

EVs and Renewables : VtoX opportunities

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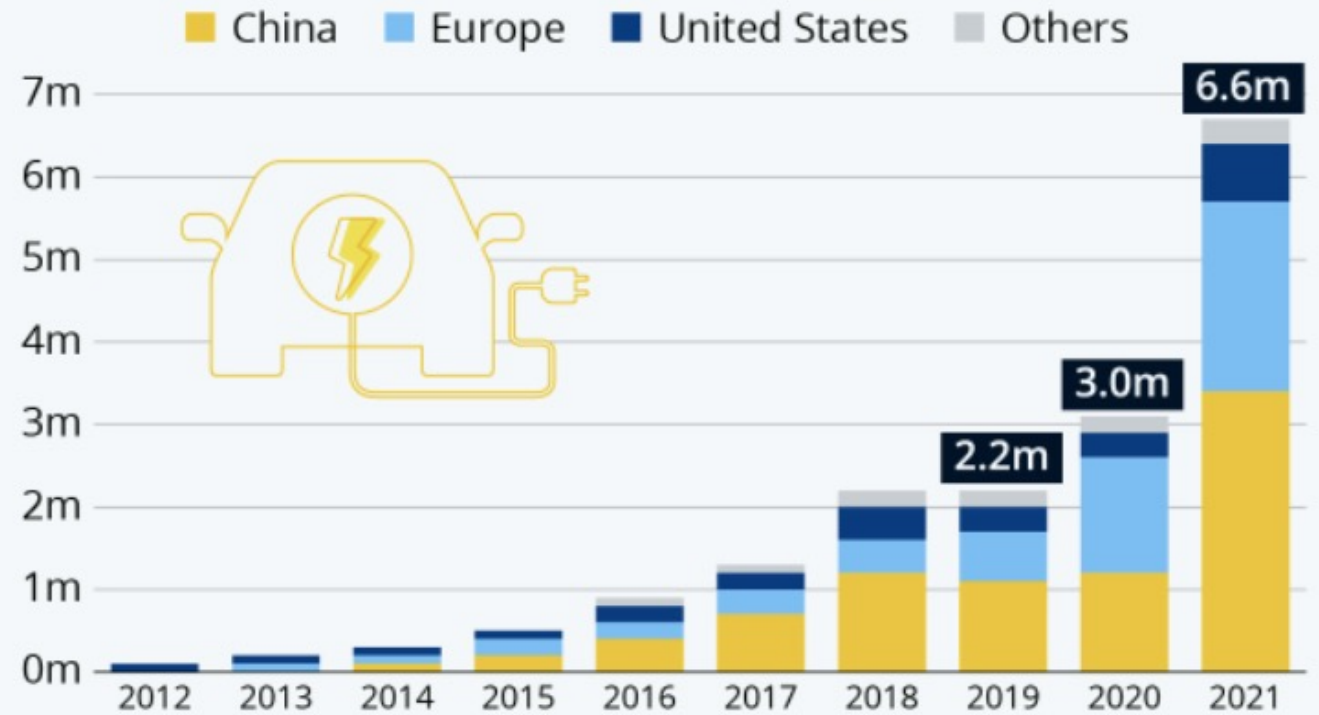
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EV sales are starting

Global Electric Car Sales Doubled in 2021

Global registrations of electric vehicles (incl. plug-in hybrids), by region*



* incl. passenger cars and light commercial vehicles (vans, light trucks)

Source: EV-volumes.com via IEA





Why?

Why the sales
are booming?

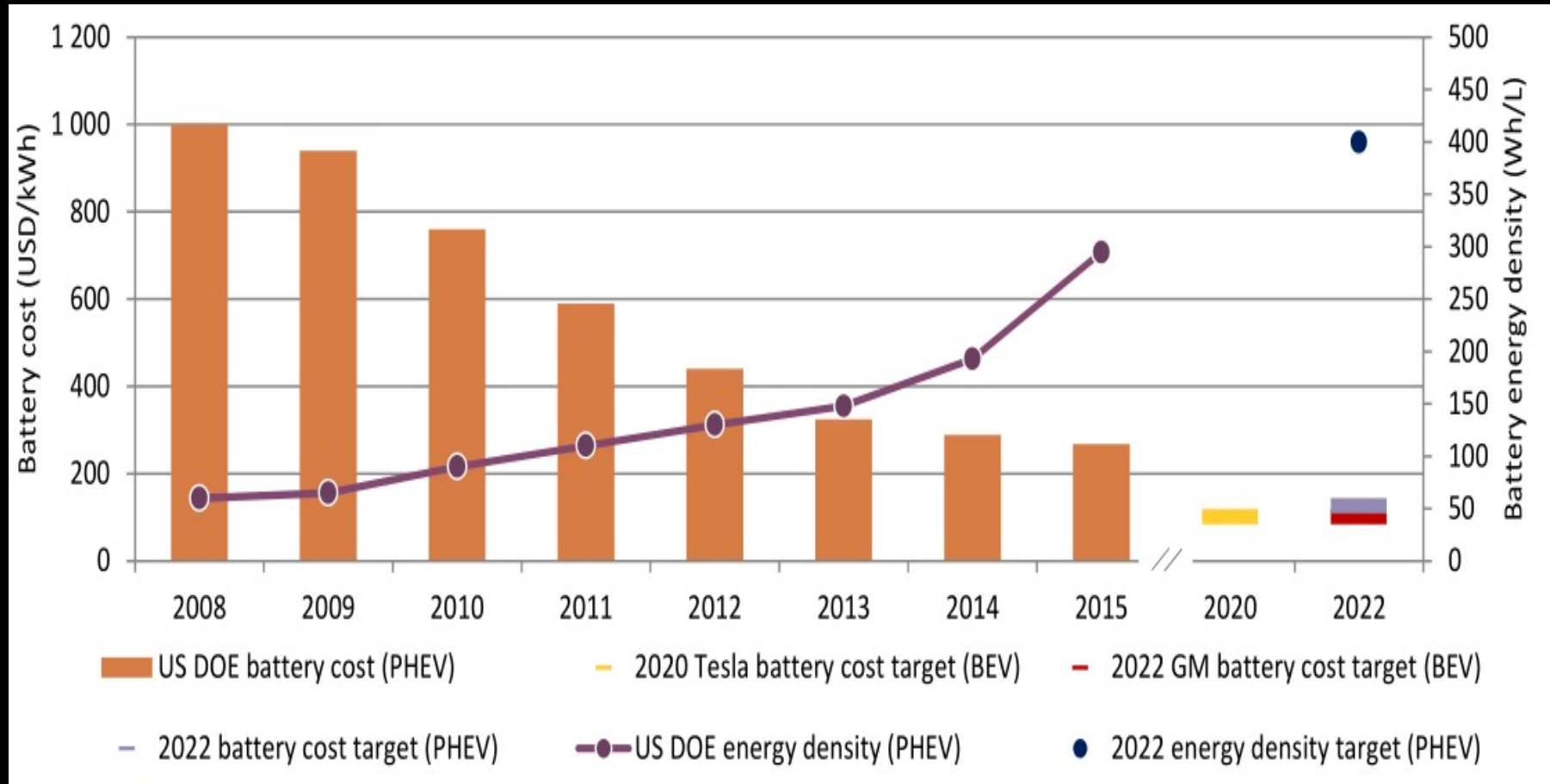
1. Cost of the battery is going down

2. Industrial strategies of car
manufacturers

3. Charging infrastructures are the
weak point

4. Innovations are about to come

1. Evs enjoy a Double dynamic: Increase in ENERGY DENSITY & decrease of COST



Source: IEA Global EV Outlook 2016

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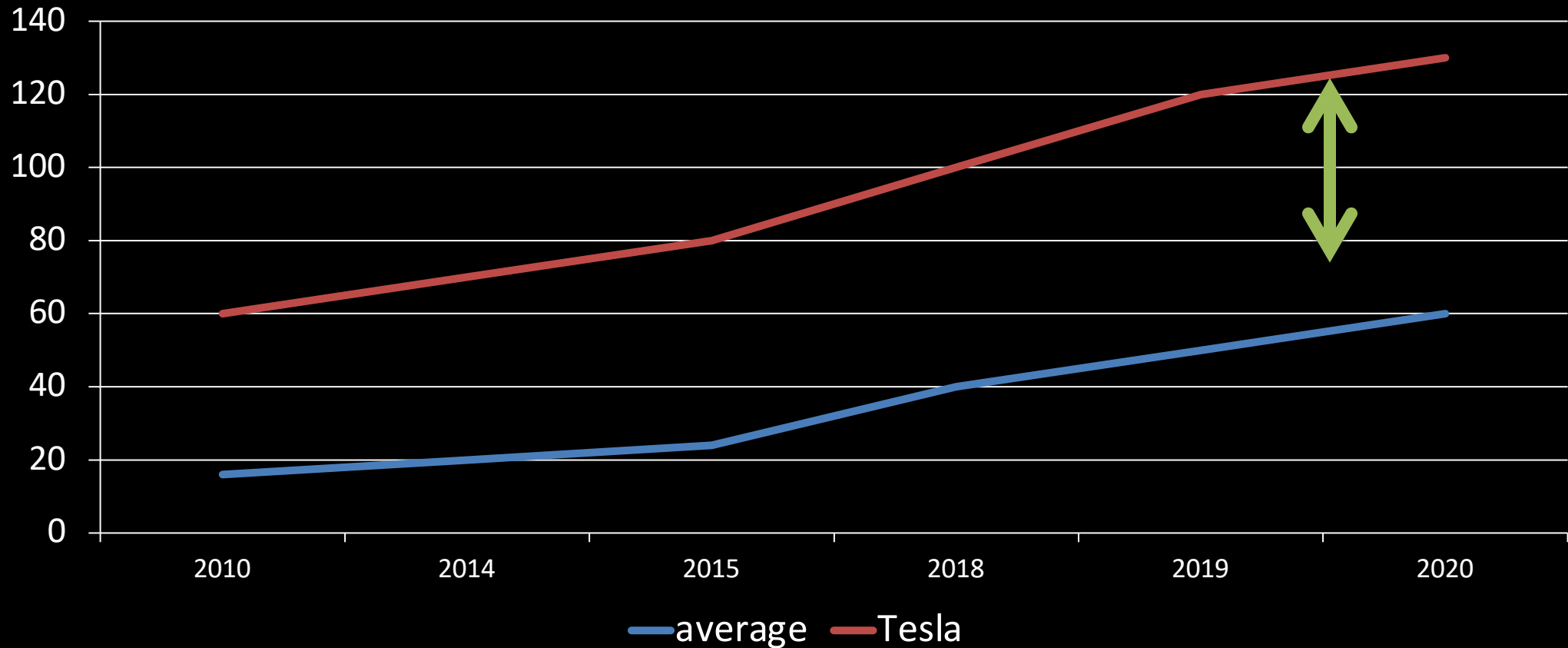
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Less cost => more stored energy / car

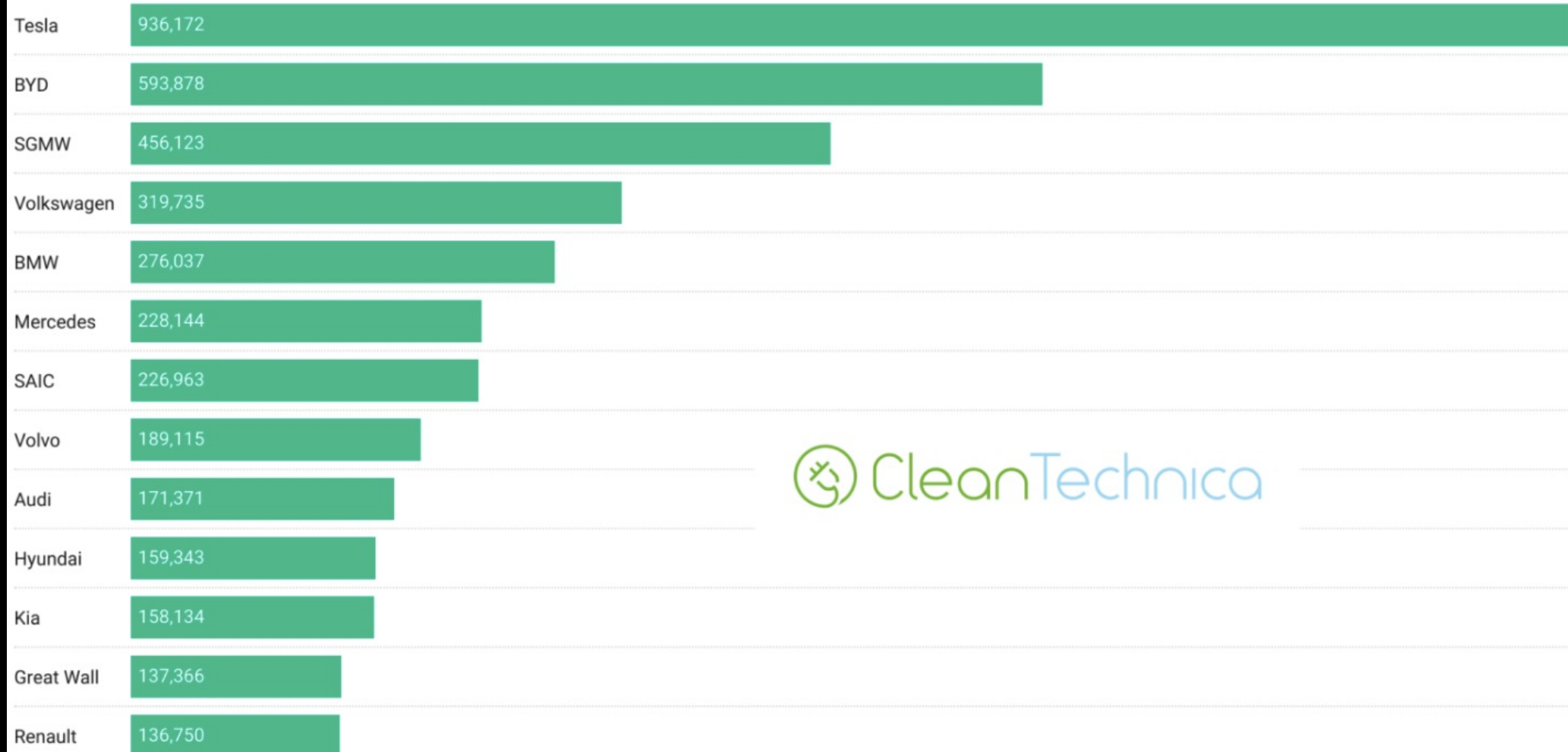
Evolution of the battery size in kWh per car



More « good cars » offers

World Plugin Vehicle Sales – Top Brands (January–December 2021)

Brands with most plugin electric vehicle sales across world, data aggregated by Jose Pontes of EV Volumes for CleanTechnica.com.



Real good cars

NOUVELLE PEUGEOT 208 UNBORING THE FUTURE*



THERMIQUE

ÉLECTRIQUE

*POUR UN FUTUR QUI NE SOIT PAS ENNUYEUX

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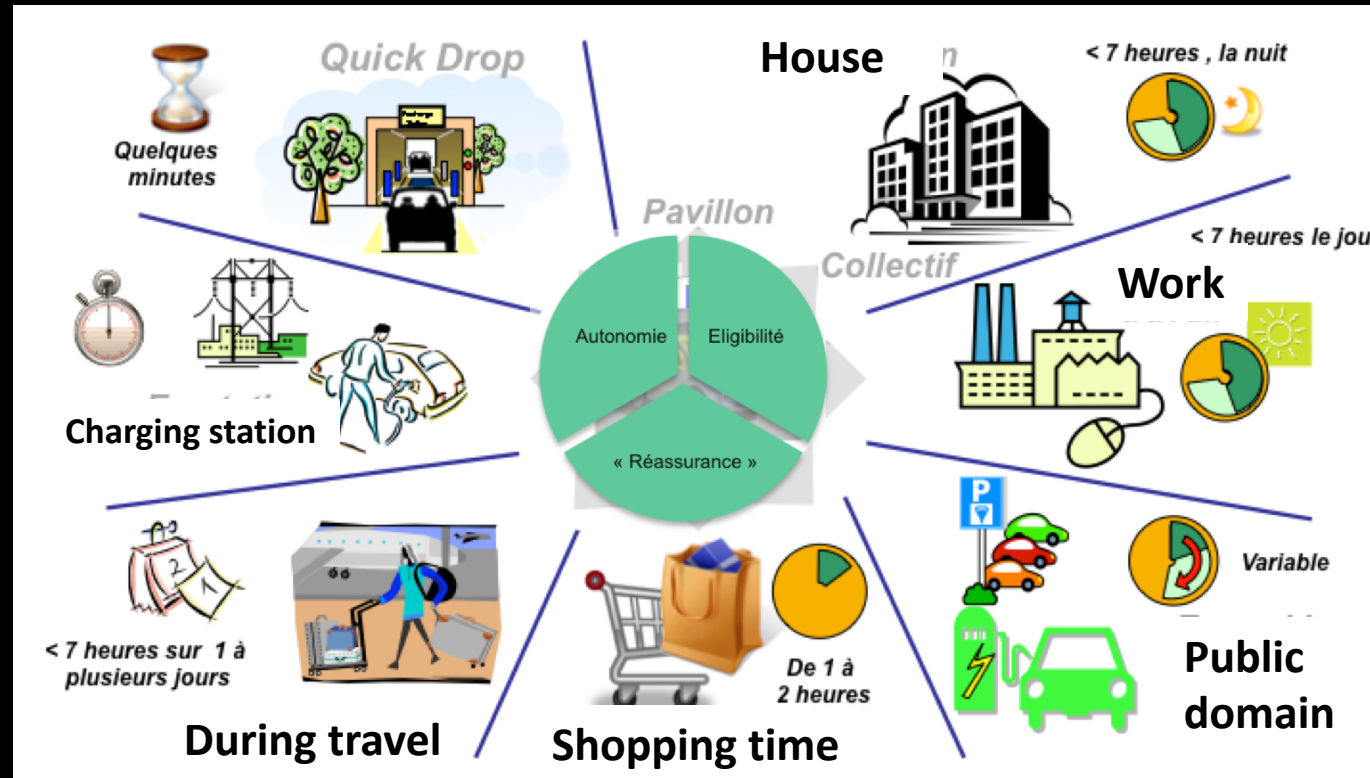
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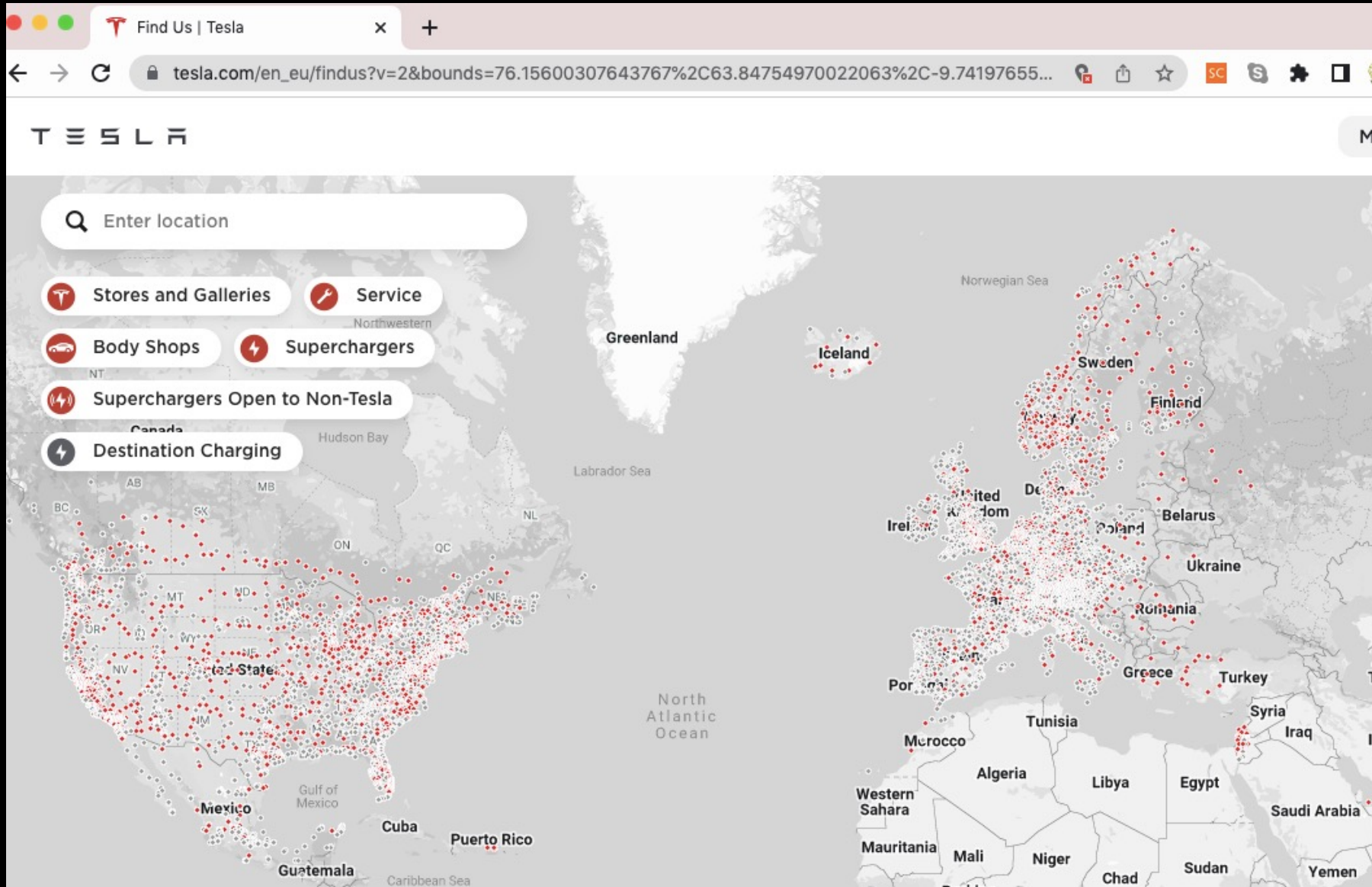
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Minimum charging infrastructures allows to start equipment

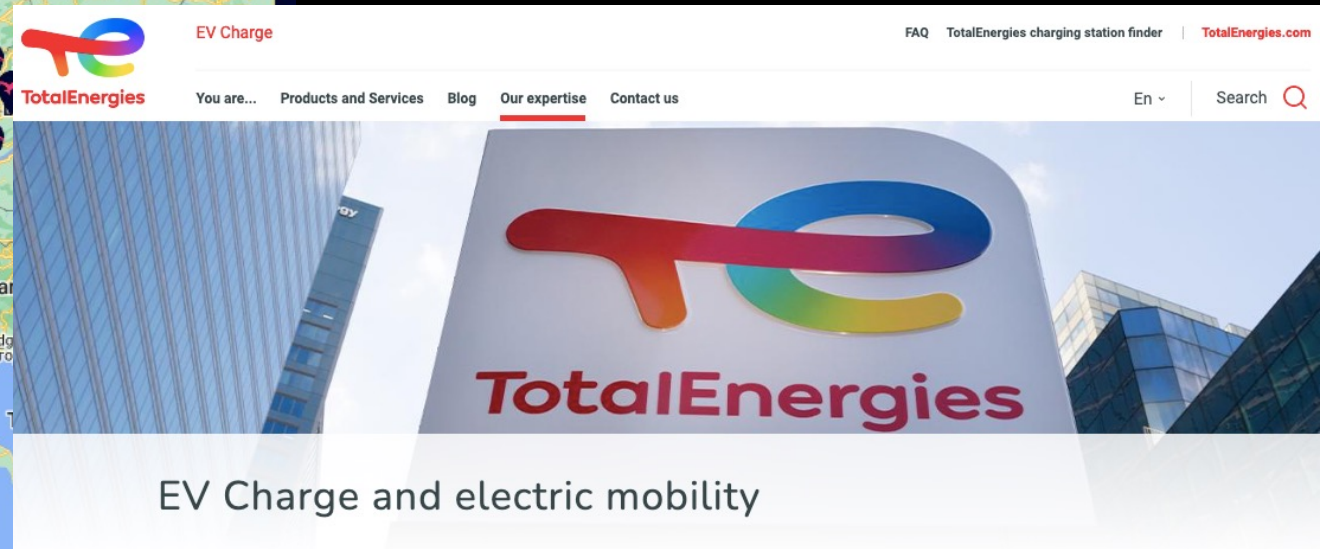
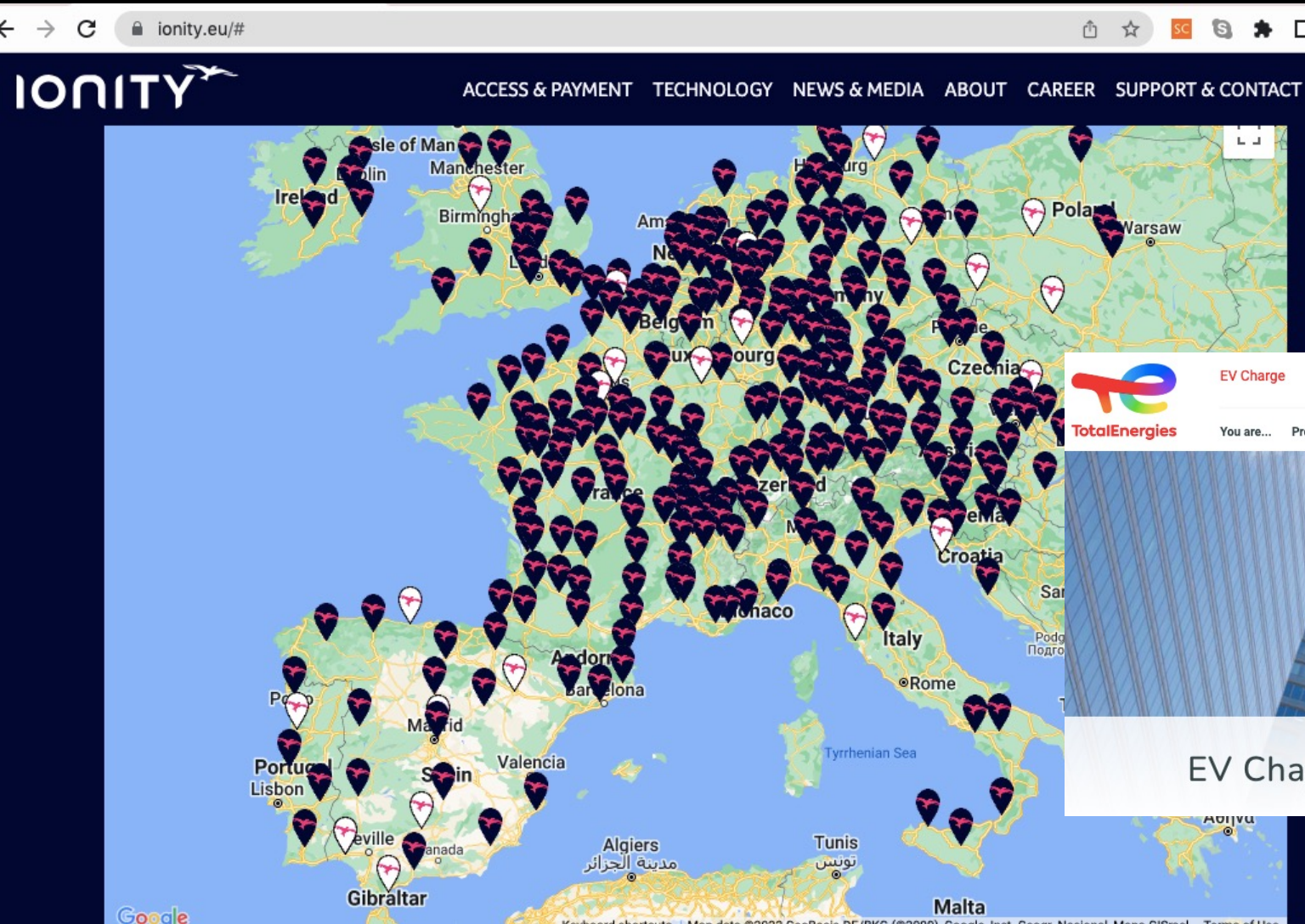


7 logical options to charge but 95% of the charging is made at home but a lot seems to be needed elsewhere to secure the EV buyer

The world leader is private



The followers are private and locals



And Public Investments are also displayed



But

English (en) ▼



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Special Report

European Court of Auditors > Publications > Special Report 05/2021: Infrastructure for charging electric cars is too sparse in the EU

Special Report

05
2021



Infrastructure for charging electric vehicles: more charging stations but uneven deployment makes travel across the EU complicated

About the report:

The objective of our audit was to determine the effectiveness of the Commission's support for the deployment of an EU-wide publicly accessible infrastructure for charging electric vehicles.

We found that despite successes such as in promoting a common EU plug standard, and improving access to different charging networks, obstacles to travel across the EU in electric vehicles remain. The availability of charging stations varies between countries, payment systems are not harmonised with minimum requirements and there is inadequate information for users. In the absence of a comprehensive infrastructure gap analysis, the Commission has been unable to ensure that EU funding goes where it is most needed. The EU is still a long way off its Green Deal target of 1 million charging points by 2025, and it lacks an overall strategic roadmap for electro-mobility.

We made a number of recommendations to the European Commission to help improve the deployment of publicly accessible charging infrastructure across the EU.

ECA special report pursuant to Article 287(4), second subparagraph, TFEU.

La densité des infrastructures dédiées à la mobilité électrique

Nombre de bornes de recharge publiques pour véhicules électriques pour 100 km de routes en 2020 *

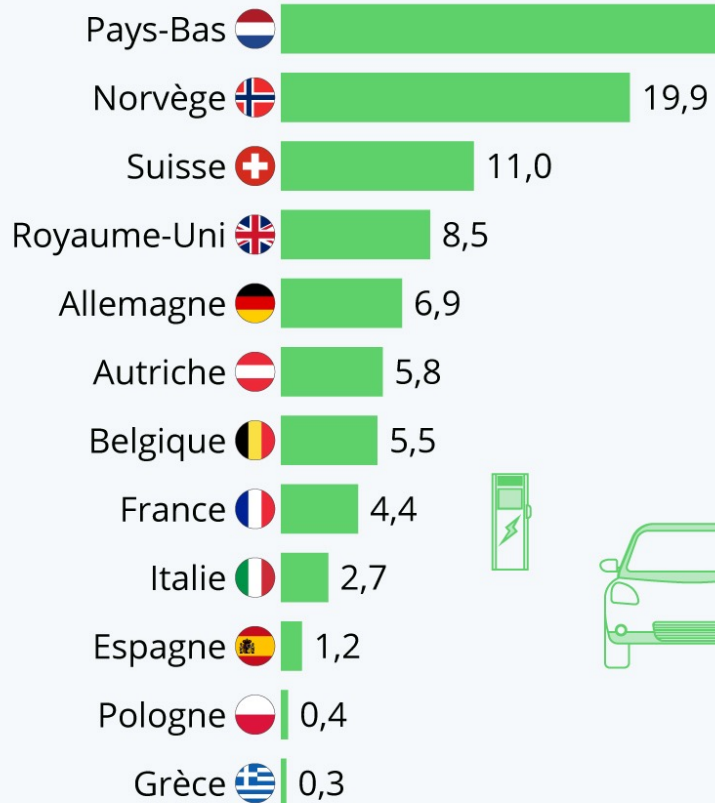
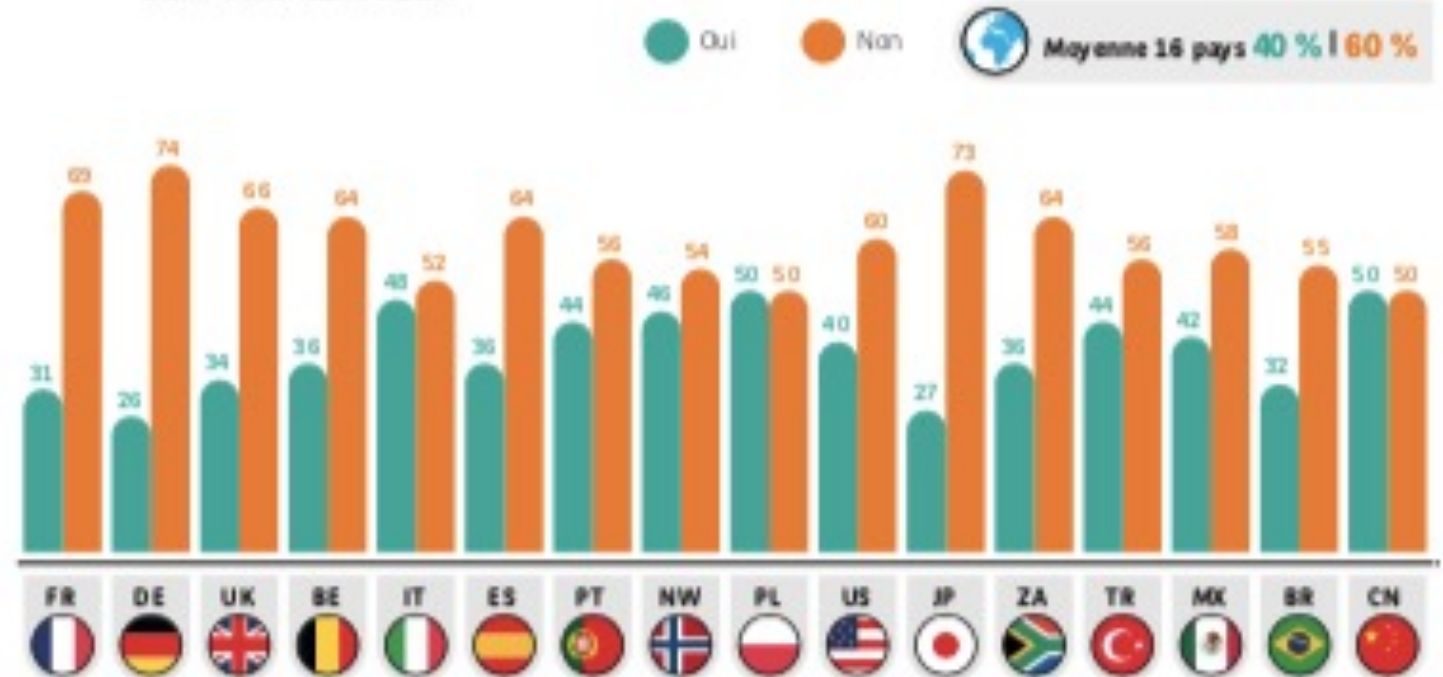


Fig. 15

Diriez-vous que les bornes de recharge publiques pour véhicules électriques sur la voirie sont correctement localisées ?

En %, Oui : somme des « Oui, tout à fait » et « Oui, plutôt », Non : somme des « Non, plutôt pas » et « Non, pas du tout »

Source : L'Observatoire Cédem



* Dans une sélection de pays européens.

Sources : Observatoire européen des carburants alternatifs, Fédération routière internationale

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Electric cars Store more energy than they daily use

- Size of the battery goes from 24 to 100 kWh
- EV consumes 15-20 kWh per 100 km
- EU- USA Mean Drivers Daily trips/day is between 24 km -40 km

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What is flexibility from EVs?

- Ability to adapt the (dis)charging pattern of the EV



Many uses, for different stakeholders:

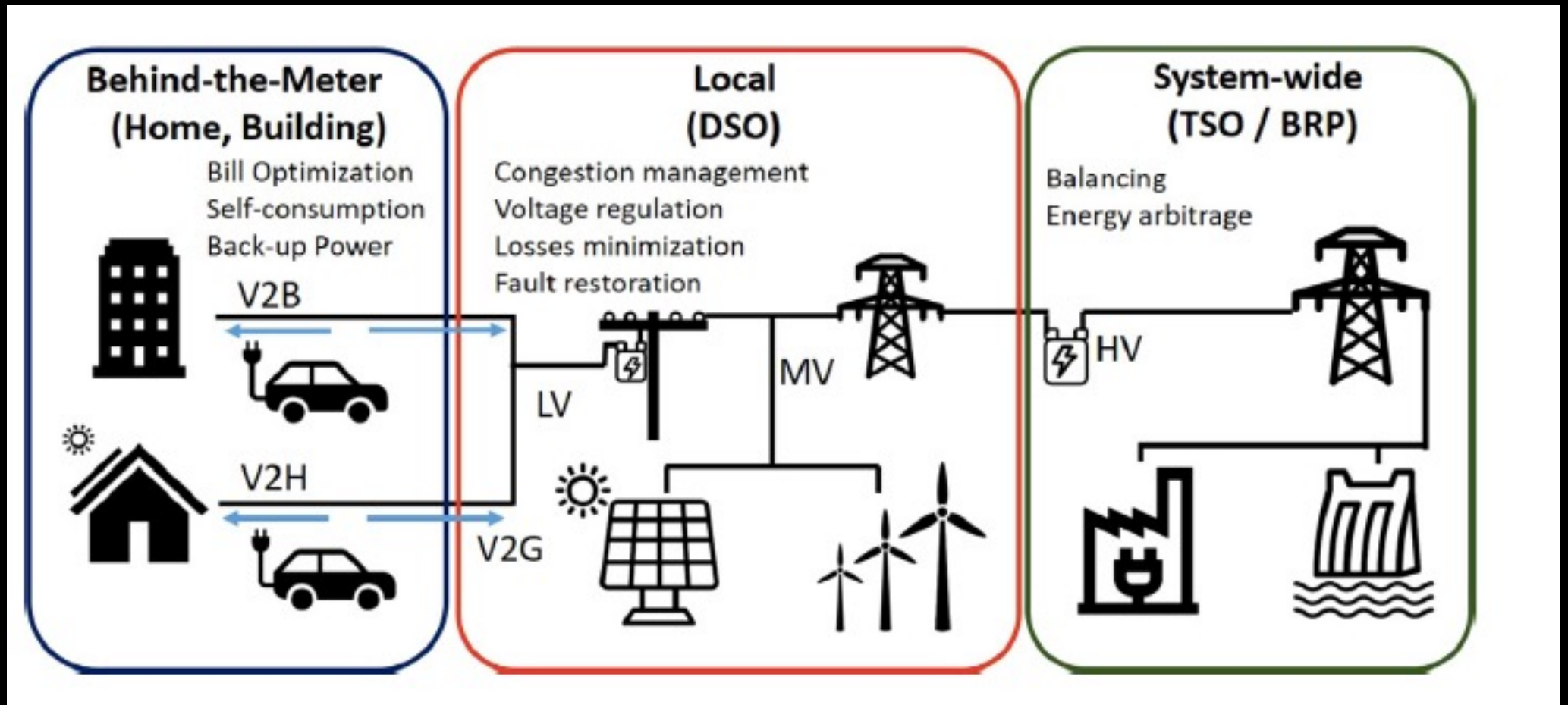
- For end-users: optimizing electricity bill, self-consumption
- For the whole system: frequency response, energy arbitrage
- **For distribution systems: congestion management, voltage regulation, fault-restoration, investment deferral**

Electric cars save more energy than they daily use

- Size of the battery goes from 24 to 100 kWh
- EV consumes 15-20 kWh per 100 km
- EU- USA Mean Drivers Daily trips/day is between 24 km -40 km
 - EVs are very flexible resources (to store or deliver electricity) if needed = **Distributed Storage Services (DSS)**
 - Arbitrage** between private use (house-building) or other flexibility buyers of DSS (Energy markets / grids)

Who need flexible electricity storage?
Who would buy flexibility provision?

Where are connected the Evs?



3 main sources

And Up to 16 services are tested around the world... and more to come


A	Wholesale	Demand Response–Wholesale	<ul style="list-style-type: none">Manages high wholesale price or emergency conditions on the grid by calling on users to reduce or shift electricity demand
		Energy Arbitrage	<ul style="list-style-type: none">Allows storage of inexpensive electricity to sell at a higher price later (includes only wholesale electricity purchase)
		Frequency Regulation	<ul style="list-style-type: none">Provides immediate (4-second) power to maintain generation-load balance and prevent frequency fluctuations
		Resource Adequacy	<ul style="list-style-type: none">Provides capacity to meet generation requirements at peak loading in a region with limited generation and/or transmission capacity
		Spinning/ Non-Spinning Reserves	<ul style="list-style-type: none">Maintains electricity output during unexpected contingency event (e.g., an outage) immediately (spinning reserve) or within a short period (non-spinning reserve)
B	Utility	Distribution Deferral	<ul style="list-style-type: none">Provide extra capacity to meet projected load growth for the purpose of delaying, reducing or avoiding distribution system investment in a region
		Transmission Deferral	<ul style="list-style-type: none">Provide extra capacity to meet projected load growth for the purpose of delaying, reducing or avoiding transmission system investment
		Demand Response–Utility	<ul style="list-style-type: none">Manages high wholesale price or emergency conditions on the grid by calling on users to reduce or shift electricity demand
C	Customer	Bill Management	<ul style="list-style-type: none">Allows reduction of demand charge using battery discharge and the daily storage of electricity for use when time of use rates are highest
		Backup Power	<ul style="list-style-type: none">Supplies power reserve for use by Residential and Commercial users when the grid is down

Conclusions

- We need to work on many issues and many different directions
 - **Car's technologies** need to be improved in many ways
 - **Infrastructures providers** need to be displayed at the right place, with the good power level for the needed use, in a timely manner...
 - **Governments regulations** need to accommodate EV innovations in power system, and mobility systems...
 - **Academics** must provide models and analytical tools to help this ecosystem to perform better in every dimensions and directions
 - **Citizens** should move forward and invest in EU-PV combo...

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