

LET'S MAKE HEAVY DUTY TRANSPORT GREENER!

At **RHODAS**, we aim at developing disruptive topologies of power converters using new semiconductor materials as well as cutting-edge digital technologies to improve architecture efficiency, power density, reliability, cost and sustainability. Integrated Motor Drive (IMD) multi-disciplinary approaches of modular power electronics and ecodesign considerations are addressed. With these approaches, we aim to integrate compact solutions in a wide range of heavy-duty transport, enabling these electric vehicles to be more sustainable and autonomous throughout the entire lifecycle of their components. We will also integrate software modules and digital tools to improve the safety, efficiency and health of the IMD inverter-motor assembly.

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🌐 Project page on Cordis
<https://cordis.europa.eu/project/id/101056896>

🌐 Project web
<https://www.rhodas.eu>

🐦 @RHODAS_EU

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REINVENTING HIGH-PERFORMANCE
POWER CONVERTERS FOR
HEAVY-DUTY ELECTRIC TRANSPORT

Overall project budget: € 5.956.938
Start date: 1 May 2022
End date: 31 October 2025
Total months: 42



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RHODAS is composed of 9 partners of 6 EU countries (3 Universities, 2 Research & Technology organisations, 2 SMEs, 2 industrial partners). Together, they collaborate in the execution of the project and contribute with significant expertise and research infrastructures, ensuring an integrated approach for proper holistic design, development and validation of the proposed solutions where nothing is left behind.



PARTICIPANTS ►



OBJECTIVES

- Improve efficiency and performance of power converters while increasing affordability of powertrains for heavy-duty EVs;
- Reduce size and weight of the power converters;
- Integrate the power electronics and thermal management system in a modular and compact integrated motor drive;

- Apply digital technologies and sensors for advanced on-line monitoring and prediction techniques using Big Data Analysis and Artificial Intelligence;
- Integrate ecodesign, material criticality and circularity considerations into the RHODaS powertrain solution;
- Promote collaborative research and interaction between academia and industry throughout the entire supply chain.

EXPECTED IMPACT

In line with the European Green Deal objectives, the targets set in the Paris Agreement, the EU 2030 Climate & Energy Framework and the European Roadmap on the “Electrification of Road Transport”, the research and innovation activities of the RHODaS project are expected to make measurable contributions in medium-term to achieve the targets set by the European Union.

- Achieve cost reduction of powertrains, increasing their affordability and reliability, and promoting a full-market penetration of heavy-duty electric vehicles.
- Extension of the truck driving range in a 10%.
- System volume reduction up to 40%.
- Greater efficiency level (+5%) in the integrated motor drive due to less energetic losses at the power conversion (-40%).
- Advanced monitoring of the system in real time with a digital twin to optimise design, operations, reduce failures and extend lifecycle of the materials.
- Modular converters also applicable to light-duty vehicles.

BETTER PERFORMANCES FOR A BETTER ENVIRONMENT

Classical road transport using fossil fuels in internal combustion engines (ICE) is one of the largest polluters, currently generating about 60 % of the total emissions released into the atmosphere from human activity. Although passenger cars are the major source of pollution, light-duty and heavy-duty vehicles are not far behind, accounting for almost the 40% of total CO2 emissions from road transport in Europe. Thus, the electrification of these vehicles, especially heavy-duty types, is a promising strategy to limit environmental pollution, contributing significantly to the mitigation of global change, with its consequent societal benefits.