Automobile newborn - new energy vehicle

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Abstract. With the environmental pollution, energy shortage, the environment on the
traditional fuel car carrying capacity is becoming smaller and smaller, and the new energy car
in life is becoming more and more important. This paper mainly describes the classification of
new energy vehicles as well as their advantages and disadvantages, and puts forward the
corresponding improvement methods.

1. The introduction
Recently, the fuel of cars is mainly oil, and the large amount of burning of oil and other fuels leads to
increasing environmental pressure, which brings great inconvenience to people's life. Air pollution,
haze and greenhouse effect have been common occurrences in life, and are slowly threatening people's
life and health. In addition, the excessive exploitation of petroleum, coal and other disposable energy
makes the world less and less [1]. Under the situation, the development of new energy vehicles must
conform to the scientific concept of "green travel, scientific environmental protection".

2. Classification of new energy vehicles
Many people think that new energy vehicles are pure electric vehicles, only charging cars can be
counted as new energy vehicles, which is actually a wrong idea. There are many classifications of new
energy vehicles. The following paragraphs will introduce the classification of new energy vehicles in
detail.

2.1. Pure electric vehicles
The main source of power for pure electric vehicles is the operation of electric motors in rechargeable
batteries. Rechargeable batteries as long as nickel cadmium, nickel hydrogen batteries, lead acid
batteries and lithium ion batteries and other new batteries. Pure electric vehicles have almost zero
pollution and no noise to the environment, giving riders a more comfortable feeling [2]. Simple
structure, no traditional car with complex transmission parts, maintenance is very convenient.

Although pure electric vehicles cause less environmental pollution, they also have many problems,
such as long battery charging time, high battery cost and short driving distance. So at present, such
new energy vehicles can only be used in small public places such as tourist attractions. The gap
between pure electric vehicles and the expected ideas is still large, and countries are making efforts to
produce pure electric vehicles with low cost and environmental protection.

2.2. Hybrid electric vehicles
Hybrid electric vehicle is mainly the internal combustion engine and engine as a source of power, the
main drive system by at least two can run at the same time of a single drive system combination of the
car. Under different working conditions, the driving system works in different ways, which can be divided into the following types: 1. When the car starts or stops, the motor is mainly used to control it, so that the car can run stably, make little noise and save energy [3]. When working under rated conditions, the fuel engine provides the power source, which can not only increase the stability of the car running, but also can charge the car's battery. 3. When the car is running under overload, the fuel engine and the electric generator work in coordination, which can reduce the energy consumption to the greatest extent.

Hybrid electric vehicles are mainly divided into conventional hybrid electric vehicles and plug-in hybrid electric vehicles. The biggest difference is the battery capacity. The battery capacity of ordinary hybrid electric vehicles is relatively small, and the battery is mainly used for auxiliary power, such as starting and accelerating supplementary power. Such typical representatives are Toyota prius, CT200h, camry and zun. The plug-in hybrid electric vehicle battery capacity is relatively large, not only can be used as auxiliary power, but also in the case of the car without gasoline, the battery can provide power for the car, so that the car can continue to move forward. Such as BMW i8, byd qin, byd tang, porsche 918 and so on. Conventional hybrid cars do not require an external power supply, while plug-in hybrids require an external power supply to charge the battery in a timely manner when the battery is dead.

Hybrid electric vehicle (hev) is the main research direction of new energy vehicles at the present stage, and it is also a kind of comprehensive promotion in the current market. The research on hev in various countries around the world has been very in-depth, and remarkable results have been achieved. In Japan and the United States in particular, many car manufacturers have put a lot of hybrid cars into the market. Research data show that, worldwide, the sales volume of hybrid electric vehicles in Japan has exceeded 10%, while the sales volume of hybrid electric vehicles in the United States has reached 300,000 [4]. In terms of the sales volume of hybrid energy vehicles sold in recent years, it has been showing a steady growth trend, with an average annual increase of up to 5%. As can be seen from Table 1, in September 2018, the year-on-year growth of plug-in hybrid electric vehicles was 122%, becoming a new force in the new energy vehicles. This fully shows that modern people's demand for and understanding of hybrid electric vehicles is also deepening, and hybrid electric vehicles have been recognized by people. With the increasing proportion of hybrid electric vehicles in the number of cars, it can effectively reduce the use of oil resources, thus effectively reducing pollution. It should be noted that this kind of new energy vehicle is only a transitional product, which requires researchers to integrate previous operation cases and exploration experience to analyze various problems in hybrid electric vehicles, such as short application time of battery storage and ineffective energy control technology.

| New energy vehicle type | On September | Year-on-year growth | Year-over-year cumulative growth |
|------------------------|-------------|---------------------|----------------------------------|
| Pure electric vehicle  | 8.4         | 83.5                | 67.8                             |
| Plug-in hybrids        | 2.7         | 122.0               | 155.8                            |

Conventional hybrid cars at the beginning of the new energy vehicles development played an important role, but unable to separate from the engine to use, energy saving effect, at the same time as the gradually improvement of the charging infrastructure and more energy-efficient the rapid development of plug-in hybrid electric vehicle, slow development of conventional hybrid cars, with some countries and regions have such a car as the traditional fuel vehicles, no subsidies and preferential policy, make the conventional hybrid cars in a tough position. However, the body structure of plug-in hybrid electric vehicles is relatively complex. After the common points of pure electric vehicles and fuel oil vehicles are obtained, the corresponding configuration setting will be more troublesome. Therefore, the cost of plug-in hybrid electric vehicles is higher than that of pure
electric vehicles and fuel oil vehicles. Because the plug-in hybrid is based on hybrid upgrade version, so the system optimization of the reserve also must with the match, but at present the related hybrid scheme, most of the power system composition is not reasonable, the core of auto parts and components, technology is also not enough "excellent", the late high and space for development.

2.3. Fuel cell electric vehicles
As long as the main energy source of fuel cell is hydrogen, methanol, natural gas, gasoline, etc. and oxygen in the air, the fuel cell will not affect the surrounding environment as long as it is burned in the battery to generate electric energy. At the same time, the fuel cell can timely supplement the energy under the circumstance of insufficient energy. This is similar to traditional car fueling. Nowadays, many cities in China have made plans to convert buses and taxis into hybrid and dual-fuel power [5]. Proton exchange membrane fuel cell (pemfc) is considered to be the most suitable fuel cell for automobile due to its relatively low operating temperature, rapid start-up characteristics and high efficiency, as well as the advantages of reusable residual heat, quick fuel replenishment, durable and reliable operation and convenient fuel acquisition [6].

However, it is difficult to remove heat from fuel cell reactor at low temperature, especially in high temperature environment. When the parking temperature is lower than the freezing point of water, cold start will occur, which has constraints in terms of price and technology, such as high cost of fuel cells, difficult to directly use hydrocarbon fuel, and immature hydrogen storage technology. According to the investigation and research, the hydrogen storage technology is the most serious problem. Not to mention the large amount of hydrogen energy consumed in the storage, the safety hidden danger of the storage technology in the introduction of electric vehicles is also the focus of researchers. Superior of reserve if not, then have a large number of hydrogen car is equivalent to a mobile bomb, the drivers and pedestrians, surrounding environment have great influence [7]. Transportation requires the use of special transportation vehicles, and these special transportation vehicles are quite expensive, which leads to the fact that the natural gas dual-fuel vehicles are usually only suitable for the use in regions rich in natural gas, and the application in other regions is quite a bit of a loss [8]. Fan to its gas, the need for more gas stations, and natural gas station construction costs are high. At the same time, it can be seen from the above exploration that the development of fuel cell electric vehicles is affected by various factors, so researchers need to do a good job in the investigation, and update the technical research in combination with the experience summarized in the past.

2.4. Solar car
Solar cars, by definition, use solar cells to power cars. Compared with traditional cars, solar cars are truly zero pollution cars. Solar energy is an inexhaustible clean energy. Wherever there is sunshine, the sun's energy can do its work. Solar energy is to use related equipment to collect the energy of solar radiation, and convert it into electric energy, and use it as the power of car, which is the power principle of solar car. In the conversion process, no matter it is to produce energy or to use energy, it will not cause any pollution, and it is a car that USES clean energy [9].

Solar electric vehicles replace oil with photoelectricity, which can save limited oil resources. Without using fuel, they will not emit pollution gas into the air. No pollution, no noise because the solar car has no internal combustion engine, the noise in the driving can hardly be heard, greatly improving the comfort of the driver. Solar electric vehicles consume less energy, only need to use 3 ~ 4 square meters of solar cell components can make the solar electric vehicles run up. In the process of energy conversion, fuel cars should follow the carnot cycle to do work, and the thermal efficiency is relatively low. Only about 1/3 of the energy consumption is used to push the vehicle forward, and the remaining 2/3 of the energy loss is on the engine and drive chain. The heat transfer of solar electric vehicles is not limited by the carnot cycle, and 90% of the energy is used to propel the vehicle forward. At the same time, solar cars do not need electronic ignition, shift gear, clutch, just pedal to accelerate the pedal can start, for many hands and feet coordination ability is not good, simplify the complexity of driving, to avoid the accident caused by operational errors. Solar electric vehicles have no internal
combustion engine, clutch, gearbox, transmission shaft, radiator, exhaust pipe and other parts, with simple structure and lower manufacturing difficulty [10]. Although solar cars have many advantages, the conversion efficiency of solar panels on the market is only 20% and the manufacturing cost is very high. Some solar panels will produce pollutants in the manufacturing process, which has had a significant impact on the environment. Solar radiation also has a great impact on the efficiency of solar cars, in the haze, rain and other bad weather, solar cars can not walk. Practical solar car except driving speed is far lower than fuel cars, can not support high-speed operation.

3. Optimization methods of new energy vehicles

3.1. Improve the development of professional core technical personnel and accelerate the research and development of core technology

The research and development of new energy vehicle technology cannot be separated from high-level talents, and technical problems have become an important factor restricting the development of new energy vehicles. Therefore, according to China's current national conditions, it is important to cultivate a group of talents with foreign technologies. Cultivating excellent talents is the mission entrusted to us by The Times and the key to mastering advanced core technologies. The development of new energy vehicles should not be rushed, especially in the field of technology. This is not conducive to the long-term development of enterprises, but also to the development of the new energy vehicle industry will lay a hidden danger. Among them, the core component battery of new energy vehicles is crucial. It is necessary to increase the investment in the research and development of the core technology of new energy vehicles, integrate domestic research and development resources, break through the technical bottleneck in power batteries, core components, electronic control technology, lightweight, intelligent and other aspects, and continue to increase product development efforts to meet consumer demand. While strengthening the development of new energy vehicles, the existing fuel oil vehicles can be optimized in terms of energy saving and emission reduction [11].

3.2. Government departments should increase support for new energy vehicles

On the one hand, according to the market demand of new energy vehicles, government departments formulate relevant technical standards in combination with domestic and foreign technical standards, and provide financial support for some researches on public foundation and technology. On the other hand, since the development of new energy vehicles is a technological revolution, the government should do a good job in related risks and industrial fund investment. In addition, in addition to providing financial subsidies for new energy vehicles, we should also reduce taxes, actively guide enterprises to increase investment in new energy vehicle technology, and constantly improve the performance of key technologies and parts, while optimizing measures for new energy vehicles to enter the market.

3.3. Improve the development of charging facilities

First, it is necessary to improve relevant standards and regulations, strictly implement the national charging facility technology and standards and regulations, and achieve compatibility and interoperability of charging equipment from different manufacturers and different brands. Second, strengthen the supporting power grid services, do a good job of supporting power grid access services; Third, increase the support from the policy, through the development and reform commission to formulate a new round of charging facilities subsidy policy, maintain the original subsidy, to charge and exchange equipment to give 30% of the subsidy, the operation link to increase the dedicated, common charging facilities to give subsidies; Fourth, intensify the research on the parking problem of new energy vehicles and gradually reduce the charging cost. It also improves the charging speed of the battery. Fifth, adhere to the principle of moderate advance, scientific planning and layout of charging infrastructure construction, to provide basic guarantee for the use of new energy vehicles.
3.4. Actively explore and develop new energy
At present, China's energy vehicles are mainly driven by pure electric power. Pure electric vehicles need to be charged. In the conversion process, electric energy not only causes indirect environmental pollution, but also consumes a lot of energy. The development of new energy can start from the aspect of the battery, the development of fuel cells, fuel and oxidant in the chemical energy directly into electricity generation device. Secondly, the hydrogen vehicle technology can be developed by using water resources to make full use of the characteristics of high calorific value, clean and pollution-free hydrogen and high energy conversion rate, take the proton battery car mentioned above. Finally, nuclear energy vehicle technology will also be one of the important development directions of China's future new energy vehicle technology [10]. We need to achieve coordinated development in various ways and keep breaking through technical difficulties.

3.5. Pay attention to the research and development of auxiliary energy recovery technology
Cars consume a lot of energy during braking, and we can develop an energy recovery technology that greatly reduces the energy consumption of cars. In addition, the air flows extremely fast when the car is moving at high speed. We can also develop the technology to generate electricity by using the air velocity. No matter what kind of energy recovery technology is adopted, its ultimate goal is the renewable utilization of resources, and environmental protection is the eternal topic of sustainable development.

4. Conclusions
New energy vehicles are the most important change in the development of automobile technology. For us developing countries, they are both opportunities and challenges [11]. In question, the power of the combination of government and enterprises, to develop the automobile industry technical standards, increase financial input, breakthrough technology, to actively explore new energy of environmental protection and energy saving, cost reduction, strengthen the cultivation of professional and technical personnel, efforts to expand the market, so that China's new energy automotive industry continually development, raise the competitive power of our country

During the development of new energy vehicles, there are contradictions and problems in price, technology, policy and business model. For these problems, the state must proceed from the overall situation in the long run, earnestly strengthen unified planning, avoid disorderly competition, low level of repeated investment and construction, guide and support the healthy development of new energy vehicles, as soon as possible to achieve core technology research and development and business model breakthroughs, in order to make greater contributions to environmental protection work.

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