FABRIC

Feasibility analysis and development of on-road charging solutions for future electric vehicles

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Dynamic charging of EVs (DWPT) is technically feasible and in some market niches could be economically viable depending on the evolution of competing technologies

Overview /introduction

Three deployment scenarios, were discussed in the Strasbourg summit in June 2017 by all experts from the initial 10 options identified.

- **Motorway Scenario.** In 2030, we can expect (if subsidized) dedicated external lanes (e-Corridors) of 25 km length for light and heavy electric-vehicles dynamic charging in the most crowded motorways (gaining travel time) between two spots at about 400 to 600 km and providing a range extension of 10% to 20%.
- **Periurban Scenario.** Dynamic charging of heavy vehicles and buses in areas with high traffic density, from periurban logistic centers, ports, etc. to the city center or among close cities (intercity buses) travelling a daily distance of around 250 km. with e-Corridors of 10 km length (e-Launchers).
- **Urban Scenario.** Likely the first entry point in 2030 using the bus stops as static-dynamic charging points with 25 m charging (e-Trenches) at each stop.

Objectives /methodology

- Analyse the **three scenarios** from three points of view of infrastructure investor, vehicle owner and administration.
- **Infrastructure investor:** requires a tariff to cover electricity costs, infrastructure investment, debt and margin. Some incentives are initially required till a critical mass of DWPT-EVs were in roads.
- **DWPT EV owner:** needs to justify the added investment to convert its EV into DWPT with a significant number of e-Roads options around his daily activity area.
- **Administrations:** a cost benefit analysis was performed considering all relevant aspects; economic investment, technology, health, environment concerns, competing technologies, fuel savings, safety.

Partners involved

QiEurope – Technology to Market

KTH Royal Institute of Technology

Politecnico di Torino

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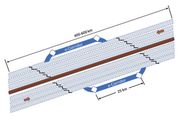
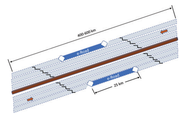


2030. Dedicated e-Corridor



2050. e-Road

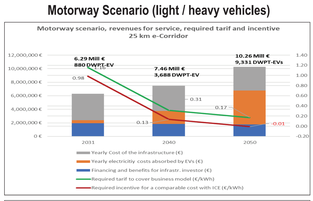
Competing Technologies	Other affecting factors
Battery Capacity	Technology breakthrough
EVs Consumption and Autonomy	Safety (autonomous driving)
Super and Ultrachargers	Health concerns
Wireless Static /Station. Charging	Regulation
Standards and plug-in interoperabili	Environmental issues
Hydrogen vehicles	Economic issues (EV and infrastr.)
Other clean techn. (gas, hybrids…)	Grid impact
Conventional Diesel/Gasoline	Supply chain impact

Variables analysed in the business model

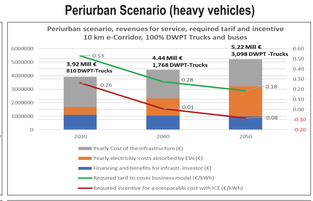
Business Model main results

Infrastructure Investor

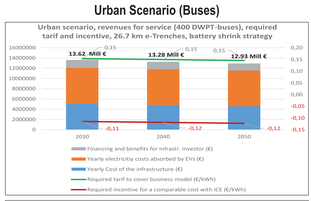
Motorway Scenario (light / heavy vehicles)



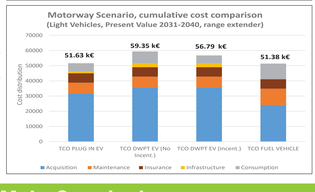
Periurban Scenario (heavy vehicles)

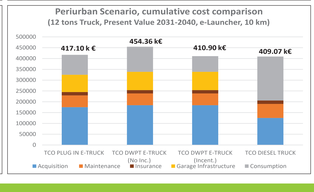


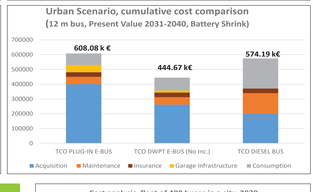
Urban Scenario (Buses)



EV owner (TCO)







Main Conclusions

Infrastructure investor:

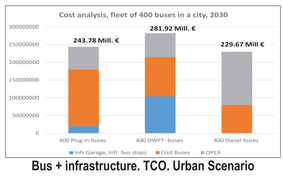
- Required tariffs to charge to users (€/kWh), will not be sustainable till 2050 (except for the urban bus scenario)
- By 2050, a critical mass of daily traffic will eliminate the need for public incentives

Vehicle owner:

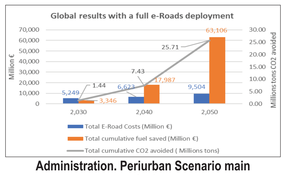
- By 2030, ownership of DWPT vehicles is always more expensive than the equivalent EV or ICE. For DWPT EVs, figures are presented with and without incentives.
- Exception: Urban buses. With a reduced battery, cost for users is cheaper than EV of ICE, but by 2030 global TCO is still more expensive than ICE or EV buses.
- Figures may change over time depending on many factors.

Administrations:

- E-Launchers (periurban scenario) cost is more that 3 times the cost of a conventional road (see Figure on the right). However, savings of fuel and CO2 emissions are significant.



Bus + infrastructure. TCO. Urban Scenario



Administration. Periurban Scenario main conclusions

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Consortium

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