

Course Outline

Electrification of Transportation Fundamentals



3-Part Course | 7 Hours

Live: October 18th, 19th, and 20th, 2022 from 2 - 4:20 PM Eastern

On-Demand: available November 3rd

Outline

Session 1: Growth of EVs, Technology Issues, and Customer Concerns

- Setting the stage – The rise of electric vehicles
 - Adoption rates
 - > Historic adoption rates
 - > Projected future growth and models
 - > Passenger vehicles
 - > Fleets and buses
- Critical issues related to customer adoption
 - Charging speeds
 - > Level 1
 - > Level 2
 - > Level 3 DC fast charging
 - Charging standards and interoperability
 - > ChadeMo
 - > CCS
 - > Tesla
 - > Wireless
 - > Battery swapping
 - Vehicle limitations and concerns
 - > Charging speeds
 - > Battery capacity and technologies
 - > Battery chemistries, cycle lives, and implications for the grid

Session 2: Implications of EVs for Future Power Grids

- Implications for load growth and energy consumption – high voltage system
 - Projected future energy use
 - Resource adequacy
- Challenges at the low voltage circuit level
 - Hosting capability and need for potential infrastructure investments
- Cybersecurity
 - Potential impacts to vehicles and grid
 - Countermeasures
- Approaches to grid connections
 - Managed charging
 - > Use cases

- Wireless charging combined with storage
 - > Pilots
- Vehicle-to-facility
 - > Initial use cases and initiatives
- Vehicle-to-grid
 - > Initial use cases and potential revenue streams
 - > Pilots and utility programs

Session 3: Policies and Planning Models for an Optimized EV Future

- Addressing the mobility of the resource
 - Registration of unique, mobile assets
- Aggregation
 - Communication and coordination among various assets from multiple vendors
 - Remote monitoring of stationary vehicles and assessing cycle life and state of readiness
 - Dispatch and portfolio management – vendor control vs utility control
- Assigning value to EVs in a DER resource planning process
 - The challenge of forecasting at macro and granular levels
 - Understanding potential evolution in-vehicle use and charging behavior
 - Valuing the resource and setting appropriate incentive levels to achieve desired outcomes
 - Understanding limitations and creating portfolio approaches
- The critical importance of incorporating EV management into multiple utility planning departments (“silos”)
 - Understanding the potential and limitations, and impacts on multiple departments (e.g., generation, transmission, distribution, IT, and customer care)
 - The challenge of coordination among multiple entities (grid operator, distribution utility, vendor)
- Effective EV program design
 - Setting appropriate rates
 - Motivating participation in DER programs (drivers, charging companies, and other potential actors)
 - Effective program design with appropriate pricing and technology
 - Iterative approaches to evaluating technologies (and desired quantities) to achieve targeted outcomes
 - Integration with other distributed energy resource programs
 - The critical need for timely, accurate, and granular market-based locational information
- Policy and rate structures
 - The importance of the policy and regulatory landscape
 - Federal policy drivers (e.g., FERC 2222)
 - EV tax incentives and other subsidies
 - State and local policy drivers (monetary incentives and other privileges)
- The growing need for an evolving and secure grid architecture
 - The challenge of growing bi-direction flows/transactive power
 - Monitoring and power quality concerns