E-MOBILITY: INTRODUCTION

PRAGUE, APRIL 27TH, 2010

ČEZ E-MOBILITY PROJECT

CEZ GROUP

FUTUR/E/MOTION
ENERGIE ZÍTŘKA

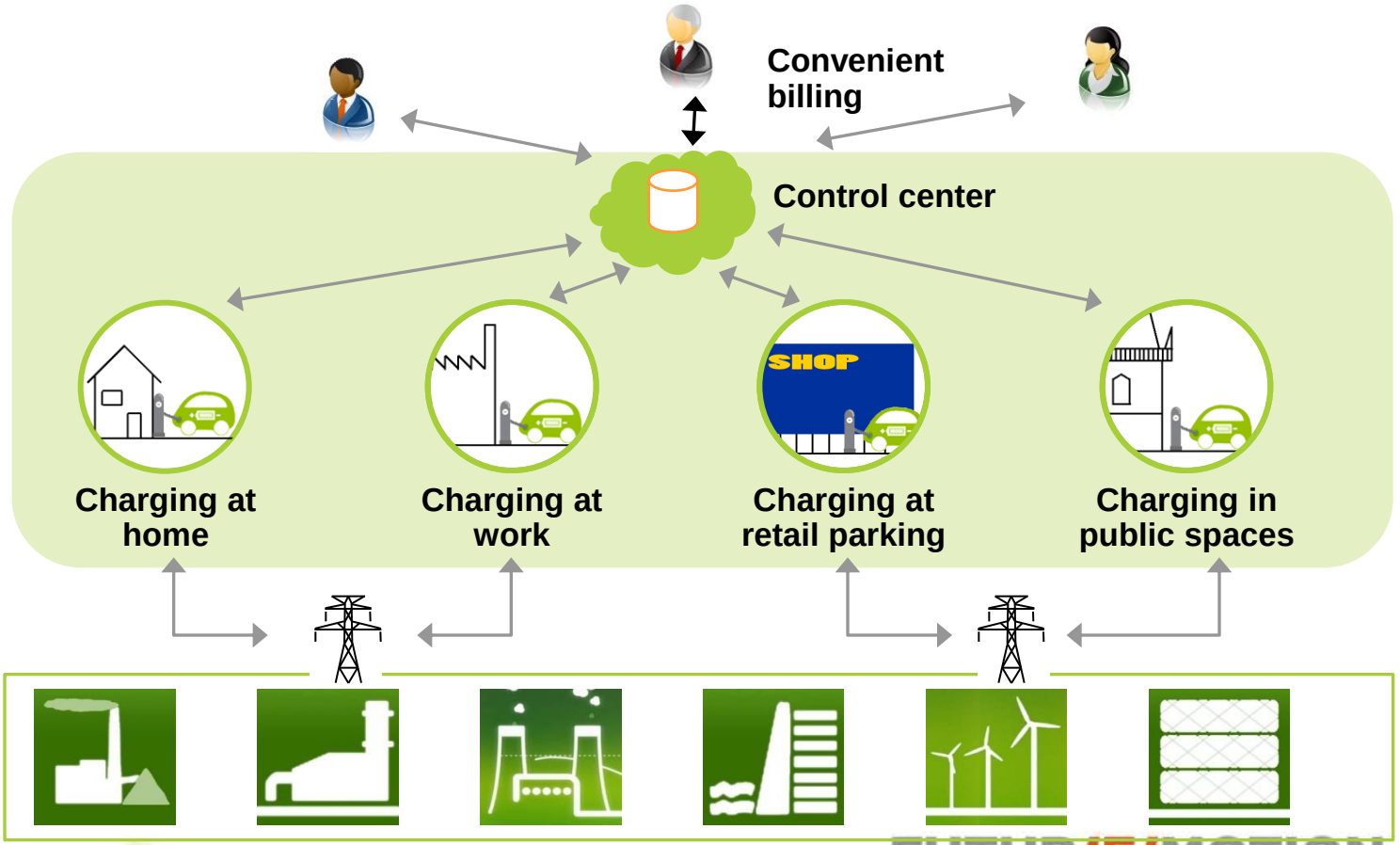
WHAT IS E-MOBILITY? – E-MOBILITY IS THE SERVICING OF ACCESS TO INFRASTRUCTURE, ELECTRICITY AND BILLING TO ELECTRIC VEHICLE USERS

e-Mobility bundled offering: Access to infrastructure + Electricity + Billing

Attractive offering for the customer

Widespread and intelligent infrastructure

Balance the grid



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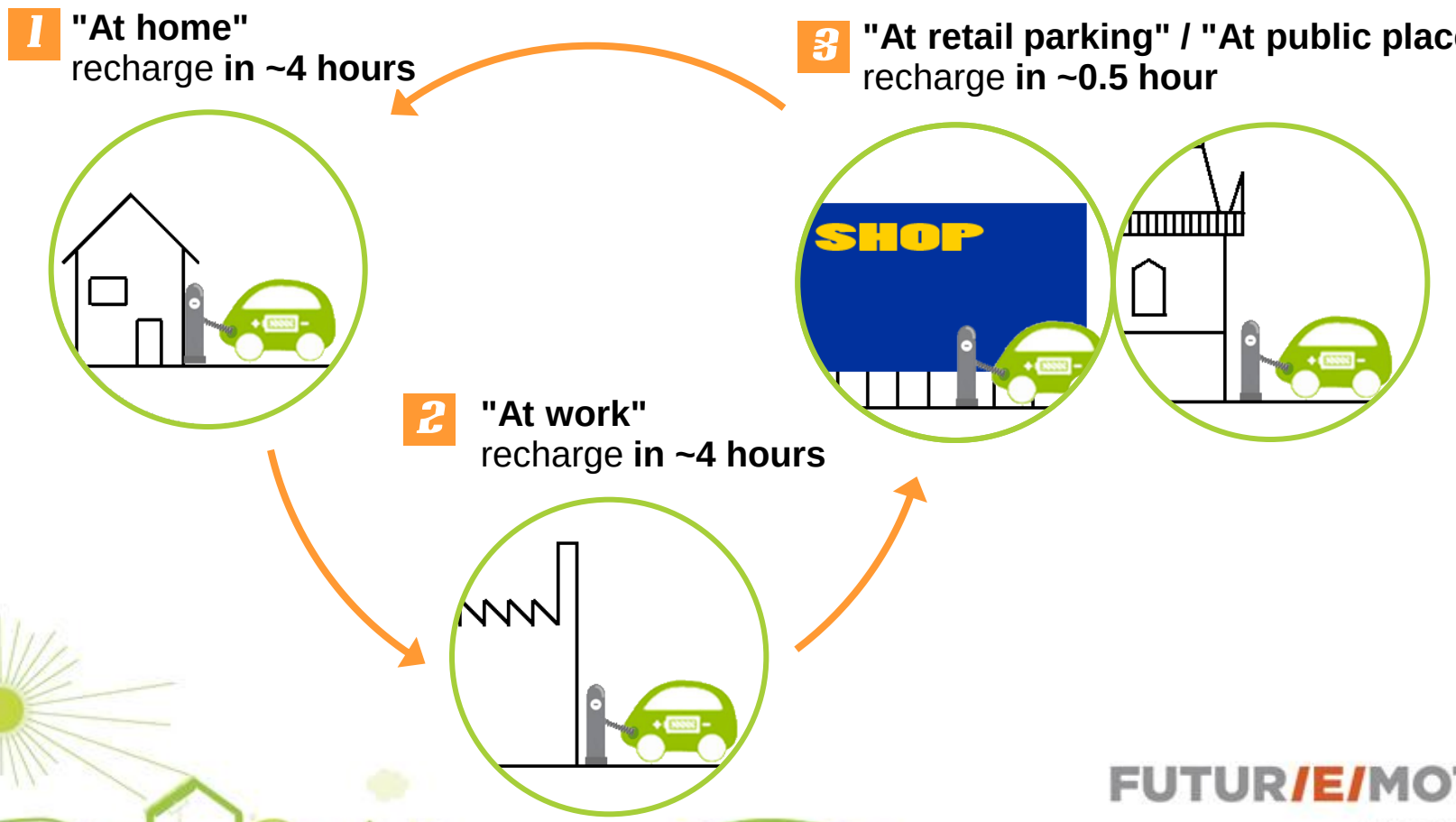
Source: CEZ

E-MOBILITY CUSTOMERS WILL REQUIRE ALL FOUR TYPES OF CHARGING STATIONS – LOCKING THE MOST ATTRACTIVE RECHARGING LOCATIONS CRITICAL

Use of charging infrastructure by e–Mobility customers, typical day



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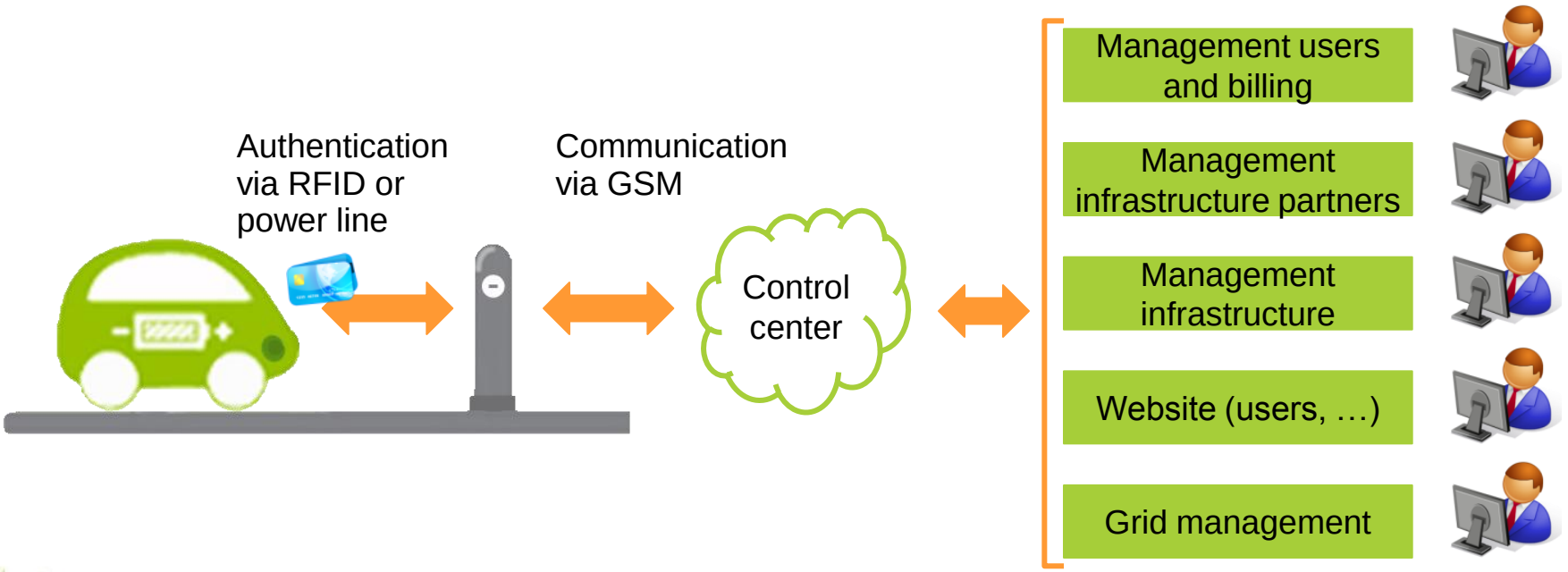
Source: CEZ

TYPE OF CHARGING STATIONS, COMMUNICATION AND STANDARDIZATION ARE THE CORNERSTONES OF THE INFRASTRUCTURE ARCHITECTURE

Charging infrastructure concept – overview



1 Type of charging stations 2 Communication 3 Standardization of infrastructure (focus Europe)

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Source: CEZ

CONVENTIONAL SOCKETS (TYPICALLY "AT HOME") CAN ONLY BE USED FOR THE SLOWEST LEVEL OF CHARGING – SAFETY STANDARDS CAN BE COMPROMISED

EV charging modes

Charging mode	Plug	Description
Mode 1 charging (up to 16A, home ch.) 	 or **Mennekes[1)]**	Connection of the EV to the a.c. supply network **utilizing standardized socket-outlets**, rated up to 16 A, at the supply side, and utilizing **phase(s), neutral and protective earth conductors**. The use of mode 1 charging depends on the **presence of a residual current device (RCD) on the supply side**. If the presence of an RCD **cannot be ensured by national codes, mode 1 charging is not permissible**
Mode 2 charging (up to 32A, home ch.) 	 **Mennekes[1)]**	Connection of the EV to the a.c. supply network **utilizing standardized socket-outlets**, single-phase or three-phase, and **utilizing phase(s), neutral, and protective earth conductors together with a control pilot conductor between the EV and the plug or in-cable control box**
Mode 3 charging (up to 32A, ch. station) 	 **Mennekes[1)]**	**Direct connection** of the EV to the **a.c. supply network utilizing dedicated EV supply equipment** where the control pilot conductor **extends to equipment permanently connected to the a.c. supply network**
Mode 4 charging 	 **SAEJ1772**	**Indirect connection of the EV to the a.c. supply network** utilizing an **off-board charger** where the **control pilot conductor extends to equipment permanently connected to the a.c. supply**

1) Fulfills IEC 61851-1 (Electric vehicle conductive charging systems – General requirements) and IEC 62196-1 (Plugs, sockets, vehicle couplers and vehicle inlets)

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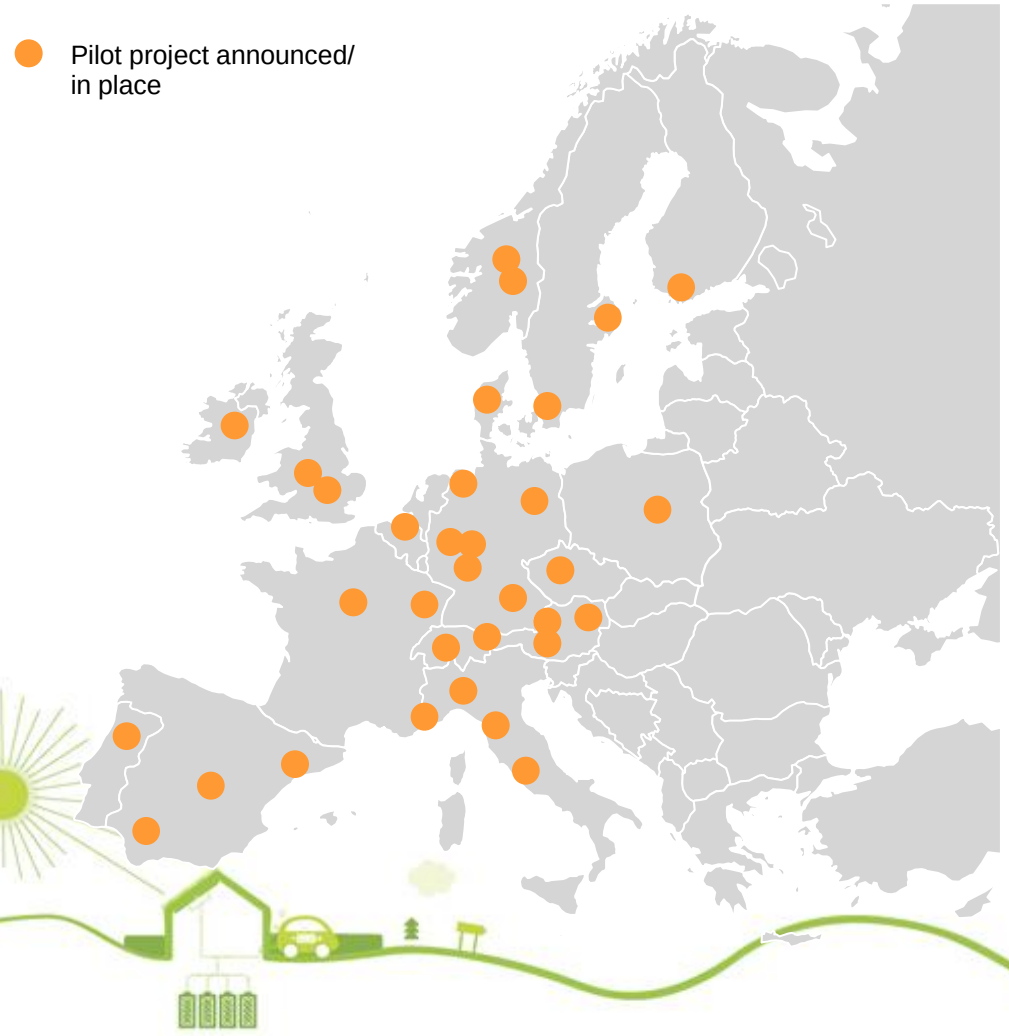
UTILITIES, IN COOPERATION WITH AUTOMAKERS, HAVE ANNOUNCED MORE THAN 30 PILOT PROJECTS SO FAR- MAIN FOCUS ON WESTERN EUROPE

Overview of selected electric vehicle pilot projects in Europe



Comments

- More than **30 electric mobility projects** have been **announced** in Europe since 2007
- EdF is one of the pioneers with the start of a **pilot project already in 2007** in Paris
- **Biggest project** announced so far is located in Paris and consists of **4,000 EVs and 1,400 charging stations** – Car sharing concept (Autolib)
- **RWE** has started already **pilot projects in more than 8 cities in Germany, Poland and Austria**

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THE FIRST STEPS OF THE ELECTRIC MOBILITY HAVE BEEN ALREADY ACCOMPLISHED BY CEZ

Current status

Phases	**PR events**	**Fast Track Pilot**	**Advanced Pilot**	**E-mobility business**
	Praha Karlovy Vary	Praha	Praha Ostrava	Liberec Praha Ostrava Plzen Olomouc Brno
Main objec-tives	▪ To communicate externally CEZ short and long term plans regarding e-mobility (including EV pilot projects) – secure the first mover position and improve image	▪ Improvement of image perception of CEZ and its partners ▪ Fast public statement regarding e-mobility in the Czech Republic ▪ Leverage on the first comer position	▪ Test of the long-term business model in real conditions ▪ Step towards wider infrastructure roll-out ▪ Test of state-of- the-art charging technology	▪ Development of e-mobility into a profitable business ▪ Large scale infrastructure roll-out ▪ E-mobility is considered as a real transportation option
Key mile-stones	15/6/2009: 1st PR[1] event: Introduction of CEZ's e-mobility project 3-11/7/2009: 2nd PR[1] event: Karlovy Vary International Film Festival	10/2009[2]: Start of phase I of the Fast Track Pilot	Q3/2010: Start of the Advanced Pilot	after 2013: Roll-out of the E-mobility business

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PRAGUE
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SONY
HDV
ELEKTROMOBIL
ELEKTROMOBIL ČEZ
NISSAN
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PSA PEUGEOT CITROEN HAS ALREADY BOARD AS AN OEM PARTNER

In 2010, joint advanced pilot aims to bring :

– Approx. 100 Peugeot cars
– CEZ charging infrastructure

Cooperation for technology standardisation and improvement.

Information campaign to educate the public and potential stakeholders about e-mobility.

Identification of a target group for a market roll-out.

Testing the layout of the charging network with respect to charging station types, geographical location and traffic.

PEUGEOT
MOTION & EMOTION

Peugeot iOn

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OVERVIEW OF E-MOBILITY KEY DATA

e-Mobility key data overview

		2020	2030
	Total electric vehicle car park in CR	**164** ths	**850** ths
	CEZ customers	**142** ths	**530** ths
	Charging stations total (cumulated)	**112 ths**	**406 ths**
	▪ At work charging stations	71 ths	265 ths
	▪ At home charging stations	36 ths	133 ths
	▪ At retail parking/ public places charging stations	5.5 ths	7.7 ths
MWh	**Electricity consumption**	**200** GWh	**750** GWh
MW	**Capacity required**	**0.2** GW (10% of Temelin plant)[1)]	**0.76** GW (40% of Temelin plant)[1)]

1) Assuming that 20% of electric vehicles charge simultaneously

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LETS GO FURTHER TO E-MOBILITY

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