

Guideline for „Slow Charging” and influence on medium voltage grids

Action plan within the Interreg project “E-MOB: Integrated actions towards enhanced e-mobility in European regions”



*Sharing solutions for
better regional*



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THE E-MOB PROJECT

E-mobility has a great potential to improve our environment. Cars, trains and planes account for a quarter of global energy consumption and approximately the same proportion of emissions. That is a heavy load – but at the same time also a unique chance to limit our impact on the climate. The 9 partners of the E-MOB project represent 8 European regions at different stages of e-mobility development, but they all share the view that e-mobility represents the future of mobility: a clean, quiet, advanced technology, combined with power, speed and lots of fun.

E-MOB stands for Integrated actions towards enhanced e-mobility in European Regions and aims at enhancing e-mobility solutions in regional passenger transport systems through coordinated policy learning and planning. As an ambitious target, the partners strive for influencing in total more than 26 million EUR of Structural and other Funds through 8 policy instruments to be revised in the frame of a series of peer reviews and learning conferences. Based on the outcomes of this interregional learning process (8 good practices and policy recommendations), the partners will jointly elaborate Action Plans for the improved implementation of the selected 4 Structural Fund Programmes and 4 other policy instruments. Actors of regional relevance will be involved in the whole procedure, being invited in the whole interregional learning and action planning process. The engagement of stakeholders will be facilitated by the establishment of 8 Regional Stakeholder Groups. Members of the RSG – together with interested municipalities – will also have the possibility to improve their capacities in turning the policies concerned into actions: Partners will elaborate the E-MOB Guideline and organise regional trainings in e-mobility strategic planning. This coordinated intraregional learning will contribute to plan and implement concrete measures and projects in the field of e-mobility, bringing tangible results to the participating regions.

WHICH POLICY INSTRUMENT DID VORARLBERG ADDRESS?

At the beginning of the project, the main policy instrument addressed was the “Elektromobilitätsstrategie Vorarlberg 2015-2020”. This document gave a framework for the development of e-mobility in the State of Vorarlberg. The document needed to be improved and redefined for the years after 2020 including a clear analysis of the pros and cons of the measures, their impact in the last years and an integration of changed boundary conditions and newest developments within Europe. For reaching the ambitious goals of the state of Vorarlberg, it was essential to define clear and ambitious short- to midterm subgoals in terms of increasing e-mobility in Vorarlberg and, therefore, decreasing energy consumption and emissions. Hence, a clear pathway for 2020 to 2025 needed to be defined by improving this policy instrument within the project. This pathway needed to include an analysis of the interaction between electric vehicles and electric grid and recommendations for a joint expansion and development of e-mobility and infrastructure (loading devices, renewable energy generation, electric grid).

During the project, the addressed policy instrument was influenced by the project in a way that electro mobility is now part of the Energy Autonomy+ 2030.

The Energy Autonomy+ 2030 Strategy for the first time since the start of the Energy Autonomy Vorarlberg in 2009 combines all aspects of generation of renewable energies and usage within the energy system of Vorarlberg. The process structure is based on the seven sectors of the Climate



Protection Act. These sectors are in turn assigned to fields of action. In these fields of action, projects and measures are defined and implemented that are necessary for achieving the goals of the respective fields of action and the overarching goals. It is important to mention at this point that the Energy Autonomy+ 2030 Strategy can be adapted to changed framework conditions if necessary. The strategy is therefore not to be seen as a rigid paper, but takes into account the dynamics of ongoing developments. The three overarching goals until 2030 are derived from the Climate Emergency Report of the Vorarlberg state government, the current government programme of the state and the EU climate target for 2030 adopted in April 2021:

- The share of renewable energy sources will be increasing and is to amount to 50 % of the total final required energy demand in 2030.
- Greenhouse gases in all sectors including mobility are to be reduced by an overall amount of 50% compared to the 2005 levels.
- In addition, 100 % renewable energies are to be used in the electricity supply from 2030 onwards.

Within the policy instrument, so called “Wesentliche Aktionsfelder” (important action fields) are given. These action fields describe necessary tasks to be done and measures to be implemented in Vorarlberg to reach the goals of the policy instrument.

WHAT’S NEXT OR BETTER: WHAT IS AN ACTION PLAN?

Based on the results of the E-MOB project, a so-called “action plan” was developed. This action plan is closely connected to the tasks and measures of the policy instrument, ensuring that the lessons learned from the E-MOB project find its direct way to the implementation of the policy instrument. Or in other words: the action plan ensures that the work of the last three years finds its way into the Energy Autonomy+ 2030 and helps to enhance electro mobility in Vorarlberg.

WHO INSPIRED THE ACTION PLAN?

In the good practice “Innovative approach for tackling public charging infrastructure” the E-MOB partner Koprivnica pointed out, how important it is to have “slow charging” facilities. They stated in their review process concerning the potential for learning or transfer, that slow charging of vehicles overnight represents a great relief for the energy system. Although they realise the slow charging via street light poles which is not done in Vorarlberg, the idea of reduced charging power during night was a great inspiration for Vorarlberg University of Applied Sciences to discuss the topic with its stakeholders illwerke vkw, vorarlberg netz and the state of Vorarlberg. Furthermore, in almost all reviews and learning conferences the necessity was identified to foster renewable electricity generation with PV along the increasing penetration of electro mobility. This inspiration will be taken to a next level in this action as the medium voltage grid will be investigated in addition to the low voltage grid. Hence, both aspects (slow charging and medium voltage grid) are directly inspired by the E-MOB project and the meetings with our European partners.



WHAT ARE THE ACTIVITIES OF THE ACTION PLAN?

The stakeholders decided to carry out a simulation study together with Vorarlberg University of Applied Sciences in 2022/2023. A simulation tool will be extended to allow for the simulation and evaluation of slow charging. The simulation tool is also extended by the medium voltage grid to allow to investigate the impact of electro mobility and PV generation from the lowest to the medium voltage level of the grid. The action is clearly related to chapter 7.8 of the policy instrument in which the following goal is stated: *“The increasing demands on the electricity grid, primarily due to the vast integration of photovoltaic systems and the increase in electromobility, should be optimally managed in economic terms through smart approaches (smart grid) and conventional grid expansion.”*

To support this goal, the aim of the study is to find out, how slow charging following the example of Koprivnica helps to relieve the low voltage grid and, therefore, helps to implement point 7.8.3.2 of the policy instrument in which it is stated that *“The grid operator should be able to reduce the charging capacity of e-mobility in times of high grid utilisation in order to enable an economically efficient and targeted grid expansion.”* For this issue, the number of charging facilities available and its monitoring is crucial.

The work on the medium voltage grid will help to implement point 7.8.3.2 of the policy instrument in which is stated that *“due to the higher utilisation of the local grids, in addition to the use of intelligent grid solutions, it will also be necessary to reinforce the medium and low voltage grids (also with additional transformer stations).”* For this issue, the share of PVs installed in medium compared to low voltage grids is crucial.

Concerning the nomenclature of the Interreg Europe manual for the projects of the fourth call, the action plan can be classified as Type 2 action: it will change the management of the policy instrument (improved governance). In particular, the State of Vorarlberg has an annual monitoring report for the policy instrument. This action plan will improve this monitoring report by implementing two new KPIs relevant to the learnings of the E-MOB project into it: 1) number of charging points (slow chargers and fast chargers) and 2) share of PV installed in medium voltage grid compared to low voltage grid.

In summary, the simulation study delivers a guideline for slow charging of EVs in Vorarlberg that will not only influence future funding of charging stations but also will help for cost efficient electricity grid investments. Furthermore, the guideline will give a clear advice on how low and medium voltage grids must be upgraded for the future needs for electro mobility. Finally, it will foster further action to increase the share of electro mobility in Vorarlberg and combines it with a clear change in the management of the policy instrument.

DOES FHV INCLUDE OTHER STAKEHOLDERS AS WELL?

Similar to the whole E-MOB project, FHV includes several stakeholders in the project. illwerke vkw is mainly responsible for the implementation of additional charging points in Vorarlberg, for fostering electro mobility in general and for increasing the share of renewables to serve the needs of increasing electro mobility. In this project they will define different slow charging options and information on the share of PV in medium and low voltage grid. vorarlberg netz is the main grid operator in Vorarlberg. They will give advice on the technical issues of the grid simulation and will be the main financing institution of the action. The State of Vorarlberg is responsible for the policy instrument and the monitoring report of the Energy Autonomy+ 2030. They will implement the results and the new KPIs into the monitoring report and, therefore, will change the management of the policy instrument. Vorarlberg



University of Applied Sciences with its group in grid simulation carries out the simulation and has the lead concerning the guidelines.

ONE STATEMENT THAT SUMMARIZES ALL?

With this action plan the E-MOB project will come to a successful end and Vorarlberg proves again that for important energy related strategies all stakeholders pull together in the same direction to achieve the overall goal: enhance e-mobility in Vorarlberg to help save CO₂ and achieve the goals of the Paris agreement.

RELEVANT LINKS:

E-MOB project FHV:

<https://www.fhv.at/forschung/energie/laufende-forschungsprojekte/e-mob/>

E-MOB project general:

<https://projects2014-2020.interregeurope.eu/e-mob/>

Energy Autonomy+ 2030 general:

<https://www.energieautonomie-vorarlberg.at/de/>

Energy Autonomy+2030 download:

<https://www.energieautonomie-vorarlberg.at/zoolu-website/media/document/3817/Strategie+Energieautonomie%2B+2030>

