

DOCKETED

Docket Number:	22-EVI-06
Project Title:	Vehicle-Grid Integration
TN #:	248691
Document Title:	Presentation - (Open Charge Alliance) V2G & Grid Codes What, why, how
Description:	N/A
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Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	2/8/2023 9:29:45 AM
Docketed Date:	2/8/2023

V2G & Grid Codes What, why, how?

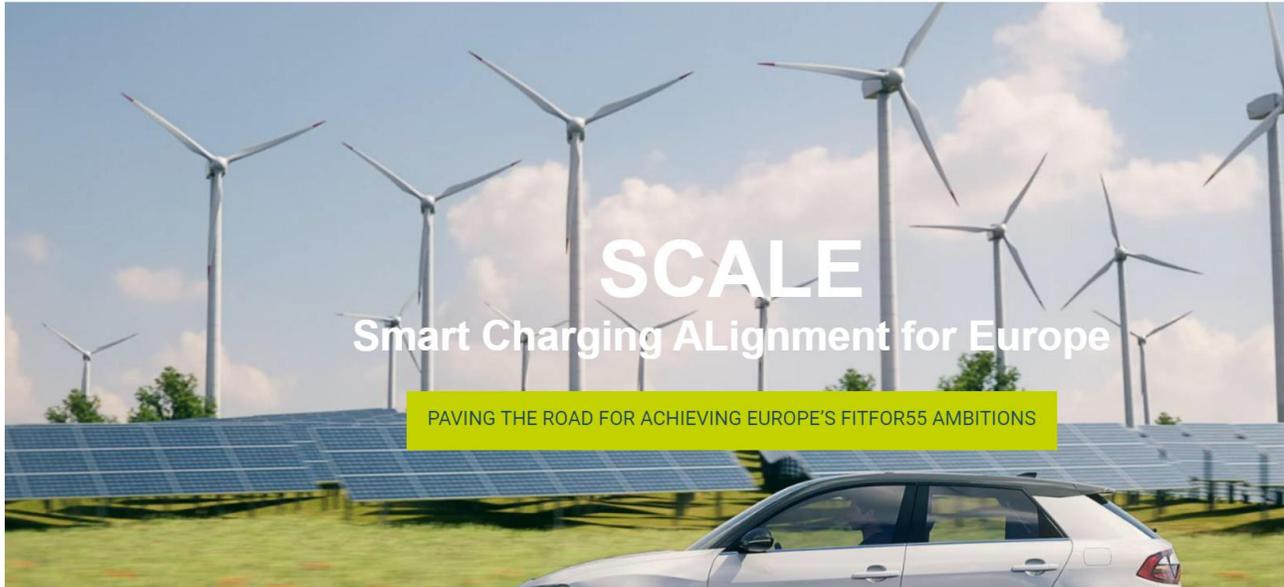




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EU Horizon project (2022-2025)

- France
 - Germany
 - Hungary
 - Norway
 - Sweden
 - The Netherlands
- Assessment of TSO and DSO requirements for V2G
- Harmonization and education to advance V2G adoption



Look out for the 'Grid Codes & V2G' publication this year

Explain what the Grid codes cover and why

- Adjust behavior according to the grid frequency and voltage
- Listen to a direct 'STOP!' signal
- Continue operation despite grid 'hick-ups'
- Detect if the grid is down: do not feed into the grid when it is down and when the grid comes back up, reconnect with care

Address France, Germany, Netherlands, USA

We are reaching out to more countries, such as Japan, Korea

Standardize, build and test V2G fully compliant with the Grid Codes

Grid Codes and V2G - how

Utility

Charging Station Operator

Charging Station

EV



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IEEE 1547 - Standard for Interconnection and Interoperability of Distributed Energy Resources with associated Electric Power Systems Interfaces

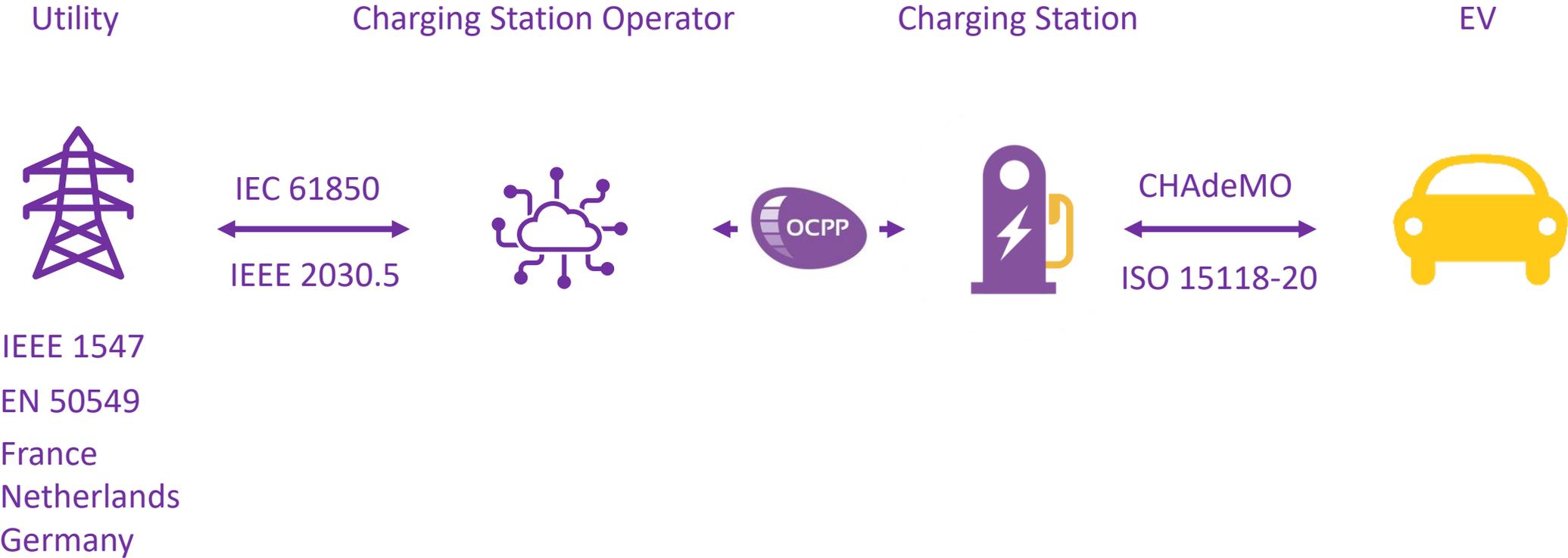
EN 50549 - Requirements for generating plants to be connected in parallel with distribution networks

France

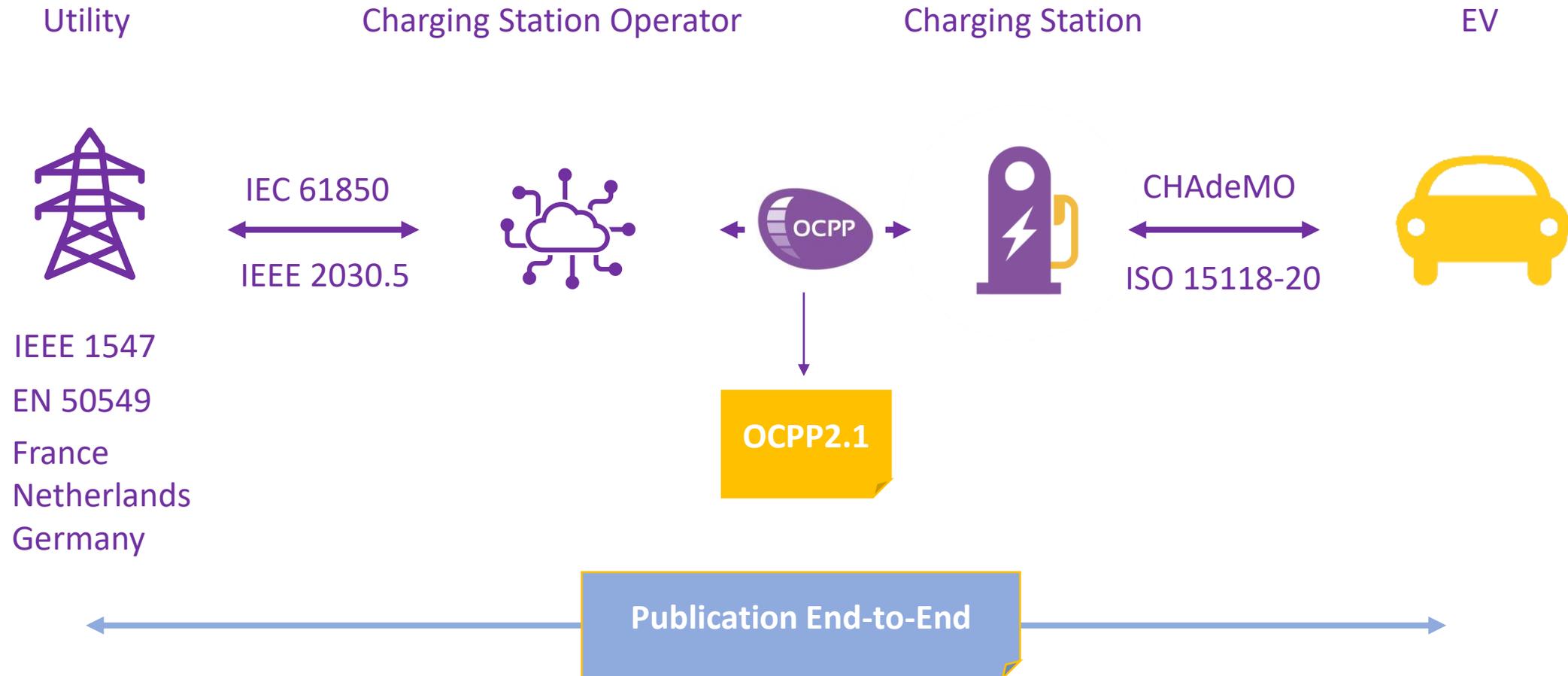
Netherlands

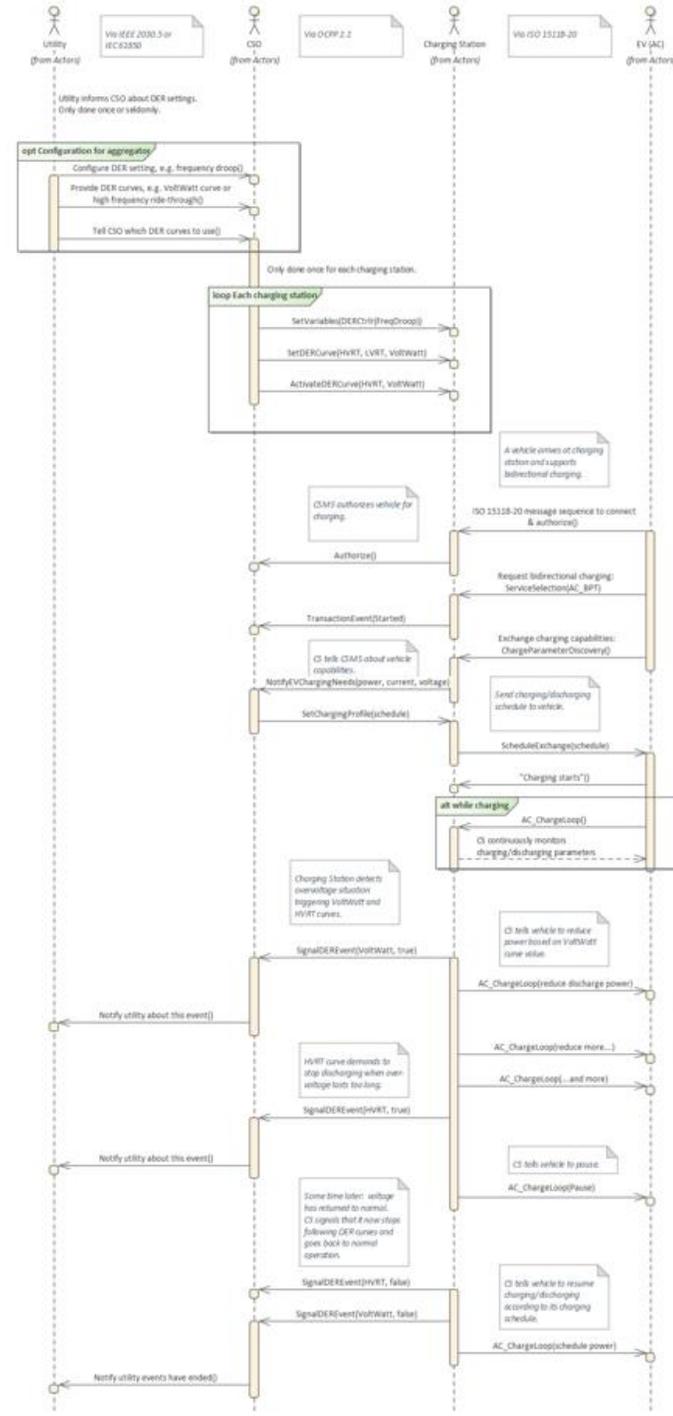
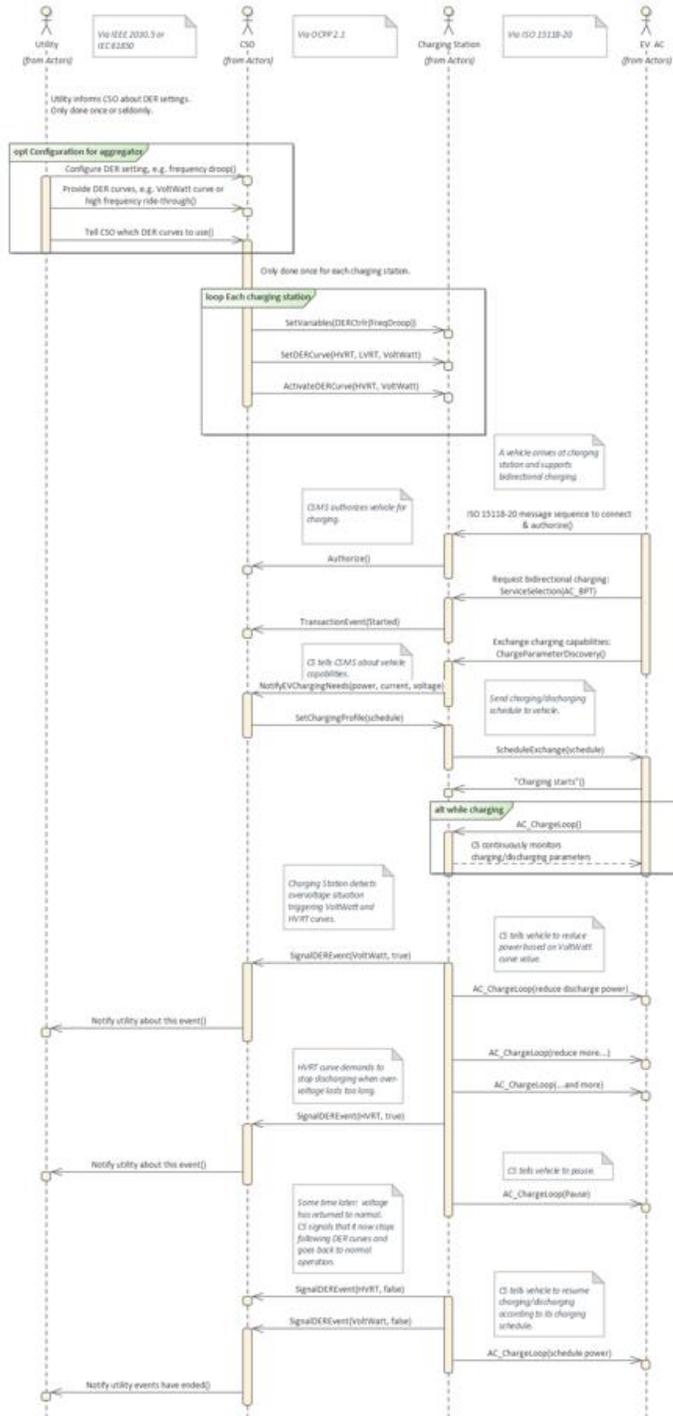
Germany

Grid Codes and V2G - how



Grid Codes and V2G





Open Questions

Examples

Can there be multiple curves to follow or will a different curve that becomes active automatically terminate the previous one?

What shall CS do if multiple DER curves are active and conflicting?

- IEEE 2030.5 ref: 10.2.3.3: use most recent
- CSIP ref: 4.4.3: use most recent command
- California phase 3 DER reqs: 9.4.2: take lowest value

How often does a utility send settings and curves to a DER?

.....etc

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