Energy Institute Hrvoje Požar on Smart Grid: Past activities and future directions

ENERGETSKI INSTITUT HRVOJE POŽAR

Hrvoje Keko, dipl.ing.

Workshop for Preparation of Croatian Technology Platform for Cooperative Renewable Energy Systems and Smart Grids

July 2nd, 2013

Who are we?

- **EIHP: Energy Institute Hrvoje Požar** is a non-profit scientific institution owned by Republic of Croatia
- the Institute financing is project-based; projects secured on international and domestic market
- 72 employees with a high education profile covering *technical, legal, economic* and *environmental* issues of the energy sector
- significant international experience and presence (within Europe and beyond)
- **EIHP - a leading strategic planning and energy sector reform institution in Croatia**

Past Activities: Smart Metering

- **Smart Metering business analyses**
  - analysis of opportunities in smart metering
    - smart metering seen as a major building block towards the implementation of smart grids
    - a viable smart metering system slated to be „smart grid-ready”
  - evaluating the value chain in smart metering:
    - stakeholder roles and possible business benefits

- for the Croatian institute of Technology (HIT) - a **system for smart measurement, data acquisition and management of energy (gas and electric) and water usage**
  - part of a design of a referral centre for energy audits, energy efficiency and planning
  - project of management and control of a nation-wide sensor network
  - special care is taken on *implementation* details – e.g. communication protocols, data grouping, regional centres etc.
  - choice and suggestion of legislative changes and organizational changes in existing entities
  - financial estimates, viability analyses

Past Activities: The Development of Energy Infrastructure for EV Charging in City of Zagreb

- EIHP participated in the development of an overall **strategy to prepare the infrastructure in Zagreb** (charging stations, electric dist. network etc.) for a **large scale EV deployment**

- compliance with energy strategy of Republic of Croatia (20-20-20, 10% of renewables in transport by 2020)

- anticipation of technologies – getting the field ready for well planned investments in the traffic infrastructure

- (pro)active management of City of Zagreb policies related to sustainable transport and development

- starting with an analysis of current state, deliver clear, concise and direct guidelines towards EV-ready infrastructure

- integrate the efforts into other initiatives and projects
- pin Zagreb to the European map of smart and modern cities!

Related Ongoing Activities: E-Mobility

- the **e-mobilnost** e-mobility initiative
  - increases of the electric mobility adoption rate by increasing awareness
  - analyses of energy efficiency measures in transport sector
    - suggesting applicable measures to the relevant national bodies
  - polls, web portal, media presentations, E-Mobility day…

- installation and operation of a *smart charging station*
  - in Savska 163, Zagreb (at EIHP)

- drafting of a Second National Action Plan on Energy Efficiency including measures for easier EV deployment

Mobilnost.hr

www.e-mobilnost.hr

Related Ongoing Activities: E-Mobility Initiative (2)

Citroen C-Zero and the first smart charging station in Croatia in Zagreb

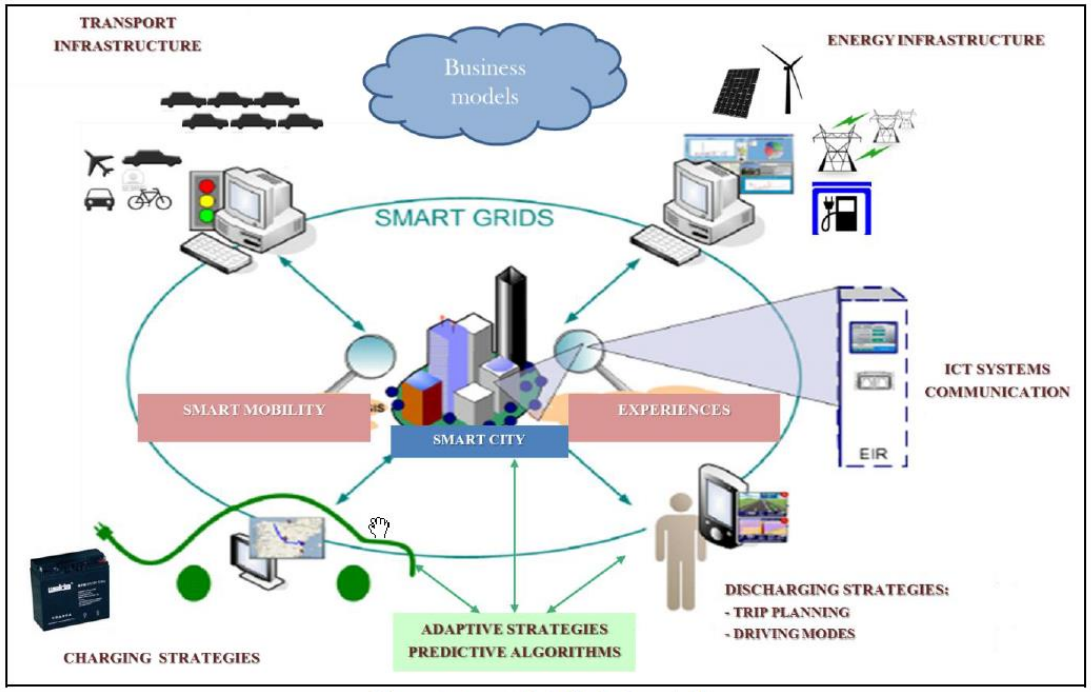
The first EV users charging their vehicles in front of EIHP

- e-mobility day
  - presentations and test drives of a first fully electric vehicle in serial production registered in Croatia: Citroën C-Zero
- in a Second National Action Plan on Energy Efficiency several measures for easier EV deployment are included
- a smart charging station in Zagreb put into service and fully operational
  - home-made converted EV owners also charge their vehicles at our charging point
- EIHP helped in establishing of a second second solar-powered EV charging station in Zadar

Related Ongoing activities: The MOBINCITY FP7 Project

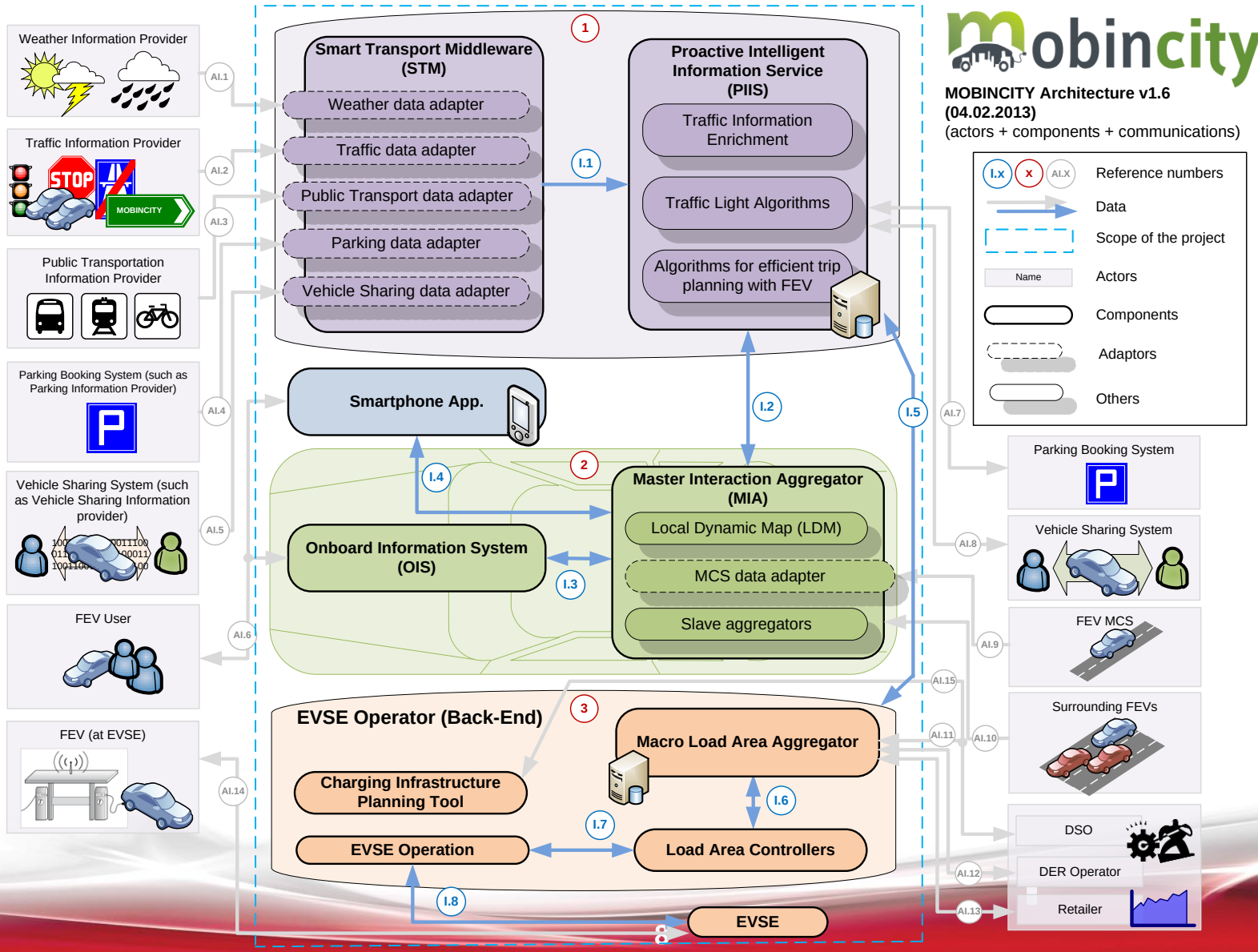
Smart Mobility in Smart City (MOBINCITY)

- FP7 project, 13 consortium members from five different states; EIHP and Croatian Telecom (HT) from Croatia
- topic: e-mobility as an efficient and *integrated* urban means of transport
- EVs as a part of energy system:
  - charging optimization
  - signals to EV owners
  - locations of charging stations
  - coordination with renewables
- *cloud* based platform for optimal exploitation of EVs and the charging infrastructure (proactive intelligent information service)



- development of algorithms and communication standards for integral connectivity of vehicles, vehicle owners and urban traffic (proactive traffic management)
- smart mobility systems: smart traffic lights and public transport

Related Activities: The MOBINCITY Project Scheme



Future Directions:
Ludbreg - Smart Energy City Project

- an **integral platform** and strategy for intelligent development of urban areas
  - increased energy efficiency
  - controlling and managing the energy use
  - lessening the cost burden on service sector
  - paving the way for alternative energy solutions and platforms
  - self-sustainable modernization of networks
  - intelligent and integrated transport solutions

- the project is designed as a development + implementation (demonstration) – a **lighthouse project**, delivering a **replicable platform** for other cities in Croatia
- direct and indirect project goals:
  - lowering emissions, compliance with relevant EU directives (e.g. 2012/27/EC, 2009/72/EC and 2009/73/EC, 2010/31/EC etc) and strategic agenda
  - control and management of electric energy, gas and water usage
  - demand response management
  - …

Future Directions:
Ludbreg - Smart Energy City Project

- Smart Energy City has two phases: **development** and **implementation** phase

- **development** phase
  - establishing the *database*: energy audits, inquiries, certificates, existing data
  - processing the data
    - delivering a set of energy and economic indices (current situation)
  - evaluating the technical solutions for all the analyzed project segments (energy, water, transport, building management…)
  - analyses of innovative tariff / remuneration models
  - development of a evaluation criteria matrix to be used in implementation
  - technical and economic analyses supporting the above

- **implementation** phase according to the above criteria:
  - defining the necessary infrastructure and stakeholders
  - tendering procedures
  - implementation, monitoring, validation

- education: for end-users and stakeholders

Future Directions:
Supporting Strategic Deployment of Smart Grids in Croatia

- the project provides **analytical support** to SG implementation strategy
- in a certain sense - implementation of smart grid is a practical obligation (through EU legislative acts)

- for a vision of smart grid:
  - a set of implementable solutions is needed – however smart grid issues extend beyond technical issues - regulatory and market standards
  - interoperable equipment conforming to technical protocols and standards
  - the underlying IT systems capable of increased quality of service (big data handling)

- in terms of strategic planning, approaching SG implementation *strategically* enables maintaining reliability, delaying or avoiding excessive investments

- EIHP offers analytical support for the above tasks and it ranges from economic and legal (e.g. tariff and regulatory) issues to the implementation-level technical issues and public acceptance issues

Future Directions:
Supporting Strategic Implementation of Electric Mobility

- a project to develop analytical support towards a set of incentive policies and removal of barriers for electric mobility
  - the motivation: increased share of clean transport, coordination of renewables and EVs,
  - a *systematic* and *coordinated* approach is required for an efficient implementation

- technical analyses of the impact of EV fleet on the distribution and transmission network and on the production
- intra-day coordination of EV fleet – economic, legal and technical issues
  - vehicle to grid and EVs as stochastic storage
- envisioning the life-cycle management of EVs:
  - new materials in waste management and recycling
- measurement to promote the required infrastructural investments
  - identifying and supporting the lighthouse projects
- promotional and educational activities
- constant support and *adjustment (!)* of incentive measures
- interface towards other efforts (Smart Grid and Smart City projects)

Thank you for your attention!

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