



Project CENIT VERDE

EVS27 18/11/2013

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Project CENIT VERDE

Project description



CENIT: Spanish program for support technological research.

Ministry of economy and competitiveness.

Centre for Industrial Technological Development

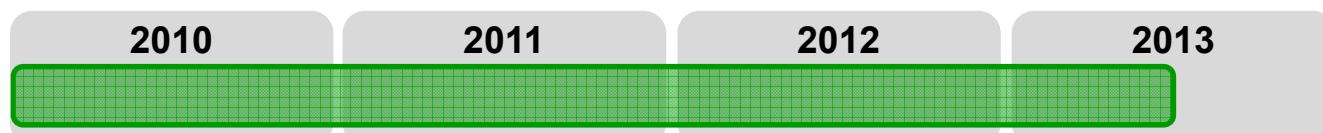


Main goal. Create key knowledge for the whole value chain of green vehicles

Reduce costs by localization of main components and services.

Project Budget & Funding Total cost 34 Mio. €. Funding 50% by CDTI

Project timing

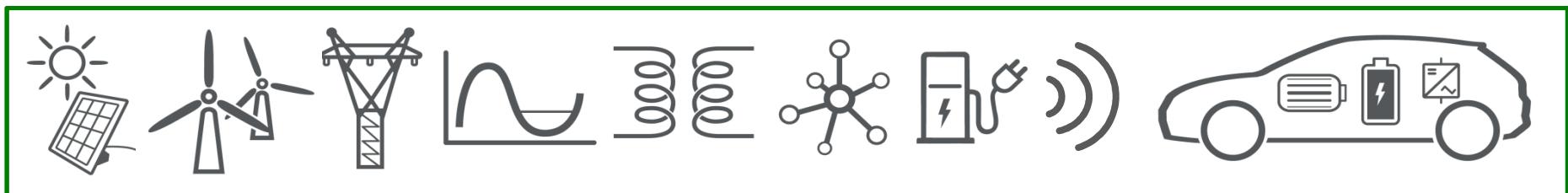


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Project scope and activities



Development of electromobility key technologies considering the whole added value chain. From energy generation to final vehicle use.



1. Vehicle definition and architecture. Global specifications and validation
2. Energy storing systems for PHEV/EV
3. Electric propulsion for PHEV y EV
4. Design of 20 KW Bidirectional Charger plus DC/DC Converter HV to LV
5. Local charging infrastructure for PHEV y EV
6. Integration of the vehicle in the electrical system
7. Integration and Prototype Building. (Project PVV)

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Project organization



Participation of the best partners from every concerned sector
16 companies and 14 public research centres / Universities



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Obtained results and conclusions.



Scientific results and technical highlights

- 867 researchers,
- 5 registered patents
- 4 Pd. D. dissertations
- 94 deliverables
- 13 scientific papers/publications
- 19 congress presentations
- 3 spin-off projects and many commercial agreements.

SEAT LEON PHEV VERDE

Full function project demonstrator
including all in-vehicle innovations

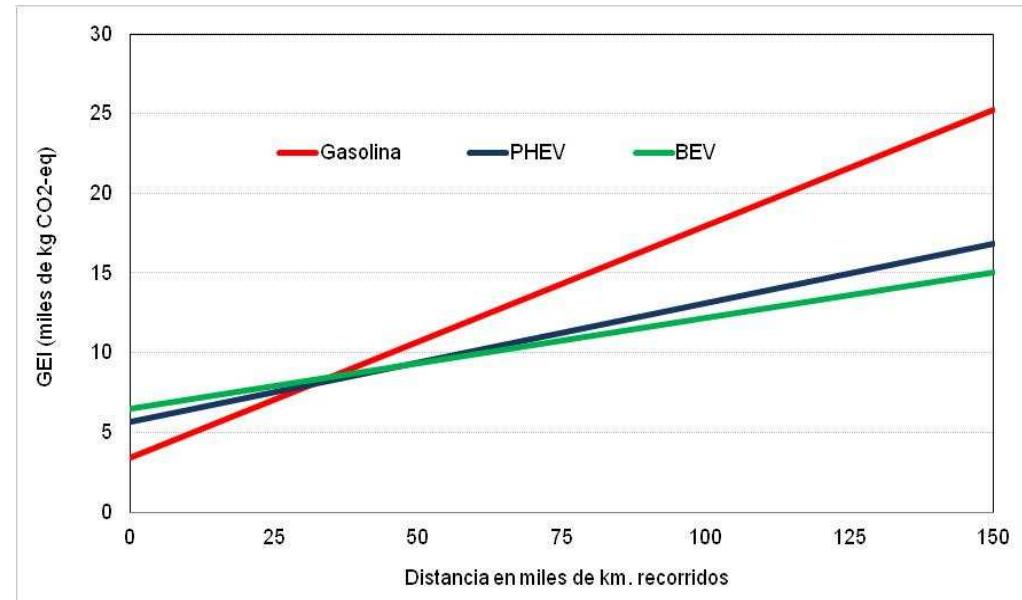
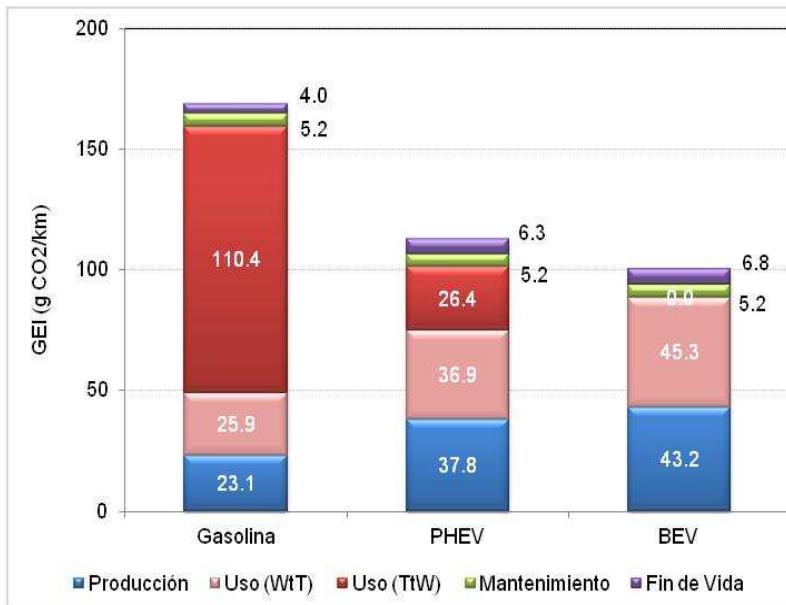
Visit us in the exposition area EVS27



We are also present in the dialog session on 19.11.13 from 13:00 to 15:00

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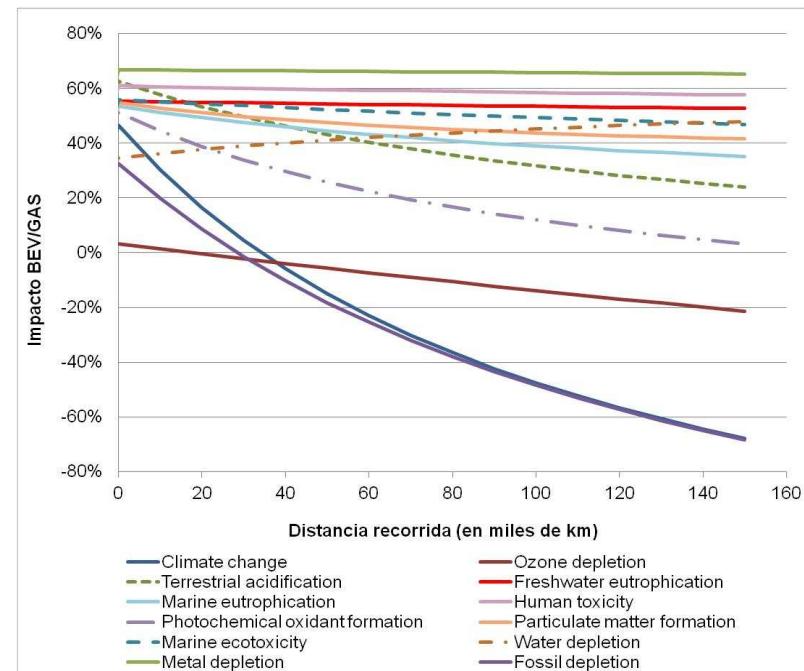
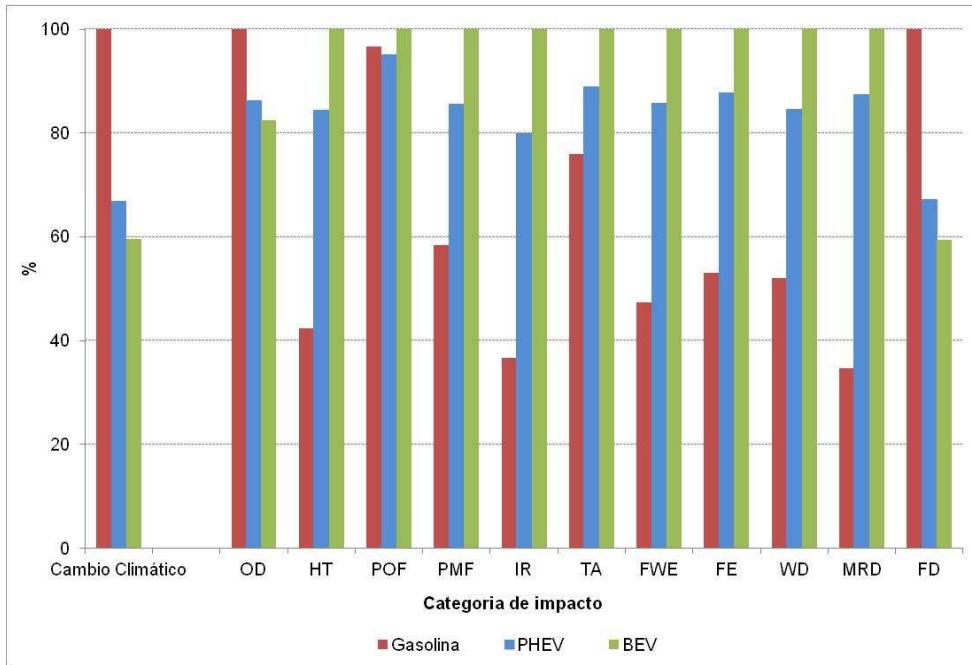
Obtained results and conclusions. Activities 1&7



Full Life Cycle Analysis comparing ICE, PHEV and BEV.
Part I CO₂ emissions

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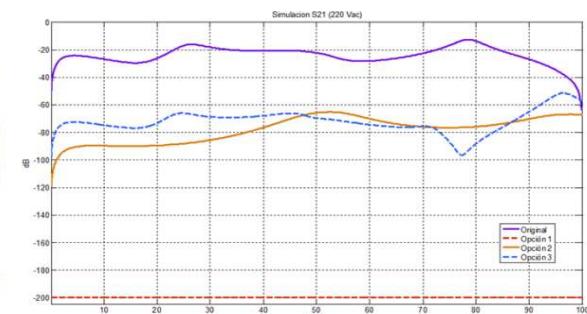
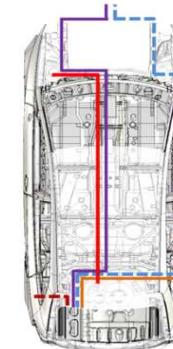
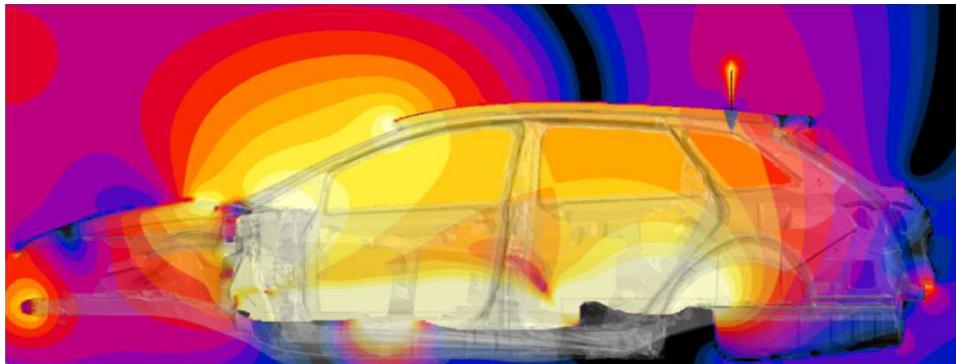
Obtained results and conclusions. Activities 1&7



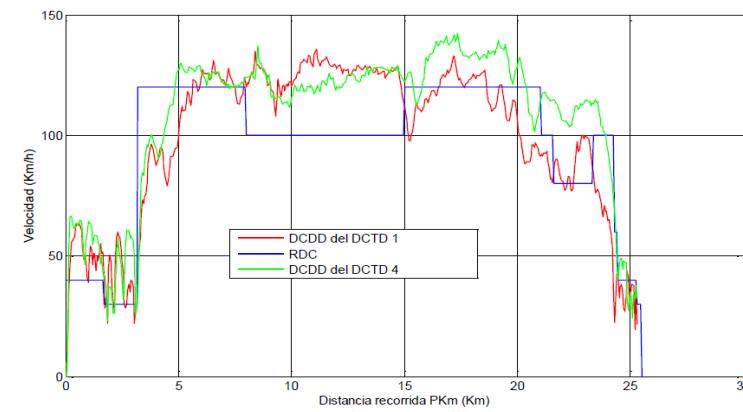
Full Life Cycle Analysis comparing ICE, PHEV and BEV.
Part II rest of categories

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Obtained results and conclusions. Activities 1&7



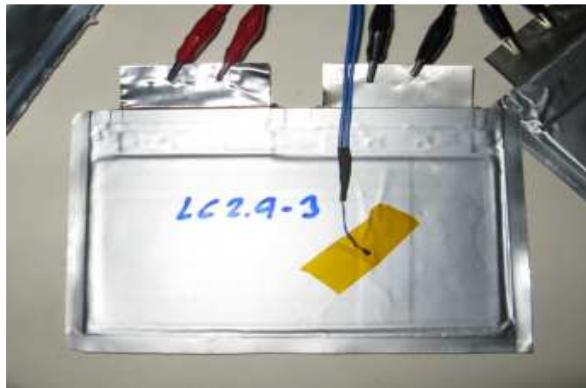
New tool for simulation of electromagnetic compatibility to improve the development of EV's



PHEV online driving cycle predictor. Trip dependent energy management for maximizing and optimizing the use of green energy

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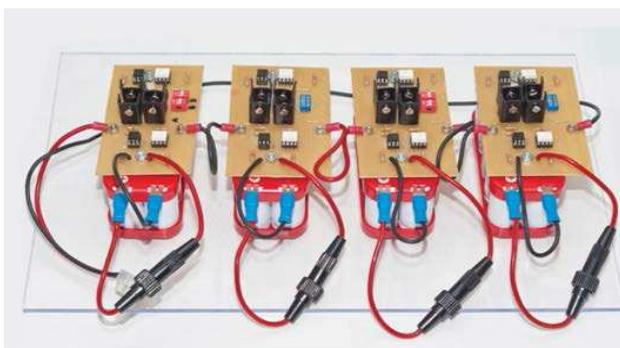
Obtained results and conclusions. Activity 2



Green Lithium ion Pouch Type" cell
Capacities 14 Ah, 30 Ah



Module for EV Voltage: 38.4 V, Energy: 532Wh
Cyclability: 3000 cycles



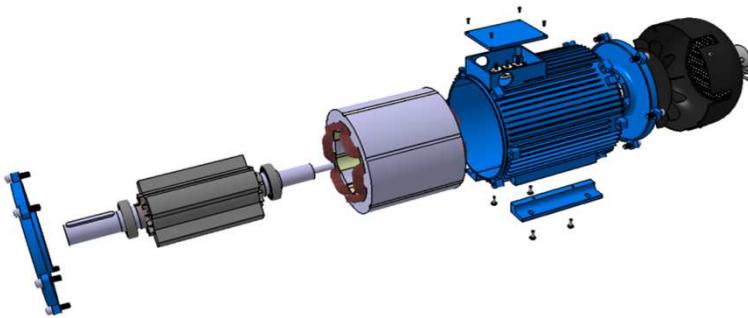
Modular advanced BMC for different battery sizes and with New active balance systems



Battery concepts for air and water cooling as well as indirect cooling via Peltier cells

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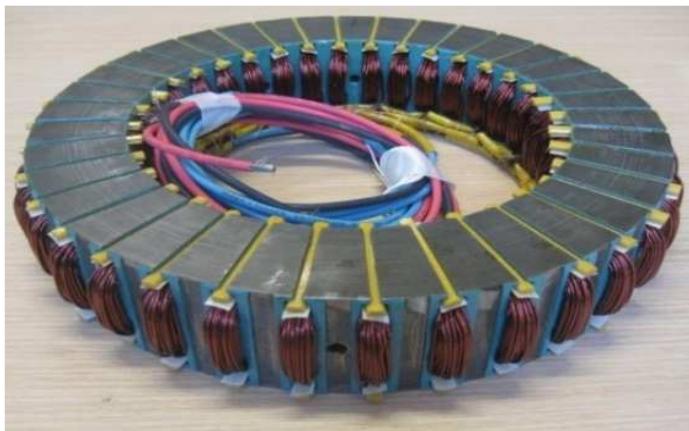
Obtained results and conclusions. Activity 3



30 kW synchronous variable reluctance motor
with two stages soft switching inverter



Monitoring and diagnostic platform for electric
motors. Fault detection algorithms



Axial flow PMSM
14kW/160Nm; 800rpm



20kW PMSM-RF with
in-housing FOC integrated inverter

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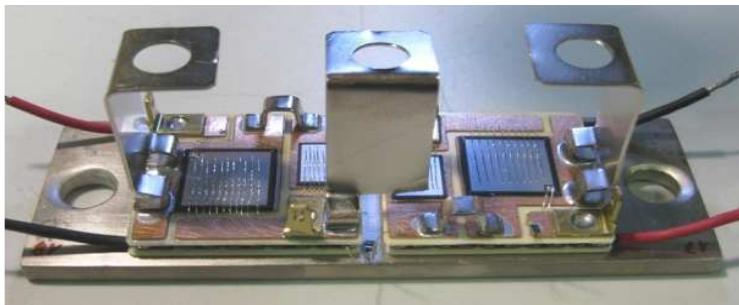
Obtained results and conclusions. Activity 4



Three-phase on-board bidirectional charger
up to 20KW (V2G)



V2I IWCM (Infrastructure Wireless communication Module)



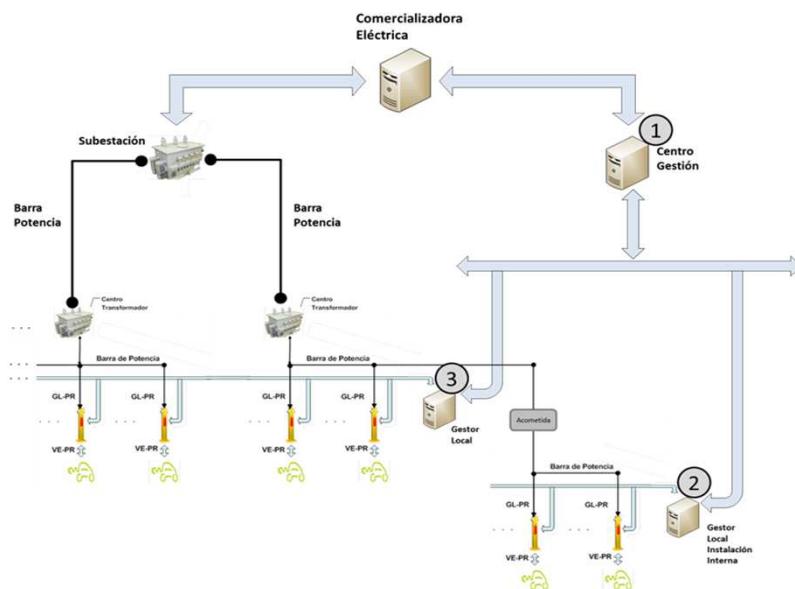
5 W Peltier cells applied to power module
Temperature reduction of about 25° C and
10% less losses.



New tool for thermal simulation
of electronic boards

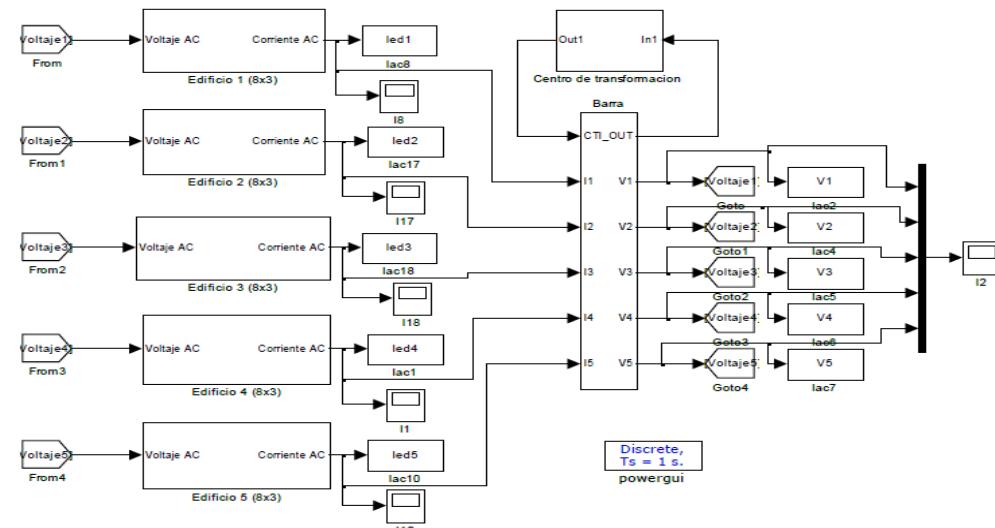
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Obtained results and conclusions. Activity 5



Role architecture for the EV charging Infrastructure

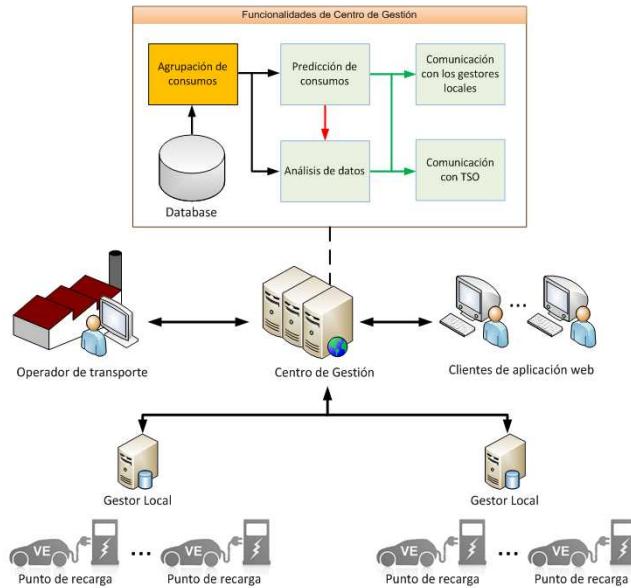
• Bloques y modelos de Matlab/Simulink.



Simulations and Analyse of critical cases in the EV charging infrastructure

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Obtained results and conclusions. Activity 5



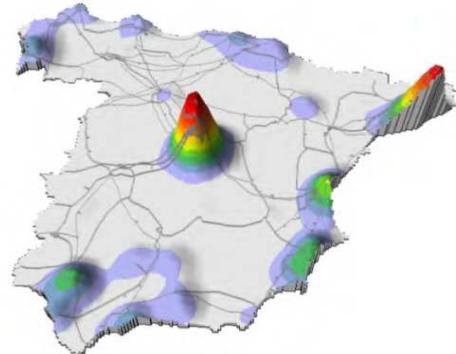
Central EV energy demand management system controlling local energy managers



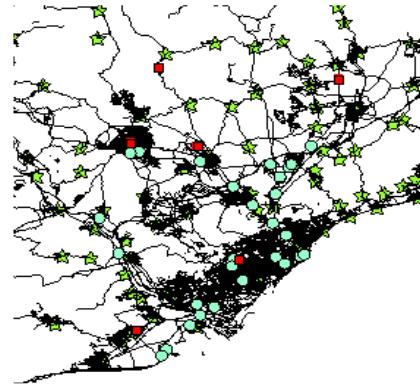
DSM (Demand Side Management)
EV energy demand forecasting and user consumption habits influence

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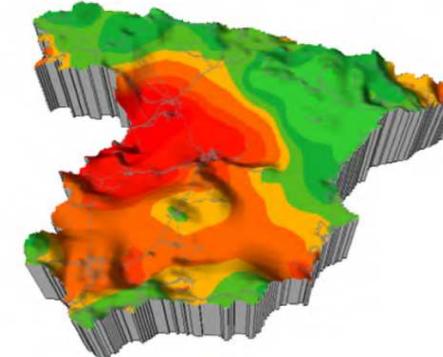
Obtained results and conclusions. Activity 6



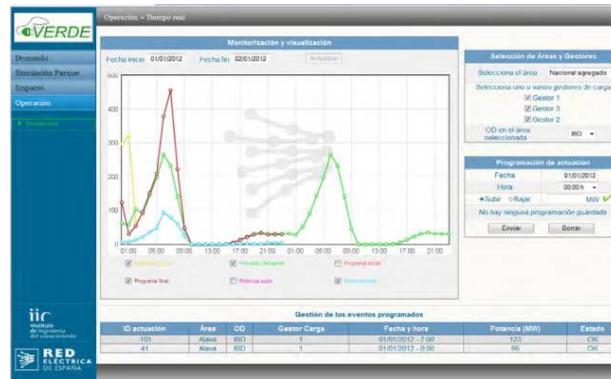
Models for geographical distribution of EV's



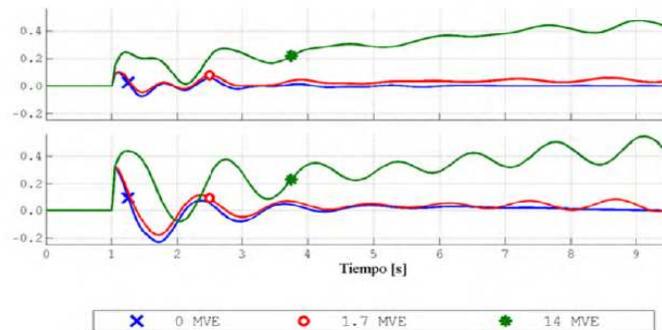
EV mobility simulator



Simulation of load level at High Voltage energy transport infrastructure (14 MVE)



Application for monitoring and active load management



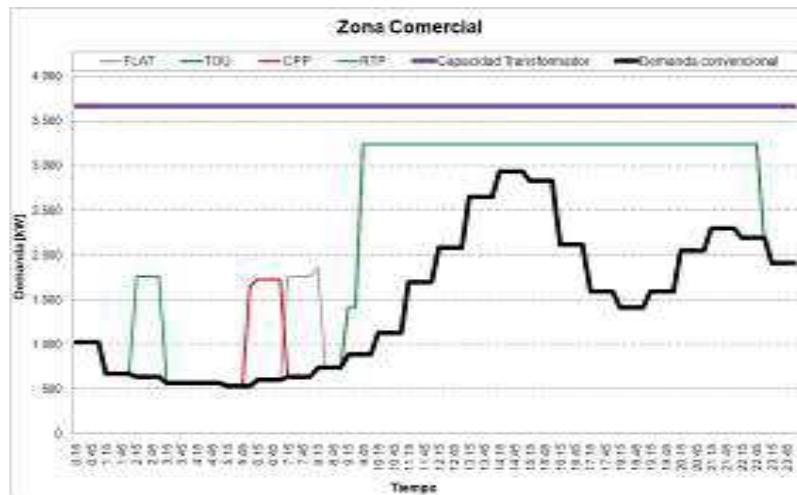
Network synchronism speed analysis influenced by different loads due to EV penetration rates

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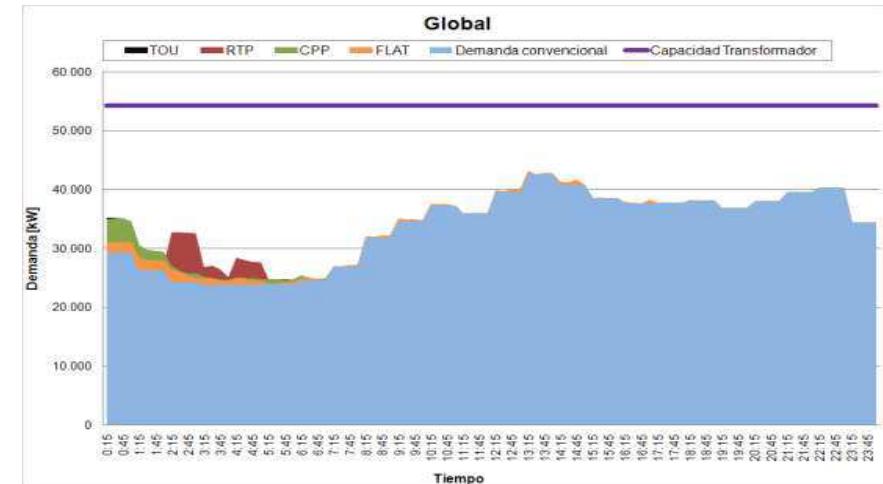
Obtained results and conclusions. Activity 6



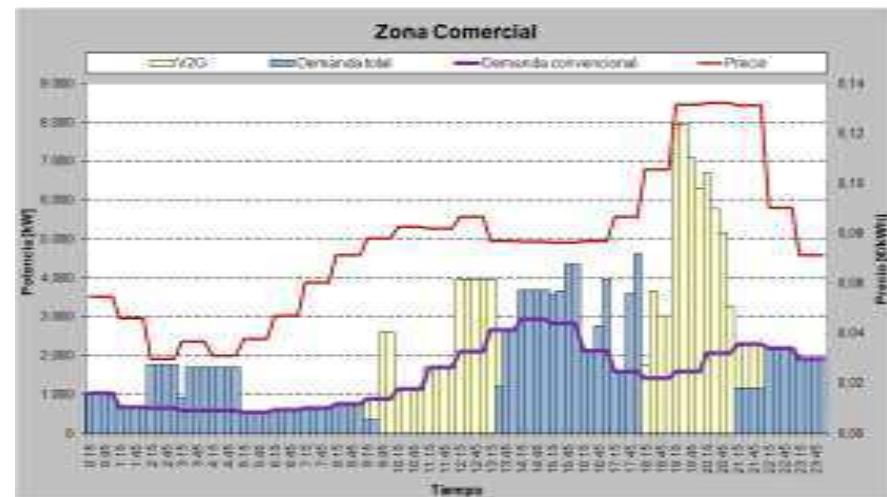
Simulations of different environments (residential, industrial, commercial) to know the impact of several incentives and prices over V2G, demand management and customer behavior



Demand behavior using Time Of Use (TOU) Critical Peak Pricing (CPP) Real Time Pricing (RTP)



V2G service with Real Time Pricing (RTP)

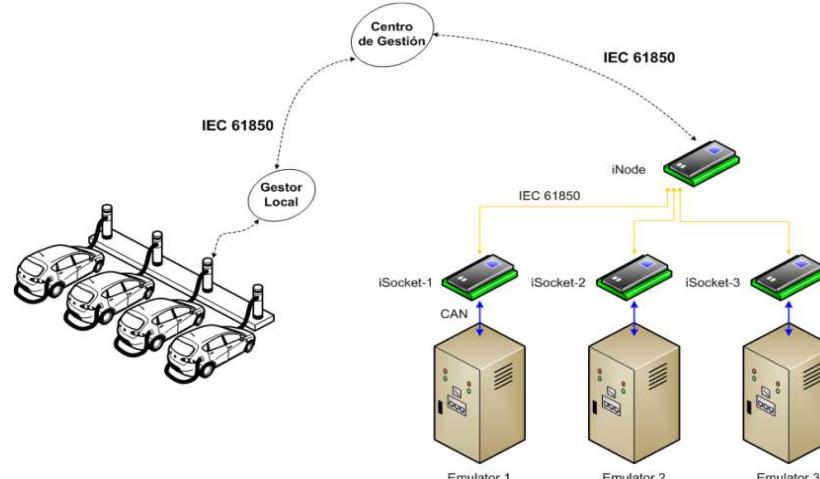
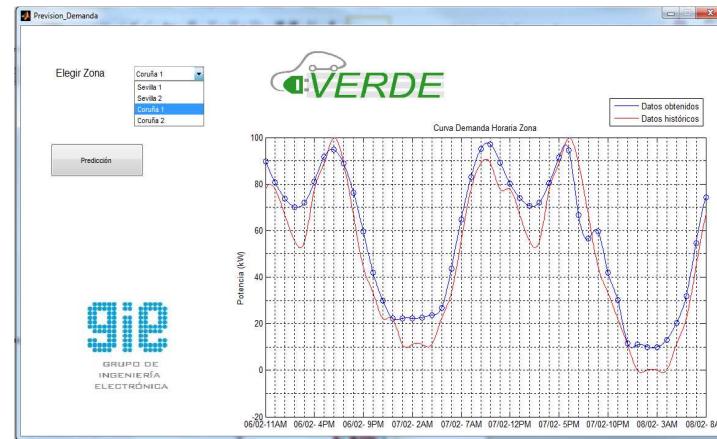


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Obtained results and conclusions. Activity 6



Algorithms, models and prototypes of different technologies such as e-Parking based on micro-grids technologies or planning tools which are able to predict over real grids the impacts depending of several parameters.



Main project conclusions

- EV performance, development and production process as well as costs could be notably improved. Additional V2I, V2G functionalities could be in a mid term implemented
- EV impact on Spanish electric system will be not so relevant in the next decade (first phase EV penetration)
- In the first phase TOU tariffs could be enough but for high penetration scenarios a demand response program has to be implanted for assure electric system optimization
- Huge Wind energy integration lessons learned are suitable for high EV penetration scenarios
- New services based on EV storage, such V2G, could be useful for improving energy systems quality in the future
- Charging manager and aggregators will be a key actors in near energy future scenarios

Thank you for your attention!

