

# NCE Fast EV Network

A large white graphic element that starts as a vertical line on the left, curves to the right, and then tapers into a curved arrow shape pointing towards the right. It frames the 'NCE Fast EV Network' text.

# Step by Step

## to a Central and Eastern European Electric Vehicle Charging Network

**NCE-FastEvNet  
Final Dissemination Report**

March 2019



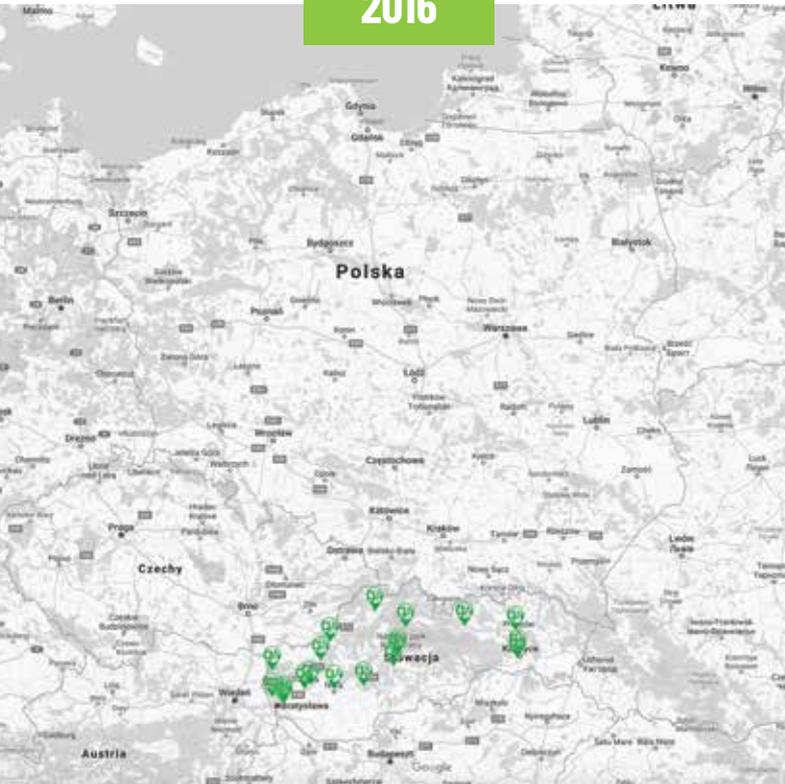
Co-financed by the Connecting Europe  
Facility of the European Union



**InnovFin**  
Energy Demo Projects

# ACTION BY THE NUMBERS

2016



2019



## MOST POPULAR CHARGERS



### Slovakia

**Tesco HM, Žilina**  
Energy output  
4 324.395 kWh  
Opened April 30, 2018



### Poland

**Galeria Mokotow, Warsaw**  
Energy output  
45 693.38 kWh  
Opened January 6, 2017

	2016		2017		2018	
	SK	PL	SK	PL	SK	PL
Number of fast charging stations	0	1	2	29	8	63
Requests for chargers from 3rd parties	28	6	80	107	110	105
Number of new EV registrations	0	114	500	799	622	2 342 / 2 642 with one-time charging
Number of charging sessions	0	140	0	8 332	1 445	33 840
Energy consumed [kWh]	0	1 100	0	136 100	16 817	586 860
CO <sub>2</sub> prevented [t]	0,0	0,89	0,0	110,58	13,7	476,82
NO <sub>x</sub> prevented [kg]	0,0	2,96	0,0	365,77	45,2	1 577,19
CO prevented [kg]	0,0	5,16	0,0	637,97	78,8	2 750,90
Fossil fuel reductions [l]	0,0	481	0,0	59 544	7 357,4	256 751
Socket preferences	N/A	30% CHAdeMO 70% CCS/COMBO	N/A	73% CHAdeMO 12% CCS/COMBO 15% AC	46% CHAdeMO 38% CCS/COMBO 16% AC	69% CHAdeMO 14% CCS/COMBO 17% AC

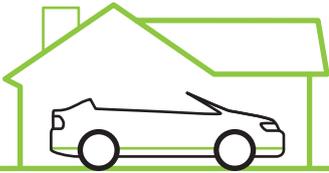
# WHO ARE THE CUSTOMERS?

One-person companies  
50% of current Greenway  
network users

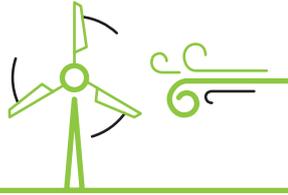


## CURRENT EV OWNERS IN SK & PL

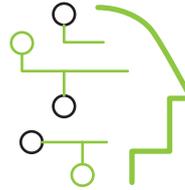
Luxury seekers



Green enthusiasts



Tech fans



High-mileage fleets



## FUTURE EV OWNERS: NEAR-TERM PURCHASERS

Urban families



Trend conscious  
shopper



Rural  
travellers



Tech and green  
enthusiasts



Urban  
commuters



## FUTURE EV OWNERS: LONG-TERM PURCHASERS

Budget buyers



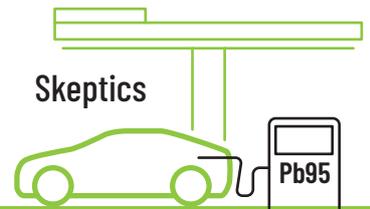
Families living in flats



Laggards



Skeptics



**Not interested  
in an EV?**  
**Why not?**



High prices



Charge time  
(length)



Insufficient  
infrastructure  
(perceived)



Insufficient  
range  
(perceived)

**"If these things  
would change,  
I will consider  
an EV"**

# EV DRIVERS, HABITS AND PREFERENCES

## TYPICAL DRIVER PROFILE



Car usually plugged in **when home** with AC charger



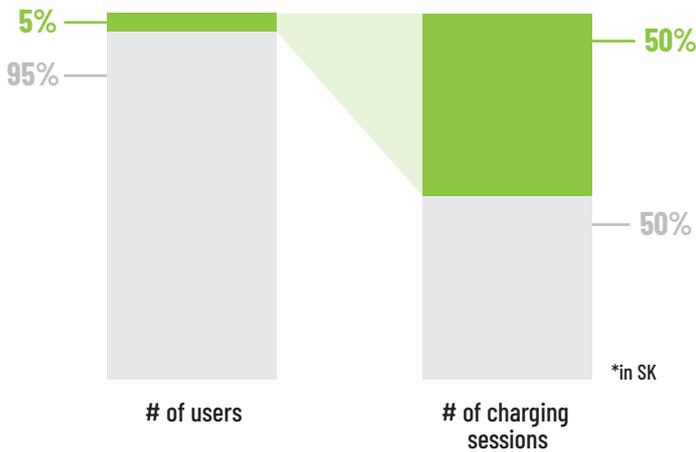
**At work**, if available, usually, with AC wallbox



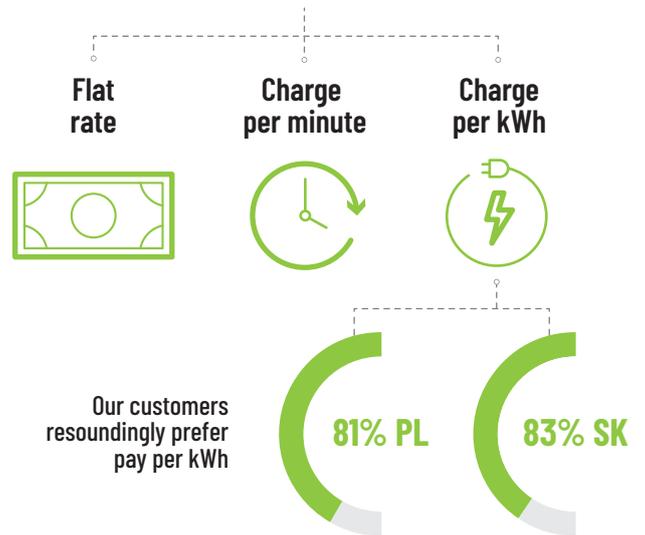
Uses **public infrastructure** to charge as needed or on long trips

## HIGH SPENDERS

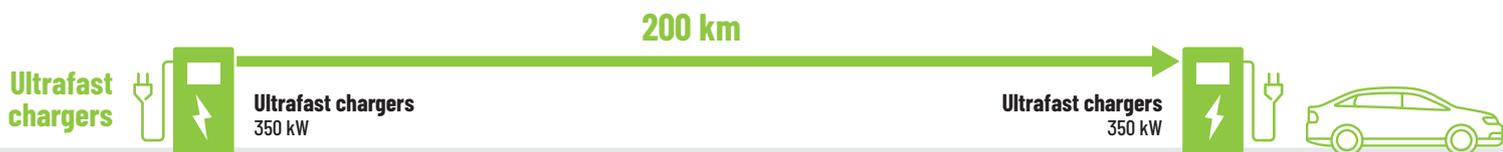
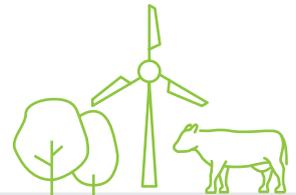
5% of users make up more than 50% of charging sessions recharging 8 and more times/month\*



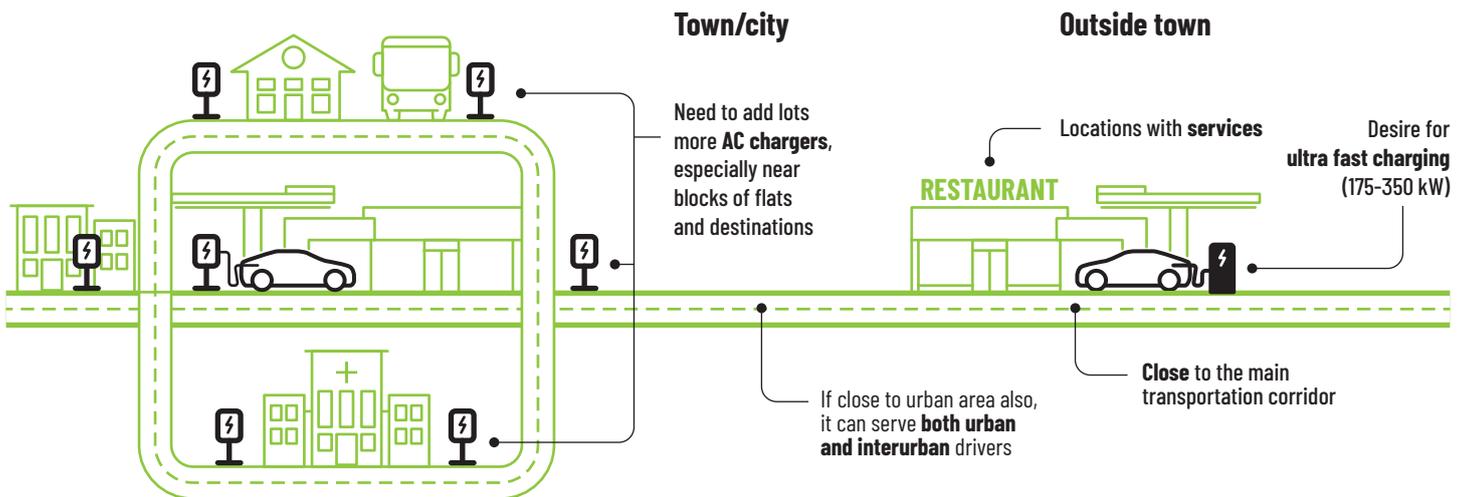
## CHARGING FOR SERVICES



## PREFERRED NETWORK DENSITY



# PREFERRED CHARGER LOCATION

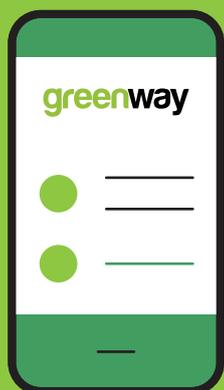


## USERS COMPARE EV CHARGING LOCATIONS TO PETROL STATIONS AND WANT A SIMILAR LEVEL OF SERVICES, ESPECIALLY:



## USERS WANT A MOBILE APP!

Services to include:



- Push notifications
- Ad-hoc charging ability
- Pay via app instead of RFID card
- Reserve a station
- Station availability
- Navigation
- Start and stop charging session

## CHARGING HUBS NEEDED

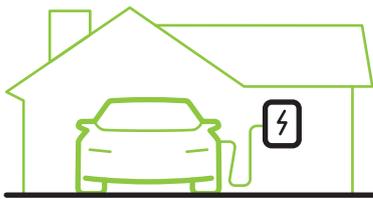
Willingness to wait maximum 10-15 minutes (PL)

Build charging hubs so multiple people can charge simultaneously

This is becoming an increasingly important topic and challenge for EV drivers



# NEED FOR PUBLIC EDUCATION



**80-90%**  
Home  
charging



**10-20%**  
Public  
fast charging



Most people compare prices to petrol station or home charging. They do not see **more expensive** public fast charging as a complement (10-20% of the time) to **much cheaper** home charging (80-90% of the time)



## Eye opener:

Many Slovak respondents do NOT see EVs as **enviro friendly**.

## Conclusion:

More education needs to be done!



Perception of **insufficient chargers** is rampant even when people don't know how much/many

## NUMBER OF PEOPLE SURVEYED

Poland		Slovakia	
515	273	207	515
504	211	203	504

Existing customers  
Potential customers

+ in-depth interviews with **50 people**

"For me, GW is a dynamic and brave company, as they invested to the market which was almost unknown at that time"

"It is very simple. One of the most important benefits of e-mobility is that you can have clean air in the city, almost as if you lived in the village. And not the smog from the cars as it is now. The coal is burned outside of the city. If the EVs were charged in the larger scale, the power plants wouldn't have a problem storing / spending the spare energy produced during the night. And so on..."

"We need to be less skeptical and follow the progress and suggested solutions more. That you cant imagine how it works doesn't mean that it cannot work. People couldn't imagine how they would fly either. They couldn't imagine a horse being replaced by a car. There was also a lot of skepticism but gradually everything improved"

"It would be good to have all the district cities also covered with chargers"

## What users say?

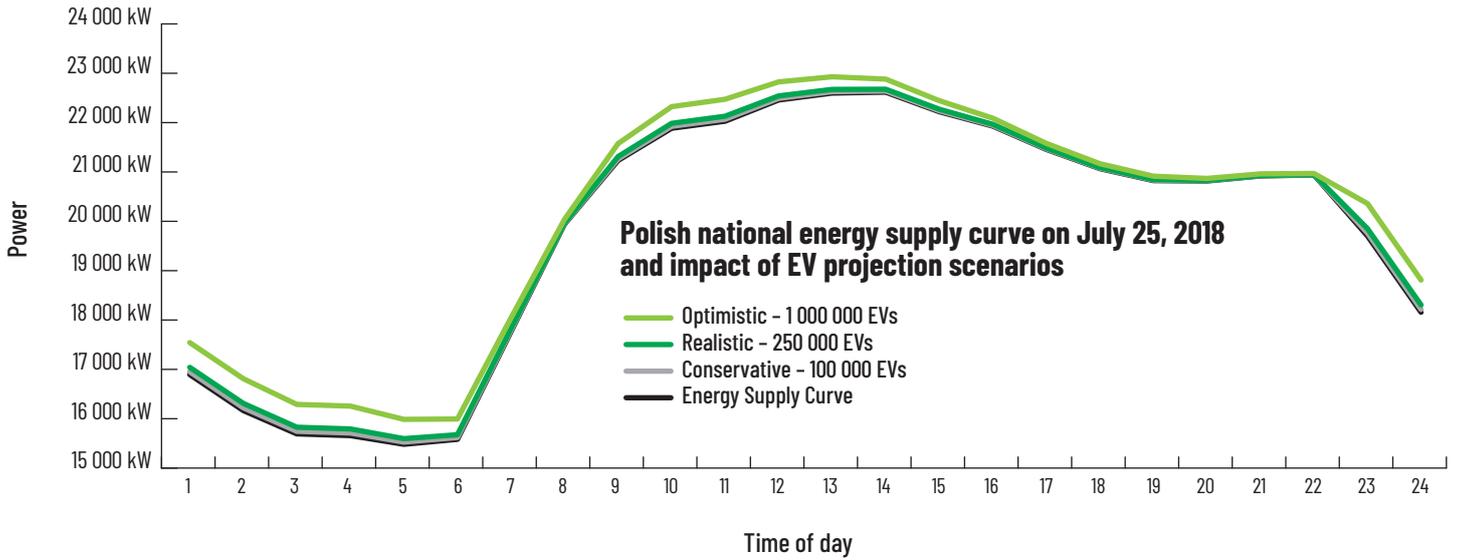
"I guess that Greenway has been listening to their users for the past year. They are not only placing new chargers at new spots, but also adding new chargers next to existing ones. For example they added one in Avion, and also in Dalitrans in Ruzomberok. This is what we - their users said, that it is better to have more chargers at one place, rather than having several scattered around the city. So that when we arrive to an occupied charger, we don't want to search for another one that might be occupied as well. We want to have more chargers at one place so that we can be sure we will be able to charge. So i think GreenWay is listening to their users. If they stick to this trend, everything will be ok"

"It is obvious that e-mobility is the future, we just need to solve the charging in the rain"

"When I get into a diesel, it feels like I am standing on the spot. I am planning to gradually switch all my cars to electric"

"My relationship with GreenWay is almost emotional, as they are basically pioneers in our country and everything worked well from the beginning"

# EVs, CHARGING AND ENERGY



## IMPACT OF ALL SCENARIOS ON ENERGY GRID JULY 25, 2018

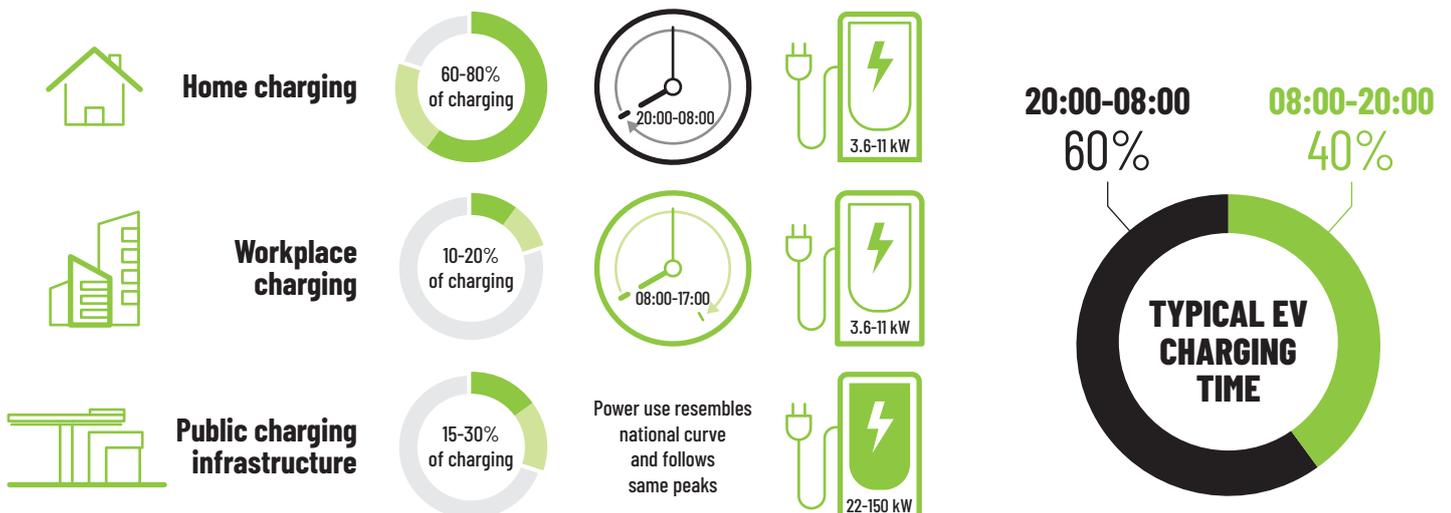
		Base	Conservative	Realistic	Optimistic
<b>Number of EVs</b>		2 700	100 000	250 000	1 000 000
<b>Average km per year</b>		15 000	15 000	15 000	15 000
<b>Average consumption kWh per 100 km</b>		18,0	18,0	18,0	18,0
<b>Yearly consumption TWh</b>		0,01	0,27	0,68	2,70
<b>Night charging AC TWh/year</b>	60%	0,004	0,16	0,41	1,62
<b>Day charging AC TWh/year</b>	25%	0,002	0,07	0,17	0,68
<b>DC charging TWh/year</b>	15%	0,001	0,04	0,10	0,41
<b>Peak demand MW 2018-07-25</b>		22 617	22 641	22 677	22 929
<b>Additional demand of EV charging MW</b>		0	23	60	312
<b>EV to peak ratio %</b>		<b>0,0%</b>	<b>0,1%</b>	<b>0,3%</b>	<b>1,4%</b>

## SUMMARY

In all but one scenario the impact on the national power grid is not significant.

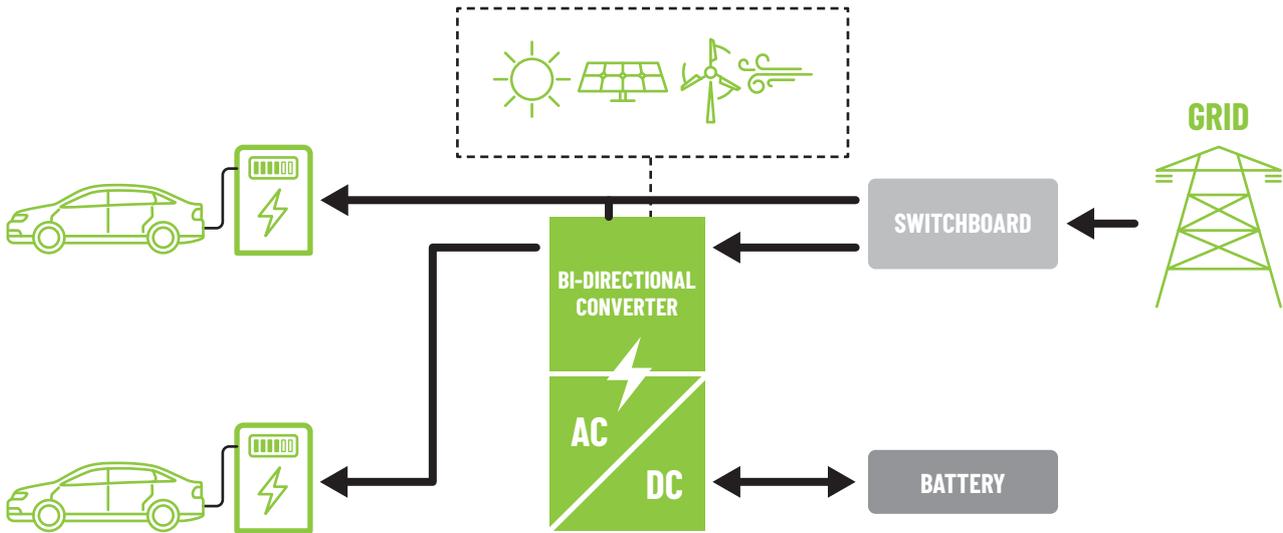
With 1 million EVs on Polish roads additional capacity would be needed during the summer midday period.

This could be covered by RES, especially PV panels, as the peak is generated in the best possible period for EV production (summertime midday).



# GridBooster

## BATTERY ASSISTED FAST CHARGING SYSTEM



**GridBooster 1:  
Bratislava, Slovakia**

Opened: Jan 6, 2018



**GridBooster 2:  
Trenčín, Slovakia**

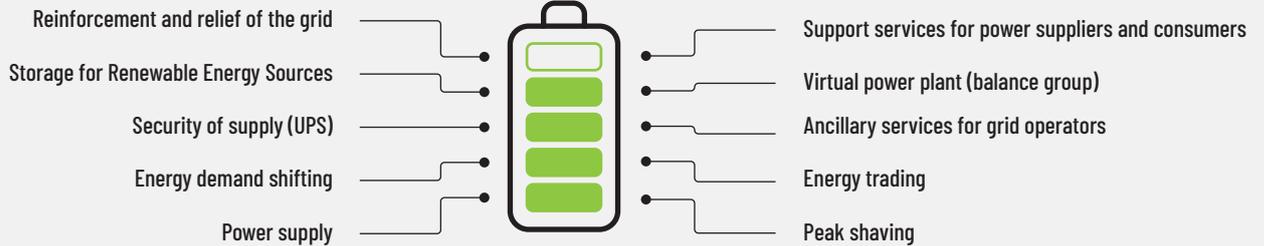
Opened: November 23, 2018



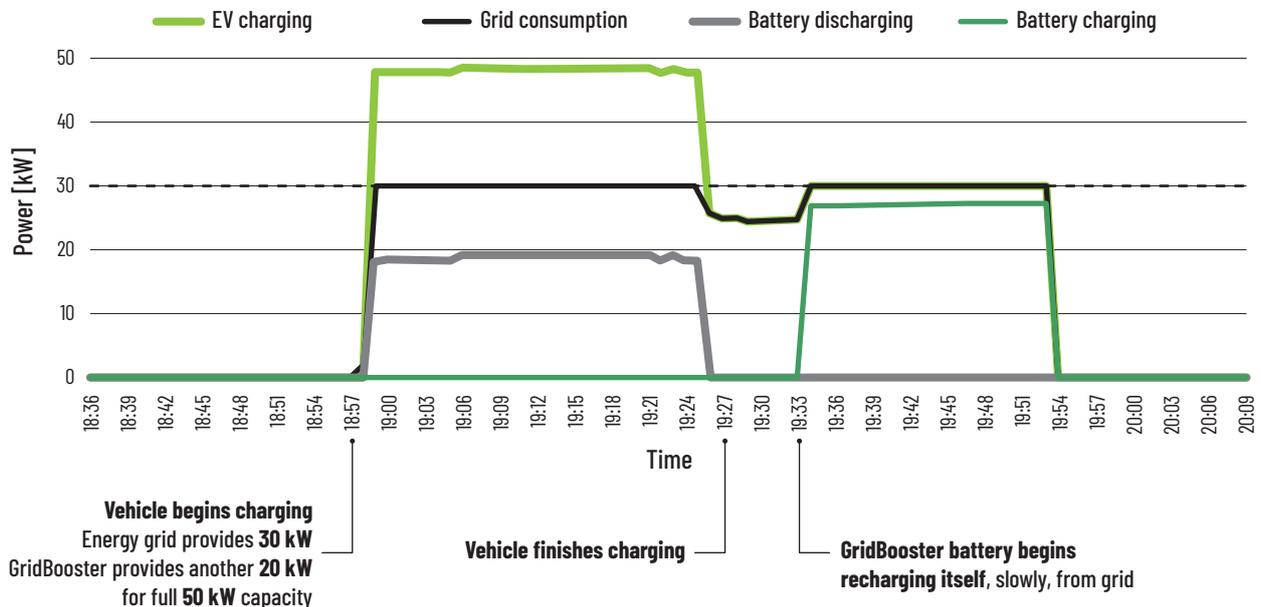
**GridBooster 3:  
Ružomberok, Slovakia**

Opened: December 31, 2018

## BATTERY STORAGE BENEFITS:



## GRIDBOOSTER PEAK SHAVING FUNCTION:



# RECOMMENDATIONS

## REGULATORS AND GOVERNMENTS

- 1 Support for electric mobility must be visible and ongoing so that people and companies can properly plan and adjust their behavior
- 2 The information gap about EV technology and related topics remain significant among the general public. Governments should prioritize educating the public and providing valid and reliable information
- 3 Lowering the fees of connection to the energy grid and Distribution Service Operator (DSO) services, especially for the fast and ultra-fast charging infrastructure, is critical for massive investment to, and rollout of, infrastructure
- 4 Ensure the recently passed European Union CO2 emissions standards for cars and vans are enforced and adhered to so that more EVs reach the market and are available to consumers
- 5 Provide direct financial incentives and subsidies to the up-front cost of an EV (around 6,000-8,000 per vehicle or total VAT exemption) to increase uptake

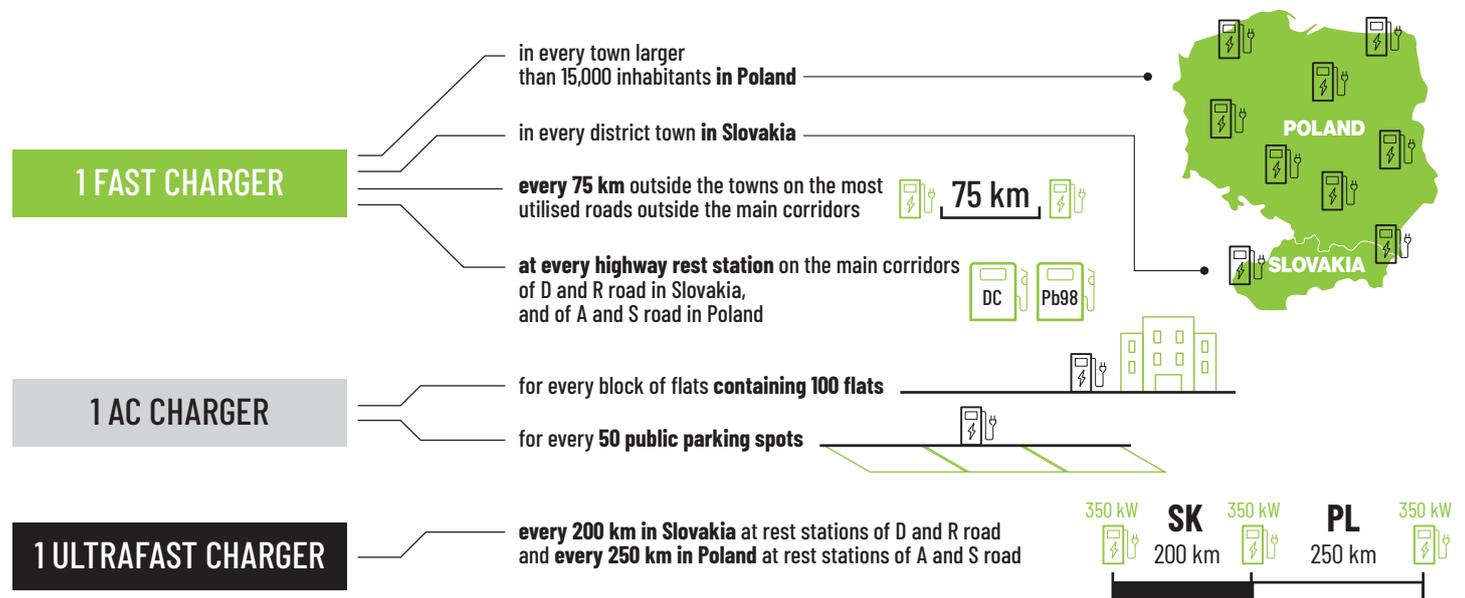
## MUNICIPALITIES

- 1 Provide clear and ongoing public leadership and role model active support for electric mobility
- 2 Update local laws, such as zoning, etc, to support the deployment of charging infrastructure in or near apartment buildings and around the city
- 3 Lead by example and purchase EVs for municipal fleet vehicles
- 4 Support residents, businesses, and visitors in driving electric, from providing municipal subsidies to free parking or using bus lanes to establishing low or zero emission zones, etc.
- 5 Establish a position within the city workforce dedicated to the development of electromobility to coordinate all of the efforts, from education to planning to deployment to operation. This position should serve as well as a single point of contact for citizens interested in having access to public charging infrastructure.

## COMPANIES IN CHARGING INFRASTRUCTURE

- 1 Ease of access, physical surroundings, and amenities around a charging location are significant factors. Significant efforts should be made to find the best possible locations with exceptional services and amenities
- 2 Locations, especially the most popular ones, should be equipped with more than one charger to prevent waiting and queuing
- 3 Education and information are critical regarding pricing and charging practices, especially the ideal ratio of home/workplace: commercial charging
- 4 Using electricity from renewable energy sources is most important in countries with high CO2 intensity of energy production, like Poland

## RECOMMENDED MINIMAL DEPLOYMENT OF CHARGING INFRASTRUCTURE IN SLOVAKIA AND POLAND





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# greenway

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