



## The secondary reserve: a solution to restore balance and frequency

Elia uses the secondary reserve on a daily basis to balance its control area and so, if need be, take part in stabilising frequency in the European system. The secondary reserve is activated automatically by a message sent directly by Elia's dispatching centre to the grid user's dispatching centre. The data are exchanged via high-tech platforms. The secondary reserve is continually activated (upwards or downwards). The reaction time of the unit providing for the secondary reserve is measurable in seconds. The provision of the reserve by the grid user is subject to a set payment as stipulated in the contract. Activation of the reserve is also subject to payment. The secondary reserve gives the grid user the opportunity to play an active role in managing the Elia grid.

### I. The secondary reserve: principles

#### I.1. The background to the primary, secondary and tertiary reserves

The Belgian high-voltage grid is part of a larger European interconnected system. UCTE (Union for Co-ordination of Transmission of Electricity) is the body responsible for co-ordination of the operation and the development of the European interconnected system, otherwise known as the UCTE synchronous area. It recommends that all the transmission system operators act in a spirit of solidarity to ensure the security and reliability of the European system. Elia handles its control area, taking the measures needed to meet the objectives of reliability, efficiency and security.

The provision of power reserves is one component of grid management. Their specific function is to maintain the frequency, voltage and efficient handling of imbalances or congestion in its control area.

Grid users provide Elia with three kinds of power reserves: primary, secondary and tertiary. The primary reserve can be activated very quickly (within 0 to 30 seconds) and is used to maintain frequency; the secondary reserve can be activated quickly (30 seconds-15 minutes) and alleviates typical imbalances; and the tertiary reserve can be manually activated in the event of major imbalances and substantial congestion.

#### I.2. A solution that can be activated automatically to restore balance and stabilise frequency

The secondary reserve's main purposes are:

- to continually restore balance in the Elia control area;
- to continually regulate frequency variations (target: between 49,99Hz en 50,01Hz).

The secondary reserve is continually activated upwards or downwards automatically (signals transmitted by Elia's dispatching department to the grid user's dispatching department). This makes the secondary reserve different from the tertiary reserve, as the latter is used to resolve unusual balance or congestion problems.

Elia is provided with the secondary reserve by grid users with sites in Belgium. The reserve can be activated upwards or downwards. Upward activation is reflected by a rise in the power injected into the Elia grid, whilst downward activation involves a reduction in the power injected.

The secondary reserve is activated automatically: a signal transmitted by Elia's dispatching centre to the grid user's dispatching centre automatically orders an increase or decrease in the power injected. The activation process must ensure that the whole reserve can be delivered upon Elia's request (with the time depending on the ramping rate, i.e. start up speed of the unit). Maximum volume increases (called "+R2") and decreases (called "-R2") are specified in the secondary-reserve contract.

#### I.3. A solution that can be activated within 30 seconds

The grid user that signs a secondary reserve contract with Elia undertakes to make the volume of reserve power fixed in the contract available within 30 seconds. The grid user also undertakes to supply this reserve to Elia for at least 15 consecutive minutes.



## II. High-tech data-exchange protocols

The provision and activation of the secondary reserve entail Elia and the grid user exchanging large volumes of data.

### II.1. Data exchanges on D-1, in real time and on D+1

Elia and the grid user exchange data:

- related to providing the reserve;
- related to ongoing activation.

#### Information related to providing the reserve

Every day before 3 p.m., the grid user forwards information to Elia that would be useful if the secondary reserve had to be activated the following day. This means that the information has to be submitted on D-1 for day D. The specific information involved is:

- the list of production units taking part in the secondary reserve;
- the amount of reserve handled by each of the production units on a quarter-hourly basis;
- the price for incremental or decremental activation.

On day D, the grid user communicates to Elia the instantaneous value, i.e. the portion of secondary reserve that is available to Elia at any given moment. The data are stored by Elia and by the grid user.

#### Information exchanged when activating the secondary reserve

When the secondary reserve is actually activated, the grid user provides Elia with the following information in real time for each of the participating production units:

- the indicator of participation in the secondary reserve;
- the minimum and maximum power that can be deployed;
- the maximum power variation;
- the power for the grid user's own requirements.

#### Information exchanged after activation of th2 reserve

On day D+1, i.e. the day after the activation of the reserve, the grid user provides Elia with the values of frequency on day D on a second by second basis and this, for all the production units that took part in secondary-control operations. The grid users delivers also the following specific information for each of the units:

- the indicator of participation in the secondary-control operations, on a second-by-second basis;
- the portion of the secondary reserve actually provided;
- the active power measured;
- the power injected for the grid user's own requirements.

These exchanges take place before 6 a.m. on day D+1.

### II.2. A high-tech platform for data exchange

Sophisticated, high-performance facilities ensure optimal conditions for all data exchanges pertaining to the secondary reserve. Due to the quality and reliability that are needed in the secondary-control process, these facilities are more complex than the facilities for the primary and tertiary reserves or the CIPU contract.

Elia and the grid user work together to:

- provide specific physical connections between their respective facilities;
- ensure duplication of the system throughout the communication chain;
- ensure the reliability of their own system.

To meet these requirements, Elia advises that the Elcom and Tase2 protocols be used for exchanges in real time.

## III. Payment for the secondary reserve

A grid user providing Elia with a secondary reserve receives payment for:

- providing the reserve;
- activating the reserve.

### III.1. Payment for provision of the secondary reserve

Elia has to make a payment to the grid user for providing the secondary reserve. Elia will check that this reserve is effectively provided by the grid user. This payment, the size of which is specified in the contract, covers the entire contractual term. According to the stipulations of the federal Grid Code, the payment (expressed in €/MW/hour of availability) must be reasonable, i.e. it must reflect the costs actually involved in providing the reserve.

### III.2. Payment for activation of the secondary reserve

Activation of the secondary reserve is subject to payment. The size of this payment is set on the basis of bids submitted by the grid user on D-1. Bids are selected by financial merit order: Elia first chooses the least expensive bids and the selection process is stopped when the reserve volume is reached. The bids have to meet a number of requirements:

- they must be submitted per block of at least 5 MW, per production unit and per tariff period;
- each bid must include two prices: a price for net upward activation and one for net downward activation;
- the prices must always be positive for upward activation (Elia pays the grid user) and negative for downward activation (the grid user pays Elia);
- the volumes included in the bids must at least cover the reserve that the grid user has undertaken to supply to Elia throughout the contract.

To ensure reasonable activation prices, a check on the amounts included in the bids was built in for both upward (incremental) and downward (decremental) activation. Prices are checked against real costs (fuel) and a market reference price. The reference price currently used is the price published (on D-1) by the Belgian power exchange Belpex.

#### Maximum price for incremental activation

For incremental activation, Elia pays the grid user on the basis of the latter's bid (Ibid). The maximum price for a bid for upward activation is expressed in € per MWh and is based on the fuel price and on the market reference price.

#### Minimum price for decremental activation

For decremental activation, the grid user pays Elia, because the user can reduce its generation output or use for other purposes the power normally deployed for the secondary reserve. The prices given in the bids submitted by grid users (Dbid) must be no lower than a certain stipulated minimum.

### III.3. Payment for an additional control volume

If the grid user so wishes, it may submit activation bids to Elia for volumes greater or less than the volumes indicated in the contract (above +R2<sup>1</sup> or below -R2<sup>1</sup>). In such cases, bids are freely set by the grid user.

### III.4. Non-selected bids transferred to the tertiary reserve

Bids not selected by Elia in the secondary-reserve activation process can be used to establish the tertiary reserve.

### III.5. Operations with a neutral effect on the balancing perimeter

Activation of the secondary reserve by Elia does not have any effect on an ARP's balancing perimeter, as long as the grid user has carried out activation in line with the agreements made with Elia. This means that the ARP will not be invoiced for an imbalance that results from changes in the power generation level that have been requested by Elia.

<sup>1</sup> Maximum volume increases (called "+R2") and decreases (called "-R2") stipulated in the secondary reserve contract.

## IV. Benefits of the secondary reserve

A grid user derives major benefits from opting to take part in the secondary reserve:

- throughout its contract, it is given a set payment for providing its reserve;
- the secondary-reserve contract provides a stable framework for operations that take place over very short periods;
- the grid user takes part in managing the national grid and contributes to it operating efficiently.

## V. Legal and contractual basis

The content of the secondary-reserve contract is based on the stipulations of the federal Grid Code. Reasonable prices are one of these legal requirements. Only grid users that have already signed a CIPU contract with Elia can sign a secondary reserve contract.

### Volumes defined by Elia and approved by CREG

Elia evaluates the volume of capacity in its secondary reserve on the basis of its requirements. CREG must approve this volume. To establish this reserve, Elia organises a procedure for grid users wishing to take part in the tertiary reserve. Grid users submit bids, which are then selected by financial merit order: Elia first chooses the least expensive bid and continues the selection procedure until the total volume of its annual reserve is reached.

Following the selection procedure, Elia concludes a secondary-reserve contract with the chosen grid users.

## The secondary reserve in 5 key points

- Grid users provide Elia with the secondary reserve so that it can manage frequency and imbalances in the Elia control area. The secondary reserve is activated upwards or downwards.
- Unlike the tertiary reserve, the secondary reserve is activated automatically.
- There are two types of payment for the secondary reserve: a set contractual payment for provision of the reserve and a payment for activation of the reserve, with the amount being determined by a bidding process.
- A complex platform is needed to handle the exchange of information between Elia and the grid user pertaining to the secondary reserve. The platform is more sophisticated than the one used for the tertiary reserve and the CIPU contract.
- The activation of the secondary reserve has a neutral effect on ARPs' balancing perimeter.

