URBAN ELECTRIC VEHICLE CHARGING ECOSYSTEM

Aivars Rubenis,

Lesla Limited

Two Problems – one solution

1. Problem with Electric Vehicle Charging for people without private driveways
2. Problem for Energy Companies how to provide Smart Energy Services in cities

URBAN ELECTRIC VEHICLE CHARGING ECOSYSTEM

Aivars Rubenis,

Lesla Limited

The Problem # 1: Urban EV charging

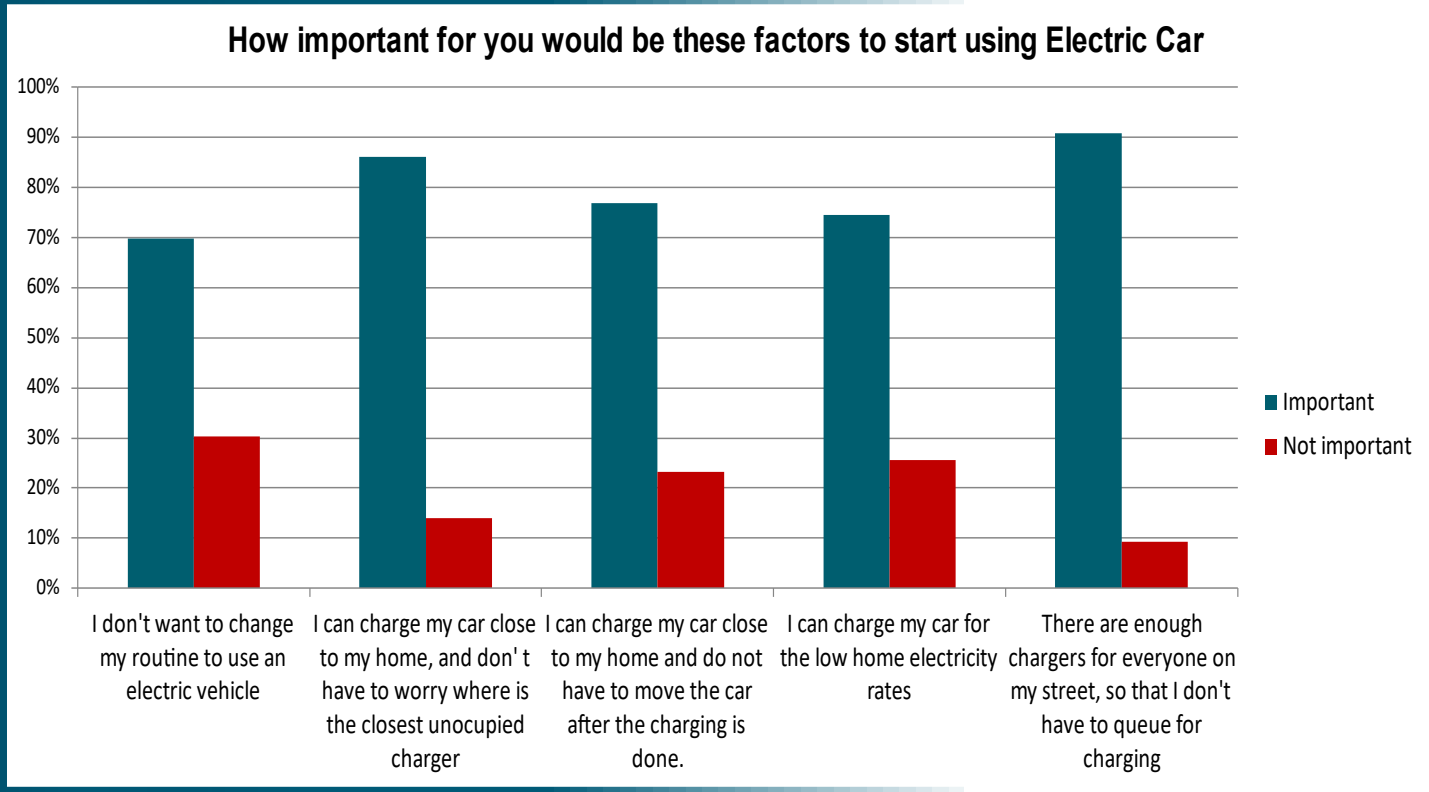
- EU plans to phase out new ICE vehicles by 2035
- Currently more than 90% of all EVs are charged at home.
- Existing on-street charging is not suitable. In the UK just 2% of EVs rely exclusively on public charging network.
- More than 30% of households in Europe don't have access to off-street parking
- => By 2035 more than 100+ million vehicles will have no good way to charge

Current situation

- People are very positive about moving to EVs:
  - In a survey in Kensington, London more than 40% expressed the willingness to buy an EV within next 5 years.
- The realities of owning an EV in urban environment have not been considered
  - Currently in Europe 10-20 EVs per one public charger
  - Chargers are often occupied, need to find an available charger
  - Charging costs are up to 10x higher than for home charging

Current situation: People

- When asked directly:
  - people are not willing to drastically change their routine
  - want their chargers to be close and available when needed
  - want the charging to be affordable



The Problem # 2: Smart Energy Grid Services

Problems with grid capacity:

- Current EV charging business model is overloading the existing power networks in cities
- With 10 cars per charger:
  - people queue to charge
  - start charging with maximum power as soon as the car is plugged in
  - leave as soon as charging is finished
- No schedule management, power optimisation, V2G or smart energy flow management is possible
- => Grid peak use increases
- **=> Huge investment costs for grid upgrades**

Lesla kerb-charger solution

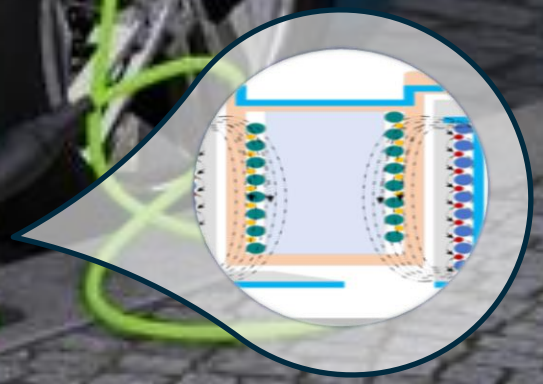
”Hidden” wireless chargers replacing existing street curbs, connected to the car using standard Type2 cable connection.

Wireless charger part:

- hidden beneath the surface
- does not occupy pavement
- disabled-person friendly solution
- completely weatherproof
- almost indestructable

Kerb enclosures:
multipurpose application, designed with 100% recyclable materials

Plug part:
fits all vehicles now, using existing plug standards does not require retrofitting vehicles



Contactless energy transfer
using 3D wireless technology
low cost WPT solution
> 90% near-field WPT efficiency

Approach to EV charging

1. **”Wholesale” kerb installation**
   - Installation of cable infrastructure for the whole street brings down the costs
   - Installation a public “personal” charger for each car on the street removes high turnover business model.

2. **Encouraging plugging in every time**
   - Enabling top-up charging instead of full charging requires less energy each day and has less stress on battery life
   - It provides possibility to provide smart grid services and V2G using bi-directional charging

3. **AI support**
   - AI automates charger setup and optimises energy flow automation to avoid grid capacity upgrades

The Project Proposal

Develop and demonstrate of a scalable and affordable smart urban on-street charging ecosystem:

- Using kerb-chargers and distributed PV energy generation, maximising use of locally produced energy
- Using AI to optimise energy consumption, using existing grid capacity
- Using EVs as aggregated Virtual Power Plants and demand side management for grid stabilisation
- Providing benefits to grid and earning from smart grid services, not high energy prices

Current partners:

- UK:
  - Lesla Limited – Kerb-charger technology
  - University of Liverpool – AI and Machine Learning competencies

- Latvia:
  - PC Energy – urban PV power systems
  - Latvia University of Life Sciences and Technologies

Looking for partners:

Energy companies - Retail Energy Suppliers and Distribution Service Operators interested in:

- Enhanced Load Management of peak load pressures, extending infrastructure lifespan and enhancing power supply reliability.
- Increased grid stability using EVs as energy storage units through V2G technology to manage energy demand spikes and integrate renewables.
- Data-driven insights on usage patterns and charging behaviour to inform future investments and strategies.
- Brand positioning as leaders in sustainability and innovation, enhancing brand reputation.
- Development of new pricing models and new revenue streams through V2G systems and smart charging solutions

Looking for partners:

Universities

- Installing and evaluating Pilot Projects
- Assessing local adaptation to varied local environmental conditions and user preferences.
- Optimizing energy flows within local grid conditions
- Researching the integration of rooftop PV panels in urban microgrids, particularly for buildings with multiple dwellers.
- Examining user responses to innovative energy models such as Vehicle-to-Grid (V2G), peer-to-peer energy trading, and community-shared energy initiatives.
- Evaluating and innovating new value streams emerging from smart urban charging systems.
- Developing strategic roadmaps that facilitate the widespread adoption of urban EV charging infrastructure.

Geographical preferences:

- Countries with most benefits from the system:
  - cities with historic streets, requiring non-intrusive charging solutions
  - high proportion of population lives in apartments and keeps vehicles on-street

- Countries with little or no snow during winter

Thank you

Mr. Aivars Rubenis

Lesla Limited

aivars.rubenis@lesla.co.uk

UK +44 (0) 7521 377 013

www.lesla.co.uk