



RULES ON CALCULATION AND ALLOCATION OF INTERCONNECTION CAPACITIES ASSIGNED FOR ELECTRICITY TRADE

I. GENERAL TERMS

Rules on calculation and allocation of interconnection capacities assigned for electricity trade (hereinafter referred to as the Rules) are intended for determining the interconnection capacities of the Lithuanian electricity system (hereinafter referred to as the Lithuanian energy system or Lithuanian ES) and the conditions of their allocation among the market participants. The purpose of the Rules is to ensure reliable operation of the system and N-1 criteria through the effective use of the available transmission network infrastructure and to allocate them following the transparent non-discriminatory principles for electricity trade with the Baltic and third countries, thus reducing the restrictions of capacity transmission within the networks and satisfying the needs of the energy system and electricity grid users.

The Rules have been developed on the basis of Point 7, Paragraph 1, Article 30 of the Electricity Law of the Republic of Lithuania, entitling the electricity transmission system operator to prepare and approve the rules on management of interconnecting lines, capacity allocation and regulation taking into consideration the principles of management and allocation of interconnection capacities established in the Electricity Trade Rules approved by the Regulation No. 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing the Regulation No. 1228/2003 and the Order No. 1-244 On the approval of the electricity trade rules of the Minister of Energy of the Republic of Lithuania of 9 December 2009.

Capacities in interconnections are established for the electricity market in different planning periods, in compliance with the electricity market operating principles and capacities distribution procedures. Capacities establishment periods are divided into the following:

- Yearly, informational capacity for market participants;
- Monthly, informational capacity for market participants;
- Weekly, informational capacity for market participants;
- Two days in advance, informational capacity for market participants;
- One day in advance, capacity for electricity trade on the market;
- During the day, capacity for electricity trade on the market.

II. TERMS AND DEFINITIONS USED IN THE RULES

TSO - transmission system operator.

ES - energy system.

BRELL ring - energy system transmission networks of Belarus, Russia (North West and Central), Estonia, Latvia, Lithuania.

BRELL agreement - agreement on parallel operation of Belarusian, Russian, Estonian, Latvian, Lithuanian energy systems.

Elsport - a day-ahead trade carried out by Nord Pool Spot.

Elbas - an intraday trade carried out by Nord Pool Spot.

Third countries - energy systems of Russia, Belarus, Ukraine.

N-1 criterion - system security level ensuring system reliability in case of disconnection of one of the transmission network elements (line, transformer, generator).

TTC - Total Transfer Capacity of interconnection, determined according to the reliability and security standards mandatory for every TSO.

TRM - Transmission Reliability Margin.

NTC - maximum Net Transfer Capacity for trade.

ATC - Available Transmission Capacity for trade. ATC is a part of NTC that is left for trade after every stage of capacities allocation.

D-1 is planning stage carried out one day before the planned day.

D-2 is planning stage carried out two days before the planned day.

III. DETERMINING TOTAL TRANSFER CAPACITY OF INTERCONNECTION

1. In interconnections TTC is determined according to the methodical instructions of the BRELL ring stability, the documents regulating parallel operation of BRELL ring, and the documents regulating Lithuanian energy system operation.
2. When determining the TTC, the TSO must use the common agreed mathematical model of the BRELL ring.
3. When determining the TTC, the TSO must calculate the static and dynamic system stability having estimated thermal limits of the lines, voltage stability limits and generators rotors angle stability limits.
4. In order to ensure the best use of interconnection capacities TTC can be determined by taking different ambient temperature into account (e.g. for summer and winter seasons).
5. If the TSO determines different TTC values in the interconnections, the smaller value of two must be used.

IV. DETERMINING TRANSMISSION RELIABILITY MARGIN OF INTERCONNECTION

6. When determining TRM in the interconnections, the TSO must consider the following:
 - irregular fluctuations of physical flows caused by synchronous zone frequency control;
 - emergency reserves exchanges within the BRELL ring;

- measuring errors;
- planning errors caused by information discrepancies from the third countries;

V. DETERMINING NET TRANSFER CAPACITY OF INTERCONNECTION

7. Determining Lithuania-Latvia interconnection capacity

7.1. Lithuania-Latvia interconnection capacities one day before trade in both directions are established according to the following formula:

$$NTC_{LV-LT} = TTC_1 - TRM + \sum K_i * P_i \quad (1)$$

where:

NTC_{LV-LT} – net transfer capacity for trade of Lithuania-Latvia interconnection;

TTC_1 – total transfer capacity of interconnection having considered the most influential line disconnection;

K_i – reserve impact coefficients presented in Annex 1;

P_i – emergency reserve at the disposal of the Lithuanian ES and other neighbouring ES, which under agreements can be used for liquidation of interconnection overloads;

TRM – transmission reliability margin in interconnection (50 MW, unless otherwise agreed by the operators).

7.2. Intraday capacity for market is determined by the following formula:

$$ATC = \text{MIN} [(NTC - P_{PF}); (NTC - P_{TF} + TRM)] \quad (2)$$

where:

NTC - net transfer capacity of Lithuania-Latvia interconnection trade.

P_{PF} – physical active power flow in the interconnection having estimated the trade results of Elspot;

P_{TF} – commercial power flow in the interconnection having estimated the trade results of Elspot.

TRM - transmission reliability margin in the interconnection.

8. Determining Lithuania-Belarus interconnection capacities

8.1. Capacity one day before for the trade in Lithuanian direction is determined by the following formula:

$$NTC = TTC - TRM \quad (3)$$

where:

TTC – total transfer capacity of Lithuania-Belarus interconnection;

TRM- transmission reliability margin of the interconnection Lithuania-Belarus, which is calculated as follows:

$$TRM=TRM_1+TRM_2$$

where:

TRM₁- irregular fluctuations of physical flows caused by synchronous zone frequency control, measuring and planning errors (0 MW, unless otherwise agreed by the operators).

TRM₂- interconnection reliability margin because of physical flow restriction in the BRELL ring interconnections, which is calculated as follows:

$$TRM_2=TTC-P_{max}$$

where:

P_{max} - physical flow of active power to the Lithuanian ES from third countries, calculated in accordance with the requirements laid down in Section 8.2, provided that P_{max} ≥ P_{rez}, where P_{rez}- secondary emergency reserve of active power maintained by the Lithuanian ES.

- 8.2. Determining the maximum physical flow of active power from third countries to the Lithuanian ES;
 - 8.2.1. Maximum physical flow of active power from third countries is determined by modelling of physical power flows within the BRELL ring via interconnections: Lithuania-Belarus; Russia-Estonia; Estonia-Latvia-Russia; Lithuania-Latvia;
 - 8.2.2. Modelling of the regimes is carried out by the use of a mathematical grid model drawn in accordance with the requirements established by the parties to the BRELL agreement;
 - 8.2.3. ES balances of the BRELL ring are used in the calculations, which are drawn according to the balance plans of respective periods presented in Table 1.

Table 1

Energy system	Monday (working day)	Tuesday-Friday (working days)	Saturday	Sunday	Public holidays
Lithuania, Latvia Estonia*	Last Friday's balance plan	Yesterday's balance plan	Last Saturday's balance plan	Last Sunday's balance plan	Last Sunday's or the closest last public holiday's balance plan
Russia	D-2 balance	D-2 balance plan	D-2	D-2 balance	D-2 balance

	plans		balance plan	plan	plan
Belarus	D-2 balance plans	Yesterday's balance plan	D-2 balance plan	D-2 balance plan	D-2 balance plan

*- if the Estonian balance according to the Table 1 exceeds NTC of the Estonia-Latvia- Russia interconnection , the Estonian balance will be reduced in the power flows calculations down to the capacity limit established for the interconnection .

8.2.4. If upon completion of the initial calculation, BRELL flows do not exceed the interconnection NTC values established in Section 8.2.1, the maximum physical flow from third countries will be determined by reducing generation in deficit Baltic ES according to the coefficients, which are calculated by the following formula:

$$K_{(i)} = \frac{P_{por(i)} - P_{gen(i)}}{\sum_{i=n}^1 (P_{por(i)} - P_{gen(i)})} \quad (4)$$

where:

- $K_{(i)}$ - i energy system generation reduction coefficient;
- $P_{por(i)}$ - i energy system demand;
- $P_{gen(i)}$ - i energy system generation;
- i - deficit Baltic energy system.

8.2.5. If upon completion of the initial calculation, BRELL flows exceed the interconnection NTC values established in Section 8.2.1, the maximum import from third countries will be determined by increasing generation in deficit Baltic ES according to the inversely proportional coefficients, calculated according to the formula 4.

8.2.6. Calculations according to the requirements laid down in 8.2.4 or 8.2.5 are completed, when one of the interconnection capacities NTC limits specified in 8.2.1 is reached. Maximum physical flow from third countries is calculated by the following formula:

$$P_{max} = NET_{intEE} + NET_{intLV} + NET_{intLT} + NET_{intKAL} \quad (5)$$

where:

- P_{max} – maximum physical flow from third countries;
- NET_{intEE} – Estonian ES balance according to calculation results together with ESTLINK 1 and ESTLINK 2;

Net_{intLV} – Latvian ES balance according to the calculation results;
 Net_{intLT} – Lithuanian ES balance according to the calculation results;
 Net_{intKAL} – Kaliningrad balance according to the D-2 Russian TSO's presented data;
 ES balance values in formula 5 are negative, when ES is surplus, and values are positive, when the system is deficit. If the value calculated according to the formula 5 is negative, capacity from third countries is equal 0 MW

8.3. Determining day-ahead capacities for trade to the **Belarusian direction**.

8.3.1. A day-ahead capacities for trade are determined by the following formula:

$$NTC_{LT-BY} = TTC_{LT-BY} - TRM \quad (6)$$

where:

NTC_{LV-BY} – net transfer capacity for trade of Lithuania-Belarus interconnection;

TTC_{LT-BY} – total transfer capacity of the Lithuania-Belarus interconnection in the Belarusian direction;

TRM – transmission reliability margin in interconnection (50 MW, unless otherwise agreed by the operators).

9. Determining Lithuania-Russia interconnection capacities

9.1. A day-ahead interconnection capacities for the trade in **Lithuanian direction** is determined by the following formula:

$$NTC_{LT-RU} = \text{MIN}((TTC_{LT-RU} - TRM); (G_{RU} - P_{RU})) \quad (7)$$

where:

NTC_{LV-RU} – net transfer capacity for trade of Lithuania-Russia interconnection;

TTC_{LT-RU} – total transfer capacity of Lithuania-Russia interconnection to the Lithuanian direction;

TRM – transmission reliability margin in the interconnection;

G_{RU} – Kaliningrad Region generation according to the D-2 Russian operator's presented plans;

P_{RU} – Kaliningrad Region load according to the D-2 Russian operator's presented plans;

9.2. A day-ahead interconnection capacities for the trade in **Russian direction** is determined by the following formula:

$$NTC_{LT-RU} = TTC_{LT-RU} - TRM \quad (8)$$

where:

NTC_{LV-RU} – net transfer capacity for trade of Lithuania-Russia interconnection;

TTC_{LT-RU} – total transfer capacity of of the Lithuania-Russia interconnection in Kaliningrad direction;

TRM - transmission reliability margin in the interconnection.

VI. ALLOCATION OF LITHUANIA-LATVIA INTERCONNECTION CAPACITIES FOR TRADE

10. Lithuanian-Latvian interconnection capacities assigned for trade between the Latvian and Lithuanian trading zones determined by Nord Pool Spot AS are equal to the joint Lithuanian-Latvian interconnection capacity (NTC), which is allocated on the implicit transmission powers auction following the trading rules established by the electricity exchange operator Nord Pool Spot AS.
11. LITGRID AB supplies Lithuanian-Latvian interconnection capacities for trade to Nord Pool Spot AS.

VII. ALLOCATION OF INTERCONNECTION CAPACITIES FOR TRADE WITH THIRD COUNTRIES

12. Interconnection capacities for electricity trade with third countries (Russian Federation, Belarus and Ukraine) are allocated on the implicit transmission powers auction following the trading rules established by the electricity exchange operator, Nord Pool Spot AS, as follows:
 - 12.1. when electricity is transmitted from the Lithuania-Belarus import trading zone to the Lithuanian trading zone, capacity calculated according to the requirements of [8.1] section is assigned for trade.
 - 12.2. when transmitting electricity from the Lithuanian trading zone to the Lithuania-Belarus export trading zone, the Lithuania-Belarus interconnection capacity of the value established in Paragraph [8.3] of the rules is assigned for trade;
 - 12.3. when transmitting electricity from the Lithuania-Kaliningrad import trading zone to the Lithuania trading zone, the Lithuania-Kaliningrad interconnection capacities of the value established in Paragraph [9.1] of the rules are assigned for trade;
 - 12.4. when transmitting electricity from the Lithuanian trading zone to the Lithuania-Kaliningrad export trading zone, the Lithuania-Kaliningrad interconnection capacities of the value established in Paragraph [9.2] of the rules is assigned for trade;
13. LITGRID AB supplies Lithuanian-Belarusian and Lithuanian-Kaliningrad interconnection capacities for trade to Nord Pool Spot AS.

VIII. FINAL PROVISIONS.

14. The Rules shall come into force from 1 January 2014.
15. The National Control Commission for Prices and Energy in order to secure competition among electricity market participants, non-discrimination of individual market participant and supervision of legality and enforcement of the rules on the connecting lines management and their capacity allocation and regulation, is carrying out supervision of the adherence to the rules on the connecting lines management and their capacity allocation and regulation. For this purpose, the Rules are submitted to the National Control Commission for Prices and Energy for approval prior to their entry into force.
16. The Rules shall be amended or their effect shall be suspended once the Baltic operators approve common or bilateral rules on establishment and allocation of interconnection capacities for electricity trade. A notice about the planned cancellation of the validity of the Rules shall be given to the market participants at least 10 calendar days before the end of the validity of the Rules.

ANNEX 1

Possible regulation downwards, %	Interconnection	Reserve dislocation			
		Lithuania	Latvia	Belarus	Estonia
100	Latvia→Lithuania	0.88		0.72	
	Lithuania→Latvia		0.88		0.62
50	Latvia→Lithuania	0.61		0.44	
	Lithuania→Latvia		0.72		0.46
0	Latvia→Lithuania	0.34		0.16	
	Lithuania→Latvia		0.55		0.29