

# Romanian E-mobility Index REI 1 (First edition)

No longer only a hot topic –  
Clear path to sustainable  
development

Bucharest, November 2019



# Executive summary

Roland Berger is launching the **first edition of the Romanian E-mobility Index (REI)**, a bi-annual report covering the developments of the e-mobility ecosystem within the local market. Conclusions are based on the results of the proprietary **E-mobility framework, with 4 main dimensions** (demand, offering & mobility services, regulatory environment and charging infrastructure)

2019 H1 index stands at **30** points (out of a maximum possible 100), ~2 points higher than 2018 average

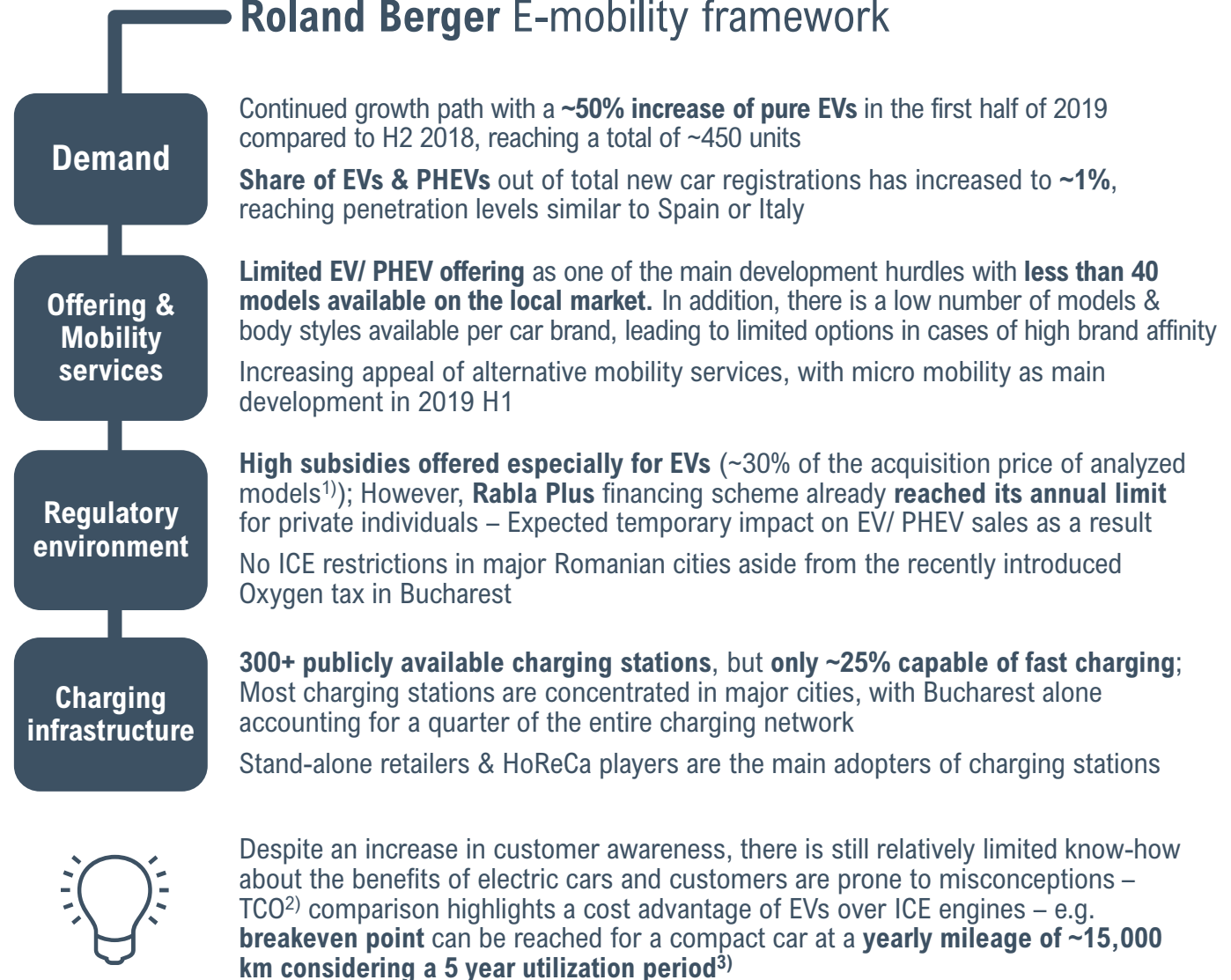


Each issue of the Romanian E-mobility Index includes a **special topic**

REI 1 focuses on the main implications deriving from the **introduction of the Oxygen tax in Bucharest**, the first internal combustion restriction to be implemented at city level in Romania. The lack of both Diesel-related restrictions and specific reduction targets diminish the potential benefits of the tax initiative.

1) 5 compact models selected for analysis

## Roland Berger E-mobility framework



2) Total Cost of Ownership

3) Further TCO comparisons to be presented in future editions

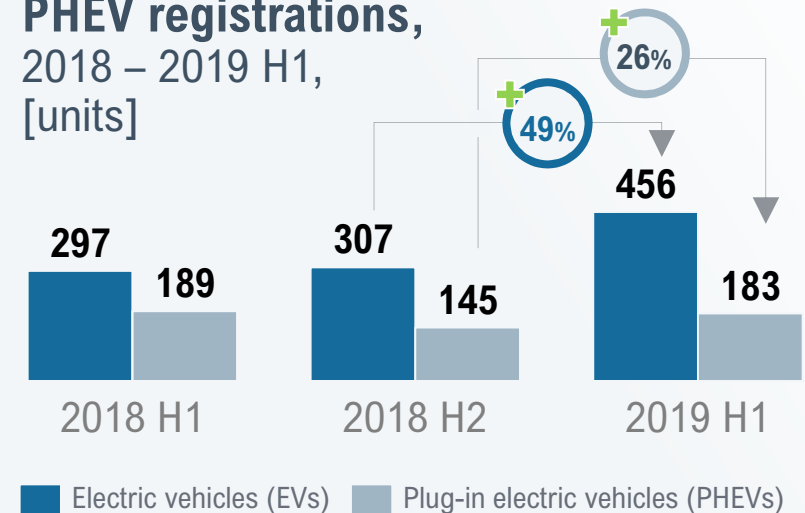
## Demand for electric powered vehicles continues its previous growth path

Demand for electric powered vehicles (xEVs) has continued its previous growth path, with registrations increasing in the first half of 2019 to ~640 units. New cars registrations for pure electric vehicles (EVs) increased by ~50% (2018 H2 vs 2019 H1), while plug-in electric vehicles (PHEVs) registrations recovered to values registered 12 months prior.

Increased customer awareness, especially regarding the main benefits of electric powered vehicles is boosting demand. Customers are starting to realize that EVs display clear cost advantages when the average yearly mileage is above a specific threshold, in spite of no major recent changes between the total cost of ownership (TCO) of electric vs. internal combustion engine (ICE) vehicles.

Unlike the overall tendency of the Romanian automotive market, highly geared towards used cars sales, the segment of electric powered vehicles is dominated by new car sales. Overall, the share of EVs & PHEVs out of total new car registrations reached ~0.9% in the first half of the year.

### Evolution of new EV & PHEV registrations, 2018 – 2019 H1, [units]



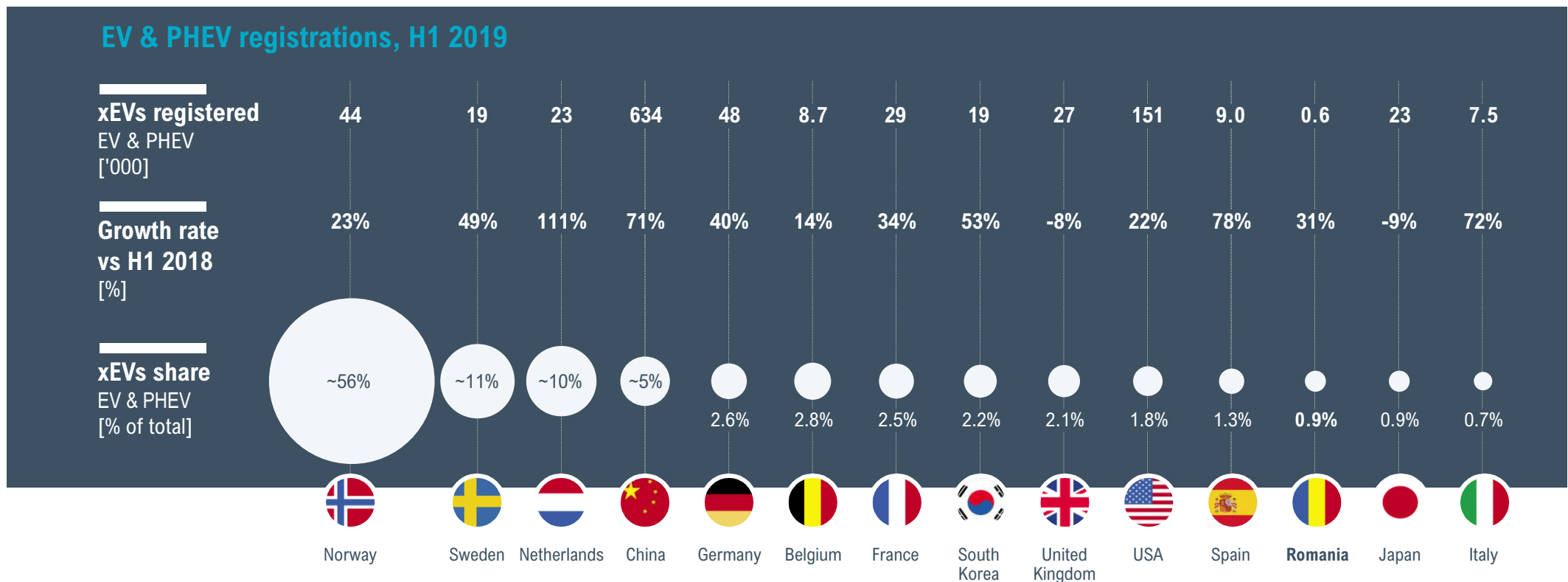
0.9%

Share of EVs & PHEVs out of total new car registrations in 2019 H1

# Share of EVs/ PHEVs sales out of total new car registrations is similar to levels reached in Spain or Italy

The share of EVs & PHEVs out of total new car registrations of ~0.9% puts Romania ahead of Italy or Japan and just behind Spain in terms of the share of xEV sales. At international level Norway leads the way in terms of xEV sales share, while China remains the undisputed leader in terms of sales volumes with +630,000 units.

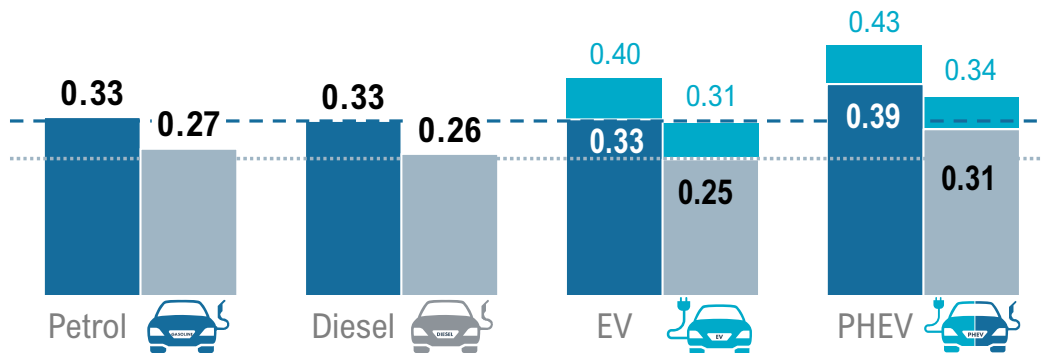
Romania registers a moderate growth rate of ~32% when comparing the first half of 2019 with the same period of 2018. However, early results after 2019 H2 indicate further acceleration of the trend until the end of the year.



# EVs are reaching breakeven point with ICE models already at ~15,000 km yearly mileage

## Total Cost of Ownership (TCO) in Romania for a compact car model with ICE & EV/ PHEV powertrains<sup>1)</sup>

Average cost per kilometer [EUR/ km], 5 years of vehicle usage



### Annual mileage

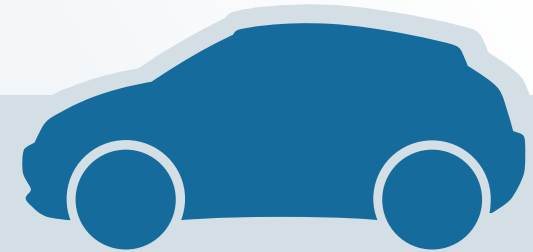
■ 15,000 km ■ 20,000 km ■ Additional costs in case of no subsidies

Despite the higher initial costs, electric vehicles are more cost efficient due to the lower operational costs. Running on electricity can save over 70% of fuel costs compared to internal combustion engines, while maintenance costs are also lower.

1) Same car brand & model considered when comparing different powertrains

2) Further TCO comparisons to be revealed in future editions

## REI 1 TCO comparison: Compact car



## Buying an electric vehicle in Romania has already become cost efficient

Compact electric vehicles reach a break-even point at a yearly mileage of ~15,000 km when accounting for the available governmental incentives for electric vehicles. Nevertheless, the customer perception of higher initial costs, coupled with still existing "range anxiety" hinders higher adoption rates of full electric vehicles.

Furthermore, the cost saving potential of electric vehicles is still highly dependent on subsidies; without their support, average cost per kilometer for EVs is still higher than for conventional engines in case of compact car models<sup>2)</sup>.

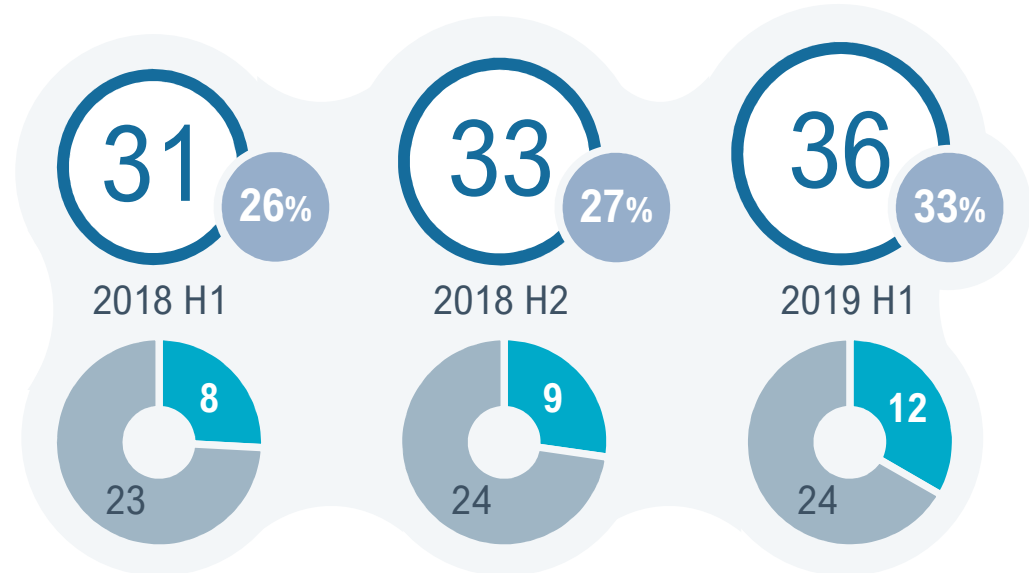
# EV/ PHEV offering as a main development hurdle with less than 40 models available

With around 35 EV & PHEV models available for purchase, the offering is still limited, accounting for only ~10% of the total number of car models available on the Romanian market. In 2019 H1 the growth of available EV & PHEV models remained low, being sustained entirely by pure EV models. The pace is expected to change however, with many brands announcing the launch of both EV & PHEV models in the next 6-12 months.

**EV/ PHEV models available<sup>1)</sup> & EV share in total EV/ PHEV models, [# of models, %]**

**Split of xEV models between pure EVs and PHEVs [%]**

■ EVs ■ PHEVs



An important constraint is the low number of models & body styles per car brand, leading to limited options in case of high brand affinity. Most EVs and PHEVs are hatchback, sedans and SUVs, while the offering for station wagons, MPVs or coupes/ cabrios is almost inexistent. The brand with most diversified EV & PHEV portfolio in Romania currently offers 7 models, while no brand manages to offer more than 2 EV models.

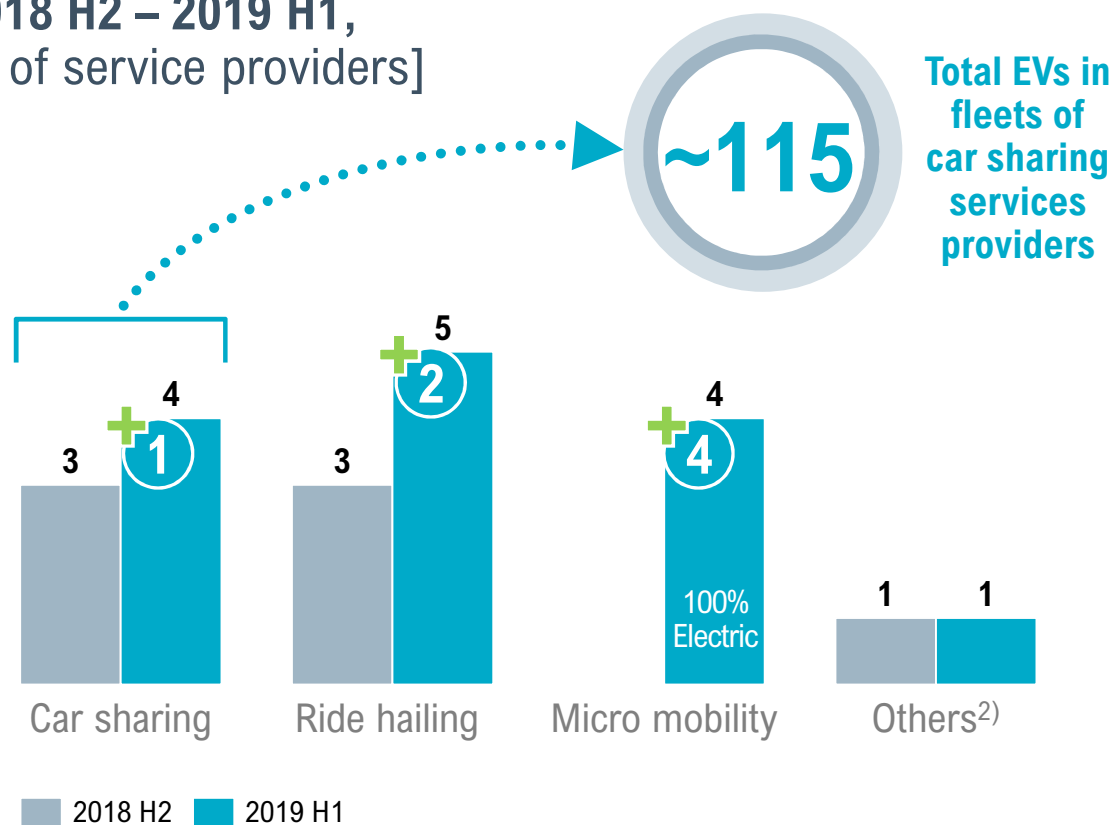
**2** Highest number of EV models from a brand

**7** Highest number of EV & PHEV models from a brand

1) Values at the end of the analyzed period

# Increasing appeal for mobility services, with micro mobility as main actor in 2019 H1

Evolution of alternative mobility services providers<sup>1)</sup>, 2018 H2 – 2019 H1, [# of service providers]



The offering for alternative mobility services in Romania has intensified in the last 6 months, both in terms of number of players and in terms of the types of services provided.

Micro mobility has become an intensely competitive segment, after 4 new providers (offering scooters and mopeds) started operating in Bucharest during the first half of 2019. In the second half of 2019, at least 3 other players are expected to enter the market, potentially with additional offerings such as electric bikes.

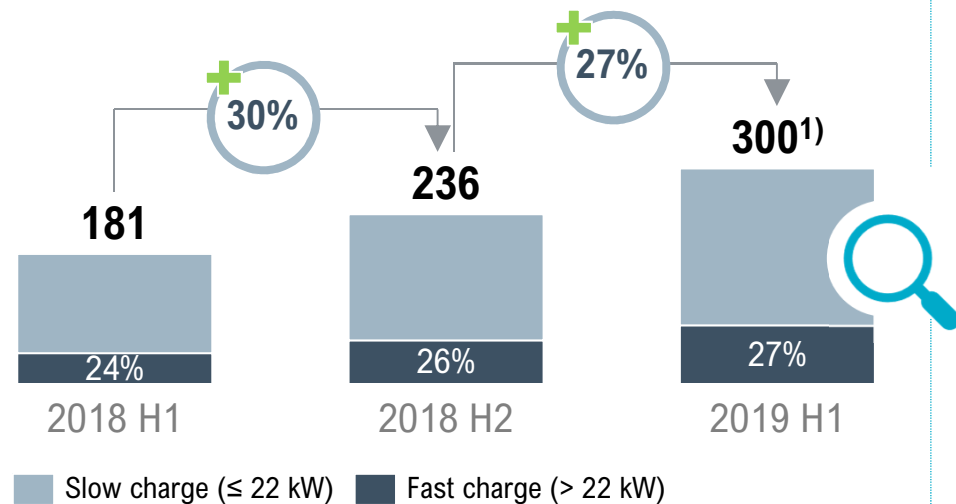
Almost all alternative mobility services providers have operations in Bucharest, with Cluj, Iasi and Timisoara generally targeted as next hubs for expansion.

1) Including only vehicles with own propulsion system

2) Includes ride sharing, peer-to-peer renting and other mobility services

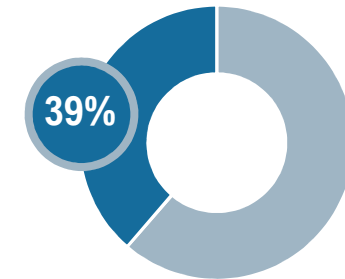
# ~300 publicly available charging stations, but only ~25% capable of fast charging

## Evolution of charging infrastructure in Romania, 2018 – 2019 H1 [#]

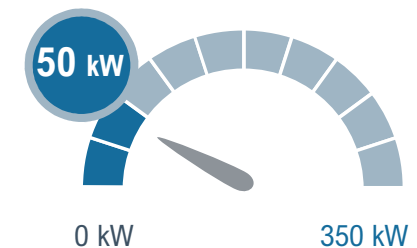


## Share of multi point stations (>2 chargers), 2019 H1

Single/dual point (light blue) Multi point (dark blue)



## Maximum installed charging power, 2019 H1



At the end of June 2019, the national charging infrastructure consisted of ~300 stations and was increasing at a steady rate of ~30% every 6 months. The number is still significantly below the national 2020 target of 6,000 stations<sup>2)</sup>.

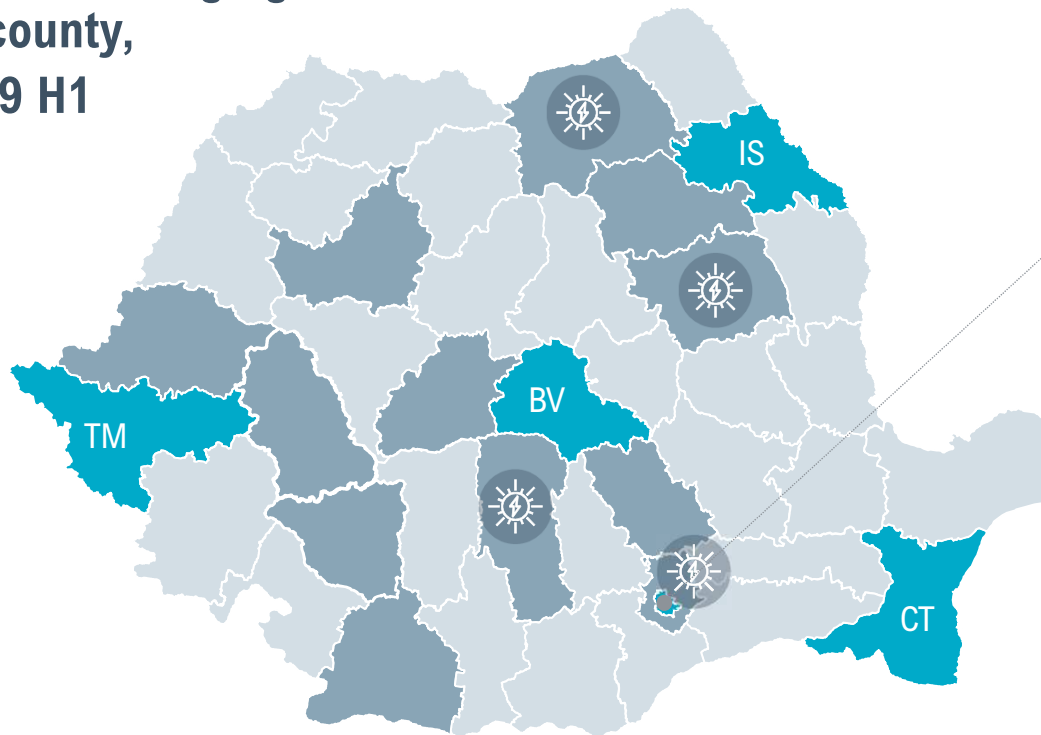
Charging capacities still favor slow charge with a maximum installed power of 50 kW and only ~25% of stations being capable of charging at powers above 22 kW. The low share of multi point stations (~40%) can create inconveniences considering the high average duration for charging when compared to a traditional fueling station, especially if the chargers do not allow for advanced bookings.

1) Total number of charging stations at the time of study publishing is ~380

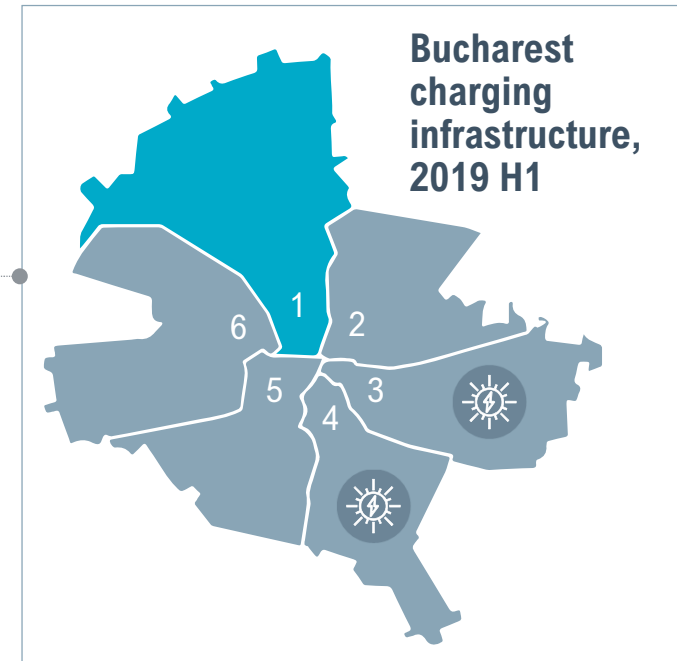
2) Communicated by the Environment Ministry

# Majority of public stations within major cities & ~25% of total stations are located in Bucharest

## National charging infrastructure by county, 2019 H1



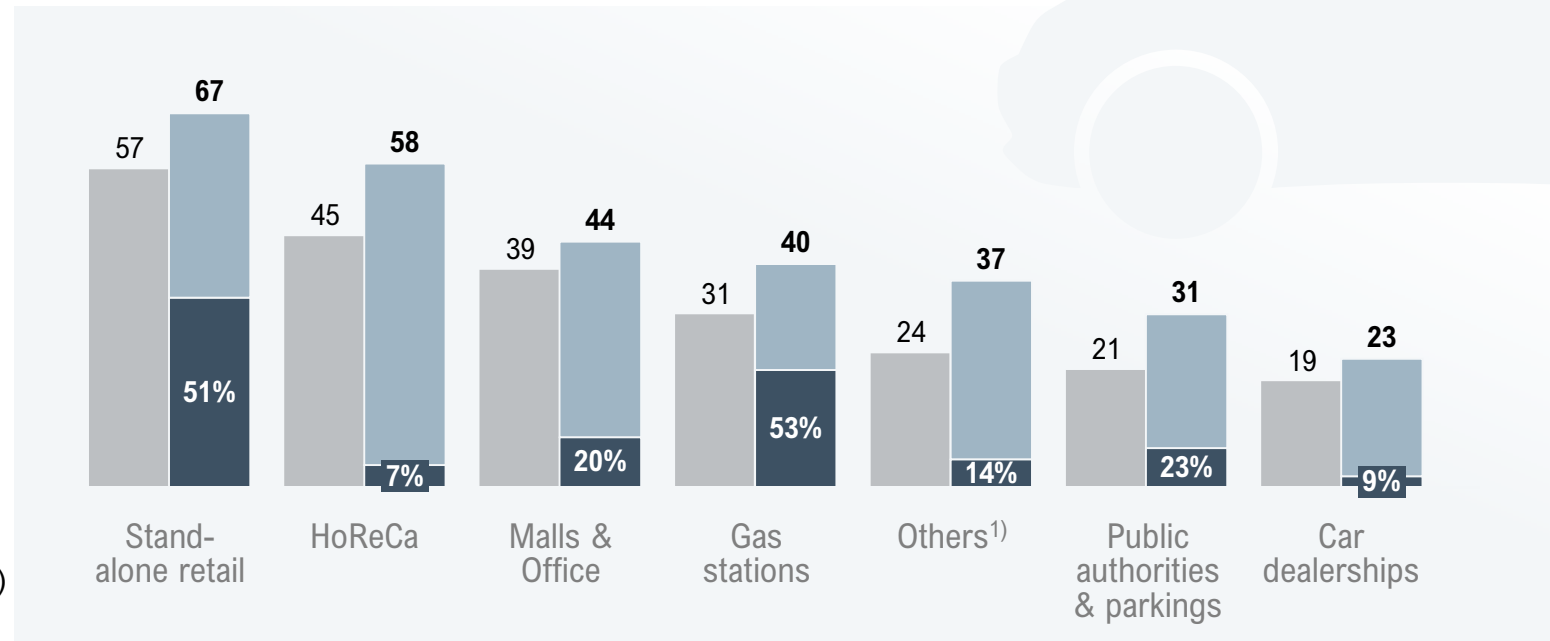
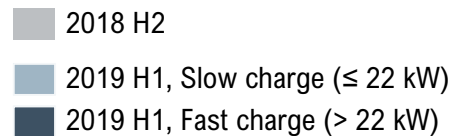
- Counties with **up to 5 charging stations**
- Counties with **5-15 charging stations**
- Counties with **15+ charging stations**
- ⚡ Counties/ districts with **5+ charging stations and growth rate above the market average (2018 H2 vs 2019 H1)**



Charging infrastructure development initially occurs within major cities (e.g. Bucharest that currently hosts ~25% of national charging stations, Timisoara, Iasi, Constanta & Brasov) however, counties with slightly smaller cities such as Suceava, Bacau or Arges are exhibiting high growth rates.

# Highest penetration of charging stations in stand-alone retailers and HoReCa locations

## National charging infrastructure split by industry and charging speed, 2018 H2 – 2019 H1, [# charging stations]



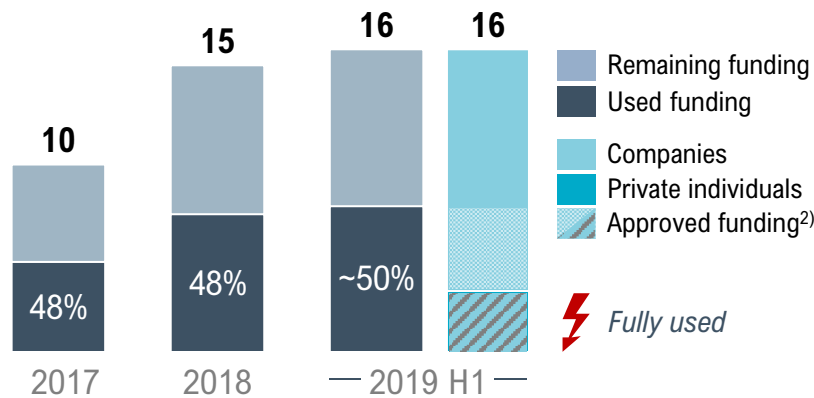
The highest number of charging stations are operated by stand-alone retailers and HoReCa players however, the distribution between fast and slow chargers varies significantly between the two. Players in the latter category focus almost entirely on slow charging, whereas stand-alone retail operators have a portfolio weighted more towards a fast charge offering; a similar approach undertaken also by fueling station operators, in an effort to maintain similar refueling speeds to fuels, thus meeting customer expectations.

In terms of operating models however, differences both within and across industries can be observed. Gas stations for example have adopted a mixed payment model, some offering charging at a cost while others still offering free charge. Stand-alone retailers on the other hand almost all offer free charging.

1) E.g. education & health facilities, touristic areas, entertainment centers etc

# Subsidies are the key market driver, in spite of emerging limitations

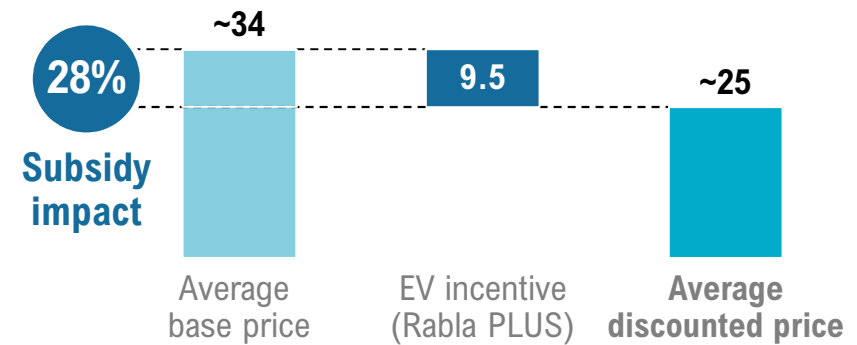
Evolution of total available funding through the government incentive scheme, 2017 – 2019 H1, [EUR m]



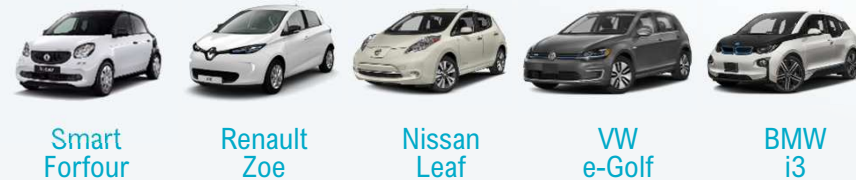
Absorption rate of the available funds expected to be significantly higher in comparison to previous years, with additional allocations awarded for both funding pools (private individuals & companies).

Half way through the session, the funding pool for private individuals has almost been fully used, capping xEV sales growth for this segment until next year. Furthermore, the sales are negatively influenced by the limited duration of the funding session which lasted from April to October in 2019.

Share of government incentives out of average price of selected compact EV models<sup>1)</sup>, 2019 H1 [%, EUR k]



Compact EV models selected for analysis

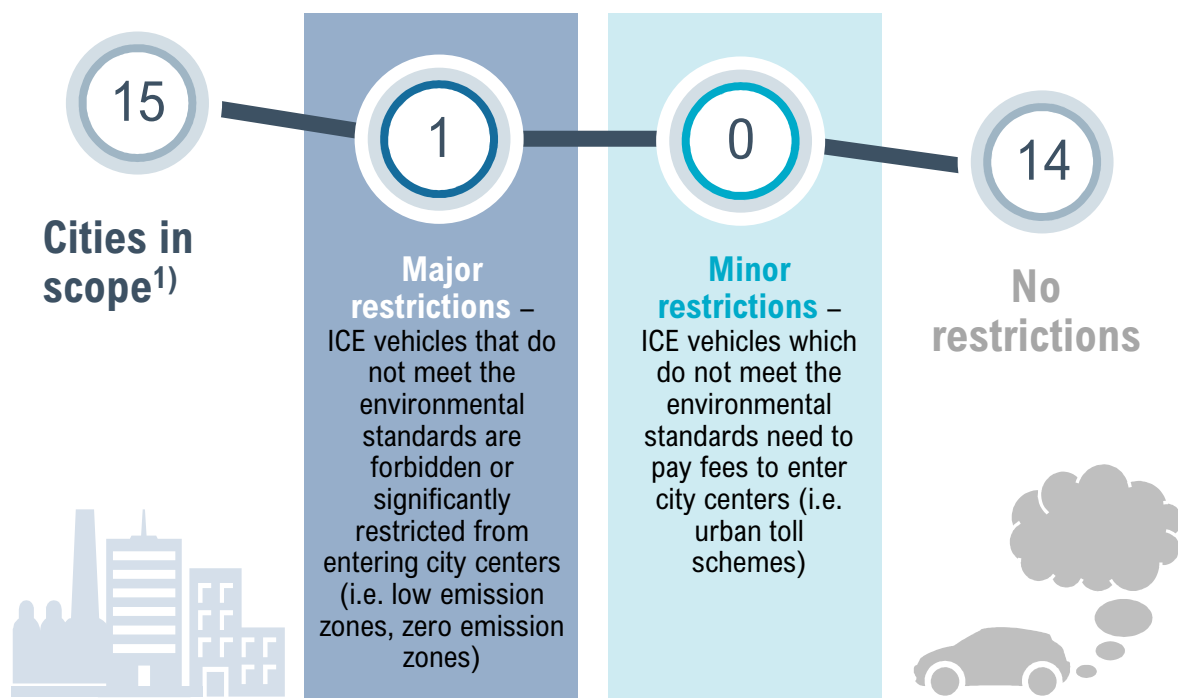


1) Selection based on registration figures for 2019 and expected future availability

2) Allocated funds expected to be lower than approved funds due to a portion of individuals/ entities opting to drop out, no longer placing the approved vehicle order

# Aside from the recently introduced Oxygen tax, no major Romanian city has ICE restrictions in place

## Regulatory restrictions for internal combustion engines in the largest urban areas in Romania



Various vehicle restrictions have been introduced across Europe with the aim of tackling air pollution in urban areas, some of the examples including:

**Low emission zones** – area based restrictions for highly polluting ICE vehicles

**Zero emission zones** – area based restrictions allowing entrance only for battery electric and hydrogen fuel cell vehicles

**Emergency air pollution schemes** – temporary restrictions on ICE vehicles due to predicted air pollution or after a prolonged period of high pollution

**Urban toll schemes** – payment for entrance in congested streets, bridges or specific city areas

In Romania, the only city planning to introduce restrictions for ICE vehicles is Bucharest with legislation entering into force as of January 2020.

1) Cities Romanian cities considered – Bucharest, Cluj-Napoca, Timisoara, Iasi, Constanta, Craiova, Brasov, Galati, Ploiesti, Oradea, Braila, Arad, Pitesti, Sibiu and Targu Mures

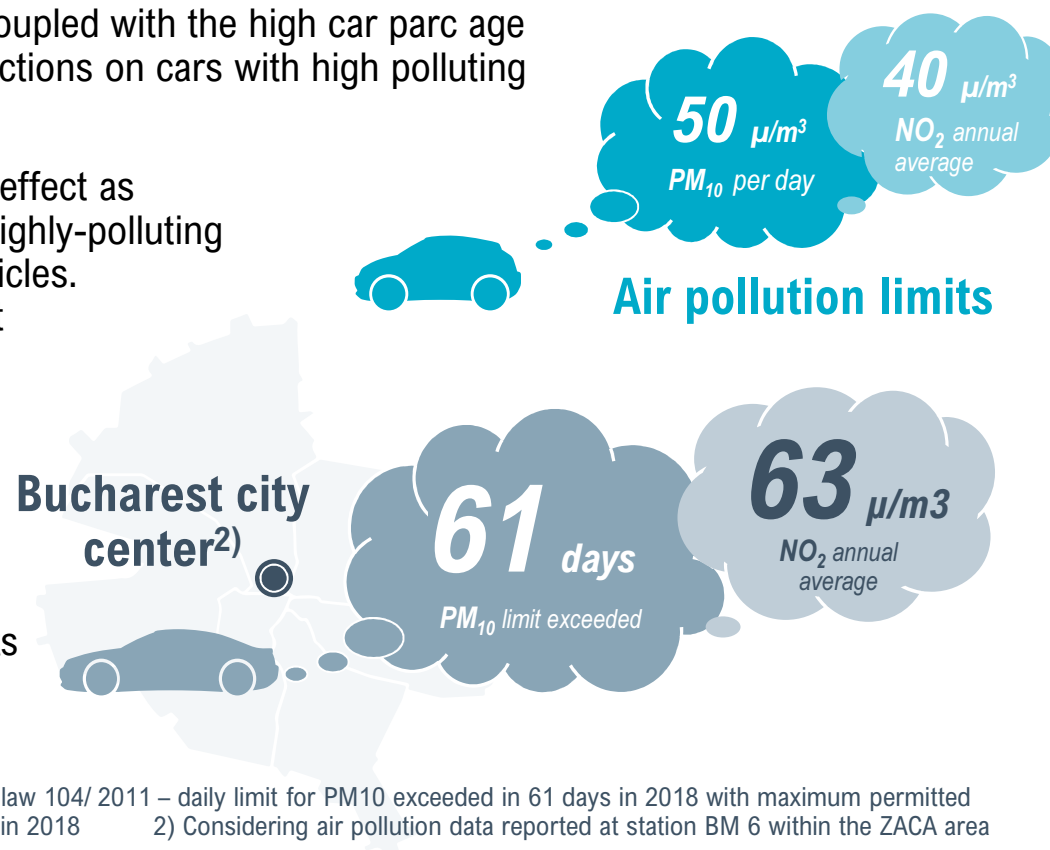
## Special topic – Key take-aways & implications from the introduction of the Oxygen vignette

Starting with January 2020, cars with engines Euro 2 or lower are banned from entering the Action Zone for Air Quality (ZACA) in downtown Bucharest. Non-Euro, Euro 1 and Euro 2 will be allowed in the rest of the Bucharest after paying an Oxygen vignette until 2022, when their entrance will be forbidden. The ban for entering the city will be extended to Euro 3 starting from 2024.

Considering the high air pollution level in Bucharest coupled with the high car parc age and limited expected short-term improvements, restrictions on cars with high polluting internal combustion engines were required.

It is expected that the restrictions will have a positive effect as inhabitants will either gradually replace their current highly-polluting vehicles or avoid the potential acquisition of such vehicles. Nevertheless, a series of aspects hinder the fulfilment of this measure's full potential:

- > No clear targets imposed/ objectives set
- > No specific restrictions for diesel vehicles or differentiation in terms of targets amongst the different fuel types
- > Limited plans to integrate alternative mobility concepts (e.g. electric scooters on dedicated bicycle lanes)



1) Air pollution limits set by the EU Air Quality Directive 2008/50/EC & Romanian law 104/ 2011 – daily limit for PM10 exceeded in 61 days in 2018 with maximum permitted exceedances of only 35 days, while annual average NO<sub>2</sub> limit exceeded by ~60% in 2018

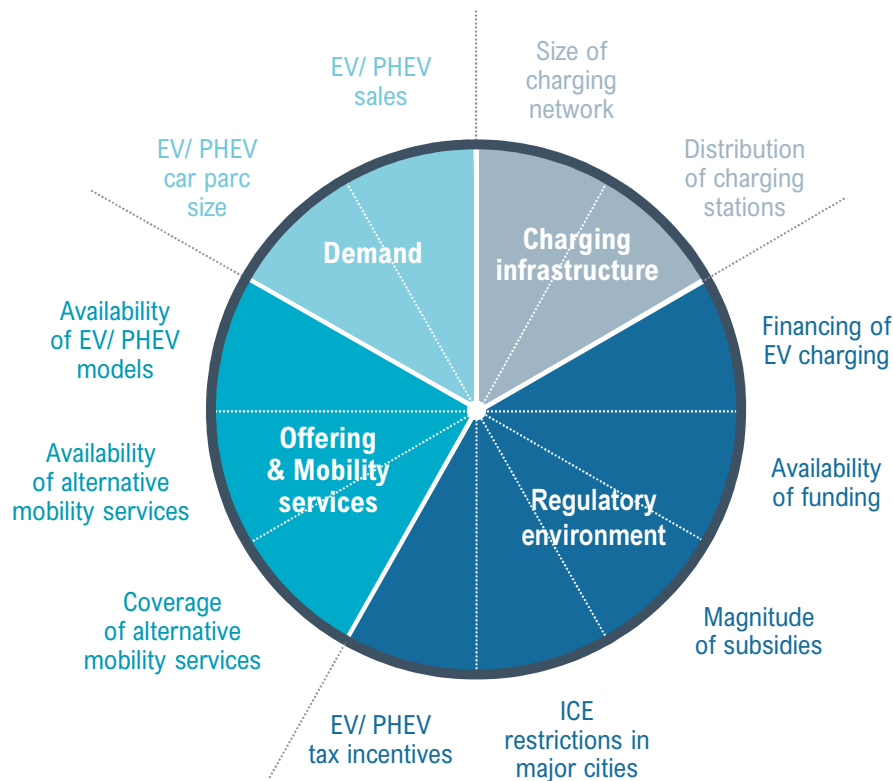
2) Considering air pollution data reported at station BM 6 within the ZACA area

# REI 1 stands at **30** at the end of 2019 H1

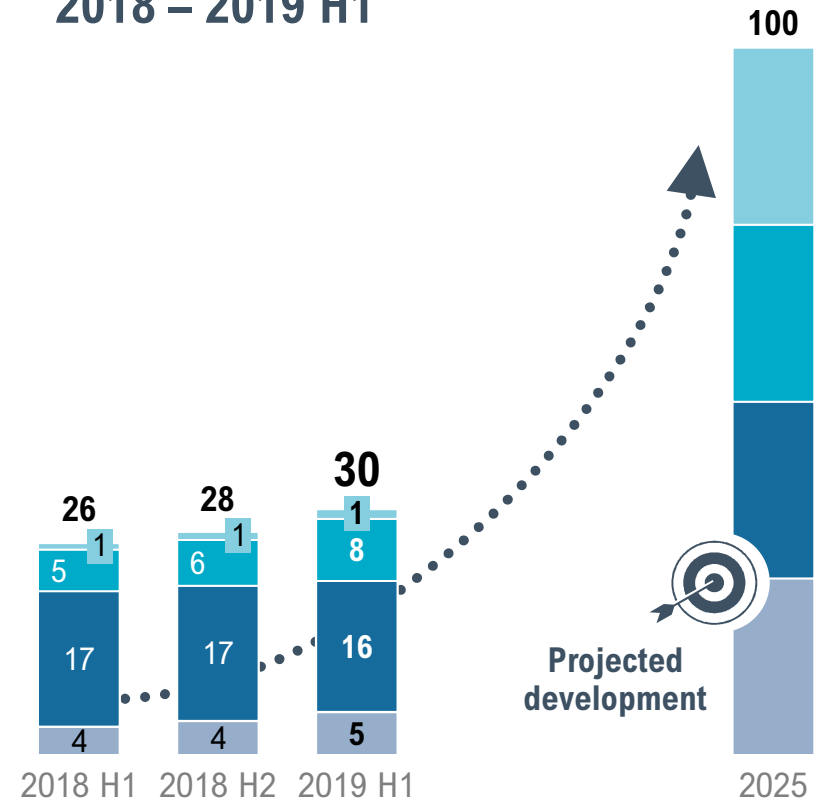
**+2 points** vs 2018 H2



## Key dimensions of the Romanian E-mobility Index calculation

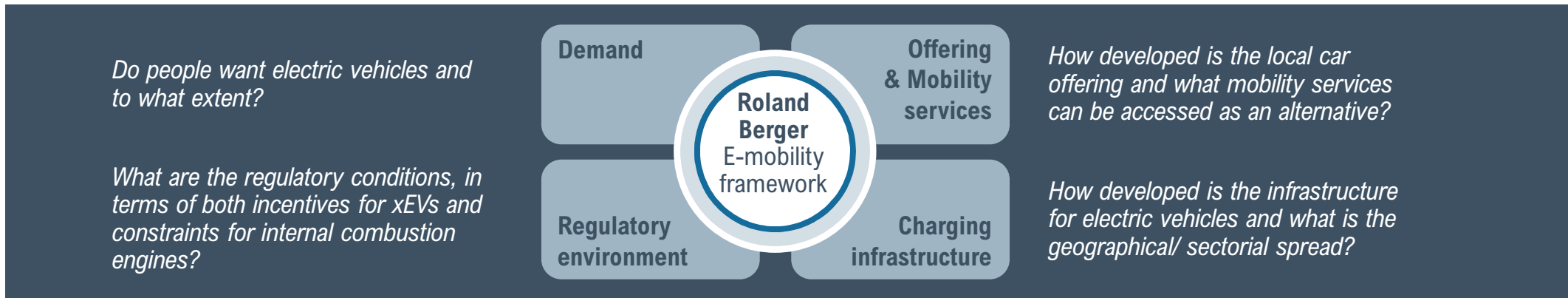


## Romanian E-mobility Index 2018 – 2019 H1



# What is the **Romanian E-mobility Index**?

The Romanian E-mobility Index (REI) is a biannual Roland Berger analysis of the main e-mobility drivers within the Romanian market. It is addressed to stakeholders & decision makers across several key industries (e.g. energy/ utilities, automotive, retail, financial services, hospitality, real estate, etc), as well as public authorities. REI includes figures & analyses grouped into four dimensions illustrated below.



The Romanian E-mobility Index aims to answer key questions such as:

- > What is the development status of E-mobility in Romania and how does this compare to more developed markets?
- > Which factors are driving E-mobility developments and how do these factors evolve over time?
- > How does the TCO of xEVs rate against vehicles powered by internal combustion engines?

## **Electric motor powertrains included in the study' analyses** (mentioned together as xEVs)

### **EVs (full electric vehicles)**

Powertrain is fully electric and vehicle does not have an internal combustion engine; Lower range than Plug-in hybrids, limited by the battery pack capacity

### **PHEVs (Plug-in hybrids)**

The e-motor uses batteries that can be recharged by connecting to an external power source; Internal combustion engine is started in case of increased acceleration or higher speeds

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For more insights into our Romanian E-mobility Index figures and analyses please do not hesitate to contact us!

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