

## Power convertors and efficiency in battery applications

More and more battery applications are entering the market, leading to stronger requirements in terms of power converter performance and efficiency in order to be competitive. Power converters are essential components in electrical systems with batteries. They serve as an interface between systems of different voltage levels, convert between AC and DC, and enable charging and discharging of batteries.

The Power convertors and efficiency in battery applications course introduces you to the world of power conversion. Specifically, you will explore the basic principles of power conversion, and receive a brief overview of the various types of power converters. You will get acquainted with power conversion principles and efficiency measurements. You will also understand how to match the right type of converter to various real-world battery applications while assessing overall system performance with respect to energy efficiency. Finally, you will learn how to measure the capacity and energy efficiency of a USB power bank and explore a home storage system use case.

### Learning outcomes

This course empowers learners to:

- Apply insights into the need for power conversion in future applications.
- Identify the type of power converters required in a battery application.
- Evaluate a given application in terms of component and system efficiency.
- Take into account the energy losses of power converters and batteries in the assessment of overall system performance.

### Course structure and content

Power convertors and efficiency in battery applications is an online course and can be taken at the learners' usual study location. The course consists of three modules. Each module includes reading materials and animations to illustrate the content.

- **Module 1:** Being introduced to the basic principles of power conversion and the relation to the energy efficiency of the energy system.
- **Module 2:** Getting acquainted with power conversion principles and efficiency measurements.
- **Module 3:** Exploring examples of the use of power electronic interfaces for batteries and compare power electronic interfaces across applications.

### Who are the experts?

#### Jolien Despeghele

PhD student in Electrical Engineering at KU Leuven/Energyville. She is a researcher on the project Energy Storage as a Disruptive Technology in the Energy System of the Future.

### Target audience

This course is beneficial for engineers without a background in power electronics concerned about system efficiency in battery applications, but anyone with a non-engineering background working with battery applications interested in an overview of power converter needs and insights into the impact on system performance might find it useful. In order to be able to follow and benefit from the Power convertors and efficiency in battery applications course learners would need to have a basic understanding of electrical systems.

### Course evaluation

To succeed in the Power convertors and efficiency in battery applications course and receive a Certificate of Completion, a learner needs to complete at least 80% of the course contents.

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