

Enrique Morgades
Fundación CIRCE

INDUCTIVE CHARGING AS FUTURE MOBILITY SOLUTION IN CITIES

ABOUT CIRCE

Research and technology centre in Zaragoza
(Spain)

25 years of experience

165 people focused on applied R&D&I

60% internationalization

Renewable
Energy

Smart Grids

Smart mobility

Industry 4.0

Energy Efficiency

Circular economy
and sustainability

Inductive charging as future mobility solution in cities



EV CHARGING SOLUTIONS

Current principal charging alternatives



Conductive



Pantograph



Inductive



**But... it is
worth for?**



- ✓ Higher efficiency
- ✓ Standards
- ✓ Lower costs
- ✓ Mature technology
- ✗ Urban furniture / visual impact
- ✗ Limited interoperability
- ✗ Electric exposure
- ✗ Vandalism

- ✓ Not visible
- ✓ Higher interoperability potential
- ✓ Security (EMI?)
- ✓ Cleaner and safer
- ✓ Lower maintenance costs (no mechanical parts)
- ✗ Higher costs
- ✗ Restricted positioning
- ✗ Lower efficiency

Inductive charging as future mobility solution in cities





**There are at least 15
companies worldwide
developing these systems
and increasing year by
year**

INDUCTIVE CHARGING – CURRENT EXPERIENCES

AND MANY OTHERS...
This is just an overview

A blue bus with the number 76 and destination PLAZA BEATRIZ is shown driving over a blue and yellow inductive charging pad on a city street.

Madrid (2017)

A red bus with the destination TO DOWNTOWN LB AND BLUE LINE is shown driving over a circular inductive charging pad on a city street.

California (2017)

A white bus with the destination MOMENTUM DYNAMICS is shown driving over a blue inductive charging pad with a circular logo on a city street.

Washington (2018)

A grey bus with the destination EMT MÁLAGA is shown driving over a blue inductive charging pad on a city street.

Málaga (2015)

Inductive charging as future mobility solution in cities



EV PROJECT IN SWEDEN (2016)

- 20 electric cars / 65 users
- Experience plug-in and wireless → more acceptance on wireless due to convenience

- Perceived attractiveness increases with plugless charging

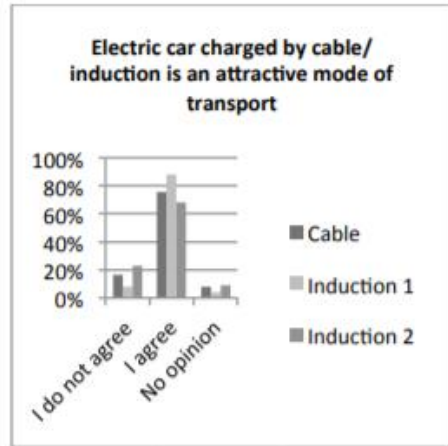


Fig. 5. Attractive mode of transport

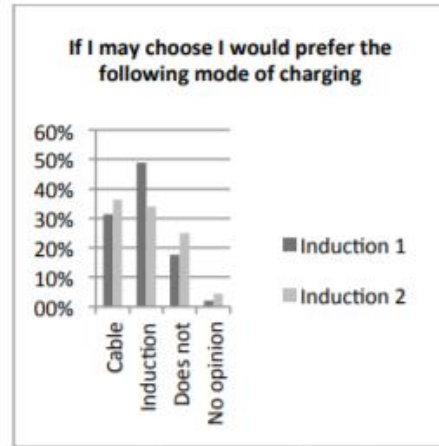
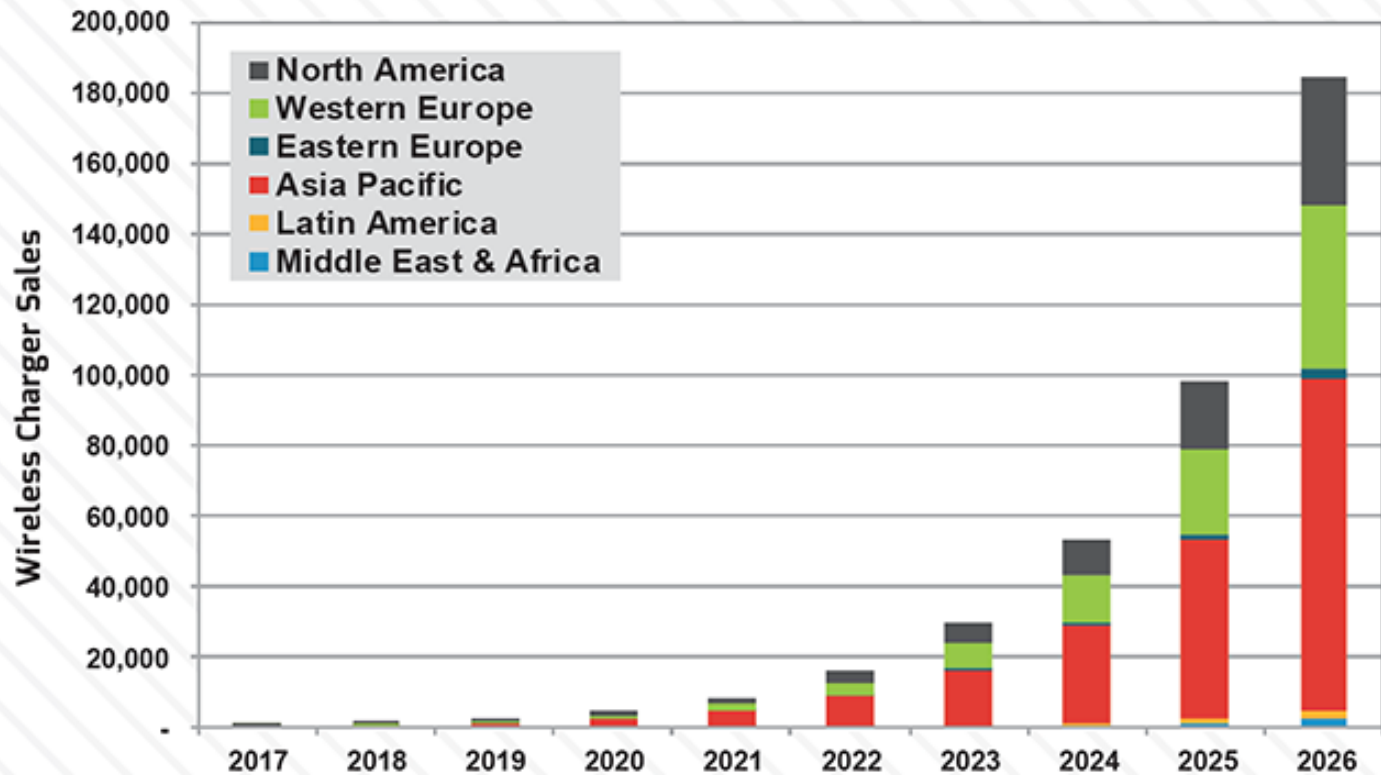


Fig. 6. Preferred mode of charging



Source: Navigant Research

Inductive charging as future mobility solution in cities

MAIN CHALLENGES

- Standardization on high power wireless transfer systems (*currently up to 22 kW*)
- Interoperability – *imagine you can use the same infrastructure for...*
- Costs and efficiency improvements

AUTONOMOUS CARS – What will happen with them?




Who will plug them?

Inductive charging comes as a pretty convenient solution for future EV mobility

Sustainable and Resilient Cities

Inductive charging as future mobility solution in cities



Enrique Morgades / CIRCE
emorgades@fcirce.es

Or on LinkedIn

THANK YOU FOR YOUR ATTENTION!