



## C.2 Terms for the Ancillary Services of Landsnet hf.

### 0. Amendments from previous version

The present version is the initial one.

### 1. Introduction

- 1.1 These Terms are adopted on the basis of the Electricity Act No. 65/2003, as subsequently amended, Regulation No. 1050/2004 on electricity trading and metering, as subsequently amended, Regulation No. 1040/2005 on the implementation of the Electricity Act, as subsequently amended, Regulation No. 513/2003 on system management in the electricity system and Regulation No. 1048/2004 on the quality and secure delivery of electricity, as subsequently amended.
- 1.2 These Terms have been confirmed by the Minister pursuant to paragraph 6 of Article 9 of the Electricity Act.

### 2. Definitions

The following definitions apply in these Terms:

- 2.1 The *transmission system* consists of the electrical lines and infrastructure connected thereto necessary to transmit electricity from power stations to power-intensive users and distribution system operators at the delivery points listed in the Annex to the Electricity Act No. 65/2003, as subsequently amended. It extends from the high-voltage side of any unit transformer connected to it, cf. paragraph 3 of Article 5 of the Electricity Act, to the high-voltage side of substation transformers for power-intensive users or distribution system operators.
- 2.2 *Primary regulation* is regulation supporting the system's frequency and takes place automatically and immediately when the frequency deviates from its nominal value. Primary regulation is carried out using the governors of generating units.
- 2.3 *Fast reserves* refers to the additional generating capacity of generating units and decrease in customer consumption that can be applied within a 15-minute notice to react to the unavailability of individual operating units (generating units, transmission lines, transformers, busbars, etc).
- 2.4 *Slow reserves* refers to the additional generating capacity of generating units and decreases in customer consumption that can be applied with a notice of more than 15 minutes.
- 2.5 *Ancillary services* are the services provided by the transmission system operator and distribution system operators to ensure the secure operation and stability of the transmission and distribution systems as well as power quality.
- 2.6 *Permanent speed droop* is a parameter describing the frequency regulation of generating units, i.e. their reactions to frequency changes in the system. A change in frequency by  $\Delta f$  (%) in the electricity system causes a change in the real power generation of a unit with installed capacity of  $P_n$  and a permanent speed droop of  $S$  (%), by  $\Delta P = - P_n \cdot \Delta f / S$ .
- 2.7 Landsnet's *Energy Management System* is a set of equipment for controlling and monitoring the electricity system.

- 2.8 *Regulating power* is the power used by Landsnet to balance differences between forecast and actual total energy use in the electricity system.
- 2.9 A *regulating power option* is an agreement concluded between Landsnet and a producer in the regulating power market under which the producer must offer a certain minimum amount of regulating power for definite periods and within specified power and price limits. Regulating power options guarantee a minimum supply in the regulating power market.
- 2.10 *Regulating capacity* is the capability of a generating unit to regulate frequency, defined on the basis of permanent speed droop and rated capacity. The regulating capacity in an interconnected electricity system is the total regulating capacity of all generating units connected to it.

$$\text{Regulating capacity} = P_n / (S \times 50 \text{ Hz})$$

Where  $P_n$  is the rated capacity and  $S$  is the permanent speed droop of the generating unit.

- 2.11 *Spinning reserves for frequency control* refers to the real power that is instantaneously available for frequency control within the range 49.8–50.2 Hz and is controlled automatically on the basis of the system's frequency deviation.
- 2.12 *Spinning reserves for disturbance recovery* refers to the real power that is instantaneously available for frequency control outside the range 49.8–50.2 Hz and is controlled automatically on the basis of the system's frequency deviation.
- 2.13 *Secondary regulation* is automated control that supports the system's frequency and takes over from *primary regulation* a few seconds after the frequency deviates from its nominal value. Secondary regulation is carried out using Landsnet's Automatic Generation Control system.
- 2.14 *Frequency control* is the maintenance of a stable frequency in the electricity system.
- 2.15 *Reserve reactive power* is reactive power activated either automatically or manually during a short deviation from normal operating conditions.
- 2.16 A *generating unit* is an independent unit for electricity generation within a power station, i.e. a generator, turbine and auxiliaries.
- 2.17 A *producer* is a company engaging in the generation of electricity or holding a power development licence.
- 2.18 *The Automatic Generation Control (AGC)* module of Landsnet's Energy Management System controls generating units remotely from Landsnet.

### 3. General

- 3.1 Landsnet has a statutory duty to ensure the operational security and stability of the transmission system, among other things by providing ancillary services. This includes ensuring the availability of spinning reserves for frequency control and disturbance recovery, slow reserves, fast reserves and reserve reactive power.
- 3.2 Landsnet provides ancillary services and to this end procures supplies from producers. These Terms set out Landsnet's obligations regarding ancillary services as well as the supply obligations of producers for ancillary services.

### 4. Real power component of ancillary services

- 4.1 Landsnet shall seek to ensure that the following frequency control criteria are met:
- That system frequency is always within the 47Hz–52Hz range and 99.5% of the time within the 49.5Hz–50.5Hz range. This is based on 10-second average values of the voltage fundamental frequency.
  - That spinning reserves for disturbance recovery in the transmission system amount to a minimum of 70MW, but can be lower locally in case of transmission constraints.
  - That the regulating capacity in the transmission system is a minimum of 400MW/Hz.
  - That the regulating power in the transmission system is a minimum of  $\pm 40$  MW.
  - That the slow reserves in the transmission system are a minimum of 30MW.

Further provisions on Landsnet's frequency control obligations are set out in the Regulation No. 1048/2004 on the quality and security of electric power delivery, as subsequently amended.

- 4.2 Landsnet procures spinning reserves for frequency control, spinning reserves for disturbance recovery, regulating power, fast reserves and slow reserves for frequency control. Landsnet's purchases of regulating power and non-spinning reserves are in accordance with Landsnet's B3 and C3 Terms. A minimum of supply in the regulating power market is ensured through Landsnet's purchasing of regulating power options, cf. Article 4.5 of these present Terms.
- 4.3 Landsnet procures spinning reserves for frequency control through purchases from producers. It is a condition that the generating units in question are connected to the transmission system and take part in frequency control through the primary regulation of governors for the entire frequency range from 47.5Hz to 52Hz. The permanent speed droop of the generating units shall be set at no more than 6% and their power set-point values shall be remote-controllable from Landsnet's Energy Management System.
- 4.4 Landsnet enters into agreements with producers on spinning reserves for disturbance recovery. The generating units in question must meet the requirements under Article 4.3, and the permanent speed droop must be no more than 5%. A particular causal relationship between the permanent speed droop and the minimum spinning reserve ratio of a generating unit is specified in the agreement.
- 4.5 Landsnet enters into agreements with producers on access to regulating power, i.e. regulating power options. Producers that enter into such agreements are obliged to offer a certain amount of power in the regulating power market.
- 4.6 Bids made on the basis of a regulating power option are treated like other bids in the regulating power market, in accordance with Landsnet's B3 Terms.

## **5. Reactive power component of ancillary services**

- 5.1 Landsnet carries out voltage control using its own equipment and through the generation of reactive power in power stations. Landsnet's voltage control obligations are set out in Regulation No. 1048/2004 on the quality and security of electric power delivery, as subsequently amended.
- 5.2 The following requirements are made on generating units connected to the transmission system for reactive power generation and voltage control:
- That they have automatic voltage regulation.
  - That their voltage set-point value can be changed instantaneously at any time, i.e. immediately when a request to such effect is received from Landsnet.
  - That they can generate and use reactive power with a power factor of up to 0.9 based on the rated capacity of the generating unit. Landsnet is entitled to determine the reactive power generation of these units within these limits.
- 5.3 Landsnet may enter into an agreement with a producer on the generation of reactive power outside the power factor limits specified in Article 5.2.

## **6. Liability**

- 6.1 The liability provisions of the General Terms on Electricity Transmission and System Management (A1 Terms) shall also apply to ancillary services.

## **7. Force majeure**

- 7.1 The force majeure provisions of the General Terms on Electricity Transmission and System Management (A1 Terms) shall also apply to ancillary services.

## **8. Breach of terms**

- 8.1 In the event of violation of these Terms, the National Energy Authority (Orkustofnun) may be requested to act on the basis of Chapters VII and VIII of the Electricity Act.

## **9. Regulation and remedies**

- 9.1 The National Energy Authority regulates the compliance of companies with the Electricity Act No. 65/2003 and with the conditions applying to their activities under law, government regulations and these Terms.

- 9.2 In the event of a dispute arising out of or relating to the implementation or interpretation of the provisions of these Terms where the National Energy Authority has the adjudication power on the basis of Chapters VII and VIII of the Electricity Act, resolution by the Authority and the Appeals Committee on Electricity may be sought where appropriate. If the resolution of a dispute does not fall under the remit of the National Energy Authority, the case may be referred to the Reykjavík District Court for a decision.

## 10. References

- 10.1 A1 General Terms on Electricity Transmission and System Management.  
10.2 B3 Terms for the Procurement of Regulating Power and Settlement of Balancing Energy.  
10.3 C3 Terms on the Procurement and Settlement of Non-Spinning Reserves.