Overview of ancillary services for the power grid

Grid users can play an active role in managing the Belgian high-voltage grid by taking part in grid ancillary services. These services enable Elia to maintain the grid's frequency and voltage and to manage balance and congestion. Elia has a wide range of means at its disposal for this purpose: the primary reserve, secondary reserve and tertiary reserves production and offtake, upward or downward activation of the power production by CIPU contract holders, voltage control, Black start etc.

Each of these services that are provided by grid users is described in detail in a specific sheet.

I. A European interconnected system with solidarity between the various operators

The Belgian high-voltage grid that is managed by Elia is one of the links in the European interconnected system. Solidarity between the various European partners is absolutely essential for ensuring grid stability. UCTE (Union for Co-ordination of Transmission of Electricity) is the body responsible for coordinating the operation and development of the European interconnected system (otherwise known as the UCTE synchronous area). It is against this background of international collaboration that Elia is contributing to the proper operation of the European system, with its role taking care of the Elia control area. It has put measures in place to ensure a reliable, effective and secure operation in its control area.

II. Power reserves provided by the grid user

To maintain frequency and voltage and reduce imbalances between production and consumption or congestion on the grid, Elia must have power reserves. These are provided by the grid users.

There are a number of categories of power reserves:

- **primary reserve**

  This power reserve is essential for stabilising the frequency of the European interconnected system and preventing blackouts. The primary reserve can be activated automatically on facilities that are able to detect a frequency variation and to react very quickly to it (within 0 to 30 seconds). It will however not be called upon after 15 minutes. The primary reserve can be provided by some production units that meet specific technical requirements.

- **secondary reserve**

  Elia mainly uses this to balance its control area. It is also used to bring frequency back to 50 Hz. It is activated automatically on a continuous basis, and upwards or downwards as required. The reaction time is quick (from 30 seconds to 15 minutes) and it will remain active for the time needed. A grid user taking part in supplying this reserve, must dispose of equipment enabling communication with the Elia dispatching centre and its production units must meet certain specific technical requirements.

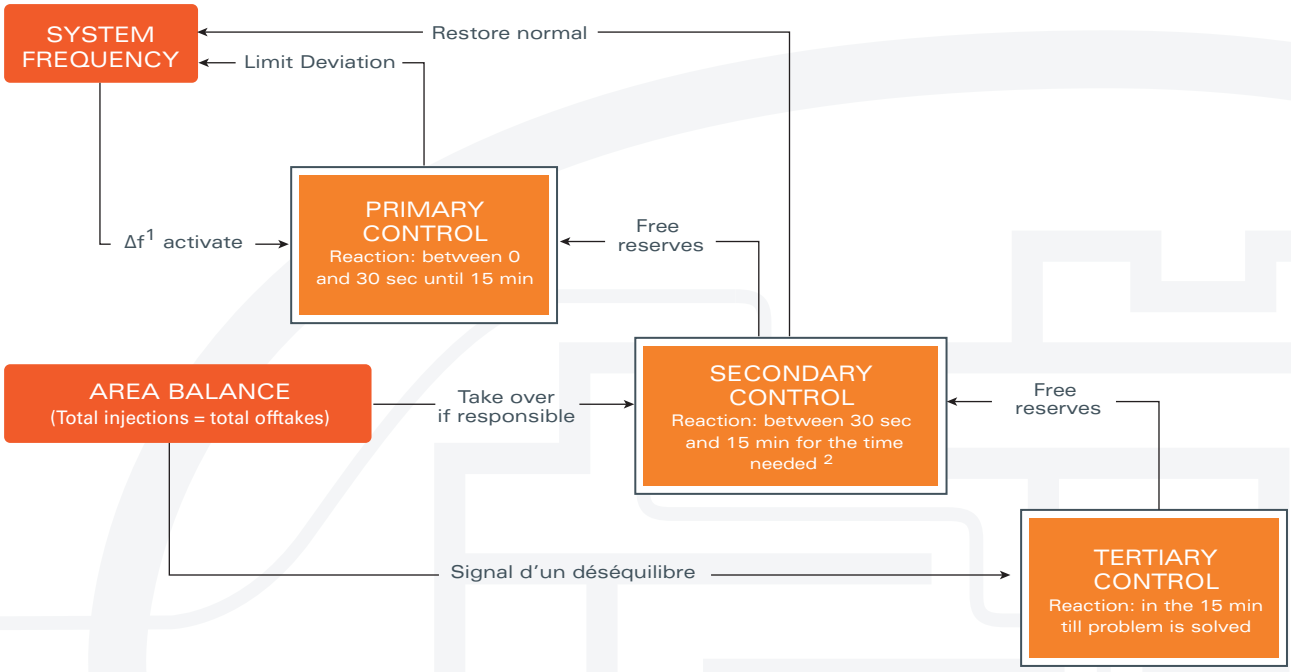
- **tertiary reserve**

  It allows Elia to deal with a major or systematic imbalance in the control area and to resolve major congestion problems. It is activated less quickly than primary or secundary reserve but will in general remain active until the problem is solved. The tertiary reserve is a power reserve that certain producers or industrial consumers make available to Elia. There are two kinds of tertiary reserve: production reserve, i.e. the injection of additional power by producers that have concluded a tertiary reserve contract, and offtake reserve, i.e. the reduction of offtake by grid users that have concluded an interruptibility contract.

  This reserve is a complementary solution to the primary reserve, secondary reserve and the power provided by the CIPU contract.

  Unlike the primary and secondary reserves, the tertiary reserve is activated manually upon a request from Elia. Any user of the Belgian grid wishing to take part can conclude a contract with Elia to this end, as long as its facilities conform to certain technical requirements.

The hierarchy is as follows: the second reserve is only activated once Elia has called on the primary reserve, and similarly, the tertiary reserve is only used after the secondary reserve has been activated.



1 Δf: the difference between the frequency measured and the frequency to be attained, i.e. between 49.99 and 50.01 Hz.
2 Until the problem is solved or until tertiary reserve has taken over from secundary reserve

III. Other solutions developed by Elia

In addition to these reserves, Elia uses other services that can be provided by grid users:

- **Voltage control**

  To maintain its grid's voltage at an appropriate level, Elia has elaborated specific services provided by grid users. Voltage control is activated automatically by the user's production units. Central voltage control is activated manually upon request by Elia, either automatically or manually depending on the situation.

- **Black start**

  Elia follows a specific procedure to gradually restore supply in the event that its grid suffers a total blackout. For this, Elia relies on various production units that provide a black-start service. These units are capable of starting without external electrical support and gradually restoring supply to grid users.

IV. General background for coordinating production units and ancillary services

To ensure grid security, effectiveness and reliability, Elia has to be able to coordinate the injections of electricity into the grid and utilise the power not used by producers. This is why producers injecting electricity into the high-voltage grid are legally bound to conclude a contract coordinating injection by the production units, more commonly known as the CIPU contract. Under the CIPU contract, reserve power is made available to Elia and, at Elia's request, power not used by the producer is activated. The producer draws up forecasts of available power and sends them to Elia.

The CIPU contract is the foundation on which participation of the grid users in the various ancillary services is based.

V. The full range of ancillary services provided to Elia by the grid user yields significant benefits for the user

- It is involved in managing the Elia grid and helps it operate efficiently. As a user of the Elia grid, it benefits because, among other things, Elia incurs lower costs and these costs directly influence Elia's grid usage tariffs. The improved operation of the grid also allows Elia to tailor the size of its investments in grid infrastructure, which also has a positive effect on the level of Elia tariffs;
- In all circumstances, the remuneration paid covers at least the costs incurred by grid users for implementing these services.

Overview of ancillary services

	Stabilising in real time	Restoring on short term	Sustaining on longer term
Indicative period =>	**0-30 sec**	**0-15 min**	**15 min – 8 hours**
Frequency	Primary control	Secundary control	-
Congestion	Light overloads acceptable	Topological modification grid	Tertiary control [1] Control by international emergency reserve
Balance	Taken up by European interconnected system	Secundary control	Tertiary control [1]
Voltage	Primary voltage control	Central voltage control Control on transformers and capacitor banks	-

[1] By means of the power margin made available through the CIPU contract or the production or offtake tertiary reserve.

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