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## ABSTRACT

Transportation is one of the means human beings use to move from one place to another. It can be used on land, water and air. Transportation technology has two kinds, namely, individuals who can accommodate 1-10 people and average can be bought by the community for example like motorcycles, bicycles and the most popular car because it is used by the entire society in the world. Group transportation that can accommodate dozens or even hundreds of people that are usually used as a general force like buses, trains or planes. With technological advances nowadays, transportation technology has undergone very rapid advances that typically use oil fuels can now be used solar fuels and especially electricity. Electricity is one of the fuels that can be replaced by gasoline. With the presence of electric fueled transportation technology, the problem can now be solved. There are a lot more positive impacts than the use of electricity-based transport such as no air pollution, less greenhouse effect, cleaner, and more efficient. Even today, there are some electric vehicles that are still mixed like the kind of electric cars that are mixed with gasoline like the Plug-in Hybrid Electric Vehicle (PHEV) and hybrid electric vehicle (HEV) but in the future it may not use gasoline fuel. Then the use of electric transportation will surely be much used in the future. According to data, electric car purchases in 2010-2022 are increasing to reach 10 billion buyers. The methods used in researching this initiation through search sites are Google, youtube and tiktok. What I discovered about how and where the transportation technology uses electricity is that, the use of this transportation gives us a lot of positive impact on using both the environment and ourselves to make it easier for us in carrying out work activities, education and above all moving elsewhere far or near. In the end, this electricity-using transportation technology is one of the key assets in tackling the adverse effects of using petrol-fueled cars that cause environmental damage as well as being a substitute for gasoline fuel in the present and future.

## **Table of Content**

**Introduction 1**

**How and where the technology is being used 2**

**Issues on the technology regarding its usage including pros and cons 7**

**Analysis Should be able to explain the usage trending, comparison and reasoning 10**

**Conclusion 12**

**References & Appendix 14**

## **1.0 Introduction**

Vehicles are a very important and needed means of transportation at this time. In the era of rapid technological development, there are alternatives to power generation in vehicles, one of which is electricity. Although today vehicles use the fuel known as combustion engine vehicles, many companies have begun to switch and develop vehicles using electric energy. (electric vehicle).

The growth of transport in the world today is very rapid, be it air, sea, or land transport, especially in the automotive sector. The most important role of transportation lies in economic activities, delivery of goods, transportation, and so on. It will be able to run smoothly if supported by safe, comfortable transportation, and can function as it should. Its function is because transport is a means of human mobility in support of survival. Generally speaking, the function and utility of transport can be used to help one either individually or in groups to its means and purpose. As time passes and people's needs become more complex, the means of transport are starting to pose problems, namely in the availability of the amount of fuel available at the moment.

So more than that, many vehicle manufacturers in the field of transport that create energy-efficient vehicles don't even use "oil fuels", but with technologies like sulrya energy, electricity, and so on. Designing or designing an energy-efficient vehicle is a product that will be developed in the modern world to create a vehicle free from air pollution. The development of electric cars today is crucial because in these days the price of fuel has begun to disrupt constantly. The existence of global warming also makes humans think about how to deal with this problem. The electric car is a step that is "one day two or three years past" meaning through electric cars the energy crisis of fossil fuels and environmental pollution can be overcome with the presence of these electric cars.

An electric vehicle is a vehicle that is powered by an electric motor and uses electric energy stored in a battery. The advantage of using electric vehicles does not lead to air pollution and simpler engine construction. As we know, there are so many kinds of vehicles that use electricity to be the energy that drives vehicles like trains, motorcycles, buses, cars and so on. The most outstanding of these electric vehicles is an electric car. The vehicle was first introduced by Robert Anderson of Scotland in 1832-1839, but at that time the price of oil fuel was relatively cheap so that the world's people tended to develop fuel-fueled fuel engines. In addition, environmental issues that are of global concern are focused on Education for Sustainable Development. (EfSD). This gave rise to the idea of replacing fossil fuels in transportation systems with electricity, thus reviving the development of electric cars.



## **2.0 How and where the technology is being used**

In this modern age, transportation technology is now increasingly advanced and of course very much needed by humans in traveling anywhere else now has been created a means of transportation that does not use oil fuel but uses electricity as energy to move a vehicle. Self-transportation as we know transportation technology is a vehicle used by humans using oil, solar or electric fuels in the air, land, or sea sectors for the purpose of traveling long distances, accelerating time efficiency as well as, being part of that job. (example like grab or cru of the ship).

Nowadays we can see in our surroundings that humans use transportation that uses electricity both in the form of transportation used individually and in groups.

Individual types of transport can usually accommodate 1 to 8 people in a single vehicle while group transport can accommodate tens or even hundreds of people. Examples of transport forms used individually such as cars, motorcycles, bicycles, and so on while in groups such as airplanes, trains, buses. Drivers who use fuel like cars and motorcycles on the grounds they like it because of their own hobbies.

### **2.1 How and where the technology individual transportation being used**

As explained above, transportation technology using individual types of electricity can only transport 1 to 10 people. This type of transportation can be purchased by the community at varying prices. This transportation is usually used on highways like cars and motorcycles while electric bikes can only be used on small roads.



Electric car example

**As information electric cars have 4 types:**

**1. Battery Electric Vehicle (BEV)**

This type of car is also known as AEV (all-electric vehicle), a vehicle that operates entirely using electricity in the battery. (ICE). The power is stored in the battery pack. The battery is charged by connecting it to an external power grid.

**2. Hybrid Electric Vehicle (HEV)**

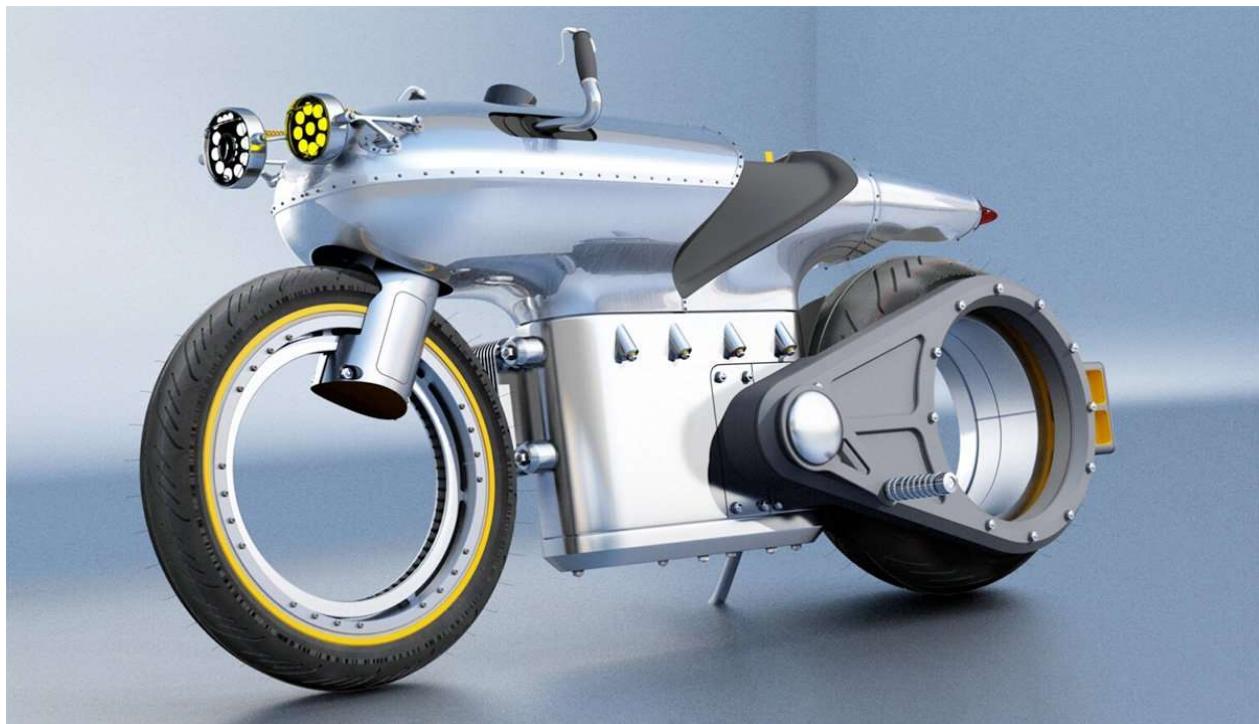
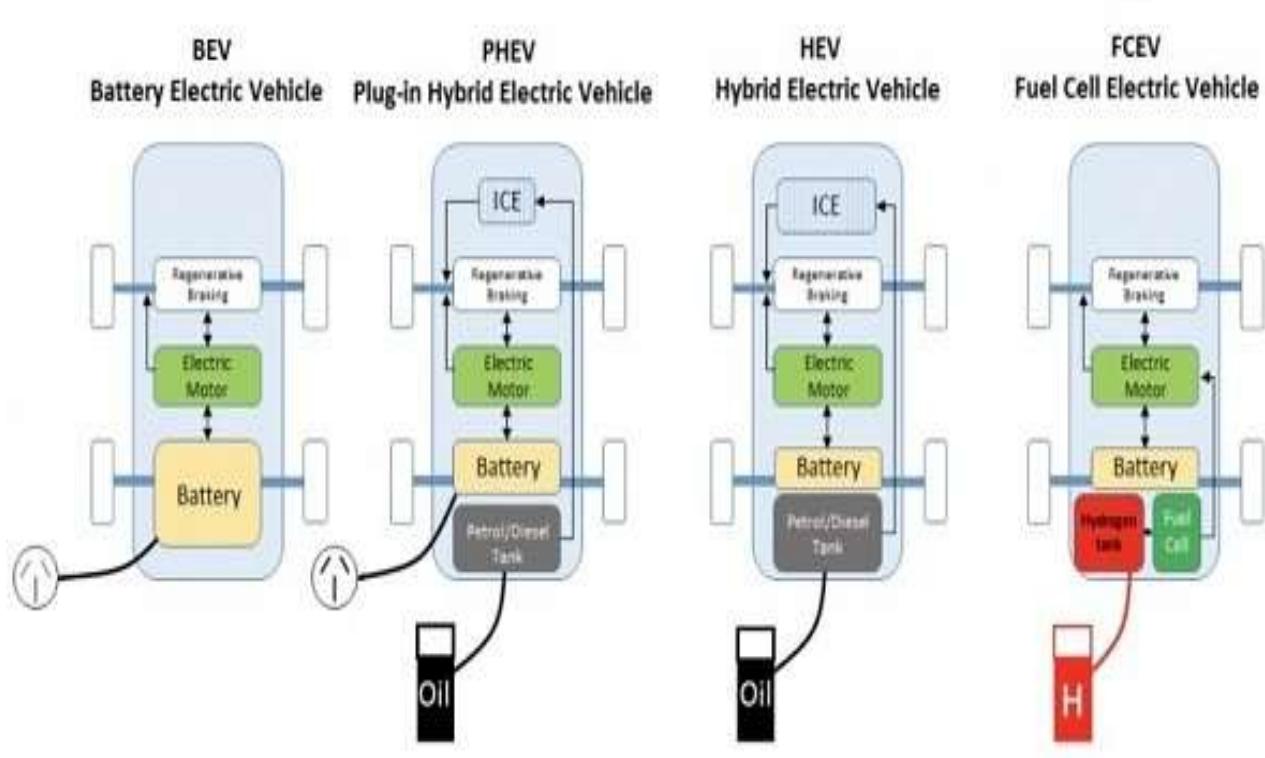
This type of electric car is also called a standard hybrid or parallel hybrid. The HEV electric car has two propulsion systems, the combustion engine (ICE) and the traction motor. The ICE gets energy from the fuel. The motor gets power from the battery. For the way this HEV electric car works, both the engine and the motor can rotate the gearbox moving the wheel at the same time.

**3. Plug-in Hybrid Electric Vehicle (PHEV)**

The type of electric vehicle PHEV is a type of hybrid that has a combustion engine (ICE) and an electric traction motor. This type of car can be powered by fossil energy sources (such as gasoline) or alternative sources (like biodiesel) and by batteries. PHEVs can usually operate in at least two modes namely all-electric mode where only electricity is on the battery as the energy drives the car and hybrid mode where electricity and gasoline are used simultaneously.

#### 4. Fuel Cell Electric Vehicle (FCEV)

The type or type of electric vehicle FCEV is also known as a Fuel-Cell vehicle (FCV) or zero emission vehicle. FCEV uses hydrogen as a source of energy to generate electricity from a fuel cell system. Electricity is used to activate the motor driving the vehicle.



electric motorcycle example

**As information electric motors also have different types of engines**

### **Single electric motorcycle**

1. A DC motor is a type of electric motor that uses a directional current. This motor consists of a rotor and a stator. When the electric current is delivered through the curves on the stator, the magnetic field generated will affect the rotors and make them rotate.
2. AC motor is an electric motor type that uses reverse current. This motor also consists of a rotor and a stator. When the electric current is rotated through the curves of the stator, a magnetic field that changes directions regularly affects the rotor, causing it to rotate.

### **Two-phase electric motor**

- 1.Synchronous motor is a type of two-phase electric motor used to produce constant and synchronized motion with the magnetic field on the stator. This motor is usually used in applications that require constant speed, as in the manufacturing industry.
- 2.Aynchronous motor is the most commonly used type of dual-phase electric motor. This engine works by rotating the magnetic field on the rotor based on the difference in speed between the magnetic field of the stator and rotor.

### **Three-phase electric motor**

1. Induction motor type three-phase electric motor is widely used in a variety of industrial applications. The two-phase synchronous motor also uses the magnetic field that rotates on the stator, but the speed of the rotor is always constant and synchronized with the frequency of the supply voltage. The three-phased sync motor is usually used in applications that require constant time precision and speed.

### **Special electric motor**

1. Stepper motorcycle is the type of electric motorcycle used to control the right angle movement.
2. Brushless DC motorcycle is a type of electric motorcycle that uses permanent magnets on the rotor and eliminates the use of brushes and switches. These motorcycles have advantages in efficiency, long life, and low maintenance.
3. Linear motorcycles are a type of electric motor that produces linear motion. The motorcycle combines the principle of electromagnetic with linear mechanisms to produce forward-facing motion.

## **2.2 How and where the technology in groups transportation being used**

As we know, group transportation using electricity can accommodate about tens to hundreds of people in one transportation and can be used in various sectors both land, sea and air. Usually people can buy a private plane or a private boat, while buses, trains, planes and ships are used for public transportation.



buses electric example

Electric buses work like electric cars. The electric bus is connected to the power grid to be charged, and stores electricity in the battery. (It's usually on the roof.). The battery drives the electric motor. Because an electric motor has fewer parts than an internal combustion engine, the maintenance is less. When the batteries run out, the bus is recharged at the charging station. (which takes an average of 4 hours with a 150 kW charger). Since the bus operates on a regular route, scheduling a recharge schedule is a fairly easy planning exercise. Depending on the size of the bus and factors such as traffic conditions, a bus can travel an average distance of 200 kilometers (124 miles) with one charging during the first year of operation.



example Hybrid electric aircraft

Hybrid electric planes are similar to hybrid electric cars because they use a combination of batteries and flight fuel. This plane uses a battery as a power source when taking off and landing. Taxiing to the runway just by using electricity can also save a lot of fuel and reduce local emissions at the airport. There is an optimal point between the extra weight of the battery and the amount of electricity that can be used to get the benefits of clean fuel. The hybrid aircraft will still burn fuel during the flight. However, this amount of fuel would be far less than relying entirely on just jet fuel.

### **3.0 Issues on the technology regarding its usage including pros and cons.**

Motor vehicles today mainly use non-renewable fossil fuels. The more motor vehicles, the more fossil fuel is used. Fossil fuel motor vehicles contribute to the greenhouse gas emissions trapped in the Earth's atmosphere. According to the World Wide Fund, in 2009, the transport sector accounted for about a quarter of the total greenhouse-gas emissions in the earth's air. Based on its own statistics, energy consumption in Indonesia's transport sector in 2007 was 29% and increased to 47% in 2017. The transport sector produced 1.28 million tons of emissions with an average increase of 6.7% per year.

Fossil fuels contain biochemicals and are the result of formation and decomposition over millions of years that then melt and generate energy for coal, petroleum, and gas. Due to their long and non-renewable processes, fossil fuel supplies are limited so long-lasting that they will be exhausted. The negative effects of the use of fossil fuels are to increase the pollution of the air in the form of toxins in free radicals, cause acid rainfall, cause soil and water environmental contamination, endanger the health of miners, affect global warming, and affect extreme climate change.

Fossil fuels also have several advantages, including that they can generate large quantities of electricity, are easier to find, are economical, and are a major supporter in sectors ranging from industrial to economic.



Nowadays, an alternative to fossil-fuel motor vehicles is emerging, which is an electric car. Electric cars will solve the environmental problems caused by fossil fuels, but the transition from fossil fuel to electric cars is not that easy and fast. Massive adaptation and socialization are needed to succeed in reducing greenhouse gas emissions.

**IntelliPaat**

## **Advantages & Disadvantages of Electric Vehicles**

An illustration of a yellow car with a black charging cable connected to its front. In the background, there are three white wind turbines with blades in motion, set against a purple sky with white clouds.

### **Advantage**

Here are some of the main reasons why electric cars are better than fossil-fuel motor vehicles. First, the electricity's getting cleaner. It means that using electricity as a primary material does not leave any dirty traces on the engine. Electricity can also be a clean and sustainable energy when using renewable energy sources. Secondly, electric motor vehicles are more efficient than fossil-fuel motor vehicles. For more than 100 years to this day, the engines used by fossil-fuel motor vehicles, only about 12-30% were used and managed to move wheels and other functions. Meanwhile, about 70-82% of the remaining are burned in the process that generates greenhouse gas emissions.

One of the other advantages, electric vehicles are more efficient than fossil-fuel vehicles. Fossil-fueled cars typically convert only 12%-30% of the energy generated from fuel combustion, then the remaining energy will be lost through mechanical processes or converted to heat. Electric cars are said to be much more efficient as they can use about 80% of the energy provided by lithium batteries in motion. This is because electric cars have fewer spare parts and there are regenerative braking features, which is a system that allows the kinetic energy used during braking to be reused.

Electric cars use lithium batteries to store energy, then electric energy is converted into mechanical energy by the part of the electric motor without the need for a combustion engine so there is no knock-out on the electric vehicle.

Using fossil-fuel cars requires expensive charges to recharge fuel at a public fuel filling station. Meanwhile, the costs required to charge electric cars are more affordable and can be done at their own homes or at public electric vehicle charging stations.

Unlike fossil-fuel cars, electric cars also tend to produce small noise when moving on the streets. It's different from the noise of fossil-fueled vehicles that are noisy and become environmental noise pollution. The noise pollution generated by vehicles can affect the health and stress conditions of road users.

### **Disadvantage**

Of all the advantages and disadvantages, there are also the drawbacks of electric cars. Its use of reducing the level of pollution is right. However, it only applies if used on the road. (sedang digunakan). Electric cars continue to contribute to air pollution from sources and elsewhere. A flashback to the process of generating electricity that requires fossil fuels, i.e. coal. This means that if electric cars are being used more and more then more electricity is needed so that more fossil fuel is needed to generate that electricity. Therefore, it requires energy sources that are also environmentally friendly such as solar panels, wooden turbines, and nuclear.

The pollution caused by electricity sources, is borne by the village community because of the industrial location that is in the village. The batteries used by electric cars also have age limits. If the deadline is exceeded, it will have to be replaced with a new battery, which means that the old battery that has not been used has to be discarded as electronic garbage and becomes an environmental problem. According to the International Council of Clean Transportation (ICCT), 99% of used batteries are recycled in the United States. However, only 5% were able to recycle the lithium in the batteries. The rest, collected, burned, and dumped at the trash. It's very unfriendly to the environment.

The preparedness of some countries in developing and using electric vehicles is currently not fully prepared due to infrastructure. There are several aspects to be taken into account in the use of these electric vehicles, such as battery modeling, battery charging ports, to battery charge requirements to fit the driving profile of the community. On the other hand, if the use of these electric vehicles is used massively in a country, this leads to an increasing demand for electric resources to be used as power to run electric vehicles that will be one of the difficult challenges is the addition of electric power.

#### **4.0 Analysis Should be able to explain the usage trending, comparison and reasoning.**

In today's modern age, people must be very confused between buying an electric car or a petrol car by weighing things like the price of a vehicle, the cost of traveling, about CO2 emissions and driving experience. Here's the comparison

##### **1.Buying Cost**

One of the obstacles to the growth of the electric vehicle market is the sharp range of electric cars compared to petrol cars. It tends to be more expensive due to two main reasons: the average cost of battery manufacturing, and the fact that this technology is still fresh in the automotive market. Battery companies are working hard to reduce costs that will make EVs more accessible and attractive to consumers. However, for now, buyers need to buy more for EVs than petrol vehicles.

##### **2.Running charges**

Electric cars don't need fuel because they run on electricity, which is cheaper than fuel. In Malaysia, the price of electricity required to charge an electric vehicle is almost 40% lower than the fuel price required for a vehicle of the same size to travel the same distance. You can charge an electric car all night by installing an EV charging unit in your home garage instead of going to a gas station. However, for fast charging, you can use the public charging stations available in the nearest area that can charge up to 80% in an hour.

##### **3.CO2 emission**

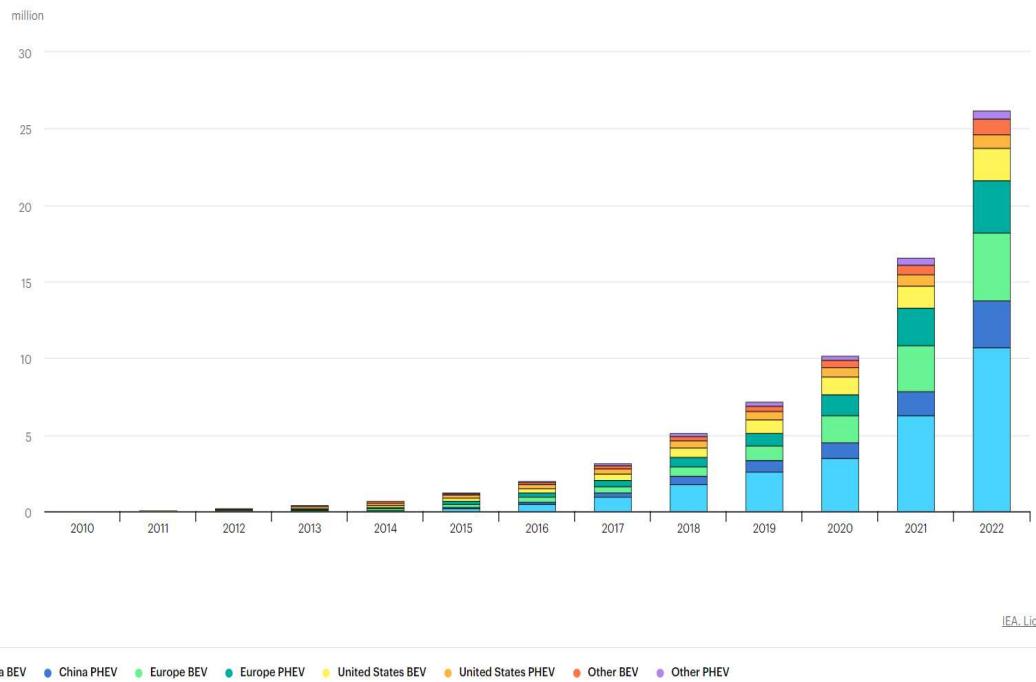
Petrol cars are powered by internal combustion engines, which consume fuel to generate power and release harmful gasses like Carbon Dioxide, Carbon Monoxide, and Sulphur Dioxide. These gases are not only harmful to nature but also the human body. A great demand to address these growing emissions has made electric vehicles more attractive in comparison to petrol cars. The former does not use any kind of fuel to generate energy. Instead, they are fitted with an electric motor, which converts the electrical energy from a battery to rotate the wheels. Thus, there are no emissions, which means electric cars are better for the environment as well as our health.

#### 4. Driving experience

EVs offer a smoother and silent driving experience with electric motors as the only moving parts. The battery delivers energy to these motors, which further led to high torque and quick acceleration. On the contrary, energy processes through gears, clutches, and the engine in the case of the petrol car. The contact of these parts creates sound waves which can be felt as vibrations in the car's cabin. By opting for an electric car, you can enjoy a vibration-free driving experience.

At the moment also, sales of electric cars, including battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs), exceeded 10 million years ago, up 55% compared to 2021. In five years, from 2017 to 2022, EV sales rose from about 1 million to more than 10 million. Previously, it took five years from 2012 to 2017 for sales to grow from 100,000 to 1 million, highlighting the exponential nature of electric vehicle sales growth.

The increase in sales pushed the total number of electric cars on the world's roads to 26 million, an increase of 60% compared to 2021, with BEVs contributing more than 70% of total annual growth, as in previous years. As a result, about 70% of the global electric car stock in 2022 is BEV. Sales growth from 2021 to 2022 is as high as from 2020 to 2021 in absolute terms – up 3.5 million but relatively lower growth. (sales doubled from 2020 to 2021). The remarkable boom in 2021 can be explained by the EV market that catches after the coronavirus pandemic. (Covid-19). Compared to previous years, the annual growth rate for electric car sales in 2022 was similar to the average rate in 2015-2018, and the annual rate of growth for global electric car stocks in 2022 is similar to that in 2021 and the 2015-2018 period which shows a strong recovery from EV market expansion to pre-pandemic rates.



## 5.0 Conclusion

In conclusion, a means of transport is a vehicle used for transportation from one place to another. Currently, transportation is divided into two categories: transportation for individuals that are technically purchasable and have a capacity of 1 to 10 people depending on the means used, such as cars, bicycles and motorcycles and group transportation that is usually transported for the public that can load in loads or hundreds of people such as ferries, aircraft and buses.

Nowadays, a lot of technology is being developed by humans to make work easier, entertainment communications and so on, such as the development of mobile phones, AI, robots, VR and not forgetting the means of transportation. transportation has been developed with the use of electric fuels as a driving force to reduce fuel consumption. Although the use of fuel vehicles in this era is still a lot, in the future more electric vehicles will be used both in the land, sea and, of course, the air sector with better engine engines. The use of these electric vehicles can have a lot of positive impact on the environment such as reduction of carbon emissions, more energy saving, do not cause air pollution and so on.

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This is an example of a train to the klia that uses electricity.



This is an example of a public transport bus that uses electricity.

