ICT tools for a more efficient and sustainable e-mobility model

Eng. Alessandro RINALDI, PhD
Polytechnic University of Bari
• The evolution of mobility in a sustainable perspective requires specific attention to issues closely related to the changing needs of cities and public policies.

• **This change is also imposed by** United Nation Agenda 2030 focusing on the several sustainable development goals linked to **improve the quality of life in urban area.**

• Studies show that, in European Countries, **the most frequent trip is made by car** and it is characterized by:
  
  I. transport systems not efficient;
  
  II. negative effects such as urban traffic congestion, parking shortages;
  
  III. air pollution and noise pollution.
Introduction

• The transition to alternative mobility meets the objectives of decarbonisation, decentralization and digitalisation.

• In addition to the reduction of CO2 emissions and a clear improvement in air quality, a transport revolution based on more sustainable patterns and mobility habits and low environmental impact technologies has important repercussions not only in the environmental but also in the social sphere.

• In the field of mobility, a new transport mode is emerging, more based on access to services rather than on the use of a vehicle owned by the company.

• In this context, the Sustainable Mobility can allow the reduction of the negative effects inside the city area and to create a real smart city.
The new vision of mobility is characterized by “smart” systems which improve the urban traffic and the inhabitants’ mobility. These systems are focused on sustainability, innovation and safe transport.

<table>
<thead>
<tr>
<th>Environment</th>
<th>Reduction of CO2 emissions, Use of renewable energy sources, monitoring on energy consumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living</td>
<td>Co-working, Cultural initiatives, Living-Lab, crowdsourcing co-design</td>
</tr>
<tr>
<td>Mobility</td>
<td>Development of technologies to improve urban mobility, low environmental impact</td>
</tr>
<tr>
<td>Governance</td>
<td>Starting of processes for the involvement of citizens about topics of public relevance</td>
</tr>
<tr>
<td>Economy</td>
<td>Cooperation among public and private actors, development of social incubators and of small and medium enterprises</td>
</tr>
<tr>
<td>People</td>
<td>Sharing of data, security and protection of sources, networking and communication</td>
</tr>
</tbody>
</table>
Modern ICT solutions allow significant improvement in the mobility sector, especially for electro-mobility and sharing systems.

The ICT tools allow to incentivize and facilitate the use of Electric Vehicles (EV) by providing services such as booking and brokering, charging station, parking spots, as well as payments and vehicle monitoring.
The ELVITEN project
**ELVITEN at a glance**

**Electrified L-category Vehicles Integrated into Transport and Electricity Networks (ELVITEN)**

**Call identifier:** H2020-GV-2017

**Topic:** GV-10-2017

“Demonstration (pilots) for integration of electrified L-category vehicles in the urban transport system”

**EC funding:** 7,840,648.75 €

**Duration:** November 2017 – October 2020

Demonstrations in Six European Cities
ELVITEN Strategic Objectives

• Develop **replicable usage schemes** of EL-Vs for owners, sharers and light goods deliverers based on the deployment of:
  
  • EL-Vs **innovative parking and charge services** (including e-charging hubs, integration of public and private charge points in Brokering service, interoperable eRoaming platform)
  
  • EL-Vs **sharing and rental services**
  
  • **Support ICT tools to facilitate the usage** of EL-Vs (Brokering service to book and pay, Management system for the e-charging hubs) and **support ICT tools to motivate** the usage (Fleet Monitoring application with Digital Coach app, Serious Game app, Incentives Management Smart Card)
  
• **Appropriate policies and incentives**
  
• Organise **long-term demonstrations** of the ELVITEN usage schemes in 6 Cities
ELVITEN Strategic Objectives

• Create a **big data bank of real driving and usage data** and users’ experiences and opinions

• Derive **guidelines towards EL-V** manufacturers and Planning Authorities

• Develop **business models** for EL-V sharing, rental, parking and charge services

• Achieve a mind-shift among users, so that they become **e-Owners**, **e-Sharers** or **e-Deliverers**.
The ICT tools
Methodology

- **Study of the actual context**, by analysing the existing ICT assets available in each city for the EL-Vs management.

- **Identification**, on the basis of the foreseen EL-Vs usage schemes, the types of EL-Vs, and other facilities (e-hub), **of the required ICT assets** to be deployed in each city.

- **Definition of the ICT functionalities** to be adapted and implemented, by identifying interactions between the various service providers.

- Develop, adapt and deploy existing ICT tools, applications and services.

- **Set-up the infrastructure for the proper data collection** during the demonstration
The ELVITEN tools

- Incentive and facilitation platform
- Dedicated parking area management
- Booking and brokering app
- ELVITEN ICT tools
- EL-Vs Fleet monitoring by black boxes
- Serious game
- D-mobility

Interreg
Italy - Croatia
STEP-UP
European Regional Development Fund

European UNION
End user: ELVITEN short-term (sharing) EL-Vs drivers

Main Goals:
• Allow ELVITEN users to book resources with a handheld device

Features:
• Book vehicles
• Book charging points
• Book parking spaces
• Cancel bookings
• Fill in questionnaires
Booking app

![Booking app screenshots]
End user: ELVITEN registered user

Main Goals:
• Collect trips’ data
• Collect questionnaires

Features:
• User-reported trip start / stop
• User-reported trip purpose
• Fill in app-related questionnaires
• Discover trip score
• Access historical data (trips and score history)
Digital Coach app

Questionnaire overview page

Trip feedback questionnaire

Trip score
End user: ELVITEN city operator

Main Goals:
Provide a GUI to visualize EL-Vs on a map.

Features:
• Visualize black box data in real time
• Localize vehicles on a map
• See driven routes
**End user:** ELVITEN registered user

**Main Goals:**
- Engage users into the project via gaming
- Collect questionnaires

**Features:**
- Show data regarding the City and Electric Light Vehicles
- Ask questions to gain points
- Collect points to reach achievements
- Reach point of Interest in the city to discover the city
- Fill in app-related questionnaires
Serious Game
End user: ELVITEN registered user

Main Goals:
• Incentivize the use of ELVITEN services
• Collect questionnaires

Features:
• Discover rewarded actions (rules)
• Browse and claim awards
• Monitor available and used points
• Access historical data (rewarded actions and vouchers)
• Fill in app-related questionnaires
Incentive Smart app

Elviten Smart App

Menu

Rules and corresponding points
(Italian, Genoa)

<table>
<thead>
<tr>
<th>Descrizione</th>
<th>Punti</th>
<th>Città</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ricerca</td>
<td>4</td>
<td>genoa</td>
</tr>
<tr>
<td>Questionario sul background a Genova</td>
<td>5</td>
<td>genoa</td>
</tr>
<tr>
<td>Questionario sulla esperienza di viaggio a Genova</td>
<td>5</td>
<td>genoa</td>
</tr>
<tr>
<td>Questionario sulla predisposizione agli ELVITEN ICT tools a Genova</td>
<td>5</td>
<td>genoa</td>
</tr>
<tr>
<td>Questionario sui veicoli leggeri elettrici privati a Genova</td>
<td>5</td>
<td>genoa</td>
</tr>
<tr>
<td>Questionario sui veicoli leggeri elettrici condivisi a Genova</td>
<td>5</td>
<td>genoa</td>
</tr>
<tr>
<td>Serious Game</td>
<td>1</td>
<td>genoa</td>
</tr>
<tr>
<td>Km</td>
<td>2</td>
<td>genoa</td>
</tr>
</tbody>
</table>
End user: City Operators only

Main Goals:
• Manage the incentive settings and objects:
  o Rules
  o Incentives
  o Awards (verifiable by awards provider)

Features:
• Customize City-specific rules, needed to gain points
• Define the awards that can be obtained for each City
• Manage general incentive settings
Incentive Administration Console

List of rules of type “recharge”

Insert/editing rule of type “Km Travelled”
Conclusions

In the smart mobility context, the ICT solutions:

• allow significant improvement in the mobility sector;

• **incentivize and facilitate the use of Electric Vehicles (EV)** by providing different services;

• **ensure high flexibility** in order to sustain a good and motivating experience for EL-Vs users.

• allow the transition to the smart mobility by improving the urban traffic and mobility on the basis of sustainability, innovation and safe transport.
Eng. Alessandro RINALDI, PhD
Polytechnic University of Bari

alessandro.rinaldi@poliba.it

www.elviten-project.eu