

THE RISE OF EVS

A SPECIAL SUPPLEMENT BY
The Daily Star
DHAKA MONDAY APRIL 8, 2024
CHAITRA 25, 1430 BS

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THE EV EVOLUTION

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ELECTRIC DREAMS TO REALITY The EV evolution since the 1880s

The internal combustion engine reigns supreme on our roads today, but its dominance wasn't always guaranteed. In the 19th century, another contender emerged: the electric car. Often relegated to the footnotes of automotive history, the electric car boasts a surprisingly long and fascinating journey.

Unlike popular belief, the story of electric vehicles (EVs) is not a narrative of the 21st century, but a saga that began in the 19th century. Understanding the evolution of electric cars, from their early origins to the present day, provides valuable context as we stand on the cusp of a potential transportation revolution in 2024.

The dawn of electric mobility

In the mid-1800s, the concept of electric mobility took its first steps with inventors across Europe and the United States experimenting with battery-powered vehicles. Notably, in 1835, British inventor Robert Anderson developed an electric carriage, although primitive, paving the way for future advancements. By the late 19th century, electric vehicles had begun to gain popularity, offering a cleaner, quieter alternative to their steam and gasoline counterparts.

Germany wasn't far behind either. In 1888, Andreas Flocken's Flocken Elektrowagen emerged, considered by

challenge. Gasoline cars offered greater range and lower running costs compared to electric vehicles. The mass production of affordable gasoline cars like the Ford Model T made electric cars less attractive.

Additionally, the discovery of vast oil reserves in the US made gasoline readily available and affordable, especially in rural areas where electricity access was limited. These factors led to the decline of electric cars by the 1930s.

For the next few decades, electric vehicle technology stagnated. Cheap and abundant gasoline, coupled with advancements in the internal combustion engine, left little incentive for alternative fuel sources.

Resurgence in the 20th century

The tide began to turn again in the late 1960s and early 1970s. Soaring oil prices and gasoline shortages, highlighted by the 1973 Arab Oil Embargo, spurred renewed interest in alternative fuel vehicles. This led to government initiatives and research into electric car technology.

Innovations such as the development of the lithium-ion battery by M. Stanley Whittingham added to the momentum, although the technology and infrastructure at the time were not conducive to mass adoption. These early electric vehicles still suffered from limited range and

range, utilitarian machines. Tesla's focus on performance and luxury demonstrated the potential for electric cars to be just as exciting and desirable as their gasoline-powered counterparts.

Secondly, the introduction of the Chevy Volt and Nissan LEAF in 2010 provided consumers with more practical options. The Volt, a plug-in hybrid, offered a compelling solution for those with range anxiety. It combined an electric motor with a gasoline engine, allowing drivers to utilise electric power for most everyday commutes while having the security of a gasoline engine for longer trips. The LEAF, an all-electric vehicle, offered a more environmentally friendly choice for those with access to charging infrastructure. These two vehicles, catering to different needs, broadened the electric car market beyond early adopters and enthusiasts.

These developments, however, were not solely responsible for the resurgence of electric cars. Government support played a crucial role in fostering innovation and consumer confidence. Investments in charging infrastructure addressed a major concern for potential buyers: "where will I charge my car?"

Additionally, government funding for battery research led to significant advancements. Battery packs became



Electric car built in England in 1895



The Nissan LEAF



The Tesla Model S

some to be the first "real" electric car. These early electric vehicles had several advantages. They were quiet, smooth-riding, and didn't require the messy process of hand-cranking an engine to start.

The US also played a significant role in the early electric car scene. Around 1890, William Morrison, an American chemist, introduced the first successful electric car in the United States. This six-passenger vehicle sparked interest in electric cars, particularly among urban residents who valued their quiet operation and ease of use. By 1900, electric cars held a surprisingly strong presence, accounting for roughly a third of all vehicles on the road.

The rise and fall

Several factors contributed to the initial popularity of electric cars around 1900. Firstly, the horse was still the dominant mode of transportation, and electric cars offered a cleaner and more convenient alternative. Secondly, the limitations of competing technologies like steam-powered cars, with their long startup times, made electric cars a more attractive option. Thanks to these factors, the turn of the century witnessed electric vehicles enjoying widespread acclaim, with cities like New York adopting electric taxis.

However, the invention of the gasoline-powered car with the electric starter in 1912 presented a significant

performance compared to gasoline cars.

The electric revolution in the 21st century

The 1990s saw stricter environmental regulations, including the Clean Air Act Amendment and the Energy Policy Act, prompting a renewed focus on electric vehicles. Automakers began developing electric versions of popular models, offering improved performance and range. Notably, Toyota introduced the Prius, the world's first mass-produced hybrid electric vehicle, in 1997. The Prius, with its combination of electric and gasoline power, proved commercially successful and helped raise the profile of electric vehicles.

The late 20th and early 21st centuries marked a significant turning point for electric vehicles. The advent of the internet and modern technology, along with heightened awareness of climate change, propelled EVs into the mainstream. Toyota's release of the Prius, followed by the advent of luxury electric cars by Tesla showcased electric cars' potential as both a necessity and a desire.

Firstly, Tesla Motors' announcement of the roadster in 2006 sent shockwaves through the automotive industry. Their ambitious vision of a luxury electric sports car with a range exceeding 200 miles on a single charge captured the public's imagination. This announcement challenged the perception of electric vehicles as short-

more efficient, offering greater range and shorter charging times. These advancements, in turn, helped to reduce the cost of electric vehicles, making them a more attractive proposition for mainstream consumers.

The future is electric

Perhaps the most telling sign of the EV boom is the growing consumer adoption and the corresponding development of charging infrastructure. Vehicles like the Nissan Leaf and the Chevrolet Bolt have brought electric driving within reach of the average consumer, offering reliable performance at competitive price points. Furthermore, the expansion of charging networks, led by initiatives like Tesla's Supercharger, is alleviating range anxiety and making electric vehicles a practical option for an increasing number of drivers.

Despite the significant progress, the road ahead for EVs is not without its challenges. The industry faces issues related to battery production, raw materials, and the environmental impact of mining activities. Additionally, the infrastructure for charging needs to keep pace with the growing number of EVs on the road. Furthermore, as the sector becomes increasingly crowded, companies will need to innovate continuously to stand out in a competitive market.

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Accelerating towards an electric future: The EV landscape in Bangladesh

As Bangladesh looks to the adoption of electric vehicles (EVs) in the country's busy streets for a greener, more sustainable future, a silent revolution is taking place. Recent years have witnessed a remarkable shift in the country's automotive industry, propelled by advancements in EV technology and policy reforms. However, is it enough to make people switch to EVs?

The adoption of electric vehicles (EVs) in Bangladesh is confronted with significant obstacles, mainly from high tax and regulatory barriers, although having a promising growth trajectory. The significant tax rate difference between EVs and conventional cars is highlighted by Imran Zaman Khan, Divisional Director of Rancon Motors Limited (General distributor of Mercedes-Benz), who also emphasizes the pressing need for more policy changes to encourage the wider adoption of EVs.

The primary factor influencing the EV market is its

dependency on batteries. Consequently, the availability of reconditioned EVs is expected to be limited, primarily due to the wear and tear on the battery. This limitation is likely to restrict the growth of the used or grey market for EVs. Instead, the majority of EVs are anticipated to enter the market through brand-new car importers.

Fueling traditional cars presents several challenges. Firstly, it requires a trip to a filling station, where users must ensure the good quality of the fuel. Additionally, there's a concerning trend of fuel theft by hired

drivers. In contrast, electricity, the fuel for EVs, is typically more affordable than fossil fuels. Moreover, EVs offer convenience and peace of mind to users. Unlike traditional cars that require servicing every three months, EVs typically only need servicing once every two years. Furthermore, EV owners can recharge their vehicles from the comfort of their own homes. In addition to convenience, EVs offer enhanced reliability. Their batteries typically come with a 10-year warranty, providing assurance to users. EVs also have a quieter and smoother driving experience, free from the vibrations and noise often associated with traditional

vehicles.

Amidst the challenges, there are unique advantages that EVs offer in the context of Bangladesh's urban landscape. With the country having a relatively low average daily commute, EVs emerge as an attractive proposition, offering an average mileage of 500 KM on a single charge and the convenience of home charging as three-phase electric lines are available in Bangladesh.

Mercedes-Benz, in alignment with Bangladesh's EV ambitions, is set to revolutionize the charging

infrastructure landscape. The company is planning to provide two 22 KW AC chargers with their EV for home and office use, complemented by a network of 21 charging stations across the country set to be launched in May, catering to intercity travel needs. Rancon Motors Limited the general distributor of Mercedes-Benz in Bangladesh aims to launch Mercedes-Benz EQ lineups in May, 2024. The models are EQS SUV, EQS Sedan, EQS SUV Maybach, EQE SUV, EQE Sedan, EQB. Rancon Motors Limited is also working on EQ charging stations setup nationwide for ensuring a great EQ experience ahead.

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The future is electric

Charting the global trends in the EV market

The electric vehicle (EV) market is experiencing a period of rapid transformation, with countries worldwide charting their course towards a more sustainable transportation future. This article delves into the key trends shaping the global EV landscape in 2024, highlighting the interplay between government policies, technological advancements, and economic factors.

Leaders charging ahead: Norway and China pave the way

Norway has emerged as a global leader in EV adoption, thanks to its unwavering commitment. Comprehensive government incentives, including tax exemptions, toll waivers, and extensive charging infrastructure development, have created a highly supportive environment for EVs. This commitment extends to a national goal of phasing out fossil fuel vehicles entirely by 2025. The results are undeniable: in 2023, over 80% of new car registrations in Norway were for battery electric vehicles (BEVs) and plug-in hybrids (PHEVs), showcasing a dominant market share for electric mobility.

China, the world's largest auto market, has also taken significant strides. Ambitious government policies, including quotas for electric vehicle production and sales, coupled with subsidies and tax breaks, have fostered a booming domestic EV market. China is now a global leader in EV manufacturing, with domestic car makers like BYD challenging established players.

Contrasting approaches in major economies: A multi-speed race

The United States presents a mixed picture. While states like California, with its stringent emission standards and generous incentives, boast a high EV market share, others lag behind. This disparity highlights the critical role of state-level policies in driving EV adoption. The federal government's recent move to prioritise the development of a domestic EV supply chain through targeted incentives in the Inflation Reduction Act signals a potential shift towards a more holistic approach.

The European Union (EU) has adopted a comprehensive strategy, combining regulations, incentives, and investments in charging infrastructure. Stringent emission targets for new cars and vans, coupled with support for innovation, are propelling EV adoption across member countries. The EU's focus extends beyond just tailpipe

emissions, with some countries like France considering the environmental impact of the entire EV production process when structuring incentives.

Germany, a traditional automotive powerhouse, has seen a steady rise in EV adoption. However, the government's recent reduction in financial incentives suggests a shift towards a more autonomous EV market. Local incentives and continued infrastructure expansion will be crucial in maintaining momentum.

The electric vehicle (EV) market is experiencing a growth spurt, leaving the internal combustion engine in the dust. After a record-breaking year in 2023, with global sales exceeding 1.5 million

incentives for EV purchases. This, coupled with high consumer uncertainty and economic headwinds, might lead to a temporary plateau in growth. However, this doesn't signal a slowdown in EV adoption. Analyst predictions from UBS suggest a shift in growth rates, with sales in Europe and the US expected to climb 10-15% in 2024, compared to the impressive 25-50% witnessed in 2023.

Legacy automakers like Volkswagen, Toyota, and Ford are scrambling to launch competitive EV models. However, their agility pales in comparison to pure-play EV manufacturers like Tesla, BYD, Nio, and XPeng. These companies are laser-focused on electric vehicles, allowing them to move faster and capitalise on technological advancements.

Traditional automakers face the additional challenge of navigating the transition from combustion engines to electric powertrains. This involves dealing with cost pressures and potential labour unrest as the workforce adjusts to new production methods. As a result, we've seen companies like Ford, GM, and Mercedes Benz scaling back production plans and revising their EV sales forecasts for 2023.

In contrast, Tesla has been able to cut production costs for its Model Y, currently on track to be the best-selling car globally in 2024, while maintaining higher profit margins than most traditional gasoline-powered vehicles. Additionally, China's BYD, having transitioned to solely producing EVs in 2021, overtook Volkswagen as China's best-selling car brand this year and is closing in on Tesla's global EV sales lead.

Chinese EVs accelerate global expansion

Having established a strong domestic market presence, Chinese EV manufacturers are setting their sights on international expansion to hedge against a potential economic slowdown at home. China boasts the world's fifth largest EV market share, trailing only Norway, Iceland, Sweden, and the Netherlands. However, its sheer size as the world's largest car market translates to a clear lead in total sales. In 2022, China accounted for a staggering 22% of global EV sales, which translates to 4.4 million units, far exceeding the combined sales of the rest of the world.

Looking ahead to 2024, global sales of electric, hybrid, and fuel cell vehicles are expected to reach 17 million units, with a significant contribution from China.



units by September, the industry is poised for a period of transformation in 2024. While the breakneck pace of growth might ease slightly, several key trends will continue to shape the EV landscape:

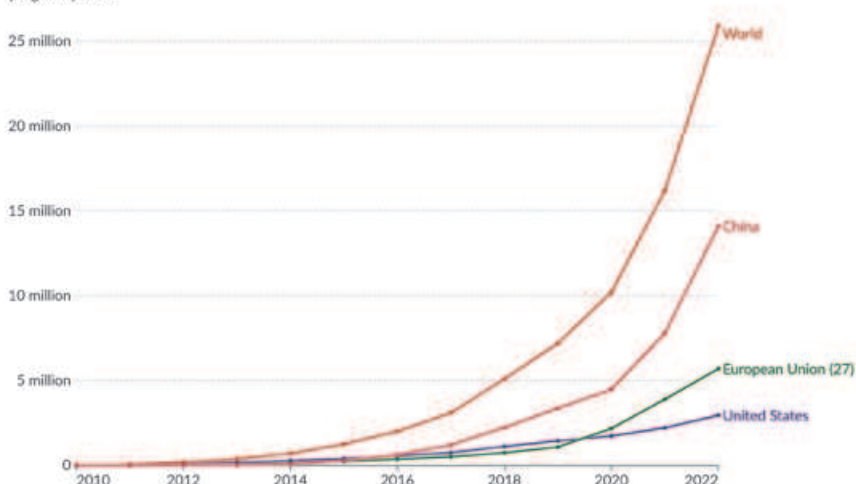
Slower growth, not stagnation

Having witnessed a surge in demand, the EV market is expected to experience a moderation in growth rates in 2024. This can be attributed to a few factors. First, the industry is looking to expand beyond early adopters and attract more price-conscious mainstream buyers. Several manufacturers implemented significant price cuts in 2023, with Tesla leading the charge by slashing prices on its Model 3 and Model S cars by 25%.

Secondly, some countries are phasing out financial

Electric car stocks, 2010 to 2022

Car stocks represent the number of cars that are in use. It is the balance of cumulative sales over time and the number of cars that have been retired or taken off the road. Electric cars include fully battery-electric vehicles and plug-in hybrids.

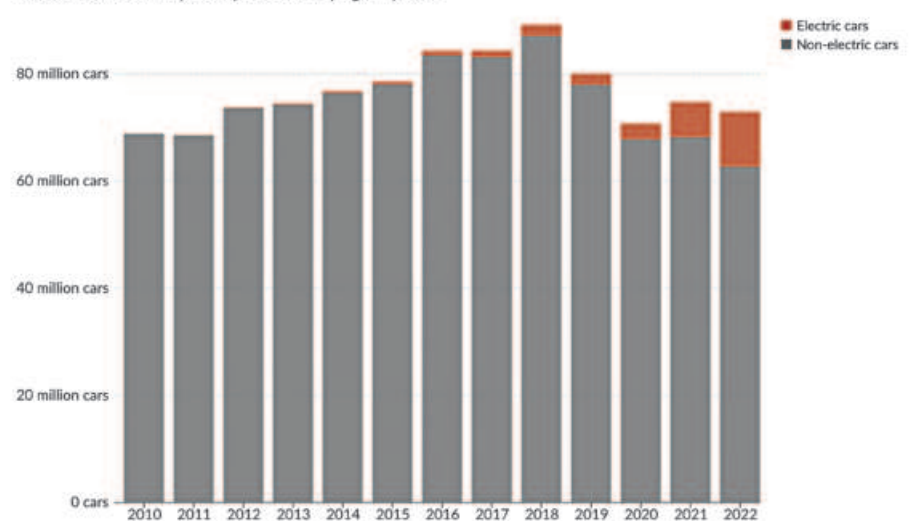


Data source: International Energy Agency, Global EV Outlook 2023.

OurWorldInData.org/energy | CC BY

Number of new cars sold, by type, World

Electric cars include fully battery-electric and plug-in hybrids.



Data source: Calculated by Our World In Data based on the International Energy Agency (2023)

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This strategic push for international expansion can be attributed to a few factors. Firstly, Chinese automakers lagged behind other countries in producing traditional gasoline-powered vehicles. However, they recognised the potential of EVs early on and invested heavily in battery production and EV development.

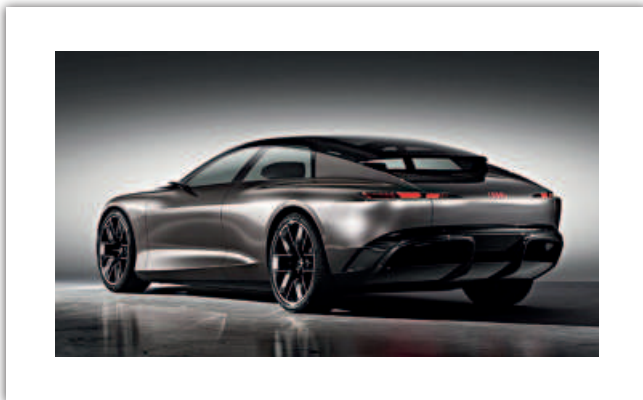
Secondly, the Chinese government actively supports EV adoption to reduce air pollution and dependence on oil imports. This translates to a resilient domestic EV market even amidst a broader economic slowdown. Finally, the "Made in China 2025" industrial strategy sets a goal for China's two largest EV manufacturers to generate 10% of their sales abroad by 2025. This ambitious target is driving a surge in international expansion efforts.

The battle for the electric truck market heats up

2024 will witness a fierce competition for dominance in the nascent electric truck market. Advancements in battery technology have finally made viable electric trucks a reality, boasting impressive range and towing capabilities. This has spurred major automakers to enter the fray with their offerings.

Tesla will finally begin mass production of its highly anticipated Cybertruck in 2024. Its angular design, powerful tri-motor drivetrain, and substantial towing capacity have captured the imagination of auto enthusiasts. However, the Cybertruck will face stiff competition from established players like Ford with its updated F-150 Lightning models, GM's Chevrolet Silverado boasting a 450-mile range, and GMC's Sierra pickup.

Ram is not backing down either, introducing a new electric pickup with a standard 168-kilowatt hour battery



pack offering a 350-mile range, with the option to upgrade to a class-leading 500-mile range.

Battery swapping as a potential game changer

One of the major hurdles to widespread EV adoption is the limited availability of charging infrastructure, particularly in non-urban areas. While there are ongoing efforts to expand traditional charging networks, battery swapping stations are emerging as a potential solution to bridge the gap.

This technology allows drivers to quickly replace depleted battery packs with fully charged ones, significantly reducing charging times. China's Nio has been at the forefront of battery swapping, establishing a network of over 2,000 stations across China and venturing into Europe with plans to expand further in 2024.

Recognising the potential of this technology, established automakers like BMW and Mercedes-Benz are collaborating to install a network of at least 1,000 battery swapping stations in China. Stellantis, another major player, has partnered with US-based Ample to introduce battery swapping for its Fiat 500e models in a pilot program scheduled to begin in Madrid, Spain, in 2024.

The widespread adoption of battery swapping, along with bi-directional battery charging that allows EVs to power homes or buildings, could significantly enhance the convenience and practicality of electric vehicles.

Shifting tides in battery chemistry

Battery swapping could also play a role in mitigating a short-term decline in driving range caused by a shift in battery chemistry. Most EVs currently use lithium-ion



batteries with a cathode made of nickel-based materials like NMC or NCA. While these offer higher energy density and longer range, concerns about volatile market prices and the environmental impact of sourcing the necessary metals are prompting a search for alternatives.

Lithium-iron-phosphate (LFP) batteries are regaining popularity due to their stability and lower reliance on critical materials. Additionally, companies are actively developing technologies for silicon anode, solid-state lithium-ion, and sodium-ion batteries. These advancements promise more stable chemistries with reduced reliance on nickel, cobalt, and graphite.

For instance, SK On Company, a South Korean battery manufacturer, is developing solid-state electrolytes with plans for mass production by 2028. Similarly, Toyota is collaborating with Idemitsu Kosan to establish a supply chain for solid-state electrolytes in the coming years.

Governments fine-tune incentives

With EVs becoming more mainstream, governments are re-evaluating their incentive programs. The US Inflation Reduction Act, for example, aims to bolster domestic EV production by offering tax credits only for vehicles with battery components sourced from North America. This is intended to reduce reliance on foreign suppliers and strengthen the domestic EV supply chain.

Australia is another example, with some states phasing out purchase incentives for new EVs due to price reductions by manufacturers. However, these funds are being reallocated to expand charging infrastructure, ensuring continued growth in EV adoption.

On the other hand, Thailand has extended its EV subsidies for consumers while reducing their value as the domestic EV market matures. This strategy aims to balance affordability with long-term sustainability. France is taking a unique approach by introducing cash incentives based on the environmental impact of a vehicle's entire life cycle, from raw material sourcing to manufacturing and disposal. This approach encourages the production of EVs with a lower environmental footprint.

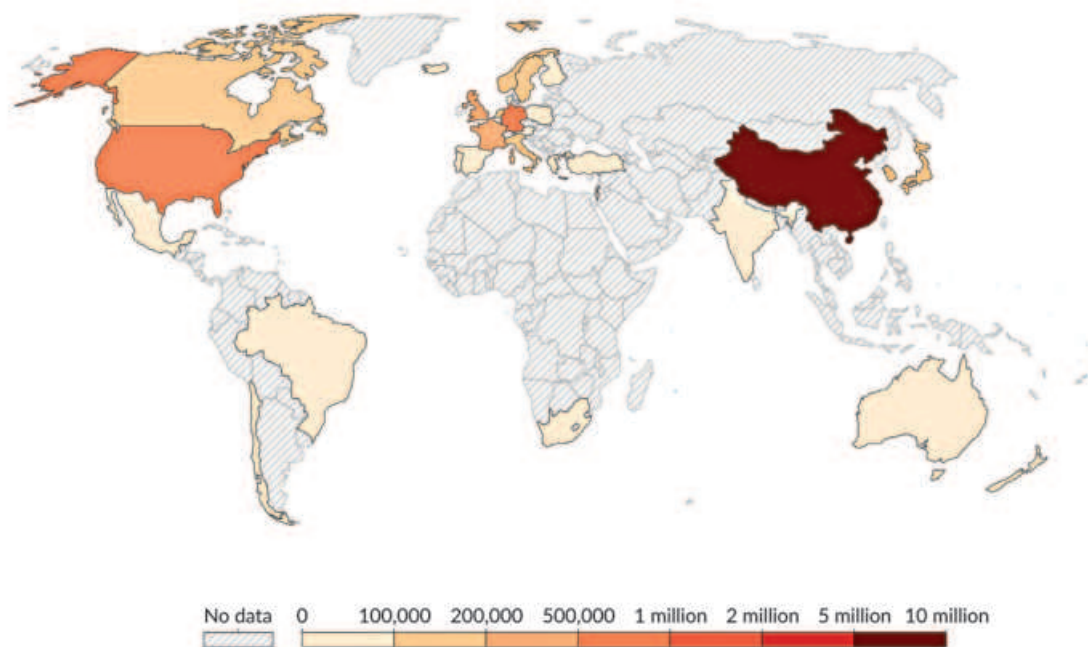
The road ahead

The year 2024 promises to be a period of significant transformation for the EV market. While growth rates might moderate in the short term, the underlying trend towards electric mobility remains undeniable. New vehicle models, government incentives tailored for a maturing market, and technological advancements in batteries and charging infrastructure will all play a crucial role in accelerating EV adoption and paving the way for a cleaner transportation future.

Number of new electric cars sold, 2022

Electric cars include fully battery-electric¹ and plug-in hybrids².

Our World in Data



Data source: International Energy Agency, Global EV Outlook 2023.

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1. Fully battery-electric: Cars or other vehicles that are powered entirely by an electric motor and battery, instead of an internal combustion engine.
 2. Plug-in hybrid: Cars or other vehicles that have a rechargeable battery and electric motor, and an internal combustion engine. The battery in plug-in hybrids is smaller and has a shorter range than battery-electric cars, so over longer distances, the car starts running on gasoline once the battery has run out.

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