The feasibility of using Dynamic Wireless Power Transfer for EVs

Denis Naberezhnykh – Head of ULEV and ITS Technology

FABRIC - Wireless Dynamic Charging For FEVs: Challenges And Concepts, 2 February 2016

Our Vision

To be the world leader in creating the future of transport and mobility, using evidence-based solutions and innovative thinking

Fast facts

- One of the largest independent transport centres in the world
- International reputation for first class consultancy, research excellence and project delivery
- A team of over 400 highly qualified transport specialists

Clients in 145 Countries

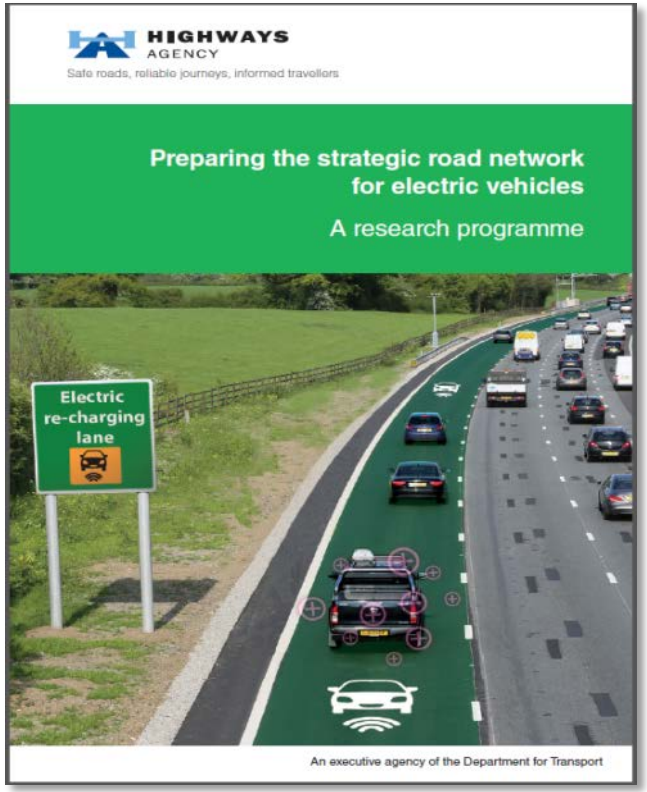
Over 800 Projects delivered in 2014

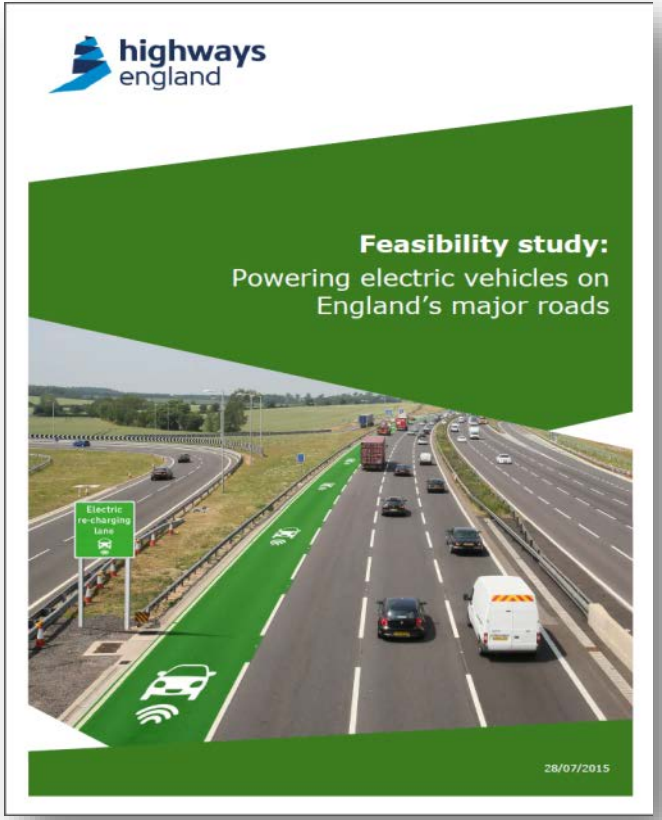
Over 4,000 TRL Reports available to download

TRL Software sold in over 60 Countries and 250 cities world-wide

Background

- Highways England published a research programme in 2014
- Prepare the SRN for future EV take up and facilitate their adoption
- Contribute to reducing GHG emissions and air pollution
- Focus is on identifying a wireless power transfer solution that could be installed under the road surface





http://www.highways.gov.uk/knowledge/publications/1902/

Trends in road vehicle electrification

- No revolution in on-board battery storage

- EV range will double by 2020 (as will battery capacity)

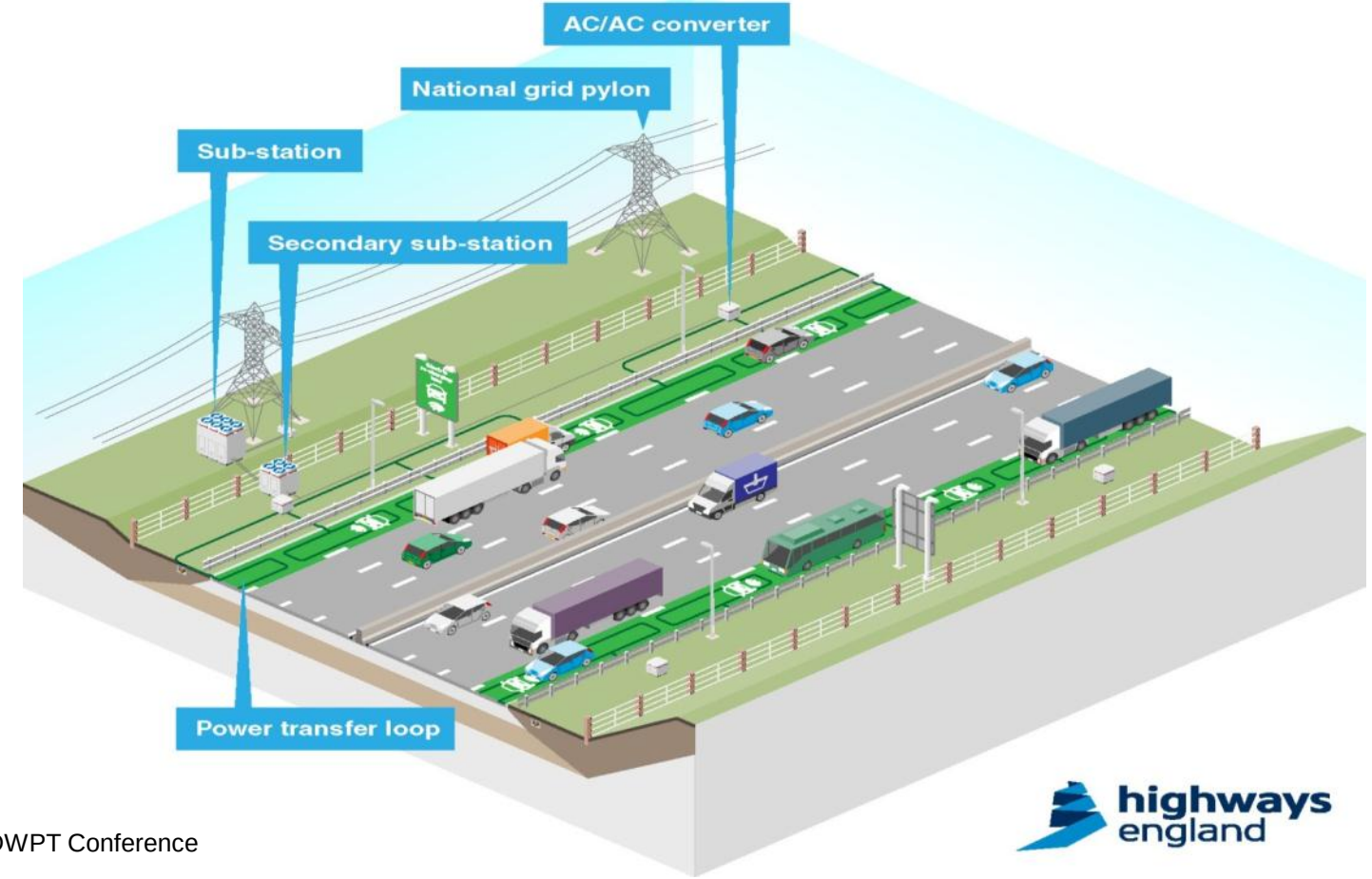
- Novel, more flexible vehicle usage and ownership leading to higher vehicle utilisation

Batteries unlikely to provide range comparable with ICE vehicles in the near future

Range anxiety could be replaced with “charging anxiety”

Increased demand in opportunistic charging

Feasibility study – concept



Project team led by TRL

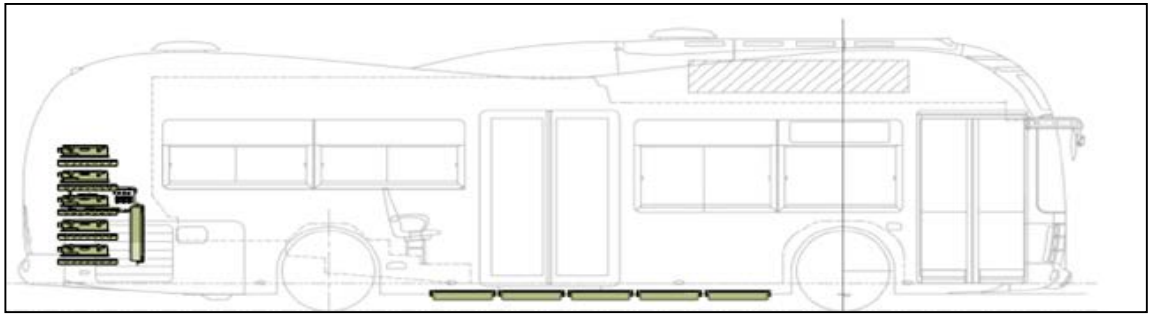
Feasibility study results

- Does the technology already exist?

Power:	140kW to 200kW
Efficiency:	80%-90%

Images: Scania

Feasibility study results

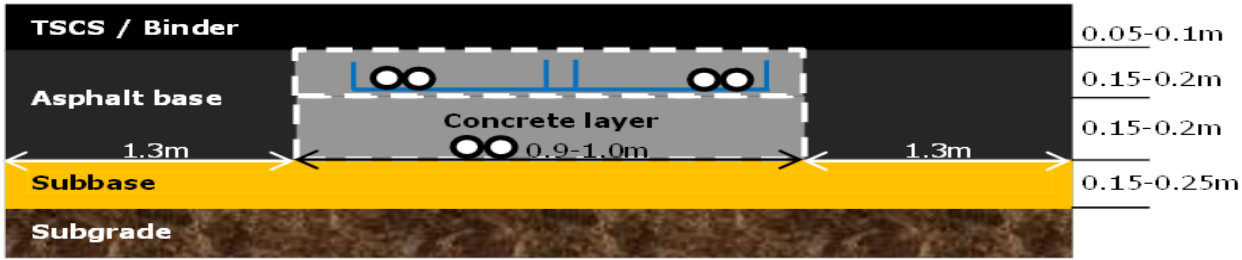


Power: Up to 200kW
Efficiency: 75%

Images: DW OLEV and KAIST

Feasibility study results

- Can it be installed in the road?

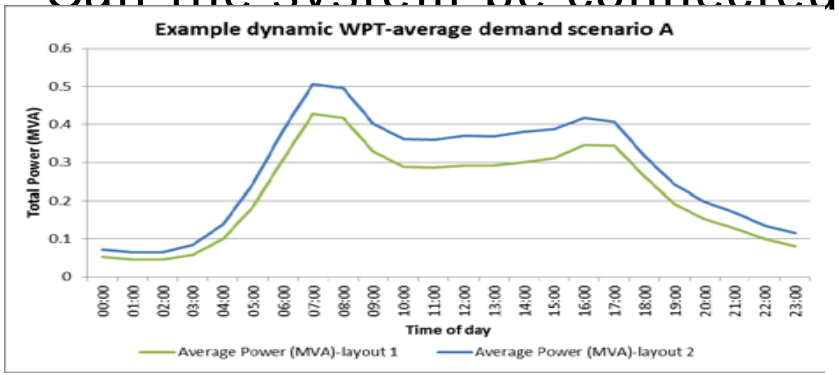


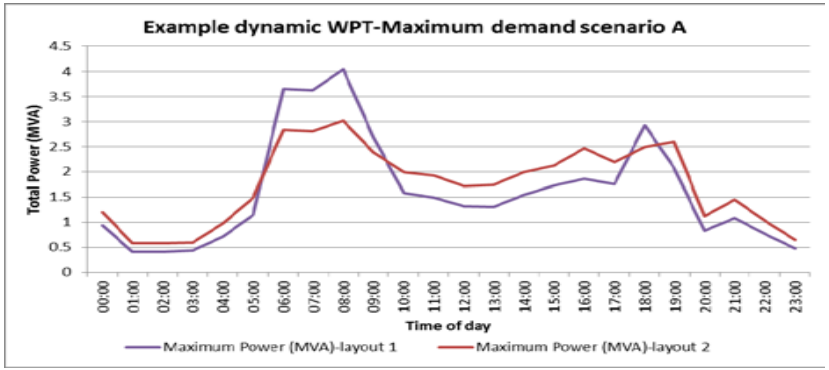
DW OLEV / KAIST DWPT system

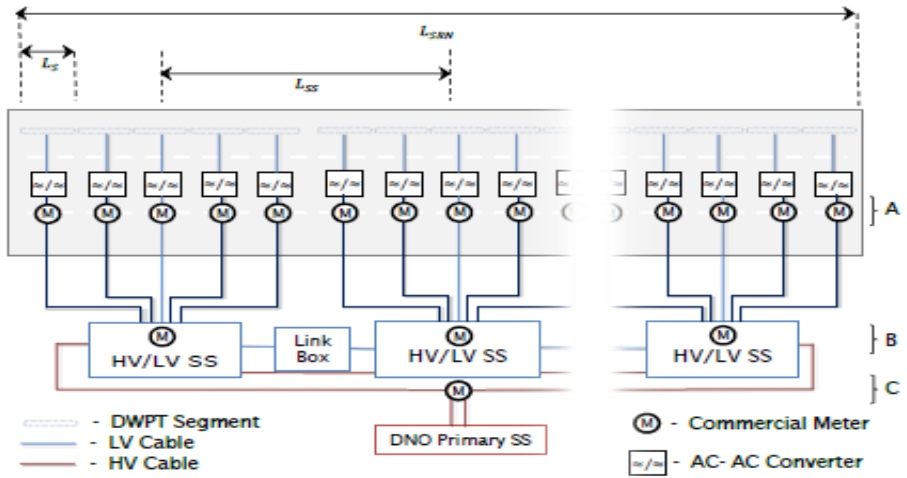
Modieslab – Netherlands

Feasibility study results

- Can the system be connected to the electric grid?







Feasibility study results

- How much will it cost?

NPV (over 20 years, from 2010)	£17M per km	Construction, operation and electricity costs
Installation and grid connection	£3.9M per km	Road works and provision of appropriate power supply
Operation	£1.2M per km	Maintenance and back office operation
Electricity cost	£12M per km	Electricity over 20 years

Environmental benefit (20 yrs)	% reduction	Monetised saving
CO_2	45%	~£2M per km
No_x and PM	35% and 40%	Between £100k to £1M per km

Could this be the future?

Thank you

Denis Naberezhnykh
Head of ULEV and ITS Technolgy
Tel: 01344770689
Email: dnaberezhnykh@trl.co.uk