

06.02.2024

## Master thesis proposal

### An energy management algorithm for DC fast charging stations of electric vehicles

#### Job Description:

You will have the opportunity to work in Energy Lab 2.0, one of the most advanced research facilities in Germany in the study of the energy solutions of the future. We cover topics such as power systems, power electronics, energy storage systems and renewable energy sources.

Your master thesis will be related to the development of an energy management algorithm for DC fast charging stations of electric vehicles. You will also define a stochastic approach to reproduce a daily the electric vehicle usage. Finally, you will have the opportunity to test your algorithm and the stochastic behavior of electric vehicle owners in a real-time simulation in Energy Lab 2.0.

#### What we offer:

- Opportunity to improve your knowledge in DC fast charging stations for electric vehicles and energy management approaches.
- Access to research and experimental facilities.
- Friendly work environment.

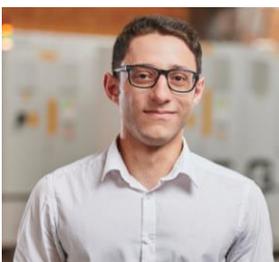
#### Thesis Tasks:

- 1.1 Review of the main standards, power levels and power electronics in DC fast charging stations.
- 1.2 Review of energy management approaches for DC fast charging stations.
- 2.1 Definition of a stochastic approach for electric vehicle usage.
- 3.1. Definition of a first level energy management approach to define the size of a battery energy storage system and photovoltaic unit.
- 3.2. Definition of a second level energy management approach to optimize the operational costs and the charging schedule of the DC fast charging station.
4. Write the final thesis work with all the simulated and experimental results.

#### Your Profile

- Currently enrolled in a master course in Electrical, Automation or Energy informatics.
- Basic knowledge of some optimization approaches is recommended but not required.

**If you are interested in this master thesis, just contact us or send us your CV with a brief mail describing yourself and your motivation – we are looking forward to your application!**



#### Contact:

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Possible start date: 1<sup>st</sup> - 31<sup>st</sup> of March 2024