



# Transition of Energy and Transport Systems How will we move about tomorrow?

Chair of Combustion Engines and Powertrain Systems, Prof. Dr.-Ing. F. Atzler

## Basic statements

---

- THE FUTURE IS ELECTRIC
- Storage and transport of electricity is not cheap, robust and easy.  
Therefore, we electrolyse hydrogen from green electricity!
- Storage and transport of hydrogen is not cheap, robust and easy.  
Therefore, we produce substances, suitable for the **new green world energy trade**,  
e.g. methanol, from green hydrogen

# Outline

## Transition of Energy and Transport Systems. How will we move about tomorrow?

- Energy situation in Germany 2022 / 2050
- Short excursion into national Biomass (avoids imports)
- Imports
- What does the future look like? Forecasts 1990 → 2020 → 2050, also with respect to imports?
- Imports, Storage, Handling: Some properties of renewable energy carriers
- Can Germany supply its own renewable energy? Are Imports necessary at all?
- World energy trade: Can the world be supplied with renewable energy?  
Simple assessment based on PV + Fraunhofer PTX Atlas
- The efficiency debate
- Cost: Rules of Industrial Production
- Cost: Hydrogen → How expensive is electrolysis? How many electrolyzers would we need?
- Cost: eFuels
- Cost: Import of eFuels, including TRANSPORT
- Cost: Use of eFuels: Efficiency and cost per kilometre
- Conclusions: the Context of Efficiency, Need for Imports, Distance, Industrial Production and Cost