



TUTORIAL ON GRID INTEGRATION OF ELECTRIC VEHICLES: STATUS AND EXPERIENCES – DETAILED DESCRIPTION

FRIDAY 27. SEPTEMBER 2021

Session 1: 09:00 - 10:30

The first session will introduce all aspects related to electric vehicle charging. The participants will gain an insight understanding on the electric vehicle charging process, before considering the grid impact in session 2.

Introduction of electric vehicles types

- Case Study China

Dependency on renewable energy to meet the climate goals

Use Cases of charging infrastructure

- Home / Work charging
- Errand charging
- Highway charging

Charging types

- AC (Type 2, Bharat AC-001)
- DC (CHAdeMO, CCS, GB/T, Oppcharge)
- Wireless
- Battery swap

Communication protocols

- IEC 62196
- ISO 15118
- OCPP
- Roaming protocols

Electric vehicle related charging parameters

- Battery design and management
- C-rate

Introduction to charging infrastructure policies

- The need for government support
- Case Studies (China, India, USA, Germany ...)

Session 2: 11:00 - 12:30

Based on the developed understanding of session one the participants will develop a comprehensive understanding on grid related aspects of electric vehicle charging and how smart charging and vehicle to grid schemes can support the energy transition towards a fossil free economy, while staying within the grid constraints.

Energy requirements vs Grid bottlenecks

General grid integration aspects

- Voltage, Frequency control
- Black start
- Safety standards
- Buffer batteries

Smart charging

- Valley filling
- Traffic light concept
- Reactive control vs. Forecasting
- Pricing (static vs. dynamic; time of use rates)
- Current status of development

Bidirectional Charging

- Car manufacturer support
- Vehicle to Grid
- Vehicle to Home
- Global development

Renewable Energy integration strategies

- Green energy vs. grid constraints
- Renewable energy forecasting
- Market impacts

User satisfaction

- Priority button
- Incentive structures