



## ABOUT THE PROJECT

INCIT-EV project aims to demonstrate an innovative set of **charging infrastructures, technologies and its associated business models**, ready to improve the **EV users experience** with the ultimate goal of **fostering the EV market** in the EU.

The project has studied the state of the art and engineered new solutions that are being tested in 7 demonstrators across all Europe.

## 7 USE CASES

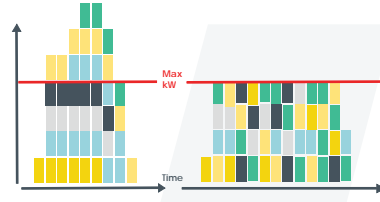
The 7 Use Cases address slow and superfast and smart bidirectional charging while providing ancillary services to the power grid and innovative dynamic and static wireless charging for urban and highway roads.

The consortium of the project is **coordinated by CIRCE counts with 33 partners**, including 3 OEMs, 6 charging technology providers and 5 public authorities, 6 RTOs, 2 ICT companies, 2 road infrastructures companies, 4 DSOs, 2 TSOs, 2 SMEs with expertise in user behaviour and e-mobility exploitation, a car sharing services SME and a EV users association.

The overall **project budget is 18,6 M€** with a EU contribution of 15 M€ and in total, the project will mobilise directly an investment on the use cases of 8.87 M€.

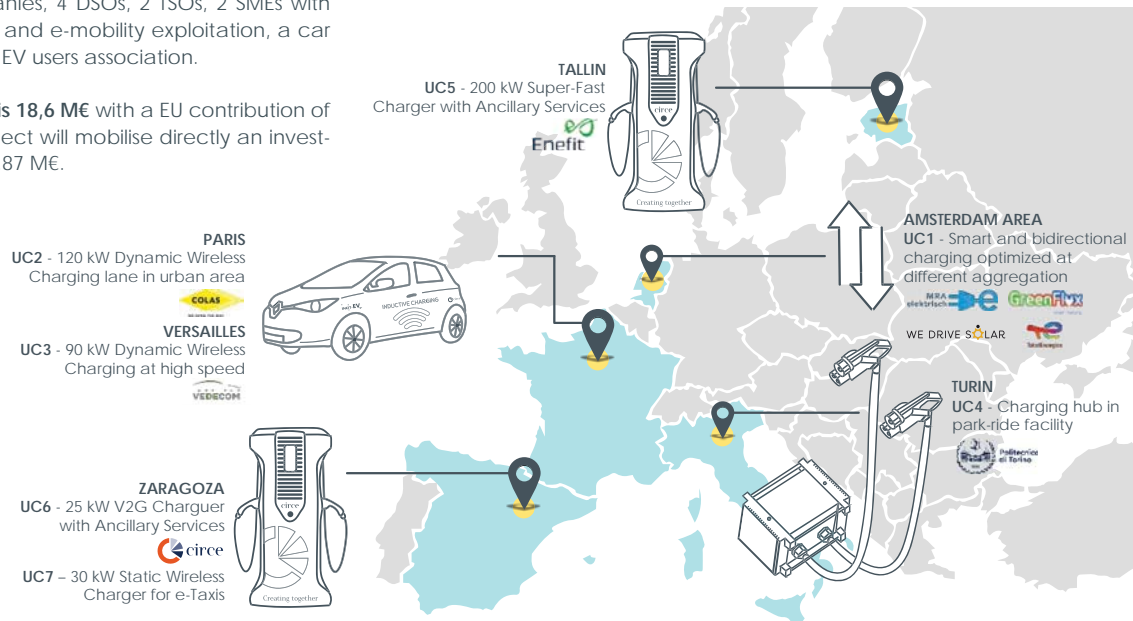
## SMART AND BIDIRECTIONAL CHARGING

The INCIT-EV **smart charging algorithm** enables demand response from EVs by optimizing existing grids, reducing peak demand and coupling renewable generation.



**Bidirectional charging (V2X)** on top of smart charging enhances the grid services EVs can provide as solution to the management and stability of the grid.

INCIT-EV project has tested a range of V2X solutions from 3,3 kW to 25 kW in various Use Cases. As world premiere, **V2G it is performed at AC level** with Hyundai Ioniq 5 vehicles in Utrecht by WDS, while in Zaragoza, it was developed by CIRCE an advanced low-cost **25 kW V2G charger based in SiC power electronics**, able to perform **ancillary services** on top of V2X capabilities, such as **voltage control, frequency regulation and phase balancing**.



## CONDUCTIVE SOLUTIONS

<p><b>1 CCS2 + 1 CHAdeMO</b> bidirectional conductive charging points (25kW)</p>	<p><b>10 CCS2</b> bidirectional conductive charging points (3,6kW)</p>
<p><b>2 Type 2 AC</b> bidirectional conductive charging points (11kW)</p>	<p><b>2 CCS2 ultrafast charging point</b> with advanced grid services (200kW)</p> <p><b>1 Common Storage</b> (only simulated)</p> <p><b>Smart charging system</b> with AI algorithm</p>

The new **ISO 15118-20** standard has been tested and debugged for both, AC V2G with Type 2 and DC V2G with CCS and CHAdeMO.



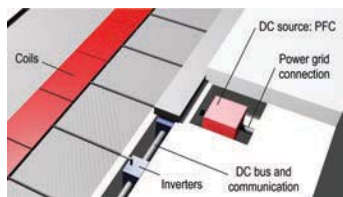
Low cost V2G chargers designed are paralleled to obtain any power rating. In the project, **200 kW super fast chargers** have been developed to charge up to 200 km in 10 minutes, whilst **providing active and reactive power management in real time to the DSO and TSO**, preparing the super-fast charging stations to be manageable by grid operator.

The aggregated power management opens the door to regulators to grant more power for EV charging with the same grid.

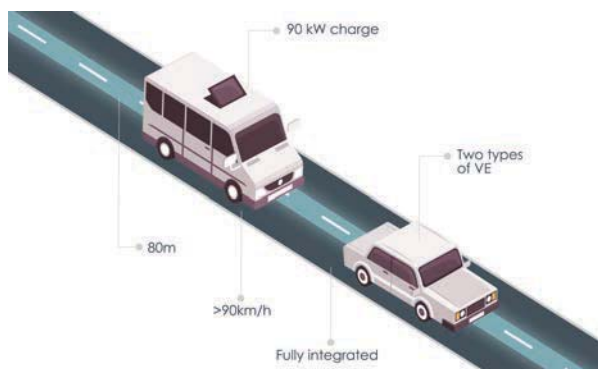
# WIRELESS INNOVATIVE SOLUTIONS

INCIT-EV developed also **Opportunity Wireless Power Transfer (OWPT)** and **Dynamic Wireless Power Transfer (DWPT)** for static and dynamic wireless charging at urban and high-speed operation

The same 30 kW secondary inductor (coil in the vehicle designed by VEDECOM) is used in all the use cases, allowing interoperability for all the wireless technologies.



The Zaragoza static charging system of 50 kW with liquid cooling (CIRCE and TRIA) has been designed to be installed underground for opportunity charging. For dynamic charging (VEDECOM and CIRCE), two different solutions have been designed for urban (<60 km/h in Paris) and highway speeds (>100 km/h in Versailles), capable of charging up to 90 kW simultaneously per charge segment.



An on-board charger is included in the vehicles to control the charging current. The EV has a lane keeping assistant to improve alignment during charging.

## PARTNERS



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Large demonstration of user centric urban and long-range charging solutions to boost and engaging deployment of Electric Vehicles in Europe