



## Beyond Automotive



MAHLE Bike

### Extensive experience

MAHLE Powertrain has been active in the automotive sector for over 60 years.

During that time, our talented engineers have developed their skills in a broad spectrum of disciplines ranging from fundamental research, concept design, modelling, analysis and simulation through to prototyping, testing, calibration, software development and systems engineering. These skillsets, coupled with in-house developed tools and techniques, have also been successfully applied across multiple non-automotive sectors to provide technical solutions for an ever-increasing range of customer projects.

The diversification from our core automotive powertrain activities is delivering vital solutions in many different areas including renewable energy, marine, medical, off-highway, defence, e-mobility, consumer products and non-automotive software.

This wide variety of successful projects clearly demonstrates the flexibility of our business and the adaptability of our technical experts in applying their transferable skills to an extensive range of engineering challenges.



Renewable energy technologies



Modelling for medical ventilator



Adaptable skillsets  
Flexible approach

### Battery Simulation

- Cell selection, pack sizing & cooling definition
- Electrical model creation from cell data
- FE-mesh to 1D cell thermal model progression
- Thermal inputs from CFD (e.g. cooling plate)
- Linked into vehicle system (powertrain for energy demand, cooling system for thermal regulation) and optimised over drive cycles

### Software, Tools & Services

- Flexible vehicle co-simulation environment
- Any sub-system models can be linked in
  - › Thermal, controls, emissions models etc.
- Sub-system specification and operating strategy optimisation over drive cycles
- Virtual calibration and testing, SiL and HiL
- Tailored RDE drive cycle generation

