VOLTAGE AND REACTIVE POWER CONTROL SERVICE FRAMEWORK CONTRACT

By and between

ELIA SYSTEM OPERATOR S.A., a company incorporated under Belgian law, having its registered office at Boulevard de l'Empereur 20, 1000 Brussels, with company number BE 476.388.378, represented herein by authorised signatories Mr **Frank Vandenberghe**, CO Customers, Market & System, and **Mr Chris Peeters**, CEO and Chairman of the Management Committee,

hereinafter referred to as "Elia";

and

Name of company:	
Registered office:	
VAT number:	
Represented here by:	

hereinafter referred to as the "Supplier".

Elia and the Supplier may also be referred to individually as the "Party" or jointly as the "Parties".

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WHEREAS:

Elia operates the Electricity Transmission Grid over which it holds a right of ownership or at least a right of use;

Elia was designated and confirmed as transmission system operator in accordance with the Electricity Act of 29 April 1999 and sees to the safety, reliability and efficiency of the Transmission Grid;

in this context, Elia shall ensure the provision of the ancillary services required for the operation of the Transmission Grid, including the Voltage and Reactive Power Control Service, under the conditions referred to in Articles 68 to 74, 76 to 78, 119 to 121, 257 to 260 and 310 to 311 of the Grid Code and this Contract;

accordingly, Elia shall purchase the Voltage and Reactive Power Control Service from Access Responsible Parties of Controlling and Non-controlling Production Units;

the Supplier has Controlling and/or Non-controlling Production Units to provide Elia with the Voltage Control Service and to generate and/or absorb the Reactive Power of the transmission grid in accordance with the aforementioned articles of the Grid Code;

this Contract defines the reciprocal rights and obligations of Elia and the Supplier for the provision of the Voltage and Reactive Power Control Service in the Control Area;

IT IS HEREBY AGREED AS FOLLOWS:

Access Responsible Party (ARP)	any natural person or legal entity listed in the register of Access Responsible Parties;
Active Energy	the integral of Active Power over a specified period of time;
Active Power	the electrical power that can be converted into other forms of power, such as mechanical, thermal or acoustic power; this value is equal to 3 UI cosine (phi), where U and I are the effective values of the fundamental components of the voltage wave (between a phase and earth) and the current wave (in that phase), and whereby phi represents the phase difference between fundamental components of the voltage wave and the current wave;
Appendix	an appendix to this Contract;
CIPU Contract	Contract for the Coordination of Injection of Production Units referred to in this Contract, concluded with Elia in accordance with Article 198 of the Grid Code;
Centralised Voltage Control	ongoing control of the Transmission Grid Voltage by involving all the resources supplied by the Production Unit which help to stabilise the voltage, and by the manual or non-manual adjustment of the Control Value for the generation and/or absorption of Reactive Power for these resources at Elia's request.
Contract	this Voltage and Reactive Power Control Contact concluded by and between Elia and the Supplier;
Control Area	the area for which Elia has been designated and confirmed as transmission system operator in accordance with the Electricity Act of 29 April 1999
Controlling Production Unit	a Production Unit that can participate in Local Voltage Control and in Centralised Voltage Control;
Day (D)	a calendar day;
General Terms and Conditions	the General Terms and Conditions governing the ancillary services, whereby the version of the General Terms and Conditions dated 13 May 2013 shall apply on the date the contract is signed;
Grid Code	all the provisions of the Royal Decree of 19 December 2002 establishing a technical code for the management of – and access to – the grid system;

HV	High Voltage;
Injection Point	the physical location and voltage level of each point from which the Active Power is injected into the Elia Grid, for which access to the Transmission Grid is allocated by concluding an Access Contract with Elia;
Local Voltage Control	ongoing control of the Transmission Grid Voltage that is provided by an automated response from the voltage regulator following a local variation of the Transmission Grid Voltage at the Injection Point;
Month (M)	a calendar month;
Mvar	Mega Volt Ampere Reactive, the unit of measurement for Reactive Power;
Network Voltage (or Unet)	the voltage of the Transmission Grid at the Injection Point (high-voltage side of the step-up transformer);
Non-controlling Production Unit	a Production Unit that can participate only in Centralised Voltage Control and is subject to the same activation rules as Controlling Production Units;
Pnom	the Active Power of a Production Unit defined in the contract for the connection of the Production Unit to the Transmission Grid, which determines the maximum continuous supply of Active Power authorised in the Transmission Grid;
Production Unit	a (controlling or non-controlling) production unit, over which the Supplier has a right of use, listed in Appendix 1 to the Contract;
Q	the Reactive Power;
Reactive Energy	the integral of Reactive Power over a specified period of time;
Reactive Power	the electrical power needed to generate magnetic fields (e.g. in motors and transformers) or electrical fields (e.g. in condensers); the quantity is equal to 3 UI sine (phi), where U and I are the effective values of the fundamental components of the voltage wave (between a phase and earth) and the current wave (in that phase), and whereby phi represents the phase difference between fundamental components of the voltage wave and the current wave;
Set Value	the value set for the Reactive Power to be supplied or absorbed by the Production Unit;

Supplier	the supplier of the Voltage Control Services is the Access Responsible Party of the Production Unit(s) considered. The Access Responsible Party has the right to transfer the rights and obligations as described in this contract to a Third Party, in which case Appendix 8 shall be duly filled and signed by both Parties.
Technical Control Band in compensatory mode	the Reactive Power that can be absorbed or supplied, within the technically possible operating limits as described in Appendix 1 to the Contract, for a Production Unit operating in compensatory mode at Elia's request;
Technical Control Band in injection mode	the Reactive Power that can be absorbed or supplied, within the technically possible operating limits as described in Appendix 1 to the Contract, for a Production Unit operating in injection mode at Elia's request;
Transmission Grid	the Belgian transmission grid over which Elia holds a right of ownership or at least a right of use, for which Elia was designated and confirmed as transmission system operator in accordance with the Electricity Act of 29 April 1999;
U	the symbol for voltage;
Voltage Control Service (or Voltage and Reactive Power Control Service)	The voltage control service provided by the Centralised Voltage Control and/or the Local Voltage Control;

1. Conclusion and term of the Contract, and application of the General Terms and Conditions

1.1. The Supplier shall provide the Voltage Control Service to Elia from 1 January 2017 to 31 December 2017 inclusive, under the terms and conditions described in this Contract and Articles 68 to 74, 76 to 78, 119 to 121, 257 to 260 and 310 to 311 of the Grid Code.

1.2. The performance of the Contract shall be governed by the clauses thereof and by the General Terms and Conditions.

1.3. The clauses of the Contract shall be supplemented by the General Terms and Conditions. In case of any contradiction between the Contract and the General Terms and Conditions, the Contract shall prevail.

1.4. The Supplier declares that he has received a copy of the General Terms and Conditions and that he accepts them. The Supplier accordingly waives all his general, particular, or other terms and conditions, irrespective of the time when or form in which they were transmitted.

1.5. To avoid any misunderstanding, the Parties acknowledge that they are aware of the mutual relations that exist between this Contract, the CIPU Contract, other ancillary services contracts, the ARP Contract, the Access Contract, and the Connection Contract, insofar as the existence and proper performance of each of them makes a key contribution to enabling Elia to guarantee the safety, reliability and efficiency of the Transmission Grid. Compliance with the provisions contained in the aforementioned contracts is essential for the full performance of the Contract.

The Supplier expressly confirms hereby that, insofar as it has not all right and title on the Production Units, it has been authorized by the relevant Grid User(s) to offer the Voltage Control Service and it undertakes to ensure that this Contract continues to have effect in any contract to be concluded between the Supplier and the relevant Grid User(s) by including said authorization in such contracts as an irrevocable condition of the Grid User(s) for the benefit of Elia.

The Supplier guarantees that said Grid User(s) will respect these rules in any involvements with Elia they might have. The Supplier will provide proof thereof at Elia's first request.

1.6. This Contract does not give rise to any right of access or connection to the Transmission Grid for the Production Units listed in Appendix 1 for the Supplier. The latter shall have access and be connected to the Transmission Grid only for those Production Units, in accordance with the Access and Connection Contracts concluded with Elia.

1.7. The entry into force and validity of this Contract shall depend on the prior signing of a CIPU Contract with Elia pertaining to the Production Units listed in Appendix 1, whereby all the Supplier's Production Units listed in the CIPU Contract or contracts concluded with Elia must provide the Voltage Control Service.

1.8. When one or more of the Production Units listed in Appendix 1 to the Contract is/are transferred to another market player, the Supplier guarantees, and procures that the Grid User(s) holding right and title on the Production Unit(s) contribute(s) to, the correct transfer of the Contract to the new supplier.

2. Purpose of the Contract

2.1. The Contract and the General Terms and Conditions shall govern the agreement concluded by and between the Parties for the provision of the Voltage Control Service, as well as the rights and obligations of the Parties relating to said service, without prejudice to the applicable provisions of the Grid Code, in its Articles 68 to 74, 76 to 78, 119 to 121, 257 to 260 and 310 and 311 or, where appropriate, without prejudice to compliance with the relative sensitivity coefficient set in Appendix 1 in accordance with the criteria defined to that end in the Connection Contract for the Production Unit concluded with Elia.

2.2. The purpose of the Voltage and Reactive Power Control Service is to manage and control the transmission grid voltage. The Supplier shall provide Elia with controlling means and resources for the Production Unit, in particular Reactive Power, in accordance with the terms of this Contract.

2.3. The Production Units used by the Supplier to provide the Voltage Control Service are listed in Appendix 1 to the Contract (including the necessary technical and measurement information). The list of these Production Units is liable to change at any time subject to agreement by and between the parties throughout the term of the Contract.

3. Conditions for participation in the Voltage and Reactive Power Control Service

3.1. Compliance with the requirements of the Grid Code

The Production Units participating in the Voltage Control Service shall meet the requirements of Articles 68 to 74 of the Grid Code and, where necessary, comply with the relative sensitivity coefficient α_{eq} set in Appendix 1, in accordance with the criteria defined to that end in the Connection Contract for the Production Unit concluded with Elia.

3.2. Availability for the Voltage and Reactive Power Control Service

The Production Units shall provide Elia with a minimum volume of 5 Mvar for generation or absorption.

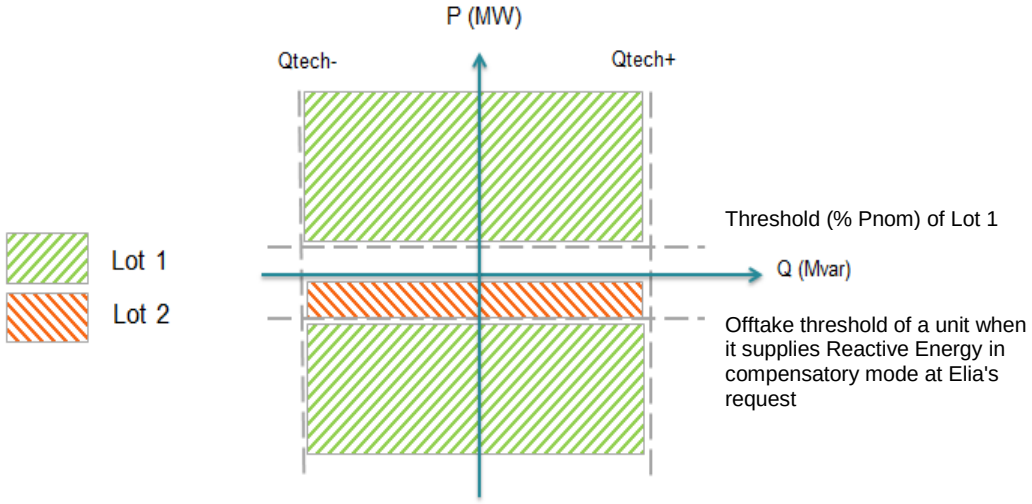
The clauses in this Contract shall apply to Production Units performing injections and/or offtakes – where they can take care of supply in compensatory mode – of Active Power into or from the Transmission Grid. The Parties have identified the following options in Appendix 1:

- Production Units that can supply Reactive Power when they:
  - generate an average Active Energy beyond a certain threshold during a certain 15-minute period (% Pnom x 15 minutes; specified for each Production Unit in Appendix 1 to this Contract); or
  - perform offtakes of Active Energy for reasons other than the supply of Reactive Power (e.g. a hydraulic Production Unit in pump mode for storage reasons)

  (**hereinafter referred to as "Batch 1" and indicated in green in the graph below)**;

- Production Units that can supply Reactive Power in compensatory mode and respond to a request from Elia to activate Reactive Power by performing an offtake of a small quantity of Active Energy (specified for each Production Unit capable of supplying this service in Appendix 1 to this Contract)

  (hereinafter referred to as "Batch 2" and indicated in red in the graph below)



The Reactive Power generated or absorbed by a Production Unit referred to in the Contract is the Reactive Power measured by Elia at the Injection Point, i.e. on the high-voltage side of the step-up transformer of that Production Unit.

3.3. Controlling Production Units

The Controlling Production Units participate in Local Voltage Control and in Centralised Voltage Control, in particular under the conditions of Articles 68 to 74 of the Grid Code and in accordance with the provisions below.

3.3.1. For these Production Units, Reactive Power is supplied or absorbed:

- automatically, during slow (minute) and sudden (second) variations in the transmission grid voltage; and
- as the case may be, by changing the Set Value of the automatic voltage regulator at Elia's request.

3.3.2. Each Controlling Production Unit may, depending on the availability defined in Article 3.2., absorb or supply Reactive Power between the technical minimum ($Q_{tech\ min}$ or Q_{tech-}) and the technical maximum ($Q_{tech\ max}$ or Q_{tech+}) specified in Appendix 1 for a normal operating voltage at the Injection Point.

3.3.3. Each Controlling Production Unit shall have the same options as those defined in the preceding paragraph for each voltage at the Injection Point between 0.925 and 1.05 times the normal operation voltage, except if a limit is defined after consultation by and between the parties following the voltage limitations of the generator or following the stator current of the generator.

Any stator current limitation at steady state shall not impede operation of the Primary Voltage Control.

3.3.4. Within the operating range defined in Articles 3.1, 3.2, 3.3.2. and 3.3.3 of this Contract, each Controlling Production Unit shall be able to adjust its Reactive Power Qnet automatically in the event of network voltage (Unet) variations at the Injection Point, so that the relative sensitivity coefficient α_{eq} corresponds to:

$$\alpha\_eq = -\frac{\left(\frac{\Delta Qnet}{0{,}45 \times Pnom}\right)}{\left(\frac{\Delta Unet}{Unorm,\exp}\right)}$$

where:

Qnet is the Reactive Power measured on the HV side of the step-up transformer;

Unet is the voltage measured on the HV side of the step-up transformer;

ΔQnet is the difference between the Reactive Power before and after the network voltage variation;

ΔUnet is the difference between the network voltage before and after the network voltage variation;

Unorm,exp is the normal operating voltage (average voltage at which the Transmission Grid is operated).

The mathematical definitions of ΔQnet, ΔUnet and the time intervals needed to calculate these values are described in Appendix 7.

The precise relative sensitivity coefficient of each Controlling Production Unit is specified in Appendix 1 to this Contract.

3.3.5. For Centralised Voltage Control, the Supplier shall provide Elia with the Technical Control Band defined in Appendix 1 to this Contract, according to the availability conditions described in Article 3.2.

3.4. Non-controlling Production Units

A Non-controlling Production Unit participates only in Centralised Voltage Control. It must be able to adapt its supply of Reactive Power between two levels agreed by and between the Grid Operator and the Production Unit concerned. These two levels are defined in Appendix 1 to this Contract.

3.5. Verification of compliance with the conditions stipulated in Article 3 during the term of the Contract

Elia shall, throughout the term of the Contract, be entitled to verify whether the conditions stipulated in this article are complied with by the Supplier. Where Elia ascertains that the Supplier does not comply with one or more of the present conditions, it may serve notice to the Supplier of its decision to suspend the Contract. If, after 15 (fifteen) working days from the notice of suspension of the Contract, the Supplier still fails to comply with these conditions, the Contract may be terminated without judicial intervention, in accordance with Article 11 of the General Terms and Conditions.

4. Activation of Centralised Voltage Control by Elia

4.1. Elia may request a Production Unit listed in Appendix 1, in real time, to adjust its Set Value from the time it is available in accordance with the provisions of Article 3.2.

4.2. The unit(s) for which Elia requests that the control signal be adjusted shall be the unit(s) that is(/are) of most financial interest to Elia, in consideration of the following constraints:

- the geographic location of the Production Unit;
- the various activation prices defined in Article 8 of this Contract;
- the supply of Reactive Power from the automatic reaction of the machine or a previous Set Value communicated by Elia when Dispatching (as identified in Appendix 6) seeks a new Reactive Power volume;
- the other technical requirements encountered at such time by Dispatching.

4.3. Elia shall communicate a Set Value to the Supplier for the Production Unit(s) selected under the conditions described in Article 4.2. of the Contract.

The Supplier shall immediately electronically confirm receipt of the Set Value (as prescribed in Article 5).

The Supplier shall have a maximum period of 5 minutes to adjust the Set Value of the Production Unit(s) concerned from the time said value is sent by Elia.

4.4. Elia shall request the Activation of Centralised Voltage Control by sending the Supplier a Set Value comprising at least the following information:

- the selected Production Unit(s);
- the volume of Reactive Power (Q_r, expressed in Mvar) to be attained within the aforementioned time limit (5 minutes) for this Production Unit, measured on the HV side of the step-up transformer.

4.5. Once the volume of Reactive Power desired by Elia is attained by the Production Unit under the conditions described in Article 7.6, the latter may no longer change its Set Value and only the automatic regulator may change this operating set point, until Elia sends a new Set Value.

4.6. Where Elia does not send a Set Value to the Supplier, the Local Control of the Controlling Production Unit shall operate from a reference Set Value set by Elia and the Supplier in Appendix 1 to this Contract, corresponding to a volume of Reactive Energy expressed in Mvar and measured on the HV side of the step-up transformer.

4.7. Once a Production Unit has been restarted, irrespective of the last Set Value sent by Elia, it is agreed that the Production Unit shall supply the Local Voltage Control based on the reference value set in Appendix 1 to this Contract.

4.8. The procedures for exchanging a Set Value between Elia and the Supplier are described in detail in Appendix 4 to this Contract.

5. Data interchange by and between the Parties

5.1. Data shall be exchanged by and between the Parties for the performance of this Contract as follows.

The Set Values shall be communicated by a B2B request message from Elia to the Supplier's contact persons identified in Appendix 6 to the Contract.

The technical receipt of the request message by the Supplier's contact persons shall likewise be acknowledged by electronic message.

5.2. Any urgent communication relating to technical difficulties at a Production Unit likely to prevent the Voltage Control Service is to be communicated via telephone by and between the contact persons identified in Appendix 6 to the Contract.

5.3. In the event of technical problems with electronic data interchange, the Parties shall use telephone communications as a back-up solution.
The Parties agree that telephone communications in real time shall be recorded by the Dispatching department of the Supplier and/or Elia, provided the Parties deem this to be useful for each of them. The parties acknowledge that recorded telephone communications are admissible as proof, e.g. in the event of consultation between the parties, or the settlement of a dispute relating to the Contract pursuant to Article 13.2. of the General Terms and Conditions.

6. Verification and penalties if the Local Voltage Control is not provided by the Supplier

6.1. Pursuant to Article 3, each Controlling Production Unit must be able to adjust its Reactive Power Q_{net} automatically in the event of network voltage variation at its Injection Point, in accordance with the relative sensitivity coefficient α eq as defined in Appendix 1 to the Contract.

6.2. To ensure that the automatic regulator of the Controlling Production Unit provides the Local Voltage Control Service correctly, Elia verifies whether the Reactive Power actually supplied by the Production Unit and measured at the Injection Point on the HV side of the step-up transformer corresponds to the Reactive Power that should have been supplied by the Production Unit in response to variations of the Transmission Grid voltage measured at that same Injection Point.

6.3. Elia uses integrated 15-minute measurements to carry out this verification for each Production Unit in Month M-2, starting out with six samples. Each sample pertains to a 10-hour period. Elia applies the penalty described in Article 6.6. of the Contract where necessary.

6.4. The static control error of the automatic voltage regulator must be less than 0.5% of $U_{norm\ expl}$ at the Injection Point. To that end, a margin of error, taking into

consideration the insensitivity area of the automatic voltage regulator, is included in the verification, and corresponds to:

$$\alpha_{eq} * 0.005 * U_{norm\ expl}$$

This margin of error is distributed round the Reactive Power that should have been supplied by the Production Unit (Q_{net}) in response to the variations in voltage measured at the Injection Point.

6.5. The 15-minute measurements, following a request for activation from Elia, are not considered in this sample.

6.6. Elia shall deem the Local Voltage Control to have not been supplied for a given 15-minute interval when the variation in Reactive Power measured at the Injection Point of the Production Unit does not fall within the margin of error defined in Article 6.4.

If the conditions for the supply of the Local Voltage Control Service are not complied with, Elia shall base the reduction of the remuneration for the activation of the Local Voltage Control to be applied on the following equation:

$$\boldsymbol{Local\ control\ not\ supplied} = \frac{\textbf{\# QHs not compliant with the supply conditions}}{\boldsymbol{\#\ QHs\ analysed\ in\ the\ sample}}$$

- Where the Local Control not supplied is between 0 and 30%, Elia shall not apply the remuneration reduction.

- Where the Local Control not supplied is between 30% and 65%, a 25% price reduction shall be applied to the remuneration of the activation cost for the Local Voltage Control for this Production Unit as set in Article 9 of the Contract, for the entire month as of which the sample was constituted.

- Where the Local Control not supplied is between 65% and 100%, Elia shall deem that the Local Control has not been supplied and shall therefore not remunerate the supplier for the Production Unit concerned, for the entire month as of which the sample was constituted.

6.7. The specific verification procedures and the application of penalties for the Local Voltage Control are provided in Appendix 2 to the Contract.

7. Verification and penalties if Centralised Voltage Control is not provided by the Supplier

7.1. The purpose of these measurements is to ascertain that Centralised Voltage Control was activated in accordance with the procedures defined in the Contract and whether the Set Value communicated by Elia to the Supplier for the Production Unit selected according to the procedures described in Articles 4 and 5 of the Contract was applied correctly.

Elia shall consequently check whether the corresponding Reactive Power was supplied correctly by the selected Production Unit within 5 minutes of notification of the Set Value.

7.2. To this end, Elia shall use the 30" remote measurements (or the most precise measurements available) at the Injection Point of the Production Unit (HV side) of the step-up transformer of:

- the Transmission Grid voltage (U);
- the Reactive Power supplied (Q).

7.3. Elia shall carry out this verification for each Production Unit in Month M-2 on six samples of activation requests by Elia over six different days. Elia shall apply a penalty as described in Article 7.6 of the Contract where necessary.

7.4. Elia shall select for this verification the activation requests pertaining to a minimum volume of 5% of Qtech max (value defined in Appendix 1 to the Contract) when the interval with the following activation request is superior to 5 minutes.

7.5. The margin of tolerance distributed around the Set Value communicated by Elia as defined in Article 6.4 of this Contract shall apply for this verification.

7.6. Elia shall deem that the Centralised Voltage Control Service is being provided correctly if the following conditions are met:

- the volume of Reactive Power requested by Elia and measured at the Injection Point on the HV side of the step-up transformer is within the limits defined in Article 7.5 for at least two successive remote measurements as defined in Article 7.2.;

- the period to execute this activation is less than 5 minutes, as of the time that Elia receives the acknowledgement of receipt (electronic confirmation) of this notification, as described in Article 5.1.

7.7. Where the volume of Reactive Power measured by Elia at the Injection Point is not within the aforementioned limits, Elia shall calculate the volume actually

supplied by the Production Unit (Q_1) and shall apply a penalty to the volume not supplied.

The **volume not supplied** corresponds to:

- the difference between the volume requested by Elia (Q_r) and the volume actually supplied (Q_1) if $Q_1 < Q_r$;
- the difference between the volume actually supplied (Q_1) and the volume requested by Elia (Q_r) if $Q_1 > Q_r$.

The **volume actually supplied (**Q_1) corresponds to the remote measurement of the highest Reactive Power where $Q_1 < Q_r$ (smallest where $Q_1 > Q_r$) obtained in response to an Elia request for generation (or absorption) within the maximum period of 5 minutes.

Where this volume not supplied is greater than 10% of the total volume requested (Q_r), Elia shall apply the following penalty:

*Activation price * volume not supplied * 1.5 (multiplication coefficient) * 10 hours (average activation period)*

where:

Activation price = the remuneration that would have been applied to the last Mvar of the volume requested by Elia for the Production Unit.

7.8. The amount of the penalty applied on the volume not supplied for each activation request analysed in the sample of the month considered may not exceed 50% of the remuneration expected for the day where the analysed activation request was made.

7.9. Where Elia notes that the Centralised Voltage Control is supplied systematically incorrectly in connection with these six samples of activation requests in M-2, it reserves the right to check all the activation requests made in M-2 and to apply the penalty on the volume not supplied pursuant to Article 7.7. The penalty cap principle defined in Article 7.8 shall remain applicable for the month concerned.

7.10. The specific procedures for the verification and application of the penalties for the Centralised Voltage Control are described in detail in Appendix 3 to the Contract.

8. Remuneration

8.1. The remuneration for the Voltage Control Service, without prejudice to any penalties defined in Articles 6 and 7 of the Contract, shall consist of:

8.1.1. the remuneration of any fixed costs of the Supplier, itemised as follows:

- a **set price amounting to** €xxxx/year:

  This price covers the costs incurred, irrespective of the Production Units offered, to provide the service under the conditions described in this Contract.

  The amount is remunerated by Elia to the Supplier after Elia has received the confirmation in writing and based on evidence from the Supplier that the service is available.

- **a set price amounting to** €xxxx/Production Unit:

  This price covers the costs incurred for the additional technical adjustments at a Production Unit covered by the Contract so that it can supply additional Reactive Power on top of the minimum Reactive Power supplied pursuant to Articles 68 to 74 of the Grid Code.

  The set price for the concerned Production Unit(s) shall be remunerated by Elia to the Supplier after Elia has received the confirmation in writing and based on evidence from the Supplier that the total Technical Control Band is made available at the Production Unit, i.e. when:

  - useful technical adjustments were carried out and additional Reactive Power is available; the date on which this additional Reactive Power is available shall be notified to Elia by the Supplier;
  - a Production Unit is not shut down because of scheduled maintenance or an incident ("PU" and "FO" status, depending on the procedures of the CIPU Contract concluded with Elia).

8.1.2. The remuneration for the costs to activate the Voltage Control Service pertaining to the supply of Reactive Power by the Production Units by means of Local Control and Centralised Voltage Control differs, being applied depending on the volume of Reactive Power Available (Q_{tech+} and Q_{tech-}), on the Batch in which the Production Unit is located, and on whether the Production Unit is controlling or non-controlling. For Production Units requiring additional technical adjustments the remuneration of the activation cost by Elia to the Supplier shall start once Elia has received the confirmation in writing and based on evidence from the Supplier that the total Technical Control Band is made available at the Production Unit (as defined in Article 8.1.1).

8.1.3. <u>For Controlling Production Units where one (or two) part(s) of one or more technical bands is(/are) greater than 20 Mvar, the remuneration for the activation costs varies, depending on:</u>

- the batch in which the Production Unit is located, as defined in Article 3.2. of the Contract;
- the volume of Reactive Power supplied within the limits of the Production Unit's technical control band, according to the graph below:

where:

Q1 and Q3 are set for each Production Unit in Appendix 1 to the Contract;

there is a minimum value of 10 Mvar per Price. Where the Production Unit provides a volume of Reactive Power below 20 Mvar for a generation (or absorption) technical band, the remuneration mechanism of Articles 8.1.6 and 8.1.7 shall apply to this(/those) technical band(s).

8.1.4. **For Batch 1, as defined in Article 3.2:**

The price (P1) for the supply of Reactive Power from 0 to Q_1 amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering.

The price (P2) for the supply of Reactive Power from Q_1 to Q_{tech+} amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering .

The price (P3) for the absorption of Reactive Power from 0 to Q_3 amounts to:

€XXX/Mvarh absorbed, measured with integrated 15-minute metering .

The price (P4) for the absorption of Reactive Power from Q_3 to Q_{tech-} amounts to:

€XXX/Mvarh absorbed, measured with integrated 15-minute metering.

8.1.5. **For Batch 2, as defined in Article 3.2**:

The price (P5) for the supply of Reactive Power from 0 to Q_1 amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering.

The price (P6) for the supply of Reactive Power from Q_1 to Q_{tech+} amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering.

The price (P7) for the absorption of Reactive Power from 0 to Q_3 amounts to:

€XXX/Mvarh absorbed, measured with integrated 15-minute metering.

The price (P8) for the absorption of Reactive Power from Q_3 to Q_{tech-} amounts to:

€XXX/Mvarh absorbed, measured with integrated 15-minute metering.

8.1.6. <u>For Controlling Production Units where one (or two) part(s) of the technical band(s) is(/are) below 20 Mvar, when the Production Unit injects into the grid (Batch 1):</u>

The price (P1) for the supply of Reactive Power from 0 to Q_{tech+} amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering.

The price (P3) for the absorption of Reactive Power from 0 to Q_{tech-} amounts to:

€XXX/Mvarh absorbed, measured with integrated 15-minute metering.

8.1.7. For Controlling Production Units where one (or two) part(s) of the technical band(s) is(/are) below 20 Mvar, when the Production Unit supplies in compensatory mode (Batch 2):

The price (P5) for the supply of Reactive Power from 0 to Q_{tech+} amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering.

The price (P7) for the absorption of Reactive Power from 0 to Q_{tech-} amounts to:

€XXX/Mvarh absorbed, measured with integrated 15-minute metering.

8.1.8. For the Non-controlling Production Units:

The price (P9) for the generation of Reactive Power from 0 to Q_{tech+} amounts to:

€XXX/Mvarh generated, measured with integrated 15-minute metering.

The price (P10) for the absorption of Reactive Power from 0 to Q_{tech-} amounts to:

€XXX/Mvarh absorbed, measured with integrated15-minute metering.

8.1.9. The activation prices defined above apply to each Production Unit measured with integrated 15-minute metering (expressed in Mvarh) of the Reactive Power generated (or absorbed) times 15 minutes.

9. Invoicing and payment

9.1. Elia shall submit a report to the Supplier, by or before the fifteenth day of Month M, regarding the measurements and checks relating to the Voltage Control Service in Month M-2.

This report shall indicate any applicable penalties as Calculated by Elia pursuant to Articles 6 and 7 of the Contract in Month M-2. The report shall comprise the methods and all the data used to calculate these penalties.

9.2. Disputes from the Supplier regarding the report stipulated in Art. 9.1 must be reported within 25 calendar days starting from the day following Elia's submission of the respective report. Should this occur, the Parties shall enter into negotiations between them with a view to reaching an agreement.

9.3. The Supplier shall send the pro-forma invoice to Elia, to the contact persons in Appendix 6 to the Contract, by or before the 25th (twenty-fifth) day of each Month M. The pro-forma invoice shall indicate in particular:

- the references of the Purchase Order;
- the remuneration for fixed costs, where applicable, calculated in accordance with Article 8 of the Contract;
- the remuneration for the activation of the Voltage Control Service in Month M−2, calculated in accordance with Article 8 of the Contract;
- where applicable, the prices of the penalties in Month M-2, as calculated by Elia in accordance with Articles 6 and 7 of the Contract;
- the Supplier's bank account number to which payment is to be made;
- the legal notes in accordance with Article 5.1 of the General Terms and Conditions.

9.4. Elia shall either approve or reject the pro-forma invoice within 5 working days of receiving it. In accordance with the pro-forma invoice, the invoice may only be sent to the Invoicing & Payment department after Elia has approved the pro-forma invoice.

9.5. Appendix 5 states the imputation structure to be used by the Supplier.

9.6. If it appears subsequently that the calculated penalty(ies) is (are) incorrect, the first Party to take action will inform the other Party thereof as soon as possible. In case of discrepancies between data of ELIA and the Supplier, the ELIA data prevail unless the Supplier can prove that the Supplier’s data are correct. The Parties will try to reach an amicable solution; in the absence thereof, the dispute settlement procedure mentioned in Art. 13.2 of the General Terms & Conditions shall apply.

10. Contact persons

The Parties shall keep details relating to the contact persons up to date for the entire term of the Contract through the respective notification of Appendix 6 duly completed. Appendix 6 may be updated by e-mail.

All correspondence exchanged by and between Elia and the Supplier relating to the Contract shall be carried out by the persons designated for that purpose in that same Appendix 6.

Done in Brussels on …….. 2016, in two original counterparts, each Party declaring that it received one original.

Elia System Operator S.A., represented by:

Frank Vandenberghe	**Chris Peeters**
Chief Officer	CEO and
Customers, Market	Chairman of the Management Committee
& System	
Date:	**Date:**

……, represented by:

Name:	Name:
Position:	Position:
Date:	Date:

Appendix 1a – List of controlling and/or non-controlling production units and related technical control bands

Production Unit (including the EAN code)	Controlling (C) or Non-controlling (NC)	Technical control band in injection mode (MVar)				Technical control band in compensatory mode (Mvar)				Coefficient α eq	Reference set value (Mvar)	Minimum threshold (% P_{nom}) to be able to supply the technical band (Batch 1 – Art. 3.2)	Minimum offtake (MW) to operate in compensation mode (Batch 2 – Art. 3.2)
		$Q_{tech\ min}$	Q_3	Q_1	$Q_{tech\ max}$	$Q_{tech\ min}$	Q_3	Q_1	$Q_{tech\ max}$				

Appendix 1b – List of controlling and/or non-controlling production units and related telemeasurement information

Realtime Measurements:

Production Unit (including the EAN code)	Reactive Power Measurement (PUTM)	Active Power Measurement (PUTM)	Voltage Measurement (PUTM)

Appendix 2 – Verification of Local Voltage Control Service

Example of verification for a Production Unit with the following characteristics:

- it is connected to the 150-kV network ($U_{norm\ expl}$);
- it can supply a volume of Reactive Power of "-60; +140" Mvar;
- it has a nominal power (Pnom) of 357 MW;
- it has a relative sensitivity coefficient α_{eq} of 18.67

The Local Voltage Control of this Production Unit is defined by the following relationship:

$$\alpha\_eq = -\frac{\left(\frac{\Delta Qnet}{0{,}45 \times Pnom}\right)}{\left(\frac{\Delta Unet}{Unorm,\exp}\right)}$$

Elia has 15-minute measurements of the Reactive Power and the voltage at the Injection Point of the Production Unit, on the HV side of the step-up transformer. As the relative sensitivity coefficient of the automatic voltage regulator is also fixed, Elia can calculate what the Reactive Power generated or absorbed should have been in theory, based on the voltage differences measured, where:

ΔUnet = the difference between the network voltage before and after the network voltage variation;

ΔQ = the difference between the Reactive Power measured at QHn and the Reactive Power Measured at QH(n-1).

$\Delta Q_{theoretical}$ = the Volume of Reactive Power that must be supplied by a Production Unit during the 15-minute interval considered after a variation of the measured voltage (ΔUnet) on this same 15-minute interval, calculated by applying the formula above.

For this example, the 15-minute measurements for 13 April 2015 are checked from 12 midnight (given here as "00:00") to 10 a.m. (given here as "10:00").

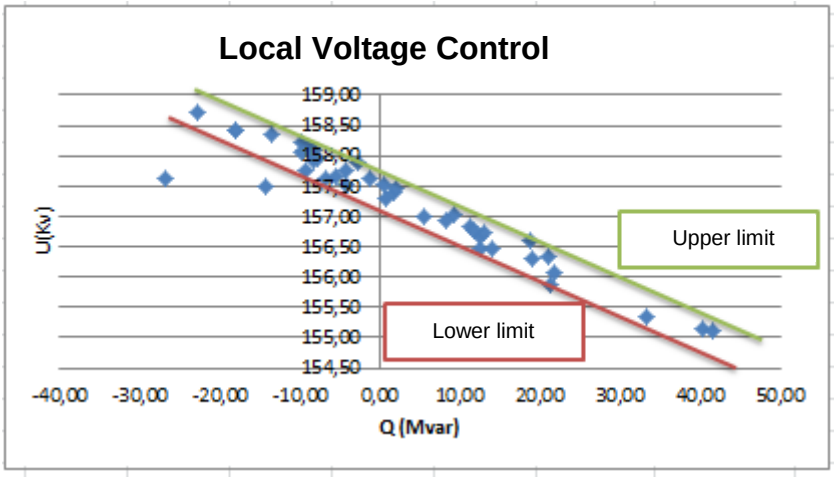
The margin of tolerance defined in Article 6.4 corresponds to 18.67 * 0.005 * 150 = 14 Mvar. It is distributed around $\Delta Q_{theoretical}$.

date	Q (Mvar) Measured	U (kV) measured	Delta U measured (kV)	Delta Q measured (Mvar	ΔQ theoretical	Lower limit (Mvar)	Upper limit (Mvar)	Local control supplied (Y/N)?
13/04/2015 0:00	-14.30	157.51						
13/04/2015 0:15	-26.87	157.64	0.13	-12.57	-2.47	-9.47	4.53	NO
13/04/2015 0:30	-9.40	157.76	0.12	17.47	-2.25	-9.25	4.75	NO
13/04/2015 0:45	-13.63	158.34	0.59	-4.22	-11.11	-18.11	-4.11	YES
13/04/2015 1:00	-8.73	158.13	-0.21	4.90	4.07	-2.93	11.07	YES
13/04/2015 1:15	-4.23	157.75	-0.37	4.50	7.09	0.09	14.09	YES
13/04/2015 1:30	-6.87	157.63	-0.12	-2.64	2.24	-4.76	9.24	YES
13/04/2015 1:45	-17.98	158.41	0.78	-11.11	-14.77	-21.77	-7.77	YES
13/04/2015 2:00	-9.86	158.20	-0.21	8.12	3.98	-3.02	10.98	YES
13/04/2015 2:15	-2.74	157.89	-0.32	7.11	5.99	-1.01	12.99	YES
13/04/2015 2:30	-8.23	157.93	0.04	-5.48	-0.73	-7.73	6.27	YES
13/04/2015 2:45	-17.97	158.41	0.48	-9.74	-9.17	-16.17	-2.17	YES
13/04/2015 3:00	-7.88	157.96	-0.45	10.10	8.50	1.50	15.50	YES
13/04/2015 3:15	-8.30	158.08	0.12	-0.42	-2.24	-9.24	4.76	YES
13/04/2015 3:30	-9.66	158.09	0.01	-1.36	-0.28	-7.28	6.72	YES
13/04/2015 3:45	-22.85	158.70	0.61	-13.19	-11.47	-18.47	-4.47	YES
13/04/2015 4:00	-9.86	158.05	-0.65	13.00	12.36	5.36	19.36	YES
13/04/2015 4:15	-1.25	157.63	-0.42	8.61	8.02	1.02	15.02	YES
13/04/2015 4:30	1.70	157.38	-0.24	2.95	4.56	-2.44	11.56	YES
13/04/2015 4:45	2.10	157.45	0.06	0.40	-1.18	-8.18	5.82	YES
13/04/2015 5:00	0.62	157.30	-0.15	-1.48	2.79	-4.21	9.79	YES
13/04/2015 5:15	5.41	156.99	-0.31	4.78	5.81	-1.19	12.81	YES
13/04/2015 5:30	9.25	157.01	0.02	3.84	-0.40	-7.40	6.60	YES
13/04/2015 5:45	8.32	156.93	-0.08	-0.93	1.53	-5.47	8.53	YES
13/04/2015 6:00	12.57	156.47	-0.46	4.25	8.78	1.78	15.78	YES
13/04/2015 6:15	21.66	156.07	-0.40	9.09	7.67	0.67	14.67	YES
13/04/2015 6:30	-5.53	157.65	1.59	-27.19	-30.10	-37.10	-23.10	YES
13/04/2015 6:45	0.48	157.53	-0.12	6.00	2.36	-4.64	9.36	YES
13/04/2015 7:00	-4.18	157.53	0.01	-4.66	-0.11	-7.11	6.89	YES
13/04/2015 7:15	11.16	156.82	-0.71	15.35	13.51	6.51	20.51	YES
13/04/2015 7:30	12.43	156.68	-0.15	1.27	2.75	-4.25	9.75	YES
13/04/2015 7:45	13.94	156.47	-0.21	1.50	3.93	-3.07	10.93	YES
13/04/2015 8:00	21.27	155.88	-0.59	7.33	11.14	4.14	18.14	YES
13/04/2015 8:15	33.41	155.34	-0.54	12.14	10.19	3.19	17.19	YES
13/04/2015 8:30	40.30	155.16	-0.19	6.89	3.52	-3.48	10.52	YES
13/04/2015 8:45	41.48	155.13	-0.03	1.18	0.54	-6.46	7.54	YES
13/04/2015 9:00	21.13	156.32	1.19	-20.35	-22.61	-29.61	-15.61	YES
13/04/2015 9:15	13.03	156.74	0.42	-8.10	-7.87	-14.87	-0.87	YES
13/04/2015 9:30	18.71	156.61	-0.13	5.68	2.46	-4.54	9.46	YES
13/04/2015 9:45	11.76	156.78	0.17	-6.95	-3.25	-10.25	3.75	YES
13/04/2015 10:00	18.92	156.30	-0.48	7.16	9.08	2.08	16.08	YES

Elia deems that the Local Control Service has not been supplied for the QH considered from the time that the ΔQ measured is not within the lower and upper limits for that QH.

In this example, this is the case for 2 out of 40 QHs, i.e. 5%. No penalty is applied, in accordance with the penalty calculation system in Article 6.6.

The supply in accordance with the Local Control Service can be shown by a linear relationship between the voltage and reactive power measurements, as illustrated for the sample analysed in the graph below:


Local Voltage Control
159,00
158,50
158,00
157,50
157,00
156,50
156,00
155,50
155,00
154,50
U(Kv)
-40,00
-30,00
-20,00
-10,00
0,00
10,00
20,00
30,00
40,00
50,00
Q (Mvar)
Upper limit
Lower limit

Appendix 3 – Verification of Centralised Voltage Control

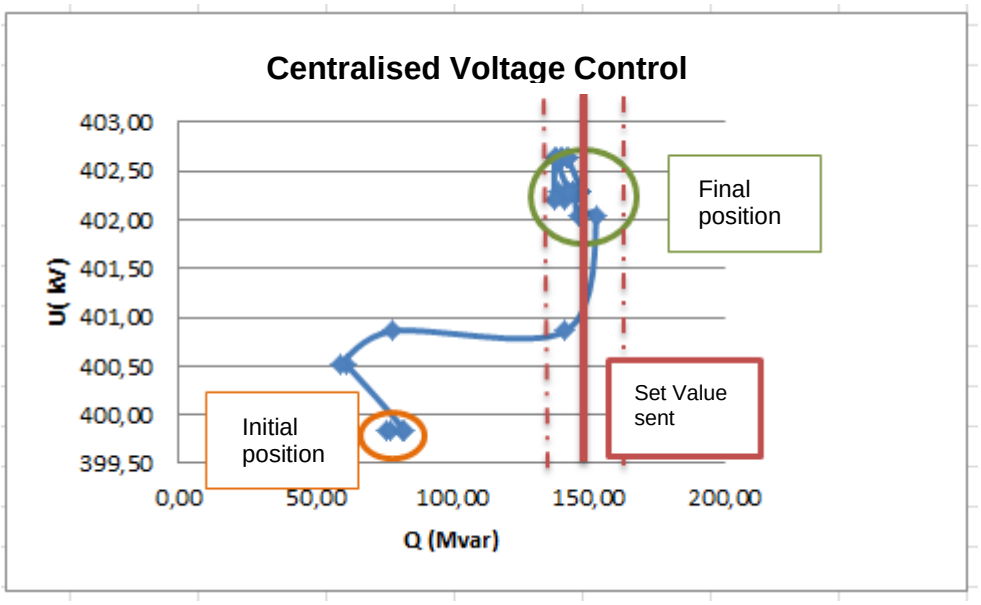
Elia sends an activation request at 8 a.m. (Generation of Reactive Power) to Production Unit X with the Set Value “150 Mvar”. (The procedures for the communication of a Set Value are described in Appendix 4.)

To verify whether the required Reactive Power was supplied, Elia uses the remote measurements available for the 5 minutes following the activation request, i.e.:

hours	Q(Mvar)	U (kV)
8:00:00	81.76	399.84
8:00:30	75.84	399.84
8:01:00	77.42	399.84
8:01:30	82.55	399.84
8:02:00	61.22	400.52
8:02:30	59.25	400.52
8:03:00	78.21	400.86
8:03:30	141.41	400.86
8:04:00	152.86	402.04
8:04:30	146.15	402.04
8:05:00	145.36	402.29

Elia checks whether the volume of the Reactive Power requested (150 Mvar) and measured at the injection point (HV side) is within the limits defined in Article 7.5, for at least two successive measurements:

That is the case in this example as of the measurement at 8:03:30 (i.e. 3 minutes and 30 seconds after 8 a.m.). The Supplier has responded correctly to Elia's activation request. That can also be shown in graph form:



For instance, if the set value communicated by Elia for this example had been 200 Mvar, Elia would have noted in its measurements that the maximum value attained by the unit is 152.86 Mvar.

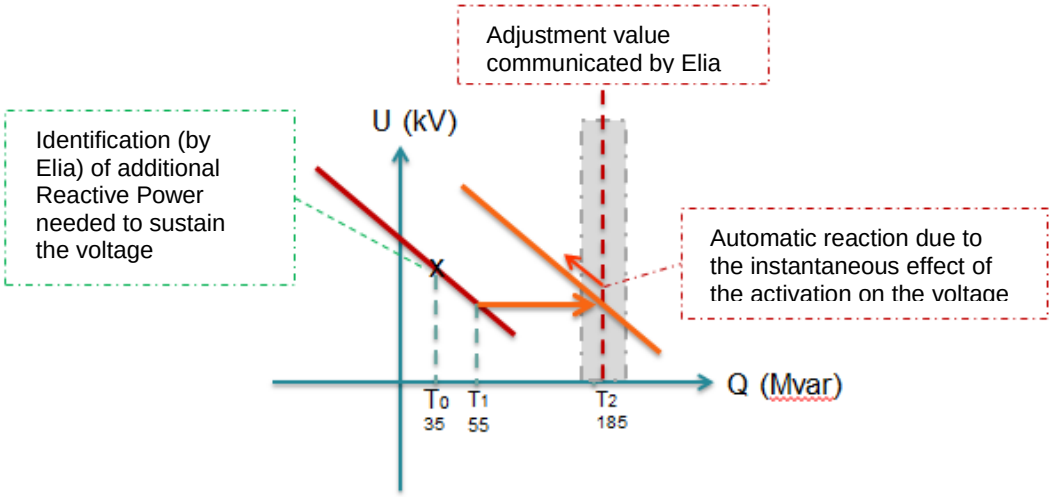
A penalty for the volume not supplied would then be imposed on the delta, i.e. 200 - 152.86 = **47.14 Mvar.**

The penalty corresponds to:

47.14 * price that should have been applied to the last Mvar supplied * 1.5 (multiplying coefficient) * 10 (h)

Appendix 4 – Communication of a Set Value by Elia for Centralised Voltage Control

The Local Voltage Control can be shown on the graph below, where the Y axis corresponds to the voltage measurement at the Injection Point of the Production Unit and the X axis defines the volume of Reactive Power injected/absorbed by that Production Unit **on the HV side of the step-up transformer.**



When Elia identifies a need for additional Reactive Power to be generated (T_0), the Unit generates 35 Mvar through its automatic voltage regulator. Elia wishes to generate an additional volume of 150 Mvar, and thus sends the Set Value “185 Mvar” (150 + 35) to the Supplier.

This set value corresponds to a Reactive Power measured on the HV side of the step-up transformer. The grey area around the Set Value desired by Elia corresponds to that defined in Article 7.5.

The supplier has 5 minutes to carry out this change. In this example, the Supplier addressed Elia’s request at T1 (55 Mvar).

From the moment it reaches the desired volume (measured on the HV side, T2 in the graph), the Supplier considers that Elia’s activation request was met and leaves the automatic control to run from that point on, until a new Set Value is communicated by Elia (orange line on the graph).

Appendix 5 – Imputation structure

Auxiliary service	Remuneration	Booking reference
Voltage regulation	Fixed fee – all except production unit	910327
	Fixed fee – only production unit	910328
	Local Mvar activation control	910339
	Central Mvar activation control	910360
	Mvar Prod-normal mode (0-50% band)	910329
	Mvar Prod-normal mode (50-100% band)	910330
	Mvar Abs-normal mode (0-50% band)	910331
	Mvar Abs-normal mode (50-100% band)	910332
	Mvar Prod-compensator mode (0-50% band)	910333
	Mvar Prod-compensator mode (50-100% band)	910334
	Mvar Abs-compensator mode (0-50% band)	910335
	Mvar Abs-compensator mode (50-100% band)	910336
	Mvar Prod- non-regulating unit (all band)	910337
	Mvar Abs- non-regulating unit (all band)	910338
	Voltage regulation start-up	905503

Appendix 6 – Contact persons

For ELIA:

1 Contract monitoring

Amandine Leroux
Boulevard de l'Empereur 20
1000 Bruxelles
Tel.: +32 (0)2 546 7443
Fax: +32 (0)2 546 7840
Email: amandine.leroux@elia.be

2 Invoicing and payments

Settlement
Manuel Aparicio
Boulevard de l'Empereur 20
1000 Brussels
Tel.: +32 (0)2 546 7062
Email: system.services@elia.be

Invoicing and payments
ELIA SYSTEM OPERATOR NV
Lieve Kerckhof
Keizerslaan 20
B-1000 Brussels
VAT no. BE 476.388.378

3 Real-time operations

National dispatching (Operations)
Chaussée de Vilvoorde 126
B-1000 Brussels
Tel.: +32 (0)2 382 2383
Fax: +32 (0)2 382 2139
Email: dispatching@elia.be
Northern regional dispatching office (Noord)

Southern regional dispatching office (Zuid)

4 Non real-time operations

National dispatching (Duty)
Chaussée de Vilvoorde 126
B-1000 Brussels
Tel.: +32 (0)2 382 2308
Fax: +32 (0)2 382 2139
Email: dispatching@elia.be

For the Supplier:

6 Contract monitoring
7 Invoicing and payments 1.1 Settlement 1.2 Invoicing and payments
8 Real time (24h/24h, telephone number in the event of technical problems with electronic data interchange)
9 Non real-time operations

Appendix 7 – Definition of ΔQ_{net} and ΔU_{net} quantities and of the time interval

A time interval is chosen for which the measurement of the voltage (high voltage) and of the net Active and Reactive Power of the Production Unit concerned is available, as is a measurement of the frequency in Belgium, but not necessarily on the site of the Production Unit. The choice of time interval must meet the following criteria:

There are no radical variations in the frequency of the system and the net Active Power of the Production Unit during the time interval, and the Reactive Power Set Value is not changed.

No radical variations of the HV and the net Reactive Power of the Production Unit occur during the first 20 seconds and last 20 seconds of the interval.

There is no major variation in HV and thus in the Reactive Power of the Production Unit during the rest of the interval.

We use U1 and Q1 to refer to the average HV and the average net Reactive Power of the Production Unit respectively during the first 20 seconds of the interval. We use U2 and Q2 to refer to the average high voltage and average net Reactive Power during the last 20 seconds of the interval.

This gives:

$$\Delta U_{net} = U_2 - U_1$$

and

$$\Delta Q_{net} = Q_2 - Q_1$$

Appendix 8 – Letter template for the transfer of rights and obligations regarding the supply of the voltage and reactive power control service to a third party

Elia System Operator NV
To attention of Amandine Leroux
Keizerslaan 20
B-1000 Brussel

Date DD/MM/YYYY

Subject: Agreement for the transfer of rights and obligations regarding the supply of the voltage and reactive power control service to a third party

	ARP	**Third Party**
Name		
Address		

[ARP] declares that:

1. He agrees to transfer the rights and obligations of the contract for the voltage and reactive power control service for the delivery period of DD/MM/2017[1] to 31/12/2017 to [Third Party] located at [ADDRESS].
2. He has signed the ARP and the CIPU contracts required for the delivery of the voltage and reactive power control service,
3. He is aware of the content of the concerned contract to be concluded by Elia System Operator and [Third Party]
4. He will not take other commitments with respect to, nor be in charge of the future contract between Elia System Operator and [Third Party] regarding the delivery of the voltage and reactive power control service.

[ARP] recognizes and agrees that the contract between Elia System Operator and [Third Party] for the delivery of the voltage and reactive power control service is without prejudice to its rights and obligations regarding the ARP and CIPU contracts.

[1] Date of the effective transfer of the contract: in any case this date should always be comprised in the delivery period of 01/01/2017 to 31/12/2017.

[ARP] and [Third Party] recognize that Elia System Operator is not accountable for:

1. A disagreement between [ARP] and [Third Party] regarding the production of energy and the delivery of the service voltage and reactive power control.
2. A disagreement between [ARP] and [Third Party] related to penalties, as provided in the contract for voltage and reactive power control service, and resulting from a faulty nomination by [ARP].

[Third Party] declares that he will inform [ARP] in case of any modification regarding the delivery of the above mentioned service. If a change of [ARP] occurs, this agreement between [ARP] and [Third Party] is no longer valid and [Third party] ensures that the new [ARP] takes over the agreement under same terms and conditions.

Best regards,

[ARP] with enterprise number [NUM], represented by:

Name:	Name:
Function:	Function
Date:	Date:

[Third Party] with enterprise number [NUM], represented by:

Name:	Name:
Function:	Function
Date:	Date:

For knowledge and agreement:
Elia System Operator NV (Elia) with enterprise number 476.388.378, represented by:

Name:	Name:
Function:	Function:
Date:	Date: