

# HyperHybrid

The Best of Both Worlds

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HyperHybrid from OBRIST Powertrain

The future of the automobile is increasingly becoming electric. This is becoming apparent in the markets, which can be seen in news headlines from the plans of the automakers. Two systems have dominated the market so far - driving exclusively via an electric motor which draws its power from a battery, and the combination of an electric motor and an internal combustion engine in which both systems in parallel provide propulsion. In both cases, recharging is carried out via sockets - either quickly at appropriate charging stations or more slowly at home.

Both systems have indisputable advantages: the purely electric variant is emission-free while driving, and the hybrid can continue to use the existing infrastructure of the gas stations to quickly refuel and gain range.

However, both systems also have undeniable disadvantages. The electric car needs a very large and expensive battery in order to achieve acceptable ranges. The hybrid carries two drive systems, with corresponding disadvantages for weight (and therefore consumption), installation space and the cost.

The solution to these dilemmas was found by Obrist Powertrain in Lustenau, Austria, with their HyperHybrid.



In this system, the vehicle is operated exclusively by electricity but also couples a very small, and therefore economical, internal combustion engine with a battery and an electric motor.



The internal combustion engine is a two cylinder 54 HP one-liter petrol engine coupled with a generator for the production of electricity. Only the engine generates electricity (which flows into the battery), so the gearshift and the transmission are not required. The engine runs, only when necessary, in the optimal speed range and Lambda 1. With this stoichiometric ratio, all fuel molecules can fully react with atmospheric oxygen without the lack of oxygen or unburnt fuel remaining, resulting in complete combustion. This means that the engine no longer emits any air pollutants, so that complicated and time consuming after-treatments of the exhaust gas is no longer necessary. The entire engine is also optimized for smoothness. Thanks to counter-rotating crankshafts, any vibrations are filtered out. Obrist calls this the "Zero Vibration Generator" and promises smooth running that even exceeds that of a twelve-cylinder engine. But that's not all; it also incorporates acoustic and thermal insulation, so that it is almost inaudible.

This silent power plant then allows the HyperHybrid to run with a small high-performance battery, compared to purely electric vehicles which need larger and heavier batteries. Therefore, the cost on the battery is not between €9,000 and €12,000, but only around €2,000. The entire HyperHybrid powertrain has a much lower cost level than a pure electric vehicle, is cheaper than a parallel hybrid, and is in the range of today's current diesel powertrains.

The purely electric range can vary between 50 to 100 kilometers and depends on the energy content of the selected battery cells and the vehicle platform.

The system can then be combined as desired with an electric motor for the rear axle, or for a four-wheel drive, each with a motor for the rear and the front axle. In a high-performance version, the system would be equipped with four electric motors for all four wheels.

These components are much lighter than the battery alone in a purely electric vehicle, and even lighter than a classic hybrid. This outstanding driving performance is also due to the low center of gravity and 50:50 weight distribution.

Thanks to the weight savings of approximately 250kg, the HyperHybrid is therefore also extremely efficient. It requires less than three liters in real daily driving and thus outperforms comparable hybrid vehicles by far. Its range is unbeatable with over

1000 kilometers. The vehicle manufacturer needs to report only 25grCO<sub>2</sub>/km (1.05l/100km) to Brussels, far below the legal requirements of today (95grCO<sub>2</sub>/km) and in 2030 (approx. 70grCO<sub>2</sub>/km).

A small engine, a smaller battery and less chassis parts also have a positive effect on costs, and thus on the price: the basic version of a smaller mid-sized car with HyperHybrid could cost less than €13,000, and the upscale model only around €17,000, which is around €10,000 lower than, for example, an electric Golf.

This technical solution is also future-proof. Needless to say, the engine can also withstand next generation synthetic fuels. These fuels are produced from renewable energy sources, do not compete with food production and also do not require drinking water for their production. Their carbon footprint is completely balanced. Obrist Powertrain is already working today on these fuels of the future, which current refinery and filling station infrastructure can use. This also represents a clear advantage over the pure electric fraction with regard to the investments required.

CO<sub>2</sub>-free, comfortable and affordable – just the combination of the best ingredients in the world of mobility.

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