

## The Project

E-LOBSTER project is developing an innovative R+C (Railway to Grid) Management system which, combined with advanced power electronics, will be able to reduce electricity losses in both the power distribution network and the light railway network.

The system will be able to make the best use of the available energy on both the grids by increasing their mutual synergies and maximizing the consumption of local Renewable Energy Sources (RES) production through electric energy storages.



9 PARTNERS



48 months



4M Funding



## Project's Consortium

# e·lobster

**Electric Losses** Balancing through integrated **Storage** and power **Electronics** towards increased synergy **between Railways** and electricity distribution networks



[www.e-lobster.eu](http://www.e-lobster.eu)

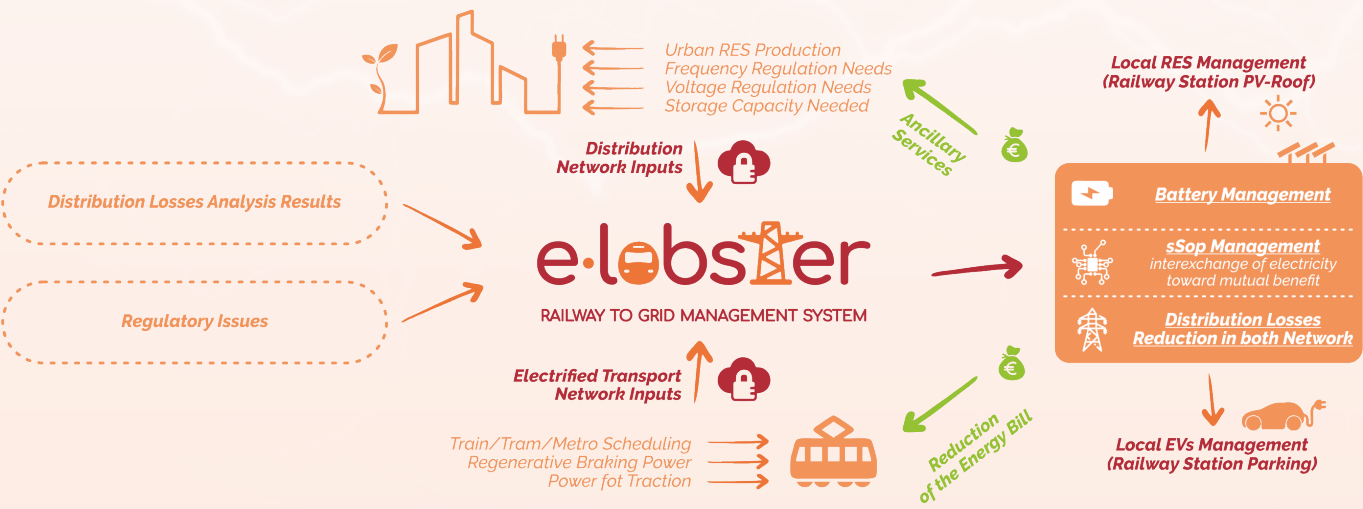
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 774392



# The Challenge

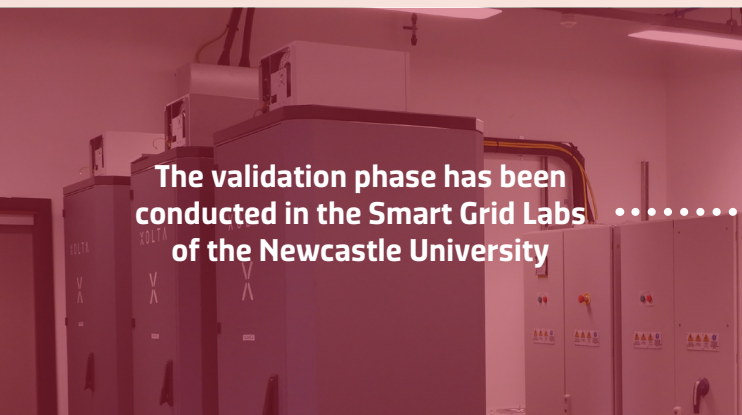
There is a global need to increase the penetration of low-carbon technologies (LCTs) and, at the same time, there is a strong need to provide people, especially in urban centers, with sustainable form of transport, i.e. electric cars and trains, which are also connected to the same power distribution networks.

E-LOBSTER proposes for the first time a substantial integration of renewable sources, electrified road and rail transport with advanced power electronics technologies and energy storage that will be managed by a unique Control Management system that will operate considering the mutual benefit of both transport and distribution network prioritizing distribution losses reduction.



# The Objectives

- Develop an innovative unique tool for the real-time monitoring of losses and energy consumption of power distribution networks and railway electrification networks validated through real data;
- Develop advanced power electronics that will allow a unique management of the energy between traction substations and distribution network;
- Develop and validate a new real-time optimized Railway to Grid/Grid to Railway (R+G) energy management aiming to optimize the interaction between electrified transport and distribution networks using shared assets;
- Identify and validate the most suitable storage technologies for the mutual synergy interconnection of electrified transport and distribution network increasing the penetration of RES and promoting EVs solutions transferring the knowledge and expertise of the automotive sector to the power distribution and railway sectors.



The validation phase has been conducted in the Smart Grid Labs of the Newcastle University



The E-LOBSTER technology will be demonstrated in the Metro De Madrid

# The Demonstrator

The E-LOBSTER innovative solutions have been validated at the Smart Grid Laboratory of the Newcastle University. Then the technology will be deployed in the Metro De Madrid as its underground railway is connected to a local power distribution network with a high penetration of RES.

# The Impacts

- Reduction of energy losses both at Distribution Network level (where they are about the 5%) and at Railway Electricity level (where they are about 8%) through a proper R+G management system that will be able to interexchange electricity between the two grids for a mutual benefit reduction of losses and increasing of grid stability.
- Support in ongoing policy developments in the field of the design of the internal electricity market, also supporting energy efficiencies policies in electrified transports and demonstrating new schemes for their “local smart” contribution to the DN management;
- Optimal energy management;
- Demonstration of stable and secure operation of smart grids integrating variable energy sources;
- Integration of larger and larger shares of renewables in the future EU market;
- Renovation and installation of new “Smart Light Railway Network” to be implement on light-railways installation that are already planned or in construction all over EU;
- Enlargement of RES hosting capacity particularly at urban and railway station level.