ELECTRIFICATION OF CONSTRUCTION MACHINERY – FROM FEASIBILITY TO INDUSTRIAL IMPLEMENTATION

Why

- Off-road machinery represents a major share of industrial CO_2 emissions
- Electrification improves energy efficiency, reduces emissions, and enhances competitiveness
- Unique challenges: high continuous power demand, robustness and operation under extreme conditions

Our Approach

- Structured, end-to-end consulting from feasibility study to industrial deployment
- Support of Cross-disciplinary engineering: mechanical, electrical, and software integration
- ROI-driven evaluation of energy efficiency, performance, and scalability
- Providing structured know-how transfer and technical guidance as a service to support OEMs

Methodology

Feasibility Study • Concept Development • Support Product Development • Support Prototype and Testing • Support for Implementation and Serialproduction

Feasibility Study – Load cycle and duty profile analysis, energy and CO_2 potential.
Concept Development and **Variant Design** – System architecture, HV harness, CAN communication, cooling layout, Hot and cold climate versions for robust operation.
Serial Development - Consultancy thru the product development to turn the concept into a validated, manufacturable product by integrating mechanical, electrical, and software systems to meet the defined requirements.
Prototyping & Testing – Support with the validation of simulation results and energy management.
Industrial Implementation – Support the supplier integration, cost optimization, scalability, training for production and aftersales concept.

Potential and Risk for Industry

Energy cost per operating hour is the strongest ROI driver.
System-optimized electrification enables **20–35% lower energy costs**.
Strengthens European competitiveness through integrated design and development methods. European manufacturers risk being displaced by faster-moving non-European competitors if electrification is delayed.

Deliverables

- Feasibility and TCO report
- Simulation and validation framework
- Complete system design documentation
- Industrial implementation roadmap

Example Result for Concept of an electrified Construction Machine