CHAPTER 5

METERING ACTIVITIES

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CHAPTER 5 – METERING ACTIVITIES

5.1 SUBJECT AND SCOPE OF APPLICATION

5.1.1 This chapter defines the following:

(a) the technical provisions relating to electricity **metering equipment** (hereafter: **ME)**, including methods for installation and activation of **ME**;

(b) the architecture of the metering system;

(c) the methods of processing the metering data;

for the purposes of calculating the quantities of electricity for the purposes of transmission and dispatching services.

The provisions contained in this chapter apply to parties responsible, on the basis of applicable regulations, for actions regarding installation and maintenance of **ME** and management of electricity metering data with reference to:

- connection metering points, i.e. a metering point of a **producer** or **final customer**, which measures the electricity injected and withdrawn by a specific user;
- consumption metering points, i.e. a metering point of an **final customer**, which measures the electricity consumption of a specific user;
- generation metering points, i.e. a metering point of a **producer**, which measures the electricity production of a specific user;
- interconnection metering points, i.e. a metering point of a grid operator, which measures the electricity at an interconnection point between **electricity grids**;

The metering activity is managed, in addition to this Chapter, by the "Testo Integrato delle disposizioni per la regolazione dell'attività di misura dell'energia elettrica" (Integrated text for the management of electricity metering services) under Annex A of Resolution 458/2016/R/eel (hereafter**:** TIME) and by the Agreement for management of electricity metering activities approved by the Authority.

5.2 PARTIES RESPONSIBLE FOR METERING ACTIVITIES

5.2.1 The parties responsible for metering activities are identified by TIME. Specifically, the parties responsible for installation and maintenance of the **ME** are:

(a) for **injection**-only **points** for metering purposes, in relation to the connection metering point and, where applicable, in relation to the generation and/or consumption metering point/s:

i. the **producer**, in the case of connection to a **medium-voltage grid with third-party connection obligations**, or **significant grid**,

ii. the **distribution company** which is responsible at the territorial level in the case of connection to a **low voltage grid with third-party connection obligations**;

(b) for **withdrawal points** for metering purposes:

1. in relation to connection metering points and consumption metering points:

i. the **Operator** in the case of connection to the **NTG**;

ii. the **distribution company** in the case of connection to a **grid with third-party connection obligations** other than the **NTG**;

2. in relation to the generation metering point**:**

i. the **distribution company** in the case of connection to a **low-voltage grid with third-party connection obligations;**

ii. the **producer**, in the case of connection to a **medium-voltage grid with third-party connection obligations**, or **significant grid**,

(c) in the case of a user characterised by the presence of more than one connection to the **electricity grid** interconnected to one another:

1. in the case that the connection points are **injection -**only **points** for metering purposes**:**

   i. in the case of connection to a **low-voltage grid with third-party connection obligations**:

   - in relation to connection metering points, the **distribution company** to whose **grid** the single connection point applies;
   - in relation to generation or consumption connection points, the **distribution company** to whose **grid** the main connection point applies[1];

   ii. in the case of connection to a **medium-voltage grid with third-party connection obligations** or **significant grid**, the **producer**;

2. in the case that the connection points are **withdrawal points** for the purposes of metering:

   i. in relation to generation metering points:

   - the **distribution company** to whose grid the main connection point applies, in the case that this point is on a **low-voltage grid** with **third-party connection obligations**;

[1] The main connection point is identified according to the criteria pursuant to article 8.1 of TIME

- the **producer** in the case that the main connection point is on a **medium-voltage grid** with **third-party connection obligations** or a **significant grid**;

ii. in relation to connection metering points, the **grid operator** to whose grid the single connection point applies;

iii. in relation to consumption metering points, the **grid operator** to whose grid the main connection point applies;

(d) for **interconnection points** between the **distribution grid** and the **NTG**, the **distribution company** that is responsible at the territorial level;

(e) for the **interconnection points** with foreign countries that fall within the **NTG, the Operator;**

(f) for the **interconnection points** with foreign countries that fall within **non-NTG grids, the distribution company** within whose grid the points fall;

(g) for **interconnection points** between **distribution grids**:

- in the case of interconnection between **distribution grids** with different voltage levels, the **distribution company** that manages the distribution grid with the higher voltage;

- in the case of interconnection between **distribution grids** with the same voltage level, the distribution company that, at the moment of the interconnection request, transfers electricity across the **interconnection point** for the majority of the time, on an annual basis (on the basis of the data for the last calendar year for which data are available).

Thus, the expression “party responsible for **ME** installation and maintenance” is used in this chapter to refer to the above-mentioned parties.

5.2.2 According to legislation in force, the parties responsible for the management of electricity meter data are:

a) for **injection-**only **points** and for **withdrawal points** for metering purposes, in relation to the connection metering points and, where applicable, in relation to the generation and/or consumption metering points:
   i. the **Operator** in the case of connection to a **significant grid**,
   ii. the **distribution company** in the case of connection to a **grid** with **third-party connection obligations** other than the **significant grid**;

b) in the case of a user characterised by the presence of more than one connection to the **electricity grid** interconnected to one another, both in the case in which the connection points are **energy injection-**only **points** for metering purposes and in the case of connection points which are **withdrawal points** for metering purposes, in relation to all metering points;

   i. the **Operator** in the case that the main connection point is on the **significant grid**,
   ii. the **distribution company** in the case that the main connection point is on a **grid** with **third-party connection obligations** other than the **significant grid**;

c) in the case of **interconnection points** with the **NTG**, the **Operator**. In the absence of **ME** at the **NTG interconnection point**, the **Operator** is also responsible for the interconnection points between distribution networks and/or medium-voltage metering points or any other **ME** necessary for the determination of energy exchanged at the interconnection points with the **NTG**;

d) for the **interconnection points** with foreign countries that fall within the NTG, the **Operator**;

e) in the case of **interconnection points** with foreign countries that do not fall within the **NTG**, the **distribution company** on whose grid these points are located;

f) in the case of **interconnection points** between distribution grids, the **distribution company** responsible for the installation and maintenance of the **ME**, with the exception of the cases indicated under point c).

Thus, the expression “party responsible for the management of electricity metering data” is used in this chapter to refer to the above-mentioned parties. Under the terms of TIME, in the cases in which, following changes to the relative regulatory framework, responsibility for the management of metering data is transferred to the **Operator**, the **distribution company** remains responsible for the management of metering data with reference to both metering data for the month of December 2016 and the adjusted metering data for the periods before 01 January 2017, limited to metering points for which the **distribution company** is the responsible party up to 31 December 2016.

5.3 TECHNICAL REQUIREMENTS FOR METERING EQUIPMENT INSTALLATION

This paragraph defines the criteria and technical instructions that must be observed by the parties responsible for **ME** installation and manintenance .

These technical instructions apply to:

(a) the **production and consumption units** connected to the **national transmission grid** and, in any case, significant **production and consumption units** connected to **grids with third-party connection obligations** other than the **national transmission grid**, or connected to **other electricity grids**

(b) the **interconnection points** between the **NTG** and the distribution grids directly connected to said grid;

(c) the circuits interconnecting the **national transmission grid** with other **electricity grids** or **electricity grids** managed by parties other than the **Operator**.

5.3.1 Connection points

The **connection point** is related to the plant layout used in ordinary operations. Emergency connection points, caused by **grid outages** due to accidental or unexpected reasons or due to maintenance interventions, will however be conventionally considered as an ordinary **connection point**.

For the purpose of metering, a **connection point** is defined as:

- **withdrawal point** in the case that it is a connection point of an **final customer**, through which electricity withdrawals are also made other than those for powering ancillary generation services or for meeting the consumption needs equalizing to them;

- **injection** only **points** in the case that it is a connection point of a **producer**, exclusively serving **production plants** through which grid electricity is issued and withdrawals are only for powering ancillary generation services or for meeting the consumption needs equalizing to them.

5.3.2 Metering point

The metering point is the point on the **electricity grid** or user plant associated with metering. Each metering point can be:

- a theoretical metering point, i.e. a physical point corresponding to where an **ME** should be installed according to the regulations;

- actual metering point, i.e. a physical point where an **ME** is actually installed.

5.3.3 Metering equipment

The **ME** must conform with the **Operator's** technical specifications stated in Appendix B in this chapter, "**Metering equipment** technical specifications". In the case that the party responsible for installation of the **ME** is also the producer and the producer**:**

- has installed an **ME** that is incompatible with the **Operator's remote reading** system;

or

- has positioned the **ME** in a point not suitable for **remote reading** or that does not guarantee safe access of the **ME**;

the **producer** is required to carry out changes or replacements indicated by the **Operator**.

In the case that the **producer** does not provide said changes/replacements, the **Operator** informs the **GSE** so that incentives where provided are suspended until the adjustment has been made. Costs incurred by said changes or replacements are at the expense of the **producer**.

The metering equipment is divided into two categories, **primary** and backup **ME**.

5.3.4 Location of metering points

5.3.4.1 At least one **ME** must be installed at each **connection point** and **interconnection point** to permit energy in transit to be read and recorded.
The identification of the generation and consumption metering points takes place according to the procedures specified in TIME**.**
The **Operator** authorises, upon express proposal by the party responsible for installation and maintenance of the **ME**, metering to be carried out at metering points other than theoretical metering points, in compliance with the conditions provided in articles 3.2 and 4.2 of TIME**,** in cases where this involves:

(a) minimising **ME** installation, operation and maintenance costs and, compatibly with the adoption of the most recent techniques and technologies, protecting those existing **ME** which, although incompatible with the location criteria in this paragraph, allow energy calculations at the exact **connection point**;

(b) containing the duration of outages for the **users** due to installation of **ME** at new metering points and due to replacement of existing **ME** which do not conform to the specifications of this Grid code;

(c) avoiding changing the location of the electrical energy metering points following alterations to the connection points resulting from changes to the **NTG**.

In particular, in cases where the metering is performed at internal points of electrical production or consumption plants, the exact value of electrical energy at the **connection point** must be calculated using the definition of a metered energy carry-over algorithm, taking into account both the plant component

losses (transformers, conductors, etc.) and other **ME** present as well as the plant's particular layout.

The algorithm used for calculations and the loss coefficients used to correct the metering in relation to different positioning of **ME** within the same system are defined by the **Operator** together with the party responsible for the installation and maintenance of the **ME** and the **distribution company** where this is different from the party responsible for the installation and maintenance of the **ME**.

In particular, for **production plants** the definition of the calculation algorithm and the loss coefficients is one of the necessary conditions for completing **production unit registration** in **GAUDI'**.

5.3.4.2 In all the other cases not mentioned in paragraph 5.3.4.1 the loss coefficients calculated by the Authority shall be applied.

5.3.5 Metering equipment installation requirements relative to injection only-points for metering purposes

The **ME** installed at the connection metering points of a **producer** must meet the following requirements, in addition to those specified in Annex B to this chapter.

The acquisition of metering measurements must permit the metering of energy injection in the **grid** by the plant, net of the power station's ancillary services.

The **ME** must meter energy exchanged with the **grid** for each individual **production unit**. This condition is binding with the aim of categorising the **production units** in **GAUDÌ**.

Should it be necessary to divide electricity issued between **generators** and/or plant **sections**, it is necessary to install the **ME** which allows tracking of energy

produced by each **generator** and/or **section**. The **ME** relative to the connection metering points must be installed for each **PU:**

(a) at the exact **connection point** with the **grid**;

or

(b) at the group outputs, in the withdrawal points of the ancillary services (AS).

In the case of (b) a calculation algorithm must be applied to obtain the meter reading at the exact **connection point**.

5.3.6 Installation requirements for metering equipment relative to interconnection points between the NTG and grids with third-party connection obligations

In addition to the specifications in Appendix B, the **ME** installed at the **interconnection points** between the **NTG** and **grids with third party connection obligations** must meet the following requirements.

The installation of the **ME** must be such as to enable the calculation of the overall energy exchanged between the **NTG** and **grids with third party connection obligations**.

The **primary ME** must be installed in the **interconnection points** between the NTG and **grids with third-party connection obligations**.

5.3.7 Metering equipment installation requirements for interconnection points with other electricity grids

In addition to the specifications in Appendix B to this chapter, the **ME** installed at the **interconnection points** between the **NTG** and other **electricity grids** must meet the following requirements.
The **primary ME** must be installed at all **interconnection points** and, if requested by the **Operator**, backup ME conforming to the specifications in paragraph 5.3.3.

In the case of interconnection with foreign **grids**, the **ME** must be installed at the Italian plant closest to the border.

5.3.8 Installation requirements for metering equipment at withdrawal points for metering purposes

In addition to the specifications in Appendix B of this chapter, the **ME**, referred to the connection metering points, installed must meet the following requirements:

a) in the **withdrawal points** of the **final customer** including the systems of the company Ferrovie dello Stato SpA or its assignees, pursuant to article 3, paragraph 4 of Decree of the Minister of the Interior of 25 June 1999, directly connected to the **significant grid**;

b) in the **withdrawal points** of the energy destined for withdrawal of the **production plants** other than withdrawal aimed at supplying ancillary generation services;

The **primary ME** relative to connection metering points must be installed, whatever the voltage level, at the **connection points**.

In line with the content of paragraph 5.3.4, installation of **ME** downstream from any plant transformers of the **final customer** is allowed. In this case it is necessary to take account of the losses due to the transformer and conductors, in accordance with the specifications in paragraph 5.3.4.

If the connection metering point is within a third-party plant, the withdrawal will be understood as being executed by the **grid** to which the plant itself is connected.

5.4 ARCHITECTURE OF THE METERING SYSTEM

The metering system is made up of the following basic elements:

(a) *Metering system* (called "*MeTer*", acronym of "Metering of Terna"): **Operator** system responsible for the direct or indirect acquisition of metering data, verification and reconstruction, and storage and processing of the same;

(b) ***Secondary Acquisition Systems*** (SAS): systems owned by the parties responsible for management of electricity metering data if different from the **Operator**, which acquire, process and store metering data and subsequently send this metering data to the MeTer system;

(c) *Additional systems for indirect acquisition of metering data*: **Operator** systems dedicated to indirect acquisition of metering data made available by parties responsible for management of electricity metering data, if different from the **Operator** and the **IITS** (Integrated IT System) in accordance with paragraph 5.4.3.

Data acquisition procedures are explained in paragraph 5.5.
A description of the systems is given in documents A.43, A.44 and A.48 of Appendix A in this chapter.

5.4.1 *MeTer System*

This system is used by the **Operator**:

1. for the direct acquisition of electricity metering data regarding production, withdrawal and input, relative to:

(a) the **production and consumption units** connected to **significant grids**;

(b) **interconnection points** between the **national transmission grid** and the **distribution grids** directly connected to the **NTG**;

(c) the **interconnection points** of the **national transmission grid** with **other electricity grids** or **electricity grids** managed by parties other than the **Operator**;

(d) the **interconnection points** between distribution grids and/or medium-voltage metering points or other **ME** necessary for the determination of energy exchanged at the interconnection point with the NTG, in the case of absence of ME at the **interconnection point** with the NTG.

2. For indirect acquisition, through SAS, of the metering of the withdrawn and input electricity relative to the relevant **production and consumption units** connected to **grids with third-party connection obligations** other than the **significant grid**.

The following data is memorised in the MeTer:

(a) identification details of the **User**;

(b) information about the **measurement gauges**, electrical diagrams and technical agreements on the algorithms to use for carrying over metering data to the theoretical metering point;

(c) calculation algorithms;

(d) metering data from the **measurement gauges**;

(e) processed metering data.

5.4.2 Secondary acquisition systems

These systems are used for the indirect acquisition by MeTer, for the metering of withdrawn and input electricity relative to the plants indicated in point 2) of paragraph 5.4.1.

The main functions of the SAS are:

(a) daily acquisition and processing of the metering data from the **ME**;

(b) transferral of the metering data to the MeTer via files.

The methods for sending the files are described in document A.48 in Appendix A in this chapter.

The methods of interfacing between the SAS and the MeTer, as well as the frequency of sending the metering data, must be agreed with the **Operator**.

The parties that own the SASs are responsible for the acquisition, installation, management and maintenance of the SAS systems and must in addition guard against alterations, accidental or fraudulent, to the metering data saved in the SASs.

Owners of the SASs are required to:

(a) equip the systems with the necessary minimum security measures in observance of the requirements of legislation on the treatment of personal data;

(b) have a supervision and control system to protect information from logical and physical access;

(c) observe regulations for prevention and detection of computer viruses;

(d) adopt directives in their own organisations to ensure the continuity of the service offered;

(e) provide for proper training of personnel regarding security and confidentiality of data.

5.4.3 Additional systems for indirect acquisition of metering data

These systems are used for the indirect acquisition of the metering of the withdrawn and input electricity relative to the dispatching points per **consumption unit** (**CU**) and to the **production units** connected to **grids with third-party connection obligations** other than the **significant grid**.
The parties responsible for management of the metering data and the **IITS** (Integrated IT System) are obliged to report, on mothly basis, the above-mentioned metering data to the **Operator** within the means and the timeframes defined in the TIS and in Chapter 6 and Chapter 7 of this Grid Code.

5.4.4 Metering data confidentiality and integrity

Metering data is confidential and is processed in accordance with the provisions of Chapter 12 of this Grid code.

The **Operator** maintains the integrity of data from the moment it is received in accordance with the transmission procedures established in this Grid code.

The parties responsible for installing and maintaining **ME** are responsible for guaranteeing the integrity of the entire **ME** and the data contained there in.

After being put into service the **ME** must not experience any reprogramming (local and/or remote), apart from setting the time and periodic synchronising of the clock. Any reprogramming other than that mentioned above must be notified to the **Operator** in accordance with the methods of data exchange with the electricity operators in paragraph 5.7 of this chapter.

The affixing of single-use numbered seals (with unique non-reproducible numbers) is the responsibility of the party responsible for the installation and maintenance of the **ME**. The party must record both the seal number and the

point of installation in a special register for each **utility** plant and supply this information to the **Operator** if requested. The party must also notify the **Operator** of any changes in the case of an intervention at the utility and interconnection metering points (repair of faults, maintenance, replacement of components).

The **Operator** reserves the right to affix its own seals in the following cases:

(a) a field inspection has revealed a violation of the integrity of the installation, or tampering of the data or reprogramming of the **measurement gauge** without prior notice to the **Operator**, or the breakage of seals or a lack of correspondence between the number of the seal installed and the number of the seal notified to the **Operator** and entered in the plant register;

(b) the field installation is exposed to acts of vandalism or tampering by third parties.

The parties responsible for managing the metering data are responsible for guaranteeing that the metering data reach the **Operator** in a state of full integrity.

In order to verify that the information and data recorded in the **ME** correspond to those received, and that the **ME** installed in the field are free from tampering and correspond to the plant data declared by the parties responsible for the **ME**, the **Operator** reserves the right, at any moment, to carry out field inspections on the **ME**, in accordance with the methods indicated in document A.47 in Appendix A in this chapter.

Without prejudice to the requirements of confidentiality, the metering data, suitably aggregated and rendered anonymous and free from commercial information, may be used and published by the **Operator** for the preparation of balances and statistics, in accordance with the provisions of Chapters 8 and 9, below, of this Grid code.

5.5 METERING DATA ACQUISITION

This paragraph describes:

(a) the various metering data acquisition methods and types;

(b) the **telecommunications system** to be used for direct **remote reading** of the **ME** and in the event SAS are used;

(c) communication protocols and interfaces;

(d) acquisition frequency.

Any liability on the part of the **Operator** and the **Users** in their reciprocal relations due to the violation of their obligations, in compliance with the law or this Code, is limited to any material damages that are the direct result of their behaviour, excluding any liability for indirect damages or loss of earnings, excepting the provisions of individual contracts.
Moreover, any liability on the part of the **Operator** is explicitly limited to cases of fraud and/or gross negligence.

5.5.1 Acquisition method

Metering data acquisition from **ME** by the MeTer may be:

(a) direct, when the **ME** is read remotely over a telecommunications network and without an interposed SAS;

(b) indirect, when the metering data is acquired over a telecommunications network via an SAS or another data transmission system.

If the **ME** may not be contacted by the MeTer, the **Operator** asks the party responsible for **ME** installation and maintenance to carry out a **local** and/or **visual reading**.

Local readings of the **ME** are used, on the instructions of the **Operator**, if it is temporarily not possible to carry out **remote readings**.

Visual readings may be used only temporarily and only if **local readings** are not possible, due to a fault in the local communications port.
The metering data acquired from **local/visual readings** must be sent to the **Operator** by the party responsible for installation and maintenance of the **ME**, by means of files and with the same acquisition frequency in paragraph 5.5.4, and in any case in compliance with the specifications in paragraph 5.8.
If there is reasonable doubt as to the correctness of the metering data read via direct and/or indirect remote acquisition, the **Operator** may request the party responsible for installation and maintenance of the **ME** to carry out an additional **local reading**, without this resulting in any restrictions on the subsequent use of these readings by the **Operator**.

5.5.2 Connection

a) *Direct remote reading of ME by the MeTer*

Each **ME** must be uniquely identified in any telecommunications network used.

Intermediate storage devices between the **ME** and the MeTer are not foreseen.

The use of intermediate telecommunication interface devices such as routers or similar, which must in any case be transparent to the data in transit (i.e. they must not internally save data, even temporarily), must be previously authorised by the **Operator**.

In the case of direct connection between the MeTer and the **ME**, any form of telecommunications network may be used. Use of such network must be previously authorised by the **Operator**, who will evaluate its suitability for adoption.

Under present conditions, the direct **connection** between the MeTer and **ME** is anticipated using the public switched telephone network (PSTN) or over the public cellular telephone network (GSM or DCS1800 Standard).

The **Operator** may request the party responsible for the installation and maintenance of the **ME** to use alternative telecommunications networks, where available, possibly based on standards other than those described above (e.g. IP networks).

b) Indirect remote reading of ME by the MeTer and other systems

In the case of an indirect connection between the MeTer, the other systems and the SAS, as is the case also for the transfer of the **local** or **visual readings** to the MeTer, the use of a file in XML format is anticipated, transferred via internet, in accordance with the methods described in document A.48 in Appendix A in this chapter.

The costs of maintenance and installation of the necessary devices for interfacing with telecommunication networks (modem or similar) as well as telecommunication costs for direct or indirect acquisition of metering data are at the expense of the party responsible for maintenance and installation of the **ME**.

5.5.3 Communication protocols and interfaces

a) Direct connection between the MeTer and ME

The communications protocols used for the direct connection between the MeTer and the **ME** must provide the following services:

(i) reading of metering data for a specified time period;

(ii) reading of internal logs;

(iii) reading the date and time of the **ME**'s internal clock;

(iv) reading the values of the **ME**'s configuration parameters;

(v) reading the state of the **ME**.

The prescribed protocols for the direct connection are:

(i) IEC 1107;

(ii) IEC 870-5-102 (as prescribed in document A.51 in Appendix A in this chapter);

(iii) DLMS-COSEM.

The party responsible for maintenance and installation must make available the drivers for and interfaces with the system, both hardware and relating to the conversion of formats and protocols. Permission to use other protocols must be requested to the **Operator** in advance.

b) Indirect connection between the MeTer and SAS

The communications protocol used for the indirect connection between MeTer and SAS must provide a file transfer service.

The methods anticipated are described in document A.48 in Appendix A in this chapter.

c) Local/visual readings

The communications protocol used to transfer **local/visual readings** to the MeTer must provide a file transfer service.
The methods anticipated are described in document A.48 in Appendix A in this chapter.

5.5.4 Acquisition frequency

The metering data must be available to be acquired by the MeTer, on a daily basis without time restrictions.

Additional readings on the same **ME** are permitted, including at the request of the **Operator**, to be carried out using methods that do not conflict with the specifications of this Grid code.

If metering data is transmitted to the **Operator** through interposed acquisition and concentration systems, the party in charge of such systems must guarantee the availability of the metering data in accordance with the **Operator**'s requirements.

5.5.5 Elective readings

The party responsible for maintenance and installation of the **ME** may carry out, on its own plants, elective additional readings with the same **ME**. This option is allowed for specific needs such as, for example, checking the input or withdrawal of electrical energy for time periods other than those prescribed in this Grid code for the metering of electrical energy.

The readings described in this Grid code must not alter the requirements and performance nor the behaviour of the **ME** installed, nor must it involve changes to the **measurement gauges** already installed.

5.6 PROCESSING OF METERING DATA

This paragraph describes:

(a) validation of the metering data: tasks, responsibilities and methods for validating the metering data;

(b) metering algorithms: definition of the algorithms necessary to carry over the measurements of the ME from the actual metering point to the

theoretical metering point as described according to the methods indicated in TIME;

(c) reconstruction of metering data: tasks, responsibilities and methods for reconstructing metering data;

(d) security of system access and integrity and confidentiality of information.

5.6.1 Validation of the metering data

All metering data that arrives at the MeTer and which has not been subjected to the validation procedures is considered to be preliminary.

The validation is done by the party responsible for the management of metering data.

The **Operator** applies the validation procedures, automatic or manual, to the measurements arriving from **primary ME,** backup ME and **reference ME** in order of priority. The validation procedures applied by the **Operator** are described in document A.44 in Appendix A in this chapter.

If, following the application of the validation procedures and any field verification required, a malfunctioning of the **primary ME**, backup ME or **reference ME** is detected, the party responsible for its maintenance is required to restore its correct functioning in accordance with the specifications in paragraph 12 letter c) in Appendix B in this chapter.

The metering data coming from an SAS or from another transmission system are validated by the party responsible for the management of metering data.

5.6.2 Metering algorithms

The metering algorithms are foreseen, in accordance with the provisions in paragraph 5.3.4.1, in the following cases:

(a) carrying over of the measurements acquired from the **ME**, installed at a different point, to the theoretical metering point;

(b) aggregation of the measurements acquired from several **ME** installed in a plant to calculate the energy at the theoretical metering point.

Any reprocessing which should be necessary for reconstructing and/or correction of erroneous data shall be carried out in accordance with the specifications in paragraph 5.6.3.

5.6.3 Reconstruction/estimate of metering data

Reconstruction is applied to data coming from the **ME**.

The party responsible for the management of metering data is responsible for the estimate of the metering data when the estimate is not available and/or the reconstruction of electricity metering data in the case of malfunction of the **ME**.

The methods for the reconstruction/estimate used by the **Operator** for the user metering points for which it is responsible are published on the **Operator**'s website according to the provisions set out in TIME.

The methods of data exchange between the **Operator** and the **User**, for the purposes of reconstruction/replacement of the metering data, must be executed in accordance with document A.49 in Appendix A of this chapter.

5.6.4 Discrepancies between acquired measurements

If the measurements obtained by repeated **remote readings** of the same **measurement gauge** (including if there is a **telecommunication system**) show different values between them, then a **local reading** of the **measurement gauge** must be performed. The metering data obtained by this method shall be considered valid.

5.6.5 Information contained in the MeTer

The parties concerned by the metering as it regards their duties, i.e. the **Operator** and all parties authorised by the Operator, have access to the information processed by the MeTer. Access to information processed by the MeTer is conducted in conformance with the principles of protection of confidentiality in Chapter 12 of this Grid code.

The information and the metering data, suitably aggregated and rendered anonymous, shall be used by the **Operator** to supplement data from other systems for the preparation of energy balances and for other statistical purposes, without prejudice to the confidentiality requirements in paragraph 5.4.4.

5.7 OPERATING PROCEDURES AND DATA EXCHANGE METHODS

Document A.49 in Appendix A of this chapter gives the operating procedures used by the **Operator** to keep the metering system updated with the actual plant situation, as well as the informational procedures between the **Operator** and the following parties:

(i) **parties responsible for the installation and maintenance of the ME** for the injection only-points for metering purposes;

(ii) operators of limited parts of **NTG** and owners of **NTG** other than the **Operator**, for the plants described in paragraph 5.3.7.

Document A.49 in Appendix A of this chapter also gives the methods with which the above-mentioned parties and the **Operator**:

(a) interact in order to exchange technical plant data for the purposes of keeping the **Operator**'s metering system in line with the metering system installed in the field;

(b) interact in order to exchange metering data;

(c) exchange information for the reconstruction of metering data in the case of **outages on the telecommunications network** and/or plant-related variations.

APPENDIX

A REFERENCE DOCUMENTATION

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

A.43 “Specifiche funzionali generali” (General functional specifications);

A.44 “Specifica tecnica funzionale del sistema di acquisizione principale del Sistema di Misura dell’energia elettrica di interesse del Gestore” (Functional technical specification of the main acquisition system of the Electricity Metering System of interest to the Operator);

A.45 “Specifica tecnica funzionale e realizzativa delle apparecchiature di misura” (Technical functional and production specification of metering equipment);

A.46 “Specifica tecnica realizzativa del sistema di acquisizione principale delle misure di energia elettrica” (Technical production specification of the main system for the acquisition of electricity metering);

A.47 “Specifica tecnica di prova delle apparecchiature di misura” (Technical specification for testing metering equipment);

A.48 “Specifica tecnica per i sistemi di acquisizione secondari (SAS)” (Technical specification for secondary acquisition systems (SAS));

A.49 “Procedure operative per la gestione delle informazioni e dei dati nell’ambito del sistema di misura” (Operating procedures for the management of information and data within the sphere of the metering system);

A.50 “Compensazione delle perdite” (Compensation for losses);

A.51 “Caratteristiche del protocollo di comunicazione e delle modalità di scambio dati tra SAPR e AdM” (Characteristics of the communication protocol and the procedures for exchanging data between the ASRP and the ME).

B METERING EQUIPMENT TECHNICAL SPECIFICATIONS

1 Scope of application

1.1 This Appendix includes the fundamental specifications that the **ME** must meet when installed in the **production and consumption units** and interconnection points described in paragraph 5.3 of this chapter.

2 General

The general, functional, and constructive characteristics and the test characteristics are described in detail in technical specifications A.43, A.45 and A.47 in Appendix A in this chapter.

The make and model of the **measurement gauges** must be approved by the **Operator** and must be remotely readable by the **Operator**. To this end the **Operator** provides on their website a list of all compatible **measurement gauges** with their related remote reading systems and the requirements for the requested interoperability.

The **ME** must be:

a) capable of metering the power withdrawn and input as well as both flows of active energy (incoming and outgoing) and the related flows of reactive energy (incoming and outgoing for each of the two flows of active energy), for a total of six values per integration period;

b) equipped with an automatic warning system for any potential operating irregularities;

c) allow the party that owns the **connection point**, or parties delegated by the same by mandate, access to reading and recording of electrical energy metering data with the same methods and independently of access to the same on behalf of the party responsible for the management of metering data;

d) be prepared for installation of devices that monitor electricity issued and withdrawn, on request of the party that owns the **connection point** and at their own expense.

The previous points b), c) and d) only apply in reference to metering points belonging to **final customers** and **producers**.

Only in cases where (in the absence of a **fault**) the flow of active energy cannot be even temporarily bidirectional, the use of unidirectional **measurement gauges** is permitted for active energy and with segregation of reactive energy, for a total of three values per integration period.

3 Accuracy rating of the ME

All the **ME** must satisfy the following minimum functional requirements:

(a) the accuracy rating of the of active electrical energy **measurement gauges** and of the voltage and **current transformers**, unless otherwise specified, must be no less than 0.5. If the accuracy rating of only one of the above-mentioned components is class 1, the metering unit must be checked to verify if it conforms to the prescribed **ME** from the point of view of accuracy, by applying the equivalence principle specified in the CEI 13-4 standard;

(b) the accuracy rating of the reactive electrical energy **measurement gauge** must be no less than 2.

The **Operator**, with the procedures specified in Chapter 14, paragraph 14.3 of this Grid code, may make an agreement with the party responsible for the installation and maintenance of the **ME**, whenever the flow of energy in transit at the exchange point so warrants, to install an **ME** with components having accuracy ratings higher than those specified above (in particular class 0.2 for metering transformers and for the active energy of **measurement gauge**). The

Operator may however impose the installation of **ME** with components having accuracy ratings higher than those specified above, if deemed necessary.

4 Metering integration period

The energy metering data must the integration of the electrical quantities within a (settable) period with a granularity of at least 15 minutes and must be recorded in numeric format.

5 Compensation for losses

The **ME** must be installed in accordance to the provisions in paragraph 5.3.4 of this Chapter 5. If, in the cases specified in paragraph 5.3.4, the ME has been installed at another point, it is necessary to transfer the measurements to the theoretical metering point by means of an algorithm that takes into account the losses introduced by the intervening electric components (transformers, conductors, etc.). It is foreseen that **compensation for losses** shall be centralised at the level of the data acquisition and processing system of the party responsible for the management of metering data.

Alternatively, through internal algorithms, the **ME** may compensate for the losses between actual **metering points** and theoretical metering points, without degrading the accuracy rating with respect to that which would be obtained by making the measurement exactly at the theoretical metering point. In this case, the same **ME** must return both the compensated measurements and the original measurements.

ME capable of applying **compensation for losses** and the algorithms used must be approved by the **Operator**.

The **compensation for losses** must take place compatibly with the prescriptions in document A.50 in Appendix A in this chapter.

6 Prevention of fraud and sealing the metering equipment

The electrical readings obtained by the **ME** must not be altered and the metering data recorded by the **ME** must not be alterable nor must they be altered.

To this end, all components of the **ME**, including cables and terminal boards, must be equipped with mechanical sealing systems (lead seals or similar) that guarantee against tampering of these components.

In particular, the local and/or remote programming interfaces must be equipped with a system of access codes that place limits on the programming functions, while the local programming interface must be fitted with a mechanical lock.

7 Power supply for the metering equipment

The power supply for the **ME** must comply with technical specification A.45 in Appendix A of this chapter.

It must also be possible to supply power to the **ME** from a high-availability external source. For unmanned plants that are difficult to access, a twin external/internal power supply must be provided.

The **ME** must be equipped with an auxiliary power supply that keeps the **measurement gauge** and the modem in operation even in the case of an **outage** of the riser (for example in the case of prolonged opening of the riser). The **ME** does not need to be equipped with an auxiliary power supply if, in the case of a prolonged lack of power, the **measurement gauge** keeps the data unaltered and guarantees the continuity of **electrical energy** metering.

8 Operation of the meter reading recorder and storage capacity

The **ME** must store the data supplied by the **ME** and by the **processing device**, if present. Metering data, and any internally processed data based on the metering data, must be available in the **ME** for at least 60 days.

9 Remote programming of the metering equipment

The **ME** remote programming activities must be limited to the following settings:

(a) setting the time;

(b) setting the daylight saving time;

(c) modifying the time bands.

No other remote settings must be possible.

Each reprogramming activity must be logged in an internal read-only log.

Any requirement other than the above must be notified in advance to the **Operator**.

10 Measurement gauge interface devices with telecommunications networks

The **telecommunications interface device** of the **ME** with the **telecommunication system** must permit remote acquisition of the metering data and information supplied by the **ME**.

This device may be used by more than one **ME** installed in the same plant if previously approved by the **Operator**.

11 Redundant metering equipment

Metering must permit adequate levels of availability of metering to be reached. These levels of availability must be obtained by:

(i) using high quality equipment;

(ii) providing for suitable redundancy of **ME** and, if necessary, of metering points.

The presence of suitable redundancy enables the reconstruction of metering data in the case of a malfunction of the **Metering Equipment**.

The redundant **ME** are classified as backup ME and **reference ME**.

a) Backup

The installation of backup ME is at the discretion of the party responsible for the installation and maintenance of the **ME**.

The backup ME must have the same accuracy rating as the **primary ME** and, if necessary, share the same metering transformers (**CT** and **VT**).

b) Reference

The **reference ME** (if present), and which may be installed at different points than the **primary ME** installation points, is used to control the functioning of the metering system and reconstruct or estimate, together with other elements (statistics and fiscal **meters**), the missing metering data.

The **reference ME** may have a different accuracy rating than that of the **primary ME**.

The same backup ME may be used by the **Operator** for purposes of reference.

12 Installation and inspection

a) Installation and putting into service

The **ME** are installed and put into service by the party responsible for the installation and maintenance of the **ME**.

The components that make up the **ME** are understood as having been calibrated at the factory.

The objective of reliable metering must be pursued at all stages of the metering data acquisition process, and in particular through:

(i) selection of certified equipment and quality components;

(ii) precision installation, with anti-tampering seals;

(iii) periodic inspection by qualified personnel;

(iv) control of validity of on-line metering.

b) Calibration and inspection of the ME

ME is subject to initial and periodic inspections by the party responsible for installation and maintenance of the **ME**, with the following frequency:

(i) metering transformers: no less than once every fifteen years (ten years for capacitive **VTs**);

(ii) **measurement gauges**: at least once every three years

or in any case in accordance with the procedures described in document A.47 in Appendix A in this chapter.

The **Operator** controls the inspections, and reserves the right to attend all related operations. The right to attend is also extended to the parties concerned with the metering.

The costs regarding inspection activities are at the expense of the party responsible for the **ME**, who may, if necessary, delegate said inspection activities to a third party from those indicated by the **Operator** pursuant to point (e) below.

The inspection activities must be carried out in compliance with the technical specification A.47 in Appendix A in this chapter.

Impromptu inspections other than those at the frequencies specified are allowed. The relevant requests may be initiated by the **Operator** or by parties concerned by the metering. If the **ME** is demonstrated to be in compliance with its corresponding specifications, the costs of the impromptu inspection will be charged to the applicant; otherwise they will be charged to the party responsible for the installation and maintenance of the **ME**.

Components found to be defective during an inspection are subject to repair or replacement in compliance with the specifications in point (c) below.

c) Metering equipment repair and/or replacement

In the event of **malfunction**, the **ME** or its components must be repaired or replaced by the party responsible for installation and maintenance of the **ME**, in accordance with the provisions of the Grid Code and the applicable regulations.

The procedures for replacement must follow the specifications described in document A.49 in Appendix A in this chapter.

If backup ME or **reference ME** are not available, the replacement and/or repair of the main **measurement gauge** must be carried out within a maximum of 48 hours, except in exceptional cases that are dependent on the continuity of the electrical service or in the case of an inactive connection/interconnection point.

If backup ME or **reference ME** are available, the replacement and/or repair of the **primary ME**, except in special cases to be evaluated with the **Operator**, must be carried out in accordance with the following:

(i) the maximum deadline for the replacement and/or repair of the **measurement gauge** and/or the **telecommunications interface device** is one week;

(ii) the maximum deadline for the replacement/repair of the metering transformers is one month. This deadline can be extended to two months if the new metering transformer is of higher quality than the one that is to be replaced.

When the replacement is carried out upon request, it must nevertheless be conducted in compliance with the prescriptions in this document, at the sole expense and care of the requesting party.

d) Certification of the inspections

The party responsible for the installation and maintenance of the **ME**, after the initial, periodic and/or **ME** replacement and repair inspections, must provide the **Operator** with documentation of the operations that took place, in accordance with technical specification A.47 in Appendix A in this chapter.

e) Certifying operators

The **Operator** reserves the right to publish the list of certifying operators who, possessing the technical and quality requirements, operate professionally in the field of metering and inspection.