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# The analysis of a hybrid turbocharger main parameters applied to an internal combustion engine

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## Abstract

Internal combustion engines are constantly developing. Currently, a solution in full development is a hybrid car that has an internal combustion engine propulsion combined with an electrical motor. The electrical motor is powered by a battery which in turn is connected to other electricity suppliers for recharging. Therefore, the aim is to recover the thermal energy from the car, through various solutions, in order to transform it into electricity. Electricity is for the car's battery as well as for its consumers. After an analysis of the energy balance of the internal combustion engine, it can be seen that the engine energy still has great potential to be transformed into electrical energy through various solutions. Electrical energy can be produced even from braking or other mechanical devices that transform mechanical energy into electrical energy. For example, a co generator of energy hybrid electric turbocharger aims to recover exhaust gas energy and to capitalize it. The turbocharger is connected through a shaft with a generator. Between the compressor wheel and the generator is a speed reducer with a gear ratio of 1:10. This article aims to present the analysis based on the results of the experimental and simulation research of the hybrid turbocharger. The tests were performed using a diesel internal combustion engine with 4 cylinders at a capacity of 1.9 liters. The simulations will be performed using AMESim software developed by Siemens. The main parameters, which are highlighted, are: pressure ratio of the turbocharger, the rotation speed of the turbocharger and the power from the experimental results in relation to time and engine power at 100% load.

*Keywords: electrical motors, electricity suppliers, recharging, hybrid cars, thermal energy, car batteries, turbochargers*

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