ANALYSIS OF ENERGY RECOVERY TECHNOLOGIES IN ELECTRIC VEHICLES

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According to public statements by the leaders of the world's automotive companies, current trends in the industry are directly linked to the introduction of electric vehicles in everyday life. Thus, the share of electric vehicles in China, the United States and Japan should reach about 50% by 2030. Today, a memorandum between the government and car companies is also being signed to stop selling internal combustion engine cars by 2040, in countries with more favorable economic conditions – by 2035. Therefore, it makes sense to further develop technologies aimed at improving the technical and operational performance of electric vehicles.

Improving the technical and economic performance of electric vehicles is achieved by increasing the power of the batteries (accumulators), so today the use of alternative energy sources to charge the batteries is being studied. The general classification of this technology is as follows: *Solar panels* (solar panels mounted on body elements, easy to handle, able to combine modules to increase power); *Electric tire* (ability to convert deformation and vibration forces into electrical energy by thermoelectric means, heat generated by absorbing light/heat and rolling into electrical energy, and excess pressure occurring during deformation into electrical energy by piezoelectric methods); *Electric Suspension* (converts deformation of suspension mounts in potholes into electrical energy while increasing the smoothness of the car's ride); *Brake Energy Recovery* (electric motors use the dynamics of the car to recover the energy lost in the brake discs during heating).

Alternative energy is implemented by the following car manufacturers: solar panels – Toyota, Hyundai, Contemporary Amperex Technology Limited; electric tires – Goodyear; electric suspension – ZF Friedrichshafen AG, LevantPowerCorp; brake energy recovery – BMW, Audi, Kia, Toyota, BYD.

A wireless energy transmission method using magnetic resonance communication is being actively developed. An alternating magnetic field in the transmitter coil causes the electrons in the receiver coil to oscillate, and transmission efficiency is best when both coils are tuned to the same frequency and located at a certain angle. This technology is under study, but has its advantages (automatic calibration system for the frequencies required at different distances, ability to charge in motion, no need for charging connectors) and disadvantages (low energy transferred, need to create a special road surface).