

## CHAPTER 3

### MANAGEMENT, OPERATION AND MAINTENANCE OF THE GRID

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## **CHAPTER 3 -        MANAGEMENT,        OPERATION        AND MAINTENANCE OF THE GRID**

### **3.1        SUBJECT**

- 3.1.1        This chapter describes the methods which the **Operator** follows in order to:
- (a)    carry out the management of the **NTG**;
  - (b)    carry out **operations** and **maintenance** of the part of the **NTG** for which it is responsible;
  - (c)    define the procedures for communicating any **emergency conditions**;
  - (d)    adopt and update the procedures for the interoperability of the **NTG** with **grids with third party access** and with **other electricity grids**;
  - (e)    adopt and update the technical rules for interconnection of the **NTG** with **other electricity grids**;
  - (f)    carry out the activities required by the procedures related to the scheduled unavailability plans for single elements of the **NTG** and of the parts of the **User's** plant which are of importance to the **NTG**;
  - (g)    verify the compatibility of the unavailability plans of the **power generation plants** with the secure operation of the electricity system, taking into account the unavailability plans of elements of the **NTG**.

### **3.2        SCOPE OF APPLICATION**

3.2.1 The provisions in this chapter apply to the following parties, according to their individual areas of responsibility:

- (a) **Owners of parts of the NTG;**
- (b) **Users of the grid;**
- (c) **Grid users** who are operators of the power stations not included in the NTG but which are important to the **NTG**.

### **3.3 MANAGEMENT AND OPERATIONS ACTIVITIES**

3.3.1 As part of its **grid management** activities the **Operator** carries out activities and procedures related to the scheduling and control of energy flows, interconnection devices and necessary auxiliary services, which determine the operation and the expected operation under every **operating** condition of the **NTG**.

3.3.2 The **Operator** carries out the activities for the **unified management of the NTG** in compliance with the policies defined by the **MSE** (Ministry for Economic Development) as required by Legislative Decree no. 79/1999, and in compliance with the principles set out in the **Concession**, and according to the conditions defined by the **Authority** as required by article 3, paragraphs 3 and 6 of Legislative Decree no. 79/1999. Similarly, this Grid code establishes the criteria for the management of the parts of the **power stations** which are not included in the **NTG** but which are of importance to the **NTG**.

3.3.3 The **Operator** defines the grid schemes to adopt in the different operating conditions of the electricity system and carries out the necessary activities for operating the plants it owns.

- 3.3.4 The **Operator** defines the state of operation of the plants, within the performance limits of the same plants by means of identifying transfer constraints, input constraints and withdrawal constraints related to the **NTG**, with reference also to unavailability plans.
- 3.3.5 The **Operator**, with respect to electricity **transmission activities**, is responsible for the **operation** and **maintenance** of the grid which it owns.
- 3.3.6 **Operation** of the **NTG** is the methodical use, according to codified procedures, of the power plants and accessories that constitute the parts of the electricity grid making up the **NTG** for the purposes of management of the **NTG**.
- 3.3.7 **Operation** of the **NTG**, with reference to the different operating conditions of the **national electricity system**, is carried out by the **Operator** in order to guarantee the security and affordability of the electricity service according to principles of transparency and non/discrimination.
- 3.3.8 **Operation** of the plants involves running the plants and continuously **monitoring** their conditions, carrying out control measures and the emergency service. Control is carried out by the **Operator**, remotely, by means of a remote control system, or manually, by means of supervising the plants.
- 3.3.9 The **Operator** of the grid will carry out the emergency service, following anomalies or **faults**, for safely managing the grid and restoring the plants.
- 3.3.10 The **Operator** carries out inspection and periodic monitoring of the plants in order to safeguard their functionality, also by carrying out the required **maintenance** activities.
- 3.3.11 The **Operator**:

- (a) carries out the calibration of the protection devices and the automatic systems related to the operation of the **significant grid**, as well as the devices envisaged in the **Defence plan**;
- (b) verifies the operation of the protection devices, of the automatic systems for the **NTG** and of the devices envisaged in the **Defence plan**.

3.3.12 The **Operator** briefly communicates to the **Owners of the NTG** and to the **Grid users** who are operators of the power stations not included in the **NTG** but which are important to the grid and to the operation of the plants of the grid, the orders required for operating the plants. For these plant parts, as regulated by the **Technical regulations for connection**, the following must be ensured by the **Owners of the NTG** and by the abovementioned **Grid users**:

- (a) the ability to remote monitor the plant by means of telemetering and remote indications;
- (b) the efficiency of the operating and switching devices, automatic systems, interlocking systems and **protection systems**;
- (c) the **operation** and management of the plant, without interruption and with adequate execution times;
- (d) emergency measures and safety in managing the plant;
- (e) the transmission of information to the office of the **Operator** for tracing the time series of demand, for resuming the service or for reconstructing service inefficiencies.

3.3.13 The **Owners of the NTG** and the **Grid users** who are operators of the power stations not included in the **NTG** but which are important to the grid, carry out:

- (a) manually or by means of remote transmission, the control orders assigned by the **Operator**;
- (b) the control measures deriving from autonomous delivery;
- (c) the control measures in **emergency conditions**, necessary for the physical safety of personnel and plants.

- 3.3.14 The **Owners of the NTG** and the **Grid users** who are operators of the power stations not included in the **NTG** but which are important to the grid may refuse to execute the orders only in the case where the orders may result in danger to the physical safety of personnel or objects; in the case where the order is not executed, they immediately inform the **Operator** of the cause which prevented the execution of the orders.
- 3.3.15 The instructions for the control orders to be carried out, assigned by the **Operator**, are recorded in the control systems of the **Operator**, of the **Owners of the NTG** and of the **Grid users** (if the latter has control systems available), together with the record of performance of the orders.
- 3.3.16 The **Grid Operator**, for the purposes of management and operation of the part of the **NTG** which it does not own, enters agreements with the parties having ownership or availability of these grids to organize the **operation** and activity for **maintenance** and **development** of these grids and of the devices interconnecting with other grids. This agreement is based on **Standard Agreements**.
- 3.3.17 The **Operator** enters a contract for the **operation**, management, **development** and **maintenance** of the power stations not included in the **NTG** but which are important to the **NTG**, with the owning parties of these **power stations**. This contract is agreed upon on the basis of a **service contract**.

3.3.18 The parties mentioned in paragraph 3.3.13 are responsible for the **operation** of the plants which they own, implementing the decisions taken by the **Operator**.

3.3.19 **Grid Users** who are owners of production plants, for the purposes of managing and operating the **NTG**, must:

- (a) as **Connection Users**, supply the **Operator** with information on their own plants related to the interoperability of these plants with the electricity grid, according to the conditions in Chapter 1, paragraph 1B.4.14 of this Grid Code. The connection documentation also indicates the possible specific conditions for the management and operation of plants which may arise from needs relating to the operation of the **NTG**;

and

- (b) as **Dispatching Users**, provide the necessary information for managing the supply process of resources for dispatching activity, and also for regulating the physical execution of electricity sale contracts; this is achieved through the valuation and regulation of the energy that has been used differently from the contract commitments undertaken. This information must be communicated in the cases specified, and according to the conditions described in Chapter 4, paragraph 4.3 of this Grid Code.

### **3.4 OPERATING CONDITIONS OF THE NATIONAL ELECTRICITY SYSTEM**

3.4.1 The operating conditions of the **national electricity system**, identified by the **Operator**, are as follows:

- (a) **normal or normal-safe conditions**;

- (b) **alert or normal-unsafe conditions;**
- (c) **emergency;**
- (d) **interruption;**
- (e) **reinstatement of electricity service.**

These operating conditions are described in [Chapter 10](#) of this Grid code.

#### 3.4.2

In order to analyze the performance of the **national electricity system** and identify the operating conditions in paragraph [3.4.1](#), the **Operator**, by means of the real-time control system, monitors the electricity system, acquiring telemetering and remote indications from **devices for measuring** and transmitting the extent of electrical characteristics (voltage, frequency, active and reactive power, state of command devices). These devices are installed at the plants by the **Owners of the NTG** and by the **Users**, on the basis of indications from the **Operator**.

The communications relating to the operation of the electricity system under **emergency conditions** are supplied according to the methods below.

(a) Previous day

The **Operator** evaluates on a daily basis the expected operating conditions of the electricity system for the following day. If there are indications of possible **emergency conditions**, the **Operator** notifies the affected parties of the expected situation, communicating this information via fax. If it is deemed necessary to implement the **Emergency plan for the security of the electricity system (PESSE)** the next day, the communication for this is forwarded according to the instructions in the **PESSE** itself.

(b) Current day



After checking the operating conditions of the electricity system in real time, the **Operator** sends a fax to confirm (or not) the situation under **emergency conditions**, which was forecasted the previous day, to the affected parties. In the case of transition to **emergency conditions** following events occurring in real time, the **Operator** sends a fax to notify the affected parties of the control orders to be adopted. Resorting to the **PESSE** will be communicated according to the instructions in the **PESSE** itself.

### **3.5 INTEROPERABILITY BETWEEN ELECTRICITY GRIDS**

3.5.1 Coordinated management of the **NTG** with **grids with third party access** and with **other electricity grids** is carried out by means of the adoption of criteria and procedures which guarantee the operating security of the **national electricity system** with an adequate level of interoperability between the grids. These procedures:

- (a) are adopted by the **Operator**, in consultation with **operators of grids with third party access** and **other electricity grids**;
- (b) give instructions for the coordination of management, operations and **maintenance** of grids other than the **NTG**.

The criteria followed when defining the procedures establish the following:

- (a) reciprocal responsibility for control and protection of the **significant grid**;
- (b) action to be carried out for securely managing the **significant grid**;

- (c) action to be carried out for the reinstatement of security from the **emergency conditions** (measures on the underload regulators of the HV/MV transformers or **EHV/MV, ECS, PESSE**);
- (d) action to be carried out in the case of outages;
- (e) methods for interfacing with external bodies and authorities, with special attention to the procedure for excluding power lines for extinguishing fires.

3.5.2 Based on these criteria, the **Operator** has adopted the following procedures that are attached to the Grid Code, enclosed in Appendix A of this chapter:

- A.4 “Criteri generali di protezione delle reti a tensione uguale o superiore a 120 kV” (*General criteria for the protection of grids with voltage greater than or equal to 120 kV*);
- A.9 “Piano di Difesa del sistema elettrico” (*Defence plan of the electricity system*);
- A.10 “Piano di Riaccensione del sistema elettrico nazionale” (*Power restoration plan for the national electricity system*);
- A.11 “Criteri generali per la taratura delle protezioni della rete a tensione uguale o superiore a 120 kV” (*General criteria for the calibration of protection devices of grids with voltage greater than or equal to 120 kV*);
- A.12 “Criteri di taratura dei relè di frequenza del sistema elettrico” (*Criteria for the calibration of frequency relays of the electricity system*);
- A.14 “Partecipazione alla regolazione di tensione” (*Participation in voltage regulation*);

- A.20 “Piano di Emergenza per la Sicurezza del Sistema Elettrico (PESSE)” (*Emergency Plan for the Security of the Electricity System (PESSE)*).
- A.21 “Disattivazione di linee aeree a 380-220-150-132-70-60-50 kV in occasione di incendi boschivi o di situazioni di pericolo” (*Disconnection of 380-220-150-132-70-60-50 kV overhead power lines in the case of forest fires or dangerous situations*);

3.5.3. The operator of each **grid with third party access** other than the **NTG** is required:

- (a) to carry out, together with the **Operator**, analyses of the performance of the **protection devices** and grid events, with the objective of diagnosing their exact sequence and the performance of the protection systems on the **significant grid**;
- (b) to supply the **Operator** with all information on the plants, including plants internal to the grid, which are important to the interoperability of electricity grids. In particular, **operators of grids with third-party access** are required to send, to the **Operator**, information relating to changes in their plants in order that the **Operator** may update the schemes of the national transmission grid and of the directly or indirectly connected grids.

## 3.6 **INTERCONNECTIONS WITH OTHER ELECTRICITY GRIDS**

3.6.1 Each element interconnecting the **NTG** with **other electricity grids** is managed in compliance with the technical regulations for connection or operation regulations, as applicable. These technical regulations establish the method of operations of the elements interconnecting the **NTG** and the **other electricity grids**, in every operating condition, and controls relations

between the affected parties by specifying their respective responsibilities. The **Operator** adopts and updates the technical regulations for interconnection, in consultation with the operators of these grids.

- 3.6.2 The technical regulations for interconnection of the **NTG** with foreign electricity grids are formulated taking into account the regulations and recommendations adopted by the **UCTE** and, where applicable, by the **ETSO**.

## **3.7 SCHEDULING AND MANAGING UNAVAILABILITY**

### **3.7.1 Unavailability plan**

This paragraph defines the procedures for scheduling and managing the **unavailability** of elements of the **NTG**, of **grids with third party access**, of the parts of the system which are important to the operation of the **NTG**, and of the **power generation plants**.

Within this context, the **Operator**:

- (a) prepares the unavailability plans for the grid it is responsible for;
- (b) coordinates the unavailability plans of the **Users** with its own plans and with those of the other **Owners of the NTG**, according to the criteria of service security, reliability and efficiency, of maintaining a secure electricity supply and of keeping the costs associated with the electricity system low. In carrying out this activity the **Operator** takes into account the **development** measures on the grid which have already been decided and which involve **unavailability** of the components of part of the grid;

- (c) coordinates the unavailability plans of the **operators of grids with third party access** different from the **NTG**, with regard to grid elements belonging to the **significant grid**. If the unavailability plans proposed by the operators are not compatible with the secure operation of the electricity system, the **Operator** will modify the plans as necessary;
- (d) coordinates the unavailability plans of the **power generation plants** with power greater than 10 MVA, and of non significant plants that are important for the secure operation of the electricity system, in order to ensure adequate levels of service reliability, efficiency, security, affordability and continuity. If the unavailability plans proposed by the **Dispatching Users** are not compatible with the electricity system's operational security, the **Operator** will modify the plans as necessary;
- (e) records the unavailability data of the elements of the **NTG**, in order to evaluate its availability on an annual basis.
- (f) sets the Production Unit limits caused by the **unavailability** of the **NTG** elements, and communicates them to the relevant **Dispatching Users**. Updates the transfer constraint values between market areas pursuant to Article 53 of Attachment A of AEEG resolution no.111/06 if they have been modified due to the **unavailability** of the **NTG** elements.

### **3.7.2      Phases of the Unavailability Planning Procedure**

- 3.7.2.1      Below the procedures are described that are adopted by the **Operator** regarding the scheduling of **unavailability** of the NTG elements, of grid with third party access and of power generation plants.
- 3.7.2.2      The planning level with which **unavailability** is requested defines the **unavailability** type.

- a. **planned** unavailability: **unavailability**, planned at least seven calendar days before its implementation;

Planned **unavailability** may in turn be divided into:

- i. **Annual: unavailability** requested in year Y for year Y+1 (as described in section 3.7.2.3).
  - ii. **On Demand: unavailability** requested in week N starting in the period from week N+3 to the end of the year (as described in section 3.7.2.4).
  - iii. **Occasional: unavailability** requested in week N starting in week N+1 and N+2 (as described in section 3.7.2.5).
- b. **non-postponable unavailability.**

In addition to the specifications of the following sections, the publication of data and information regarding the various types of unavailability, including non-postponable, takes place in compliance with the provisions of the EU Regulation 543/2013. Specifically, as regards the timing and methods indicated in articles 10 and 15 of the aforesaid Regulation, on the Entsoe Transparency platform, Terna publishes information relative to:

- unavailability of the interconnections and of the transmission grid reducing interzonal capacity between the supply zones of 100 MW or more and the relative estimated impact on such capacity;
- unavailability of 100 MW or more of production units;
- unavailability of plants with a capacity of 200 MW or more.

### 3.7.2.3 *Annual unavailability plan*

By July 30<sup>th</sup> of each year, **NTG Owners, operators of grids with third party access** other than the **NTG**, and **Dispatching Users** send the **Operator** the **requests for unavailability** for the following year. Requests must include at least the following information:

- (i) identification of the grid element affected by the **unavailability** and of its related **maintenance** component;

- (ii) indication of the work involved;
- (iii) possible start and end dates of the **unavailability** period and any relative flexibility period;
- (iv) maximum time required for reinstatement of the element's availability;
- (v) any interdependencies between the **unavailability** of elements of this part of the grid;
- (vi) any interdependencies with the **unavailability** of elements of parts of the grid belonging to other **Owners of parts of the NTG** or of users connected to the part of the grid.
- (vii) for **power generation plants** only, the maximum Production Unit power under standard conditions as modified due to the unavailability. with the possible indication of details of the production groups belonging to the Production Unit in question which will be unavailable in the period indicated.

**NTG Owners, operators of grids with third party access** other than the **NTG**, and **Dispatching Users** must:

- submit requests for **unavailability** to the **Operator** as per the method and timeframe indicated in this chapter;
- implement all the necessary measures and actions to ensure that the timeframe set out in the application is respected.

By September 14<sup>th</sup> of each year, the Operator evaluates the requests submitted and adopts the **temporary annual deliberation of unavailability**. By November 10<sup>th</sup> of each year, the **NTG Owners, operators of grids with**

**third party access** other than the **NTG**, as well as **Dispatching Users**, request any changes or additions to the **temporary annual plan**.

By November 30<sup>th</sup> of each year, the **Operator** adopts the final annual deliberation of unavailability and then publishes the **annual unavailability plan** on the Terna website.

The **Operator** may make changes to the **annual plan** of the year in progress in compliance with the conditions set forth in sections 3.7.2.4 and 3.7.2.5. below.

#### 3.7.2.4 *On-demand planning of **unavailability***

**NTG Owners, operators of grids with third party access** other than **NTG**, as well as **Dispatching Users** send, on a weekly basis, every Tuesday by 12:00 pm (Tuesday of week N) the new requests for “on-demand” **unavailability**, which begin in the period between week N+3 and the end of the year.

Together with the new requests, it is also possible to send requests for changes to “on-demand” **unavailability**, which have already been authorized, and which begin in the period from week N+1 to the end of the year.

Requests for cancellation or postponement of “on-demand” **unavailability** which have already been authorized, can be sent as events occur.

**The Operator** evaluates the requests and adopts the **unavailability deliberation**:

- by 12:00 pm of the Friday of week N+1 (or in any case within 10 days of the request) for the new “on-demand” requests;



- by 12:00 pm of the Friday of week N for “on-demand” **unavailability** modification requests;
- in the event modifications become necessary for cancellation or postponement requests.

#### 3.7.2.5 *Occasional (bi-weekly) planning of **unavailability***

On a weekly basis, usually every Tuesday by 12:00 pm (Tuesday of week N), **NTG Owners, operators of grids with third party access** other than **NTG**, as well as **Dispatching Users** send the flow of new requests, or requests for “occasional” **unavailability** changes, which begin in weeks N+1 and N+2.

Requests for the cancellation or postponement of “occasional” **unavailability** which have already been authorized can be sent as events occur.

The **Operator** evaluates the requests and adopts the relative **deliberations** by Friday midday of week N, solely for the unavailability requests sent within the deadlines specified above.

Together with the bi-weekly deliberation, the Operator informs about the **operating unavailability plan**, that summarizes the planned unavailability only for weeks N+1 and N+2 and also publishes the **updated unavailability plan** on the Terna website.

- #### 3.7.2.6
- When preparing the abovementioned unavailability plans, the **Operator** identifies the transfer constraint between the market areas and publishes this information on the Terna website. In the same way, the **Operator** evaluates the production constraints and limitations on withdrawals associated with the **unavailability** events, communicating them as required to the affected **users**, according to the terms and conditions established in paragraph 3.7.5 .

3.7.2.7 **NTG Owners, operators of grids with third party access** other than **NTG**, as well as **Dispatching Users** send to the Operator, per event, any requests for non-postponable **unavailability** which will be authorized within 7 days from receipt, and in any case where possible by midday on the day prior to the date of the start of **unavailability**.

However, should security requirements for the **NTG** occur or exceptional events (natural disasters, acts of terrorism, acts of war, etc.), the **Operator** may make changes at any time to the **unavailability plans** for limited periods of time.

3.7.2.8 The rules for managing the flow of information relating to the management of **unavailability** are provided by the **Operator** to the Dispatching Users and to the other **Owners of the NTG**.

### 3.7.3 ***Unavailability plans for power generation plants***

3.7.3.1 In order to allow the Operator to correctly and accurately carry out the activities within the planning process, the **Dispatching Users** must communicate, respecting the times and methods indicated by the **Operator**, all data and information useful in carrying out the evaluation of **unavailability**, and, in particular:

- by the month of April of each year, with reference to the subsequent year, every limitation in current or future availability (even potential limitations, should their impact be significant) to the operation of the Production Units they own, due to constraints of a regulatory, authoritative, technical (except for scheduled maintenance) or organizational nature;
- by the month of April of each year, with reference to the subsequent year, every significant variation in production capacity such as the possible entry of new Production Units, the discard or variation of the maximum power of existing Production Units;

- by the month of April of each year, with reference to the subsequent year, the best forecast for the unavailable capacity performance due to environmental causes (with a separate indication for each reason).

**Dispatching Users** must timely communicate any changes and/or additions (even if potential, should their impact be significant) made to previous communications.

The **Users of Dispatching** are also required to submit to the **Operator** by May and November of every year, according to the Decree dated 25.06.2003 by the Ministry of Productive Activities, the updated long-lasting **unavailability plans** for the **Production Units**

- (a) undergoing renovation and/or environmental work as approved by the **MSE**;
- (b) whose removal has already been approved.

The **Operator** sends to the **Authority** and to the **MSE** the update of the situation of all the long-lasting unavailability plans of the Production Units under renovation and/or environmental work, by June and December of every year.

3.7.3.2 In order to allow the **Dispatching Users** to draft a schedule of **unavailability** for maintenance of the **Production Units**, the **Operator** must send to the **Dispatching Users** by the month of May of each year, with reference to the subsequent year, the following:

- the trend of the adequacy margins expected at the aggregate level of the market area;
- an indication of the production capacity trend as a whole available for every market area aggregate, for maintenance service, when they exceed the

level of availability of production capacity considered necessary for purposes of operating the electricity system security;

- an indication, for every market area aggregate, of the production capacity trend available for maintenance service attributable to each **Dispatching User**;
- an indication of the non significant Production Units considered critical, and which must receive from the **Dispatching User** the **unavailability** schedule due to maintenance.

The allotment of the production capacity as a whole available for maintenance service at the thermoelectric units and at the hydroelectric production and pumping units owned, at the date of the submission of the communication, of each **Dispatching User** and carried out by the Operator in proportion to the sum:

- of the net efficient power of the thermoelectric production units owned by the **Dispatching User** in each market area aggregate;
- of the product between the net efficient power of the production and pumping units owned by each **Dispatching User** in each market area aggregate and a factor of conventional productivity.

3.7.3.3 The **Operator** verifies the compatibility with the adequacy and security of the electricity system's operation for the **unavailability** proposals by the **Dispatching Users**, also taking into consideration the **unavailability** of the grid elements.

The **Operator** can refuse the proposals for **unavailability** by the **Dispatching Users** by supplying adequate reasons to the User.

Requests for unavailability shall be evaluated taking into consideration the following:

- the type of **unavailability** requested (in order: annual, on-demand, and occasional) and, equally, the date of submission;
- the greater value of the minimum adequacy margin provided for in the period of unavailability; the duration;
- compliance of the production capacity available for maintenance service attributed to each **Dispatching User**, or the smallest excess of the same.

#### **3.7.4 Margins of forecasted adequacy**

The evaluation of the forecasted adequacy margins verifies the system capacity within a certain timeframe, in order to cover the demand with the due margins of substitution reserves, and in compliance with the transfer constraints between the zones.

The forecasted adequacy margin identifies for each geographic area and period of analysis the difference between:

- the sum between the available production capacity and the import of electricity from contiguous areas;
- the electricity demand increased by the necessary substitution reserve.

#### 3.7.4.1 Available production capacity

The available production capacity is the part of installed production capacity which, in each period, the Operator forecasts as being effectively available for the coverage of demand and/or for the supply of the substitution reserve.

The installed production capacity is considered equal to the sum:

- of the maximum power of the production units as it appears, at the moment of the forecast, in Terna's archives;
- of the maximum power of the new production units, starting from the best estimate at the moment of the forecast, of the date of the first parallel connection;
- of the variations expected to be increased (+) and decreased (-) of the maximum power of the production unit, starting from the best estimate at the moment of the forecast, of the date of effect of the variation itself.

Available productive capacity is obtained by subtracting the following elements from the installed production capacity:

- unusable production capacity;
- production capacity subject to planned **unavailability** and non-postponable unavailability;
- production capacity subject to accidental **unavailability**;
- production capacity subject to **grid restrictions**.

#### 3.7.4.2 Unusable production capacity

Unusable production capacity is the difference between the installed production capacity and the production capacity that the **Operator** forecasts to be effectively usable in the absence of **unavailability** or **grid restrictions**. Depending on the type of production unit, the unusable production capacity is forecast using different methods.

#### Thermoelectric units

The unusable production capacity of thermoelectric units is the sum of the power unavailable due to:

- regulatory, authoritative, technical, organizational or process restrictions;
- limitations due to environmental factors (ATS, derating).

Furthermore, with respect to non qualified thermoelectric units, the following differences are considered unusable between:

- the installed production capacity;
- the estimate of the maximum input obtained under standard conditions, starting from historical input data held by the **Operator**.

Also considered unusable is the capacity of thermoelectric production units during the trial period.

#### Other production units

For Production Units different from thermoelectric units, the useable production capacity is equal to the best estimate of producible energy from the same units in the absence of **unavailability** or **grid restrictions**, obtained starting from the historical data and from the information held by Terna at the moment of the forecast.

The unusable production capacity of production units different from qualified thermoelectric units is, therefore, equal to the difference between:

- the installed capacity
- the usable capacity

#### 3.7.4.3 Production capacity subject to planned **unavailability** and non-postponable unavailability

Production capacity subject to planned unavailability and non-postponable unavailability is that part of the usable production capacity made available for scheduled and non-postponable maintenance servicing, technical controls or tests.

Production capacity subject to planned unavailability and non-postponable unavailability is, therefore, for each thermoelectric production unit or hydroelectric production and pumping unit, equal to the difference between:

- the production capacity usable under normal conditions;
- the usable production capacity reduced as a result of the planned **unavailability**.

For Production Units different from thermoelectric production units and hydroelectric production and pumping units, the production capacity subject to planned, non-postponable and accidental unavailability is considered nil.

#### 3.7.4.4 Production capacity subject to accidental **unavailability**

Production capacity subject to accidental **unavailability** is that part of the usable production capacity made unavailable due to accidental events, which



cannot be planned and are unpredictable, and which bring about a reduction of the producible power of the units involved.

The production capacity subject to accidental **unavailability** is evaluated starting from historical data for **unavailability** of the production units, considering the best information held by Terna at the time of the estimate.

#### 3.7.4.5 Production capacity subject to **grid restrictions**

Production capacity subject to **grid restrictions** is that part of the usable production capacity which is not fully available to the **Operator** as a result of transmission restrictions along the grid which limit, for reasons of security in the operation of the national electricity system, the producible power by a single unit or by a grouping of production units.

Such restrictions can be connected to situations present in a “fully operating grid” or they can occur in correspondence with, and as a result of, **unavailability** of grid elements.

#### 3.7.4.6 Import of electricity

The import of electricity is obtained starting from:

- the best estimate of transfer constraints between zones;
- the best information held by Terna concerning the use of interconnection capacity.

### **3.7.5      *Restrictions for unavailability of grid elements***

#### **3.7.5.1      Grid restrictions due to unavailability**

The **Operator** evaluates the **grid restrictions** due to **unavailability** according to the scheduled cycle described in paragraph [3.7.2](#).

The **Operator** informs the **Dispatching Users** of all production restrictions and withdrawal limitations associated with the **unavailability**:

- if a time interval of at least 30 days between the restriction **deliberation** and the start of the restriction itself is guaranteed.
- or, if a time interval of at least 8 days between the deliberation of the restriction and the start of the restriction itself is guaranteed, limited to a maximum non-producible energy [old: producible energy] equivalent to:
  - 80 hours at maximum power of the **Production Unit** as declared in **Gaudì**, in the case of wind-powered plants,
  - 60 hours at maximum power of the **Production Unit** as declared in **Gaudì**, in the case of photovoltaic plants;
- 240 hours at maximum power of the Production Unit as declared in **Gaudì** in all other cases.

In the case of restrictions placed on a group of Production Units, the non producible energy is distributed to each Production Unit subject to restrictions as a result of its maximum power as declared in Gaudì.

Changes to transfer limits between the market zones due to **grid restrictions** are published on the Terna website.

### **3.7.6      *Unavailability plans for parts of the system which are important to the NTG and for elements of grids with third party access***

- 3.7.6.1      The unavailability plans for the parts of the system which are important to the **transmission** and **dispatching activities** as well as elements of **grids with third party access** must be periodically agreed and approved by the

**Operator** to take into account the compatibility with the unavailability plans of the **NTG**.

- 3.7.6.2 Coordination is ensured by scheduling the **unavailability** events according to the terms and conditions described under paragraph [3.7.2](#).

### **3.8 MAINTENANCE STANDARDS: CRITERIA AND GUIDELINES**

- 3.8.1 The **Operator** decides and carries out **maintenance** activity on its grid in order to maintain the operational state of the plants and the regularity of their operation, in compliance with current legislation and regulations.

- 3.8.2 **Maintenance** activities aim at:

- (a) maintaining an adequate level of operation of the system and its components, and reducing the probability of the occurrence of anomalies and **faults** on the plants of the **NTG**;
- (b) ensuring the conditions for the continuity of service and reinstating, as soon as possible, the correct operation of the system and its components following anomalies or **faults**;
- (c) guaranteeing the safety of the plants, their operating personnel and of third parties in general.

- 3.8.3 To achieve the goals described in the previous paragraph [3.8.2](#), **maintenance** activities must be:

- (a) *free from* or in any case *not conditioned by* external activities to the electricity service which may impose operational limits on the service itself, e.g. as a consequence of sharing infrastructure;

- (b) *efficient* from the organizational/management point of view, by means of suitable planning;
- (c) *derived from* the historical analysis of the plant and its components;
- (d) *based* on a clear policy of emergency measures following anomalies and **faults**;
- (e) *complying with* all current legislation regarding the safety of operating personnel and third parties;
- (f) *implemented* in such a way as to ensure the quality of the service supplied, while at the same time guaranteeing respect for the environment.

3.8.4 In order to keep its **NTG** efficient and available, the **Operator** carries out suitable checks and **maintenance activity** (ordinary and extraordinary). The checking and maintenance criteria are defined by the **Operator** according to principles including the technical code of practice, standards, indications from building constructors, the technical conditions of the components and equipment, the **Operator's** own past experience and, therefore, according to best practices.

3.8.5 The **Operator** prepares an annual plan of checks and inspections, drawn up according to its own strategies and policies, aimed at ensuring the maximum availability of the grid.

## 3.9 **SAFETY AND ELECTRIC RISK**

3.9.1 All work-related activities such as checks, inspections, controls, measurements, tests, electrical work including maintenance, non-electrical work in proximity to active areas and which are carried out on electricity

plants (power stations and lines) of the transmission grid, must be carried out in compliance with the CEI EN 50110-1 and CEI EN 50110-2 standards, with the European framework harmonization standard issued by CENELEC, which sets out the minimum requirements for safety for the operation of electrical plants and for the execution of work on or in proximity to electrical plants, with the provisions of the Single Text on occupational safety as indicated in Legislative Decree no. 81/2008, and with the requirements of the CEI 11-27/1 standard and the applicative CEI EN 50110 standard.

The abovementioned standards involve, among others:

- (a) identification of the dangers;
- (b) evaluation of the risks present in the workplace;
- (c) reduction of the risks;
- (d) identification and adoption of adequate safety measures in the workplace.
- (e) Drawing up action plans for both the lines and substations.

Regarding the above, each **Owner of the NTG** and **User** is obliged to adopt TERNA's Requirements for the Prevention of Electric Risk (DPRET) for rendering **NTG** connections and **points of connection** to the **NTG** inoperative and safe.

## **APPENDIX**

### **A REFERENCE DOCUMENTATION**

As a supplement to the contents of this chapter, the reference documents which represent enclosures to this Grid code are listed below:

- A.4 “Criteri generali di protezione delle reti a tensione uguale o superiore a 120 kV” (*General criteria for the protection of grids with voltage greater than or equal to 120 kV*);
- A.9 “Piano di Difesa del sistema elettrico” (*Defence plan of the electricity system*);
- A.10 “Piano di Riaccensione del sistema elettrico nazionale” (*Restoration plan for the national electricity system*);
- A.11 “Criteri generali per la taratura delle protezioni della rete a tensione uguale o superiore a 120 kV” (*General criteria for the calibration of protection devices of grids with voltage greater than or equal to 120 kV*);
- A.12 “Criteri di taratura dei relé di frequenza del sistema elettrico” (*Criteria for the calibration of frequency relays of the electricity system*);
- A.14 “Partecipazione alla regolazione di tensione” (*Participation in voltage regulation*);
- A.20 “Piano di Emergenza per la Sicurezza del Sistema Elettrico (PESSE)” (*Emergency Plan for the Security of the Electricity System (PESSE)*).
- A.21 “Disattivazione di linee aeree a 380-220-150-132-70-60-50 kV in occasione di incendi boschivi o di situazioni di pericolo” (*Disconnection of 380-220-150-132-70-60-50 kV overhead power lines in the event of forest fires or dangerous situations*).