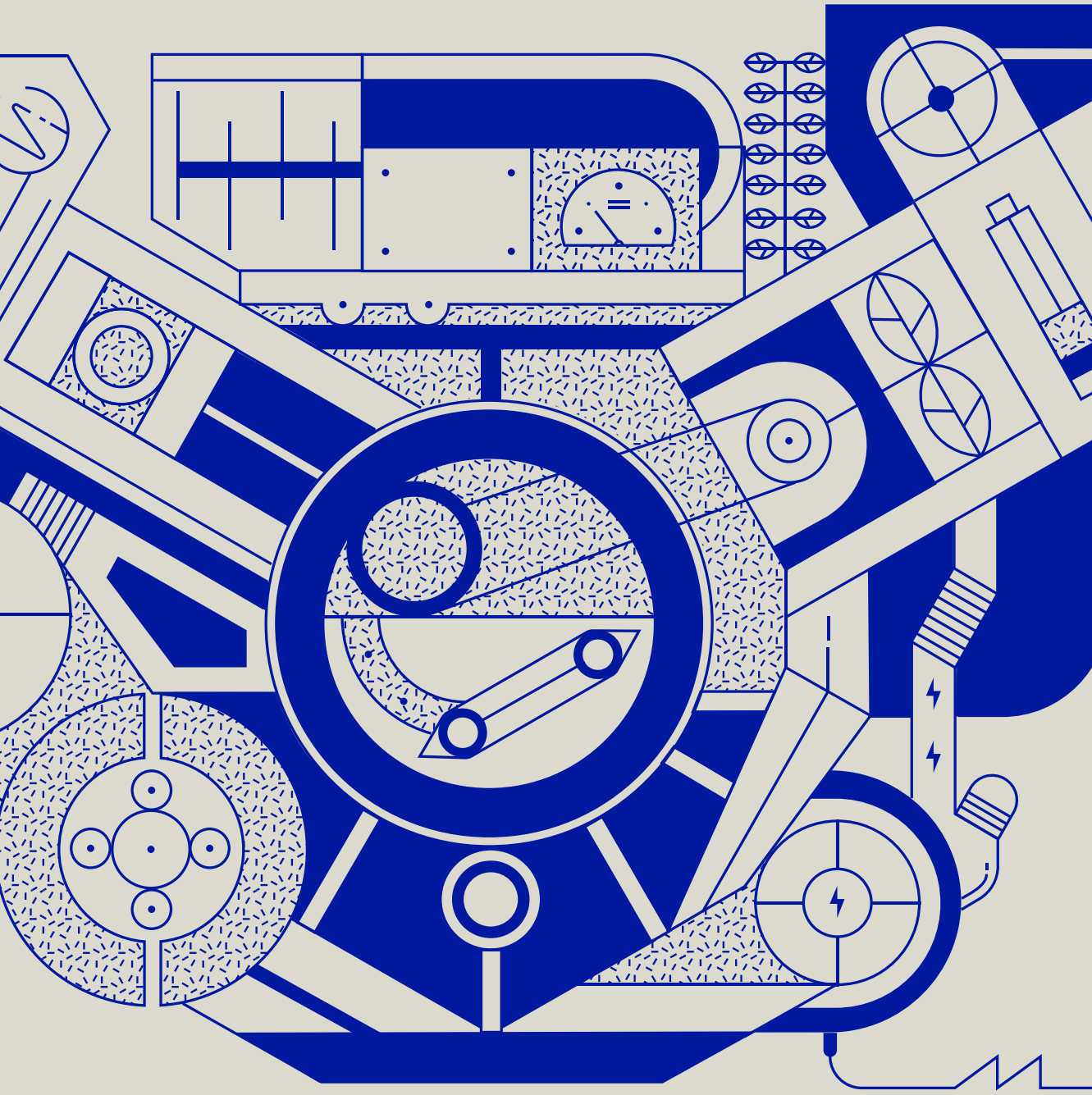
E-mobility in Poland as a business opportunity



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Electric Vehicles Promotion Foundation is a Warsaw-based think tank established to accelerate the up-take of e-mobility in Poland.
We run the Innovative Transport Forum, the biggest dialog platform for stakeholders interested in advancing the idea of e-mobility.
We provide analytical services on demand.

Warsaw, May 2018

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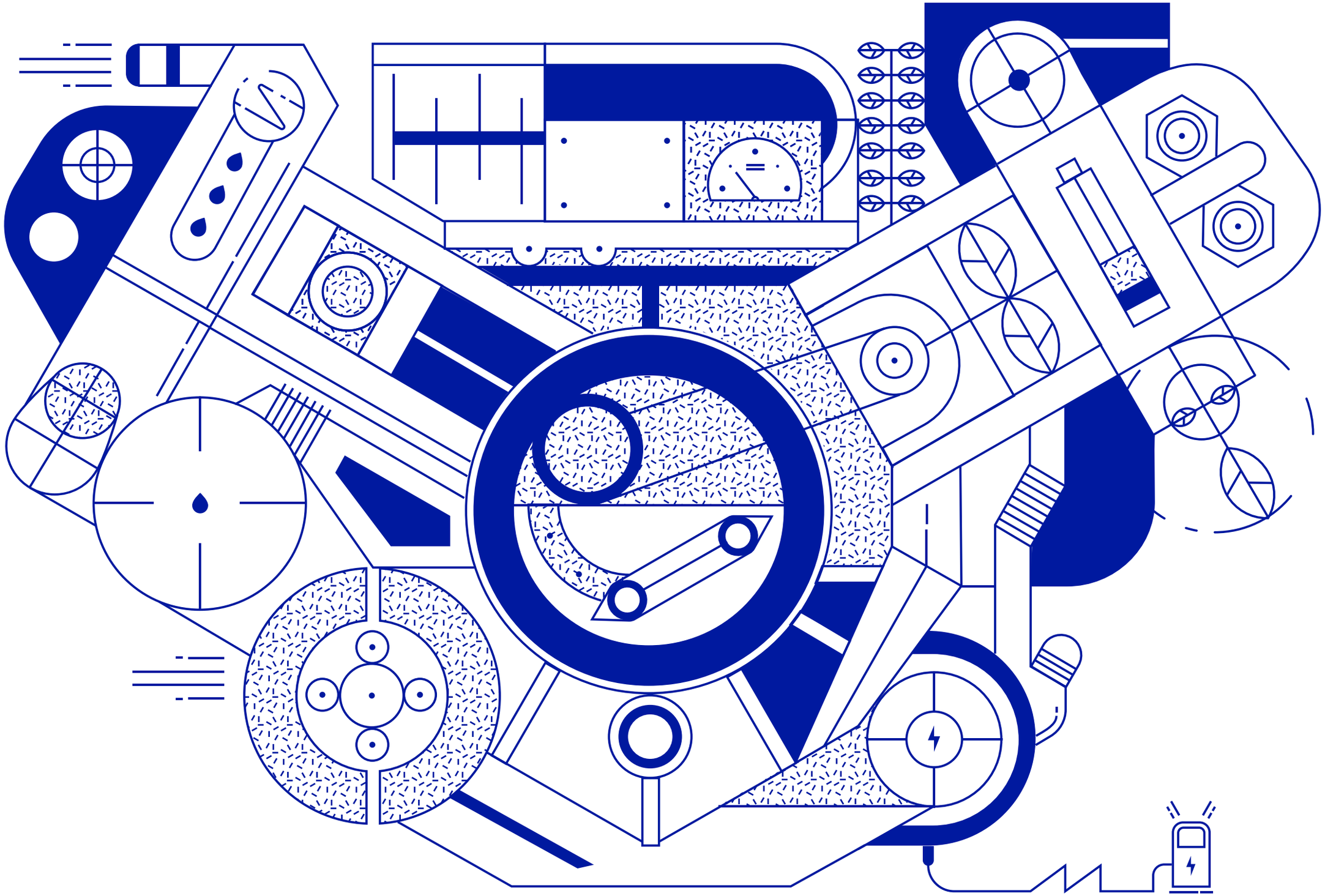


Executive summary

The e-mobility market is growing fast. Sales of new electric cars worldwide surpassed 1 million units in 2017, an increase of 54 per cent compared with 2016. The global stock of electric cars surpassed 3 million units in 2017 after crossing the 2-million mark only in 2016. The spread of electric vehicles is supported by climate action policy, rising concerns over air quality in ever more congested cities, and also energy security. After all, in today’s volatile energy market, the most secure oil supplies are those that can be avoided altogether.

Europe is a pioneer of this technological shift. The European market is going strong with a few countries clearly in the lead including Norway, Iceland, Sweden, the UK, France and the Netherlands.

Poland has grand ambitions for e-mobility and legislation in place to enable their realization. But Poland lacks sufficient incentives for e-mobility uptake, which, as research and experience has shown, is the prerequisite of rapid market growth. The Polish market has great economic potential due to its size and the importance of the automotive sector for the country's economy. Furthermore, the electrification of transport could vastly improve Poland’s environment and energy security, mitigating air pollution and oil import dependency. Still, the uptake of EVs so far has been slow, and the investment in infrastructure lags behind the government's plans. The Polish EV development programme, launched only in recent years, is already running behind schedule.

On the other hand, there are a number of e-mobility sectors performing well. Some players are enjoying healthy growth and are keen to expand and look for new opportunities in this innovative business environment. The most promising sectors include the electric bus manufacturing value chain, the development of charging infrastructure, battery production and innovative storage solutions.

The leaders of change in the Polish market are far from obvious. They include some start-up companies and small and medium-sized Polish municipalities. It is these stakeholders who push the boundaries of what is possible. It is cities like Jaworzno or Zielona Góra where business opportunities are the greatest. From e-mobility to autonomous vehicles, local leaders will continue to set new standards and test new solutions. They are open to new solutions and new ideas. These are the business partners to look for.

This report describes why e-mobility is such an important topic in Poland, how the regulations are set up and how the market is developing. Our analysis also describes the key stakeholders. We hope that getting familiar with the Polish e-mobility market will be the first step in recognising some interesting and advantageous business opportunities.

Table of contents

E-mobility in Poland – a political and an economic priority

E-mobility is the first industrial revolution in which Poland could participate as a leader and not as a technology buyer. It could be a pass for Polish companies to become important global players, in particular in electric bus manufacturing.

Mateusz Morawiecki ‣ Polish Prime Minister

After Poland's national elections in 2015, then-Development Minister and current Prime Minister Mateusz Morawiecki unveiled his Responsible Development Strategy[1]. The document is a complex plan for the Polish economy specifying a number of strategic goals to be achieved by the government by 2020 and 2030.

One of the flagship programmes included in the strategy is e-mobility. This programme is divided into two independent components: one that targets the development and production of electric buses and one that focuses on designing and manufacturing a Polish electric car.

1 https://www.miir.gov.pl/strony/strategia-na-rzecz-odpowiedzialnego-rozwoju/informacje-o-strategii/

The official in charge of the electric bus project is Jadwiga Emilewicz, Minister of Entrepreneurship and Technology. She is also responsible for the fight against smog and for the promotion of sustainable transport in cities. She is a keen supporter of innovative technologies, which aligns well with her portfolio.

Michał Kurtyka, state secretary at the Ministry of Energy is in charge of the electric car project. Before joining the government, he wrote the book New Electricity and New Cars – *The Future of the European Energy Doctrine*[2], in which he states that "the electric car is bound to become a pivotal element of emerging electricity revolution."He is the right person in the right place.

The growing importance of the Responsible Development Strategy, as evidenced by the Prime Minister's support and its strong management team guarantees that e-mobility will remain one of the main priorities of the Polish government. The potential for change and growth is significant but the starting point is unquestionably difficult.

2 M.Kurtyka, L.Jesień, New Electricity and New Cars – The future of the European energy doctrine, CeDeWu, Warsaw 2016.

02

Strategy papers and regulatory framework

In 2016 the government tabled the “Package for clean transport” – a set of documents which is to determine the direction of e-mobility development in Poland. The documents include the E-mobility Development Plan, the national framework for the alternative fuel development policy, a new dedicated piece of legislation on e-mobility and the amendment of the law on biocomponents and liquid bio-fuels that should safeguard the financing of e-mobility for the future.

Plan for development of e-mobility

The aim of the "E-mobility Development Plan in Poland" (E-mobility Plan) is to promote electric vehicles among Polish consumers and to create the opportunities for Polish firms to participate in this new market. This strategic document was designed to map out the implementation of Morawiecki's Plan on e-mobility. CHART 01.

CHART 01.

Government forecast for EVs registation growth in Poland

Year	Total nb of EVs	New registrations
2015	1007	0
2016	2397	1390
2017	5704	3307
2018	13576	7871
2019	32310	18734
2020	76898	44587
2021	183017	106119
2022	366034	183016
2023	549051	183016
2024	823576	274525
2025	1029470	205894

Source: The national framework for the alternative fuel development policy

One of the most ambitious assumptions of the E-mobility Plan is to have one million EVs on Polish roads by 2025. Authors of the strategy recognise that to achieve this goal, charging infrastructure will need to be properly developed in Poland. A more robust network of charging stations will neutralise the "range anxiety" experienced by car drivers who may worry that their battery capacity is insufficient for their journey. The E-mobility Plan also concedes that some incentives will be needed to boost sales of electric cars which will remain more expensive than their diesel or petrol-powered competition for another few years. A number of regulations will need to be revised, as they are not well prepared for the rolling out of e-mobility.

According to the document, the increase in the number of electric cars will have a noticeable impact on the electricity sector. The Ministry of Energy estimates that the targeted one million vehicles could generate an annual demand of approximately 2.3-4.3 TWh of electricity, which is on the one hand a challenge for the national grid, but on the other – an opportunity for firms in the sector. The Ministry estimates that the revenues for energy companies from the sale of electricity for EVs could reach as much as PLN 20bn. CHART 02.

ACCORDING TO THE INTERNATIONAL ENERGY AGENCY, RD&I AND MASS PRODUCTION PROSPECTS ARE LEADING TO RAPID BATTERY COST DECLINES AND INCREASES IN ENERGY DENSITY.

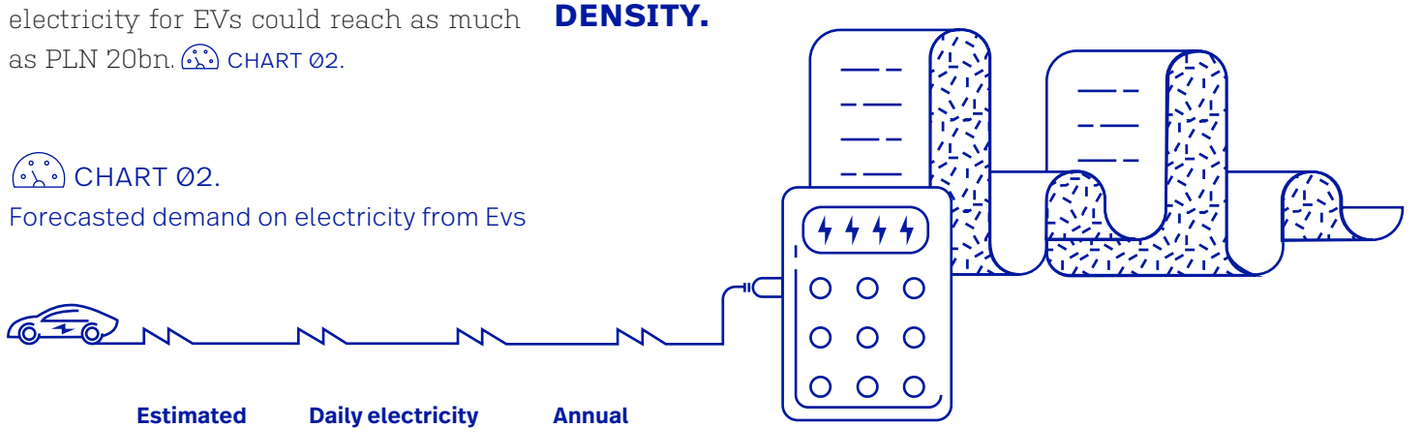


CHART 02.
Forecasted demand on electricity from Evs

Year	Estimated nb of EVs	Daily electricity demand (MWh)	Annual demand (MWh)
2015	1 007	6	2 228
2016	2 397	15	5 303
2017	5 704	35	12 621
2018	13 576	82	30 039
2019	32 310	196	71 492
2020	76 898	466	170 150
2021	183 017	1109	404 958
2022	366 034	2219	809 915
2023	549 051	3328	1 214 873
2024	823 576	4993	1 822 309
2025	1 029 470	6241	2 277 886

Source: Ministry of Energy

55%
of Polish vehicles are over 16 years old

This additional revenue could be used to finance innovation in the electricity sector and for investments in the low and medium voltage grids necessary to integrate EV charging stations. Electric vehicles will become another means to optimise the grid. Batteries for electric cars will be charged mainly at night neutralising the so called "night valley" phenomenon. Today, inconsistent demand for electricity at night is difficult to manage as some of the power plants simply need to run all the time to maintain the grid.

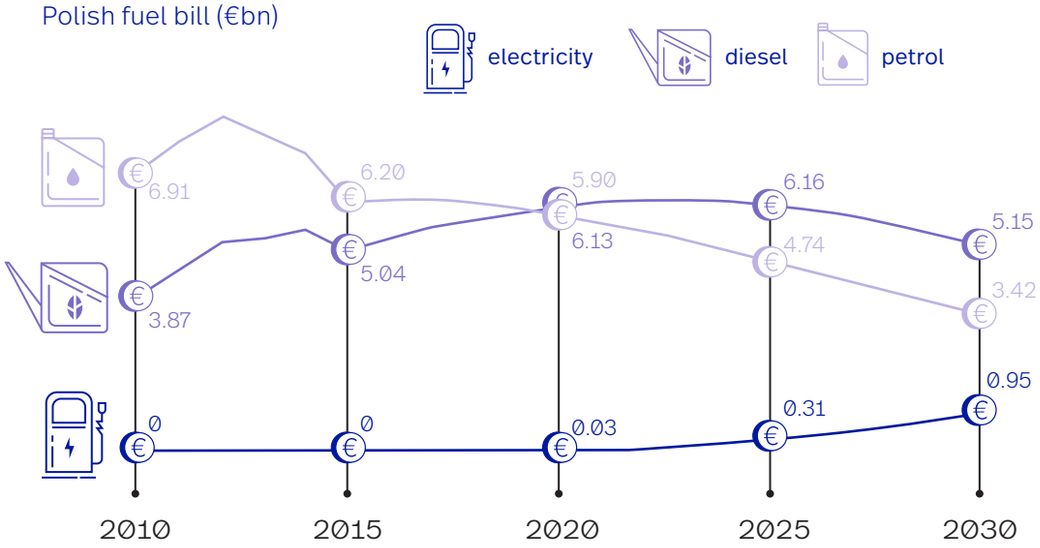
To improve the management of the electricity system, 80 per cent of consumers are to be equipped with smart meters. Furthermore, the government wants to introduce dynamic tariffs for electricity which will encourage owners to charge their cars when demand for electricity is low. The Ministry wants also to encourage electricity storage solutions. One idea would be to offer financial incentives for car-owners to return electricity back to the system.

The E-mobility Plan also highlights the environmental aspect of EVs. Poland currently has the worst air quality in Europe due to emissions from household heating and a high prevalence of obsolete vehicles. The Polish passenger vehicle market is characterized by extremely large volumes of imported used vehicles, which accounted for 1.04mn units in 2016. In Poland today, 55 per cent of vehicles are over 16 years old. The EV roll-out should be one of the ways to improve air quality.

The increase in the number of electric vehicles should also reduce oil consumption, which will in turn translate into greater energy independence for Poland. Although the country is self-sufficient in terms of electricity production, 97 per cent of its oil is imported from abroad at a cost of some 2 per cent of GDP annually. The savings

could be significant. According to FPPE and Cambridge Econometrics,[3] if Poland sticks to the target of one million EVs in 2025, the oil import bill be reduced by 25% between 2015 and 2030. CHART 03.

CHART 03.
Polish fuel bill (€bn)



Source: Cambridge Econometrics

The E-mobility Plan points out three challenges to which Polish companies can respond. CHART 04.

The first is the need of new business models associated with the changing manner of car use and the emergence of new possible services in transport. This includes among other things carpooling and car sharing services.

3 Charging Poland, Cambridge Econometrics and Electric Vehicles Promotion Foundation, Warsaw, February 2018.

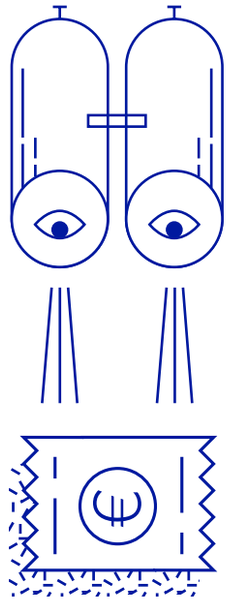
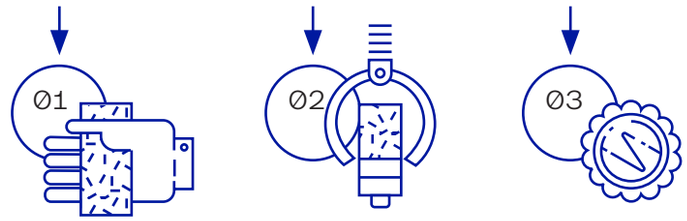


CHART 04.
Business respond to electromobility



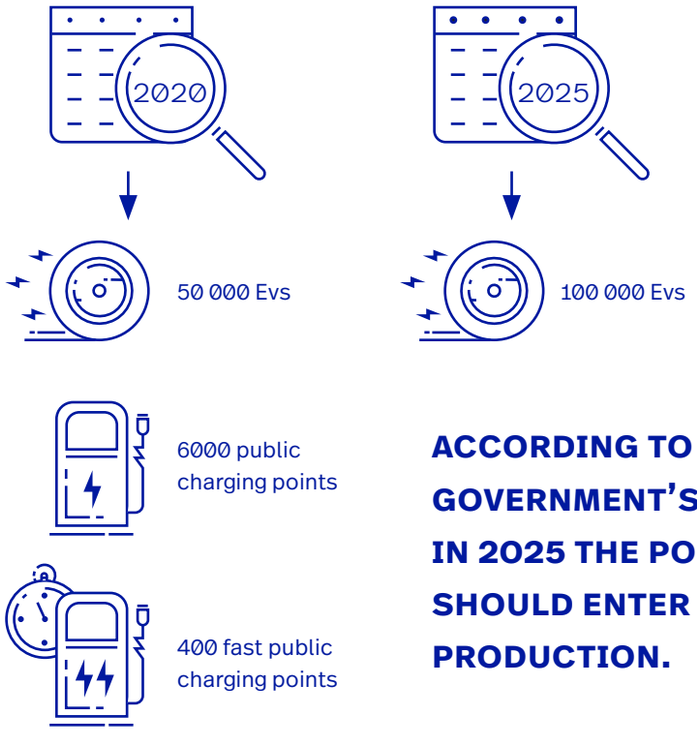
The second challenge is technology, especially with regard to batteries. New solutions are needed to reduce their cost. Vehicle-to-grid technologies will be one of the priorities. Other solutions include the extension of second battery life and battery recycling.

The third challenge is the revolution in the Polish automotive market. While the lack of domestic auto manufacturers could be seen as a challenge, e-mobility could be used to create new Polish companies or brands. Poland could take advantage of its "underdevelopment benefit" and enter the car market traditionally reserved for well established players. E-mobility will make it possible for new, non-traditional, and start-up companies, rather than existing ones, to become car manufacturers. Through state involvement and financial stimulus, Poland could replicate its success in bus manufacturing within the EV market.

The E-mobility Plan will have three stages. The first, which runs until the end of 2018, is the preparatory phase, which will introduce first incentives to purchase EV. Additionally,

this phase envisaged the construction of prototypes for a Polish electric vehicle. At the same time, preparations will be finalised to build charging infrastructure, and promotional campaigns to increase awareness of e-mobility among the public will be aired through different media.

CHART 05.
Emobility objectives for 2020 and 2025



ACCORDING TO THE GOVERNMENT'S PLAN, IN 2025 THE POLISH EV SHOULD ENTER MASS PRODUCTION.

In the second phase – from 2019 to 2020 – the producers will start to assemble limited quantities of the Polish electric car. The first charging stations will be built and the incentives for purchasing electric vehicles will be

intensified. Local governments will be encouraged to transition their public transport systems to electric buses.

In the third stage – to 2025 – the Polish EV will enter mass production. Poland will become the destination for some EV equipment and the infrastructure necessary for the development of e-mobility. Electric cars will start rapidly replacing traditional engines. CHART 05.

The national framework for the alternative fuel development policy

The national framework for the alternative fuel development policy (Framework) is part of the e-mobility package, but its main objective it to implement the EU Directive 2014/94 on the deployment of alternative fuels infrastructure[4].

400 FAST CHARGERS SHOULD BE BUILD AROUND POLAND BY 2020

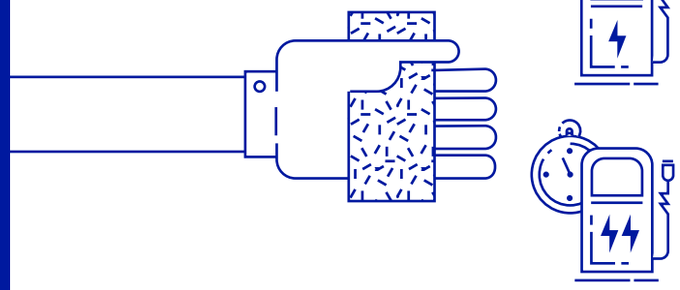
The Framework adopted in 2017 addresses most of the requirements of the Directive. As regards e-mobility infrastructure, it assumes significant expansion of the charging infrastructure by 2020. The objective is 6,400 charging stations (including 400 fast chargers) in biggest Polish cities and on transit routes. No target beyond 2020 has been set.

An important part of the Framework is the list of incentives that should be introduced in order to meet the e-mobility development objectives. Some of them have already been introduced through the E-mobility Law.

4 Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure, OJ L 307/1, 28.10.2014.

The E-mobility Law

The E-mobility Law entered into force on 22 February 2018. Similar to the national framework for the alternative fuel development policy, it is a simple implementation of the Directive on the development of alternative fuels infrastructure. It focuses on the introduction of mechanisms guaranteeing the creation of an EV charging network, but it also regulates the development of CNG (Compressed Natural Gas), LNG (Liquid Natural Gas) and hydrogen in order to facilitate and speed up their spread around Poland.



6000
public charging points 22kW

400
fast public charging points above 22kW

Charging infrastructure

The legislation sets a target for the installation of 6400 charging points in Polish cities with more than 100,000 inhabitants by 2021. According to our data, 39 cities meet this criterion. The overall target is spread over the cities depending on their population, number of registered cars and the ratio of cars per inhabitant. However, there are no sanctions envisaged for local authorities for failing to meet the target. If the required figures are not met by 2021, local electricity distribution companies (DSOs) will be charged with making sure the remaining gaps in charging points

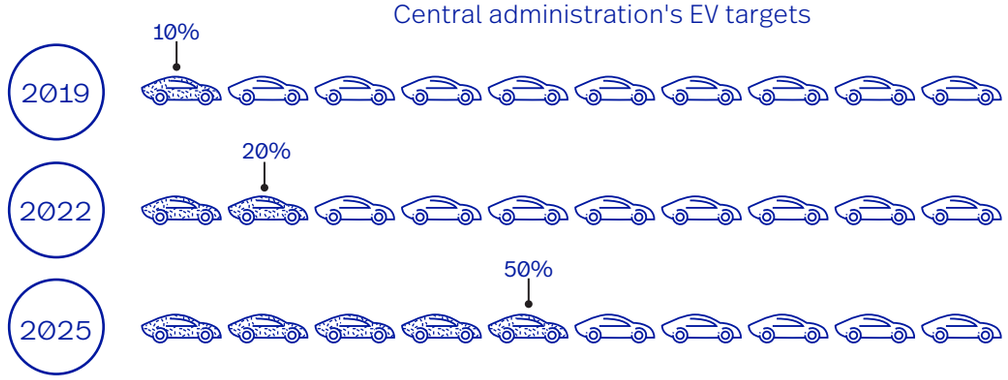
in their cities are filled. There are four state-owned DSOs in Poland (PGE, Tauron, ENEA and ENERGA) and one private DSO (innogy), all operating in assigned regions around Poland. MAP PAGE 24/25.

Apart from building the necessary infrastructure in cities, the legislation also looks to provide main transit routes with chargers. There is no specific target figure in this case, however, the General Directorate for National Roads and Motorways should prepare a plan indicating sites for installing chargers along the main routes in the near future. The General Directorate published the draft plan on 23 May 2018 indicating 170 possible locations for chargers. The plan will be now discussed with DSOs and agreed by August 2018.

E-mobility infrastructure in buildings

In cities with populations greater than 100,000, all newly built public and multi-family buildings have to be designed in such a way to make sure all parking spaces could be equipped with electrical charging capacity of 3.7kW.

INFO-GRAPHIC
Central administration's EV targets



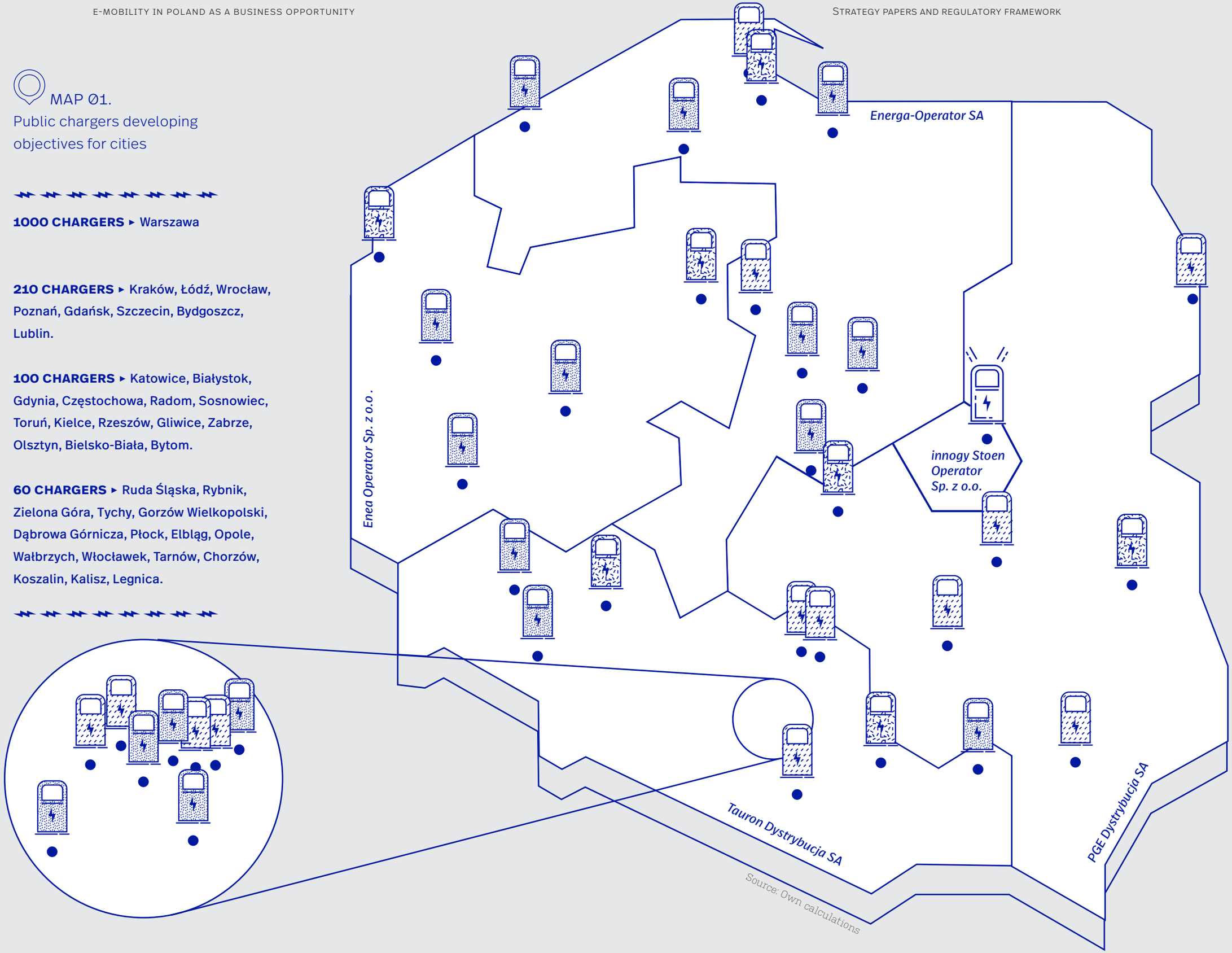
MAP 01.
Public chargers developing objectives for cities

1000 CHARGERS ▸ Warszawa

210 CHARGERS ▸ Kraków, Łódź, Wrocław, Poznań, Gdańsk, Szczecin, Bydgoszcz, Lublin.

100 CHARGERS ▸ Katowice, Białystok, Gdynia, Częstochowa, Radom, Sosnowiec, Toruń, Kielce, Rzeszów, Gliwice, Zabrze, Olsztyn, Bielsko-Biała, Bytom.

60 CHARGERS ▸ Ruda Śląska, Rybnik, Zielona Góra, Tychy, Gorzów Wielkopolski, Dąbrowa Górnicza, Płock, Elbląg, Opole, Wałbrzych, Włocławek, Tarnów, Chorzów, Koszalin, Kalisz, Legnica.



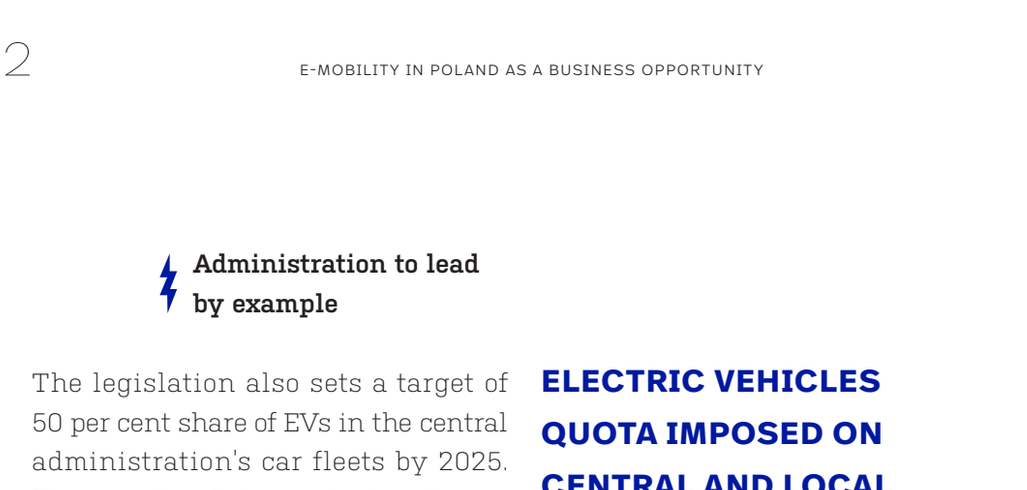
Source: Own calculations

Administration to lead by example

The legislation also sets a target of 50 per cent share of EVs in the central administration's car fleets by 2025. The growth will be gradual as the administration could meet the obligation in stages (10 per cent by 2019, 20 per cent by 2022 and the remaining EVs by 2025). The obligation will increase the EV stock in Poland by approximately 2000 units.

ELECTRIC VEHICLES QUOTA IMPOSED ON CENTRAL AND LOCAL ADMINISTRATION TRANSLATES INTO 2500 EVS AND 3000 ELECTRIC BUSES.

INFO-GRAPHIC
Local administration's electric bus targets



There are even more ambitious obligations imposed on local authorities. In communities where the number of inhabitants exceeds 50,000. Only 30 per cent of the local administration's car fleet will have to be electrified by 2025 but also at least 30 per cent of buses used for public transport will have to be electric by the same date. As the latter target is more expensive, it could be implemented in stages:

5 per cent by 2020, 10 per cent by 2022, 20 per cent by 2024 and 30 per cent by 2027. These obligations will increase the EV stock in Poland by another 1,500 units and the electric buses fleet by 3000 units.

THE PARLIAMENT IS WORKING TO ENABLE LOCAL AUTHORITIES TO CHARGE FEES FOR ENTERING CLEAN TRANSPORT ZONES IN CITIES

Clean Transport Zones

The E-mobility Law introduces the possibility for local authorities to create clean transport zones in cities. As a rule, EVs, hydrogen cars and natural gas vehicles will have access to these zones. Exceptions can be decided locally but charging fees for entry into clean transport zones would be generally illegal. Currently, the Parliament is working to change this provision to allow local communities to charge fees for entering such zones in order to finance investment in clean transport.

CHART Ø6.
Key incentives for EVs owners in Poland

Incentive	Poland
Financial	
Exemption from excise duty	✓
VAT exemption on purchase	–
Purchase grant	–
Tax deduction	✓
Extra perks	
Access to bus lanes	✓
Free public parking	✓
Access to clean transport zones	✓

Source: Own calculations

Incentives for EV owners and drivers

CHART 06. The most significant incentives in terms of prestige and visibility are the two privileges that EV users are granted through the E-mobility Law: the possibility to use bus lanes and free parking in public areas. First, electric vehicles are able use all the bus lanes that up till now, have been reserved for public transport and taxis. However, local authorities could make this privilege dependent on the number of persons in the EV to promote ride sharing. Secondly, EVs can park for free in all public areas, even in zones where other car owners are charged.

The purchase of new electric battery-driven vehicles is exempt from excise duty. The regular rate is 3.1%.

Another incentive for EV buyers is the improved depreciation rate as compared to diesel and petrol cars. The EV owner can deduct the depreciation costs of up to €30,000 from his or her income tax. It is €10,000 more than in case of traditional engines.

Low-emission Transport Fund

In March 2018, the government submitted an amendment to the Law on biocomponents and liquid biofuels to the Parliament. When passed, it will create the Low-Emission Transport Fund, which is designed to finance various projects to promote the development of all alternative fuels, not only e-mobility.

THE NEWLY CREATED LOW-EMISSION TRANSPORT FUND COULD FINANCE AS MUCH AS €1.3 BN WORTH OF PROJECTS OVER 10 YEARS

3.1%

Exemption from excise duty for purchase of new EVs in Poland

The Fund will be financed mostly through a dedicated fee imposed on oil products and paid by refiners. It is estimated that the Fund could amass PLN 5.3bn (€1.3 bn) over 10 years.

This new funding source will be operated by the National Fund for Environmental Protection and Water Management. Its e-mobility-related funding priorities cover i.a.: the development of charging infrastructure for electric vehicles, both passenger cars and buses, EVs and spare parts manufacturers, the electrification of public transport in cities, EV-related RD&I, educational programs promoting electric vehicles, as well as purchase of electric vehicles.

The Act on Public Private Partnership (PPP)

The prospect of declining EU funds in the forthcoming years pushed the government to consider promoting the PPP formula. The draft is currently proceeded by the Parliament.

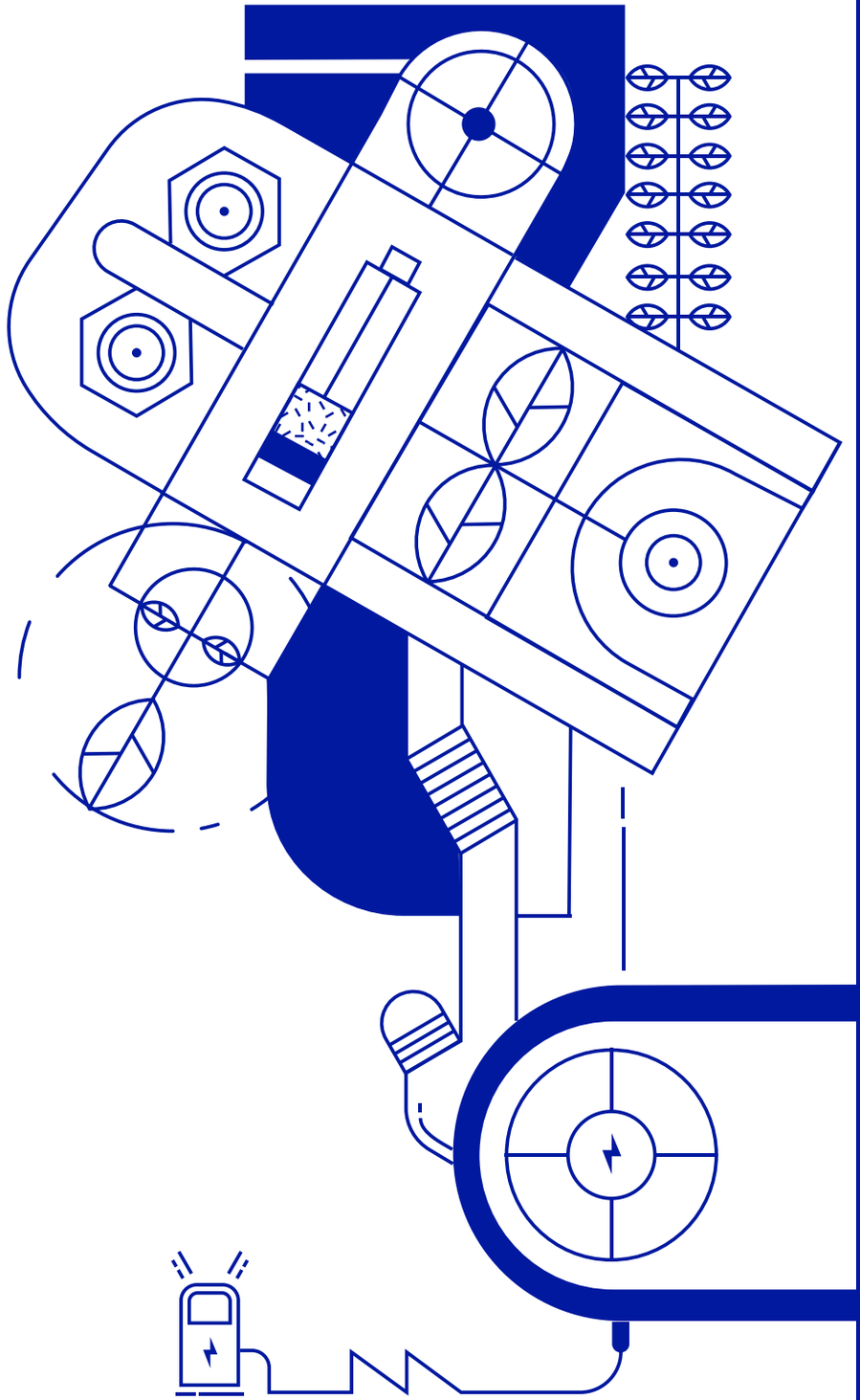
The Ministry of Investment and Development tabled the amendment of the Public Private Partnership Act to improve procedures and make the formula more popular. Since 2009 only 116 agreements have been reached in PPP format, among them 15 projects concerned transport infrastructure.

The proposal introduces changes to a number of legislative acts, including the Act on public roads. Municipalities with population exceeding 100,000 will be allowed to introduce two categories of paid parking zones – one with regular fees and a city centre parking zone with possibly more expensive charges. Today, cities have the right to introduce just one type of paid parking zones with charges regulated at the central level.

The draft proposes that charges for both types of parking zones will amount to 0.15 per cent and 0.45 per cent of the National Minimum Wage respectively. It means that the new provisions will also define the maximum price for parking, but they allow cities to increase prices three-fold compared to current levels. Taking into account National Minimum Wage of 2018 the maximum fee for the first hour of parking in Warsaw city centre would amount to PLN 9.45 (€2.25), a three-fold increase from today's PLN 3 (€0.71).

65% OF CITIES INCOME FROM PARKING CHARGES WILL HAVE TO BE INVESTED TO IMPROVE SUSTAINABILITY OF TRANSPORT

An important provision is that 65 per cent of total income from the parking charges will have to be spent on improvements of the public transport or management of infrastructure to incentivise green transport.



03

E-mobility as an element of industrial policy

The Responsible Development Strategy, the economic guidelines of the Polish government include a strong e-mobility component. It is divided into two independent parts, one targeting the development and production of electric buses (e-bus) and one designing and manufacturing a Polish electric car (e-car).

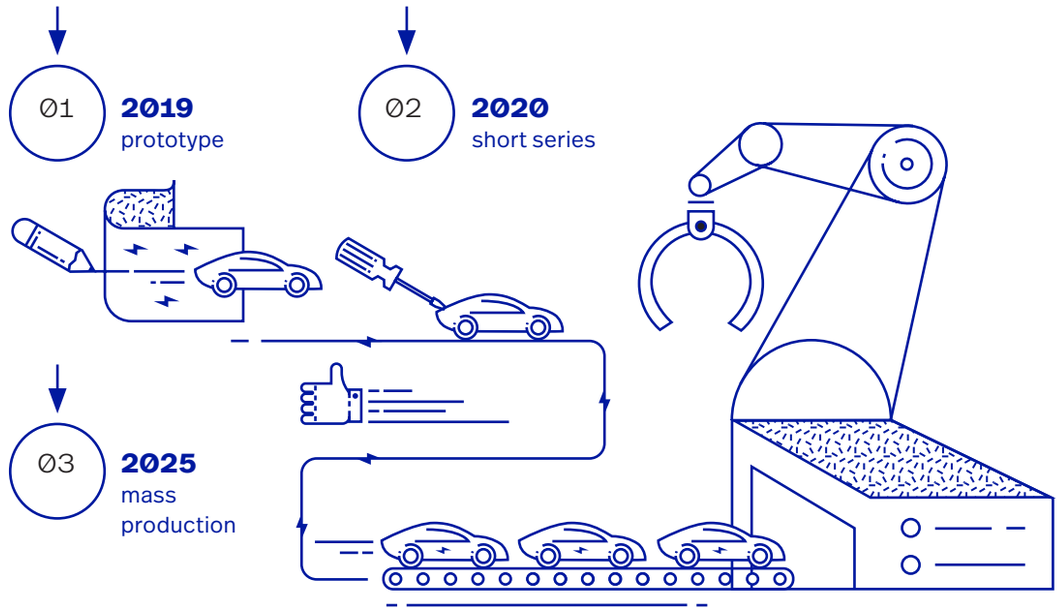
Polish electric car

The electric car revolution has been identified as an opportunity for Polish firms to participate in the newly created EV market. Three areas were mapped as particularly promising: new business models associated with the use of cars, batteries manufacturing and recycling, and the design and manufacturing of EVs.

The aspiration of the government is to achieve one million electric cars registered in Poland by 2025 or roughly 6 per cent of today's Polish car stock. An important part of that ambition is that at least 30 per cent of EVs should be manufactured by Polish companies.

ElectroMobility Poland (EMP) is a special-purpose company established by state-owned energy utilities to develop the concept of a Polish electric vehicle. Its establishment was stimulated by the government. It will not own production lines but will support private entities in the design and construction of EVs under a new brand. The state financing institutions will support EMP in funding even risky projects at an early stage of their development.

To stimulate the production of Polish EVs, the EMP will act in three stages. The preparatory phase should finish at the end of 2018 with the production of first prototypes of Polish electric vehicles. This deadline will not be met however. The CEO of EMP announced that the prototypes are now planned to be built towards the end of 2019. In the second stage – from 2019 to 2020 – the producers will start to assemble limited quantities of electric cars. Increased incentives for the purchase of electric vehicles are considered for this period. In the third phase – to 2025 – Polish EVs will be mass-produced.



The EMP already concluded a competition to design a body of the Polish electric car. After assessing around 90 applications, 4 finalists were selected. Having concluded the design competition, in November 2017 EMP started discussing the project with the automotive sector. 17 parties registered their interest, but no agreements were signed.

Polish electric bus

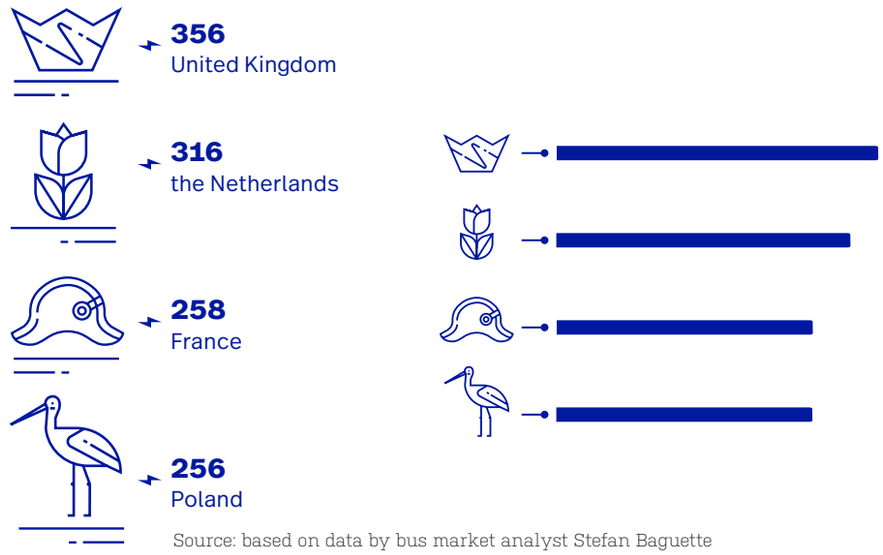
The aim of the e-bus programme is to produce an electric bus built mainly from Polish components that would be affordable, efficient, technologically advanced and competitive in the market. The programme is ambitious and hopes to make and sell approximately 1,000 electric buses annually worth PLN 2.5bn (€0.6bn), which would create employment for 5,000 people. This would result in a globally recognisable brand and build a strong export position by 2025. The first milestone of the programme would be introducing 1,000 e-buses into the market by 2021. To put these figures into perspective, in the first quarter of 2018, a total of 628 buses were sold in Poland – 9 of them electric and 26 hybrids.

Poland is already one of the largest bus manufacturers in Europe. In addition to domestic brands such as Solaris, major European bus manufacturers such as Volvo, Man or Scania also maintain production plants in Poland. With regard to electric buses, Polish companies are also among the leaders in Europe. In 2017, Solaris Urbino was recognised as the bus of the year in Europe at the Hanover Fair. This was the first time that an electric vehicle won this title. Poland is also among the best electrified countries in terms of busses. According to the bus

POLISH LOCAL AUTHORITIES WANT TO BUY A TOTAL OF 819 ELECTRIC BUSES BY 2020

market analyst Stefan Baguette, only the United Kingdom (356), the Netherlands (316) and France (258) had more electric busses on the streets than Poland (256) in 2017. CHART 07.

CHART 07.
European countries leading in electric bus usage in 2017



Source: based on data by bus market analyst Stefan Baguette

To stimulate more manufacturing, the Polish Development Fund (PFR), a state financial institution, signed a letter of intent with the Ministry of Development and Entrepreneurship, the Ministry of Energy, the National Fund for Environmental Protection and Water Management as well as with 45 Polish cities and communities on developing e-mobility. Local authorities expressed their goal to procure 819 electric buses by 2020. This represents 16 per cent of the total bus fleet in these cities and 7 per cent of the buses currently in use in the public transport systems in Poland.

POLAND IS A MEMBER OF THE EUROPEAN BATTERY ALLIANCE, AN INITIATIVE TO DEVELOP BATTERY CELLS MANUFACTURING TECHNOLOGY

The National Centre for Research and Development (NCBiR), a research coordinator and funding institution has launched a tender for the design and production of a Polish electric Bus. It will finance 100 per cent of R&D costs to design all the necessary e-bus components and put them together to be commissioned by interested cities. Accumulating demand and centralising R&D will reduce the e-bus costs through an economy of scale. The purchase itself will then be co-financed through existing funding mechanisms including the EU Structural and Cohesion funds.

The order amounts to PLN 2.3bn (approximately €500mn). The winning bus design is to be adapted to various types of electric drive, should feature three versions in different length and should have an autonomous option for the depot manoeuvres.

Batteries production

The Polish government has expressed desire for the country to become a net exporter of EV batteries. So far, only battery packs are manufactured in Poland, not cells, and the output is very limited.

On 22 February 2018 an R&DI consortium Pol-Stor-En was created, pitching together the Warsaw, Gdańsk and Poznań Technical Universities, Warsaw and Jagiellonian Universities, Mining and Metallurgical Academy and the Institute for Nonferrous Metals. The consortium will work to develop electricity storage solutions in cooperation with the industry.

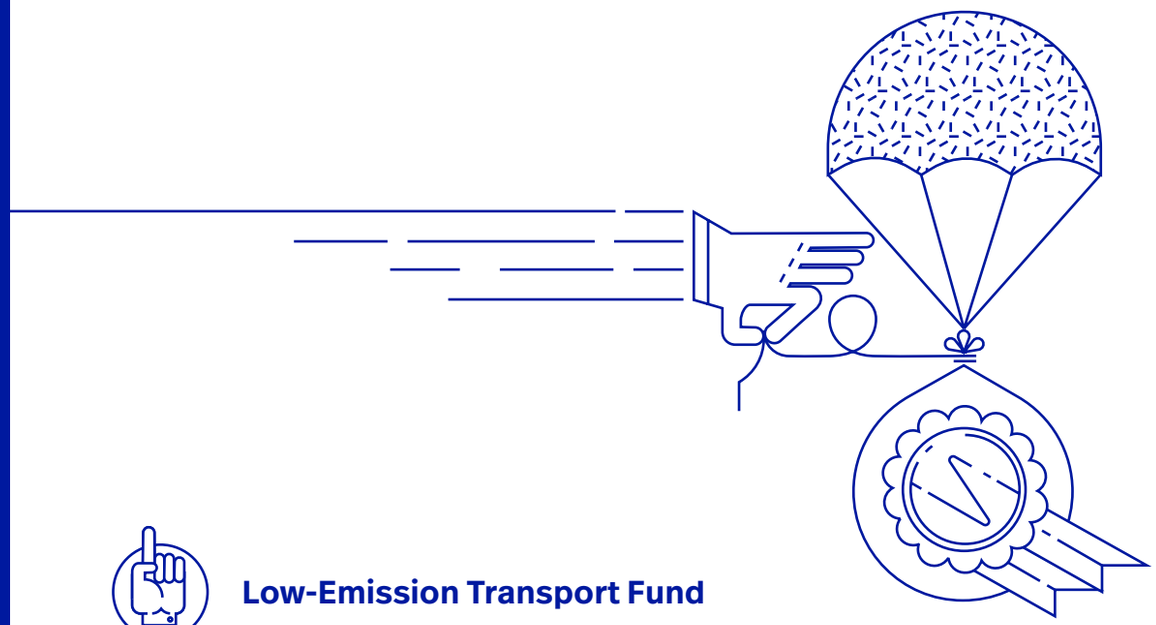
Poland is also a member of the European Battery Alliance, an EU initiative working to develop EV battery cells manufacturing technology. The initiative should result in developing a battery production value chain in Europe from 2025 onwards.

In terms of incentives for established companies, the government is ready to grant state aid to battery manufacturers who may be looking to open new factories. There is a number of interested parties and Poland could easily turn into a battery tech hub. LG Chem, a South Korean giant, is building a factory in Kobierzyce near Wrocław with a target capacity of 100,000 battery packs a year (4-6 GWh). Belgian Umicore will invest near Nysa in making cathode materials - used in EV batteries. The factory should start production in 2020. And a Chinese producer of EV battery components Guotai-Huarong will build a lithium-ion electrolyte factory near Oława in south-western Poland to reach an annual capacity up to a million batteries a year.

04

Funding sources for e-mobility

A number of financial institutions and funding programmes exist that will aid the development of e-mobility in Poland.



Low-Emission Transport Fund

The Low-Emission Transport Fund which should start operations in 2019 will be the most important source of finance for the development of e-mobility in Poland. It could allocate funding to projects worth up to 5.3 billion PLN by 2028 (€1.3 billion). It is most likely that the support will be used for helping the local authorities to purchase electric buses and for aiding the development of the charging infrastructure. The Fund will be supervised by the Ministry of Energy and managed by the National Fund for the Environment and Water Management with the support of Bank Gospodarstwa Krajowego, a state development bank.

The bill introducing the Fund is currently under legislative review in the Parliament. According to the draft bill specific goals and programmes will be issued in the form of a regulation, which can be expected after the bill's adoption. The target group of applicants will vary depending on the goal and/or programme.

Polish Development Fund

Polish Development Fund (PFR) is a state-owned financial institution which implements programmes focused on long-term investment, economic potential and environmental protection. PFR plays a leading role in the e-bus programme making sure sufficient resources are in place to guarantee its successful completion.

The Fund could invest in equity and may join the Polish EV manufacturing consortium, if it is created, to offer capital support.

E-mobility accelerator

The Polish Agency for Enterprise Development (PARP) opened a dedicated e-mobility accelerator programme designed for stimulating companies to start production based on R&D results. The programme is open to entities that are considered either a micro, small or medium-sized company. The grants could be used to implement the company's own research or research results the company has purchased in order to introduce new or significantly improved products. The accelerator has two separate budget lines,

one for entities located in the Masovian region (PLN 71m – €16.9m) and one for entities from other regions of Poland (PLN 679m – €161.7m). The minimum value of eligible costs of the project is PLN 5m (€1.2) and the maximum co-financing amount is PLN 20m (€4.8m). The deadline for applications is 5 December2018.

INNOMOTO

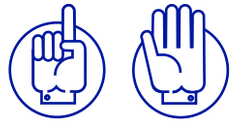
The main goal of the programme established by the National Centre for Research and Development is to increase the competitiveness and the level of innovation of the Polish automotive sector to 2026. The research areas include innovative technologies of production, regeneration, recovery and recycling, innovative vehicles and drives, innovative parts, components and systems for use in vehicles. During the first edition of INNOMOTO 50, mainly small and medium-sized companies received a total co-funding amounting to PLN 300mn (€71.4mn). The second call for projects opened on 11 May 2018 with the same budget. The deadline for applications is 10 July 2018.

THE SECOND CALL FOR PROJECTS IN INNOMOTO HAS A BUDGET OF €71.4MN. THE DEADLINE FOR APPLICATIONS IS 10 JULY 2018

GEPARD

Gepard is a programme established within the National Fund for Environmental Protection and Water Management. Its objective is to reduce air pollution from transport. It is designed for local governments and companies but also

other entities providing public transport services. The programme budget totalled PLN 200m (€47.6m) and is to be used mainly to finance the purchase of a low-emission bus fleet. The last applications were accepted on 30 March 2018, however, a new round of the programme is planned. The budget at this stage is still unknown, but the programme will be designed mainly to underpin the e-bus governmental project.



Emission Trading System

The European Emission Trading System (ETS) is the main tool of European climate policy designed to limit emissions of CO_2. Apart from creating a market in CO_2 allowances, it also includes a number of funding mechanisms sourced from selling emission rights.

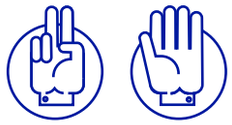
POLAND WILL RECEIVE 43 PER CENT OF THE MODERNIZATION FUND'S BUDGET. TODAY THE FUND IS WORTH MORE THAN €4BN

The main funding source is the MODERNIZATION FUND. It will finance selected projects from 2021 to 2030. Its budget equals 310 million CO_2 allowances or the money generated from their sales. Since the allowances do not have a fixed price and are decided by the market, it is difficult to assess the Modernization Fund's total budget. Using today's prices, the Fund's budget amounts to approximately €4bn. The aim of the Fund is to support the modernisation of energy systems in a number of countries including Poland. The Fund should be used, among other things, for investments in the electrification of road transport.

The shares of the Fund to be allocated to specific countries are fixed. Poland will receive 43 per cent of its budget. The rules for the Fund's management are to be decided at the EU level. However, the ETS Directive already specifies that the awarding procedure will involve the European Investment Bank and countries not benefiting from the Fund, including the Netherlands. These countries will have a vote in assessing projects tabled by Poland.

The INNOVATION FUND is another financial mechanism within the ETS to enhance cost-effective emission reductions and low-carbon investments. This fund will provide financial support for a wide variety of projects including energy storage technologies. Small-scale projects can be supported. The fund would be financed by the sale of 400 million allowances or €5.2bn at today's prices. There are no fixed allocations in the Innovation Fund. Countries have to compete for funds.

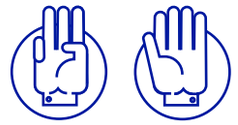
Both Modernisation Fund and Innovation Fund will become operational from 2021. For both funds the applications will be prepared and proposed by companies and sent for validation to the Polish administration. Joint projects will be possible.



Connecting Europe Facility

The Connecting Europe Facility (CEF) is a key EU funding instrument to promote targeted infrastructure investment at the European level. It supports the development of interconnected trans-European networks in the fields of transport, energy and digital services. The Programme's budget amounts to €30.4bn. A total budget of €5.35bn has been made available for energy projects for the 2014-2020 period. The 2018 CEF Transport call for proposals opened on 17 May 2018, and with an indicated budget of €450mn, it covers funding objectives and priorities supporting the policy orientations of the 3rd Clean Mobility Package. The deadline for submissions is 24 October 2018. The 2018-2 CEF Energy call is planned to be published in June 2018. There are no fixed national budgets within the CEF. Countries compete for funding.

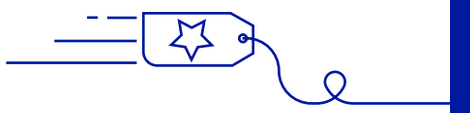
THE TOTAL BUDGET OF THE CONNECTING EUROPE FACILITY (CEF) AMOUNTS TO €30.4BN



Other EU funds

Poland is the biggest beneficiary of Structural and Cohesion Funds of the European Union. A number of funding sources exist to support e-mobility projects. Only for public transport they include Operational Programme Infrastructure and Environment (€2.2bn), Regional Operational Programmes (€1.5bn) and Eastern Poland (€440mn).

Moreover, e-mobility projects will have a number of advantages when they compete for new EU funds, beyond 2021. They promote fight against both climate change and air pollution. They meet the industrialisation objective and reduce EU oil dependence. All these features will make e-mobility one of the future EU funding priorities.



05

E-mobility on the ground

The foundations for e-mobility development have been put in place but their quality has not been tested yet by the market. Poland lags behind European e-mobility leaders and there is only few companies whose projects have a scale greater than a pilot or a demonstration.

Electric cars

According to statistics provided by the SAMAR Institute, 1035 electric cars are currently driving on Polish roads (powered by batteries only or EVs), 152 of which were registered in 2018 (by March 31). This is an increase of 130 per cent year-on-year. However, such a sharp rise in EV registrations means little in terms of absolute numbers and is still very much a low-base effect. New electric car registrations constitute a fraction of new registrations in total which amounted to 139.9 thousand the first quarter of 2018.

There are no foreign EV manufacturers in Poland. Certain brands produce or procure parts and components, but all newly registered electric cars come from abroad. The project to design and manufacture a new Polish EV brand has been launched but years remain before its completion. CHART Ø8.

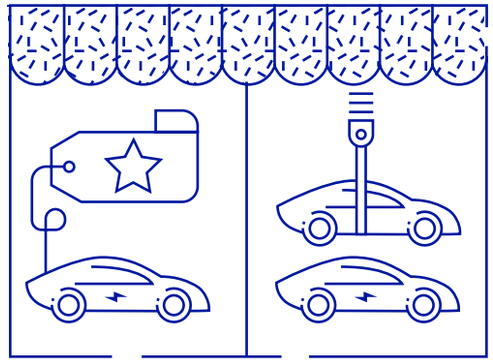
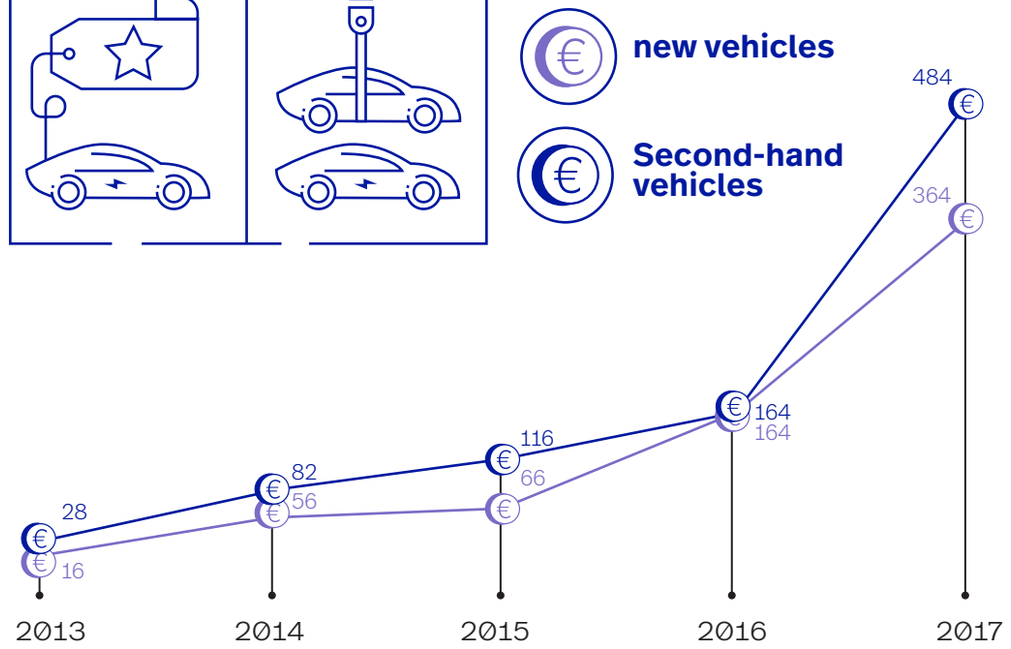


CHART Ø8.
EVs sales in Poland



Source: SAMAR

Electric buses

The situation looks better with regard to electric buses. In 2016, 1942 new buses were sold in Poland, 17 of which were with hybrid drive and 6 were fully electric. In 2017, 2,297 buses were sold, an increase of 18 per cent. However, as much as 85 of these vehicles were hybrid buses and 63 were electric, 4 and 10 times as much respectively. An impressive result that will continue to grow in the near future.

The electric bus manufacturing base in Poland is very robust. Apart from the European leader Solaris (a private company) who features 3 different models of electric

buses and sells to a number of different countries around the world from their only factory in Bolechów, there is also Ursus which operates out of Lublin and the state-controlled Autosan with its HQ in Sanok. The public company Rafako has just published its intent to produce the first prototypes of an electric school bus towards the end of 2018. If the project goes ahead, the manufacturing operations will most likely be located in Racibórz. Apart from the Polish companies, Volvo already manufactures electric buses in their factory in Wrocław. Scania and MAN plan to start production soon in Słupsk and Starachowice respectively. MAP PAGE 54/55.

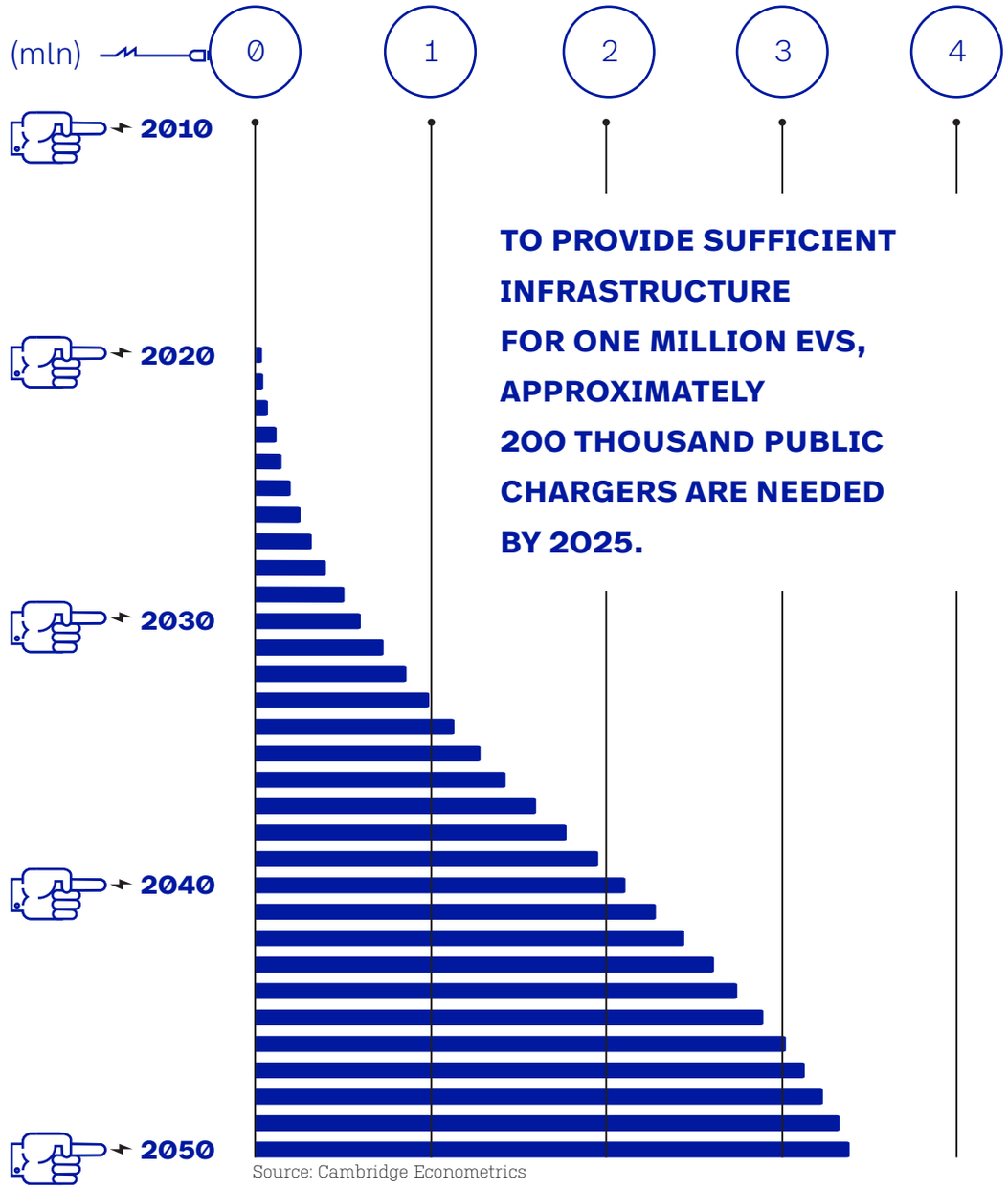
Charging infrastructure

Today, Poland can be regarded as a gap country in terms of electric cars' charging infrastructure. The lack of sufficient infrastructure hinders the development of e-mobility. There are only 66 fast charging stations around the country, with a 50 kW power output and only approximately 150 public charging stations in total.

These numbers are significantly short of the government targets for 2020 (400 fast chargers and 6,000 points of slower speed). Moreover, some experts prove that even if the government's plans are met, they will be insufficient to properly stimulate up-take of electric cars. Cambridge Econometrics and FPPE report "Charging Poland"[5] shows that on the pathway to one million EVs (the government's target for 2025), the country would need around 94,000 charging points in 2020 and 1.2 million points in 2025. CHART 09. CHART 10.

5 Charging Poland, op. cit.

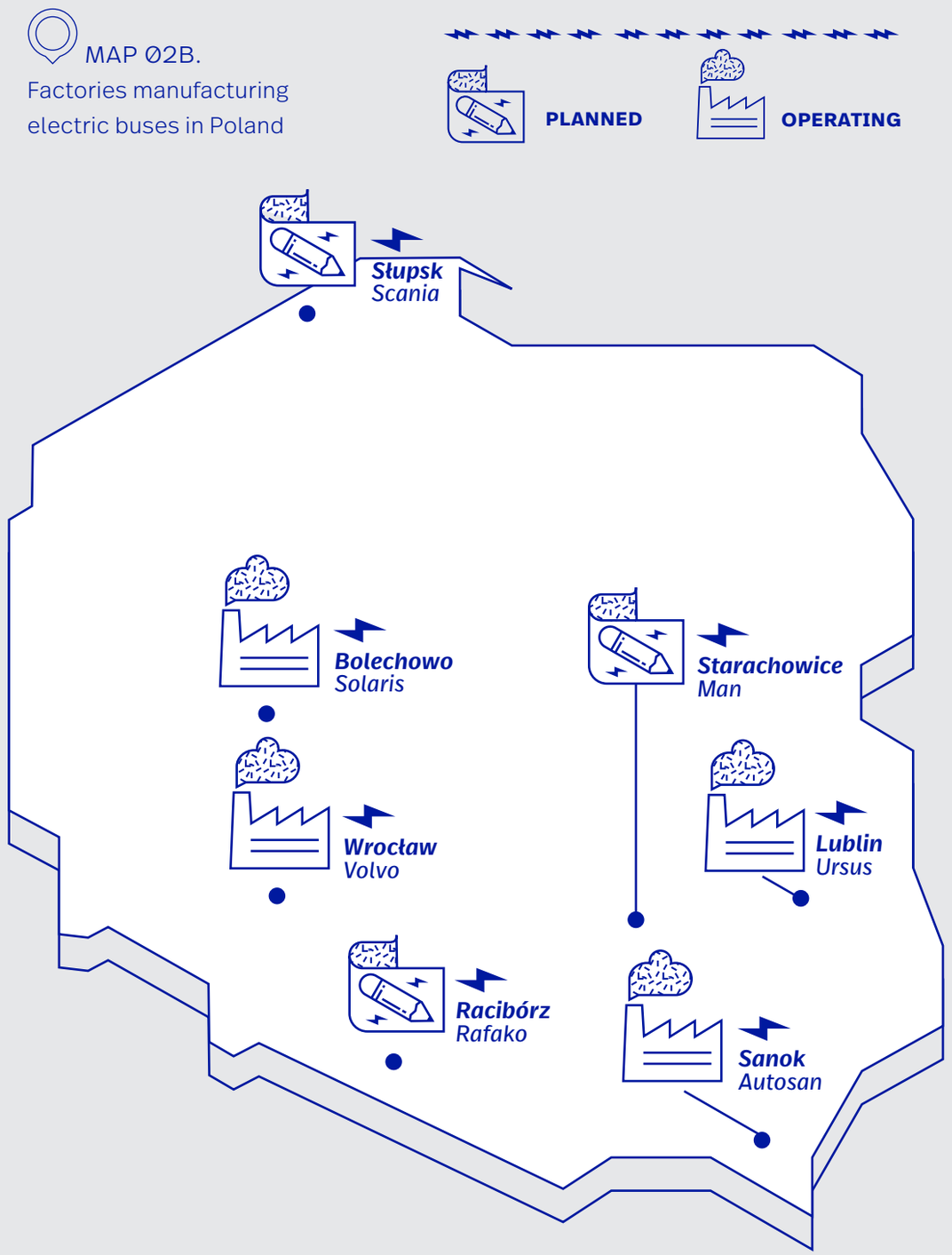
CHART 09.
Total EV public charging posts on the path to one million Evs



Source: Cambridge Econometrics

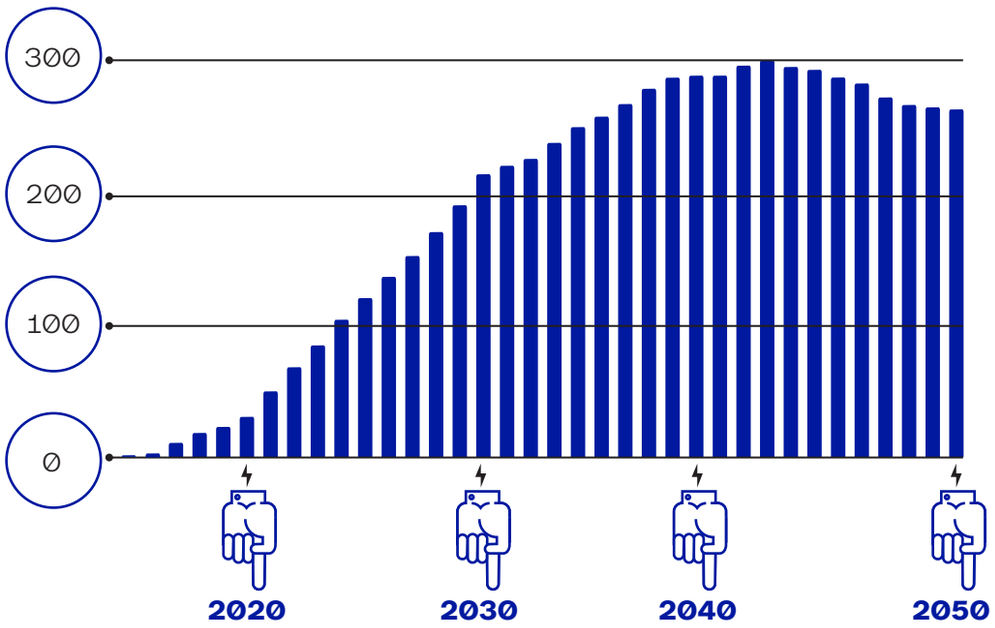
MAP Ø2A.
Battery-powered electric buses
in Polish Cities (1Q 2018)

MAP Ø2B.
Factories manufacturing
electric buses in Poland



To build the missing charging infrastructure is on the one hand a great challenge, but on the other hand, provides a great business opportunity for companies. The government did not impose any obligations on local authorities or on state-owned companies. Rather, it expects that the development of charging infrastructure will be carried out on market terms. The stock taking exercise in 2020 will show whether government targets will have been met and if any support measures are necessary. It is expected, nevertheless, that a number of funding options will be at hand for private operators in the meantime. The Low-Emission Transport Fund should deliver devoted programmes for developing the charging network. European structural and cohesion funds will also be available.

CHART 10.
Annual investment in public charges assuming 1 million EVs in 2025 (mn €)

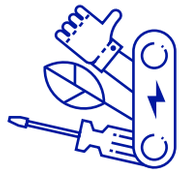


200

chargers by 2020 will build GreenWay – the biggest new entrant.

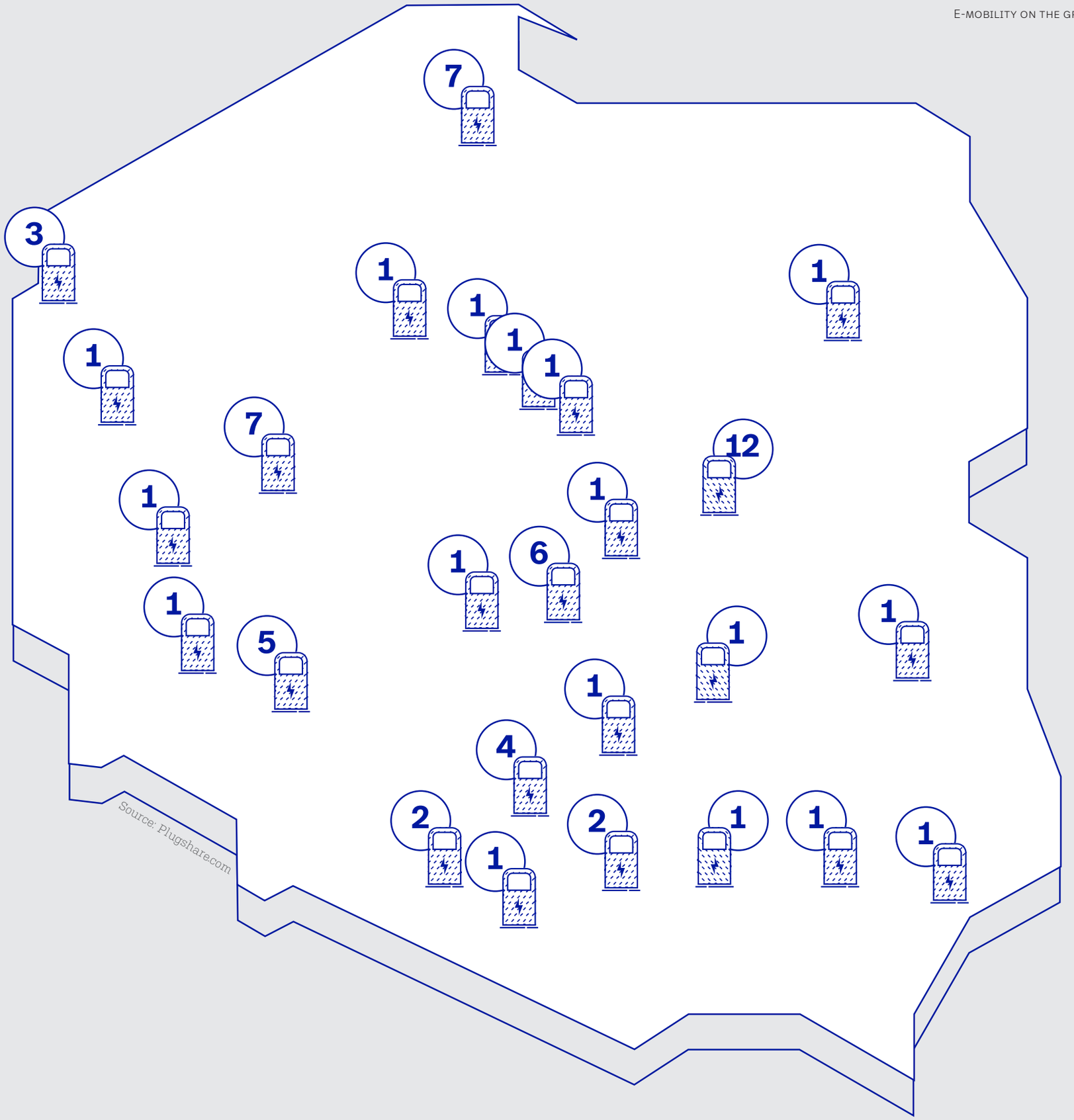
New entrants

Some companies already took up the mantle and started deploying charging stations, not waiting for governmental incentives. New companies have sprung up entering the empty market niche. GreenWay Poland, a branch of a Slovak company focuses on the construction and operation of a network of fast charging stations for EVs. It intends to become the main provider of charging services on transit roads, planning to operate 10 ultrafast charging stations (350 kW), 135 fast chargers (50 kW), and 55 regular ones (22 kW) – a total of 200 charging stations around Poland – by 2020. Greenway has already signed an agreement with the GTC S.A., an operator of the A1 highway connecting Łódź with Gdańsk to place ultra-fast charging stations along this route enabling seamless experience for EV drivers going from Warsaw to the seaside. Until recently, charging at all of Greenway's 34 operating stations was free of charge as part of the company promotional campaign. On 7 May 2018, the promotion ended, and the service is now paid (PLN1.89 for 1kWh). MAP PAGE 58/59.



Power utilities

Energa is a utility company operating in the north of Poland and is likely the most advanced in e-mobility among state-owned companies, although quite far behind Greenway. It runs most of its innovative operations including e-mobility under the brand of Enspirion. It provides a modest electric car sharing service featuring several cars. It also installs and operates EV charging terminals. The company can supply 50kW, 43kW and 22kW stations. Enspirion owns only 6 charging stations around Gdańsk, Gdynia and Sopot. They plan to install a further 50 stations by 2020. PGE, Poland's largest energy utility, committed approximately PLN 400 million to research, development



MAP Ø3.
Fast chargers in Poland in May 2018

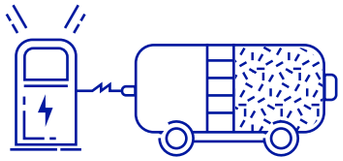
1 FAST CHARGERS

In May 2018 there were 65 public chargers in Poland with capacity greater than 22 kWh. The government's objective is to have 400 of such points by 2020. The gap is significant but it is still relatively easy to close it on time.

and innovation until 2020. Aside from financing start--ups, these funds will be invested in, among other things, the creation of an e-mobility ecosystem. The plans cover the development and manufacturing of fast and normal charging stations for EV cars and buses. For this purpose, PGE has signed a letter of intent with H.Cegielski Poznań, a Polish manufacturer. First tests of new chargers are to take place at the beginning of 2019. Currently, PGE is executing a pilot programme in four Polish cities: Łódź, Kraków, Lublin and Rzeszów, where they plan to install 40 fast charging stations. The purpose is to verify a business model based on car fleets and the possibility of replicating it in other locations. Apart from manufacturing charging stations, PGE intends to operate the infrastructure and provide fast charging services.

Tauron and Enea, two other state-owned energy utilities have limited their actions so far to demo projects. Tauron is experimenting with e-mobility by running the R&D pilot programme with Jaworzno city to develop an effective concept of charging buses through battery swapping. The company expects to verify a concept of electricity storage through proper electric bus fleet management. Enea is less advanced in its plans. The company has recently signed a letter of intent with Kolejowe Zakłady Łączności (a Polish manufacturer and supplier of dedicated communications systems for railways) to design and build fast EV charging stations. The project is at the very initial stage.

A number of independent power utilities are also venturing into the e-mobility market. InnogyStoen, the Warsaw-based electricity supplier currently operates 8 charging stations around the city. Fortum Charge & Drive also entered the Polish market. It offers software solutions for operating chargers.



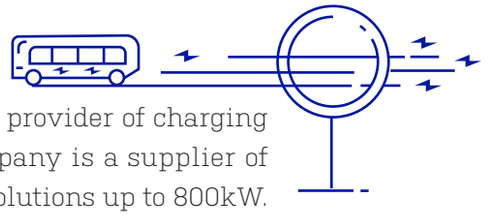
THERE ARE A NUMBER OF COMPANIES LOOKING INTO INVESTING IN THE CHARGING INFRASTRUCTURE IN POLAND.

Fuel distributors

Apart from utilities, which are naturally well-positioned to develop e-mobility solutions, there is growing interest in e-mobility from petrol stations operators as well. PKN Orlen, the biggest Polish refiner, has recently launched a pilot project to install 150 fast chargers at its service stations. The project will be implemented in 2018–2019, with the first chargers to be put into service already by the end of 2019. The company follows the example of Greenway, targeting similar market fitting most of the chargers at transit routes.

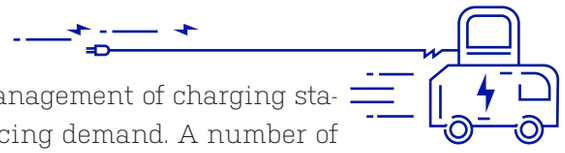
Lotos, another Polish refiner and petrol station operator, also plans on entering the charging business. The company has selected 50 of their stations where the EV chargers will be installed. The first 12 points will be set on the Gdynia – Gdańsk – Warsaw route till the end of 2018.

At the level of strategic planning, there are a number of companies looking into investing in the charging infrastructure. One of the examples is Shell, which operates 424 petrol stations in Poland. The company declared that it will build 80 charging points across Europe by 2020 without specifying locations. It will be a project executed in partnership with IONITY (a dedicated company established by BMW, Audi, Porsche, Daimler, Ford, and Volkswagen to invest in fast charging stations). The idea is to fit charging stations on motorways throughput the continent, turning the transit routes into a very crowded market in the near future. In 2018, IONITY will build its first 20 charging stations, however none of them in Poland.



Bus chargers

Ekoenergetyka – Polska is a leading provider of charging stations for electric buses. The company is a supplier of customisable and flexible charging solutions up to 800kW. They cooperate with leading EV bus producers and have already installed over 100 e-buses chargers across Europe. The company won a tender in Zielona Góra where 60% of the bus fleet or 47 buses will be electrified. The buses will be charged overnight in the depot and during the day at bus terminals. The €4mn contract is the biggest project of its kind in Poland and one of the biggest in Europe. It will be completed at the end of 2018.



Equipment suppliers

Overall, the installation and management of charging stations is growing and far outpacing demand. A number of companies entering this niche market, including state-owned utilities, are mostly new entrants who sell or install chargers manufactured by well-established brands including ABB, EVBOX, GARO, Mennekes or Ecotap. However, there are also small and medium sized Polish companies who are offering their own products and hoping to grow within the market. In terms of software, the situation is similar. GreenWay, the biggest network at the moment uses ready-made software. Fortum Charge & Drive is looking to enter the market, offering custom made solutions. However state-owned companies tender out chargers and software deliveries separately, which might stimulate the market and create local players.

Batteries

Poland is trying to expand its footprint in terms of batteries manufacturing. The government is an active participant of the Battery Alliance – an EU initiative. One Polish

NEW COMPANIES ENTERING BATTERY MANUFACTURING IN POLAND MAKE IT POSSIBLE FOR THE COUNTRY TO BECOME THETECHNOLOGY HUB.

battery pack manufacturer is already well established on the EU but also global market.

Impact Clean Power Technology S.A. specializes in lithium-ion energy storage systems development and system integration for public transport. The company is 12 years old and employs 130 people, half of them engineers. IMPACT's production of batteries exceeds 70MWh annually and is growing constantly.

South Korean LG Chem invested in batteries production facility in Poland with a target capacity of 4-6 GWh. The company announced that the whole output has already been contracted and will be exported. Other potential investors, mostly from Asia, are looking at the Polish market but no firm interest has been reported yet.

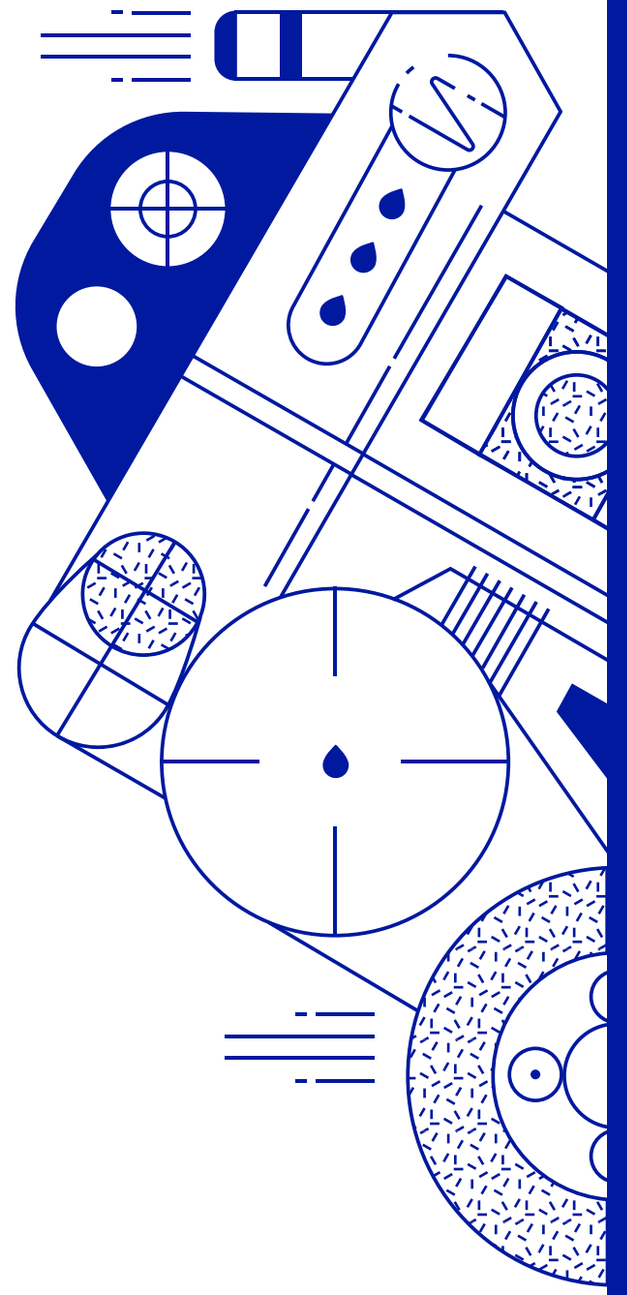
Electrifying cities

The problem of air pollution and changing mobility trends are pushing Polish cities to search for sustainable transport options. E-mobility is among the popular directions.

Warsaw and Kraków lead among cities with highest number of electric buses. Each have 26 in their fleets. In total 95 electric buses serve in public transport in 11 cities around Poland. According to the Ministry of Technology and Entrepreneurship which coordinates the e-bus programme by the end of 2019 there will be 356 electric buses in 30 cities. The leaders of growth will be Warsaw which plans to buy 135 new vehicles, followed by Zielona Góra (47), Lublin (32), Poznań (21) and Jaworzno (20).

Car-sharing is another feature some cities see as an integral part of their mobility policies. The biggest car-sharing scheme running exclusively on electric vehicles was established in Wrocław. Offering 200 parking places the city authorities signed a Public Private Partnership contract with a car-sharing operator. The system called Vozilla features 200 electric cars (Nissan). Other cities are less advanced in deploying electric cars. Warsaw opted for hybrids, Kraków is carefully looking at possible options. Gdynia intends to establish electric car-sharing but only in 2020.

Apart from obvious places of e-mobility development like Warsaw, Kraków or Wrocław there are a number of cities where determined authorities put electrification of transport as a priority. Zielona Góra will have 61% of its buses running on batteries in 2019. Jaworzno wants do go further and test autonomous electric buses. Without a doubt, Polish cities are most advanced in implementing e-mobility and their place seems to be unchallenged.



06

Short-term e-mobility forecast for Poland

Global trends and the European legislation

E-mobility is not a distant future anymore. It is very much the present. According to the International Energy Agency (IEA)[6], sales of new electric cars worldwide surpassed 1 million units in 2017 – up 54% compared with 2016. At the same time the global stock of EVs surpassed 3 million vehicles in 2017 after crossing the 2-million mark in 2016.

ALMOST EVERY SECOND NEW CAR PURCHASED IN NORWAY IS AN ELECTRIC VEHICLE. EVS ALREADY REACHED 6 PER CENT IN THE TOTAL CAR STOCK.

China is leading the change. More than half of global sales of electric cars in 2017 were registered in the Middle Kingdom. EVs reached a market share of 2.2% in 2017. The vast majority of electric buses sold in 2017 were in China. In Europe, Norway is the clear leader. Almost every second new car purchased is an EV and electric cars have already reached 6 per cent of the total car stock. Other markets with strong growth include the UK, the Netherlands, Germany and Sweden.

The most important cost factor of EVs - the price of the battery - continues to decline. The IEA assumes that the price for large, mass-produced batteries last year was approximately USD 155/kWh. When compared to the EV battery cost reduction target in 2030 for the European Union (below USD 100/kWh), it becomes evident that the cost of electric vehicles will continue to go down.

6 Global EV Outlook 2018 - Towards cross-modal electrification, OECD/IEA 2018.

Politics and therefore legislation are important factors too. Combating climate change requires more than just regulations to reduce CO_2 emissions from big industrial plants and power generation. The so-called non-ETS decision[7] of the European Commission sets ambitious CO_2 reduction targets for the EU countries by 2030. These targets cover sectors that have thus far proved difficult or expensive to decarbonise, including transport.

At the same time, the European Commission is trying to force cuts with regulations targeted at the automotive industry. Published in November 2017, the clean mobility package[8] includes a proposal outlining new emission standards for cars. Producing EVs will be one of the ways to comply with new rules.

Normally, more diesel engines would be an easy choice to reduce transport's carbon footprint and meet climate policy objectives. However, "diesel-gate" in the US and other smaller recalls effectively killed the reputation of this form of transport. A strong bottom-up movement is sweeping through Europe with local authorities creating limited circulation zones or banning diesel cars altogether. National jurisdictions are following suit. Norway will ban new ICE cars by 2025, and Ireland, the Netherlands and Slovenia are set to do the same by 2030.

7 Proposal for a regulation of the European Parliament and of the Council on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 for a resilient Energy Union and to meet commitments under the Paris Agreement and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change, SWD(2016) 247 final, SWD(2016) 248 final; COM(2016) 482 final, Brussels, 20.7.2016 - adopted on 14 May 2018 and awaits publication.

8 Clean mobility package was published on 8 November 2018; https://ec.europa.eu/transport/modes/road/news/2017-11-08-driving-clean-mobility_en

All these factors make the spread of electric cars unavoidable. The only question mark remains the speed of the change, which is very much true for Poland as well.

Short-term e-mobility forecast for Poland and business opportunities

Poland wants to reach a target of 1 million registered EVs in 2025. In order to realize this goal, the government passed a dedicated e-mobility legislative package. The infrastructure development plan is already in place and some state funding to kick-start the market will be secured in the coming months in addition to European money already available.

However, the pace of growth of the EV market is limited. The main culprit seems to be the lack of direct purchase grants for EVs. Research has shown that these are the best way to stimulate the market, and it is unlikely that in the short-term such incentives will be introduced. On the other hand, there are market niches that will develop at a pace exceeding expectations, which will create business opportunities.

The most dynamic growth in the EV market can be observed in ELECTRIC BUSES. There are a number of bus factories in Poland and there are start-ups preparing products that will soon enter the market. The government supports the industry through the e-bus programme, by funding research and by cultivating demand from local municipalities. The sales of electric buses and trolley buses will continue to surge. The government target to reach market sales of 1000 units in 2021 (from 9 units sold in the first quarter of 2018) seems ambitious but realistic. The

THERE ARE E-MOBILITY MARKET NICHES THAT WILL DEVELOP IN A PACE EXCEEDING EXPECTATIONS CREATING BUSINESS OPPORTUNITIES.

EU Clean Vehicles Directive and the Polish E-mobility Law both include targets of electric bus purchases for local municipalities. There is also growing pressure from citizens to offer transport options that aid in the fight against smog. The growth of this manufacturing base will stimulate innovation for complementary EV products as well. It will boost demand not only for battery packs and charging infrastructure but also smart mobility solutions for cities including in the electricity sector (V2G, storage, renewable energy).

Another city-related market segment poised for growth is CAR-SHARING A majority of the systems operating in Poland at the moment use ICE cars and are run by private companies. However, a number of cities are looking into launching official electric car-sharing schemes following the example of Wrocław, which operates a municipal car-sharing service of electric vehicles (200 units) through a public-private partnership. Some state-owned companies, including power utilities are also working on their own car-sharing projects. We predict that this market segment will grow fast and that most of the new car-sharing schemes will be based on EVs. The problem of air quality, the dropping price of EVs and improvements to the charging infrastructure will all make this development inevitable.

Considering the current pace of e-mobility development in Poland, it is clear that bottom-up initiatives and LOCAL GOVERNMENTS are more effective than those executed by the central government. Medium-sized and small cities are not afraid of implementing innovative projects and have

proved themselves to be more flexible and daring than their bigger and wealthier governmental counterparts. This is a key feature of the first stage of the Polish e-mobility. We believe that the push and drive to electrify transport will continue to come from local municipalities whose actions can be underpinned by European money.

The CHARGING INFRASTRUCTURE is a challenging market. Most of major charging suppliers already sell to the Polish market. On top of that, Polish power utilities work on their own products, including software. The market has large growth potential. According to Cambridge Econometrics, in order to service 1 million EVs, Poland needs around 127,000 charging points by 2020 and just under 1 million by 2025. Today, charging stations are still a rare sight. The biggest investor so far is the Slovak company GreenWay, which builds and operates fast chargers on transit routes. It is the most popular target for infrastructure developers, as the EU has a dedicated support scheme for chargers located at European transit roads. Apart from GreenWay, Polish energy giants Lotos and Orlen want to make use of these funds crowding the market. As the experience of more developed EV markets have shown, however, most EV charging occurs either at home or at work, rather than on the road. Enhanced charging infrastructure, including making charging more available at homes and workplaces is therefore a promising business opportunity. This includes not only infrastructure but also software and smart energy management systems.

127,000

chargers are needed to service 1 million EVs by 2025

200

vehicles operate in the biggest electric car-sharing system in Poland

E-mobility BUILDING INFRASTRUCTURE is a neglected area of the market that will need to grow fast to accommodate EV owners' needs and also implement incoming EU regulations. According to the revised Energy Performance of

Buildings (EPB) Directive[9], at least one charging station will be required in all newly build non-residential buildings that have parking. Moreover, cabling needs to be in place to enable the future installation of chargers for all parking spaces in newly-built residential buildings. The Polish E-mobility Law already requires that such buildings be designed in a way to ensure that all parking spaces could be equipped with electrical charging capacity of 3.7kW. It is a certainly new element to be considered by developers and one that could be transferred into an opportunity. New requirements for buildings will create demand for simple things like cabling but also for tailor-made and innovative products like charging, storage or even V2G solutions.

The ELECTRICITY SECTOR as a whole will benefit from e-mobility. Electric vehicles will bring a portfolio of things that will change the sector for the better like additional investment in electricity grids, increased power demand, new tools to balance the system including storage solutions and V2G. Today, Polish power utilities do not see e-mobility as a platform for change. They expect increased revenues and look into a number of various pilot projects from charging stations to electric car-sharing systems, but their actions are limited in scope and in the capital invested. An important part of the problem is that the four biggest utilities were tasked with developing the Polish electric car. This venture could limit their investment in e-mobility, leaving the market empty for alternative electricity suppliers and other new entrants.

9 Proposal for a Directive of the European Parliament and of the Council amending Directive 2010/31/EU on the energy performance of buildings, COM/2016/0765 final - 2016/0381 (COD) - adopted on 14 May 2018 and awaits publication.

The issue of BATTERY manufacturing is very closely related to the power sector. Poland seeks to create a national battery cells producer. Poland has joined the EU-driven Battery Alliance and the Polish government is ready to spend money on dedicated RD&I. It is a difficult market and the chance for success is very limited. On the other hand, the country will continue to attract foreign direct investment including in battery manufacturing, creating opportunities in the whole value chain, which includes recycling and batteries' second life applications.

ELECTRIFICATION OF THE LOGISTICS SECTOR, IN PARTICULAR THE LAST -MILE DELIVERY, IS AN IMPORTANT BUSINESS OPPORTUNITY.

An important emerging business opportunity is the LOGISTICS SECTOR. With ever tighter CO2 emission targets for cars and the demand from society for cleaner air in city centres, some logistics operators have already started to look into changing their van and truck fleets into more environmentally-sustainable models. The state-owned Polish Post is among the companies testing various models of electric vehicles. With the emergence of the first clean transport zones in Poland, which we expect in the coming 2-3 years, and the continued growth of e-commerce, the electrification of last-mile delivery vehicles will become necessary. So far, the options for the Polish logistics operators including vehicles, software and smart management systems are limited, which constitutes an important business opportunity.

Dos and don'ts of Polish e-mobility

Overall, there are quite a few market segments in Poland where the development of e-mobility will exceed expectations. The clear winner is the electric bus supplies and

fleet management, especially if one considers the latest Bloomberg New Energy Finance forecast[10], which predicts that 84% of all municipal bus sales globally in 2030 will be electric. Poland's bus fleet will electrify fast and the whole value chain will benefit. E-mobility will slowly change the electricity sector by expanding the charging infrastructure and by providing distributed balancing and storage solutions. Still mostly uncovered are two new markets where e-mobility will soon make inroads: buildings and logistics. In both, incumbent companies will have to invest and look for new business models in order to adapt to e-mobility needs. The growing problem of air quality and the flow of EU funds have turned local municipalities into the frontrunners of e-mobility. It is the medium-sized cities that are driving the most innovative and daring projects, including those on mobility.

84%
of all municipal bus sales globally in 2030 will be electric

Not all market segments will be attractive for investment, however. EV manufacturing is not an easy market despite the government's ambition to design and market the first Polish electric car. The heavy involvement of the state combined with reliance on large power companies do not bode well for the enterprise. Polish batteries have a limited chance of being designed. The market will be driven by well-established Asian players who can invest in Polish factories. The limited uptake of EVs will create few opportunities for selling charging services. The successful projects will be those that find a way to co-operate with companies switching their fleets to electric propulsion. Today, firms are responsible for up to 70 per cent of all new car purchases, a figure, which charging station owners should keep in mind.

10 Electric Vehicle Outlook (EVO) 2018, Bloomberg New Energy Finance, https://about.bnef.com/electric-vehicle-outlook/.

07

Key Polish e-mobility stakeholders

Poland has a dedicated e-mobility legislation. The infrastructure development plan is in place and some state funding to kick-start the market will be secured in the coming months in addition to European money already available. Although the market activity is still limited, the are a number of players moving in keen to invest, creating business opportunities.

Business

Chargers

H.CEGIELSKI-POZNAŃ S.A. (HCP)

ul. 28 Czerwca 1956r. 223/229,
61-485 Poznań.

Bio and achievements in e-mobility▸ The company provides solutions for energy, rail transport, gas and petrochemical industries. The company is keen to move into e-mobility. It signed an agreement with URSUS to provide electric engines to a concept electric van. HCP also has a letter of intent with PGE to develop a charging station for the energy utility.
Ownership▸ State-controlled.
Operates abroad▸ Yes.

Ekoenergetyka

Nowy Kisielin – Wysockiego 8,
(66-002) Zielona Góra.

Bio and achievements in e-mobility▸ Ekoenergetyka supplies customisable and flexible bus charging solutions, from 3kW to 800kW.Having deployed over 100 bus chargers Ekoenergetyka is leading provider of chargers not only in Poland but also in Europe.
Ownership▸ Private.
Operates abroad▸ Yes – i.a. Adana (Turkey) Barcelona, Berlin, Tampere (Finland).

E.URBAN SYSTEMS

Westerplatte 35,
33-300 Nowy Sącz.

Bio and achievements in e-mobility▸ E.URBAN offers turn-key charging solutions for public transport and vehicles in the construction, mining and port industries. It is an exclusive technology and business development partner to Dutch EVES Heliox B.V. which is the global market leader in high power charging solutions for electric vehicles and other heavy-duty applications.
Ownership▸ Private.
Operates abroad▸ Yes.

Kogeneracja Zachód S.A.

ul. Czartoria 1/27,
61-102 Poznań.

Bio and achievements in e-mobility▸ Company developing small gas--fired CHP plants in medium sized Polish cities. New in the e-mobility market but together with Siltec won a tender announced by LOTOS to install 12 fast public chargers. The hardware for this project will be provided by a Chinese company SETEC Power.
Ownership▸ Private.
Operates abroad▸ Yes.

Software

NEXITY

Westerplatte 35,
33-300 Nowy Sącz.

Bio and achievements in e-mobility▸ NEXITY offers a complete, universal and flexible tools, technology and knowledge for running electric vehicle charging business or support EV charging business with interim – management. It enables management of a professional network

of charging stations for electric cars and provides roaming services. NEXITY offers solutions turning electric vehicles into a balancing element in the energy system – VTG.
Ownership▸ Private.
Operates abroad▸ No.

Siltec Sp. z o.o.
ul. Parzniewska 12,
05-800 Pruszków.

Bio and achievements in e-mobility▸ Provides IT equipment designed for protection of classified and sensitive information. Diversifying sources of revenue invested in charging stations know how. Together with Konereracja Zachód won a tender announced by LOTOS to install 12 fast public chargers. The hardware for this project will be provided by a Chinese company SETEC Power.
Ownership▸ Private.
Operates abroad▸ Yes.

Charging infrastructure operators

GreenWay Polska Sp. z o. o.
Aleja Zwycięstwa 96/98,
(81-451) Gdynia.

Bio and achievements in e-mobility▸ Company created as EV charging stations' operator on transit routes, with no other activities. Largest charging network operator in Poland with 33 points running and another 20 built and waiting for necessary permits. Intends to add another 50 fast charging stations by the end of 2018 and further 100 stations by 2020. Among its 200 charging stations to be operational in 2020, 10 will be ultra-fast and 135 fast chargers. Intends to offer limited energy storage solutions.
Ownership▸ Private, daughter company of Slovak-based firm.
Operates abroad▸ Foreign company.

Green Lights
ul. Migdałowa 4 lok. 68,
(02-796) Warszawa.

Bio and achievements in e-mobility▸ Green Lights is a leading alternative electricity supplier in commercial centres around Poland. The company is looking into launching its network of charging stations in several hundred locations.
Ownership▸ Private.
Operates abroad▸ No.

Lotos – Lotos Electromobility
ul. Elbląska 135,
80-718 Gdańsk.

Bio and achievements in e-mobility▸ The company extracts natural gas and crude oil in Poland, Norway and Lithuania and operates one of the most modern European refineries. LOTOS also has a network of nearly 500 petrol stations and controls nearly 1/3 of the market in Poland. It tendered out supplies of charging stations. Plans to operate 50 charging stations by 2020 (to be installed at LOTOS' petrol stations).
Ownership▸ Listed, state-controlled.
Operates abroad▸ Yes.

PKN ORLEN
Bielańska 12
00-085 Warszawa.

Bio and achievements in e-mobility▸ Largest oil refiner and fuel retailer in Poland with over 2000 petrol stations. The company plans to install 50 fast public chargers at its petrol stations in 2019 and another 100 in 2020.
Ownership▸ Listed, state-controlled.
Operates abroad▸ Yes, Germany (581 filling stations), Czech Republic, Lithuania (Mojeiku Refinery).

Energy sector

Utilities

Enea S.A.

ul. Górecka 1,
(60-201) Poznań.

Bio and achievements in e-mobility▸ Enea is the fourth largest energy group in Poland. Co-owns ElectroMobility Poland. It plans to invest in charging infrastructure in 2019 aiming at transport hubs, car parks, petrol stations by the A1 and A2 motorways, express road S5 and national roads 11 and 12, but also in Poznań.
Ownership▸ Listed, state-controlled.
Operates abroad▸ No.

Energa S.A.

al. Grunwaldzka,
472, 80-309 Gdańsk.

Bio and achievements in e-mobility▸ Third largest Polish energy company. It is most advanced with e-mobility among public utilities. It operates 7 charging stations in the Gdańsk area. Operates a modest car sharing scheme using EVs (first in Poland). Co-owns ElectroMobility Poland.
Ownership▸ Listed, state-controlled.
Operates abroad▸ No.

Fortum

Heweliusza 9,
(80-890) Gdańsk.

Bio and achievements in e-mobility▸ Energy utility. Operates CHP plants and sells electricity and heat. In Scandinavia and India Fortum is one of the leaders in providing EV charging solutions under a brand Fortum Charge and Drive which is now spreading to Poland.
Ownership▸ Daughter company of the Finnish-based Fortum.
Operates abroad▸ Foreign company.

innogy Polska S.A.

ul. Włodarzewska 68,
02-384 Warsaw.

Bio and achievements in e-mobility▸ innogy is a distribution system operator and an electricity supplier in the Warsaw area with 930 thousands customers. The company manages a network of 12 public charges located in Warsaw.
Ownership▸ Private, daughter company of German innogy.
Operates abroad▸ Foreign company.

PSE S.A.

Warszawska 165,
05-520 Konstancin-Jeziorna.

Bio and achievements in e-mobility▸ Polish Transmission System operator (TSO) responsible for providing electricity transmission services and ensuring secure and cost-effective operation of the power system. According to the PSE Strategy for 2017-2019, the company focuses on promotion innovations aimed at adjusting the system to a new shape of markets and new technologies, among others, e-mobility.
Ownership▸ State-owned.
Operates abroad▸ No

PGE S.A.

ul. Mysia 2,
00-496) Warsaw.

Bio and achievements in e-mobility▸ Polish biggest power utility, active in generation, distribution and sale of electricity and heat. E-mobility is part of strategy but detailed plans for immediate future are not public. Operating few fast chargers as a pilot project. Looking into car-sharing. Co-owns ElectroMobility Poland.
Ownership▸ Listed on a stock exchange, state-controlled.
Operates abroad▸ No.

Tauron Polska Energia S.A.

Ks. Piotra Ściegiennego 3,
40-114 Katowice.

Bio and achievements in e-mobility▸ Second biggest Polish power utility, serving over 5 million clients. The company owns power and heat generation, distribution and sale, as well as coal mining assets in south-western Poland. It intends to invest in e-mobility but immediate plans are not public. Together with ING Bank Śląski started a small car-sharing project, based on EVs in Katowice. Co-owns ElectroMobility Poland. Implements all innovative projects under Magenta brand.
Ownership▸ Listed on a stock exchange, state-controlled.
Operates abroad▸ No.

Battery producers

BMZ Poland

Einsteina 9,
44-109 Gliwice.

Bio and achievements in e-mobility▸ Polish branch of the German BMZ who is one of the leading system suppliers of rechargeable battery packs and chargers.BMZ Poland employs around 700 people. Immediate plans include the development of intelligent electricity storage solutions, including batteries for electric busses. BMZ Poland is part of the e-car project. It also received a grant from INNOMOTO programme to build an new electric bus battery.
Ownership▸ Private.
Operates abroad▸ Foreign company.

Impact – Impact Clean Power Technology S.A.

Warszawska 57,
05-820 Piastów.

Bio and achievements in e-mobility▸ Company with 12 years of experience, employing over 130 people of whom over 50% in R&D and engineering departments. Manufacturer of Li-ion batteries (70MWh annually). Delivers to leading European electric bus manufacturers: Solaris Bus & Coach, Irizar, Temsa and others. Holder of homologation certificate of compliance with R100 rev.2 regulation for standard lithium-ion battery line with high energy density based on NMC technology within UVES 200 (Universal Vehicle Energy Storage) category. Wants to offer a service of renting electric bus batteries.
Ownership▸ Private.
Operates abroad▸ Yes, Present in Europe, North America, and Asia.

LG CHEM

LG 3,
55-040 Kobierzyce.

Bio and achievements in e-mobility▸ South-Korean company is building a factory in Kobierzyce near Wrocław with a target capacity of 100,000 battery packs a year (4-6 GWh). The future output has been already contracted few years ahead.
Ownership▸ Private.
Operates abroad▸ Foreign company.

Umicore

Bio and achievements in e-mobility▸ Belgian materials group will build a factory in Nysa, town in southern Poland, which will make cathode materials - used in EV batteries - for the European automotive market. It will start production in 2020.
Ownership▸ Private.
Operates abroad▸ Foreign company.

Guotai-Huarong (Poland) sp. z o. o.

ul Powstańców Śląskich 2/4,
Wrocław.

Bio and achievements in e-mobility▸ Chinese producer of EV battery components will build a lithium-ion electrolyte factory near Oława in south-western Poland with an annual capacity up to a million batteries a year.
Ownership▸ Private.
Operates abroad▸ Foreign company.

Automotive

Electric bus manufacturers

AUTOSAN Sp. z o.o.

Lipińskiego 109
(38-500) Sanok.

Bio and achievements in e-mobility▸ AUTOSAN ltd. is a bus manufacturer with 185 years of tradition. The current offer includes a wide range of buses for public, suburban and intercity transport, as well as special buses. In 2017, Autosan started production of electric buses and is developing a small electric car.
Ownership▸ State-owned.
Operates abroad▸ Yes, Germany.

RAFAKO S.A.

ul. Łąkowa 33,
47-400 Racibórz.

Bio and achievements in e-mobility▸ RAFAKO is a globally recognised manufacturer of steam generators and equipment for power, CHP and incineration plants. RAFAKO is currently working on a prototype of a 8.5 meter-long electric bus, dedicated for public transport or as a school bus. First prototypes will be ready before the end of 2018. Rafako is also working on a project of urban electric car and small light duty vehicle.
Ownership▸ Listed, private.
Operates abroad▸ Yes, China, Turkey,India, Balkan region, Germany, France, Switzerland, Belgium, Czech Republic, Scandinavia, South Korea.

SOLARIS Bus & Coach

ul. Obornicka 46, Bolechowo Osiedle,
(62-005) Bolechowo.

Bio and achievements in e-mobility▸ European leader in the production of modern public transport vehicles: buses, trolleybuses and trams. Since the launch of production in 1996, nearly 15,000 vehicles have already left the factory. It is also a leading European electric bus manufacturer. The new Solaris Urbino 12 electric has been chosen the “Bus of the Year 2017”. Solaris already delivered 132 electric buses to markets around the world. Another 173 are in production.
Ownership▸ Private.
Operates abroad▸ Yes, company sales to 32 countries.

URSUS Bus S.A.

Rajców 10,
(00-220) Warszawa.

Bio and achievements in e-mobility▸ URSUS Bus S.A. is a producer of a wide range of electric buses (from 8.5 to 18.0 m), trolleybuses (12.0 and 18.0 m) and diesel-engine buses (10.0 and 12.0 m). In 2017, in co-operation with two Dutch companies: HyMove and e-Traction and two German companies: Ziehl Abegg and BMZ, URSUS Bus created the 12.0 m long, low floor Fuel-Cell Electric City Bus (FCEB). The largest single contract in the field of e-bus, signed by URSUS Bus is the supply of 47 electric buses to Zielona Góra.
Ownership▸ Private.
Operates abroad▸ Yes, in Sweden, Germany and a number of countries in Africa.

VOLVO POLSKA Sp. z o.o.

ul. Mydlana 2,
(51-502) Wrocław.

Bio and achievements in e-mobility▸ Volvo Buses is one of the largest manufacturers of buses and coaches in the world. The Polish branch of Volvo Bus produced 20 fully electric buses, 128 plug in hybrid buses and 1051 hybrid buses. The pipeline consist of another 98 fully electric buses, 19 Plug in and 231 hybrid buses.
Ownership▸ Foreign.
Operates abroad▸ Yes, in 190 countries.

Electric bus value chain

ENIKA Sp. z o. o.

ul. Morgowa 11,
91-223 Łódź.

Bio and achievements in e-mobility▸ Founded in 1992, employs over 100 people and relies heavily on the Łódź Technical University as a source of workforce. Manufactures several hundred types of equipment, including voltage converters, complete asynchronous drive systems for tramway, trolleybus and EV bus vehicles, inverters, power supply units available in wide range of input and output voltages and power ratings up to 1.2 MW. ENIKA is part of the governmental e-bus project.
Ownership▸ Private.
Operates abroad▸ Yes.

SAV Studio

Borówiec 13,
Potrzanowo.

Bio and achievements in e-mobility▸ Design studio providing services i.a in visualization of electric buses.
Ownership▸ Private.
Operates abroad▸ Yes.

EV manufacturers

AK Motor Polska Sp. z o.o.

Jagiellońska 88/106,
Warsaw.

Bio and achievements in e-mobility▸ Established in Toronto in 2012. deals with automotive intellectual property management. In 2013 r. acquired rights to use Syrena brand for newly designed vehicles. In 2014 opened its Polish branch. It aims at developing a range of EVs using a traditional Polish car brand – Syrena. Any manufacturing is years away.
Ownership▸ Private.
Operates abroad▸ Yes, Canada.

ElectroMobility Poland

Mysia 2,
(00-496) Warsaw.

Bio and achievements in e-mobility▸ ElectroMobility Poland is a special purpose vehicle established by four biggest Polish state-controlled utilities to develop the concept of an urban electric car and to promote the development of e-mobility system in Poland.
Ownership▸ State-controlled.
Operates abroad▸ No.

Walkin Start Up Venture

Bio and achievements in e-mobility
The company is building an EV called SEVI. It will have a range of 150 km with batteries of 18 kWh. It exists only as rendering and functional prototype. The company is looking for an investor. With new capita lit plans to produce 100 cars by 2019.
Ownership▸ Private.
Operates abroad▸ No.

Van manufacturers

WB Electronics S.A.
129/133 Ul. Poznańska,
(05-850) Ożarów Mazowiecki.

Bio and achievements in e-mobility▸ WB Electronics contributes to technological transformation in the Polish army and the defence sector. Operating in the field of specialised electronics and military IT, it is the leader of the WB Group – the largest private defence industry holding in Poland. New entrant in e-mobility. The company is working on the construction of electric vehicles. First prototype scheduled for December 2018. Models under development include vehicles for mines, including large excavators.
Ownership▸ Private.
Operates abroad▸ Yes, USA, India, Malaysia, Sweden, Hungary and North Africa.

Logistics

No Limit, Sp. z o.o.
Księżnej Anny 4,
(03-866) Warsaw.

Bio and achievements in e-mobility▸ No Limit provides logistics solutions. Range of services cover transport of goods, unloading operations, warehousing, customising, preparation of goods for further distribution and return of goods related services. No Limit is the leader in last mile deliveries by 'alternative fuel' vehicles. Strongly engaged in testing and development of B2B/B2C deliveries by electrical vehicles.
Ownership▸ Private.
Operates abroad▸ Yes, Central – Eastern Europe.

Poczta Polska S.A.
ul. Rodziny Hiszpańskich 8,
00-940 Warszawa.

Bio and achievements in e-mobility▸ Poczta Polska is the biggest postal operator on the Polish market. Its network includes 7500 postal offices, subsidiaries and agencies, all serving both private and corporate customers. In 2018 about 50 electric vehicles will be tested by the company before a decision on EV purchase is made.
Ownership▸ State owned.
Operates abroad▸ No.

Car-sharing

Enigma
ul. Jutrzenki 116,
02-230 Warsaw.

Bio and achievements in e-mobility
Enigma has been providing information security services for 25 years. It now operates the first full-electric city car sharing system in Poland under the brand Vozilla. It is run in co-operation (PPP agreement) with the city of Wrocław. The system started on 4 November 2017 and features 200 electric cars: 190 Nissan Leaf and 10 Nissan e-NV200.
Ownership▸ Private.
Does operate abroad▸ No.

Panek S.A.

Bio and achievements in e-mobility
Panek S.A. is a car renting company. In 2017 it launched a car-sharing system in Warsaw. Its cars are not electric but the company does not exclude opting in EVs in their fleet in the near future. The company participates in a competition to become Warsaw' official car-sharing system provider.
Ownership▸ Private.
Does operate abroad▸ Yes, Lithuania.

Transporters S.A.

Bio and achievements in e-mobility
Established in 2010 as a car rental company. In 2015 it creates GreenGoo brand with the aim to invest in charging infrastructure. The company invested in several charges and launched a small electric car--sharing scheme. It signed an agreement with the city of Rybnik to build 3 public chargers and is in talks with Rzeszów to launch an electric car-sharing scheme featuring 40 cars at the first stage and targeting 180 vehicles later.
Ownership▸ Private.
Does operate abroad▸ No.

Financial institutions

ING Bank Śląski S.A. (ING BSK)

ul. Sokolska 34,
(40-086) Katowice.

Bio and achievements in e-mobility
ING Bank Śląski SA (ING BSK) is a daughter company of the Dutch ING Bank. Together with Polish utility Tauron, ING BSK runs a car-sharing project in Katowice.
Ownership▸ Daughter company of the Dutch-based company.
Operates abroad▸ Foreign.

Public sector

Central Government

Mateusz Morawiecki,

Prime Minister of Poland

Role in e-mobility▸ Author of Polish government economic strategy that includes Polish EV development plan (e-car) and electric bus development plan (e-bus). Open to foreign investments in e-mobility.

Chancellery of the President

Key person▸ MARTA GAJĘCKA, Advisor to the President of Poland
Role in e-mobility▸ The Chancellery plays an active role in the promotion of the e-mobility, organises conferences, debates and events devoted to the e-mobility.

Chancellery of the Prime Minister

Key person▸ PIOTR WOŹNY, Government Plenipotentiary for the „Clean Air" Programme
Role in e-mobility▸ Responsible for the implementation of the government programme combating smog. One of the main component of smog in Polish cities are cars running on internal combustion engines.

Ministry of Energy

Key person▸ MICHAŁ KURTYKA, Deputy Minister
Role in e-mobility▸ Responsible for the implementation of the e-car programme and for e-mobility legislation. Could set priorities for the Low-Emission Transport Fund. His responsibilities as COP President could distract him from e-mobility tasks.

Ministry of Entrepreneurship and Technology

Key person▸ JADWIGA EMILEWICZ, Minister
Role in e-mobility▸ Responsible for the implementation of the e-bus programme and the EU Battery Alliance.

Ministry of the Environment

Key person▸ HENRYK KOWALCZYK, Minister
Role in e-mobility▸ In charge of National Fund for Environmental Protection and Water Management, a key e-mobility funding mechanism.

Ministry of Innovation and Development

Key person▸ JERZY KWIECIŃSKI, Minister
Role in e-mobility▸ In charge of management of the EU structural and cohesion funds, key funding source for e-mobility.

Public institutions

Bank Gospodarstwa Krajowego (BGK)

Key person▸ BEATA DASZYNSKA – Muzyczka, President of the Management Board
Role in e-mobility▸ BGK, a state development bank. It will run the account of the Low-Emission Transport Fund and will provide advisory services regarding its management.

National Fund for Environmental Protection and Water Management (NFOŚiGW)

Key person▸ ARTUR MICHALSKI, Vice-President of the Management Board
Role in e-mobility▸ The Fund will create and manage Low-Emission Transport Fund. It will also aid e-mobility development from other budget lines.

The National Centre of Research and Development (NCBiR)

Key person▸ MACIEJ CHOROWSKI, Director of the NCBiR
Role in e-mobility▸ NCBiR funds RD&I to implement innovative solutions related to e-mobility. It is an important participant of the e-bus development programme.

The Polish Agency for Enterprise Development (PARP)

Key person▸ NINA DOBRZYŃSKA, Vice-President of the Polish Agency for Enterprise Development
Role in e-mobility▸ PARP implements Elektro-ScaleUp programme dedicated for e-mobility start-ups.

The Polish Development Fund (PFR)

Key person▸ WŁODZIMIERZ HRYMNIAK, Head of the Department of Sector Programs
Role in e-mobility▸ PFR is responsible for the e-bus programme financing. The fund is ready to acquire a stake in companies manufacturing EVs or electric buses.

The General Director for National Roads and Motorways (GDDKiA)

Key person▸ Acting Director General JACEK GRYGA.
Role in e-mobility▸ The central administration authority for issues related to the national road system. The General Director manages the national roads and implements the state budget to the extent of the national road system. According to the E-mobility Law GDDKiA prepared location plan for public charging stations. On 28 May draft plan indicating 169 possible locations was published for consultations.

KEY LOCAL AUTHORITIES

Gdynia

Key person▸ KATARZYNA GRUSZECKA SPYCHAŁA, Deputy Mayor of Gdynia.
Role in e-mobility▸ There are 7 trolleybuses in Gdynia. Another 30 will join the public transport fleet in 2019, together with 6 electric buses. The city intends to establish electric car-sharing by 2020.

Jaworzno

Key person▸ PAWEŁ SILBERT, Mayor of Jaworzno.
Role in e-mobility▸ Public transport fleet in the city features 24 electric buses. Another 20 will join the fleet in 2019. The city authorities pursue their ambition to test autonomous buses. A dedicated chapter on that topic was included in the E-mobility law at Jaworzno's request.

Katowice

Key person▸ HELENA ULANOWSKA, CEO of Katowice Public Transport Company (PKM).
Role in e-mobility▸ PKM will buy 10 electric buses this year. TAURON and ING are opening a pilot electric car-sharing system with charging infrastructure. More e-mobility activities are expected this year due to COP24 to be held in the city in December.

Kraków

Key person▸ TADEUSZ TRZMIEL, Deputy Mayor of Kraków.
Role in e-mobility▸ Public transport fleet in Kraków features 26 electric buses. The city participates in the e-bus programme and has the option to buy 161 electric buses built under its umbrella. City authorities pro-actively assigned 40 locations for public charges. These shall be built and operated by private companies. Kraków co-operates with a small private company Smart City Polska and PGE to develop city electric car-sharing. Kraków is notorious for poor quality of air and it could be the first city in Poland that will decide to limit car circulation in a low emission transport zone.

Lublin

Key person▸ KRZYSZTOF ŻUK, Mayor of the City of Lublin.
Role in e-mobility▸ Currently the city public transport fleet features 2 electric buses. In May ZTM, city-owned public transport company published a tender for another 20 electric buses including charging infrastructure. The buses should be delivered in 2019 r. Apart from BEV buses the city transport also features 50 trolleybuses with another 15 being ordered. URSUS Bus factory is located in Lublin.

Poznań

Key person▸ MACIEJ WUDARSKI – Deputy Mayor.
Role in e-mobility▸ The city will buy 21 electric buses by 2019.

Rzeszów

Key person▸ MAREK USTROBIŃSKI – Deputy Mayor
Role in e-mobility▸ Next year the city authorities will buy 10 electric buses. It will also will invest in charging infrastructure. It plans to build 10 and then 100 public chargers in the near future. An agreement with PGE is in place where Rzeszów assigns places for chargers and PGE builds them. The project has not been launched yet. The city is in talks with

Transporters SA, a company providing car renting services. The objective is to launch an electric car-sharing scheme in Rzeszów. Transporters would not only provide cars (40) but also build charging stations (20).

Warsaw

Key person▸ WIESŁAW WITEK, CEO of the Warsaw Transport Authority (ZTM).
Role in e-mobility▸ Warsaw Transport Authority(ZTM) uses 26 electric buses. It ordered another 135 to be delivered in 2019.

Wrocław

Key person▸ ANNA BADEŃSKA – Department of Infrastructure and Economy of the city office.
Role in e-mobility▸ Wrocław launched the biggest car-sharing scheme running exclusively on electric vehicles. It is a Public Private Partnership project called Vozilla featuring 200 electric cars (Nissan).

Zielona Góra

Key person▸ JANUSZ KUBICKI, Mayor of Zielona Góra.
Role in e-mobility▸ Zielona Góra will have 61% of its buses running on batteries in 2019. The city signed an agreement with Ursus for delivery of 47 electric buses in 2019. It will also invest heavily in bus charging systems. The city implements an ambitious low emission transport strategy financed from EU money.

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