InnoEnergy Skills Institute

Battery Storage Value Chain

Last revised: 2023 March

The shift to sustainable energy hinges on improving both our environmental and our economic footprint. That means moving from a linear to a circular value chain: from sourcing raw and processed materials to assembly through to end of life, through to recycling and reuse. And it means understanding the risks, the challenges, and the opportunities involved.

This certification gives you a rock-solid overview and understanding of the full battery value chain, production processes, and end-of-life scenarios. In this certification, you will understand how a Li-ion battery is produced following the different steps in the battery value chain. You will look at both large-scale battery production and the laboratory manufacturing process and understand the steps required to turn materials into battery cells. To evaluate whether we can use the full potential of batteries while in use and, at the same time, regain value from end-of-life batteries, you will learn about state-of-the-art scenarios related to batteries end-of-life in particular re-use and recycling.

Learning outcomes

Upon completion of the certification, learners will be able to:

- Understand the battery industry value chain
- Identify the main challenges of raw materials extraction, supply, and options for end-of-life batteries
- Design a process flow for the production of a Li-ion battery cell
- Describe each step of production of a Li-ion battery cell and discuss its function and challenges
- Appraise the main challenges faced by large-scale production of Li-ion batteries concerning supply chain and manufacturing process
- Discuss the importance of recycling for a circular battery value and pinpoint the relevant steps

Certification structure

The certification is delivered fully online and is self-paced, making it easy for participants to learn without having to take time off work.

The certification consists of three courses and is structured as follows:

Course 1,2: Battery Storage Raw Materials and Supply Chain

- Get an overview of the raw materials that are needed for lithium-ion batteries, how critical they are, and how lithium is extracted.
- Learn the general industrial perspective on Li-ion battery production, focusing on supply chain and the manufacturing process in large scale facilities.

Course 3: From Materials to Battery

- Review the key concepts of battery cells and an in-depth view of the manufacturing process.

Course 4: Batteries End-of-Life: Reuse and Recycling

- Explore the battery end-of-life, reuse, and battery recycling.

Instructors

The certification is led by experts from the EIT InnoEnergy ecosystem. Instructors on this certification are:

An Hardy

Full Professor at Hasselt University, Institute for Materials Research (IMO) & EnergyVille. Specialised in the designed synthesis of inorganic and hybrid (nano)materials for various applications including energy storage and conversion.

Carlos Nogueira

Senior Researcher at Laboratório Nacional de Energia e Geologia with a PhD in Materials Engineering and degree in Chemical engineering, as well as numerous research projects within the area of batteries and recycling processes.

Fernanda Margarido

Associate Professor with Habilitation at IST/UL, on the scientific area of Environment and Energy of the Department of Mechanical Engineering, President of the Scientific Council and researcher at the Center for Innovation, Technology and Policy Research (IN+), and coordinator of the Waste Processing and Management Laboratory, leading a research group on Materials Recycling of Wastes and End-of-Life Products.

Momo Safari

Associate Professor, Department of Engineering Technology, Hasselt University & EnergyVille. The main area of activity is advanced battery technologies and the fundamental research centres around experimental/theoretical investigation of thermodynamics, kinetics and transport phenomena in batteries.

Victoria Flexer

Researcher at CONICET and Professor at the National University of Jujuy. She has a Ph.D. in Chemical Sciences and her work ranges from sustainable mining techniques to the development of state-of-the-art batteries.

Yann Laot

VP Strategy, Sales & Marketing VP Strategy, Sales & Marketing ACC - Automotive Cells Company and former Director of Services, Support, and Solutions for Energy Storage Solutions at SAFT. Specialties are Li-ion topics, i.e., markets, products, technologies, manufacturing, and competitive landscape analysis.

How will you learn?

This is an online certification and can be taken at your usual study location. The certification consists of three courses and is self-paced.

Duration: 13 Hours

Is it right for you?

This certification is beneficial for professionals interested in understanding the process and value behind each step of the battery storage value chain.

Prerequisites: In order to be able to follow and benefit from the Battery Storage Value Chain certification learners would need to a basic general background knowledge on chemistry and the energy system.

Certificates of Achievement

We offer two pathways for issuing of certificates, **InnoEnergy Skills Institute Certificate** and **EDC (European Digital Credentials),** each with its own unique set of benefits, allowing your organization to choose the one that best suits the objectives. **The Achievement recognition will be awarded at a >75% course assessment pass rate.**

InnoEnergy Skills Institute Certificates

What is it?

The InnoEnergy Skills Institute serves as the certificate issuer, verifying learners' progress and achievements with the course material.

What are the benefits?

InnoEnergy Skills Institute certificates are highly adaptable for recognizing various learning levels and achievements. We offer Participation, Completion, and Achievement certificates for learners who complete online courses through the Skills Institute platform.

What that means for you?

You will receive a digital credential that you can store in your personal digital credential wallet. You can also add and share these credentials on your social media platforms. The authenticity of the credentials can be verified online by anyone seeking credential verification.

European Digital Credentials (europass)

What is it?

European Digital Credentials provide an online record of an individual's personal achievements and qualifications. Recognized by employers across the continent, InnoEnergy Skills Institute can issue European Digital Credentials, which learners can add to their European Digital Credentials wallet. For this type of credentials, we only offer Achievement certificates, awarded at a >75% course assessment pass rate.

What are the benefits?

It allows learners to signal their skills and qualifications using the European Learning Model — a semantic standard that helps the recognition of qualifications and digital credentials across Europe. It also combats fraud, and greatly reduces administrative costs.

What that means for you?

You can be confident in the authenticity of your credentials and showcase your skills in a way that is understood in the context of the European Learning Model. You'll also be able to access everything quickly and easily via your online European Digital Credentials wallet.

Versioning

#	Version	Summary of Changes	Date
1	v1.1	Updated the formatting as per InnoEnergy Colour and Font styles	09-Dec-24