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Emissions of Chinese New Energy Vehicle and the Development Recommendations

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Abstract

In this paper, by analysis of emissions throughout the life cycle of new energy vehicles, pointing out that new energy automobile emissions is not only arising in its using process but also including emissions from its production process. Finally concluded that China's development of new energy vehicles is inevitable, but it should be strictly controlled of critical emissions during its life cycle.

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Keywords: new energy vehicles; emissions; suggestions;

1. Introduction

United Nations Development Programme (UNDP) put new energy into the following three categories: large and medium hydropower; new renewable energy sources, including Small-hydro, Solar, Wind, Modern biomass, Geothermal, Ocean (tidal energy); traditional biomass.

Conventional energy means technically more mature and has been large-scale used energy. New energy usually refers to small-scale used energy under research and development. Therefore, coal, oil, natural gas and hydropower are considered as medium-sized conventional energy, and solar energy, wind energy, modern biomass, geothermal, ocean energy and nuclear energy, hydrogen energy as a new energy [1, 2].

According to the definition of new energy sources, we can intuitively believe that cars using new energy as the main power fuel can be called the new energy vehicles. Otherwise, the Chinese Ministry of Industry and Information issued "new energy vehicles manufacturing companies and product access management rules" ([2009] No. 44) on

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June 17. 2009. State Department issued "energy saving and new energy automotive industry development plan (2012-2020)" on June 28, 2012[3], and said that the new energy vehicle is defined as the cars which use unconventional vehicle fuel or use conventional fuel but adopt new vehicle power unit, integrate the advanced technologies of power control and drive of the vehicle with new technology, new structure and new theory. New energy vehicles including hybrid electric vehicle, pure electric vehicles, plug-in hybrid and fuel cell vehicle, hydrogen-based fuel-cell car, and other power car. According to these two views, it is obvious that electric car is within the scope of new energy vehicles.

2. Car's emission

How do we determine the amount of vehicles emissions traveling one kilometer in the end? Now many people say that electric vehicles are zero-emission vehicles, in fact, which emission is zero during the use phase. However, we should focus on the emissions during the production and decommissioning phases of a vehicle. Typically the life cycle of the vehicle consists of the following stages, namely the procurement and processing of raw materials, parts manufacturing, vehicle assembly, vehicle use, scrap recycling. The stage before using the vehicle is referred to as the vehicle production phase, then we can analyze the energy consumption and emissions of the vehicle during the stages of production, use, scrap.

2.1. Production Stage

A vehicle is composed of thousands of parts and components, the main components manufacturing and production processes consump the largest energy and generate the largest gas emissions, mainly in the following stages, namely batteries, motors, tires, wheels and frame welding production. Parts are made in an assembly plant, then assembled into a car. Production stage is the largest energy consumption stage.

2.2. Using stage

Energy consumption of using phase of vehicle is mainly fuel or electricity. Fuel consumption causes exhaust emissions in urban used vehicles. Electricity generates by the solar power or by thermal power, hydroelectric power, wind power, it is conversed from coal, water, wind, solar and other energy. Thermal power plant causes exhaust emissions in its location while produce electricity.

2.3. decommissioning stage

Large number of scrapped vehicles generate solid waste, recycling its scrap material will produce exhaust emissions, the following described separately recovered from vehicles scrapped links.

3. Two aspects cannot be ignored

3.1. Emissions of power plant

As mentioned earlier, in China, after decades of energy structure adjustment, and still have 70% of electricity is produced by thermal power plants. Now, a total of 15 national grid to provide services for different regions. Electricity in some areas still local small-scale, low efficiency of power plants, has not been incorporated into the national grid.

3.2. Battery production and recycling issues

Battery production and recycling process included three stages: 1) mining and smelting; 2) cell production; 3) heavy metals recycling. Production and recycling process does not take full advantage of heavy metals, and pollutant will be released into the environment.