



Rare earth reduction in high performance
permanent magnet electric machines

LowREEMotors Newsletter - Nr. 1 / 2021

We are glad to present the first LowREEMotors newsletter. Many things had occurred since the beginning of our project in February last year, when the kick-off meeting took place in Mondragon, Spain. In February 2020, the CoViD-19 effects were starting to be felt in Europe combined with a transportation strike in France, which led to a hybrid kick-off meeting. Partners in France and Slovenia joined the partners from Spain and Austria via teleconference. This kick-off meeting reflected the times to come during the entire 2020, where teleconferences and remote working with limited access to R&D facilities became the norm. Regardless of these difficulties, our consortium continued with many of the R&D activities planned for 2020. We invite you to keep reading to find out more about LowREEMotors and its achievements in 2020.

Meet the Consortium

Dr Gaizka Ugalde Rosillo

Mondragon University

Drive systems applied to traction and the generation of electric energy

Role in the Project: *Coordinator*

Area of Expertise: *Electronics and automatisaton, advanced design of electrical machines for traction and energy generation*



How did the idea for the LowREEMotors come about?

LowREEMotors came as a response to the great interest in the electrification of transportation systems. By now, it is clear that the future of the mobility industry will be electric. However, efficient electrical machines require permanent magnets containing materials that are not abundant in Europe and thus have to be imported; therefore, LowREEMotors aims to design new electric motors that use less of these rare earth elements without sacrificing performance.

What is the role of the team at Mondragon University in LowREEMotors?

Organisational tasks are a big part of the responsibilities of the team at Mondragon University. Ensuring all tasks are running on time and smooth communication between the consortium members and the funding agency is a demanding workload. In the technical aspects, Mondragon University will be responsible for designing and building prototypes of new electrical machines with different magnetic arrangements to maintain performance specified by our industrial partner even if the magnets used are not as powerful.

What do you hope and expect will be the main impact of the LowREEMotors?

I hope that LowREEMotors can demonstrate that design changes in electrical machines are essential to utilise resources more efficiently to have a more sustainable future in Europe.

What do you think is or will be the greatest challenge in LowREEMotors?

CoViD-19 has and still is making the project's progress slower, but that is the overall general challenge of our current global situation. A specific challenge of the electrical machine industry is the dependence on imports, which will be difficult to stop due to economic reasons. Hopefully, LowREEMotors can help in making a transition to a more European supply chain.

Project Update

Magnets with less neodymium

Researchers at CEA in Grenoble, France, are currently developing new alloys that substitute some of the neodymium, which is in greater demand and therefore more expensive, by cerium which has a lower demand than neodymium. Different processing conditions are being investigated to maximise these new alloys' magnetic performance in CEA and Magneti Ljubljana in Slovenia.

Simulations provide alternatives for new motor design

Researchers at Mondragon University in Spain have been running numerous simulations to optimise the performance of several electrical machines. Based on these simulations, the permanent magnets' shape and magnetic orientations will be suggested to achieve the specifications set by Valeo in Creteil, France.

Powder injection moulding of new magnetic alloys

Researchers at Montanuniversität Leoben in Austria and CEA in France are working together to develop a new binder system to protect the magnetic powder from oxidation and allow the successful implementation of powder injection moulding for the fabrication of magnets with the required geometries to improve the performance of new motors

Life cycle assessment of magnets has started

Researchers at KU Leuven in Belgium are working together with all consortium members to collect the data required to evaluate the environmental impact assessment of the LowREEMotors production and the traditional production methods of rare-earth permanent magnets.

Upcoming Related Events

IEEE - International Magnetism Conference

26 - 30 April 2021, online



INTERMAG covers all aspects of applied magnetism. This year the conference will be held online, with the talks being pre-recorded and available to registered attendees on-demand starting 19.04.2021.

<https://intermag.org/>

eMobility World

08 - 11 July 2021, Friedrichshafen, Germany



eMOBILITY WORLD revolves around alternative drive systems and new mobility concepts for e-bikes, e-scooters, electric vehicles, hybrid vehicles, charging technology and energy supply. It is still planned for July 2021, but this could change due to the CoViD-19 pandemic.

<https://www.ibo-messe.de/aussteller/emobility-world>

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This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation

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