



Electrify Your Ride

Dr. Udo Kessler
Leutershausener Weg 2
68549 Ilvesheim, Germany

Tel: +49 1624033317

E-Mail: udo@electrifyyourride.info

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"It's worth converting more existing vehicles."

The conversion of combustion vehicles to electric is about to leave its previous niche existence behind. Johannes Hübner, Udo Kessler and Philip Schuster want to make a contribution to further professionalization. As authors of the book "Deep dive EV conversion" they explain the background and importance of the topic in an interview.

What is the book "Deep dive EV conversion" about?

Udo Kessler: On the one hand, we want to explain in an unprecedented level of detail how to do an electric conversion – so that interested people can assess exactly whether they should tackle such a project. On the other hand, we would like to make it clear that conversions are absolutely sensible, even necessary, in terms of sustainability and resource conservation.

How did you come to write this guidebook?

Johannes Hübner: Udo asked both Philip and me whether we wanted to help him with his project, since we had done it before. Together we came up with the idea of documenting the conversion. Many people are already exchanging ideas on openinverter.org, a digital platform I founded. But we believe that with the help of the book we can make the topic even better known and reach new target groups. And that's important.

Who did you write the book for?

Philip Schuster: For everyone who loves cars and knows something about them – in other words, car guys who are not afraid of getting their hands dirty. And as we all know, there are a lot of them in Germany and other parts of the world. Also, we would like to reach people who are pursuing the goal of making their individual mobility as climate-friendly as possible

How does an EV conversion help the environment?

Udo Kessler: The energy-related CO2 footprint per capita and year in Germany is around 11.2 tons. According to our calculations, it can be reduced to 3.4 tons per year by converting the Volvo 850 – calculated over five years. It is therefore worth converting existing vehicles instead of scrapping them or exporting them to Africa, where they continue to pollute the environment. That's why we want to encourage as many experts as possible to further standardize and simplify the conversion process. That would make conversions faster and cheaper, so they could make a

significant contribution to climate protection in the roughly 20-year transition phase to electromobility.

How expensive is an EV conversion?

Philip Schuster: That depends on many factors, for example the desired range of the vehicle. The greater the range, the larger the traction battery has to be – the most expensive component in a conversion. What we can say about our own projects: The costs were between 15,000 and 20,000 euros. Conversions are therefore a comparatively inexpensive way to switch to an electric vehicle. This is also an important aspect in accelerating the transition to sustainable mobility.

To what extent do your electric conversions differ from those of professional shops, which charge upwards of 50,000 euros?

Johannes Hübner: Our concept differs in the respect that we would like to use as much used components as possible – so that the ecological footprint is as small as possible. But there is another decisive difference: conversion shops must of course take the working hours into account in their calculations. That drives up the price. We don't do this as it would go against the spirit of a private do-it-yourself project.

How many hours did you invest in converting your cars?

Udo Kessler: We didn't exactly keep a record of that. And as with costs, the time required depends on many factors. But to give you an idea: you can definitely count on around 300 hours spread over several months – depending on the complexity of the project and your own skills.

What are the biggest challenges in an EV conversion?

Johannes Hübner: Whoever converts a combustion engine vehicle to electric faces many challenges – for example, when the various components have to be orchestrated into harmony with the help of software. From a mechanical point of view, connecting the electric motor to the existing manual transmission is likely to be the most demanding. Connecting means joining both hubs together using a specially manufactured precision coupling and screwing the two components together using adapter plates and spacer rings.

Can I convert any car?

Johannes Hübner: You often hear that you should only convert older models with little electronics. That is basically correct, but modern vehicles such as a Philip's Toyota built in 2012 or my Touran built in 2004 can also be converted. In principle, any vehicle that can handle an increase in weight and the power of the electric motor is suitable. Shock absorbers and springs can be a topic here. Udo, for example, not only installed stronger springs, but also raised the vehicle. One thing is certain: If conversions are to make a significant contribution to climate protection and resource conservation in the medium term, then in the future modern vehicles in particular will have to be converted in large numbers.

Why did you choose a 1993 Volvo 850 wagon to document your conversion?

Udo Kessler: I've been driving Volvo station wagons for a long time. Professionally mainly V70 and V60 models. Privately, I had a Volvo 265, built in 1980, for a long time. So, it made sense

to convert a Volvo. I sold the 265 and got an 850. An 850 because it is very solidly built and well protected against rust and therefore has the best prerequisites for a second car life.

How does the EV conversion of the Volvo 850 affect its performance and range?

Philip Schuster: The performance is roughly the same as before the conversion. The range depends on the driving style, the average speed, but also on the season. It is between 130 and 150 kilometers. This is perfectly adequate for Udo's driving profile with a daily mileage of 50 to 70 kilometers, as he can charge at home overnight at the wall boxes.

Why is it not enough to rely just on new electric vehicles in order to bring about the transition to new drive concepts?

Udo Kessler: Because we have to keep an eye on the topic of resources. Products such as cars, which used up many resources when manufactured, need to be on the road as long as possible. And the re-use of components from the growing number of electric vehicles are also playing an important role. Conversions help in both respects. They can serve as an example of how we can consume more reasonably and sustainably.

How could the average car owner be persuaded to rather convert an existing vehicle than buy a new car?

Johannes Hübner: Many families have several vehicles. If they want to make their mobility more sustainable, one scenario would be to buy an electric vehicle as the next new car and convert the second car to electric. Or – if the financial means for a new electric vehicle are not sufficient – to rely only on a conversion.

How do you think you can win over hobby mechanics for conversions?

Philip Schuster: Well, for example with the guidebook. It shows: Conversions are exciting and meaningful projects that are also fun. The car guy community has the best prerequisites for further advancing the topic of conversions. The claim of a hardware store chain in Germany "Make it your project" sums it up pretty well.

The German state promotes the purchase of electric vehicles. Does this also apply to electric conversions?

Udo Kessler: No, although it would of course make sense. But maybe that will change. Other countries are ahead here: France is already promoting conversions financially, and in California a proposal is in the legislative process.

What do you think: will we see more cars being converted to electric drive in the future?

Udo Kessler: Definitely. The scene is growing and is in the process of leaving its niche status. At the same time, automobile manufacturers are beginning to realize that being serious about sustainability, resource conservation and the circular economy means not just to rely on new car production. For example, Renault has converted its traditional factory in Flins into a center for circular economy and is developing conversion kits for classics such as the Renault 4 and 5. The US manufacturers Ford and General Motors have also launched the first solutions for converting their own existing vehicles. And German manufacturers have also experimented with electric conversions for iconic models.

The authors

Johannes Huebner

As a software engineer and initiator of the forum openinverter.org, I have developed products with which components from electric vehicles can be re-used. I have already contributed to a number of conversions and have already carried out three myself.

Dr Udo Kessler

For me, the private car is a good starting point for doing something to protect the climate. That's why I got involved with the topic of electric conversion and converted a Volvo together with Johannes and Philip. I spent my days working on a desk. In the evenings, I enjoy working in the garage as a way to relax.

Phillip Schuster

In my world travel workshop, I convert vehicles into all-terrain campers. Recently, however, electric conversions are also part of my projects. My first build was a Toyota GT86 with Nissan Leaf components.

To learn more about the book visit www.deepdiveevconversion.com