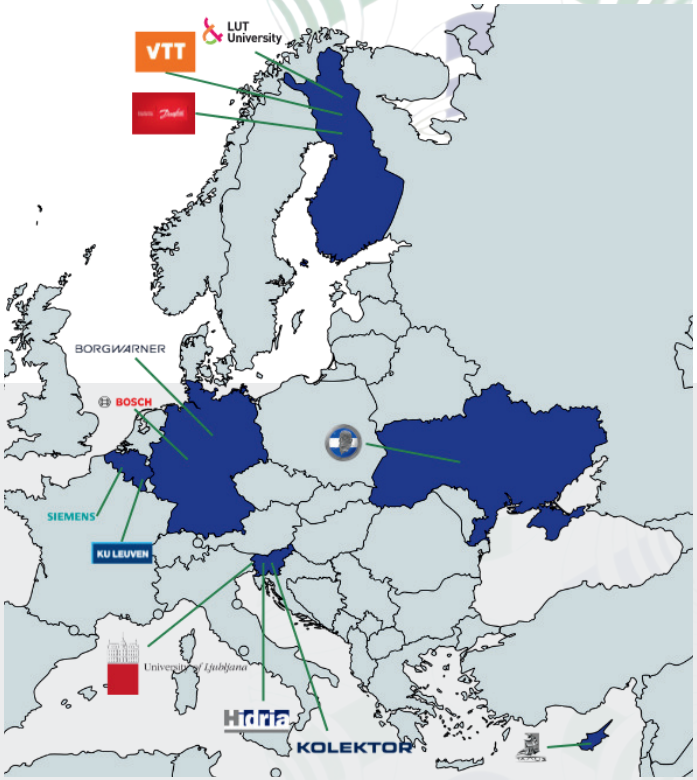
Consortium



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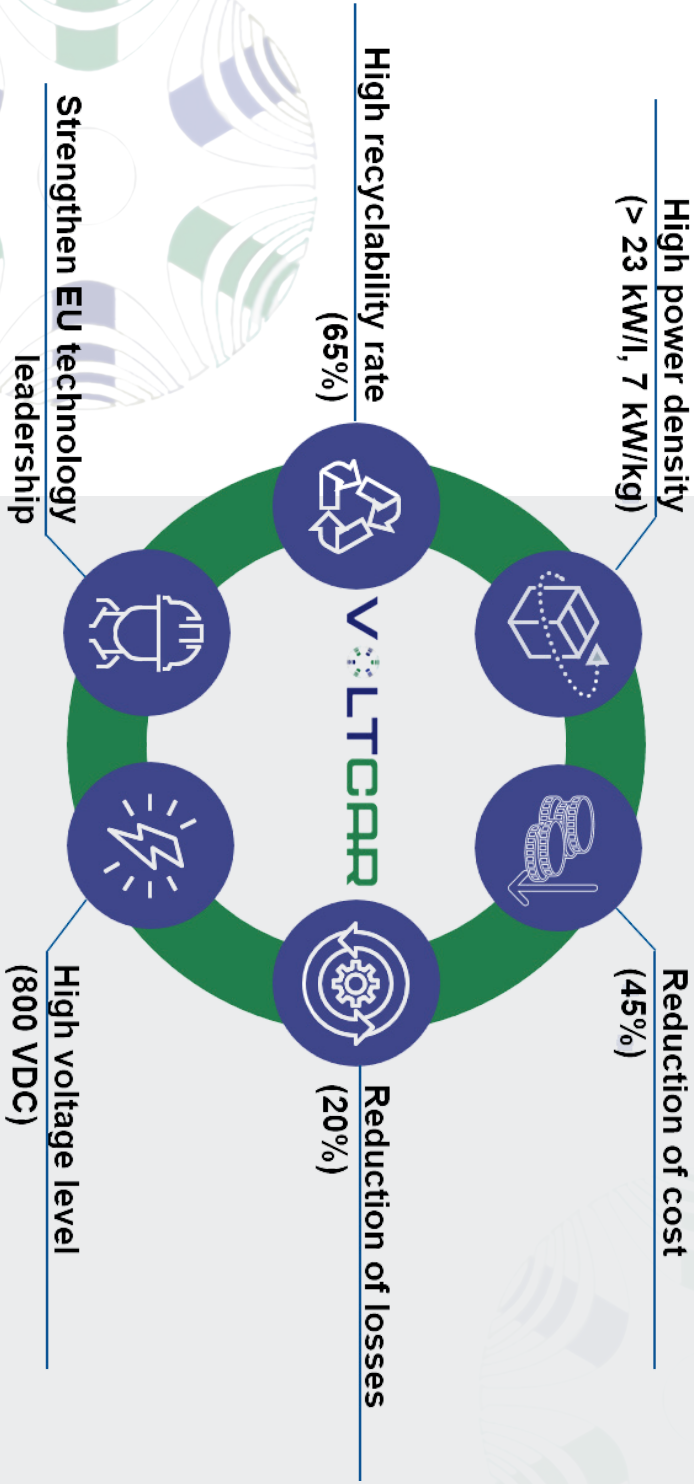
VOLTCAR

Design, manufacturing, and validation of ecocycle electric traction motor



Challenge

As a response to the need to decrease the transportation related emissions and energy consumption, today, all major passenger car and other light-duty vehicle manufacturers are broadening their electric vehicle portfolio.
The dependency of the present electrical traction motors on rare materials, such as rare earth permanent magnet materials, namely Neodymium-Iron-Boron magnets, is problematic from several viewpoints: they are imported and expensive and there is a real risk for supply problems in the coming years.

The main challenge of VOLTCAR is to ensure that the motor prototype combines

- performance requirements (power density, efficiency),
- sustainability criteria (recyclability, circularity and low use of rare resources and copper) and
- the expectations of the automotive sector (cost, reliability, integrability).

Solution

To strengthen the European competitiveness, VOLTCAR proposes highspeed, permanent magnet assisted synchronous reluctance technology with a drastic reduction in rare materials' utilization and modern mass manufacturing technologies.

This major goal is supported by introducing digital design and optimization methodologies that are capable of assessing the life cycle costs, energy consumption, and carbon footprint in the early phase, guiding the outcomes towards maximized sustainability with reduced use of rare materials.

Additionally, VOLTCAR motor is optimised at all stages of its life cycle, increasing the reliability, extending the lifetime and providing efficient end-of-life circularity strategies, including efficient recycling and repurposing patterns.

Objectives

The VOLTCAR overall goal is to reduce the costs, energy consumption, and carbon footprint of future traction motors to enable the transformation towards greener transportation, especially in the light-duty segment.

VOLTCAR main objective is split to 4 specific objectives to guarantee that all relevant topics are properly covered with measurable and achievable targets:

Specific Objectives

1. Creation of highly compact and efficient VOLTCAR traction motors with reduced amount of rare materials for passenger cars and vans (nominal power 50-120 kW)
2. Development of circular technologies for next generation electrical traction motors
3. Demonstration of a cost efficient, durable, over the life cycle digitalized motor
4. Comprehensive testing and validation of VOLTCAR traction motors and systems according to automotive standards with advanced and virtual testing methodologies