



Chargers of  
Electric Vehicles  
in Learning



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# Guidelines for VET institutions

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## 1 INTRODUCTION

Present guidelines were elaborated for VET institutions offering electricity courses who are also interested in including EV charger training materials in their own courses. The guidelines highlight for the management board of the institutions the new knowledge, skills and competences that can be acquired via these training materials and how they can attract (further) VET students. The document also points out how innovative and competitive the materials are, and how they will help the institution to adapt the elaborated materials into their regular educational activities. The guidelines will include an overview of the project results:

- summary of learning approaches, methodologies the partners found the most effective to be included in the EV charger training materials;
- the elaborated curriculum;
- list of teaching materials (visualisations, assignments, projects) to be used in classrooms.

The document also set up a to-do list on how to adapt and reshape, if necessary, the materials in the institution's own trainings. Recommendations for institutions from countries not participating in the project will be made on how to integrate their own country-specific information into the materials.

## 2 THE C-EVIL PROJECT

The objective of C-Evil project is to develop new learning and training materials on EV chargers in order to fill the gap in electricity education due to the sufficient and efficient multiplying activities. The growing number of electric vehicles needs more and more EV chargers which require adequate electricity professionals who can install, operate and maintain the equipment properly.

There is a need for knowledge that can be taught to electricians or future professionals (VET students). As such the project elaborated materials that can be used anywhere in the EU. The materials cover the main areas connected to EV chargers such as charger types, electrical connections, licencing and permitting, installation, electricity standards, management, maintenance and error maintenance.

Special focus is put on not only the hardware part of the EV chargers, but also on its software features, i.e. smart management applications. The content also acknowledges the fact that, even though, there is general information that is valid everywhere, there are also rules and specifications that are different in every country. Country-specified information is available which makes the materials more thorough.

In order to help understanding the terminology in the different languages, and to facilitate the employment in the EU, a glossary is set up with the most important terminology in the project partners' languages.

### 3 SUMMARY OF LEARNING APPROACHES, METHODOLOGIES

The C-Evil partnership identified **seven** major learning objectives for the learning materials on chargers of electric vehicles.

To provide students with specific knowledge that will enable them to handle EV Chargers

To develop students' personal/ professional skills

To develop training materials and assessment methods and tools

To take the necessary steps to have EV chargers included in the national curriculum

To train specialists in the area among teachers

To make use of European instruments to recognize and validate the learning results

To enhance cooperation with local or national entrepreneurs in order to create a common framework

- Blended learning: theoretical materials with real-life examples
- Inviting experts from the field
- Circular learning approach
- Distance learning for self-study

Adequate form of teaching



- Simple and self-explanatory
- Materials online and to be downloaded
- Lots of visualisation
- Registration
- Online tests
- Summary of the chapters

Use of e-learning platform



- Introducing the materials in the VET school's programmes
- Initiating accreditation at policy level
- Getting in touch with local entrepreneurs from the field

Integration of the materials



How can we best achieve these learning objectives?

How can C-Evil project and its results contribute to your efforts to be able to include EV charger knowledge in your offered programmes?

- Blended learning materials: theoretical materials with real-life examples
- Inclusion of experts from the field during elaboration
- Opportunity for distance learning via e-learning platform

Adequate form of teaching



- Free, easy-to-use and transparent platform
- Online and downloadable materials
- Visualisations
- Registration
- Online tests
- Extra supporting materials

Use of e-learning platform



- Guidebooks available not only for VET institutions but also for VET teachers and policy-makers
- Project partners are available for collaboration for wider integration of the materials locally

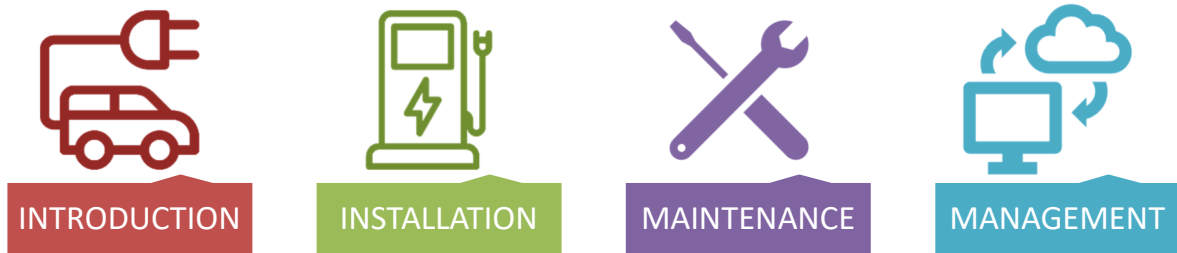
Integration of the materials



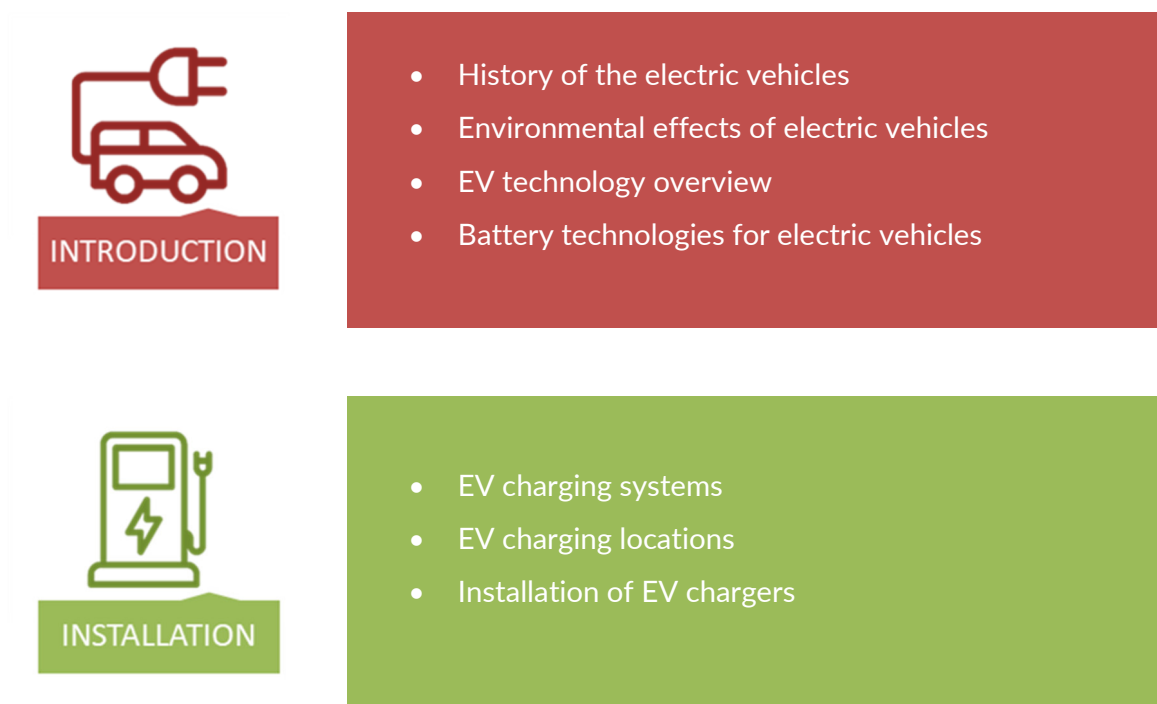
The C-Evil training and learning materials offer a complex and comprehensive approach towards chargers of electric vehicles. Theoretical knowledge is available in the field of electricity with a pinch of physics, social studies and IT. Better understanding is supported by real-life examples.

## 4 THE ELABORATED CURRICULUM

The identified structure of the training materials:



What do these chapters cover?







### MAINTENANCE

- Regular maintenance
- Troubleshooting



### MANAGEMENT

- Management of EV charger stations
- Smart management

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## 5 LIST OF TEACHING MATERIALS

Downloadable training material for teachers/trainers

Video recording of an EV charger installation

List of further reading

Visualized printable activities

Country-specific information from the project partners' countries (bilingual)

Glossary

Tips for online teaching

## 6 TO-DO LIST ON HOW TO ADAPT AND RESHAPE THE MATERIALS

### Get familiar with the C-Evil platform and materials

- Visit our project website (<https://www.c-evil.eu/>) and platform (<https://cevil.avaca.eu/en/home>).
- Ask your teachers and trainers to go through the modules and tests as an e-learning material.
- Discuss your institution's opportunities to include the materials in your offered programmes.

### Get in touch with stakeholders

- Assess the needs of your students related to e-mobility and EV chargers.
- Contact local authorities/policy-makers for information about integration.
- Contact local companies working in the field of e-mobility about possible collaborations.
- Contact C-Evil project partners for questions, recommendations and cooperation.

### Initiate the process of integration

- Contact other local VET institutions if they have similar intentions.
- Regardless the possible method of integration of the materials (accreditation or simply as an extra topic in one of your available course), follow the instructions of the authorities.
- Strengthen your application/request (if needed) with needs analysis based on the feedbacks of other schools, students and local businesses.

### Adapt the materials to your needs

- Translate if necessary.
- Complement the modules with further topics/information. Think about local characteristics.
- Create/update the country-specific information.
- Develop further supporting materials (e.g. visualisation) and test questions.

Project partners of C-Evil are open for new ideas, recommendations, and collaboration with further institutions. Please, get in touch with us.

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Learning Hub Friesland	NETHERLANDS	<a href="http://learninghubfriesland.nl/">http://learninghubfriesland.nl/</a>
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