



Electrify Your Ride

Dr. Udo Kessler
Leutershausener Weg 2
68549 Ilvesheim, Germany

Tel: +49 1624033317

E-Mail: udo@electrifyyourride.info

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Do it yourself – with some help

When it comes to EV conversions, valuable classics and professional conversion companies are all the rage. However, three Germans want to give DIY conversions a boost – because retrofitting is great fun and could help in the transition to more sustainable mobility.

This is the motivation why they converted a 1993 Volvo 850 GLE to electric power and documented the project in a detailed book. The Volvo station wagon proves the fact that models with a considerable number of electronic systems can also be converted – to the advantage of the environment, especially if used components are implemented.

The 30 kWh traction battery, the 80 kW electric motor and the corresponding inverter were taken from a 2016 Nissan Leaf; the DC/DC converter and 11 kW charger came from a 2015 Tesla Model S; the 5 kW high-voltage heater from a 2018 Range Rover. The second-life approach was also applied to components like used electric vacuum and oil pumps for the brake booster and power steering.

The traction battery was split into three battery boxes distributed in the vehicle. The heaviest box is in the rear. The Volvo therefore received reinforced springs and was raised by 30 millimeters. Since one battery box was placed in the engine compartment, the weight distribution only changed marginally. Compared to the original version, the Volvo is now 78 kilograms heavier, but the payload is still comfortable at 442 kilograms.

However, some compromises had to be made: Although the torque of the Volvo 850 electric (254 Nm) is higher than that of the Volvo 850 GLE (204 Nm), the top speed of 80 miles an hour and the range of 80 miles are well below the ICE values. But this is not critical as typical every-day trips just include the daily commute to the office and some shopping and recreational trips which adds up to 40 to 60 miles per day.

The Volvo 850 electric is charged at home. So, a charging time of two hours is not an issue. And as it does not need public charging stations, the converted Volvo can also do without quick charging (CCS).

Because of its complexity an EV conversion is not for lone wolves. According to Udo Kessler, the owner of the Volvo and co-author of the book, a small but reliable network of individuals and

companies is needed because the requirements for knowledge, skills, tools, and technologies are very broad. That is why he implemented the project with the support of Philip Schuster and Johannes Huebner, who are also his co-authors in the book.

Philip Schuster knows his way around metals and mechanics and has converted a 2012 Toyota GT86 himself; Johannes Huebner is a software engineer and founder of the conversion portal openinverter.org/forum. His conversions include two popular models in Europe, a 2004 VW Touran and a 2001 Audi A2.

With a project duration of two years, the Volvo conversion cost 18,000 euros (not including working hours). In addition, another 3,000 euros were put into the car, for example for mechanical components, new fenders and a newly painted tailgate.

“The Volvo 850 electric is not a sporty vehicle nor one with a long range. But it is well suited as a second car for daily use,” says Udo Kessler, “since my driving profile is similar to many others, we see the Volvo’s configuration as a concept with potential.”

So, their guidebook would like to motivate others to follow in their steps. After reading “Deep dive EV conversion” anyone considering an EV conversion should know what to expect – and then decide.

With their book, the authors also hope to encourage others to meticulously document their own conversions – and thus help achieve standardization and also cost reductions. “The question is how the conversion of existing vehicles can mature into an affordable standard process in order to contribute to more sustainable mobility,” says Udo Kessler. According to his own calculations, he reduces his ecological footprint with the Volvo 850 electric by 7.8 tons of CO₂ per year. The average CO₂ footprint per person in Germany amounts to 11.2 tons a year.

More about the book at: <https://deepdiveevconversion.com/>