

## **Expert group: Development of certification schemes, particularly for EVs and heat pumps**

**Chair:** Mike Kay

**Vice-Chairs:** Florentien Benedict and Erno Leväniemi

### **Problem Statement**

The draft NC RfG 2.0 includes for the mandatory certification of vehicle-to-grid (V2G) EVs (and associated EV supply equipment (EVSE)). Similarly the draft NC DC 2.0 requires the mandatory certification of V1G EVs (and associated EVSE) and heat pumps.

Much good work was completed by the Expert Group “Harmonization of Certification and product Family Grouping” which reported to the GC ESC in March 2023, with follow up actions for draft legal text reported to the September and December 2023 GC ESC meetings. The report laid out the organizational and legal requirements to support the implementation of equipment certification for power generating units within the scope of the NC RfG 2.0 and the NC DC 2.0. That report’s recommendations have been taken into consideration in the drafting of the NC RfG 2.0 and the NC DC 2.0.

For power generating modules, only some member states have existing compliance schemes that include formal equipment certificates, but other member states do not. Those without will need to modify their compliance schemes to include certification for EVs/EVSEs, and even where formal certification is already required, the schemes will need to be extended to include the specific requirement of the NC RfG 2.0 and NC DC 2.0 for EVs (and associated EVSE). For heat pumps it is believed that no member state has a certification scheme for technical requirements, as currently all requirements are assured via the CE Mark process.

However, the international standards and associated technical specifications for EVs (and EVSE) and heat pumps are not yet mature or complete. Consequently there are a number of uncertainties in implementing the relevant mandatory equipment certification schemes. In addition to the still evolving standards, there is a large number of directly affected parties, including all European DSOs, international equipment manufacturers, testing laboratories and authorised certifiers, many of whom will be looking for guidance as to what is required of them when the certification regime becomes mandatory. Although the focus might be on the testing of equipment, there are also requirements for appropriate software simulation models, and these should also be in scope of this work.

Wherever possible, existing testing and/or modelling schemes should be adopted or adapted, particularly those in existing standards.

A further consideration is the existing national requirements for interface protection (including anti-islanding protection) for generation and electricity storage. These are pre-existing national rules and which will apply to V2G EVs and EVSE, and which are differentiated on a national basis, ie they are not standard. Although not in the direct scope of the requirements of the NC RfG 2.0, manufacturers and DSOs will need to consider how these requirements sit alongside the new mandatory certification requirements, and how any resulting additional complexity and costs can be minimised.

The implementation period for mandatory equipment certificates is expected to be three years after entry into force of the revised NCs RfG 2.0 and NC DC 2.0. It would be ideal if the issues foreseen in this proposal could be resolved and briefed to DSOs, manufacturers, testing laboratories and potential certifiers as soon as possible after entry into force so that processes and systems are all in place for when certification becomes mandatory. Since important international product standards eg IEC 61851-1 (product standards for V1G and

V2G AC EV supply equipment) are under revision right now this proposal needs to recognize the likely outcome of those revisions.

As heat pumps and EVs and EVSE are mass market products it is essential that the processes for certification are simple for manufacturers, certifiers and DSOs, well understood, and also fully functioning before the end of the implementation period. The processes should be such that domestic customers who become owners of EVs, EVSE and heat pumps do not need to engage with the compliance process, and that the engagement for larger customers (eg EV charge park owners) are minimized.

In reviewing the implications for EVs, the expert group should consider the implications, if any, that arise from whether the V2G EV is connected via AC or DC, and whether there is any impact from the vehicle homologation regulation and the Alternative Fuels Infrastructure Regulation.

Due to the nature of electric vehicles having various and undetermined connection points to the electrical grid, some additional thoughts should be given on digital compliance labelling and whether this would be a useful facility for owners, DSOs or others.

### **Target (objectives)**

- Understand the relevant international landscape for standards on technical requirements.
- Identify legitimate relevant associated technical requirements which are specified nationally.
- Understand the existing state of compliance schemes and certification nationally and internationally.
- For EVs consider if and how certification can be integrated with the mandatory (mandatory via other EU regulation) homologation process. For EV supply equipment define an appropriate conformity assessment including clarification about requirements that can be harmonised and those that need to be certified on national level.
- For heat pumps identify whether CE marking in combination with an appropriate conformity assessment would be appropriate for the requirements under the NC DC 2.0 and if not whether there is a possibility to include these requirements under an already existing CE marking regulation such as ecodesign.
- Identify gaps in existing schemes of conformity evaluation and assessment of the relevant products, and gaps in relevant international standards.
- Recommend how identified gaps can be closed by appropriate additional specification, and by appropriate evaluation measures (testing, modelling, manufactures' data) including by specific advice from, or actions by, this Expert Group. The Expert Group's recommendations may include possible harmonisation and mutual recognition of the existing and new certification schemes in terms of the technical requirements under the NC RfG 2.0 and NC DC 2.0.
- Recommend steps to be taken by the EC, standards bodies, manufacturers, certifiers and DSOs to close the remaining gaps.
- Ensure relevant briefing material etc is available to all those parties who have future responsibilities for the operation of compliance certification for EVs and heat pumps.

### **Legislative background and standards**

Commission Regulation (EU) 2016/631 Commission Regulation (EU) 2016/1447

Commission Regulation (EU) 2018/858

Commission Regulation (EU) 2023/180

Decision No 768/2008/EC

Regulation (EC) No 765/2008

Regulation (EU) 2024/1781

Commission Regulation (EU) No 813/2013

[Draft NC RfG 2.0](#)

[Draft NC DC 2.0](#)

EN 50549-x

IEC 61851-x

ISO 5474-x

ISO 15118

IECRE OD 009

[EG HCF Final Report \(eepublicdownloads.blob.core.windows.net\)](#)

[Are there others, such as heat pump or other product standards legislation? CE marking?]

The appendix contains an explanation of the timeline of the introduction of the new requirements, and also has an extract of the relevant clauses from the NC RfG 2.0 and NC DC2.0 (at the current stage of drafting).

### **Task description**

- Review technical requirements with the NC RfG 2.0 and NC DC 2.0, international standards and further national grid code implementations within the Member States
- Review existing compliance schemes within EU Member States using information to be gathered from manufacturers, DSOs, authorised certifiers and Expert Group members. Summarise the certification scheme landscape, drawing out apparent attractive and negative features of the schemes examined.
- From an understanding of what is required, suggest what gaps exist in compliance schemes and standards, particularly in relation to DSO requirements which are not within the scope of the NC RfG 2.0 and 50549-1, -2/, -10.
- Review CE marking legislation and identify the possibility of introducing it as a proof of conformity in the different Member States instead of developing new certification schemes (which may or may not be harmonised). Consider what legislative vehicles could be appropriate for this if the NC RfG 2.0 and NC DC 2.0 are not suitable and identify what additional work that is necessary to introduce a CE marking scheme for the requirements under the NC RfG 2.0 and NC DC 2.0.
- Consider what additional work is necessary to create appropriate compliance schemes for EVs and heat pumps in each Member State, and also look to see if existing compliance arrangements can or should be modified to allow for a more consistent approach between Member States, particularly in relation to the necessary actions by manufacturers in order to provide efficient pan-European market access. Ideally each Member State's scheme should be identical (to match the exhaustive NC requirements), but if not to include the possibility of mutual recognition of the certification schemes. Consideration should be given to whether a joint European/international certification scheme can be established that would be recognized by all Member States.

- Using the information gathered, propose a standard or proforma compliance scheme referring to respective equipment certificates and that can be adopted by DSOs as appropriate for the local/national needs.
- A proposal for standard requirements for any necessary local or national feature which does not currently exist in the NCs RfG 2.0 and NC DC 2.0 or in international standards, and which will be part of the DSOs' compliance schemes.
- Comprehensive briefing material related to the bullet above.

## Deliverables

There will be five main deliverables from this Expert Group:

1. A comprehensive report on the work, findings and recommendations of the Expert Group.
2. Outline additional technical requirements resulting from national grid code survey that can be provided as requirements to international standardisation committee work.
3. A set of recommendations for the EC, standards bodies, manufacturers, prospective certifiers and DSOs
4. A pro-forma or example compliance and certification scheme that can be adopted by DSOs as appropriate for their existing local or national arrangements, and which is intended to achieve the maximum uniformity of approach.
5. In addition, briefing material on (3) for use with affected parties in advance of the compliance deadline.

## Timing

- estimated [12] months from [October 2024].

## Team (update TBA)

The following nominations to participate in EG XX have been received (name and association):

Name	Organisation	Representation at GC ESC
Fatteh Ahmet		EHPA
Lama Al Fakhri		EHPA
Freddy Alcazar		EUGINE
Frederic Alonso		DSO Entity
Georgios Antonopoulos		ACER
Leonhard Bartsch		ACEA
Veerle Beelaerts		EHI
Florentien Benedict		DSO Entity
Laurent Benedit		EHI
Serdar Bolat		DSO Entity
Tommaso Carbone		DSO Entity
Glenn Cezanne		CharIn
Keith Chambers		EUROPGEN
Koen De Branader		EHPA
Giuseppe Dell'Olio		CEN/CENELEC

Didier	Deruy	ACEA
Ingo	Diefenbach	CEN/CENELEC
Uros	Gabrijel	ACER
Lorenzo	Gasperi	CEN/CENELEC
Juan	Giner Folques	ENTSO-E
Crispim	Guilherme	CharIN
Artjom	Gruber	EHPA
Andrea	Hamzova	DSO Entity
Dennis	Haub	CEN/CENELEC
Adeline	Houtart	EHPA
Tobias	Kampl	CharIn
Mike	Kay	DSO Entity
Emre	Konuk	EHI
Nico	Kreutzer	ACEA
Joost	Kuppen	DSO Entity
Erno	Levaniemi	DSO Entity
Ezequiel	Manzini	CEN/CENELEC
Miguel	Martinez	CEN/CENELEC
Sergio	Martinez Villanueva	ENTSO-E
Richard	Masquelier	EHI
Sebastien	Mather	CEN/CENELEC
Laure	Meljac	EHPA
Thomas	Moskal	ACEA
Stefan	Muller	CEN/CENELEC
Tom	Overington	ACEA
Mark	Pagett	ACEA
Matteo	Poarella	EHPA
Adriana	Pop	ACEA
Hartmut	Popella	ENTSO-E
Arnaud	Rouffignon	DSO Entity
Michael	Schirrwagen	ACEA
Bernhard	Schowe	EFAC
Georg	Schumacher	ENTSO-E
Ingo	Selinger	EHPA
Andreas	Sulzenbacher	CharIn
Julian	Treichel	CharIn
Thijs	Van Wijk	Elaad
Arjan	Wargers	Elaad
Ali	Yousefian	EHI
Marco	Zaccaria	ENTSO-E

## Estimated workload

- monthly (or other appropriate timing) virtual plenary meetings;

- workstream meetings as required
- possible commitment of 40 days per member (not expected to be exceeded).

**Target audience**

- Manufacturers
- DSOs
- TSOs
- Standards bodies
- Authorised certifiers
- GC ESC
- Relevant and/or interested stakeholders on the Connection Network Codes

**Appendix**

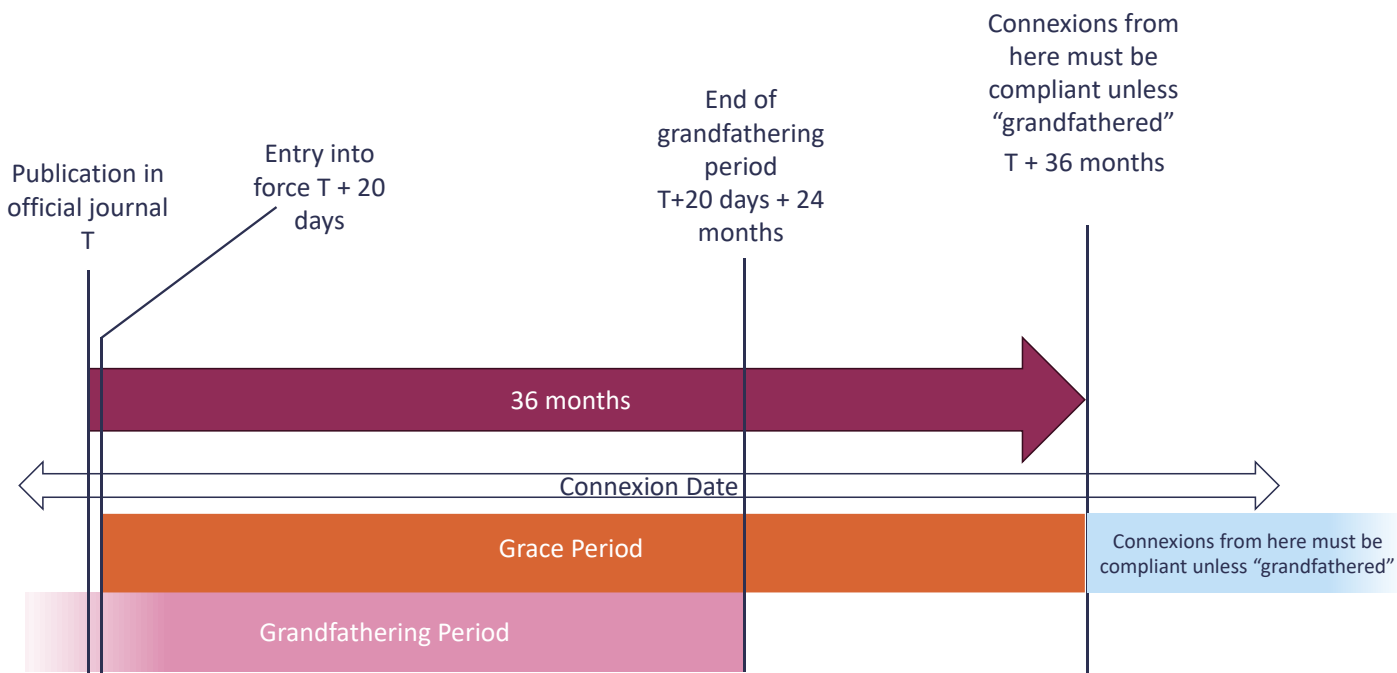
**Introduction of the NCs RfG and DC 2.0**

To help stakeholders understand the timescales of the introduction of the NCs RfG 2.0 and NC DC 2.0 requirements and compliance deadlines, reference needs to be made to Articles 4.1, 4.2 and 72 in the draft NC RfG 2.0 and Articles 4 and 59 in the NC DC 2.0.

The description now focuses on the NC RfG 2.0, although the NC DC 2.0 is essentially the same. NC RfG 2.0 Article 4.1 explains that the NC RfG 2.0 does not apply to existing PGMs, and Article 4.2 explains that a PGM will be considered existing if it was already connected before Entry into Force or if not physically existing, if a contract for the purchase of the main plant has been formalized within two years of Entry into Force. This is the grandfathering period.

Article 72 allows that the main requirements of the NC RfG 2.0, and compliance with these requirements, do not take effect until 3 years after publication. This is the grace period.

The following figure shows this diagrammatically.



## Relevant NC RfG and NC DC Articles.

### RfG

#### Article 5.6

“.....Type EV2 V2G electric vehicles and type EV1 V2G electric vehicles and associated V2G electric vehicle supply equipment shall possess **equipment certificates**....”

#### Article 29.2

2. The relevant system operator shall clarify and make publicly available the details of the operational notification procedure which shall include the **compliance scheme** in the case the relevant system operator provides for the use of **equipment certificates**.

#### Article 30a

1. The operational notification procedure for connection of each new type EV2 associated V2G electric vehicle supply equipment shall consist of submitting an installation document. The electrical charging park owner shall ensure that the required information is filled in on an installation document obtained from the relevant system operator and is submitted to the system operator.

The relevant system operator shall ensure that the required information can be submitted by third parties on behalf of the electrical charging park owner.

2. The relevant system operator shall specify the content of the installation document, which shall have at least the following information:

- (a) the location at which the connection is made;
- (b) the date of the connection;
- (c) the maximum capacity of the installation in kW;
- (d) reference to equipment certificates issued by an authorised certifier used for equipment that is in the site installation;
- (e) as regards equipment used, for which an **equipment certificate** has not been received, information shall be provided as directed by the relevant system operator; and
- (f) the contact details of the electrical charging park owner and the installer, and their
- (g) signatures

#### Article 41.3

The relevant system operator shall make publicly available a list of information and documents to be provided as well as the requirements to be fulfilled by the power generating facility owner within the framework of the compliance process. The list shall cover at least the following information, documents and requirements:

- (a) all the documentation and certificates to be provided by the power-generating facility owner;
- (b) details of the technical data on the power-generating module of relevance to the grid connection;
- (c) requirements for models for steady-state and dynamic system studies;
- (d) timeline for the provision of system data required to perform the studies;
- (e) studies by the power-generating facility owner to demonstrate the expected steady state and dynamic performance in accordance with the requirements set out in Chapters 5 and 6 of Title IV;
- (f) conditions and procedures, including the scope, for registering **equipment certificates**; and



- (g) conditions and procedures for the use of relevant **equipment certificates** issued by an authorised certifier by the power-generating facility owner.

Article 43a – Common Provisions on **equipment certificates**

1. In the case that the **compliance scheme** specified by the relevant system operator provides for the use of **equipment certificates** issued by an authorised certifier in the context of Title III and/or Title IV, the **equipment certificates** shall comply with the following provisions:

- (a) Any **equipment certificate** shall be based on a certification scheme defined within the **compliance scheme** that shall be specified by the relevant system operator. The **equipment certificates** include PGU certificates and component certificates. The **equipment certificates** shall demonstrate the conformity with the relevant technical requirements under this Regulation as of the national implementation. When the relevant system operator decides that the evaluation methodology provided in the certification scheme may not be applicable to conclude the conformity assessment, the relevant system operator should provide alternative methodologies for evaluation. These methodologies should, to the extent possible, be harmonised with or provide unambiguous references to established technical standards or conformity assessment schemes.
- (b) If not otherwise specified by the certification scheme defined within the **compliance scheme** based on which the **equipment certificate** is issued according to (a), the **equipment certificate** shall contain the information specified by the relevant system operator as a minimum, which shall be provided to the power generating facility owner by the relevant system operator upon request.
2. Relevant system operators may accept **equipment certificates**, for power generating units or components, issued by authorized certifiers of Member States whose accreditation is given by the national affiliate of the European cooperation for Accreditation ('EA').
3. Relevant system operators may accept **equipment certificates** for PGU and/or components which belong to a PGU family and/or component family with a range of applicability defined within the **compliance scheme**, that shall be specified by each relevant system operator, under which the assessed PGU and/or component is certified.

NC DC

Article XX+2

V1G electric vehicles and associated V1G electric vehicle supply equipment, power-to-gas demand units and heat-pumps connected at a voltage level of or below 1000 V shall possess **equipment certificates**, proving compliance with this Regulation.

Article XX+3.1

V1G electric vehicles and associated V1G electric vehicle supply equipment, and heat-pumps connected at a voltage level above 1000 V shall possess **equipment certificates**, proving compliance with this Regulation.

Article 35.3

The relevant system operator shall make publicly available the list of information and documents to be provided as well as the requirements to be fulfilled by the demand facility owner, the DSO or the CDSO in the frame of the compliance process. The list shall cover at least the following information, documents and requirements:

- (a) all documentation and certificates to be provided by the demand facility owner, the DSO or the CDSO;

- (b) details of the technical data required from the transmission-connected demand facility, the transmission-connected distribution facility, the distribution system, or the demand unit, with relevance to the grid connection or operation;
- (c) requirements for models for steady-state and dynamic system studies;
- (d) timeline for the provision of system data required to perform the studies;
- (e) studies by the demand facility owner, the DSO or the CDSO for demonstrating expected steady-state and dynamic performance referring to the requirements set forth in Article 43, Article 44 and Article 45;
- (f) conditions and procedures including scope for registering **equipment certificates**;
- (g) conditions and procedures for the use of relevant **equipment certificates** issued by an authorised certifier by the demand facility owner, the DSO or the CDSO.

#### Article 42.5

The compliance of V2G electric vehicle and V2G electric vehicle supply equipment, shall be based on individual type-test certificates issued according to Regulation (EC) No 765/2008 regarding the V2G electric vehicle supply equipment on one side and the V2G electric vehicle homologated platform (in case of AC connection of V2G electric vehicle) on the other side. The individual type-test certificates shall enable interoperability between different V2G electric vehicles and V2G electric vehicle supply equipment. Certifications on V2G electric vehicle supply equipment side shall not include the V2G electric vehicle, and certifications on V2G electric vehicle side, by means of type approval or homologation platforms, shall not include certification for V2G electric vehicle supply equipment. In this respect, certification programs and procedures shall be harmonised, cross-linked and consist of associated procedures on data exchange, communication handshake and technical power transfer.