Order no. 51 of 17.04.2019

approving the Notification Procedure for connection of power generating units and verification of compliance of power generating units with technical requirements for connection of power generating units to public electricity networks

Having regard to the provisions of art. 6 par. (11) of Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) 1228/2003, of art. 7 par. (1), 30 to 37 and 40 to 57 of Commission Regulation (EU) 2016/631 of Commission of 14 April 2016 establishing a network code for requirements for the network connection of generating installations, of art. 36 par. (7) lit. i) of the Law on Electricity and Natural Gas no. 123/2012, as amended and supplemented,

under the provisions of art. 5 par. (1) lit. c) and d) and art. 9 par. (1) lit. h) of the Government Emergency Ordinance no. 33/2007 on the organization and functioning of the National Regulatory Authority for Energy, approved with amendments and completions by Law no. 160/2012, as amended and supplemented,

the President of the National Regulatory Authority for Energy issues the following order:

Art. 1. The notification procedure for the connection of the power generating units and the verification of the compliance of the power generating units with the technical requirements for the connection of the power generating units to the public electricity networks, privided for in the annex to the present order is approved.

Art. 2. The economic operators in the electricity sector comply with the provisions of this Order and the organizational entities within the National Energy Regulatory Authority shall observe the provisions of this Order.

Art. 3. This Order shall be published in the Official Gazette of Romania, Part I and shall enter into force on 27 April 2019.

Art. 4. On the date of entry into force of this Order, Annex no. 1, Annex no. 2, point 2.1. of Annex no. 5 and point 2.1 of Annex no. 6 shall be repealed to the Procedure for the Tensioning and Certification of Technical Conformity of Wind and Photovoltaic Power Plants, approved by the Order of the President of the National Energy Regulatory Authority no. 74/2013 for the approval of the Voltage Procedure for the Sample Period and the

Certification of Technical Conformity of Wind and Photovoltaic Power Plants and the Abrogation of Paragraph (4) of art. 25 of the Technical Norm "Technical conditions for connection to the public electricity networks for photovoltaic power plants", approved by the Order of the President of the National Energy Regulatory Authority no. 30/2013, published in the Official Gazette of Romania, Part I, no. 682 of November 6, 2013, as amended.

President of the National Regulatory Authority for Energy,

Dumitru Chiriță

Annex

Notification procedure for connection of power generating units and verification of conformity of power generating units with technical requirements for connection of power generating units to public electricity networks

Chapter 1. Purpose

Art. 1. This procedure establishes the deployment and stages of the process of energisation for the beginning of the testing period of the power generating units, the content of the tests for checking the conformity and the stages of the process of certifying the conformity of the power generating units with the technical requirements for their connection to the public electricity networks.

Art. 2. The compliance of the power generating units with the technical requirements for their connection to the public electricity networks is evidenced by the issuance by the relevant system operator of the certificate of compliance attesting to the compliance by the power generating units with the technical requirements corresponding to the category and type to which they belong.

Chapter 2. Scope

Art. 3. This procedure shall be applied by the Transmission System Operator, the Relevant System Operators, the management of the power generating facilities and the economic operators holding the A3 certificate issued by the National Regulatory Authority for Energy.

Art. 4. This procedure is applicable:

(1) new synchronous power generating modules, new power generating modules, new power plants made of power generating modules and plants made of power generating modules located in offshore, connected in alternating current, in accordance with the provisions of the technical regulations in force for each category.

(2) Existing synchronous power generating modules, existing power generating modules, and existing power plants made of power generating modules, that have undergone significant changes in accordance with the technical regulations in force for each category.

(3) existing synchronous power generating modules, existing power generating modules and existing power plants made of power generating modules after the

implementation of certain technical requirements in the technical connections for existing power generating units proposed by the Transmission System Operator on the basis of a cost-benefit analysis and for which the National Authority of the Energy Regulation has issued a decision.

Chapter 3. Definitions and abbreviations

Art. 5. The terms used in this Procedure are defined as follows:

dead band in frequency	a frequency range in which the frequency setting is deliberately disabled
ability to cross over the defect (FRT/LVRT)	the ability of electrical devices to remain connected to the network and to operate during voltage dips in the connection point caused by eliminated defects
maximum capacity	the maximum power produced continuously, which a power generating unit can produce without taking into account any related load (no consumption) exclusively intended to ensure the operation of the power generating unit and not distributed in the network as specified in the technical approval notice or as agreed between the Relevant System Operator and the owner of the power generating facility
the equipment certificate	document issued in accordance with the provisions of Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) 339/93 by an approved certification body for the equipment used by a power generating unit, a demand unit, a distribution operator, a demand facility or the high voltage direct current system. The equipment certificate defines the scope of its validity at national or other level that requires a specific value within the range allowed at European level. In order to replace certain parts of the compliance process, the equipment certificate may include mathematical models that have been checked against actual test results
declaration of	a document provided by the owner of the power generating

conformity	facilities or the demand unit owner, a distribution system operator or a high-voltage direct current system operator to the system operator presenting the current state of compliance with the required specifications and requirements
the P-Q capability diagram	a diagram illustrating the capability of generating reactive power of a power generating unit at variations of active power at the connection point
Pmax / U-Q diagram	a diagram representing the capability of producing a reactive power of a power generating unit or a high voltage direct current conversion substation for different voltage variations at the connection point
disposition	any order given, to the extent of its authority, by a system operator to a power generating facility owner, a distribution system operator or a high-voltage direct-current system operator to carry out an action
the installation document (ID)	a simple structured document containing information about a category A power generating unit and proving its compliance with the applicable technical requirements. in force
power generating module document (PGMD)	a document submitted by the power generating facility owner to the relevant system operator in the case of a B, C or D power generating unit that confirms that the power generating unit complies with applicable applicable technical requirements and provides the necessary data and declarations, including a compliance report
main generating plant	one or more equipment that is needed to convert the primary energy source into electricity
power factor	the ratio between the absolute value of the active power and the apparent power
frequency	the frequency of the electric system expressed in herts, which can be measured at all points of the synchronous zone, assuming a quasi-constantial value in the order of seconds, with only minor differences between the different measuring points. The nominal frequency is 50 Hz
houseload operation	the operation that ensures that power generating facilities can

	continue to activate their own services in the event of network incidents that cause the power generating unit to disconnect from the power network
power generating facility owner	a natural or legal person who owns a power generating facility
wind power generator unit	a generating set designed to transform the kinetic energy of the wind into electricity
synchronous power generating module (PGMS)	indivisible set of installations capable of generating electricity so that the frequency of the generated voltage, the generator speed and the frequency of the network voltage are in a constant ratio and therefore are synchronous
insensitiveness in frequency	intrinsic characteristic of a control system defined as the minimum value of the frequency deviation or input signal that causes a variation in the active power or output signal
power generating facility	an installation which converts primary energy into electricity and which is composed of one or more electricity power generating units connected to a network at one or more connection points
inverter	equipment that converts continuous voltage into alternating voltage
significant change	upgrades / refurbishments of category C or D power generating units which determine the updating of the Connection Technical Evaluation Report / connection certificate in accordance with the provisions of the technical connection regulations in force
final operational notification	the consent issued by the relevant system operator to an electricity or storage site operator, distribution system operator or high-voltage direct current system operator which meets the required specifications and requirements, giving it the right to operates a power generating unit, a power substation, a distribution network or a high-voltage direct current system using the mains connection The document underlying the issue of the final functioning notification is the certificate of conformity.

limited operational notification	a notification issued by a relevant system operator to an electricity or storage site owner, a distribution system operator or a high-voltage direct current system operator that has previously received the status given in the notification of operation but which temporarily passes through a significant change or has a significant loss of ability leading to non-compliance with the required specifications and requirements
provisional operating notification	a notification issued by a relevant system operator to an electricity or storage site owner, a distribution system operator or a high-voltage direct current system operator that enables him to operate a power generating unit of electricity, a demand facility, a distribution network or a high-voltage direct current system using the mains connection for a limited period of time and to start compliance tests to ensure compliance with the required specifications and requirements. The Provisional Operating Notice confers on the power generating facility owner the right to use the connection system according to the Connection Technical Evaluation Report and to operate in the energy market as a sample unit until the final energisation conditions are met, but not more than 24 months after energisation for the beginning of the testing period. During the period of provisional operating notification, the power generating facility owner shall perform the test for checking the conformity necessary to demonstrate compliance with the applicable technical requirements in force and shall take the necessary steps to remove the non-conformities as appropriate.
energisation operational notification	the acceptance issued by a relevant system operator to a power generating facility owner or storage site operator, a distribution operator or a high-voltage direct current system operator allow to him to activate the power plant
relevant system operator	The carrier and the system operator or distribution system to whose system / network is or will be connected a power generating unit, a demand facility, a distribution network or a

	high-voltage direct current system
investment order	the document establishing the management authority by dispatching the installations and the way of exercising of it
Authorised certifier	an entity issuing certificates for equipment and documents for power generating units, the accreditation of which is given by the national subsidiaries of the European Co-operation for Accreditation ("EA") established in accordance with Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) 339/93
slope	the ratio of the voltage variation relative to the reference voltage of 1 μm, and the absorbed reactive power, relative to the maximum reactive power
connection point	physical point in the electrical network to which the power generating unit is connected, the demand facility, the distribution network or the high-voltage direct current system
the minimum power of stable operation	the minimum active power agreed between the relevant system operator and the power generating facility owner to which the power generating facility can operate under stable conditions on a permanent basis
minimum regulating level	the minimum active power specified in the Connection Technical Evaluation Report / connection certificate or agreed by the relevant system operator with the power generating facility owner up to which the active power produced by the power generating facility can be adjusted
insulated operating condition	the independent operation of an entire network or part of a network that is isolated after being separated from the interconnected system having at least one power generating unit or a high-voltage direct current system supplying power to that network and controlling the frequency and voltage
limited frequency sensitive mode limited to the increase of	the operating mode of a power generating unit or a high-voltage direct current system which results in a reduction in the active power in response to an increase in the system frequency over a

frequency	certain value
limited frequency sensitive mode - underfrequency	the operating mode of a power generating unit or a high-voltage direct current system which results in an increase in active power in response to a system frequency drop below a certain value
limited frequency sensitive mode as an active power frequency response	the operating mode of a power generating unit or a high-voltage DC system in which the output of active power changes as an active power frequency response so as to contribute to the restoration of the frequency to the reference value
the active power stabilization function at cross-zonal oscillations	an additional function of the automatic voltage regulator of a group of synchronous generators, the purpose of which is to attenuate the cross-zonal power oscillations
excitation control system	a control system that includes the synchronous machine and its excitation system
offset characteristic	the ratio of a steady-state change of frequency to the resulting steady-state change in active power output, expressed in percentage terms. The steady-state change of frequency is related to the rated frequency and the relative variation of the active power is related to the maximum capability or the actual active power at the time of reaching the relevant threshold
power generating unit	either a synchronous power generator group, or a power generating module from a power plant, or a plant made up of power generating modules
reference value	the value specified as a reference for any parameter used in the control systems

Art. 6. The following abbreviations are used in the present procedure：

NRA	Romanian Energy Regulatory Authority
ATR	Connection Technical Evaluation Report
CDC	Certificate of compliance with the technical requirements
CDCT	Temporary certificate of compliance with the technical requirements
CEE	Wind Power Plant
CEF	Photovoltaic power plant

CfR	Certificate of connection
PPM	Power Plant made up of power generating modules
PPMO	Power Plant made up of power generating modules of offshore connected in alternating current
Cod RED	Technical code of the electrical distribution network
Cod RET	Technical code of the transport network
DEC	Central Power Dispatcher
DET	Territorial Energy Dispatcher
DED	Energy Distribution Dispatcher
ID	Installation Document
DMS-SCADA	SCADA system of the distribution operator
DLC	Power Plant Local Dispatcher
PGMD	Power Generating Module Document
EMS-SCADA	SCADA carrier system
FO-OPGW	Fiber optic
PGMS	Synchronous power generating module
HVDC	High-Voltage Direct Current
LEA	Electrical air line
LES	Electrical underground line
LVRT	Capability of crossing the defect (Low Voltage Right Through)
PGM	Power Generating Module
FON	Final Operational Notification
LON	Limited Operational Notification
ION	Interim Operational Notification
EON	Energisation Operational Notification
DSO	Distribution System Operator; may be the concessionaire distribution system operator or another operator holding a distribution network
RSO	Relevant System Operator
TSO	Transport and System Operator
Pi	Installed power
P_{max}	Maximum capacity
energisation for the	Putting into service

beginning of the testing period	
PSS	Active power stabilization function at cross-zonal oscillations
AVR	Automatic voltage regulator
LFSM	Limited frequency sensitive mode as an active power frequency response
LFSM-O	Limited frequency sensitive mode - overfrequency
LFSM-U	Limited frequency sensitive mode - underfrequency
RoCoF	Rate of change of frequency
RfG	Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code for requirements for the network connection of generating installations
SCADA	Information system for monitoring, controlling and acquiring data of a technological process or installations
NPS	National Power System
STC	Standard test conditions
THD	Total harmonic distortion
Vn	Nominal voltage of the network (reference voltage)
u.r.	Relative Unit

Chapter 4. Reference documents

Art. 7. The application of the present procedure is done by corroborating the provisions of the following normative acts:

(1) Commission Regulation (EU) 2016/631 of 14 April 2016 establishing a network code for requirements for the network connection of generating installations;

(2) Law on Electricity and Natural Gas no. 123/2012, as amended and supplemented;

(3) The technical code of the electric transport network, approved by the Order of the President of NRA no. 20/2004, as amended and supplemented;

(4) The technical code of the distribution networks, approved by the Order of the President NRA no. 128/2008, as amended and supplemented;

(5) Regulation on connection of users to the public electricity networks, approved by NRA Order no. 59/2013, as amended and supplemented;

(6) The Regulation on the Establishment of Connections of Users to the Public Electricity Network, approved by the Order of the President NRA no. 102/2015;

(7) The performance standard for the electricity transport and service system, approved by the Order of the President NRA no. 12/2016;

(8) The performance standard for the power distribution service, approved by the Order of the President NRA no. 11/2016, as amended;

(9) Operational procedure for the granting of derogations to power generating facility, from the obligation to fulfill one or more of the requirements stipulated in the technical connection standard, approved by Order of the President of the Romanian Energy Regulatory Authority no. 191/2018;

(10) The Electricity Measurement Code, approved by the Order of the President NRA no. 103/2015;

(11) Classification of power generating units and power plant modules approved by Order of the NRA President;

(12) The rules for takingover the electricity delivered in the electrical networks produced during the production capacity probation approved by Order of the President NRA no. 59/2015.

Chapter 5. Responsibilities and way of working

Section 5.1. NOTIFICATION FOR THE CONNECTION OF GENERATING POWER

5.1.A. NOTIFICATION FOR THE CONNECTION OF THE GENERATING UNIT OF CATEGORY A

Responsibilities of the power generating facility owner

Art. 8. The applicant (the manager, a third party or a manager-appointed aggregator) has the following responsibilities:

(1) to draw up the technical documentation according to the type of unit generating category A - ID in accordance with the technical data in Annex 1;

(2) to submit to RSO, at least 1 month before the proposed date of commissioning, the application for commissioning (in accordance with the provisions of Annex 16), accompanied by the ID, and specify the scheduled time for energisation for the beginning of the testing period;

(3) to send RSO the request for definitive withdrawal from operation of a Category A power generating unit and to ensure that RSO is informed of its final withdrawal from operation;

(4) to conclude for the probation the operating agreement and, where appropriate, the contract (s) for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(5) to ensure that the power generating unit is in compliance with the applicable technical requirements in force for the category to which it belongs during its lifetime. Compliance verification is based on the generation unit equipment certificates obtained from the manufacturer at the time of purchase. If the power generating unit of Category A is provided with the fault-ride-through function, the certificate shall also contain the test results of the fault-ride-through function. Equipment Compliance Certificates are provided with RSO at the time of submission of the ATR documentation and are part of the ID;

(6) to transmit RSO at least 1 month before the proposed date for energisation for the beginning of the testing period any planned changes in the technical capabilities of the power generating unit that may affect its compliance with the applicable technical requirements in force for the category to which it belongs before proceeding with the respective changes (for example: increasing installed power, replacing some inverters, adding/connecting storage batteries, etc.);

(7) notify any RSO or operating deficiencies of the power generating unit that affect its compliance with the applicable technical requirements in force, specific to the category to which it belongs without undue delay after the occurrence of these incidents.

Responsibilities of RSO

Art. 9. RSO has the following responsibilities:

(1) to publish on its website the technical requirements for power generating units of Category A;

(2) to establish the ID model in accordance with the technical data in Annex 1 and publish it on its own website;

(3) to analyze the technical documentation submitted by the power generating facility owner by a third party or aggregator designated by the owner for the power generating facility of Category A that is connected to its own network;

(4) to inform the TSO on a half-yearly basis (March 1 and September 1) cumulatively of all requests for the connection of Category A power generating facilities to their own network as well as to the connected ones. At the request of the TSO, the DSO sends the required technical data;

(5) to issue and transmit to the applicant the power for the probation of the power generating facility or the EON under the conditions set forth in Article 11 and Article 14. The power generating facility owner shall not energised the power generating unit without the written consent of RSO or EON respectively;

(6) to participate in the verification of the power generating unit of category A commissioned according to the development stage mentioned in the ATR (verification of protection, quality of electricity, integration in DMS SCADA, as the case may be, two-lane counter mounting, etc.);

(7) when the tests carried out demonstrate the compliance of the power generating unit with the requirements of the ATR and the applicable legislation, issue the certificate of connection according to the development stage mentioned in ATR;

(8) to submit to the TSO on a half-yearly basis (on March 1 and September 1) cumulatively, the situation of the decommissioning of power generating units in category A;

(9) assess the compliance of a power generating unit of Category A with the applicable technical requirements throughout the lifetime of the power generating facility in the situations referred to in Art. 4, par. (3) and inform the power generating facility owner of the outcome of this assessment.

Art. 10. The energisation for the beginning of the testing period of power generating units of Category A shall only take place after the acceptance of the power supply through EON issued by RSO.

Art. 11. The process of issuing the EON contains the following steps:

(1) submission to the RSO of the documentation referred to in Article 12 at least

one month before the energisation for the beginning of the testing period by the power generating facility owner, a third party or an aggregator designated by the manager;

(2) the RSO's analysis of the documentation provided in paragraph (1);

(3) the conclusion of the operating agreement and, as the case may be, of the contract (s) for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(4) the EON's issuance by the RSO.

Art. 12. The documentation submitted by the applicant contains the following:

(1) the request for energisation for the beginning of the testing period, compiled in accordance with the provisions of Annex 16;

(2) ID containing at least:

(a) the connection point;

(b) maximum capacity of the plant, expressed in kW or kVA (or kW and kVAr);

(c) type of primary energy source;

(d) classification of the power generating unit as emerging technology (YES / NO);

(e) technical data and equipment certificates and the results obtained from an inspection by an approved certification body listed in Annex 1;

(f) in respect of the equipment used for which a certificate of equipment has not been received, technical information / data according to the instructions given by RSO, relevant to the applicable technical requirements in force, specific to power generating units of category A;

(g) contact details of the manager, a third party or aggregator designated by the manager and their signatures.

(3) the date at which it is expected the energisation for the beginning of the testing period appropriate to the stage specified in ATR (if applicable);

(4) the documents attesting the performance of preceding works for the begining of the test period in accordance with the applicable provisions in force.

Art. 13. Within 10 working days after receiving the documentation referred to in Article 12, RSO shall examine whether it is complete and shall prove the compliance of the power generating unit, request the completion of the documentation, if applicable, and may request information at TSO, as appropriate on compliance of ID.

Art. 14. RSO issues EON only if the following conditions are fully met:

(1) the compliance of the power generating unit of Category A is proven, which is going to be activated, with the technical applicable requirements in force;

(2) the test bulletins for ATR protection are issued for both the point of connection, as appropriate, and the internal ones of the power generating unit, according to the applicable technical requirements, in force;

(3) there are documents attesting the accomplishment of the works prior to commissioning, provided for in Article 12 (4), respectively the acquisition and installation of equipment required by ATR (integration into DMS SCADA, as appropriate, including communication path, double-sense counter, etc.);

(4) there are documents proving the implementation of the aggregation and integration solution implementation in the DMS-SCADA systems of RSO, if applicable. Integration refers at least to the integration of measures P (active power) and Q (reactive power);

(5) the operating agreement and the contract (s) for the transport, distribution or supply of electricity are concluded, as the case may be, in compliance with the regulations in force.

Art. 15. If at least one of the conditions provided in Article 14 is not fulfilled by the required date for the energisation for the beginning of the testing period, the RSO shall send the applicant within 5 working days the list of nonconformities as well as the postponement of the deadline of putting into operation the power generating unit until it is removed.

Art. 16. RSO shall issue EON within 5 working days from the observation of the fulfillment of all the conditions stipulated in Article 14 or of the elimination of all non-conformities, according to the provisions of Article 15.

(2) The power generating unit of category A shall be activated within 5 working days of the EON being issued, in accordance with the program prepared by the RSO.

Art. 17. (1) The RSO participates in the verifications of the power generating unit of category A put into operation according to the development stage mentioned in ATR.

(2) If the checks made demonstrate the compliance of the power generating unit with the requirements of the ATR and the applicable legislation, the RSO issues the connection certificate according to the ATR development stage.

5.1.B. Notification for connection of power generating units of category B

Responsibilities of the power generating facility owner

Art. 18. The applicant (the manager, a third party or an agent designated by the manager) has the following responsibilities:

(1) to draw up the technical documentation according to the type of power generating unit of category B - PGMD in accordance with the technical data in Annex 2

(2) to submit at RSO, at least 3 months before the proposed date of energisation for the beginning of the testing period, the application for commissioning (according to the provisions of Annex 16) with the PGMD and specify the scheduled time for commissioning;

(3) transmit RSO, directly or through a third party or aggregator, designated by the manager, the request to obtain the CDC (in accordance with the provisions of Annex 17);

(4) to conclude the exploitation contract and, as the case may be, the contract / contracts for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(5) to notify RSO of the timing and type of tests to verify compliance with the applicable technical requirements in force, specific to the category to which the power generating unit belongs, before commencing. The RSO firstly approves the timetable for the tests and the procedures to be followed. RSO grants this approval in due course which can not be unduly refused.

(6) to carry out, through economic operators holding A3 type certificate issued by NRA, the performance verification tests in terms of compliance with the applicable technical requirements in force;

(7) to submit test results to RSO;

(8) to ensure that the power generating unit is in compliance with the applicable technical requirements in force, specific to the category to which it belongs, throughout its life. The power generating facility owner is based on the certificates of conformity of the power generating unit components that are

obtained from the equipment manufacturer at the time of purchase. Equipment Compliance Certificates are made available to RSO at the time of submission of the ATR documentation and are part of the PGMD;

(9) to transmit RSO, at least 1 month before the proposed date for energisation for the beginning of the testing period, any planned changes in the technical capabilities of the power generating unit that may affect its compliance with the applicable technical requirements in force, specific to the category from which it belongs, prior to initiation of such amendments (for example: increasing installed power, replacing some inverters, adding / connecting storage batteries, etc.);

(10) to notify the RSO of any incidents or deficiencies in the operation of the power generating unit that affect its compliance with the applicable technical requirements in force, specific to the category to which it belongs, without undue delay after the occurrence of such incidents / deficiencies;

(11) to send the RSO the request for definitive withdrawal from the operation of the power generating unit and to ensure that RSO is informed of its definitive withdrawal from operation of it.

Responsibilities of RSO

Art. 19. RSO has the following responsibilities:

(1) to publish on its website the technical requirements for power generating units;

(2) to establish the PGMD model in accordance with the technical data in Annex 2 and to publish it on its own website;

(3) to analyze the technical documentation submitted by the power generating facility owner by a third party or aggregator designated by the owner for the power generating facility of category B that is connected to its own network;

(4) to inform TSO, if RSSO is DSO, on a half-yearly basis (March 1 and September 1), on an aggregate besis, on all requests for connection of power generating units of Category B to its own network, and connected ones. At the request of the TSO, the DSO sends the required technical data;

(5) If the RSO finds that the request for the energisation for the beginning of the testing period of the power generating unit has been submitted prior to the curing work specified in the ATR, RSO has the obligation to redo the calculations for the operating regimes, taking into account of:

(a) demand facilities and / or generation units under energisation at that time;

(b) demand facilities and / or generation units under the power phase, for which the demand for energisation for the beginning of the testing period has been submitted to RSO.

(6) to issue and transmit to the applicant the acceptance for appliance of power for the probation of the power generating unit or the EON under the conditions provided for in Articles 23 and 25. The power generating facility owner shall not activate the power generating unit without written consent of RSO or EON respectively;

(7) to agree with the manager on the timing of the verification tests and to give timely approval to the timetable and type of tests which he submits to the manager and which can not be unreasonably refused;

(8) to participate in the verification tests for the voltage generator unit for the test period according to the development stage mentioned in ATR;

(9) to analyze the documentation containing the results of the verification tests;;

(10) to release the CDC if the verification tests demonstrate the compliance of the power generating unit with the technical requirements applicable in force and issue the FON if the condition from ATR are observed, according to the development stage mentioned in ATR;

(11) to ensure the transparency of the process of certification of compliance with the technical connection requirements by publishing on its own website the status of the power generating units under test (with ION status) and CDC issued / revoked and transmit it quarterly to TSO, if RSO is DSO, within 10 business days after the end of each quarter;

(12) if RSO is DSO, transmit to the TSO on a half-yearly basis (on March 1 and September 1), on an aggregate besis, the situation of the decommissioning of the power generating units of category B;

(13) to assess the compliance of the power generating unit with the the technical requirements applicable in force, specific to the category B, throughout the lifetime of the power generating facility and inform the power generating facility owner of the result of this assessment;

(14) to revoke the CDC in the situations provided for in Article 38 by informing the power generating facility owner and the TSO, where the RSO is DSO with respect to the loss of compliance with the technical connection requirements and the FON as a result of the revocation of the CDC

Art. 20. The RSO has the right to require the power generating facility owner to perform tests to verify the compliance with the technical requirements for connection and simulations using the model of the power generating facility in the situations referred to in Article 4, (3). The RSO shall inform the power generating facility owner of the results of these tests and simulations.

Art. 21. The energisation for the beginning of the testing period of the power generating unit of the category B shall take place only after the receipt of the acceptance of energisation for the beginning of the testing period by EON issued by RSO.

Art. 22. The documentation submitted by the applicant contains the following:

(1) the request for energisation for the beginning of the testing period (in accordance with the provisions of Annex 16);

(2) the technical documentation, drawn up in accordance with the provisions of Annex 2;

(3) the documents attesting the performance of preceding works for energisation for the beginning of the testing period in accordance with the applicable provisions in force and set out in Annex 3;

(4) the program of tests to check the compliance of the power generating unit;

(5) Full documentation of the results of the test for compliance of the power generating unit;

(6) request for CDC (in accordance with the provisions of Annex 17).

Art. 23. The process of issuing the EON contains the following steps:

(1) at least 3 months before the energisation for the beginning of the testing period, the power generating facility owner, a third party or an aggregator designated by the owner, submits to RSO the documentation provided for in Article 22, paragraph (1) and (2);

(2) RSO restores the system calculations, if applicable, in accordance with the provisions of Article 19, (6);

(3) at least 10 days prior to the energisation for the beginning of the testing period, the power generating facility owner, a third party or an aggregator designated by the owner, submits to RSO the documentation referred to in Article 22, (3);

(4) the RSO's analysis of the technical documentation provided in paragraph (1) and the documentation referred to in paragraph (3);

(5) the conclusion of the operating agreement and, as the case may be, of the contract (s) for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(6) registration of the power generating unit to the balancing market as a unit of evidence;

(7) the issuance by the DED / DET of the investment order for the power generating unit;

(8) the EON's issuance by the RSO.

Art. 24. (1) Within 30 days of receipt of the documentation referred to in Article 23, paragraph (1), RSO considers whether this is complete and that the technical data confirm the capability of the power generating unit to meet the applicable technical requirements.

(2) Where appropriate, RSO consults with TSO on the compliance of the technical documentation of the power generating unit.

(3) RSO transmits to the applicant the non-conformities identified, requesting the completion of the documentation, as the case may be.

Art. 25. RSO issues EON only if the following conditions are fully met:

(1) the documentation referred to in Article 232, (2) is complete and in compliance with applicable technical requirements;

(2) the results of the calculations for the operating regimes referred to in Article 19, (5) indicates that the generator unit can be energized without performing the curing work specified in the ATR, as applicable;

(3) the documents attesting the carrying out of the works prior to the energisation for the beginning of the testing period provided in Art.23, par. (3) are complete;

(4) the required ATR protections are installed and the settings are set to the values set by RSO, confirmed by sample bulletins and, as appropriate, there are arrangements between the owner and the RSO for the protection schemes;

(5) the operating contract and, where applicable, the contract (s) for the transport, distribution or supply of electricity, in accordance with the regulations in force.

Art. 26. If at least one of the conditions provided for in Article 25 is not met by the required date for the energisation for the beginning of the testing period, the RSO shall send the applicant, within 5 working days, the list of nonconformities and the

postponement of the deadline under energisation for the beginning of the testing period of the power generating unit until it is eliminated.

Art. 27. (1) RSO issues EON within 5 working days of the observation that all conditions provided for in Article 25 have been met or that all non-conformities have been eliminated in accordance with the provisions of Article 26.

(2) The power generating unit is activated for the probation within 5 working days of the EON issue, according to the program developed by DED / DET, as appropriate.

Art. 28. (1) Within a maximum of two days from the date of energisation for the beginning of the testing period of the new power generating unit, and in the case of plants made up of power generating modules, at least one power generating module, RSO issues the ION and publishes on its own website the name of the power generating unit, the date of energisation for the beginning of the testing period and the approved active power specified in the ATR.

(2) The status of the ION in which the power generating unit is in provisional or sample mode begins after receipt of the EON and lasts from commissioning until the date of obtaining the CDC.

Art. 29. (1) The maximum period during which the power generating facility owner can maintain ION status is 24 months.

(2) RSO is entitled to set a shorter validity period for ION.

(3) An extension of the ION shall only be granted if the power generating facility owner has made significant progress towards full compliance.

(4) Non-conformities must be clearly identified when submitting an extension request.

Art. 30. An extension of the maximum period provided for in Article 29, (1) may be granted if the power generating facility owner transmits to RSO a request for derogation before the expiry of that period in accordance with the procedure of granting derogations in force.

Art. 31. During the trial operation, the power generating unit responds to dispatch orders through:

(1) disconnection / connection;

(2) change of active power produced by disconnecting / connecting generating modules in the case of power generating units or modifying the active power in the possible operating range in the case of synchronous power generating modules;

(3) the change of the reactive power injected / absorbed into / from the network at the value disposed by the dispatcher in the case of synchronous power generating modules within the reactive power capability.

Art. 32. The conditions for carrying out tests to verify compliance with the technical requirements for connection of the power generating unit are:

(1) compliance testing may only commence after receiving the approval issued by the RSO for the implementation of the test program submitted by the applicant as provided for in Article 22 (4);

(2) compliance testing shall be carried out in accordance with the provisions of Chapter 5.2 of this Procedure;

(3) Conformity testing shall be carried out after at least 90% of the installed power installed in the ATR has been operated for each of the phases of energisation for the beginning of the testing period provided in ATR;

(4) for power generating units whose total installed power is foreseen in the ATR to be achieved in a staged manner, compliance testing for the installed power corresponding to each stage of development will be made.

(5) Compliance testing is performed by a third party (economic operator holding A3 certificate issued by NRA). The RSO representative can participate in the tests;

(6) the complete documentation containing the results of the compliance testing shall be submitted to the RSO;

(7) within 10 working days of receipt of the documentation referred to in paragraph (5), RSO analyzes the results of the compliance testing and asks for additions, if applicable;

(8) RSO shall send the applicant in writing any non-conformities and set deadlines for their elimination; after eliminating the nonconformities, the applicant shall provide proof of their removal and request RSO to release the CDC.

Art. 33. (1) The power generating facility owner announces the RSO regarding the definitive withdrawal from the operation of a power generating unit in accordance with the provisions of the current legislation.

(2) Where appropriate, the RSO shall inform the TSO of any request for the withdrawal of a power generating facility within 10 days of receipt of the request.

Art. 34. (1) In the case of modifications to the power generating unit, the technical data required to be transmitted by the power generating facility owner to RSO are:

(a) the technical data of the replacement equipment;

(b) certificates of conformity for the replacement generating equipment or modules;

(c) the single line diagram, if there are any changes;

(d) restoring the study for the calculation of reactive power at the connection point, the mathematical model, the permanent and dynamic performance study, as appropriate.

(2) RSO has the right to request other necessary technical data, as appropriate.

Art. 35. If the existing power generating unit undergoes modifications during the trial operation period, tests shall be carried out to check the technical performances specific to the modification made: active power regulation, reactive power.

Art. 36. (1) The issue date of CDC is 10 business days from the date that all documents and tests carried out, show the compliance of the power generating facility with the technical connection requirements specified in applicable technical regulations in force.

(2) After the CDC is issued, RSO notifies (FON) the power generating facility owner within 5 working days, transmitting to the CDC (the original remains with the power generating facility owner).

(3) RSO publishes on its own website the CDC issue / revocation status.

RSO may, at the justified request of the CDC holder, issue a duplicate that will be marked with the duplicate sign and issued in two original copies, one at the applicant and the other at the issuer (Annex 9).

(4) Replacement of the CDC may be performed on the basis of the justified request submitted by the power generating facility owner to RSO together with the CDC original if, during its period of validity, there are administrative changes such as those provided in the the regulation of connecting users to public electricity networks into force.

(5) RSO issues a new CDC with the modifications provided in paragraph (5) and, where appropriate, hand it over to the owner, destroy the original copy of the old CDC and update the situation on its own website.

Art. 37. Pentru instalațiile de producere a energiei electrice a căror putere aprobată totală este prevăzută în ATR a se realiza în mod etapizat, se acordă CDC pentru fiecare etapă de dezvoltare prevăzută în ATR.

Art. 38. (1) Revocation of the CDC takes place under the following conditions:

(a) non-compliance with the regulated limits on the parameters of the quality of the electricity measured at the connection / delimitation point, as the case may be;

(b) failure to perform proven test performance;

(c) in the absence of measurement data or in the absence of records;

(d) in the event of non-compliance in the case of periodic testing;

(e) to indicate a non-compliance in performing the verificarions / tests ordered by the RSO as a result of monitoring the operation of the power generating unit;

(f) at the commencement of action of significant changes to the installations of the power generating unit;

(g) to loss of communication over a period of time affecting the operation of the power generating unit.

(2) In case of CDC revocation according to the provisions of par. (1), FON is automatically canceled.

(3) RSO informs the power generating facility owner of the loss of compliance with the technical requirements for connection and revocation of the CDC.

5.1.C. NOTIFICATION FOR THE CONNECTION OF GENERATING UNITS OF CATEGORY C

Responsibilities of the power generating facility owner

Art. 39. The applicant (the owner, a third party or an agent appointed by the owner) has the following responsibilities:

(1) to draw up the technical documentation according to the type of unit generating of category C - PGMD in accordance with the technical data in Annex 4;

(2) to submit to the RSO at least 3 months before the proposed date for the energisation for the beginning of the testing period, the request for the energisation for the beginning of the testing period (in accordance with the provisions of Annex 16) accompanied by the PGMD and specify the scheduled time for energisation for the beginning of the testing period;

(3) to transmit RSO, directly or through a third party or aggregator, designated by the owner, the request to obtain the CDC (in accordance with the provisions of Annex 17)

(4) to conclude for the probation the exploitation contract and, as the case may be, the contract / contracts for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(5)to notify RSO and TSO, where appropriate, of the timing and type of tests to verify compliance with technical requirements applicable in force, specific to the category to which the power generating unit is part, before commencing. The RSO firstly approves the timetable for the tests and the procedures to be followed. RSO grants this approval in due course which can not be unduly refused;

(6)to carry out, through economic operators holding A3 certificate issued by NRA, the performance verification tests in terms of compliance with the applicable technical requirements in force;

(7)to submit the results of preliminary tests (as appropriate) and final tests both to RSO and TSO, as appropriate;

(8) to ensure that the power generating unit is in compliance with the technical requirements applicable in force, specific to the category to which it belongs, throughout its life. The power generating facility owner is based on the certificates of conformity of the power generating facility components that are obtained from the equipment manufacturer at the time of purchase. Equipment compliance certificates are made available to RSO at the time of submission of the ATR documentation and are part of the PGMD;

(9) to transmit RSO, at least 1 month before the proposed data for energisation for the beginning of the testing period, any planned changes in the technical capabilities of the power generating unit that may affect its compliance with the applicable technical requirements in force, specific to the category from which it belongs, prior to the initiating those modification (for example: increasing installed power, replacing some inverters, adding / connecting storage batteries, etc.);

(10) to notify the RSO of any incident or performance impairment of the power generating unit that affects its compliance with the applicable technical requirements in force, specific to the category to which it belongs, without undue delay, immediately after the occurrence of such incidents / deficiencies;

(11) to send the RSO the request for definitive withdrawal from the operation of the power generating unit and to ensure that RSO is informed of its definitive withdrawal from operation of it.

Responsibilities of RSO

Art. 40. RSO has the following responsibilities:

(1) to publish on its website the technical requirements for power generating units;

(2) to establish the PGMD model in accordance with the technical data in Annex 4 and to publish it on its own website;

(3) to submit to the TSO, in the event that RSO is DSO, within 5 working days after receipt, the documents referred to in Article 43 (1) and (2) in order to obtain a technical acceptance for the technical documentation submitted;

(4) to analyze the technical documentation submitted by the power generating facility owner by a third party or aggregator designated by the owner for the power generating facility of category C that is connected to its own network. At the request of OTS, DSO transmits the required technical data;

(5) to inform TSO, if RSO is DSO, on a half-yearly basis (March 1 and September 1), on an aggregate besis, on all requests for connection of power generating units of Category C to its own network, and connected ones. At the request of the TSO, the DSO sends the required technical data;

(6) if the RSO finds that the request for the energisation for the beginning of the testing period of the power generating unit has been submitted prior to the curing work specified in the ATR, RSO has the obligation to redo the calculations for the operating regimes, taking into account of:

   (a) demand facilities and / or generation units under energisation for the beginning of the testing period at that time;

   (b) demand facilities and / or generation units under the energisation for the beginning of the testing period stage, for which the request for energisation for the beginning of the testing period was submitted to RSO.

(7) to issue and transmit to the applicant the acceptance of energisation for the beginning of the testing period of the power generating unit or the EON, under the conditions provided for in Articles 44 and 45. If RSO is DSO, it issues the EON only after receive technical approval from TSO for technical documentation for energisation for the beginning of the testing period the plant. The power generating facility owner does not activate the power generating facility without RSO's written consent, or EON;

(8) to ensure the transparency of the process of certification of compliance with the technical requirements for connection by publishing on its own website the situation of the power generating units in the probation (ION status), CDC and CDCT issued / revoked and the power generating units are subject to significant changes and send it

to TSO on a quarterly basis, if RSO is DSO, within 10 business days after the end of each quarter;

(9) to agree with the owner the verification test period and to grant in timely manner, in coordination with the TSO, the approval of the timetable and type of tests which he submits to the owner and which can not be unreasonably refused;

(10) to participate in the verification tests for the energisation of the power generating unit for the testing period according to the development stage referred to in ATR;

(11) to analyze the documentation containing the results of the verification tests;

(12) issue the CDC after receiving the TSO technical acceptance of the results of the verification tests demonstrating the compliance of the power generating unit with the technical requirements applicable into force, and issuing the FON under the ATR conditions according to the development stage mentioned in ATR;

(13) if RSO is DSO, to transmit to the TSO on a half-yearly basis (March 1 and September 1) on an aggregate basis the situation of the operating withdrawals of the power generating units of category C;

(14) to assess the compliance of the power generating unit with the technical requirements applicable, into force, specific to the category to which it belongs during the lifetime of the power-gemerating plant and inform the power generating facility owner of the result of this assessment;

(15) to revoke the CDC in the situations provided for in Article 68, informing the power generating facility owner and the TSO, where the RSO is DSO, of the loss of compliance with the technical connection requirements and the FON following the revocation of the CDC.

Responsibilities of OTS

Art. 41. OTS has the following responsbilities:

(1) to submit to RSO and the manager, within 30 days of receipt of the documentation referred to in Article 43 (1) and (2), and within 5 working days of receipt of the documentation referred to in Article 43 (3), any non-compliance notified and, in the absence of non-conformities, transmit the technical acceptance for the documentation submitted for energisation for the beginning of the testing period, in the energisation for the beginning of the testing period agreement;

(2) to analyze the timetable submitted by the applicant and the type of tests that he proposes to perform to verify compliance with the applicable technical requirements in force, specific to the category to which the power generating unit is part, before they start. TSO shall transmit RSO, as appropriate, to the applicant for approval of the test program;

(3) to analyze the results of the tests and deliver the RSO technical acceptance of the results of the verification tests demonstrating the compliance of the power generating unit with the technical requirements applicable, in force.

Art. 42. RSO has the right to require the power generating facility owner to perform tests to verify compliance with the technical requirements for connections and simulations using the model of the power generating facility in the situations referred to in Article 4 (3). The RSO shall inform the power generating facility owner of the results of these tests and simulations.

Art. 43. The documentation submitted by the applicant shall contain the following:

(1) the request for the energisation for the beginning of the testing period (in accordance with the provisions of Annex 16));

(2) the technical documentation, in accordance with the provisions of Annex 4;

(3) the documents proving the performance of the preceding works for energisation for the beginning of the testing period as set out in Annex 5;

(4) the program of tests to check the compliance of the power generating unit;

(5) full documentation of the results of the compliance test of the power generating unit;

(6) the request to obtain the CDC (in accordance with the provisions of Annex 17)).

Art. 44. The process of issuing the EON contains the following steps:

(1) at least 3 months before the energisation for the beginning of the testing period, the power generating facility owner, a third party or an aggregator designated by the owner, submits to RSO the documentation provided in Article 43 (1) and (2);

(2) the transmission by RSO to TSO, as the case may be, of the documentation referred to in paragraph (1);

(3) RSO re-establishes the system calculations, if applicable, according to the provisions of Article 40, paragraph (6);

(4) at least 10 days prior to the energisation for the beginning of the testing period, the power generating facility owner, a third party or an aggregator designated by the owner, submits to RSO the documentation referred to in Article 43 (3);

(5) the RSO's analysis of the documentation referred to in Article 43 (3);

(6) transmission by TSO, as the case may be, of the technical acceptance for the documentation submitted by the RSO for the purpose of energisation for the beginning of the testing period;

(7) the conclusion of the operating agreement and, as the case may be, of the contract (s) for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(8) enrolling the power generating unit to the balancing market as a unit of evidence;

(9) the issuance by the DED / DET of the investment order for the power generating unit;

(10) the EON's issuance by the RSO.

Art. 45. RSO issues EON only if the following conditions are fully met:

(1) the documentation referred to in Article 43 (2) is complete and in compliance with applicable technical requirements;

(2) the results of the calculations for the operating regimes provided for in Article 44 (3) indicates that the power generating unit can be activated without performing the curing work provided in the ATR, as appropriate;

(3) the documents proving the carrying out of the works prior to the energisation for the beginning of the testing period provided in Article 43, (3) are complete;

(4) the protection required by the ATR is installed and the settings are set to the values set by the RSO, confirmed by sample bulletins and, where appropriate, there are arrangements between the owner and the RSO for the protection schemes

(5) there is technical acceptance for the energisation for the beginning of the TSO testing period;

(6) the operating agreement and, where applicable, the contract (s) for the transport, distribution or supply of electricity are concluded, in accordance with the regulations in force.

Art. 46. (1) If at least one of the conditions provided for in Article 45 is not met by the required date for the energisation for the beginning of the testing period, the RSO shall send the applicant within 5 working days the list of nonconformities as well as the postponement of the period of the energisation for the beginning of the testing period of the power generating unit until they are removed.

(2) RSO issues EON within 5 working days of the observation that all conditions provided for in Article 45 have been met or that all nonconformities have been eliminated in accordance with paragraph (1).

(3) The power generating unit is activated for the probation within 5 working days of the EON issue, according to the program developed by DED / DET, as appropriate.

Art. 47. (1) Within a maximum of two business days from the date of energisation for the beginning of the testing period of the power generating unit, and for power generator module plants, at least one generator module, RSO issues the ION and publishes on its own website the name of the power generating unit, its owner, the date of energisation for the beginning of the testing period and the approved active power specified in the ATR.

(2) The provisions of paragraph (1) also applies to power generating units that have undergone significant changes.

(3) The status of the ION in which the power generating unit is in provisional or probable operation begins after receipt of the EON and lasts from commissioning until the obtaining of CDC / CDCT.

Art. 48. (1) The maximum period during which the power generating facility owner can maintain ION status is 24 months.

(2) RSO is entitled to set a shorter validity period for ION.

(3) An extension of the ION shall only be granted if the power generating facility owner has made significant progress towards full compliance.

(4) Non-conformities must be clearly identified when submitting an extension request.

Art. 49. An extension of the maximum period provided for in Article 48 (1) may be granted if the power generating facility owner transmits to RSO a request for derogation before the expiry of that period in accordance with the procedure of granting derogations, into force.

Art. 50. During the trial operation, the power generating unit responds to dispatcher orders through:

(1) disconnection / connection;

(2) changing the active power produced to the value ordered by the dispatcher by disconnecting / connecting generating modules in the case of power generating units or changing the active power in the possible operating range in the case of synchronous power generating modules;

(3) changing the reactive power injected / absorbed into / out of the network at the value disposed by the dispatcher within the reactive power capability.

Art. 51. The conditions for carrying out the tests for checking the compliance with the technical requirements for connecting the power generating units are:

(1) Conformity testing may only commence upon receipt of approval of the test program by the TSO and after agreement with RSO, as appropriate, of the period of verification tests;

(2) the conformity check tests are carried out in accordance with the provisions of chapter no. 5.2. of the present proceedings;

(3) compliance testing shall be performed after at least 90% of the installed ATR power has been put into service for each of the stages of energisation for the beginning of the testing period provided for in ATR;

(4) for power generating facility owner the total installed power of which is set out in the ATR is achieved in stages, the tests shall be carried out for the installed power corresponding to each stage of development;

(5) compliance testing is performed by a third party (economic operator holding A3 certificate issued by NRA). A representative of RSO also participates in the tests;

(6) the complete documentation containing the results of the compliance testing shall be transmitted to TSO and RSO, if applicable;

(7) within 10 working days of receipt of the documentation referred to in paragraph (6), TSO analyzes the results of the compliance testing and asks for additions, as appropriate. In the absence of non-conformities, TSO issues technical acceptance of the results of the verification tests demonstrating the compliance of the power generating unit with the technical requirements applicable, into force, that the RSO sends to the power generating facility owner;

(8) RSO shall send in writing to the applicant the possible non-conformities and set deadlines for their elimination, after eliminating the non-conformities, the power

generating facility owner shall request approval for the final tests to check the compliance of the power generating facility with the technical requirements for the connection. A representative of RSO also participates in the tests.

Art. 52. (1) The power generating facility owner announces the RSO regarding the definitive withdrawal from the operation of a power generating unit in accordance with the provisions of the current legislation.

(2) Where appropriate, the RSO shall inform the TSO of any request for the withdrawal of a power generating unit within 10 days of receipt of the request.

Art. 53. (1) In case of significant modifications of the power generating facility, the technical data required to be transmitted by the power generating facility owner to RSO are:

(a) the technical data of the replacement equipment;

(b) certificates of conformity for the replacement generating equipment or modules;

(c) the single line diagram, if there are any changes;

(d) restoring the study for the calculation of reactive power at the connection point, the mathematical model, the permanent and dynamic performance study, as appropriate.

(2) RSO has the right to request other necessary technical data, as appropriate.

Art. 54. If the existing power generating unit undergoes changes that fall within the category of significant changes, during the trial operation period, will be achieved:

(1) technical performance check tests, specific changes made: active power adjustment, reactive power setting;

(2) verification tests for a new power generating unit in the event of a change in the maximum active power to increase it, or in case of passing the power generating unit from Category B to Category C as a result of the increase in the maximum active power approved by the ATR.

Art. 55. TSO issues technical acceptance of the results of the verification tests demonstrating the compliance of the power generating unit with the applicable technical requirements in the event that the following requirements are met cumulatively:

(1) the results of the verification tests show compliance with the applicable technical requirements in force;

(2) The quality of the electricity monitored at the connection point for a period of at least 2 weeks, including during the tests, falls within the limits set out

in the performance standard for the electricity distribution service or in the service performance standard for transport of electricity and system service into force, as applicable;

(3) where appropriate, the reactive power compensation means have been activated and integrated into the related adjustment loops;

(4) the existence and operation of a local central dispatcher from which active power and reactive power setpoints can be transmitted;

(5) the messages transmitted by the RSO or the local central dispatcher (DLC) through the EMS-SCADA / DMS-SCADA / SCADA system of the DLC are received and integrated into the power generating unit's own adjusting system;

(6) the power generating unit has been integrated into the TSO's forecasting system, as appropriate;

(7) the power quality analyzer of the power generating unit is integrated into the TSO's electrical quality monitoring system, respectively the DSO, as appropriate, as specified in the ATR;

(8) the data communication paths to the RSO referred to in the ATR are provided.

Art. 56. The CDC and FON issuance process contains the following steps:

(1) obtaining technical acceptance of test results that demonstrate compliance of the power generating unit with technical requirements applicable, into force, issued by TSO;

(2) the submission by the owner to RSO of the request for CDC issuance;

(3) Confirmation by RSO / Manager of the settings of protection, including special protections, as appropriate (sample bulletins are transmitted);

(4) confirmation by the owner of the implementation of measures to avoid operating on the island, for installations made up of power park modules.

Art. 57. (1) The CDC issuance term is 10 business days from the date that all documents and tests show the compliance of the power generating facility with the technical connection requirements specified in applicable technical regulations in force.

(2) After the CDC is issued, RSO notifies (FON) the power generating facility owner and DSO/TSO, as the case may be, within 5 working days, transmitting the CDC (the original remains to the power generating facility owner) or the decision to grant an derogation in accordance with the provisions of Article 61

(3) RSO publishes on its own website the CDC issue / revocation status.

Art. 58. For power generating facilities whose total approved power is foreseen in the ATR to be carried out in a staged manner, the CDC shall be granted for each ATR development stage.

Art. 59. (1) If only one non-compliance is identified, RSO may grant CDCs with temporary validity, ie CDCT.

(2) CDCT is granted for a maximum of 6 months.

(3) The period provided for in paragraph (2) may be prolonged in justified cases, up to a maximum of three months, only if the power generating facility owner has made significant progress towards full compliance.

Art. 60. In the event of multiple non-conformities or the expiry of the term of the CDCT without removing the non-compliance, RSO has the right to refuse to allow the operation of the power generating facility until the power generating facility owner remedies the nonconformities.

Art. 61. (1) If the RSO finds that the identified non-compliance requires a request for derogation from the requirements of the technical norm, the power generating facility owner shall submit a request to RSO in accordance with the procedure for granting derogations to the power generating facilities from the obligation to fulfill one or a variety of the requirements provided for in the technical connection standard, in force.

(2) If the derogation is not granted, RSO has the right not to allow the operation of the power generating facility until the power generating facility owner has rectified the non-compliance and the power generating unit complies with all the requirements of the technical connection standard in force.

(3) If the RSO and the power generating facility owner does not remedy the non-compliance within at the latest six months after of notification of the decision not to grant the derogation, each party may submit the matter to NRA in order to solve it.

Art. 62. The power generating facility owners holding CDC and FON shall immediately inform the RSO (within 48 hours) of the following situations:

(1) the installation temporarily undergoes a significant change or loss of capability affecting its performance, specifying the projected duration of operation in that state;

(2) equipment failure that results in non-observance of technical requirements in the technical specification specific to the category to which the power

generating facility belongs (loss of communication, impossibility to achieve active or reactive power setting, failure to meet the requirements for reactive power exchange at the connection point, etc.) in force.

Art. 63. The power plant manager shall request the LON if it reasonably foresees that the situations referred to in Article 62 last for more than three months.

Art. 64. (1) RSO issues an LON containing the following clearly identifiable information:

(a) the unresolved issues that justify giving LON;

(b) responsibilities and timing for their resolution;

(c) the duration of validity of the LON, which may not exceed 12 months.

(2) The CDC is suspended for the duration of validity of LON, for the unfulfilled requirements for which the LON was issued.

Art. 65. RSO has the right to refuse to allow the power generating unit to function upon termination of validity of LON. In such cases, FON and CDC are automatically canceled.

(2) RSO requires for restoration of compliance testing for unfulfilled requirements for which the LON was issued for the issuance of a new CDC and a new FON.

Art. 66. A further extension of the period of validity of LON may be granted following a request for a derogation to RSO prior to the expiration of that period, in accordance with the provisions of the procedure for granting derogations to power generating facilities from the obligation to comply one or more of the requirements in the technical connection standard in force.

Art. 67. If the derogation provided for in Article 66 is not granted or if RSO refuses to allow the operation of the power generating unit upon termination of the LON, the power generating facility owner may submit a request for settlement to NRA in within six months of notification of the decision not granting a further extension of the period of validity of LON.

Art. 68. (1) Revocation of the CDC takes place under the following conditions:

(a) at non-compliance with the regulated limits on the parameters of the quality of the electricity measured at the connection / delimitation point, as the case may be;

(b) in the event of failure to perform proven test performance;

(c) in the absence of measurement data or in the absence of setpoints;

(d) in the event of non-compliance in the case of periodic testing;

(e) to indicate a non-compliance in performing the verifications / tests ordered by the RSO as a result of monitoring the operation of the power generating unit;

(f) at the commencement of significant changes to the installations of the power generating unit;

(g) to the loss of communication over a period of time affecting the operation of the power generating unit.

(2) In case of CDC revocation according to the provisions of par. (1), FON is automatically canceled.

Art. 69. The RSO informs the power generating facility owner about the loss of compliance with the technical requirements for the connection and the revocation of the CDC.

Art. 70. The RSO may issue, at the justified request of the CDC holder, a duplicate. The duplicate will be marked with the duplicate logo and issued in two original copies, one to the applicant and one to the issuer (Annex 9).

Art. 71. (1) Replacement of the CDC may take place if, during its period of validity, there are administrative changes such as those set out in the Rules for Connecting Users to Public Electricity Networks in force.

(2) The power generating facility owner has the obligation to submit to RSO a justified request for its replacement, along with the original CDC.

(3) RSO issues a new CDC with the modifications provided in paragraph (1) and, where appropriate, hand it over to the manager, destroy the original copy of the old certificate of conformity and update the situation on its own website.

Art. 72. (1) Where compliance with the technical connection requirements has been demonstrated for a power lower than that approved in the ATR, the power plant manager shall file an RSO declaration attesting acceptance of the rated power for which the certificate of conformity has been issued.

(2) The amount of power provided in paragraph (1) can be found in the connection certificate.

5.1.D. NOTIFICATION FOR THE CONNECTION OF GENERATING UNITS OF CATEGORY D

Responsibilities of the power generating facility owner

Art. 73. The applicant (the owner, a third party or an agent appointed by the owner) has the following responsibilities:

(1) to draw up the technical documentation according to the type of power generating unit of category D - PGMD in accordance with the technical data in Annex 6;

(2) to submit to the TSO and RSO, as appropriate, at least 6 months prior to the proposed date for the energisation for the beginning of the testing period, the request for energisation for the beginning of the testing period (in accordance with the provisions of Annex 16) accompanied by PGMD and Specify the scheduled delivery time;

(3) to transmit the TSO, either directly or through a third party or aggregator, designated by the owner, for CDC request (in accordance with the provisions of Annex 17);

(4) to conclude the exploitation contract and, as the case may be, the contract / contracts for the transport, distribution or supply of electricity, in compliance with the regulations in force;

(5) to notify TSO and, where applicable, RSO, the timing and type of tests to verify compliance with technical requirements applicable, specific to the category of the power generating unit, before commencing. TSO shall in advance endorse the timetable for the tests and the procedures for carrying out the tests. TSO will grant this approval in due course which can not be unduly refused;

(6) to carry out, through economic operators holding A3 certificate issued by NRA, the performance verification tests in terms of compliance with the technical requirements applicable in force;

(7) submit the results of the preliminary and final tests to TSO;

(8) to ensure that the power generating unit is in compliance with the technical requirements applicable to the category to which it belongs during the lifetime of the installation. The power generating facilityt owner is based on the certificates of conformity of the power generating unit components that are obtained from the equipment manufacturer at the time of purchase. Equipment compliance certificates are made available to TSO and RSO as appropriate at the time of submission of the ATR documentation and are part of the PGMD;

(9) to transmit to TSO and RSO, as appropriate, at least 1 month before the proposed date for energisation for the beginning of the testing period, any planned changes in the technical capabilities of the power generating unit that may affect its compliance with the technical requirements applicable, specific to the category fom which they belong, before initiating that modification (for example, increasing the installed power, replacing some inverters, adding / connecting some storage batteries, etc.);

(10) to notify the TSO and the RSO, as appropriate, of any incident or deficiency in the operation of the power generating unit that affects its compliance with the technical requirements applicable in force, specific to the category to which it belongs without undue delay immediately after the occurrence of such incidents / deficiencies;

(11) transmit to the TSO and RSO, as the case may be, the request for definitive withdrawal from the operation of the power generating unit and to ensure that TSO and RSO, as appropriate, is / are informed of the definitive withdrawal from operation.

Responsibilities of OTS

Art. 74. OTS has the following responsibilities:

(1) to publish on its website the technical requirements for power generating units;

(2) to establish the PGMD model in accordance with the technical data in Annex 6 and publish it on its own website;

(3) analyze the technical documentation submitted by the power generating facility owner by a third party or aggregator, designated by the owner, for the power generating unit of category D;

(4) in the event that the TSO finds that the request for the energisation for the beginning of the testing period of the power generating unit has been submitted prior to the curing work specified in the ATR, it has the obligation to redo the calculations for the operating modes by taking consideration of:

(a) demand facilities and / or generation units that are under pressure at that time;

(b) demand facilities and / or generation units in the stage of energisation for the beginning of the testing period, for which the request for the energisation for the beginning of the testing period has been submitted to TSO.

(5) in the event that TSO is not RSO, to transmit to the operator and the RSO, within 30 days of receipt of the documentation referred to in Article 76, paragraph (1) and (2) and within 5 working days of receipt of the documentation referred to in Article 4376 (3), any non-compliance notified and, in the absence of non-conformities, to transmit the technical acceptance for the documentation submitted for the purposes of energisation for the beginning of the testing period, in the agreement for energisation for the beginning of the testing period;

(6) in the event that TSO is also RSO, to issue and transmit to the applicant the acceptance of energisation for the beginning of the testing period of the power generating unit of category D or the EON, under the conditions provided for in Articles 78 and 79. The power generating facility owner does not activate the power generating unit without the written permission of the TSO (EON);

(7) to ensure the transparency of the process of certification of compliance with the technical requirements for connection by publishing on its own website the status of the power generating units in the probationary period (ION status), CDC and CDCT issued / revoked and the power generating units are subject to significant changes;

(8) to agree with the owner to conduct the verification tests and give in due time approval to the timetable and type of tests which he submits to the owner and which can not be unreasonably refused;

(9) to participate in the final tests for the energisation for the beginning of the testing period of power generating unit according to the development stage referred to in ATR;

(10) to analyze the documentation containing the results of the verification tests;

(11) to assess the compliance of the power generating unit with the technical requirements applicable to the category to which it belongs during the entire lifetime of the power plant and inform the power generating facility owner of the outcome of that assessment;

(12) to release the CDC and issue the FON under the ATR conditions according to the ATR development stage;

(13) to revoke the CDC in the situations provided for in Article 102, informing the power generating facility owner and the RSO in this regard, if the TSO is not RSO regarding the loss of compliance with the technical connection

requirements and the FON following the revocation of the CDC.

Responsibilities of RSO

Art. 75. RSO has the following responsibilities, in the event that it is not TSO:

(1) to analyze the technical documentation submitted by the power generating facility owner by a third party or aggregator, designated by the owner, for the power generating unit of category D, which is connected to its own network;

(2) If the RSO finds that the request for the energisation for the beginning of the testing period of the power generating unit has been submitted prior to the curing work specified in the ATR, it has the obligation to redo the calculations for the operating modes by taking consideration of:

(a) demand facilities and / or generation units that are under pressure at that time;

(b) demand facilities and / or generation units in the stage of energisation for the beginning of the testing period, for which the request for the energisation for the beginning of the testing period has been submitted to RSO.

(3) to issue and transmit to the applicant the acceptance of the energisation for the beginning of the testing period of the power generating unit of category D or the EON, under the conditions provided for in Articles 78 and 79, only upon receipt of the technical approval of the TSO for the technical documentation in order to activate the installation or the agreement of the energisation for the beginning of the testing period. The power generating facility owner does not activate the power generating unit without the written approval of the RSO (EON);

(4) to transmit to the TSO on a half-yearly basis (on March 1 and September 1) cumulatively the situation of the decommissioning of the power generating units of category D.

Art. 76. The documentation submitted by the applicant contains the following:

(1) the request for the energisation for the beginning of the testing period (in accordance with the provisions of Annex 16);

(2) the technical documentation, in accordance with the provisions of Annex 6;

(3) he documents attesting the carrying out of preceding work of energisation for the beginning of the testing period, as set out in Annex 7;

(4) the program of compliance tests of the power generating unit;

(5) complete documentation on the results of the compliance tests of the power generating unit;

(6) the request to obtain the CDC (in accordance with the provisions of Annex 17).

Art. 77. TSO shall have the right to require the power generating facility owner to perform compliance tests with the technical requirements for connection and simulation using the model of the power generating unit in the situations referred to in Article 4 (3). TSO informs the power generating facility owner of the results of these tests and simulations.

Art. 78. The process of issuing the EON contains the following steps:

(1) at least 6 months prior to the energisation for the beginning of the testing period, the power generating facility owner, a third party or an aggregator designated by the owner, submits to the TSO and, as appropriate, to the RSO the documentation referred to in Article 76, (1) and (2);

(2) RSO redo the system calculations, if applicable, according to Article 74, paragraph (4);

(3) at least 10 days prior to the energisation for the beginning of the testing period, the power generating facility owner, a third party or an aggregator designated by the owner, submits to the TSO the documentation referred to in Article 76, (3);

(5) analysing the technical documentation provided by Art. 76, para. (3);

(6) the transmission by TSO, as appropriate, of the technical acceptance for the documentation submitted for the purposes of energisation for the beginning of the testing period;

(7) the conclusion of the operating agreement and, where appropriate, the contract (s) for the transport, distribution or supply of electricity, in compliance with the rules in force;

(8) enrolling the power generating unit to the balancing market as a unit of evidence;

(9) the issuance by the DED / DET / DEC of the investment order for the power generating unit;

(10) the EON's issuance by the RSO.

Art. 79. RSO issues EON only if the following conditions are fully met:

(1) the documentation referred to in Article 76, paragraph (2) is complete and in compliance with applicable technical requirements;

(2) the results of the calculations for the operating procedures provided for in Article 74 (4) indicates that the generator unit can be activated without performing the curing work provided in the ATR, as appropriate;

(3) the documents proving the performance of the works prior to the energisation for the beginning of the testing period provided in Article 76, (3) are complete;

(4) the protection required by the ATR is installed and the settings are set to the values set by the RSO, confirmed by sample bulletins and, where appropriate, there are arrangements between the owner and the RSO for the protection schemes;

(5) there is the acceptance of energisation for the beginning of the testing period issued by TSO;

(6) the operating agreement and, where applicable, the contract (s) for the transport, distribution or supply of electricity are concluded, in accordance with the regulations in force.

Art. 80. (1) If at least one of the conditions provided for in Article 79 is not met by the required date for the energisation for the beginning of the testing period, the TSO shall transmit the list of nonconformities to the power generating facility owner and, as appropriate, to DSO, within 5 working days, as well as postponement of the energisation for the beginning of the testing period of the power generating unit until it is eliminated.

(2) RSO issues EON within 5 working days of the observation that all conditions provided for in Article 79 have been met or that all non-conformities have been eliminated in accordance with paragraph (1).

(3) The power generating unit is energized for the sampling period within 5 working days of the EON issue, according to the program prepared by DED / DET / DEC, as appropriate.

Art. 81. (1) Within a maximum of two business days from the date of energisation for the beginning of the testing period of the power generating unit, and for plants made up of generating modules, at least one generator module, RSO issues the ION and publishes on its own website the name of the power generating unit, the date of energisation for the beginning of the testing period and the approved active power specified in the ATR.

(2) The provisions of paragraph (1) also applies to power generating units that have undergone significant changes.

(3) The status of the ION in which the power generating unit is in provisional or probationary mode begins after receipt of the EON and lasts from commissioning

until the CDC / CDCT.

Art. 82. (1) The maximum period during which the power generating facility owner can maintain ION status is 24 months.

(2) TSO is entitled to establish a shorter validity period for the ION.

(3) An extension of the ION shall only be granted if the power generating facility owner has made significant progress towards full compliance.

(4) Non-conformities must be clearly identified when submitting an extension request.

Art. 83. An extension of the maximum period provided for in Article 82 (1) may be granted if the power generating facility owner transmits to RSO a request for derogation before the expiry of that period in accordance with the procedure of granting derogations in force.

Art. 84. During the trial operation, the power generating unit responds to dispatcher orders, through:

(1) disconnection / connection;

(2) the change of the active power produced to the value disposed by the dispatcher by disconnecting / connecting the generating modules in the case of the power generating unit plants or the change of the active power in the possible operating range, in the case of the synchronous generator groups;

(3) changing the reactive power injected / absorbed into / out of the network at the value disposed by the dispatcher within the reactive power capability.

Art. 85. The conditions for carrying out the tests for compliance tests with the technical requirements for connecting the power generating units are:

(1) Compliance tests may only begin after the TSO has been approved for the program and the period of the verification tests;

(2) preliminary conformity verification tests shall be carried out according to the provisions of chapter no. 5.2. of the present proceedings;

(3) compliance tests shall be carried out after at least 90% of the installed power in the ATR for each of the phases of energisation for the beginning of the testing period, as the case may be;

(4) compliance tests is performed by a third party (economic operator holding A3 certificate issued by NRA). The final test is attended by a representative of the TSO;

(5) the tests are carried out in two stages: the preliminary stage where the tests are carried out by the owner together with the A3 certified economic operator and the final tests, attended by a representative of the TSO;

(6) the power generating facility owner shall establish with the TSO, with RSO information, as appropriate, a period of completion of the final samples to verify compliance with the technical connection requirements, conditional upon the existence of the operating conditions at an available power of at least 60% of the installed power approved by the ATR for the stage of energisation for the beginning of the testing period (if applicable);

(7) for power generating facility owner the total installed power of which is provided in the ATR to be achieved in stages, the preliminary and final tests shall be carried out for the installed power corresponding to each stage;

(8) at the end of the final test of energisation for the beginning of the testing period of the power generating unit, the power generating facility owner, the sample contractor and the TSO draw up a minute with reference to the non-conformities reported during the final samples, the completion of the existing setting at the power generating unit and the values the set parameters in the control loops, and the mode of operation of the power generating unit at the end of the probationary period;

(9) the complete documentation containing the results of the preliminary and final compliance tests shall be transmitted to the TSO.

Art. 86. The power generating facility owner shall notify TSO and RSO, as the case may be, of the definitive withdrawal of a power generating unit from operation, in accordance with national legislation.

Art. 87. In case of significant modifications of the power generating unit, the technical data transmitted by the owner to the TSO and the RSO, as the case may be, are:

(1) the technical data of the replacement equipment;

(2) certificates of conformity for the replacement generating equipment or modules;

(3) the single line diagram, if there are any changes;

(4) restoring the study for the calculation of reactive power at the connection point, the mathematical model, the permanent and dynamic performance study, including avoidance of operation on the island, as appropriate;

(5) TSO and RSO, as the case may be, are entitled to request other necessary technical data.

Art. 88. If the existing power generating units undergoes changes that fall within the category of significant changes, during the trial operation period will be made:

(1) tests of the technical performances, specific to the modification made: active power regulation, reactive power, pressure;

(2) verification tests corresponding to a new power generating unit in the event of a change in the maximum active power approved for increasing it or in case of passing the power generating unit from category C to category D as a result of the increase of the maximum active power approved by ATR.

Art. 89. TSO issues CDC when the following requirements are met cumulatively:

(1) the results of the verification tests show compliance with the technical requirements applicable in force;

(2) the quality of the electricity monitored at the connection point for a period of at least 2 weeks, including during the tests, falls within the limits laid down in the performance standard for the electricity distribution service or in the performance standard for the service transport of electricity and system service in force, as applicable;

(3) where appropriate, the reactive power compensation means have been activated and integrated into the respective adjustment loops;

(4) the existence and operation of a local central dispatcher from which active power, reactive power and pressure;

(5) the messages transmitted by the TSO through the EMS-SCADA are received and integrated into the control systems of the power generating unit;

(6) the power generating unit has been integrated into the forecasting system of TSO;

(7) the power quality analyzer of the power generating unit is integrated into the TSO's electrical quality monitoring system, respectively the DSO, as appropriate, as specified in the ATR;

(8) the data communication paths to the RSO referred to in the ATR are provided.

Art. 90. The CDC and FON issuance process contains the following steps:

(1) the submission by the manager to the TSO of the request for CDC issuance after the final tests;

(2) confirmation by the owner and, where appropriate, by RSO, of the settings of the protection, including special protections, as appropriate (sample bulletins);

(3) confirmation by the operator and, where appropriate, by the RSO, of the implementation of measures to avoid operating on the island, for the plant made up of generating modules.

(4) confirmation by the manager and, where appropriate, by the RSO, of meeting all ATR requirements

(5) within 10 working days of receipt of the results of the tests provided for in Article 85, (5), the TSO shall examine the conformity of the documents attesting the fulfillment of the requirements of Article 89, paragraph (2), (3) and (4), as well as the results of the compliance tests, and request additions, as appropriate. In the absence of non-compliance, TSO issues CDC, and if there is only one non-compliance issues CDCT.

Art. 91. (1) The CDC issuance term is 10 business days from the date that all documents and tests show the compliance of the power generating facility with the technical connection requirements specified in technical regulations applicable in force.

(2) TSO notifies the power generating facility owner and DSO, as the case may be, within 5 working days by transmitting the FON based on the existence of a CDC or a decision granting a derogation in accordance with the provisions of Article 95.

(3) After the CDC is issued, the TSO transmits the original to the power generating facility owner.

(4) TSO publishes on its own website the CDC issuance / revocation status.

Art. 92. For power generating facility whose total approved power is foreseen in the ATR to be carried out in a staged manner, the CDC shall be granted for each development stage provided in ATR.

Art. 93. (1) If a single non-compliance is identified, TSO may grant CDC with temporary validity or CDCT.

(2) CDCT is granted for a maximum of 6 months.

(3) The period provided for in paragraph (2) may be prolonged in justified cases, up to a maximum of three months, only if the power generating facility owner has made significant progress towards full compliance.

Art. 94. In the event of multiple non-conformities or the expiry of the term of the CDCT without removal of the non-compliance, TSO has the right to refuse to allow the operation of the power generating unit until the owner of the power generating plant remedies the non-conformities.

Art. 95. (1) If TSO finds that the identified non-compliance requires a request for derogation from the requirements of the technical standard, the owner of the power generating plant shall submit a request to the TSO in accordance with the procedure for granting derogations to electricity generating installations from the obligation to fulfill one or more than one of the requirements in the technical connection standard in force.

(2) If the derogation is not granted, RSO has the right not to allow the operation of the power generating unit until the power generating facility owner has rectified the non-compliance and the power generating unit fully complies with the requirements of the technical connection standard in force.

(3) If the RSO and the power generating facility owner does not remedy the non-compliance within six months at the latest of notification of the decision not to grant the derogation, each party may submit the matter to NRA.

Art. 96. The power generating facility owners holding FON and CDC shall immediately inform the TSO and the RSO, as appropriate (within 48 hours) of the following situations:

(1) the installation temporarily undergoes a significant change or loss of capability affecting its performance, specifying the expected duration of operation in that state;

(2) equipment failure that results in non-observance of technical requirements in the technical specification specific to the category to which the generation unit belongs (loss of communication, impossibility to perform active, reactive or pressure control, failure to meet the requirements for reactive power exchange at the connection point, etc.), in force.

Art. 97. The power generating facility owner shall request the LON if it reasonably foresees that the situations referred to in Article 96 last for more than three months.

Art. 98. (1) TSO issues an LON containing the following clearly identifiable information:

(a) the unresolved issues justifying the grant LON;

(b) responsibilities and timing for their resolution;

(c) the duration of the LON, which may not exceed 12 months.

(2) The CDC shall be suspended for the period of validity of LON for the unfulfilled requirements for which it was issued.

Art. 99. (1) TSO has the right to refuse to allow the power generating unit to function when the LON expires. In such cases, FON and CDC are automatically canceled.

(2) TSO asks for restoration of conformity testing for unfulfilled requirements for which the LON was issued for the issuance of a new CDC and a new FON.

Art. 100. A further extension of the period of validity of LON may be granted following request for derogation addressed to the TSO before the expiry of that period in accordance with the procedure for granting derogations to power generating facility from the obligation to comply one or more of the requirements in the technical connection standard in force.

Art. 101. If the derogation provided for in Article 100 is not granted or if the TSO refuses to allow the operation of the power generating unit upon termination of the LON, the power generating facility owner may submit a request for settlement to NRA within six months from the notification of the decision not granting a further extension of the period of validity of LON.

Art. 102. (1) Revocation of the CDC takes place under the following conditions:

(a) non-compliance with the regulated limits on the parameters of the quality of the electricity measured at the connection / delimitation point, as the case may be;

(b) failure to perform proven test performance;

(c) in the absence of measurement data or in the absence of records;

(d) in the event of non-compliance in the case of periodic testing;

(e) to indicate a non-compliance in performing the verifications / tests ordered by the RSO as a result of monitoring the operation of the power generating unit;

(f) commencement of significant changes to the installations of the power generating unit;

(g) loss of communication over a period of time affecting the operation of the power generating unit.

(2) In case of CDC revocation according to the provisions of par. (1), FON is automatically canceled.

Art. 103. TSO informs the power generating facility owner about the loss of compliance with the technical requirements for the connection and revocation of the CDC.

Art. 104. The TSO may issue a duplicate at the justified request of the CDC power generating facility owner. The duplicate will be marked with the duplicate logo and issued in two original copies, one to the applicant and one to the issuer (Annex 9).

Art. 105. (1) Replacement of the CDC may take place if, during its period of validity, there are administrative changes such as those set out in the Rules for Connecting Users to Public Electricity Networks in force.

(2) The power generating facility owner has the obligation to submit to TSO a justified request for its replacement, along with the original CDC.

(3) TSO issues a new CDC with the modifications provided in paragraph (1) and, where appropriate, it sends it to the owner, destroys the original copy of the old certificate of conformity and upgrades the situation on its own website.

Art. 106. (1) In a situation where compliance with the technical connection requirements has been demonstrated for a power lower than that approved in the ATR, the power generating facility owner shall file an RSO declaration attesting acceptance of the rated power for which the certificate of conformity has been issued.

(2) The amount of power provided in paragraph (1) can be found in the certificate of connection.

Secțiunea 5.2. TESTING OF POWER GENERATING UNITS

Art. 107. Testing of power generating units shall apply:

(1) after the commissioning of a new power generating unit or significant modification of an existing power generating unit;

(2) at the end of each development stage specified in the ATR;

(3) after the implementation of certain technical requirements of the technical connection standards for existing power generating units proposed by TSO based on a cost-benefit analysis and for which NRA has issued a decision;

(4) during operation, to determine the performance of the power generating unit, in the event of non-observance of applicable technical connection requirements, in force;

(5) following the monitoring of how power generating units comply with the operating regulations and the parameters declared in the connection process;

(6) after faults, modifications or replacements of the equipment related to the power generating units referred to in art. 4;

(7) at the request of RSO or TSO in justified cases. In this case, RSO may request that you perform any of the tests specified in this procedure.

Art. 108. TSO has the following responsibilities:

(1) verifies all documentation regarding the realization of active power, reactive power and pressure loops, and asks for additional documentation if the technical requirements to be confirmed by the tests are not proven by the documentation presented;

(2) participate in the final tests for synchronous power generating modules and for power plants made up of power generating modules of category D and for power plants made up of power generating modules;

(3) initiates verification of the operation of the power generating unit in the event of repeated breach of one of the technical connection requirements in force;

(4) approves the test program submitted by the owner of the power generating facility of category D;

(5) has the right to ask the person in charge of the taking of evidence to resume one or more tests;

(6) in the case of deviations from the present proceeding, resulting from objective reasons, presented by the test officer, before doing so, the TSO is responsible for interpreting the application of the procedure.

Art. 109. The power generating facility owner (synchronous power generating modules or power plants made up of power generating modules or power plants made up of offshore power generating modules) has the following responsibilities:

(1) Initiates the tests to be carried out;

(2) draws up the program of compliance tests together with the economic operator holding type A3 attestation, issued by NRA for carrying out the tests for compliance tests and for the preparation of the documentation (records);

(3) transmits to RSO (for synchronous power generating groups and power plants made up of power generating modules of category B and C), respectively to TSO and RSO, as the case may be (for synchronous power generating modules and power plants made up of power generating modules of category D or power plants made up of offshore power generating modules), at least 10 working days before the start of the tests, the test program together with the request to participate in their execution, agreeing with this / they a date to perform the preliminary and final tests and

requesting the participation of the representatives of RSO and TSO representatives as appropriate;

(4) informs TSO and RSO, as appropriate, of the times during which the tests will be carried out and request their acceptance from the point of view of operating conditions in the electrical network;

(5) ensures the technical conditions for conducting conformity testing;

(6) ensures throughout the tests the safe operation of the synchronous power generating modules or the power plants made up of power generating modules, being responsible for the integrity of the whole installation during the compliance tests;

(7) designates a person responsible with the tests;

(8) after carrying out the compliance tests, send the documentation containing the test results, including the final results, in accordance with the present procedure, to TSO for synchronous power generating modules or power plants made up of power generating modules of category D, RSO and OTS respectively for synchronous power generating modules or power plants made up of power generating modules of category C.

Art. 110. RSO has the following responsibilities:

(1) to develop, within 6 months of the approval of this procedure, their own verification procedures for synchronous power generating modules or power plants made up of power generating modules of category A and B, containing at least the tests and working modes of this procedure;

(2) to collaborate with TSO, as appropriate, to ensure test conditions, perform tests and analyze the test results contained in this procedure from the point of view of operating conditions in the distribution network, for synchronous power generating modules or power plants made up of power generating modules of category C or D connected to their own distribution network.

(3) cooperate with the power generating unit owner to perform the tests and do not unduly delay their performance.

Art. 111. RSO has the right to:

(1) allow the power generating unit owner to carry out a series of alternative tests provided that they are effective and sufficiently demonstrate that a power generating module complies with the requirements of the technical connection rule in force;

(2) require the power generating unit owner to perform additional or alternative tests if the information provided by RSO with regard to the verification tests provided for in Articles 114 to 173 is not sufficient to demonstrate compliance with requirements laid down in the technical connection rule in force;

(3) require the power generating unit owner to carry out appropriate tests to demonstrate the performance of a power generating module when operating with alternative fuels or fuel blends; the RSO and the power generating unit owner agree on the types of fuel to be used for the tests;

(4) to participate in the compliance tests, either on-site or remotely, from the control center of the system operator. For this purpose, the power generating unit owner shall provide the monitoring equipment necessary to record all relevant signals and measurements as well as to ensure that the representatives of the power generating unit owner are available on site throughout the probationary period. Signals specified by RSO should be provided if, for certain tests, the system operator wants to use their own equipment for performance recording. RSO is the only one able to decide on its participation.

Art. 112. The following general conditions are set for the tests:

(1) the tests set out in Annex 12 are performed entirely in the preliminary tests and are partially / fully resumed in the final tests performed in the presence of TSO representatives for synchronous power generating modules or power plants made up of power generating modules of category D and power plants consisting of offshore power generating modules;

(2) testing of power plants made up of power generating modules/ power plants consisting of offshore power generating modules may only start only if the number of power generating modules operated by their manufacturer according to their own procedures is bigger than or equal to 90% of the total number of power generating modules provided in the ATR according to the staging period of installed power;

(3) the tests shall be carried out during periods when the primary source provides a minimum power of the power plants made up of power generating modules/offshore power generating modules of 60% from the maximum power.

Art. 113. The requirements for measuring instruments, simulation and recording equipment are as follows:

(1) frequency converters must have an accuracy of ≤ 0.005 Hz, response time <100 ms, measuring range (45 ÷ 55) Hz;

(2) the converters P, Q, U must have a minimum precision class of 0.3;

(3) the acquisition system of the measured sizes must have a minimum purchase rate of 0.5s for each purchased size and the possibility of registration in ".xls" files. For the requirements of the reconnection tests for a maximum of 1 second after a deliberate disconnection test, recording speeds of at least 40 ms are ensured;

(4) the frequency simulation must have an accuracy of <0.005 Hz, the range (45 ÷ 55) Hz in steps or a ramp of not more than 2 Hz / sec;

(5) the GPS system (global positioning system) for the time stamp;

(6) the available power measure and the wind / solar radiation speed taken from the power plant equipment made up of power generating modules;

(7) analyser of the electricity A class quality, with GPS, are provided with the posibility to perform disturbance calculations at different time intervals, predetermined or determined post-recording (eg: determining the perturbation over a timeframe in which each sample was made, but also on 1 week (standardized). The quality of electricity is recorded throughout all tests, including a minimum of 2 weeks of operation of the power plant made up of power generating modules;

(8) for verifications carried out on synchronous power generating modules or power plants made up of power generating modules of category C or D, the economic operator conducting the tests shall have a valid A3 certificate issued by NRA.

5.2.1. Testing response to frequency variations

Art. 114. These tests are designed to verify the power generating module's response to:

(1) frequency increases (LFSM-O) for power generating units of category B, C and D;

(2) for category A and in justified cases accepted by TSO, instead of performing the tests in paragraph (1) and points (1) and (3) respectively, the power generating unit owner (synchronous power generating modules, power plants made up of power generating modules) may use the certificates for equipment issued by an approved certification body to demonstrate compliance with

relevant requirements. In this case, the certificates for equipment are made available to RSO;

(3) frequency decreases (LFSM-U), for power generating modules of category C and D and for offshore power generating modules;

(4) frequency variations in the range (49,8 ÷ 50,2) Hz - LFSM, by continuous change of active power over the entire operating range, between the maximum capability and the minimum adjustment level required for automatic frequency adjustment (LFSM) for synchronous power generating modules, power plants made up of power generating modules of category C and D, and offshore power generating modules.

Art. 115. Testing the frequency increase response (LFSM-O) consists in demonstrating the technical capability of the power generating module / PPMO to continuously modify its active power by contributing to the frequency setting in any significant increase in frequency in the system above the value of 50.2 Hz and is thus achieved:

(1) Verify the permanent setting parameters of the adjustments (such as offset characteristic and dead band) and dynamic parameters, delay (t1), response time (t2), including response to ROCOF frequency step change variations;

(2) The test is carried out by simulating sufficiently high frequencies to trigger a variation of at least 10% of the maximum active power capability typically starting at 500 mHz from the 50 Hz frequency with a maximum frequency ramp of 2 Hz / s (simulated frequency variation ramp). During the tests, the offset characteristic is set to 5%, the dead band in frequency is set to 0 mHz. If necessary, the simulated frequency deviation signals will be input simultaneously into the speed controller and the active power regulator from the control systems, taking into account their scheme;

(3) For synchronous power generating modules of category C and D, the tests shall be performed at an operating power equal to Pmax or 10% of Pmax operating power bigger than the steady Pmin. After applying each simulated frequency step, a time of between (5 ÷ 30) minutes is expected;

(4) For the power plants made up of power generating modules of category C, respectively D, the tests shall be carried out by simulating some frequency steps and ramps sufficiently large in order to determine a variation of at least 10% from the maximum capacity of the active power (Pmax) starting from an active power which does not exceed 80% from Pmax (the offset characteristic

does not set the value at %5, the frequency dead band is set at 0 mHz) of the power plant made up of power generating modules;

(5) The test is considered successful if:

(a) the results, in terms of static and dynamic parameters, comply with the technical connection requirements applicable, in force, to the limited response frequency deviations - overfrequency (LFSM-O) related to the category to which the power generating modules belongs;

(b) undamped oscillations do not occur after the step change response.

Art. 116. Testing frequency decrease response (LFSM-U) consists in demonstrating the technical capability of the power generating module / PPMO to continuously modify its active power by contributing to the frequency stabilization in case of any significant decrease of the frequency in the system below 49.8 Hz and this shall be perform as follows:

(1) Verify the permanent setting parameters of the adjustments (such as offset characteristic and dead band) and dynamic parameters, delay (t1), response time (t2), including frequency step change response to ROCOF;

(2) The test is performed by simulating small frequency ranges and ramps sufficiently large to trigger a variation in the active power of at least 10% of the maximum capability, taking into account the values set by the rule of 200-500 MHz in a decreasing sense, starting from at a frequency of 50 Hz, with a maximum frequency ramp of 2 Hz / s (simulated frequency variation ramp). During the tests, the offset characteristic is set to 5%, the dead band in frequency is set to 0 mHz. If necessary, the simulated frequency deviation signals will be input simultaneously into the speed controller and the active power regulator from the control systems, taking into account their scheme;

(3) For synchronous power generating modules of category C and D, the tests shall be performed at an operating power equal to stable Pmin or 10% of Pmax operating power lower than the Pmax. After applying each simulated frequency step, a time of between (5 ÷ 30) minutes is expected;

(4) For power plants made up of power generating modules of category C, respectively D, the tests shall be carried out at a power setpoint less than 10% of Pmax compared to the available primary source power and at a power setpoint of at least 60 % of Pmax of the power plant made up of power generating modules;

(5) The test is considered successful if:

(a) the results, in terms of static and dynamic parameters, comply with technical connection requirements applicable in force, for the category to which the power generating module belongs for the frequency decrease response (LFSM-U);

(b) undamped oscillations do not occur after the step change response.

Art. 117. Testing the response to frequency variations in the (49,8 ÷ 50,2) Hz (LFSM) range consists in demonstrating the technical capability of the power generating module / PPMO to continuously modify its active power by contributing to the frequency setting and achieving so:

(1) The permanent setting parameters of the adjustments (such as offset characteristic and dead band) and dynamic parameters, delay (t1), response time (t2), including frequency step change response to ROCOF are verified;

(2) The test is performed by simulating frequency ranges of 10 MHz, 50 MHz and 200 MHz respectively, starting at 50 Hz with frequency ramps of 2 Hz / s (simulated change of frequency ramp) and 1.5 Hz / s and 1.25 Hz / s. During the tests, the offset characteristic is set to 4%, the dead band in the frequency is set to 0 mHz, so that the frequency variation leads to the mobilization of at least 10% of the maximum power capacity. If necessary, the simulated frequency deviation signals will be input simultaneously into the speed controller and the active power regulator from the control systems, taking into account their scheme;

(3) For synchronous power generating modules, the tests are performed at three operating powers, namely Pmin, Pmax and an interspecific power between Pmin and Pmax. Frequency steps of 200 mHz shall be applied so as not to exceed Pmin or Pmax respectively. The steps of 50 mHz shall be applied so that the entire frequency range (49.8 ÷ 50.2 Hz), in one direction and the other, is covered to determine the insensitivity (a hysteresis curve will be made);

(4) For power plants made up of power generating modules of category C and, respectively D, the tests shall be carried out at the available power of the primary energy source and at a rated power of at least 60% of the Pmax of the power plant made up of power generating modules;

(5) The test is considered successful if:

(a) the results, in terms of static and dynamic parameters, meet the technical connection requirements applicable in force, related to the category to which the power generating modules belongs, namely the offshore power generating modules;

(b) undamped oscillations do not occur after the step change response.

Art. 118. Testing the possibility of reconnecting to the network of the power generating module at frequencies in the range (47,5 ÷ 51,5) Hz, after a disconnection on a frequency criterion, is done thus:

(1) For synchronous power generating modules of category B, C and, respectively D, the test is performed by maintaining the group in an excited or functioning backlash on its own services (if possible) with the open gang switch. The adjusting speed is put into operation (speed / frequency), applying speed setpoints corresponding to the frequency range (47,5 ÷ 51,5) Hz, with steps of 500 mHz. The stable operation of the synchronous power generating module is being pursued.

(2) For the power plants made up of power generating modules of category B, C, and respectively D after the disconnection test on the frequency criterion, in the power adjuster of the plant, simulated frequencies in the (47,5 ÷ 51,5) Hz range with the steps of 500 mHz are applied. It is intended to reconnect the power generating modules.

Art. 119. (1) Records are made (in time) for the available power - Pd (only for power plants made up of power generating modules), the active power setpoint - Pcons, the simulated frequency value - fsim, as well as the measured values (P, Q, U, f), both at the connection point and at the power generating module level.

(2) The P-f graphic is raised compared to the one provided in the Technical Standard related to the category of the power generating unit, as well as the evolution over time of the measured quantities.

Art. 120. (1) On the graph of the evolution of time of active power and frequency and frequency-power dependence, the t1, t2 measures, dead band and insensitivity of the power generating module specified in Fig. no. 1 are determined.

(2) Parameters provided in paragraph (1) shall comply with the technical connection requirements applicable in force, related to the category to which the power generating module belongs.

(3) It is verified the fact that the power of the power generating module follows the P-f graph provided in the technical standard for the category to which it belongs, if the frequency varies in the range (50,2 ÷ 51,5) Hz for LFSM-O, in the range (49,8 ÷ 50.2) Hz for LFSM, respectively in the range (47.5 ÷ 49.8) Hz for LFSM-U and if it has the capability to connect to the network at any frequency value in the requested range.

(4) In the case of checking the frequency reduction operation, the number of power generating modules that are off is noted.

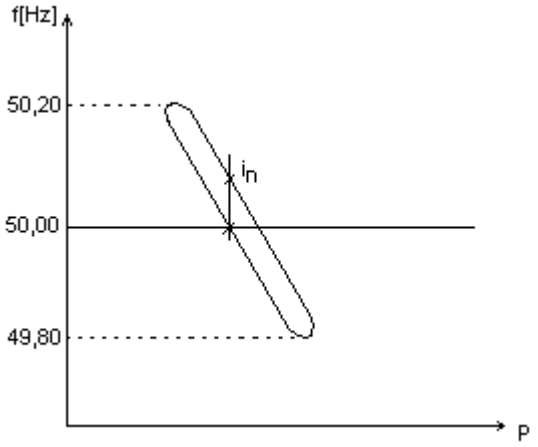


Figure no. 1. Determination of speed adjuster insensitivity to frequency variations.

in which:

i_n - represents the frequency dead band;

$i = i_n/2$ insensitivity represents ½ of the frequency dead band.

5.2.2. Using model simulations to determine compliance in response to frequency variations response

Art. 121. (1) To verify the response of power generating modules to high frequency variations (LFSM-U and LFSM-O control mode), the power generating unit owner may use the equipment certificates issued by an approved certification body to demonstrate compliance with the relevant technical requirements.

(2) Equipment Certificates, provided in paragraph (1) are made available to the RSO, which specifies whether on-the-spot tests are required.

Art. 122. For model simulation of LFSM-U response (for power generating units of category C and D) and LFSM-O, the following requirements are applied:

(1) the capability of the power generating module to modify the active power to increase or decrease the frequency in accordance with the connection technical requirements applicable into force, to the category to which the power generating module belongs is to be demonstrated;

(2) the simulation is performed by frequency steps and ramps for increase, respectively decrease, leading to the minimum setting, taking into account the set offset characteristic values (usually 5%) and the dead band (usually, equal to zero);

(3) simulation is considered successful if:

(a) the model used in the simulation of the power generating module is validated against the LFSM-O, LFSM-U;

(b) it is demonstrated the observance of the technical connection requirements applicable in force, to the category to which the power generating module belongs.

5.2.3. Rate of Change of Frequency Testing (ROCOF)

Art. 123. (1) Verification of the compliance of power generating modules with the technical requirements for response to 2 Hz / sec rapid frequency variations over a 500 ms time interval of 1.5 Hz / s for a time interval of 1 s and 1.25 Hz / s for a 2 second time interval is not covered by testing.

(2) For power generating modules of category A and B, an OR is required to submit a certificate of conformity issued by an accredited body that performs tests by type of power generating module.

(3) To the extent that compliance tests can be performed in accredited laboratories for power generating modules of category C and D, they will be considered in the compliance process.

Art. 124. (1) For power generating modules of Category C and D, model simulations are accepted to analyze the response to the rate of change of frequency of the power generating modules at the connection point and to use the mathematical models provided by the manufacturer of each equipment (boiler, turbine, generator, inverter, wind turbine, nuclear reactor, transformer, etc.).

(2) The complete mathematical model provided in par. (1) shall be transmitted to the TSO using a Eurostag and PSSE software.

(3) The power generating unit owner transmits both the mathematical model and the result of the simulations on this model for the three types of rate of change of frequency (ROCOF).

(4) TSO performs its own simulations for different forms of ROCOF on the mathematical model received from the power generating unit owner.

(5) Confirmation of compliance with the ROCOF technical requirement shall only be issued after the results of the simulations, including those carried out by the TSO, show compliance with the technical connection requirements applicable in force, to the category to which the power generating module belongs.

Art. 125. The ROCOF profiles for which model simulations are required shall highlight the frequency evolution before the frequency variation due to disturbance, during and after this, both for frequencies below 50 Hz and 50 Hz of the type those in figures 2 and 3:

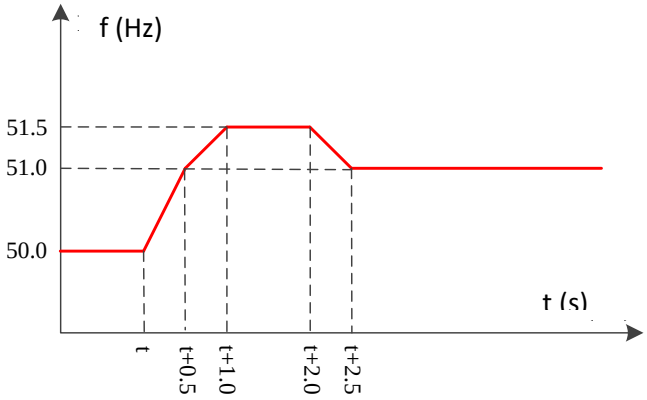


Figure no. 2. Frequency-time profile at frequencies above 50 Hz

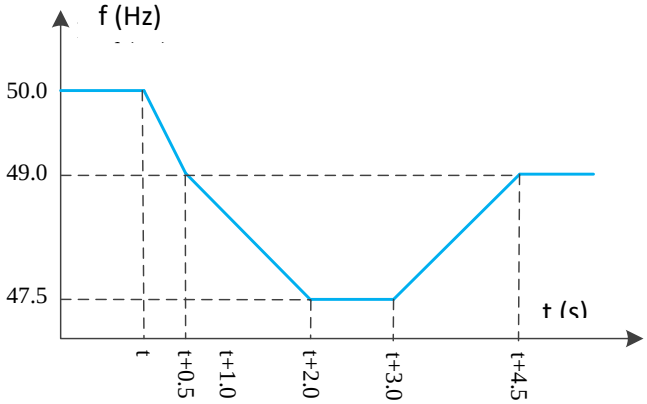


Figure no. 3. Frequency-time profile at frequencies below 50 Hz

5.2.4. Testing the active power response

Art. 126. The Active Power Frequency Response Tests are designed to verify how the power generating modules of category B, C and D / PPMO perform the active power setpoint while respecting the technical connection requirements applicable, in force to the category to which the unit belongs generating means for the power variation parameters of fig. no. 4.

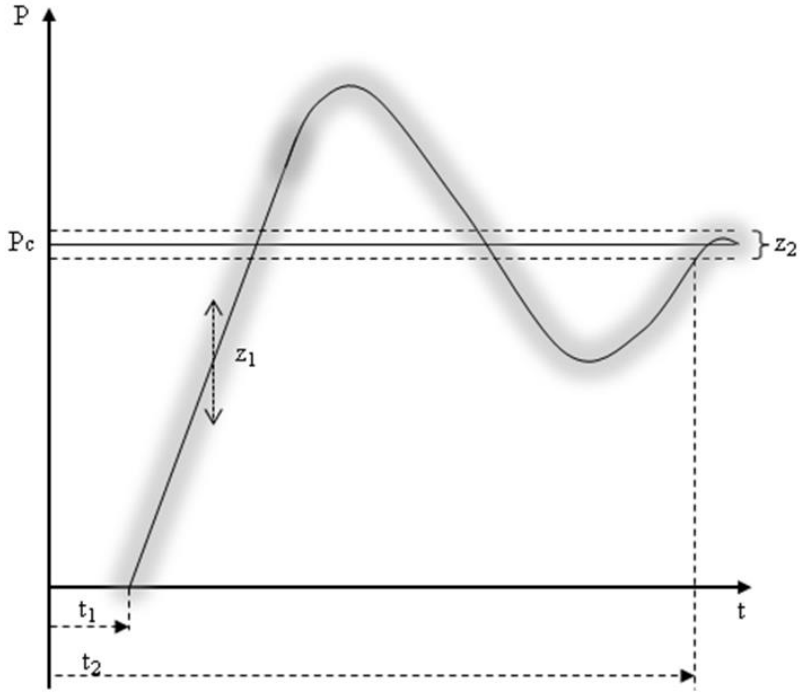


Figure no. 4. The mode of active power variations

where:

t_1 - dead time;

t_2 - the actuation time in which the value of the mobilized power falls within the tolerance zone z2 of ± 1% Pn (Pn-rated power for the synchronous power generating modules, Pn = Pmax for the power plants made up of power generating modules);

z_1 - the tolerance zone for active power mobilization of ± 5% Pn (power variation velocity);

z_2 - the tolerance zone for active power stabilization of ± 1% for category D or ± 5% for category B or C after reaching power setpoint;

Pc - the active power setpoint (in power setting is the power reference requested by the power generating module and in the frequency setting it is the required power to be mobilized, increasing and decreasing as a result of the frequency variation).

Art. 127. (1) The active power response test for the power generating modules of category C and D providing this type of adjustment is the verification of their adjustable capability to restore the frequency.

(2) This test checks the following:

(a) the possibility of simultaneously assuring the variation of the power setpoint and of the response to the frequency variations;

(b) the areas of tolerance of the active power response of the power generating module in response to variation of the active power setpoint;

(c) determining the maximum power setting speed;

(d) receiving and executing an active power received from a remote location.

Art. 128. Verification of the achievement of the power setpoint shall be carried out under the conditions from the scene (local) and remote (at a distance) setting of at least 3 power setpoints, namely:

(1) Pmin, 75% Pn, and 95% Pn respectively, for synchronous power generating modules;

(2) 20% Pmax, 40% Pmax, respectively 75% Pmax, for power plants made up of power generating modules.

Art. 129. At least two values of the speed of variation of the active power are checked, namely:

(1) 3% Pn / min and 5% Pn / min for synchronous power generating modules;

(2) 10% Pmax / min and 20% Pmax / min respectively for power plants made up of power generating modules.

Art. 130. Records shall be made with a take-up rate of not more than 200 ms for available power, active power setpoints, simulated frequency values, and for measured values at both the connection point and the power generating unit (P, Q, U, f), wind speed / solar irradiation, as the case may be.

Art. 131. The active power setpoint shall be reached during the given set-up speed and power stage and maintained in a ± 1% Pn band for Category D or ± 5% for Category B or C The new power supply will last for at least 5 minutes. During power variation, the required tolerance band is 5% Pn.

5.2.5. Testing the fault-ride-through function

Art. 132. Verification of compliance with technical connection requirements applicable in force, for power generating units related to the LVRT / ZVRT profile of the category to which the power generating unit belongs shall be performed as follows::

(1) For power generating units of category A (if equipped with LVRT) and B respectively:

(a) analyzes the technical reports containing the type tests records made by authorized laboratories regarding the response of the power generating unit to the type of symmetrical voltage, single phase and biphasic voltage;

(b) the response of the power generating unit is evaluated from the point of view of:

i. reactive current injection as value and response time after application of the voltage hole;

ii. the evolution of active power during the voltage hole;

iii. response time of the active power return after the voltage is reset to more than 85% Un.

(c) the transmission of tests is required for symmetrical (three-phase) and asymmetrical (biphasic or monophasic) voltage hole;

(d) in order for the test results to be validated accordingly the submitted records must comply with the technical requirements applicable in force.

(2) For power generating modules of category C and D respectively:

(a) in the absence of type tests by authorized laboratories regarding the response of the power generating module to voltage hole or voltage interruptions, the power generating unit owner shall present model simulations on the ability to pass over the fault, simulations made at the connection point.

(b) simulation on the mathematical model must demonstrate the capability of the power generating unit to provide the ability to pass over the defect in accordance with technical requirements applicable in force;

(c) the simulation shall be deemed successful if it complies with the technical requirements applicable in force.

Art. 133. Where, instead of certificates of conformity issued by an approved certification body, mathematical model simulations are used for power generating modules of category B, C and D, including PPMO, the simulations will also include simulation of power restoration active after fault. This demonstrates the capability of the power generating module / PPMO to ensure the restoration of the active power after the fault.

Art. 134. Under the conditions provided for in Article 132, generating and central modules consisting of power generating modules of category B, C and D, including

PPMO, shall be simulated by the injection corresponding to the transient component of the fault current. This simulation requires the following:

(1) the simulation shall demonstrate the capability of the power generator module in the power plant, the power generating modules (category B, C and D) and the PPMO for the supply and injection of the fault current transient component, in accordance with the technical connection requirements applicable in the force;

(2) the simulation is considered to be successful if compliance with the technical connection requirements is demonstrated.

5.2.6. Testing the ability to deliver synthetic inertia

Art. 135. (1) Testing is done by simulating the ability to provide synthetic inertia on mathematical models for power generating modules.

(2) The test shall be applied to power plants made up of power generating modules of category C and D, including PPMO, which shall demonstrate the capability to provide artificial inertia in the case of rapid variation in frequency.

(3) The activation time of the active power and the delay of the frequency variation is followed.

(4) The simulation results are considered "in conformity" if the mathematical model demonstrates that it complies with the technical requirements for synthetic inertial delivery capability for the power generating modules in force.

5.2.7. Testing the startup capability without power supply in the system

Art. 136. (1) Testing is carried out by power generating units with a power-on start-up capability without voltage source in the system.

(2) The test demonstrates the technical capability of the power generating units to start from the stop state without any external source of power supply and it is considered successful if the start time is maintained within the time period set by TSO (usually one hour).

Art. 137. (1) Depending on the restoration path on which the power generating modules are located, tests are made to restore a route and to synchronize the system either at the connection substation or at a point set by the TSO

(2) Note the start times, the ability to adjust the voltage, frequency and active power when connecting some consumers.

(3) The test is considered "in compliance" if the starting times are within the value requested by TSO.

(4) Tests can be replaced by model simulations.

Art. 138. The detailed procedures, as well as the Registry for periodic verification of the restoration routes, respectively the isolation of the power units on their own services or the insular functioning, with the maintenance of the frequency on the island, are subject to a procedure developed by the TSO.

5.2.8. Testing of insulated operation

Art. 139. (1) The test applies to synchronous power generating modules of category C and D.

(2) During the test, the frequency shall be maintained in the island within the range (47,5 ÷ 51,5) Hz and voltage in the range ± 10% Un for 110 kV and 220 kV ± 5% Un for the voltage of 400 kV.

Art. 140. (1) The test is aimed at the ability of synchronous power generating modules to change the active power to frequency variations in the frequency control model.

(2) If the test can not be performed, it is possible to accept simulations on the mathematical model of the insulated operation of the power generating module.

(3) Mathematical models are used for installations of the power generating modules and / or consuming on the island.

Art. 141. (1) The simulations must demonstrate the performance of the synchronous power generating modules to maintain the frequency and voltage in the island in the specified range.

(2) The simulation shall be considered successful if the synchronous power generating modules reduce or increase the active power from the previous operating point at any new operating point on the P-Q capability chart, within the technically feasible limit, but at least up to 55% of its capability (which corresponds to a reduction of at least 45% of its maximum capability) without disconnecting the power generating module due to the low or increased frequency.

5.2.9. Testing isolation operation on own services

Art. 142. (1) The test applies to synchronous power generating modules of category C and D.

(2) The type of test is intended to demonstrate the technical capability of the power generating module to isolate on its own services and to function well with the supply of its own services.

Art. 143. (1) The test shall be carried out at the maximum capacity and rated reactive power of the power generating module before isolation.

(2) RSO has the right to set additional test conditions according to the specific situation.

Art. 144. The test is considered successful if:

(1) the power generating module disconnected from the network and switched to service on its own;

(2) the power generating module remained in service on its own services for at least 1 hour;

(3) the power generating module successfully resynchronized to the network.

5.2.10. Testing the damping of power oscillations

Art. 145. (1) Testing of synchronous power generating modules of category D for damping of power oscillation refers to the assignment of the PSS function parameters both at the oscillations of the node to which the synchronous power generating module is connected as well as in the cross-zonal oscillations.

(2) Testing is carried out in accordance with procedures developed by TSO.

Art. 146. (1) The power oscillation simulation simulation must demonstrate the performance of the synchronous power generating module in terms of its control system (PSS performance), a system that is capable of cushioning the active power oscillations according to the conditions established by the TSO.

(2) Parameter delivery proposed by simulations should lead to improved damping of the active power response corresponding to AVR in combination with PSS, relative to the active response of a single AVR.

(3) Simulation is considered successful if the following conditions are met cumulatively:

(a) the PSS function cushions the active power oscillations of the power generating module in a frequency range specified by TSO. This frequency

range includes the frequencies of the power generating module and the specified oscillations of the electrical network;

(b) a sudden reduction in the power of the power generating module from 1 u.r. to 0.6 u.r. of the maximum capability does not lead to unstimulated oscillations of the reactive or active power of the power generating module.

5.2.11. Testing the ability to produce reactive power

Art. 147. (1) The test is performed on power generating modules of category B (where applicable), C or D respectively, and power plants made up of power generating modules / PPMO and demonstrates the technical capability of the power generating module in terms of the capability to provide reactive power (in capacitive regimes, respectively inductive) in accordance with the requirements of the current technical norm.

(2) The test aims to verify the P-Q plot determined by the study at the connection point and comparing it with the actual P-Q diagram at the connection point at the voltage value at the moment of the tests and zero reactive power exchange with the system at the connection point, at zero active power.

Art. 148. The test shall be carried out under the following conditions:

(1) Synchronous power generating modules operate for at least 60 minutes at peak, inductive and capacitive reactive power at the following active power ranges:

i. stable minimum operating level,

ii. Pmin;maximum power, Pmax;

iii. an operating point at active power between Pmin and Pmax.

(2) the power plants made up of power generating modules, including PPMO, operate for at least 60 minutes at maximum, inductive and capacitive reactive power for the following active power ranges:

i. at least 60% of the maximum capacity;

ii. at two operating points in the range (30-50)% of the maximum capacity;

iii. at least 60 minutes at a working point in the (10-20)% range of the maximum capacity.

(3) synchronous power generating modules operate at any reactive power reference value in the agreed or established range of reactive power.

Art. 149. The test provided for in Article 147 shall be deemed to be successful if the following conditions are met:

(1) power plants made up of power generating modules / including PPMO operate for a period longer than or equal to the duration required to produce maximum reactive, inductive or capacitive reactive power at each parameter referred to in Article 147 (2);

(2) the synchronous power generating modules shall operate for a period longer than or equal to the duration required to produce maximum reactive, inductive and capacitive reactive power at each parameter referred to in Article 148 (1);

(3) the synchronous power generating module, the power plant made of the power generating modules, including CGMO, can achieve any reactive power reference value in the agreed or established range of reactive power;

(4) there is no start or no triggering of any protection in the operating range defined by the reactive power capability diagram during the compliance tests.

Art. 150. To determine the theoretical P-Q diagram of the synchronous power generating module and the power plant made up of power generating modules, including PPMO, in the allowable voltage band at the connection point, for a value closest to the installed active power, the power generating unit is switched to the control reactive power and:

(1) a maximum reactive power setpoint is applied in both inductive and capacitive modes. Record the values obtained. Continue to raise the P-Q diagram of the power generating module for at least 5 active power points;

(2) for a zero active power setpoint, the reactive power injected at the connection point is also measured to ensure that it is null;

(3) the measured values at both the substation (connection point) and the power generating module (P, Q, U, f), as well as the value of the reactive power, the active power and the voltage at the connection point shall be recorded.

Art. 151. After performing the tests provided for in Article 150, the U-Q / Pmax diagram shall also be raised.

Art. 152. (1) In addition to the actual tests, the reactive power capability simulation (using the mathematical model of the synchronous power generating module and the power plant made up of power generating modules PPMO) is carried out by demonstrating the capability of supplying reactive power both as a P-Q diagram, and as a UQ / Pmax chart;

(2) Simulation is considered successful if the following conditions are met cumulatively:

(a) the simulation model of the power generating module is validated in relation to the compliance tests for the reactive power supply capability;

(b) compliance with the requirements of the technical standard for the category to which the power generating module belongs is demonstrated.

(c) for a zero active power setpoint, the reactive power injected at the connection point is also measured to ensure that it is null, respecting the tolerance requirements for ensuring the reactive power exchange at the connection point.

i. maximum 0.5 MVAr for connection point with nominal voltage bigger than or equal to 110 kV;

ii. maximum 0.5 MVAr at connection point with rated voltage less 110 kV, for power plants connected to the bars of the electrical substations;

iii. maximum 0.1 MVAr at connection point with rated voltage less 110 kV, for power plants connected to lines or to the end of a long line.

5.2.12. Testing the reactive power control

Art. 153. The test is designed to demonstrate the capability of the power generating module of category C and D, including the PPMO, to operate in the reactive power control mode, in accordance with the requirements of the technical standard for the category of the power generating module, relating to the behavior of the power generating module the variations of reactive power setpoint.

Art. 154. The test checks the following parameters:

(1) the range and rate of variation (ramp) of the reactive power reference in the sense of achieving the received reactive power setpoint and the rate of variation of the reactive power of the power generating module for achieving the reactive power setpoint;

(2) accuracy of adjustment (tolerance for setpoint achievement);

(3) activation time of reactive power.

Art. 155. (1) Tests are resumed for at least 3 locally set reactive power setpoints, remotely (DEC / DET) or the DLC of the power generating module

(2) In the case of power plants made up of power generating modules including PPMO, the tests are resumed for at least two different values of reactive power variations, of which 95% of the reactive power available for 30 seconds.

Art. 156. The test shall be considered "in accordance with" if the following conditions are met:

(1) the setting area of the reactive power setpoint and the reactive power gradient are provided in accordance with the requirements of the technical standard for the category to which the power generating module belongs. As far as reactive power regulation is concerned, the power generating module must allow the reactive power reference value to be set anywhere in the reactive power range with adjustment steps of not more than 5 MVAr or 5% of the reactive power (if this value is lower) by adjusting the reactive power at the connection point to an accuracy of plus or minus 1 MVAr or plus or minus 1% of the total reactive power (if this value is less);

(2) the accuracy of the adjustment complies with the requirements of the technical regulation on the requirements for connection to the public interest networks for the power generating modules.

5.2.13. Testing the adjustment of the power factor

Art. 157. The test is designed to demonstrate the capability of power generating modules of category C or D, including PPMO, to operate in the power factor mode according to the provisions of the technical normative for the category to which the power generating unit belongs.

Art. 158. The test checks the following parameters:

(1) the range of the power factor reference value;

(2) the accuracy of the adjustment;

(3) the reactive power response triggered at the change of the active power stage.

Art. 159. The test is considered "in accordance with" if the following conditions are met:

(1) the setting area of the reactive power setpoint and the reactive power gradient are provided in accordance with the requirements of the technical standard for the category to which the power generating unit belongs. With regard to the power factor mode, the power generating module must allow the power factor setting at the connection point in the P-Q / Pmax diagram of the reactive power set by the relevant system operator with a factor of power set in steps not

exceeding 0,01. RSO sets the value of the power factor requested, the tolerance and the duration of the required power factor due to a sudden change in the active power. The tolerance of the required power factor is expressed by the corresponding reactive power tolerance, which shall not exceed 1% of the reactive maximum power value of the power generating module that is part of the plant.

(2) the activation time of the reactive power as a result of the change in the active power stage does not exceed the requirement in the technical standard on the requirements for connection to the public interest networks;

(3) the accuracy of the adjustment is in accordance with the specific value in the technical standard regarding the requirements for connection to the networks of public interest.

5.2.14. Testing the voltage adjustment

Art. 160. (1) The object of testing is:

(a) demonstrating the capability of synchronous power generating modules of category C or D to achieve voltage regulation in accordance with the provisions of the technical standard for the category to which it belongs;

(b) demonstrating the capability of power generating modules of category C or D including PPMO to operate in voltage regulation mode in accordance with the provisions of the technical standard for the category to which they belong.

(2) The tests provided for in paragraph (1) refers to the behavior of power generating moduless at voltage variations.

Art. 161. The test checks the following parameters:

(1) ramp and dead band implemented in accordance with the technical standard of the category to which the power generating unit belongs. Regarding the voltage control mode, the power generator module must be able to contribute to the voltage setting at the connection point:

(a) by providing the required power exchange with reactive power to the network at a voltage reference value of at least in the range (0.95 ÷ 1.05) ur, with a reference prescribed in steps not exceeding 0.01 ur, with a minimum ramp of (2 ÷ 7)%, in steps of not more than 0.5%;

(b) the reference can be made with or without a dead band, selectable in a range from 0 to ± 5% U_{ref}, where U_{ref} = Un in steps of not more than 0.5% $U_{ref;}$

(c) after a voltage step change, a power generating module must be capable of reaching 90% of the step value at t1, set by RSO in the (1 ÷ 5) seconds, typically 1 second, and must stabilize at the required value within a time t2 set by the RSO within the range of (5 ÷ 60) seconds, typically 10 seconds. The change of the voltage generated by the power plant made up of power generating modules follows a slope of variation, and the required value will be achieved with a reactive power tolerance in a permanent regime of maximum 5% of the maximum reactive power.

(2) precision of adjustment;

(3) insensitivity of the adjustment;

(4) activation time of reactive power.

Art. 162. (1) In the test, different voltage setpoints, corresponding to the connection point, with ± (0.5 ÷ 3) kV values from the existing network voltage at the start of the tests.

(2) The tests are resumed for locally and remotely set voltage setpoints (RSO / DEC / DET / dispatcher center of the power generating unit) and for at least two different values of the voltage variation velocity.

(3) The MVAr / kV values of the connection point are determined for at least two active power values produced by the power generating module.

(4) The voltage variation velocity is determined, which should be as close as possible to the set value (V / s or kV / min).

Art. 163. The test is considered "in accordance with" if the following conditions are met:

(1) the control range, offset characteristic and dead band set respect the agreed or established parameters;

(2) the insensitivity of the voltage adjustment is not bigger than 0.01 u.r.;

(3) after a change in the voltage step, 90% of the reactive power variation was made within the ranges and tolerances provided in art. 156.

5.2.15. Testing the data exchange between the power generating unit and the EMS / DMS-SCADA

Art. 164. Tests shall be applied to power generating modules of category B, C and D, including CGT, and shall relate to verification:

(1) For power generating modules of category B and C, including PPMO:

(a) the integration of the quantities and state and command signals as provided in the technical regulations applicable into force, in the DMS / EMS-SCADA system of the RSO, as appropriate;

(b) the exchange of data is verified by RSO and TSO, as the case may be, and the signals provided in paragraph (2) (i) must be correctly received and the records must be functional and properly executed by the power generating module.

(2) For power generating modules of category D, including PPMO:

i. reception / emission and correct execution of changed status signals and switches: measured quantities (P, Q, U, f), P (Q, U) records including active programmed power, status signals and circuit breaker commands, position of separators and operation status signal with / without automatic response to frequency and operating deviations in reactive power or voltage control;

ii. receiving the values by means of a fiber optic communication path with reservation on another communication medium, as the case may be;

iii. integration into the EMS-SCADA system and DMS-SCADA respectively;

iv. the correct treatment of the measured values and setpoints in the power generating module in all protocols;

v. checking the analogue and digital sizes displayed on screens with the analogue sizes read from other devices at the power generating module level (P, Q, U, f).

Art. 165. For power generating modules of category D, including CGTG, data exchange verification shall be carried out by TSO, the signals referred to in Article 164 (2) (i) must be correctly received and the setpoints must be functional and properly executed.

5.2.16. Testing the power quality at the point of connection / delimitation, as the case may be

Art. 166. The tests apply to power generating modules of category B, C or D / PPMO and refer to the compliance of THD, harmonics, negative unbalance factor and flicker effect at the point of connection / delimitation, as appropriate, thus:

(1) quality analyzers must be of class A and belong to the test executor, respectively RSO, as appropriate;

(2) for power generating modules of category C and D, including CGTG, the registrations made during the tests and for a further two weeks shall be transmitted to the TSO;

(3) for power generating modules of category B and C, including PPMO, the records made are transmitted to RSO;

(4) in the event that the records show a deterioration of the electricity quality at the point of connection / delimitation through the operation of the power generating module during the testing period, the power generating unit owner must, as the case may be, take measures to equip the compensating means necessary to lead to the fitting of the quality parameters of the electricity at the connection point within the limits established by the performance standards for the electricity distribution service, respectively for the electricity transmission service and the system service in force. It is not allowed to operate the power generating module without complying with the quality requirements of the electricity at the connection point / delimitation, as the case may be.

Section 5.3. Monitoring the compliance of power generating units

Art. 167. The power generating unit owner, a third party or an aggregator designated by the CDC applicant, must comply with the provisions of the NPS Dispatcher Regulation and the General Regulation of maneuvers in medium and high voltage electrical installations, approved by NRA President's Order, and must hold the "Investment Order with Attributes of the Dispatching Management Authority", for the related installations, issued, as the case may be, by DET / DEN / DED.

Art. 168. In the event of the CDC being revoked, RSO shall, as appropriate, notify the TSO and the power generating unit owner.

Art. 169. (1) Updating of the CDC can be made if, during the period of its validity, there are changes of administrative elements of the generation units, provided in the regulation of connection of users to the public electricity networks in force.

(2) The power generating unit owner has the obligation to send to RSO a justified request for updating it together with the original CDC.

(3) RSO issues an updated CDC with the changes foreseen in par. (1), it shall send it to the owner and TSO, as the case may be, destroy the original copy of the old CDC; RSO updates the CDC status on its own website.

Art. 170. The verification, control and monitoring activity shall be conducted in accordance with the RSO procedures for:

(1) monitoring how a power generator unit complies with declared parameters in operation;

(2) Testing, controlling and monitoring how a power generator unit complies with the operating and control instructions of the TSO;

(3) esting and controlling the connection installations of a power generating unit after major repairs;

(4) testing, controlling and monitoring of the telecommunication and electricity measuring installations of the power generating unit at the RET / RED interface during operation.

Art. 171. Control and monitoring operations are carried out by the RSO, and for power generating units of category D and TSO, including those connected to the DSO (Article 193 of the RET Technical Code), in the event that:

(1) a power generator unit does not comply with the operating parameters checked and recorded during the certification process, or

(2) a power generating unit does not comply with TSO or RSO, as applicable.

Art. 172. The TSO or RSO, as the case may be, and the power generating unit owner shall jointly determine the measures to be taken to remedy the situations referred to in Article 171 and the time limits for the completion of the remedy.

Art. 173. If, within 10 days of the notification of the TSO or the RSO, as the case may be, no agreement is reached to remedy the situations referred to in Article 171, TSO or RSO, as the case may be, may request a test for the verification compliance with the applicable technical requirements that the power generating unit owner has an obligation to achieve.

Chapter 6. Transitional and final provisions

Art. 174. Annexes no. 1 to 17 form an integral part of this proceeding.

Art. 175. (1) For power generating units with installed power less than 0,8 kW, the power generating unit owner shall send to RSO at least 1 month before the proposed date of energisation for the beginning of the testing period, copies of the equipment documentation and certificates, including the records of the parameters measured by the

testing performed by certified internationally recognized certification bodies as well as the technical data set out in Table 1A - PGM.

(2) For the power generating units referred to in paragraph (1), the power generating unit owner shall submit to the RSO the request for definitive withdrawal from its operation and shall ensure that the RSO is informed of the final withdrawal from operation.

Annex 1

ID model for power generating units of category A

ID for category A units contains the following documents:

(1) the technical project and technical data of Table 1A-PGMS, respectively Table 1A-PGM, as appropriate;

(2) the connection point;

(3) the expected date for energisation for the beginning of the testing period;

(4) maximum plant capacity, expressed in kW or kVA (or kW and kVAr);

(5) type of primary energy source;

(6) classification of the power generating unit as emerging technology (YES / NO); if the power generating unit benefits from the status of power generating unit using emerging technology in Romania, the certificates referred to in paragraph (9);

(7) with regard to equipment used for which a certificate of equipment has not been received, technical information / data shall be provided in accordance with instructions given by the RSO relevant to the technical requirements applicable into force for power generating units of category A;

(8) the contact details of the owner, a third party or aggregator designated by the owner and their signatures;

(9) copies of the documents and certificates of equipment, including records of the parameters measured by the testing, carried out by certified bodies recognized at European level, certifying:

(a) checking the P - Q capability curve;

(b) fault-ride-through capability if the power generating unit is provided with this function;

(c) operation in the frequency range (47,5 ÷ 51,5 Hz) Hz at a frequency variation of 2 Hz / sec for a 500 ms time window of 1,5 Hz / s for a 1 s time window and 1.25 Hz / s for a 2 s time window at voltage variations (0.85 ÷ 1.1) Vn;

(d) the capability of providing limited response to frequency increases above the 50 Hz nominal value;

(e) the ability to constantly maintain the active power mobilized irrespective of frequency variations within the power provided by the primary source;

(f) the reduction in power to the maximum active power produced when the frequency drops below 49.5 Hz and 49 Hz respectively;

(g) the ability to automatically reconnect the power generating unit;

(h) ability to reduce the active power to stop within a maximum of 5 seconds of receipt of the disconnect command using the logic interface of the power generating unit;

(i) disturbances introduced from the point of view of the quality of electricity, in accordance with EN 50160, in force, communicated by the manufacturer of the power generating unit by means of bulletins issued by laboratories certified at European level or measured at the point of connection by the RSO or by an economic operator holding attestation type A3 issued by NRA. Measurements of the quality of the electrical energy shall be completed by a measurement report, with attached data from the Class A quality analyzer.

Table 1A-PGMS: *Technical data for synchronous power generating modules of category A*

Description of the data	**Unit of measurement**
The point of connection to the network	Text, schema
Rated voltage at the point of connection / delimitation, as appropriate	kV
Apparent nominal power	MVA
Net power	MW
The nominal active power produced at the terminals	MW
The maximum active power produced at the terminals	MW
Maximum / minimum frequency of operation at rated parameters	Hz
Maximum reactive power at terminals	MVAr
Minimum reactive power at terminals	MVAr
Minimum active power produced	MW
Turbo-generator inertia constant (H) * or moment of inertia (GD^2)*	MWs/MVA
Rated speed*	Rpm
Short-circuit ratio*	
Nominal stator current*	A
Saturated and unsaturated reactance	
Rated current [rated voltage^2 / nominal rated power]	Ohm
Longitudinal synchronous reactance [% of nominal reactance]	%
Longitudinal transient reactance [% of nominal reactance]	%
Longitudinal supra-transient reactance [% of nominal reactance]	%

Description of the data	Unit of measurement
Synchronous transverse reactance [% of nominal reactance]	%
Transverse transverse reactance [% of nominal reactance]	%
Transversal over-transient reactance [% of nominal reactance]	%
Stator leakage reactance [% of nominal reactance]	%
Zero sequence reactance [% of nominal reactance]	%
Negative sequence reactance [% of nominal reactance]	%
Potier Reactance * [% of nominal reactance]	%
Time constants	
Transient time constant of the excitation winding with the stator closed (T_d')	s
The over-transient time constant of the damping winding with the stator closed (T_d")	s
Transient time constant of the excitation winding with the open stator (T_{d0}')	s
The over-transient time constant of the damping winding with the open stator (T_{d0}")	s
Transient time constant of the excitation winding with the stator open on the q axis (T_{q0}')	s
The over-transient time constant of the damping winding with the open stator on the q axis (T_{q0}")	s
Capability diagram P-Q	diagram
Diagram of variation of technical data according to deviations from standard environmental conditions	

***** Mandatory data according to characteristics reported by the manufacturer of power generating units of category A

Table 1A-PGM: *Technical data for power generating modules of category A*

Description of the data	**Unit of measurement**
The point of connection to the network	Text, schema
The standard environmental conditions for which technical data has been determined	Text
Rated voltage at the point of connection / delimitation, as appropriate	kV
The apparent power	MVA
Nominal active power	MW
Maximum active power	MW
Maximum / minimum frequency of operation at rated parameters	Hz
Maximum reactive power	MVAr
Minimum reactive power	MVAr
Diagram of variation of technical data according to deviations from standard environmental conditions	Diagram
Capability of LVRT fault-ride-through	Diagram

* Mandatory data according to the features communicated by the manufacturer of the power generating modules

Note: Depending on the safety needs of the NPS, the RSO may request from the owner of the power generating units of category A the information additional to those provided in Tables 1A-PGMS and 1A-PGM.

Annex 2

Technical documentation for power generating units of category B

The technical documentation for power generating units contains the following documents:

(1) the establishment authorization granted by NRA, or, as the case may be, the commercial exploitation license;

(2) the contact details of the power generating unit owner and the third party or aggregator, as appropriate;

(3) the connection point;

(4) the expected date of the energisation for the beginning of the testing period;

(5) type of primary energy source;

(6) equipment certificates issued by an approved certification body for the equipment used by the power generating units, together with the test results:

(a) checking the P - Q capability curve;

(b) fault-ride-through capability;

(c) operation of the power generating unit in the frequency range (47,5 ÷ 51,5) Hz at a frequency variation rate of 2 Hz / sec for a 500 ms time window, of 1,5 Hz / s for a 1 s time window and 1.25 Hz / s for a 2 s time window, the reduction of active power to the maximum active power produced in the case of a frequency decrease below 49.5 Hz and 49 Hz respectively, the capability of providing limited response to frequency increments above the nominal value of 50 Hz; the capability of constantly maintaining the active power mobilized irrespective of frequency variations, within the power limit provided by the primary source, the capability of automatic reconnection of the power generating unit at voltage variations of (0,85 ÷ 1,1) Vn;

(d) electrical disturbances in accordance with EN 50160 in force, communicated by the manufacturer of the power generating unit issued by laboratories certified at European level or measured at the point of connection by an economic operator holding a type A3 certificate issued by NRA or by RSO. The electrical energy measurements shall be completed by measuring ratio, with the data extracted from the Class A quality analyzer;

(e) response mode to the setpoints of active and reactive power variations.

(7) in the case of equipment used for which a certificate has not been received, information (tests and their results, carried out by approved certification bodies, etc.) shall be provided in accordance with the instructions given by RSO relevant to the technical requirements applicable in force, power generating units of category B;

(8) the detailed technical data of the power generating unit, according to Tables no. 1B-PGMS and 1B-PGM as well as the technical design to show: the lengths and technical characteristics of the cables and the connection to the RSO substation / cell, the connection of the power generating unit and the auxiliary installations as well as the single line diagram of the substation and the power plant module;

(9) modeling requirements for permanent and dynamic regime system studies, mathematical models of power generating facilities, as follows:

(a) for the calculation of stationary test and short-circuit currents are required:

i. the electrical diagram of the power generator unit and the system

connection substation;

ii. the length of all cables and the length of the LEA or LES between the power generating unit and the system connection substation;

iii. lectrical parameters specific to all cables and lines: type (material), R + [Ω / km], R_0 [Ω / km], Rm_0 [Ω / km], X_0 [Ω / km], X_0 [Km / s], C_0 [μF / km], C_0 [μF / km], S [mm], V_n [kV];

iv. for transformer units LV/MV kV: rated winding power, nominal voltages, loose losses, copper losses, short-circuit voltage, idle current, connection unit, voltage setting (type of adjustment, including the number of the nominal plot, the maximum plot number), neutral treatment;

v. reactive power compensation data (for example, if capacitor batteries are installed: the number of steps, the power installed on each stage), and an indication of the required electrical installation scheme of the compensation system.

(b) for calculating the dynamic regime are required:

i. logic operating diagram of the power generating unit;

ii. the mathematical model of the power generating unit and its parameters;

iii. model of the power generating unit. Alternatively, you can specify assimilation with a generic model from one of the PSSE v32 applications (".dll" will mandatory be provided) or Eurostag v4.5 for which parameters are provided.

(10) studies conducted by the power generating unit owner, including model simulations, to demonstrate the steady-state and dynamic performances, including the use of measured factory values during testing at the level of detail required by RSO;

(11) the data required for calculations of protection settings that are sent to the RSO at least one month before the date when the energisation for the beginning of the testing period is requested:

(a) for the power generating unit:

i. complete technical project (primary and secondary electrical circuits);

ii. generators' internal protection for internal and external defects, adjustments and drive times;

iii. the short-circuit contribution on the MV bar of the connection substation of each power generating unit that is connected by the same cable to the fault types: single phase, biphasic, biphasic with earth and three-phase;

iv. its electrical characteristics, its own protections with related adjustments and the connection / disconnection automation of the reactive power compensation elements.

(b) for the connection substation to RED:

i. the complete technical project (primary and secondary electrical circuits) of the RED / RET power generating unit's electrical connection substation;

ii. complete documentation and software for connection terminal / terminals;

iii. the electrical and geometric characteristics of FO-OPGW for each line section (electrical resistance specific at 20 ° C [Ω / Km], nominal section [mmp], conductor radius [cm]);

(c) for the substations adjacent to the power generating unit's connection substation: complete documentation of the technical project (electrical part - primary and secondary circuits, block diagram of the protections and trigger matrix) if, in order to activate for the probationary period of the power generating unit, necessary replacement of primary equipment and / or additions to the line protection scheme;

(12) the telecommunication project that provides the communication path used to integrate into DMS-SCADA, through which data is transferred to the RSO, including the settlement data extracted from the settlement group. Telecommunication projects must be endorsed at the CTES meeting of the RSO.

Table no. 1B-PGMS: *Data for synchronous power generating modules of category B*

Description of the data	**Unit of measurement**
Point of connection / delimitation, as appropriate	Text, scheme
The standard environmental conditions for which the technical data were determined (temperatures, etc.)	Text
Reduced active power at frequencies below 49 Hz	diagram
Rated voltage at the point of connection / delimitation, as appropriate	kV
Nominal apparent power	MVA
Net power	MW
The nominal active power produced at the terminals	MW
The minimum active power produced at the terminals	MW
The maximum active power produced at the terminals	MW

Description of the data	**Unit of measurement**
Maximum / minimum frequency of operation at nominal parameters	Hz
Capability of LVRT fault-ride-through	diagram
Maximum reactive power at terminals	MVAr
Minimum reactive power at terminals	MVAr
Turbo-generator inertia constant (H) * or moment of inertia (GD^2)*	MWs/MVA
Rated speed*	rpm
Short-circuit ratio*	
Nominal stator current*	A
Diagram of variation of technical data according to deviations from standard environmental conditions	
Saturated and unsaturated reactance	
Rated reactance [rated voltage^2 / nominal rated power]	ohm
Longitudinal synchronous reactance [% of nominal reactance]	%
Longitudinal transient reactance [% of nominal reactance]	%
Longitudinal supra-transient reactance [% of nominal reactance]	%
Synchronous transverse reactance [% of nominal reactance]	%
Transverse transverse reactance [% of nominal reactance]	%
Transversal over-transient reactance [% of nominal reactance]	%
Stator leakage reactance [% of nominal reactance]	%
Zero sequence reactance [% of nominal reactance]	%
Negative sequence reactance [% of nominal reactance]	%
Potier Reactance * [% of nominal reactance]	%
Time constants	
Transient time constant of the excitation winding with the stator closed (T_d')	s
The over-transient time constant of the damping winding with the stator closed (T_d")	s
Transient time constant of the excitation winding with the open stator (T_{d0}')	s
The over-transient time constant of the damping winding with	s

Description of the data	Unit of measurement
the open stator (T_{d0}”)	
Transient time constant of the excitation winding with the stator open on the q axis (T_{q0}’)	s
The over-transient time constant of the damping winding with the open stator on the q axis (T_{q0}”)	s
Diagrams	
P-Q capability diagram	Graphical data
Diagram of variation of technical data according to deviations from standard environmental conditions	

Table no. 1B-PGM: *Data for power generating modules of category B*

Description of the data	Unit of measurement
Point of connection / delimitation, as appropriate	Text, scheme
The standard environmental conditions for which the technical data were determined (temperatures, etc.)	Text
Reduced active power at frequencies below 49 Hz	kV
Rated voltage at the point of connection / delimitation, as appropriate	MVA
Nominal apparent power	MW
Net power	MW
The nominal active power produced at the terminals	MW
The minimum active power produced at the terminals	kV
The maximum active power produced at the terminals	Hz
Maximum / minimum frequency of operation at nominal parameters	diagram
Capability of LVRT fault-ride-through	MVAr
Maximum reactive power at terminals	MVAr
Point of connection / delimitation, as appropriate	MW
The standard environmental conditions for which the technical data were determined (temperatures, etc.)	

Table no. 1B-PPM: *Data for power plants made up of power generating modules of category B*

Description of the data	**Unit of measurement**
Point of connection / delimitation to the network, as appropriate	Text, scheme
The standard environmental conditions for which technical data has been determined	Text
Rated voltage at the point of connection / delimitation as appropriate	kV
Apparent nominal power	MVA
Net power	MW
The nominal active power produced at the terminals	MW
The maximum active power produced at the terminals	MW
Nominal voltage	kV
Maximum / minimum frequency of operation at nominal parameters	Hz
Capability of LVRT fault-ride-through	diagram
Diagram of variation of technical data according to deviations from standard environmental conditions	

Data for synchronous power generating modules, connected by wind power/ asynchronous electronics, which are part of a power plant	
Type of wind unit (horizontal / vertical axis)	Description
Rotor diameter	m
The height of the rotor shaft	m
Remote system of the blade	Text
Speed control system (fixed / two-speed / variable)	Text
Type of the generator	Description
Inverters type certificates accompanied by the results of tests performed by recognized laboratories at European level for: variations in frequency, voltage and fault-ride-through	Certificates
Type of frequency converter and nominal parameters (kW)	
RoCof (rate of change of frequency)	MW/min
Reactive power	kVAr

Description of the data	Unit of measurement
Nominal current	A
Nominal voltage	V
Cut-in wind speed	m/s
Nominal wind speed (corresponding to nominal power)	m/s
Cut-off wind speed	m/s
Variation of power generated at wind speed	Table
P-Q diagram	Graphical data
Quality parameters of electric power for power generating modules that are part of the plant	
Continuous flicker coefficient	
Stage flicker for switching operations	
Voltage variation factor	
Maximum number of switching operations at 10 minutes	
Maximum number of switching operations at 2 hours	
At the bus bar:	
Total THD_i current distortion factor	
Harmonic (up to harmonic 50)	
Negative sequence unbalance factor	
Data relating to inverters and photovoltaic panels	
Number of photovoltaic panels constituting CEF	Number
Company producing photovoltaic panels	Name
The type of photovoltaic panels	Name
Surface area of the photoelectric panel	m^2
The nominal power of the photoelectric panel (c.c.)	kW
The maximum power of the photoelectric panel (c.c.)	kW
The nominal electrical current of the photoelectric panel (c.c.)	A
Nominal voltage of the photoelectric panel (c.c.)	V
Data relating to the inverters used by the power plant with photovoltaic power generating modules	
Number of inverters	Number
Type of inverter	Description

Description of the data	Unit of measurement
Inverters type certificates accompanied by the results of tests performed by recognized laboratories at European level for: variations in frequency, voltage and over-fault	Certificates
Nominal input power (c.c.)	kW
Recommended maximum input power (c.c.)	kW
Input voltage range (c.c.)	V
Maximum input voltage (c.c.)	V
Maximum input current (c.c.)	A
Active nominal output power (c.a.)	kW
Active maximum output power (c.a.)	kW
Reactive nominal output power (c.a.)	kVAr
Nominal output voltage (c.a.)	V, kV
Nominal output current (c.a.)	A
Operating frequency range	Hz
Power factor adjustment range	
Maximum yield	%
Maximum consumption (c.a.)	W
Consumption at night (c.a.)	W
Diagram of variation of technical data according to deviations from standard environmental conditions	

Quality parameters of power at the power plant with photovoltaic generating modules	
Maximum power variation (ΔS / Ssc) per minute	
Maximum value for fast voltage variations	
Total electrical distortion factor	
Harmonic current (up to harmonic 50)	
Total voltage distortion factor	
Voltage harmonics (up to harmonic 50)	
Negative voltage sequence unbalance factor	
Maximum power variation (ΔS / Ssc) per minute	

Description of the data	Unit of measurement
Capability in terms of reactive power:	
Reactive power in inductive / capacitive mode at maximum power generated	Generated MVAr
Reactive power in inductive / capacitive mode at minimum power generated	Generated MVAr
Reactive power in inductive / capacitive mode at zero power generated	Generated MVAr
P-Q diagram according to V	Graphical data
Documentation relating to protection:	
Differential protection	Text
Transformer units:	
Number of windings	Text
The nominal power on each winding	MVA
Nominal transformer ratio	kV/kV
Short-circuit voltages per winding pairs	% of V_{nom}
Losses on no load	kW
Load losses	kW
The magnetizing current	%
Connection unit	Text
Control range	kV-kV
Adjustment scheme (longitudinal or long-transversal)	Text, diagram
Size of adjustment step and socket number	%
Adjustment under load	YES/NO
Treating the neutral	Text, diagram
Saturation curve	Diagram

Note: Depending on the needs concerning the operational security of the NPS, RSO and TSO may request additional information from Table 1B-PGMS from Table 1B-PGM or Table 1B-PPM from the power generating unit owner.

Annex 3

Documentation demonstrating the performance of preceding works of energisation for the beginning of the testing period for power generating units of category B

The documentation contains:

(1) evidence of an agreement on the protection schemes applicable at the point of connection between the RSO and the power generating unit owner;

(2) the documents attesting the realization of the communication link with DMS-SCADA (a communication path), if applicable;

(3) documents evidencing the implementation of the aggregation and integration solution in the DMS-SCADA system of RSO. Integration refers at least to the integration of measures P (active power), Q (reactive power) and f (frequency);

(4) the program of the energisation for the beginning of the testing period of the power generating unit in the energisation sequence for the testing period of the component of power generating modules, as applicable, and the expected energisation for the beginning of the testing period of the power generating unit, until the ATR approved power corresponding to the ATR specified stage (if applicable);

(5) the operating agreement between the RSO and the power generating unit owner, the dossier of the installation manual and the minutes confirming the receipt at the end of the work on the connection system;

(6) evidence of receipt of the investment order;

(7) evidence of registration in the energy market as a unit tests.

Annex 4

Technical documentation for power generating units of category C

The technical documentation for generating units contains the following documents:

(1) the ATR copy;

(2) the authorization to set up NRA, or, as the case may be, the commercial exploitation license;

(3) the contact details of the power generating unit owner and the third party or aggregator, as appropriate;

(4) the connection point;

(5) the expected date of the energisation for the beginning of the testing period;

(6) type of primary energy source;

(7) certificates of equipment issued by an approved certification body for the equipment

used by the power generating units, together with the results of the tests. These include:

(a) checking the P - Q capability curve;

(b) fault-ride-through capability;

(c) operation of the power generating unit in the frequency range (47,5 ÷ 51,5) Hz at a frequency variation rate of 2 Hz / sec for a 500 ms time window, of 1,5 Hz / s for a 1 s window, of and 1.25 Hz / s for a 2 s time window, the reduction of active power to the maximum active power produced in the case of a frequency drop below 49.5 Hz and 49 Hz, the capability of providing a limited response to frequency capacities above 50 Hz, capability of providing limited response to frequency drops below 50 Hz, ability to constantly maintain active power mobilized irrespective of frequency variations, within the power limit provided by the primary source, capability of reconnection automatic generation of the power generating unit at voltage variations of (0,85 ÷ 1,1) Vn;

(d) electrical disturbances according to EN 50160 edition in force, communicated by the manufacturer of the builder unit issued by laboratories certified at European level or measured at the point of connection by an economic operator holding an A3 certificate issued by NRA or RSO. The electrical energy measurements shall be completed by measuring ratio, with the data extracted from the Class A quality analyzer;

(e) response mode to the setpoints of active and reactive power variations.

(7) in the case of equipment used for which a certificate has not been received, information (tests and their results, carried out by approved certification bodies, etc.) shall be provided in accordance with the instructions given by RSO relevant to the technical requirements applicable in force, specific to power generating units of category C;

(8) the detailed technical data of the power generating unit, according to tables no. 1C-PGMS and 1C-PPM as well as the technical project showing the lengths and technical characteristics of the cables and the connection to the RSO substation / cell connection, the connection module of the power generator unit and the auxiliary installations as well as the single line diagram of the substation and the power plant module.

(9) modeling requirements for permanent and dynamic regime system studies, mathematical models of power generating facilities, as follows:

(a) for the calculation of substationary and short-circuit currents, are required:

i. the electrical scheme of the power generating unit and the system connection substation;

ii. the length of all LEAs or LES between the power generating unit and the system connection substation and the LES in the plant with power generating modules, as appropriate;

iii. electrical parameters specific to all cables and lines: type (material), R + [Ω / km], R0 [Ω / km], Rm0 [Ω / km], X0 [Ω / km], X0 [Ω / km], C + [μF / km], C0 [μF / km], S [mm], Vn [kV];

iv. for processing units 110 kV / MV: rated winding power, nominal voltages, loose losses, copper losses, short-circuit voltage, idle current, connection unit, voltage setting (type of adjustment, including the number of the nominal plot, the maximum plot number), neutral treatment;

v. reactive power compensation data (for example, if capacitor batteries are installed: the number of stages, the power installed on each stage) and the electrical scheme of the installation location of the compensation system;

vi. data relating to power generating facilities of categoty C: the number of power generating modules, the rated active power, the P-Q diagram of each power generating module, the rate of change of the active power;

(b) dynamic calculation is required:

i. logic operating diagram of the power generating unit;

ii. the mathematical model of the power generating unit and its parameters;

iii. electrical control system: control schemes and parameters for active power control and reactive power control and, where applicable, voltage at terminals or at the connection point;

iv. the mathematical model of the power generating unit and the model of the central level control system in the form of diagrams (including mathematical functions) and the corresponding set of parameters. Alternatively, you can specify assimilation with a generic model from one of the PSSE v32 applications (".dll" will mandatory be provided) or Eurostag v4.5 for which the parameters are provided. If the model includes additional control functions or specific features, these will be mentioned and graphics will be added;

v. protections for voltage variation: "fault-ride-through - low voltage" (LVRT, ZVRT);

vi. other special functions: "low voltage power logic", participation in frequency control etc;

vii. the dynamic equivalent of the power generating unit;

(10) studies conducted by the electricity power plant manager, including model simulations, to demonstrate the steady-state and dynamic performances, including the use of measured factory values during testing at the level of detail required by RSO;

(11) the active power regulation scheme, reactive power, in detail at the power generating unit, in order to highlight the way in which:

(a) active power and reactive power setpoint are taken and modified;

(b) the reactive power measure at the power generating unit level is taken;

(12) the network study for calculating the reactive power requirement at the connection point to meet the reactive power requirements at the connection point (0.9 inductive ÷ 0.9 capacitive) across the entire active power range, with zero reactive power exchange with the system when the active power produced is zero. Attach the P-Q diagram of the power generating unit at the connection point (including the contribution of all generating units and auxiliaries) and the V / Q /P_{max};

(13) for the category C of power plants made up of power generating modules, the dynamic regime study of the plant and the area to determine the measures to avoid its insular operation;

(14) the data required for the calculations of protection settings, which are sent to the TSO at least one month before the date when the energisation for the beginning of the testing period is requested:

(a) for the power generating unit:

i. complete technical project (primary and secondary electrical circuits);

ii. generators' internal protection for internal and external defects, adjustments and drive times;

iii. the short-circuit contribution on the MV busbar of the connection substation of each power generating unit that is connected by the same cable to the fault types: single-phase, biphasic, biphasic with earth and three-phase;

iv. the electrical characteristics of the installed power generating units and the related transformers, the operating modes, including the values of the short-circuit currents at the transformer-converter assembly terminals, namely:

– synchronous power generator: type, Sn, [MVA], Pn [MW], Vn [kV], In [A], N_n [rpm], cosφn, Xd, Xq, X0, X'd, X'q , X'0, X"d, X"d [%], T_{launch} [s],

Excitation (type), V_{excit} [kV], $I_{forcing}$ [A], $T_{forcing}$ [A];

- asynchronous power generator: manufacturing, type, Sn [MVA], Pn [MW], Vn [kV], In [A], Nn [rot/min], cosφn, Xd, Xq, X0, X'd, X'q, X'0, X"d, X"d [%];
- photovoltaic panel: type, Pn [kW];
- Photovoltaic panel inverter: name, type, manufacturing, Sn [VA], Pn [W], Vn [V], Inac [A], cosφn, Pmax [W], Vcc [V], protection to minimum and maximum voltage;
- two-windings transformer: manufacturing, type, tank, core, neutral insulation level, connection group, Sn [MVA], VnI [kV], VnJ [kV], VsccIJ [kV], Pagk [kW], Pascc [kW], Vpmax [kV], Vpmin [kV], Vplot [kV], N (transformer ratio), Vsccmax [%], Vsccmin [%], Vsccn [kV] neutral (mode, impedance values, etc.);
- three-windings transformer: manufacturing, type, cell, core, connection unit, neutral isolation level, Sn1 [MVA], Sn2 [MVA], Sn3 [MVA], Vn1 [kV], Vn2 [kV]], VsccIM, VsccMJ, VsccIJ [%] (specify power to which they are measured), PsccIM, PsccIJ, PsccMJ [kW], Igol [%], Pgol [kW], Vpmax [kV] [kV], Vsccpmax [%], Vsccpmin [%], Vsccpmed [%], neutral (mode, impedance, etc.);
- LEA / LES: Type (material), R + [Ω / km], R0 [Ω / km], Rm0 [Ω / km], X0 [Ω / km]], C [μF / km], C0 [μF / km], S [mm], Vn [kV];

v. Electrical characteristics, self-protection with related adjustments and connection / disconnection automation of reactive power compensation elements;

(b) for the RED / RET connection substation:

i. the complete technical design (primary and secondary electrical circuits) for the electrical connection of the power generating unit;

ii. the electrical characteristics of the power transformers, the documentation, the software and the settings of their protection terminals;

iii. complete documentation and software related to the protection terminals of the connection line / lines;

iv. the electrical and geometric characteristics of the FO-OPGW for each line section (electrical resistance specific at 20 ° C [Ω / Km], nominal

section [mmp], conductor radius [cm]), if FO-OPGW was mounted at the time of the energisation for the beginning of the testing period of the power generating unit;

(c) for the substations adjacent to the connecting substation of the power generating unit:

i. full documentation of the technical design (electrical part - primary and secondary circuits, block diagram of the protections and tripping matrix) if, for energisation for the beginning of the testing period of the power generating unit, primary equipment replacements and / or additions to the line protection scheme were necessary;

ii. complete documentation and software for the protection terminals to be installed in the substations adjacent to the power generator unit's connecting substation.

(15) (a) for power generating units connected to the RET, the main communication path between the power generating unit and the connection point to the EMS-SCADA system of the TSO is made on optical fiber, and a spare path is provided, as the case may be. Telecommunication projects must be endorsed in the CTES meeting of TSO.

(b) for power generating units connected to RED, the primary communication path used for integration into DMS-SCADA is the transmission of settlement data extracted from the settlement counter. Telecommunication projects must be endorsed at the CTES meeting of the RSO.

(16) the technical characteristics of the power quality analyzer to be mounted at the connection point when the power generating unit is connected to a substation belonging to TSO. The analyzer must be Class A certified PSL and be capable of transmitting "SQL", "PQDIF", ".txt" or ".xls" files to the structure required by TSO's electrical quality monitoring system. It integrates into TSO's electricity quality monitoring system. These requirements do not apply to synchronous power generating modules.

(17) the procedure of the equipment supplier for energisation for the beginning of the testing period of the power generating unit;

(18) studies on:

(a) the ability to island operation;

(b) the ability to provide reactive power at the connection point, including compensation of reactive power at the connection point when the active power produced is zero, the V-Q / Pmax diagram, the P-Q diagram;

(c) coordination of protection, with RSO agreement on the protection schemes at the connection point;

(d) permanent and dynamic performance at the level of detail required by RSO:

i. certificates of conformity for the main equipment (wind turbine, inverter, generator, generator, battery) or model simulations for these;

ii. mathematical models and simulation models of the power generating unit made in the soft language indicated by RSO and TSO and possibly integrated into mathematical models used by DSO and TSO. The list of supported software is submitted to the owner by RSO.

Table no. 1C-PGMS: *Data for synchronous power generating modules of category C*

Description of the data	**Unit of measurement**
Point of connection / delimitation, as appropriate	Text, scheme
The standard environmental conditions for which technical data has been determined	Text
Nominal voltage at the point of connection / delimitation, as appropriate	kV
Maximum short-circuit current value at the connection / delimitation point, as appropriate:	
- Symmetric (three-phase)	kA
- Non-symmetric (biphasic, biphasic with earth, single-phase)	kA
Minimum short-circuit current value at the connection / delineation point, as appropriate:	
- Symmetric (three-phase)	kA
- Non-symmetric (biphasic, biphasic with earth, single-phase)	kA
Synchronous power generating modules data:	
Nominal apparent power	MVA
Nominal power factor ($\cos \varphi_n$)	
Net power	MW
The nominal active power produced at the terminals	MW
The maximum active power produced at the terminals	MW
The minimum active power produced at the terminals	MW

Nominal voltage	kV
Maximum / minimum frequency of operation at nominal parameters	Hz
Consumption of own services at the maximum power output at terminals	MW
Maximum reactive power at terminals	MVAr
Minimum reactive power at terminals	MVAr
Minimum active power produced	MW
Capability of LVRT fault-ride-through	diagram
Turbo-generator inertia constant (H) * or moment of inertia (GD2)*	MWs/MVA
Short-circuit ratio	
Rated stator current	A
Rated speed	rpm
Diagram of variation of technical data according to deviations from standard environmental conditions	
Internal protections	
Saturated and unsaturated reactances	
Rated reactance [rated voltage^2 / nominal rated power]	Ω
Longitudinal synchronous reactance [% of nominal reactance]	%
Longitudinal transient reactance [% of nominal reactance]	%
Longitudinal supra-transient reactance [% of nominal reactance]	%
Synchronous transverse reactance [% of nominal reactance]	%
Transverse transverse reactance [% of nominal reactance]	%
Transversal over-transient reactance [% of nominal reactance]	%
Stator leakage reactance [% of nominal reactance]	%
Zero sequence reactance [% of nominal reactance]	%
Negative sequence reactance [% of nominal reactance]	%
Potier Reactance * [% of nominal reactance]	%

Time constants	
Transient time constant of the excitation winding with the stator closed (T_d')	s
The over-transient time constant of the damping winding with the stator closed (T_d")	s
Transient time constant of the excitation winding with the open stator (T_{d0}')	s
The over-transient time constant of the damping winding with the open stator ($T_{d0}^{"}$)	s
Transient time constant of the excitation winding with the stator closed, on the q axis ($T_{q0}^{'}$)	s
The over-transient time constant of the damping winding with the open stator, on the q axis ($T_{q0}^{"}$)	s
Diagrams	
Capability diagram	Graphical data
Diagram of variation of technical data according to deviations from standard environmental conditions	
Capability in terms of reactive power:	
Reactive power in inductive mode at maximum active power generated	Generated MVAr
Reactive power in inductive mode at minimum active power generated	Generated MVAr
Reactive short-time inductive power at nominal values for power, voltage and frequency	MVAr
Capacitive reactive power at maximum / minimum power generated	Absorbed MVAr
Excitation system	
Excitation system type	Text
Nominal Rotor Voltage (Excitation)	V
Maximum Rotor Voltage (the excitation ceiling)	V
The maximum allowable length of the excitation ceiling	s
Excitation adjustment scheme	V/V
Maximum rate of increase of excitation voltage	V/s

Maximum speed to reduce excitation voltage	V/s
Dynamics of over-excitation characteristics	Text
The dynamics of under-excitation characteristics	Text
Excitation limitation	Block diagram
Speed governor (RAV):	
Equivalent, possibly standardized, function of the speed governor, values and units of measurement	Text
The equivalent transfer function, values and units of measurement, according to the technical design	Text
Closing / opening time of the turbine control valve	s
The response to the frequency drop	diagram
Response to frequency increase	diagram
Setting range for the offset characteristic	%
The value of the offset characteristic s_1	%
Frequency dead band	mHz
Delay time (dead time $–t_1$)	s
Response time (t_2)	s
The insensitivity zone	mHz
Insularity capability	MW
Details of the speed controller presented in the block diagram of the transfer functions associated with the individual elements and related units of measurement	Schema
Block diagram and parameters for the automatic generator-turbine speed controller, (possibly boiler), the thermoelectric and nuclear groups.	Text
Automatic Voltage Regulator (AVR):	
Regulator type	Text
The equivalent transfer function, possibly standardized voltage regulator, values and units of measurement	Text
The equivalent transfer function, values and units of measurement, according to the technical project	Text
Protection data:	
Possibility of asynchronous operation without excitation	Text

(loss of excitation) - maximum active power and duration	
Minimum excitation	Text, diagram
Maximum excitation	Text, diagram
Differential	Text
Protection against asynchronous operation with connected excitation	Text
Setting of the adjustment of:	
The maximum excitation limit	Text, diagram
The minimum excitation limit	Text, diagram
Stator current limiter	Text, diagram
Transformer units:	
Number of windings	Text
The rated power on each winding	MVA
Nominal transformer ratio	kV/kV
Short-circuit voltages per winding pairs	% din V_{nom}
Losses on no load	kW
Load losses	kW
The magnetizing current	%
Connection unit	Text
Adjustment range	kV-kV
Adjustment scheme (longitudinal or long-transverse)	Text, diagram
Size of the adjustment step and number of sockets	%
Under load adjustment	Yes/No
Treating the neutral	Text, diagram
Saturation curve	Diagram

Table no. 1C-PPM: *Data for power plants consisting of power generating modules of category C*

Description of the data	**Unit of measurement**
Point of connection / delimitation, as appropriate	Text, diagram
The standard environmental conditions for which technical data has been determined	Text

Rated voltage at the point of connection / delimitation, as appropriate	kV
The value of the short-circuit current at the connection / delimitation point, as the case may be, provided by the generating module (before the power electronics / after the power electronics equipment) to a fault:	
- Symmetric (three-phase)	kA
-Non-symmetric (biphasic, biphasic with earth, single-phase)	kA
The value of the minimum short-circuit current at the connection / delimitation point, as the case may be, provided by the generating module (before the power electronics / after the power electronics equipment) to a fault:	
- Symmetric (three-phase)	kA
-Non-symmetric (biphasic, biphasic with earth, single-phase)	kA
Generation mode that is part of the power plant:	
Nominal apparent power	MVA
Nominal power factor ($\cos \varphi_n$)	
Net power	MW
The nominal active power produced at the terminals	MW
The maximum active power produced at the terminals	MW
Nominal voltage	kV
Maximum / minimum frequency of operation at nominal parameters	Hz
Consumption of own / internal services at peak power output at terminals	MW
Maximum reactive power at terminals	MVAr
Maximum capacitive reactive power at terminals	MVAr
Capability of LVRT fault-ride-through	Diagram
Short-circuit ratio	
Data for synchronous power generating module connected by wind power / asynchronous electronics that comes into a power plant	
Type of wind unit (horizontal / vertical axis)	Description
Rotor diameter	m

The height of the rotor shaft	m
The blade control system (pitch/stall)	Text
Speed control system (fixed / two-speed / variable)	Text
Type of generator	Description
Inverters type certificates accompanied by the results of tests performed by recognized laboratories at European level for: variations in frequency, voltage and fault-ride-through	certificates
Type of frequency converter and nominal parameters	
Speed of active power variation	MW/min
Reactive power	kVAr
Nominal current	A
Nominal voltage	V
Cut-on wind speed	m/s
Nominal wind speed (corresponding to nominal power)	m/s
Cut-off wind speed	m/s
Variation of power generated at wind speed	Table
P-Q diagram	Graphical data
Parameters of power quality for power generating modules that are part of the power plant	
Continuous flicker coefficient	
Stage flicker for switching operations	
Voltage variation factor	
Maximum number of switching operations at 10 minutes	
Maximum number of switching operations at 2 hours	
At the bus bar	
Total THD_i current distortion factor	
Harmonic (up to harmonic 50)	
Negative sequence unbalance factor	
Data relating to inverters and photovoltaic panels	
Number of photovoltaic panels	Number
Company producing photovoltaic panels	Name
The type of photovoltaic panels	Name

Area of the photovoltaic panel surface	m^2
The rated power of the photovoltaic panel (c.c.)	kW
The maximum power of the photovoltaic panel (c.c.)	kW
The rated electrical current of the photovoltaic panel (c.c.)	A
Rated voltage of photovoltaic panel (c.c.)	V
Internal protection functions	
Data relating to the inverters used by the power plant with photovoltaic power generating modules	
Number of inverters	Number
Type of inverter	Description
Inverters type certificates accompanied by the results of tests performed by recognized laboratories at European level for: variations in frequency, voltage and fault-ride-through	Certificates
Nominal input power (c.c.)	kW
Recommended maximum input power (c.c.)	kW
Input voltage range (c.c.)	V
Maximum input voltage (c.c.)	V
Maximum input current (c.c.)	A
Active nominal output power (c.a.)	kW
Active maximum output power (c.a.)	kW
Reactive nominal output power (c.a.)	kVAr
Nominal output voltage (c.a.)	V, kV
Nominal output current (c.a.)	A
Operating frequency range	Hz
Power factor adjustment range	
Maximum yield	%
Maximum consumption (c.a.)	W
Consumption at night (c.a.)	W
Quality parameters of electric power at the power plant with photovoltaic power generating modules	
Maximum power variation (ΔS / Ssc) per minute	

Maximum value for fast voltage variations	
Total electrical distortion factor	
Harmonic current (up to harmonic 50)	
Total voltage distortion factor	
Voltage harmonics (up to harmonic 50)	
Negative voltage sequence unbalance factor	
Maximum power variation (ΔS / Ssc) per minute	
Capability in terms of reactive power:	
Reactive power in inductive / capacitive mode at maximum power generated	Generated MVAr
Reactive power in inductive / capacitive mode at minimum power generated	Generated MVAr
Reactive power in inductive / capacitive mode at zero power generated	Generated MVAr
P-Q diagram depending on V	Graphical data
Data relating to protection:	
Differential protection	Text
Transformer units:	
Number of windings	Text
The rated power on each winding	MVA
Nominal transformer ratio	kV/kV
Short-circuit voltages per winding pairs	% of V_{nom}
Losses on no load	kW
Load losses	kW
The magnetizing current	%
Connection unit	Text
Adjustment range	kV-kV
Adjustment scheme (longitudinal or long-transverse)	Text, diagram
Size of the adjustment step and number of sockets	%
Under load adjustment	YES/NO
Treating the neutral	Text, diagram
Saturation curve	Diagram

Note: Depending on the needs on operating security of the NPS, the RSO may request

additional information from the power generating unit owner from the 1C-PGMS and 1C-PPM tables.

Annex 5

Documentation proving the performance of preceding works of energisation for the beginning of the testing period for power generating units of category C

The documentation contains:

(1) evidence of an agreement on the protection diagram applicable at the point of connection between the RSO and the power generating unit owner;

(2) the documents attesting the realization of the communication paths with DMS-SCADA (a communication path), if applicable;

(3) the documents attesting to the implementation of the EMS-SCADA integration solution of the TSO agreed with it (individually through its own local dispatcher center or through a DLC). Integration refers at least to the integration of active power, reactive power, voltage and frequency measures;

(4) the documents attesting integration into the forecasting system of the TSO;

(5) the program of energisation for the beginning of the testing period of the power generating unit and, in the case of successive energisation of production capacities, the active power and the time at which it is expected to be activated for the testing period up to the power approved by the ATR, corresponding to the development stage specified in the ATR; TSO has the obligation to publish this program on its own website;

(6) the operating agreement concluded between the RSO and the power generating unit owner, the dossier of the installation manual and the protocols confirming receipt at the end of the work on the connection installation;

(7) the document proving the existence and mounting of the reactive power compensation means at the connection point, if this is apparent from the reactive power study;

(8) proof of setting up a local dispatcher of the plant or integrating the power generating unit into an existing DLC;

(9) evidence of obtaining an investment order;

(10) evidence of registration in the energy market as a unit tests.

Annex 6

Technical documentation for power generating units of category D

The technical documentation for power generating units contains the following documents:

(1) ATR copy;

(2) the establishment authorization granted by NRA, or, as the case may be, the commercial exploitation license;

(3) the contact details of the power generating unit owner and the third party or aggregator, as appropriate;

(4) the connection point;

(5) the expected date of the energisation for the beginning of the testing period;

(6) type of primary energy source;

(7) equipment certificates issued by an approved certification body for the equipment used by the power generating units, together with the results of the tests. These include:

   (a) Checking the P - Q capability curve;

   (b) fault-ride-through capability;

   (c) operation of the power generating unit in the frequency range (47,5 ÷ 51,5) Hz at a RoCoF of 2 Hz / sec for a 500 ms time window, of 1,5 Hz / s for a 1 s window and 1.25 Hz / s for a 2 s time window, the reduction of active power to the maximum active power produced in the case of a frequency drop below 49.5 Hz and 49 Hz respectively, the capability of providing limited response frequency capacities above the 50 Hz nominal capability, capability of providing limited response to frequency drops below the rated 50 Hz, ability to constantly maintain active power mobilized irrespective of frequency variations, within the power limit provided by the primary source, capability of automatic reconnection of the power generating unit at voltage variations of (0,85 ÷ 1,1) Vn;

   (d) electrical disturbances according to EN 50160 edition in force, communicated by the manufacturer of the builder unit issued by laboratories certified at European level or measured at the point of connection by an economic operator holding an A3 certificate issued by NRA or RSO. The electrical energy measurements shall be completed by measuring ratio, with the data extracted from the Class A quality analyzer;

   (e) response mode to the setpoints of active and reactive power variations.

(8) in the case of equipment used for which a certificate has not been received, information (tests and their results, carried out by approved certification bodies, etc.) shall be provided in accordance with the instructions given by RSO relevant to the technical

requirements applicable in force, specific to power generating units of category D;

(9) the detailed technical data of the power generating unit, according to Tables no. 1D-PGMS and 1D-PPM as well as the technical project to show: the lengths and technical characteristics of the cables and the connection to the RSO substation / cell, the connection of the power generating unit and the auxiliary installations as well as the single line diagram of the substation and the power plant module;

(10) modeling requirements for permanent and dynamic regime system studies, mathematical models of power generating facilities, as follows:

(a) for the calculation of stationary and short-circuit currents are required:

i. the electrical scheme of the power generating unit and the system connection substation;

ii. the length of all LEA or LES between the power generating unit and the system connection substation and the LES in the plant with power generating modules, as appropriate;

iii. electrical parameters specific to all cables and lines: type, R_+ [Ω/km], R_0 [Ω/km], Rm_0 [Ω/km], X_+ [Ω/km], X_0 [Ω/km], Xm_0 [Ω/km], C_+ [μF/km], C_0 [μF/km], S [mm], V_n [kV] etc.

iv. for transformer units of 110 kV / MV: rated winding power, nominal voltages, loose losses, copper losses, short-circuit voltage, idle current, connection unit, voltage setting (type of adjustment, including the number of the nominal plot, the maximum plot number), neutral treatment;

v. data on the reactive power compensation system (e.g. if capacitor batteries are installed: the number of steps, the power installed on each stage) and the indication on the required electrical circuit of the installation location of the compensation system;

vi. data on power generating facilities of category D: the number of power generating modules, the rated active power, the P-Q diagram of each power generating module, the rate of change of the active power;

(b) for calculating the dynamic regime are required:

i. logic operating diagram of the power generating unit;

ii. the mathematical model of the power generating unit and its parameters;

iii. electrical control system: control schemes and parameters for active power control and reactive power control and, where applicable, voltage at terminals or at the connection point;

iv. the mathematical model of the power generating unit and the model of the central level control system in the form of diagrams (including mathematical functions) and the corresponding set of parameters. Alternatively, you can specify assimilation with a generic model from one of the PSSE v32 applications (".dll" will mandatory be provided) or Eurostag v4.5 for which the parameters are provided. If the model includes additional control functions or specific features, these will be mentioned and graphics will be added;

v. Protection against voltage variations: "fault-ride-through - low voltage" (LVRT, ZVRT);

vi. other special functions: "low voltage power logic", participation in frequency control etc;

vii. the dynamic equivalent of the power generating unit;

(11) studies conducted by the power generating unit owner, including model simulations, to demonstrate the steady-state and dynamic performances, including the use of measured factory values during testing at the level of detail required by RSO;

(12) the active power regulation, reactive power diagrams, in detail, at the power generating unit, in order to highlight the way in which:

(a) active power and reactive power setpoints are taken and modified;

(b) the reactive power measure at the power generating unit level is taken;

(13) the network study for calculating the reactive power requirement at the connection point to meet the reactive power requirements at the connection point (0.9 inductive ÷ 0.9 capacitive) across the entire active power range, with zero reactive power exchange with the system when the active power produced is zero. Attach the P-Q diagram of the power generating unit at the connection point (including the contribution of all generating units and auxiliaries) and the V-Q / P_{max};

(14) for the category D of power plants made up of power generating modules, the dynamic regime study of the power plant and the area to determine the measures to avoid its insularity;

(15) the data required for the calculations of protection adjustment, which are sent to the TSO at least one month before the date when the energisation for the beginning of the testing period is requested:

(a) for the power generating unit:

i. complete technical project (primary and secondary electrical circuits);

ii. generators' internal protection for internal and external defects, adjustments and drive times;

iii. the short-circuit contribution on the MV busbar of the connection substation of each power generating unit that is connected by the same cable to the fault types: single-phase, biphasic, biphasic with earth and three-phase;

iv. the electrical characteristics of the installed power generating units and the related transformers, the operating modes, including the values of the short-circuit currents at the transformer-converter assembly terminals, namely:

– synchronous power generating module: manufacturing, type, Sn [MVA], Pn [MW], Vn [kV], In [A], Nn [rot/min], cosφn, Xd, Xq, X0, X'd, X'q, X'0, X"d, X"d [%], $T_{launching}$ [s], excitation (type), V_{excit} [kV], I_{excit} [A], $I_{forcing}$ [A], $T_{forcing}$ [s];

– asynchronous power generating module: manufacturing, type, Sn [MVA], Pn [MW], Vn [kV], In [A], Nn [rot/min], cosφn, Xd, Xq, X0, X'd, X'q, X'0, X"d, X"d [%];

– photovoltaic panel: type, Pn [kW];

– photovoltaic panel inverter: name, type, manufacturing, Sn [VA], Pn [W], Vn [V], Inac [A], cosφn, Pmax [W], Vcc [V], protection to minimum and maximum voltage;

– two-winding transformer: manufacture, type, tank, core, neutral insulation level, connection unit, Sn [MVA], VnI [kV], Vn_J [kV], $Vscc_{IJ}$ [%], $Igol_I$ [%], $Igol_J$ [%], Pagol [kW], Pascc [kW], Vpmax [kV], Vpmin [kV], Vplot [kV], N (transformer ratio), Vsccmax [%], Vsccmin [%], Vsccn [kV], neutral treatment (mode, impedance values, etc);

– three-winding transformer: manufacturing, type, tank, core, connection unit, neutral insulation level, Sn_1 [MVA], Sn_2 [MVA], Sn_3 [MVA], Vn_1 [kV], Vn_2 [kV], Vn_3 [kV], $Vscc_{IM}$, $Vscc_{MJ}$, $Vscc_{IJ}$ [%] (the power to which they are measured is specified), $Pscc_{IM}$, $Pscc_{IJ}$, $Pscc_{MJ}$ [kW], Igol [%], Pgol [kW], Vp_{max} [kV], Vp_{min} [kV], Vplot [kV], $Vsccp_{max}$ [%], $Vsccp_{min}$ [%], $Vsccp_{med}$ [%], neutral treatment (mode, impedance values, etc);

– LEA/LES: type (material), R+ [Ω/km], R0 [Ω/km], Rm0 [Ω/km], X+ [Ω/km], X0 [Ω/km], Xm0 [Ω/km], C+ [μF/km], C0 [μF/km], S [mm], Vn [kV];

v. Electrical characteristics, self-protection with related adjustments and connection / disconnection automation of reactive power compensation elements;

(b) for the RED / RET connection substation:

i. the complete technical project (primary and secondary electrical circuits) for the electrical connection of the power generating unit

ii. the electrical characteristics of the power transformers, the documentation, the software and the settings of their protection terminals;

iii. complete documentation and software for protection terminals of the connection line / lines;

iv. the electrical and geometric characteristics of the FO-OPGW for each line section (electrical resistance specific at 20 ° C [Ω / Km], nominal section [mmp], conductor radius [cm]), if FO-OPGW was mounted at the time of energisation for the beginning of the testing period of the power generating unit;

(c) for the substations adjacent to the connecting substation of the power generating unit:

i. full documentation of the technical design (electrical part - primary and secondary circuits, block diagram of the protections and tripping matrix) if, in order to supply voltage for the sample period of the power generating unit, primary equipment replacements and / or additions to the line protection scheme;

ii. complete documentation and software for the protection terminals to be installed on the 110 kV side in the substations adjacent to the power generating unit;

(16) (a) for power generating units connected to the RET, the main communication path between the power generating unit and the connection point to the EMS-SCADA system of the TSO is made on optical fiber, and a spare path is also provided. Telecommunication projects must be endorsed in the CTES meeting.

(b) for power generating units connected to RED, the primary communication path used for integration into DMS-SCADA is the transmission of settlement data extracted from the settlement counter. Telecommunication projects must be endorsed at the CTES meeting of the RSO;

(17) the technical characteristics of the power quality analyzer to be mounted at the connection point when the power generating unit is connected to a substation belonging to TSO. The analyzer must be Class A certified PSL and be capable of transmitting "SQL", "PQDIF", ".txt" or ".xls" files to the structure required by TSO's electrical quality monitoring system. It integrates into TSO's electricity quality monitoring system. These requirements do not apply to synchronous power generating modules;

(18) the procedure of the equipment supplier for energisation for the beginning of the testing period of the power generating unit;

(19) studies on:

(a) the capability to island operation;

(b) the capability to provide reactive power at the connection point, including compensation of reactive power at the connection point when the active power produced is zero, the V-Q / P_{max} diagram, the P-Q diagram;

(c) coordination of protection, with RSO agreement on the protection schemes at the connection point;

(d) permanent and dynamic performance at the level of detail required by RSO:

i. certificates of conformity for the main equipment (wind turbine, inverter, motor generator, generator, battery) or model simulations for these;

ii. mathematical models and simulation models of the power generating unit made in the software indicated by RSO and TSO and possibly integrated into mathematical models used by DSO and TSO. The list of supported software is submitted to the manager by RSO.

Table no. 1D-PGMS: *Data for synchronous power generating modules of category D*

Description of the data	**Unit of measurement**
Point of connection / delimitation, as appropriate	Text, scheme
The standard environmental conditions for which technical data has been determined	Text
Nominal voltage at the point of connection / delimitation, as appropriate	kV
Maximum short-circuit current value at the connection / delimitation point, as appropriate:	
- Symmetric (three-phase)	kA
- Non-symmetric (biphasic, biphasic with earth, single	kA

phase)	
Minimum short-circuit current value at the connection / delimitation point, as appropriate:	
- Symmetric (three-phase)	kA
- Non-symmetric (biphasic, biphasic with earth, single phase)	kA
Synchronous power generating module:	
Nominal apparent power	MVA
Nominal power factor ($\cos \varphi_n$)	
Net power	MW
The nominal active power produced at the terminals	MW
The maximum active power produced at the terminals	MW
Nominal voltage	kV
Maximum / minimum frequency of operation at nominal parameters	Hz
Consumption of own services at peak power output at terminals	MW
Maximum reactive power at terminals	MVAr
Minimum reactive power at terminals	MVAr
Minimum active power produced	MW
Capability of LVRT fault-ride-through	Diagram
Turbo-generating inertia constant (H) or moment of inertia (GD^2)	MWs/MVA
Rated speed	rpm
Short-circuit ratio	
Rated stator current	A
Diagram of variation of active power produced by deviations from standard environmental conditions	
Internal protection	
Saturated and unsaturated reactances	
Rated reactance [rated voltage^2 / nominal rated power]	Ω
Longitudinal synchronous reactance [% of nominal reactance]	%

Longitudinal transient reactance [% of nominal reactance]	%
Longitudinal supra-transient reactance [% of nominal reactance]	%
Synchronous transverse reactance [% of nominal reactance]	%
Transverse transverse reactance [% of nominal reactance]	%
Transversal over-transient reactance [% of nominal reactance]	%
Stator leakage reactance [% of nominal reactance]	%
Zero sequence reactance [% of nominal reactance]	%
Negative sequence reactance [% of nominal reactance]	%
Potier Reactance * [% of nominal reactance]	%
Time constants	
Transient time constant of the excitation winding with the stator closed (T_d')	s
The over-transient time constant of the damping winding with the stator closed (T_d")	s
Transient time constant of the excitation winding with the open stator (T_{d0}')	s
The over-transient time constant of the damping winding with the open stator ($T_{d0}^{"}$)	s
Transient time constant of the excitation winding with the stator closed, on the q axis ($T_{q0}^{'}$)	s
The over-transient time constant of the damping winding with the open stator, on the q axis ($T_{q0}^{"}$)	s
Diagrams	
Capability diagram	Graphical data
Diagram of variation of technical data according to deviations from standard environmental conditions	
Capability in terms of reactive power:	
Reactive power in inductive mode at maximum active power generated	Generated MVAr

Reactive power in inductive mode at minimum active power generated	Generated MVAr
Reactive short-time inductive power at nominal values for power, voltage and frequency	MVAr
P-Q diagram according to V	Graphical data
Capacitive reactive power at maximum / minimum power generated	MVAr absorbit
Excitation system	
Excitation system type	Text
Nominal Rotor Voltage (Excitation)	V
Maximum Rotor Voltage (the excitation ceiling)	V
The maximum allowable length of the excitation ceiling	s
Excitation adjustment scheme	V/V
Maximum rate of increase of excitation voltage	V/s
Maximum speed to reduce excitation voltage	V/s
Dynamics of over-excitation characteristics	Text
The dynamics of under-excitation characteristics	Text
Excitation limitation	Block diagram
Speed governor (RAV):	
Equivalent, possibly standardized, function of the speed regulator, values and units of measurement	Text
The equivalent transfer function, values and units of measurement, according to the technical design	Text
Closing / opening time of the turbine control valve	s
The response to the frequency drop	diagram
Response to frequency increase	diagram
Setting range for the offset characteristic	%
The value of the offset characteristic s_1	%
Frequency dead band	mHz
Delay time (dead time $-t_1$)	s
Response time (t_2)	s
The insensitivity zone	mHz
Insularity capability	MW

Details of the speed controller presented in the block diagram of the transfer functions associated with the individual elements and related units of measurement	Schema
Block diagram and parameters for the automatic generator-turbine speed controller, (possibly boiler), the thermoelectric and nuclear units.	Text
Automatic Voltage Regulator (AVR):	
Regulator type	Text
The equivalent transfer function, possibly standardized voltage regulator, values and units of measurement	Text
The equivalent transfer function, values and units of measurement, according to the technical project	Text
Protection data:	
Possibility of asynchronous operation without excitation (loss of excitation) - maximum active power and duration	Text
Minimum excitation	Text, diagram
Maximum excitation	Text, diagram
Differential	Text
Protection against asynchronous operation with connected excitation	Text
Setting of the adjustment of:	
The maximum excitation limit	Text, diagram
The minimum excitation limit	Text, diagram
Stator current limiter	Text, diagram
Transformer units:	
Number of windings	Text
The rated power on each winding	MVA
Nominal transformer ratio	kV/kV
Short-circuit voltages per winding pairs	% din V_{nom}
Losses on no load	kW
Load losses	kW
The magnetizing current	%
Connection unit	Text

Adjustment range	kV-kV
Adjustment scheme (longitudinal or long-transverse)	Text, diagram
Size of the adjustment step and number of sockets	%
Under load adjustment	Yes/No
Treating the neutral	Text, diagram
Saturation curve	Diagram

Table no. 1D-PPM: *Data for power plants of category D made up of power generating modules*

Description of the data	**Unit of measurement**
Point of connection / delimitation, as appropriate	Text, diagram
The standard environmental conditions for which technical data has been determined	Text
Rated voltage at the point of connection / delimitation, as appropriate	kV
The value of the short-circuit current at the connection / delimitation point, as the case may be, provided by the power generating module (before the power electronics / after the power electronics equipment) to a fault:	
- Symmetric (three-phase)	kA
-Non-symmetric (biphasic, biphasic with earth, single-phase)	kA
The value of the minimum short-circuit current at the connection / delimitation point, as the case may be, provided by the power generating module (before the power electronics / after the power electronics equipment) to a fault:	
- Symmetric (three-phase)	kA
-Non-symmetric (biphasic, biphasic with earth, single-phase)	kA
Generation mode that is part of the power plant module:	

Nominal apparent power	MVA
Nominal power factor (cos φ_n)	
Net power	MW
The nominal active power produced at the terminals	MW
The maximum active power produced at the terminals	MW
Nominal voltage	kV
Maximum / minimum frequency of operation at nominal parameters	Hz
Consumption of own / internal services at peak power output at terminals	MW
Maximum reactive power at terminals	MVAr
Maximum capacitive reactive power at terminals	MVAr
Capability of LVRT fault-ride-through	Diagram
Short-circuit ratio	
Data for synchronous power generating module connected by wind power / asynchronous electronics that comes into a power plant module	
Type of wind unit (horizontal / vertical axis)	Description
Rotor diameter	m
The height of the rotor shaft	m
The blade control system (pitch/stall)	Text
Speed control system (fixed / two-speed / variable)	Text
Type of power generator	Description
Inverters type certificates accompanied by the results of tests performed by recognized laboratories at European	certificates

level for: variations in frequency, voltage and fault-ride-through	
Type of frequency converter and nominal parameters	
Rate of change of active power	MW/min
Reactive power	kVAr
Nominal current	A
Nominal voltage	V
Cut-in wind speed	m/s
Nominal wind speed (corresponding to nominal power)	m/s
Cut-off wind speed	m/s
Variation of active power generated at wind speed	Table
P-Q diagram	Graphical data
Parameters of power quality for power generating modules that are part of the power plant module	
Continuous flicker coefficient	
Stage flicker for switching operations	
Voltage variation factor	
Maximum number of switching operations at 10 minutes	
Maximum number of switching operations at 2 hours	
At the bus bar	
Total THD_i current distortion factor	
Harmonic (up to harmonic 50)	
Negative sequence unbalance factor	

Data relating to inverters and photovoltaic panels	
Number of photovoltaic panels	Number
Company producing photovoltaic panels	Name
The type of photovoltaic panels	Name
Area of the photovoltaic panel surface	m^2
The rated power of the photovoltaic panel (c.c.)	kW
The maximum power of the photovoltaic panel (c.c.)	kW
The rated electrical current of the photovoltaic panel (c.c.)	A
Rated voltage of photovoltaic panel (c.c.)	V
Internal protection functions	
Data relating to the inverters used by the power plant with photovoltaic power generating modules	
Number of inverters	Number
Type of inverter	Description
Inverters type certificates accompanied by the results of tests performed by recognized laboratories at European level for: variations in frequency, voltage and fault-ride-through	Certificates
Nominal input power (c.c.)	kW
Recommended maximum input power (c.c.)	kW
Input voltage range (c.c.)	V
Maximum input voltage (c.c.)	V
Maximum input current (c.c.)	A
Active nominal output power (c.a.)	kW
Active maximum output power (c.a.)	kW
Reactive nominal output power (c.a.)	kVAr
Nominal output voltage (c.a.)	V, kV
Nominal output current (c.a.)	A
Operating frequency range	Hz
Power factor adjustment range	
Maximum yield	%
Maximum consumption (c.a.)	W

Consumption at night (c.a.)	W
Quality parameters of electric power at the power plant with photovoltaic power generating modules	
Maximum power variation (ΔS / Ssc) per minute	
Maximum value for fast voltage variations	
Total electrical distortion factor	
Harmonic current (up to harmonic 50)	
Total voltage distortion factor	
Voltage harmonics (up to harmonic 50)	
Negative voltage sequence unbalance factor	
Maximum power variation (ΔS / Ssc) per minute	
Capability in terms of reactive power:	
Reactive power in inductive / capacitive mode at maximum active power generated	Generated MVAr
Reactive power in inductive / capacitive mode at minimum active power generated	Generated MVAr
Reactive power in inductive / capacitive mode at zero active power generated	Generated MVAr
P-Q diagram depending on V	Graphical data
Data relating to protection:	
Differential protection	Text
Transformer units:	
Number of windings	Text
The rated power on each winding	MVA
Nominal transformer ratio	kV/kV
Short-circuit voltages per winding pairs	% of V_{nom}
Losses on no load	kW
Load losses	kW
The magnetizing current	%
Connection unit	Text
Adjustment range	kV-kV
Adjustment scheme (longitudinal or long-transverse)	Text, diagram
Size of the adjustment step and number of sockets	%

Under load adjustment	YES/NO
Treating the neutral	Text, diagram
Saturation curve	Diagram

Note: Depending on the needs on operating security of the NPS, the RSO may request additional information from the owner of the power generating facility of category D, from the 1D-PGMS and 1D-PPM tables.

Annex 7

Documentation demonstrating the performance of preceding works of the energisation for the beginning of the testing period for power generating units of category D

The documentation contains:

(1) evidence of an agreement on the protection schemes applicable at the point of connection between the RSO and the power generating unit owner;

(2) the documents attesting the realization of the communication paths with DMS-SCADA (a communication path), if applicable;

(3) the documents attesting the implementation of the EMS-SCADA aggregation and integration solution agreed with TSO, as the case may be. Integration refers at least to the integration of measures P (active power), Q (reactive power), V (voltage) and frequency as well as P, Q, V;

(4) the documents attesting integration into the forecasting system of the TSO;

(5) the program of energisation for the beginning of the testing period of the power generating unit, in the sequence of energisation for the beginning of the testing period of the component power generating modules, as appropriate, and the expected voltage over the probationary period of the power generating unit , up to the ATR approved specific to the specific phase in ATR / staged, for the power generating unit, starting with the startup of the power plant, the connection of the power generating unit. The program is detailed on installed power levels; (if applicable) TSO has the obligation to publish this program on its own website;

(6) the operating agreement between the RSO and the power generating unit owner, the dossier of the installation manual and the minutes that confirm receipt at the completion of the work on the connection installation;

(7) the document proving the existence and mounting of the reactive power compensation means at the connection point, if this is apparent from the reactive power study;

(8) proof of setting up a local central dispatcher or integrating the power generating unit into an existing DLC;

(9) evidence of obtaining an investment order;

(10) evidence of registration in the energy market as a unit tests.

Annex 8

Template of the Technical Certificate of Conformity (model)

Operatorul de rețea relevant[*6]

Ca urmare a solicitării adresate de către **……(solicitant)……..,**
Nr. Reg. Comerțului **……..,** *CUI* **……..,**
solicitare înregistrată cu numărul **….. din data de ……..,**
în baza probelor de verificare și a documentației tehnice depuse la ***Operatorul de rețea relevant***[*6]
se acordă

CERTIFICAT

de conformitate cu cerințele
Normei Tehnice *„Cerințele tehnice de racordare la rețelele electrice de interes public pentru .....*[**]**„**
aprobată prin ORDINUL ANRE nr. XX[***]
pentru unitatea generatoare de categorie ....[*1]
cu P_i = ...[*2] **MW și cu P_{max} = ...**[*3] **MW**

în condiții de valabilitate ……..[*4]

Operatorul de rețea relevant[*6]

DIRECTOR ……
……

Seria: …..[*5] **Nr.: …..** **Data eliberării: ……..**

Certified Legend: empty spaces numbered will be completed as follows:

*1 – B/C/D
*2 – the maximum active power approved in ATR [MW]

*3 – maximum operating power [MW]

*4 – temporary (up to date ..../...../.....) or definitive

*5 – PGMS – synchronous power generating module
PGM – power generating module
PPM – power plant made up of power generating modules
PPMO – power plant made up of offshore power generating modules

hydro (H)/thermo (T)/aeolian (E)/photovoltaic (F)/nuclear (N)/biomass (B)/cogeneration (CC)

*6 - for power generating units of category D, the relevant system operator shall be replaced by TSO

** - synchronous power generating modules/power generating modules, power plant made up of power generating modules and offshore power generating modules XX *** - 72 / 02.08.2017, as amended and supplemented or 208 / 14.12.2018, as the case may be

Annex 9

Template of the Technical Certificate of Conformity – Duplicate (model)

Operatorul de rețea relevant[*6]

Ca urmare a solicitării adresate de către **……(solicitant)……..,**
Nr. Reg. Comerțului **……..,** *CUI* **……..,**
solicitare înregistrată cu numărul **…..** *din data de* **……..,**
în baza probelor de verificare și a documentației tehnice depuse la ***Operatorul de rețea relevant***[*6]
se acordă

CERTIFICAT

DUPLICAT

de conformitate cu cerințele
Normei Tehnice *„Cerințele tehnice de racordare la rețelele electrice de interes public pentru .....*[**]**„**
aprobată prin ORDINUL ANRE nr. XX[***]
pentru unitatea generatoare de categorie ....[*1]
cu P_i = ...[*2] **MW și cu P_{max} = ...**[*3] **MW**

în condiții de valabilitate ……..[*4]

Operatorul de rețea relevant[*6]

DIRECTOR …….
……

Seria: …..[*5] **Nr.: …..** **Data eliberării: …..**

Duplicate certificate legend: empty spaces numbered will be completed as follows:

*1 – B/C/D
*2 – the maximum active power approved in ATR [MW]

*3 – maximum operating power [MW]

*4 – temporary (up to date ..../...../.....) or definitive

*5 – PGMS – synchronous power generating module

PGM – power generating module

PPM – power plant made up of power generating modules

PPMO – power plant made up of offshore power generating modules

hydro (H)/thermo (T)/aeolian (E)/photovoltaic (F)/nuclear (N)/biomass (B)/cogeneration (CC)

*6 - for power generating units of category D, the relevant system operator shall be replaced by TSO

** - synchronous power generating modules/power generating modules, power plant made up of power generating modules and offshore power generating modules XX *** - 72 / 02.08.2017, as amended and supplemented or 208 / 14.12.2018, as the case may be

Annex 10

Table no. 10.1 PGMS and PPM performance test requirements through tests and documents

Test type		Category **A**	Category **B**	Category **C**	Category **D**
Response to frequency variations	f > 50,2 Hz (LFSM-O)	Certificate	Certificate	Certificate/ model simulations **Tests:** - on phasing - PGMS – on loop adjustment P	Certificate/ model simulations **Tests:** - on phasing - PGMS – on loop adjustment P
	f < 49,8 Hz (LFSM-U)	-	-	Certificate/ model simulations **Tests:** - on phasing - PGMS – on loop adjustment P	Certificate/ model simulations **Tests:** - on phasing - PGMS – on loop adjustment P
	f ∈ (49,8÷50,2) Hz (LFSM)	-	-	**Tests:** - on loop adjustment P	**Tests:** - on loop adjustment P
Frequency range operation (47,5÷51,5) Hz		Certificate	Certificate/ model simulations	Certificate/ model simulations	Certificate/ model simulations

				Tests: - at the loop adjustment level P for PPM; - idle up for PGMS.	**Tests:** - at the loop adjustment level P for PPM; - idle up for PGMS.
ROCOF	2 Hz/s – 500 ms window time	Certificate	Certificate/ model simulations	Certificate/ model simulations	Certificate/ model simulations
	1,5 Hz/s - 1 s window time	Certificate	Certificate/ model simulations	Certificate/ model simulations	Certificate/ model simulations
	1,25 Hz/s - 2 s window time	Certificate	Certificate/ model simulations	Certificate/ model simulations	Certificate/ model simulations
The response to the variation of the active power setpoint		-	Certificate/**Tests**	**Tests**	**Tests**
Reconnection after a disconnection on the frequency deviation criterion		-	**Tests**	Certificate/ model simulations **Tests:** - for PPM in the test to the response of the frequency variation	Certificate/ model simulations **Tests:** - for PPM in the test to the response of the frequency variation
Automatic reconnection		Certificate	Certificate	Certificate	Certificate

when frequency and voltage returns	**Tests:** - after disconnection through protection	**Tests:** - after disconnection through protection	**Tests:** - for PPM, after disconnection through protections	**Tests:** - for PPM, after disconnection through protections
LVRT (FRT)	Certificate	Certificate	Certificate and Model simulation	Certificate and Model simulation
Providing the synthetic inertia	-	-	Model simulation	Model simulation
Starting without power supply from the system	-	-	Tests: Model simulation	Tests: Model simulation
Insulated operation	-	-	Tests: Model simulation	Tests: Model simulation
Houseload operation	-	-	Tests	Tests
Damping power oscillations	-	-	-	Model simulation and tests
Producing reactive power	-	Tests: Model simulation	Tests: Model simulation	Tests: Model simulation
Reactive power adjustment	-	-	Tests	Tests
Power factor adjustment	-	-	Tests	Tests
Voltage adjustment	-	-	Tests	Tests
Data exchange between the power generating unit and the EMS /	-	Tests	Tests	Tests

DMS-SCADA				
The quality of the electricity at the connection / delimitation point as appropriate	-	Tests	Tests	Tests

ANNEX 11

Table no. 11.1 Synthesis of the notification process

	Category A	Category B	Category C	Category D
PGMD/ID shall be submitter to:	RSO	RSO	RSO	RSO and TSO
Deployment time of PGMD/ID before energisation for the beginning of the testing period	1 month	3 months	3 months	6 months
CDC is issued by	-	RSO	RSO	OTS
Testing and verification	-	Economic operator holding A3 certificate RSO	Economic operator holding A3 certificate Participates in RSO and validates TSO	Economic operator holding A3 certificate OTS
Situation of request for connection of	RSO transmits to TSO	RSO transmits to TSO	RSO transmits to TSO	-

power generating units and connected power generating units	semesterly	semesterly	semesterly	
Situation of sample power generating units (ION Status) and CDC / CDCT Issued / Revoked	-	RSO sends to the TSO quarterly	RSO sends to the TSO quarterly	-
Situation of the withdrawal from exploitation	RSO transmits to TSO semesterly, cumulative	RSO transmits to TSO semesterly, cumulative	RSO transmits to TSO semesterly, cumulative	-
Accepting energisation for the beginning of the testing period	RSO	RSO	RSO with the acceptance of OTS	RSO with the acceptance of OTS
Restoration of the tests	-	RSO	RSO	OTS
Integration in DMS-SCADA	It is not mandatory, but if necessary it will be specified	x	x	As appropriate
Integration in EMS-SCADA	-	-	Through DLC/DMS-SCADA	Individually (and setpoints: P_c, Q_c, U_c, procedure)
DLC	-	-	x	x

ANNEX 12

General requirements for performing model simulations

1. Simulation of the performance of individual power generating units in a power plant module shall be performed to demonstrate that the requirements of technical regulations applicable in force.

2. RSO has the right to:

   (a) allow the power plant module owner to carry out a series of alternative simulations to demonstrate, in a manner accepted by the RSO, that a power generating unit complies with the requirements of the technical rules applicable in force;

   (b) require the power plant module owner to perform additional or alternative simulations if the information provided to RSO with regard to simulation of compliance under Article 122, Article 132 (2), Article 133 , Article 134, Article 135, Article 140 (2), (3), Article 141, Article 146 and Article 152 are not sufficient to demonstrate compliance with the requirements of technical regulations applicable in force.

3. The power plant module owner shall provide a report with the results of the simulations. The power plant module owner will design and provide the simulation model, in the format requested by the RSO, validated for each power generating unit.

4. RSO has the right to verify that the power generating unit complies with the technical regulations applicable in force by performing its own compliance simulations on the basis of the simulation reports provided, the models used in the simulation and the conformity test measurements.

5. The RSO shall provide the power plant module owner with the technical data and the network simulation model, to the extent necessary to perform the necessary simulations in accordance with Article 122, Article 132 (2), Art. 133, Article 134, Article 135, Article 140 (2), (3), Article 141, Article 146 and Article 152.

Table no. 12.1 Types of tests and simulations carried out by category of power generating units

	Testing				**Model simulation and / or certificates**			
Requirements	**B**	**C**	**D**	PPMO	**B**	**C**	**D**	PPMO
Active	-	PGMS,	PGMS,	x	PGMS,	PGMS,	PGMS,	x

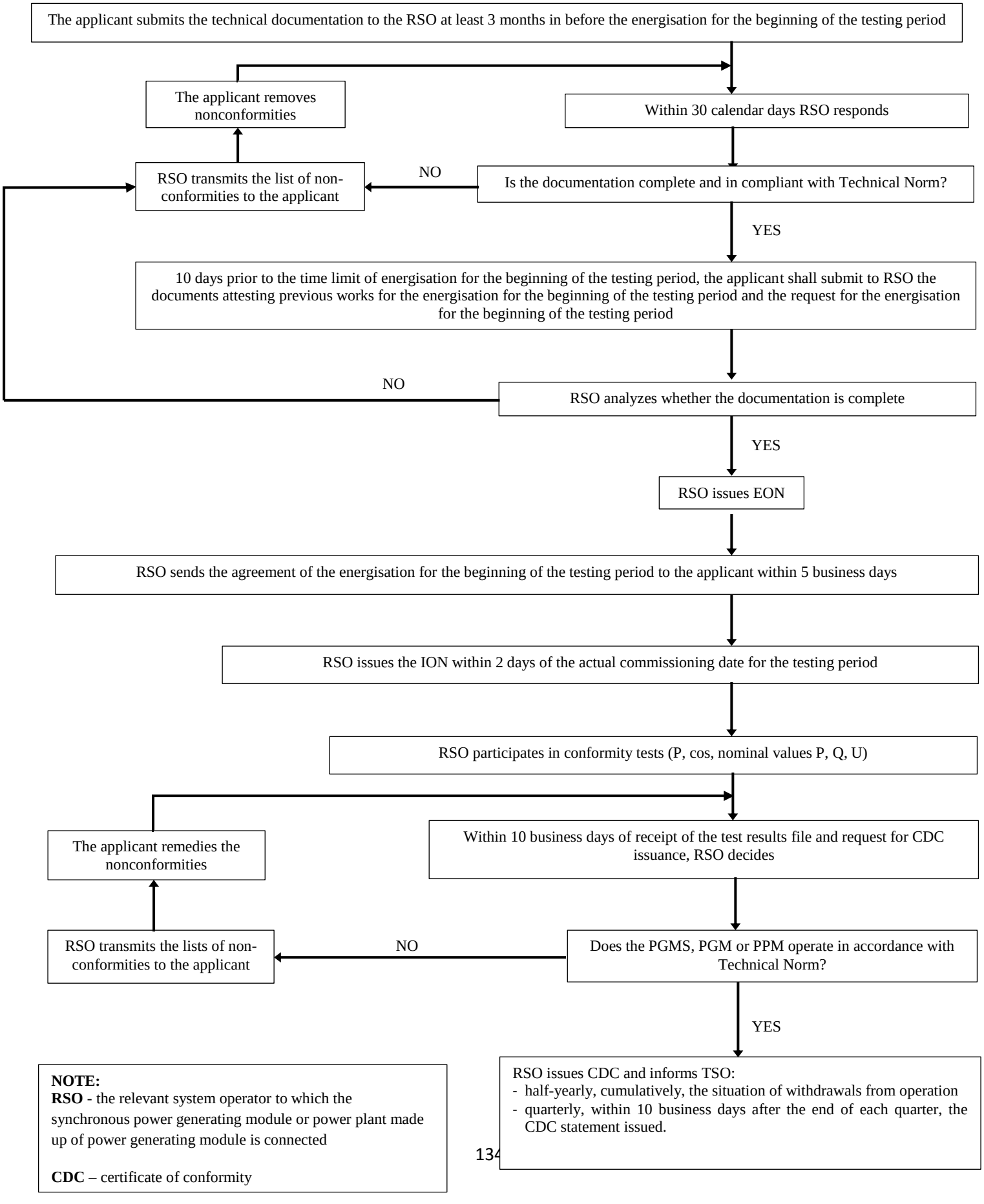
frequency control – Limited to frequency-increasing (LFSM-O)		PPM	PPM		PPM	PPM	PPM	
Active frequency control – Limited to frequency-decreasing (LFSM-O)	-	PGMS, PPM	PGMS, PPM	x	-	PGMS, PPM	PGMS, PPM	x
Active frequency control – Frequency deviation response (LFSM)	-	PGMS, PPM	PGMS, PPM	x	-	PGMS, PPM	PGMS, PPM	x
Active power adjustment	PPM	PGMS, PPM	PGMS, PPM	x	-	-	-	-
Startup capability without power supply in the system	-	PGMS	PGMS	x	-	PGMS	PGMS	x
Isolated operation on own services	-	PGMS	PGMS	x	-	PGMS	PGMS	x

Capability of producing reactive power (P-Q diagram)	-	PGMS, PPM	PGMS, PPM	x	PGMS, PPM	PGMS, PPM	PGMS, PPM	x
Voltage adjustment	-	PGMS, PPM	PGMS, PPM	x	-	PGMS, PPM	PGMS, PPM	x
Reactive power adjustment	PPM	PPM	PPM	x	-	PGMS, PPM	PGMS, PPM	x
Power factor adjustment	-	PPM	PPM	x	-	PGMS, PPM	PGMS, PPM	x
Island operation	-	-	PGMS- in the NES restoration tests	-	-	PGMS, PPM	PGMS, PPM	x
Fault-ride-through function	-	-	-	-	PGMS, PPM	PGMS, PPM	PGMS, PPM	-
The return of active power after the fault has been eliminated to the value before fault	-	-	-	-	PGMS, PPM	PGMS, PPM	PGMS, PPM	x
Damping power oscillations	-	-	PGMS- in the tests PSS	-	-	PGMS PPM	PGMS PPM	x
Reactive Current Injection during LVRT, FRT	-	-	-	-	PPM	PPM	PPM	x

Capability of providing synthetic inertia	-	-	-	-	-	PPM	PPM	x

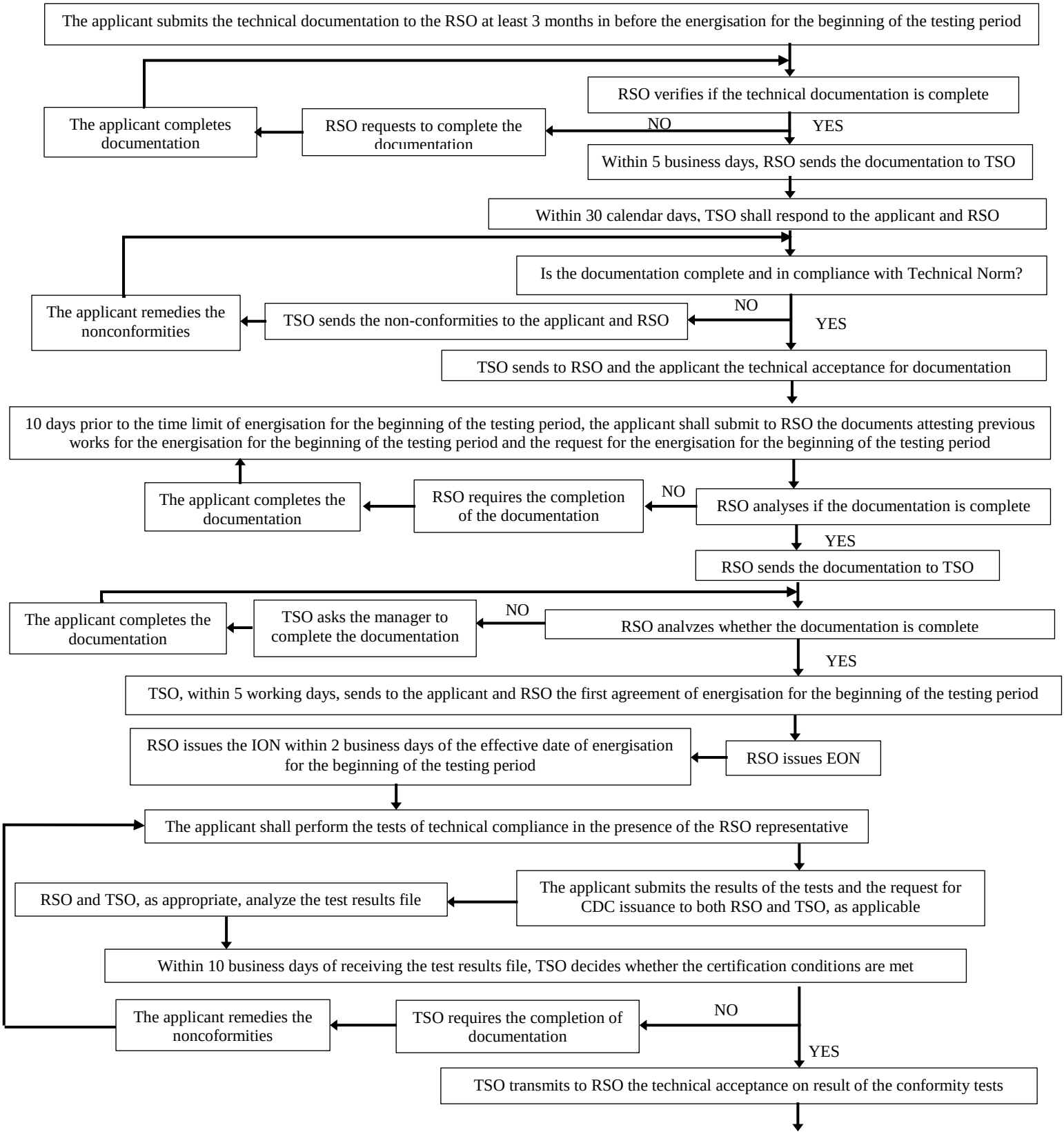
Annex 13

The logical schema of the EON, ION and FON emission process for PGMS and PGM, including PPM and PPMO, of category B



Annex 14

The logical schema of the EON, ION and FON emission process for PGMS and PGM, including PPM and PPMO, of category C



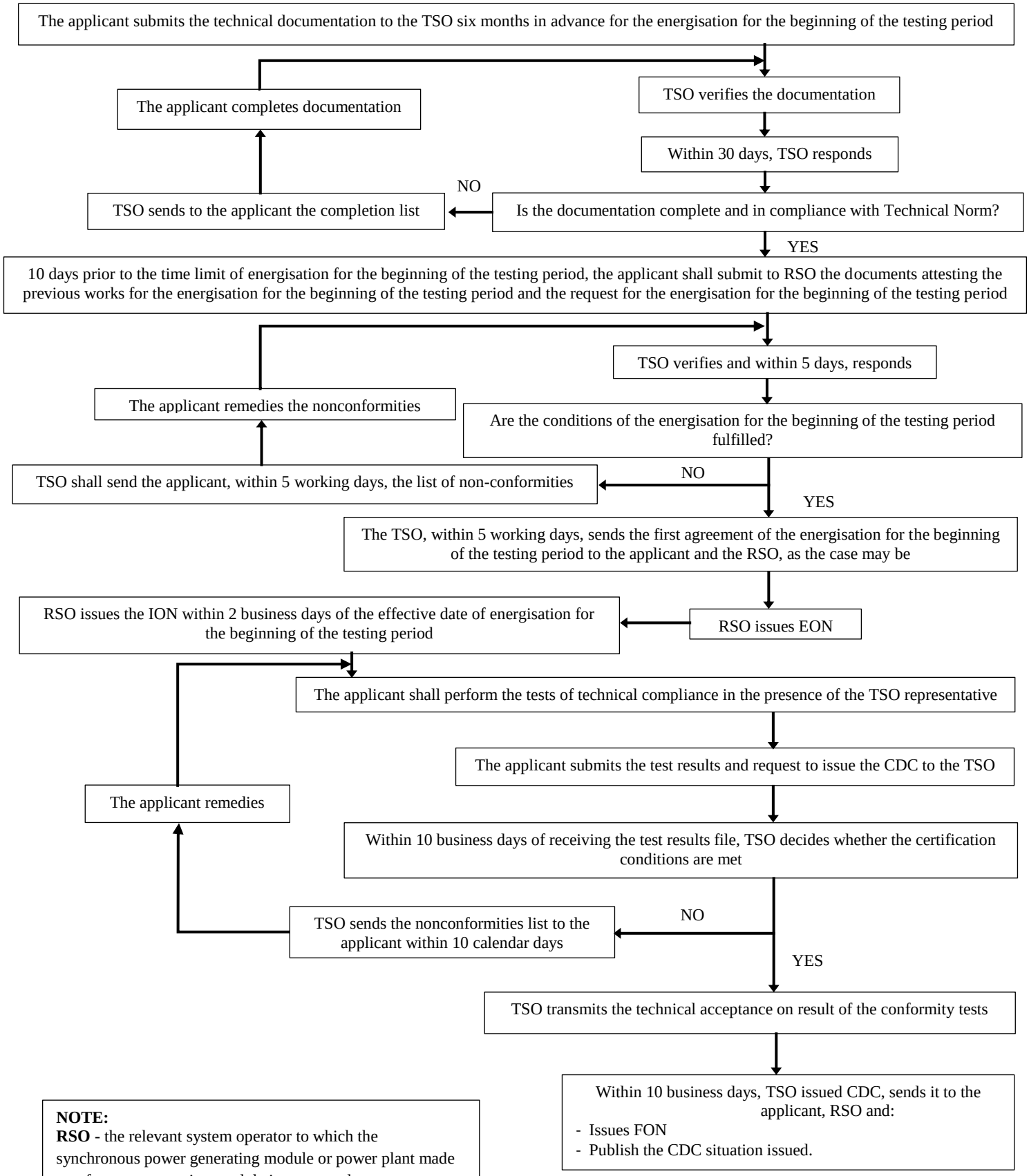
NOTE:
RSO - the relevant system operator to which the synchronous power generating module or power plant made up of power generating module is connected

CDC – certificate of conformity

Within 10 business days, RSO issued CDC, sends it to the applicant and:
- Issues FON;
- send quarterly, within 10 business days of the end of each quarter, to TSO, the CDC situation
- submits to the TSO, on a cumulative basis, the status of the withdrawals.

Annex 15

The logical schema of the EON, ION and FON emission process for PGMS and PGM, including PPM and PPMO, of category D



NOTE:
RSO - the relevant system operator to which the synchronous power generating module or power plant made up of power generating module is connected

CDC – certificate of conformity

Annex 16

Pattern of request for issuing the acceptance of the energisation for the beginning of the testing period

HEADER
Towards,
.....*

Trading company (company name, address, registration number, legal representative, telephone, fax, e-mail) .... registered at the Trade Register from ..... with the number ....., requires the energisation for the beginning of the testing period of the power generating unit .... of category ..... ** under his / her management.

In support of this request, the documents stipulated in the *Notification Procedure for connection of generating units and verification of conformity of generating units with the technical requirements for connection of generating units to the public electricity networks approved by* the Order of the President of the National Energy Regulatory Authority no. _____ corresponding to the category to which the power generating unit belongs.

Director / Legal Representative

Date:_____

* - Distribution System Operator
- C.N.T.E.E. Transelectrica S.A., for power generating units of category D and for power generating units of category B, respectively, C if they are connected to the C.N.T.E.E. Transelectrica S.A. installations.

** A/B/C/D

Annex 17

Pattern of request for issuing the certificate of conformity

HEADER
Towards,
.....*

Trading company (company name, address, registration number, legal representative, telephone, fax, e-mail) .... registered with the Trade Registry Office in ..... with the number ...., requires certification of compliance with the technical connection requirements for the power generating unit .... of category ..... **, under his / her management.

In support of this request, the documents stipulated in the *Notification Procedure for connection of generating units and verification of conformity of generating units with the technical requirements for connection of generating units to the public electricity networks* approved by the Order of the President of the National Energy Regulatory Authority no._____.

Director / Legal Representative

Date:_____

* - Distribution System Operator
- C.N.T.E.E. Transelectrica S.A., for power generating units of category D and for power generating units of category B, respectively, C if they are connected to the C.N.T.E.E. Transelectrica S.A. installations.

** B/C/D