MOBINCITY- Smart Mobility in Smart City

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Hrvatski Telekom

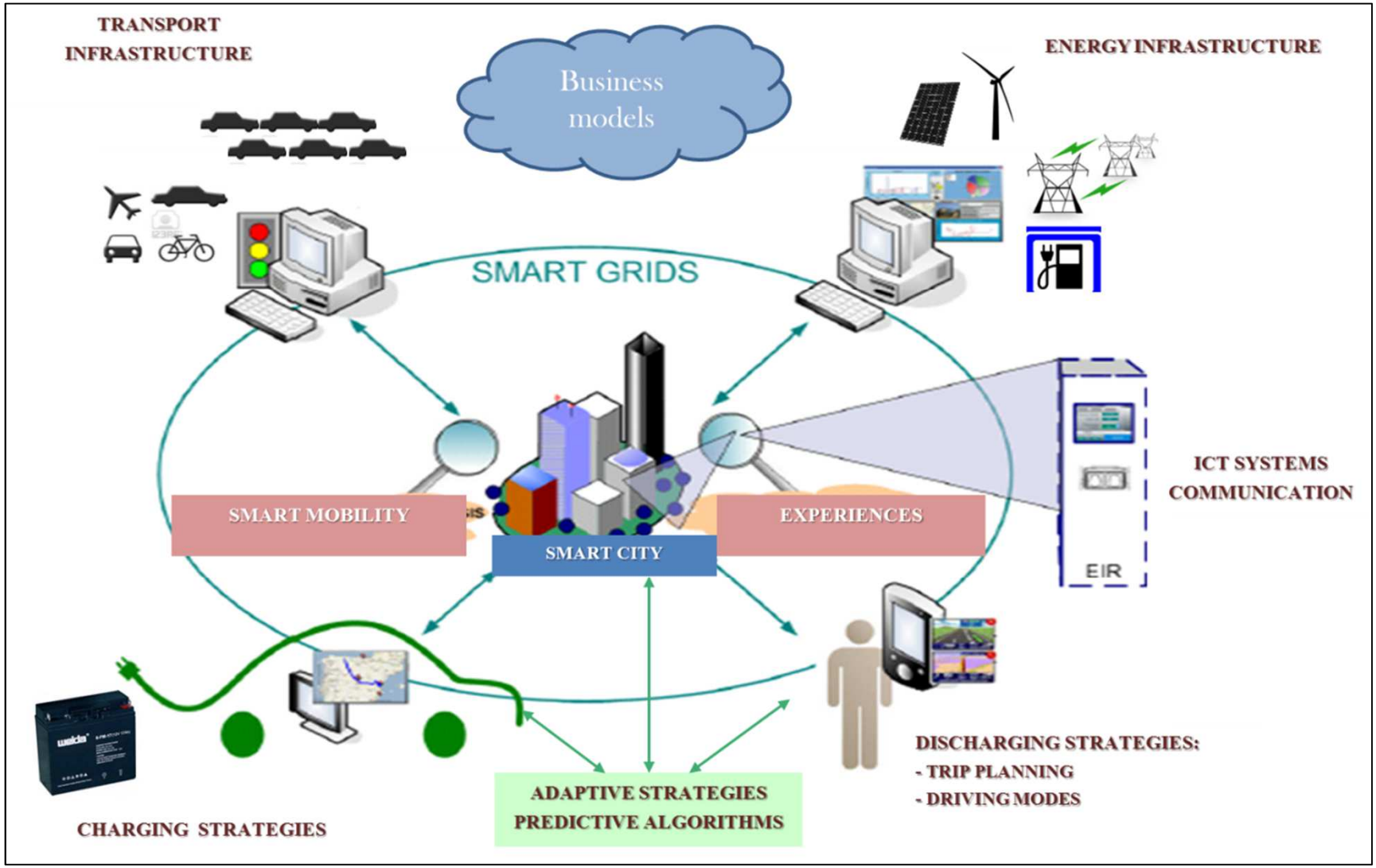
Živjeti zajedno

Mobility in the city of tomorrow

Presentation Agenda

1) Connected city of the future
2) Main objectives of the Mobincity project
3) Consortium partners
4) Work packages within the project
5) HT's role within the Mobincity project
6) Areas covered within Mobincity project and State-of-the-art innovations
7) Mobincity architecture design
8) Use case
9) Conclusion

1. Connected city of the future



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2. Main objectives of the Mobincity project

The maximization of FEV autonomy range by means of **a complete ICT-based integrated system able to interact between driver, vehicle, transport and energy infrastructures**, taking advantage of the information provided from these sources in order to optimise both energy charging and discharging processes and the increase in energy efficiency.

The following **specific objectives** are established within MOBINCITY:

- develop a system to receive information from the surrounding environment
- optimise the trip planning and routing of FEV
- define efficient and optimum charging strategies
- implement additional energy saving methods

MOBINCITY is aligned with the call FP7-2012-ICT-GC 6.8. ICT for fully electric vehicles; and more specifically the target outcomes outlined in the project are in application area f) Integration of the FEV in the cooperative transport infrastructure.

SEVENTH FRAMEWORK PROGRAMME

EUROPEAN COMMISION

Hrvatski Telekom

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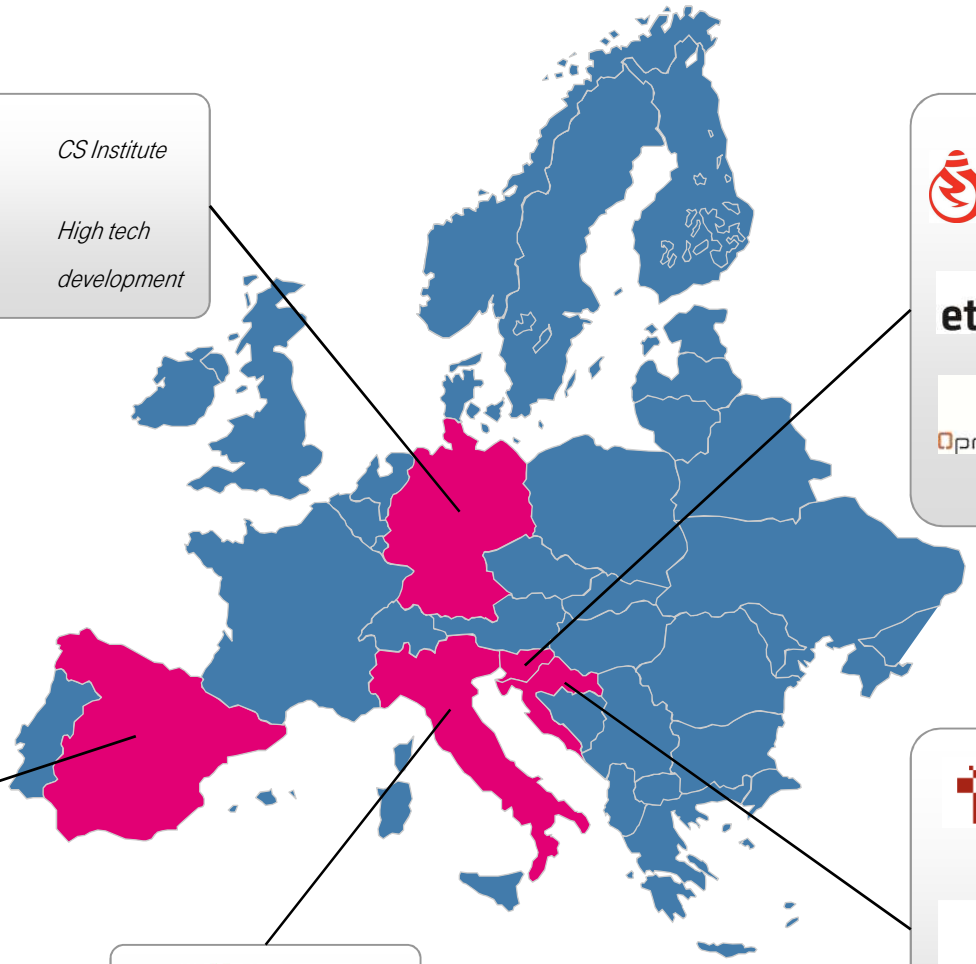
3. Consortium partners



Fraunhofer ESK — *CS Institute*

TECHNOMAR — *High tech development*

ELEKTRO LJUBLJANA — *DSO*

etrel — *ICT Services*

Oprema Ravne — *Automotive Component Supplier*

zabala innovation consulting — *R&D Consulting*

ITE INSTITUTE OF ELECTRIC TECHNOLOGY — *R&D Institute*

Cit development — *ICT Integrator*

GRUPOETRA — *Traffic management*

Enel Distribuzione

CRAT

EIHP — *Energy Institute*

Hrvatski Telekom — *Telco provider*

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4. Work packages within the project

WP1	Definition of requirements and system design
WP2	Interaction of FEV with transportation infrastructures
WP3	Interaction of FEV with energy infrastructure
WP4	Communication Systems
WP5	Adaptative strategies for trip planning, charging and driving
WP6	System integration and validation
WP7	Field tests
WP8	Dissemination and Exploitation
WP9	Project Management

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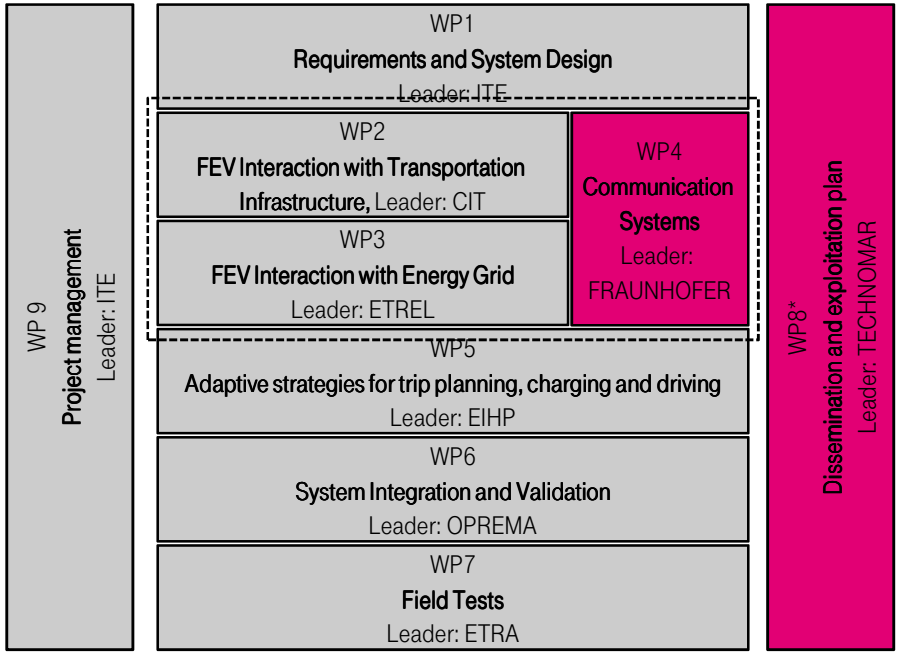
5. HT's role within the Mobincity project



Activities

- Detailed Communication Requirements and Concept
- Communication between FEV and Transport Infrastructure
- Communication between FEV and Public Transport
- Communication between FEV and charging station/ Energy Grid:
  - Network connectivity and use of local energy sources
  - Grid communication to allow temporary energy storage
- Design and development of a data integration system for user interfaces

- HT's main engagement is **focused on work package 4 (communication systems).** The Leader of the work package is the **Fraunhofer Institute of Germany,** while **HT would play a supporting role**, along with the Institute of Technology and Energy of Spain.
- In addition to the WP4, HT would play a role in the business / strategic activities (business model development) in the WP9, lead by Technomar of Germany.
- HT will also play a role within WP8 Dissemination and Exploitation, where it will deal with: elaboration of the dissemination (commercialization) plan, participation in workshop and publications, business and exploitation plane and impact assessment

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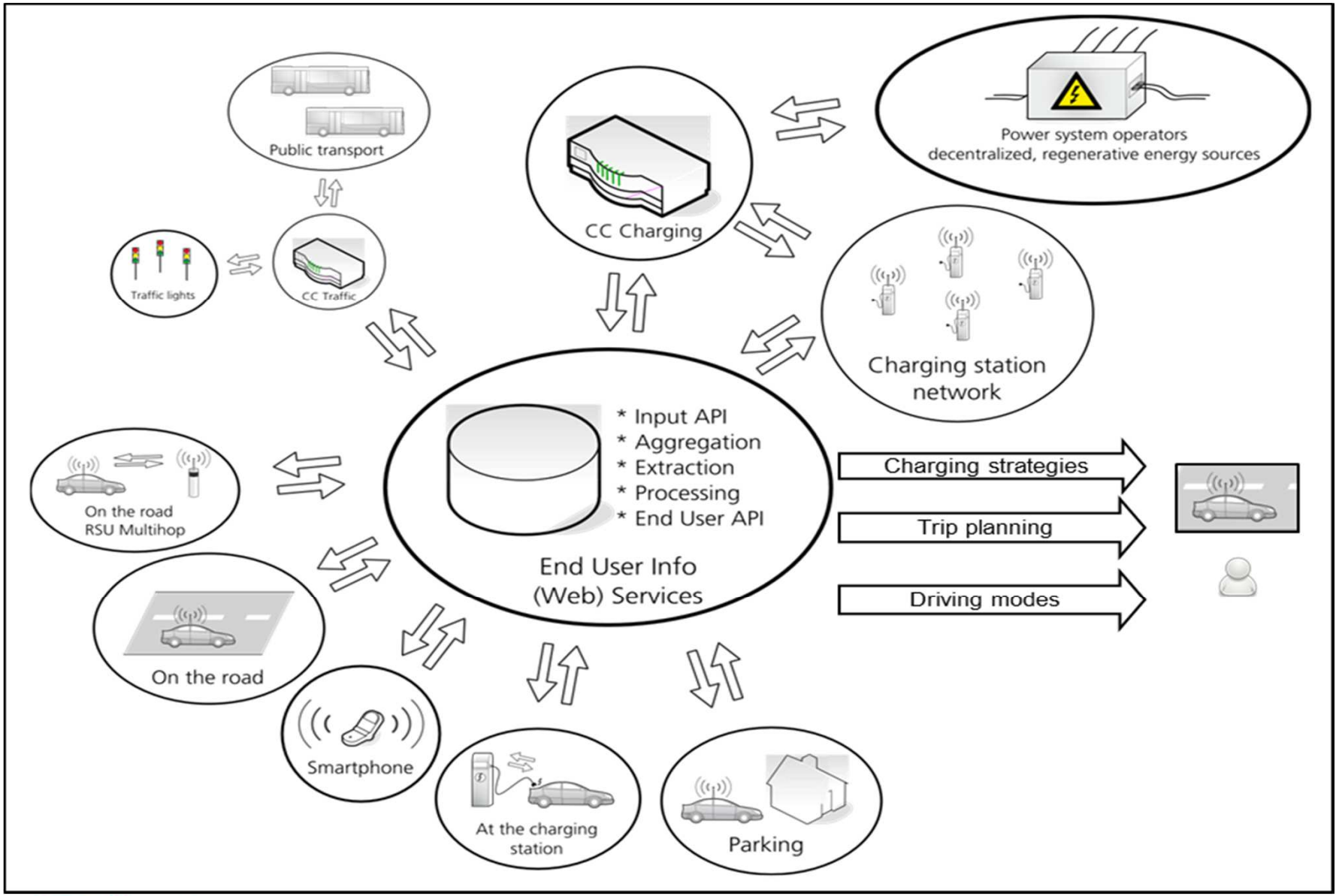
6. Areas covered within Mobincity project



6. Areas covered within Mobincity project

FEV Interaction with Transport Infrastructure

- MOBINCITY aims at **developing a system providing live traffic information**, able to **predict and anticipate traffic congestions before they occur** (using real-time and historical data), integrating as well the **interaction between vehicles and traffic signal timings, to optimise the route.**
- MOBINCITY will establish also close **interaction with other alternative public transportation modes** that are aligned with the driver preferences, opening the possibilities for trip planning not just considering the FEV scope, but also other options

6. Areas covered within Mobincity project

FEV Interaction with Energy Infrastructure

- MOBINCITY project will develop **control methodologies for management of charging infrastructure** where the FEV users' preferences and needs will be integrated into present control solutions.
- MOBINCITY project will will develop **advanced control methodologies and strategies** for the management and control of clusters of FEV charging points.
- MOBINCITY will resolve more complex problem of **remote management and control of large clusters** by means of local FEV Charging Controllers (FEV-CC).

6. Areas covered within Mobincity project

Communications

- Communication must be **reliable to obtain the full optimization potential of the smart FEV** and communication systems

- The most important European standards for communication between vehicles and infrastructure are provided by the European Telecommunications Standards Institute (ETSI) and grouped under the term **Intelligent Transport Systems (ITS)**

- MOBINCITY will develop a **flexible and modular basic software framework** which models the ETSI ITS architecture and helps to decrease the development time of new applications

6. Areas covered within Mobincity project

Trip planning and re-routing

- Interface where **complete trip information and other functionalities are available to user before starting the trip.**
- The system will give the possibility of **monitoring traffic status** (traffic volume, composition, prediction, meteorological and road conditions) and **re-routing the trip when something unforeseen happens**

Driving modes and FEV interaction with the user

- MOBINCITY aims at **changing this vehicle-centered approach to a multivariable approach,**
- The automated and semi-automated methods developed **take into account the information coming from external sources** (mainly traffic and energy infrastructure), **and also from driver needs.**

6. Areas covered within Mobincity project: State-of-the-art innovations

Areas covered	Current limitations	Innovations proposed by MOBINCITY
Interaction with Transport Infrastructure	Lack of information regarding road conditions with can influence vehicle performance	Interaction with factors around the FEV (traffic, weather, road conditions) to optimize its route in real time
	Lack of interaction with other alternative transport modes as an efficient option	Integrate the FEV with other smart media transport in perfect synchronization on real time
Interaction with Energy Infrastructure	Lack of convenient interaction of energy grid and Demand-Side management in FEV	Interaction with the whole energy infrastructure: trans& distrib. networks, control centres; charging stations.
Communication	Lack of applications for the complete set of communications possible in this framework	Flexible and modular software framework which decrease the development time of new applications
Trip planning and vehicle routing	Single variable approach, taking into account just one factor to calculate trip planning	Full integration of FEV charging needs and vehicle routing objectives in to one optimization model
FEV interaction with user	Automated strategies taking into account just the FEV, wo/ interacting with external info	Set of driving modes depending on the external information received by the FEV, with automatic control of several applications within the vehicle.

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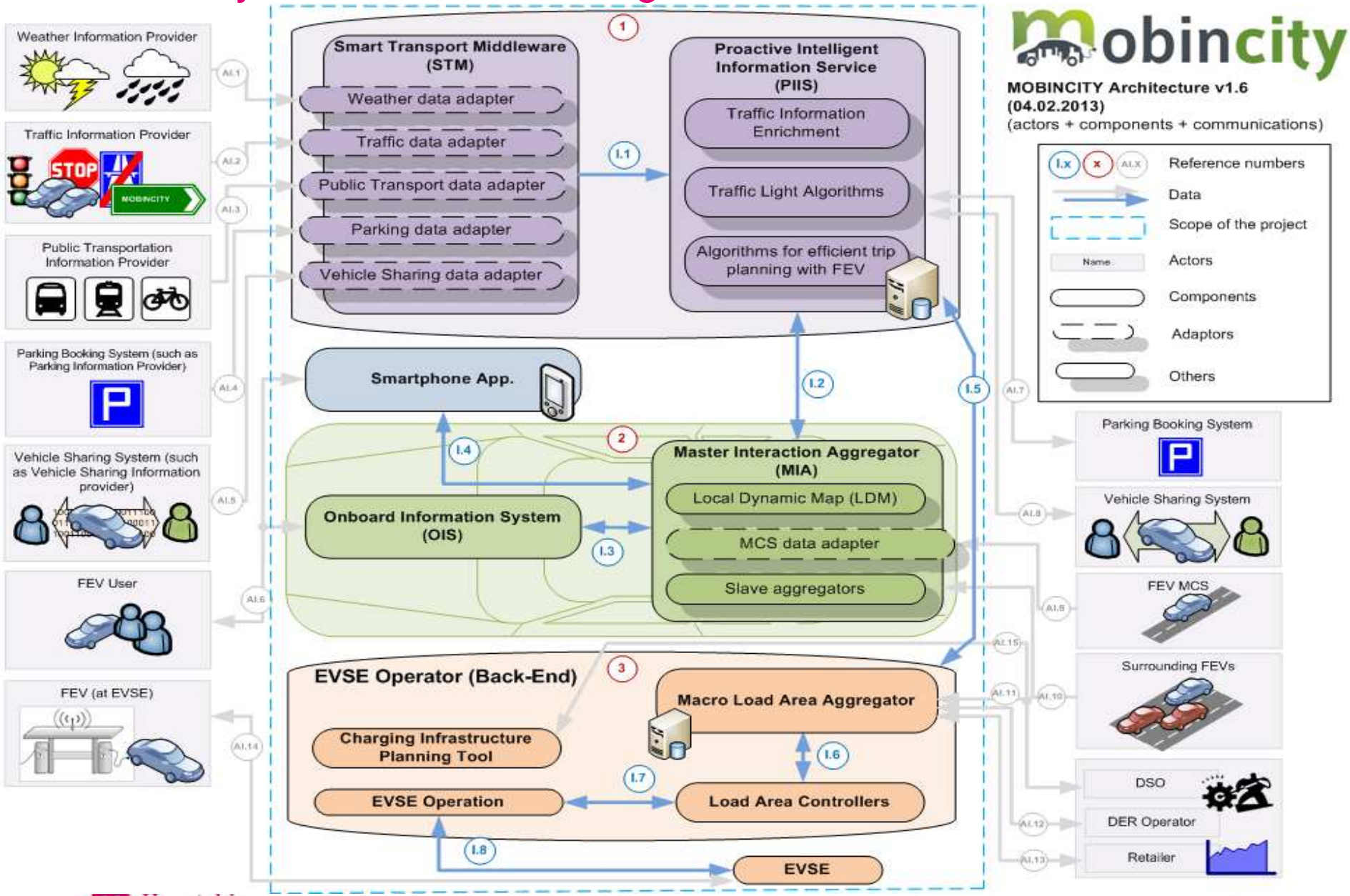
8. Mobincity architecture design



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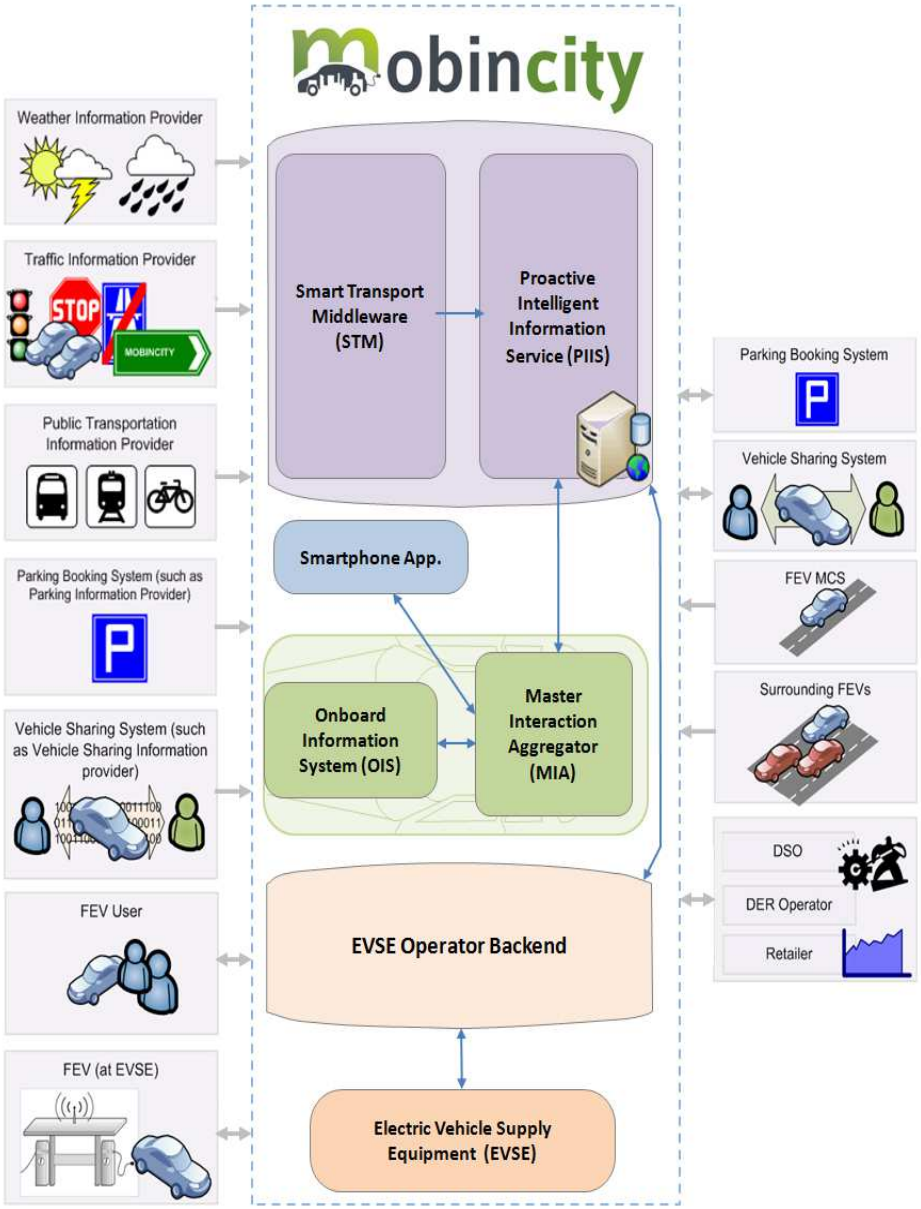
7. Use cases – list of all

- Information gathering
- Integration with Weather Information Provider
- Integration with Traffic Information Provider
- Integration with Public Transportation Infrastructure
- Integration with Parking Booking System
- Integration with Vehicle Sharing System
- Parking Lots Reservation
- Sharing Vehicle Reservation
- Trip Routing
- Adaptive energy management
- Charging strategies

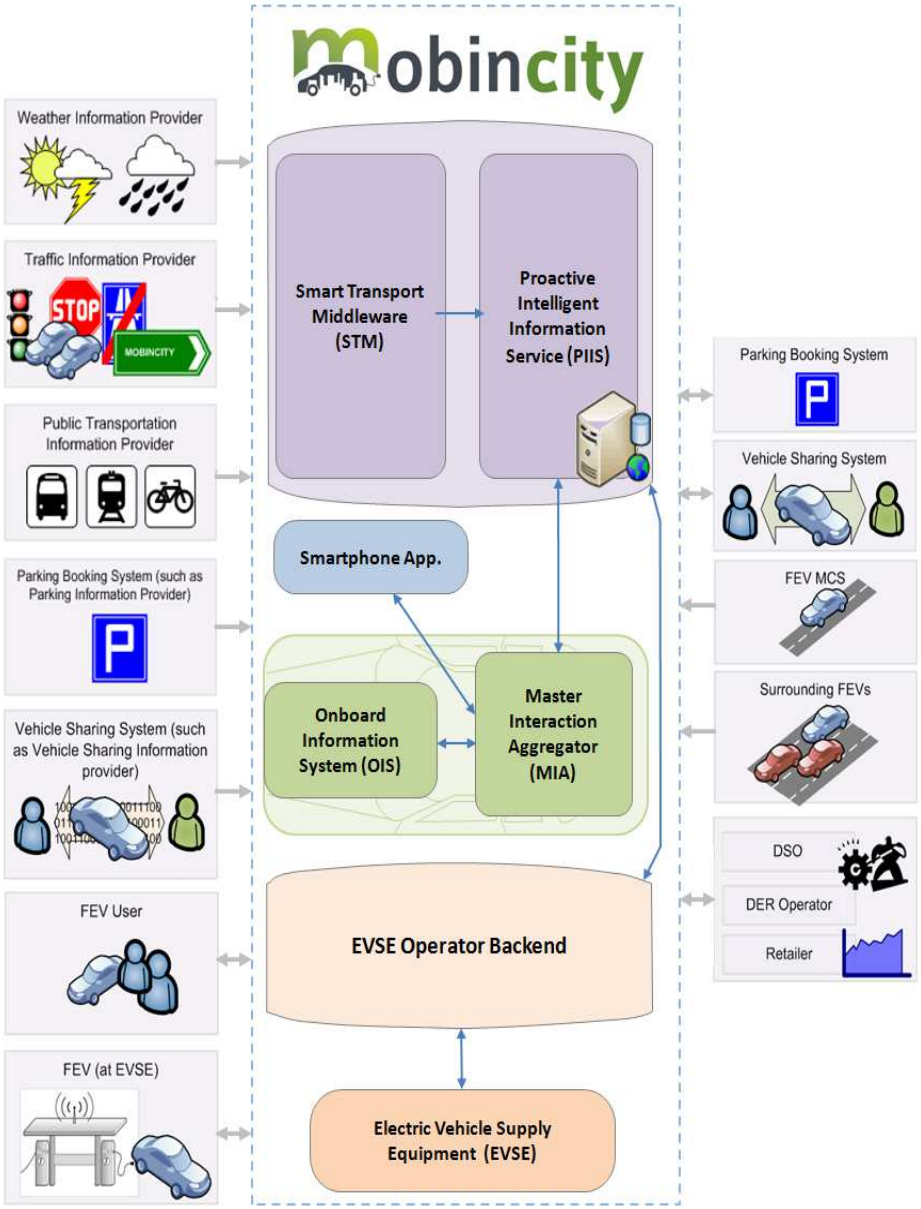
8. Mobincity architecture design



Trip planning

- PIIS will obtain information about the traffic, the weather, the public means of transport, the parking status and the vehicle sharing status. The traffic information will be enriched in the PIIS using UCTP0201 and UCTP0202. The algorithms for efficient trip planning with FEV will use all this information to calculate the optimal route during the stag of Trip Planning. If the optimal route includes the use of a shared vehicle or the vehicles has to be parked, the result of the trip planning will include this activities and using UCTP0203 and UCTP0204, with the user's authorization, the parking lot and vehicle sharing reservation could be completed.
- If any of the Information Providers does not send valid information, the trip routing will be in any case calculated with the information available.
- This use case starts with a MIA's request and when the optimal route is ready is also sent to the MIA. With the trip planning request, the MIA will send to the PIIS all the parameters about the route that the user has introduced to the system: where the route starts and when does it end, if the vehicle is going to be parked and for how long, if any stop has to be done, etc. Information about the conditions of the battery will also be sent to the PIIS through the MIA with the trip routing request.

8. Mobincity architecture design



On trip services

- The **system server queries traffic** information to single and double traffic or computer vision detectors.
- Traffic Information Provider **receives road information including occupation, speed, intensity, composition of light and heavy vehicles**, measured length of vehicles and average distance between vehicles.
- Number of vehicles is also received periodically according to the defined range of speeds.
- All the information requested is always referred to a geographical position. The system can also **request road status looking for unforeseen events like accidents, traffic works, black points, closed roads, etc.**

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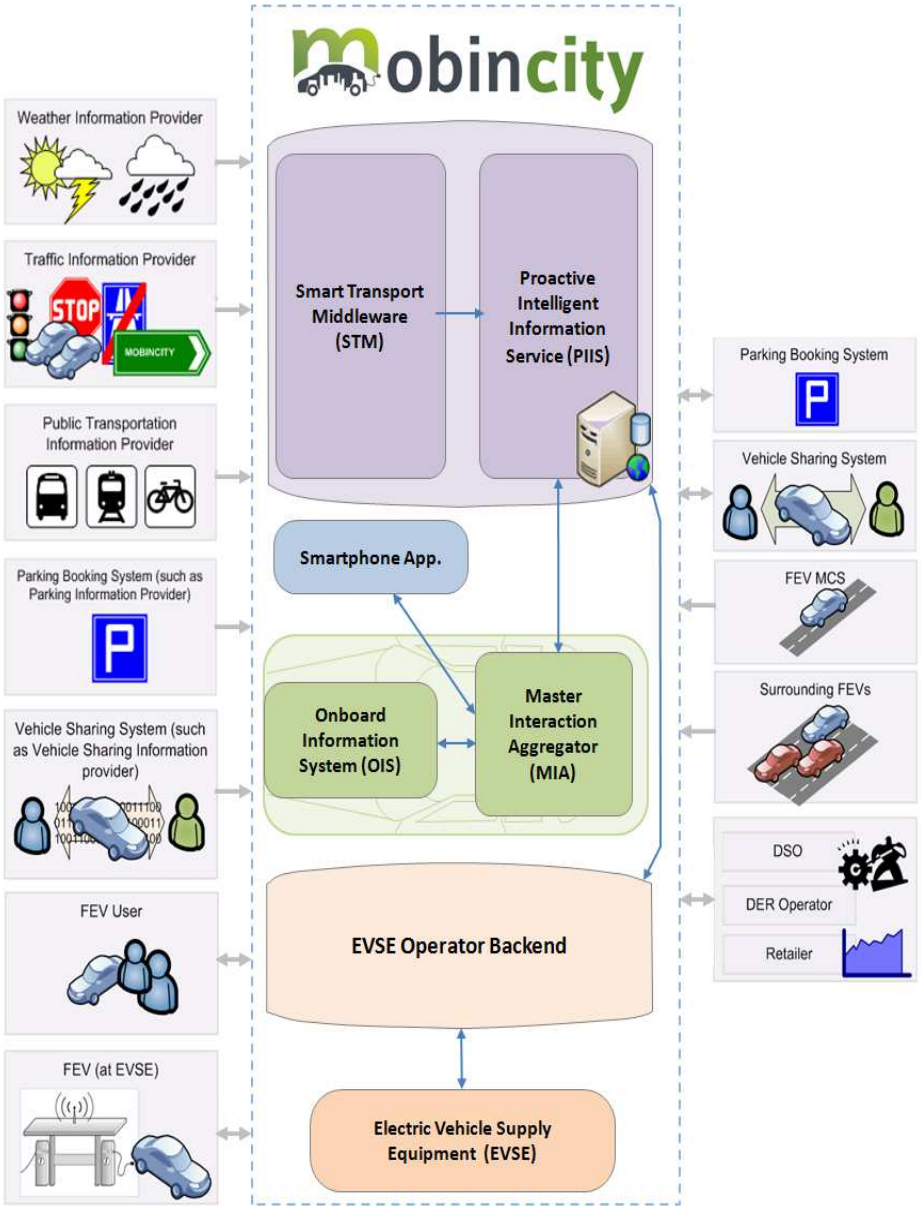

Charging

- The **precondition is a well developed charging infrastructure** with charging stations installed on locations,
- EV **charging process beginning with the purchase of energy**, which shall be planned with **consideration of the impacts** on the grid and of additional services that the EV charging can offer to all actors involved in the electricity supply.
- In order to purchase the electrical energy from Retailer and DER Operator, the EVSE Operator will run an optimal algorithm to negotiate energy quantities base on the expected consumptions of EV on each Macro Load Area.
- To achieve these goals **advanced applications will be developed** for optimal determination of location of CSs to be installed in the future

9. Conclusion

- Currently, MobinCity **project is at the end of its first of three years**
- Fully Electric Vehicles (FEV) are using **significantly less energy and have lower negative impact** on the environment
- Even though there are some limitations, **FEV's will have a great role in the future**
- In order to maximize the benefits of FEV and to extend their driving range **it is necessary to have wider look at the system**.
- **HT is recognized as a leading ICT company in the region which can tackle this challenges**

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