

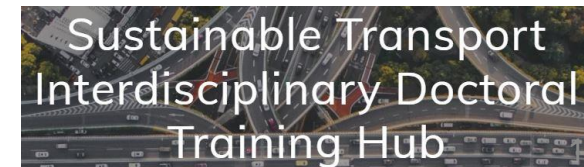
# Equitable roll out of electric-vehicle charging infrastructure:

## The challenges ahead and possible solutions

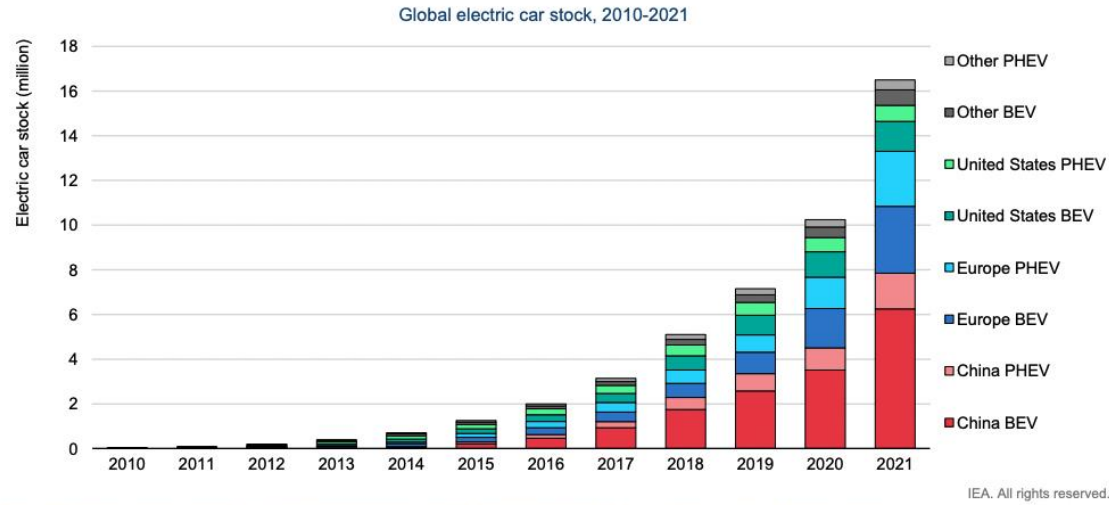
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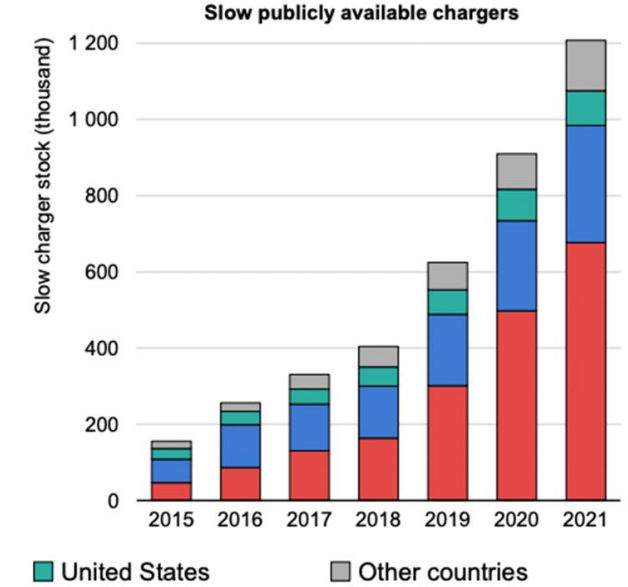
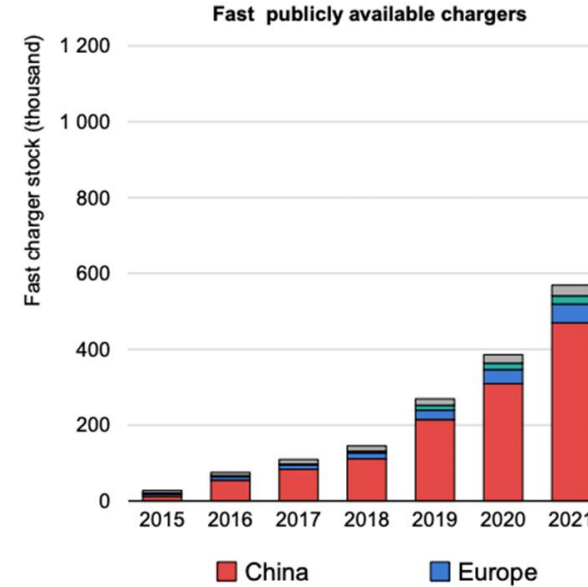
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# Adoption of EVs and deployment of charging infrastructure are moving at an exciting pace



Notes: BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle. Electric car stock in this figure refers to passenger light-duty vehicles. "Other" includes Australia, Brazil, Canada, Chile, India, Japan, Korea, Malaysia, Mexico, New Zealand, South Africa and Thailand. Europe in this figure includes the EU27, Norway, Iceland, Switzerland and United Kingdom. Sources: IEA analysis based on country submissions, complemented by [ACEA](#); [CAAM](#); [EAFO](#); [EV Volumes](#); [Marklines](#).



Source: IEA Global Electric Vehicle Outlook, 2022

# Social equity in EV charging infrastructure is an emerging area but still a synthesis of issues is limited and evidence scattered

- The aim is to provide a synthesis of evidence on social equity in various aspects of EV charging infrastructure, in particular:
  - How it has been recognised in previous studies and which areas covers?
  - What would be the potential 'corrective' strategies or policies and funding based on the measures employed to date?

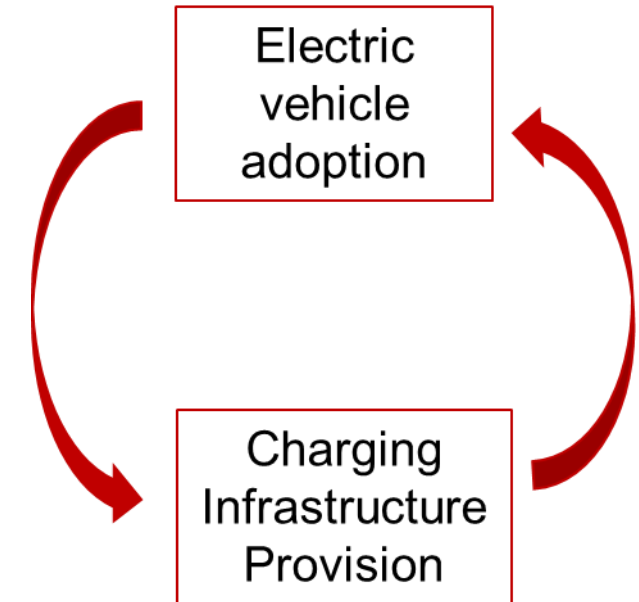
# Definition of social inequity in EV infrastructure

*“An uneven opportunity for individuals or groups to benefit from electric vehicles due to the lack of provision, affordability or useability of charging infrastructure”*

- Benefits include:
  - Reduced carbon emissions
  - Reduced household transportation costs in terms of fuel, taxation, and maintenance costs in relation to internal combustion vehicles, and
  - Health benefits due to improved air quality in the areas of adoption

# Social equity, electric vehicles and charging infrastructure: A summary of issues

- ‘Chicken and Egg’ problem in EV infrastructure provision and availability of home charging
- Social equity in charging point placement studies
- Accessibility, usability and charging infrastructure funding barriers
- Metrics to assess roll out and planning for EVs
- Energy and fuel prices



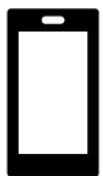
# Cross-sectoral challenge of social equity in EV mobility



- No overnight parking available
- Charging Infrastructure market led / in areas of demand
- Car clubs –grant funded chargers to be publicly available discourages shared use schemes



- VAT 20% for public chargers, 5% for home charging
- Off peak charging at home cheaper
- Higher energy costs for prepaid meters
- Electricity supply reinforcement may be required



- Higher pricing for pay as you go.
- Apps needed to get discounted rates.



- High cost of vehicle purchase
- Out of price bracket to benefit from incentives.
- Grants not generally available for secondhand vehicles

## Social equity issues for EV charging



- Fuel price increase to disincentivise
- High road tax for internal combustion engine vehicles



- Secondhand vehicles battery degradation issues



- Accessibility and usability of charging points

# Best practice solutions (implemented or suggested)

# Solutions – Charging placement and access



- Access-based targets and funding/ subsidy to reaching the minimal coverage at local / regional level
- Concession business models with the private sector
- Mobile charging stations (to test demand)
- Accessible charging specifications to address absence of universal standards



# Proposed Solutions – Home and workspace charging

- Regulations for new development to provide electric vehicle charging infrastructure (HM Building Regulations, 2022)
- Grant schemes to support landlords and multi-unit dwellings (Electric Vehicle Home charge Scheme)
- Smart chargers and dynamic tariffs to incentivise off-peak charging and vehicle to grid
- Development of a public charging network where vehicles are “naturally sat” including on street charging near homes in conjunction with rapid charging



# Proposed Solutions – EV affordability

- New business models to reduce the need to own an EV - e.g. e-car sharing and car clubs
- Grants/loans for new and second-hand vehicle purchases
- Battery swapping stations and replacement programmes



# Questions to be answered

*How can social equity in electric vehicle charging infrastructure be provided/ demanded where there is not a business case without stifling innovation in still a developing technology market?*

*How can we address the issue of social inequity in EV take up and infrastructure use if we do not understand the scale of the problem?*

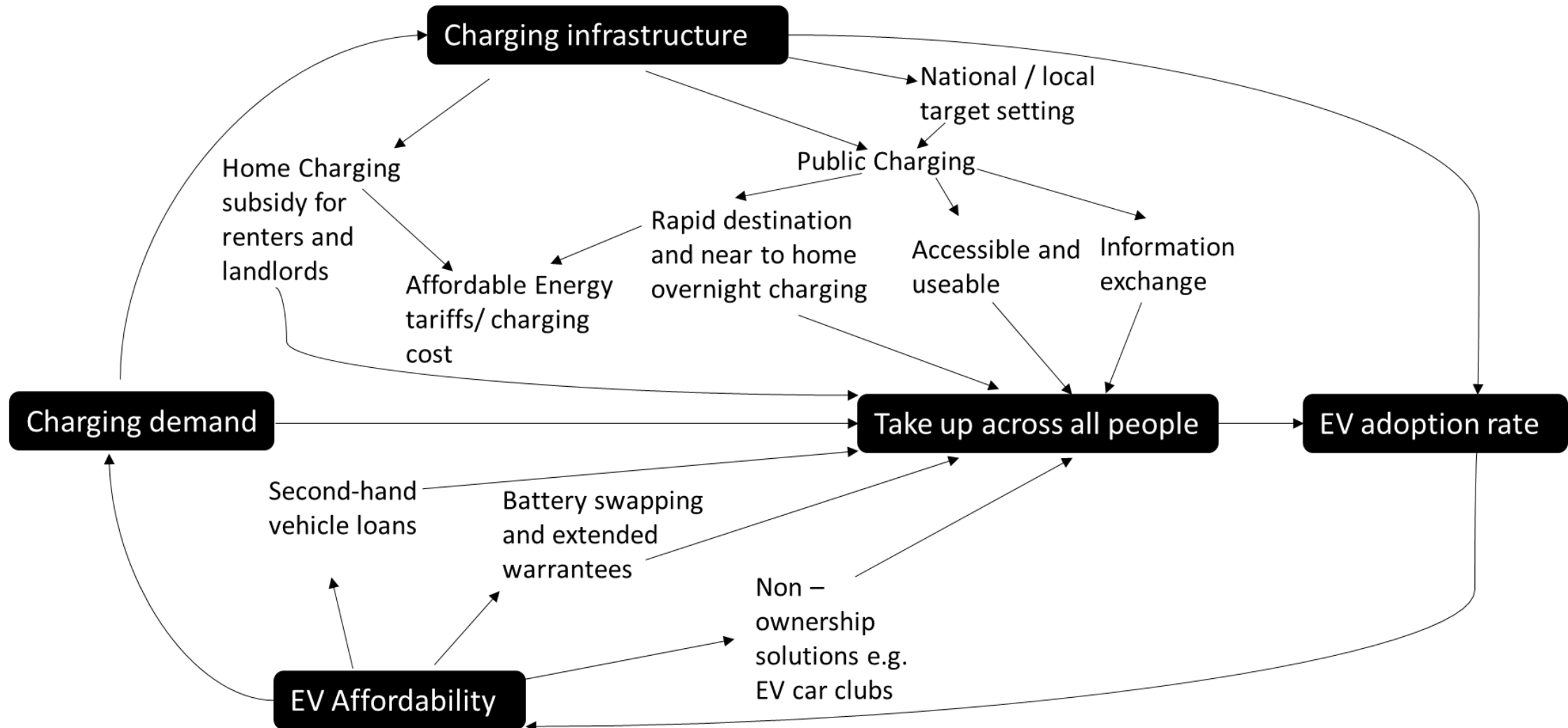
# Proposed directions

- Mapping of the breadth of EV charging infrastructure ‘players’
  - Better understanding of delivery challenges at different geographic scales
  - Qualitative mapping can be enhanced with quantitative data on charging sessions and electricity consumption
- Improving equity requires data!
  - Open and big data would support analysis of charging patterns and trends
  - There is currently a knowledge gap on the socio-economic profile of the charging-infrastructure user
- Further need to study existing EV policies and strategies to review the extent at which social equity has been considered including the effect of targets for infrastructure at various levels

# Thank you!

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# Relationship between EV interventions and take up

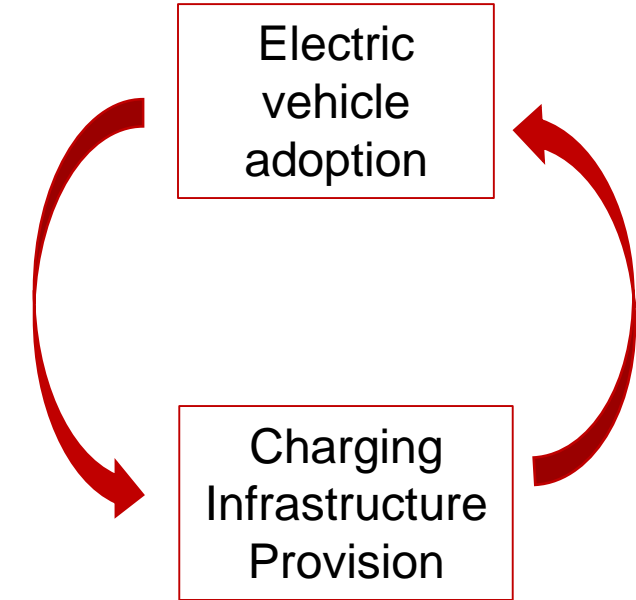


# Despite these encouraging trends, there is considerable uncertainty regarding the EV charging market

- Across the 100 most populous US metropolitan areas, **over 4 times the charging points these markets had at the end of 2017 will be needed by 2025**, amounting to over 195,000 non-residential electric vehicle charging points
- The 2014/94/EU on deployment of alternative fuels is not fit for purpose:
  - Lacks **guidance on the level of ambition and coherence needed**, leading to insufficient, uneven charging infrastructure distribution
  - Presents **interoperability issues in terms of physical connections and communication standards**, including connection to the electricity grid; and
  - Lacks of **transparent consumer information and easy to use payment systems**, which impact user acceptance.

# Thus far, equity analysis in the context of road transport and mobility has focused on spatial and temporal accessibility

- There is now an emerging discourse regarding social equity in the context of ‘decarbonisation through electrification’:
  - ‘Beyond early adopter’ charging provision
  - Inability of all people to benefit from reduced transport cost gains
  - Not all people would benefit from improved air quality



The aim of this presentation is to provide a synthesis of the challenges pertaining ‘social equity’ in the various aspects of charging infrastructure and the potential strategies to mitigate those