

I European Conference on Sustainable Mobility at Universities

Universitat Autònoma de Barcelona



8, 9, 10 March 2017

electricdriveitalia 

 **LUISS** Università Guido Carli

Ing. Daniele Del Pesce

INTEGRATED SERVICES FOR SUSTAINABLE MOBILITY PROJECTS WITH ICT PLATFORM



FOR INTELLIGENT MANAGEMENT OF INFRASTRUCTURE, VEHICLE'S MONITORING & PROVISION OF RELATED SMART SERVICES



The conference is in the Framework of the European Project about sustainable Mobility: U-MOB LIFE.



LIFE project number LIFE15 GIC/ES/000056 This is funded by the European Union. It reflects on author's view and the agency is not responsible use that may be made of the information it contains

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1.0 GENERAL AND SYSTEMIC FRAMEWORK

SMART GRID / SMART MOBILITY



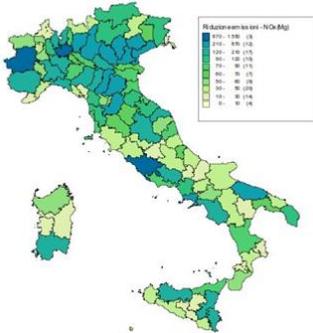
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1. ENVIRONMENT: IMPROVEMENT OF AIR QUALITY

- ❑ Reduction of particulate matter by 70% to 90% per year (estimate), replacing 100 thousand vehicles, equipped with combustion engine with equal number of electric vehicles.
- ❑ Reduction of about 350/400 tons per year of nitrogen monoxide.
- ❑ As shown through a study of the Italian Research on Energy System (RSE) in Italy, considering in 2030 a fleet comprehending 25% of electric cars, the annual average concentration of NO₂ will be reduced by a further 6 percent in urban areas, while the reduction of particulate matter will amount to 2 %.



Italy Provinces: level reduction of NO_x emissions in road transport sector due to the introduction of electric vehicles (2030).

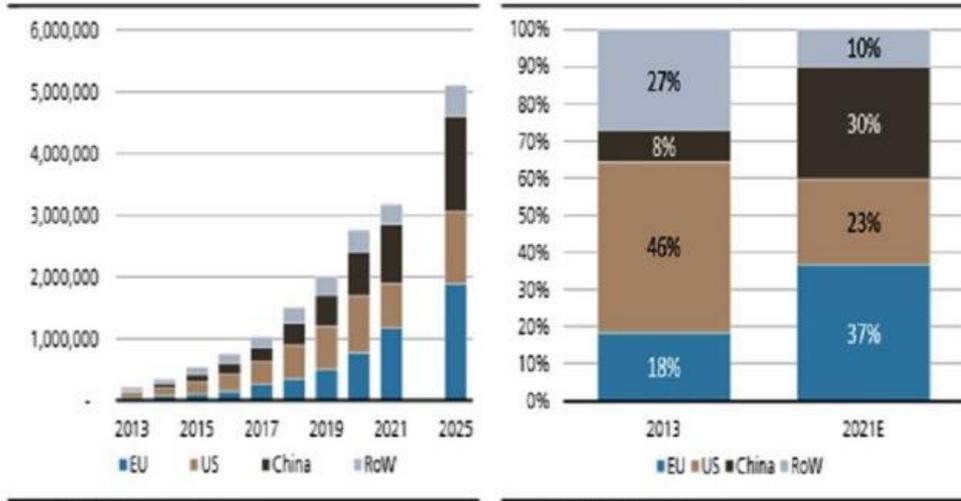


2. AUTOMOTIVE SECTOR: NEW TECHNOLOGICAL TREND DUE TO RESPECT OF 95 g CO₂/km

3. HIGH VISIBILITY & PROMOTION OF TOURISM

- ❑ High Impact projects characterized by ethical value and image, focused on:
 - ✓ Green / Circular economy
 - ✓ Preferential sustainable pathways
 - ✓ Touristic and hotel services

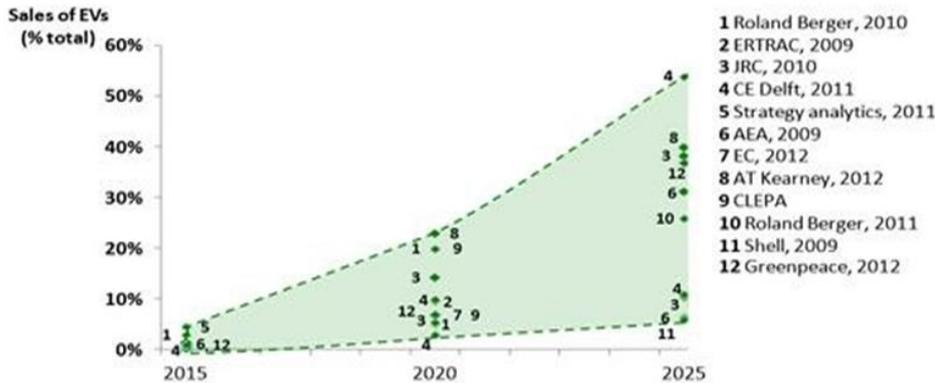
Vendite attese di veicoli elettrici e quote di mercato per regione nel tempo



Source: Global EV Outlook, UBS estimates

Source: Global EV Outlook, UBS estimates

Grafici tratti da Foresight investor su dati EV Outlook e stime UBS



Notes: where literature sources provide figures in terms of percentages, we have converted them to absolute figures using the new fleet volumes estimated based on extrapolation from 2010 sales provided in ICCT (2011). Estimates from Greenpeace (2012) are based on the weighted average of projections for the small, medium and large market segments.

Within 2021 the European Union, will control 37% of market (about 1.0 million of vehicles)



“Full electric or Plug in Hybrid” Vehicles:

Not derived from a combustion engine models, but specifically engineered from the beginning
Autonomy > 300 km

The B.O.M.T.S. platform is able to provide two types of Services:

A. E-MOBILITY SERVICES - I.E.M.S.: related to sustainable mobility services (electrical / hybrid)

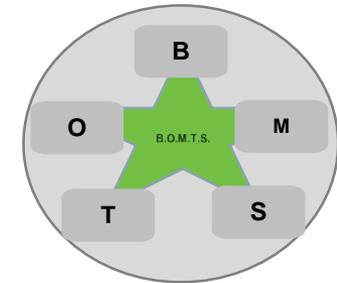
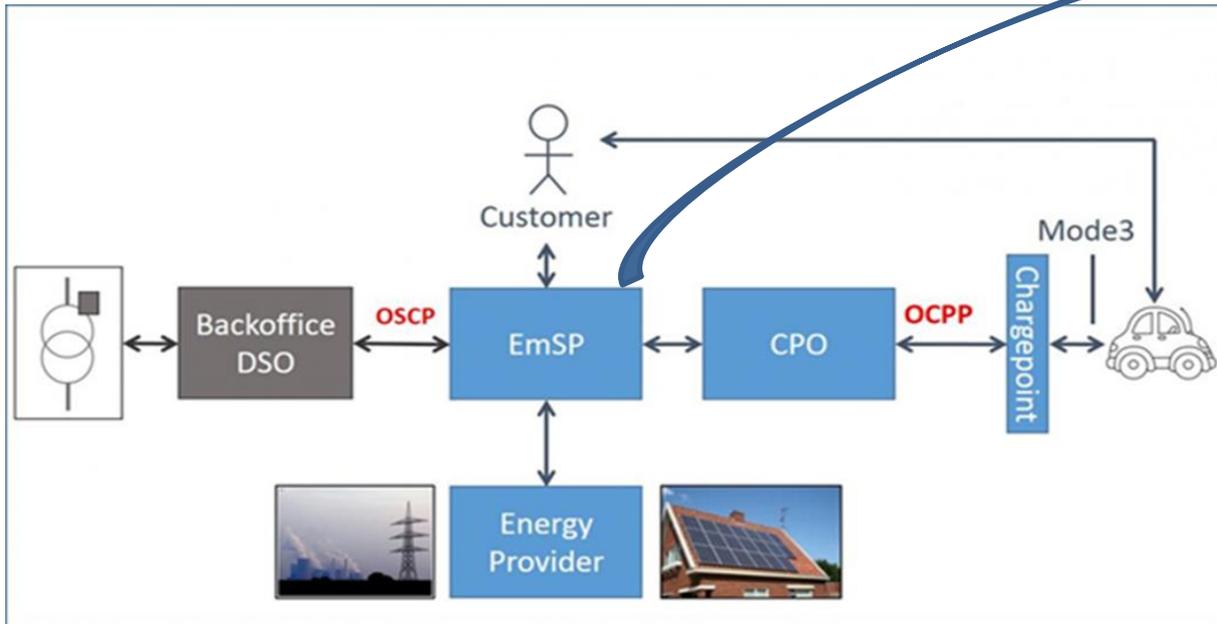
B. SMART SERVICES: ICT services for various sectors, such as

- Touristic / Hotels
- Info Mobility
- Energy Efficiency
- Public Administration, constant monitoring of energy consumption, including tools for analysis and benchmarking of energy consumption and emissions (CO₂)
- Airports
- Interports



Electric Drive Italia is the only entity, in Italy, to play both roles of EMSP and CPO.

- Electric Drive Italia is equipped with a back-office platform (BOMTS), which, on the one hand, dialogues with each recharging point (Charge Point) and on the other hand with the DSO, in order to provide a plurality of services to the final user (customer); services can be also enriched providing further information systems (touristic, PA, etc.). All the other actors, particularly Energy Provider and DSO, continue to carry out their respective mandates, particularly for the provision of energy and management of the distribution network.



Legenda:

- **DSO: Distribution System Operator.** Responsible for the management and maintenance of the power grid
- **EmSP: E-Mobility Service Provider.** Responsible for all contacts with the driver
- **CPO: Charge Point Operator.** Responsible of the charging station

2.0 ICT PLATFORM B.O.M.T.S. – STRUCTURE OF THE SYSTEM

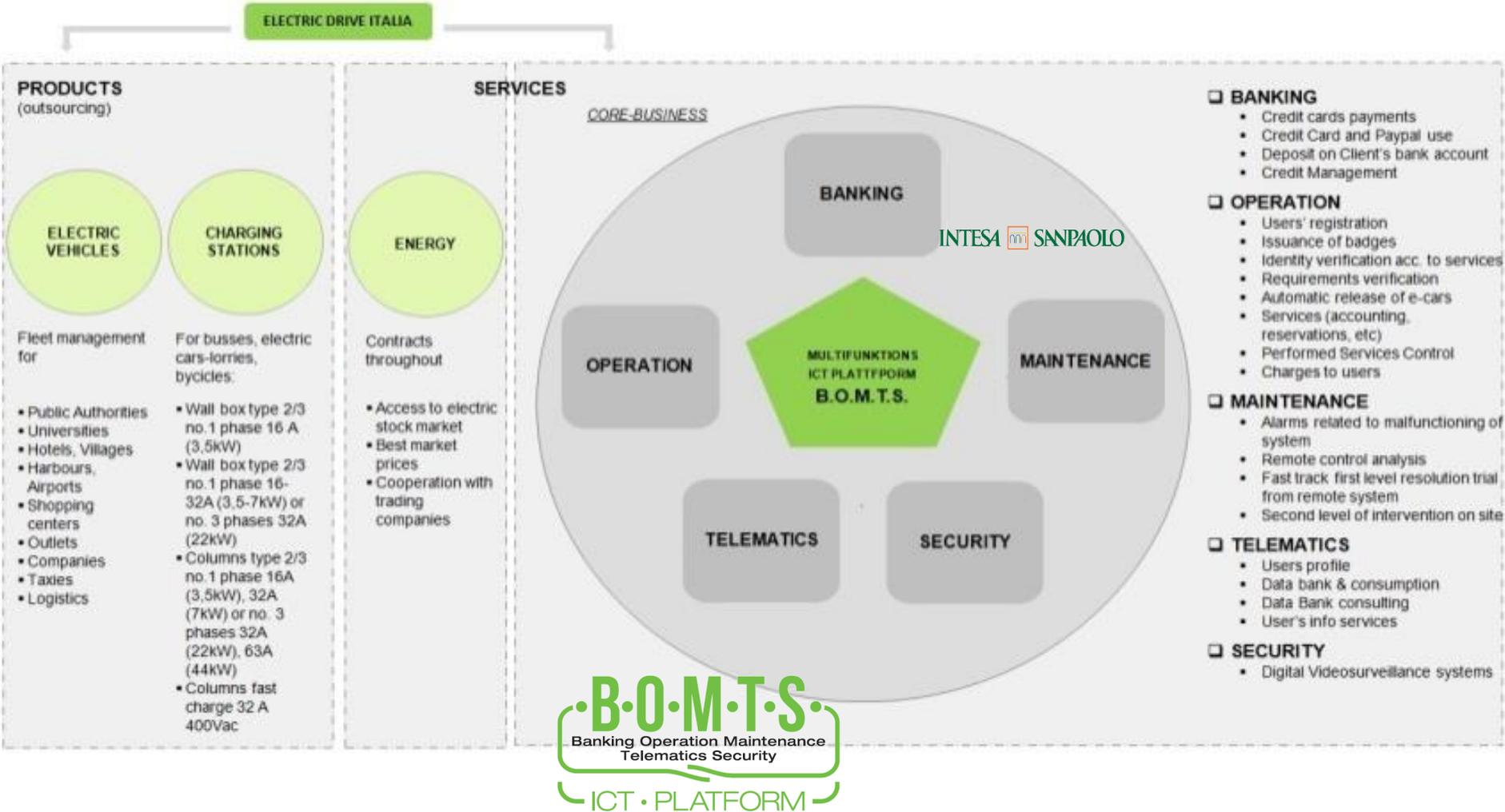


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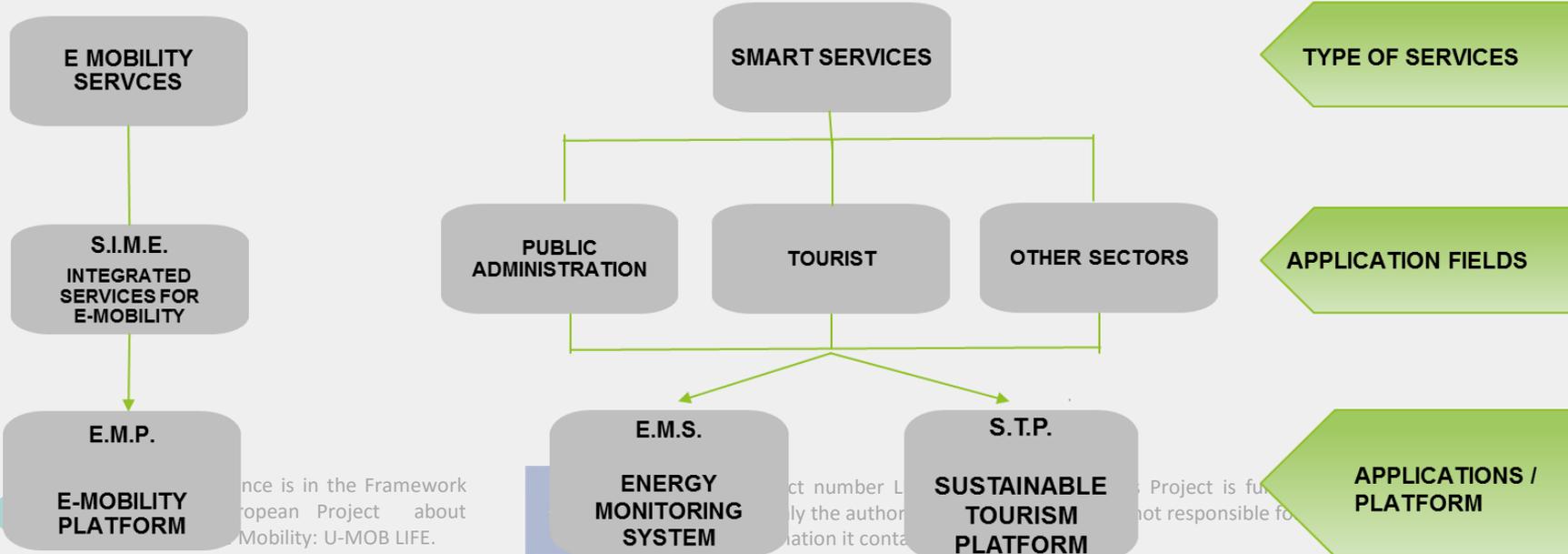
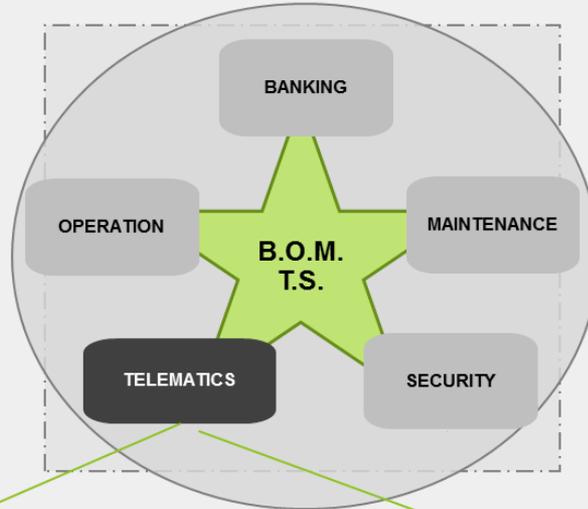


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TURN KEY INTEGRATED SUPPLY



BUSINESS UNITS



Electric Drive Italia has immediately reacted to the new market requirements by engineering, for public/private organizations, companies, business / tourist hotels, a customized project design solution offering professional **TURNKEY SERVICES** including:

- ✓ **MULTIFUNCTIONAL PLATFORM BOMTS (BANKING, OPERATION, MAINTENANCE, TELEMATICS, SECURITY)**
- ✓ **DYNAMIC INFRASTRUCTURE FOR ELECTRIC RECHARGING CONNECTED TO BOMTS**
- ✓ **POWER SUPPLY**
- ✓ **ELECTRIC CARS / FLEET MANAGEMENT CONNECTED TO BOMTS**
- ✓ **OPERATION & MANAGEMENT OF THE ENTIRE SYSTEM FOR PROJECT LIFETIME PERIOD**



This package enables Customers to professionally run the infrastructure by **respecting their business plan's requirements** within the years.

Electric Drive Italia stands out for its ability to provide the **"SMART" CUSTOMIZED ICT INFRASTRUCTURES (BOMTS PLATFORM)**, with massive use of Technology.



BACKEND ICT PLATFORM FOR SUSTAINABLE E-MOBILITY

The platform is able to operate on-line 24 hr / 24 hr all charging stations for any kind of electric vehicle (e.g: cars, busses, pedal assisted bicycles, etc), connected via specific servers to BOMTS platform & delivering various services:

1. Accessibility to the services (no need of pre-paid badges issued by infrastructure owner) by citizens, tourists, municipalities and public entities, via App
2. Use of infrastructure via App - with detection / booking of charging stations belonging to the network
3. On-line payment of the services charges (credit card); further payment services (e.g. parking)
4. H24 monitoring of the proper functioning of the network
5. E-station status information (available, booked, under operation etc.)
6. Provision of information related to the state of recharging energy (kW disbursed etc.)
7. Provision of information regarding delivered energy (global / daily value)
8. Additional services for third-party activities related to electric car sharing
9. Additional services for third-party activities related to electric bike sharing
10. Link to management platform via website www.bomts.it and Help-Desk
11. Interfacing with smart grid / smart mobility



**AVAILABLE
BY
B.O.M.T.S.
PLATFORM
VIA APP**

HOW DOES IT WORK

SWITCHBOARD

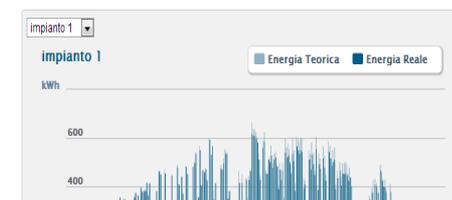
Through the portal, the user can view the summary information of its production plants.

Thanks also to graphs and charts you can make comparisons between the performance of different plants (Figure 1).

impianto	stato	potenza (kW)	energia (kWh)		rapporto percentuale %	performance ratio %	meteo
		nominale	attesa	reale			
IMPIANTO 1	✓	100	101.305	98.098	97%	88 %	☀️
IMPIANTO 2	✓	955	847.621	721.263	85%	76 %	☁️

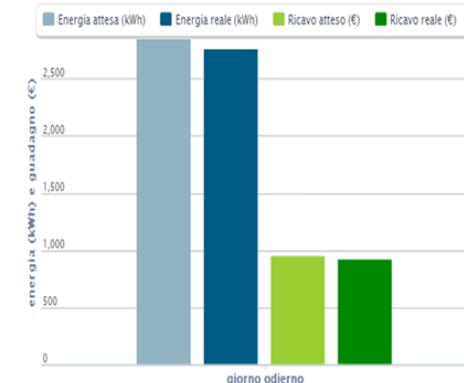
scegli l'impianto: scegli il mese: energia totale prodotta: (kWh)

scegli periodo:



(Figure 1)

energia e ricavo giornaliero



energia parziale giornaliera (kWh)		ricavo parziale giornaliero (€)	
attesa	reale	atteso	reale
2.850	2.762	955	925

(Figure 2)

PRODUCTION DATA

In the single plant control panel following energy production information can be provided:

- Currents and voltages
- Power output
- Energy Performance Ratio
- Remuneration received

Evidence of the history of environmental measures, the current weather data and forecasts for the coming days (Figure 2).

MULTISERVICES PLATFORM FOR SUSTAINABLE TOURISM:

- ✓ Utilization of the infrastructures with "App" by identifying structures that are part of the network
- ✓ Tourist info:
 - Geolocation of touristic facilities - hotel belonging to the network
 - Hotel sector: Check Availability hotel rooms, hotel room reservation and payment
 - Geolocation tourist paths
 - Reservation touristic activities:
 - ❖ Touristic itineraries
 - ❖ Cultural itineraries, Museums
- ✓ Payments via App by credit card
- ✓ Interfacing with smart grid / smart mobility
- ✓ Possibility to access / other payment services (e.g. parking)
- ✓ Multilingual app for an easy and complete access to the tourist



3.0 TECHNICAL DESCRIPTION

CHARGING STATIONS CONNECTED TO B.O.M.T.S.



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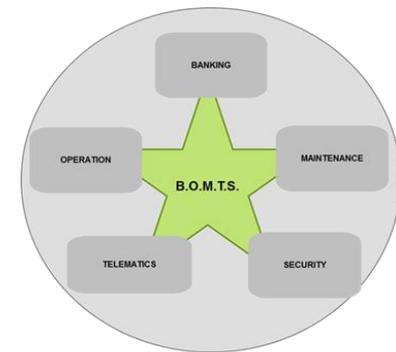
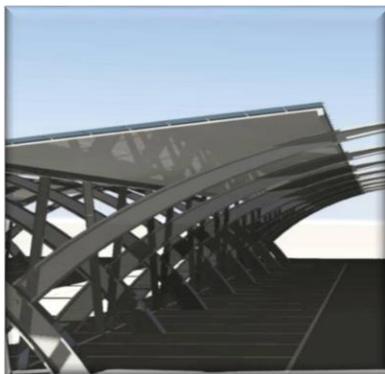


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The "smart" infrastructure connected to B.O.M.T.S. is able to communicate in real time with users and with infrastructure owners

ELECTRICAL FUNCTIONS:

- ✓ Identification of user licenced to recharge
- ✓ Identification of connected cable type
- ✓ "Mode 3" charging with pilot circuit pwm (pulse wide modulation)
- ✓ Surcharge protection + direct contacts' protection
- ✓ Measuring of supplied energy + current
- ✓ Control of correct plug opening
- ✓ Management of shutter block – avoidance of plug extraction
- ✓ Management of recharging procedure in case of current failures
- ✓ System functioning in mode: stand-alone, free or personal
- ✓ Configuration for serial functioning



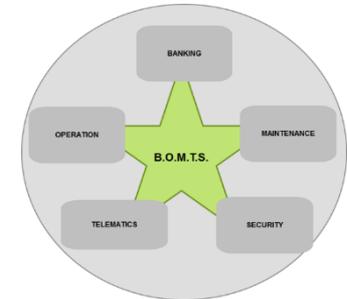
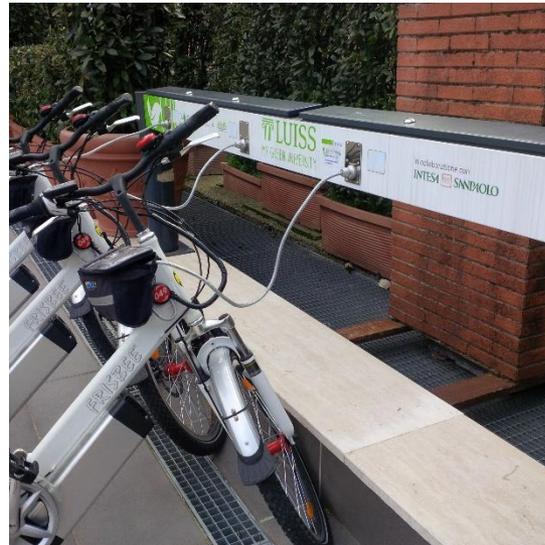
B·O·M·T·S.
Banking Operation Maintenance
Telematics Security
ICT · PLATFORM



COUPLING WITH PHOTOVOLTAIC SYSTEMS - CARPORTS

Bar with no. 4 connections for charging & Identification of assisted bicycles connected to BOMTS platform

- ✓ Length of 2,835 meters.
- ✓ Power supply via single-phase current
- ✓ Quick hitch for charging the light vehicle
- ✓ Coupling constituted by a metal connector with locking system, in turn connected to an electric cable with metal braid which having an RFID chip carries the voltage up to the BMS (Battery Management System) of the pedal assisted bicycle
- ✓ No need to use external batteries chargers
- ✓ Bike and user identification with RFID
- ✓ BOMTS services (reservations, accounting, invoicing etc.).
- ✓ Services & hotel tourist information
- ✓ Monitoring system 24h / 24h
- ✓ Charging station complete with a bike shed.



☐ CONTACT CENTER

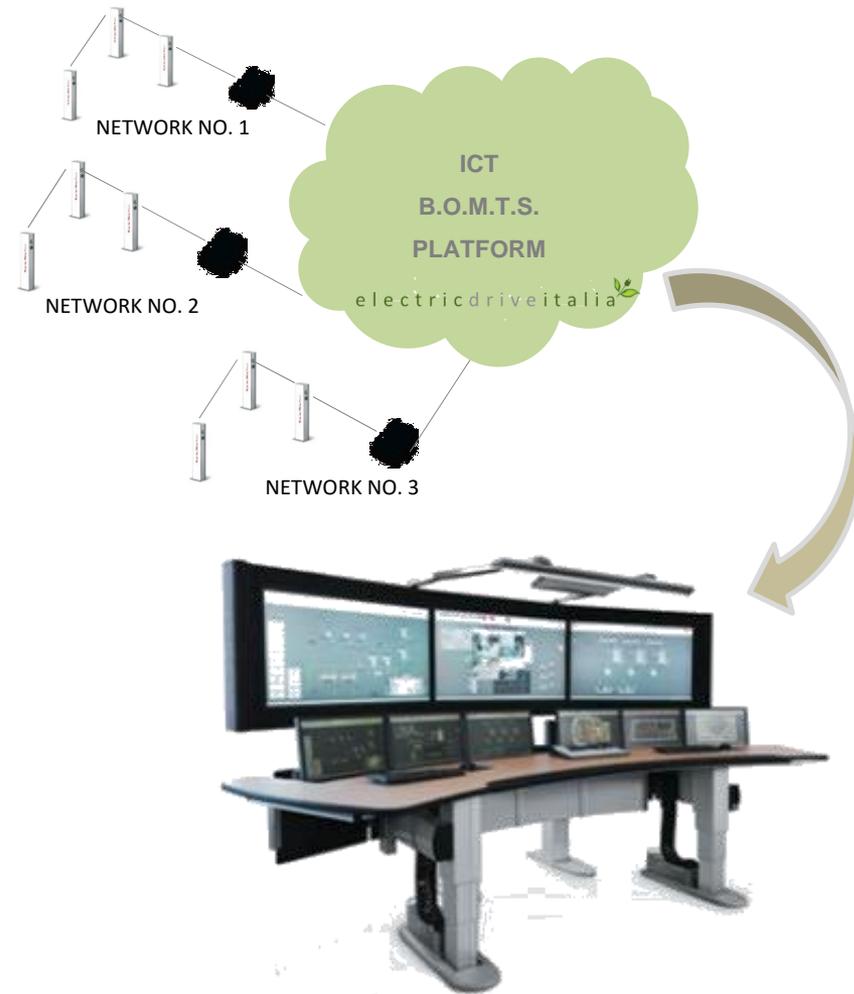
- ✓ Call center
- ✓ Web interface

☐ OUTAGES MANAGEMENT

- ✓ Help desk – first level
- ✓ Help desk – second level
- ✓ Trouble ticketing service

☐ SPECIAL SERVICES

- ✓ Engineering (O&M support)
- ✓ Control of each network's performance (financial incomes, e.g. case of private investors owning networks that sell energy to public users for e-vehicles recharging)
- ✓ Video surveillance



4.0 LUISS “GUIDO CARLI” UNIVERSITY, ROME – ITALY

LUISS GREEN MOBILITY (LGM)

PROJECT DESCRIPTION



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LUISS – Libera Università Internazionale degli Studi Sociali Guido Carli – is an independent university. It was created out of a pre-existing Roman institution, Pro Deo, between 1974 and 1978.

Number of students 8.500



1.0 Departments

LUISS offers an innovative educational approach at its **four Departments:**

- **Economics and Finance,**
- **Business and Management,**
- **Law,**
- **Political Science.**

Its goal is not simply to convey knowledge but to instill flexibility in young people, giving them a sense of mastery over their future.

2.0 Schools

LUISS has **four Schools for graduate and professional studies:**

- **LUISS Business School,**
- **School of Government,**
- **School of Law,**
- **School of European Political Economy.**

1.0 Pre-study

“Mobility Manager”[®] licensed software for preliminary analysis of no. **8.500 students’s** mobility transport inclinations & output incl. suggested Project design results to:

- 1) Improve Mobility
- 2) Reduce Environmental Impact (CO2)

2.0 Project design – B.O.M.T.S. for LGM Project



1. Intelligent Recharging Stations
2. E-Car Sharing
3. E-Bike Sharing
4. E-Scooter Sharing
5. Info Mobility Bus Tracking System

8.500 Users

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- A. B.O.M.T.S. platform & intelligent charging stations for electric car-sharing service (students and staff) + supply of electric cars

- B. B.O.M.T.S. platform & intelligent charging bars for the electric bike sharing service (students and staff) + supply of electric bicycles with pedal assistance

- C. B.O.M.T.S. platform & intelligent charging bars for electric scooter sharing service (students and staff) + supply of electric scooters (2Hire partners)



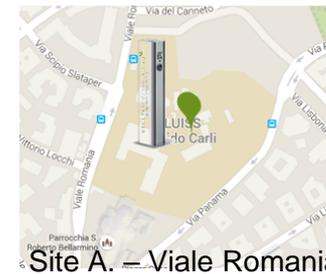
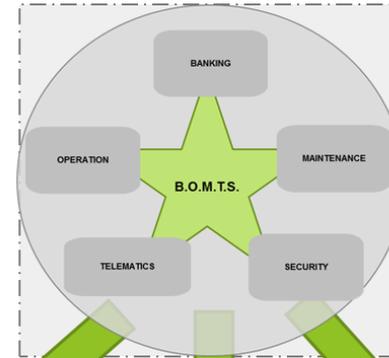
BOMTS & INTELLIGENT CHARGING STATIONS FOR ELECTRIC CAR SHARING No. 3 Locations – No. 9 Stations - No. 18 E-Cars

The project aims to exploit the potential of
B.O.M.T.S. platform as follows:

- A. No. 5 intelligent charging stations for electric cars (tot. 10 cars)
@ LUISS headquarters,
Viale Romania
- B. No. 2 intelligent charging stations for electric cars (tot. 4 cars)
@ LUISS headquarters,
Viale Pola
- C. No. 2 intelligent charging stations for electric cars (tot. 4 cars)
@ LUISS headquarters,
Via Parenzo



The locations equipped with BOMTS platform services can be networked with further Electric Drive Italia infrastructure.



E-CARS SUPPLY FOR ELECTRIC CAR SHARING

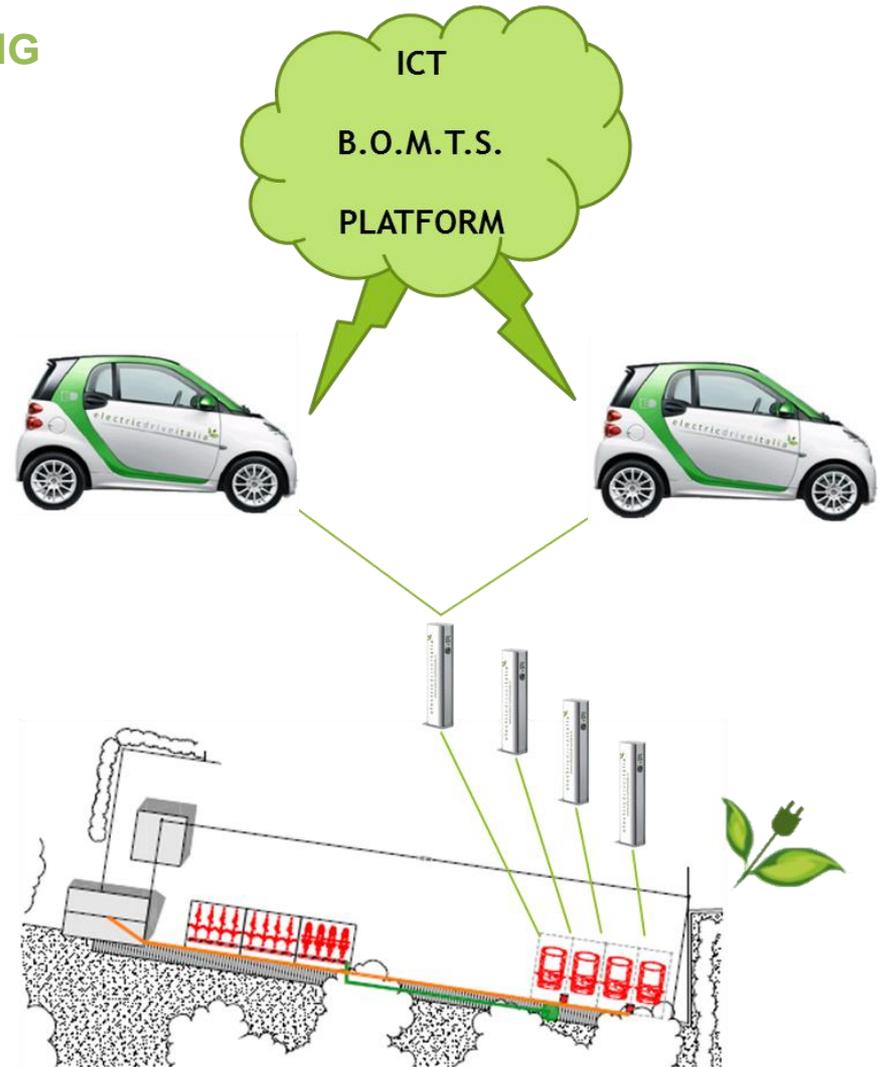
The project comprehends:

A. Supply tot. No. 18 electric cars equipped with an internal black box, "real-time communication," and management platform through B.O.M.T.S. for electric car sharing service:

- The vehicles will be divided for each location as follows:
 - No. 10 @ LUISS headquarter, Viale Romania
 - No. 4 @ LUISS headquarter, Viale Pola
 - No. 4 @ LUISS headquarter, Via Parenzo



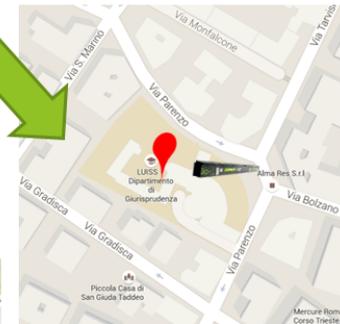
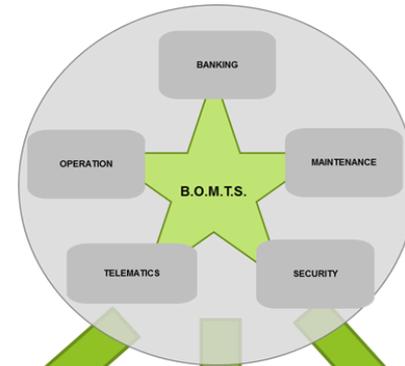
The car sharing service will be managed through the platform B.O.M.T.S



**BOMTS & INTELLIGENT CHARGING STATIONS FOR ELECTRIC BIKE SHARING
 No. 3 Locations – No. 6 Stations - No. 24 E-Bikes**

The project aims to exploit the potential of BOMTS platform as follows:

- A. No. 2 intelligent charging stations for electric bikes (tot. 8 bikes)
 @ LUISS headquarters, Viale Romania**
- B. No. 2 intelligent charging stations for electric bikes (tot. 8 bikes)
 @ LUISS headquarters, Viale Pola**
- C. No. 2 intelligent charging stations for electric bikes (tot. 8 bikes)
 @ LUISS headquarters, Via Parenzo**



The locations equipped with BOMTS platform services can be networked with further Electric Drive Italia infrastructure.

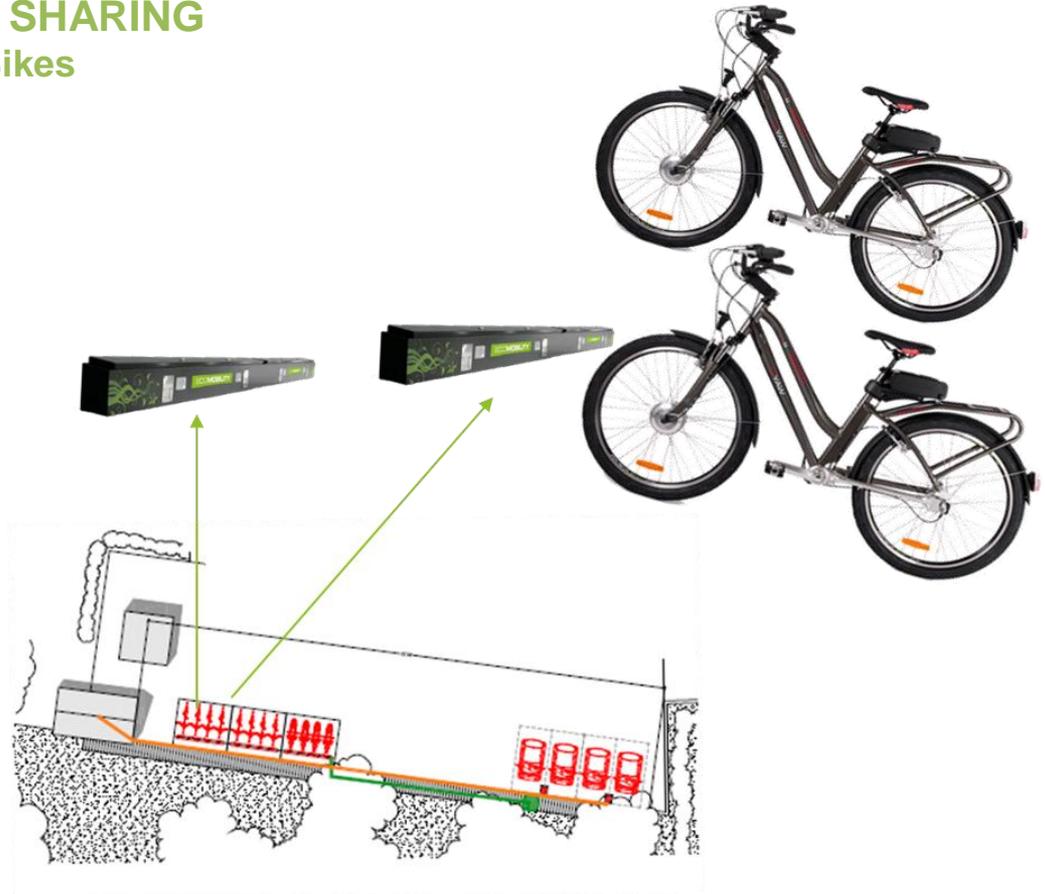
E-BIKES SUPPLY FOR ELECTRIC BIKE SHARING

No. 3 Locations – No. 6 Stations - No. 24 E-Bikes

The project involves:

A. Supply tot. No. 24 electric bikes equipped with an internal black box "real-time communication," and management platform through B.O.M.T.S. for bike sharing service:

- The vehicles will be divided for each location as follows:
 - No. 8 @ LUISS headquarter, Viale Romania
 - No. 8 @ LUISS headquarter, Viale Pola
 - No. 8 @ LUISS headquarter, Via Parenzo



The bike sharing service will be managed through the platform B.O.M.T.S



BOMTS & INTELLIGENT CHARGING STATIONS FOR ELECTRIC SCOOTER SHARING

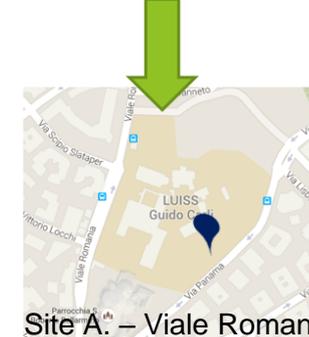
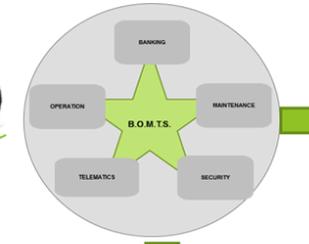
No. 3 Locations – No. 3 Stations - No. 12 E-Scooters

The project aims to exploit the potential of BOMTS platform as follows:

A. No. 1 intelligent charging station for electric scooters (tot. 4 scooters) + supply of No. 4 E-scooters @ LUISS headquarters, Viale Romania

B. No. 1 intelligent charging station for electric scooters (tot. 4 scooters) + supply of No. 4 E-scooters @ LUISS headquarters, Viale Pola

C. No. 1 intelligent charging station for electric scooters (tot. 4 scooters) + supply of No. 4 E-scooters @ LUISS headquarters, Via Parenzo

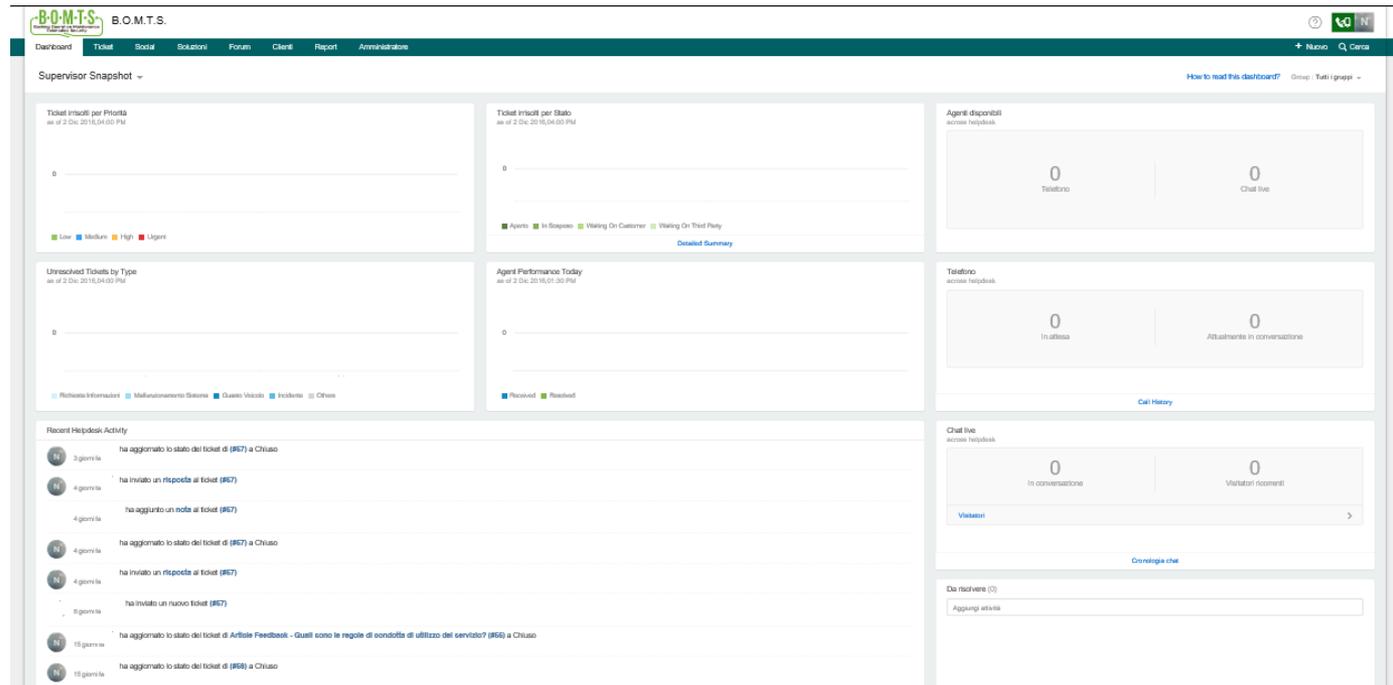


The locations entitled to the services of BOMTS platform and will be networked with primary infrastructure Electric Drive Italia.

In order to ensure the user an optimal management of the electric mobility service LUISS, an **HelpDesk** platform, available through the site <http://helpdesk.bomts.it>, has been implemented.

Features:

- **FAQ**
- **Assistance via Web**
- **Forum**
- **Ads via Twitter**
- **Mobile Call**





Con il Patrocinio di



SAVE THE DATE

Presentazione del progetto

GREEN MOBILITY LUISS

con piattaforma intelligente B.O.M.T.S.
(Banking Operation Maintenance Telematics Security)

Martedì 5 Luglio 2016 · ore 15.00

LUISS · Viale Pola, 12 · Roma

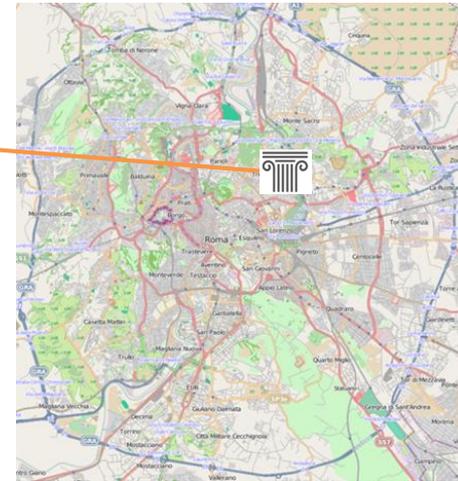
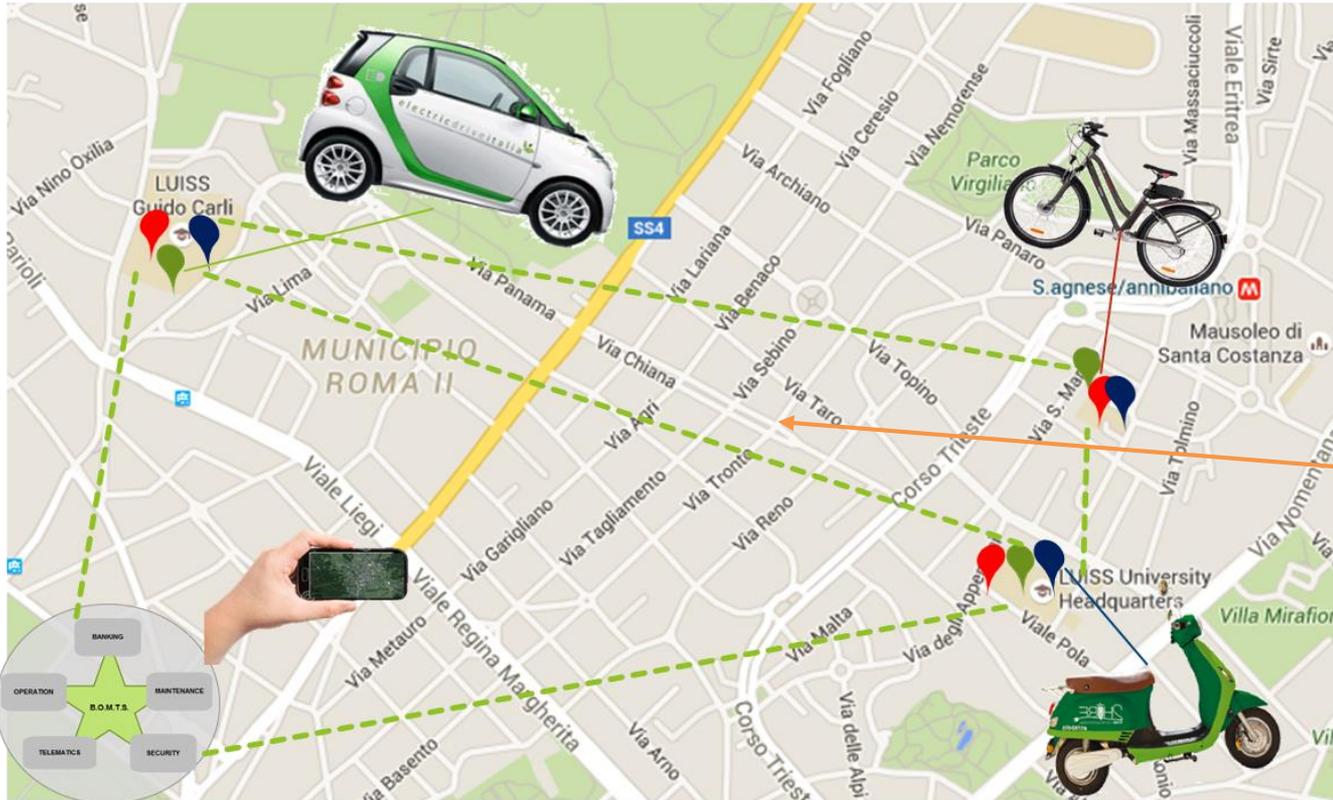
Con questo progetto la LUISS, prima in Europa, lancia un programma che offre un **servizio innovativo per gli studenti** ed una **piattaforma integrata di gestione della mobilità sostenibile** e di fornitura di servizi smart correlati esportabile e adattabile a tutti i principali settori di mobilità green e condivisa.

in collaborazione con
INTESA  **SANPAOLO**

si ringrazia
ancitel
energia & ambiente

I European Conference on Sustainable Mobility at Universities





LEGENDA

- No. 9 tot. Intelligent charging stations for e-cars (tot. no. 18) for electric car sharing
- No. 6 tot. Intelligent charging stations for e-bikes (tot. no. 24) for electric bike sharing
- N°. 3 tot intelligent charging stations for e-scooter (tot. no. 12) for electric scooter sharing



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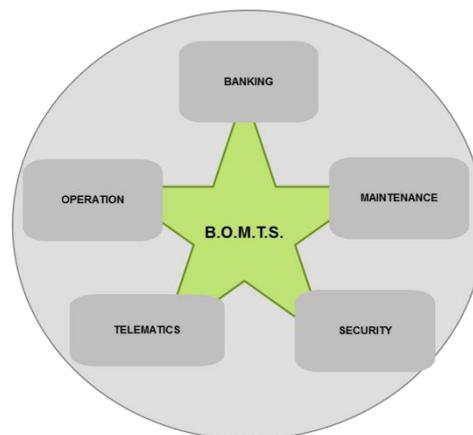
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Info Mobility Bus Tracking System functions:

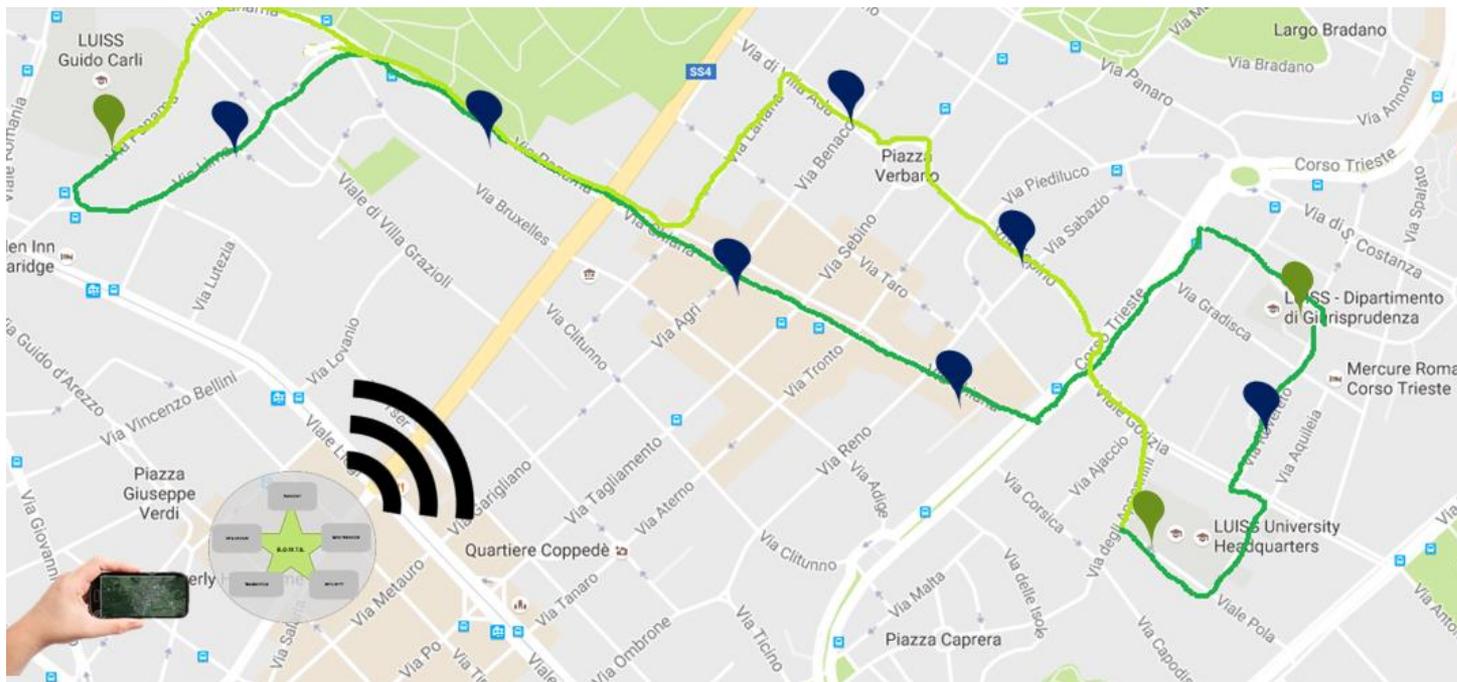
1. Info Shuttle Service (tot. No. 6) to LUISS students, connection to university locations via screens in the Halls (arrival time and bus position)
2. Dedicated App development and integration into SuperApp LUISS
3. Tracking real-time map of the location and route of the shuttles with estimates of arrival times
 - daily storage paths, stops and speed
 - display traffic data in real time
4. Various information: for example
 - km covered
 - Fuel consumption, CO2 saved, etc.
5. Intermediate stops within the main route for citizens
6. Maxi screens installed at the bus stops (option) for info arrival times in each location LUISS



Project Framework
about
MOB LIFE.



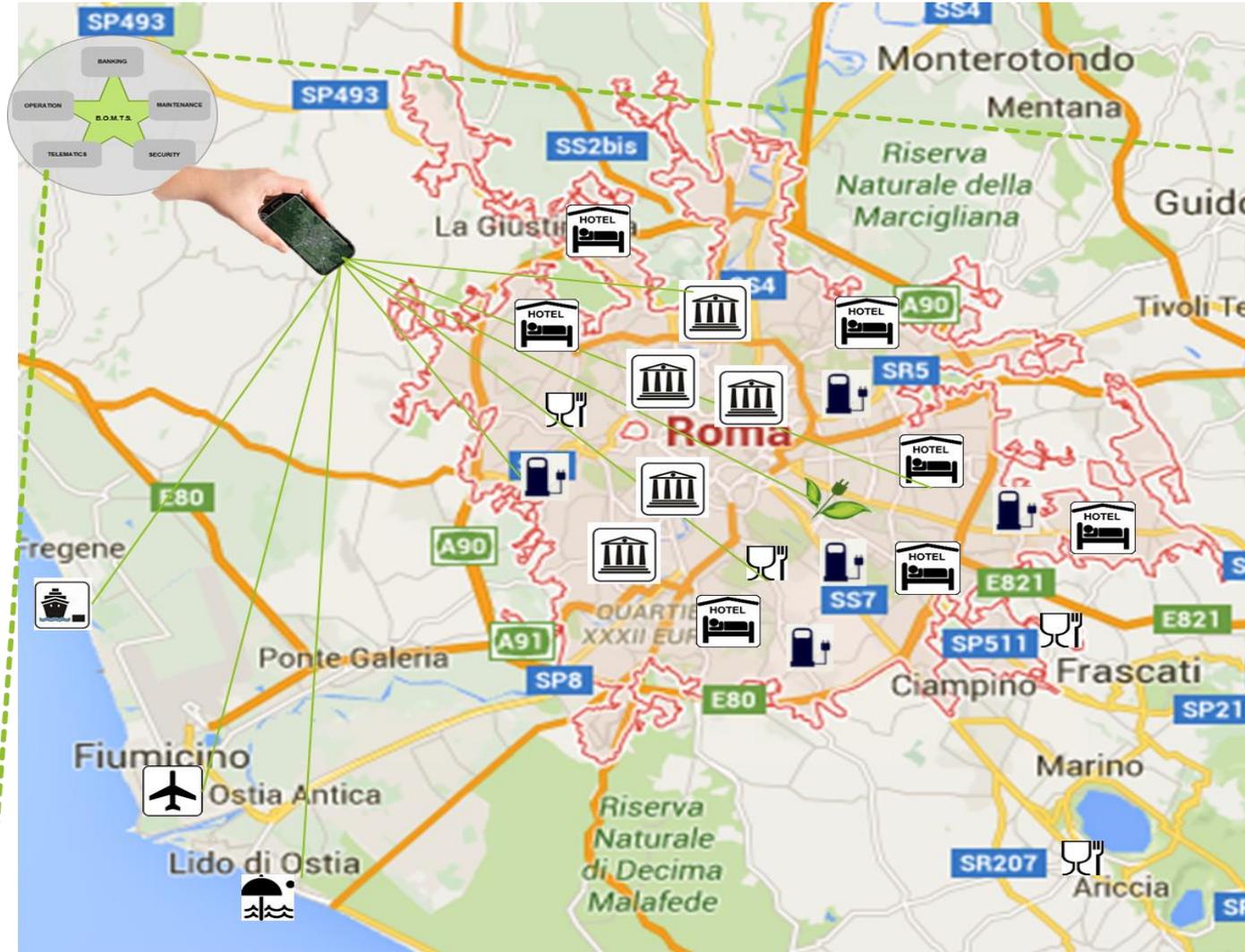
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Legenda

-  LUISS locations
-  Stops for citizens
-  Route No. 1
- 





LEGENDA



-  Airport
-  Port
-  Wine and Food Tours
-  Bathing Locations
-  Cultural / Tourist Itineraries
-  Hotels
-  Luiss Green Mobility Project
-  Charging Stations

5.0 FOLLOW UP: PUGLIA – BASILICATA SMART & GREEN PROJECT DESCRIPTION



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The first phase of the project involves the construction of an intelligent network of charging stations related to the Intelligent Platform B.O.M.T.S. and are intended for charging electric cars / plug-in hybrid and implementation of an e-bike sharing service for citizens and tourists.

The proposed is a multilayer solution and will involve no. 2 macro groups, listed below:

1. CITIES

- a. Matera (Basilicata)
- b. Mesagne (Puglia)

In each City will be installed:

- No. 2 Intelligent Charging Stations (tot. No. 4 charging points) for electrical and / or plug-in hybrid cars.
- No. 2 Intelligent Charging Bars (tot. No. 8 charging points) for e-bikes uses on bike sharing + supply No. 8 e-bikes



2. HOTEL / RESORT

- a. Resort A
- b. Resort B
- c. Resort C

In each Resort will be installed:

- No. 1 Intelligent Charging Stations (tot. No. 4 charging points) for electrical and / or plug-in hybrid cars.
- No. 2 Intelligent Charging Bars (tot. No. 8 charging points) for e-bikes uses on bike sharing + supply No. 8 e-bikes



No. 2 LOCATIONS – No. 4 CHARGING STATIONS - N°. 8 CHARGING POINTS
No. 4 CHARGING BARS- No. 16 CHARGING POINTS – No. 16 E-BIKES

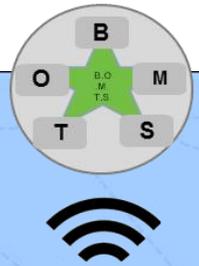
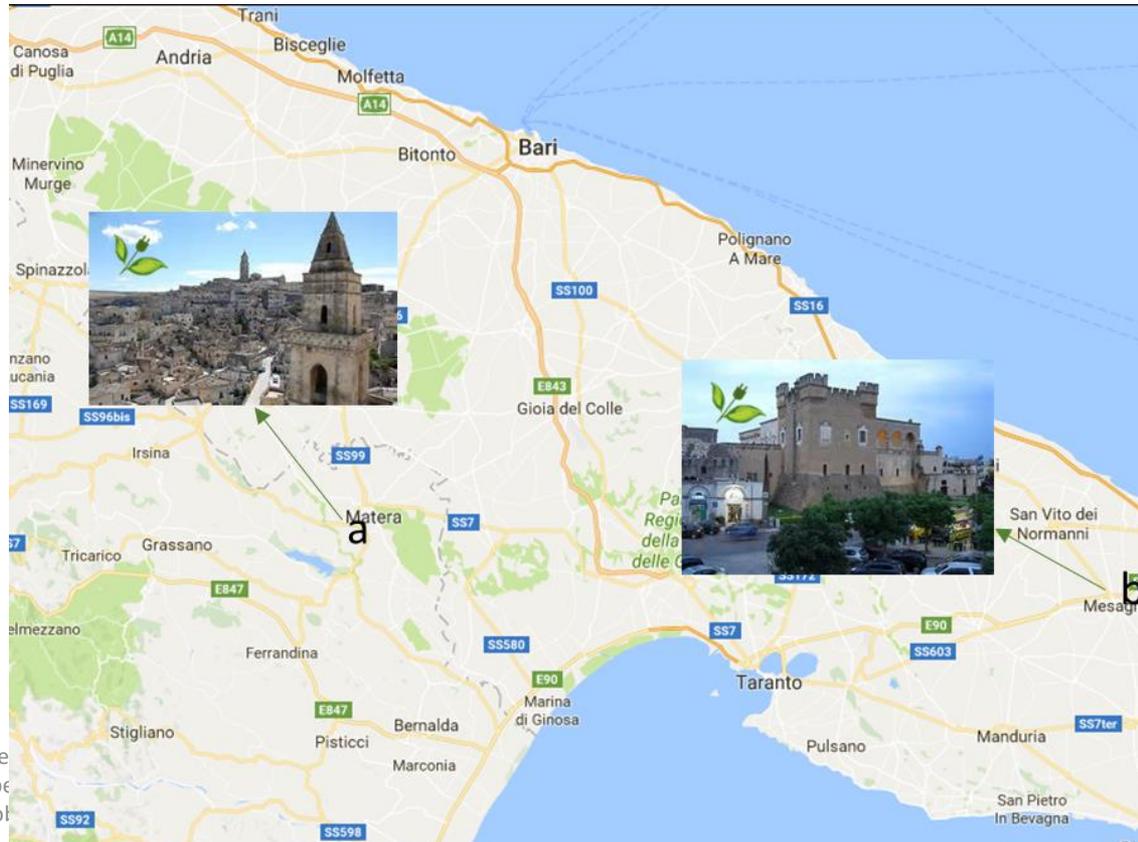
The project intend to install

- No. 2 Intelligent Charging Stations (tot. No. 4 charging points) for electrical and / or plug-in hybrid cars.
- No. 2 Intelligent Charging Bars (tot. No. 8 charging points) for e-bikes uses on bike sharing + supply No. 8 e-bikes connected to B.O.M.T.S. platform to exploit its full potential, in the following N °. 2 Cities:

- Matera (Basilicata)
- Mesagne (Puglia)



The locations equipped with BOMTS platform services can be networked with further Electric Drive Italia infrastructure.



No. 3 LOCATIONS – No. 3 CHARGING STATIONS - N°. 6 CHARGING POINTS

NO. 6 CHARGING BARS- NO. 24 CHARGING POINTS – NO. 24 E-BIKES

The project intend to install

- **No. 1 Intelligent Charging Stations (tot. No. 2 charging points) for electrical and / or plug-in hybrid cars.**
- **No. 2 Intelligent Charging Bars (tot. No. 8 charging points) for e-bikes uses on bike sharing + supply No. 8 e-bikes**

connected to B.O.M.T.S. platform to exploit its full potential, in the following N °. 3 Resort:

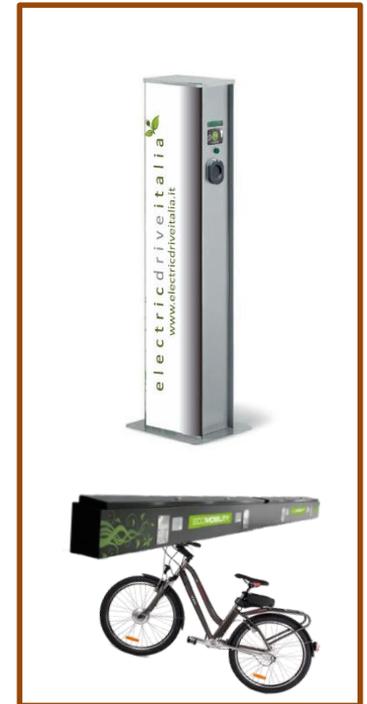
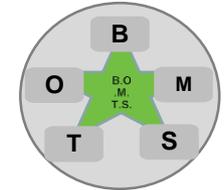
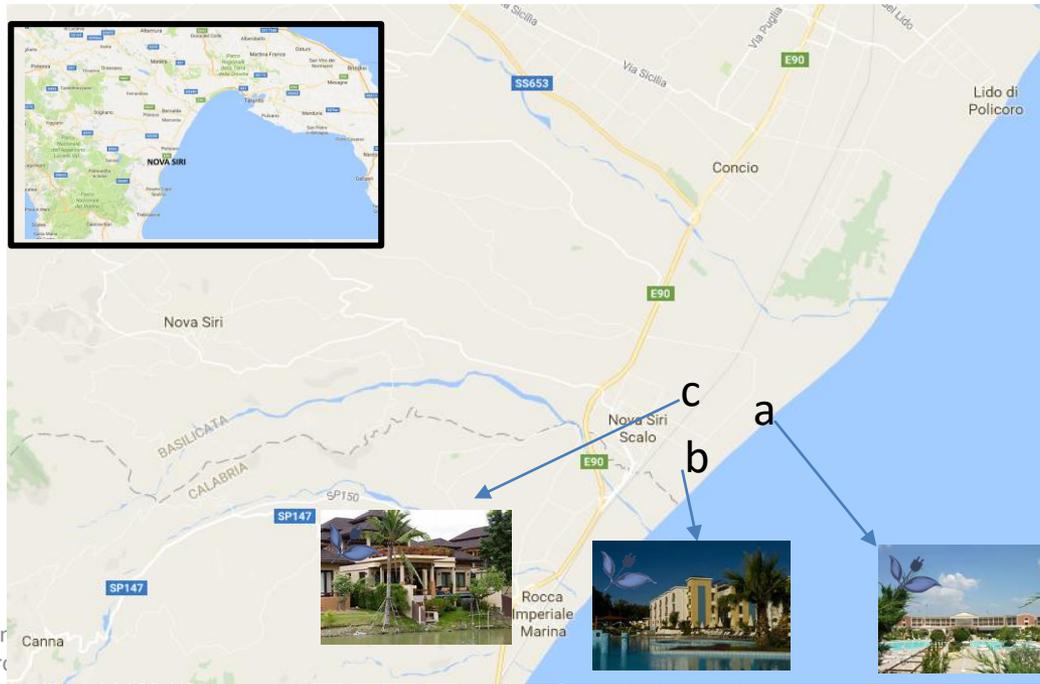
- a. Resort A
- b. Resort B
- c. Resort C



The locations equipped with BOMTS platform services can be networked with further Electric Drive Italia infrastructure.

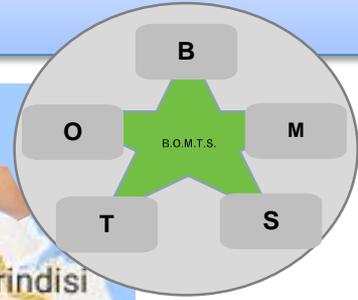


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It is funded by the European Union. It is possible for any use that may be made of

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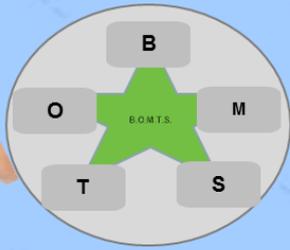
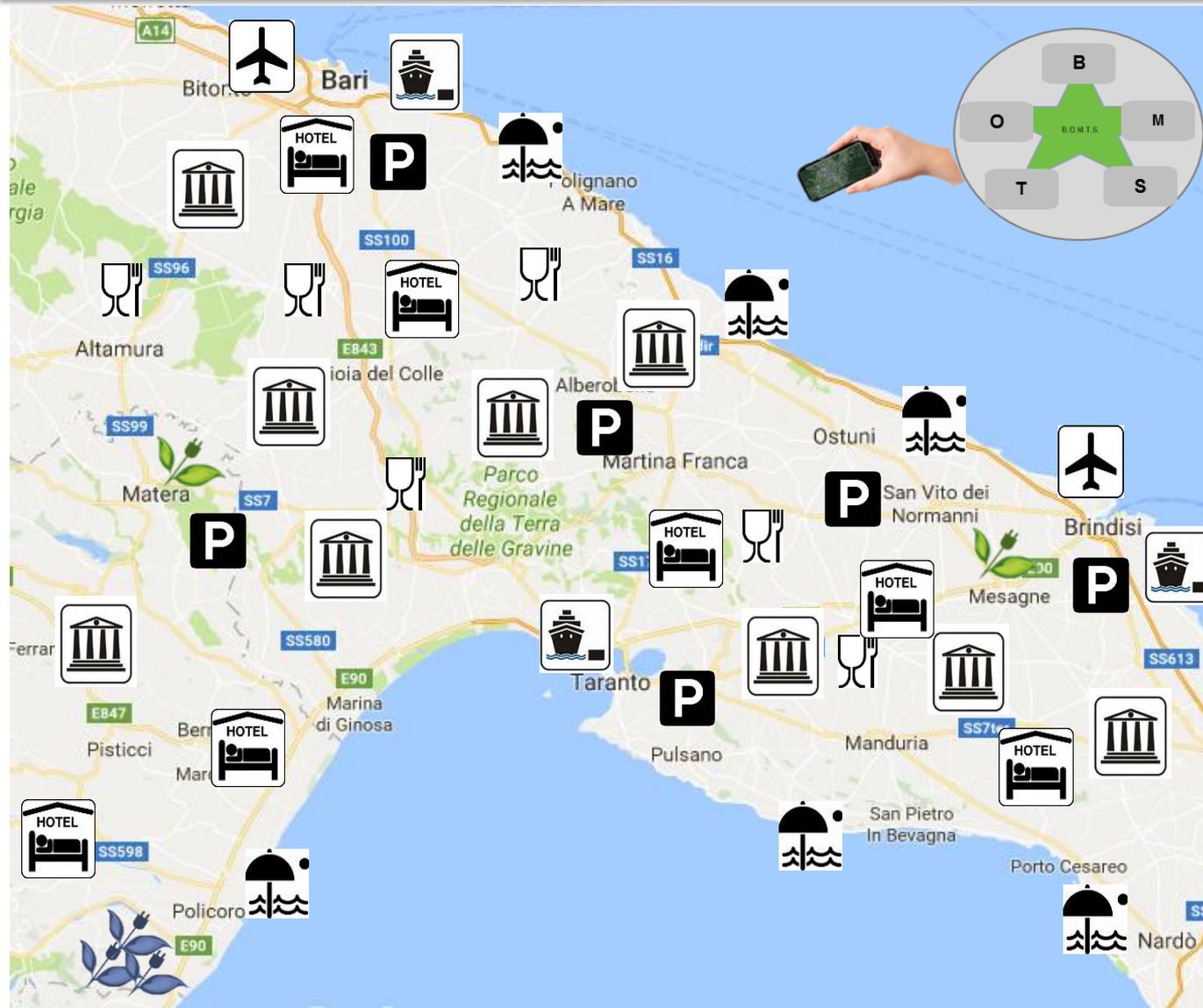
LEGENDA

 Cities – Tot No. 4 Intelligent Charging Stations (tot. No. 8 charging points) – Tot. No. 4 Intelligent Charging Bars (tot. No. 16 charging points) uses on bike sharing

 Hotel / Resort – Tot No. 3 Intelligent Charging Stations (tot. No. 6 charging points) – Tot. No. 6 Intelligent Charging Bars (tot. No. 24 charging points) uses on bike sharing



GEOLOCATION INTELLIGENT CHARGING STATION ELECTRIC DRIVE ITALIA INFRASTRUCTURE AND SERVICES



LEGENDA



-  Airports
-  Ports
-  Wine and Food Tours
-  Seaside Locations
-  Cultural / Tourist Itineraries
-  Hotel
-  Car Parking
-  Smart & Green Project - Cities
-  Smart & Green Project – Hotel / Resort

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