Action Plan[1]

developed on the basis of Article 15 of Regulation (EU) 2019/943

Adopted for implementation on December 17, 2019

[1] Please note that this document is executed in Polish language version only. The translation is made for working and consultation purposes exclusively and should not be treated as a binding one.

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Executive summary of the Action Plan

The purpose of the Action Plan document is to fulfil the obligation to make available to market participants cross-zonal capacity at a level of no less than 70% of the transmission capacity under Article 16(8) of Regulation 2019/943 (hereinafter "CEP 70% target"). With the use of the Action Plan, the deadline for the achievement of the CEP 70% target is 31 December 2025. The CEP 70% target shall be achieved with the use of the Action Plan by means of a linear trajectory.

The Ministry of State Assets (MAP, former Ministry of Energy) in coordination with the Energy Regulatory Office (Regulator, ERO) has prepared the Action Plan, which is an outcome of cooperation between MAP, ERO and the Polish Transmission System Operator (TSO) – Polskie Sieci Elektroenergetyczne S.A. (PSE S.A.). The Action Plan will be implemented as of 1 January 2020. The measures adopted under the Action Plan have been scheduled for four years (1 January 2020 – 31 December 2023). Progress in the achievement of the CEP 70% target in the course of implementation of the Action Plan will be monitored by ERO verifying the achievement of at least the minimum transmission capacity expressed in the linear trajectory.

The Action Plan has been prepared for the synchronous profile (borders: Poland - Germany, Poland - Czech Republic, Poland - Slovakia) and for the asynchronous borders: Sweden-Poland and Lithuania-Poland.

The Action Plan contains the methodology and result of calculations for the determination of the linear trajectory pattern, as well as a timetable of measures adopted to gradually achieve the CEP 70% target. The methodology identifies a list of elements for which linear trajectories has been prepared. These are critical network elements (hereinafter: "CNEs") and critical network elements associated with a contingency used in capacity calculation (hereinafter: "CNECs"), forming a set of 813 elements of the total of CNEs and CNECs (hereinafter also "CNE/CNEC"). Types of CNEs and CNECs have also been defined for the purposes of the Action Plan (Section 1). A further part of the document describes how the values of individual points of the linear trajectories have been calculated for each of the 813 elements, including the presentation of calculation results.

The primary tool provided for in the timetable of measures to be used to achieve the CEP 70% target is the implementation of network investment projects (the list and timetable are provided in Section 3). The use of remedial actions, e.g. in the form of redispatching is a supplementary tool.

The draft Action Plan was submitted for public consultation (from 14th November, 2019 until 29th November, 2019). The Action Plan has been adopted for the implementation on 17 December, 2019. The final version of the document will be delivered to the European Commission and ACER (Agency for the Cooperation of Energy Regulators).

Action plan is a *strategic project of the Energy Policy of Poland until 2040* (EPP 2040), which was submitted for the public consultation as the Energy Policy of Poland until 2040 in the Strategic direction 4 – Development of energy markets, Part A) Development of electricity market.

Introduction and purpose of the document

The energy market model prevailing in Europe is the zonal model where market participants can enter into electricity trading transactions within a particular bidding zone, while trading between bidding zones requires access to cross-zonal capacity.

In June 2019, the last documents of the Clean Energy Package for All Europeans (CEP) were published, including Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (hereinafter: "Regulation 2019/943"). Regulation 2019/943 introduced a number of significant changes in the EU electricity market. Some of them concern the rules of cross-zonal electricity trading. The purpose of the changes is to continue the present direction of increasing the capability of cross-zonal trading, which is reflected in the imposition on Transmission System Operators (hereinafter: "TSOs") of the obligation to make available to market participants cross-zonal capacity of not less than 70% of the transmission capacity for a particular border or a pair of critical network element and contingency (CNEC), determined respecting operational security limits.

The CEP 70% target should be met from 1 January 2020. If this target cannot be achieved due to the occurrence of structural congestions, the Member State, together with the TSO, may opt to prepare an Action Plan that will enable the CEP 70% target to be achieved by 31 December 2025, or may decide to split its bidding zone. If the Action Plan option is chosen, the Member State will prepare such a plan in coordination with the Regulator.

On 7 August 2019, the President of the Energy Regulatory Office approved the PSE S.A. Report on Structural Congestions in the Polish Bidding Zone[2] (hereinafter: "PSE S.A. Report"), and then, on 12 August 2019, the PSE S.A. Report was submitted to the Ministry of Energy, providing a basis for taking the above-mentioned decisions. As a consequence, the MAP, in coordination with the Regulator and with the TSO, has prepared the Action Plan.

This document constitutes the Action Plan developed in accordance with Article 15 of Regulation 2019/943. The Action Plan includes:

- the methodology and calculation results for the determination of the starting points of the linear trajectory of the annual growth of transmission capacity for the purposes of cross-zonal electricity trading, in order to achieve the CEP 70% target;
- the timetable for adopting measures to reduce identified structural congestions, planned for implementation in 2020-2023.

[2] The calculation results for 2020 presented in the PSE S.A. Report on Structural Congestions in the Polish Bidding Zone showed that the provision of cross-zonal capacity in volumes resulting from the CEP 70% target leads to a number of structural congestions within the Polish Power System.

1. Calculation of the trajectory of increasing capacity for the purposes of cross-zonal trade

According to Article 15(2) of Regulation 2019/943, the starting point of the trajectory is the **capacity allocated** at the border or on a critical network element either:

- **the average in the calendar year before adoption of the action plan**

or

- **the average during the three calendar years before adoption of the action plan**,

whichever is higher.

The application of the Polish Action Plan is to start on 1 January 2020, and its adoption date falls at the end of 2019. Thus, the basis for the calculation of the starting point is the average capacity allocated in 2018 and the average capacity allocated in 2016-2018.

The CEP 70% target is calculated differently for the borders for which the capacity calculation methods are used based on the coordinated net transmission capacity (NTC) approach and the flow-based approach (FBA) (see Article 16(8) of Regulation 2019/943). Having regard to the planned implementation of the FBA in the Core region (Polish bidding zone is a part of the CORE region), the way of calculating starting points that has been adopted is the one that is right for NTC and that can be applied to the future FBA in Poland. In addition, according to the CEP 70% target monitoring guidelines contained in the ACER[3] (Agency for the Cooperation of Energy Regulators) Recommendation of 8 August 2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to Article 16(8) of Regulation (EU) 2019/943 (hereinafter: "ACER Recommendation"), the achievement of the linear trajectory will be monitored at CNEC level[4] – as is the CEP 70% target itself for the FBA. Having regard to the provisions of the ACER Recommendation and the planned implementation of the FBA, the linear trajectories and their **starting points have been calculated for each CNE and CNEC** in this Action Plan according to a specific list of CNEs and CNECs for synchronous connections of the Polish bidding zone and on the basis of historical results for the energy market, represented by hourly net positions of bidding zones of the Continental Europe synchronous area for 2016-2018. For the Sweden-Poland and Lithuania-Poland interconnectors, the starting points of the linear trajectory have been calculated on the basis of historical capacity allocated on these interconnectors for 2016-2018.

[3] ACER Recommendation of 8 August 2019 on the implementation of the minimum margin available for cross-zonal trade pursuant to Article 16(8) of Regulation (EU) 2019/943. https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2001-2019.pdf

[4] The ACER Recommendation shows in Section 4.2 that a uniform and consistent monitoring approach should be taken to monitor the minimum levels of the margin available for cross-zonal trade (MACZT) and should consist in MACZT monitoring at the level of critical network element associated with a contingency used in capacity calculation (CNEC) in all coordination areas, i.e. areas with different methods of calculating and allocating cross-zonal capacity and with different levels of coordination of those processes.

A detailed description of the process of calculating starting points of linear trajectories is provided in Appendix 1 to this document.

1.1. Rules for taking into account the variation of the nature of CNE/CNECs over time

The list of CNEs and CNECs for which trajectory starting points have been calculated includes network elements currently used and monitored when calculating transmission capacity. Nevertheless, the present list of CNEs and CNECs will be extended in future by additional CNEs and CNECs. It should also be noted that most CNEs and CNECs were invariable over the 2016-2018 period and they are taken into account in all grid models that were used in calculating trajectory starting points. However, there are CNEs and CNECs that appeared in 2016-2018 and are consequently included only in a part of the grid models used to calculate trajectory starting points.

Therefore, four types of CNEs and CNECs have been identified, regarding their operation manner in the respective timeframes:

a) Invariable CNE/CNEC

The first considered group of critical network elements consists of the elements operating in 2018 and throughout the 2016-2018 period in the identical manner as they will operate in 2020. For such CNEs and CNECs, the trajectory starting point is taken to be the greater of: (i) the average of the allocated capacity in 2018 or (ii) the average of the allocated capacity for the years 2015-2018.

b) CNE/CNEC commissioned in 2016-2018

Another group of critical network elements consists of the elements that started to operate at a certain point in time during the 2016-2018 period and will operate in 2020 in an identical manner. For such CNEs and CNECs, the trajectory starting point is taken to be the greater of: (i) the average of the allocated capacity in 2018 or (ii) the average of the allocated capacity for the years 2016-2018, limited to the period for which the CNE/CNEC concerned was included in the grid model. For example, if a new CNE/CNEC was first included in the grid model applicable from November 2018, the starting point for that CNE/CNEC was taken to be the average of the allocated capacity for the period of November-December 2018.

c) New CNE/CNEC commissioned after 2018

In the case of new network elements, i.e. those non-existent in the grid models used to calculated trajectory starting points, both values for comparison (average capacity allocated on an element) are assumed to be 0 MW. Thus, the trajectory starting point is 0% of the transmission capacity of the element.

It should be noted that 0% is a minimum value and on that CNE/CNEC element the TSO will offer the maximum capacity calculated according to the results of the cross-zonal capacity calculation process.

d) Network element commissioned by the end of 2018, which is added to the list of CNEs/CNECs after the decision to adopt the Action Plan

In the case of network elements that existed physically in the 2016-2018 period, but did not constitute relevant elements in terms of cross-zonal exchange, and consequently were not included in the list of CNEs/CNECs at the time the Action Plan was developed, they can be added to the list of CNEs/CNECs

after a decision to adopt the Action Plan, e.g. due to their operation in a different grid topology. In such a case, it is necessary to determine the relevant point of reference. The reason is that capacity allocated in a specific topology may be disproportionately lower or higher than those possible to be allocated in a new configuration. However, the element already operates in the grid and it would not be reasonable to treat it as a completely new one, and consequently "0%" has been assumed for it as the trajectory starting point.

In order to determine what capacity would be allocated on that element if the element were included in the list of CNEs/CNECs at the time the decision was taken to adopt the Action Plan, it will be assumed that the linear trajectory starting point for that element is calculated as for an invariable CNE/CNEC (where such element was commissioned before 2016, see point a) or as for a CNE/CNEC commissioned in 2016-2018, see point b.

2. Linear trajectory starting points – calculation results

According to Regulation 2019/943, the trajectory starting point is the capacity allocated at the border or on a critical network element in the year before adoption of the Action Plan or the average during the three years before adoption of the Action Plan, whichever is higher.

The linear trajectory starting points have been calculated for asynchronous interconnectors and for CNEs and CNECs taken into account in calculating cross-zonal capacity for synchronous interconnectors. The linear trajectory starting points have been calculated separately for the direction consistent with the CNE definition (e.g. from node A to node B for the A-B CNE definition) (hereinafter "consistent direction") and direction opposite to the CNE definition for the definition of the element CNE A-B[5] (e.g. from node B to node A for the A-B CNE definition) (hereinafter "opposite direction"), and they are expressed in percentage of the transmission capacity of the element concerned. This section presents selected examples of linear trajectory starting points, whereas a full list of linear trajectory starting points together with their patterns is provided in Appendix 2 to this document.

2.1. Asynchronous profile

The asynchronous profile includes two borders: Sweden-Poland and Lithuania-Poland

Consistent direction

Calculation parameters for the interconnector Sweden-Poland:

- F_{max}= 600 MW
- $F_{alok\_consistent}$= 502 MW

[5] For example, for the CNE Hagenwerder - Mikulowa power flow direction from the Hagenwerder station to the Mikulowa station is the direction consistent with the definition of the CNE element, and the power flow direction from the Mikulowa station to the Hagenwerder station is the direction opposite to the definition of the CNE element.

Calculation parameters for the interconnector Lithuania-Poland:

- F_{max}= 500 MW
- $F_{alok\_consistent}$= 349 MW

where: F_{max} – maximum capacity

$F_{alok\_consistent}$ – average capacity allocated in the consistent direction, direction, determined based on article 15(2) of the Regulation 2019/943

Average allocated capacity, determined in the manner to the determination of trajectory starting points for the Sweden-Poland and Lithuania-Poland interconnectors in the consistent direction are respectively 84% and 70% of the maximum capacity. Thus the trajectory starting points on the Sweden-Poland and Lithuania-Poland interconnectors in the consistent direction are taken to be equal to minimum capacity provided for in Article 16(8) in Regulation 2019/943 (i.e. 70% of the maximum capacity of these interconnectors).

Opposite direction

Calculation parameters for the Sweden-Poland interconnector:

- F_{max}=600 MW
- $F_{alok\_opposite}$= 239 MW

Calculation parameters for the Lithuania-Poland interconnector:

- F_{max}=500 MW
- $F_{alok\_opposite}$= 267 MW

where: F_{max} – maximum capacity

$F_{alok\_opposite}$– average capacity allocated in the opposite direction, determined based on article 15(2) of the Regulation 2019/943

Average allocated capacity, determined in the manner to the determination of trajectory starting points for the Sweden-Poland and Lithuania-Poland interconnectors in the opposite direction are respectively 40% and 53% of the maximum capacity of these interconnectors. Thus, the trajectory starting points on the Sweden-Poland interconnector in the opposite direction is taken to be 40% of the maximum capacity of this interconnector. Due to international commitments, on the Lithuania-Poland interconnector in the opposite direction is taken to be equal to minimum capacity provided for in Article 16(8) in Regulation 2019/943 (i.e. 70% of the maximum capacity of this interconnector).

The results of the determination of the linear trajectory starting point for the Sweden-Poland and Lithuania-Poland interconnectors in the both directions together with the linear trajectory pattern are provided in Tables 1 and 2.

Table 1. Summary of trajectory starting points and their patterns in the consistent direction

No.	Critical network element associated with a contingency (CNEC)		% of capacity on CNE in the consistent direction						
	Critical network element (CNE)	Contingency	2020	2021	2022	2023	2024	2025	from Jan 1, 2026
1	SE4-PL[6]	-	70	70	70	70	70	70	70
2	LT-PL[6]	-	70	70	70	70	70	70	70

Source: PSE S.A.

Table 2. Summary of trajectory starting points and their patterns in the opposite direction

No.	Critical network element associated with a contingency (CNEC)		% of capacity on CNE in the opposite direction						
	Critical network element (CNE)	Contingency	2020	2021	2022	2023	2024	2025	from Jan 1, 2026
1	SE4-PL[6]	-	40	45	50	55	60	65	70
2	LT-PL[6]	-	70	70	70	70	70	70	70

Source: PSE S.A.

2.2. Synchronous profile

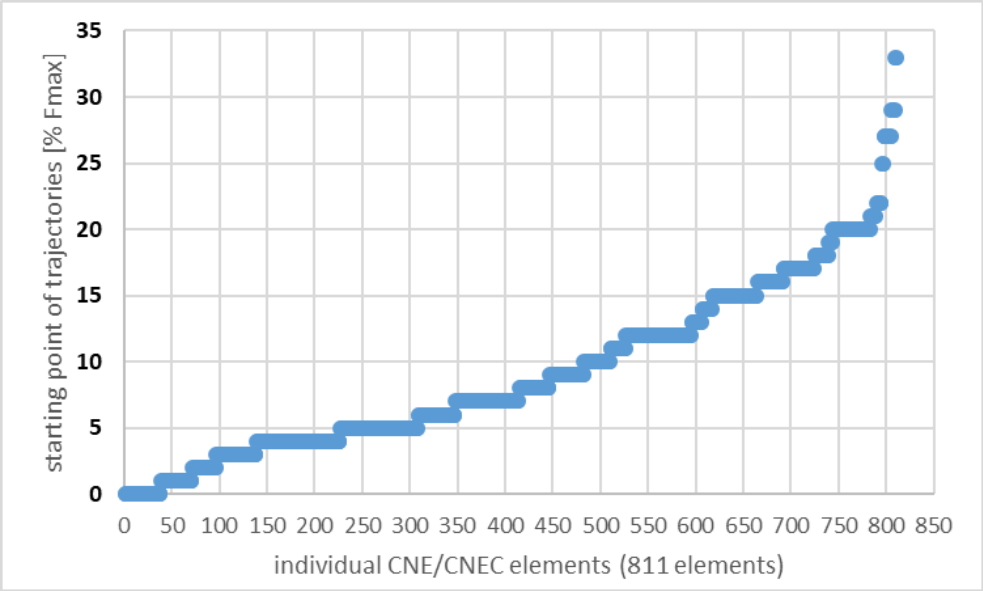
The synchronous profile includes three borders: Poland – Germany, Poland – Czech Republic and Poland – Slovakia. In accordance with the ACER Recommendation, the linear trajectory starting points for synchronous interconnectors have been calculated for individual network elements from the list of CNEs and CNECs identified by the TSO, which includes 811 elements for synchronous interconnectors. The methodology for the calculation of trajectory starting points for CNEs/CNECs is presented in Appendix 1, whereas a summary of calculation results for trajectory starting points with their patterns is shown in Appendix 2 to this document.

Figures 1 and 2 show duration curves of linear trajectory starting points for all CNEs and CNECs including synchronous interconnectors. In order to intuitively illustrate the results of calculations, the trajectory starting points are presented in the figures below, separately broken down into the direction of import and export, assigning them to a given direction based on the dominant power flows on individual CNE/CNEC elements in the past periods. However, it should be emphasized that the process of allocating cross-border transmission capacities from 01/01/2020 will be based on the minimum transmission capacities as determined by the trajectories for the directions consistent and opposite to the definition of CNE elements, in accordance

[6] The Sweden-Poland interconnector has been implemented between the Swedish SE4 bidding zone and the Polish optimisation area. The Lithuania-Poland interconnector has been implemented between the Lithuanian bidding zone and the Polish optimisation area. Polish optimisation area is a technical tool which enables to handle allocation constraints (see a definition of the allocation constraints - article 2 (6) of Regulation 1222/2015). The transmission capacities of these interconnectors reflect the network constraints to which linear trajectories will apply. Capacity of the interconnector between the Polish optimization area and the Polish bidding zone along with the capacity on synchronous profile are subject to allocation constrains in accordance with article 23 of the Regulation 1222/2015, which will also be subject to monitoring by the President of the Energy Regulatory Office as part of the examination of compliance with the obligation to provide market participants with the minimum capacities as determined in the linear trajectory.

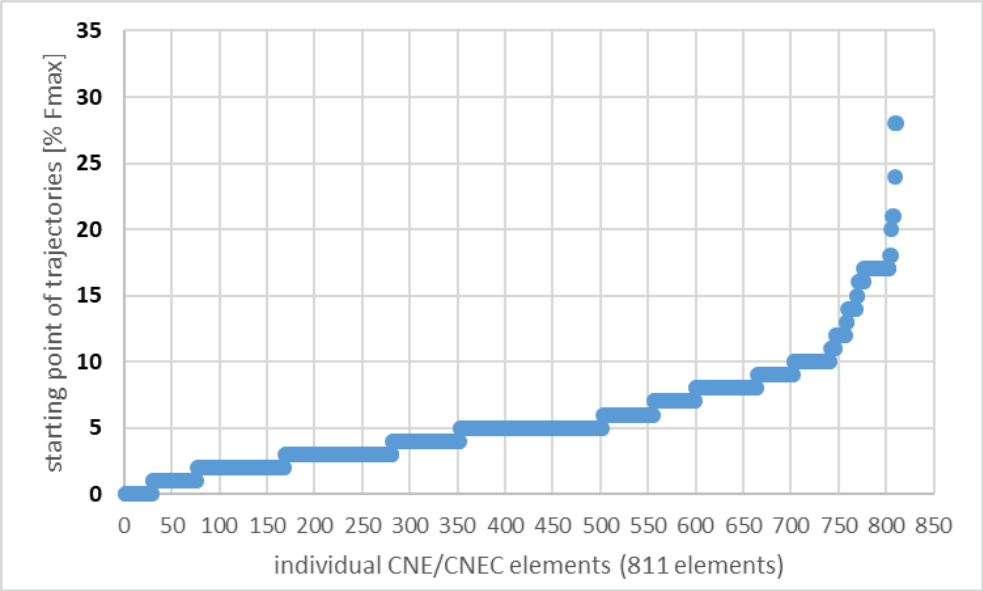
with the amounts contained in Annex 2 to this document. This will allow to correctly follow the trajectory regardless of the network topology and power flow directions resulting from it.

Figure 1. Summary of trajectory starting points for individual CNEs/CNECs in the import direction – duration curve



Source: PSE S.A.

Figure 2. Summary of trajectory starting points for individual CNEs/CNECs in the export direction – duration curve



Source: PSE S.A.

3. Timetable for adopting measures to reduce identified structural congestions

Pursuant to Article 15 of Regulation 2019/943, the Action Plan contains a timetable for adopting measures to reduce the structural congestions identified within four years of the adoption of the decision in accordance with Article 14(7) of Regulation 2019/943, i.e. the decision to adopt the Action Plan. Thus, the above timetable covers the period from 1 January 2020 to 31 December 2023. The primary measure adopted under the Action Plan is the implementation of network investment projects. As a supplementary measure, remedial actions, such as redispatching, are envisaged.

3.1. Network investment projects intended to improve the conditions of electricity exchange on asynchronous interconnectors

In order to increase the capability of electricity export to Sweden in line with the specific linear trajectory, the network investment implementation timetable is adopted in accordance with Table 3.

Table 3. Summary of investment projects intended to reduce structural congestions – Sweden-Poland interconnector

No.	Investment projects intended to reduce structural congestions	Planned year of investment implementation[7]
1.	Construction of Żydowo Kierzkowo-Słupsk 400 kV line	2019/2020
2.	Construction of Żydowo Kierzkowo 400/110 kV substation including 220/110 kV transformer installation	2019/2020
3.	Construction of Gdańsk Przyjaźń-Żydowo Kierzkowo 400 kV line	2020
4.	Construction of Gdańsk Przyjaźń 400/110 kV substation including the entry of one circuit of Gdańsk Błonia-Żarnowiec 400 kV line	2020

Source: PSE S.A. on the basis of the current "Development Plan for meeting the current and future electricity demand for 2018-2027[8]"

In order to achieve the cross-border exchange of electricity on the Lithuania-Poland interconnector, in accordance with determined linear trajectories, the schedule for implementing network investments is adopted in accordance with Table 4.

[7] The deadline that are indicated in the table are the dates of completion of the investment (commissioning date).

[8] Development Plan for meeting current and future electricity demand in the years 2018-2027, https://www.pse.pl/dokumenty, in the Development Plans tab.

Table 4. Summary of investment projects intended to reduce structural congestions – Lithuania-Poland interconnector

No.	Investment projects intended to reduce structural congestions	Planned year of investment implementation[9]
1.	Construction of Stanisławów-Ostrołęka 400 kV double-circuit line	2023

Source: PSE S.A. on the basis of the current "Development Plan for meeting the current and future electricity demand for 2018-2027[10]"

3.2. Network investment projects intended to improve the conditions of electricity exchange on synchronous interconnectors

In order to increase the capability of electricity exchange on synchronous interconnectors in line with specific linear trajectories, the network investment implementation timetable is adopted in accordance with Table 5.

Table 5. Summary of investment projects intended to reduce structural congestions on the synchronous profile

No.	Investment projects intended to reduce structural congestions	Planned year of investment implementation[11]
1.	Construction of 400 kV Mikułowa-Czarna-Pasikurowice double-circuit line	2021
2.	Construction of Kromolice-Pątnów 400 kV double-circuit line	2021
3.	Construction of Plewiska-Piła Krzewina 400 kV double-circuit line	2021
4.	Construction of Krajnik-Baczyna-Plewiska 400 kV double-circuit line	2022

Source: PSE S.A. on the basis of the current "Development Plan for meeting the current and future electricity demand for 2018-2027[12]

[9] A date that is indicated in the table is a date of completion of the investment (commissioning date).

[10] Development Plan for meeting current and future electricity demand in the years 2018-2027, https://www.pse.pl/dokumenty, in the Development Plans tab.

[11] A date that is indicated in the table is a date of completion of the investment (commissioning date).

[12] Development Plan for meeting current and future electricity demand in the years 2018-2027, https://www.pse.pl/dokumenty, in the Development Plans tab.

4. List of appendices

Appendix 1 - Methodology for the Calculation of Linear Trajectories

Appendix 2 - Linear Trajectories