SCOPE
of Services

Context and operations analysis

Risk and Hazard analysis

Energy system and supply analysis

Power Simulation
Simulation of power and energy supply requirements based on route, time tables and operational requirements

Vehicle Analysis
- Performance
- Weight distribution and Packaging
- Vehicle system architecture options including safety and interfaces to energy system
- Migration Options based on client requirements and overall technology trends
- Required investment budgets and timelines

ABOUT US

We are an engineering consultancy specializing in Off-Highway Zero-Emission powertrain systems. Senior management combines decades of experience in both alternative drive and energy systems as well as rail engineering. Our dynamic team covers all relevant disciplines from vehicle engineering and the related mechanical and electrical subdomains including safety engineering for ESS and hydrogen systems as well as system simulation and controls.

Firmly embedded in a network of research and industrial partners, we deliver Zero Emission solutions tailored to the needs of the sector.

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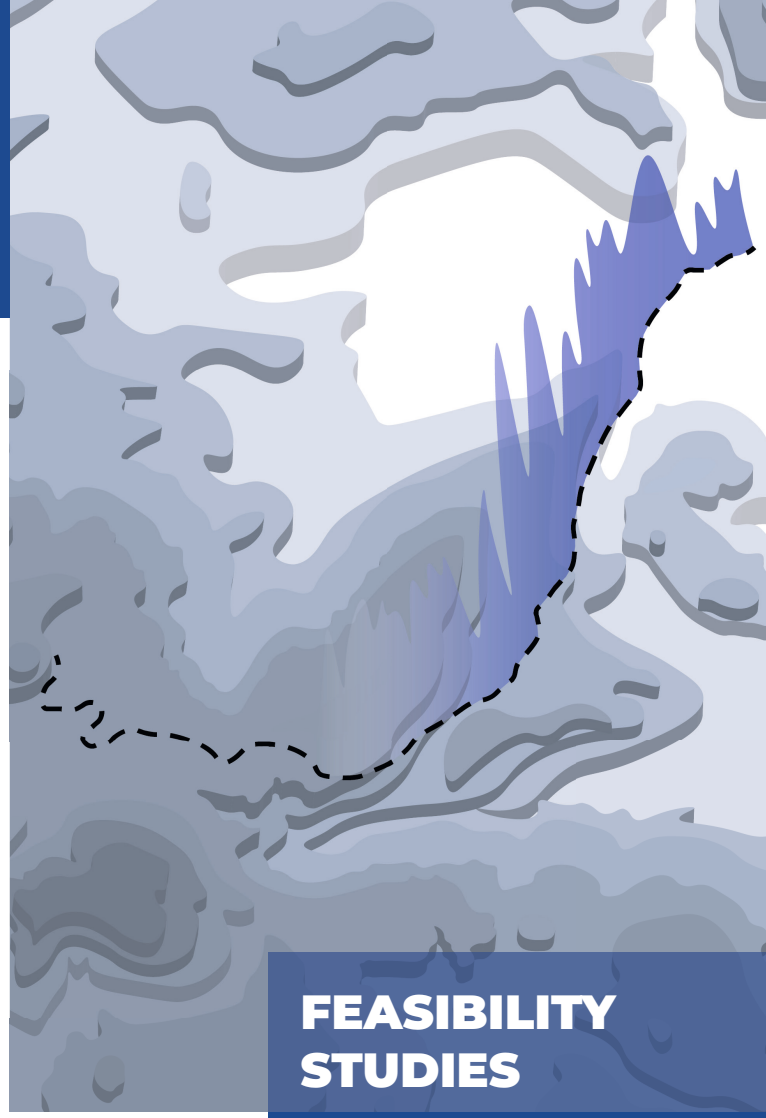


FEASIBILITY STUDIES

helping you decide

mZERO

Research driven. Context aware. Results focused.

01

RATIONALE

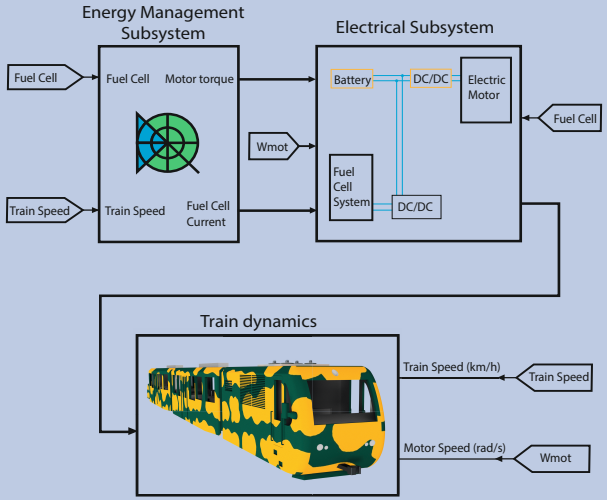
vehicle life extension

Keeping diesel propulsion may not be an option for much longer, so you need solid alternatives.

Our feasibility study package delivers an informed decision base while at the same time covering the early phases of the V-Process as per EN50126 (RAMS).

We use a complete simulation suite developed in close cooperation with the simulation experts at Uni Roma *Tor Vergata*.

It covers the basic vehicle simulation at the rail/wheel interface as well the structure of the powertrain to enable optimized component sizing and balance of the fuel cell system vs. batteries or similar electrical energy storage systems. As battery driven units are much more sensitive to parasitic losses typically ignored in legacy systems, we have detailed submodules enabling us to optimize the whole system.



02

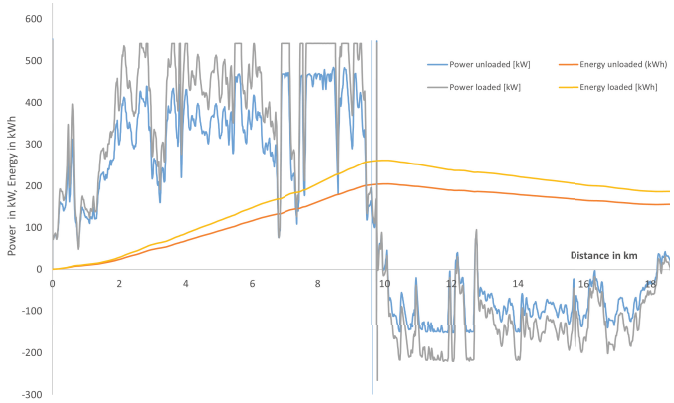
SIMULATION

tools

03

EXAMPLES

simulation results



Time or distance based plots of power and energy requirements as well as cumulated values are typical outputs that enable easy comparison of different propulsion system variants.

In the example shown above, a rack and pinion rail is consuming energy going uphill while recovering a significant portion of this energy on the return downhill trip.

Speed limitations and electric inefficiencies as well as vehicle weight limitation frame the decision on battery size and fuel cell primary power unit capacity as well as the required hydrogen on-board storage for at least a full day of operations.