To fulfill upcoming environmental standards in terms of pollutant emission, Automotive market is going towards Electrification.

As consequence, vehicles become more and more hybrid or full electric.

In any case, the use of electric motor is mandatory, whatever its power.

Electronics to control these motors is moving to power electronics with current from few tens A to few hundreds A and voltages from 600V till 1200V. Electrical automotive requirements for power systems increase efficiency management in power loss during energy transfers.

To optimize efficiency of the power electronics, new technologies like Wide Bandgap technology are foreseen.

Figure 16: Vitesco applications: a) HV motor and inverter system, b) DC/DC 4kW, c) charger 400V to 12V.
MOTIVATION

**WBG MosFet**
- Enables higher switching frequency
- Enables higher switching slew rate
- Smaller active area @same performance
- Higher Tj, max

**Product**
- Lower switching losses
- Lower conduction losses @partial load
- Efficiency increase
- Enables smaller power module
- Size reduction of:
  - inverter cooler
  - motor cooler
  - Passive components

**System**
- Battery cost reduction
- System cost reduction
- Increased power density
- Total weight reduction
- Expected for high power/ high voltage systems
- Enables smaller vehicle cooler
WBG INTRODUCTION

OPEN QUESTIONS

- Datasheet maturity
- Technology maturity
- Component behavior at extreme temperature, in switching mode, at high frequency, ...
- Conduction and switching losses variations across all conditions
- Reliability, failure modes & Qualification standards for automotive