

Inter-regional Workshop on Electrification of Mobility - Challenges and opportunities for transport, energy and spatial planning. Needs for slow and fast charging in cities

François Cuenot, UNECE Secretariat

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Recharging needs in cities

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- EVs in city environments
- Vehicle and recharging infrastructure trade-offs
 - Battery size vs recharging infrastructure
 - EV per recharging points
- Quick review of London Uber drivers recharging needs
- The importance of battery durability
 - New technical regulation adopted by UNECE/WP.29
 - Quality batteries in PHEVs and BEVs
- Conclusions / next steps

Electric cars in cities

When active modes (walking/cycling) or public transport not possible



- Many cities have set ambitious targets for EV deployment

- Car ownership usually lower
- Distances usually rather short
- Car sharing/pooling economically viable

- EV low usage cost a perfect fit

- Individual parking with plug rarely available

- Rules for apartment buildings slow to evolve

- On-street recharge difficult to avoid

- Many cities reclaiming public/parking space for other purposes

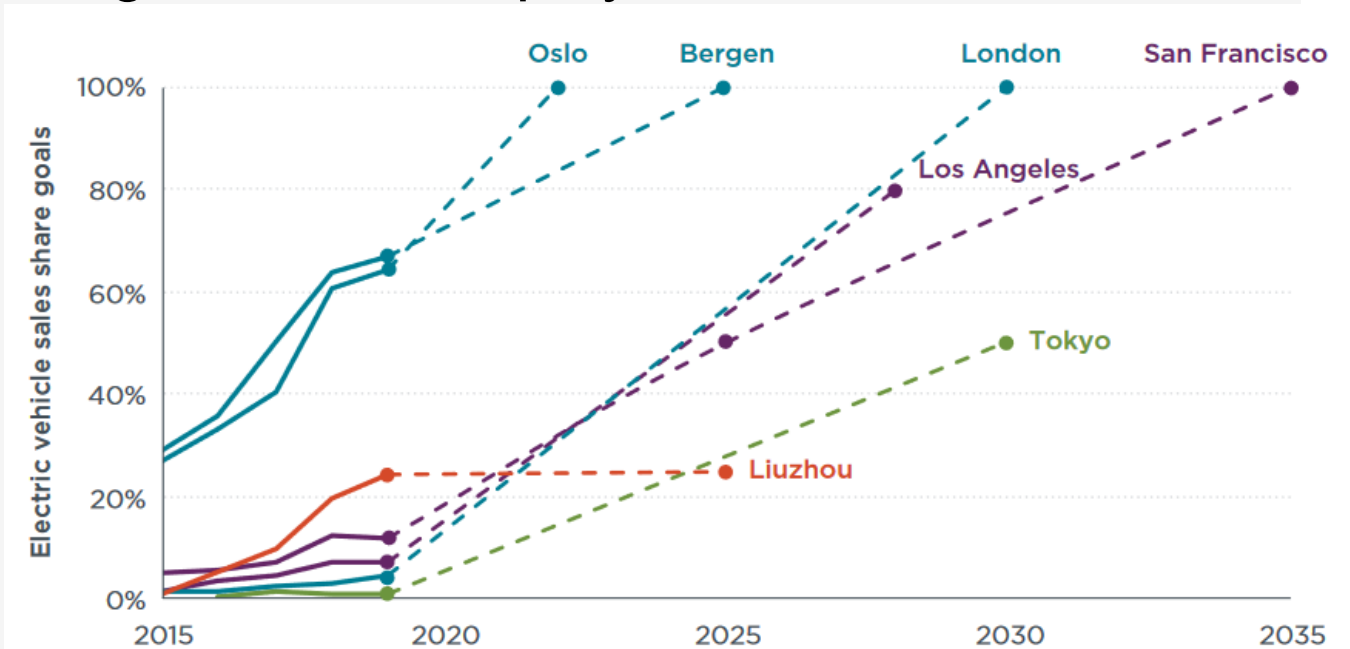


Figure 4. Goals for shares of electric vehicle sales in selected electric vehicle capitals.

Source : ICCT

Battery size versus charging needs



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- Battery size has increased over the years
- As a consequence, range has also been steadily increasing, reaching more than 300 km for the average electric car
- Probably enough to cover week-long urban trips for most drivers
- Shared vehicle / taxi a different story ? (see later)
- Decreased need (and business case) for recharging stations in urban areas
- Would more charging stations (per EV) engage car OEM to lower battery capacity?

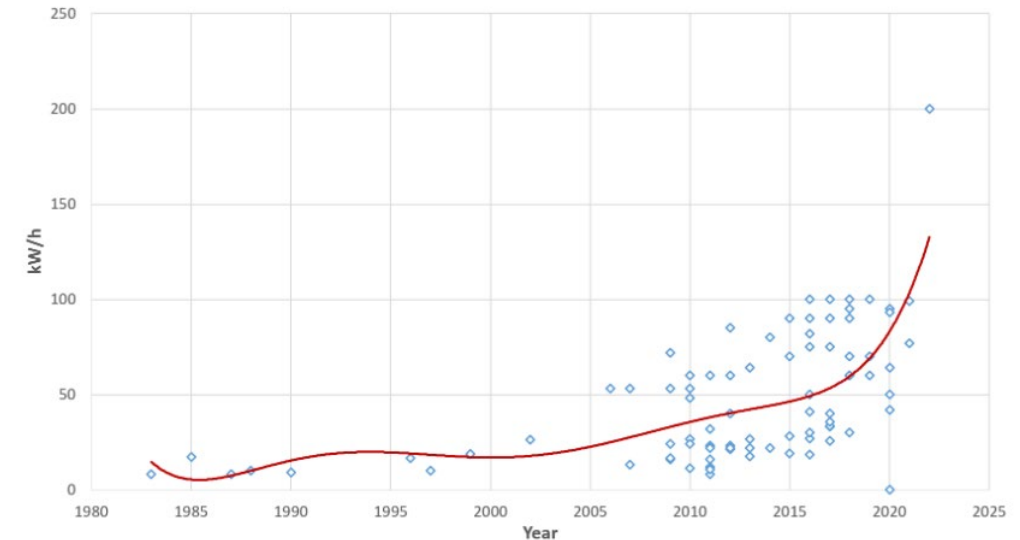
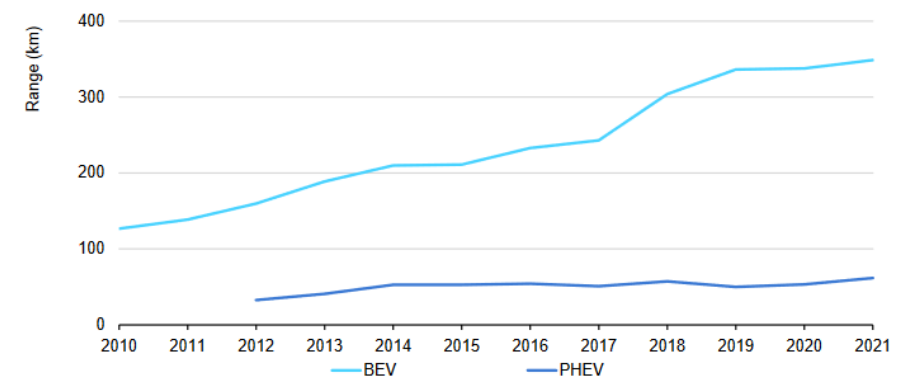


Figure 5. Evolution of the battery capacity since the mid 80s until now.

Source : Sanguesa, J.A. et al. A Review on Electric Vehicles: Technologies and Challenges. Smart Cities 2021,4, 372–404

Evolution of average range of electric vehicles by powertrain

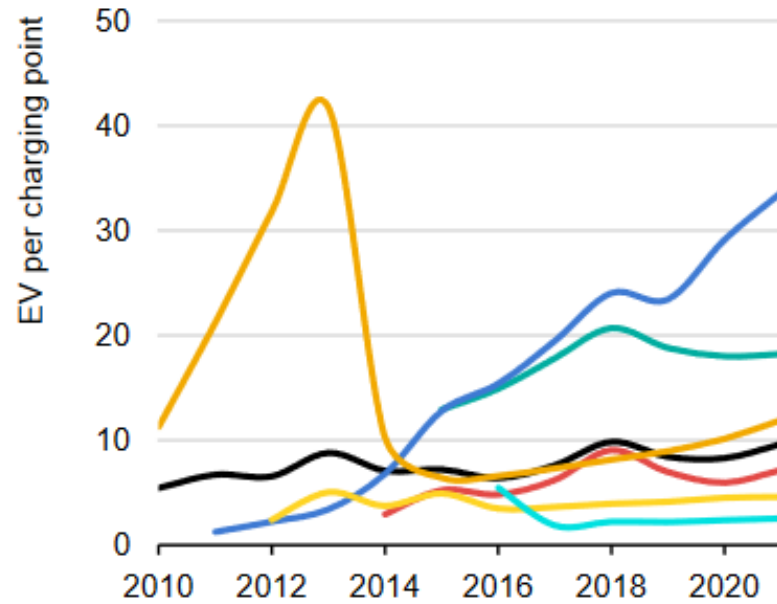


EVs fleet increasing faster than recharging points

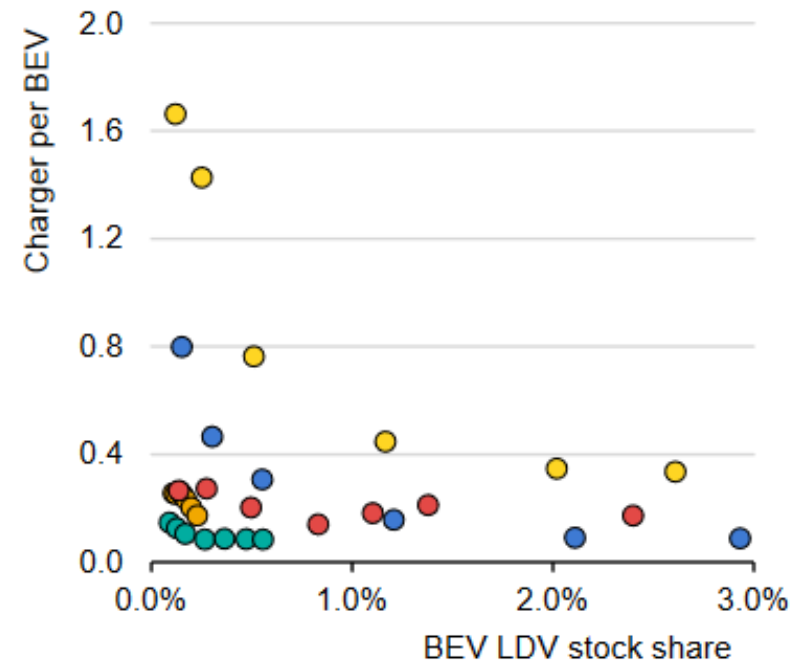


- Global tendency to have more EVs per recharging points

Electric LDV per charging point in selected countries, 2010-2021



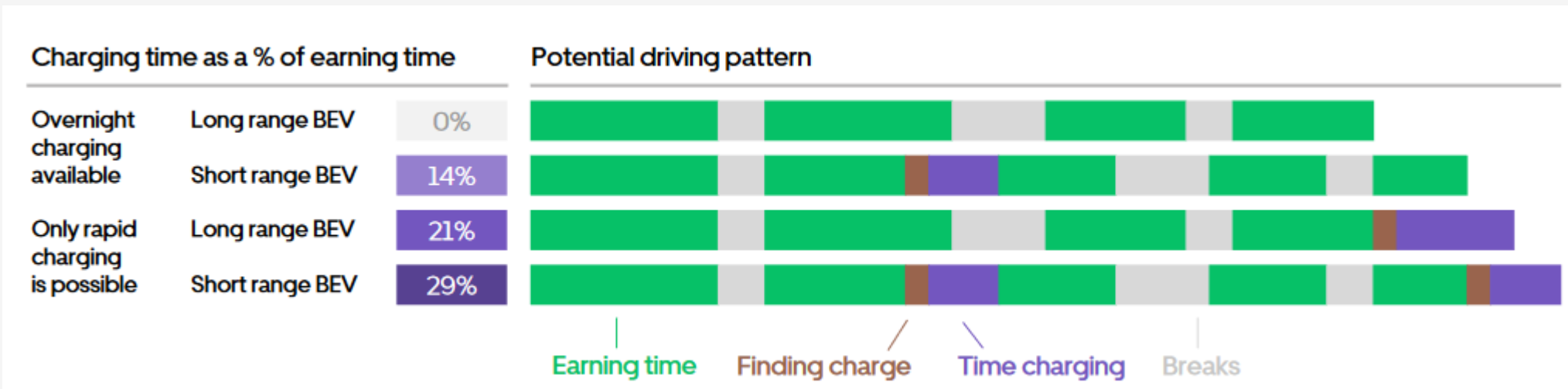
Charging point per BEV relative to the BEV LDV stock



UBER's London drivers case study



- Uber has performed a case study of their EV London drivers
 - Outcomes presented at [UNECE workshop](#) on “Real-Time Upstream Emissions of Electric Vehicles During Recharge”
- Long range Uber cabs can recharge once a day overnight
- Overnight (slower) charging better for their business

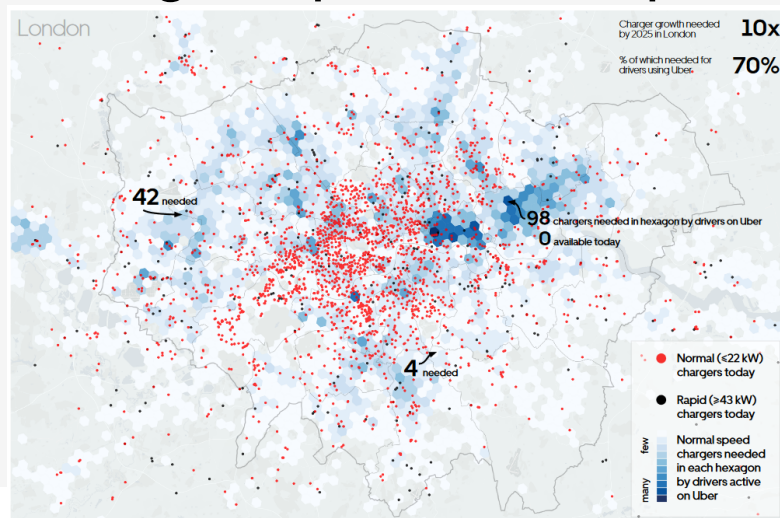


Source : Uber Spark Report, 2020

UBER's London drivers case study



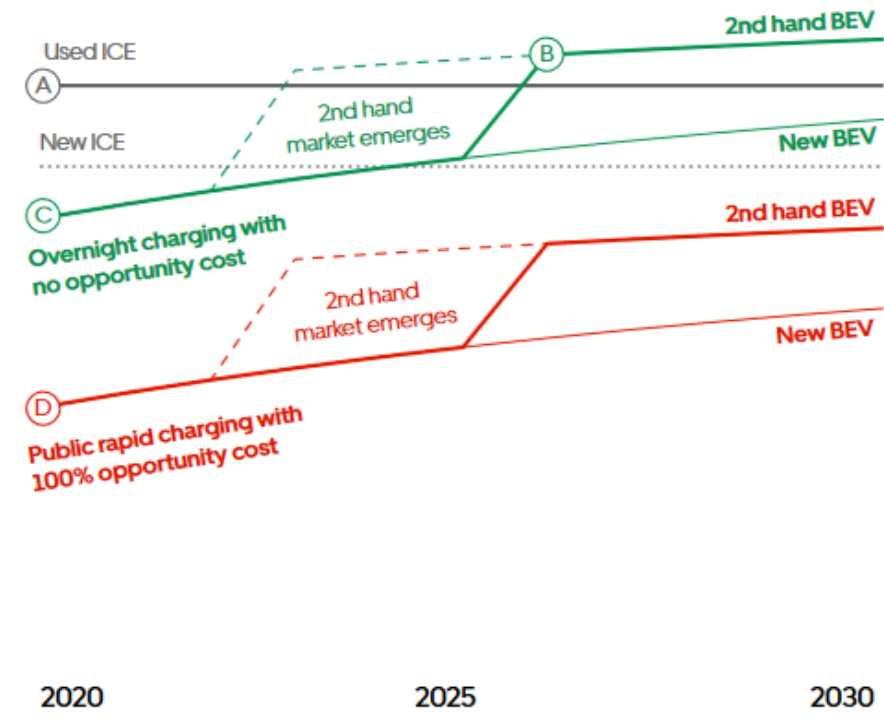
- Location of charging infrastructure not where needed
- Most driver live where there is a lack of recharging infrastructure
 - Wealth distribution key criteria
- Careful planning and repartition of charging stations have a huge impact on adoption



Drivers on Uber will need many times more chargers, and in very different places to today

- EVs more profitable than ICE from 2025

2020-30 net earnings scenarios for ride-hail drivers in different vehicles, in an EU ride-hail market with no mitigating measures, as the cost of BEVs falls



Source : Uber Spark Report, 2020

Battery durability a key criteria for long lasting performance



- Batteries should not degrade over the years to ensure sustained performance and constant recharging needs
 - If battery degrades, recharging needs increase
- UNECE/WP.29/GRPE has developed UN GTR No.22 on “In-Vehicle Battery Durability”
- Adopted in March 2022 by WP.29/AC.3
- EU and US made statements of intent to include in their forthcoming legislation in 2022/2023
- Only covers cars for now, phase 2 for vans and heavy duty initiated

UN GTR No. 22 - In-Vehicle Battery Durability



- GTR provides legal basis to report battery degradation, using “monitors”, of each vehicle to authorities
- Battery capacity should retain

Table 1

Battery Energy based (SOCE) MPR

Vehicle age/km for categories 1-1 and 1-2 in the scope of this GTR

	<i>OVC-HEV</i>	<i>PEV</i>
From start of life to 5 years or 100,000 km, whichever comes first	80 per cent	80 per cent
Vehicles more than 5 years or 100,000 km, and up to whichever comes first of 8 years or 160,000 km	70 per cent	70 per cent

- Of the original capacity

Next steps: Model developments strategies

Way forward for ForFITS



- Two-level strategy for future activities, endorsed by ITC
 1. With additional funding secured:
 1. Develop a ForFITS 2.0 simplified model for a broader audience,
 2. Develop additional features for ForFITS 1.0 on a modular approach or through a new modelling framework.
 2. With no additional funding (using existing limited resources),
 1. carry on with the existing ForFITS model and internal use pattern and implementation of digital infographics / visuals to be used with digital component of ECE publications, when deployed
 2. continue the reach out strategy to closely collaborate with other modelling groups, partnerships and activities to mutualize resources and to maximize the added value of ForFITS
- ITC to support secretariat in fundraising for ForFITS

ITC decisions

Way forward for ForFITS



- During its 84th session in Feb 2022, ITC: (decision 35.)

Welcomed the work on climate change, in particular the For Future Inland Transport Systems (ForFITS) tool, and **emphasized** its importance for the realization of the ITC Declaration on “Enhancing sustainable inland transport solutions for global climate and environmental challenges: a united call for universal action”, endorsed by the Committee at its eighty-second session; **supported** the proposed approach in order to further develop ForFITS, sustain its use internally, develop partnerships with other modelling groups, and engage in future technology modelling, pending additional resources;

Conclusions



- Battery capacity of EVs constantly increasing
- Durability to be acceptable and probably no need for battery replacement over the vehicle's lifetime
- Looking at actual trends, fast charging in cities of lower priority
 - Fast charging of high importance for inter-city / long distance journeys
- Focus on overnight lower power charging where vehicle are parked
- Vehicle / Charging station / [Grid] to be looked at as a system



Thank you!

Francois Cuenot
Mechanical Engineer
UNECE
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