Electric Vehicle Charging and the Electric Grid

Workshop on cyber threats to electric vehicles and their charging infrastructure
(WP.5) Working Party on Transport Trends and Economics (36th session)
September 5th, 2023

Sylvain Clermont, ing.
Vice-chair Group of experts on Cleaner Electricity Sytems

DigiTransfo expertise
Electric Grid Digital Transformation and security | Energy Transition

Grid-Friendly Behavior

- Adoption of EV is projected to grow rapidly
- Electric Grid is challenged and is adaptating to:
  - Climate changes (extreme weather events) - resiliency
  - Energy Transition
    - Changing energy mix
    - Integration of renewables
    - Decarbonation, decentralization and digitalization
- Relationship between both distribution and transmission grid reliability and EV charging must be understood
  - Continuous Operation
  - Ride-Through Operation during Large Grid Disturbances
  - Severe and Unexpected Grid Conditions

New Attack Vectors

- Benefit of Integration of EV with smart-grid technology
  - Optimized Charging
  - Load Balancing
  - Efficient Energy Management
- Introduces new attack vectors and risks
  - Communication network
  - Data exchange
- Malicious attempts to compromise (cyber-attack) the charging infrastructure:
  - Charging station
  - Networks
  - Back-end systems
    - Charging operations
    - User data

- Main attack planes of the charging system:
  - Internal network access
  - Physical Access to the EVSE and related components
  - Remote Attacks via internal and external interfaces, protocols and Services for the EVSE
- Interfere with
  - Charging process
  - Access user data
  - Electric grid?
- Protect with good hygiene and cybersecurity program:
  - Identify
  - Protect
  - Detect
  - Respond
  - Recover

Conclusion

- EV Charging must be managed and protected
- Collaboration is key