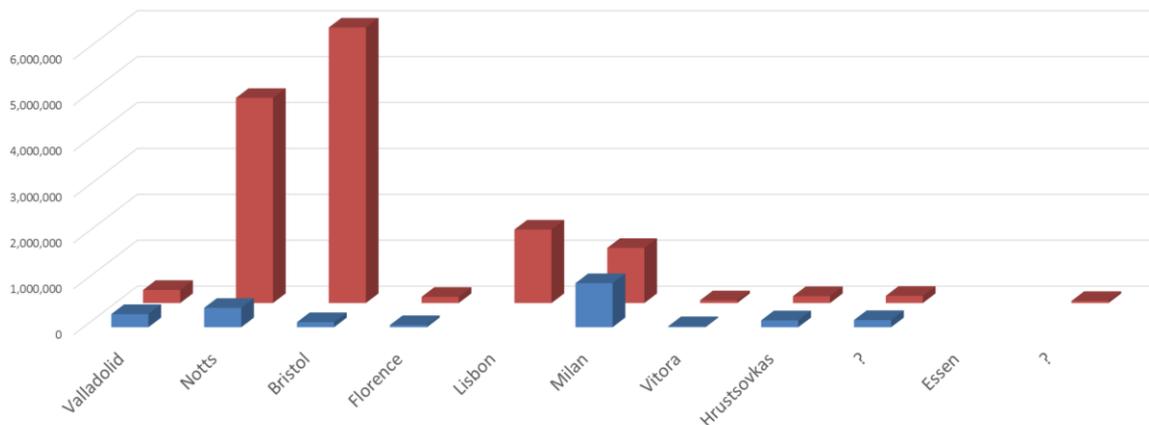
Using EC funds to stimulate scale



€ 2.1 m EU funds – ‘stimulus’

€ 14 m Total Direct – city-specific additional investment

€ 40 m identified trigger funds



Source: *Sharing Cities*





SCC1 lighthouse projects' impacts

Energy actions

Buildings			
EU funding (€)	42 M€	Energy savings (MWh/year)	316,967
Total direct investment (€)	308 M€	CO2 emissions reduction (tCO2/year)	122,279
Leverage factor (before replication)	7.17	Total number of citizens impacted	1.15 M
Total direct investment after replication in the city (€)	2,582 M€		
Leverage factor (after replication)	60.11		

Source: INEA





SCC1 lighthouse projects' impacts

Total impacts

Total expected impacts

EU funding (€)	109.76 M€	Total direct investment after replication in the cities	3,756.08 M€
Total direct investment (€)	1,201.21 M€	Leverage factor after replication	34.22
Leverage factor (before replication)	10.94	Energy savings (MWh/year)	593,369
Invested €/MWh/year saved	2,024 €	CO2 emissions reduction (tCO2/year)	230,445
EU funding/citizen	22.52	Total number of citizens impacted	4.87 M
Global emission factor (tCO2/MWh)	0.39		

Source: INEA



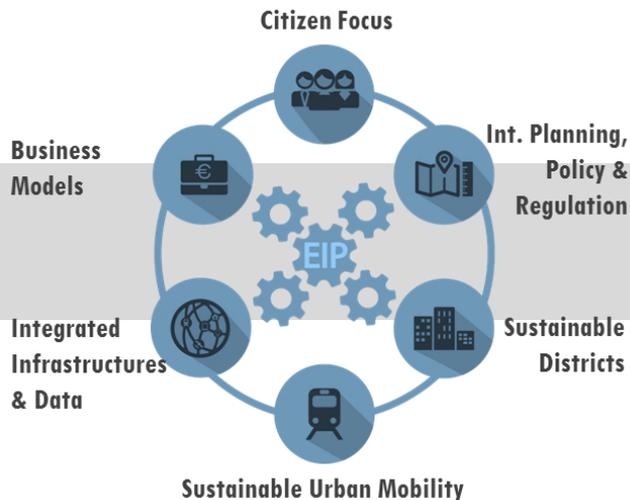


Our goal – replication and upscaling



Lighthouse cities

Demonstration of common solutions for shared challenges (technical, social, financial)



Follower cities

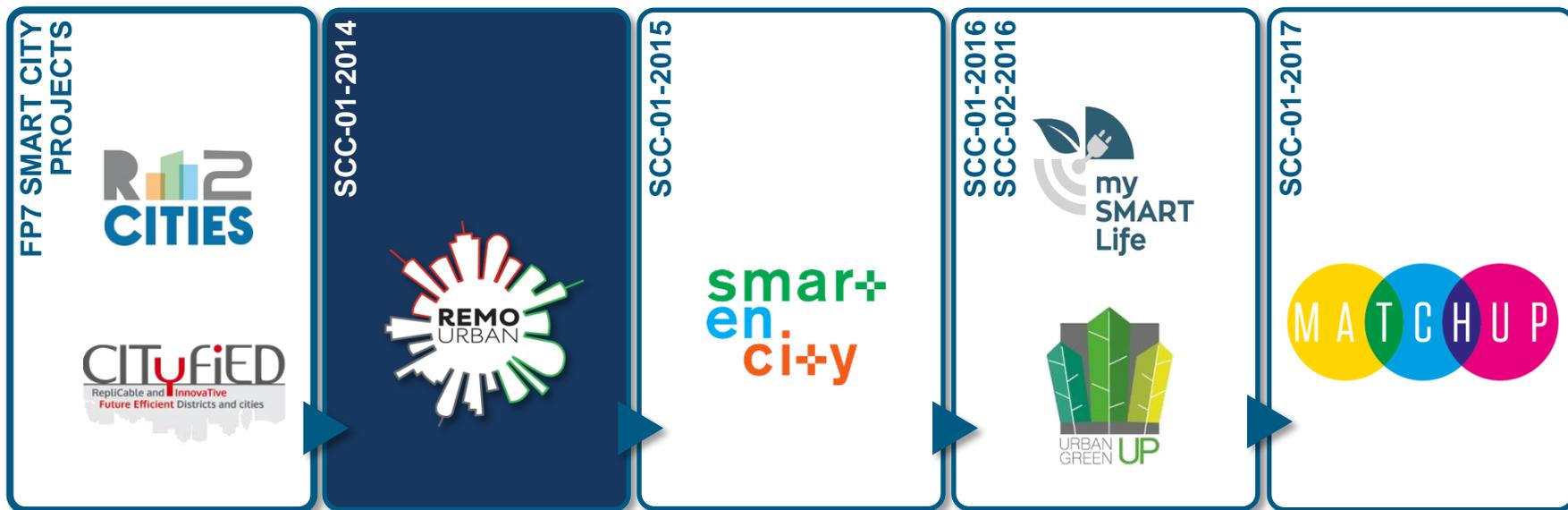
Ground for replication, represent the city needs/demand





REMOURBAN project

Smart City projects in CARTIF





REMOURBAN project



Total REMOURBAN budget: **32.5M€** (21,5M€ EU funded)
 Total investment in REMOURBAN actions: **22.9M€** (80% public)
 Energy savings: **6,858,735 MWh/yr**
 CO₂ emissions avoided: **2,841 TnCO₂/yr**
 Citizens directly involved in demos: **19,800**
 Direct job creation: **187**
 Consortium: **22** partners (5 municipalities, 3 RTD, 5 industries, 9 SMEs)
 Nationalities: **7** (Spain, UK, Turkey, Belgium, Hungary, Germany, Italy)

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REMOURBAN key objective

- Develop and validate an **Urban Regeneration Model** – highly replicable and based on the joint transformation of:
 - Buildings/districts towards **Low Energy Districts**
 - City transportation towards a **Sustainable Urban Mobility**
 - Integrate existing city infrastructures through **ICTs**



Source: PETER PARKS/AFP/Getty Images



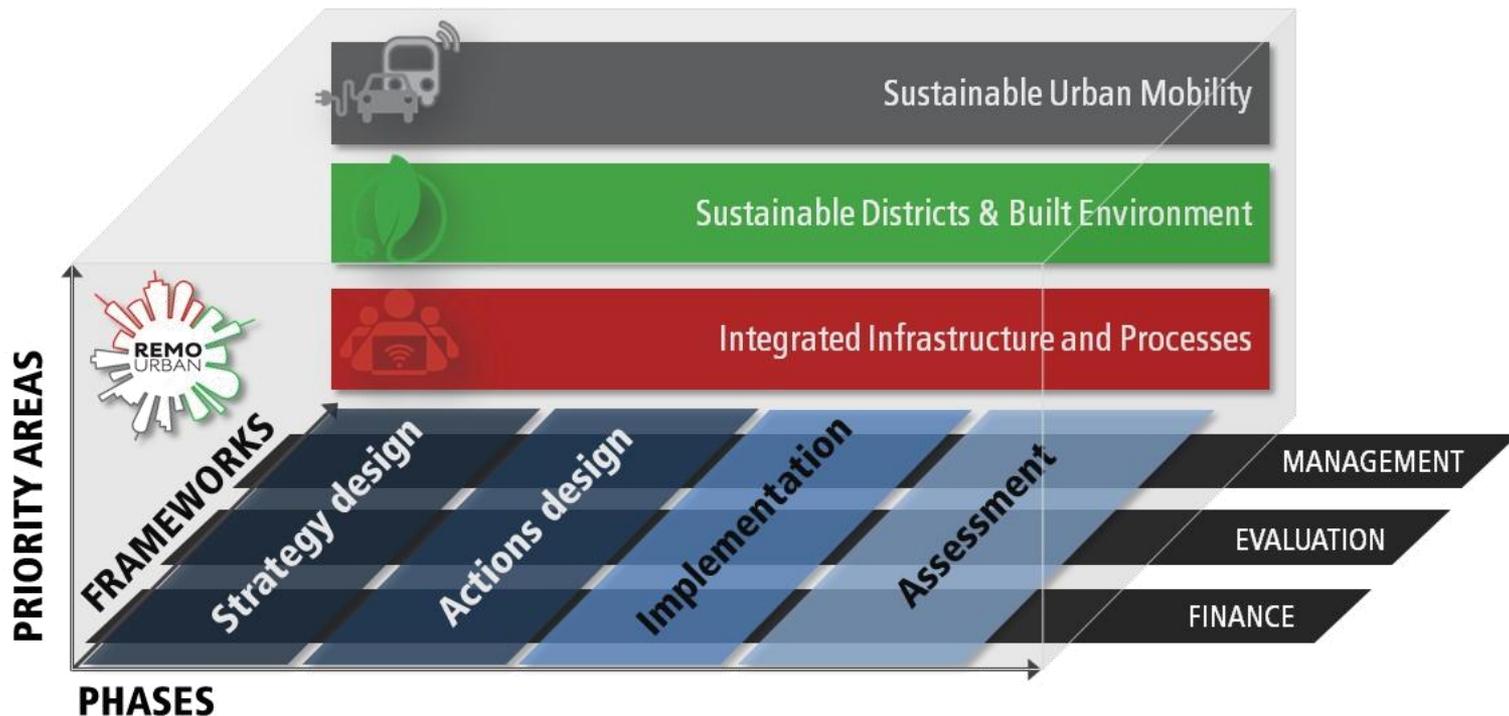
Source: theskyisbig.blogspot.com



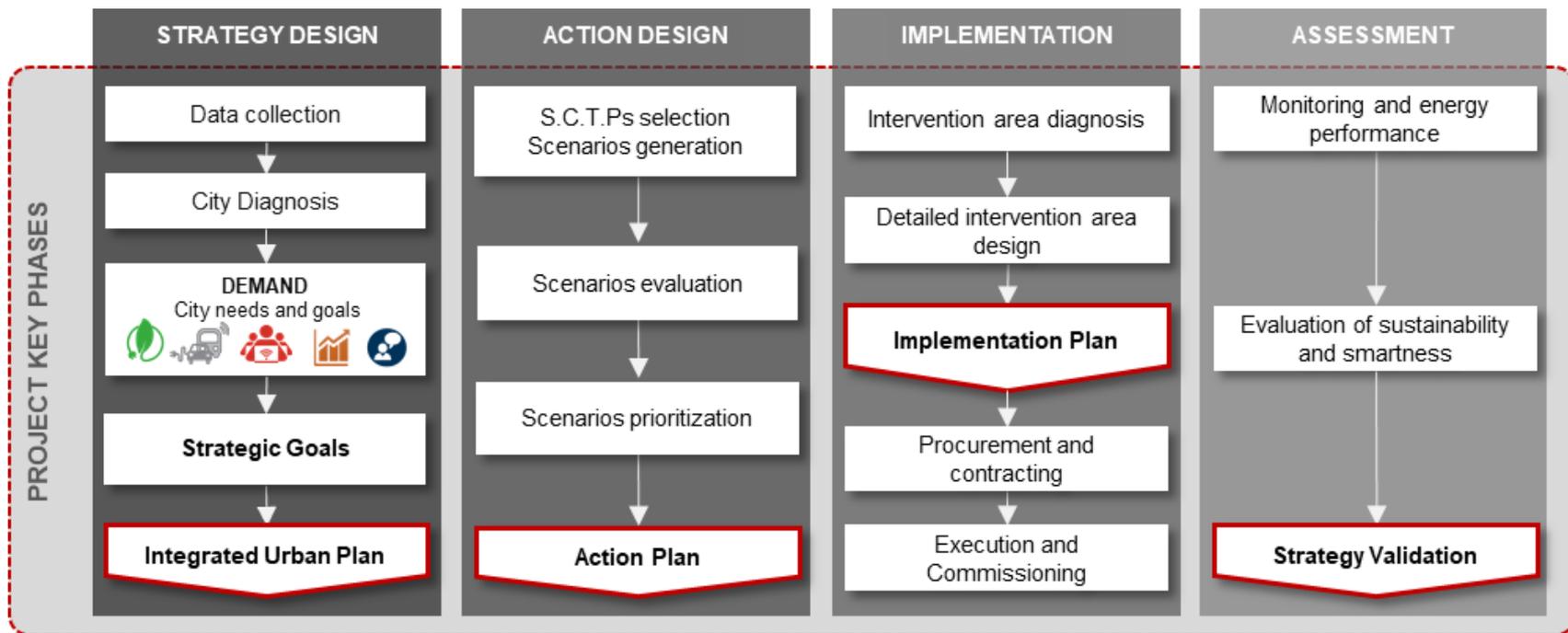
Source: Stephen Thomas-Patel



Urban Regeneration Model

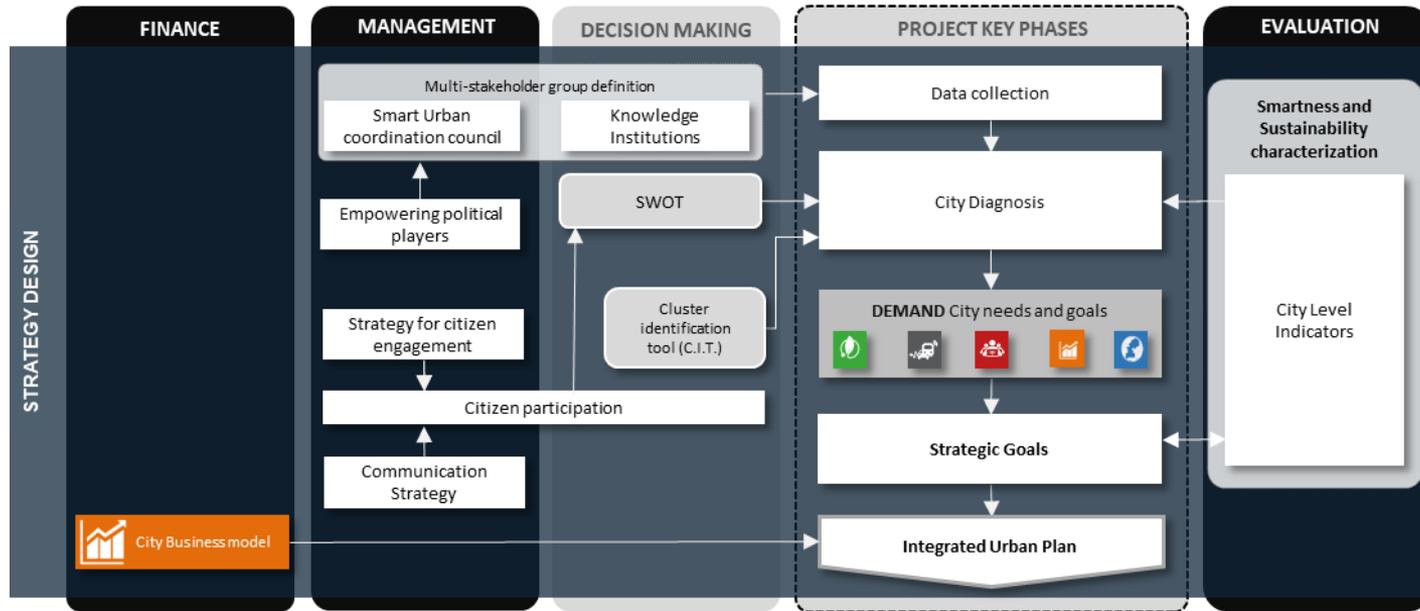


Urban Regeneration Model



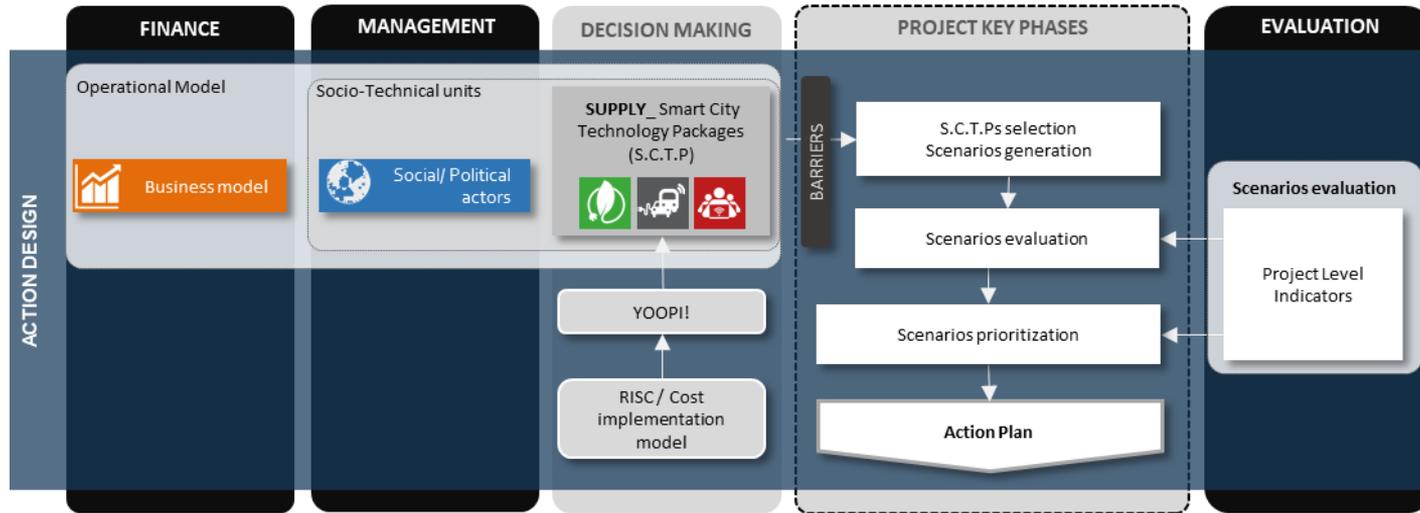
Urban Regeneration Model

- Step 1: strategy design



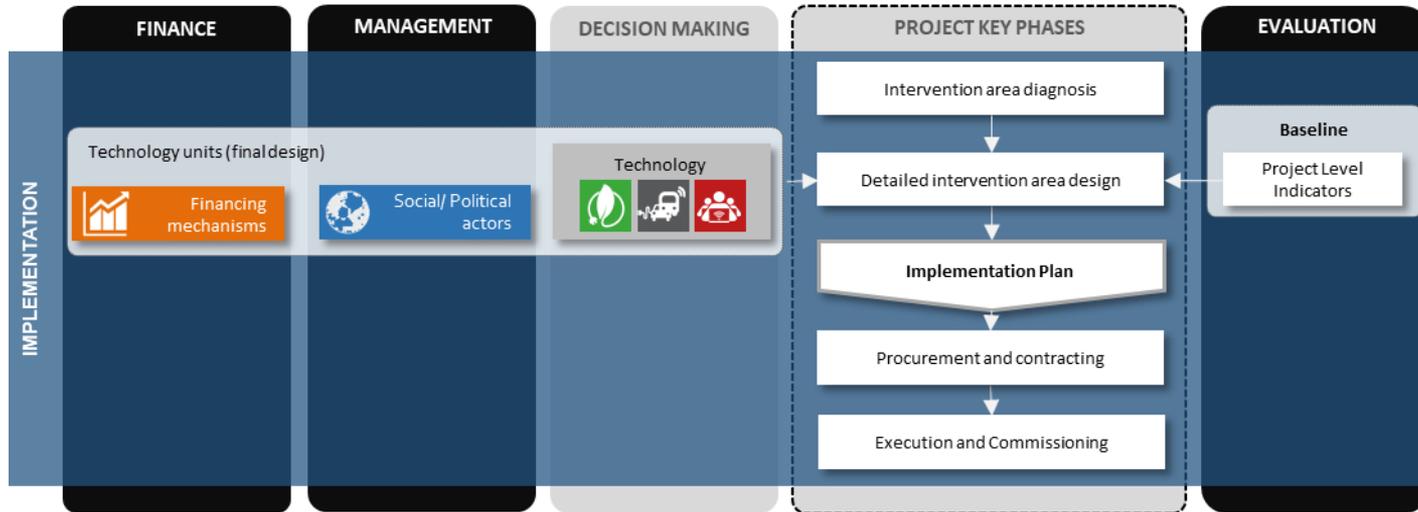
Urban Regeneration Model

- Step 2: action design



Urban Regeneration Model

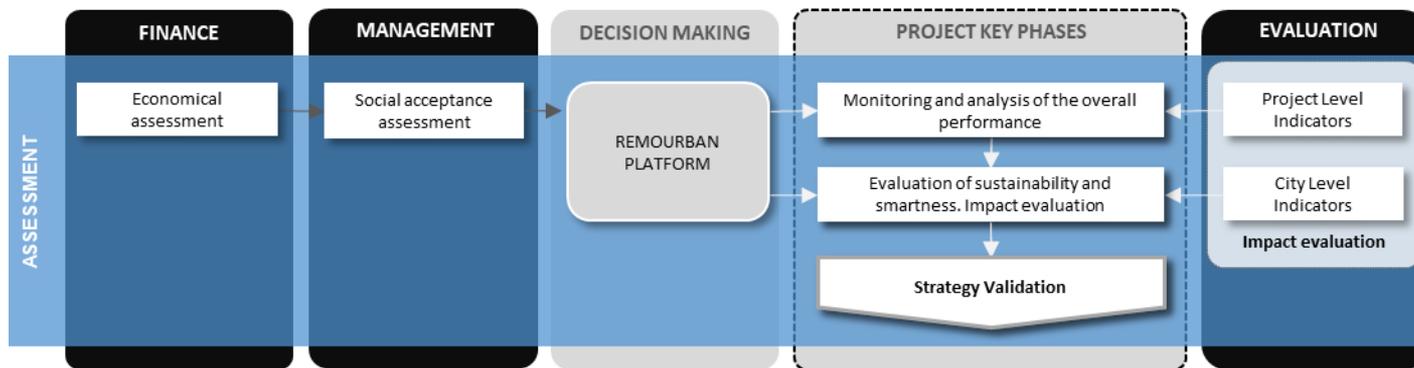
- Step 3: implementation





Urban Regeneration Model

- Step 4: assessment



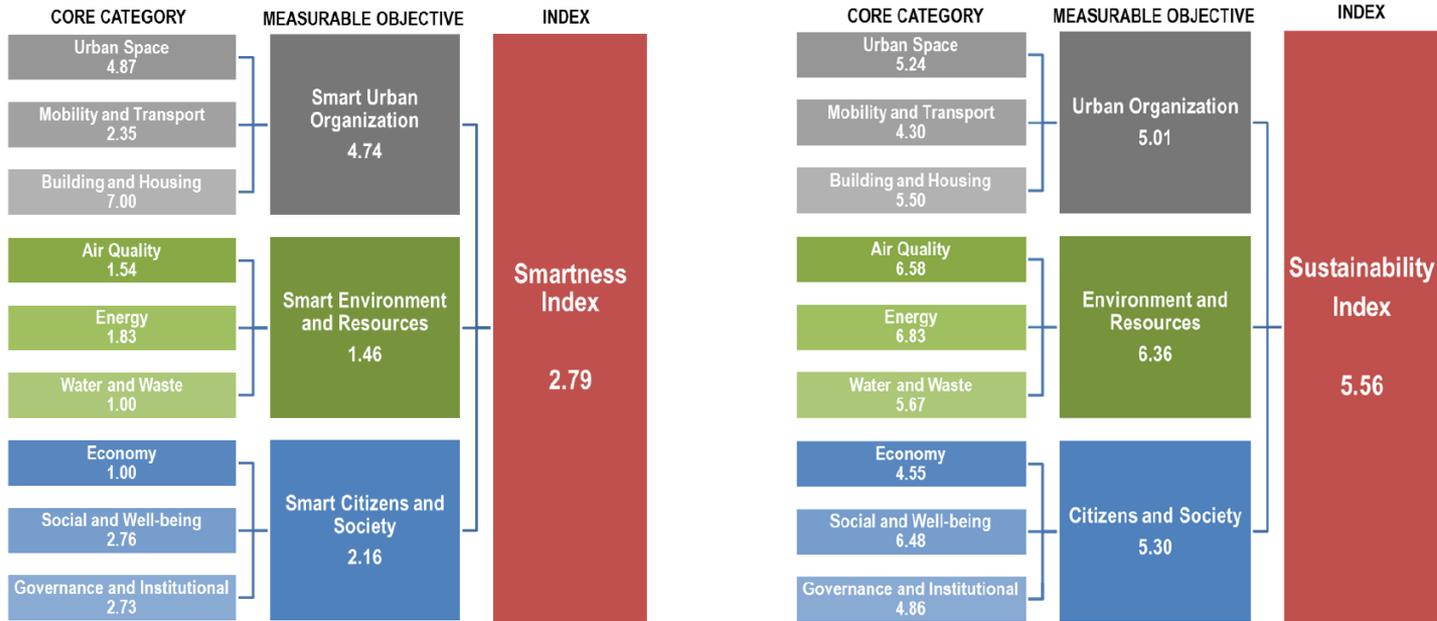
Urban Regeneration Model

- Evaluation of the transformation process



Urban Regeneration Model

- Evaluation of the transformation process

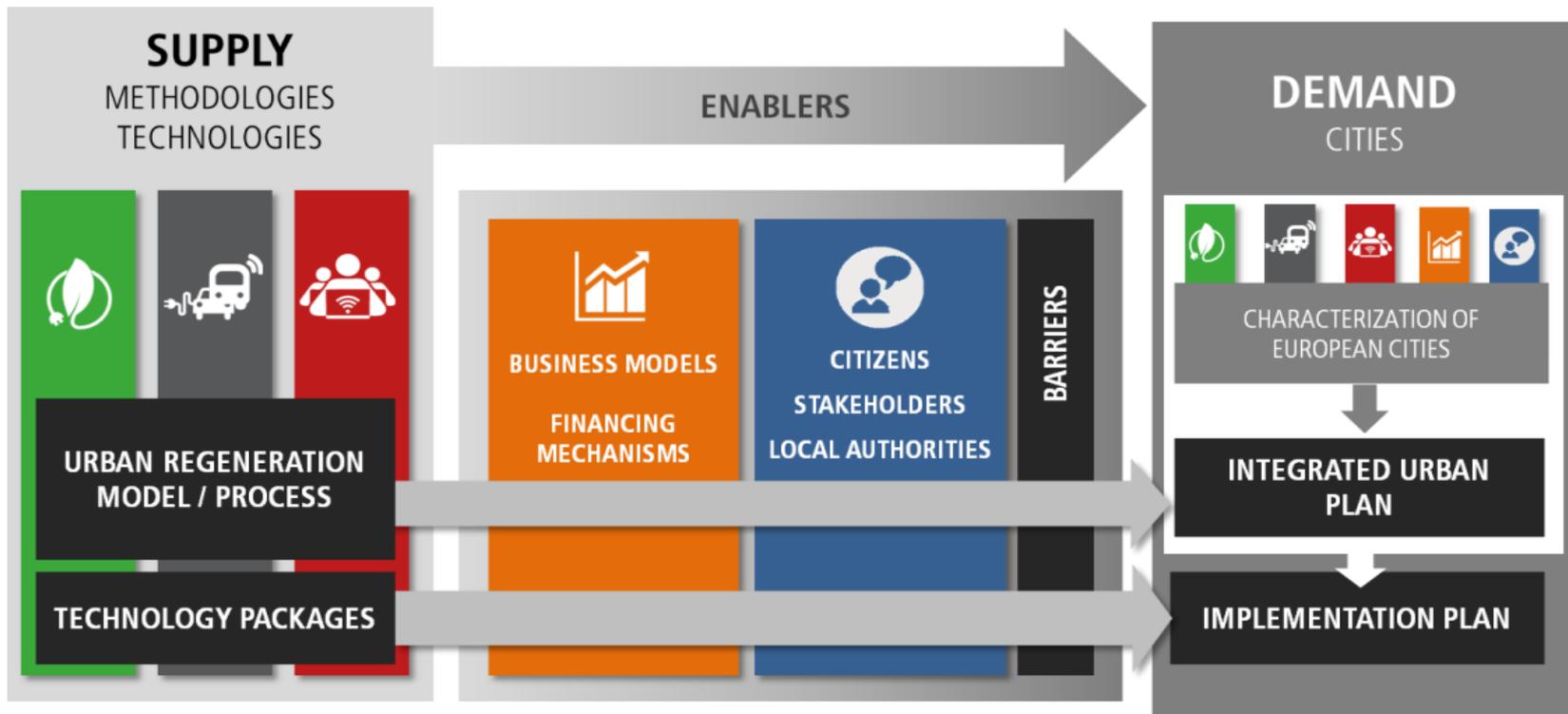


Urban Regeneration Model

- Evaluation of the transformation process



Ensuring the replication of the model





Non-technical barriers

Social and cultural barriers

- Lack of confidence in innovative energy efficient solutions
- Bad opinion of the residents against energy efficiency solutions and lack of understanding of benefits
- Annoyance for residents during the retrofitting works
- Lack of knowledge in financial options to tackle the works to be carried out
- Lack of best practices on energy efficiency and renewable energy technologies
- Lack of easy identification of savings coming from the e-mobility sector





Non-technical barriers

Social and cultural barriers

- Little control exists over them – **Communication is key to overcome them**
- Certain actions should be implemented:
 - Place high the communication issues in the Smart City Agenda
 - Devote more resources (human, money, time) to communication
 - Communication needs to be more “local”
 - Key messages should be focused on the benefits of the project





Non-technical barriers



Luis Vélez @velezpsoe · 5 abr. 2016

Hoy en la #AsambleaVecinal #PoligonoFASA sobre proyecto @Remourban_EU con @manuel_saravia @herrero Pedro



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Non-technical barriers

- Some of them are **perceived to be barriers (behavioural) rather than being actual barriers**. An example – range anxiety that prevented people and businesses from using electric vehicles.
- Need to address the perceived barriers and **changes in behaviour of citizens** in order to ensure the successful and sustainable implementation of urban development.



Source: Electric Blue





Non-technical barriers

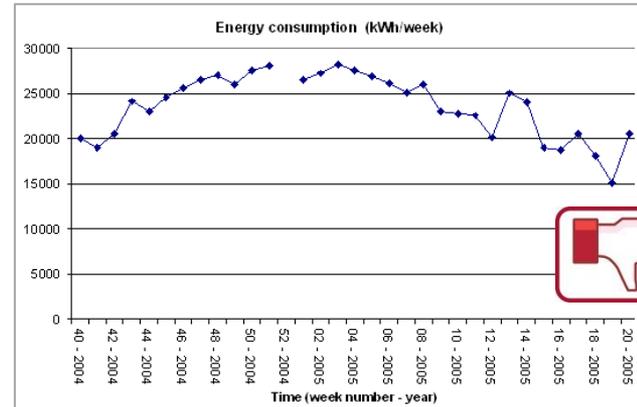
Perceived barriers in public sector

- However, these perceived barriers were just **as likely to be found in public sector organisations.**
- For example the continued use of procurement regulations that blocked innovative approaches, when, in fact, the mechanisms existed to enable the procurement to be undertaken in an open, transparent manner, completely in line with the Official Journal of the European Union processes.



Use of data: finding the balance between privacy and economic development

- Be able to process and aggregate the information before it comes to the public
- Public sector is usually more trustable rather than private companies
- Need to make it clear what data is needed and on what purpose is it collected





Non-technical barriers

Financial barriers

- Financial issues are particularly critical in relation to their ability to act as barriers if not dealt with effectively. For example:
 - High investment and upfront costs
 - Lack of long term guarantee for heat and electricity prices
 - Lack of financial support to finance early stages
 - Long payback periods
 - Fluctuations and sometimes cheaper fossil energy prices
 - Short depreciation period for some technologies
- Overreliance on EU funding: lack of workable local business models that are successful and scalable





Non-technical barriers

Some proposed solutions

- **Training** programmes for an ideal local skill development
- Assistance to **promotion initiatives** of crowd-sourcing, microfinance and community projects
- Establishment of entities that **share risk and costs**
- **Externalisation** of investment costs and risks through innovative contracting
- **Incentives** to citizens and local governments willing to exploit potentials for smart solutions





Procuring low energy districts

Barriers:

- Continuing with existing procurement practices tends to reinforce the established standards
- Municipalities tender with very detailed specifications that do not test the market

Solutions:

- Tendering for bids that deliver solutions to urban challenges (rather than specific items)
- Change to the evaluation of scoring (performance is valued)
- Municipality needs to take the role of the “intelligent customer” and work with the construction sector in a collaborative manner





Procuring low energy districts



Incentives for eMobility

- Sufficient charging infrastructure to ensure that users are more likely to use electric vehicles
- Establishment of ultra-low emission zones in urban areas, using regulation at a city level, in order to ensure electric vehicles are used by both commercial and private owners





Low energy districts

Following current tendencies, by 2050 the building sector alone will be responsible for all the global emissions that the 2°C increase scenario allows.

It is impossible to reach desirable climate change scenarios with the current building sector.

*“Building a common home.
A Global Vision Report”*

Global Vision Area within the WSB14



Challenges:
Improve energy efficiency
Changing energy resources





Low energy districts



MONITORING TOOLS FOR ENERGY

Develop and deploy monitoring tools to achieve performances related to energy efficiency and financial viability



DISTRICT SCALE RETROFITTING

Systemic implementation of passive and active technologies to improve comfort and reduce the energy consumption



RENEWABLE HEATING AND COOLING

Use of heating and cooling from RES and implementation of innovative DH technologies (Low Temperature District Heating)



ELECTRICITY DISTRIBUTED GENERATION

Electricity generation from small scale energy sources located close to where the electric energy is being used



ADVANCED BUILDING ENERGY MANAGEMENT SYSTEMS

Integration of advanced monitoring and control strategies for thermal and electric energy uses





Sustainable urban mobility

Cities all over Europe face similar problems (congestion, road safety, security, pollution, climate change, etc.) increasing constantly.

Urban mobility accounts for 40% of all CO₂ emissions of road transport and up to 70% of other pollutants from road transport with a negative impact on citizens' health.

“Green paper on Urban Mobility”
Directorate General for Energy and Transport. European Commission

Challenge:
Create a new culture of urban transport





Sustainable urban mobility



IMPROVE CLEAN POWER FOR TRANSPORT: e-Vehicles

Use of electric or hybrid technologies to ease a mass-shift to cleaner forms of transport



IMPROVE CLEAN POWER FOR TRANSPORT: INFRASTRUCTURE

Use the charging infrastructure related to electric and plug-in hybrid vehicles to make easier a mass-shift to cleaner transport



FOSTER SEAMLESS D2D MULTI-MODALITY IN URBAN TRANSPORT

Achieve better connecting transport modes, nodes and mobility services



FURTHER CLEAN LOGISTICS

Enhance the logistics supply chain inside the cities (last mile delivery)



OPEN UP INTELLIGENCE IN URBAN TRANSPORT SYSTEMS

Supporting alliances that use open data – eases the development of demand-responsive and integrated mobility services



PROMOTE USE OF CLEANER VEHICLES

Incentive schemes provided by the cities to stimulate collective transport, clean logistics, sharing of goods and distribution





Integrated infrastructures and processes

An integrated and intelligent approach to urban development is needed to address the complexity of a smart sustainable city, aiming at improving the quality of life of all its citizens.

“Workshop: Smart Sustainable Cities and Regions”
Paul Bevan, Secretary General,
EUROCITIES, Brussels



Challenge:
Integration across infrastructures and their related operational processes





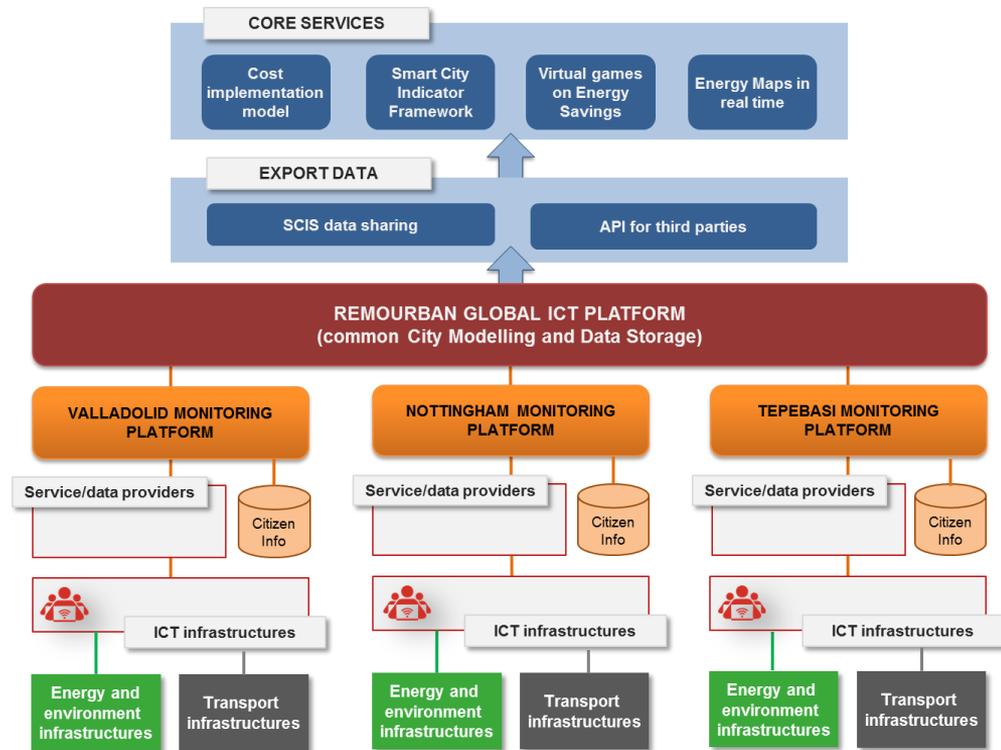
Integrated infrastructures and processes

City Information Platform:

- Added-value services (big data adaptation, taxonomies, export data services, etc.)

Core Services:

- Smart City Indicator Framework
- Cost implementation Model
- Virtual games on Energy Savings
- Energy maps in real time





Enabling factors for urban transformation

Developing integrated solutions throughout Europe will allow industry to deliver what cities and regions need, with better quality and at lower costs to the benefit of, and with the involvement of, society.

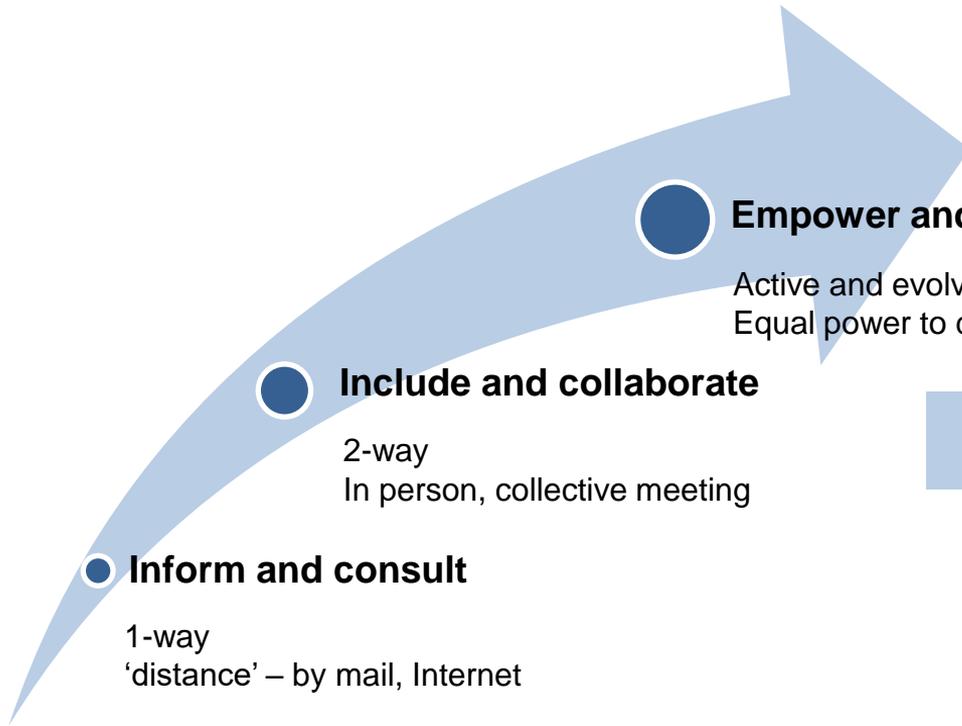
“Strategic Implementation Plan”
European Innovation Partnership on Smart Cities and Communities

Challenges:
Ensure citizens engagement, improve framework conditions to be able to become smart, and develop new market-oriented and strategies of Public-Private cooperation





Enabling factors for urban transformation



● Inform and consult

1-way
'distance' – by mail, Internet

● Include and collaborate

2-way
In person, collective meeting

● Empower and co-create

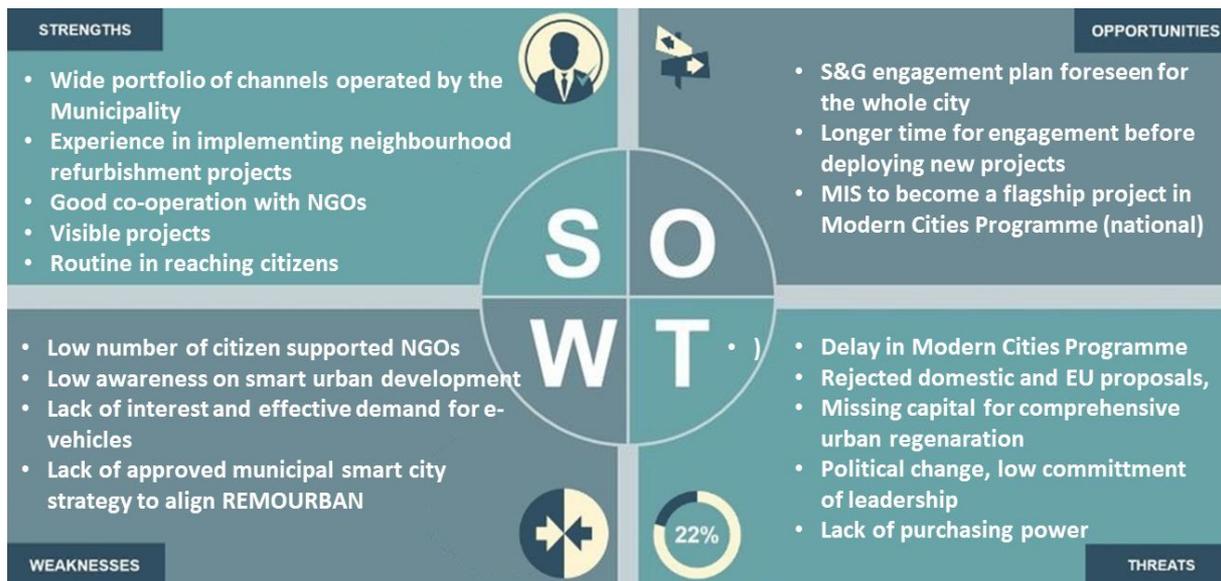
Active and evolving dialogue
Equal power to decide outcomes at one or many parts of the process

Good communication ≠ Citizen engagement
But citizen engagement **NEEDS** good communication

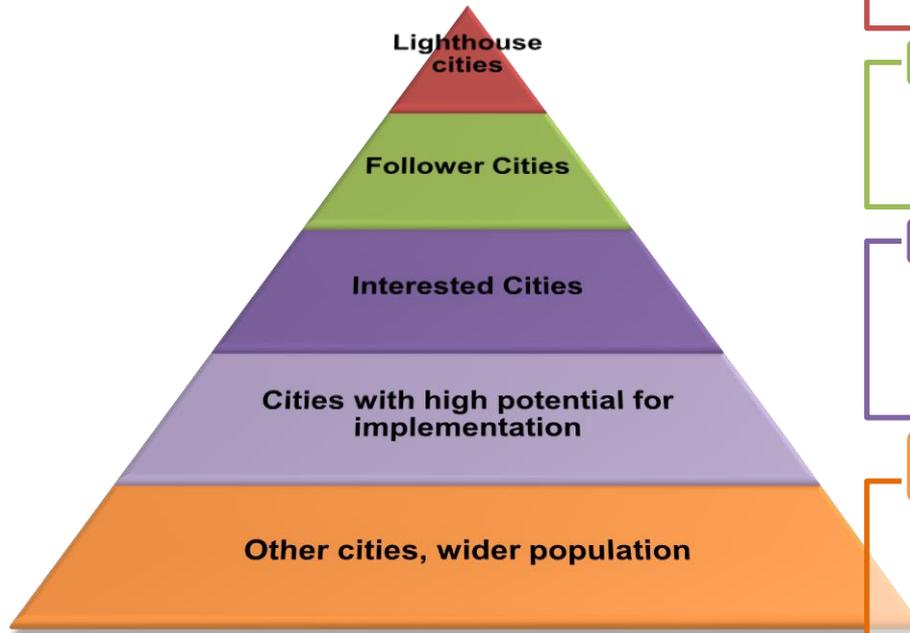




Enabling factors for urban transformation



Scale-up approach to maximise the impact



Demonstration

- Directly involved in project as demo: training, technology transfer

Replication

- Directly involved in project as replication: workshops, replication activities, implementation plans

Exploitation

- Attracted during the project lifetime: exploitation activities, transfer activities, feasibility plans, study visits, webinars about solutions proposed

Dissemination and communication

- e.g. articles, LinkedIn communication, press releases, presentations, conference, social media (appropriate), website, leaflet or flyer, general awareness raising

INTENSITY OF ENGAGEMENT





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Valladolid lighthouse city



Valladolid Smart City

Population = 310.000 inh (415.000 metropolitan area); **City area** = 197,9 km²

Strategies and plans

- INNOLID 2020 – Sustainable and Integrated Urban Development Strategy
- Sustainable Urban Mobility Plan (PIMUSSVA)
- SEAP – Covenant of Mayors (2011)
- Smart City Strategy Valladolid y Palencia (2010)
- Local Agenda 21 (V Action Plan – dic 2016)
- PGOU

Networks

- RECI
- Red INNPULSO (Cities of Science & Innovation)
- CTN 178 (Comité Técnico de Normalización)
- Automotive Intergroup
- MetropolRegion MHBGW - European Network: Regions promoting eMobility
- CENCYL Network
- CELSIUS Network
- EuroCities





Valladolid Smart City



REMOURBAN

H2020-SCC-2014-2015: Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects

URBAN GREEN UP

H2020- SCC-02-2016-2017-Demonstrating innovative nature-based solutions in cities

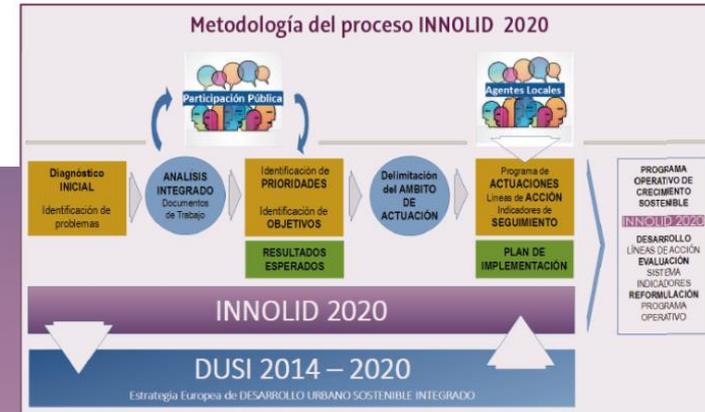
TO2. Enhancing access to, and use and quality of information and communication technologies (ICT)

TO4: Carbon Economy

TO6.Sustainable Urban Development

TO9. Promoting social inclusion, combating poverty and any discrimination

Innolid 2020



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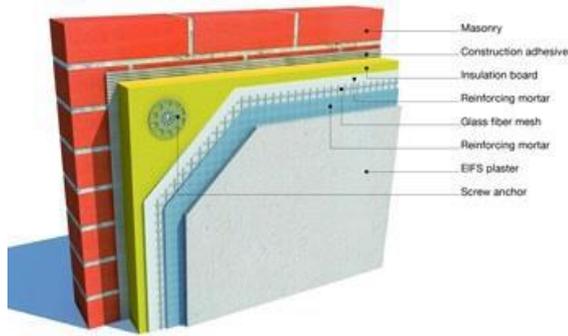
Energy retrofitting – FASA residential district



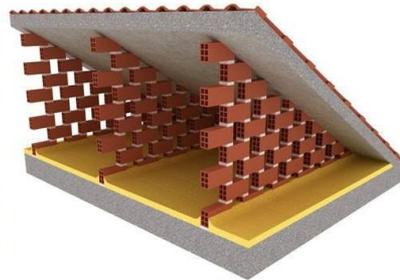


Energy retrofitting – FASA residential district

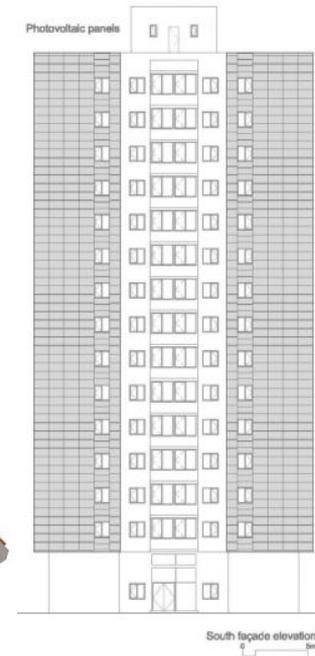
Façade insulation



Roof insulation



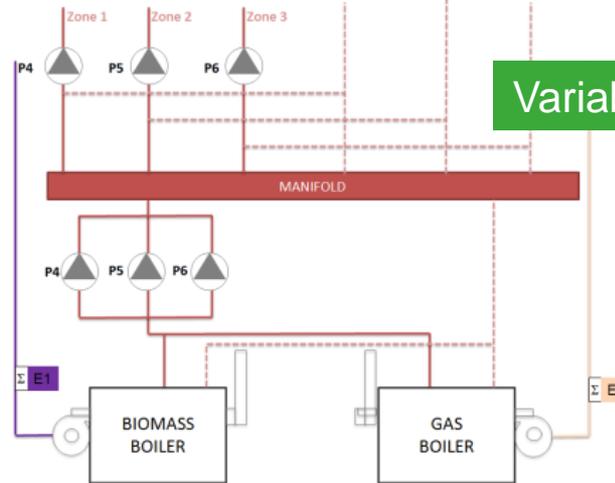
PV façade (BIPV)





Energy retrofitting – FASA residential district

Biomass based DH (1000 kW)



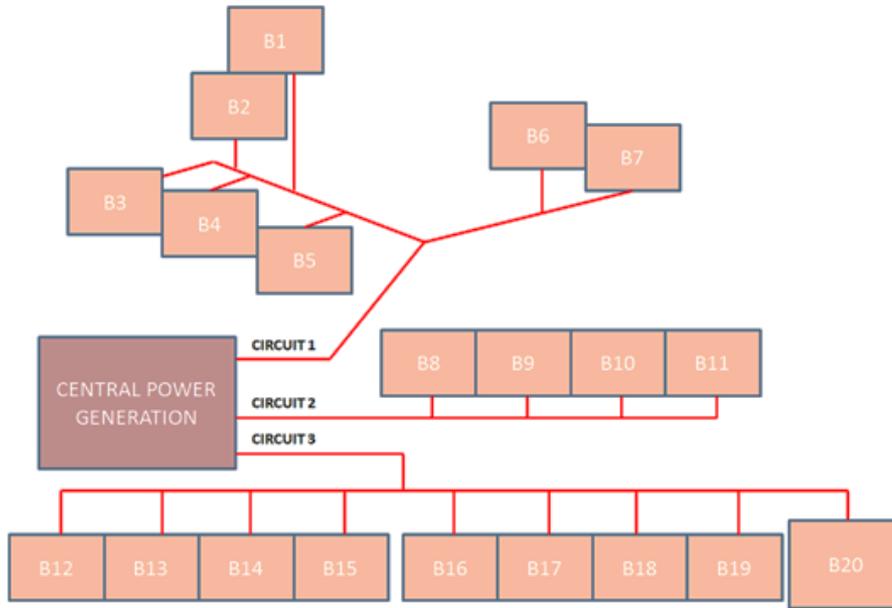
Variable flow pumps





Energy retrofitting – FASA residential district

Distribution network retrofitting



Replacement of substations



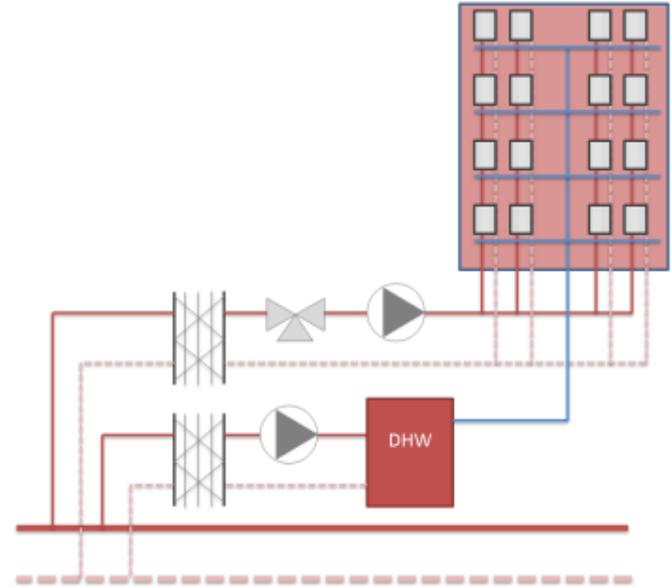


Energy retrofitting – FASA residential district

Thermal storage



DHW centralisation





Energy retrofitting – FASA residential district

Installation of heat allocators



Installation of thermostatic valves





Retrofitting of FASA residential district

Political Support

Dissemination & Communication Activities

Technical Support

Financial Support

 **Ayto. de Valladolid**
@AyuntamientoVLL

Siguiendo

#ConcejalUrbanismo @manuel_saravia en reunión con vecinos del #PolígonoFASA, abordando el Proyecto @Remourban_EU



Luis Vélez @velezpsoe · 5 abr. 2016

Hoy en la #AsambleaVecinal #PoligonoFASA sobre proyecto @Remourban_EU con @manuel_saravia @herreropedro





i+D Valladolid @INNOLID · 24 ago. 2016

Avanzando en proyectos #smartValladolid #Remourban S2CITY #smartcities #Valladolid



Retrofitting of FASA residential district

Political
Support

Dissemination &
Communication
Activities

Technical
Support

Financial
Support



Leaflet

Fundación CARTIF
Cristina de Torre: critor@cartif.es - Teléfono: 983 54 89 11
Ayuntamiento de Valladolid / Agencia de Innovación y Desarrollo Económico de Valladolid
Ángela Rivada: arivada@ava.es - Teléfono: 983 24 74 01
<http://es.remourban.eu>

...tas

...a durante las obras?

...balizaremos en el interior de su vivienda es el agua caliente sanitaria, donde conectaremos colocado su actual sistema (caldera o termo por un sistema con contador individual.

...vecinos de Torrelago, en Laguna de Duero, han edificios con medidas similares a las planteadas

...antados con la reducción de su consumo en de sus viviendas. Si tiene oportunidad, ¡no

Si tiene alguna más...

Abri el 29 de Abril pasaremos por su vivienda lo prefiere, también puede contactarnos en:

REGENERATION MODEL for accelerating the smart URBAN transformation

El Proyecto Noticias Recursos Contacto

Home - Recursos

Preguntas Frecuentes

Preguntas frecuentes sobre el Distrito Grupo de Viviendas FASA-Renault

01 ¿Cuánto tiempo durarán las obras?

Esta previsto que las obras duren aproximadamente un año y medio. Las intervenciones en fachadas y cubierta comenzaran en verano de 2016, y se prolongarían hasta verano de 2017 (aproximadamente 12 meses). Durante este periodo se rehabilitarán los edificios por fases, es decir no habrá andamios en todos los edificios durante los 12 meses

Debido a que las intervenciones en la central térmica sólo se pueden hacer en periodos de verano, para no cortar el suministro de calefacción durante el invierno, en verano de 2016 se modificarán las calderas, las subcentralitas de cada portal y la red de distribución (las tuberías desde la central térmica hasta cada uno de los portales). La instalación de la red de agua caliente sanitaria así como las instalaciones individuales de los repartidores de costes se realizarán a partir de la primavera de 2017. Estas obras durarán aproximadamente 7 meses, comenzando en verano de 2016 y finalizando tras el verano de 2017, sin hacer nada durante el invierno.

02 ¿Nos proporcionarán la información por escrito?

Por supuesto, en las visitas a cada portal les llevaremos la documentación de los costes y el detalle de las intervenciones. Si aprueban el proyecto, a partir de entonces tendrán que firmar un contrato con las empresas Acciona Infraestructuras (para la rehabilitación de fachadas) y con VEOLIA Servicios (rehabilitación de instalaciones térmicas y contrato de energía y servicios), donde ustedes podrán revisar los términos del contrato por escrito.

En cualquier caso, cuentan con los teléfonos de contacto de todas las empresas implicadas en la rehabilitación de su barrio por

Spanish Web /FAQ



Local TV



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[TECHNOLOGY CENTRE] CARTIF





Retrofitting of FASA residential district

Political
Support

Dissemination &
Communication
Activities

Technical
Support

Financial
Support

Consulting Office in the district



More than 50 meetings

Multiple doubts resolved



Follow-up Commission



Periodic communications





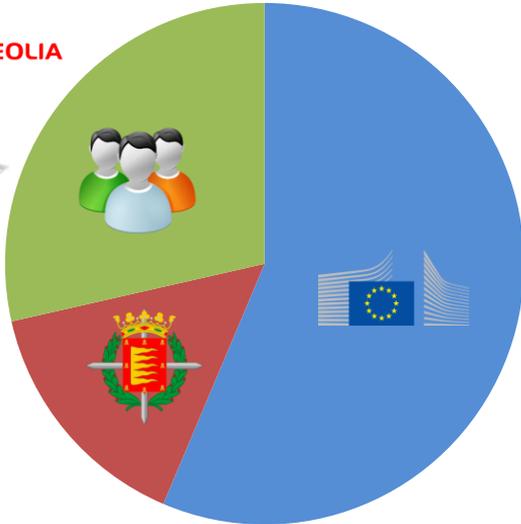
Retrofitting of FASA residential district

Political Support

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Technical Support

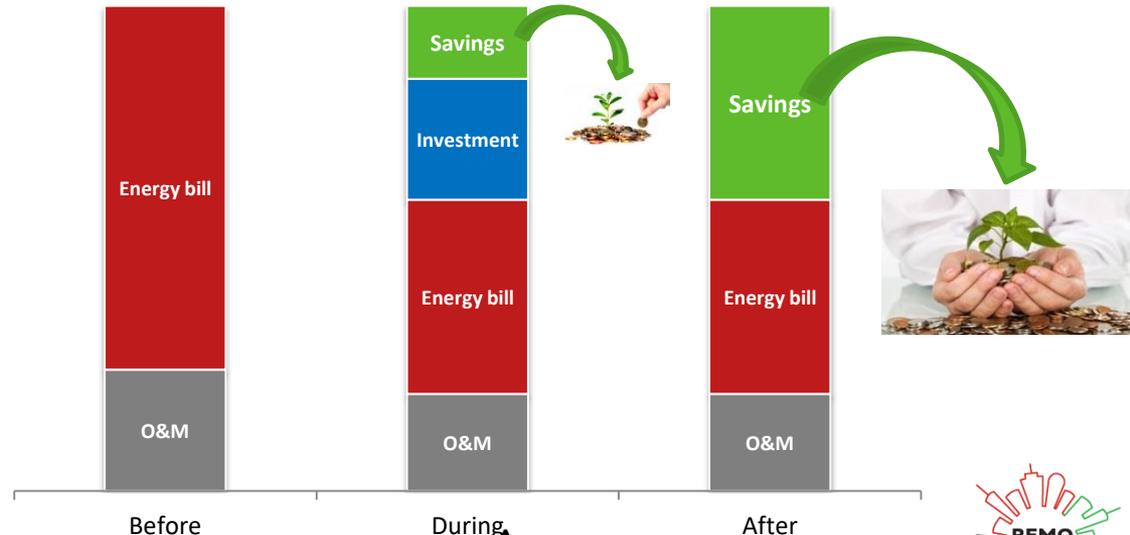
Financial Support



VEOLIA



acciona Infraestructuras



Before

During

After



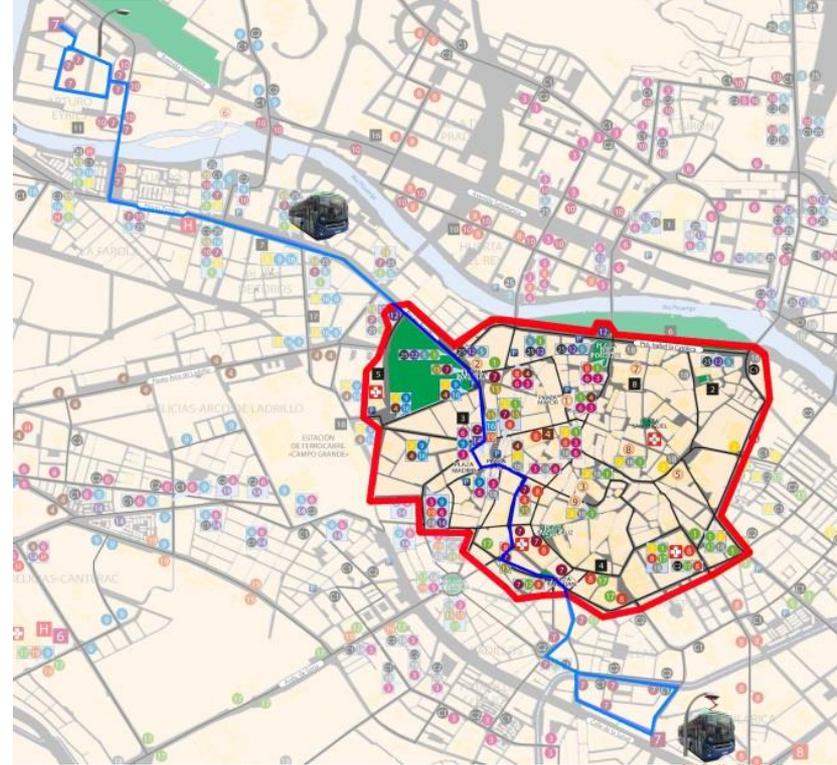
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Sustainable Urban Mobility: eV





Sustainable Urban Mobility: eV



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Sustainable Urban Mobility: fostering eV

Tender for contracts to monitor eV
addressed to taxi drivers, last mile delivery
vehicles and local businesses



Siguiendo

Sustainable Postal service!



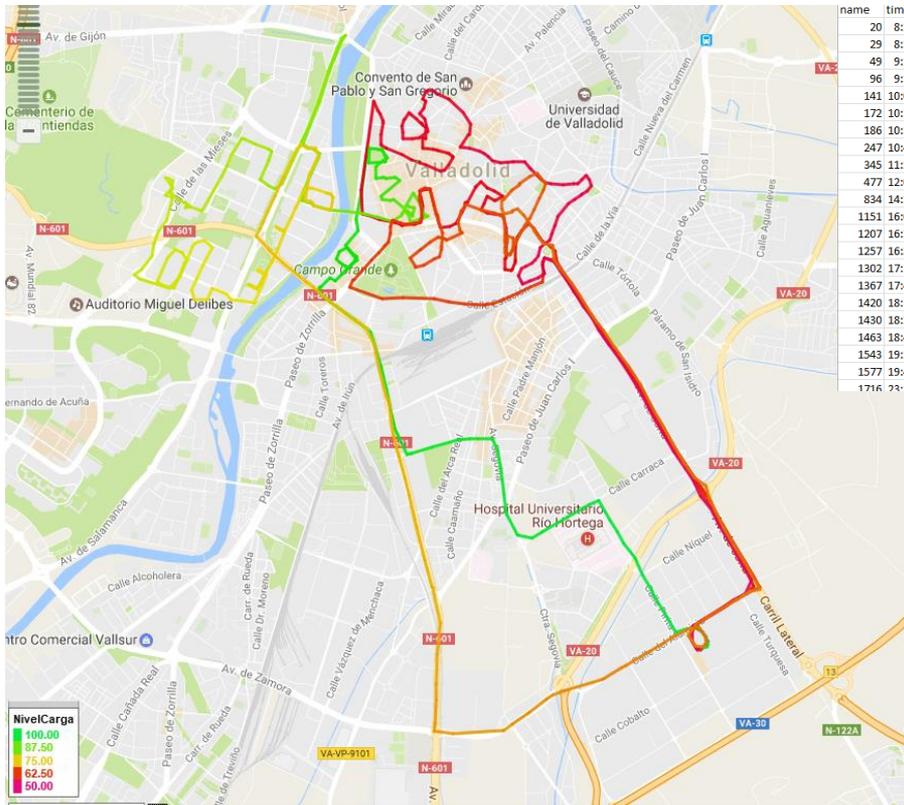
i+D Valladolid @INNOLID

Ya es una realidad! Proyecto "Reparto Postal Sostenible", acuerdo entre @Correos @Groupe_Renault y @AyuntamientoVLL



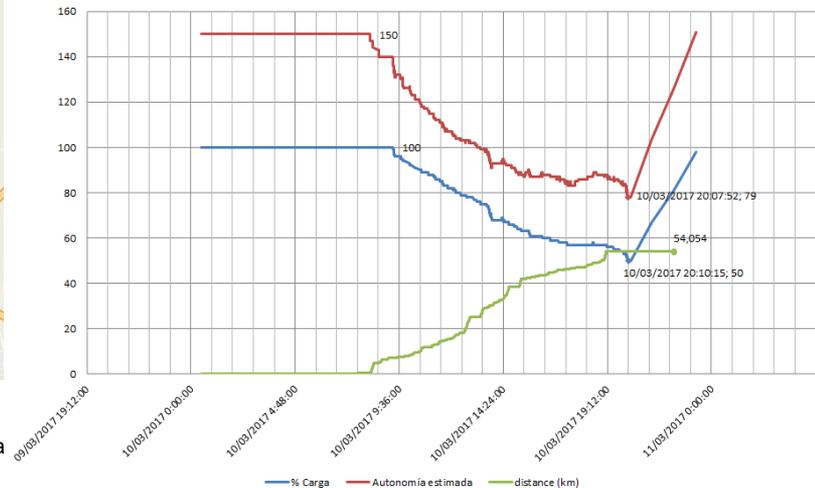


Sustainable Urban Mobility: monitoring



name	time	lon	lat	auton	Cargand	NivelCar	InstAux	NoMovC	Parada	EsParad	MintParada	time	lon	lat	auton	Cargando	NivelCarga	InstAux	NoMovGPS	Parada	EsParada	MintParada	
20	8:22:15	-4.70455	41.62285	147	0	100	0	1	7:54:53	1	474	18	8:33:36	-4.70473	41.62295	138	0	100	2	1	7:48:18	1	489
29	8:38:37	-4.70385	41.62315	143	0	100	1	1	0:16:12	1	16	19	8:51:02	-4.70382	41.62004	127	0	97	26	1	0:13:26	1	17
49	9:18:02	-4.70851	41.6264	140	0	100	12	1	0:37:31	1	37	21	9:51:13	-4.74306	41.62178	127	0	97	14	0	0:02:21	0	0
96	9:39:11	-4.73579	41.64511	132	0	96	30	1	0:13:28	1	13	22	8:51:59	-4.74584	41.62218	127	0	97	12	0	0:01:50	0	0
141	10:04:06	-4.73183	41.6527	126	0	93	0	1	0:15:02	1	15	23	8:52:05	-4.74634	41.62254	127	0	97	0	0	0:02:50	0	0
172	10:19:09	-4.72957	41.6517	123	0	91	1	1	0:09:04	1	9	28	8:58:16	-4.74917	41.61938	126	0	96	2	0	0:05:30	1	5
186	10:31:32	-4.73068	41.6504	121	0	90	1	1	0:11:40	1	11	29	8:58:18	-4.74918	41.61916	126	0	96	6	0	0:02:02	0	0
247	10:44:08	-4.72982	41.6504	118	0	89	0	1	0:12:16	1	12	31	8:58:59	-4.75092	41.62054	126	0	96	5	0	0:02:30	0	0
345	11:28:07	-4.73681	41.6536	112	0	86	1	1	0:10:29	1	10	37	9:00:12	-4.74809	41.62089	126	0	96	0	1	0:01:13	0	1
477	12:01:55	-4.74007	41.6535	107	0	82	6	1	0:19:30	1	19	43	9:01:14	-4.74767	41.62237	126	0	96	0	1	0:00:41	0	0
834	14:20:08	-4.70441	41.6230	93	0	69	1	1	0:27:31	1	27	44	9:01:24	-4.74779	41.62356	125	0	95	28	0	0:00:10	0	0
1151	16:06:53	-4.70448	41.6228	88	0	61	8	1	0:27:02	1	27	47	9:02:06	-4.74825	41.62772	124	0	95	-2	0	0:00:11	0	0
1207	16:26:17	-4.71755	41.6479	88	0	60	0	1	0:11:53	1	11	48	9:02:15	-4.74873	41.62724	124	0	95	-2	0	0:00:09	0	0
1257	16:51:34	-4.72049	41.6478	86	0	59	0	1	0:09:24	1	9	52	9:04:03	-4.74875	41.63009	124	0	95	0	1	0:01:48	0	1
1302	17:13:50	-4.72260	41.6515	85	0	58	1	1	0:12:12	1	12	55	9:05:37	-4.75124	41.63601	123	0	94	-5	0	0:01:34	0	1
1367	17:42:19	-4.72920	41.6489	84	0	57	0	1	0:11:53	1	11	57	9:06:38	-4.75153	41.63991	123	0	94	0	1	0:00:31	0	0
1420	18:13:50	-4.73039	41.6535	86	0	57	17	1	0:12:23	1	12	58	9:06:28	-4.74804	41.63765	123	0	94	8	0	0:00:20	0	0
1430	18:29:09	-4.72765	41.6527	87	0	57	1	1	0:12:11	1	12	60	9:07:07	-4.75179	41.64215	123	0	93	7	0	0:00:10	0	0
1463	18:42:31	-4.72653	41.6535	88	0	57	2	1	0:09:36	1	9	61	9:07:19	-4.75076	41.64228	123	0	93	-7	0	0:00:12	0	0
1543	19:28:40	-4.72358	41.6544	96	0	56	33	1	0:09:09	1	9	63	9:07:39	-4.75179	41.64342	123	0	93	0	1	0:00:20	0	0
1577	19:42:36	-4.71759	41.6516	95	0	55	0	1	0:11:19	1	11	64	9:07:56	-4.75385	41.64399	123	0	93	14	0	0:00:11	0	0
1716	20:16:04	-4.70243	41.6292	113	1	68	0	1	3:07:21	1	187	66	9:08:10	-4.75359	41.64536	122	0	93	10	0	0:00:10	0	0
												69	9:08:41	-4.75239	41.64629	122	0	93	8	1	0:00:31	0	0

2017-03-10 VVVV XXXX-ABC (%Carga y Autonomia estimada)





Sustainable Urban Mobility: car sharing



Bienvenido Ayuntamiento de Valladolid

REMO URBAN

Mi perfil | Reservar | Mis reservas

Crear una Reserva

1 Cuándo

Fecha inicio: 17/03/2017 18:00

Fecha fin: 17/03/2017 19:00

2 Vehículos disponibles

ZOE - Agencia

Marca: **RENAULT** | Modelo: **ZOE**

Consumo: **0 kWh/100km** | Consumo Ralenti: **0 kWh/100km**

Combustible: **Eléctrico** | Tipo: **Genérico**

Reservar

Bienvenido Admin

REMO URBAN

Vehículos representados: 2

- REMOURBAN - EV Sharing
- Orange -5355
- Zoe Ayuntamiento

Puntos singulares

Rutas

Zonas

© REMOURBAN - Ayuntamiento de Valladolid 2017

Bienvenido Ayuntamiento

Reservar

Mis viajes

PLAZAS DISPONIBLES

Plazas | Hora salida | Hora vuelta

Sin datos disponibles!

RESERVAS

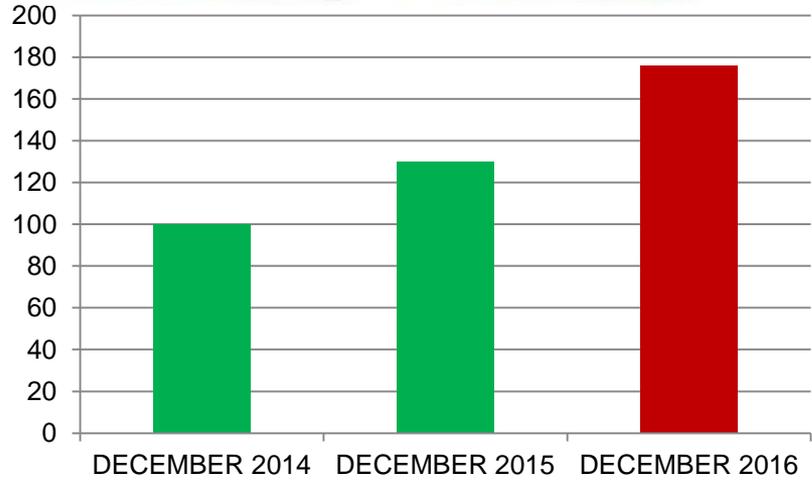
Reservar | Hora salida | Hora vuelta

Sin datos disponibles!





Sustainable Urban Mobility: eV incentives

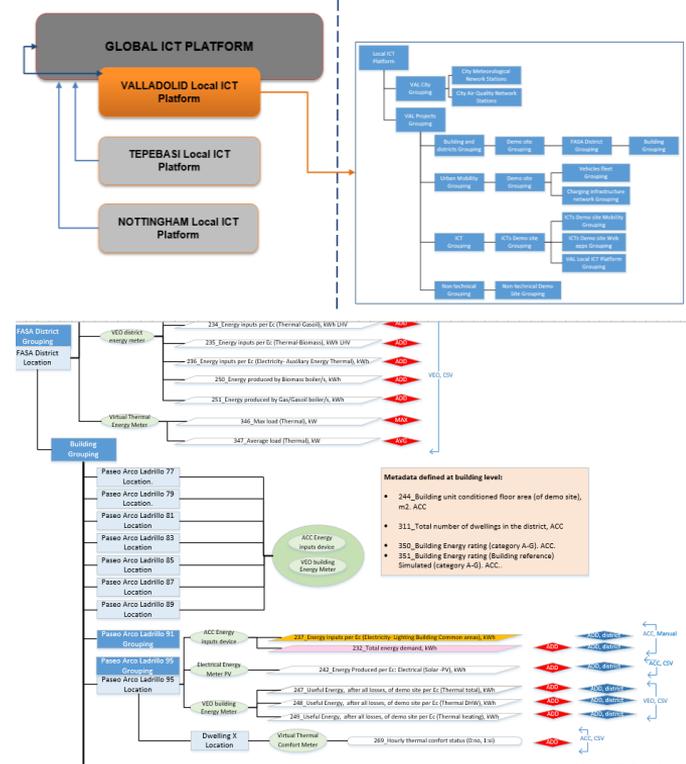
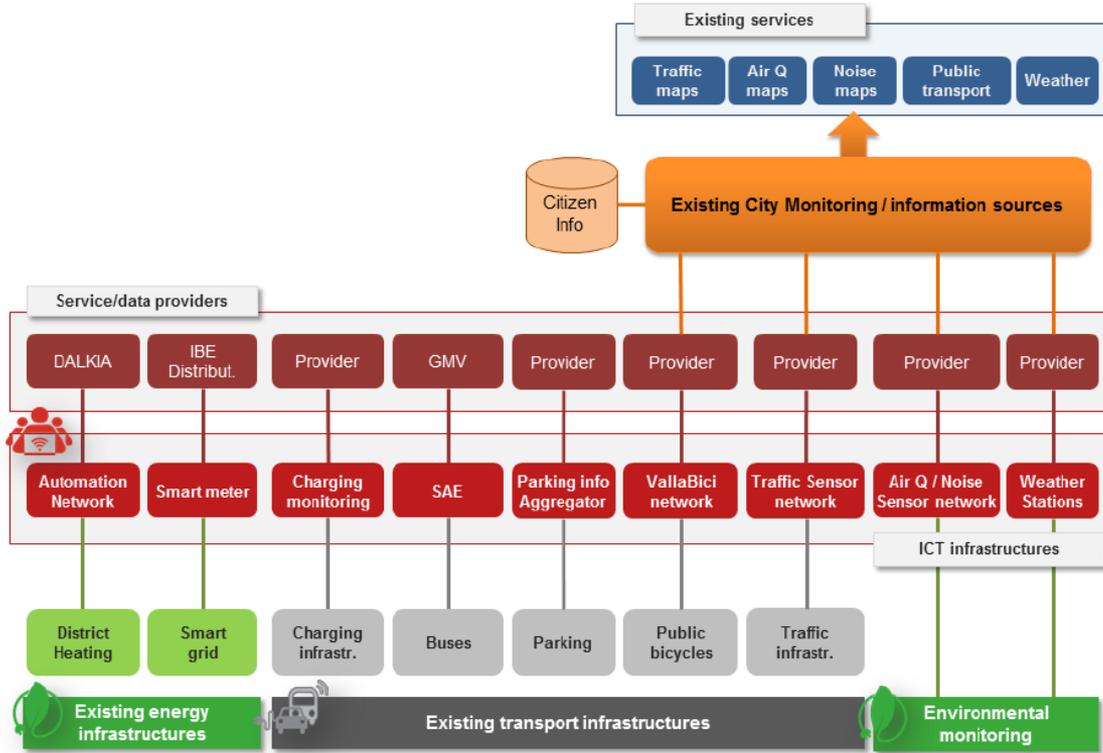


VALLADOLID, CIUDAD AMIGA DEL VEHICULO ELÉCTRICO

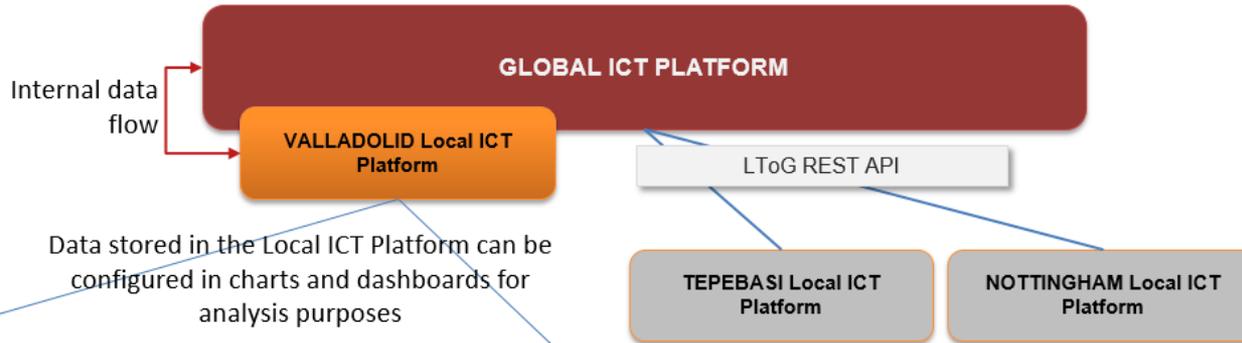
Una ciudad que llega puntual al Futuro



Urban platform



Urban platform





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Regenerate your city with
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Thank you for your attention!

Fundación CARTIF

Miguel Á. GARCÍA-FUENTES

Coordinador proyecto REMOURBAN



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646511



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