

## Ph.D Vacancy on Hardware design and optimization of RDC in battery buffered fast-charging stations (E2GO DC6)

- **Research Programme Description**

“E2GO– Cost-reduction of EV fast-charging station to enable large-scale electrification of mobility” is hiring 9 Doctorate Candidates (DCs) to be funded by the Marie Skłodowska-Curie Actions (MSCA) Doctoral Networks-Industrial Doctorates (DN-ID), 2021, within the European Union's EU Framework Programme for Research and Innovation Europe Horizon under Grant Agreement No. 101072414.

The E2GO consortium contains Eindhoven University of Technology, Delta Electronics (Poland) Ltd., Heliox BV, University of Minho, Efacec Electric Mobility SA, Aalborg University, Silicon Austria Labs GMBH, Infineon Technologies Austria AG, Shell Global Solutions International BV, Kema Lab BV, University of Innsbruck, which brings together the stakeholders that cover the complete value chain of high-power fast-charging stations for EV creating an in-depth training programme that covers the spectrum from hardware design and electronics, to modelling and control algorithms. The multidisciplinary and intersectoral collaboration described here provides the unique opportunity to achieve the ambitious goal of E2GO to develop innovations to reduce the cost of fast-charging stations for electric vehicles (EV) for massive deployment. Hence the DCs involved in this project will not only be highly sought-after individuals due to their gained experience at the interface of industrial and academic collaboration, but additionally they will be highly attractive for the automotive industry as experts in the strongly growing field of fast-charging, a frontier research area that will help to address the infrastructural needs and sustainability goals of the 21st century. This constellation will significantly further their individual career paths in industry and academia.

E2GO will hire 9 DCs in total, which will multiply the immediate impact of their own training and experience by sharing not only the newly acquired technical expertise but also the “soft knowledge” concerning the different ways of thinking between industry and academia. By this, these fellows will gain a high level of employability and become real translational researchers capable of integrating both worlds of academia and industry.

The 9 DCs will be enrolled as PhDs earning experience in the industry.

- **Eligibility and mobility criteria (mandatory requirements EU rules)**

- Supported researchers must be doctoral candidates, i.e. not already in possession of a doctoral degree at the date of the recruitment.
- Recruited researchers can be of any nationality and must comply with the following mobility rule: they must not have resided or carried out their main activity (work, studies, etc.) in the country of the recruiting beneficiary for more than 12 months in the 36 months immediately before their recruitment date. For 'International European Research Organisations' (IERO), 'international organisations', or entities created under Union law, the researchers must not have spent more than 12 months in the 36 months immediately before their recruitment in the same appointing organisation. Compulsory national service, short stays such as holidays and time spent by the researcher as part of a procedure for obtaining refugee status under the Geneva Convention<sup>1</sup> are not considered.

- **Conditions of employment**

The successful candidates will receive from both employers an attractive salary in accordance with the Marie Skłodowska-Curie Actions (MSCA) regulations for Doctoral Candidate researchers and will include a mobility allowance.

The guaranteed PhD funding for the E2GO DC6 is for 36 months, divided in two consecutive periods (the initial period of 18 months is supported by University of Minho and the second period is supported by Efacec Electric Mobility, S.A.). In addition to their individual scientific projects, all fellows will benefit from further continuing

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<sup>1</sup> 1951 Refugee Convention and the 1967 Protocol.

education, which includes internships and secondments, a variety of training modules as well as transferable skills courses and attractive participation in conferences

- **Job Description**

- **Research field:** Electrical Engineering, Power Electronics
- **Research Objectives:** New power electronics technologies for advanced high-current DC fast chargers.
- **Research Activities:** DC6 The research will focus on the study and application of new semiconductor technologies and conversion topologies targeting a design of a DC/DC conversion stage module with a higher-power rating (>90 kW). This converter if compared with the state of the art, allows the significant reduction of the number of parallel modules that are required for an ultra-fast DC Charging station. To overcome this challenge, it is necessary to study each key component (e.g., wide band gap semiconductors, driver circuits, magnetic materials, high-current capacitors) applying innovative methodologies for the multi-variable characterization and modelling. The research will then be focused in the designing of solutions for the expansion of the operation area of limiting components to increase the current and power ratings. This is especially important to address the trend on the evolution of the charging current and power ratings.
- **Employment and Secondment:** The selected DC will be enrolled as Ph.D. student at University of Minho. The DC will be hired for 36 months, with 18 months in the University of Minho and with 18 months in EFACEC (PT), respectively, supervised by Prof. Vitor Monteiro and Mr. Nuno Costa.

- **Job Requirements**

We are looking for a candidate who meets the following requirements:

- You are creative and ambitious, hard-working, and persistent.
- You have an MSc degree in electrical engineering or any other relevant program.
- You have theoretical and applied knowledge of power electronics
- You have hands-on experimental experience in power converter circuit design and implementation. Experience with high-power converters is a big plus.
- You have good communicative skills, and the attitude to partake successfully in the work of a research team.
- You have a good command of the English language (Spoken and Written).

- **Application Procedure**

**Documents requested:**

- Eligibility Statement: for verifying MSCA requirements, the candidates clearly indicate exact dates of (1) degree entitling to pursue a PhD (typically a Master of Science degree or Engineering degree), (2) positions and country of residence in the last 5 years.
- Complete CV (Europass format obligatory: <https://europass.cedefop.europa.eu/documents/curriculum-vitae>). The candidates are allowed to pursue a maximum of three positions in the E2GO programme. If more than one position is pursued, please clearly indicate all the positions that applied with priorities on the first page of the CV.
- Motivation letter (maximum 1 page per position applied) should state why the applicant wishes to pursue the specific research and why she thinks s/he is an ideal candidate for the position.
- Scan of certificates showing BSc, MSc and other courses followed, with grades and if it is possible a ranking.
- Up to 3 recommendation letters and/or contact e-mail addresses with a brief professional description (title, position, relationship with applicant) of the referring person.
- If possible up to two selected publications (e.g. MSc thesis, conference paper) in English.

**Selection Process:**

The selection process contains two phases.

In the first phase, a pre-selection of possible candidates will be performed by Recruitment Committee. Based on CV, experience, skills, and motivation letter and a few round interviews, the Recruitment Committee will reduce the candidate list to a max of three candidates for each position.

In the second phase, the selected candidates will be invited to an official recruitment event in TU/e campus (NL) for the final interview. In the recruitment event, all the selected candidates for the 9 positions will meet each other with the supervisors.

E2GO deals with a recruitment process based on the European principles of openness, fairness and transparency that guarantee a selection of candidates in respect of merit and gender balance.

Please, note that applications that do not follow the announcement's guidelines will not be considered.

- Deadline for online application: 28 September 2022
- Recruitment event in October
- Targeted Starting date 1 March 2023

For more information about the project and any informal enquiries, please contact Mr. Nuno Costa ([nfcosta@efacec.com](mailto:nfcosta@efacec.com)) and Prof. Vitor Monteiro ([vmonteiro@dei.uminho.pt](mailto:vmonteiro@dei.uminho.pt)).