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## CHALLENGES FACING ELECTRIC VEHICLE ADOPTION IN RUSSIA

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Nowdays electric cars gain popularity thanks popular idea of ecologically clean transport. But there are some challenges facing electric cars industry in Russia.

*The first challenge* is the lack of government's support. Some European countries and the USA encourage using electric cars and make some benefits for people who using it. Most countries have adopted incentive programs to stimulate demand for electric vehicles. These programs currently have limited funds; they range from approximately \$3,000 per car purchased in China to approximately \$7,500 per car purchased in France, Germany, the United Kingdom, and the United States. Certain Japanese programs offer up to \$10,000 in electric-vehicle incentives. If these incentive programs continue to 2020, the TCO breakeven period for an electric vehicle relative to an ICE-based vehicle in Western nations will fall from 9 to 15 years to 1 to 5 years. Electric cars have a chance to become popular in Russia, but it needs in support of government.

In Russia there is *the lack of an official dealer on the market*. There are some big electric car makers in the world. One of them is world-known company "Tesla". Tesla cars don't sale in Russia officially. People can buy different models of this electric car only from informal agents.

There are free *charging stations* in the countries where electric cars are popular. Charging in such stations is very fast and easy: full charge lasts about 1.5 hour and provides about 500 km of driving. Electricity for free stations usually generates by wind turbines, solar panels and by other generators working with renewable energy. In some places electricity generates by thermal power plants, so idea of clean transport is questioned. The lack of free charging stations is a big problem for owners of electric cars in some countries. The Russian electricity company Rosseti has installed a public EV charging station in a Moscow parking lot, the first of 150 that will be deployed in the city's public parking lots by the end of next year. Rosseti has al-

ready operated a network of about 30 charging stations on Moscow streets and highways and at shopping malls. According to Roman Berdnikov, First Deputy General Director for Technology at Rosseti, the network will expand to 1,000 chargers in 10 Russian regions by the end of 2018.

*Renewable energy* is not readily controllable and the challenge for those supplying energy to a fleet of electric vehicles is to match their varying charging needs to a fluctuating and unpredictable power supply. In terms of annual energy consumption, the additional power requirements caused by a mass take-up of electric vehicles would be manageable, but supplying sufficient power at times of peak demand would be more difficult.

Many people say that electric cars have no future and are *skeptical about production and consumption of it*.

All of these challenges can be replaced by advantages of using electric cars.

Charging action by home electric network (220 volt) for “tesla model s” costs 68 rubles in Russia (night tariff). It is *cheaper* than refilling the car with petrol.

Mr Musk, owner of Tesla Motors, claimed that the new 100-kilowatt hour battery pack means high-end versions of the Model S sedan, called the P100D, will be the world's *fastest accelerating cars* in production. It will do 0-60mph in 2.5 seconds. He said there were faster cars on the market, but these were limited-run vehicles, while the Tesla is aimed at the mass market, he said. Electric cars are using lithium-ion batteries [1]. Competing of lithium-ion technologies can be compared along six dimensions: safety, life span, performance (peak power on low temperatures, state-of-charge measurement, and thermal management), specific energy (how much energy the battery can store per kilogram of weight), specific power and cost. Electric cars are the most safety cars according to crash tests. Electric car has free space in front and behind salon, so there are no elements that can harm. National Highway Traffic Safety Administration (NHTSA) awarded the highest rating (5 stars) to electric car “Tesla model s” manufacturing by Tesla Motors in all test categories.

The discussion lets us to draw the conclusion that there are some caused challenges facing electric car industry in Russia. Now these challenges are solving by Russian government, developers and businessmen. Promotion of electric vehicles in Russia may be delayed. But it does not mean that electric cars have no future in our country.

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