

**EVs: in the world and in Kazakhstan,  
and their role in reducing  
greenhouse gas emissions**

**Astana  
July 2023**

## Summary

This analytical report describes the role of electric vehicles (hereinafter - EV) in reducing greenhouse gas emissions (hereinafter - GHG emissions) and air pollution, as well as the current state of the EVs market in the world and in Kazakhstan. The report aims to inform the public about the benefits of EVs compared to fossil-fuel vehicles, and to inform financial and other institutions about the possibilities of attracting investments through sustainable financial instruments, such as green bonds and loans, to finance the purchase of EVs and clean transport infrastructure.

The transport sector is one of the sources of greenhouse gases and air pollution in the world and in Kazakhstan, which is largely powered by fossil fuels. Greenhouse gases lead to climate change, which has been recognised by the UN as one of the most serious problems of our time, bearing direct physical risks and threats to ecosystems, infrastructure, human life and health.

In this regard, the reduction of carbon emissions in the transport sector is an important measure to reduce GHG emissions into the atmosphere and improve air quality.

At the global level, the transition to alternative modes of transport, namely EVs that do not produce carbon emissions, is gaining momentum. Various studies show that over the entire life cycle of an EV, including battery production, other manufacturing and end of life, feedstock & fuel, vehicle in-use, EVs generally produce lower emissions than conventional fuel vehicles.

In Kazakhstan, in recent years, the number of EVs has been growing rapidly, but the share of vehicles with electric fuel is still negligible – less than 1%. On the one hand, various measures are being introduced to encourage the transition to green transport, such as exemption from transport tax and recycling fees. On the other hand, there are still such constraining factors as the high initial cost of buying an electric car and underdeveloped infrastructure, including charging stations and specialised services.

At the same time, the business community and financial institutions of the country do not remain aloof from the global green transition. Companies are gradually replacing their vehicles with electric cars and electric buses, including those powered by their own renewable energy sources. Banks have begun issuing green car loans for the purchase of EVs.

However, for a more massive popularisation of EVs among the population and business, additional measures are required to increase solvent demand, develop the infrastructure of charging stations and services throughout the country, as well as develop domestic production of environmentally friendly vehicles.

One of the key tasks of the Astana International Financial Centre (AIFC) is to contribute to the sustainable economic growth of the country, including the transition to a low-carbon economy by attracting sustainable investment and creating a supporting financial ecosystem.

The main instruments of sustainable finance are green bonds and loans, proceeds of which are used to finance environmentally sustainable projects, and which comply with internationally recognised standards in the field of green finance, such as the Green Bond Principles of the International Capital Market Association and the Climate Bonds Standard of the Climate Bonds Initiative. According to these standards, an obligatory requirement for the recognition of a bond issue or a loan as green is to receive an independent evaluation. The AIFC Green Finance Centre is the flagship provider of an independent evaluation of green financial instruments in the country. 70% of green bonds and loans in the country were issued with the support of the AIFC Green Finance Centre.

To increase the availability of EVs in the country, the Centre can provide services to support financial and other organisations in issuing green bonds and providing loans by developing the necessary documents and policies in the field of green finance and providing an independent evaluation.

## **1. GHG emissions in the Transport sector of Kazakhstan**

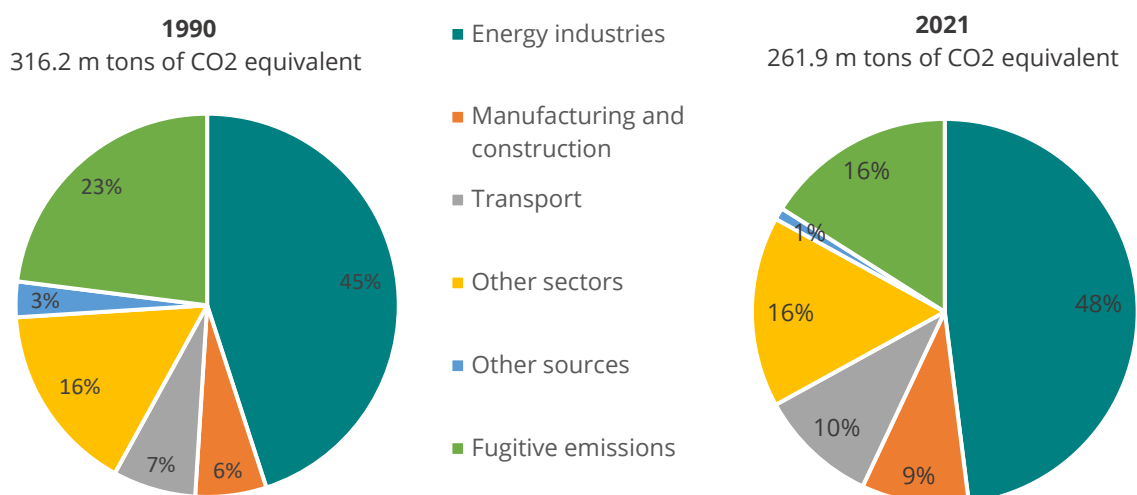
Greenhouse gases lead to climate change, which has been recognised by the UN as one of the most serious problems of our time, bearing direct physical risks and threats to ecosystems, infrastructure, human life and health.

According to the Guidelines for National Greenhouse Gas Inventories (2006) of the Intergovernmental Panel on Climate Change, the scientific group assembled by the United Nations to study all global science aspects of the climate change, when calculating contribution of economic activity sectors to GHG emissions, the “Energy” sector includes the following categories:

- *Energy industries*
- *Manufacturing and construction*
- ***Transport***

- *Other sectors*
- *Other sources*
- *Fugitive emissions*

**Figure-1. Contribution of subsectors to GHG emissions in the “Energy” sector of Kazakhstan**



**The share of GHG emissions in Kazakhstan from the “Transport” category during the observed period has been growth: in 1990, the share of transport was 7% of the "Energy" sector while in 2021 the share of the Transport category was 10%<sup>1</sup>.**

Auto transport ranks third, after railway and pipeline transport in the unified transport system of the country in terms of the volume of transported cargo. However, **auto transport is the leader in GHG emissions into the atmosphere (accounts for 86.5% of total CO2-eq emissions from the transport sector in 2020).**

***“Auto transport is the leader in terms of GHG emissions in the transport sector of the country”***

<sup>1</sup> Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, Zhasyl Damu JSC. National report of the Republic of Kazakhstan on the inventory of anthropogenic emissions from sources and removals by sinks of greenhouse gases not regulated by the Montreal Protocol for 1990-2021. National report on the state of the environment of the Republic of Kazakhstan for 2021

**Table-1. GHG emissions in the transport industry, thousand tons of CO<sub>2</sub>-eq.**

Year	Road transport	%	Domestic aviation	%	Railway transport	%	Internal navigation	%	Others	%	Total
2016	19 110,74	85,9	929,31	4,18	1246,53	5,60	14,44	0,06	956,28	4,30	22 257,30
2017	20 221,64	85,6	985,97	4,17	1502,74	6,36	8,75	0,04	903,67	3,83	23 622,76
2018	21 324,35	84,0	1074,04	4,23	1443,17	5,68	9,77	0,04	1535,23	6,05	25 386,57
2019	21 803,15	84,4	1182,51	4,58	1437,16	5,56	6,91	0,03	1412,78	5,47	25 842,51
2020	15 704, 23	86,5	11,19	0,61	1001,41	5,51	3,02	0,02	1344,28	7,40	18 164,13

Source: Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, UNDP in Kazakhstan, The Global Environment Facility. 8th National Communication and 5th Biennial Report of the Republic of Kazakhstan to the UNFCCC.

## 2. Reduction of GHG emissions while using EVs

Transport is a source of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) emissions, which make up the majority of exhaust emissions from the combustion of the fuel-air mixture in a motor vehicle internal combustion engine. Some of them are greenhouse gases that lead to global warming and climate change.

At the same time, when burning fuels of all types, a number of other pollutants are emitted, such as carbon monoxide (CO), volatile non-methane compounds (NMVOC), sulfur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), particulate matter, which contribute to local, regional and even global air pollution.<sup>2</sup>

To reduce GHG emissions and pollutants from vehicles, increase in production of and switching to EVs are actively gaining momentum at the global level.

With no tailpipe, electric cars do not produce carbon dioxide emissions when driving. This reduces air pollution considerably. **In over a year, just one EV can reduce an average 1.5 million grams of CO<sub>2</sub> (or 1.5 tonne a year).**<sup>3</sup>

According to a European Environment Agency report on EVs, **GHG emissions of EVs were about 17-30% lower than emissions of petrol and diesel cars.** Another study has shown that **emissions of EVs are 43% lower than those of diesel vehicles.**

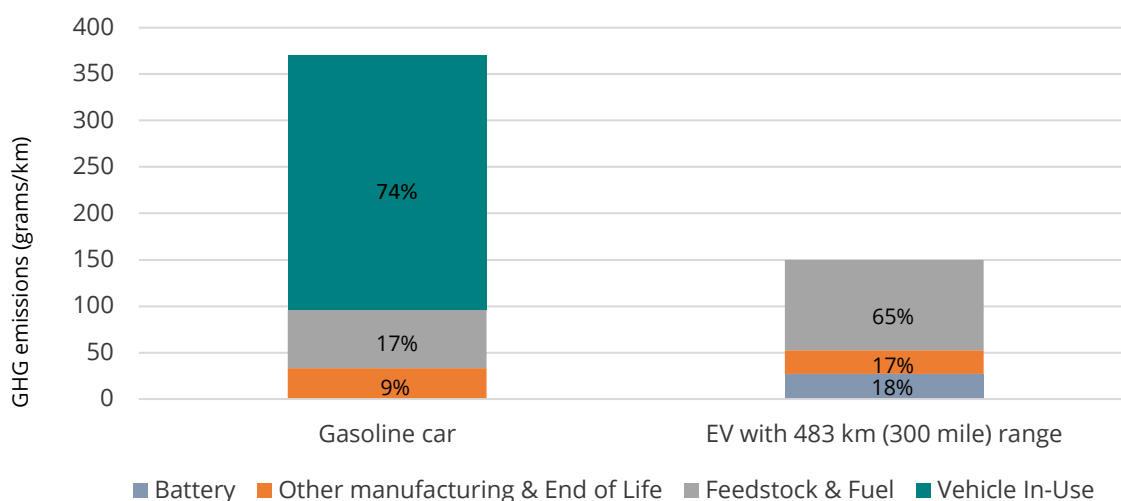
These differences arise from assumptions used by the researchers, namely which specific vehicles are being compared, what electricity grid mix is used, if marginal or average electricity emissions are used, what driving patterns are assumed, and even the weather.

<sup>2</sup> Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, Zhasyl Damu JSC. National report of the Republic of Kazakhstan on the inventory of anthropogenic emissions from sources and removals by sinks of greenhouse gases not regulated by the Montreal Protocol for 1990-2021

<sup>3</sup> [EDF Energy. Benefit of electric cars on the environment](#)

It should be noted that the **electrical grids in most countries of the world are still powered by fossil fuels such as coal or oil, and EVs depend on this energy for charging.** Also, the emissions generated by the production of an EV are generally higher than those of a conventional vehicle. **More than a third of CO2 emissions over the lifetime of an EV come from the energy used to produce the vehicle itself.** This is due to the production of lithium-ion batteries, which are an integral part of the EV.

**Figure-2. Life cycle emissions of electric cars vs. gasoline\***



Source: [United States Environmental Protection Agency. EVs Myths](#)

\* Note: based on US study, US energy mix data used (41% clean energy, 59% conventional energy)

Nevertheless, GHG emissions associated with an EV over its lifetime are typically lower than those from an average gasoline-powered vehicle, even when accounting for manufacturing.

Researchers from the universities of Cambridge, Exeter in the UK, and Nijmegen in Netherlands found that **in 95% of the world, driving EV is better for the environment than driving a gasoline-powered car.**

Another research detailed that **“in all cases examined, electric cars have lower lifetime climate impacts than those with internal combustion engines”<sup>4</sup>.**

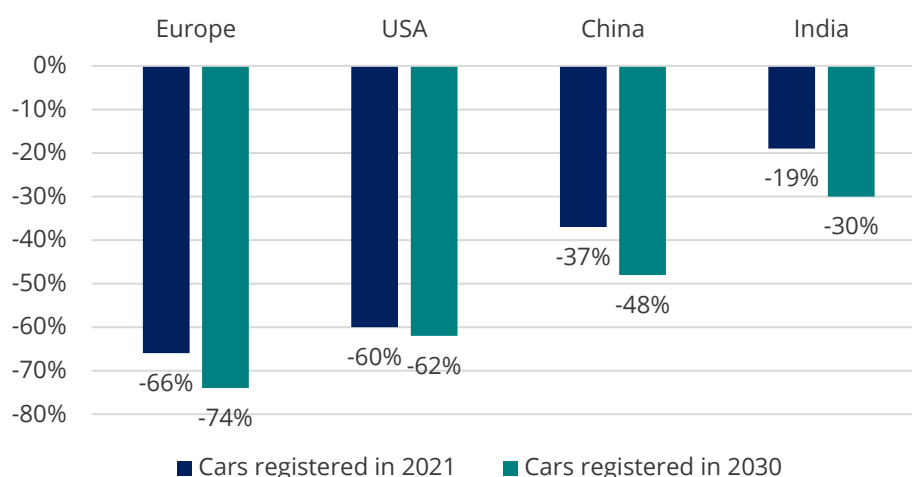
<sup>4</sup> [CarbonBrief. Factcheck: How EVs help to tackle climate change](#)

In general, experts broadly agree that **EVs create a lower carbon footprint over the course of their lifetime than do cars that use traditional, internal combustion engines.**<sup>5</sup>

*“Life cycle emissions related to the EVs are usually lower, than of the average car with a gasoline engine”*

As the efficiency of EV production and the share of clean energy in electricity mix increases, emissions over the life cycle of an EV are expected to decrease. For example, in Europe, new EVs in 2030 are predicted to produce 74% less emissions than new gasoline vehicles, in the US this figure is 62%, in China - 48% and in India - 30%.

**Figure-3. Estimated reduction in life cycle GHG emissions of new medium-size electric cars compared to gasoline cars**



Source: [Statista. Electric Cars Found to Cut Emissions Drastically](#)

### 3. EVs in the world

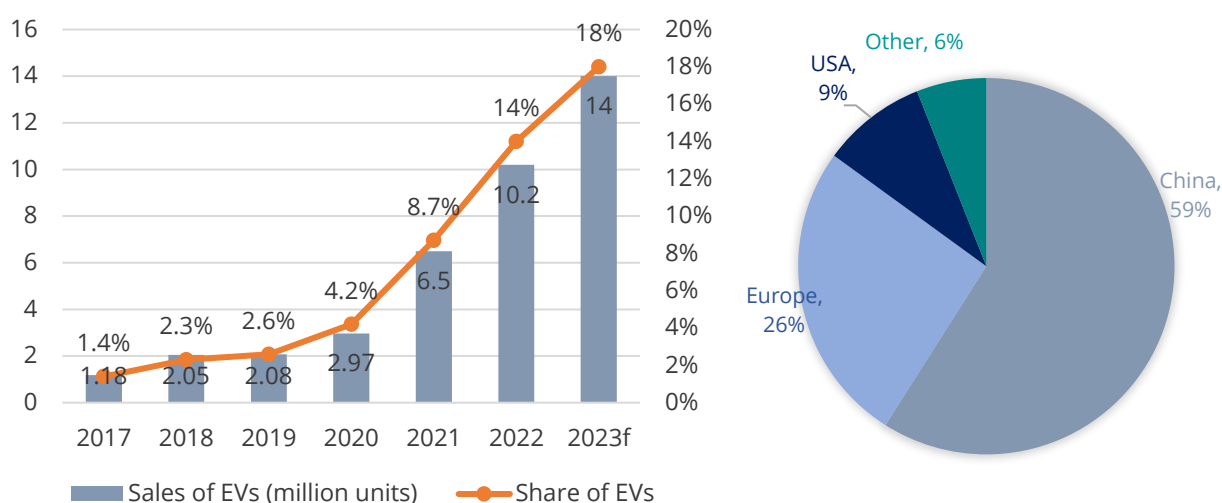
According to Bloomberg NEF forecasts, **EV sales worldwide will reach 56 million units per year by 2040.** In accordance with the Green Agenda of the European Union, by 2035 all new cars sold must be electric. In this regard, it is expected that by 2025 every fifth car sold in the EU will be an electric car, and by 2035 sales of cars with an internal combustion engine will be banned altogether. As an intermediate

<sup>5</sup> [CNBC. Are electric cars 'green'? The answer is yes, but it's complicated](#)

step towards zero emissions, the new CO2 standards will also require a 55% reduction in the average emissions of new cars by 2030 and new vans by 50% by 2030. The United States plans that by 2030, half of the sales of all vehicles will be electric cars.

**2022 has been a historic year for EVs, with annual production exceeding 10 million vehicles for the first time.** This represents a significant increase of 56% compared to the 2021 figure of 6.5 million vehicles.

**Figure-4. Sales of EVs globally and shares of leading countries in 2022**

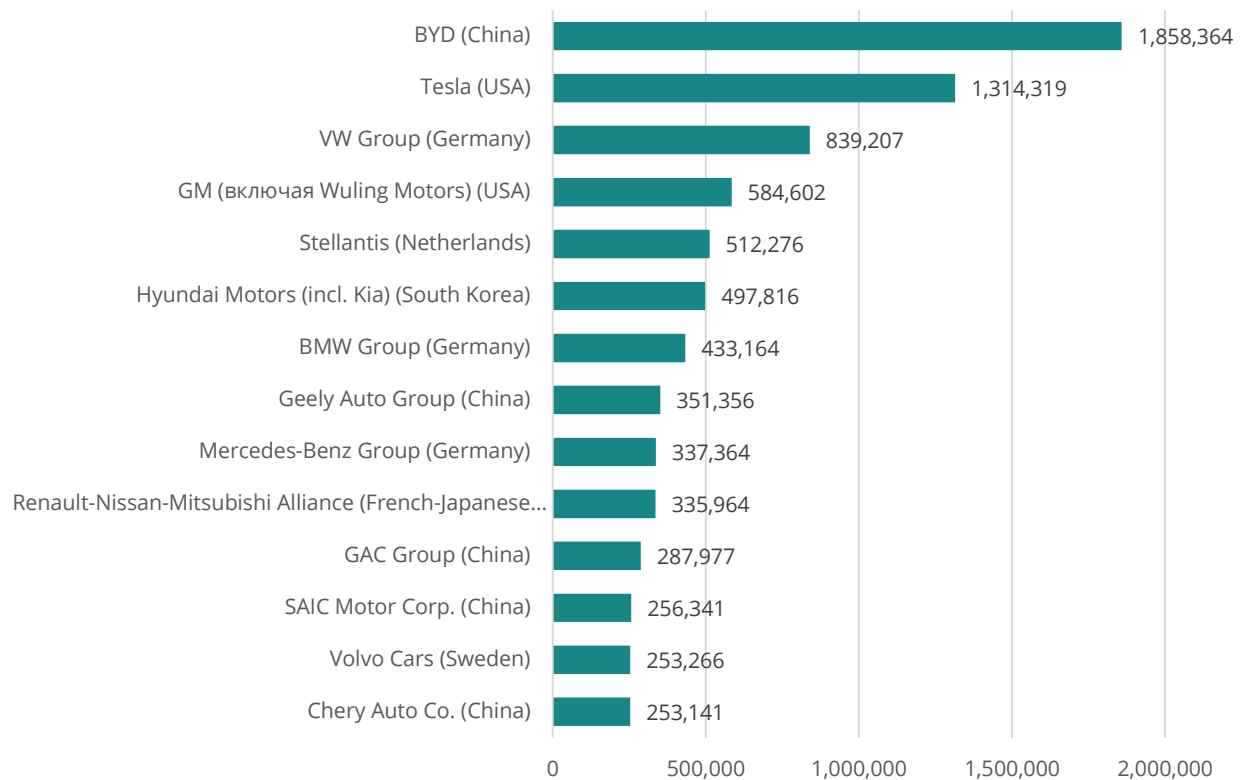


Source: [International Energy Agency. Global EV Outlook 2023](#)  
[Canalys. Global EV market grew 55% in 2022 with 59% of EVs sold in Mainland China](#)

China accounts for 59% of global sales, among the top 15 EV models sold in the world in 2022, 6 were manufactured by Chinese automakers. Chinese company BYD (Build Your Dream) has become a global leader in 2022 with a 211% increase in sales that amounted to 1.8 million EVs.



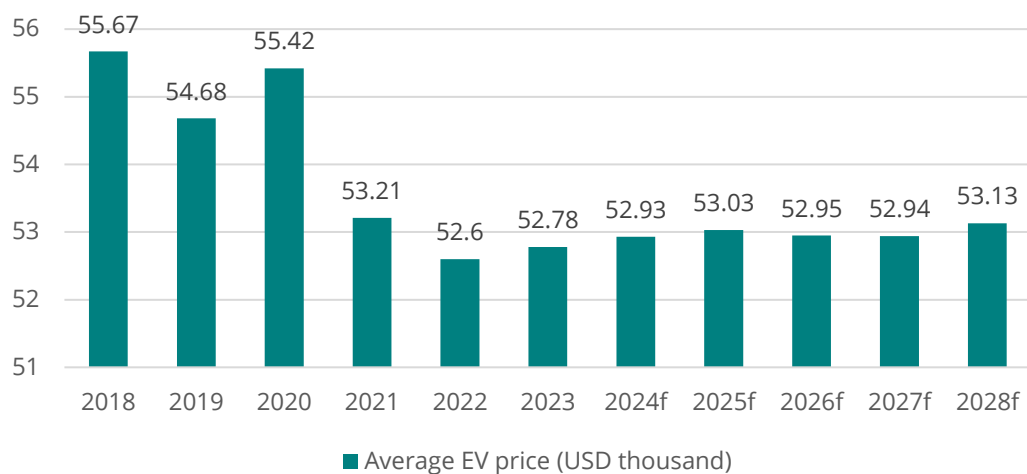
**Figure-5. Top 15 electric car models sold in 2022, units**



Source: [Visual Capitalist. Global EV Production in 2022, by Brand](#)

With the development of production technologies, EVs are becoming more affordable.

**Figure-6. The average price of EVs has fallen over the last 5 years**

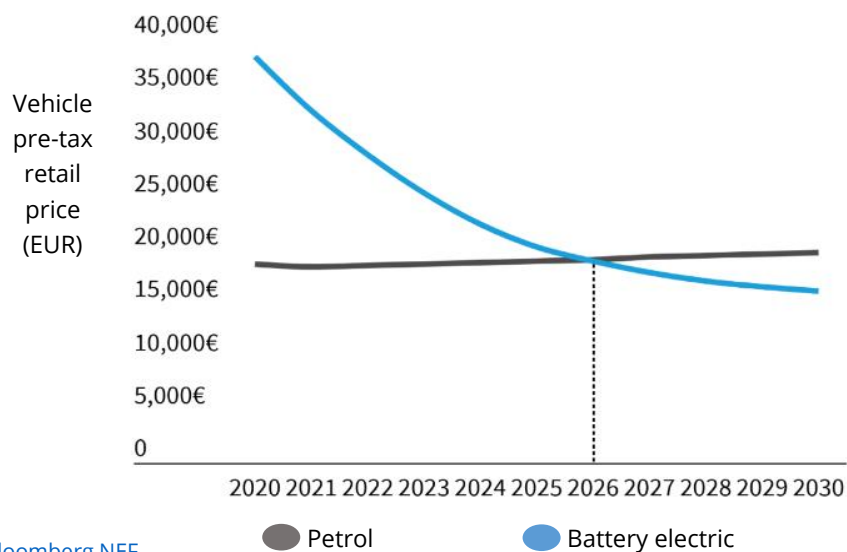


Source: [Statista. Average EVs price worldwide from 2018 to 2028](#)

In Europe, it will be cheaper to produce zero-emission EVs than fossil-fuel vehicles by 2027, according to a study by Bloomberg New Energy Finance. Electric mid-size and

full-size sedans (C and D segments) and SUVs will become as cheap to manufacture as gasoline-powered cars starting in 2026, while small EVs (B segment) will become cheaper in 2027 as falling battery costs and specialised production lines for EVs will make their purchase cheaper on average.

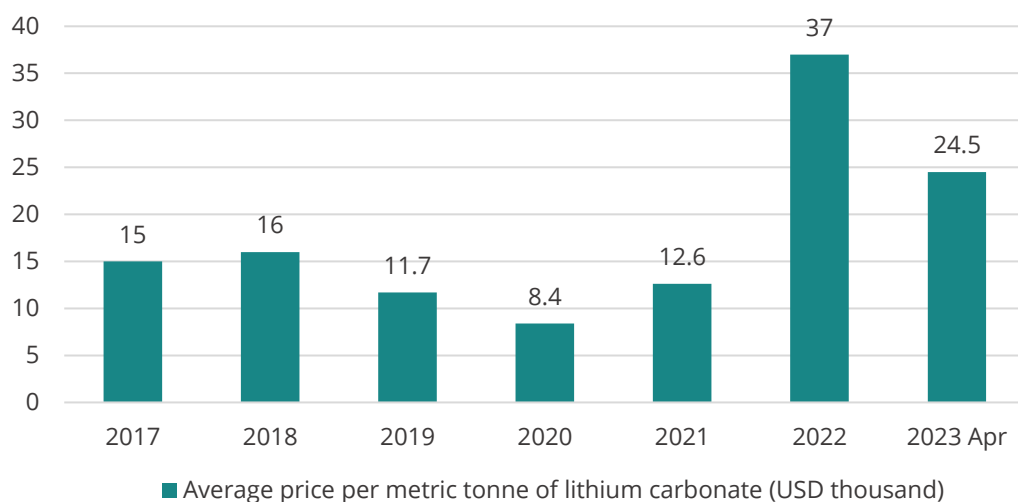
**Figure-7. EVs will be cheaper than fossil-fuel vehicles in Europe by 2027**



Source: [Bloomberg NEF](#)

After rising in recent years, the price of lithium, a critical mineral needed to make an electric car battery, has fallen significantly from its peak in November 2022 at \$90,000 per metric ton, batteries make up 40% of the cost of an electric car.

**Figure-8. Lithium carbonate price dynamics**



Source: [Nikkei. Chinese EV market slowdown slashes lithium, cobalt prices](#)  
[Statista. Average lithium carbonate price from 2010 to 2022](#)

#### 4. EVs in Kazakhstan

According to the Bureau of National Statistics of Kazakhstan, **as of 1 May 2023, the number of registered vehicles in Kazakhstan amounted to 4 million 730 thousand 661 units**, of which 87.6% are cars, 10.3% are trucks and 2.1% are buses.

82.3% of the registered vehicles use gasoline, the share of mixed fuel vehicles is 7.6%, diesel fuel is 7.4%, gas is 0.2%, **electricity is 0.06%**, and for over 2.44% of vehicles fuel type not specified.

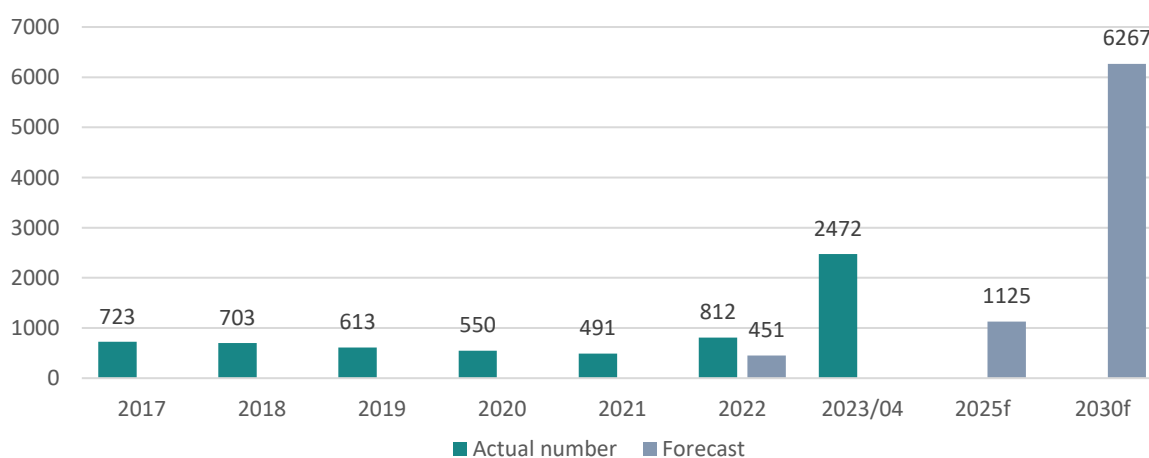
**Among cars:** 87.5% of cars are on gasoline, 1.9% on diesel fuel, 0.1% on gas, on mixed fuel – 8.3%, **on electricity – 0.06%** and for 2.14% of cars fuel type not specified.

According to the statistics, vehicles older than 20 years prevail in Kazakhstan – 49.1% of the fleet, from 10 to 20 years – 22.4%, from 7 to 10 years – 13.5%, from 3 to 7 years – 6.1% and only 8.7% of vehicles are less than three years old while 0.2% of vehicles have another year of manufacture.

Statistics show a significant increase in the number of EVs in the country in 2023, so if in 2022 there were 812 EVs in the country, then, **as of 1 May 2023, there were 2,790 EVs. Of the 2,790 units of electric transport, the share of cars is 88.6% (2,472 units)**, trucks – 6.6% (183 units), buses – 4.8% (135 units).

Already by the end of 2022, the actual number of passenger EVs exceeded the forecast published on the website of the Ministry of Energy of Kazakhstan in the same year by almost 2 times (812 cars instead of 451), and already in April 2023, the actual number exceeded the forecast for 2025 by more than two times (see Figure-9.)

**Figure-9. Number of registered electric cars in Kazakhstan, units**



Source: Bureau of National Statistics of Kazakhstan, [www.finprom.kz](http://www.finprom.kz), [Ministry of Energy of Kazakhstan](http://Ministry of Energy of Kazakhstan)

Likewise, according to the forecast, by 2030, about 6,267 EVs were predicted to be in operation, and in 2035 about 40 thousand EVs. However, given that current factual data exceeds the forecast, the latter may need to be revised upwards.

With the increase in the number of EVs, the demand for electricity will increase. Based on the calculations by the Ministry of Energy of Kazakhstan, on average 1 electric car consumes 3,400 kWh per year, then the annual consumption in 2035 in the electric car sector will be 136 million kWh. The dynamics is calculated on the basis of average growth rates of units of cars per year.

**Table-2. Electricity consumption forecast for EVs**

Year	Number of EVs, units	Consumed electricity per year, kWh
2025	1 125	3 825 526
2030	6 267	21 309 406
2035	40 173	136 587 624

Source: [Ministry of Energy of Kazakhstan](#)

In Kazakhstan, the cost of each kilometre of travel on an electric car with a range of 500 km, a power of 350 kW and a battery capacity of 85 kWh (Tesla) is KZT **8.5** (*in the urban cycle*). For comparison, the cost of fuel for each kilometre of the Toyota Camry (XV70) 2.5, the tank volume of 60 litres is KZT **19.06** (*based on: 9.3 litres per 100 km in the urban cycle at a price of AI-92 gasoline – KZT 205*). Given that the average mileage in Kazakhstan is 20,000 kilometres, the annual cost of recharging an electric car will be KZT 170,000 tenge, taking into account the tariff for 1 kWh in the amount of KZT 50<sup>6</sup>, which is 2.7 times cheaper than the annual cost of owning a car with an internal combustion engine.

<sup>6</sup> [Ministry of Energy of Kazakhstan](#)

**Table-3. Comparison of the ownership cost of ICE-based car and EV in Kazakhstan**

	<b>ICE (internal combustion engine)-based car (volume 2,5 l)</b>	<b>EV</b>
Annual costs per 20 thousand km (refueling or recharging)	KZT 381 300 (price of AI-92 gasoline – KZT 205, fuel consumption – 9.3L/100 km)	KZT 170 000 (KZT 55 000 when charging at home)
Annual tax	KZT 24 200	KZT 0
Engine oil change every 8000 km	KZT 62 500	KZT 0
<b>Total basic costs</b>	<b>KZT 468 000 KZT</b>	<b>KZT 170 000 or KZT 55 000</b>

Source: [Ministry of Energy of Kazakhstan](#), Official website of Toyota Kazakhstan, AIFCA calculations

*“In Kazakhstan, driving an electric car is almost 3 times cheaper than a gasoline car”*

Despite the obvious benefits of buying an electric car, people in the country are not yet ready to massively switch to environmentally friendly transport due to the following barriers:

- 1) the high initial cost of an electric car compared to a car with an internal combustion engine. About 40% of the cost of an electric car is the battery;
- 2) underdeveloped infrastructure: insufficient number of charging stations in the regions of the country and the lack of specialised services and the supply of spare parts;
- 3) unknown residual value when selling in the secondary market.

One of the main constraining factors in the development of green transport is the insufficient development of EV infrastructure, namely charging stations. In Kazakhstan, two companies can be noted that specialise in the installation and operation of electric charging stations and have the largest number of installed stations: eDrive.kz and Operator EZS. The largest number of electric charging stations is concentrated in the cities of Almaty and Astana, 1-2 charging stations operate in the cities of Karaganda, Temirtau, Shymkent, Taldykorgan, Atyrau, 3 each in Shchuchinsk and Kostanay. Owners of EVs in other regions do not have the

opportunity to use public charging stations and “refuel” their cars at home, “from the outlet”.<sup>7</sup>

According to data from open sources\*, the following companies operate in the field of production and installation of electric charging stations in Kazakhstan:

**1) eDrive.kz** - according to information on the official website [www.edrive.kz](http://www.edrive.kz), the company has installed **102 charging stations** throughout the country in:

- Almaty city – **63 stations**,
- Astana city – **29 stations**,
- Shchuchinsk city – **3 stations**,
- Karaganda and Temirtau cities - **2 stations each**,
- Atyrau, Shymkent and Taldykorgan cities – **1 station each**.

**2) Operator EZS** - according to information on the official website [www.oeks.kz](http://www.oeks.kz), the company installed **102 charging stations** throughout the country in:

- Almaty city – **52 stations**,
- Astana – **50 stations**.

**3) Adele Energy** - according to information on the official website [www.adele.energy](http://www.adele.energy), the company has installed **more than 100 stations** throughout the country.

**4) The official importer of the Porsche brand in Kazakhstan** - 12 Porsche Destination Charging stations have been installed (according to the website [www.maps.google.com](http://www.maps.google.com)) in:

- Almaty city – **8 stations**,
- Kostanay – **3 stations**,
- Astana city – **1 station**.

**5) Tesla Motors** - according to information on the official website [www.tesla.com](http://www.tesla.com), 10 Tesla Superchargers stations are installed in the country in:

- Astana - **6 stations**,
- Almaty city – **4 stations**.

**6) Gasenergy** - **4 stations** installed in Astana (according to the 2gis.kz application)

**7) Blue Sky Energy** - a network of electric taxis and charging stations installed **3 stations** in Almaty (according to the 2gis.kz application)

**8) Audi, Hyundai, Compass, Wallbox** installed **one charging station each** in Almaty (according to the 2gis.kz application)

*Note\*: data are taken from open sources and official websites of the indicated companies and may differ from the actual number of installed electric charging stations*

At the same time, measures are being taken by the state to encourage the shift to cleaner modes of transport, including the modernisation of an outdated public transport fleet and the development of a national electric transport industry. In order

<sup>7</sup> [Energyprom.kz](http://Energyprom.kz)

to stimulate the purchase of EVs by the population, owners of EVs in Kazakhstan are exempted from:

- payment of customs duty (quota of 15,000 units for 2023);
- payment of recycling fees (from June 2021);
- payment of transport tax.

### **Transition of businesses to sustainable transport**

Currently, not only the population, but also local businesses are switching to green transport. There is a demand in the private sector for the use of EVs for their own needs, for example, for transporting employees.

Kazakhstani companies are currently **implementing projects to install autonomous charging stations powered by renewable energy sources** to charge EVs of companies, including electric cars and electric buses. Particularly, charging stations are installed in the parking lots of companies, and renewable energy facilities, such as a solar photovoltaic system or a wind power plant, are installed on the adjacent territory or on the roof of the building.

*“Kazakh companies are introducing innovative solutions for the transition to green transport using electricity from renewable energy sources”*

This way, charging stations receive electricity from renewable sources and charge EVs using electricity from renewable sources, which will further reduce the carbon footprint of the companies and contribute to more environmentally friendly business operations.

### **Green loans for the purchase of EVs**

The trend towards clean, sustainable transportation is not going unnoticed by financial institutions that are striving for a more environmentally friendly, social and responsible business and joining the ESG values of their customers.

*“Domestic banks began to issue loans with favourable terms for the purchase of EVs”*

Examples include green car loans from Bank CenterCredit and Halyk Bank.

### **Green car loan with cashback from Bank CenterCredit (BCC)**

According to the information on the official website of the bank, Bank Center Credit has become a partner bank of the European Bank for Reconstruction and Development under the Green Economy Financing Facility (hereinafter - GEFF) program for financing green technologies.

**The goal of the GEFF programme** is the energy-efficient modernisation of the country's business and residential facilities using environmentally friendly materials and technologies, which have now become more accessible to the population and business representatives of Kazakhstan thanks to the BCC loan from the EBRD. Popularisation of energy efficient technologies and reduction of CO2 emissions are also the goals of the GEFF programme. **The programme finances** energy-efficient solutions, technologies, and transport, **including EVs of certain brands.**

**The advantage of the programme is the opportunity to receive cashback compensation from the Global Environment Facility in the amount of 10% or 15% of the loan amount or the amount of investment** in energy efficient modernisation made using loan funds (compensation is calculated from the lower of the two amounts).

Source: [BCC official website](#)

### **Green car loan from Halyk Bank**

On 7 June 2023, at the Astana Finance Days financial conference organised by the Astana International Financial Centre (AIFC), one of the largest banks in the country, **Halyk Bank, announced plans to launch a “green” car loan for the purchase of EVs.**

The green car loan will be issued digitally at an interest rate one percent lower than standard loans, the bank said. Green car loan will be provided for a period of 6 to 84 months for both new and used electric cars.

Source: [www.inbusiness.kz](http://www.inbusiness.kz)

### **Expected legislative changes in the EVs Industry**

According to the information on the website of the Union of Automotive Industry Enterprises of Kazakhstan “KazAutoProm”, currently, the Mazhilis of the Parliament of Kazakhstan, with the participation of KazAutoProm, is **developing a draft law “On amendments and additions to certain legislative acts of the Republic of Kazakhstan on the promotion of environmentally friendly transport and infrastructure development for EVs”**, which includes the following initiatives:



- the Law will provide definitions for EVs, hybrid vehicles and electric charging stations;
- it is proposed to oblige local authorities to allocate places for charging stations in the design of roads and public areas;
- it is proposed to establish a state-owned JSC “National Administrator of the Network of Electric Charging Stations and the Development of Electric Mobility”, which will be engaged in the promotion of electric transport;
- it is proposed to ban entry to specially protected areas in cars equipped with an internal combustion engine, and to install electric charging stations in such areas.<sup>8</sup>

As a result, the adoption of the bill might have a positive impact on improving EV infrastructure and increasing the number of EVs in the country.

At the same time, in order to accelerate the popularisation of EVs among the population and businesses, additional incentive measures will be required, including those aimed at increasing solvent demand, the widespread development of EV infrastructure throughout the country, as well as the development of domestic production of environmentally friendly vehicles.

---

<sup>8</sup> [KazAutoProm. Draft law on the promotion of EVs in the Republic of Kazakhstan](#)

**Prepared by:**

**Daniyar Kelbetov,**

Chief Product Officer,  
Member of the Board of JSC “Astana International Financial Centre Authority”

**Asset Onglassov,**

Director, Industry Analysis Department,  
JSC “Astana International Financial Centre Authority”

**Ainur Zhakupova,**

Senior manager, Industry Analysis Department,  
JSC “Astana International Financial Centre Authority”