CharIN – Charging Interface Initiative e. V.

30th GC ESC meeting

Julian Treichel (Porsche) - 15th June 2023, Brussels

CHARIN

ACER proposal – NC RfG

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European Union Agency for the Cooperation of Energy Regulators

Electromobility – applicability of NC RfG

Bidirectional electric vehicles and associated bidirectional electric vehicle charging points or installations

0,8 kW ≤ capacity < 2,4 kW
V2G type EV1

2,4 kW ≤ capacity ≤ 42 kW
V2G type EV2

42 kW < capacity < 1 MW
V2G type EV3

Article 13a of NC RfG
– exhaustive requirements (same for both EV1 and EV2)
- frequency and voltage (LV) ranges
- RoCoF withstand capability
- data interface for charging infrastructure
- autonomous connection
- LFSM-U EV and LFSM-O EV
- voltage robustness/FRT

Article 14a of NC RfG
- requirements applicable to type EV1 and EV2
- voltage ranges for MV/HV/EHV
- system management
- reactive power capabilities
- post-fault active power recovery
- (grid forming capabilities)

LFSM: limited frequency sensitive mode –U: under / -O: over
FRT: fault ride through

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Electromobility – NC RfG compliance

Bidirectional electric vehicles and associated bidirectional electric vehicle charging points or installations

0,8 kW ≤ capacity < 2,4 kW	2,4 kW ≤ capacity ≤ 42 kW	42 kW < capacity < 1 MW
V2G type EV1	**V2G type EV2**	**V2G type EV3**
Equipment certificates only, no connection agreement required in the NC RfG (however national connection rules may require a connection agreement)	Connection agreement between the system operator and electrical charging facility owner Operational notification procedure and requirements to demonstrate the compliance *(Article 30a, RfG)* (potential dynamic/fixed power limitations)	Connection agreement between the system operator and electrical charging facility owner Operational notification procedure and requirements to demonstrate compliance *(Article 30b, RfG)*

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Electromobility /demand units – applicability of NC DC

V1G EVs and associated one-way EV charging point or installation

> 0,8 kW capacity at all voltage levels

heat pumps,

power-to-gas demand units

> 0,8 kW capacity at all voltage levels

New Article in NC DC – exhaustive requirements:

- Frequency and voltage ranges
- RoCoF withstand capability
- LFSM-UC

0,8 kW – capacity threshold follows the current NC RfG determination of significance rules

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Electromobility/demand units – NC DC compliance

Connection point below 1000 V

Equipment certificates only, no connection agreement required

Connection point above 1000 V

Operational notification procedure using demand unit document specified by the relevant system operator

1000 V – voltage criterion follows the current NC DC approach to the compliance rules

(see Articles 32 and 33)

Overarching position on European Grid Codes

CharIn opinion (11/2022)

Regarding NC DC:

- Emobility will become a part of EU grid codes. Support change of requirements for **harmonization of charging**.
- There shall be **no additional requirements which would increase costs** in existing and future chargers (EVSE and EV)
- Charging functions shall **not impose additional homologation requirements and processes**
- European wide **unified Grid Codes** and requirements shall be specific and mandatory in each member state

Risk for existing charging functions

Regarding NC RfG:

- EMobility (incl. energy storage) will become a part of the RfG. Support change of requirements for **harmonization of (dis-)charging**.
- **Bidirectional** Charging (**both AC & DC chargers**) must be enabled and described within a legal framework
- Bidirectional Power Flow functions should **not impose any additional testing & certification requirements** compared to any **stationary energy storage or generation units**
- BiDi capable vehicles shall **always be allowed to charge**
- There shall be an **EU wide dedicated set of Grid Code requirements** mandatory in each member state specifically for mobile devices with limited generating power

Chance for bidirectional charging

Evaluation of ACER Amendment Draft

according to CharIN overarching position

NC DC:

- Equipment certificate requirements for V1G to be checked – delta effort unclear
- LFSM-UC requirements for V1G charging will lead to additional effort

NC RfG:

- New types EV1, EV2 and EV3 appreciated
- Limits for AC BiDi with main functions inside the vehicle (not in charging station) are feared
  - Focus on „electric vehicle charging point or installation”
  - Equipment certificates unsuitable for mobile storages → digital certificates would be appreciated

Overall:

- No target of grid code harmonization on European level visible

Remarks by CharIN members

NC DC

Definition of associated electric vehicle charging point:

Question whether “electric vehicle charging point or installation” applies to Mode 3 and 4 chargers only, or also to Mode 2 chargers (IC-CPD)?

Austria: Charging stations are **usually stationary facilities**. But "in order not to restrict the flexible use of charging points and **also to record mobile devices** such as e.g. on vehicles, trailers or in containers, charging points are not defined as stationary".

→ Interpretation of the term "associated electric vehicle charging point" to be defined in revision of NC DC in Article 2 “Definitions”. Example: “"Associated electric vehicle charging point" defines a charging point, which connects a usually fixed demand facility with a transmission or distribution system. An associated electric vehicle charging point also covers mobile facilities such as on vehicles, trailers or in containers.”

Voltage levels and different requirements:

CharIN members are against allowing different requirements for charging, depending on the voltage level at the grid connection point. Every country, every network area and every charging point in the EU should have the **same requirements** so that we **don't get lost in discussions with individual network operators** again.

NC RfG

AC / DC V2G:

No distinction is made between AC and DC V2G, which means that cars and charging points are often mixed up. It would be helpful if the two variants were described once, and if it was clearly stated that **both are meant**.

Comments on ACER proposal for NC RfG

Article	Proposed draft text	Comment
5.2	A power-generating modules, excluding V2G electric vehicles and associated V2G electric vehicle charging points or installations below 1 MW maximum capacity, within the following categories shall be considered as significant:	This amendment is just excluding EVs and charge points from type A/B/C categories, correct?
13a 1.b	• ±4,0 Hz/s over a period of 0,25 s • ±2,0 Hz/s over a period of 0,5 s • ±1,5 Hz/s over a period of 1 s • ±1,25 Hz/s over a period of 2 s	What is the result of the RoCoF workshop? Will it be amended again?
13a Table XY	Frequency range: 51.5 Hz – 52.5 Hz Time period for operation: 10 seconds	This requirement seems to be new for us (frequency range and time period). Where does this requirement come from? Are these values final?
13a 2.	A V2G electric vehicle charging point or installation shall be equipped with a cyber-protected data exchange interface in order to modulate, without undue delay, active power output and input following an instruction being received at the input port. The relevant system operator shall have the right to specify requirements for equipment to make this facility operable remotely.	The technology must be open in this case, whether EVSE or EV drives this curve.
14a 8.	The relevant TSO shall have the right to request grid forming capability at its connection point from type EV3 electric vehicles and associated V2G electric vehicle charging points or installations as listed in Article Y.	Conversion from on-grid to off-grid operation? What is the outcome of the grid forming workshop?
30b 2.f	studies demonstrating steady-state and dynamic performance as required by Chapters 5, 6 or 7 of Title IV, to the level of detail required by the relevant system operator.	The simulations only apply in Germany and Austria as a requirement for medium voltage. Are the relevant references for tests and simulations already drafted?

Comments on ACER proposal for NC DC

Article	Proposed draft text	Comment
2 (4)	'demand unit' means an indivisible set of installations containing equipment which can be actively controlled by a demand facility owner or by a CDSO, either individually or commonly as part of demand aggregation through a third party or is a **V1G electric vehicle and associated V1G electric vehicle charging point or installation**, power-to-gas demand unit or heat-pump;	What about V2G EV at V1G EVSE or V1G EV at V2G EVSE?
3.1(e)	**V1G electric vehicles that do not meet the definition of electricity storage** and associated V1G electric vehicle charging point or installations, heat-pumps and power-to-gas demand units, with maximum consumption capacity larger than 800W at any voltage level.	What about V2G EVs? What about V2G EV charging point?
25 3(c)	an update of the applicable technical data, **simulation models** and studies proving compliance of electric vehicles and associated V1G electric vehicle charging point or installations, power-to-gas demand unit and heat-pumps	How are simulation models possible for V1G EVs, which move from connection point to connection point? How to handle different V1G EVs charging at a charging point or installation?
XX.2a	• ±4,0 Hz/s over a period of 0,25 s • ±2,0 Hz/s over a period of 0,5 s • ±1,5 Hz/s over a period of 1 s • ±1,25 Hz/s over a period of 2 s	What is the result of the RoCoF workshop? Will it be amended again?
XX.3	With regard to LFSM-UC on V1G electric vehicle and associated V1G electric vehicle charging point or installation and power-to-gas demand units:	LFSM-UC will be extra effort (e.g. for AC chargers in Germany).
XX+2	V1G electric vehicles **and** associated V1G electric vehicle charging point or installations, power-to-gas demand units and heat-pumps shall possess equipment certificates, proving compliance with this regulation.	Do EV AND EVSE shall both have equipment ceritificates?

Control of Chargers and Charge Parks

Active & Reactive Power Management by the DSOs

Active & Reactive Power Control

NC DC states that demand facilities "may" offer active/reactive power control. For EV charging, in practice that is often mandatory – especially for HPC charging.

A unified approach for the control connection would strongly help installation of chargers.

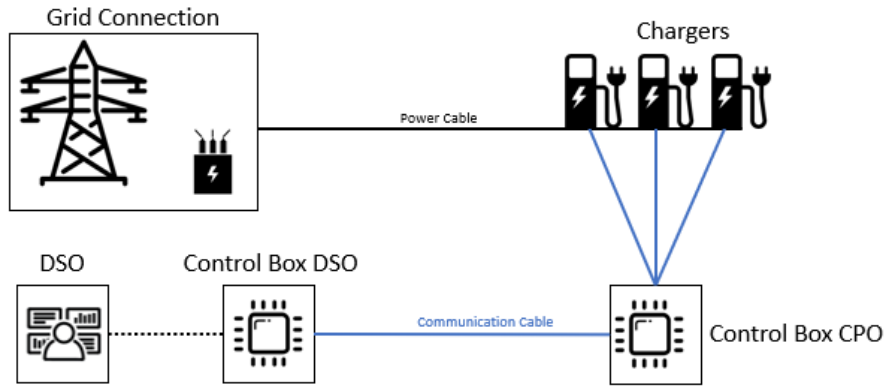
Therefore, it would be beneficial if the grid codes call for requirement harmonization concerning active/reactive power control.

Requirement transparency for charger control

NC DC states that „the relevant system operator shall make publicly available the technical specifications approved to enable this transfer of information."

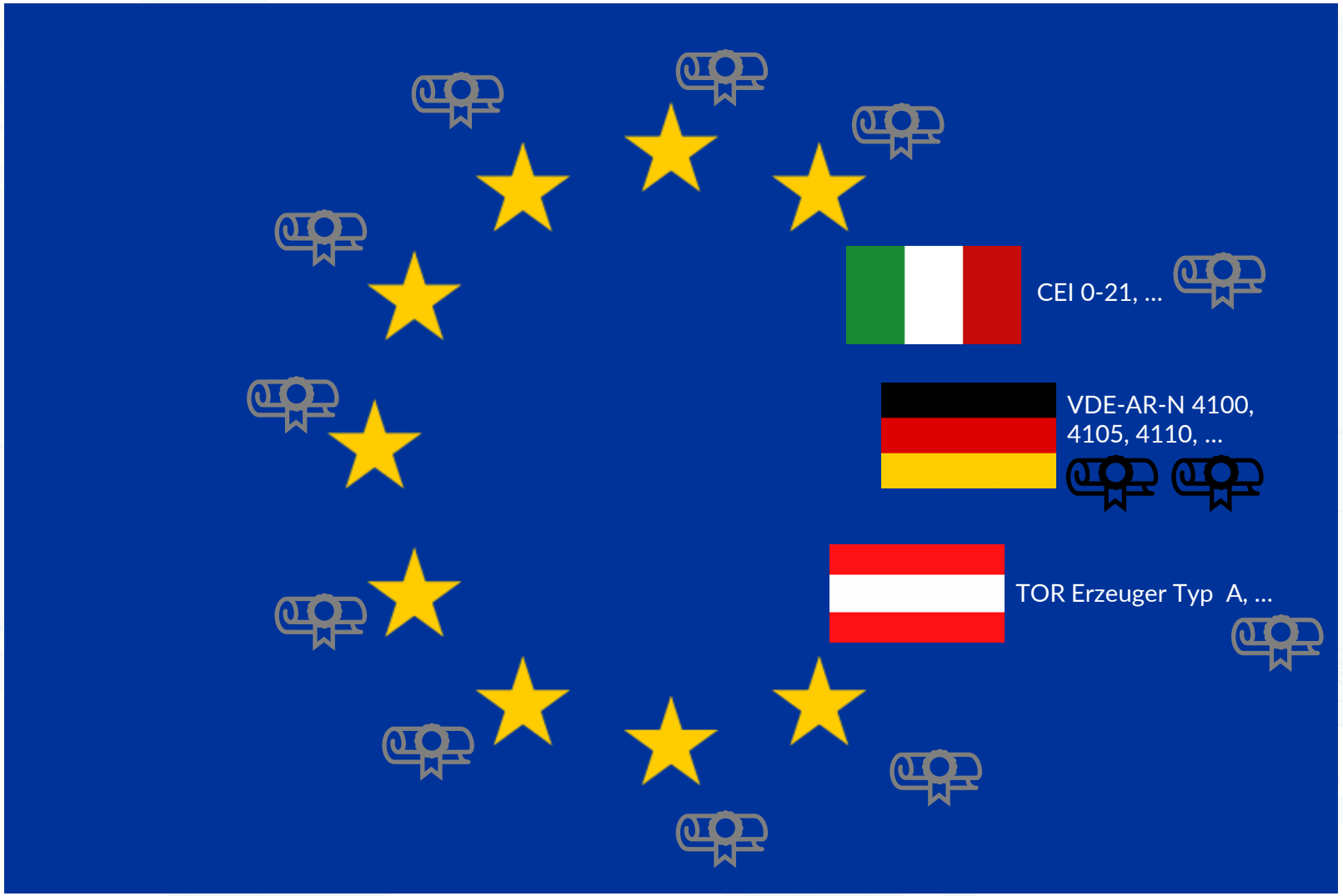
To increase transparency for charger installation, the respective article could be amended by „In accordance with Article 9, a demand facility only has to fulfill the publicly available requirements at the respective date..."

Such an amendment could also be done in NC RfG.



National grid codes

Different requirements in member states



Harmonization of national grid codes necessary

Thank you for your kind attention!

Any questions?

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