GREEN CAR TECHNOLOGIES AS A PART OF SMART GRID

V. Litvinenko, D. Matukhin
Tomsk Polytechnic University

Green cars are cars which are more environmentally friendly than conventional cars. It is usually how the car is fuelled which determines whether or not it is a green car. A conventional car works using an internal combustion engine which burns fuel to create motion. Fuel is a fossil fuel which means it is non-renewable and will one day run out. The burning of fossil fuel results in the emission of greenhouse gases into the atmosphere. Greenhouse gases have been proven to contribute to the effect of global warming.

On top of this, fuel is created from crude oil. Crude oil is not only a non-renewable resource which will one day run out; the production of oil is also highly dangerous for the natural environment. Oil spills, such as the BP Deepwater Horizon Disaster oil spill in 2010, destroys natural habitats and kills wildlife. These factors have led to the development of 'green' cars, which cause less damage to the environment [4].

A green car is a vehicle that is considered to be environmentally friendly and have less of a damaging impact on the environment than conventional cars. A green car consumes less petroleum than conventional cars or uses renewable energy sources to fuel its engine. There are a number of green cars available today: Electric cars, Hybrid cars, Hydrogen cars, Solar cars.

There are a range of green cars available on the market and they are becoming more popular as we realize the need for greener cars. When looking for an eco-friendly car you should look at the CO2 emissions to check how green the car actually is. Any car with less than 100 g/km CO2 emissions is a pretty good car. Another way to tell if a car is eco-friendly is by looking at the tax band; the lower the band the better. There are now a lot of cars in the market now that cost nothing to tax because of their low CO2 emission [3].

There are so many forms of car available to you today it can be difficult to choose which car to buy. To help you choose you should think about a car's fuel efficiency and emissions. Not only will a more efficient vehicle be better for the environment, it will also save you money. Green cars are affordable and cost much the same price as conventional cars.

Small cars are much more fuel efficient than large cars, they produce fewer toxic emissions and if driven sensibly can substantially lower your fuel bill. You could also save up to £80 per year on road tax if you purchase a small car.

Each car has different fuel efficiency; the better the fuel efficiency the more environmentally friendly it is likely to be, and the more you will save on your fuel bill. Check the fuel efficiency before you buy a car by looking at the MPG (miles per gallon). The higher the MPG, the better the fuel efficiency.

There are a range of green car technologies for you to choose from. Here you can find out more about green car technologies and whether a green car would suit you. The environment is an ongoing issue and new technologies are always being developed and tested. One day we will have many more green technologies than those listed here.

An electric car uses an electric motor instead of an internal combustion engine which is what most conventional cars use for power. They store chemical energy in rechargeable battery packs and are more energy efficient than most conventional cars that use internal combustion engines. Electric cars decrease the need for petroleum powered vehicles and reduce the effect of global warming. They have good fuel efficiency and many have an acceleration performance that exceeds that of conventional cars. However, electric cars do have some limitations. For example, travel distance between battery recharging is limited. This travel time depends on the driver's performance, the shape and weight of the car and the type of battery used, etc. Although these drawbacks can be seen with electric cars, new technologies are producing batteries with a longer lifespan and reduced recharging time. Even some car hire providers are investing in electric cars by adding them to their fleet, which shows how companies see a future in electric vehicles [5].

A hybrid car uses both an electric motor and an internal combustion engine to power the vehicle. These cars use petrol or diesel to power internal combustion engines and use electric batteries to power electric motors. They use less petroleum than conventional cars and therefore produce less pollution. Hybrid cars can be more fuel efficient than conventional cars, resulting in cheaper running costs and less damage to the environment. However, some hybrid cars are designed to have a power boost which means there would be no benefit to the environment or running cost.

Hydrogen cars use hydrogen as the primary source of power opposed to petrol. They are not a huge success at the moment and only a few hydrogen cars have been produced so far. There are two ways in which hydrogen can be used to power a vehicle: combustion conversion and fuel-cell conversion. These cars use oxygen from the air and hydrogen as a power source; this produces water vapor which is better for the surrounding environment. Although, they are expensive to produce and have high running costs and low energy efficiency.

These technical challenges are unlikely to be solved for several decades. However, global transport is taking the first step towards overcoming these challenges by investing in hydrogen fuel cell vehicles. They have a fuel cell that combines hydrogen with oxygen to produce water; this process creates electricity to power the vehicle. It is hoped that the buses will reduce noise and air pollution in London and serve as a positive influence to the rest of the world.

A solar car uses solar energy to power the vehicle. It obtains solar energy by using solar panels on the surface of the car and converts it into electrical energy. There are tremendous benefits of solar cars to the environment such as there are no exhaust fumes and no release of greenhouse or noxious gases, reducing global warming and improving human health. However, solar cars are yet to make it into the market as practical transportation for many reasons as they can only travel a limited distance without the sun, which could be problematic on cloudy days and at night. Moreover, solar cells are very fragile and can be easily damaged [6].

To sum up, it is necessary to say that studies by various Research centers suggest that the extra energy cost of manufacture, shipping, disposal, and the short lives of some of green vehicles (particularly gas-electric hybrid vehicles) outweighs any energy savings made by their using less petroleum during their useful lifespan.

As cars cannot do anything good for the environment except less damage than others. In some countries law severely restricts the use of "greenwashing" to market automobiles, strongly prohibiting advertising a vehicle as being environmentally friendly, with large fines issued to violators [1].

A study that looks at other factors other than energy consumption and carbon emissions suggests that there is no such thing as an environmentally friendly car. The use of vehicles with increased fuel efficiency is usually considered positive in the short term but criticism of any hydrocarbon-based personal transport remains. Experts say that energy efficiency programs are often counter-productive, even increasing energy consumption in the long run [2].

Many environmental researchers believe that sustainable transport may require a move away from hydrocarbon fuels and from our present automobile and highway paradigm.

REFERENCES

1. CNW Marketing Research, Inc. Dust to Dust – The Energy Cost of New Vehicles From Concept to Disposal, 2006.
2. Gilbert R. Transportation is the Post Carbon World. The Post Carbon Reader: Managing the 21st Century Sustainability Crisis, Watershed Media, 2010.
3. http://google.ru/imgres?imgurl.
4. http:// greencarreports.com/news/1080871_electric-car-price-guide-every-2012-2013-plug-in-car-with-spects.
5. http:// petrolprices.com/green-guide.html.
6. http://en.wikipedia.org/wiki/Green_vehicle

ANALYSIS OF POWER SUPPLY HYDROSTEEL PLANT "PPGHO" (GMZ)

O. Novgorodov, N. Kosmynina
Tomsk Polytechnic University

The Priargunsky Mining and Chemical Corporation (PMCW) – the Krasnokamensk city-forming enterprise, the largest in Russia and one of the largest uranium mining enterprises in the world, the biggest multifield mining enterprise of Zabaykalsky Krai. It conducts uranium production in the mine way on 16 uranium and molybdenum – uranium fields. 34 divisions, including the PPGHO (GMZ) hydrosteel works are a part of association.

Power supply of plant is carried out from the main step-down substation (MSDS) having two distributing devices: RU of 110 kV and RU of 6 kV. RU of 0,4 kV [1]. Electric power comes from RU of 110 kV of CHPP-3 on a two-chain air-line to the RU of 110 kV located in the territory of plant.

Figure 1 shows the block diagram of plant power supply.

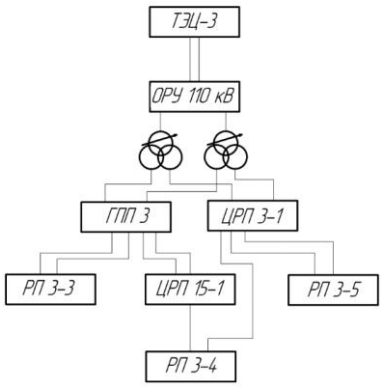

Fig. 1. The block diagram of plant power supply