



Smart Transportation Alliance

2022 Annual Conference
& Innovation Awards

Infrastructure Requirements for Intelligent, Electrified, Cooperative and Autonomous Road Driving

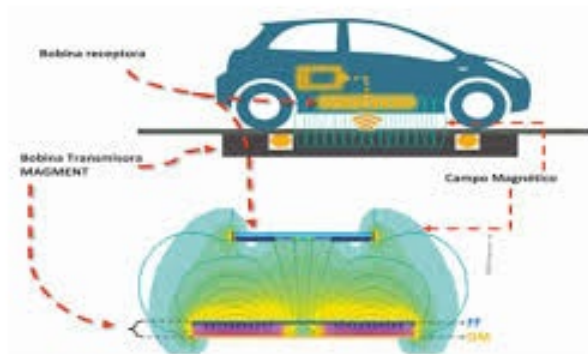
César Bartolomé Muñoz

29 November 2022

1. Electrified



Electric roads

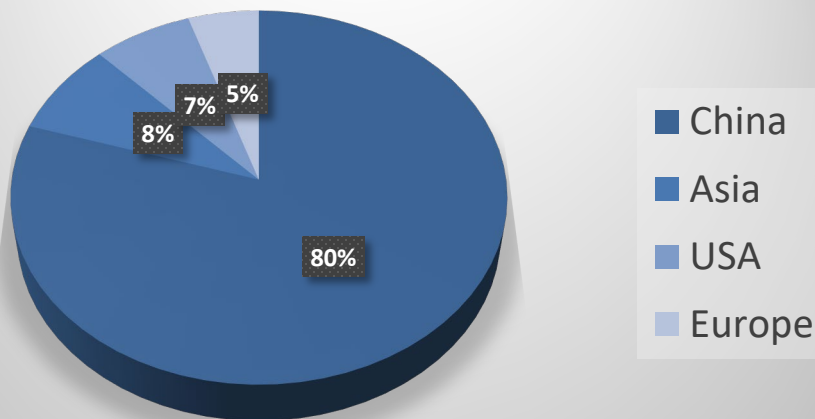


Inductive charging

- The autonomy of vehicles has increased 60% in the last 10 years (International Energy Agency).
- In this field, the challenge will be on vehicles and on increasing the number of charging points. In Spain, we currently have 8.545 charging points and 48.000 are estimated to be needed.

1. Electrified

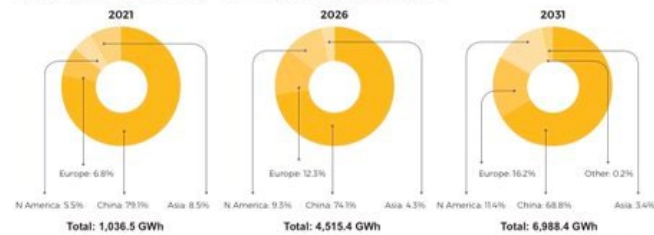
Production of lithium ion batteries



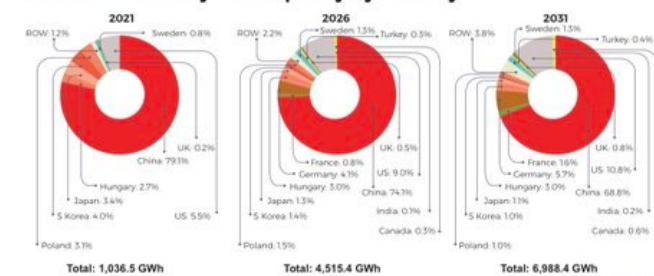
BENCHMARK | LITHIUM ION BATTERY GIGAFACTORY ASSESSMENT
AUGUST 2022

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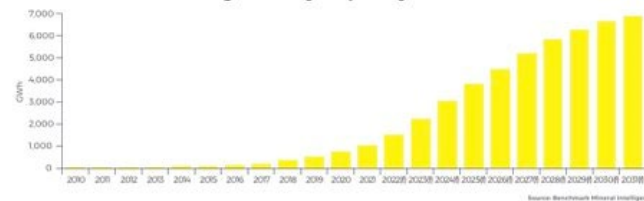
LITHIUM-ION BATTERY GIGAFACTORY TRACKER CONTINUED... Lithium ion Battery Cell Capacity by Region



Lithium ion Battery Cell Capacity by Country

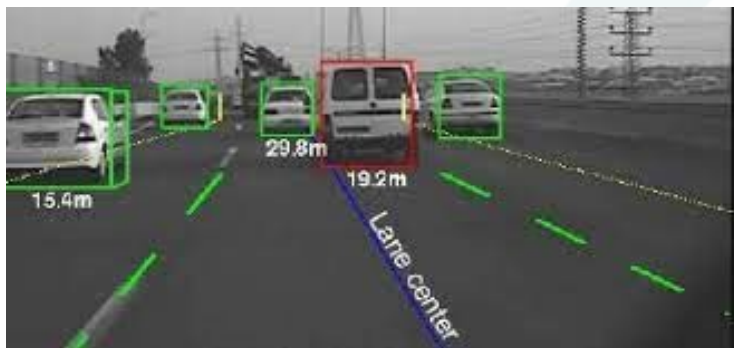


World Lithium Ion Gigafactory Capacity 2010-2031



2. Autonomous driving

- The technology of autonomous vehicles is developing independently from the road.



Camera: image recognition



LIDAR systems

3. Intelligent roads and cooperative driving



- Cars are already cooperating, but where is the information?
- Road condition: deterioration, water, ice, ...
- Sensors to obtain information and systems to transmit that information to cars and drivers:
 - Speed adaptation.
 - Route election.
- Real time is a key factor.
- And, also, maintenance needs, predictive algorithms.

The way ahead

1. Infrastructures will have more opportunities on cooperative driving than on electric or autonomous mobility.
2. To be successful:
 - Focusing not only on owners of the road, but on users.
 - Information must be transmitted in real time to make good decisions.



Smart Transportation Alliance

**THANK YOU
FOR YOUR
ATTENTION**

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