



MOTION PRODUCTS

## DESIGN AND PROTOTYPING OF ELECTRICAL AND MECHANICAL ENERGY STORAGE

Energy storage is an important topic in modern machine and vehicle design. To improve the energy and power density as well as the total cost of ownership (TCO), Flanders Make designs, dimensions, integrates, benchmarks, selects and prototypes various energy storage solutions such as batteries, (magnetic) springs, inertias and capacitors.

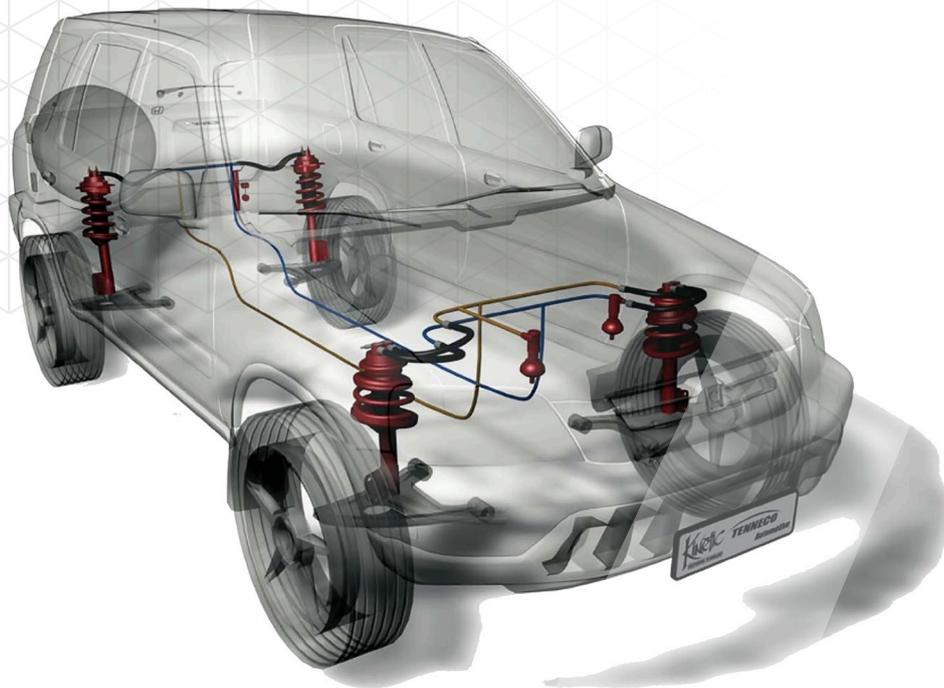


Our services include:

- electrical, mechanical, thermal, structural and control design for energy storage components and their integration in a system;
- modular battery and energy management and balancing systems for mobile and stationary applications;
- optimisation of advanced thermal management.

### We use various unique software and hardware tools in this process:

- In-house developed SoX (State of charge, health, power...) software for batteries and (real-time) models in MatLab, SimuLink and Simscape
- Patented magnetic spring with variable stiffness



## SUCCESS STORY

### Shock absorber with integrated energy storage

#### PROBLEM

The energy from the suspension motion of a vehicle is currently dissipating/wasted.

#### SOLUTION

We developed an energy harvester for a vehicle's suspension system. We also designed the innovative architecture with optimal storage sizing and controller design for this system.

#### CUSTOMER VALUE

Our prototype harvested energy up to 5W, while we were able to increase the efficiency of the energy conversion up to 48%. The harvested energy can be used to make the (semi-)active suspension self-supplying and thereby reduce wiring costs (material, labour). The comfort level inside the car remained unchanged.