

Electric Vehicle Charging and the Electric Grid

Exploring Pathways for a balanced integration of e-mobility into power systems

Sylvain Clermont, ing.
Vice-chair Group of experts on Cleaner Electricity Systems
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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 adapting 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: including to cyber-risks
 - Communication
 - Charging components like charge ports, power electronics, etc
 - Data
- Malicious attempts by physical + remote access could compromise the charging infrastructure:
 - Charging components
 - Networks
 - Back-end systems
 - Charging operations
 - User data



State of Cybersecurity

- In addition to comprise the security of the EV
- Attack can lead to
 - Power fluctuations and altered operations
 - Escalated privileges
 - Exfiltration of data
- Attack to aggregations = worst
- We know charging infrastructures to have many flaws not being addressed
- + Legacy devices, protocols and apps = weak cybersecurity posture



Solutions

- No simple, silver bullet solutions
- Good cybersecurity hygiene + robust plan based on best practices and standards over all phases:
 - Identify
 - Protect
 - Detect
 - Respond
 - Recover
- Recommendations
 - Baseline level of security and resilience
 - Share best-practices
 - Use/develop standards
 - Understand the threat



Conclusion

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