



HSL
HRT

Electrification of public transport – from pre-commercial pilot to roll-out

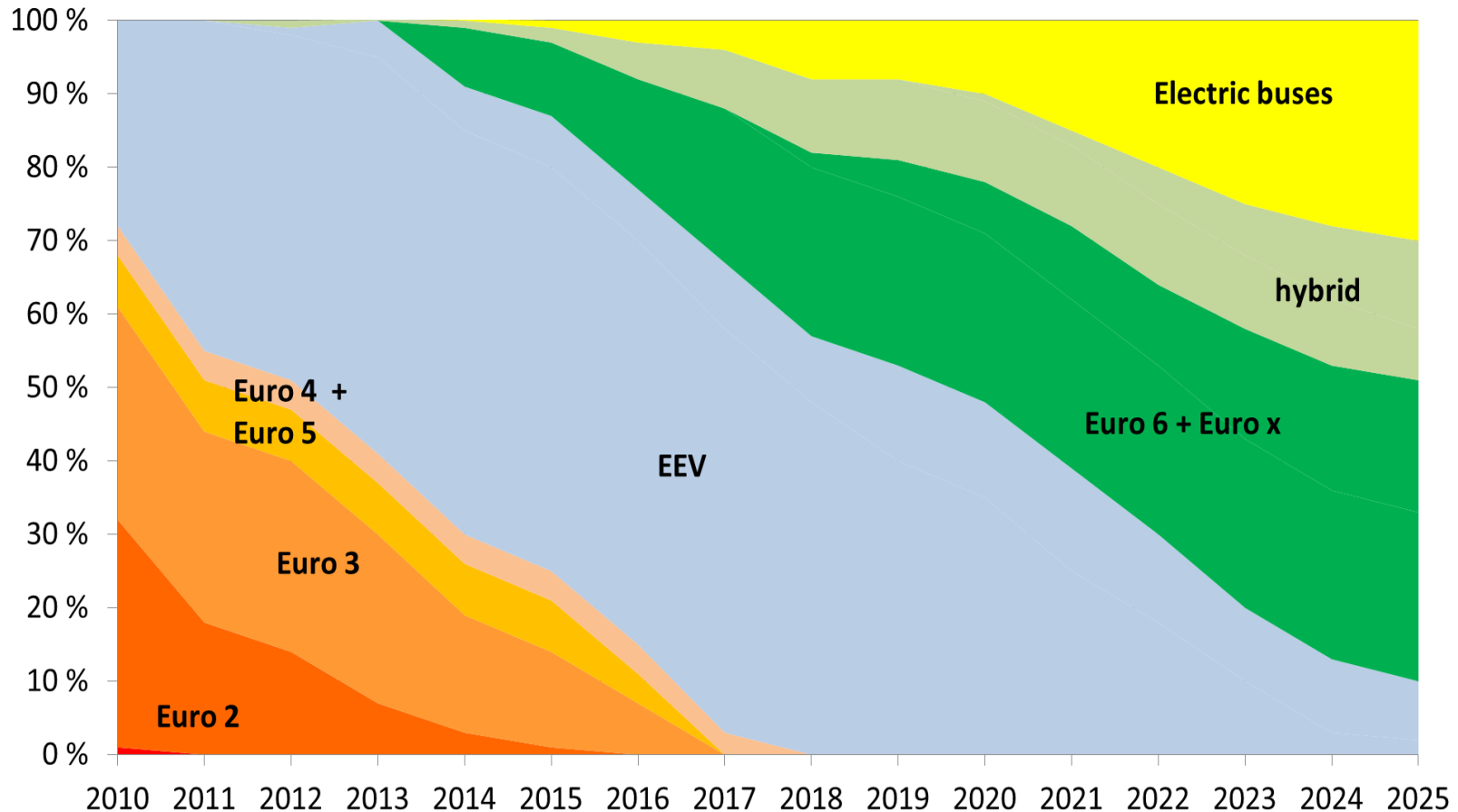
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HSL fleet strategy 2025



Estimated effect on emissions by 2025 (compared to 2010):

- Reduction of NO_x (-92%), PM (-95%), CO₂ (-90%)
- For conventional buses, 2nd gen. biofuels constitute 100% from 2020 onwards

e-bus system KPI's and requirements from PTA point of view

- Sustainability: positive environmental and societal impacts on emissions and noise
- Productivity: the size of the fleet or the number of drivers is not to be increased upon electrification (TCO)
- Operability: the electric buses must be equally operable compared to conventional buses
- Reliability: system-level reliability
- Attractiveness and comfort: the level of service and passenger comfort need to be the same or better compared with conventional buses

ePELI innovation environment

- HSL started the game by changing it's operating model and by procuring the pilot electric busses (12 pcs) → delivery to operators
- ePELI creates a platform for innovations, i.a.:
 - Innovative procurement models of electric bus transportation
 - Electric bus fleet management and defining electric bus specifications
 - New passenger services
- ePELI creates the actor network needed for electric public transportation
- ePELI is an open platform, that involves several buyers, providers, and developers of transportation services

Pre-commercial pilot ePELI

(Part 1 - Innovative public procurement of an electric bus system)

”ePELI” Part 1 – Innovative public procurement

- HSL, city of Helsinki, city of Espoo
- Preparing for the market-based entry of electric bus systems
 - Initiating the market dialogue: bus operators, charging systems, bus manufacturers, system suppliers, service providers
 - Supplier conferences and workshops
 - Ensuring the correct system requirements and specifications
- Creation and activation of the ecosystem
- Moving fast towards the market-driven procurement and business

Procurement preparation of electric bus transportation services

- ePeli project prepares for the tendering of electric bus transportation
- The goal is to have full readiness for procuring electric bus transportation services through normal tendering
- Procurement preparation affects HSL, cities, transportation and charging service providers, and bus and charging equipment manufacturers

Procurement preparation of electric bus transportation services (2)

- Procurement preparation contains
 - Preparing the procurement documents of electric bus transportation
 - Description of the provided charging infrastructure
 - Defining the bus requirements
 - Defining the information that the transportation service provider needs
 - Preparation of the electric bus transportation procurement procedure
 - Collaboration with cities to arrange charging
 - Scheduling of procurement preparation
 - Stakeholder collaboration
 - Work shops with transportation service providers
 - Market dialogue with bus and charger manufacturers, and service providers

Practical measures of ePELI in Helsinki and Espoo

Practical actions in the ePELI PCP

- 12 electric buses are to be lent to 5-6 different PTO's
 - The 2 first buses are already delivered, the rest in 2016-2017
- The buses will be operated on 5 – 6 different city lines among conventional buses during 2016 – 2019
 - Tentatively 1 – 2 lines in Espoo and 4 – 5 lines in Helsinki
- City of Espoo implements the opportunity charging infrastructure in Espoo (end stops)
- City of Helsinki and Helen implement the opportunity charging infrastructure in Helsinki (end stops)
- Each city will have own CPO's





Pre-commercial pilot ePELI

(Part 2 - Ensuring the productivity of an electric bus system)

”ePELI” Part 2: Ensuring the productivity of the electric bus system

- HSL, cities of Turku, Helsinki and Espoo
- Monitoring and KPI analysis through the 12-bus fleet
- Key contents
 - System-level performance, energy flow and fleet management
 - Scalability from pilot-phase to commercial roll-out
 - Analysing and improving the attractiveness and acceptance of electric bus systems
 - System performance vs requirements and specifications
 - Syntheses, wider dissemination with stakeholders and international reference & co-operation

ePELI Part 2 "System productivity"

1. Verifying electric vehicle performance and reliability

- Collection and analysis of on-line vehicular and component data
- Verifying vehicle performance in laboratory
- Assessment of the reliability of vehicles in operation

2. Verifying system-level productivity

- Collection of real time system-level data
- Real-time follow-up and analysis of fleet and charging management
- Key performance indicators, analysis of operational margins

3. Scalability according to strategy

- Methodology and tools for scalability analysis
- Operational (GIS) analysis of pilot operation lines
- Scalability analysis for roll-out strategy

Summary and conclusions

- The technology is not yet mature and proven at systemic level – careful engineering is required
- Level of standardisation is low (progressing)
- Ownership, operation and service models not fully established
- All actors are not yet active / established
- HSL sees the PCP "ePELI" activity as the last step before commercial procurement and roll-out of electric bus systems
- Helsinki region will show the way to market-driven electric bus introduction

Nordic co-operation?

- Several Nordic cities have the same challenges
- Many of the questions are the same
- Could we team up in solving them?

Thank you!