E-Mobility: Implications for the distribution grid

1 – Introduction

1 Learning objectives of the course
2 Introduction of the course

2 – Introduction to E-mobility

1 Electric drive train
2 Comparison of battery electric vehicles and plug-in hybrid electric vehicles
3 Fields of application
4 Global market share of electric vehicles

3 – Charging infrastructure

1 Charging technology
Regular and fast charging/ Charging curves
2 Charging locations for passenger vehicle
Private / workplace charging/ public charging
3 Commercial vehicles
4 Construction of public charging infrastructure
Methods to find the right location for public charging infrastructure/ The approval process and actors involved

4 – Challenges and opportunities in grid integration of e-mobility

1 Conventional energy system
2 Renewable energy system

E-Mobility: Implications for the distribution grid

3 Grid integration challenges
General challenges/ New load for grid operators/ Variable predictability in different use cases and charging power levels/ Impact on the distribution grid
4 Opportunities in grid integration
Generation and load synchronization/ Reduction of the need for grid expansion/ New business areas

5 – Charging strategies

1 Charging strategies
Uncontrolled charging/ Balances charging/ Peak load shaving / Flexible charging / Vehicle to grid technology
2 Weekly load profile

6 – Differences between urban and rural areas

1 Energy systems in rural and urban areas
2 E-Mobility in rural, suburban, and urban areas
Rural areas/ Suburban areas /Urban areas
3 Multi-use concepts
4 Charging infrastructure

7 – Recommended course of action for system operators

1 Passive and active grid operators
2 Grid operator signals
3 Long-term grid integration
4 Changes in distribution grid operations
Internal processes/ External processes
5 Need for local research
6 Incentives for distribution grid operators

8 –Summary

1 Summary of the course
2 References
3 Additional readings
4 Additional glossary terms