



Energy
Community
Regulatory
Board

2025 ECRB REPORT

On the Implementation of the Network Code on Requirements for Grid Connection of Generators in the Energy Community

December
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Introduction

Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators ("Connection network code on generators connection"), incorporated and adapted by Permanent High Level Group Decision 2018/03/PHLG-EnC of 12 January 2018 (hereafter "NC RfG")¹ is binding for Contracting Parties of the Energy Community with the following implementation deadlines:

- transposition deadline - 12 July 2018
- general implementation deadline - 12 July 2021
- Articles 4(2)(a)(b), 7(4), 58 and 59 implementation deadline - 12 July 2018
- Articles 68(1) and 69(1) implementation deadline - 12 July 2018
- Article 61(1) implementation deadline - 12 March 2019

For all three Connection Network Code (hereafter "CNCs")² incorporated into the Acquis of the Energy Community (hereafter "ENC"), the transposition deadline was 12 July 2018 and general implementation deadline was 12 July 2021.

CNCs include the legal obligation on CNCs implementation monitoring by ENTSO-E, the Energy Community Secretariat (hereafter "Secretariat") and the Energy Community Regulatory Board (hereafter "ECRB") in similar wording indicating that ENTSO-E performs such monitoring for the Contracting Parties whose TSOs are members of ENTSO-E for Electricity, while the Secretariat and ECRB – for the Contracting Parties whose TSOs who are not members of ENTSO-E. Specifically, in Regulation (EU) 2016/631 on generators connection, such obligations are stated in Article 59 (1) of in the following wording:

"ENTSO for Electricity shall monitor the implementation of this Regulation for the Contracting Parties whose TSOs are members of ENTSO for Electricity. The Secretariat and the Energy Community Regulatory Board shall monitor the implementation of this Regulation for the Contracting Parties whose TSOs are not members of ENTSO for Electricity. Monitoring shall take

¹ [https://www.energy-community.org/dam/jcr:d1f9353b-c1d7-4044-b32b-fae396e5438f/REGULATION%20\(EU\)%202016_631.pdf](https://www.energy-community.org/dam/jcr:d1f9353b-c1d7-4044-b32b-fae396e5438f/REGULATION%20(EU)%202016_631.pdf)

² Regulation (EU) 2016/631 of 14 April 2016 establishing a network code on requirements for grid connection of generators, Regulation (EU) 2016/1388 establishing a network code on demand connection, Regulation (EU) 2016/1447 establishing a network code on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules.



into account the list of relevant information developed by the Agency for the Cooperation of Energy Regulators and it shall cover in particular the following matters: (a) identification of any divergences in the national implementation of this Regulation; (b) assessment of whether the choice of values and ranges in the requirements applicable to power-generating modules under this Regulation continues to be valid. ENTSO for Electricity shall report its findings to the Secretariat and the Energy Community Regulatory Board. The Secretariat and the Energy Community Regulatory Board shall make available the findings stemming from the monitoring of the implementation of this Regulation”.

Further to this legal basis, ECRB Electricity Working Group (hereafter “EWG”) discussed launching CNCs monitoring for Contracting Parties whose TSOs are not members of ENTSO-e as part of 2024 ECRB EWG Work program, i.e. for Kosovo³, Georgia and Moldova. It was assumed that interpretation of the legal basis is clear regarding ENTSO-e obligations to monitor: Albania, Montenegro, North Macedonia, Bosnia & Herzegovina, Serbia, Ukraine.

At the same time, the latest CNCs monitoring reports on all three CNCs were published by ENTSO-E in 2021⁴. The scope of these reports does not include the Energy Community CPs. Moreover, the preamble of the report indicates that ENTSO-E's CNCs monitoring obligations have ceased because Regulation (EU) 2019/943 of 5 June 2019 on the internal market for electricity (hereafter “Regulation 2019/943”) replaced the legal obligation for monitoring of the three CNCs that had been defined by Article 8(8) of Regulation (EC) No 714/2009 on conditions for access to the network for cross-border exchanges in electricity (hereafter “Regulation 714/2009”).

It should be noted, that ENC CNCs were adopted for the ENC at the time when ENTSO-E monitoring obligations were still valid in the EU. But unlike the wording of EU Network Codes, adapted for ENC CNCs wording does not refer to Regulation 2009/714.

Further developments in the EU framework resulted in migration of the CNCs monitoring obligations from ENTSO-E to ACER according to provisions of Regulation 2019/943, Articles 30, 32 and 55. At the same time, Articles 30, 32 and 55 are deleted in Regulation 2019/943, as adapted and adopted for ENC by Decision 2022/03/MC-EnC.

Given the transfer of CNCs monitoring obligations from ENTSO-E to ACER at the EU level, and considering the provisions regarding competence for monitoring CNCs in the Contracting Parties, it was determined that the ECRB is the appropriate body to carry out this activity.

³ [Here and after, this designation is without prejudice to positions on Kosovo's status and aligns with UNSC 1244 and the ICJ opinion on the Kosovo Declaration of Independence](#)

⁴ https://ee-public-nc-downloads.azureedge.net/strapi-test-assets/strapi-assets/211202_Implementation_Monitoring_Report_2021_final_f2867db293.pdf

Building on ACER's monitoring practice, ECRB EWG submitted questionnaires to the NRAs of the Contracting Parties and prepared a Report on the Implementation of the Network Code on Requirements for Grid Connection of Generators (NC RfG) in 2025.

Data presented in this report refers to the year **2024/2025**.

This report was prepared by the ECRB Electricity Working Group with active participation and inputs from all Energy Community Regulatory Authorities. ECRB acknowledges the leadership of Mr. Saša Lukić (SERC) in preparing this deliverable and thanks Ms. Ina Osikmashvili (GNERC) for her contribution.



Executive Summary

The European Network Code on Requirements for Grid Connection of Generators represents a fundamental shift from nationally fragmented grid connection rules towards a harmonized, Union-wide framework. Its primary objective is to ensure that power-generating facilities actively support the security and stability of the interconnected electricity system, particularly as the generation mix becomes increasingly dominated by inverter-based resources. This report consolidates the responses from nine Energy Community Contracting Parties (CPs) and Armenia (observer) regarding the implementation of Commission Regulation (EU) 2016/631 (NC RfG). The assessment covers four key areas: determination of significance (banding values), establishment of requirements of general application, certification and validation processes, and derogation frameworks.

The analysis reveals a **mixed yet promising state of implementation**, characterized by significant progress in foundational areas and identified challenges in operationalizing a full compliance ecosystem.

- **Foundational Frameworks Largely in Place:** A strong majority of CPs (**Serbia, North Macedonia, Bosnia and Herzegovina, Moldova, Georgia and Ukraine**) have successfully established the core legal architectures mandated by the NC RfG. This includes the proportional **banding thresholds** (Art. 5) and the **requirements of general application** (Arts. 13-16) that govern connection processes, roles, and responsibilities. This achievement marks a critical departure from disparate national rules and lays the groundwork for a harmonized regional market. **Albania and Kosovo*** have made progress through their grid codes but have not fully implemented the banding framework as defined in Article 5. **Montenegro** lags significantly, with key foundational work still pending.
- **A Critical Implementation Gap in Certification:** A defining challenge across almost all CPs is **the absence of nationally authorized certification bodies**. This missing link in the compliance chain forces a reliance on interim solutions. Most CPs depend on **TSO-led validation through mandatory commissioning tests and manufacturer declarations of conformity**. While pragmatic, this approach places a significant administrative and technical burden on Transmission System Operators (TSOs), potentially creates bottlenecks in the connection process, and lacks the standardization and efficiency of a fully developed certification ecosystem. Ukraine's legal framework for authorized certifiers, Serbia's well-defined functional testing process and Georgia's nascent accreditation system are positive steps, but confirms that in practice, TSO-led testing

and modeling remain the primary validation method. This gap represents the largest barrier to achieving the full efficiency and harmonization intended by the NC RfG.

- **Sophisticated Derogation Management:** Reflecting a mature understanding of the regulation, most CPs have **proactively established robust derogation frameworks** with clear criteria, strong National Regulatory Authority (NRA) oversight, and transparency measures (e.g., public registers). **Ukraine** is finalizing its derogation criteria, with adoption expected by the end of 2026. The fact that derogations are used judiciously – with only one temporary, technical derogation reported in Georgia and several temporary derogations for Type D modules in Albania – is a positive indicator. It suggests that the core NC RfG requirements are generally fit-for-purpose and that the bar for exceptions is rightly set high, preventing misuse.
- **A Divergent Pace of Progress:** Implementation status is heterogeneous. **Serbia, North Macedonia, Bosnia and Herzegovina, Moldova and Ukraine** are the most advanced, with comprehensive frameworks in force. **Georgia** is in a transitional phase, finalizing its general requirements while planning to leverage its accredited certifiers. **Albania** and **Kosovo*** have implemented many technical requirements via their grid codes but lack full formal alignment with the NC RfG's banding and general application articles. **Montenegro** lags significantly, with key foundational work still pending. **Armenia**, as an observer, has not yet begun implementation of the NC RfG, maintaining its own national classification for systemically significant plants.

In conclusion, the Energy Community has made substantial strides in transposing the NC RfG into national law. The focus must now shift from **legal transposition to effective application**, addressing the systemic certification gap and ensuring consistent enforcement of the new rules to fully realize the Code's benefits for system security and market integration.

Determination of Significance - Banding Values

A core innovation and a prerequisite for the effective application of the NC RfG is the categorization of Power Generating Modules into significance bands. This "banding" process is not merely an administrative step; it is the critical filter that determines which specific technical requirements from the NC RfG apply to a given generator. The principle is one of proportionality: the greater a generating facility's potential impact on the grid, the more stringent the requirements it must meet.

This section assesses the establishment of thresholds for categorizing Power Generating Modules:

Contracting Party	Proposal Submitted by TSO	Coordination with Adjacent TSOs/DSOs	Public Consultation Held	Approved By & Date	Status
North Macedonia	TSO: Dec 2019 DSO: Jun 2023	Conducted via public debates	Yes (Jan 2020, Dec 2023)	NRA (ERC) TSO: Dec 2021 DSO: Mar 2024	Fully Implemented
Bosnia and Herzegovina	Nov 2021 (with Grid Code)	With DSOs and utilities in BIH only	Yes	NRA (SERC) (Dec 2021)	Fully Implemented
Moldova	2019 (within Network Code)	With national DSOs	Yes (as part of Code consultation)	NRA (ANRE) (2019)	Fully Implemented
Georgia	2019	With DSOs	Yes (no link provided)	NRA (GNERC) (Jul 2019)	Fully Implemented
Montenegro	Not yet submitted	Process ongoing with DSO	No	N/A	Not Implemented (New law draft in progress)
Serbia	Proposal adopted by TSO Jan 2024	Consulted with DSO	Yes (Until Nov 2023)	NRA (AERS) (Feb 2024)	Fully Implemented
Ukraine	Nov 2017 (within TSC)	Yes, via public discussions	Yes (Nov 2017)	NRA (NEURC) (Mar 2018)	Fully Implemented

Albania	Not submitted	N/A	No	N/A	Not Implemented (Process can be initiated "when necessary")
Kosovo*	Not submitted as per Art. 5	Via OCGC committee (internal stakeholder process)	No (Process covered by OCGC procedure)	N/A	Partially Implemented (Grid Code covers generators >5MW, but formal banding not adopted)
Armenia (Observer)	Not applicable	Not applicable	Not applicable	Not applicable	Not Implemented (National codes use a 10 MW threshold for "systemic significance")

Key Observation: The foundational principle of the NC RfG – proportionality through banding – has been widely embraced across the Energy Community. The data indicates a significant achievement: six out of the nine reported Contracting Parties (**North Macedonia, Bosnia and Herzegovina, Moldova, Georgia, Serbia and Ukraine**) have successfully established and fully implemented the legally-enforceable banding thresholds. This represents a critical first step in the harmonization agenda, moving from a patchwork of national rules towards a common-wide framework. **Albania** and **Kosovo*** have not formally implemented the Article 5 banding, relying instead on their existing grid codes which capture the technical requirements for larger generators. **Montenegro** remains the notable exception, with its process dependent on forthcoming legislation. **Armenia**, as an observer, maintains its own regulatory framework.

Establishment of Requirements of General Application

Requirements of General Application form the essential legal and technical bedrock upon which the entire NC RfG is built. They are not specific technical performance criteria, but rather the foundational rules that govern the roles, responsibilities, and processes ensuring that all technical requirements are met consistently and fairly. Their purpose is to create a stable, predictable, and non-discriminatory environment for connecting new generators to the grid, thereby supporting market integration and system security.

This section evaluates the development and approval of the technical requirements that generators must comply with.

Contracting Party	Proposed by TSO	Approved by NRA & Date	Transparency (Art. 7(3)(b))	Current Rules for New PGMs
North Macedonia	TSO: Dec 2019 DSO: Mar 2019	TSO: Dec 2021 DSO: Aug 2019	Public debates, website publication	Fully Implemented Requirements are part of Grid Codes
Bosnia and Herzegovina	Nov 2021	Dec 2021 (with Grid Code)	Public consultation	Fully Implemented
Moldova	2023 (after NRA-facilitated talks)	Mar 2024	Public online consultation	Fully Implemented
Georgia	Sep 2024	Not yet approved	To be conducted after internal agreement	Old grid code rules apply. Approval planned by end of 2025.
Montenegro	Not yet proposed	N/A	N/A	Old rules for transmission/distribution systems apply.
Serbia	Nov 2023 (as Annex to Connection Rules)	Nov 2023 & Mar 2024	Public consultation of full Connection Rules	Fully Implemented

Ukraine	Nov 2017 (within TSC)	NRA (NEURC) (Mar 2018)	Public consultations, open discussions, AMCU review	Fully Implemented (Within Transmission and Distribution System Codes)
Albania	Not formally proposed	N/A	N/A	Partially Implemented (Network Code and Transmission Code apply. Full requirements planned by 2026.)
Kosovo*	Not formally proposed as per Art. 7	N/A	N/A	Partially Implemented (Connection Code and other TSO documents contain technical requirements, but Art. 7(1) not formally transposed.)

Key Observation: The data indicates that the implementation of these foundational requirements is a more complex undertaking, resulting in a split between advanced and lagging implementations.

A clear majority of Contracting Parties (**North Macedonia, Bosnia and Herzegovina, Moldova, Serbia and Ukraine**) have successfully developed and approved these requirements. However, the paths taken and timelines involved vary significantly. **Georgia** is in a critical transitional phase, and **Montenegro** has not yet begun the process. **Albania** and **Kosovo*** apply technical requirements.

The implementation of the Requirements of General Application is where the theoretical framework of the NC RfG is stress-tested against institutional and procedural realities. The progress is commendable but uneven.

The successful countries have demonstrated that implementation can be achieved through different legal models (integration or annexation), provided there is strong regulatory oversight, transparent stakeholder engagement, and clear timelines.

The focus for advanced countries must now shift to monitoring and enforcement – ensuring the new rules are applied correctly in everyday connection procedures. For others, the priority is to adhere to their timeline to close the compliance gap. For **Montenegro**, urgent action is needed to commence the process, potentially leveraging the experiences and best practices of its regional peers to accelerate its own implementation.

Certification and Validation

Certification and Validation constitute the essential compliance demonstration framework of the NC RfG. This process transforms the Code's legal and technical stipulations from abstract obligations into a certified, verifiable reality. It is the critical link between the design phase, grid connection approval, and the ongoing secure operation of the power system.

This section examines the existence of authorized certifiers and the processes for verifying compliance.

Contracting Party	Authorized Certifier Present?	Certification Processes Adopted?	Process in Absence of Certificates
North Macedonia	No	Yes (Annex to Grid Code)	Manufacturer's statement of compliance with MKC EN 50549-1/2. Testing and simulations by TSO
Bosnia and Herzegovina	No (activities started in 2025)	Yes (De facto, CE marking required)	Compliance tests are obligatory as per Grid Code
Moldova	No	No	Detailed notification procedures defined in Network Code but not fully applied. Reliance on connection permit checks
Georgia	Yes (accredited companies)	Partially (under improvement)	To be detailed in future procedural documents
Montenegro	No	No (accreditation scheme exists but unused)	Compliance demonstrated per national system rules and testing procedures
Serbia	N/A	Yes (Articles 35-37 of Regulation)	TSO (EMS) conducts functional testing and issues consents for energization, temporary, and permanent connection
Ukraine	Yes (Legal framework exists, but not used in practice)	No (in practice)	TSO-led testing and simulation. Owners must provide test reports and simulation models for each electrical installation. TSO assesses compliance for connection and ongoing operation
Albania	No	No	Reliance on technical compliance declarations, technical documentation, and test reports from the generator

Kosovo*	No	No	TSO-led testing. KOSTT engineers perform site tests and commissioning checks before and after energizing the facility
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Key Observation: The data on Certification and Validation reveals a significant implementation gap across the Energy Community. A cornerstone of the EU's model is the use of independent "authorized certifier". The data shows this infrastructure is largely absent and major challenge is the lack of nationally accredited certifiers. All Contracting Parties have developed or are developing alternative validation methods, primarily through rigorous TSO-led testing and manufacturer declarations. The lack of independent certifiers forces TSOs to become the default verifiers of compliance, a role for which they may not have the specific expertise or resources. This creates a bottleneck, increases the perceived regulatory risk for developers, and can lead to inconsistencies.



Derogations

Derogations are legally defined exceptions to the full application of the NC RfG's technical requirements. They are not a tool for avoiding compliance but are a targeted mechanism to prevent disproportionate cost or technical burden where the application of a specific requirement is not necessary for system security or is not technically feasible.

This section reviews the frameworks for granting exemptions from specific NC RfG requirements.

Contracting Party	Criteria Defined?	Approved By & Date	Derogations Granted?	Adverse Effects Considered?	Register Maintained?
North Macedonia	Yes (for transmission)	NRA (ERC) (Feb 2024)	No	Yes	Implied
Bosnia and Herzegovina	Yes (Separate act)	NRA (SERC) (Dec 2021)	No	Yes	Yes
Moldova	Yes (in law) but not yet adopted	N/A (No requests received)	No	Yes (must show no adverse cross-border effect)	Yes
Georgia	Yes	NRA (GNERC) (Sep 2021)	Yes (1)	Yes	Yes
Montenegro	Draft finalized, not adopted	N/A	N/A	N/A	N/A
Serbia	Yes	NRA (AERS) (Dec 2023)	No	Yes	Yes
Ukraine	In development (draft TSC amendments)	N/A (Target Q4 2026)	No	Yes (Draft criteria include multiple factors)	Yes (Planned in draft amendments)
Albania	Yes	NRA (ERE) (May 2020)	Yes (4)	Yes	Yes
Kosovo*	Information not provided	Information not provided	Information not provided	Information not provided	Information not provided

Key Observation: The establishment of derogation frameworks across the Energy Community is a significant achievement that indicates a sophisticated understanding of the NC RfG's principles. The data on derogations reveals that most Contracting Parties have proactively established the legal and procedural mechanisms to manage exceptions, even in the absence of immediate demand.

This proactive approach is a hallmark of a mature regulatory regime. It demonstrates that Contracting Parties are not just transposing rules verbatim but are implementing a manageable system of compliance that can adapt to real-world complexities and prevent the rules from becoming an impractical impediment to necessary investment.

While most Contracting Parties have or are developing a derogation framework, their application is rare. **Albania's** experience is particularly instructive, having actively used its framework to grant several temporary, project-specific derogations, demonstrating a practical and managed approach to compliance. **Georgia** also reported to have granted a derogation, which was limited and temporary.

Details of Granted Derogation (Georgia):

- **Date:** August 15, 2024
 - **Status:** Granted
 - **Type:** Module C
 - **Requirement:** Article 44(1) - Limited Frequency Sensitive Mode - Overfrequency (LFSM-O)
 - **Duration:** Until January 1, 2025
 - **Reason:** The service provider failed to deliver the LFSM-O testing service on time, a reason beyond the plant owner's control. All other tests were passed successfully.
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Overall Conclusions and Recommendations

Overall Conclusions

- 01. Progress is Varied but Promising:** The implementation landscape is heterogeneous, yet a clear majority of Contracting Parties have successfully established the foundational legal frameworks required by the NC RfG. The principles of proportionality, transparency, and harmonization are now largely embedded in national rules in **Serbia, North Macedonia, Bosnia and Herzegovina, Moldova, Georgia and Ukraine**. However, the pace and completeness of implementation differ significantly, with **Albania** and **Kosovo*** having partially implemented the framework via grid codes, **Montenegro** representing a notable outlier and **Armenia** as an observer not yet engaged in the process.
- 02. Systemic Certification Gap is the Primary Challenge:** The most significant regional challenge is the absence of a certification services. The widespread reliance on TSO-led testing, while a practical interim solution, is inefficient, burdensome for system operators, and lacks the objectivity and standardization of an independent certification model. This gap represents the largest barrier to achieving the full efficiency and harmonization intended by the NC RfG.
- 03. Derogation Frameworks Demonstrate Regulatory Maturity:** The proactive establishment of strict, transparent, and NRA-led derogation processes across most CPs indicates a sophisticated regulatory approach. **Albania's** active use of its framework for temporary, technical exemptions and **Georgia's** single, well-justified derogation show that these systems are operational and being used appropriately. The infrequent use of these frameworks confirms that the NC RfG's core requirements are appropriate and that derogations are correctly treated as a measure of last resort for exceptional circumstances.
- 04. TSO-DSO Coordination is Functioning:** The processes for developing banding values and general requirements show evidence of effective consultation and coordination between transmission and distribution system operators. This is crucial for ensuring consistent application of the rules across different voltage levels and preventing regulatory arbitrage.
- 05. The Transition from Law to Practice is Ongoing:** For most CPs, the next phase of implementation is the most critical: moving from having rules on paper to ensuring their consistent and effective application in daily grid connection procedures. This requires capacity building, guidance for market participants, and vigilant monitoring by NRAs.

Recommendations

01. Address the Certification Gap:

- **Recommendation 1 (Short-Term):** The Energy Community Secretariat, in cooperation with the ECRB, should develop **Guidance on Certifications** from other jurisdictions (e.g., EU member states) and on **standardizing validation testing protocols**. This would provide immediate relief and ensure consistency in TSO-led validation.
- **Recommendation 2 (Long-Term):** Launch a **regional initiative or provide technical assistance** to support CPs in developing national accreditation schemes and fostering a market for certification services. This could include workshops, model tender documents for certification services, and facilitating partnerships with EU-accredited bodies.

02. Provide Targeted Support for Lagging Parties:

- **Recommendation 3:** The development and finalization of **Montenegro's** banding values, general requirements, and derogation framework should be accelerated through the effective leveraging of established best practices and documentation originating from advanced CPs (like Serbia or North Macedonia).

03. Facilitate Knowledge Exchange on Application and Enforcement:

- **Recommendation 4:** The ECRB should facilitate **regular workshops and working groups** for NRAs and TSOs from all CPs. Focus areas should include:
 - Sharing experiences on conducting compliance tests and reviewing certification dossiers.
 - Developing common interpretations of specific technical requirements.
 - Discussing the practical challenges of applying the rules to new technologies and project structures.

04. Formalize and Continue Monitoring:

- **Recommendation 5:** Given the unclear obligations of other bodies, the ECRB should **formalize its role in ongoing NC RfG monitoring**. This report should become a periodic publication (e.g., biennial) to track progress, especially in closing the certification gap and finalizing implementation in **Georgia, Albania, Kosovo*** and **Montenegro**.

05. Learn from Derogation Cases:

- **Recommendation 6:** The details of the derogations granted



in **Georgia** and **Albania** should be **documented as case studies** and shared with all NRAs. They provide valuable, real-world examples of how to assess derogation requests for temporary, technical issues while upholding the principles of proportionality and no adverse cross-border effects.

06. Engage with Observer Countries:

- **Recommendation 7:** The Secretariat should initiate a dialogue with **Armenia**, sharing the benefits and implementation experiences of the NC RfG to encourage future alignment and support its energy market integration ambitions.

This report demonstrates a collective movement towards full compliance with the NC RfG. While challenges remain, particularly regarding certification, the foundational steps taken by most Contracting Parties provide a strong basis for continued progress toward a more secure, integrated, and harmonized energy market in the Energy Community.



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