



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

EV CHARGING SOLUTIONS

Current principal charging alternatives



Conductive



Pantograph



Inductive



But... it is worth for?

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European Conference on Smart,
Sustainable and Resilient Cities

- ✓ 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



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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



Madrid (2017)



AND MANY OTHERS...
This is just an overview



California (2017)



Málaga (2015)



Washington (2018)

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

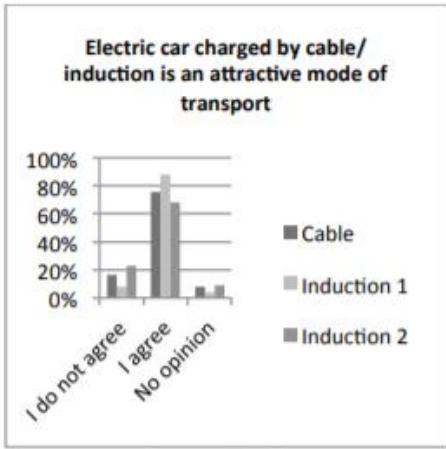


Fig. 5. Attractive mode of transport

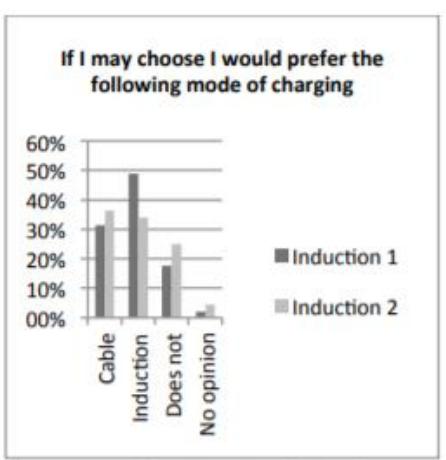
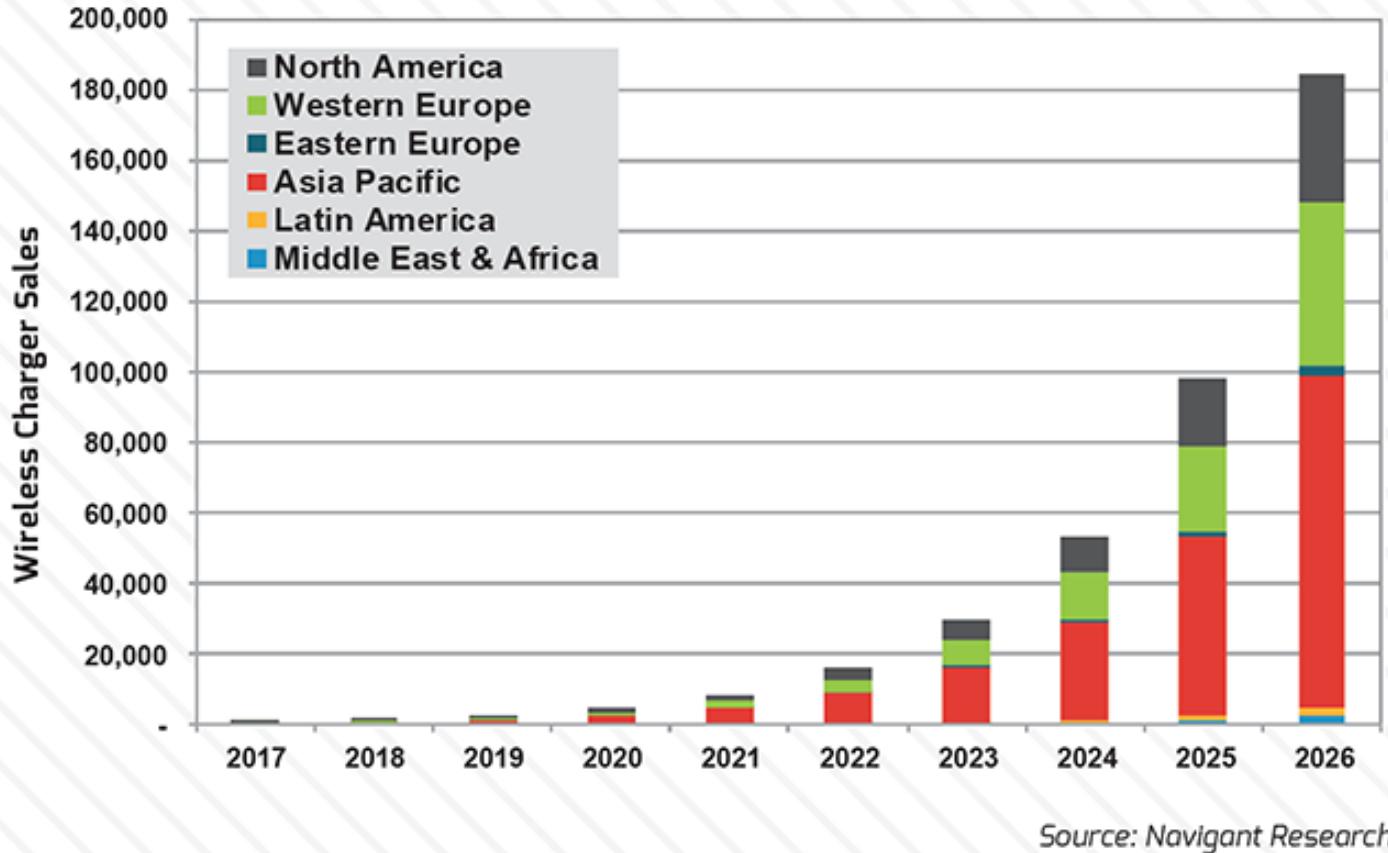


Fig. 6. Preferred mode of charging

- Perceived attractiveness increases with plugless charging



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?



Sustainable and Resilient Cities

Who will plug them?

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

Inductive charging as future mobility solution in cities



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THANK YOU FOR YOUR ATTENTION!