EVS27

Title
SMARTV2G Project

Barcelona, 19th of November 2013

SEVENTH FRAMEWORK PROGRAMME

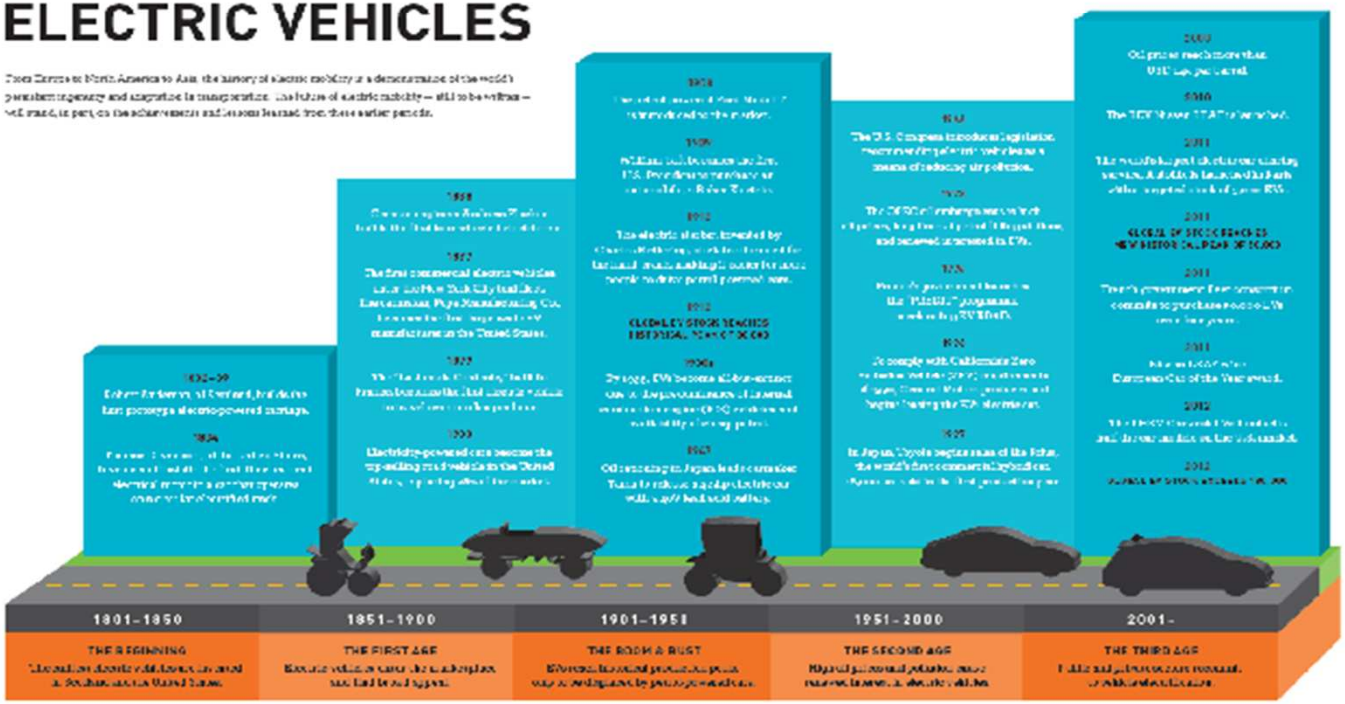
EUROPEAN COMMISION

PRECEDING

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
- Impact
- Conclusions

- One of the most promising technological areas that are expected to contribute in a most relevant way to the optimisation of the energy consumption rates in developed societies, is **ELECTROMOBILITY.**



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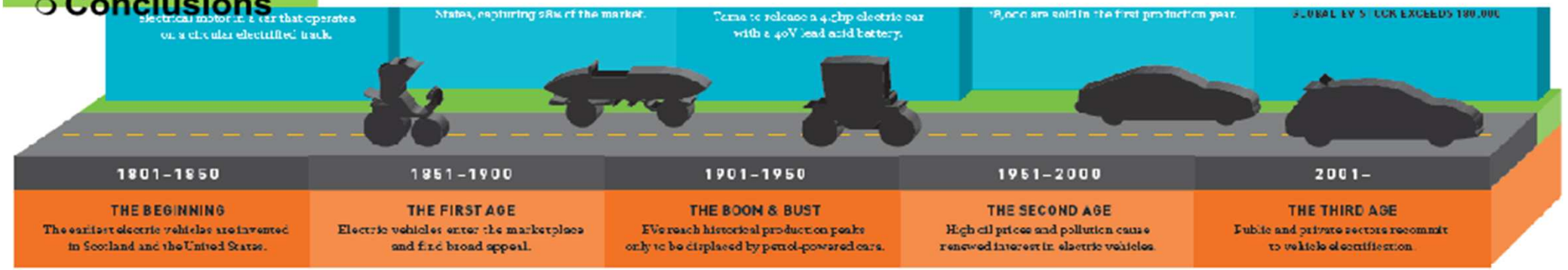

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- **Some recent news:**
  - **21/09/2013.** Santa Monica Bets on Electric Cars, but Consumers Are Slow to Switch
  - **19/09/2013.** General Motors Looks to Cut Battery Prices and Increase E.V. Range.
  - **01/10/2013.** In Electric BMW i3, Hopes for a Stylish Future of Green.

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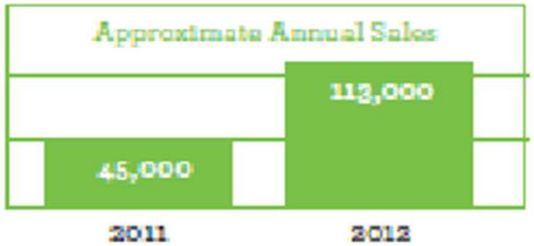

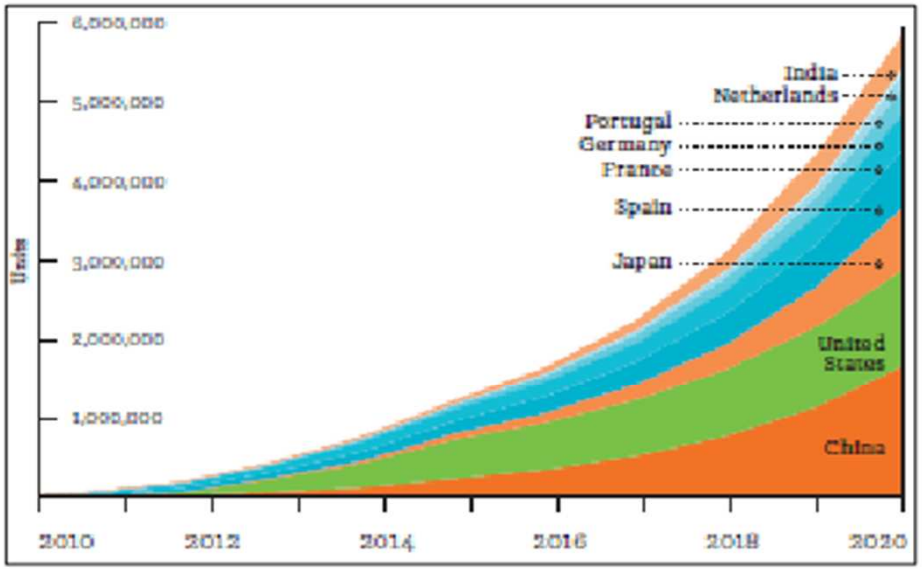

EV sales targets (*Global EV Outlook*, April-2013, EVI)

PRECEDING

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
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- Conclusions

There were several key projects founded by the EC that have been an important framework for the SMARTV2G project.

OVERVIEW

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
- Impact
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SMARTV2G Project

SMART VEHICLE TO GRID INTERFACE

ITE INSTITUTE OF ELECTRIC TECHNOLOGY

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Fraunhofer ESK

Cit development

SAPIENZA UNIVERSITÀ DI ROMA

ELEKTRO LJUBLJANA

TECHNOMAR

OVERVIEW

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
- Impact
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SMARTV2G Project
SMART VEHICLE TO GRID INTERFACE

- **SMART:**
  - Power grid management functionalities due to specific algorithms.
  - Mobility management due to specific algorithms.
  - Whole communication architecture.
- **V2G:**
  - Implementation of reverse current flow.
  - Configuration interface of the charging station: New standards applications.

OVERVIEW

SMARTV2G Project

SMART VEHICLE TO GRID INTERFACE

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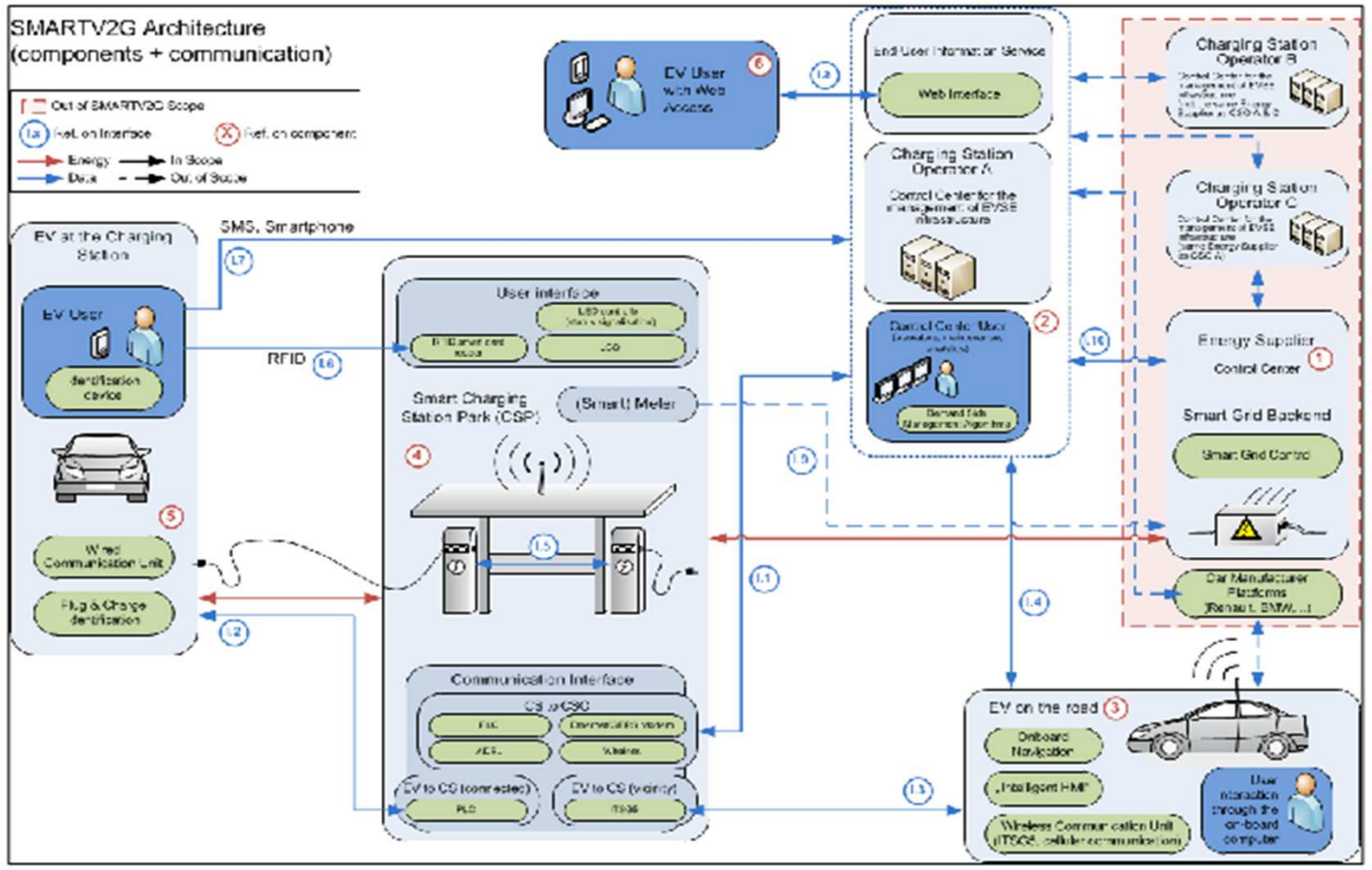

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OBJECTIVES

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
- Impact
- Conclusions

- Smart Charging Station design and development.
- Development of DC Power System for the fast charge.
- Communications between charging station and control centre.
- Communications between charging station and smart grid.

OBJECTIVES

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
- Impact
- Conclusions

- Development of FEV Access & Security Policy on V2G protocols and FEV communications & PKI-based architecture.
- Design and development of a control strategy basing on event driven Model Predictive Control.
- Design of lab protocol and real field test.

CURRENT STATUS

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
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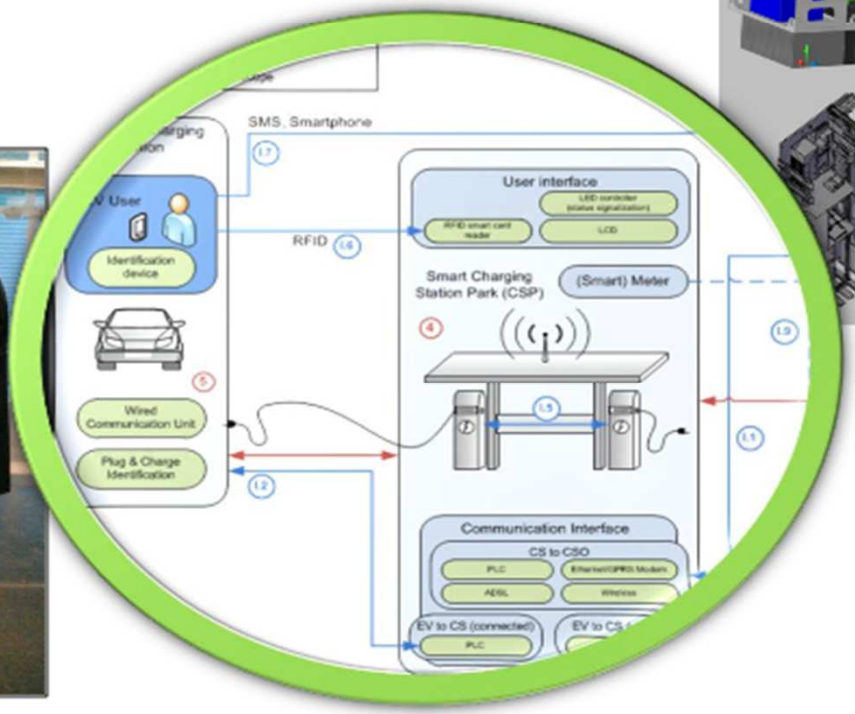
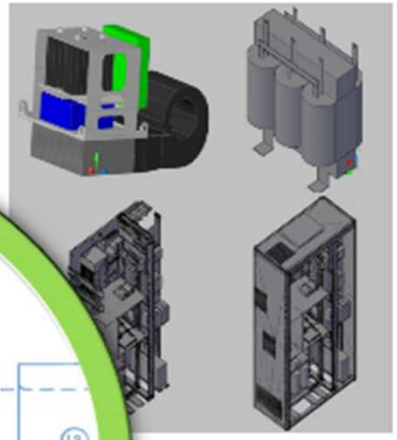
- **Smart Charging Station:**
  - Smartness
  - Implementing new standards (IEC61851-23/24 – IEC15118)
  - Bi-directionality





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- Overview
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- Current status
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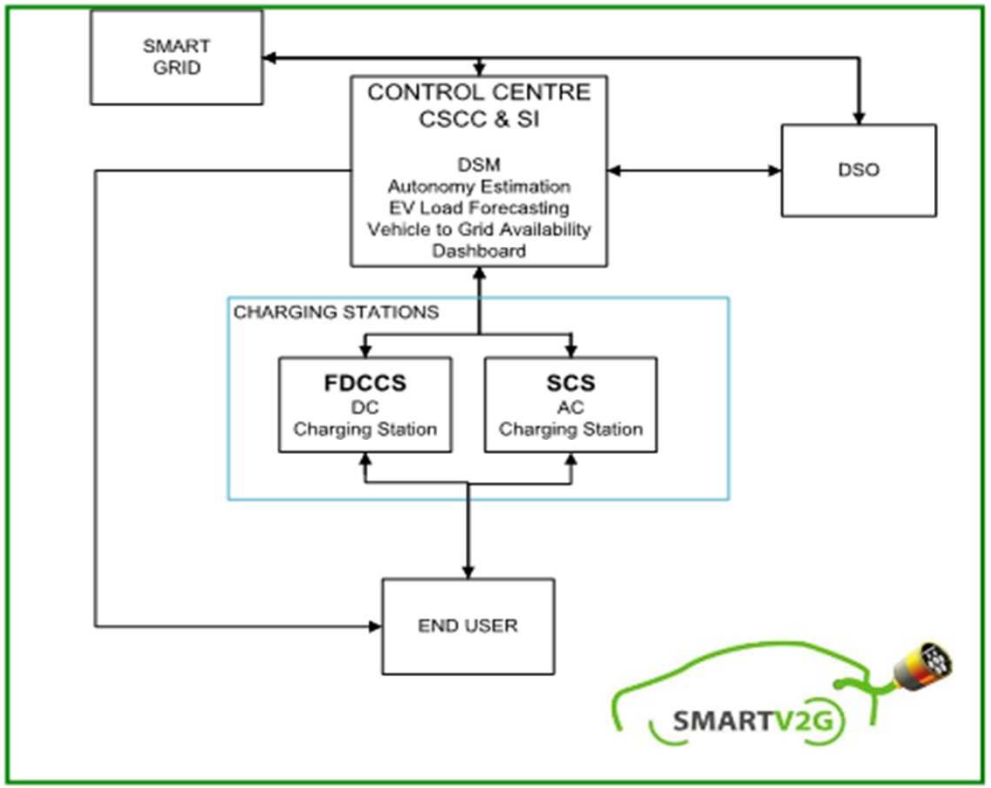
- **Smart Charging Station:**
  - **Smartness**
    - Complete interaction with the e-mobility agents.
    - Integrating algorithms with data coming from the power grid, EV location, EV infrastructure, battery status, etc.



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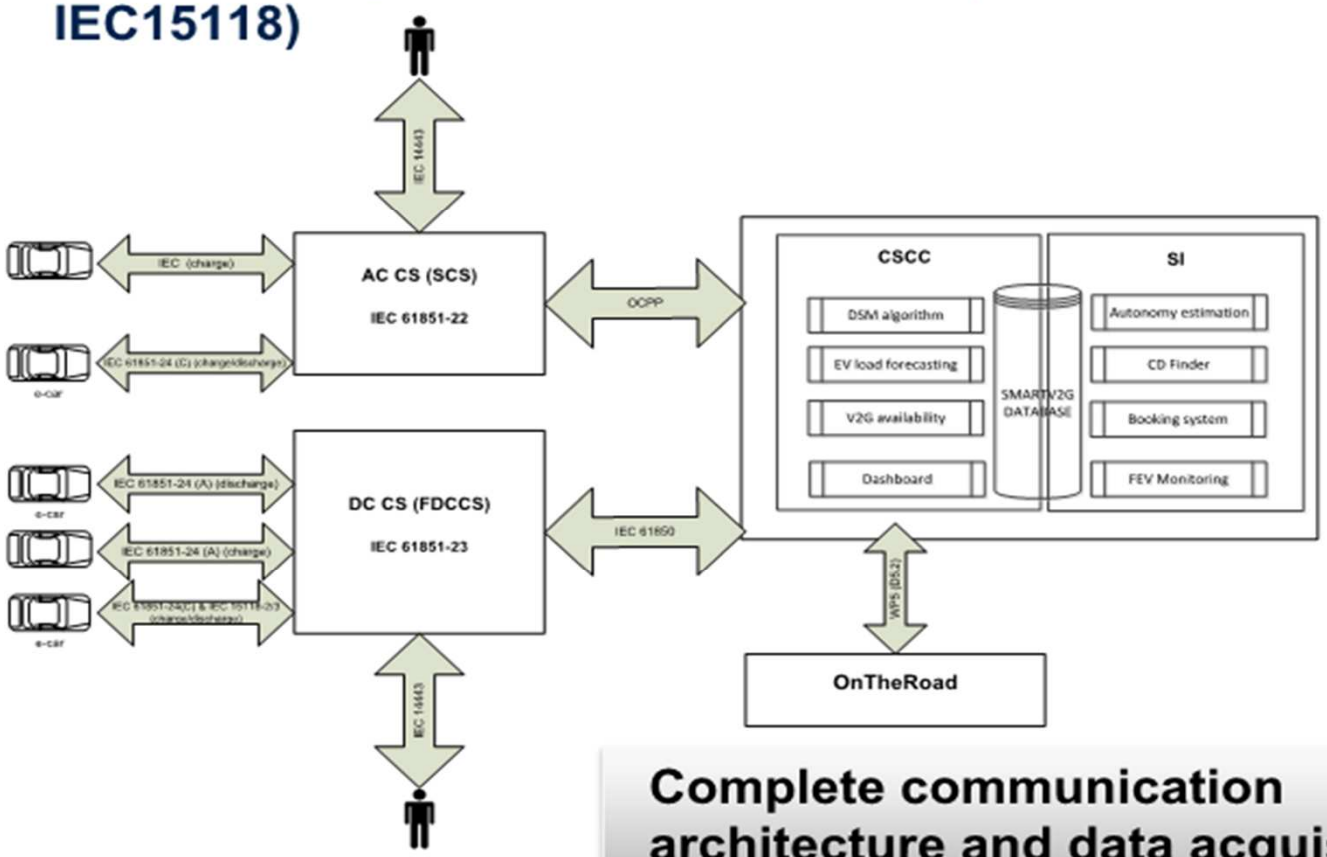

Complete communication architecture and data acquisition.

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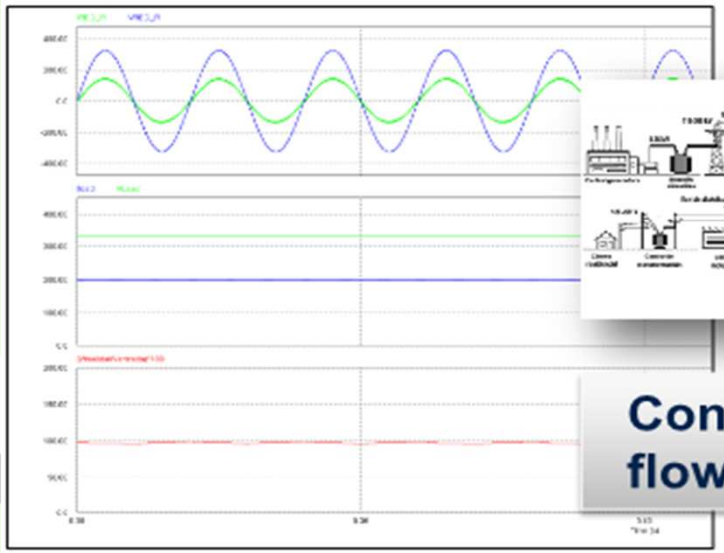
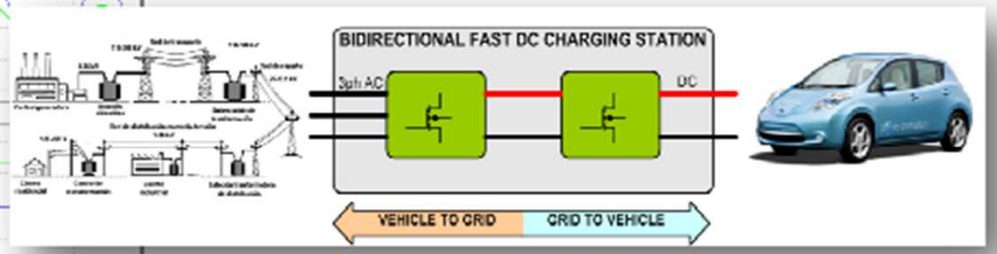
  - Smartness
  - Implementing new standards (IEC61851-23/24 – IEC15118)
  - Bi-directionality
    - AC Charging station enable to receive EV prepared with on-board control flow.
    - DC Charging station developed with Annex A adding the V2G functionality, and Annex C.





Contributing bi-directionality data flow to the ChaDeMo's protocol.

CURRENT STATUS

CONTENTS

- Preceding
- Overview
- Objectives
- Current status
- Impact
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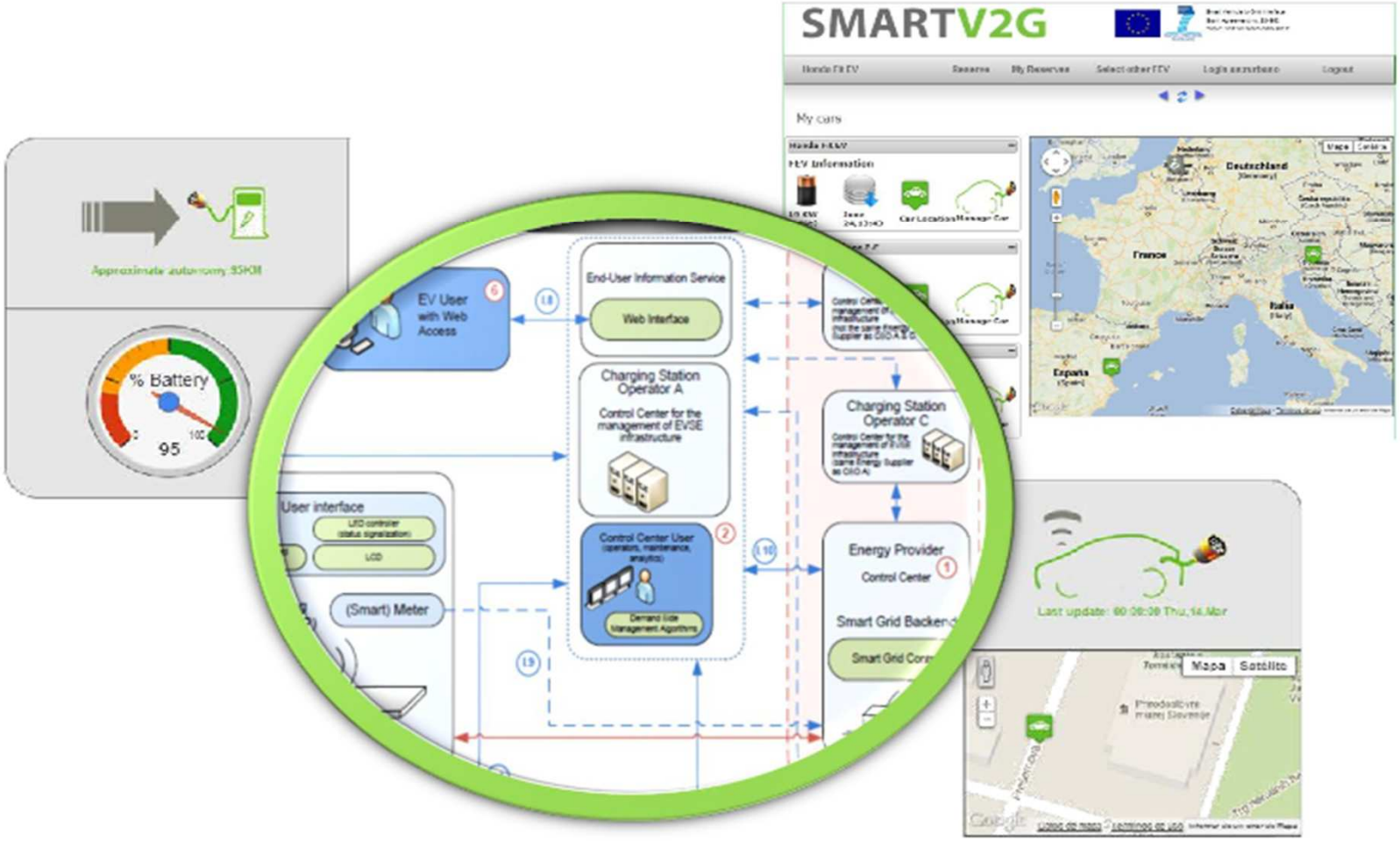
- **Charging Stations Control Center:**
  - **Added value to the users and operators.**



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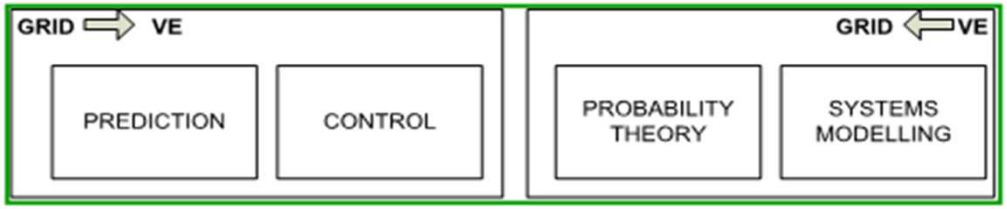

  - **Integrated functionalities:**
    - Load prediction.
    - V2G availability energy estimation.
    - EV autonomy estimation.
    - Demand Side Management
    - CS Booking
    - CS finder and route planning
    - FEV monitoring

IMPACT

CONTENTS

- Preceding
- Overview
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- Impact
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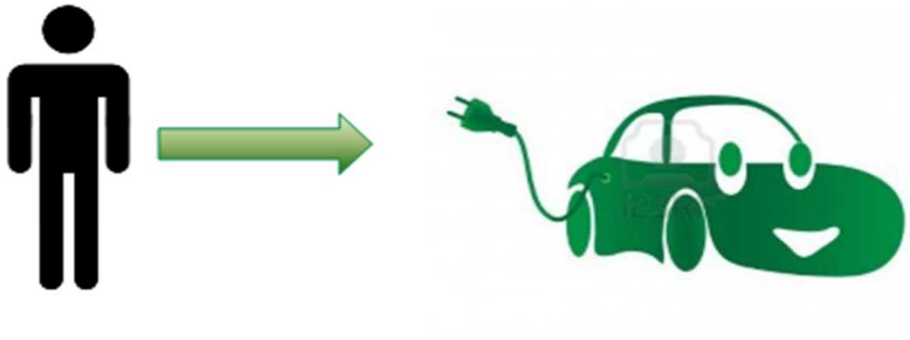
- **Possible use cases.**
  - Mr. X forgot to charge his EV last 2 days and today he is going to visit city center, different shops, etc.



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CONTENTS

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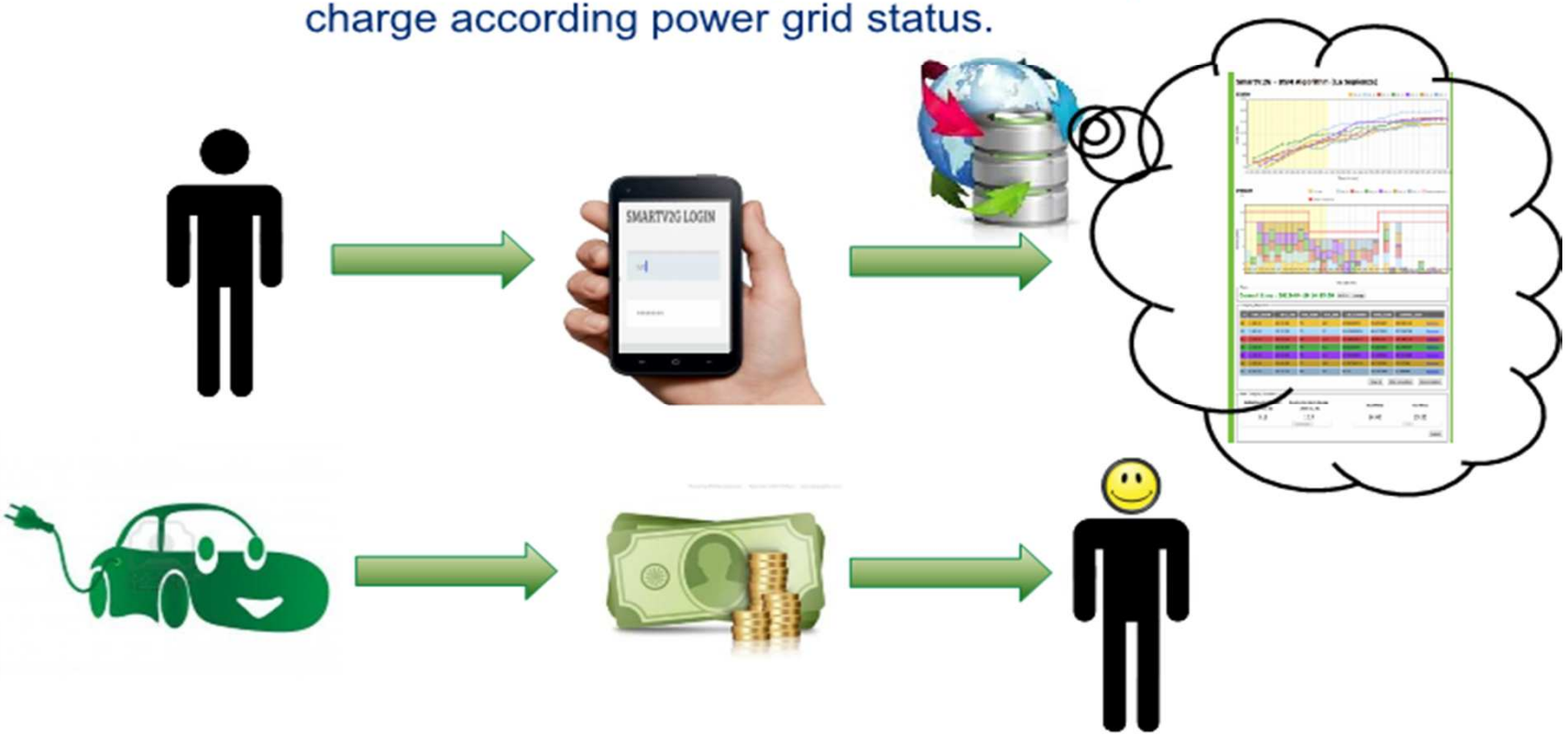
- **Possible use cases.**
  - **Mr. X will not need the vehicle the following days.**
    1. He has the EV battery full of charge and he would like to sell energy to the grid.
    2. Mr. X has not the battery charged, could optimize the charge according power grid status.



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- **Which is the impact on X-people.**
  - Allowing normalized charging systems: Clear and unique infrastructure.
  - Allowing sustainable mobility. Integrating EV in our habits.
  - Avoiding range anxiety: Allowing rapid charge and pre-charging services
  - Integrating EV with the Internet technology: Allowig charging status knowledge, reservations, optimal routes, just from your smartphone.

CONCLUSIONS

CONTENTS

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CHARGING STATIONS

Smartness

New standards

Bi-directionality

CONTROL CENTER

CS booking and finder

Autonomy estimation

Smart Grid services

V2G availability

COMMs

New architecture

Smartphone integration

Friendly interfaces

Complex data flow

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THANK YOU FOR YOUR ATTENTION

Smart Vehicle To Grid Interface

THE FUTURE DEPENDS ON YOU!!

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