Smart applications for smarter cities: How the ICT platform "City on Cloud" is making the Turkish city of Tepebasi greener?

This project is funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No 646511.

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IMPORTANT NOTICE:

This webinar <u>will be recorded</u> and uploaded to REMOURBAN's website and YouTube channel.

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Do you want to know more about this project and the oportunities that it holds for you and your organization?

Get in touch with us!

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Valladolid
Nottingham
Tepebasi/Eskisehir

Seraing
Miskolc

Agenda

INTRODUCTION

Fernando Barrientos: Project Consultant, Steinbeis-Europa-Zentrum

Introductory words on the Project REMOURBAN and this webinar.

PART #1 - OVERALL CONNECTION BETWEEN REMOURBAN AND THE ICT PLATFORM IMPLEMENTED IN TEPEBASI

Caner Demir: Consultant, Demir Enerji

Insights into REMOURBAN's urban regeneration model and how energy, mobility and ICT can converge.

PART #2 - WHY IS TEPEBASI STRENGHENING ITS ICT INFRASTRUCTURE?

Murat Aksu: Project Manager, Tepebasi Municipality

The importance of integrated ICT infrastructures for sustainable Municipalities.

PART #3 - HOW DOES "CITY ON CLOUD" MEET TEPEBASI'S DEMAND?

Murat Karabatur: Head of Mobile Solutions, Olcsan Technology

Delivery of energy and mobility data required by Tepebasi. Some notes on a smart lighting App.

QUESTIONS & ANSWERS

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PART #1

OVERALL CONNECTION BETWEEN REMOURBAN AND THE ICT PLATFORM IMPLEMENTED IN TEPEBASI

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World Population Increasing

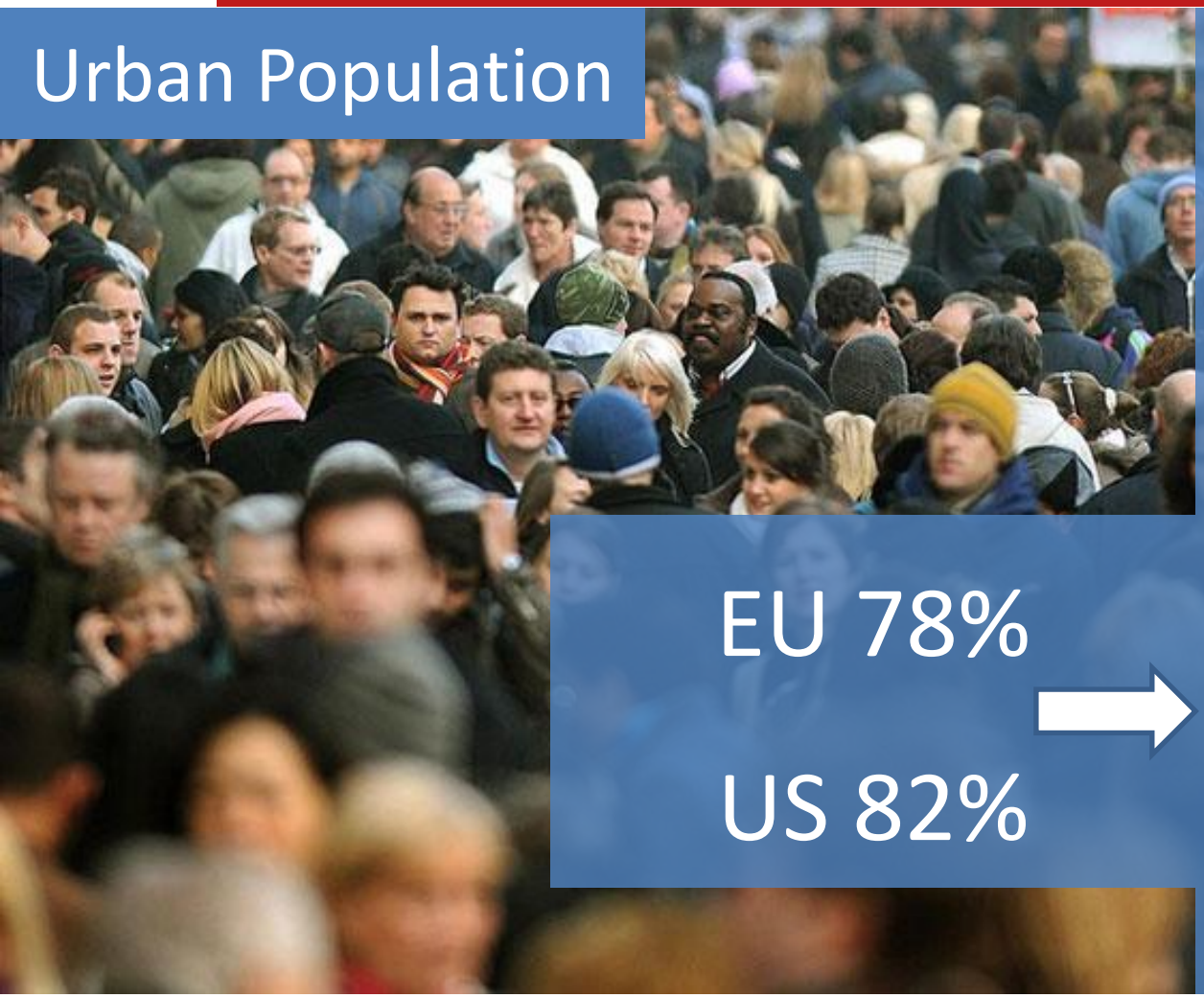
World Population

1900	1.7B
1950	3.5B
Today	7.5B
2050	9.7B

Resources Decreasing

Urban Population is Increasing

Urban Population



1900 13%

1950 29%

EU 78%

US 82%

→ Today 54%

2050 66%

City Challenges

- Energy
- Building
- Transportation
- Environment
- Technology
- Public Health
- Infrastructure (water, waste, communication etc)
- Governance
- Participatory processes

ICT Enabled

SMART 2020

Report (2008)

THE CLIMATE GROUP | GeSI GLOBAL e-SUSTAINABILITY INITIATIVE

ICT Impact: The Global Footprint and the Enabling Effect

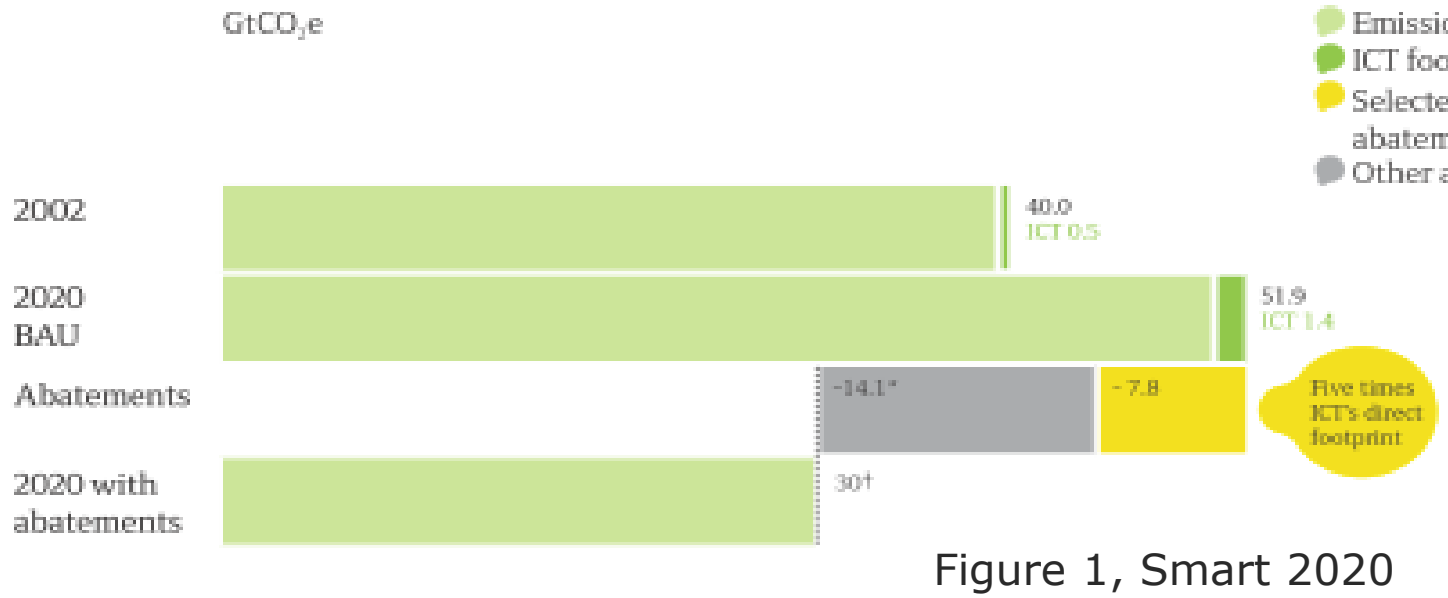


Figure 1, Smart 2020

* For example, avoided deforestation, wind power or biofuels.
† 21.9 $GtCO_2e$ abatements were identified in the McKinsey abatement cost curve and from estimates in this study. Source: Enkvist P., T. Naucler and J. Rosander (2007), *'A Cost Curve for Greenhouse Gas Reduction'*, The McKinsey Quarterly, Number 1.

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ICT Enabled Impact

GeSI
GLOBAL e-SUSTAINABILITY INITIATIVE

BCG
THE BOSTON CONSULTING GROUP

Fig. 8 ICT: The enabling effect

$GtCO_2e$

7.8 $GtCO_2e$ of ICT-enabled abatements are possible out of the total BAU emissions in 2020 (51.9 $GtCO_2e$)

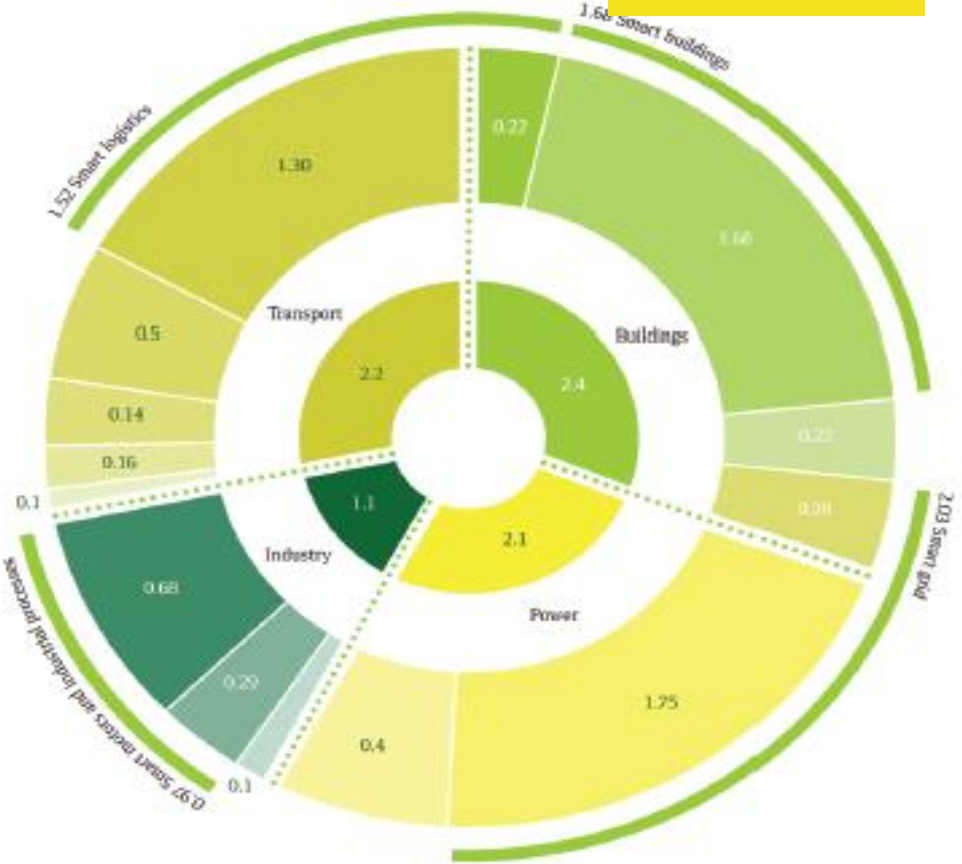
The SMART opportunities including dematerialisation were analysed in depth

Industry
- Smart motors
- Industrial process automation
- Dematerialisation* (reduce production of DVDs, paper)

Transport
- Smart logistics
- Private transport optimisation
- Dematerialisation (e-commerce, videoconferencing, teleworking)
- Efficient vehicles (plug-ins and smart cars)
- Traffic flow monitoring, planning and simulation

Buildings
- Smart logistics†
- Smart buildings
- Dematerialisation (teleworking)
- Smart grid‡

Power
- Smart grid
- Efficient generation of power, combined heat and power (CHP)



*Dematerialisation breaks down into all sectors except power. See detailed assumptions in Appendix 3.
†Reduces warehousing space needed through reduction in inventory. See Appendix 3.
‡Reduces energy used in the home through behaviour change. See Appendix 3.

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Smart Cities and Communities

2014

GROWSMARTER
Köln, Barcelona, Stockholm & Graz, Cork, Valletta, Porto, Suceava

REMOURBAN
Valladolid, Tepebasi, Nottingham & Seraing, Miskolc

TRIANGULUM
Eindhoven, Stavanger, Manchester & Prague, Leipzig, Sabadell

2015

REPLICATE
San Sebastián/Donostia, Firenze, Bristol & Lausanne, Essen, Nilufer

SHAR-LLM
Milano, Lisboa,London (Greenwich) & Burgas, Bordeaux, Warsaw

SMARTENCITY
Sønderborg, Tartu, Vitoria/Gasteiz & Asenovgrad, Lecce

SMARTER TOGETHER
Wien, München, Lyon & Sofia, Santiago de Compostela, Venezia, Yokohama, Kiev

2016

mySMARTlife
Hamburg, Helsinki, Nantes & Varna, Palencia, Rijeka, Bydgoszcz

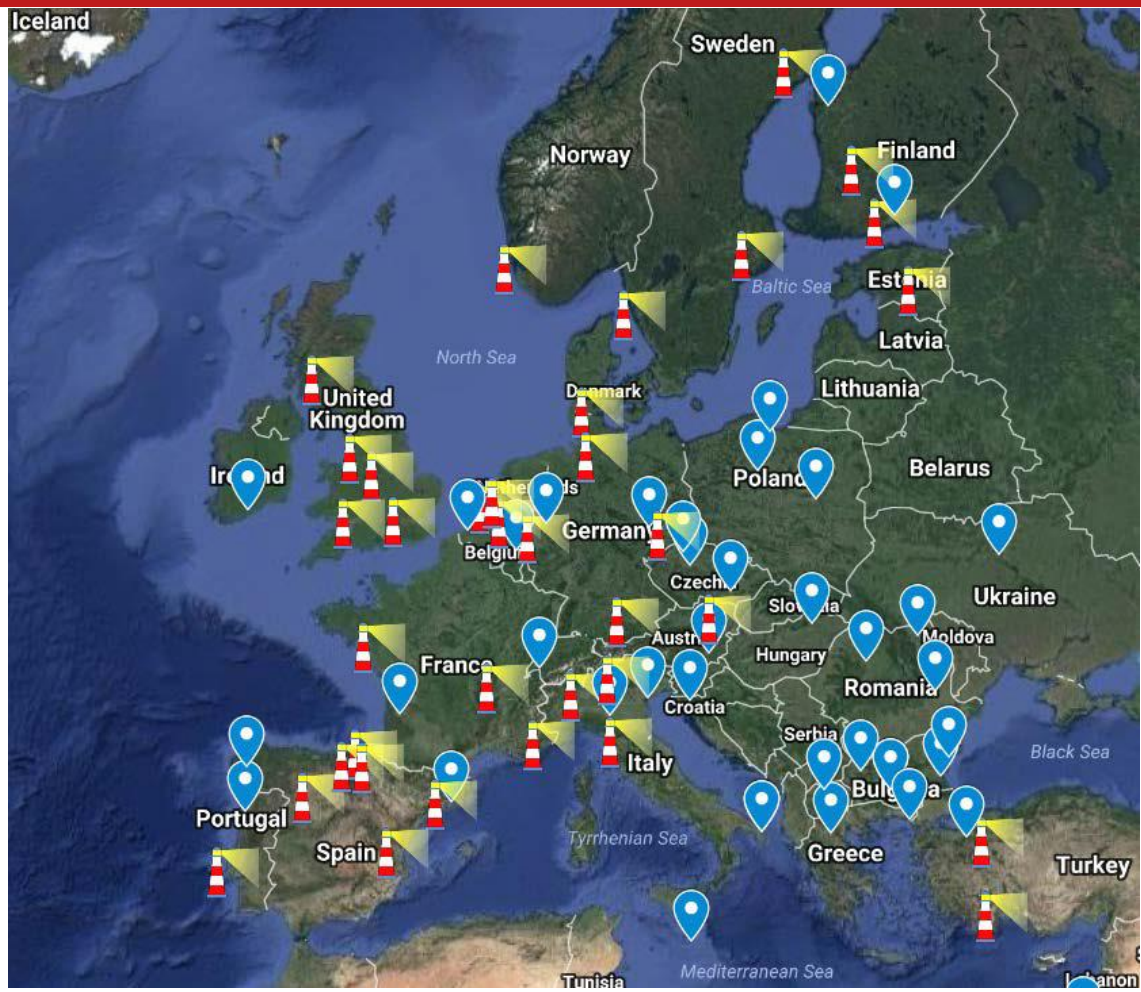
RUGGEDISED
Rotterdam, Ůmea, Glasgow & Brno, Parma, Gdansk

2017

STARDUST
Pamplona, Tampere, Trento & Cluj-Napoca, Derry, Kozani, Litoměřice

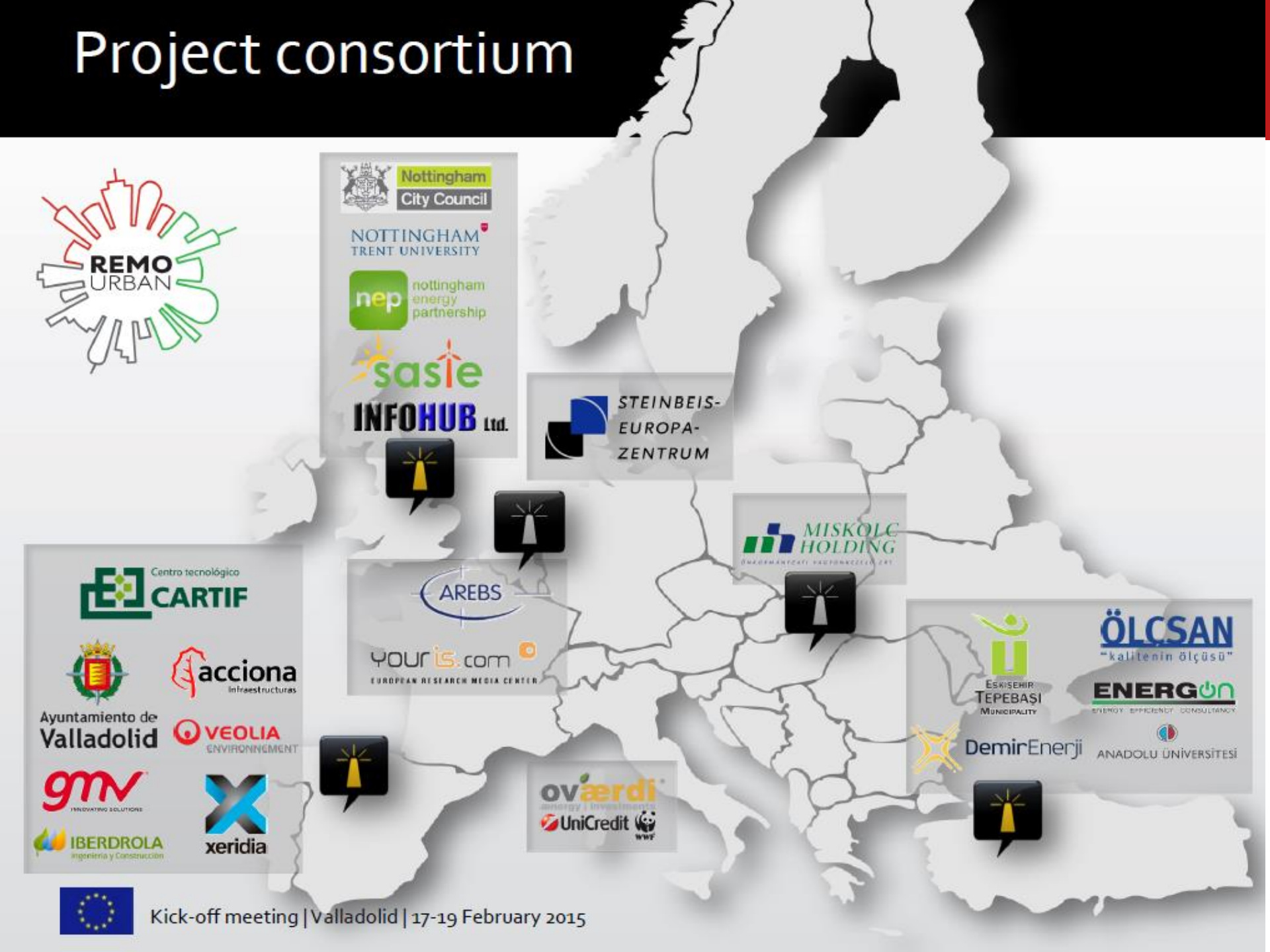
IRIS
Utrecht, Göteborg, Nice Côte d'Azur & Vaasa, Alexandroupolis, Santa Cruz de Tenerife, Focsani

MatchUP
Valencia, Dresden, Antalya & Ostend, Herzliya, Skopje, Kerava

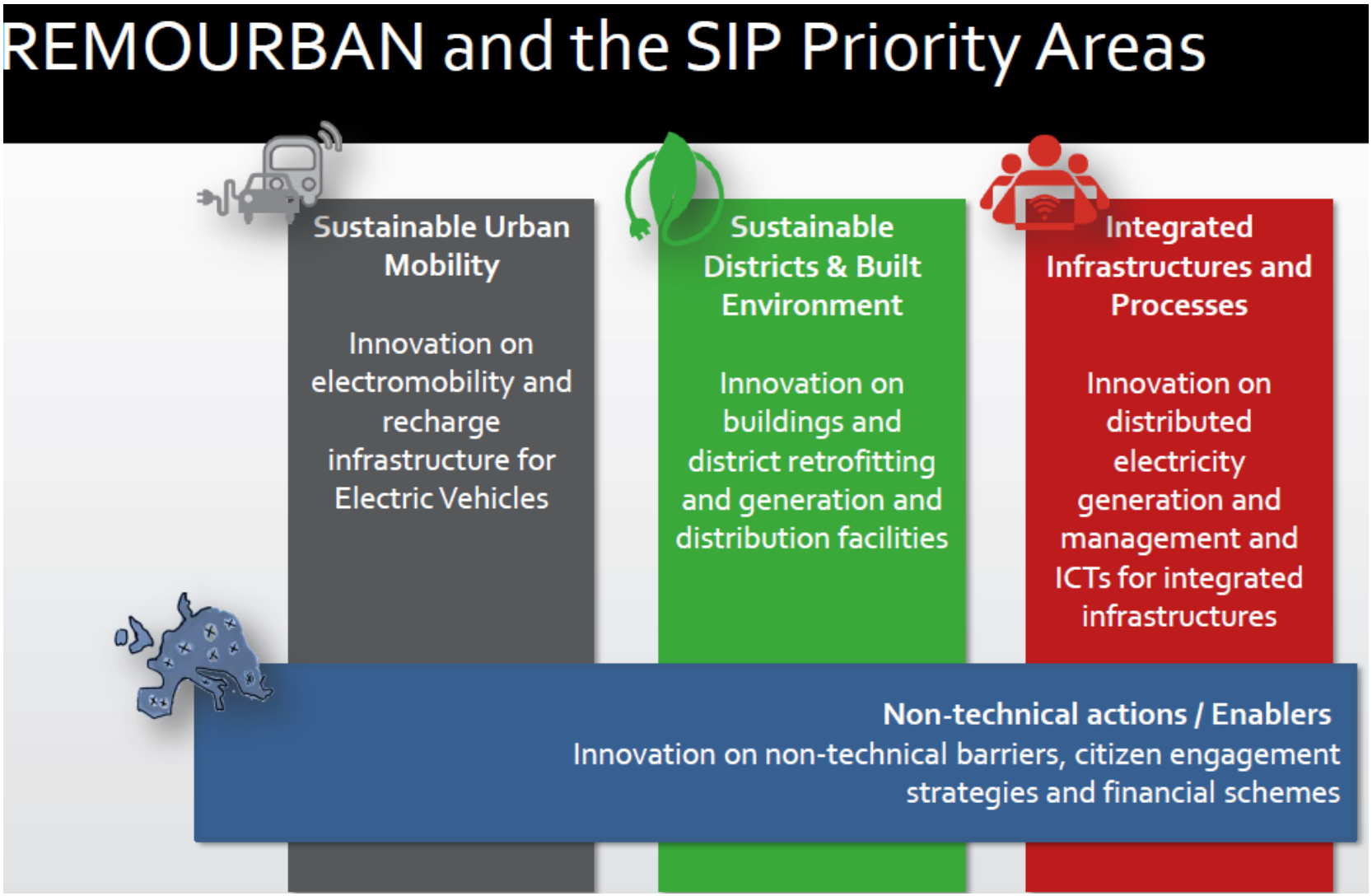


14 June 2019

Project consortium



Remourban Priority Areas



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PART #2

WHY IS TEPEBASI STRENGHTENING ITS ICT INFRASTRUCTURE?

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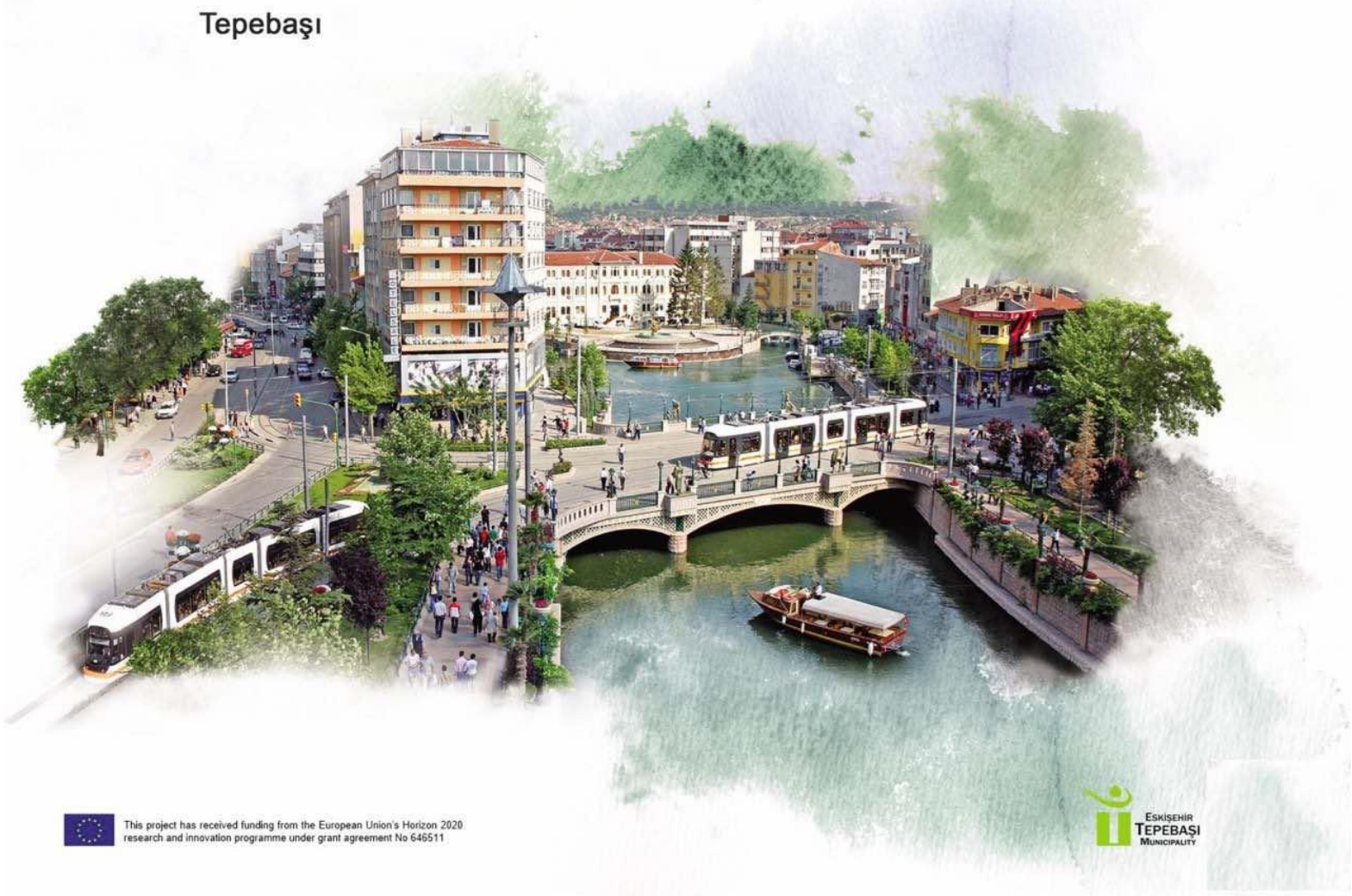
Tepebaşı



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ESKİŞEHİR TEPEBAŞI MUNICIPALITY

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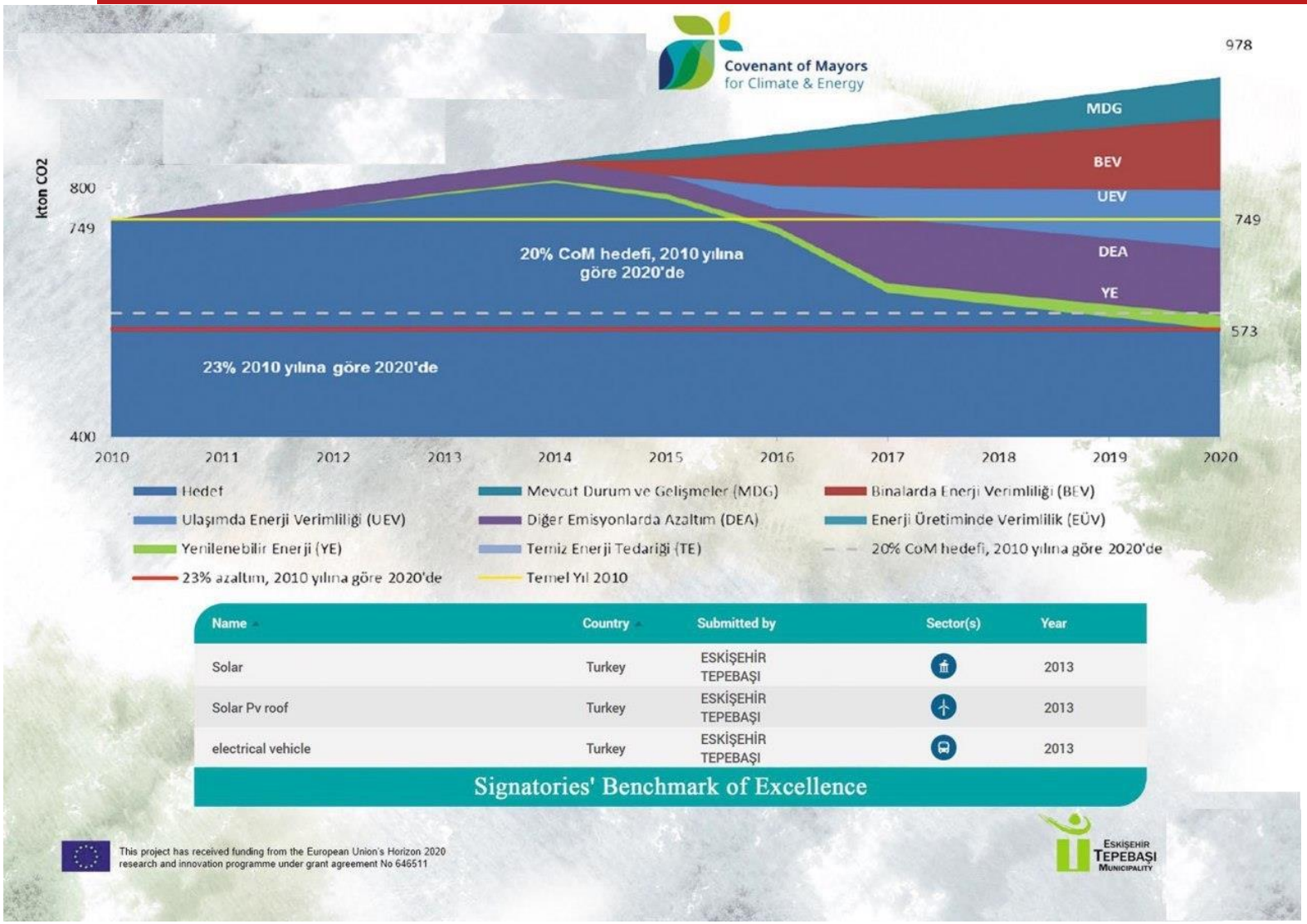
Level of Excellence in 3 Areas



Name	Country	Submitted by	Sector(s)	Year
Solar	Turkey	ESKİŞEHİR TEPEBAŞI		2013
Solar Pv roof	Turkey	ESKİŞEHİR TEPEBAŞI		2013
electrical vehicle	Turkey	ESKİŞEHİR TEPEBAŞI		2013

Signatories' Benchmark of Excellence

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Tepebaşı Interventions

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Tepebaşı Demo Site

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Tepebaşı Demo Site

14 June 2019

Tepebaşı Demo Site

14 June 2019

Manifesto

THE LIGHTHOUSE PROJECTS COOPERATION
MANIFESTO

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

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

Nottingham City Council — Cllr Sam WEBSTER, Employment and Skills

NOTTINGHAM TRENT UNIVERSITY — Pro Vice-Chancellor Michael CARR, Employment & Economic Engagement

In representation of the lighthouse projects

REMOURBAN — Mr Miguel A. GARCÍA-FUENTES, REMOURBAN Project Coordinator
Chair of the SCCOI Board of Coordinators at the time of the signature

triangulum — Mr Damian WAGNER, TRIANGULUM Project Coordinator

GrowSmarter — Mrs Lisa ENARSSON, on behalf of GrowSmarter Project Coordinator

smarten city — Mr Francisco RODRÍGUEZ, SmartEnCity Project Coordinator

SHARINGCITIES — Mr Nathan PIERCE, Sharing Cities Project Coordinator

REPLICATE — Mrs Elisabeth JORGE, REPLICATE Project Coordinator

SMARTER TOGETHER — Mr Maxime VALENTIN, Smarter Together Project Coordinator

my SMART Life — Mr Rubén GARCÍA-PAJARES, mySMARTLife Project Coordinator

RUGGEDISED — Mr Albert ENGELS, RUGGEDISSED Project Coordinator

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.

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ESKIŞEHIR TEPEBAŞI MUNICIPALITY

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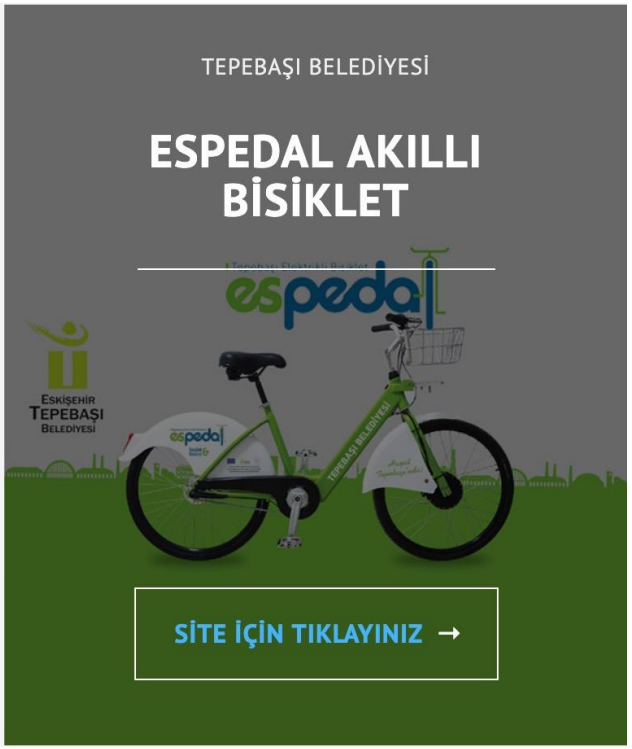
All in one



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PART #3

HOW DOES "CITY ON CLOUD" MEET TEPEBASI'S DEMAND?

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CITY ON CLOUD

"If you can't measure it, you can't improve it.”

Peter Drucker

Smart City Information Platform – City on Cloud

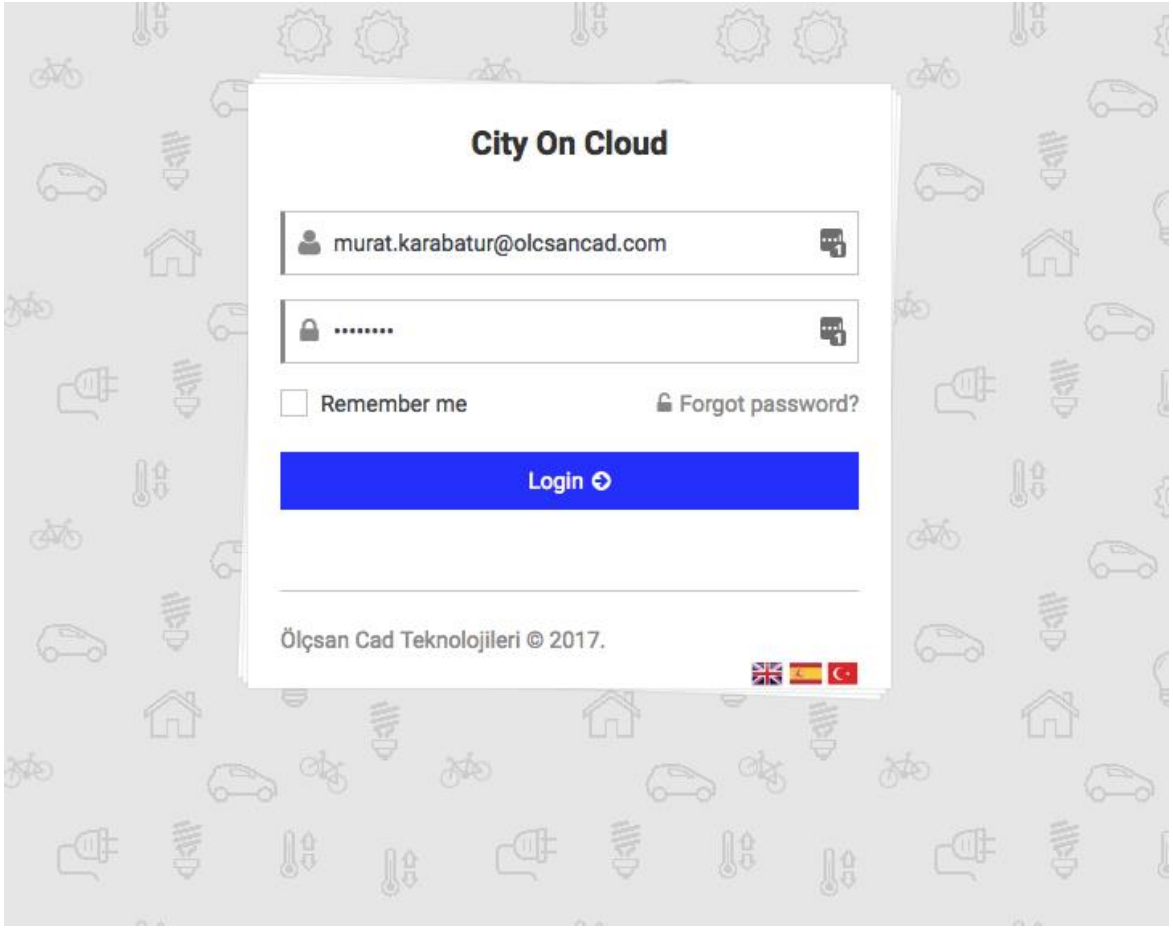
The City Information Platform of Tepebaşı is collecting, tracking and processing the whole set of variables being monitored in Tepebaşı

City on Cloud – Platform of Platforms

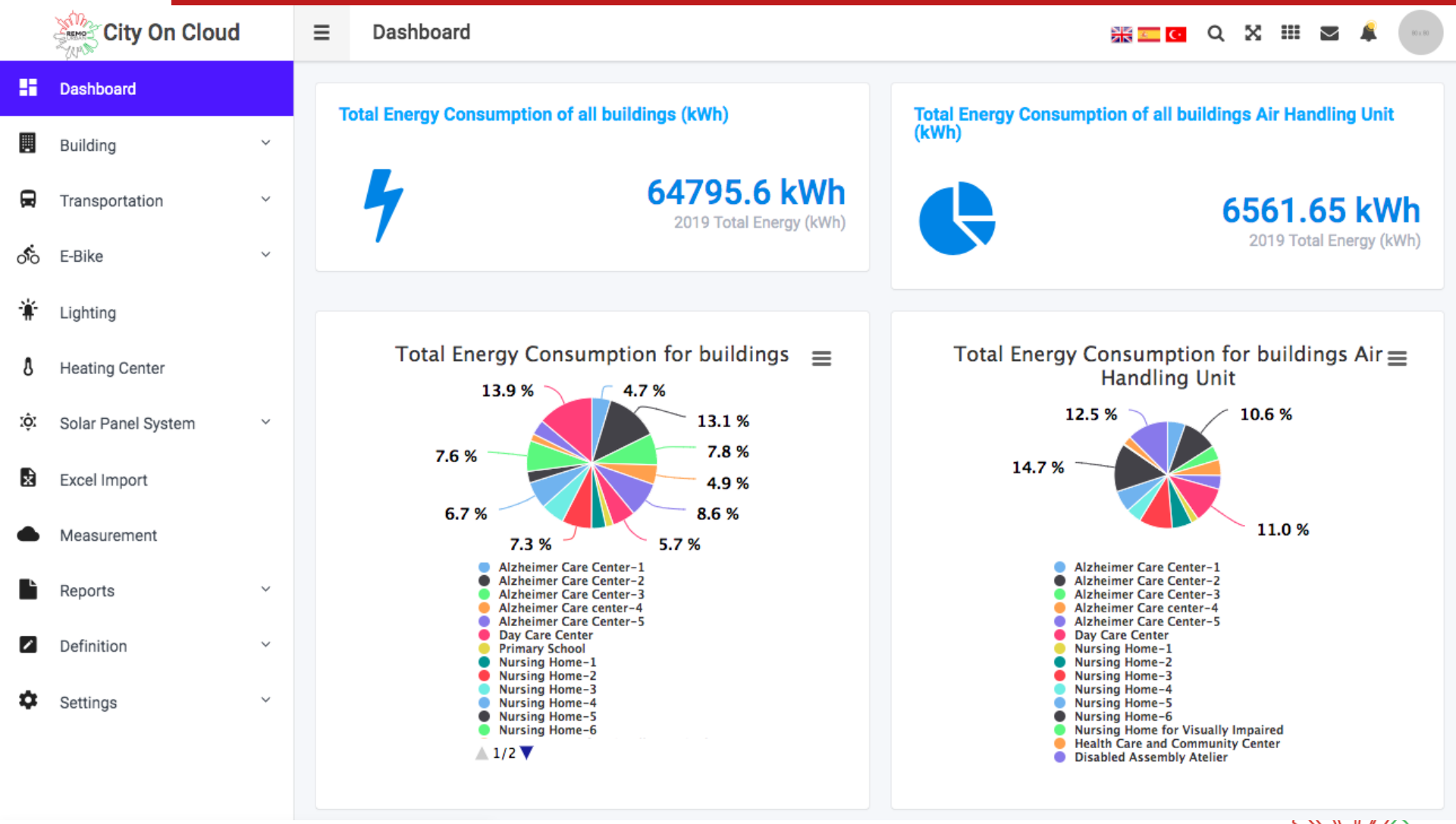
CoC collects data from multiple platforms and systems and provides the user one platform to control and track all of the important data

- Building Energy Management System
- Energy Monitoring System for Electric Meters
- Solar Panel System
- Vehicle Tracking System
- E-Bike Management System
- Smart Street Lighting System

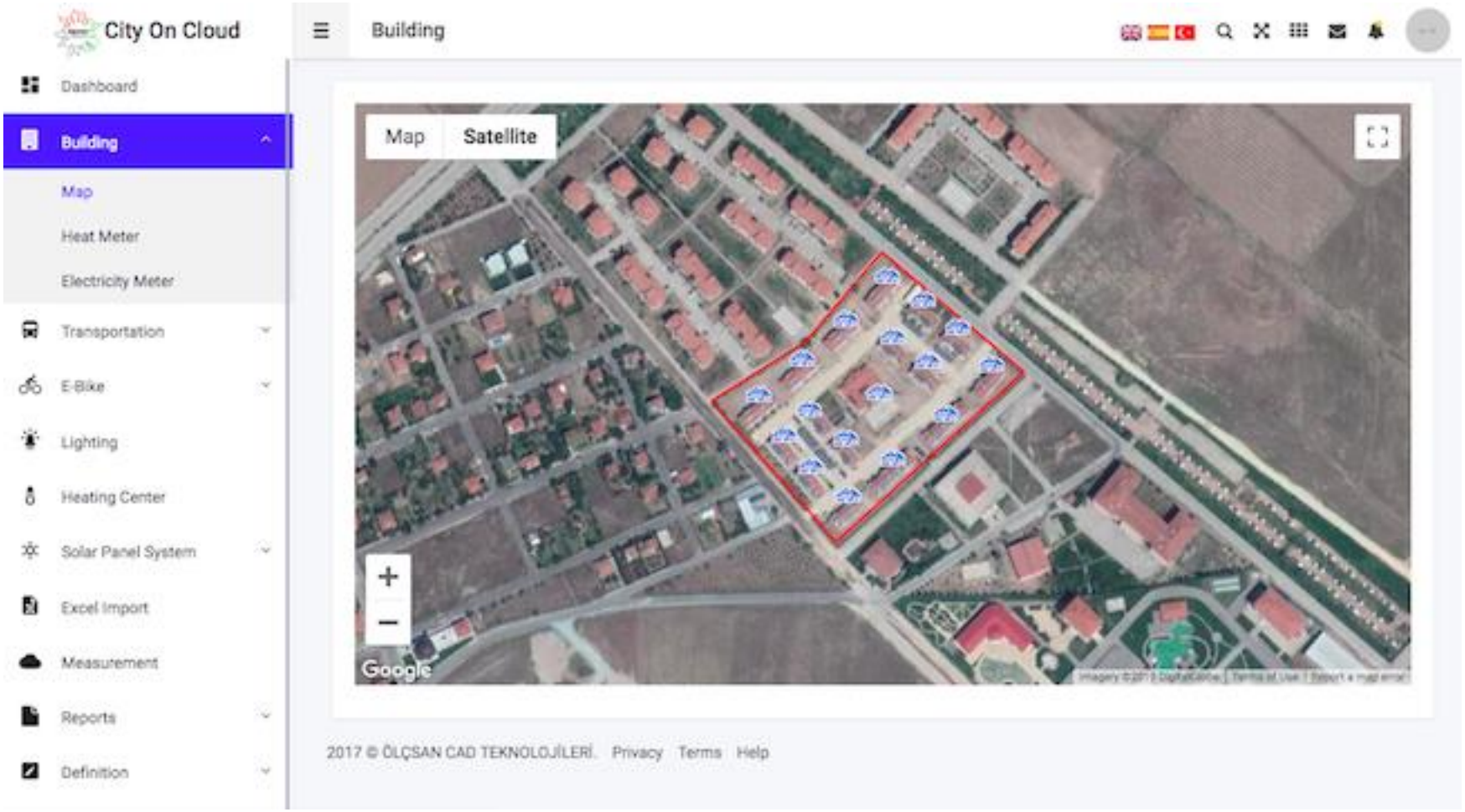
Olcsan Smart City Platform – City On Cloud



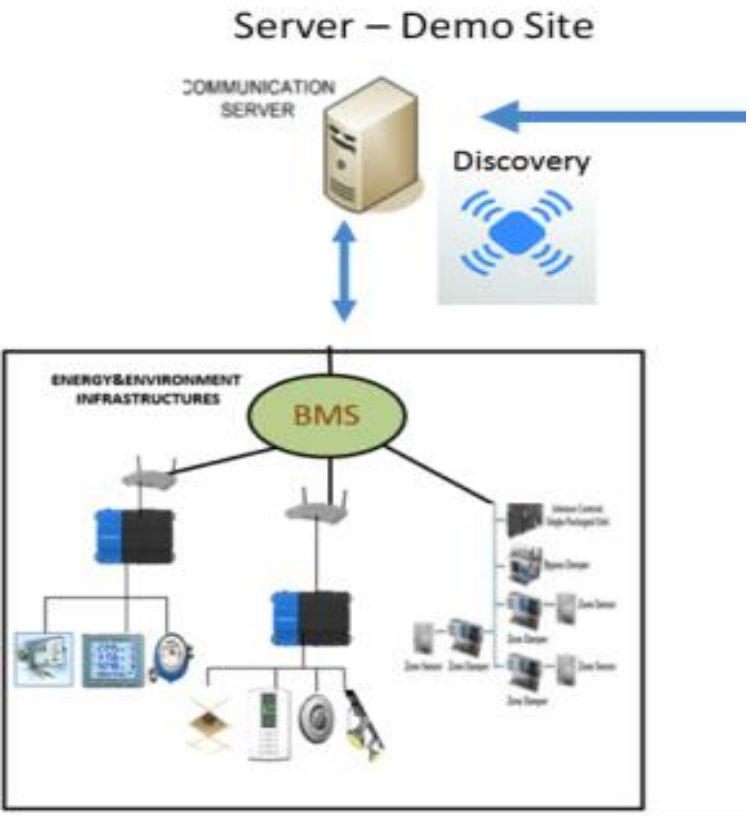
City On Cloud – Dashboard



City On Cloud – Operation Map

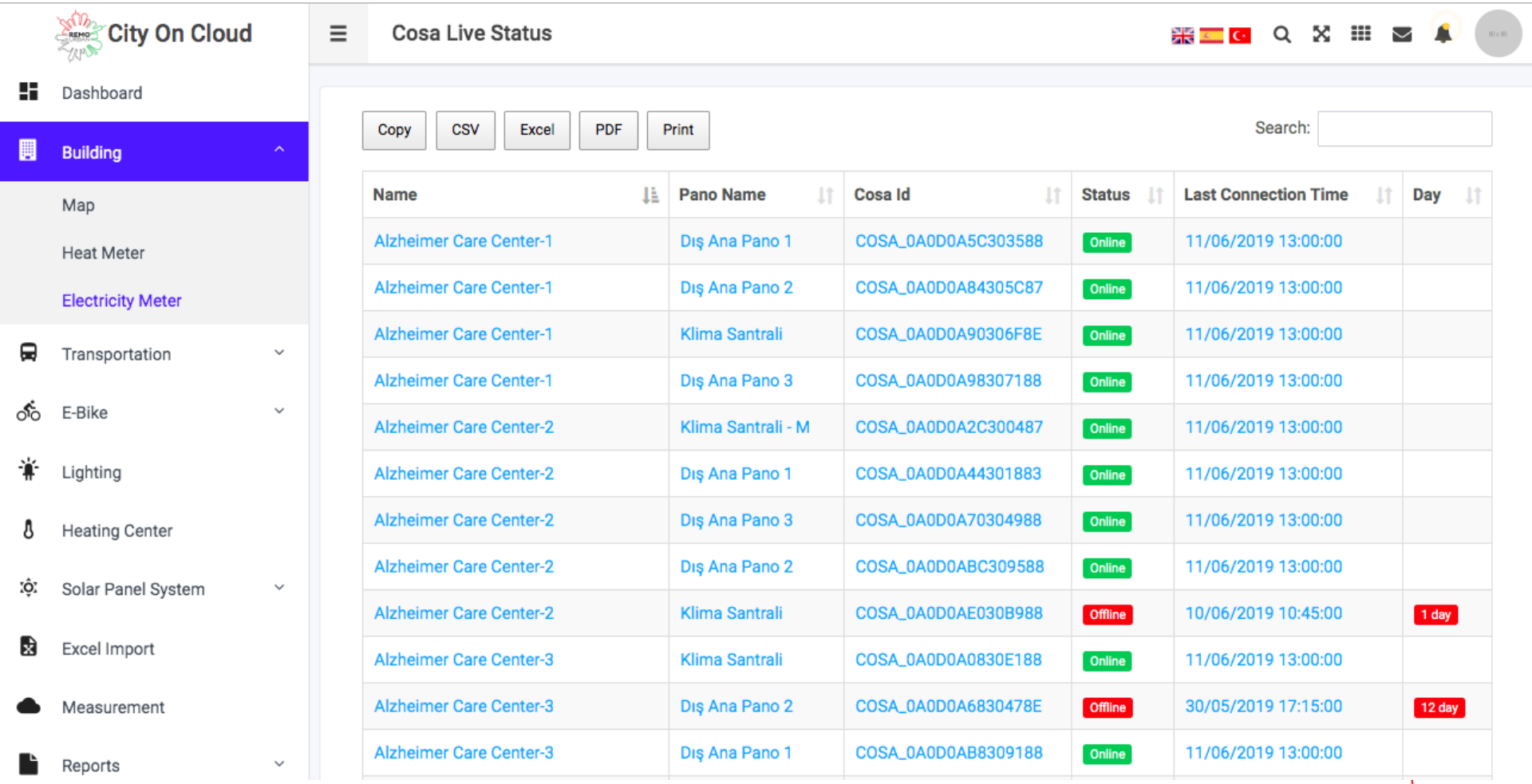


Energy Monitoring



- A Building Management System (BMS) takes care of three main subjects
  - Energy Monitoring
  - Thermal Comfort
  - HVAC Controls
- CoC collects the raw data from the BMS via Modbus over TCP/IP
- CoC processes the raw data to calculate the important energy indicators

Energy Monitoring for Electric Meters



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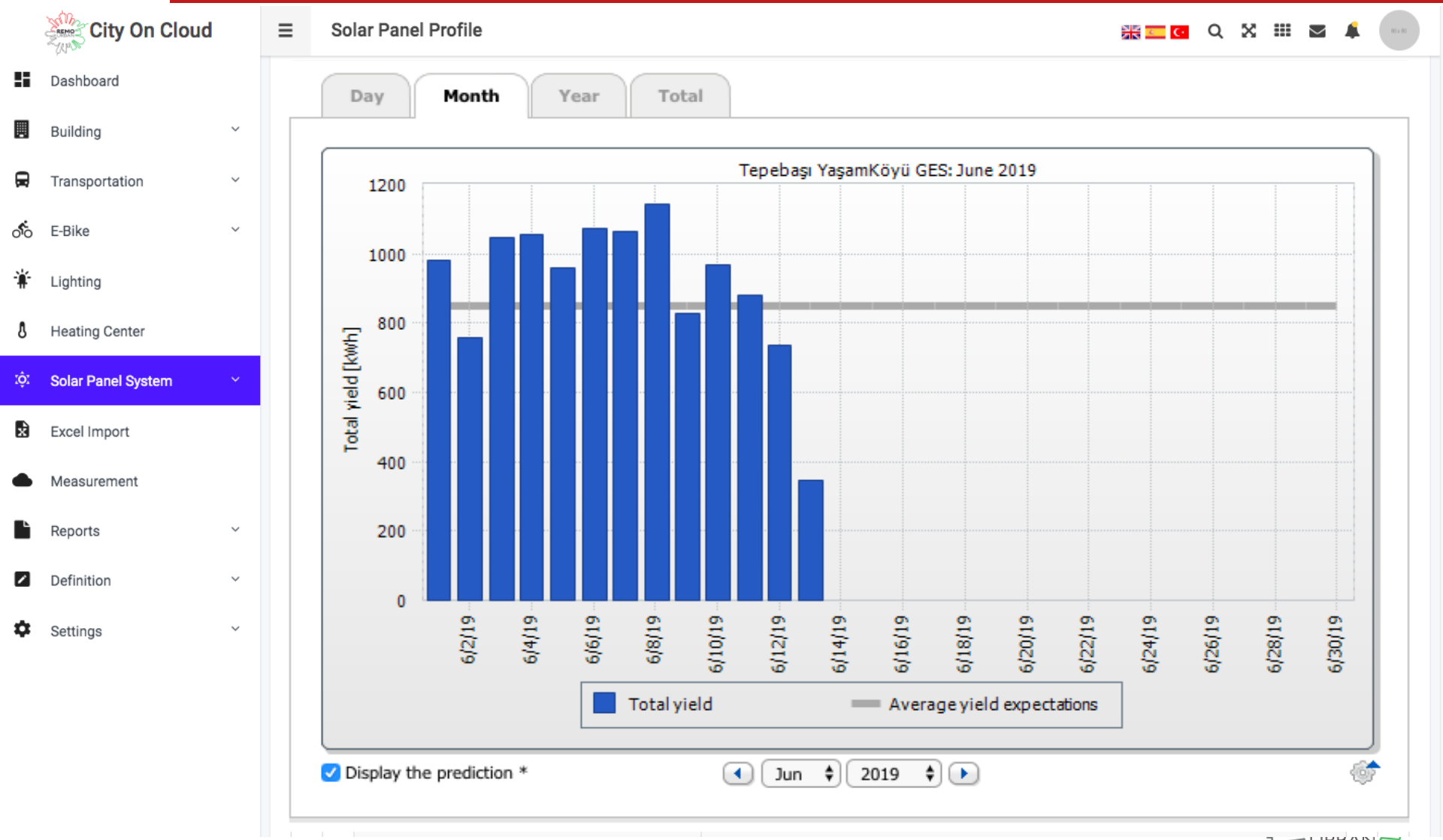
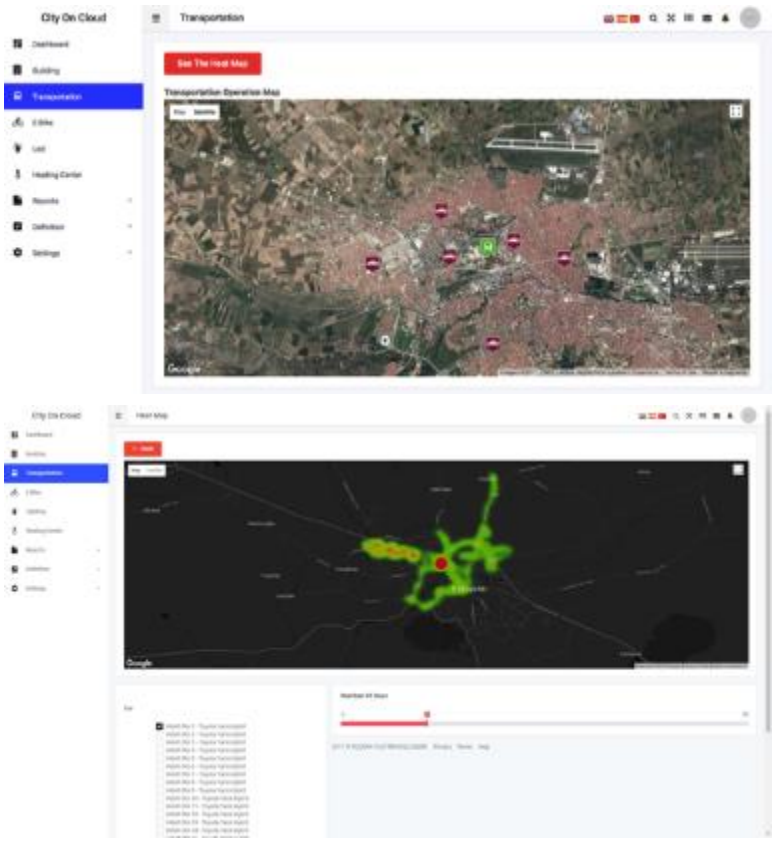
Solar Panel System Monitoring



Sustainable Mobility with e-bus, e-bikes & hybrid cars

Fleet Management System Integration

- CoC is connected to a fleet management system to track e-buses and cars
- The speed, odometer value of the car and other info about the car is shown on platform
- The location of the vehicles is shown on the map and it is possible to see the history of the places visited by each vehicle as a heat map
- For the e-buses the battery charge level and consumption information can be also tracked

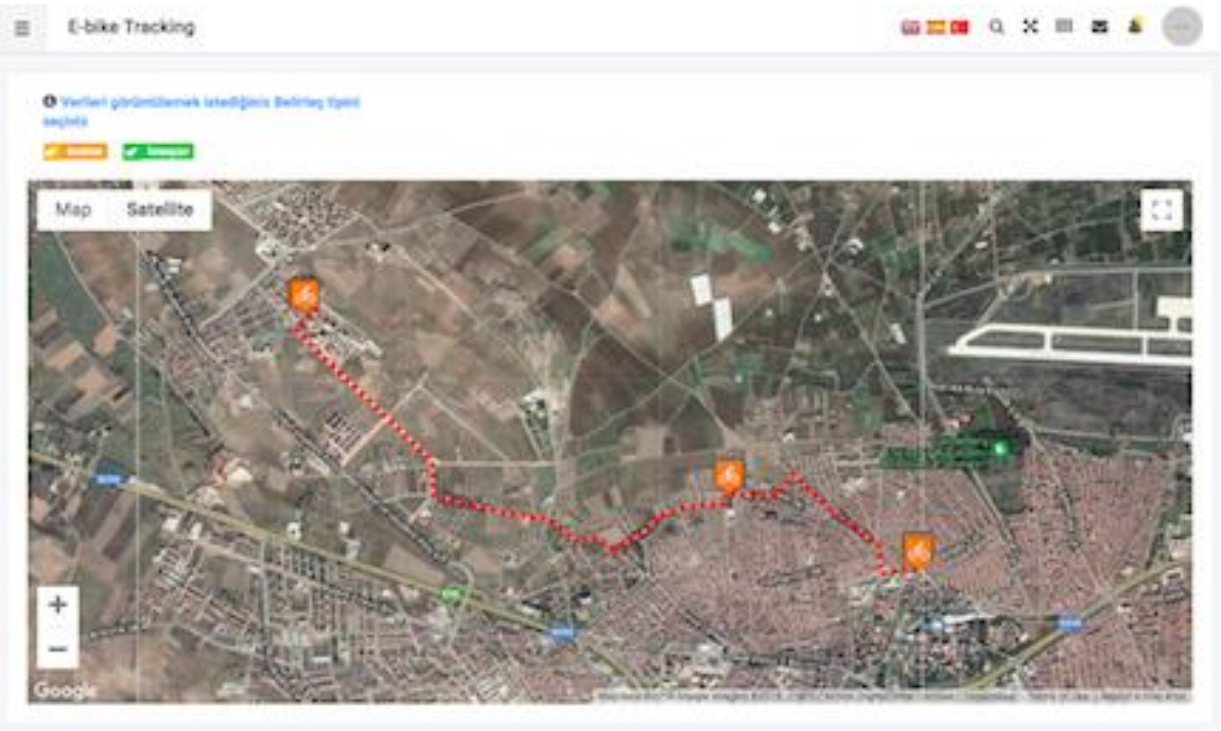


E-bus Charging Station

E-bike Rental & Charging Stations

E-bike monitoring on City on Cloud

- E-bike rental system deployed at Tepebaşı, consists of 30 e-bikes, 3 e-bike rental locations with 15 corresponding docking stations
- 3 rental locations for e-bikes located at:



Yaşam Köyü (demo site)

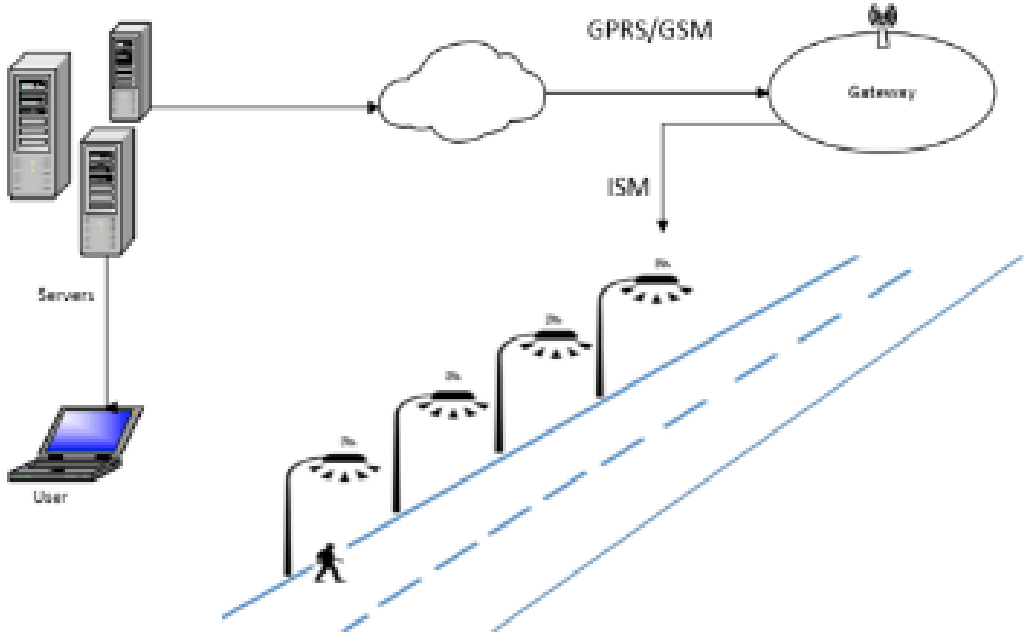
Yunus Emre Spor

Anadolu University

Smart Streetlight Implementation

Olcsan Smart Lighting Solution

- The intelligent lighting is performed by using AGASY, a smart lighting solution provided by OLC
- 44 25W lamps are controlled by the system
- It supports 3 different modes: Manual, Schedule-Based and Sensor-Dependent Mode



Advantages of LEDs

- Very quick start-up time
- High color temperature (CT); improves driver peripheral vision
- Long lifespan (LEDs last 15-20 years)
- Twice as energy efficient as fluorescent lighting
- Safer and more efficient in colder environments
- Highly shock-resistant (ideal for locations with vibrations, e.g. bridges)
- Relatively smaller carbon footprint and recyclable

Downsides to LEDs

- Whiter-looking light suppresses melatonin production – LEDs suppress melatonin production five times more than HPS light does
- LEDs produce far more blue light, which scatters more than red and yellow light do and causes retinal damage
- Have to invest exclusively in higher-tier LED products
- Complaints include light pollution (i.e. glare, light trespass, etc.)

Why Smart Street Lighting

- Improve citizens' satisfaction
  - Security, safety, and wellbeing
- Savings
  - Less power consumption
  - Lighting system maintenance
- Lighting infrastructure as a backbone for IoT applications
  - Monitoring changes in weather, pollution rates
  - Mapping traffic conditions and flow

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Questions & Answers

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Upcoming Webinar:

“The Integrated Urban Plan: methodology for the design of a sustainable urban development strategy for European cities”

June 19th, 2019 at 14:00h (UTC+2)