E-mobility II – Roll-out of charging infrastructure

7 December 2021

Chicken or egg? Challenges for charging infrastructure roll-out

Guido Piccoli
A LOT srl,
Technical support of Province of Brescia

e-MOPOLI
Interreg Europe

European Union
European Regional
Development Fund

Interreg Europe

European Union | European Regional Development Fund

ere we are?

- EU GREEN DEAL: transition to sustainable mobility by reducing GHG emissions transport sector by 90% by 2050.

FACTORS

Autonomous mobility and an intelligent traffic management system

Modal shift to railways and inland waterways navigation

Fuel price that reflects its impact on the environment

Increase of alternative fuel options

Transport decarbonisation: increasingly stringent emissions standards

PASSENGER CAR

Veicoli utilizzati per il **trasport**
a 3,5 tonnellate.

«LAST MILE» VEHICLES

Max 8 pax, 3,5 ton

LIGHT DUTY VEHICLE

Veicoli utilizzati per il
trasporto di più di otto pers

> 8 pax, max 5 ton

HEAVY DUTY

Veicoli utilizzati per il **tr**
i più

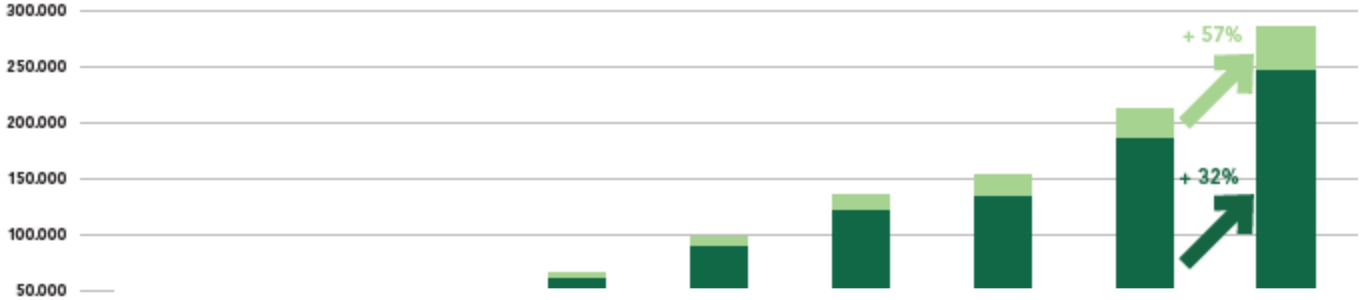
> 8 pax, > 5 ton

«OFF-ROAD» VEHICLES

X		X	X	X	X	X
		X	X	X	X	X
X						

Europe is the largest world market, with almost 1.4 million electric vehicles registered in 2020 (+ 137% compared to 2019): 1,36 mln cars & 2.100 e- buses

Sources images: SMART MOBILITY REPORT 2021 – oct. 2021 – Politecnico di Milano



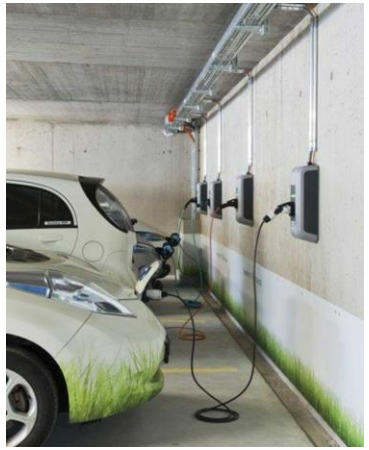
EU

- At the end of 2020, over 285,000 public charging points (public use/accessible) are estimated in Europe:
  - 87% normal charges
  - 13% fast charges
  - >35% compared to 2019

Sources images: SMART MOBILITY REPORT 2021 – oct. 2021 – Politecnico di Milano

Most used Type of Charging

When & how: Charging overnight/during the day at home/parks areas or charging opportunity during trips.



Type: wall box

Type: Conductive charging via cable

When & how: Charging overnight in depots or charging opportunity during service.

Type: Conductive charging via cable

Type: Pantograph system

Sources images :https://aeee.in/electric-buses-where-and-how-to-charge-them/; pixabay; https://www.stazioni-di-ricarica.it/shop/stazioni-di-ricarica-con-software/wall-box-x-line-slave-22-kw-presa-tipo-2-smart/

Current challenges for charging

TECHNOLOGICAL TRENDS FOR THE CHARGING OF ELECTRIC VEHICLES (CARS)

ITEMS	TREND
CHARGING SPOT	Columns and "Energy Storage”
	Dynamic management of recharging
	Direct payment of charging service
	Plug & Charge columns (ISO 15118)
	Smart charging: "V1G" and "V2G“
	Integration of the charging system into the "street furniture”
NEW CHARGING TECHNOLOGY	Battery swap
	Mobile charging
	Wireless charging (pilot also for e-BUSES)

Sources images: SMART MOBILITY REPORT 2021 – oct. 2021 – Politecnico di Milano

Outlook for charging technology

NOW

SHORT (5 Y)

- "**dynamic load balancing" systems** *(differentiated modulation of the power delivered by the column).*
- **payment by credit or debit card for charging service***(simplify and speed up the charging process)*.
- **mobile charging with vans equipped with an on-board battery**.

MID-LONG (5-10 Y)

Integration charging systems with the **electricity grid**:

- **columns and "energy storage“** *(storage systems and RES production).*
- **V1G and V2G** *(connection among vehicles, charging systems and different operators to optimize the charging process).*

OVER 10 Y

- **Autonomous robots** equipped with a battery that can move in limited contexts.
- **Battery swap and wireless charging** *(current technological limits both on the infrastructure and vehicle).*

FUTURE

Sources: SMART MOBILITY REPORT 2021 – oct. 2021 – Politecnico di Milano

Synergy is the Key

Charging Infrastructure

- Lack of homogeneous & interoperable diffusion in EU
- Range anxiety (fast & normal charge)
- Impacts on energy network/grid

Electric Vehicles

- High costs of vehicles
- Battery autonomy
- Vehicle2Grid (V2G)

e-MOPOLI
Interreg Europe
European Union
European Regional Development Fund

Regional Best practices and policies improvement (funds and strategies) for alternative fuel mobility, in particular e-mobility

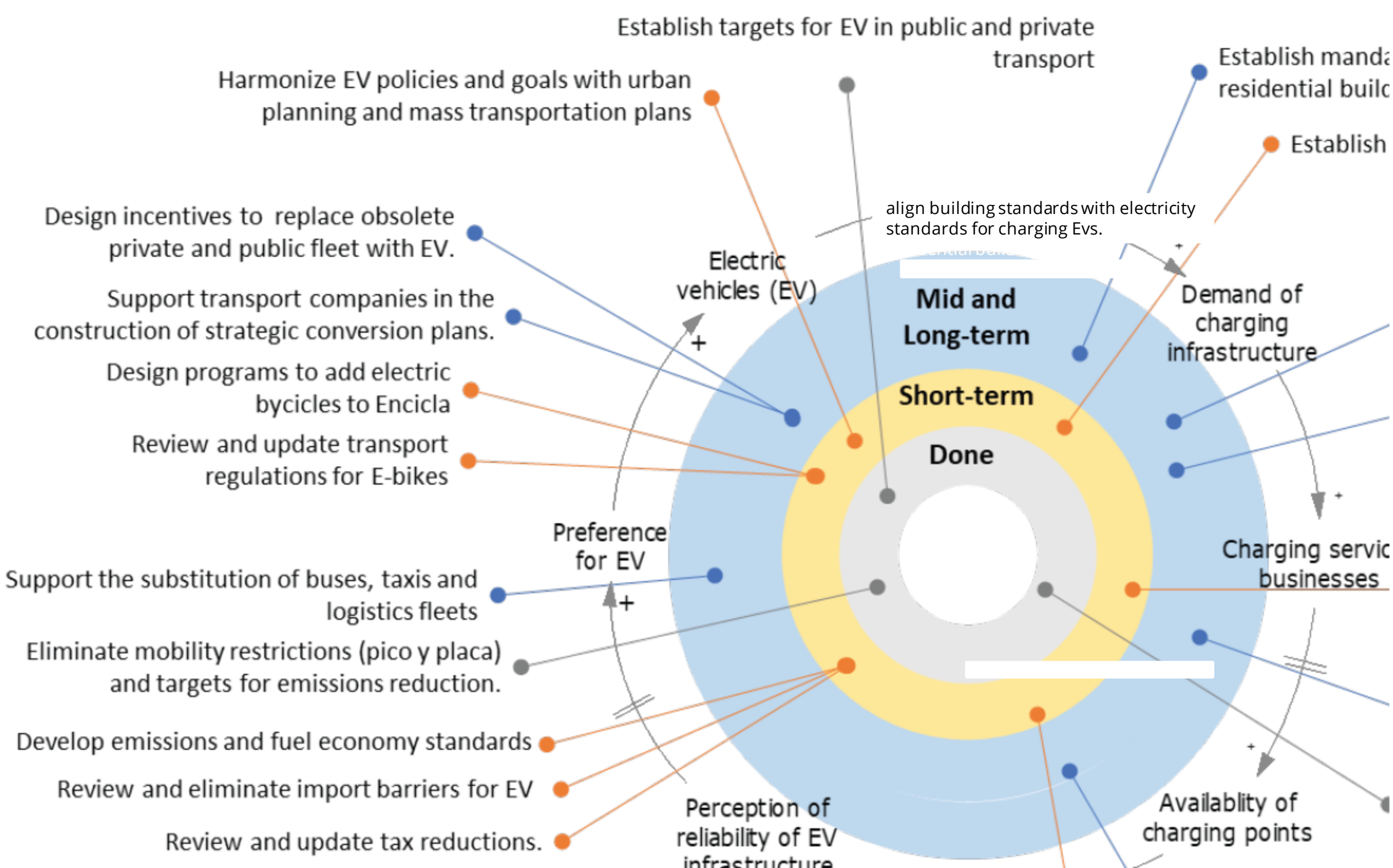
in 2020 it became 1°country where EV sales accounted for more than half of new cars. **Public:** Generous incentives - tax breaks, toll exemptions, vehicle grants with a massive roll out of charging infrastructure. **private companies:** see the potential of a fast-growing market and flooded the Nordic country with EVs. Car manufacturers have used the country as a test-bed for new models

Public Initiatives

- Governance & policies
- Mid & long-term Planning & strategies
- Incentives
- Research (Universities)
- Public-Private Partnership
- Information campaigns for end-users (behavioural changes of citizens)

Private Initiatives

- Sustainable Business models
- Short,Mid & long-term Investments
- Services
- Research & Innovation
- Cooperation with PAs
- Information campaigns for end-users (e-mobility is cool!)


Establish targets for EV in public and private transport
Establish manda
residential build
Establish
Harmonize EV policies and goals with urban planning and mass transportation plans
align building standards with electricity standards for charging Evs.
Design incentives to replace obsolete private and public fleet with EV.
Support transport companies in the construction of strategic conversion plans.
Design programs to add electric bycicles to Encicla
Review and update transport regulations for E-bikes
Electric vehicles (EV)
Mid and Long-term
Short-term
Done
Demand of charging infrastructure
Preference for EV
Support the substitution of buses, taxis and logistics fleets
Eliminate mobility restrictions (pico y placa) and targets for emissions reduction.
Develop emissions and fuel economy standards
Review and eliminate import barriers for EV
Review and update tax reductions.
Perception of reliability of EV infrastructure
Charging servic businesses
Availablity of charging points

Thank you!

Guido Piccoli
Guido.piccoli@alot.it
+39/348/2291977
ALOT srl
Technical support
of Province of Brescia