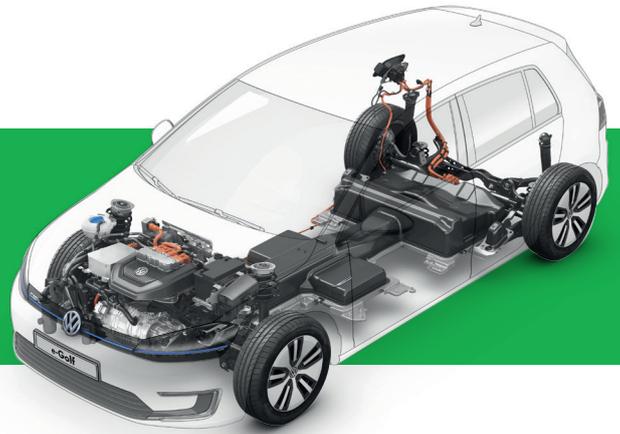




# cees

A bright future



## Power electronics takes to the road in the future

– Cars and other forms of transport are becoming more and more electric

Fossil fuels are a limited resource. While supplies are running out, it is also increasingly clear that burning fossil fuels represents a mounting threat to the global environment. The transport sector, and private car owners in particular, are large-scale consumers of fossil energy sources.

A number of car manufacturers have long had a focus on developing and producing electric cars and various forms of hybrid cars to reduce fuel consumption and local CO<sub>2</sub> emissions. An increasing number of these vehicles are already on the roads in many countries, and an infrastructure of charging stations is quickly taking shape, especially in Denmark. There is no doubt that the trend within the transport sector is towards electric powered vehicles.

### New demands on power electronics

Electric and hybrid cars are literally packed with advanced electronics. In electric vehicles, alternating current is essentially converted into direct current, which is stored in the vehicle's batteries. When the car is driven, the power from the batteries is converted again to drive the motor. In hybrid cars, power electronics controls the electric motor and the petrol motor, so that the car runs in the most eco-friendly or economic way.

These processes place demands on the power electronics being used. For example, charging must be possible at different voltages, depending on whether the vehicle is connected to the power grid at home in the garage, or at one of the highly-efficient charging stations, which reach a charge of 80% capacity in less than 30 minutes. Figures which it is hoped will improve in the future. What vehicles need – in addition to efficiency – is advanced control using smaller and lighter units.

### Growth and development opportunities

There is enormous potential for growth and innovative research in power electronics. It is about more than just motor control and charging. Cars are dependent on all kinds of electronics – electrical control and braking functions, power steering, cooling, heating, and countless sensors and control systems.

Denmark has a research environment within power electronics, giving us the best opportunities to get a share of the large growth in electric and hybrid vehicles. CEES actively seeks to attract new talent to this exciting but sometimes overlooked development area.

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**Centre for Electrical Energy Systems (CEES)** is a Danish network for companies and research institutions. We research and develop electrical energy systems, the global market for which is DKK 300 billion annually.

The partners in the network are universities and companies in Denmark. Our goal is to consolidate Denmark's strong position in the field of power electronics and to train enough qualified manpower. We also research the intelligent control of power electronics.

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