Polskie Sieci Elektroenergetyczne

Integrated Impact Report

of Polskie Sieci Elektroenergetyczne S.A.

Filling Poland with Power

EDITION: 2020

INDUSTRY: ENERGY

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THE ECONOMY AND MARKET AREA

PPS operation data

- **41.297 TWh** – total electricity consumption by final consumers connected to the PPS in 2019,
- **7.228 GWh** – total quantity of electricity supplied from the transmission network to domestic transmission service customers in 2019.

System operation reliability indicators

- **9.99 percent –** electricity supply continuity index in 2019. The level of this index confirms the certainty of power supply to all our transmission service customers.
- **.38 percent** – transmission loss rate. In 2019 it was the lowest ever.
- **9.77 percent** – availability index for transmission facilities (DYSU) in 2019. It reached a high value at reference value of ≥ 97.5 percent.

Capital expenditure

- **PLN 8.4 bn** – PSE's planned capital expenditure for 2020-2024,
- **PLN 1.5 bn** – capital expenditure incurred by PSE in 2019,
- **PLN 1.95 bn** – total value of contracts awarded to contractors in 2019.

Forecast and R&D

- **181.1 TWh** – forecasted net electricity demand in Poland in 2030,
- **PLN 25 m** – total cost incurred by PSE in 2017-2019 for R&D projects, of which PLN 7.2 m was earmarked for research and PLN 17.8 m for development work.

Financial data

- **PLN 9,106 m** – net sales in 2019,
- **PLN 729 m** – net profit in 2019,
- **PLN 1,513 m** – EBITDA in 2019,
- **4.82 percent** – ROE (net profit/equity) in 2019.

Capacity Market and Balancing Markets data

- **8,671.154 MW** – capacity obligation volume resulting from 103 capacity agreements concluded, for the delivery year 2024 under the main auction in the Polish Capacity Market in 2019,
- **100 percent** – failure-free operation of the Balancing Market – 100 percent,
- **129 participants** of the Balancing Market in 2019.

NATURAL ENVIRONMENT AREA

- **PLN 0 (zero)** – monetary value of fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations in 2019,
- **86,375 GJ** – total electricity and heat consumption in the organisation in 2019 (decrease by 10.55 percent YoY),
- **1.476 TWh** – electricity transmission losses in 2019 (decrease by 8.1 percent YoY). In addition, mainly owing to the decrease in electricity transmission losses, reduction of greenhouse gas emissions was also recorded.

SOCIETY AND EMPLOYEES AREA

- **5.3 percent** – share of the fee paid to PSE for transmission services, included in the household electricity bill in 2019,
- **PLN 4.4 m** – total value of PSE's social project in 2019 and in the 1st half of 2020,
- **2,662 information meetings** with residents for projects undertaken in 2016 – 2018, including **746 meetings** in 2019,
- **47 training sessions** on the Polish Power System Simulator, in 2019 with the participation of **338** PSE O&M personnel and **127** DSO and TSO dispatchers,
- **37 industry conferences, debates, seminars and congresses** with the participation of PSE's experts in 2019,
- **69 PSE experts involved** in conferences, debates, seminars, forums and industry congresses held in 2019 (increase by 21 percent YoY),

CHAPTER I: LEARN ABOUT PSE

Electricity reaches homes, businesses and institutions through the distribution network fed from the transmission network we manage. We are the only electricity transmission system operator within the territory of Poland. We care about the reliability of electricity supply to all regions of the country.

We play a key role in the development of the Polish economy. We also ensure the secure and cost-effective operation of the Polish power system as part of the common European system.

I. LEARN ABOUT PSE

1.1. PSE's role in the power sector

We live in an era of electricity. Today, it is hard to imagine our daily routines without electricity, as electric energy drives powers not only innumerable pieces of equipment but also all areas of our lives.

Continuity of electricity supply is a result of an efficiently operating power system which comprises energy generating, converting, transmitting and distributing systems. The operation of the system is managed by Polskie Sieci Elektroenergetyczne, the Polish transmission system operator that also takes care of providing us with reliable electricity supply.

[GRI 103-1] How does the power system work?

The Polish Power System (PPS) consists of three subsystems responsible for specific functions.

- **Electricity generation** – electric energy production by generating sources in the power system – power plants, CHP plants and distributed sources.
- **Electricity transmission** – performed over the transmission network in order to deliver electric energy to distribution networks or transmission-connected consumers. Electricity transmission is performed by the transmission system operator whose functions are performed by PSE.
- **Electricity distribution** – delivery of electric energy over distribution networks to institutional and individual distribution-connected consumers. Electricity distribution is performed by distribution system operators.

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Energy sources in the power system

Electricity supplied to our homes is generated mainly in power plants and combined heat and power (CHP) plants. In Poland, the basic energy generating sources are thermal power plants in which energy is generated as a result of coal combustion – usually by burning hard coal or lignite. The largest clusters of CHP plants are situated in the southern part of the country. In cities, CHP plants operate which are mostly fired with coal, but also with natural gas. Generation of energy from renewable sources (RES) – wind, water, biomass and sun – is also being developed.

Facts worth knowing:

The key thermal plants in Poland include: Bełchatów, Kozienice, Opole, Turów, Połaniec, Rybnik, Pątnów, Dolna Odra, Jaworzno, Łaziska and Łagisza.

The largest hydroelectric power plants are the Żarnowiec, Porąbka-Żar, Solina, Żydowo, Niedzica, Dychów, Rożnów and Włocławek plants.

Electricity transmission

Electricity transmission from the generator to various consumer groups requires the operation of a complex structure composed of many electric power facilities and lines, knows as the power system. The system consists of the transmission network and distribution networks.

The extra-high voltage (EHV) transmission network – 750 and 220 kV in Poland – covers the territory of the whole country. The owner of the network is our company, PSE. The transmission network provides the capability to transmit electricity over long distances, including the ability to quickly change the directions and volumes of transmitted electricity.

The transmission network supplies electricity to distribution systems and to large industrial consumers.

Distribution of electricity

Distribution networks are of a regional nature and they comprise high (110 kV), medium (6-30 kV) and low (230 and 400 V) voltage lines and electrical substations for electricity supply to consumers.

In order to ensure that electricity is supplied in a sufficient quantity and meets specific parameters, the voltage level is first changed at electrical substations with the use of transformers.

The administrators of distribution networks are distribution system operators. The medium voltage distribution network supplies electricity to business and industrial consumers, and first of all to final consumers using low voltage lines.

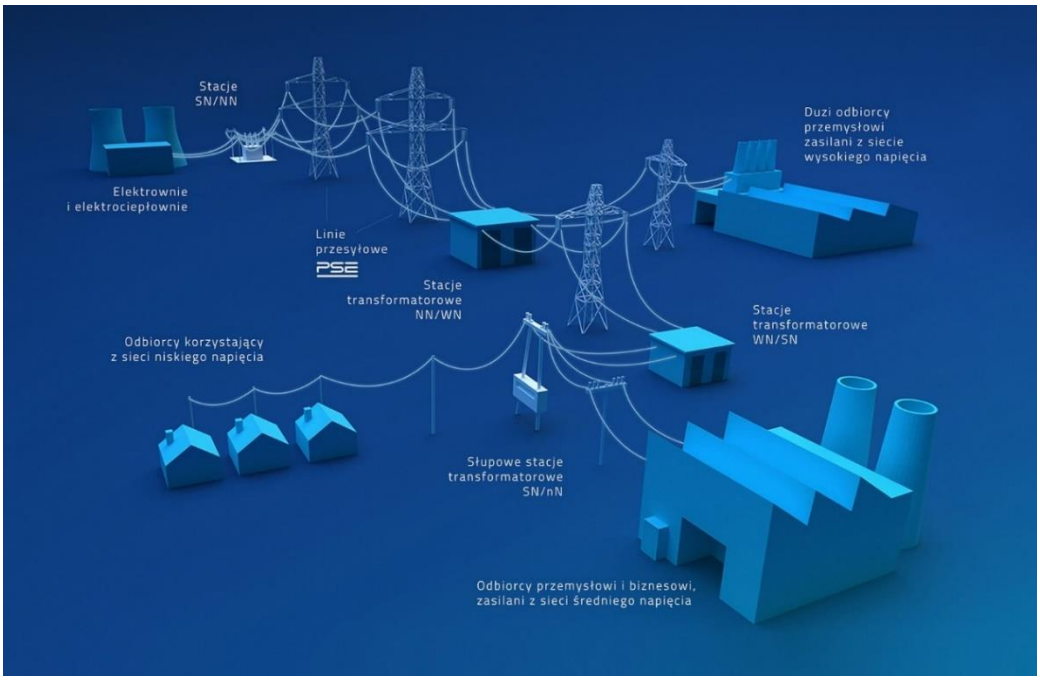


Fig. 1. The path of electricity from generator to consumer

Stacje SN/NN	MV/EHV substations
Elektrownie i elektrociepłownie	Power plants and CHP plants
Linie przesyłowe	Transmission lines
Stacje transformatorowe NN/WN	EHV/HV transformer stations
Duzi odbiorcy przemysłowi zasilani z sieci wysokiego napięcia	Large industrial consumers fed from HV network
Odbiorcy korzystający z sieci niskiego napięcia	Consumers using LV network
Słupowe stacje transformatoroweSN/nN	Pole-mounted MV/LV transformer stations
Stacje transformatorowe WN/SN	HV/MV transformer stations
Odbiorcy przemysłowi i biznesowi, zasilani z sieci średniego napięcia	Industrial and business consumers fed from MV network

Facts worth knowing:

→ The national transmission network is fed with 50 Hz AC voltage. By comparison, in the United States 60 Hz voltage is used.

→ The following voltage standards are usually used in Poland for electricity transmission:
- **220, 400 kV** (extra-high voltages) – for long-distance transmission,
- **110 kV** (high voltage) – for transmission over distances not exceeding several dozen kilometres,
- **6, 10, 15, 20 or 30 kV** (medium voltage) – in local distribution networks,
- **400/230 V** (low voltage) – used to supply power to final consumers.

→ The extra-high voltages most commonly used in Europe are: **220-275, 300-330 and 500 kV.**

1.2. PSE as transmission system operator

Electric power transmission systems are territorially extensive and technologically complicated engineering systems managed by transmission system operators.

[GRI 102-6, GRI 102-4, GRI 103-1] PSE is the only transmission system operator (TSO) in Poland, as pursuant to the Energy Law one TSO is appointed within the territory of the Republic of Poland. Our company was appointed by the President of the Energy Regulatory Office (ERO) to serve this function until 31 December 2030.

We provide electricity transmission and power system access services while maintaining the required criteria for the operational security of the Polish power system (PPS). As a TSO, our company is expected to conduct effective activities to ensure the required quality and security of electricity supply and cost-effective operation of the system. The operator's activities are determined by technological development of power transmission systems and the regulatory framework of the power sector. All this makes us an enterprise of special significance to public order and security, and of particular importance for the Polish economy.

PSE's tasks as Transmission System Operator

[GRI 102-2] Tasks performed by PSE as transmission system operator can be classified into four basic categories::

1. Quality and current security of electricity supply.
2. Adequacy of the national transmission network.

3. Operation of the national central commercial balancing mechanism.
4. International cooperation within interconnected power systems and the single European electricity market.

Tasks related to the current security of supply

The regulatory framework applicable to the transmission system operator defines the technical standards for the transmission system operation and technical measures that should be available to it to meet the requirements in this area. The tasks performed by PSE in this area:

- **Balancing, i.e. striking a balance between the generation of electricity and actual demand**
  Balancing concerns both very short periods (seconds) and very long ones (hours), and it is performed by using power reserves maintained especially for this purpose. The TSO is required to maintain specific amounts of second, minute and hourly reserves. The first two types of reserves are acquired by PSE by entering into relevant contracts with generators for so-called regulation ancillary services – this action is preceded by a tendering procedure. The source of the hourly reserve is the balancing market (commercial bids). Depending on type and location, reserves are activated automatically or remotely, from the central power regulator, based on an order communicated by telephone or in another agreed way.

- **Ensuring compliance with network operation security criteria**
  The TSO is required to plan network operation and generation distribution in its nodes so that a criterion distortion does not cause a system failure and constraints in energy supply to consumers. For this purpose, coordination plans are prepared spanning periods from three years to one day. They include both maintenance schedules for network elements and repair schedules for generating units. In the planning process, constraints in the operation of generating units are identified for individual network nodes. The operator manages those constraints by using the balancing market mechanism or by entering into relevant agreements with generators.

- **Using automation systems of a preventive and recovery nature, and preparation of the PPS defence and restoration plans.**
  The TSO prepares measures to prevent the occurrence of states that pose a risk to the stable operation of the PPS, in particular the propagation of a failure in the transmission system. These are different kinds of automatic protection systems that support quick changes of the network operation configuration and the production level of generating units, plans of consumer outage or reduction of electricity supply and consumption, e.g. based on power rationing levels communicated by radio. In the event of failure in the transmission system, the TSO has restoration scenarios in place, which provide, in an extreme case, even for the need to restore the entire national system. In order to enable such scenarios to be executed, the system operator enters into contracts with generators capable of starting up without external power supply (ancillary service).

Tasks related to the adequacy of the national transmission network

As transmission system operator, PSE is responsible for the expansion and maintenance of the national transmission system and its interconnections with the neighbouring countries' systems. To ensure network adequacy, our company performs the following tasks:

- Planning the expansion of the transmission network, taking into account the expected changes in the value and geographical distribution of domestic demand, location of new generating sources and network expansion plans of the operators of neighbouring countries and distribution system operators.
- Maintenance of the physical condition of network resources so as to ensure their high availability.

Tasks related to the operation of the national central commercial balancing mechanism

Due to the special nature of electricity as a product, there must be a central balancing mechanism and a balance responsible party. The balancing mechanism is to ensure the commercial balancing of electricity market participants in real time and settlement of balancing energy. In Poland, this role is played by the balancing market mechanism through which current balancing of energy market participants is performed on the basis of bids submitted by parties actively participating in the market. The balancing market mechanism has a highly significant impact on other segments of the energy market as well as decisions on how generating resources should be used.

The balancing market operation rules should ensure:

- equal treatment of all participants,
- transparency of the calculation of clearing prices,
- the possibility of consumer participation (consumption reduction bids),
- creation of price signals conducive to the improvement of the operational performance of the entire sector.

International cooperation tasks

We are a member of the European Network of Transmission System Operators for Electricity (ENTSO-E). ENTSO-E groups together 42 transmission system operators from 35 countries in Europe. The Turkish operator TEIAS has been an Observer Member since 2016.

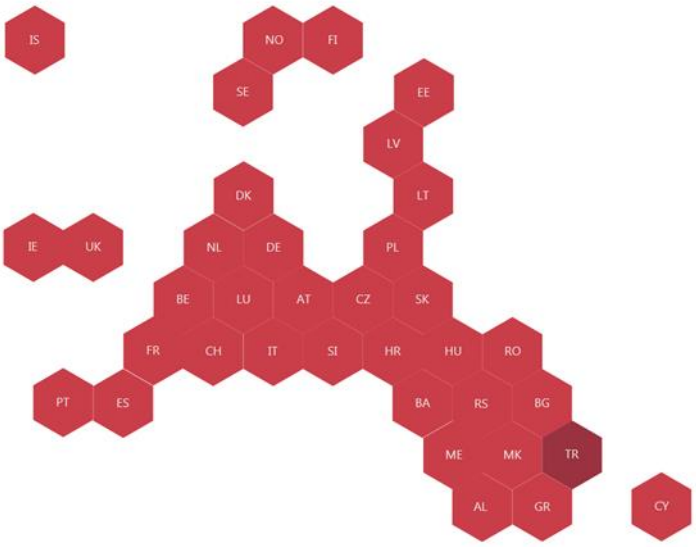


Fig. Member States associated in ENTSO-E

The task of ENTSO-E is to promote reliable operation, optimal management and sustainable development of the pan-European electric power transmission system to ensure the security of supply and satisfy the needs of the internal energy market.

More than 100 representatives of PSE are engaged in the work of ENTSO-E, actively participating at different levels of the organisation in all key tasks.

Our employees participate, among other things, in the process of preparing European Network Codes, issued as regulations of the European Commission, and guidelines to them. The Network Codes are regulatory tools for the implementation of the single electricity market in the EU – they contain common rules for the operation and management of power systems, and they are aimed to eliminate technical barriers for further integration of the market.

The Network Codes are legislative acts – EU Regulations – and as such they are directly applicable in the legal order of the EU Member States from the moment they enter into force. This entails a number of obligations. First of all the Member States must align their relevant laws and regulations with the norms arising from the Network Codes. Our company actively participates in the process. In addition, the TSO is obliged to adjust all regulatory measures which enable the transmission system operator's tasks to be fulfilled, e.g. the Instruction of Transmission System Operation and Maintenance, to the provisions of the Network Codes.
The Network Codes give the Member States the option to regulate certain fields covered by the Network Codes within synchronous areas or capacity calculation regions, in order to take into account the specificities of the area or capacity calculation region concerned. For this reason, international cooperation is necessary between operators from a particular area or region in order to enable TCM (terms, conditions and methodologies) to be developed. These are documents prepared by TSOs from synchronous areas or capacity calculation regions. Our company actively participates in the process. The developed documents are approved by regulatory bodies in those areas or capacity calculation regions, i.e., in Poland, the President of the Energy Regulatory Office, or they are approved by the Agency for the Cooperation of Energy Regulators (ACER).

1.3. Our company in numbers

[GRI 102-1, GRI 102-6] We operate throughout the country under the name of Polskie Sieci Elektroenergetyczne Spółka Akcyjna (PSE S.A.).

Our clients are:

- electricity undertakings involved in electricity generation and trading,
- electricity distribution system operators (DSOs),
- final consumers connected to the transmission network.

GRI 102-7 Scale of PSE operations in numbers	2019	2018	2017
EMPLOYMENT			
Number of PSE employees	**2,538**	**2,376**	**2,258**
PSE Capital Group		**2,495**	**2,348**
FINANCIAL DATA			
Net sales (in PLN m)	**9 106**	**10,097**	**8,887**
Net profit (in PLN m)	**729**	**490**	**531**
Total assets (in PLN m)	**20,640**	**20,377**	**19,513**
EBITDA (in PLN m)	**1,513**		
TAX EBITDA (in PLN m)	**1 552**		
ROE (net profit/equity)	**4.82**		
NETWORK INFRASTRUCTURE			
Total length of transmission lines (in km)*	**14,822**	**14,695**	**14,195**
Number of transmission lines (EHV)	**280**	**267**	**258**
Number of extra-high voltage substations	**107**	**106**	**106**
SERVICES			
Number of transmission service agreements with entities:	**127**	**127**	**123**
- connected to the transmission network	**37**	**34**	**33**
- operating in the electricity balancing market, not connected to the transmission network	**90**	**93**	**90**
Number of PPS access service agreements with DSOs not connected to the transmission network	**157**	**158**	**163**
Number of concluded agreements for the connection of new sources to the transmission network	**29**	**31**	**35**
Total capacity of new generating sources with connection agreements in force	**14,775 MW**	**15,102 MW**	**16,098 MW**
Number of connection agreements for new generating sources for which PSE has launched investment projects involving works necessary for connection	**20**	**22**	**24**
[GRI 102-5] 100 percent stake is held by the State Treasury			
The share capital of PSE is PLN **9,605,473,000.00** and has been fully paid up.			

* Line length converted to 1 circuit.

Tab. 3. Scale of PSE operations in numbers

Number of agreements for the provision of demand side response services	
Number of agreements concluded for the period 1 July 2018 – 30 June 2019 by programme:	
• **Guaranteed Programme** – payment for readiness and utilisation; **summer package** (1 July - 30 September 2018 and 1 April - 30 June 2019) with a guaranteed capacity volume of 362.5 to 534.5 MW in individual hours	**10**
• **Guaranteed Programme; 2 agreements increasing capacity in the summer package** (1 April - 30 June 2019) to the **guaranteed** capacity volume of 372.5 to 558 MW in individual hours	**2**
• **Guaranteed Programme**; **winter package** (1 October 2018 - 31 March 2019) with a guaranteed capacity volume of 510 to 535 MW in individual hours	**6**
• **Current Programme** – payment for performance (1 July 2018 - 30 June 2019)	**5**
• **Simplified Current Programme** – payment for performance (1 April - 31 December 2019) (item shown owing to the continuity of application of agreements from the beginning of Q2 2019)	**5**
Total	**28**

Number of agreements concluded for the period 1 July 2018 – 31 December 2020 by programme:	
• **Guaranteed Programme** – payment for readiness and utilisation; **summer package** (9 agreements: 5 country-wide and 4 in defined areas; provision period 1 July - 30 September 2019) with a guaranteed capacity volume of 593 MW to 715.4 MW in each hour	**9**
• **Guaranteed Programme** – payment for readiness and utilisation; **summer package** (7 agreements – 2 country-wide and 5 in defined areas; provision period 1.10-31.12.2019) with a guaranteed capacity volume of 442.8 MW in each hour	**7**
• **Guaranteed Programme** – **summer package** (to cover the whole PPS from 1 February to 31 March 2020 and from 1 October to 30 November 2020) with a guaranteed capacity volume of 612 MW in each hour	**6**
• **Guaranteed Programme** – **summer package** (to cover the PPS excluding 5 areas, provision period from 1 April to 30 September 2020) with a guaranteed capacity volume from 683.7 to 764.5 MW in each hour	**6**
• **Guaranteed Programme** – **summer package** (to cover dedicated areas: Poznań, PAK, Łódź, Lublin-Zamość, Zielona Góra, provision period from 1 April to 30 September 2020) with a guaranteed capacity volume of 25.5 MW in each hour	**7**
• **Current Programme** – payment for performance (1 July 2019 - 31 December 2019)	**4**
• **Current Programme** – payment for performance (1 January 2020 - 31 December 2020)	**4**
• **Simplified Current Programme** – payment for performance (1 January 2020 - 31 December 2020)	**4**
Total	**47**

Tab. 4. Number of agreements for the provision of DSR services

[GRI 102-45] PSE Capital Group

PSE Capital Group consists of Polskie Sieci Elektroenergetyczne (PSE) as a parent company and 2 subsidiaries wholly-owned by PSE. Polskie Sieci Elektroenergetyczne is also linked by equity to three undertakings with foreign equity share: LitPol Link Sp. z o.o. in liquidation, Joint Allocation Office S.A. and TSCNET Services GmbH. PSE Capital Group was established to perform tasks under the

Programme for the Power Sector adopted by the Council of Ministers on 28 March 2006. The Programme provided for the endowment of the transmission system operator with transmission assets, and with tools for the maintenance, operation and expansion of the assets in the form of specialised companies.

Name of company	Scope of activity	PSE interest in share capital
Polskie Sieci Elektroenergetyczne S.A.*	Power transmission system operator within the territory of Poland. In accordance with the Decision of the President of ERO of June 2014, PSE will serve the TSO function in the country until 2030. www.pse.pl	
PSE Inwestycje S.A.	Until 30 April 2017, PSE Inwestycje operated within the PSE Capital Group as an entity specialised in preparing and supervising investment projects. The company had design and project supervision expertise, based on which it provided services related to the preparation and implementation of investment projects, development of the power system, and social communication services. On 1 May 2017, an organised part of business was disposed of by way of dividend in-kind payment to the sole shareholder, i.e. Polskie Sieci Elektroenergetyczne. From then on, PSE Inwestycje has provided project preparation and implementation services for the construction, expansion and upgrading of buildings for the purposes of welfare/ office and technical facilities of PSE's transmission system. As a result of a significant reduction of operations in 2018 due to the transfer of project implementation tasks to PSE, as of 1 January 2019 the company suspended business for a period of 24 months. http://www.pse-inwestycje.pl	**100 percent**
PSE Innowacje Sp. z o.o.	The primary business object of PSE Innowacje is the provision of consulting services which involve analysing, research, new technologies and IT solutions in the power sector. The company's activities support the secure and economical operation of the PPS, in particular through work performed under PSE's strategic projects. http://www.pse-innowacje.pl	**100 percent**
LitPol Link Sp. z o.o. in liquidation	LitPol Link was established in 2008 for implement the initial phase of the Poland-Lithuania interconnection project as a joint venture of the Lithuanian and Polish transmission system operators, i.e. Litgrid and PSE. The company was responsible for the preparation of analyses, studies and obtaining permits necessary for the implementation of investment projects. As a result of the company's activities, arrangements were made concerning the final route of the interconnector, its cost and financing, as well as the interconnector operating model. LitPol Link has achieved its objectives by completing the first Poland-Lithuania interconnector project which has been in operation since 2016. On 19 June 2019, the company's meeting of shareholders decided to put the company into liquidation.	**50 percent**
Joint Allocation Office S.A.	A company established by 20 TSOs from the CEE and CWE regions and Norway through a merger of the auction offices Central Allocation Office GmbH and Capacity Allocation Service Company.eu S.A. Currently, JAO is owned by twenty-five transmission system operators from 22 countries. Joint Allocation Office (hereinafter JAO) is a service company supporting the electricity market by holding cross-border capacity auctions. It provides cross-border capacity allocation services to operators including PSE. In compliance with the requirements of the Network Codes, they are implemented through a centralised common European platform. JAO is the operator of the platform. PSE holds a 4.0% stake in JAO. The shareholders of the company are 25	**1/25 share**

Name of company	Scope of activity	PSE interest in share capital
	transmission system operators from 22 European countries. http://www.jao.eu	
TSCNET Services GmbH	In order to improve the quality of inter-TSO cooperation within the TSC initiative, 10 TSOs established the company TSCNET based in Munich. TSCNET started its operating activities as of 1 May 2015. The shareholders of TSCNET are 14 TSOs associated in TSC. The activities of TSCNET Services (hereinafter TSCNET) include supporting transmission system operators in the operational planning processes, as well as support in the development and implementation of new regional processes. Within the meaning of SOGL regulation, TSCNET is one of the Regional Security Coordinators (RSCs) which, pursuant to the SOGL and CACM/FCA regulations are to serve five regional processes performed in 10 capacity calculation regions (CCRs). PSE holds a 6.7% stake in TSCNET and is one of the 14 shareholders of the company. http://www.tscnet.eu	**1/14 share**

***Polskie Sieci Elektroenergetyczne S.A. – parent company. The company has field subunits of PSE units and PSE field job positions in: Bydgoszcz, Katowice, Poznań, Radom and Warsaw.**

Tab. 5. PSE Capital Group

In the financial statements and in equivalent documents, PSE data is disclosed excluding the Capital Group companies.

Economic performance

[GRI 103-1] We implement our strategic objectives, continuously monitoring our performance and the achievement of key economic and financial indicators. Preparing mid-term projections that make it possible to assess the capability to finance the expenditure adopted in the Investment Projects Plan, assuming full implementation of strategic objectives and operations.

GRI 201-1, GRI 102-7 Direct economic value generated taking into account income, operating costs, employee remuneration, subsidies and other investments for the community, undistributed profits, and payments to capital owners and state institutions	Value in PLN	
	2019	2018
Income (all income and profits included in the financial statements):	**9,270,307,269**	**10,234,389,294**
Net sales	9,105,506,738	10,097,050,680
Other operating income	130,523,044	85,888,437
Financial income	34,277,487	51,450,177
Operating expenses:	**8,368,699,784**	**9 626 634 040**
Operating expenses	8,266,475,329	9,478,295,377
Other operating expenses	94,602,127	145,827,388
Financial expenses	7,622,329	2,511,276
Operating expenses (taking into account the exclusions shown)	**7,654,073,341**	**8,950,524,427**

exclusions:		
Payroll, social security and other benefits	396,651,288	380,403,771
Taxes and charges	313,447,101	294,446,624
Investment in communities*	0	86,646
Interest expense	4,528,054	1,172,572
Payments to investors:	**0**	**0**
Dividend	0	0
Payments to the state:	**599,645,716**	**508,814,711**
Taxes and charges	313,447,101	294,446,624
Interest expense**	4,528,054	1,172,572
Income tax, current part	172,249,354	143,610,031
Payment from profit	109,421,207	69,585,484
Retained value	**619 936 924**	**394 559 739**

* We carry on a regulated activity, generating our core income from the transmission tariff approved by the President of ERO. In practice, this means that we have limited capabilities to develop social engagement programmes. It is the responsibility of the President of ERO to determine whether or not tariff-financed costs are justified, and therefore it is not up to PSE to decide on its involvement in social areas.

** In 2019, 98 percent of PSE's interest expense was remitted directly to the state budget, and in 2018 it was 69 percent.

GRI 201-4 **Total monetary value of financial assistance received by the organisation from government during the reporting period, including at least the value of:**	**Value in PLN**	
	2019	**2018**
- subsidies, investment and development grants, others	**218,437,990.01**	**36 436 049**
- other financial benefits received from government	**243,804.90**	**287,924**

Membership of organisations

GRI 102-12, GRI 102-13 Learn about international industry organisations and associations of which PSE is a member

- **ENTSO-E** – European Network of Transmission System Operators for Electricity, a key player in building a common electricity market. ENTSO-E was established in 2009, taking over the tasks of the TSO organisations UCTE, NORDEL and ETSO. The primary area of the organisation's activities is promoting the reliable operation and development of interconnected power systems while ensuring the security of electricity supply within the EU's common energy market. ENTSO-E plays an important role in implementing the EU's Third and Fourth Energy Packages, assuming responsibility for the development of many documents, in particular network codes which set forth rules necessary for the development of a common electricity market in the EU.

  PSE's representatives are involved in the activities of the organisation at each level of the structure, ranging from its Assembly, the Board and the Committees, to regional groups, expert groups, task forces and working groups.

  [GRI 103-2] The working structure of ENTSO-E is composed of committees. PSE has its representatives in each of the following:

  - Market Committee
  - System Development Committee

- System Operations Committee
- Research, Development and Innovation Committee
- Digital Committee
- Legal and Regulatory Group acting on a committee basis.

The active presence of PSE's representatives in the ENTSO-E structures strengthens the position of the Polish transmission system operator on the global stage.

- **Polish Committee for Large Electric Systems (PKWSE)** – one of 58 national committees operating on behalf of *International des Grands Réseaux Électriques* (CIGRE), the world's largest international association of experts dealing with the issue of power generation, transmission and distribution. PKWSE operates on behalf of CIGRE, promoting the activities of the associate in Poland. It is currently composed of 6 supporting members and more than 112 full members.
- **Cooperation within CCRs** – Poland is included in three capacity calculation regions (CCRs): CORE, Baltic and Hansa, established under a decision of the EU Agency for the Cooperation of Energy Regulators (ACER) in November 2016 on the proposal of all TSOs. Through the working structures of the above-mentioned regions, representatives of the individual TSOs, including PSE, carry on work aimed to implement market mechanisms whose design will ensure the capability for efficient, unconstrained and secure cross-border commercial exchange of electricity. The activities cover all market segments – from long-term markets, , through the day-ahead market (in the form of market coupling), to the intraday market – and they involve, among other things, the implementation of a coordinated process of capacity calculation, including the allocation of costs of remedial actions used in the process and implementation of the Market Coupling mechanism on the PPS interconnections.
- **CEE Forum (Central Eastern European Forum for Electricity Market Integration)** – a forum established to provided political support in the electricity markets integration process;
- **Central Europe Energy Partners (CEEP)** – an international non-profit association representing the Central European energy sector, whose objective is to support the integration of the Central European energy sector within the framework of the EU common energy policy. The Chairman of the CEEP Board of Directors is a representative of PSE.

Learn about the national industry organisations and associations and CSR initiatives of which PSE is a member

- **Association of Polish Electrical Engineers (SEP)** – a creative non-governmental organisation of a scientific and technical nature operating for social and public benefit. It is a voluntary association of electrical engineers of all specialties, whose professional activities are related to broad-based power engineering, as well as legal persons with an interest in its activities. The activities of SEP include electrical engineering, energy engineering, power engineering, electronics, radio-frequency engineering, optoelectronics, bionics, information technology, computer science, telecommunications, automation, robotics, and other related fields.
- **Polish Association for Electricity Transmission and Distribution (PTPiREE) –** an organisation whose main object is to take measures towards comprehensive development and rational use of networks and facilities for the transmission and distribution of electricity. The Association seeks to

initiate, promote and take advantage of technical and organisational progress in electricity transmission and distribution, and to support the development of the electricity market.

- **Partnership for the Implementation of Sustainable Development Goals (SDGs)** – a partnership between the Ministry of Entrepreneurship and Technology and representatives of more than 100 entities, including PSE, for the implementation of sustainable development goals. The goals are the content of the UN Agenda 2030: Global Plan for Sustainable Development adopted by the UN in 2015, referred to in brief as "Agenda 2030". The Agenda has set 17 Sustainable Development Goals whose implementation is to contribute to building a more sustainable future, in particular to levelling out socio-economic inequalities, with a simultaneous development combined with the preservation of the natural environment in as good condition as possible and reducing the adverse impact of climate changes (Goal No 13).
- **Responsible Business Forum** – the largest non-governmental organisation in the country dealing with CSR (Corporate Social Responsibility). Its mission is to promote sustainable development, inspire the business that changes the world, and to integrate people who change the business. The association was set up in 2000 on the initiative of business, academic and NGO communities, and it has the public benefit organisation status. Since 2002, the Forum has been the national partner of CSR Europe – a network of organisations promoting the concept of responsible business in Europe.
- **Responsible Energy** – an initiative that groups together socially responsible companies from the energy sector. Its main idea is to increase the awareness of the importance of sustainable development and popularise good practices among representatives of the energy sector, students, and representatives of the administration and NGOs. Since 2010, PSE, as a signatory of the Declaration, has been implementing projects concerning e.g. transparency of operation and effective management, occupational safety and health, promotion of energy efficient solutions, cooperation with local governments, and stakeholder engagement.
- **"Sport & Energy" Tourist and Sport Society** – an organisation set up by employees of PSE, continuously pursuing its statutory objectives since 1998 by providing both member and non-member PSE employees with access to sport facilities, participation in organised sport competitions, representation of PSE in sport competitions of the energy sector, and by supporting the integration of company employees.

1.4. Management principles – corporate governance and organisational culture

PSE is a sole shareholder company of the State Treasury, operating in the form of a joint-stock company with its headquarters in Konstancin Jeziorna at ul. Warszawska 165. The company has been operating as an independent transmission system operator for 16 years.

Authorities of the company

[GRI 102-5] The sole shareholder of PSE is the State Treasury whose powers are exercised by the Government Plenipotentiary for Strategic Energy Infrastructure. In both subsidiaries of PSE CG, i.e. PSE Inwestycje and PSE Innowacje, the role of the general meeting of shareholders is served by the Management Board of PSE through designated attorneys-in-fact.

[GRI 102-18, GRI 102-22] Corporate oversight over the company's activities is exercised by the Supervisory Board. The Members of the Supervisory Board are appointed for the 3-year term of office

by the General Meeting acting through the Government Plenipotentiary for Strategic Energy Infrastructure.

The SB acts on the basis of the Commercial Companies Code and other provisions of law, the Company's Articles of Association, GM resolutions and the SB By-Laws it adopts.

Composition of the Supervisory Board as at the date of the publication:

1. Paweł Łatacz – Chairman of the Supervisory Board
2. Marcin Czupryna – Deputy Chairman of the Supervisory Board
3. Paulina Mielcarek – Secretary of the Supervisory Board
4. Ksenia Ludwiniak – Member of the Supervisory Board
5. Tadeusz Skobel – Member of the Supervisory Board

[GRI 102-22]

Composition of the Supervisory Board by age category and diversity	Percentage breakdown in each category	
	Women	Men
<30 years	0	0
30-50 years	2	1
>50 years	0	2
Total % by gender	40	60
Foreigners	0	0

Composition of the Management Board as at the date of the publication:

- Eryk Kłossowski – President of the Management Board
- Jarosław Brysiewicz - Vice-President of the Management Board
- Jakub Kozera - Vice-President of the Management Board
- Włodzimierz Mucha – Vice-President of the Management Board
- Tomasz Sikorski – Vice-President of the Management Board

The Management Board of PSE manages its affairs and represents it in all judicial and non-judicial proceedings. Members of the Management Board are appointed for a 3-year term of office by the GM or the SB.

The Management Board acts on the basis of the Commercial Companies Code and other provisions of law, the Company's Articles of Association, GM resolutions and Management Board By-Laws adopted by the Management Board and approved by the SB.

[GRI 102-22]

Composition of the Management Board by age category and diversity	% breakdown in each category	
	Women	Men
<30 years	0	0
30-50 years	0	3
>50 years	0	2
Total % by gender	0	100

Foreigners	0	0

GRI 102-18, GRI 102-20 PSE organisational structure as at the report date

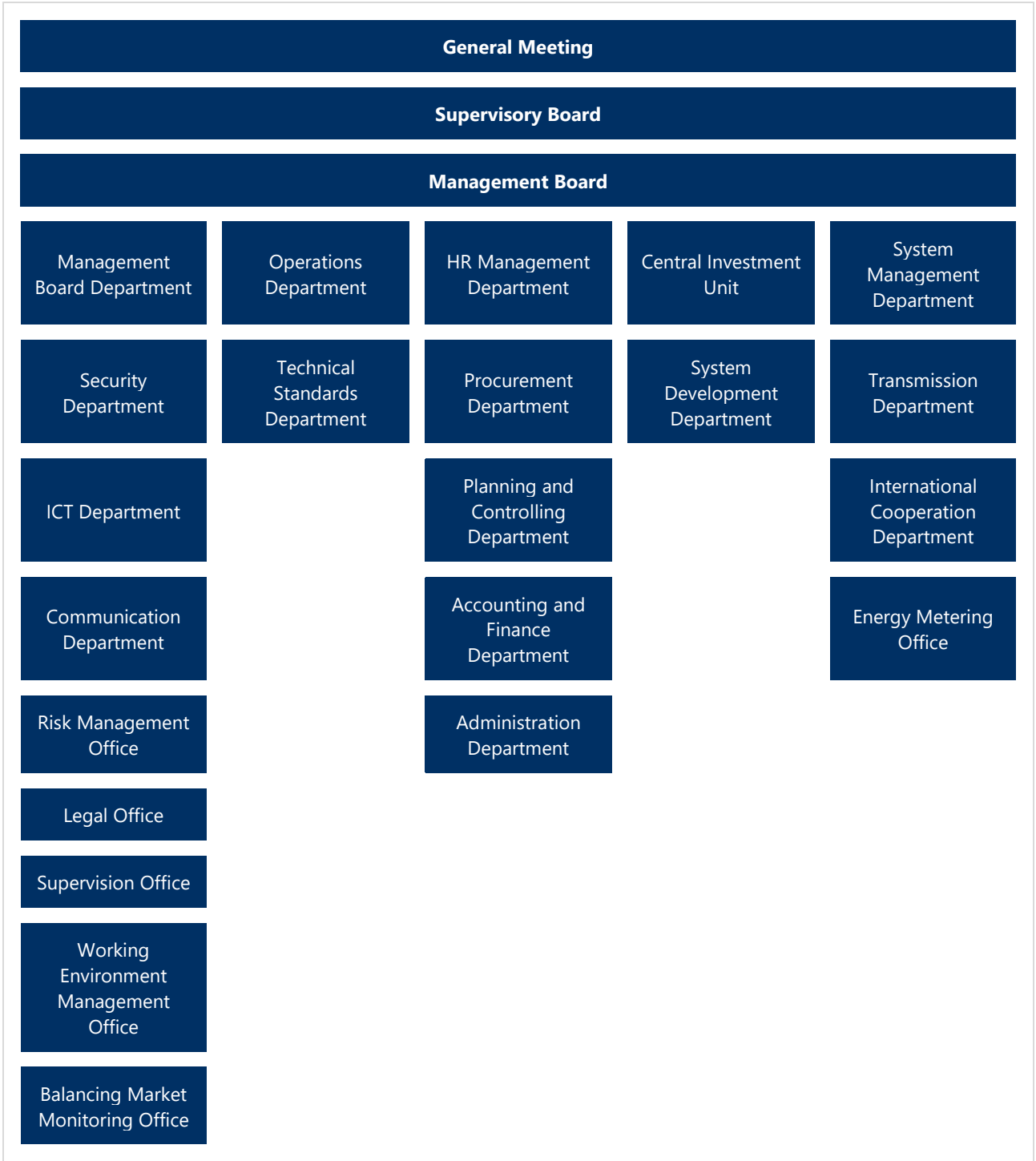


Fig. 1. PSE organisational chart

The Management Board, indicating the scope of rights and responsibilities, has established Committees for carrying out regular surveillance and coordination of activities in the areas of particular importance for the company. The committees, as opinion-giving, advisory and decision-

making bodies, support the Management Board in the set areas. The Committees are composed of the President and Vice Presidents of the PSE Management Board in charge of a given area and heading relevant units as well as subject-matter experts:

- **Investment Committee** – the area of investment process management at PSE CG and taking key decisions on projects from PSE's Project Portfolio assigned to programmes implemented by the Committee. The Committee is chaired by the President of the Management Board;
- **Standardisation Committee** – the area of approving the technical and technological standards in force at PSE CG; The Committee is chaired by the Vice-President of the Management Board supervising the unit responsible for determining the aforementioned standards;
- **Security Committee** – the area of maintaining and improving physical, ICT and cyber-security at PSE CG. The Committee is chaired by the President of the Management Board;
- **Data Governance Committee** – the area of data management. The Committee is chaired by the President of the Management Board;
- GRI 103-2 **Innovation Committee** – the area of adequacy and continuity of implementation of R&D projects. The Committee is chaired by the Vice-President of the Management Board supervising the unit responsible for research and development;
- **REMIT Committee** – the area of coordination of the implementation of duties arising from Regulation (EU) No 1227/2011 of the European Parliament and of the Council of 25 October 2011 on wholesale energy market integrity and transparency (REMIT). The Committee is chaired by the Vice-President of the Management Board supervising the unit responsible for communication;
- **Network Codes Implementation Committee** – the area of regular supervision and coordination of PSE's activities involving the implementation of the rights and obligations arising from the Network Codes and Guidelines – regulations issued under Articles 6 and 18 of Regulation No. 714/2009 of the European Parliament and the Council (EC) of 13 July 2009 on conditions for access to the network for cross-border trade in electricity and repealing of Regulation (EC) No 1228/2003 (OJ L 211/15). The Committee is chaired by the Vice-President of the Management Board supervising the unit responsible for the international cooperation area;
- GRI 103-2**Social Activities Committee** – the area of corporate social responsibility at PSE CG. The Committee is chaired by a Vice President of the Management Board;
- GRI 103-2 **Cybersecurity Committee** – the area of coordinating ICT security and cybersecurity at PSE CG. The Committee is chaired by the President of the Management Board;
- GRI 103-2 **System Management Department Committee** –the following areas:
  - coordinating and supervision the work of the System Management Department, in particular the effective integration of different types of activity performed by the department, i.e. those related to technical and market issues, and decision-making support tools.
  - policy creation and effective integration of project and operational activities,
  - taking key decisions arising power sector transformation process, which require collective decisions within DO.

  The Committee is chaired by the Managing Director of the System Management Department.

GRI 102-18 There are special functions appointed at the company to perform specific tasks. The existence of most of them results directly from the requirements of relevant standards.

Special function	Area

Special function	Area
Integrated Environmental, Health and Safety Management System Officer	Integrated Environmental Health and Safety Management System (ISO 14001:2015 and PN-ISO 45001:2018 standards)
Management System Officer at the Measuring and Testing Laboratory in Radom	Testing or calibration in compliance with the quality system (ISO 17025)
Quality Manager	Testing or calibration in compliance with the quality system (ISO 17025)
Laboratory Manager	Testing or calibration in compliance with the quality system (ISO 17025)
Information Security Management System Coordinator	Information Security Management System (ISO 27001)
Business Continuity Management System Coordinator	Business Continuity Management System (ISO 22301)
Management Board's Representative for Anti-corruption	Anti-corruption management
Critical Infrastructure Protection Officer	Regulation on the Critical Infrastructure Protection Officer
Personal Data Inspector	Regulation (EU) No 575/2013 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC
Deputy Personal Data Inspector	Regulation (EU) No 575/2013 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC
Sustainable Development Officer at PSE CG	Updating, implementing and coordinating the PSE Strategy for Sustainable Development
Chief Power Engineer	Baseload, emergency and guaranteed power supply systems
Classified Information Protection Officer	Classified Information Protection Act
ICT Security Inspector	Classified Information Protection Act
IT System Administrator	Classified Information Protection Act
Deputy System Administrator	Classified Information Protection Act
Head of the Registry	Classified Information Protection Act
Deputy Head of the Registry	Classified Information Protection Act
Management Board's Representative for Compliance	Minimising the risks of behaviour which fail to comply with the laws and regulations in force
Aid Funds Officer	Acquisition and settlement of aid funds

Management of the area of ethics and anti-corruption

[GRI 102-17, GRI 103-1] Compliance System

Our company has an compliance system in place, aimed at ensuring the compliance of the company's operations with law provisions, internal regulations and ethical standards. One of the main functions of compliance is supporting the protection of the company, its employees and management bodies against threats in terms of reputation, conflict of interest and protection of market participants.

We have adopted the "zero tolerance" policy for all kind of fraud and misconduct, defined as both situations such as receiving monetary benefits from service providers, theft, disclosure of business secrets, and other unacceptable behaviour, such as mobbing and harassment. Each PSE employee is obliged to unconditionally comply with the "zero tolerance" principle for such behaviour.

The employees have the possibility to report any abuses anonymously to the email address and contact telephone number of the Compliance Officer provided in the Intranet.

406-1 Total number of incidents of discrimination and corrective actions taken		
Description	Number of cases	Percentage of cases
Discrimination and unequal treatment	1	0.039

* The case was examined with due care and diligence and a relevant Action Plan was implemented on this basis.

Our anti-corruption activities

At PSE, our anti-corruption system relies on a set of detailed internal regulations such as the Compliance Policy, which governs anti-corruption issues within the company, conflict of interest, and the Gift Policy, as well as the Corruption and Fraud Risk Counteracting Manual, which governs a system of responding to corruption incidents in the company.

[GRI 103-2] As part of anti-corruption activities at PSE:

- The Corruption and Fraud Risk Counteracting Manual has been implemented, which presents clear and transparent rules of procedure to be followed in the event of the risk of corruption, fraud or potential conflict of interest. The document is an element of the company's business security and it is intended to ensure comfort for employees in increased risk situations,
- The Management Board verifies the effectiveness of the anti-corruption system in place at the company on an ongoing basis,
- The Management Board has set up the position of the Management Board's Representative for Anti-corruption within the organisational structure, based at the Security Department,
- Issues related to the risk of conflict of interest have been regulated.

As part of anti-corruption measures, our company provides cyclic anti-corruption training to PSE employees. In 2019, five corruption prevention training events were held in our organisation. Four of them were dedicated to employees performing capacity auctions and one to managers and personnel involved in the strategic project Programme 9 – Harmony Link HVDC Interconnection between Poland and Lithuania.

Anti-corruption and fraud prevention training is also a permanent feature of the Compass for Start training provided to PSE's new employees. Such training was completed by 100 percent of PSE's new hires in 2019. The participants were acquainted with the ways of handling corruption issues, mainly the ways of reporting such issues faced in performing their responsibilities.

In addition, the company:

- analyses specific business areas in order to diagnose and counteract potential corruption threats,
- publishes educational and legal information for PSE employees on its intranet pages,
- monitors corruption threats and regulatory changes in the field of counteracting corruption crime.

Third parties can report their objections concerning potential fraud by contacting, by email or by telephone, the Management Board Representative for Anti-corruption, whose contact details are available on PSE's website in the "Preventing corruption and fraud" section. In the case of network development projects co-financed by the Ministry of Investment and Development, related to the

Operational Programme Infrastructure and Environment, irregularities or fraud cases can also be reported directly to the Ministry of Investment and Development. Fraud can be reported by email: naduzycia.POIS@mir.gov.pl or using the form published at: www.pois.gov.pl/strony/zglaszanie-nieprawidlowosci.

GRI 205-1 Percentage and total number of business units analysed for risks related to corruption and identified risks in 2019		
1	Total number of the organisation's business units	22
2	Total number of business units analysed for risks related to corruption	22
3	Percentage of business units analysed for risks related to corruption	100%

[GRI 205-2] Training on the organisation's Compliance Policy and anti-corruption procedures

[GRI 205-2] Communication and training on the organisation's anti-corruption procedures	
Total number of employees in the organisation (according to GRI 102-8)	2,538
Percentage of employees who have familiarised themselves with the Compliance Policy and anti-corruption procedures in the organisation	100%
Percentage of Management Board members who have familiarised themselves with the Compliance Policy and anti-corruption procedures in the organisation	100%
Percentage of employees who have completed anti-corruption training	100%
Percentage of Members of the Management Board who have completed anti-corruption training	100%
Percentage of business partners to whom the anti-corruption procedure has been communicated	100%

All members of the Management Board of PSE have accepted the anti-corruption arrangements adopted at our company and are kept informed about the fulfilment of tasks by the Representative for Anti-corruption and the Security Department Director.

The Compliance Policy related to anti-corruption and the anti-corruption procedures in force at the organisation have been communicated to all individuals working for PSE.

In each (new or annexed) contract , our business partners are informed through relevant contractual clauses about the "Zero tolerance for corruption and fraud" standard adopted by PSE. This means that in each case they commit themselves to preventing corruption offences and affirm that no such fraud is, or will ever be, tolerated in the course of their activities under the contract. The rules of the anti-corruption system in place at PSE are communicated in writing to all suppliers and business partners of the company. In addition, in 2014, the Management Board of PSE introduced a system of multi-stage contract analysis. Contracts are checked, among other aspects, for potential irregularities at the design stage, and then again just before approval. In addition, our business partners are subjected to stringent assessment. This way, a consistent system has been established in the company, which minimises the risk of corruption.

[GRI 205-3] Confirmed incidents of corruption	2019
Dismissal or disciplinary punishment of employees	0

Total number and character of the confirmed incidents of corruption	0
Non-renewal of contracts with counterparties due to breach of anti-corruption rules	0
Legal cases concerning corrupt business practices initiated against the reporting organisation or its employees in the reporting period	0
Total	0

No corruption incidents were found in 2019.

[GRI 206-1] Legal actions for anti-competitive behaviour, anti-trust, and monopoly practices	
Number of pending (unfinished) judicial and administrative proceedings concerning behaviour that distorts free competition or anti-trust rules, in which the organisation acts as a participant of the proceedings	0
Main results of completed legal actions, including any decisions or judgements.	0

1.5. Risk management

Risk management is an integral part of the operational and decision-making processes carried out in all areas of PSE's activities, including power system management, system development, ICT, operation or investment. When initiating and subsequently implementing activities in these and other business areas, account is taken of risks the materialisation of which could contribute to the failure to achieve the strategic and operational objectives pursued, including the ability of the organisation to ensure the operational continuity of both the national electricity system and the company itself. Risk management in each area involves the systematic application of planned and coordinated measures, procedures and practices that reduce or eliminate the possibility of risk materialisation, and minimise the negative effects of their occurrence or enable their positive effects to be utilised.

Risk management measures, undertaken at strategic and operational level, are aligned with the process of identifying, assessing and monitoring the risks most relevant to PSE. In accordance with the company's **Risk Management Policy**, this process covers the most important areas of PSE's activities, including in particular ensuring the continuity of electricity supply, the provision of transmission services and the implementation of investment processes. In practice, the substantive scope of this process refers to all dimensions of the company's activities and is intended to adequately reflect the changing internal and external circumstances in the register of risks most relevant to PSE.

At PSE, as part of the continuous improvement of organisational, process and technological solutions, initiatives are undertaken aimed both at improving the operational efficiency and security of the PPS and the company, as well as reducing or managing risks more effectively. Their implementation is reflected in the risk parameters included in the register mentioned above.

Risk management and the parties involved

The following parties are involved in risk management activities, both those undertaken within the framework of operational and decision-making processes, as well as those being part of the process of identifying, assessing and monitoring the most significant risks from the point of view of PSE:

- the Audit Committee/ Supervisory Board,

- the Management Board,
- managers of the company's organisational units,
- risk coordinators in the company's organisational units,
- all employees of the company,
- the Risk Management Office.

Presented below is essential information on the role of each of those parties.

Audit Committee/ Supervisory Board

The Audit Committee supports the Supervisory Board in supervising the operation of risk identification and management systems.

In particular, the Audit Committee can:

- assess the appropriateness of the business risk identification, monitoring and mitigation systems used by the Management Board,
- assess the compliance of the internal control system with the internal rules and regulations and procedures that ensure the effective operation of the system,
- indicate internal control system areas that need improvement,
- assess the performance of systems reducing the risk of irregularities occurring in the company,
- submit internal audit plan proposals for a particular year.

The Audit Committee may demand that the Management Board submit information on the approach to risk management, as well as risks relevant to the company and the PPS.

Management Board

The Management Board is responsible for the establishment of a system-based approach to risk management in the company. Approves the Risk Management Policy. In addition, the Management Board studies periodic reports on PSE's business risks as well as measures taken as part of risk management.

Managers of the company's organisational units

Each manager of the company's organisational unit is responsible for the management of the business area assigned to that unit. Management activities include the identification of risks and the development and implementation of an approach to the management of risks that may affect the functioning of the area concerned and the achievement of its objectives.

In order to ensure terminological and methodological consistency in risk identification and assessment, and to ensure the adequate reflection of risks related to a given business area in register of risks of key significance for PSE, organisational unit managers cooperate with the Risk Management Office (RMO). The manager of an organisational unit acts as the risk owner for risks falling within their area of responsibility, which are included in the risk register.

Risk coordinators in the Company's organisational units

Risk coordinators in the Company's organisational units are individuals designated by the managers of those units. They are responsible for operational cooperation with the RMO, mainly for ensuring the current risk information flow between the unit concerned and the RMO. They support managers of organisational units in performing their role as risk owners.

All employees of the Company

PSE's employees are a significant component of a system-based approach to risk management at the company – they engage in activities falling in line with the approach to the management of respective risks and support unit managers in the risk identification process. In addition, all employees are required to familiarise themselves with the Risk Management Policy and the risk management rules described in it.

Risk Management Office

The RMO is an organisational unit responsible for providing the Management Board with a comprehensive picture of the most significant risks for the operation of the PPS and the company. The unit ensures a system-based approach to the identification and assessment of those risks. In addition, the RMO develops recommendations for measures promoting risk management, pursued by the company's individual organisational units (this applies to areas such as investment, ICT, anti-corruption, or employee health and safety). The Office ensures terminological and methodological consistency with regard to risk identification and assessment, as well as risk monitoring and reporting to the Management Board.

Risk management and objectives of the organisation

The operational security and efficiency of the PPS, and of the company itself, is ensured through the implementation and continuous maintenance of necessary systems and functions, including: risk management, internal control, compliance management, and internal audit. Their common assumption is to support the organisation in achieving the company's operational and strategic objectives.

PSE's strategy defines 6 main challenges and 17 objectives to be achieved within 10 years. The implementation of the objectives involves a number of risks. Therefore, it is of key importance for the company to ensure a system-based approach to the identification, assessment, management and monitoring of strategic as well as operational risks.

[PRZYKŁADOWY KSZTAŁT GRAFIKI – DO ZMIANY/DOSTOSOWANIA]

Strategia	Strategy
Cele strategiczne	Strategic objectives
Zarządzanie ryzykiem	Risk management
Cele operacyjne	Operational objectives
Rada Nadzorcza, Zarząd	Supervisory Board, Management Board
Departamenty, biura, procesy, projekty	Departments, offices, processes, projects
Definiowanie i realizacja celów strategicznych	Defining and implementing strategic objectives

Cele strategiczne przekłada się na cele operacyjne na poziomie: jednostek, procesów, projektów	Strategic objectives translate into operational objectives at unit, process and project level
Zarządzanie ryzykiem wspiera realizację celów stawianych organizacji	Risk management supports the achievement of objectives set for the organisation

At the same time, risk management is treated at the company as an indispensable element within three independent but mutually complementary lines of defence.

[PRZYKŁADOWY KSZTAŁT GRAFIKI – DO ZMIANY/DOSTOSOWANIA]

RADA NADZORCZA / COMITET AUDYTU	Impact Report
ZARZĄD	Market
1. Linia obrony	1st line of defence
2. Linia obrony	2nd line of defence
3. Linia obrony	3rd line of defence
Kontrole zarządcze	Management Control
Kontrola finansowa	Financial Control
Bezpieczeństwo	Security
Zarządzanie ryzykiem	Risk Management
Kontrola jakości	Quality Control
Zgodność	Compliance
Audyt wewnętrzny	Internal Audit
Audyt zewnętrzny	External Audit
Regulator	Regulator

First line of defence

It is provided by PSE's organisational units which are risk owners and are responsible for their management. The first line of defence comprises management control solutions forming a set of supervisory and audit measures such as control mechanisms embedded in processes and systems.

Their purpose is to reduce risks related to the different business areas of the company, as well as taking advantage of opportunities.

Second line of defence

It involves the organisational units performing supervisory and control tasks at the company, including units responsible for financial audit, physical and ICT security, risk management, regulatory compliance, and quality control. Activities pursued by these functions involve the monitoring and control of solutions deployed in the first line of defence, and supporting PSE organisational unit managers (risk owners) in order to ensure the correct design and efficient operation of implemented controls mechanisms.

Third line of defence

In includes the functions that provide the Management Board and the Supervisory Board with a guarantee in the form of independent assurance that the first and second lines of defence effectively support the achievement of the company's strategic and operational objectives. At PSE, the third line of defence is delivered by the internal audit function performed by the Supervision Office.

Activities pursued as part of the risk identification, assessment and monitoring process

The process of identifying, assessing and monitoring the risks most relevant to the PPS and the company is coordinated by the Risk Management Office (RMO. The main activities pursued in the process include:

Risk identification

In coordination with risk owners, the RMO analyses changes in external and external conditions, as they can lead to the emergence of risks of a high significance for the company, which previously did not pose an obstacle to the fulfilment of its tasks. As part of risk identification, a description of the risk scenario is developed together with associated potential causes and effects. In addition, the main elements of the approach to risk management are indicated. Risk identification is performed both as part of annual risk reviews and ad hoc – risks can be identified in the course of a current analysis of PSE's business conditions.

Risk assessment

Identified risks are subject to assessment which is also performed in coordination with risk owners and the RMO. Risk assessment is carried out in accordance with the specific methodological approach adopted by the company (*see "Methodological approach adopted"*).

Keeping and updating the risk register

Identified and assessed risks are recorded in the register of the company's key risks. The register is kept by the RMO. The register reflects all changes in the value of each risk parameter. Updates are performed both as a result of the annual risk review and ad hoc, where this is justified by a change in conditions, including risk data obtained from the company's different business areas.

Key Risk Indicators

For the purposes of risk monitoring, Key Risk Indicators (KRIs) are defined. The character and design of each KRI are determined in coordination with the owner of the risk to be monitored with the use of the indicator. Data that allow changes in the indicator value and related trends to be traced are acquired cyclically, at the intervals adopted. Information on the KRO values is used in analysing the conditions

related to each risk. They are also taken into account in reporting to the Management Board on the risks included in the company's risk register.

Approach to management – initiatives supporting risk management

The approach to risk management is defined by the risk owner. Irrespective of permanent, predefined components of the approach, in many cases initiatives are undertaken which are aimed at supplementing or modifying previously adopted solutions so as to improve the quality of risk management or reduce the probability of a specific risk scenario occurring. The initiatives, including their implementation progress, are subject to periodic monitoring.

Reporting

Findings of the analyses of external and internal conditions affecting the risk measures, changes in KRI values, progress in implementing initiatives supporting risk management and recommendations resulting from monitoring performed by the RMO are reported to the Management Board on a periodic basis. Annual and quarterly reports are submitted to the Management Board. Moreover, in the event of changes in the risk register, reported during specific quarters, ad hoc reports are drafted, containing information on such changes and their reasons.

The methodological approach adopted

The company follows the Methodology for Risk Assessment at PSE S.A. and its subsidiaries, which defines the methodological approach used in assessing identified risks of key significance for the PPS and the company. The document is subject to periodic reviews and updates. It is the company's intention to ensure that the approach presented in the document takes into account the experience gained in the course of its application and reflects the current level of methodological development and advancement.

The methodology and the associated toolbox support activities aimed at:

- identifying key risks related to the functioning of the organisation – including in particular those related to operation, maintenance and investment activities
- assessing, quantifying and ranking of identified risks,
- determining the correlations between identified risks and their significance for the measure of individual risks,
- enabling the current monitoring of risks, including risk value trends, and generating synthetic management information on risks.

The basic risk measure is the product of:

- the expected frequency of materialisation of a particular risk in a year, taking into account the susceptibility (conditional probability of risk materialisation in case of occurrence of individual causes),
- the total value of the direct and indirect effects of its materialisation, weighted by resilience (conditional probability of effects occurring following the materialisation of a particular risk).

It was also assumed that the materialisation of one risk may be a trigger (cause) of the emergence of other risks. In such cases, cascades of risks are identified and taken into account in estimating risk measures:

- the measure of the upstream risk as a potential cause of the materialisation of the downstream risk takes into account the indirect effect (the effect of the materialisation of the downstream

risk, adjusted by the conditional probability with which the upstream risk leads to the materialisation of the downstream risk.

For each risk, its causes, incidence, conditional probability and effects are defined:

- in relation to the cause, i.e. specific event (or circumstance) the occurrence of which may lead to risk materialisation, the incidence and conditional probability of risk materialisation after the occurrence of such cause (susceptibility) is determined;
- the incidence of causes, susceptibility and resilience are determined using a scale (see below) or by providing a specific numerical value,
- the effects understood as any (negative and positive) consequences of risk materialisation are determined by a numerical value or descriptively, using the following ratings on a descriptive scale: critical, serious, moderate, low, insignificant,
- as part of the 5 dimensions of effect (financial and material, continuity and quality of the PPS operations, image and legal issues, impact on health and life, environmental impact), a qualitative description of the effect to which a given value is assigned is formulated with the use of scales,
- not all effect dimensions are expressed in monetary form – therefore their measures are converted into PLN with the use of monetary conversion rates defined further on in the methodology.

Risk parameters (incidence, susceptibility, resilience, effect) are subject to expert assessment or they are assessed with the use of dedicated area-specific methodologies (if developed).

[GRI 102-15] Company Risk Register – selected substantial risks

Presented below is a summary of selected risks included in the Company Risk Register. For each of them, significant elements of the approach to management adopted are indicated.

Having regard to the epidemic conditions that have recently developed – the SARS-CoV-2 pandemic – the description of the approach to management has been supplemented with information on measures and solutions that additionally apply to particular risks.

RISK NAME	APPROACH TO RISK MANAGEMENT – MAIN ASSUMPTIONS	ADDITIONAL MEASURES/SOLUTIONS APPLIED IN CONNECTION WITH THE SARS-COV-2 PANDEMIC
EXTENSIVE SYSTEM FAILURE (PARTIAL OR TOTAL BLACKOUT) LEADING TO COMPLETE HALT OR LIMITATION OF ELECTRICITY SUPPLY TO CUSTOMERS	– ongoing monitoring of the level of compliance with network operation security criteria – ongoing elimination of risks by changing the distribution of generation within the PPS – coordination of network outage scheduling – obtaining, under emergency supply agreements, assistance from neighbouring transmission system operators – installation and operation of automatic load shedding systems – KDM dispatcher training system (with the use of the PPS simulator) – maintaining standby KDM and ODM centres – the development and implementation of tools supporting the management of the unavailability of power system elements – the Outage Management System (SPSM/OMS) based on a centrally managed grid model *(implementation phase)*	– restrictive precautions are in force at PSE facilities to prevent the virus infection: mutual locational separation between key teams in each organisational unit, segmentation of buildings accommodating critical workplaces – the KDM, ODM and RCN centres, as well as key staff responsible for cybersecurity and operation of the communications network – the necessary redundancy is maintained of workforce/teams directly involved in the current management of the transmission system
IMPOSITION OF POWER RATIONING	– conclusion and performance of DSR service agreements and the reliability-must-run service agreements with nJWCD units	– the following measures have been taken relating to PSE's own resources necessary for the management of processes which are important in terms of risk

LEVELS DUE TO LONG-LASTING CAPACITY SHORTFALL IN THE PPS	– obtaining, under emergency supply agreements, assistance from neighbouring transmission system operators – coordination with generators of repair schedules for generating units – implementation of the capacity market, including the conclusion of capacity agreements with generating units – implementation of a dedicated IT platform supporting the functioning of the capacity market *(implementation phase)* – implementation of software for the calculation of the required stochastic capacity reserve (SRM – *Stochastyczna Rezerwa Mocy*) and performing the short-term generation adequacy (STA – Short Term Adequacy) analysis *(implementation phase)*	management: (i) employees have been instructed to work from home, (ii) the use of tools for remote group work has been increased, (iii) the methods of access to IT systems dedicated to the operation of the capacity market have been adapted to remote operation
LONG-TERM INABILITY TO EVACUATE POWER FROM JWCD UNITS FOR NETWORK REASONS	– ensuring the undisturbed operation of network infrastructure through systematically undertaken maintenance actions and immediate failure repair (PSE's own maintenance teams and maintenance contracts with specialised third-party service providers, preventive replacement of depreciated grid assets, maintenance of stock at the standard levels adopted) – planning and implementation of investment projects – construction and upgrading of power lines and electrical substations (a unit dedicated to the implementation of investment projects, a standardised project implementation and monitoring, planning and execution of outages of PPS elements for investment project purposes)	– the rules for the separation of teams/groups of employees responsible for operation and maintenance (the "iron 3 & 4" have been separated, employee turnover introduced – base location, standby location and availability/work from home) while preserving the executive capabilities of teams – an additional sanitary regime has been put in place (including preventive measures minimising the risk of malfunction of the fault and failure elimination process adopted) – facilities/rooms have been designated to provide accommodation to employee teams/groups in the event the need arises for total isolation of critical centres, i.e. RCN, ZES (they have been equipped with essential food packages, hygiene and sanitary supplies, personal protection equipment, items necessary for long-term accommodation, including leisure facilities) – a personal protection equipment standard has been prepared; personal protection equipment is replenished on an ongoing basis and maintained at the required levels – guidelines have been introduced for CJI employees, i.e. Project Team Members and employees of third-party service providers performing work for PSE such as (i) strict control of personnel authorised to enter and move about the facility, (ii) obligatory temperature measurement and distancing, (iii) ban on direct contact between PSE CIU employees and employees of third-party providers, minimisation/ elimination of situations where work is performed by third-party personnel in rooms where ZES employees are present (including members of Project Teams), provision of personal protection equipment to both PSE and third-party personnel – some of PSE CJI employees have been delegated to work from home or have been put on standstill – a total ban has been imposed on movement between locations, foreign business travel, e.g. to participate in FAT procedures (the tests are carried out remotely with online monitoring capability) – contractors working with PSE CJU have put into effect their own work procedures and guidelines with a view to reducing the spread of the pandemic – communication with the use of IT tools (mainly Skype) has been put in place on a wider basis for the organisation of internal meetings at PSE and external meetings with contractors and subcontractors

LOSS OF THE ABILITY OF CURRENT MANAGEMENT OF THE PPS	– ICT infrastructure supporting the operation of high-availability/ high criticality systems is designed and deployed with a hardware and logical redundancy, and strictly technological processes are monitored on an ongoing basis – periodic technical checks/ inspections are carried out – procedures have been established to maintain business continuity in the event of loss of selected solutions forming the PPS management system (check tests are performed) – monitoring planned departures of key personnel in the system management area, HR activities, including development and educational actions with a view to ensuring competence continuity for the correct control of the PPS	– restrictive precautions are in force at PSE facilities to prevent the virus infection: mutual locational separation between key teams in each organisational unit, segmentation of buildings accommodating critical workplaces – the KDM, ODM and RCN centres, as well as key staff responsible for cybersecurity and operation of the communications network – the necessary redundancy is maintained of workforce/teams directly involved in the current management of the transmission system
EFFECTIVE CYBERATTACK ON KEY/CRITICAL SYSTEMS	– the ICT Strategy has been developed and is implemented (with the strongest emphasis placed on ICT security) – a number of technical and organisational solutions based on good practices in cybersecurity are in place, improving security and preventing cyberattacks – continuous risk monitoring is performed (the dedicated unit called PSE SOC (Security Operation Centre) has been set up for the purpose)	– thanks to previously developed security solutions, the company, having identified COVID-19 pandemic risks and having taken the business decision to delegate a significant number of employees to work from home, was able carry out the process in a secure manner and within a relatively short time period. This activity was prepared and carried out by the ICT Department by ensuring appropriate infrastructure and contractual securing of services for remote work – in accordance with the guidelines adopted by the company, most of the department's employees, like other departments, are now working from home, and only indispensable resources work on site, at the company's headquarters, meeting relevant safety precautions (work in dedicated rooms, following distancing rules, with the use of protection equipment) – in addition, the ICT Department has taken steps to provide adequate human resources for the operation critical systems of key importance for PSE, as reported in the previous quarters in quarterly risk management reports; for key resources and those working at the company's headquarters, appropriate replacements are available in the event of illness
LOSS OF THE ABILITY TO USE PSE'S KEY/CRITICAL IT SYSTEMS	– ICT infrastructure supporting the operation of high-availability/ high criticality systems is designed and deployed with a hardware and logical redundancy – industrial processes using ICT infrastructure are monitored on an ongoing basis – a dedicated training system is in place for employees responsible for the operation of ICT systems – procedures have been established to maintain business continuity in the event of loss of selected solutions forming the PPS management system (check tests are performed)	– thanks to previously developed security solutions, the company, having identified COVID-19 pandemic risks and having taken the business decision to delegate a significant number of employees to work from home, was able carry out the process in a secure manner and within a relatively short time period. This activity was prepared and carried out by the ICT Department by ensuring appropriate infrastructure and contractual securing of services for remote work – in accordance with the guidelines adopted by the company, most of the department's employees, like other departments, are now working from home, and only indispensable resources work on site, at the company's headquarters, meeting relevant safety precautions (work in dedicated rooms, following distancing rules, with the use of protection equipment) – in addition, the ICT Department has taken steps to provide adequate human resources for the operation critical systems of key importance for PSE, as reported in the previous quarters in quarterly risk management reports; for key resources and those working at the Company's headquarters, appropriate replacements are available in the event of illness
THE RISK OF	– the possibility to use ad hoc remedial	– the following measures have been taken relating to

GENERATION INADEQUACY	actions improving the power balance in the PPS remains available (DSR agreements, reliability-must-run (RMR) agreements, TSO emergency import service under agreements with neighbouring transmission system operators) – coordinating repair plans JWCD units, including the introduction of changes to improve the power balance in the PPS – monitoring the utilisation of operating hours of generating units covered by the natural derogation for 17,500h under the Industrial Emissions Directive (IED) - implementation of the capacity market, including the conclusion of capacity agreements with generating units, implementation of a dedicated IT platform supporting the functioning of the capacity market *(implementation phase)*	PSE's own resources necessary for the management of processes which are important in terms of risk management: (i) employees have been instructed to work from home, (ii) the use of tools for remote group work (Skype, Confluence, Jira) has been increased, (iii) the methods of access to IT systems dedicated to the operation of the capacity market have been adapted to remote operation
FAILURE TO IMPLEMENT ON TIME KEY PROJECTS FOR POWER EVACUATION/ IMPROVEMENT OF POWER SUPPLY CONDITIONS	– planning and implementation of investment projects – construction and upgrading of power lines and electrical substations (a unit dedicated to the implementation of investment projects, a standardised project implementation and monitoring, planning and execution of outages of PPS elements for investment project purposes)	– guidelines have been introduced for CJI employees, i.e. Project Team Members and employees of third-party service providers performing work for PSE such as (i) strict control of personnel authorised to enter and move about the facility, (ii) obligatory temperature measurement and distancing, (iii) ban on direct contact between PSE CIU employees and employees of third-party providers, minimisation/ elimination of situations where work is performed by third-party personnel in rooms where ZES employees are present (including members of Project Teams), provision of personal protection equipment to both PSE and third-party personnel – some of PSE CJI employees have been delegated to work from home or have been put on standstill – a total ban has been imposed on movement between locations, foreign business travel, e.g. to participate in FAT procedures (the tests are carried out remotely with online monitoring capability) – contractors working with PSE CJU have put into effect their own work procedures and guidelines with a view to reducing the spread of the pandemic – communication with the use of IT tools (mainly Skype) has been put in place on a wider basis for the organisation of internal meetings at PSE and external meetings with contractors and subcontractors
SOCIAL CONFLICTS THAT MAKE IT IMPOSSIBLE TO UNDERTAKE KEY INVESTMENTS OR IMPEDE TIMELY COMPLETION	– selection of the optimal routes and locations of network investment projects with a view to reducing the risk of social conflicts (coordination with local communities) – development and implementation of public communication programmes at the level of individual projects (including the dialogue with stakeholders) – supervision over communication activities carried out by project contractors	– existing videoconferencing platforms (e.g. Skype and ClickMeeting) are used widely in communication with local authorities – the geosurvey (a web tool that allows detailed lines routes to be viewed on satellite maps, distances from designated points to be checked, and comments to be submitted) has been deployed for communication with local communities – cooperation with local media has been intensified in areas in which the company has been carrying on or is planning investment projects (publication of information and educational materials, information campaign on the implementation of the geosurvey) – support mechanisms have been launched for PSE's social partners – local governments and public benefit institutions (PSE has purchased and donated to them personal protection equipment; in cooperation with the Ministry of State Assets and the Ministry of Health, PSE has made monetary and in-kind donations to hospitals; under the #GratefulToMedics (*#WdzięczniMedykom*)

		campaign, PSE has been partnering with Caritas Poland) – the rules of the 2nd edition of the social initiative "EmPower Your Environment", which has taken the form of an all-year grant scheme this year due to the ongoing pandemic, have been modified and one of the main categories under which support can be sought is now health and medical care, in particular measures to combat the SARS-CoV-2 pandemic (support is available to selected communes and their organisational units, e.g. schools, kindergartens or social welfare centres, as well as non-governmental organisations)
DAMAGE TO A CRITICAL SUBSTATION ASSET	– periodic assessments of the condition of substation equipment are carried out – preventive replacements of the most depreciated and oldest grid assets are performed – substation O&M work is carried out by employees with experience and competence necessary for the secure and correct performance of operation and maintenance procedures – necessary physical security and access control solutions will be deployed at substation facilities	– the rules for the separation of teams/groups of employees responsible for operation and maintenance (the "iron 3 & 4" have been separated, employee turnover introduced – base location, standby location and availability/work from home) while preserving the executive capabilities of teams – an additional sanitary regime has been put in place (including preventive measures minimising the risk of malfunction of the fault and failure elimination process adopted) – facilities/rooms have been designated to provide accommodation to employee teams/groups in the event the need arises for total isolation of critical centres, i.e. RCN, ZES (they have been equipped with essential food packages, hygiene and sanitary supplies, personal protection equipment, items necessary for long-term accommodation, including leisure facilities) – a personal protection equipment standard has been prepared; personal protection equipment is replenished on an ongoing basis and maintained at the required levels
DAMAGE TO A CRITICAL LINE ASSET	– periodic assessments of the condition of line infrastructure components substation equipment are carried out – preventive replacements of the most depreciated and oldest grid assets are performed	– the rules for the separation of teams/groups of employees responsible for operation and maintenance (the "iron 3 & 4" have been separated, employee turnover introduced – base location, standby location and availability/work from home) while preserving the executive capabilities of teams – an additional sanitary regime has been put in place (including preventive measures minimising the risk of malfunction of the fault and failure elimination process adopted) – facilities/rooms have been designated to provide accommodation to employee teams/groups in the event the need arises for total isolation of critical centres, i.e. RCN and ZES (they have been equipped with essential food packages, hygiene and sanitary supplies, personal protection equipment, items necessary for long-term accommodation, including leisure facilities) – a personal protection equipment standard has been prepared; personal protection equipment is replenished on an ongoing basis and maintained at the required levels

Selected examples

SARS-CoV-2 pandemic

PSE participates in the work of the Team for Monitoring Security Risks reporting to the Minister of Climate, including the Sectoral Team for Electricity operating of part of it.

In addition, business continuity prevention procedures are implemented, and a Crisis Team set up by PSE at the end of January 2020, working in coordination with the Management Board, has been monitoring the spread of the virus on an ongoing basis and taking necessary actions as the situation requires, such as:

- analyses of the pandemic development and its consequences for the company have been conducted, and recommendations are drawn up on measures necessary to ensure business continuity of the company and an undisturbed operation of the PPS,
- restrictive precautions are in force at PSE facilities to prevent the virus infection: mutual locational separation between key teams in each organisational unit, segmentation of buildings accommodating critical workplaces – the National Power Dispatch Centre, Area Power Dispatch Centres and Regional Supervision Centres, as well as key staff responsible for cybersecurity and operation of the communications network,
- work organisation has been modified at all locations and organisational units of the company (with remote work introduced wherever possible); the company is also prepared for the eventuality of having to provide on-site accommodation for key workers; all meetings are held through video or teleconferencing; information activities regarding occupational health and safety, as well as conduct in the event of coronavirus infection suspicion, are undertaken on an ongoing basis, targeting all employees and contractors.

Other solutions have also been put in place in response to the pandemic, including:

- the possibility to submit applications for transmission network connection conditions electronically,
- drones for aerial inspection of power lines have been deployed on a wider scale,
- as part of the projects which have to be carried on due to their importance for Poland's energy security, a pilot geosurvey has been conducted (an interactive application that allows a proposed location to be learnt and change proposals to be submitted – the solution was intended to enable and facilitate communication with stakeholders).

More information on the measures taken in connection with the SARS-CoV-2 pandemic can be found in the table presenting selected risks and the approach adopted to manage those risks.

The further functioning of the organisational and procedural arrangements implemented or their tightening or relaxation is dependent on the development of the epidemic situation in the country and worldwide. Decisions will be taken having regard to personnel health and safety and operational continuity of the company and the PPS.

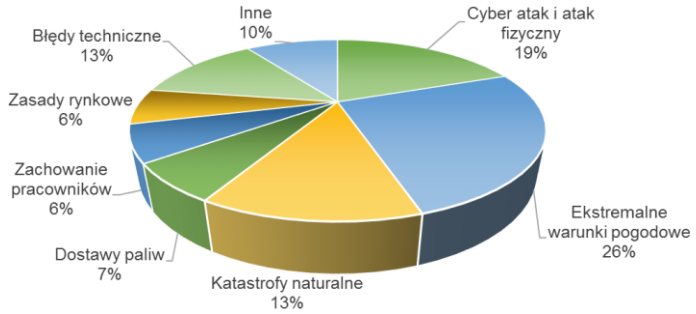
Regional and national electricity crises

Irrespective of ongoing activities pursued by the company as part pf risk management, PSE is involved in performing tasks aimed at the correct and timely implementation of the provisions of **Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC**.

The objective of the above regulation is to initiate, and then implement, measures with a view to preventing, preparing for and managing electricity crises in a spirit of solidarity and transparency and in full regard for the requirements of a competitive internal market for electricity. 'The Regulation defines the **electricity crisis** as a present or imminent situation in which there is a significant electricity shortage, as determined by the Member States and described in their risk-preparedness plans, or in which it is impossible to supply electricity to customers. The above regulation provides for:

- defining regional electricity crisis scenarios,
- drafting national electricity crisis scenarios,
- developing risk-preparedness plans,
- performing periodic risk-preparedness plan effectiveness tests and electricity crisis simulations,
- drafting early warnings of the risk of a crisis occurring in a Member State and declaring an electricity crisis,
- implementation of measures set out in risk-preparedness plans,
- preparing ex post evaluation reports drawn up in each case after the end of an electricity crisis.

In order to ensure the performance of PSE's tasks resulting from the above regulations, the **Task Force for the performance of tasks resulting from Regulation 2019/941 relating to risk-preparedness plans** (hereinafter: "Task Force") was established on 28 January 2020 by Order of the President of the Management Board. In the course of its work so far, the Task Force has selected electricity crisis scenario proposals and submitted them to ENTSO-E (after having obtained the acceptance of the Management Board and the Competent Authority – the Minister of Climate). Based on the proposals submitted by Poland and other countries, ENTSO-E has defined 31 regional electricity crisis scenarios which can be assigned to several categories:



[PRZYKŁADOWY KSZTAŁT GRAFIKI – DO ZMIANY/DOSTOSOWANIA]

Cyber atak i atak fizyczny	Cyberattack and physical attack
Ekstremalne warunki pogodowe	Extreme weather conditions
Katastrofy naturalne	Natural disasters
Dostawy paliw	Fuel supply
Zachowanie pracowników	Personnel conduct
Zasady rynkowe	Market principles
Błędy techniczne	Technical errors
Inne	Other

The Task Force assessed the aforementioned scenarios and submitted them to ENTSO-E (after having obtained the acceptance of the Management Board and the Competent Authority).

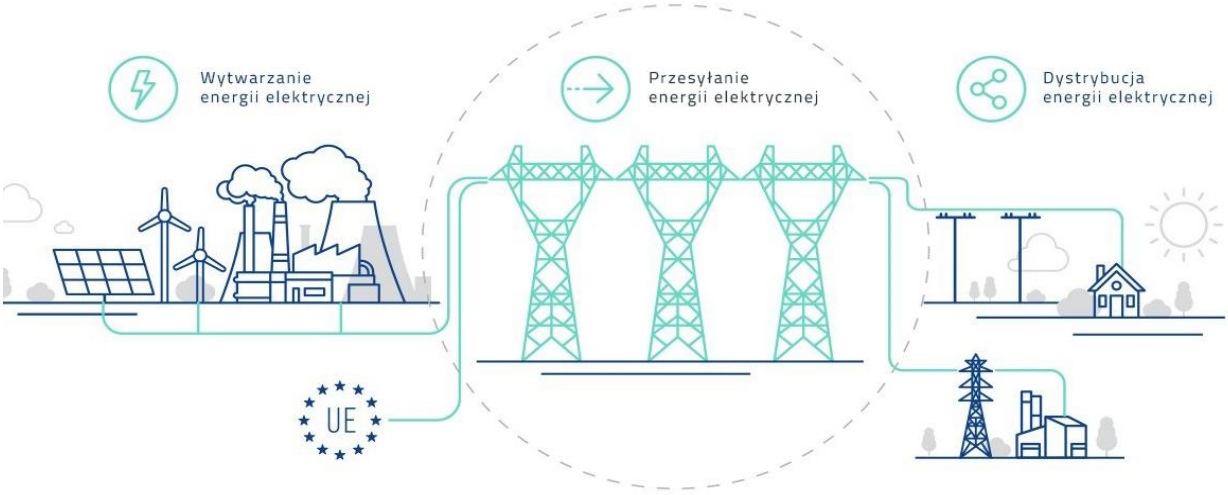
Further work, for which the Competent Authority will be responsible, includes:

- the development of national electricity crisis scenarios – by 5 January 2021,
- the development of risk-preparedness plans for individual scenarios – by 5 January 2022.

PSE will be engaged in the performance of those tasks in line with its competences and responsibilities arising from the role of transmission system operator in Poland.

II. BUSINESS AND VALUE CREATION MODEL

2.1. Business Model



Wytwarzanie energii elektrycznej	Electricity generation
Przesyłanie energii elektrycznej	Electricity transmission
Dystrybucja energii elektrycznej	Electricity distribution
UE	EU

PSE is the only transmission system operator (TSO) within the territory of Poland. It supplies electricity over the transmission network to all regions the country.

Operating rules of the transmission system operator in Poland

Our core duties are prescribed by the Energy Law and the implementing regulations issued under it, which define both our tasks and the way of financing them, and the applicable technical standards and reliability criteria.

The costs of the tasks we perform are regulated costs, covered by transmission charges paid by users of the transmission system in accordance with a tariff approved by the President of ERO. As an operator, we perform our tasks using technical facilities of transmission-connected parties – the parties are obliged to provide access to them under the applicable laws or relevant civil-law contracts.

2.2. Value Creation Model

- **Financial capital** The company's resources of a financial nature, held or acquired in the course of financing.

- **PSE's intellectual capital.** Unique expert knowledge accumulated within the organisation; abundant know-how acquired over years. PSE cares for its intellectual capital and keeps expanding it, e.g. through development programmes, investing in employee education and in research and development.
- **Human capital.** Intangible resource of the organisation which consists of individual competence, experience and motivations of employees and contributors, as well as their development aspirations. We are continuously building PSE's human capital through various forms of professional improvement and competence development, as well as employee-friendly employment policy that covers a wide range of employee and supplementary benefits. It is owing to employees, their experience and commitment that the company is an organisation in which social responsibility combines with business objectives.
- **Social and relational capital**. We ensure the secure and cost-effective operation of the Polish power system and reliable operation of the electricity market. We care about the supply of electricity to all areas of the country so as to ensure that the current and expected mid- and long-term electric energy and capacity demand is met across the national system. To this end, we cooperate with a wide group of stakeholders. We care about trust and honesty in relations with our stakeholders.
- **Natural capital.** Secure and reliable transmission of electric energy to all regions of the country means the need to use both non-renewable and renewable natural resources. In our investing activities, we care about minimising key threats to nature and avoid the risk of losing biological diversity.
- **Production capital.** The organisation's tangible resource which includes e.g. critical infrastructure assets (extra-high voltage power lines and substations) and buildings together with equipment, as well as measurement and technological equipment and infrastructure, which enable the company to perform the tasks of the electricity transmission system operator in Poland.

INPUT - Market

Value creation areas

I. Active involvement in shaping market mechanisms in the process of building the European energy market, taking into account the conditions of the domestic electricity market.

II. Development of favourable market conditions to ensure effective and secure operation of the Polish Power System as an element of the European market.

III. Supporting active participation of customers in market mechanisms.

I. Active involvement in shaping market mechanisms in the process of building the European energy market, including the conditions of the domestic electricity market

- Involvement in the process of building the electricity market in Europe, in particular with regard to the creation of:
    - - Flow-Based Market Coupling for day-ahead and Intraday markets

- the cross-border balancing market

- Activities towards strengthening the coordination of cross-border exchange in Europe, including the reduction of unscheduled flows though the PPS.

Our input

- **Implementation of the Single Intraday Coupling mechanism on Polish borders** –after two years of intensive preparations, on 19 November 2019, the Polish bidding zone joined the Single Intraday Coupling (SIDC) mechanism implemented with the use of the XBID platform. Initially, the SIDC mechanism was deployed on four Polish borders (CZ-PL, DE-PL, LT-PL, PL-SE).
- **Development of the Concept Note containing key assumptions for the methodology under Article 76 of SO GL in the Core Capacity Calculation Region**
  The Concept Note assumed, among other things, that remedial actions to eliminate constraints from the entire transmission network of the Core region would be optimised in the Core region within the framework of the Regional Coordinated Operational Security Analysis.
- **Involvement of PSE representatives in the work of European institutions and agencies:**
  - **The European Network of Transmission System Operators for Electricity - (ENTSO-E).** ENTSO-E groups together 42 transmission system operators from 35 countries. The Turkish operator TEIAS has been an Observer Member since 2016.

    The main components of the working structure of ENTSO-E:

    - System Operations Committee,
    - System Development Committee,
    - Market Committee,
    - Research, Development and Innovation Committee

    PSE is represented on each of them.
  - **European Commission.** Cooperation in the identification of critical infrastructures in accordance with Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection.
  - **European Parliament, ACER.** The cooperation concerns the coordination of work in the Council of the European Union.

  - **More than 100 PSE representatives are engaged in ENTSO-E work.**
  - In 2019, as part of commercial exchange, a total of 1,153 GWh was exported from the Polish power system, while electricity imports amounted to 11,546 GWh. Compared with the 2018 data, the excess of electricity imports into Poland over electricity exports to the neighbouring countries continued to persist. The difference between the value of imports and exports was 10,393 GWh to the advantage of imports (in 2018 – 5,654 GWh). The largest volumes of electricity were exported as part of parallel exchange with the systems of Germany, the Czech Republic and Slovakia – 558 GWh, whereas the largest quantity of electricity was imported also as part of parallel exchange – 4,735 GWh and over the DC link from Sweden: 3,116 GWh.
- **The cross-border exchange capacity offered by PSE in 2019 totalled:**
  - parallel exchange (synchronous profile):
    - export: 11,239 GWh,

- import: 5,081 GWh;

- non-parallel exchange – LitPol Link interconnection with Lithuania:
  - export: 3,579 GWh,
  - import: 4,380 GWh;
- non-parallel exchange – SwePol Link interconnection with Sweden:
  - export: 3 428 GWh,
  - import: 5,081 GWh;
- non-synchronous exchange – interconnection with Ukraine (Zamość-Dobrotvir line); auctions concern only the import direction:
  - import: 1,450 GWh.

The data presented concern offered transmission capacity. They do not take into account the capacity offered through the single intraday coupling process launched on 19 November 2019.

II. Development of favourable market conditions to ensure effective and secure operation of the Polish Power System as an element of the European market

- Involvement in the process of building the electricity market in Europe, in particular with regard to the creation of:
  - - the Capacity Market.
- Implementation of segments of the Target Model of the European electricity market within the PPS.
- Effective balancing of the power system, in particular:
  - failure-free execution of the balancing market processes,
  - development of balancing market mechanisms.

Our input

- **The fourth main auction in the Polish capacity market** was held on 6 December 2019 for the delivery year 2024. As a result, 103 capacity agreements were concluded for 1, 2, 5, 7, 15 and 17 delivery periods.

Delivery year	Auction closing price, (in PLN/kW/year)	Number of capacity agreements concluded	Capacity obligation volume resulting from capacity agreements concluded, (in MW)	Auction closing round
2024	259.87	103	8,671.154	5.

Tab. Summary of the main auction conducted in 2019

- As a result of **additional auctions in the Polish capacity market** conducted in 2020, a total of 54 capacity agreements were concluded for the individual quarters of the delivery year 2021.

Quarter of 2021	Auction closing price, (in PLN/kW/year)	Number of capacity agreements concluded	Capacity obligation volume resulting from capacity agreements concluded, (in MW)	Auction closing round
I	286.01	25	880.931	1.
II	286.01	7	303.260	1.
III	286.01	5	156.010	1.
IV	286.01	17	616.760	1.

Tab. Summary of additional auctions conducted in 2020

- **Number of borders covered by the market mechanism consistent with the European Target Model – four borders:**
  - Poland-Sweden,
  - Poland-Lithuania,
  - Poland-Germany,
  - Poland-Czech Republic.

- **Number of fall-back procedures used in the balancing market – 0 (zero).**

III. Supporting active participation of consumers in market mechanisms

- Developing mechanisms for customers' active participation in the PPS balancing.
- Developing mechanisms for customers' active participation in the electricity market.
- Supporting various forms of market operation of customers such as prosumers, aggregators, energy clusters

Our input

- In order to ensure the current operational security of the power system, in 2019 our company entered into **48 demand-side response service (DSR) contracts** including:
  - Guaranteed Programme (payment for readiness and utilisation):
    - 6 contracts in the winter package for the period from 1 January 2019 to 31 March 2019 with a guaranteed capacity volume of **510 to 535 MW** in individual hours,
    - 12 contracts in the summer package for the period from 1 April 2019 to 30 June 2019 with a guaranteed capacity volume of **372.5 to 558 MW** in individual hours (with the option to obtain a maximum of 633 MW by shifting flexible products),
    - 9 contracts (including 5 for the entire country and 4 in defined areas) in the summer package for the period from 1 July 2019 to 30 September 2019 with a guaranteed capacity volume of **593 to 715.4 MW** in individual hours,
    - 7 contracts (including 2 for the entire country and 5 in defined areas) in the winter package for the period from 1 October 2019 to 21 December 2019 with a guaranteed capacity volume of **442.8 MW** in individual hours.
  - Current Programme (payment for utilisation):

- 5 contracts for the period from 1 January 2019 to 30 June 2019;
- 4 contracts for the period from 1 July 2019 to 31 December 2019.

- The Simplified Current Programme (payment for performance) for the period from 1 April 2019 to 31 December 2019 – 5 contracts.

OUTPUTS - Market

Value creation areas

I. Active involvement in shaping market mechanisms in the process of building the European energy market, taking into account the conditions of the domestic electricity market.

II. Development of favourable market conditions to ensure effective and secure operation of the Polish Power System as an element of the European market.

III. Supporting active participation of customers in market mechanisms.

I. Active involvement in shaping market mechanisms in the process of building the European energy market, including the conditions of the domestic electricity market

II. Development of favourable market conditions to ensure effective and secure operation of the Polish Power System as an element of the European market

- Performance of statutory obligations of PSE as an independent national transmission system operator.
- Maintaining the reliability of the power system.
- Increasing electricity import and export opportunities.

Outputs of our activities

- **Electricity supply continuity index** (defines the certainty of supply to all customers connected to the transmission network) **- 99.99 percent**.
- **Failure-free operation of the Balancing Market – 100 percent**
- **129 participants of the Balancing Market in 2019**
- **The cross-border exchange capacity offered by PSE in 2019 totalled:**
  - parallel exchange (synchronous profile):
    - export: 11,239 GWh,
    - import: 5,081 GWh;
  - non-parallel exchange – LitPol Link interconnection with Lithuania:
    - export: 3,579 GWh,
    - import: 4,380 GWh;
  - non-parallel exchange – SwePol Link interconnection with Sweden:

- export: 3 428 GWh,
- import: 5,081 GWh;

- non-synchronous exchange – interconnection with Ukraine (Zamość-Dobrotvir line); auctions concern only the import direction:
  - import: 1,450 GWh.

The data presented concern offered transmission capacity. They do not take into account the capacity offered through the single intraday coupling process launched on 19 November 2019.

- **Volume of cross-border exchange (in the import and export direction) in all market segments (GWh)* for 2019:**
  - parallel exchange (synchronous profile):
    - export: 558 GWh,
    - import: 4 735 GWh;
  - non-parallel exchange – LitPol Link interconnection with Lithuania:
    - export: 405 GWh,
    - import: 2 296 GWh;
  - non-parallel exchange – SwePol Link interconnection with Sweden:
    - export: 190 GWh,
    - import: 3 116 GWh;
  - non-parallel exchange – interconnection with Ukraine (Zamość-Dobrotvir line); commercial exchange concerns only the import direction:
    - import: 1 399 GWh.

**The indicators have been calculated as a sum of cross-border commercial exchange based on agreed nominations from the annual, monthly, daily and intraday market timeframes.* The above data do not include remedial actions agreed as part of inter-TSO exchange, mandatory compensation returns and exchange over 110 kV lines.

III. Supporting active participation of customers in market mechanisms.

- Reducing the risk of inability to balance capacity and energy in the PPS.
- Acquisition of a tool designed to increase the security of electricity supply.
- Increasing the operational flexibility of the PPS.

Outputs of our activities

- In order to ensure the current operational security of the power system, in 2019 our company entered into **48 demand-side response service (DSR) contracts** including:
  - Guaranteed Programme (payment for readiness and utilisation):

- 6 contracts in the winter package for the period from 1 January 2019 to 31 March 2019 with a guaranteed capacity volume of **510 to 535 MW** in individual hours,
- 12 contracts in the summer package for the period from 1 April 2019 to 30 June 2019 with a guaranteed capacity volume of **372.5 to 558 MW** in individual hours (with the option to obtain a maximum of 633 MW by shifting flexible products),
- 9 contracts (including 5 for the entire country and 4 in defined areas) in the summer package for the period from 1 July 2019 to 30 September 2019 with a guaranteed capacity volume of **593 to 715.4 MW** in individual hours,
- 7 contracts (including 2 for the entire country and 5 in defined areas) in the winter package for the period from 1 October 2019 to 21 December 2019 with a guaranteed capacity volume of **442.8 MW** in individual hours.

- Current Programme (payment for utilisation):
  - 5 contracts for the period from 1 January 2019 to 30 June 2019;
  - 4 contracts for the period from 1 July 2019 to 31 December 2019.
- The Simplified Current Programme (payment for performance) for the period from 1 April 2019 to 31 December 2019 – 5 contracts.

INPUT – Infrastructure and investments

Value creation areas

I. Expansion of infrastructure necessary for the operation of the company and the PPS through investments.

II. Transmission network maintenance and repair.

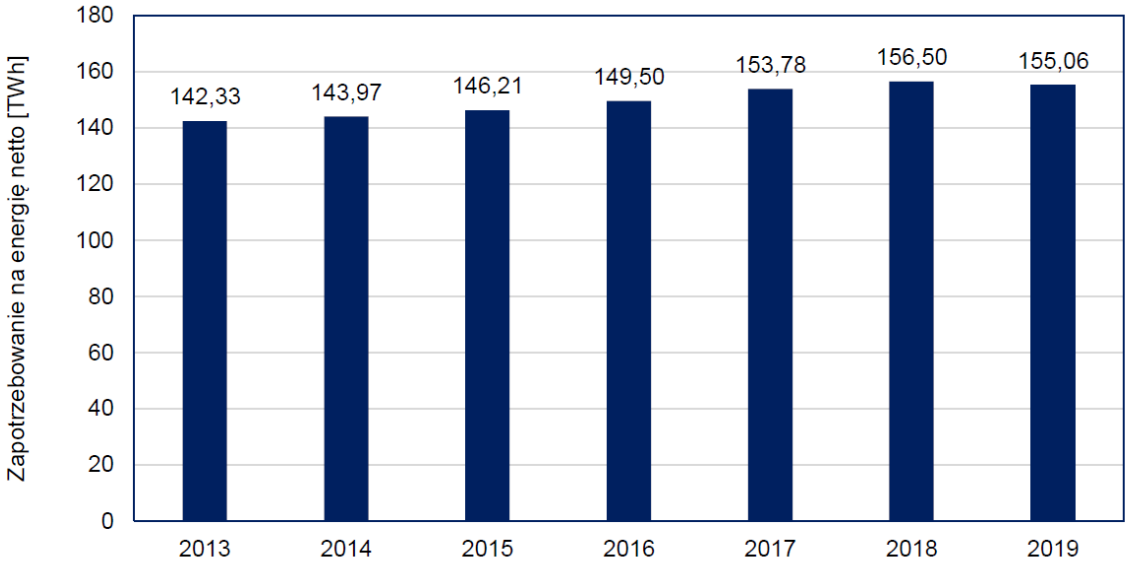
III. Social communication around projects in progress.

I. Expansion of infrastructure necessary for the operation of our company and the PPS through investment projects

- Transmission infrastructure development.
- New build and upgrade projects.
- Ensuring the continuity electricity transmission.
- IT investments.
- Expenditure on improvement of contractors' work safety, of which:
  - supervision of contractors,
  - preparation of project implementation procedures,
  - contractor training in HSEQ,
  - social communication activities.

Our input

- **Historical net electricity demand:**



Zapotrzebowanie na energię netto [TWh]	Net electricity demand [TWh]

- **Table 2-1 Forecast of net electricity demand in Poland for 2020-2040 (in TWh):**

	2020	2025	2030	2035	2040
Podstawa zapotrzebowania	159,6	168,6	177,5	185,0	193,1
Pojazdy elektryczne i pompy ciepła	0,3	1,5	3,5	6,9	11,1
Całkowite zapotrzebowanie na energię elektryczną netto	159,9	170,1	181,1	191,9	204,2

Podstawa zapotrzebowania	Base load
Pojazdy elektryczne i pompy ciepła	Electric vehicles and heat pumps
Całkowite zapotrzebowanie na energię elektryczną netto	Total net electricity demand

- **PLN 8.4 bn – PSE's planned capital expenditure for 2020-2024**

PLANNED EXPENDITURE BY INVESTMENT GROUP /PLN '000s/*							
GROUP	**NAME OF THE GROUP**	**2020**	**2021**	**2022**	**2023**	**2024**	**2020-2024**
I	ICT	132,985	181,418	120,798	75,653	48,375	559,229
II	Construction, expansion and upgrade of substations and power lines	1,002,434	1,130,983	1,545,806	1,309,134	1,936,889	6,925,246
III	List of investment proposals for conditional or later implementation	-	-	-	-	-	0
IV	Buildings and structures	14,972	107,981	166,830	164,359	153,399	607,541
V	Purchase of finished capital goods	41,919	9,628	2,977	765	246	55,535
VI	Purchase of grid assets and clarification of the legal status of properties	90	90	90	90	90	450
TOTAL Groups I – VI		**1,192,400**	**1,430,100**	**1,836,500**	**1,550,000**	**2,139,000**	**8,148,000**

VII	Provision	50,000	50,000	50,000	50,000	50,000	250,000
TOTAL		**1,242,400**	**1,480,100**	**1,886,500**	**1,600,000**	**2,189,000**	**8,398,000**

* values calculated taking into account rounded amounts in PLN

< Uwaga: na podstawie ww. tabeli zostanie docelowo przygotowany wykres kołowy>

- **162 network infrastructure investment projects implemented with respect for the natural environment**

  * as at 15 June 2020

- **PLN 1,513.3 m – capital expenditure incurred by PSE on the construction, expansion and upgrade of electrical substations and power lines***

  *Total value of expenditure incurred in 2019.

- **PLN 66,539 k – expenditure incurred on IT security***

  * in 2019

- **2,662 information meetings** with residents for projects undertaken in 2016 – 2019, including 746 meetings in 2019,

II. Transmission network maintenance and repair

- Maintenance and repair of the transmission network
- Expenditure on improvement of contractors' health and safety, including:
  - supervision of contractors,
  - contractor training in HSEQ,
  - social communication activities (activities pursued by PSE and by subcontractors)

Our input

- **PLN 109,184.5 k — maintenance and repair** expenditure incurred in 2019, of which the amount spent on maintenance of grid assets was **PLN 87,974.8 k**, and that spent on repair projects was **PLN 21,209.7 k.**

III. Social communication around completed projects

- Social communication activities (activities pursued by PSE and by subcontractors).

Our input

- **We analyse the impact of our investment projects on the local community in 100 percent of the cases.**

OUTPUTS - Infrastructure and investments

Value creation areas

I. **Expansion of infrastructure necessary for the operation of the company and the PPS through investments.**

II. **Transmission network maintenance and repair.**

III. **Social communication around projects in progress.**

I. Expansion of infrastructure necessary for the operation of our company and the PPS through investment projects

- Replacement and development of grid assets.
- Management of the reliability and continuity of electricity transmission.
- Ensuring the operational cybersecurity of the PPS systems.
- Improving the PPS operation security through the implementation of PSE investment projects.

Outputs of our activities

- **ENS – 601.26 MWh, AIT – 111.50 (minutes). Such low 2019 ratios testify to a high level of operational reliability of the transmission system and the certainty of supply to consumers connected to our network.**
- **The condition of the transmission network is confirmed by a high collective transmission equipment availability factor (DYSU) which reached 99.77 percent in 2019.**
- **1.38 percent – transmission losses (the lowest ever)** as percentage of total energy fed into the system.
- **Average age of equipment: 22 years for EHV substations, 42 years for EHV lines.**
- **PLN 1.95 bn –** total value of contracts awarded to contractors in 2019.
- **Main groups of PSE's contractors:**
  - contractors for new build, upgrade and repair projects performing work on grid assets,
  - equipment and hardware suppliers and service providers.

97.5 percent of contractors for works and services (in terms of contract value) come from Poland and 2.5 percent from the EU countries.

II. Transmission network maintenance and repair

- Maintaining grid assets in due state of repair.
- Improving the reliability and operational security of the transmission network through its ongoing maintenance and repair.
- Building and maintaining reputation for PSE's care of network operation security.

Outputs of our activities

- **The availability index for transmission facilities (DYSU) in 2019 was 99.77 percent.**

III. Social communication around completed projects

- Winning social acceptance.
- Timely completion of projects.
- Increased awareness and sense of security of local communities with regard to projects in progress.
- Optimisation of line routes for their acceptance by local communities.

Outputs of our activities

- **2,662 information meetings** with residents for projects undertaken in 2016 – 2019, including 746 meetings in 2019,

- **Increasing the awareness of the significance of power infrastructure in investment areas.** Social communication is performed on the basis of a participation model engaging all interested parties in the project implementation process.
  Public awareness of the current status of the energy sector and energy projects is not a frequent subject-matter of sociological surveys in Poland, but available data and real-life experience acquired in the course of projects suggest that energy awareness is low among the general public in Poland.

INPUT – People and Relations

Value creation areas

I. **Management of human resources, creation of a responsible and friendly workplace.**

II. **Competence building (ensuring employee development opportunities, strengthening innovation).**

III. **Active cooperation with the company's environment.**

IV. **Social education.**

I. Management of human resources, creation of a responsible and friendly workplace

- Ensuring an attractive employee remuneration system and non-pay benefits as well as care of social security
- Care of safety at work.
- Internal organisation culture based on specific values: reliability, credibility, responsibility and respect.

Our input

- **Attractive social benefit package.**
- **100 percent of employees covered by the pay incentive system.**
- **Broad access to diverse forms of professional development.**

II. Competence building (ensuring employee development opportunities, strengthening innovation)

- Training and development of employees in all functional areas of the organisation, relating to both technical issues and soft skills.
- A team of internal trainers who train employees in key positions.
- Running internship programmes, subsidising employees' studies, etc.

Our input

- **Implementation of e-DEK – an educational and development platform for employees, which is also an e-learning management tool.**
- **51 internal trainers delivering training in 2019.**

III. Active cooperation with the company's environment

- Improving the new investment project implementation model.
- Knowledge and unique corporate know-how sharing at meetings with contractors.
- Cooperation with local and central administration at the project preparation and implementation stages.
- Cooperation with industry organisations.

Our input

- **Improvement of the investment project implementation model. Its coordination is the responsibility of the Central Investment Unit (*Centralna Jednostka Inwestycyjna, CJI*) operating within the PSE's internal organisation structure.**

IV. Social education

- Implementation of educational and social projects.
- Publication of the *Elektroenergetyka* magazine.

Our input

- **Information meetings with local communities were held in 100 percent of communes situated along the routes of planned line projects.**
- **Launch and execution of the national grant programme "EmPower Your Environment"** to be implemented in the years to come. Link to programme website page: http://wzmocnijotoczenie.pl/.
- **Implementation of local social projects, in particular the "Ping-pong Dreams with PSE" programme with the Polish Table Tennis Association.**
- **Publication of the *Elektroenergetyka* magazine.**

OUTPUTS - People and Relations

Value creation areas

I. **Management of human resources, creation of a responsible and friendly workplace.**

II. **Competence building (ensuring employee development opportunities, strengthening innovation).**

III. **Active cooperation with the company's environment.**

IV. **Social education.**

I. Management of human resources, creation of a responsible and friendly workplace

- Increased employee satisfaction and motivation.
- Promoting work-life balance.
- Safe workplace – negligible number of accidents at work.

Outputs of our activities

- As an employer, PSE takes a number of measures aimed to build the work-life balance approach among employees, including special events for employee's children under the so-called *Kolorowy KDM* initiative, financial support for housing purposes, medical care, subsidising leisure for employees and their children, subsidising sports, recreational, cultural and educational activities.
- The average length of service of employees carrying out maintenance work in substation maintenance teams (ZES) is 24 years.
- Full implementation, knowledge and application by employees of work safety procedures for EHV electrical substations.

II. Competence building (ensuring employee development opportunities, strengthening innovation)

- Improving the competence of employees.

- Improving employee motivation, competence retention in the organisation.
- Partnering with universities.

Outputs of our activities

- **0.95 percent** – percentage of employees with the doctor's degree.
- **84 percent** – percentage of employees with higher education.
- **57.57 percent training budget performance in 2019.**
- **Electricity supply continuity index** (defines the certainty of supply to all customers connected to the transmission network) **- 99.99 percent**.
- **47 training sessions** on the Polish Power System Simulator, including:
  - **34 training sessions and 2 examination sessions with the participation of 338 PSE O&M employees.** The sessions were conducted by 4 trainers from the National Power Dispatch Centre with support from PSE Innowacje trainers.
  - **11 sessions with the participation of the Distribution System Operators' O&M personnel, in which 127 DSO and TSO Dispatchers participated.** The training sessions were conducted by 10 TSO trainers and 4 DSO trainers with support from PSE Innowacje trainers.

III. Active cooperation with the company's environment

- Increased effectiveness of mutual cooperation with the environment, including electricity market participants.
- Maintaining partner relations with the environment.
- Increased effectiveness of the implementation of industry initiatives.

Outputs of our activities

- **37 industry conferences, debates, seminars and congresses** with the participation of PSE's experts
- **69 PSE experts involved** in conferences, debates, seminars, forums and industry congresses (increase by 21 percent YoY),
- **51 reports** (including PPS operation data and BM actions) generated automatically on the PSE website.

IV. Social education

- Building understanding and social acceptance for PSE as an independent national power system operator.

Outputs of our activities

- **Social Communication Programmes are implemented in 100 percent of communes situated in PSE's investment areas.**
- **Implementation of 5 local social projects, in particular the "Ping-pong Dreams with PSE" programme with the Polish Table Tennis Association.** Under the programme, the company provided necessary sport equipment to more than 1,100 young players in 20 communes.
- **Launch and execution of the national grant programme "EmPower Your Environment"** (http://wzmocnijotoczenie.pl/), to be implemented in the years to come.

CHAPTER III: OUR STRATEGY

Key messages of the chapter:

Our new strategy is a response to challenges of the power sector transformation in Poland and Europe.

The regulations stemming from the Clean Energy Package for All Europeans have set a new operating framework for transmission system operators. Technologies, in particular the digitalisation of the electricity sector and the resulting changes in consumer behaviour, as well as the development of electromobility, will shape new areas of activity for operators.

The need for climate protection is causing a growing demand for green energy from onshore and offshore wind farms and photovoltaic installations. All this poses challenges in the form of the need to ensure system balancing with a significant share of distributed generation.

III. BUSINESS STRATEGY

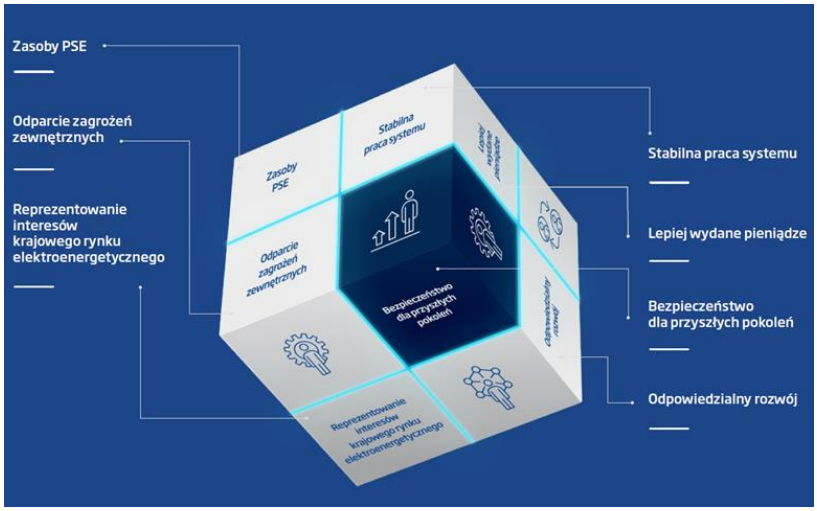
The power sector has found itself at a crossroads. It is not clear which electricity market model will prevail in future. On the one hand, the EC and ACER propose a concept of integrated wholesale electricity markets for the whole of Europe, but, on the other hand, distributed, prosumer generating units and storage facilities have been developing, aiming at energy self-sufficiency of local communities. The strategic decisions, including investment decisions, required in building a market based on the integration of business functions and making internal transmission capacity available in the European market are different from those looking forward to a future built with the use of a prosumer energy infrastructure representing an alternative way of satisfying energy needs.

There are many dilemmas ahead and hard decisions to take. However, irrespective of the path the sector will pursue, it will always remain the transmission system operator's role to ensure the current security of electricity supply. PSE will develop a model for the provision of services added to the transmission service, representing a compelling value proposition for consumers, which services will enhance the standard of security and quality of electricity supply. The services include mainly services ensuring the cybersecurity of demand facilities, metering information operator's services – a metering data centre, and services making the power system immune to emergency states and failures of different scales.

All these issues are a foundation of PSE's strategy and are reflected among our organisation's priority initiatives.

3.1. Summary of the implementation of the Strategy for 2017-2019

Our strategy for 2017-2019 included 62 initiatives broken down into 24 specific objectives. The implementation of each initiative was monitored quarterly. As many as 51 initiatives were completed in their existing status, in line with the strategy application timeframe, and set to be performed and developed within the framework of PSE's operating activities. The remaining 11 initiatives, owing to their priority and importance, will be implemented under PSE's new strategy for 2020-2030.



Zasoby PSE	PSE resources
Odparcie zagrożeń zewnętrznych	Fending off external threats
Reprezentowanie interesów krajowego rynku elektroenergetycznego	Representing interests of the national electricity market
Stabilna praca systemu	Stable operation of the system
Lepiej wydane pieniądze	Money spent better
Bezpieczeństwo dla przyszłych pokoleń	Security for future generations
Odpowiedzialny rozwój	Responsible development

[GRI 103-1, GRI 103-2] PSE CG Cybersecurity Programme

PSE CG Cybersecurity Programme

Due to its significant impact on the security of the Polish power system, cybersecurity plays a key role in PSE's business strategy. One of the strategic initiatives defined in PSE's Strategy are activities involving in particular the management of the risk of loss of ability to manage the operation of the PPS, related to cyberattacks against IT/OT systems of the transmission system operator and distribution system operators, generators, traders, exchanges or industrial consumers.

The actions taken respond to the growing cybersecurity risks. This approach increasingly gains in importance in the light of increasingly extensive use of new technologies and communication methods. Recent years have seen an increase in hazards accompanying new solutions and an intensification of targeted attacks with the use of dedicated tools, especially against critical infrastructure. Phishing attacks are also more common, showing an increasing level of sophistication in response to higher awareness among users. The additional intensification of attacks is also related to the present epidemic situation and increasing digitisation of everyday life, which consequently leads to attempts at taking advantage of new solutions.

As part of the actions taken, we adjust organisational and technical solutions to applicable legal requirements and current ICT security standards as well as industry standards.

By adopting the cybersecurity strategy, we have managed to identify in advance the possible directions of situation development and build a portfolio of measures necessary to manage defined risks. The growing volume cyber threats and specialised attack tools confirmed the accuracy of the assumptions made in the strategy.

ICT security and cyber threat management

In 2017, we developed and have since been implementing the ICT (Information and Communications Technology) Strategy of the PSE Capital Group. The strategy highlights the unavoidable and mutual dependence of cybersecurity of our company, its market partners at home and abroad, and entities of the Capital Group, and subcontractors. It also describes the overall impact of cybersecurity on the PPS operational stability.

The pillar of the strategy is ICT security – business continuity defined as availability and resilience of systems as well as data integrity and confidentiality in IT solutions. The ICT strategy defines the following areas as priorities:

- **Network Segmentation** – in this area, projects are implemented which are aimed to ensure adequate separation of resources with different sensitivity levels; both through actions at infrastructure level and through appropriate design of business projects.
- **Workstation** – covers projects providing secure work tools, allowing performance and functionality to be maintained according to business needs, while ensuring protection from malicious software, and rights and data flow control.
- **Internet Interface** – functional and unified access to the Internet (including a secure Wi-Fi network deployed in 2017 at the company's head office in Konstancin-Jeziorna) for the company's employees and guests, and secure remote access adequate to needs.
- **Detection and response** – in order to ensure current ICT security, the dedicated Security Operations Centre (SOC) team performs the monitoring of threats on a 24-hour basis. In the case of incidents involving IT or OT networks, it takes relevant actions and remedial measures. The Computer Emergency Response Team (CERT) forms another line of support. CERT was set up in 2016, and in 2017 it became an accredited member of the Trusted Introducer organisation. It is involved in enhancing employees' awareness through the publication of threat alerts and warnings, publication of ICT security bulletins and reporting information on incidents. It is also engaged in cooperation with third parties in incident handling coordination and exchange of information on threats with third parties (e.g. CERT NASK, Government Security Centre, cert.gov.pl).

In collaboration with our stakeholders, we continuously carry on activities aimed to ensure common ICT security and harmonisation of the efforts undertaken. We closely cooperate with entities responsible for cybersecurity of the country and the power sector. To be able to enhance the cooperation, build awareness of threats to cybersecurity and an approach to counteracting such threats, we actively participate in numerous conferences, seminars, as well as national and international industry cooperation forums.

In the process of promoting ICT security and tightening cooperation in the power sector, in 2019 we held the Cyber Conference For Energy Sector, with the participation of foreign industry experts.

The key forum for international cooperation is the European Network of Transmission System Operators for Electricity within which PSE's representatives engage in projects aimed at ensuring energy security in Europe, developing new solutions or concepts and principles concerning critical infrastructure in different ENTSO-E working and project groups. Some of them are presented below:

- Digital Committee Cyber Security Task Force – a team responsible ENTSO-E's cybersecurity strategy, headed by the director of PSE's ICT Department;
- Critical System Protection (CSP) – the group deals with the protection of critical infrastructure;
- Cyber Security Special Interest Group – the group deals with ICT security issues. Its task is to monitor information on global threats, cooperate under projects where care of security is required, and shape the rules for secure operation of systems and operators.
- ENTSO-E's Electronic Data Interchange (EDI) Working Group – a group that has prepared electronic information standards in the European electricity market.

PSE members also participate in the work of other groups, supporting them with their expertise in the management of the inter-TSO IT network and designing future ones that will be created to address growing needs of operator and market systems. In the course of that work, concepts of new connections for data exchange between transmission system operators are created and the existing connections are developed. Cooperation in the above-mentioned groups significantly contributes to the security and stability of the power systems in Europe. It also helps to improve employee skills and support partners in the process.

Employees of PSE's ICT Department actively participate in the work the International Council on Large Electric Systems (*International des Grands Réseaux Électriques,* CIGRE). Working groups on ICT security prepare technical brochures which influence the direction of work of other committees responsible for the creation of global standards. As early as the document preparation stage, joint conferences of CIGRE and IEC teams are held, which lead to setting a uniform line of action at an early stage of the document creation process. Owing to those activities, our employees influence the establishment of global standards of ICT security of industrial systems and significantly improve their competence in the area, which translates into easier adjustment of the ICT community to the growing security requirements and increasing immunity to threats.

[GRI 103-1, GRI 103-2] Educational initiatives, events and actions promoting the security of critical power infrastructure

PSE actively participates in events organised by public administration, the academic community and international institutions. Our company has taken many initiatives to promote the awareness of people involved in the improvement of the country's energy security:

- In January 2019, on PSE's initiative, the Council of Ministers adopted the Regulation amending the Regulation on facilities of particular importance for the security and defence of the state and their special protection (Journal of Laws of 2003, No 116, item 1090, as amended). In the new regulation, "load dispatch centres and electrical substations of strategic significance for the national power system" were recognised as Category I facilities of particular importance for the security and defence of the state.

- In September 2019, PSE, in coordination with Tauron Polska Energia, hosted the first conference for experts and individuals responsible for ensuring the security of critical power infrastructure. The Security of Power Facilities conference brought together more than 80 representatives of power companies, the Ministry of Energy, the Internal Security Agency, the General Police Headquarters and voivodeship Police headquarters, the General Fifer Service Headquarters, as well as representatives of Security and Crisis Management Departments of voivodeship authorities.
- In September 2019, we co-hosted the 3rd SAFE PLACE National Scientific Technical Congress "Anti-terrorist Security of Public Utility Buildings". The subjects of the congress included the issues of anti-terrorist protection of facilities critical to national security and unprotected buildings, anti-terrorist education, and the issue of public resilience against terrorism. PSE representatives participated in workshops and discussions during expert panels.
- In November 2019, PSE hosted the participants of the 7th Congress of Postgraduate Studies for the Police Academy students majoring in Strategic Management of Internal Security of the State. The lectures discussed the issues of counteracting terrorist hazards to facilities of strategic significance for the state. The practical component included operational demonstrations by the National Power Dispatch Centre (PSE), the National Gas Dispatch Division (Gaz-System), and the Liquid Fuel Depot in Emilianów (PERN).
- In December 2019, we co-hosted the 7th Congress of Postgraduate Studies for the Police Academy students majoring in Strategic Management of Internal Security of the State. The lectures discussed the roles and tasks of critical infrastructure owners and related legislative changes. The event provided an opportunity for the exchange of views and experience sharing, and to discuss relevant security issues related to facilities of critical importance for the state.

[GRI 103-1] Development of the methodology for remedial actions related to capacity allocation and congestion management (CACM Article 35) and the methodology of cost sharing related to those actions (CACM Article 74)

According to the CACM Regulation (Commission Regulation (EU) 2015/1222 of 24 July 2015) and the schedule adopted by the Commission, transmission system operators in the Core region were to submit for approval to their national regulatory authorities, at the beginning of 2019, the methodology for remedial actions (Article 25 of the CACM Regulation) and the cost sharing methodology for those actions (Article 74). PSE participated in the development of both methodologies.

Owing to the objective complexity of the problem and a lack of detailed analyses, the methodologies presented were of a general nature and did not prejudge the majority of key aspects of the described processes.

The basic provisions of the methodology for remedial actions, developed by TSOs (Article 35):

- cost sharing covers exclusively the cost of eliminating overloads on cross-border relevant network elements (interconnectors and internal elements with PTDF>5 percent),
- cost sharing covers exclusively the cost of remedial actions ordered (energy only, without the capacity component),
- the implementation is dependent on other methodologies (the capacity calculation methodology, the methodology under CACM Article 74 and SOGL Article 76), and the deployment of IT tools.

The basic provisions of the cost sharing methodology (Article 74):

- the cost sharing process requires: the identification of flows by category (loop flows, internal flows, import/export flows, transit flows and PST flows), the mapping of the costs of remedial actions onto other elements (total cost split between specific lines), and calculation of the aggregate cost to be covered by the country (bidding zone) concerned,
- the methodology does not prejudge the sequence cost assignment to particular flow categories or details of mapping, decomposition, etc.,
- the cost of eliminating overloads on network elements other than cross-border relevant are covered by the element owner,
- the cost on uncoordinated remedial actions are covered by initiators of uncoordinated actions,
- TSOs have the right to use PTS to reduce loop flows,
- the costs generated by non-Core countries are to be identified, but covered by Core operators.

The Core transmission system operators and regional security coordinators (RSCs) needed time to carry out analyses to gain in-depth knowledge on key parameters of the methodologies. For this purpose, national regulatory authorities obtained ACER's consent to extend the time for evaluation and acceptance of the methodologies from 6 to 12 months, i.e. until 27 March 2020, so as to enable the results of the analyses performed to be also taken into account.

The analyses were planned and performed in the latter part of 2019 and in the beginning of 2020. Core TSOs submitted preliminary analysis results on 20 February 2020, and the final report on 13 March 2020. Owing to divergent interests of the countries, incompleteness of the methodologies, simplified analysis results (due to limitations of the existing tools and algorithms) and the fact that the provisions of the CEP were not taken into account, the national regulatory authorities decided to refer both methodologies to ACER for further processing. As announced, ACER will prepare final versions of both methodologies by the end of 2020. The implementation of both methodologies is envisaged by ACER in approx. 3 years.

[GRI 103-1] Development of the Concept Note containing key assumptions for the methodology under Article 76 of SO GL in the Core CCR.

In April 2019, the transmission system operators in the Core region prepared and provided to the national regulatory authorities the *Draft for common concept note for regional operational security coordination for the Core CCR in accordance with Article 76 of Commission Regulation (EU) 2017/1485 of 2 August 2017 ("Concept Note")*. The document sets forth the main assumptions of the methodology for regional operational security coordination in the Core region (Core ROSC). The need to prepare the above methodology arises from Article 76(1) of Commission Regulation (EU) 2017/1485 of 2 August 2017 establishing a guideline on electricity transmission system operation (SOGL), which provides that "by 3 months after the approval of the methodology for coordinating operational security analysis in Article 75(1), all TSOs of each capacity calculation region shall jointly develop a proposal for common provisions for regional operational security coordination".

The Concept Note assumed, among other things, that remedial actions to eliminate constraints from the entire transmission network of the Core region would be optimised in the Core region within the framework of the Regional Coordinated Operational Security Analysis. Other relevant elements of the Concept Note include:

- the principle of avoiding the aggravation of the situation on selected (observed) elements outside the region,

- the method of determining cross-border impact remedial actions, i.e. remedial actions subject to coordination,
- definition of information on remedial actions which has to be exchanged between TSOs and RSCs,
- designation of the hours for performing security analyses in intraday processes (00:00, 08:00, 16:00), with the option to add a fourth hour (fixed or on-demand),
- determination of the basic rules for the operation of the remedial action optimiser (RAO),
- providing preliminary assumptions on the method of activation and rejection of remedial actions and the initial description the fast activation process.

The CSA methodology pursuant to Article 75 of SOGL (CSAM) was approved and published by ACER on 19 June 2019. Owing to significant changes in the methodology, introduced by the Agency, ENTSO-E requested the European Commission to extend the time limit for the development of the Core ROSC methodology until 21 December 2019, and the Commission granted the request.

The purpose of the methodology (along with CSAM under Article 75 of SOGL) is to create a regional process aimed to identify hazards in the transmission network to eliminate them by selecting optimal remedial actions. The methodology concerns the short-term timeframes: day-ahead and intraday.

In order to ensure the identification of the most effective and economically efficient remedial actions, the ROSC methodology in the Core region provided for the use of the remedial action optimiser (RAO). Once approved by TSOs, the optimiser results will provide a basis for cost sharing in accordance of the methodology under Article 74 of CSAM.

The methodology was subject to public consultations and preliminary opinions by regulators. In the course of work, it was supplemented, among other things, with a detailed description of the implementation, including individual implementation stages and deadlines. Finally, in December 2019, the Core ROSC methodology was referred for approval to national regulatory authorities.

Although national regulatory authorities have 6 months to approve the methodology, it is likely to be also referred to ACER, as, for the most part, it regulates the same subject-matter areas as the methodology under Article 35 of CACM, due to which both methodologies should be consistent and approved at the same time. The implementation of the methodologies is envisaged by ACER in approx. 3 years.

[GRI 103-1] Implementation of the Single Intraday Coupling mechanism on Polish borders

On 19 November 2019, the Polish bidding zone was included in the Single Intraday Coupling (SIDC) mechanism implemented with the use of the XBID platform. Initially, the SIDC mechanism was deployed on four Polish borders (CZ-PL, DE-PL, LT-PL, PL-SE). On 4 February 2020, a temporary solution was launched for the Intraday Market on the PL-SK border, based on the explicit auction mechanism. The solution will be used until Slovakia joins the SIDC mechanism. Covering the PL-SK boarder by the SIDC mechanism will be possible after the mechanism is implemented in the Slovak bidding zone. For this purpose, in the first half of 2020, work started under Local Implementation Project LIP17 covering the SK-CZ, SK-HU and SK-PL borders. The operational rollout of LIP17 is scheduled for the fourth quarter of 2021.

The SIDC mechanism is based on continuous trading and implicit allocation. Market participants perform electricity purchase and sales transactions until 1 hour before the period of its physical delivery, using both bids available in the country and those originating outside the Polish system. The ability to adjust a trading position at a short notice is of particular importance for entities managing

portfolios characterised by high variation of demand and generation, e.g. RES. The use of cross-border bids is possible owing to interconnection capacity made available for trading purposes is performed in the background of transactions concluded.

The SIDC launch has opened up new opportunities for national market participants. The mechanism provides access to energy bids and offers from outside the country, which will translate into increased liquidity of the national Intraday Market. From the point of view of energy security, providing access to intraday allocation will ensure better utilisation of cross-border interconnections, in particular when new transmission capabilities emerge after the closure of the Day-Ahead Market or when operating conditions of power systems change in respective countries.

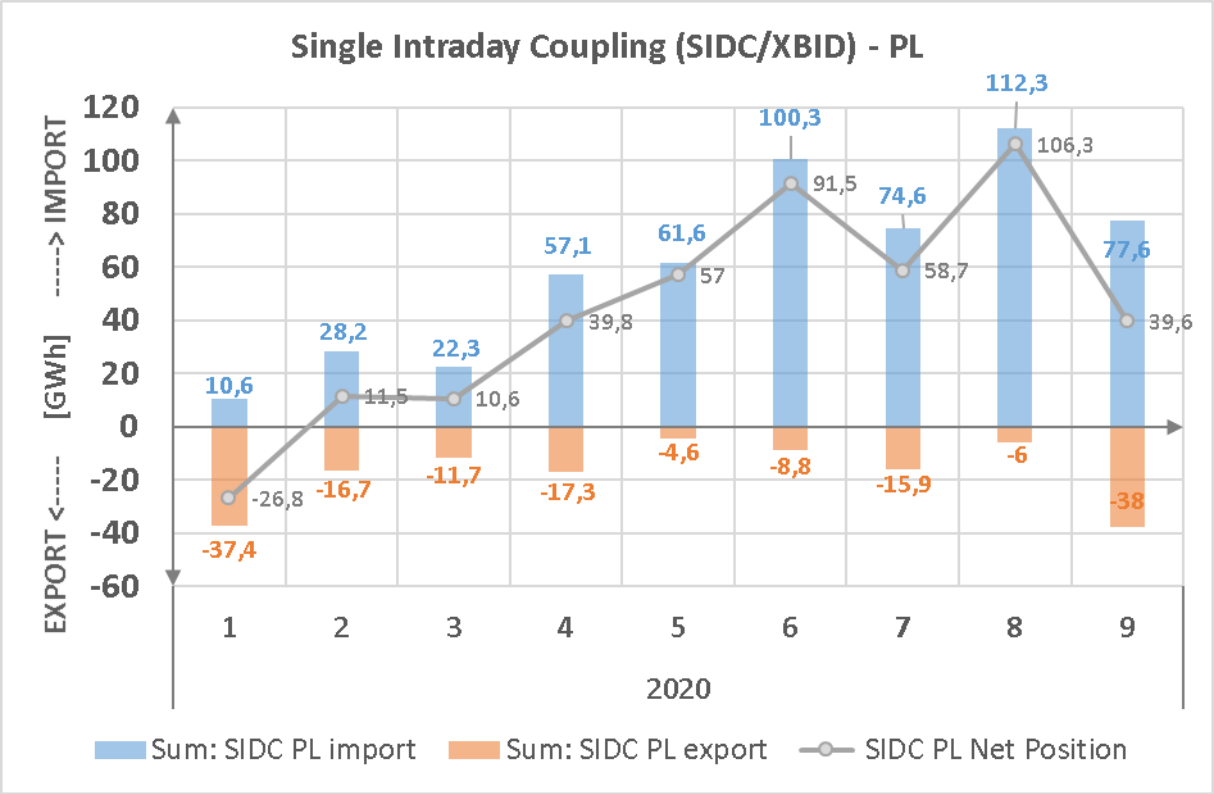


Fig. Volume of commercial exchange in the Polish bidding zone under SIDC

[GRI 103-1] Cooperation with government administration in the process of implementing the provisions of the Clean Energy Package for All Europeans package

On 4 July 2019, EU legislation included in the Clean Energy Package for All Europeans package entered into force, which directly affect TSOs' operations, i.e.: 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) and Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (hereinafter: Directive 2019/944).

The objective of Regulation 2019/943 is to accelerate the completion of the internal electricity market and to adapt market operation rules to changing operating conditions of the power sector. Therefore, PSE has started work and activities to adapt to the new regulations, in particular with regard to the rules for making available cross-zonal capacity and the balancing market operation rules, in parallel

with the ongoing advanced process of implementing codes and guidelines adopted under Regulation (EC) No 714/2009 of the European Parliament and of the Council on conditions for access to the network for cross-border exchanges in electricity.

With regard to the new requirement related to the obligation to make available a minimum level of available capacity for cross-zonal trade, as defined in Regulation 2019/943, the Polish State adopted, pursuant to the Regulation, an action plan aimed at gradually achieving the required level of available cross-zonal capacity by 31 December 2025 according to the linear trajectory specified in the plan. PSE has also made parallel efforts to obtain temporary derogation from the obligation to make available cross-zonal capacity in accordance with the requirements of Regulation 2019/943 in order to guarantee that the system remains within prescribed operational security limits. On 30 December 2019, the President of the Energy Regulatory Office decided to grant PSE the requested derogation from the obligation to make available cross-zonal capacity in accordance with the requirements of Regulation 2019/943 for 2020.

In performing those activities, PSE was simultaneously preparing for the implementation of requirements for the operation of the balancing market, set forth in Regulation 2019/943, with the simultaneous process of harmonisation and integration of European balancing markets, as part of implementation of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing. As part of the above work, PSE also entered into cooperation with the government administration in connection with amendments to national legislation in order to enable the application of Regulation 2019/943 to the extent necessary to implement the new rules of balancing market operation.

In 2019, cooperation with the government administration started on the implementation in national law of new Directive 2019/944, the objective of which is to continue building the single electricity market and to empower consumers and promote their activity, including the development of the flexibility services market.

The development of the flexibility services market is a very broad issue, the preparation and implementation of which requires the involvement of many PSE employees, as well as coordination with third parties such as DSOs, the Ministry of Climate, or the Energy Regulatory Office. The flexibility services market is created by each Member State, but as Directive 2019/944 has been in force for a short time so far, no single line of action has been set in this respect. Work to create the flexibility services market requires the involvement of employees from different fields, ranging from designing a business model for the operation of the market, including settlements, congestions, ensuring the operational security of the entire power system, to legal measures and the definition of technical conditions that will make it possible to implement standards arising from Directive 2019/944 and to establish a legal framework covering the flexibility services market. PSE continuously liaises with government administration bodies, forming a kind of expert body for the power system.

On 4 July 2019, Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector (forming part of the Clean Energy Package for All Europeans package). It sets forth the rules for preventing critical situation and tools ensuring cross-border cooperation, including the obligation of Member States to prepare risk-preparedness plans in the electricity sector. In performing the obligations under the regulation, in particular the obligation to develop methodologies for the identification of regional crises, and then regional crisis scenarios, PSE actively participated in the work of ENTSO-E. Besides, our company started working with the government administration on the coordination of measures relating to the fulfilment of obligations under the regulation.

[GRI 103-1] Capacity Market

One of the basic obligations of our company as a transmission system operator is to ensure operational security of the power system. The implementation of the capacity obligation make it possible to guarantee generation adequacy in stress events, and it will also support the potential development of renewable energy sources without a negative impact on the security of electricity supply to final consumers.

The capacity market should generate necessary investment incentives supporting the construction of new generating capacity, restoration of withdrawn capacity and upgrades of existing units. It should also make it possible to implement an effective, competition-based mechanism for the coordination of the construction and withdrawals of generating capacity and the development of the demand side response services, while ensuring the optimisation of costs incurred by final consumers.

The Capacity Market Act

The capacity market in Poland was established by the Act of 8 December 2017 consolidated text of 2020, item 247, hereinafter: "the Act"). The Act entered into force on 18 January 2018. According to Article 82, PSE developed the Capacity Market Rules aimed to set forth specific terms and conditions for the cooperation of the operator with other participants of the Capacity Market. In addition, pursuant to Article 55 PSE, PSE keeps the Capacity Market Register (hereinafter: "register"). The register is an electronic platform used to operate the capacity market, to collect, process and exchange commercial, settlement and technical data pertaining to the Capacity Market. It is a medium for communication between the operator and market participants.

Launching further functionalities of the ICT system supporting the Capacity Market operational processes

All processes of the Capacity Market are conducted exclusively in electronic form, with the use of the register. As further processes are implemented, the register is successively expanded with new, necessary functionalities. As part of work on the register, in 2019 PSE was obliged to create functionalities making it possible to report transactions entered into on the secondary market and preliminary auctions within timeframes prescribed by the Act. In addition, our company established functionalities for the submission of declarations as part of monitoring the performance of capacity agreements.

Carrying out further Capacity Market processes, including the main auction for the delivery year 2024 and additional auctions for the delivery year 2021

Our organisation, acting as operator within the meaning of the Act, is responsible for the management of Capacity Market processes. Since the beginning of 2019, a number of processes have been performed which allow capacity agreements to be concluded for delivery periods falling in 2021 and 2024.

The execution of processes withing the Capacity Market in 2019 started with the **general certification** conducted between 3 January and 8 March. Participation in general certification is obligatory for all existing physical generating units with a gross maximum capacity of not less than 2 MW, and the fulfilment of this obligation is monitored by the President of the Energy Regulatory Office (hereinafter: "President of ERO"). A physical unit that has successfully completed the general certification process is entered in the register. The participation of planned physical generating units, demand side response

physical units and planned demand side response units is not obligatory, but it is prerequisite for subsequent participation in main certification.

Under general certification, in 2019 applicants submitted 1,103 applications for entry in the register. 1,092 units were successfully verified and entered in the register, including 985 physical generating units and 107 demand side response units.

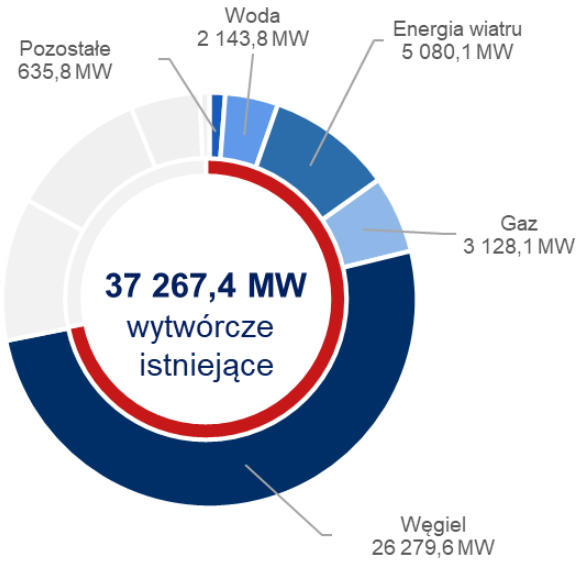
Błąd! Nie można odnaleźć źródła odwołania.. presents a summary of the general certification conducted in 2019.

	Number of units entered in the register	**Total net maximum capacity of units entered in the register, MW**
Existing generating physical units	900	37,267.446
Planned generating physical units	85	14,587.115
Demand side response physical units	36	413.190
Planned demand side response units	71	2,120.000

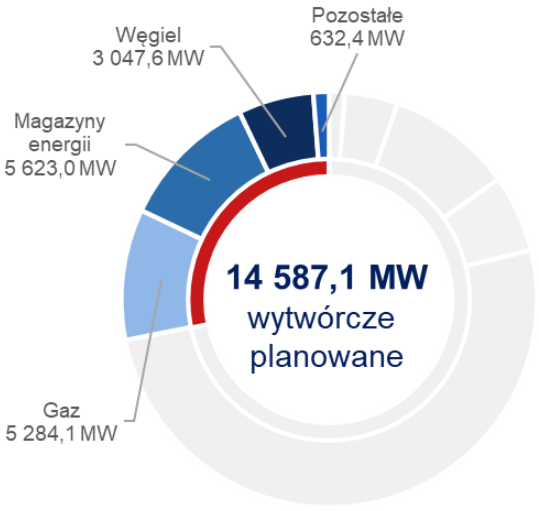
Tab. 1. The number and net maximum capacity of units entered in the register as a result of general certification in 2019.

The charts below show the structure of physical generating units entered in the register in the course of 2019 general certification, by basic energy source.

Net maximum capacity of existing physical generating units entered in the register



Net maximum capacity of planned physical generating units entered in the register



wytwórcze istniejące	existing generation
wytwórcze planowane	planned generation
Pozostałe	Other
Woda	Hydro
Energia wiatru	Wind
Gaz	Gas
Węgiel	Coal
Magazyny energii	Energy storage

Within 14 days of the end of general certification, PSE submitted to the minister in charge of energy and the President of ERO a detailed report summing up the general certification. In addition, within 28 days of the end of the general certification, our company prepared a proposal for the main auction parameters for the delivery year 2024 and the additional auction parameters for each quarter of 2021, and submitted it to the President of ERO and the minister in charge of energy.

The final parameter values were published in the Regulation of the Minister of Energy of 2 August 2019 on the parameters of main auctions for the delivery year 2024 and the parameters of additional auctions for the delivery year 2021.

Another Capacity Market process was **certification for the main auction** for the delivery year 2024. Participation in the main certification is not obligatory, but it is necessary to establish capacity market units and to enable them to participate in the auction or in secondary trading for a particular delivery period. As a result of positive verification of applications, PSE issued certificate authorising capacity market units to participate in the above processes. Following the certification, PSE submitted to the minister in charge of energy and the President of ERO a detailed report summing up the main certification.

Another Capacity Market process performed in 2019 was the **main auction** for the delivery year 2024. A capacity market auction is performed in the form of Dutch auction, with a uniform clearing price for all capacity market units that have won the auction. It consists of a defined number of rounds during which the participants must submit exit bids. Non-submission of an exit bid declaration is treated as acceptance of the starting price for the next round. The Capacity Market units that have won a given auction conclude capacity agreements. The term of the capacity agreement depends on the type of Capacity Market unit and the duration of the capacity obligation offered by it. Existing generating Capacity Market units may offer a capacity obligation for only one delivery period. Refurbishing generating Capacity Market units and demand side response Capacity Market units that will declare to invest and incur unit capital expenditure levels (as specified by regulation) may offer the capacity obligation for not more than 5 delivery periods. On the other hand, new generating Capacity Market units declaring unit capital expenditure levels specified by regulation may offer the capacity obligation for not more than 15 delivery periods. In addition, the term of the capacity agreement may be extended by an additional 2 years for low-emission generating Capacity Market units ("green bonus").

The fourth main auction in the Polish Capacity Market was held on 6 December 2019 for the delivery year 2024. As a result, 103 capacity agreements were concluded for 1, 2, 5, 7, 15 and 17 delivery periods. T**Błąd! Nie można odnaleźć źródła odwołania.**ab. shows a summary of the main auction conducted.

Delivery year	Auction closing price PLN/kW/year	Number of capacity agreements concluded	Capacity obligation volume resulting from capacity agreements concluded (MW)	Auction closing round
2024	259.87	103	8,671.154	5.

Tab. 2. Summary of the main auction conducted in 2019.

The table presents the breakdown of capacity agreements by duration of the capacity obligation.

Duration of the capacity obligation in years	Number of agreements concluded in main auction for delivery year 2024

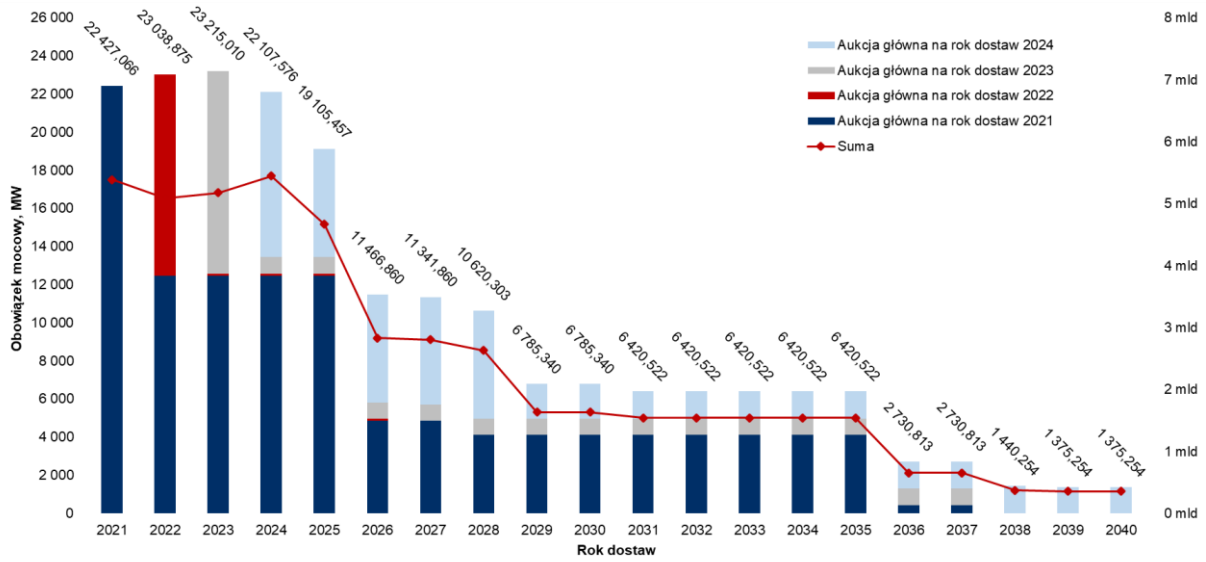
Duration of the capacity obligation in years	Number of agreements concluded in main auction for delivery year 2024
1	71
2	1
5	15
7	12
15	1
17	3
Total capacity agreements concluded	**103**

Tab. 3. Number of capacity agreements concluded in the main auction conducted in 2019.

In compliance with the time limit under the Act, after the capacity auction, PSE entered in the register and published preliminary results of the auction. Then our company submitted a detailed report summing up the course of the auction to the minister in charge of energy and the President of ERO. The final results of the main auction were published by the President of ERO in the Public Information Bulletin on 30 December 2019.

As a result of the capacity agreements concluded, capacity obligations were contracted for the years **2024-2040**.

The chart below presents capacity obligations under capacity agreements concluded as a result of main auctions conducted in 2018-2019.



Aukcja główna na rok dostaw	Main auction for delivery year
Suma	Total
Obowiązek mocowy, MW	Capacity obligation, MW
Rok dostaw	Delivery year
mld	bn

The Act provides for holding main auctions for successive delivery periods during the period between 1 and 22 December in the fifth year before the delivery period. The next main auction for a delivery period falling in 2025 will be held on 14 December 2025.

At the same time, between 25 November 2019 and 19 February 2020, PSE carried out the first **certification for additional auctions** for individual quarters of the delivery year 2021. As in certification for the main auction, participation was not obligatory, but it was necessary in order to establish capacity market units and to enable them to participate in additional auctions for individual quarters of the delivery year 2021 or in secondary trading for a particular delivery year. As a result of positive verification of applications, PSE issued certificate authorising capacity market units to participate in the above processes. Following the certification, PSE submitted to the minister in charge of energy and the President of ERO a detailed report summing up the certification for additional auctions.

In 2019, work started within the next Capacity Market process, i.e. the verification of documents submitted as part of the **monitoring of capacity agreements**. The process was performed by PSE for the first time. Pursuant to the Act, the capacity provider who has concluded a capacity agreement relating to a new or refurbishing generating Capacity Market unit shall be required to demonstrate, no later than 12 months after the announcement of the final results of the main auction, that the Capacity Market unit in its disposal has achieved the Financial Commitment Milestone (hereinafter: "FCM"). The achievement of the FCM is demonstrated by proving that capital expenditure has been incurred in the amount of at least 10 percent of the total investment cost and that investment contracts have been concluded with an aggregate value of at least 20 percent of the total financial expenditure (Article 52 (1) and (2) of the Act). In order to meet these requirements, the capacity providers who concluded capacity agreements as a result of main auctions for the delivery periods 2021, 2022, 2023, submitted statements through the registry confirming the achievement of the FCM.

In 2019, PSE verified FKM statements for 60 capacity market units. The next step in the process of monitoring the performance of capacity agreements will be the delivery by capacity providers of the first reports presenting the current progress of projects (between 1 July and 7 July 2020).

At the beginning of 2020, PSE started another general certification which was conducted between 2 January and 6 March. In the course of certification, the applicants submitted 1,210 applications for entry in the register. 1,188 units were successfully verified and entered in the register, including 1,019 physical generating units and 169 demand side response units.

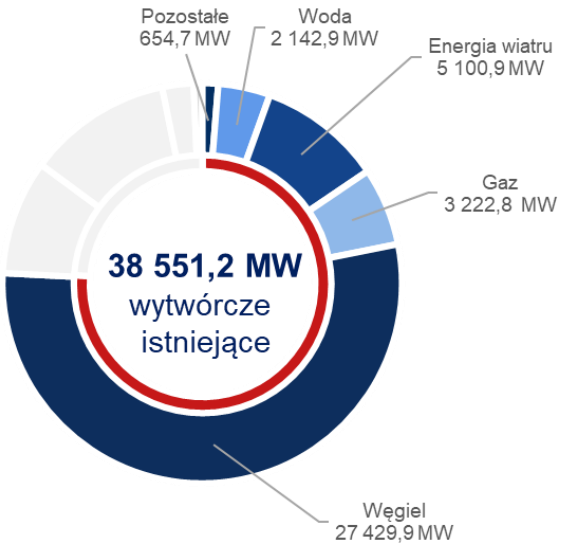
A summary of the number and net maximum capacities of the units entered in the register is provided in Tab. 4.

	Number of units entered in the register	**Total net maximum capacity of units entered in the register, MW**
Existing generating physical units	920	38,551.128
Planned generating physical units	99	12,096.266
Demand side response physical units	60	527.565
Planned demand side response units	109	3,681.000

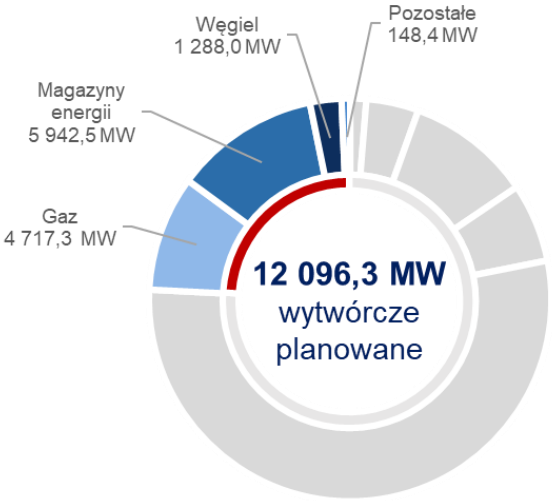
Tab. 4. The number and net maximum capacity of units entered in the register as a result of general certification in 2020.

The charts below show the structure of physical generating units entered in the register in the course of 2020 general certification, by basic energy source.

Net maximum capacities of existing physical generating units entered in the register



Net maximum capacities of planned physical generating units entered in the register



wytwórcze istniejące	existing generation
wytwórcze planowane	planned generation
Pozostałe	Other
Woda	Hydro
Energia wiatru	Wind
Gaz	Gas
Węgiel	Coal
Magazyny energii	Energy storage

Within 14 days of the end of general certification, PSE submitted to the minister in charge of energy and the President of ERO a detailed report summing up the general certification in 2020.

In addition, within 28 days of the end of the general certification, PSE prepared a proposal for the main auction parameters for the delivery year 2025 and the additional auction parameters for each quarter of 2022. The parameter proposal was submitted to the President of ERO and the minister in charge of energy.

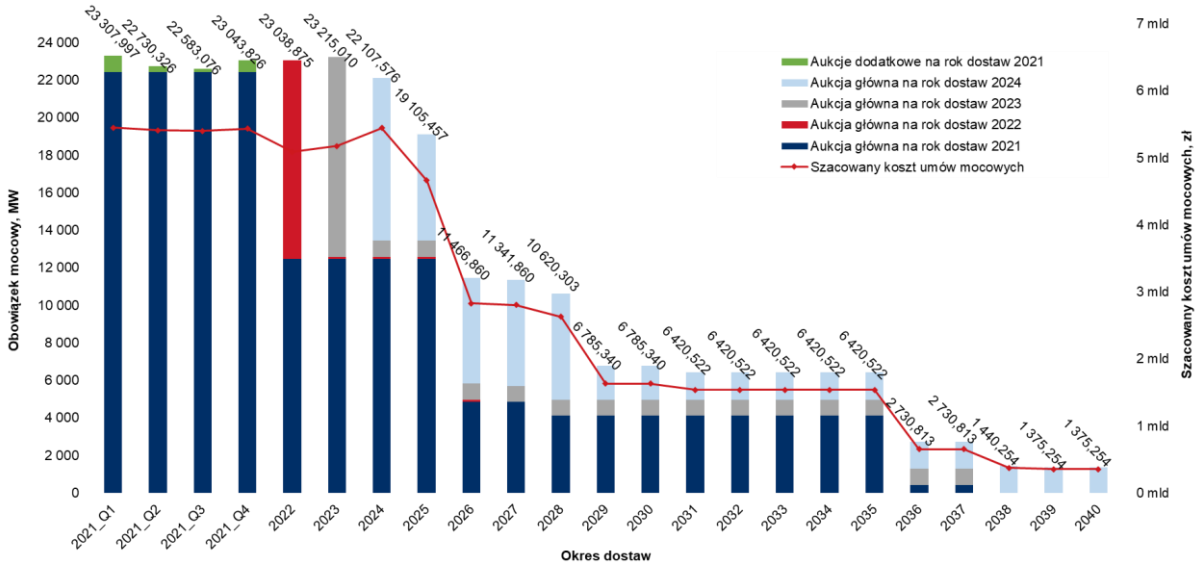
On 18 March 2020, PSE conducted the first **additional auctions**. Four additional auctions for each quarter of the delivery year 2021 were held simultaneously. The rules for conducting additional auctions are identical with the rules for main auctions.

As a result of additional auctions, 54 capacity agreements were concluded for the individual quarters of the delivery year 2021. Tab. 5 shows a summary of the main additional auctions conducted.

Tab. 5. Summary of the additional auctions conducted in 2020.

Quarter of 2021	Auction closing price (PLN/kW/year)	Number of capacity agreements concluded	Capacity obligation volume resulting from capacity agreements (MW)	Auction closing round
I	286.01	25	880.931	1.
II	286.01	7	303.260	1.
III	286.01	5	156.010	1.
IV	286.01	17	616.760	1.

The chart below presents capacity obligations under capacity agreements concluded as in the course of capacity auctions conducted in 2018-2020.



Aukcje dodatkowe na rok dostaw	Additional auctions for delivery year
Aukcja główna na rok dostaw	Main auction for delivery year
Obowiązek mocowy, MW	Capacity obligation, MW
Okres dostaw	Delivery period
mld	bn
Szacowany koszt umów mocowych, zł	Estimated cost of capacity agreements, PLN

In compliance with the time limit under the Act, after the additional capacity auctions, PSE entered in the register and published preliminary results of the auctions. Then our organisation submitted a detailed report summing up the course of the auction to the minister in charge of energy and the President of ERO. The final results of the additional auctions for delivery quarters of 2021 were published by the President of ERO in the Public Information Bulletin on 9 April 2020.

Immediately after the publication of preliminary results of additional auctions for individual quarters of the delivery year 2021, implementing the provisions of Article 48(1)(1) of the Act, PSE launched the option to report in the register **secondary market transactions** concerning the delivery year 2021. Each secondary market transaction must be reported to PSE for verification of meeting the requirements specified in Article 48(2) of the Act. The minimum volume of a transferred capacity

obligation covered by a single transaction is 0.001 MW, whereas its minimum duration is one hour between 7:00 and 22:00 on working days. Until June 2020, PSE verified and entered in the register a dozen or so transactions as part of secondary trading in the capacity obligation.

Challenges for 2020 and beyond

The coming years will see a number of challenges for PSE in the context of the Capacity Market. These include, *inter alia*:

- continuation of the monitoring of capacity agreements concluded,
- management of transactions concluded in the secondary market, including the reallocation of the capacity obligation,
- replacement of planned demand side response units,
- performing tests of demand side response units,
- implementation of mechanisms supporting the participation of foreign capacity in the Capacity Market,
- collection of the capacity fee,
- integration with metering/billing data acquisition systems,
- verification of the performance of the capacity obligation,
- implementation of the Capacity Market settlement model.

Supporting the government administration in preparing legal arrangements concerning the Electricity Market Information Operator

PSE actively participates in the work of the Team for the introduction of smart metering in Poland established in October 2019, attached to the Minister of Energy (and currently attached to the Minister of Climate). The work is related to the draft amendment of the Energy Law Act in the legislative pipeline. The objectives defined for the team include the preparation of assumptions for draft regulations setting forth detailed conditions for the operation of the metering system and additional conditions for the functioning of retail energy market processes. From the point of view of PSE – designated in the draft amendment as the party responsible for the establishment of the Electricity Market Information Operator (*Operator Informacji Rynku Energii*, OIRE) and the implementation of the Central Electricity Market Information System (*Centralny System Informacji Rynku Energii,* CSIRE) – involvement of the company in the Team's work aimed to agree a list of functionalities of electricity market processes to be performed through CSIRE.

We expect that by launching CSIRE a number of important processes of the retail electricity market, the participants of which are today in particular entities dealing with the sale and supply of electricity and consumers, will be simplified and streamlined, and process management itself will be standardised and based on uniform solutions.

Development of the business process model of the electricity retail market for the purposes of the Central Electricity Market Information System

In our company, we are continuing a project aimed to build and implement the Central Electricity Market Information System (CSIRE) – a centralised system for the acquisition, collection, processing and provision of electricity market information (including metering data) and to establishment the Energy Market Information Operator (OIRE) within PSE. In accordance with the proposed legislation

(amendment of the Energy Law Act), PSE, acting as OIRE, is to be responsible for the management of CSIRE, including in particular the implementation, operation and development of the ICT system. We perform our work respecting and ensuring equal treatment of the interests of all parties interested in using CSIRE. We take into account opinions of the market participants with whom we work in the Team attached to the Minister of Climate.

Implementing the OIRE project, we seek to achieve objectives which are significant from the point of view of electricity market participants in Poland, in particular to ensure the effective and secure information exchange in the retail electricity market in such a manner as to enable individual market players to exercise their statutory rights and obligations in this respect.

Thanks to the implementation of CSIRE, consumers will be able to use the effects of improved management of the seller change process – owing to the involvement of CSIRE in the market process, it will be possible to change the seller much quicker than today (eventually even within just 24 hours). In addition, consumers will obtain access to their metering data supporting informed decision-making about the way of using electricity. Consumers' rational decisions on electricity purchase will contribute to a better competitiveness in the market and make it possible to adjust electricity consumption to the costs of its supply resulting, among other things, from the variability of electricity generation from renewable sources.

The model of market processes supported by CSIRE and entrusting the management of the system to PSE (OIRE) – a third party independent of electric utilities dealing with electricity trading or distribution – will yield an additional benefit by reducing the risk of unequal treatment of market participants. Uniform rules, ensuring equal access to information for individual types of market participants, will be implemented through standardisation and rules of access to electricity market information processes in CSIRE.

We are continuing work on an optimal information exchange model for CSIRE, which is necessary for the execution of basic processes of electricity supply and consumption by final consumers in the retail market. What will be a significant, positive change for market participants, in particular for trading companies, is the unification of processes and simplification of operations in connection with the functioning of a "one stop shop" in the market for data exchange.

The existing "many-to-many" communication model will be replaced with a simpler, transparent "one-to-all" model.

We expect that CSIRE will finally be integrated with the balancing market in the metering data processing area, in particular for settlement purposes, as well as the development network analyses and creation of market signals.

4 Performing financial and optimisation feasibility analyses of the use of energy storage facilities

In May 2018, the Investment Committee established the Energy Storage Facility Construction project. The objective of the project was to increase the flexibility and operational security of the Polish Power System. In the course of project work, the preferred storage capacity range was defined and potential locations were identified. At the next stage of work, legal analyses of the possibility of PSE owning and operating an energy storage facility were performed. The analyses showed that in the present legal system the TSO may own energy storage facilities only if such facilities operate exclusively for system purposes, i.e. where the storage facility performs functions which are necessary for the correct and secure operation of the power system.

In the event a storage facility performs market functions (price arbitrage by third parties), our company may not be an owner and operator of such facilities. It is legally permissible for such operations to be performed by an SPV subsidiary belonging to the PSE Group, taking into account the rules of unbundling (legal ban on combining electricity transmission or distribution with electricity trading or generation, mainly to prevent the formation of monopolies to the disadvantage of final consumers). In such a case, the operations of the storage facility would have to be profitable to an extent enabling the SPV to be self-sustainable, as it is not possible to include related investment and operating costs in the tariff.

In order to select an optimum business, technological and locational option for the planned energy storage facility, a Feasibility Study for the energy storage facility project was prepared. Owing to the economic results of the Feasibility Study as well as legal circumstances and the regulatory environment, on 20 September 2019 the Investment Committee decided to abandon the project.

4 Performing a feasibility analysis of the use of heuristic algorithms for scheduling outages of network elements in production run of medium-term coordination planning processes

Changes taking place in the environment and in processed performed by PSE, as well as an increasing risk of inadequacy of existing solutions from the point of view of changes around and within PSE, necessitate the development and implementation in our organisation of an IT support system for coordination planning processes carried out by the TSO.

The development of target support for coordination planning processes, including a system supporting decision-making on outages of network elements and generating sources, led to performing a feasibility analysis of the use of heuristic algorithms for scheduling outages of network elements in production run of medium-term coordination planning processes. Based on the above analysis, a concept of support for the use of the above algorithms was developed, which will make it possible to optimise the cost of covering demand in the power system in the course of creation and approval of a schedule of outages of network elements. Taking additional attributes of outage notifications into account in the scheduling process, such as flexibility (time windows), cost of outage, cost of lack of outage, outage priority, readiness or sequence dependences, allows a greater number of reported needs to be taken into consideration in outage plans.

5 [GRI 103-2] Approval of the updated Business Continuity Plan and update of the Business Continuity Management Book

In our company, we maintain and improve the Business Continuity Management System in compliance with the PN-EN ISO 22301:2012 standard.

As of September 2019, we adopted a modified Business Continuity Management Book at PSE S.A. The procedure, being a formal fulfilment of the PSE's Business Continuity Policy, mainly identifies those responsible for the different elements of the Business Continuity Management System, emphasises the role of unit managers, and sets standards for training, testing and improvement of the system.

Updated in 2019, the Business Continuity Plan is a guarantee of the continuity of processes necessary to ensure the operation of the Polish Power System and the maintenance of critical infrastructure.

[GRI 103-1] Development of DSR IP services and contracting reduction capacity

Changes taking place in the electricity sector, including an increase in the share of renewable sources in the generating structure, with the growing consumption of electricity at peak demand hours, result, among others, in the increased risk of a difficult balancing situation in the PPS. This situation requires the deployment of new tools available to the TSO, including the activation of the demand side, i.e. electricity consumers. This is ensured, among other things, by means of reduction of consumers' demand on instructions from the TSO, i.e. the Demand Side Response (DSR) service.

Between September 2016 and July 2017, we developed and implemented new DSR service, called DSR Intervention Programmes (DSR IP). The new DSR IP service started the activation of the demand side on the electricity market based on new rules adapted to the capabilities of consumers and the needs of the PPS. The work produced outcomes in the form of contracting increased capacity volumes. The agreements for the provision of the DSR service concluded for the period from 1 July 2017 to 30 June 2018 under the Guaranteed Programme covered the aggregate reduction capacity volume of 361 MW in the summer season and 315 MW in the winter season. An additional, non-guaranteed reduction volume was acquired by concluding relevant agreements under the Current Programme. The first agreements for the provision of the DSR service, concluded under new rules, entered into force on 1 July 2017 and applied until the end of June 2018.

In 2018, PSE allotted another tender for the purchase of the DSR service under the Current Programme and the Guaranteed Programme for the period from 1 July 2018 to 30 June 2019. The total acquired guaranteed capacity, which can be reduced on instructions from the TSO was 362.5 to 534.5 MW in the summer season (with an option to obtain 609.5 MW), and between 510 and 535 MW in the winter season. An additional, non-guaranteed reduction volume was acquired by concluding 5 agreements under the Current Programme.

In the first half of 2019, PSE had contracts concluded as a result of tendering procedures held in 2019 for the purchase of the DSR service – Current Programme and the DSR service – Guaranteed Programme.

The Guaranteed Programme (payment for readiness and utilisation) included:

- 6 contracts in the winter package for the period from 1 January 2019 to 31 March 2019 with a guaranteed capacity volume of 510 to 535 MW in individual hours,
- 10 contracts in the summer package for the period from 1 April 2019 to 30 June 2019 with a guaranteed capacity volume of 362.5 to 534,5 MW in individual hours (with the option to obtain a maximum of 609,5 MW by shifting flexible products),

The Current Programme (payment for performance) included 5 contracts for the period from 1 January 2019 to 30 June 2019.

In order to acquire an additional potential demand side response capacity for Q2 2019, PSE performed an additional tendering procedure for the purchase of the DSR service: Guaranteed Programme, for the period from 1 January 2019 to 30 June 2019. Our company selected 2 bids under which it obtained an additional 23.5 MW.

In 2018, PSE implemented a new intervention DSR service – the Simplified Current Programme (DSR SCP). The DSR SCP concept is based on solutions developed under the current programme, but its formula is less complex and more accessible for contractors (one method of baseline profile calculation, no penalties for non-performance of service, common technical certification of reduction facilities, and the location parameter – the option to use the service split into zones). On 4 March 2019, PSE awarded another contract for the purchase of DSR SCP services. All correctly submitted bids were

accepted. For the period from 1 September 2019 to 31 December 2019, the DSR service was acquired from 5 contractors.

PSE, in coordination with DSOs, introduced to the Instruction of Transmission System Operation and Maintenance (hereinafter: Transmission Network Code) the obligation of power system operators concerning the certification of reduction facilities without an application. In 2019, in accordance with the provisions of the Transmission Network Code, DSOs and the TSO performed the certification (in the basic mode) of consumers subject to constraints in electricity supply and consumption. The process was performed in an optimum way from the point of view of DSOs and the TSO (no complications were recorded in the course of the process). Mass certification in the basic mode facilitated the consumers' participation in the provision of the DSR service, in particular within the framework of activities pursued by aggregators. In addition, extensive communication contributed to building consumers' awareness of the possibility of participating in the DSR Programmes offered the TSO.

In February 2019, PSE issued three public contract notices for open procedure for the provision of the DSR service under the respective programmes: the Current Programme and Guaranteed Programmes: GP II (dedicated areas) and GP III (country).

Developing the DSR programmes – towards functionality expansion with a simultaneous improvement of performance – a locational parameter was introduced to enable the activation of the DSR service under the Guaranteed Programme and the Current Programme in a dedicated area defined as a set of electrical substations. In 2019, the above functionality was also introduced to the conditions for service provision under the Simplified Current Programme.

The procedure for the purchase of the DSR service under GP II was divided into 6 packages corresponding to selected areas (Poznań, PAK, Łódź, Lublin-Zamość, Zielona Góra, Kraków), to which available capacity volumes were assigned planned for purchase in the summer and winter packages.

The procedure for the purchase of the DSR service under GP III, covering the country excluding 6 areas defined in GP II was divided into the summer package and winter package. Under GP III, PSE was planning to purchase the following respective reduction volumes: 640 MW for the summer package and 400 MW for the winter package.

The summer packages of Guaranteed Programmes II and III concern the service provision period from 1 July 2019 to 30 September 2019, and the winter packages – from 1 October 2019 to 31 December 2019. The Current Programme concerns the period from 1 July 2019 to 31 December 2019.

On 10 May 2019, PSE awarded a contract for the purchase of the DSR Current Programme service. The DSR Current Programme services was provided from 1 July to 31 December 2019 by 4 contractors.

On 23 March 2019, PSE awarded a contract for the purchase of the DSR Guaranteed Programme II service (i.e. dedicated areas according to the needs of the PPS).. The service was provided between 1 July and 31 December 2019. In the summer season, the aggregate guaranteed capacity was 7.8 MW, whereas in the winter season it was 15.8 MW.

On 31 May 2019, PSE awarded a contract for the purchase of the DSR Guaranteed Programme III service (i.e. the country excluding dedicated consumers in GP II). The service was provided between 1 July and 31 December 2019. In the summer season, the aggregate guaranteed capacity was 588.2 to 707.6 MW, whereas in the winter season it was 427 MW.

In July 2019, PSE issued four public contract notices for open procedure for the provision of the DSR service under the respective programmes: The Simplified Current Programme, the Current Programme and Guaranteed Programmes: GP IV (dedicated areas) and GP V (country) for 2020:

- GP V Package No 1L (PPS excluding 5 areas from GP IV Areas) – service provision period from 1 April to 30 September 2020 – expected capacity of 715 MW, contract awarded on 17 December 2019, with 683.7 to 764.5 MW of guaranteed capacity acquired;
- GP V Package No 1Z (covering the entire PPS) – service provision period from 1 February to 31 March 2020 and from 1 October to 30 November 2020 – expected capacity of 600 MW, contract awarded on 17 December 2019, with 612 MW of guaranteed capacity acquired;
- GP IV covering packages 2L÷6L, i.e. 5 packages corresponding to dedicated areas (Poznań, PAK, Łódź, Lublin-Zamość, Zielona Góra) – service provision period from 1 April to 30 September 2020 – the contract was awarded on 25 October 2019, with 25.5 MW of guaranteed capacity acquired;
- CP with the service provision period from 1 January to 31 December 2020. Contracts under the tendering procedure were awarded on 26 September 2019 – the service will be provided by four companies: Enspirion Sp. z o.o., Enel X Polska Sp. z o.o., Tauron Polska Energia S.A. and Lerta Sp. z o.o.;
- PBU with the service provision period from 1 January to 31 December 2020. Contracts under the tendering procedure were awarded on 26 September 2019 – the service will be provided by four companies: Enspirion Sp. z o.o., Enel X Polska Sp. z o.o., Tauron Polska Energia S.A. and Lerta Sp. z o.o.

[GRI 103-1] Development and rollout of new functionalities of the IP-DSR system

Continuous development of the systems supporting the management of the DSR service under the Guaranteed and Current Programme is in progress, aimed to implement new functionalities in the service provision concept. In addition, IT systems were modified for the purposes of launching a new Simplified Current Programme and a new functionality (location parameter). Implementation of changes to the system is performed in stages.

Development of the DSR service

The PSE expert team conducts work on the development of the DSR service by modifying the concept and operating rules of the DSR Intervention Programmes. Changes in the rules of the programmes – both the guaranteed one (with payment for readiness to provide the DSR service and for reduction) and the current programme and the simplified current programme (with payment for reduction) – developed on the basis of existing experience will allow us to maximise the utilisation of the consumers' reduction capacity. The basic modifications developed in 2019 in the guaranteed and current programmes include the location parameter, i.e. the capability to use the service in defined areas.

Conceptual work in designing new balancing market operation rules

The dynamically changing operating conditions of the power sector, which arise both from new EU regulations on the operation of the electricity and ancillary services market, as well as the growing share of new electricity generation technologies, necessitate the modification of the rules of balancing market operation. The development of renewable energy, energy storage facilities and an active demand side influence the conditions of electricity balancing in the power system. New electricity market resources represent a significant, and as yet untapped potential, for the effective balancing of the PPS. In the power sector transformation period, conventional power plants remain a component of national generation assets, necessary to ensure the security of electricity supply to final consumers,

although their share in meeting electricity demand will be increasingly determined by intermittent sources dependent on variable weather conditions, increasing demand for the flexibility of conventional generating sources in the system.

The ability of flexible operation must become a strength of the balancing market participants. Its development and effective management of a dynamic environment are stimulated by the electricity price formation mechanism which will correctly reflect in prices the costs of electricity supply, including the costs of activating conventional sources and providing reserve capacity.

The new Balancing Market Operation Concept developed and presented by PSE to market participants takes into account the change considerations mentioned above and ensures the adjustment of the solutions adopted to the provisions of the Clean Energy Package for All Europeans and Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (EBGL). The objective of the concept is to fulfil the commitments made by Poland in the process of notification to the European Commission of the implementation of the Capacity Market in Poland. The commitments are stated in Section 16 of the Commission notification decision (No SA. 46100 of 7 February 2018).

The expected benefits of implementation of the changes presented in the Concept result in an increased effectiveness of the Polish power sector through:

- acquisition of balancing energy and balancing capacity based on market mechanisms;
- integration of the national balancing market with the European platforms for the exchange of balancing energy;
- creation of price signals reflecting the balancing situation in the PPS and providing a basis for taking correct (from the point of view of the effectiveness of the whole sector) modernisation decisions.

7 Improvement of the integrated environmental, health and safety management system

As part of activities related to the maintenance and development of the integrated environmental management system and the occupational health and safety management system, new objectives were developed in 2019 for the years 2019-2021. They involve, in particular, improving HSEQ performance, fire protection and respect for the natural environment (e.g. by reporting observations of the working environment, training and other educational actions), accident prevention, and improving employee skills in pre-medical first aid. Other objectives were related to reducing the negative environmental impact, e.g. by developing and upgrading the network infrastructure with the use of modern technological solutions and reducing the probability of environmental damage arising from hazardous substance leakage. The performance of the objectives was presented to the Management Board of PSE during a review of the operation results of the integrated system. 90 percent of the objectives were achieved (including tasks in progress). In May 2020, the objectives of the integrated system were updated by the company owing to the coronavirus pandemic and restrictions on events.

In 2019, a review was carried out of the Integrated Environmental, Health and Safety Management System Policy, as well as environmental aspects. Measures were implemented to adjust the integrated OHS system to the requirements of PN-ISO 45001 – a newly published international standard released in 2018. The measures included an update of internal documentation and training in the modified requirements for a wide group of employees.

3.2. Business strategy 2020-2030

[GRI 102-16] [GRI 103-1] PSE values

The key values of PSE are reliability, credibility and responsibility.

Reliability

PSE is a reliable partner for electricity consumers, generators, distribution system operators, market operators, power exchanges, the regulator, and the Government of Poland. The company ensures continuity of short- and long-term electricity supply based on actions leading to efficient management of threats to continuity of electricity supply from the transmission network.

Credibility

By its activities, PSE confirms that it has all competence necessary to perform its duties and fulfil its mission. Operation stability and lasting relations with business partners are guaranteed in our organisation by stringent compliance with corporate governance and internal procedures.

Responsibility

In all its activities, PSE cares about future generations, the natural environment, energy security of the country, and the position of Poland's economy in the world.

The defined values of our company give rise to ideas which guide the conduct of all employees of our organisation. These ideas are: **modernity, professionalism, partnership, development, openness**. Acting in line with those ideas ensures smooth and effective work as well as undisturbed professional and personal development.

PSE's strategic challenges and objectives

[GRI 103-1] PSE's new Strategy is a vision of a modern energy market. It was designed with the use of the Jibility platform. This placed PSE among global leaders whose business strategies rely on an ambitious capabilities-based planning method.

PSE's Strategy for 2020-2030 was prepared with the use of the capabilities-based planning method. The method, developed by the US RAND Institute, consists in defining challenges, identifying objectives and initiatives, allocation of resources to initiatives, and tracing the progress of the initiatives and their results.

PSE has identified **6 main challenges and 17 objectives** to be achieved within 10 years.

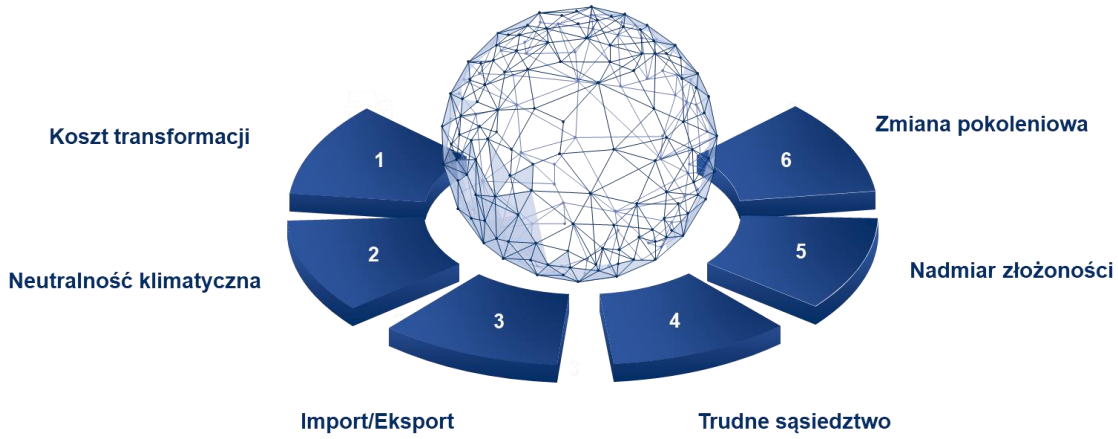


Fig. 1. PSE challenges

Koszt transformacji	Transformation cost
Neutralność klimatyczna	Climate neutrality
Import/Eksport	Import/Export
Trudne sąsiedztwo	Problem neighbourhood
Nadmiar złożoności	Excessive complexity
Zmiana pokoleniowa	Generational change

For the next ten years, PSE has identified 6 main challenges facing the operator:

1. Transformation cost

The electricity transition in the current model of the European electricity market, in which large bidding zones are treated as "copper plate", only electricity is traded on the market, and wind and solar sources are preferred among non-emission sources, will put pressure on transmission system operators, including PSE, to bear greater risks and costs. These costs arise from divergences between the market model and its actual implementations, which are significantly affected by physical phenomena. Operator's activity, understood as ensuring the feasibility of electricity flows and securing its supply of "last resort", is also becoming a matter of interest from exchanges, regional coordination centres for the secure operation of the system, as well as the European regulators: ACER and the European Commission. It should be stressed that the cost of non-adaptation to the forthcoming changes will primarily come at the expense of society (households) and the economy (industry). For PSE, the key to a proper contribution to the electricity transition will be a fair allocation of costs to individual users of the European electricity system. Cost relations in the field of market infrastructure, i.e. cost sharing between exchanges, distribution system operators and the transmission system operator, and, on a pan-European basis, between transmission system operators, in terms of a joint effort to maintain the operation of synchronously connected electricity systems by all TSOs, will also be important.

2. Climate neutrality

The currently promoted concept of climate neutrality is moving away from technological neutrality towards a preference for two types of renewable energy sources: wind farms and photovoltaics, which are expected to be supplemented over time by the storage of electricity in hydrogen and chemical batteries. Preferred types of RES will be distributed and will be characterised by weather-dependent generation variability, resulting in increased uncertainty about generation levels in the transmission network and distribution networks.

Due to the development of prosumers, the level of demand will also be fraught with great uncertainty. Nuclear generation will be an important element in the implementation of climate neutrality, by supporting the operational security of the power system due to its capability of stable operation.

3. Import/export

The rising cost of purchasing carbon rights, the increasing share of zero-variable-cost units and the over-production of electricity from RES in neighbouring countries have led to a situation where the use of fossil fuel generation capacity is decreasing. For this reason, ageing and successively phased-out national generating units are not fully replaced by new sources which would allow the PPS capacity and energy needs to be met internally in the future.

In addition, legal changes at European level increase the pressure to maximise cross-border exchange capabilities, which can also contribute to reducing the use of domestic fossil fuel generation sources in favour of increased imports of cheaper electricity produced abroad.

The possible division of the market into bidding zones (and the possibility of subdividing zones into smaller zones) raises legitimate concerns about domestic generating units and their competition within the zones for access to the electricity market and cross-zonal capacity.

In view of the above, an important challenge for the PSE will be to foster cooperation with neighbouring countries, so as to, on the one hand, ensure the operational security of the system in a situation that prevents balancing with the use of only national sources and, on the other hand, to avoid an excessive expansion of cross-border networks and interconnections, the role of which may diminish over time.

4. Social acceptance

New infrastructure investments are becoming increasingly challenging due to growing public engagement caused by a lack of acceptance for investment projects or a lack of acceptance of how they are implemented.

The challenge for the PSE is therefore to carry out effective measures to increase public acceptance of investment in transmission infrastructure among local communities, while ensuring the reliable operation and development of the PPS.

5. Excessive complexity

European regulations impose a number of new legal requirements on TSOs that deeply interfere with operator processes at both EU and regional or national level.

The new requirements are aimed at increasing the use of transmission infrastructure and thus reducing safety margins.

The system works much more often at the limit of its capabilities. This approach clearly increases the system's vulnerability to external threats, including cyberattacks. Their probability is high due to the far-reaching digitisation and automation of these processes.

6. Generational change

A generational change is visible in the labour market, which has a huge impact on the functioning of companies and the approach to employing workers. Representatives of the youngest age group present different attitudes and expectations towards work. In addition, the labour market has become an employee's market, which is also confirmed by the demographic changes taking place in Poland

What remains a challenge for PSE is to create an offering that addresses employees' expectations regarding employment conditions while protecting the employer's needs, e.g. with regard to:

- Effective talent management – securing qualified and prepared successors for all key positions.
- Changes in incentive schemes – the working atmosphere or development opportunities play an equally important role in recruiting employees, not just the pay level.
- Multigenerational team management – diversity management policies should take into account increasingly diversified (also in terms of age) teams of employees.

- New technologies – making the working environment more flexible, offering employees a greater sense of freedom while increasing efficiency and ensuring communication free from traditional time and location constraints.
- Work-life balance – work should make it possible to reconcile work and private life, which can be done, for example, by providing flexible working time or remote work.
- Employer branding – representatives of the younger generation of employees seeking career are guided by the image of the organization, hence the need for proper management of the employer's brand

Based on the challenges, **strategic objectives** have been set to be achieved by PSE in the near future.
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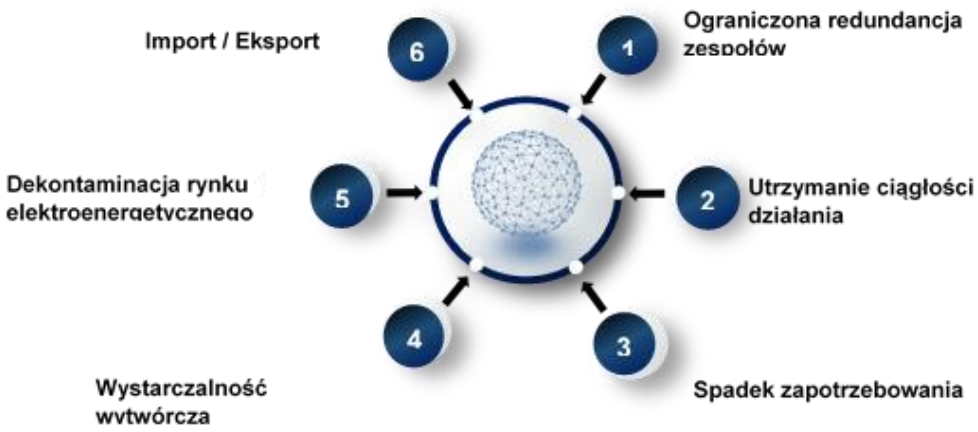
1. Increase in the share of non-tariff revenues,
2. Integration with RCC based on reservation and verification of RCC results,
3. Improvement of tariff accuracy,
4. Improvement of budge accuracy,
5. Keeping the churn rate at a minimal level,
6. Implementation of PRSP,
7. Creation of balancing mechanisms and ancillary services supporting transition to low-carbon electric power,
8. Ensuring compliance with CEP70,
9. Ensuring schedule accuracy,
10. Clearing the legal status of infrastructure,
11. Optimisation of capital expenditure,
12. Providing for planning uncertainties,
13. Providing for criticality,
14. Ensuring internal backup for outsourced functions,
15. Reducing the incident management time,
16. Implementation of the model of competence and competitiveness of remuneration,
17. Building a knowledge-based organisation.

PSE Strategy (2-year horizon) – Supplement

The SARS-CoV-2 pandemic poses an additional challenge for PSE. According to the forecasts by epidemic modelling experts, the pandemic can cause a significant decrease in economic activity over a timespan of even more than two years and therefore also a decrease in capacity and energy demand, which may be relevant to many strategic initiatives of PSE. Taking these circumstances into account, PSE has decided to develop a supplement to the Strategy for the next two years, leaving the Ten-Year Strategy unmodified. The document identifies 6 challenges and 8 strategic objectives which PSE will have to address during this period.



Import/Eksport	Import/Export
Dekontaminacja rynku elektroenergetycznego	Decontamination of electricity market
Wystarczalność wytwórcza	Generation adequacy
Spadek zapotrzebowania	Decline in demand
Utrzymanie ciągłości działania	Maintaining business continuity
Ograniczona redundancja zespołów	Limited redundancy of units

PSE's challenges for 2020-2022

1. Limited redundancy of critical units
2. Maintaining business continuity
3. Decline in demand
4. Generation adequacy
5. Decontamination of the electricity market
6. Import / Export

PSE's strategic objectives for 2020-2022

1. Reskilling of a part of available human resources
2. Attracting and recruitment of new people
3. Ensuring the redundancy of facilities
4. Reduction of operating costs
5. New ancillary services
6. Developing a risk assessment methodology for generation adequacy
7. Trying to gain time (Current analysis of the financial condition of electricity market participants)
8. Maintaining the continuity of the investment process

Activities of the Crisis Team and PSE during the COVID-19 pandemic

In January 2020, the Management Board appointed the Crisis Team for the implementation of preventive measures and responding to the current situation related to the spread of the coronavirus (SARS-CoV-2).

In connection with the development of the epidemic situation, in March the Team was divided into four sub-teams and the Team for Medical Protection and OHS was set up. The outcomes of the work of this Team include the development and implementation of a range of internal instructions designed to minimise the risk of occurrence and spreading of the COVID-19 disease among the company's

employees, including those related to temperature monitoring of personnel entering the premises of PSE and responding whenever infection is suspected. The Team members participated in checks of compliance with the new regime, collected reports on signs of concern from employees and updated internal requirements according to changes in the external environment and inside the company. The Team's responsibilities also included the provision disinfectants for the company and personal protection equipment for employees.

3.3. Sustainable development strategy

PSE Strategy for Sustainable Development supports the implementation of its mission and business strategy. It rests on five equally important pillars:

01. **Guarantor of energy security**
02. **Exemplary investor**
03. **Responsible employer**
04. **Credible partner**
05. **Industry expert**

Fig. 2. Priority areas of PSE's sustainable development

ZRÓWNOWAŻONY ROZWÓJ	SUSTAINABLE DEVELOPMENT
EKSPERT Z BRANŻY	INDUSTRY EXPERT
GWARANT BEZPIECZEŃSTWA ENERGETYCZNEGO	GUARANTOR OF ENERGY SECURITY
PRZYKŁADOWY INWESTOR	EXEMPLARY INVESTOR
WIARYGODNY PARTNER	CREDIBLE PARTNER
ODPOWIEDZIALNY PRACODAWCA	RESPONSIBLE EMPLOYER

02. Guarantor of energy security

Objective: Maintain a proper level of energy security in a manner that is responsible towards society and the environment

Our core regulated activity is the fulfilment of the duties of a national transmission system operator. We manage the Polish Power System, balancing electricity demand with electricity production by generating sources available in the PPS.

We take part in creating the European electricity market and actively participate in developing pan-European initiatives taken by operators, members of ENTSO-E.

The power transmission network must allow for changing power generation technologies and the location of generating sources both in Poland and in Europe. We are aware of the challenges posed by climate, environmental and social changes, and the need to adjust all our activities to face up to them.

03. Exemplary investor

Objective: Winning favourable attitude of the investment environment

We plan and implement transmission network investment projects throughout the country. It is an essential condition for ensuring the continuous and reliable operation of the transmission system and maintaining the country's energy security. Irrespective of the impact of our activities on the environment, we always listen intently to the needs and expectations of all interested parties.

Utmost care and diligence in performing investment tasks is aimed to ensure that the values of the natural environment will remain available for future generations, and investments will be implemented with the acceptance of local communities in a manner that does not conflict with their broadly defined social interest.

04. Responsible employer

Objective: Provide employees with an opportunity for professional development and build a corporate culture based on the supported values

PSE employees – their knowledge and commitment – are at the core of the company's success and its sustainable development. We focus on providing high-class specialists to our company, who will build its high market value by pursuing the missionand strategic objectives of the company, building its high market value. We offer a secure and friendly working environment. We focus on responsibility, professionalism and commitment.

05. Credible partner

Objective: Support transparency of activities and ethical conduct in relation to partners

We attach significant importance to how we build relations with our partners. We play a leading role in the power sector, which translated into taking responsible decisions and measures concerning other participants of the electricity market in Poland.

We seek to create a sustainable future for all our internal and external stakeholders. What we find very important are transparency and reliability, equal treatment of all market participants, as well as preventing by applying transparent and effective rules of procedure in collaboration with other participants of the electricity market.

06. Industry expert

Objective: Build and maintain the TSO’s image as an expert in key legislative and opinion-forming forums.

Owing to our employees' competence and experience, we are perceived as a partner for cooperation with legislative bodies, central and local administration units, as well as scientific establishments and industry organisations.

We are actively involved in the law-making process. We take care of the development and transparency of the electricity market.

3.4. Key global trends

[GRI 103-1]

3.4.1 Description of key global trends in the environment affecting the power system and PSE

In 2019, the situation of the Polish power sector was influenced by a number of global and European trends. In particular, the renewable energy and electromobility sector was developing as well as new measurement technologies opening opportunities for the use of high frequency data (HFD) with high accuracy concerning demand. The European regulatory environment had an increasing influence on the sector's development profile in Poland, as did long-term pricing trends for energy resources and greenhouse gas emission allowances. In addition, Poland's dynamic development supported a gradual increase in demand for electricity despite a growing energy efficiency of the economy.

Key trends

- **Technological progress in data collection and processing will affect TSOs as HFD holders**

  In today's economy, high frequency data showing economic activity in micro and macro scale play an increasing role. Until recently, such information consisted mainly of financial data (prices of shares and other financial instruments, exchange rates, etc.). With technical progress in measurement, it becomes increasingly possible to collect – and partly make available – data from the real economy (public transport passenger flows, vehicle flows, purchase information from credit cards, etc.). Among the data mentioned above, those originating from electricity and gas suppliers and from water and sewerage utilities, which are the closest to the real economy, are of particular value. New measurement technologies make it increasingly possible to collect, provide and analyse such data. European TSOs, including PSE, already make available to the public a range of data on electricity generation, demand and import. Technical capabilities will soon emerge that will enable PSE to acquire and access more detailed high-frequency data on the PPS operation, supporting the analysis of business processes in near real time.

- **Technological changes in the area of electricity storage and generation affect the change of generation structure and nature of the transmission network and the TSO's role**

  The recent two decades have seen a rapid development of RES technologies, and their dissemination in Europe has been supported by fiscal incentives. So far, this development has involved mainly the widespread deployment of onshore wind power. Wind generation costs decreased dramatically, but uncertainty of generation remained an unresolved challenge. For several years, new RES technologies have also been widely deployed: offshore power (the recent development of the technology of large wind turbines has enabled its wider and more cost-effective use) and photovoltaics. Offshore power partly reduces the problem of generation uncertainty, as sea and ocean areas are much windier than land areas, but it is available only to coastal countries. For its part, photovoltaics contributes to the development of community energy and the emergence of active individual producers/consumers of electricity (households and businesses), called prosumers.

Until recently, what posed a barriers to the development of renewable energy was the problem of electricity storage in periods of its excessive generation for use in periods when RES generation is impossible (no wind, night time, etc.). The lack of an effective storage technology rendered the solution of the problem impossible. However, the recent years have seen a number of technological breakthroughs making the commercial use of renewable energy more viable. Firstly, owing to the development of electromobility, the cost of batteries dropped significantly and the first commercial installations for the purposes of power systems have appeared. Secondly, new ICT and measurement technologies supporting the management of distributed sources offer an opportunity to use the e-vehicle fleet as an electricity buffer.
At the same time, electricity storage technologies other than chemical cells are being developed. What draws particular attention is the growing interest in the power-to-gas and hydrogen electrolysis technologies. The widespread deployment of those technologies is to enable the use of excess RES energy for electrolysis and its long-term storage (albeit by no means efficient as yet) in the form of gas (e.g. hydrogen).

In Poland, 2019 saw a very dynamic development of photovoltaics-based prosumer power. Generators are preparing for the implementation of offshore wind power projects. Work is also in progress on the first commercial-scale energy storage facilities. As a result of widespread use of those technologies, it will become necessary to adjust to the new model and spatial allocation of generation both of distribution networks managed by distribution companies (photovoltaics) and transmission networks managed by PSE.

- **The development of the European market and increase in international exchange contribute to a long-term price convergence process in Europe**

  The development of the Pan-European market has become a major objective of the European energy policy. It is supported by regulations increasing the capacity made available for the purposes of cross-border exchange, such as CEP70. The increase in the scale of exchange results in a progressive convergence of electricity prices in Europe. The acceleration of the development of a common market based on bidding zones through successive regulatory packages contributes to the development of the national transmission network and necessitates its adaptation to the new scale and directions of cross-border flows. In the medium-term, it can also be a source of additional costs for transmission system operators owing to the need for a more frequent use of remedial actions by transmission system operators outside the market, e.g. redispatching.

- **The European climate policy increasingly contributes to an increase in the cost of generation from emission sources**

  The situation of the Polish Power System, in particular the condition of generators using conventional generation sources (e.g. coal-fired power plants) is also increasingly influenced by the EU climate policy. The basic tool of the policy are ETS emission allowances, the prices of which are determined by the market. The increase in ETS allowance prices witnessed for several years (stabilised at EUR 24-26 per tonne in 2019) causes generation costs in the conventional power sector to grow, reducing its competitiveness vis-à-vis zero-emission sources. Under open market conditions, conventional energy sources will be forced to compete with domestic and foreign RES and with foreign conventional generators. Together with adverse pricing trends in the Polish coal market, this can contribute to accelerating the transformation of the Polish power sector.

  New methods of curbing emissions are discussed increasingly often. There are even proposals for economic growth suppression and degrowth. The implementation of such concepts would undoubtedly have a serious effect on the functioning of power systems.

- **The process of weakening coal demand with a growing number of low-cost generators** (open-pit mining in Australia, Africa, the Americas) results in a long-term declining tendency in global coal prices. The decrease in gas prices due to the emergence of new mining technologies contributes to a growing competitiveness of gas energy.
  The declines in global coal prices – very distinct in 2019 – reduce the competitiveness of the domestic coal-based power sector, as the prices of domestic fuel are increasingly less correlated with global prices and have been higher than global prices for a long time now. This results from the fact that Polish generators of electricity from coal do not compete in global markets. Together with the factors described in the previous paragraphs (electricity import, EU climate policy), this will be a factor supporting the process of transformation of the Polish power sector. The change process in generation will have a significant impact on the functioning of the PPS. At the same time, the long-term decrease in gas prices (also relative to coal) makes gas-based energy a medium-term alternative to coal-based energy. It has additional benefits, and lower CO_2 emission rates of gas-fired units makes the aggregate cost of emission allowances lower (although, taking into account the ethane leakage during extraction and transport, wider environmental benefits are small compared to coal energy). Owing to a greater flexibility of gas units, gas-fired power plants integrate better with an extensive RES sector.

In 2020, the trends described above continued until the outbreak of the COVID-19 pandemic which affected some of them. In particular:

- The uncertainty of investment funding in the power sector has increased. Currently, aid schemes (at national and European level) provide for an increase support for energy transition towards RES development;
- Demand for energy in Europe, including Poland (due to the lockdown and the following recession) decreased significantly in Q2 2020. This contributed to a decrease in prices in Poland.
- It was accompanied by a decline in demand for CO_2 emission allowances in Europe, which resulted in a brief downturn of ETS prices. Under the ETS, prices returned to the pre-pandemic levels in June 2020, but forecasting their future level is difficult because it will be affected by the economic situation in Europe.
- The global coal prices remain at very low levels and coal prices in Poland are stable (while the price in EUR has decreased slightly due to the weakening of the zloty). The competitiveness of the Polish conventional energy sector remains low under these conditions.

3.4.2 Our response to global trends and changes in the environment

In order to adjust the PPS to the new market design and new technologies, PSE has consistently engaged in the development of new technologies and cooperation on cybersecurity within the entire power sector. We actively participate in preparing new market solutions aimed to ensure integration of the European electricity market, through activities including the development and implementation of harmonised market mechanisms and products required by European regulations. One example of such activities is PSE's involvement in work on the preparation and development of a method of capacity allocation based on the Market Coupling mechanism and the Flow-Based methodology. Another example is the involvement in the process of creating European platforms, such as the Single Allocation Platform for long-term transmission rights and the European platforms for balancing energy exchange.

We take part in the implementation of modern solutions. Our activities involve the participation in developing competitive mechanisms of electricity market operation in Poland and the European Union, covering the following market segments:

- Forward Market;
- Day-Ahead Market;
- Intraday Market;
- Cross-Border Balancing Market.

We are an active participant of innovative research projects. The projects in which we engage are aimed to develop solutions that allow new technologies to be actually implemented in the market and in the power system. These include:

- EU - SysFlex – a project aimed to develop tools for the integration of large volumes of renewable energy in the power system;
- OneNet – TSO – DSO – Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation – a project aimed at developing efficient methods for the use of common resources by the TSO and DSOs for the acquisition of ancillary services;
- A pilot demonstration project for the implementation of a system supporting the operational security of the PPS under conditions of a high share of generation from wind sources based on the Special Protection Scheme (SPS) and hybrid battery electricity storage.

<Więcej: Link – patrz rozdz. 3.3 Wzmacnianie innowacyjności i wdrażanie nowych technologii>

3.4.3 Integration of the Polish market with European markets

<Rozdział linkowany z obszarem RYNEK w ramach modelu tworzenia wartości PSE >

[GRI 103-1, GRI 103-2]

In the context of the planned integration of the national electricity markets, the main implementation measures are centred around the implementation of the common market encompassing the day-ahead and intraday markets. We actively participate in all processes related to the implementation of Flow-Based Market Coupling on all cross-border interconnections from Poland, with a special focus on synchronous connections.

The central segment of the European electricity market model is to be the Day-Ahead Market based on the Market Coupling (MC) process, with trading gate closure time at 12:00 hours. It is a mechanism within which exchange prices for each bidding zone in Europe can be calculated in a coordinated manner, in a common process, with a single computational point. Capacity allocation is to be based on the price difference between bidding zones. Thus it is an implicit auction model, i.e. combining transmission rights trading with electricity trading. Market participants do not reserve transmission capacity for the purposes of their cross-border transactions, but only for purchase/sale transactions on the market to which they are geographically assigned (to put it simply). Capacity allocation through the MC mechanism takes place automatically, in the course of energy trading in a manner that maximises the total market surplus. A graphical illustration of Market Coupling is shown below.

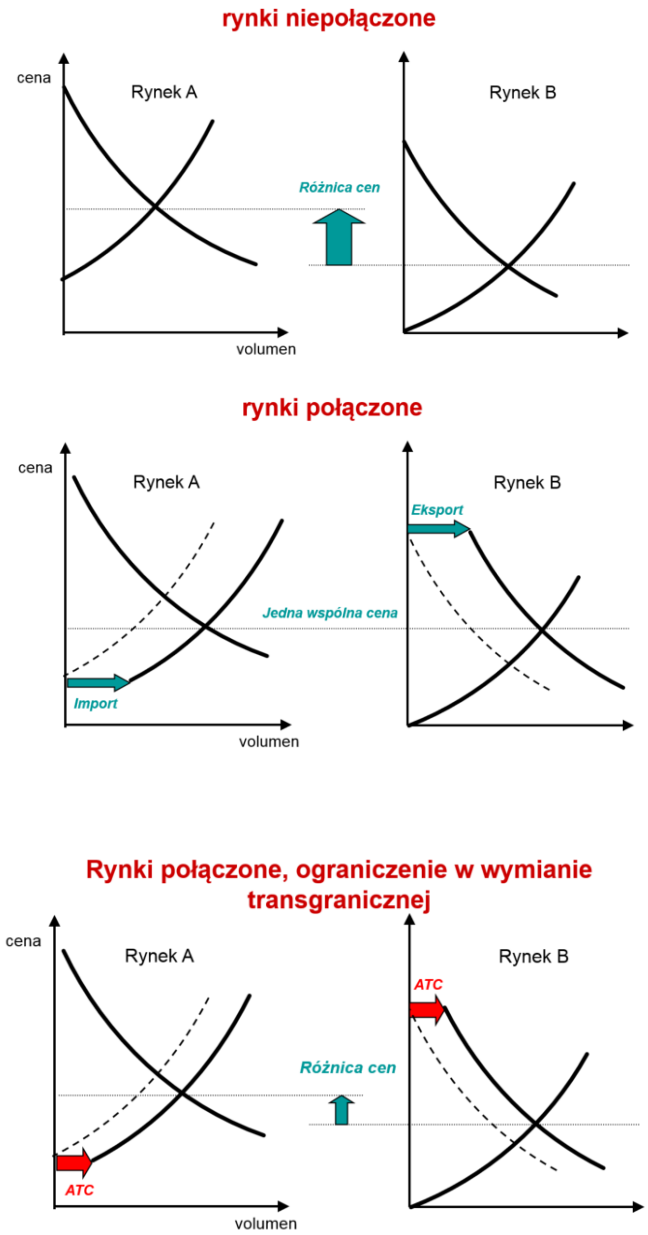


Fig. Graphical illustration of Market Coupling

Rynki niepołączone	Uncoupled markets
Rynki połączone	Coupled markets
Różnica cen	Price difference
Wolumen	Volume
Price	Cena
Rynek A	Market A
Rynek B	Market B
Jedna wspólna cena	Single price

Implementation of the European Market Coupling is to take place under regional projects which are then to merge into a pan-European project. Currently, the following projects are being developed:

- MRC (Multi-Regional Coupling) – the basic Market Coupling initiative in Europe, under which capacity allocation is performed on the SwePol Link and LitPol Link interconnectors;
- CORE FB MC – a Flow-Based Market Coupling implementation project for the Central and Eastern Europe region, including the synchronous borders of the PPS;

- 4M MC – an area of temporary Market Coupling operation based on the NTP method, covering the Czech Republic, Slovakia, Hungary and Romania;
- Interim 4M Market Coupling – an initiative which emerged at the end of 2018, aimed to connect the 4M zone and the synchronous borders of Poland to MRC based on the NTC method until the CORE region is covered by the Market Coupling formula based on the Flow-Based method.

Price Coupling of Regions initiative

Price Coupling of Regions (PCR) is an initiative of European energy exchanges aimed to develop a single price coupling solution to be used to calculate electricity prices across Europe and allocate cross-border capacity on a day-ahead basis. The integrated European electricity market is expected to increase liquidity, efficiency and social welfare.

The initiative of energy exchanges initially involved the day-ahead markets in: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Latvia, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The initiative was established in 2009, and the PCR parties signed a cooperation agreement in June 2012. It is open to other European Power Exchanges wishing to join. In 2016, PCR was joined by the Polish Power Exchange.

PCR is based on three main principles:

1. **One single algorithm.** The single algorithm ensures transparent calculation of day-ahead electricity prices across Europe and allocates cross-border capacity. The algorithm was developed respecting the specific features of the various power markets across Europe. It optimises social welfare and increases transparency.
2. **Reliable operation of the algorithm.** The PCR process is based on decentralised sharing of data, ensuring a robust and resilient operation.
3. **Individual responsibility of the energy exchange**. The PCR Matcher Broker (PMB) allows the exchange of anonymised order books and cross-border transmission capacities among the exchanges to calculate reference prices and electricity transmission volumes between all bidding zones participating in the process.

SIDC

Operational inclusion of the Polish bidding zone in the Single Intraday Coupling (SIDC) mechanism took place on 19 November 2019. Thereby the obligation to implement a pan-European solution for Single Intraday Coupling was fulfilled as set forth in Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management ("CACM Regulation").

SIDC development activities are undertaken:

- elaboration of solutions to ensure the correct operation and development of SIDC.

  PSE is engaged in this strand of activities by participating in steering committees and in SIDC expert groups. The most important initiatives for the development of SIDC in the coming few years include: (i) introduction of intraday auctions in which prices will be set for individual bidding zones, providing a basis for the calculation of the congestion rent for each border, (ii) implementation of 15-minute market products, (iii) implementation of a solution which allows transmission losses on HVDC connections to be automatically taken into account, and (iv) implementation of the flow-based method;

- local activities to expand the SIDC coverage.

In 2021, the following are planned to join the SIDC mechanism:

- the bidding zones of Greece and Italy (as part of the so-called third LIP wave including LIP14);
- the bidding zone of Slovakia (as part of the third LIP wave including LIP17).

The launch of LIP17 will mean that Poland's four borders ((CZ-PL, DE-PL, LT-PL, PL-SE) currently covered by the SIDC mechanism will be joined by the PL-SK border, which will make it possible to phase-out the temporary Intraday Market solution used on this border so far, based on the explicit auction mechanism.

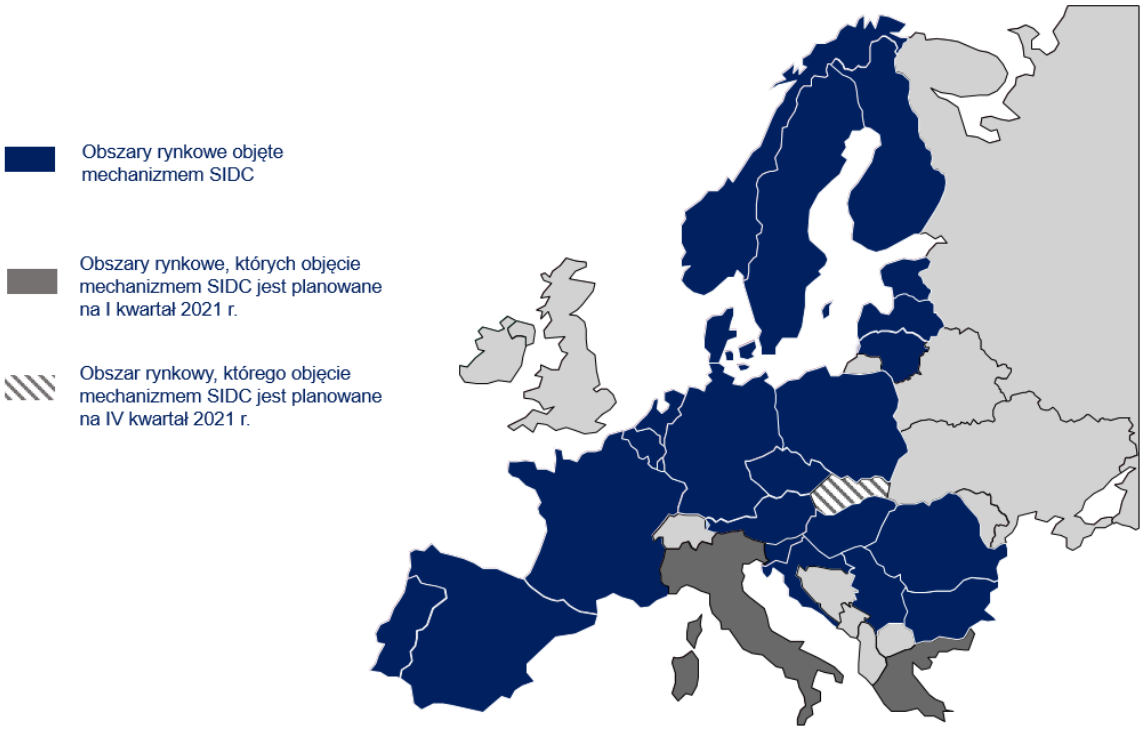


Fig. Outline of the current and planned coverage of the SIDC mechanism

Obszary rynkowe objęte mechanizmem SIDC	Bidding zones covered by SIDC mechanism
Obszary rynkowe, których objęcie mechanizmem SIDC jest planowane na I kwartał 2021 e.	Bidding zones planned to be covered by SIDC mechanism in Q1 2021
Obszary rynkowe, których objęcie mechanizmem SIDC jest planowane na IV kwartał 2021 e.	Bidding zones planned to be covered by SIDC mechanism in Q4 2021

Apart from integration of segments of the Day-Ahead and Intraday Market, PSZE has also been working actively on the integration of balancing markets in Europe in accordance with the requirements of Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereinafter: EBGL. The EBGL Regulation provides for integration of the European balancing market through the implementation of four platforms:

1. European platform for the exchange of balancing energy from replacement reserves

- Required activation time: 30 minutes.
- Implemented under the TERRE project launched on 15 January 2020.

2. European platform for the exchange of balancing energy from frequency restoration reserves with manual activation

- Required activation time: 15 minutes.
- Implemented under the MARO project; planned launch in July 2022.

3. European platform for the exchange of balancing energy from frequency restoration reserves with automatic activation

- Activation via an automatic controller in up to 5 minutes.
- Implemented under the PICASSO project; planned launch in July 2022.

4. European platform for the imbalance netting process

- Based on avoiding the activation of balancing energy from automatic reserves in opposite directions by neighbouring TSOs.
- Implemented under the IGCC project (operating in Germany and the neighbouring countries).

PSE actively participates in all implementation projects of European balancing platforms. Within the framework of work conducted at ENTSO-E, PSE participates in the preparation of detailed methodologies required by the EBGL Regulation. Since February 2020, our organisation has been involved operationally in the IGCC project. Connection to the TERRE platform is scheduled for January 2022, and to the MARI and PICASSO platforms in January 2023.

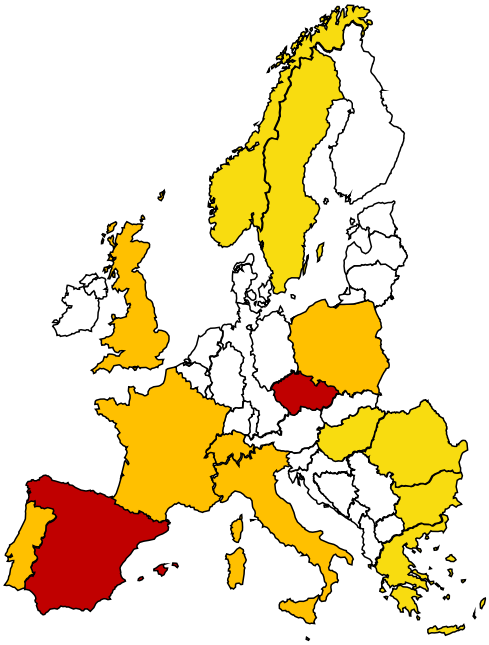


Fig. 2. TERRE project

Fig. 1. MARI project

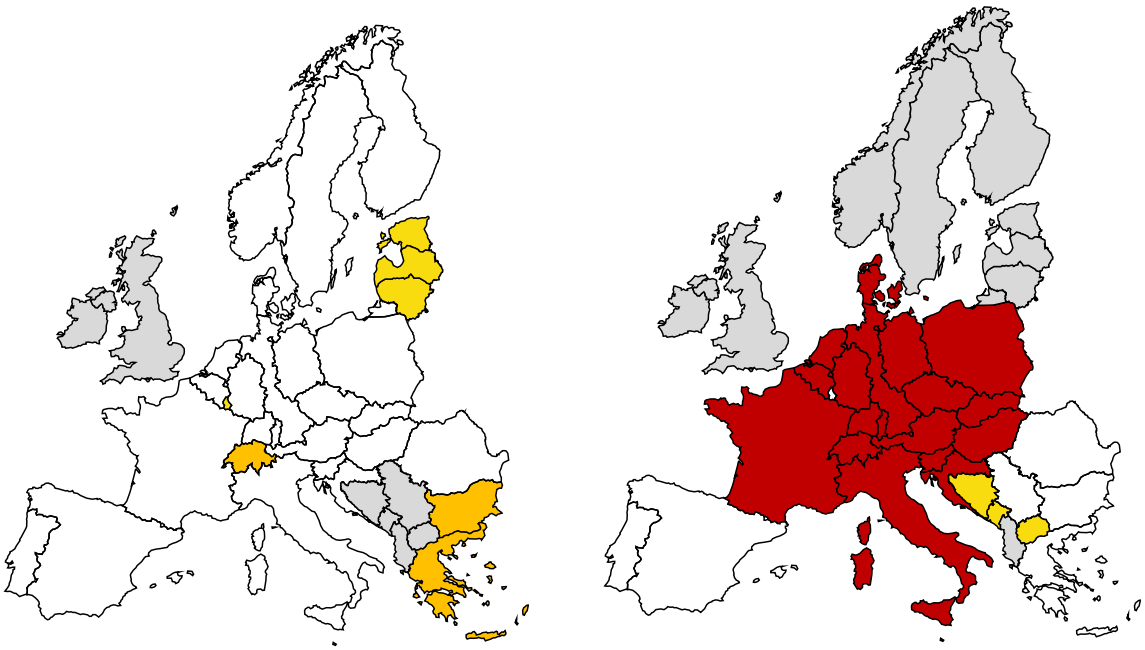


Fig. 4. IGCC project

3.4.4 Key achievements (and their scale) owing to international cooperation

Activities under the TSC/TSCNET initiative

We actively cooperate with European operators under the TSO Security Cooperation (TSC) initiative. The members of the TSC are 14 operators from Central Europe. The objective of the initiative is to increase the operational security of interconnected power systems in the region, including PSE, through the intensification of regional inter-TSO cooperation, which currently involves threat identification processes and the use of relevant inter-TSO remedial measures.

The key issues concerning the TSC initiative, including the strategy and directions of development of TSC cooperation and activities, are decided upon by the TSC Cooperation Board. Technical operational matters and the elaboration of system solutions, including the definition of services to be supplied by TSCNET under service contracts – the responsible body is the TSC Advisory Operational Board. Several representatives of PSE are involved in activities resulting from the ESC decision-making and working structures.

We are a shareholder of TSCNET. We have our representative in the Shareholders' Meeting and in the Supervisory Board of TSCNET, which is currently composed of 5 members.

Synchronisation of the Baltic States' systems

PSE is actively engaged in the process of expanding the synchronous system of Continental Europe (CE) by the systems of the Baltic States (BS). In October 2018, the ENTSO-E Regional Group Continental Europe Plenary (ENTSO-E RGCE Plenary) approved the commencement of the relevant extension procedure. For the coordination of the process, a working group was appointed, which is headed by a representative of PSE.

In May 2019, an agreement entered into force, setting forth the terms and conditions of the synchronous connection of the BS system to the CE system. The agreement contains a set of requirements which is a list of detailed technical conditions for implementation by the Baltic TSOs,

which are to ensure the secure operation of systems after synchronisation. One of the main infrastructural elements included in the set is the Poland-Lithuania submarine DC interconnector (Harmony Link). In December 2019, PSE and LITGRID received EUR 10 million in co-financing from the Connecting Europe Facility (CEF) for measures implemented as part of the preparatory stage of the project. In April 2020, energy market regulators from Poland, Lithuania, Latvia and Estonia signed Cross Border Cost Allocation Agreement under which they agreed to implement projects forming part of synchronisation phase II including the construction of the Harmony Link. In May 2020, PSE and three Baltic TSOs submitted a joint application for funding of Phase II of the Baltic Synchronisation Project from the CEF. On 1 October 2020, the CEF Steering Committee took a decision to grant funding in the amount of EUR 719.7 m.

Currently, the BS systems operate within the IPS/UPS system which geographically covers the former Soviet Union territory. The synchronisation of the BS systems with CE planned for 2025 is a part of the European Energy Union concept and an example of solidarity in energy security. The implementation of the project is of key significance to the completion of integration of the BS systems with the European system. This is confirmed by a roadmap signed in June 2020 by the President of the European Commission and the Prime Ministers and Presidents of Poland, Lithuania and Estonia, implementing the synchronisation project.

Synchronisation of the systems of Ukraine and Moldova

PSE is also actively engaged in the process of expanding the Continental Europe (CE) system by the systems of the Ukraine and Moldova. We are a member of a TSO Consortium set up to carry out additional studies and work aimed to adjust the technical operational standards of those systems and to ensure compliance with relevant EC regulations on operation management and market rules. A representative of PSE chairs the working group responsible for performing dynamic system analyses.

Through our core business and additional ventures, we generate positive impulses in the Polish economy. We have a significant contribution to the creation of added value, new jobs, income of the population and, owing to the taxes we pay, to the development of the region.

IV. IMPACT ON THE ECONOMY AND THE MARKET

4.1. Our impact on the economic development of Poland

PSE's priority is to ensure the current and long-term operational security of the power system in Poland. The company's tasks include maintenance and development of the transmission network, management of the Polish Power System, including network balancing, as well as cooperation with other TSOs.

Ensuring the operational security of the system significantly contributes to Poland's economic growth, which is reflected in increased income and life qualify of Poles. Such impact of PSE on economic growth is possible owing to the company's cooperation with numerous enterprises.

As a contributor of taxes and other levies, we have a positive impact on the local, regional and national

budgets, enabling many significant projects to be financed.

We have a positive impact on all branches of the Polish economy: the energy sector, trade, construction, the professional and business services sector, agriculture, hotel industry, and food service. We generate this impact through all elements of our value creation model, i.e.:

1. Management of the Polish Power System operation;
2. Contractors for new build, upgrade and repair projects performing work on grid assets;
3. Management of human resource and active cooperation with the company's environment.

The effects of our activities include:

Added value generated in the economy

Employees hired and new jobs created

Wages paid.

Thousands of kilometres of power network in three dimensions

In order to demonstrate the extensive impact of our activities on the economy and society, we used three areas of key importance for the economic growth: **added value, jobs and wages**.

For each of the impact measures mentioned, three dimensions can be identified, through which we support the development of the Polish economy and contribute to the development of the wellbeing of Poles: **direct, indirect and induced:**

- **Direct dimension** – resulting from PSE's core activity.
- **Indirect dimension** – generated among counterparties and entities from related industries.
- **Induced dimension** – a further growth generated by an increase in household income.

PSE's impact on the Polish economy in 2019:

PLN 5.39 bn value added generated in the Polish economy

13.4 k retained jobs in domestic market

PLN 667 m – the value of household wages

more than PLN 942.5 bn – total amount of taxes and contributions paid to the state budget and local government budgets.

Generated value added

Value added is the difference between global production and intermediate consumption.

Global production is the sum of:

- revenue from sales of own products (goods and services)
- change in the balance of products
- manufacturing cost of products for internal purposes
- trade margin on goods purchased for resale

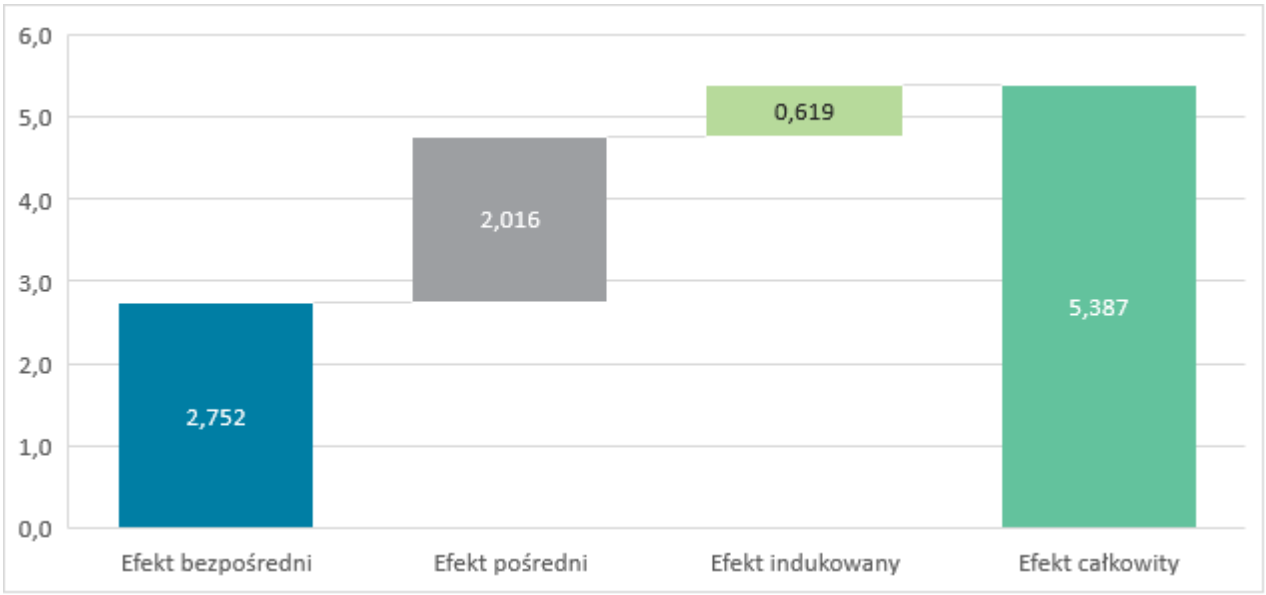
Intermediate consumption includes: the aggregate of net value of consumed materials, raw materials, fuels, energy, industrial gases, third-party services, business travel and other costs[1].

Value added generated owing to PSE's activities:

- **PLN 5.39 bn** – total value added generated in the Polish economy in 2019 owing to PSE's activities.
- **PLN 2.75 bn** – the direct value added generated by PSE in the power sector.
- In the industries in which PSE purchases equipment, materials and services, and in related industries, the company contributed to the creation of a total value added of more than **PLN 2 bn**.
- The wages paid to PSE employees, employees of counterparties and subcontractors in the whole chain of supply made it possible to create an induced value added in 2019 in the amount of **PLN 619 m.**

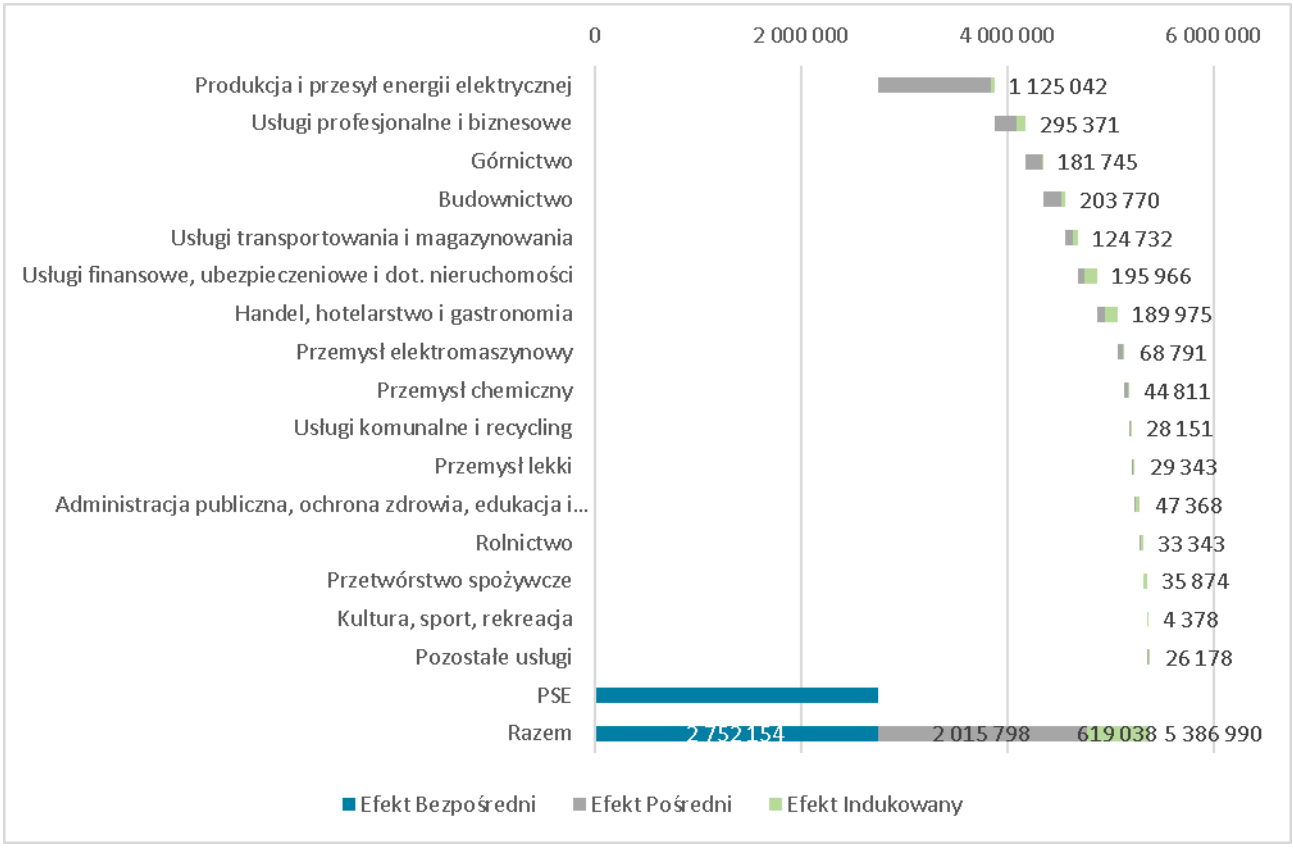
Value added generated in the economy owing to the activities of PSE in 2019 (in PLN bn)

[1] For PSE, intermediate consumption was calculated on the basis of data from the profit and loss account through the aggregation of costs to the level of the branches of the economy included in the model. Stranded costs and funds paid by PSE to the Settlement Body in respect of the RES charge were then deducted, as the costs do not represent a component of intermediate consumption. This approach was also applied in calculations in 2017 and 2018.



Efekt bezpośredni	Indirect effect
Efekt pośredni	Direct effect
Efekt indukowany	Induced effect
Efekt całkowity	Overall effect

Value added generated in individual industries owing to the activities of PSE in 2019 (in PLN '000s)



Produkcja i przesył energii elektrycznej	Electricity generation and transmission
Usługi profesjonalne i biznesowe	Business and professional services
Górnictwo	Mining
Budownictwo	Construction
Usługi transportowania i magazynowania	Transport and storage services
Usługi finansowe, ubezpieczeniowe i dot. nieruchomości	Financial, insurance and real estate services
Handel, hotelarstwo i gastronomia	Trade, hotel industry and food service
Przemysł elektromaszynowy	
Przemysł chemiczny	Chemical industry
Usługi komunalne i recykling	Municipal services and recycling
Przemysł lekki	Light industry
Administracja publiczna, ochrona zdrowia, edukacja i…	Public administration, healthcare, education and …
Rolnictwo	Agriculture
Przetwórstwo spożywcze	Food processing
Kultura, sport, rekreacja	Culture, sport and recreation
Pozostałe usługi	Other services
PSE	PSE
Razem	Total
Efekt bezpośredni	Indirect effect
Efekt pośredni	Direct effect
Efekt indukowany	Induced effect

Wages

Wages are a major measure of the affluence of households, and simultaneously a guarantee of satisfying the living needs of the household members. Through the employment of our own employees and an indirect impact on contractors, suppliers and subcontractors, who provide employment and pay wages to thousands of people, we positively impact the generation of additional income in many branches of the national economy.

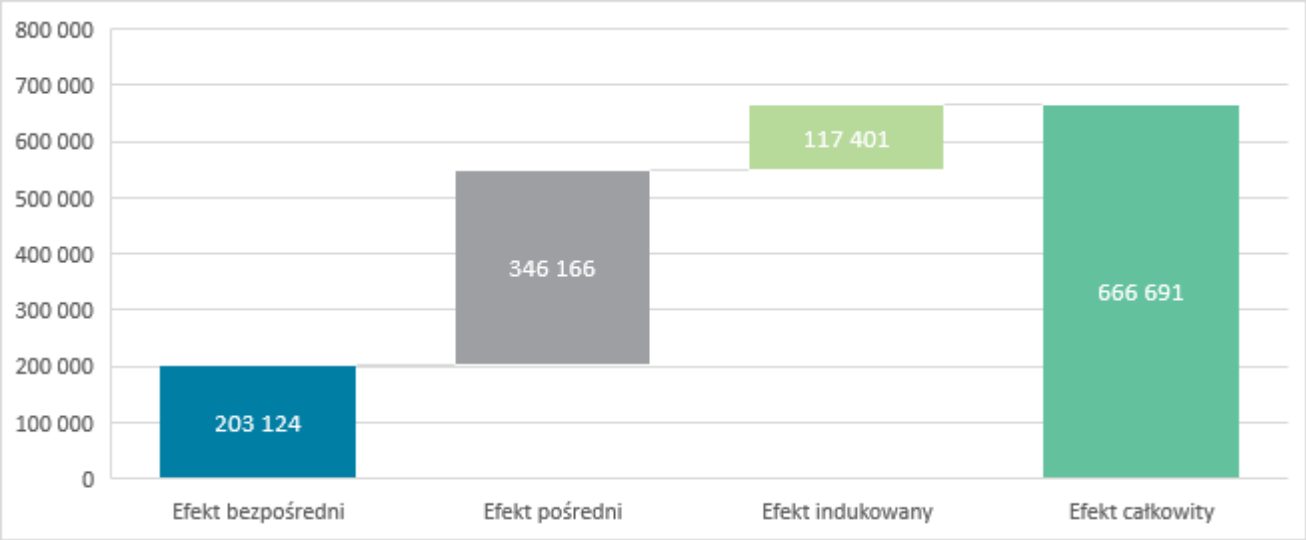
Wages generated owing to PSE's activities:

- **PLN 667 m** – total value of wages created in the Polish economy in 2019 owing to the activities of PSE.
- The total amount of net wages at PSE was **more than PLN 203 m** in 2019.
- Owing to purchases from our suppliers and links in the economy between different branches, suppliers and sub-suppliers could pay wages to their employees in the amount of **more than PLN 346 m.**
- The national economy saw a further increase in wages resulting from a growth in household income and consumption. These are wages generated in an induced manner. Their total amount in 2019 was **more than PLN 117 m**.

Multiplier: **3.28**

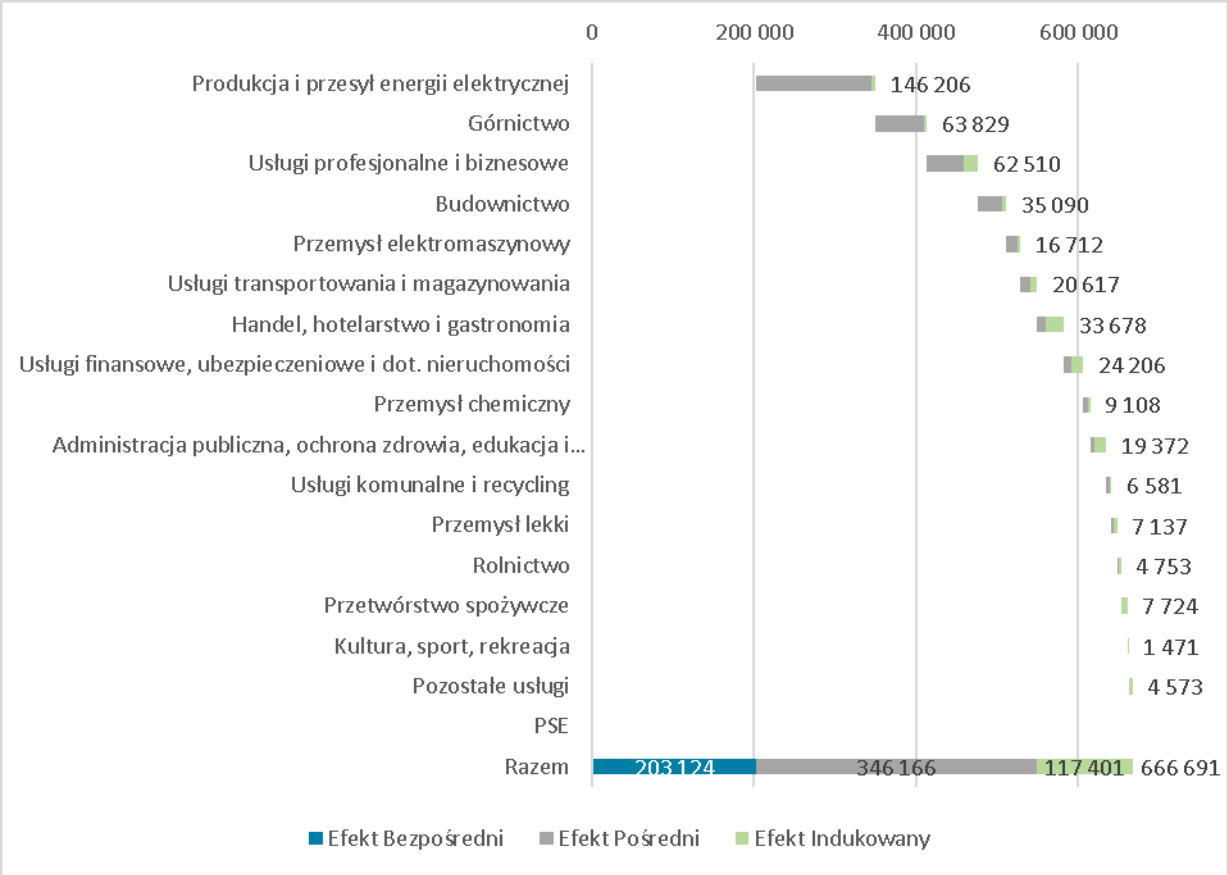
- Every zloty spent on net wages in PSE generates **more than 2 zlotys** in wages generated in the whole economy.

Wages generated in the economy owing to the activities of PSE in 2019 (PLN '000s)



Efekt bezpośredni	Indirect effect
Efekt pośredni	Direct effect
Efekt indukowany	Induced effect
Efekt całkowity	Overall effect

Wages generated in individual industries owing to the activities of PSE in 2019 (PLN '000s)



Produkcja i przesył energii elektrycznej	Electricity generation and transmission
Usługi profesjonalne i biznesowe	Business and professional services

Górnictwo	Mining
Budownictwo	Construction
Usługi transportowania i magazynowania	Transport and storage services
Usługi finansowe, ubezpieczeniowe i dot. nieruchomości	Financial, insurance and real estate services
Handel, hotelarstwo i gastronomia	Trade, hotel industry and food service
Przemysł elektromaszynowy	
Przemysł chemiczny	Chemical industry
Usługi komunalne i recykling	Municipal services and recycling
Przemysł lekki	Light industry
Administracja publiczna, ochrona zdrowia, edukacja i…	Public administration, healthcare, education and …
Rolnictwo	Agriculture
Przetwórstwo spożywcze	Food processing
Kultura, sport, rekreacja	Culture, sport and recreation
Pozostałe usługi	Other services
PSE	PSE
Razem	Total
Efekt bezpośredni	Indirect effect
Efekt pośredni	Direct effect
Efekt indukowany	Induced effect

Employment

Employment is a significant area of impact, both economic and social. Through its activities, PSE not only creates and maintains jobs in its organisation, but also contributes to employment with contractors, subcontractors and suppliers, and with related entities throughout the economy.

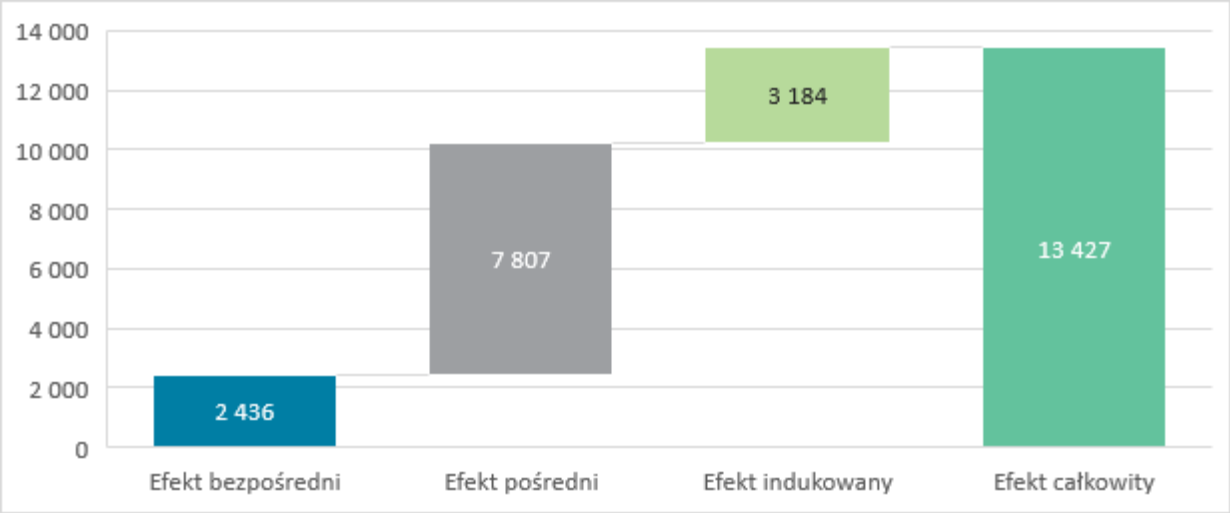
Number of jobs maintained owing to PSE's activities:

- **13,427 jobs** – the total number of jobs maintained in the Polish economy in 2019 owing to PSE's activities.
- In 2019, the average staffing at PSE was **2,436 employees**.
- By awarding contracts for the implementation of new build, upgrade and repair projects, and cooperation with many suppliers and sub-suppliers, and in sectors related to them, we maintain **7,807** jobs in different industries.
- The induced effect of PSE's activities is **3,184** jobs across the economy.

Multiplier: **5.51**

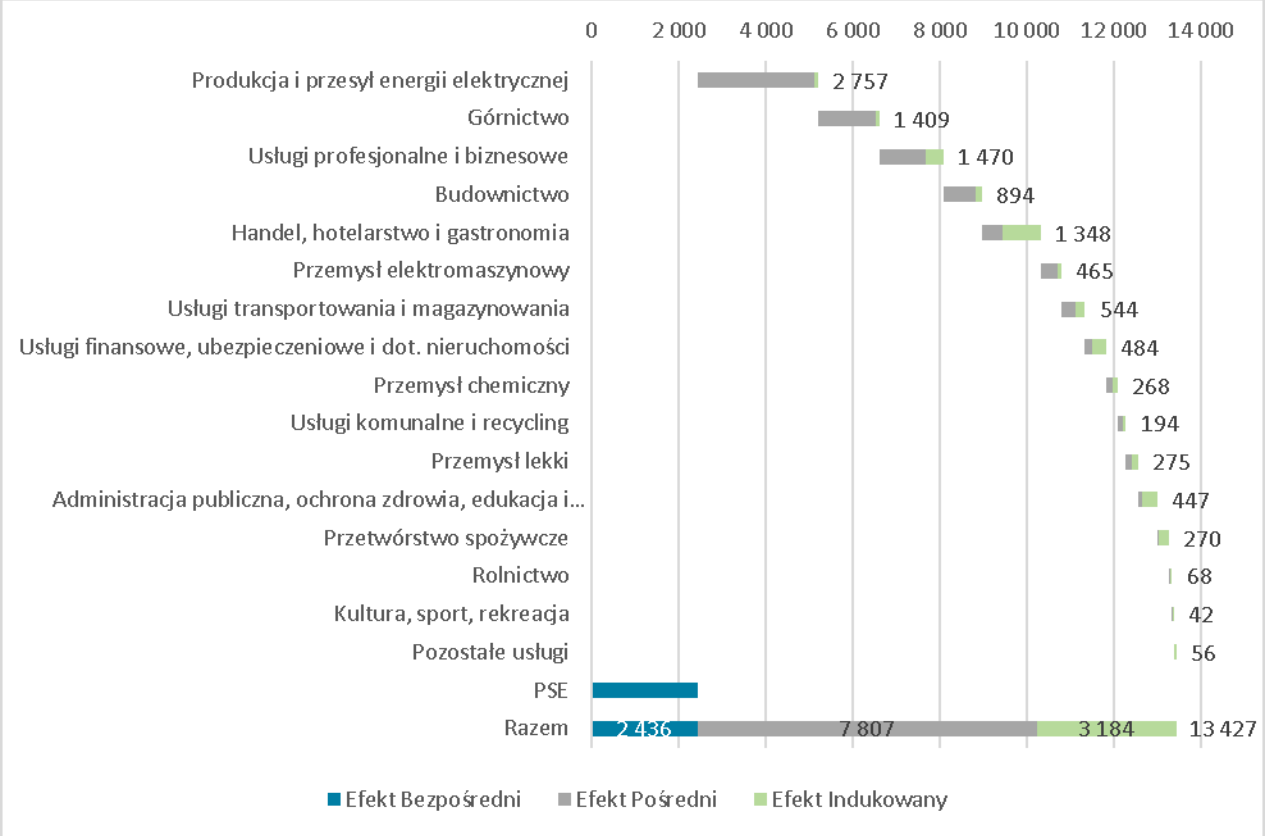
- 1 job in PSE is **more than 4** additional jobs across the economy.

Jobs maintained in the economy in 2019 owing to PSE's activities (number of jobs)



Efekt bezpośredni	Indirect effect
Efekt pośredni	Direct effect
Efekt indukowany	Induced effect
Efekt całkowity	Overall effect

Jobs maintained in individual industries owing to the activities of PSE in 2019 (number of jobs)



Produkcja i przesył energii elektrycznej	Electricity generation and transmission
Usługi profesjonalne i biznesowe	Business and professional services
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Budownictwo	Construction
Usługi transportowania i magazynowania	Transport and storage services

Usługi finansowe, ubezpieczeniowe i dot. nieruchomości	Financial, insurance and real estate services
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PSE	PSE
Razem	Total
Efekt bezpośredni	Indirect effect
Efekt pośredni	Direct effect
Efekt indukowany	Induced effect

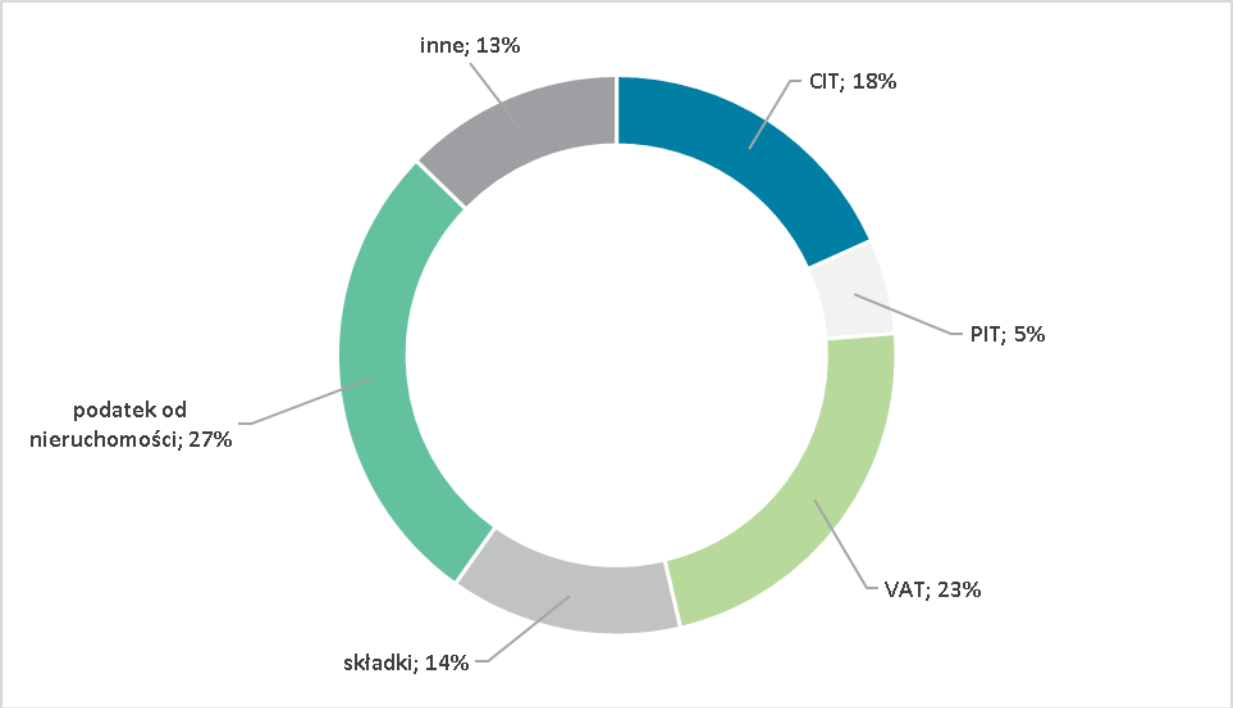
Taxes and charges

We run one of Europe's investment programmes for the development of power transmission infrastructure. We make a significant contribution in taxes and other charges, which represent the general government income. Numerous public investments, possible owing to income from taxes and other charges, make it possible, among other things, to increase transport availability, environmental protection, education, and welfare improvement.

- **PLN 942.5 bn** – the total amount of taxes, charges and social security contributions paid by PSE to the state budget, local government budgets and the Social Insurance Fund in 2019. *It is more than twice the annual spending on the "Maluch+" programme under which a network of nurseries and children's clubs is being expanded*[2].
- **PLN 223.8 m** – total amount of payments in respect of income taxes (PIT and CIT) in 2019.

Distribution of taxes, charges and contributions paid by PSE in 2019 (in percent)

[2] https://www.gov.pl/web/rodzina/rodzina-praca-seniorzy-ministerstwo-rodziny-pracy-i-polityki-spolecznej-podsumowuje-dzialania



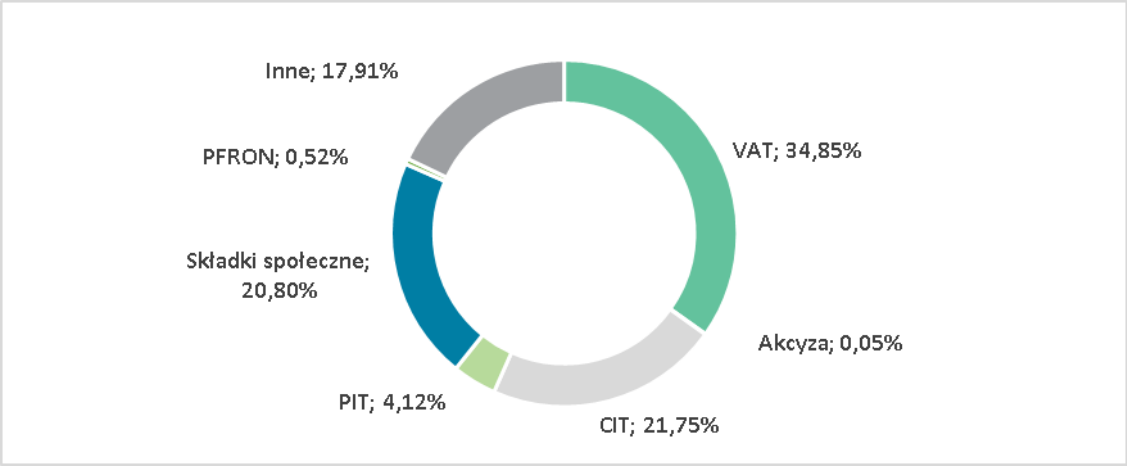
podatek od nieruchomości	property tax
składki	contributions
inne	other

It is the distribution of all taxes paid by PSE for the benefit of the State. The central budget receives 65 percent of the total amount of taxes and local budgets receive 35 percent[3].

- Almost **65 percent** of taxes, charges and contributions paid by PSE in 2019 were contributions to the central budget in respect of the following taxes:

Distribution of taxes, charges and contributions paid by PSE to the central budget in 2019 (in percent)

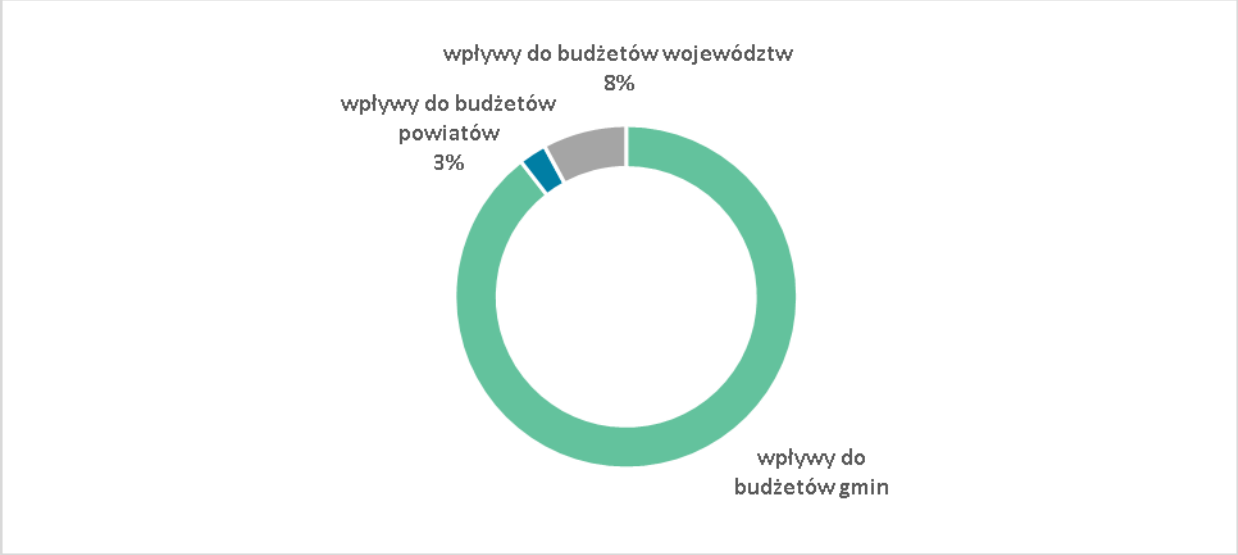
[3] *The calculations take into account the split of CIT and PIT revenues between the central budget and local government budgets. PSE's Impact Report for 2018 (as explained in footnote 11) took into account only a part of the taxes paid to the central budget. In this Report, the respective amounts have been added also to local government budgets, which results in significant differences in PSE contributions to local government budgets compared with 2018.*



inne	other
PFRON	Disability Fund contributions
Składki społeczne	Social security contributions
Akcyza	Excise duty

- The remaining **35 percent** represents contributions paid to local budgets, broken down as follows:

Distribution of taxes, charges and contributions paid by PSE to local government budgets in 2019 (in percent)



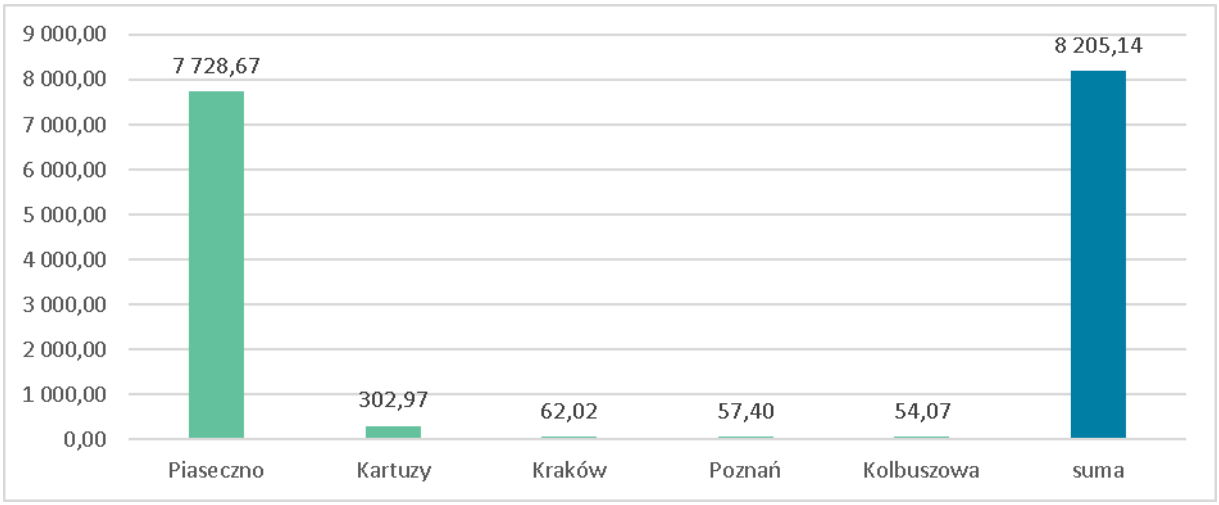
wpływy do budżetów gmin	revenue of commune budgets
wpływy do budżetów powiatów	revenue of poviat budgets
wpływy do budżetów województw	revenue of voivodeship budgets

The largest tax beneficiaries

In the case of voivodeships, more than 99% of local taxes paid in 2019 benefitted the Mazowieckie voivodeship budget. In total, **more than PLN 26.2 m** was received by voivodeship budgets in respect of taxes paid by PSE.

In 2019, PSE paid **almost PLN 8.7 m** to powiat budgets. 89% of the amount benefitted the poviat of Piaseczno.

Total amounts paid by PSE to the budgets of the 5 largest tax beneficiaries at poviat level (PLN '000s)

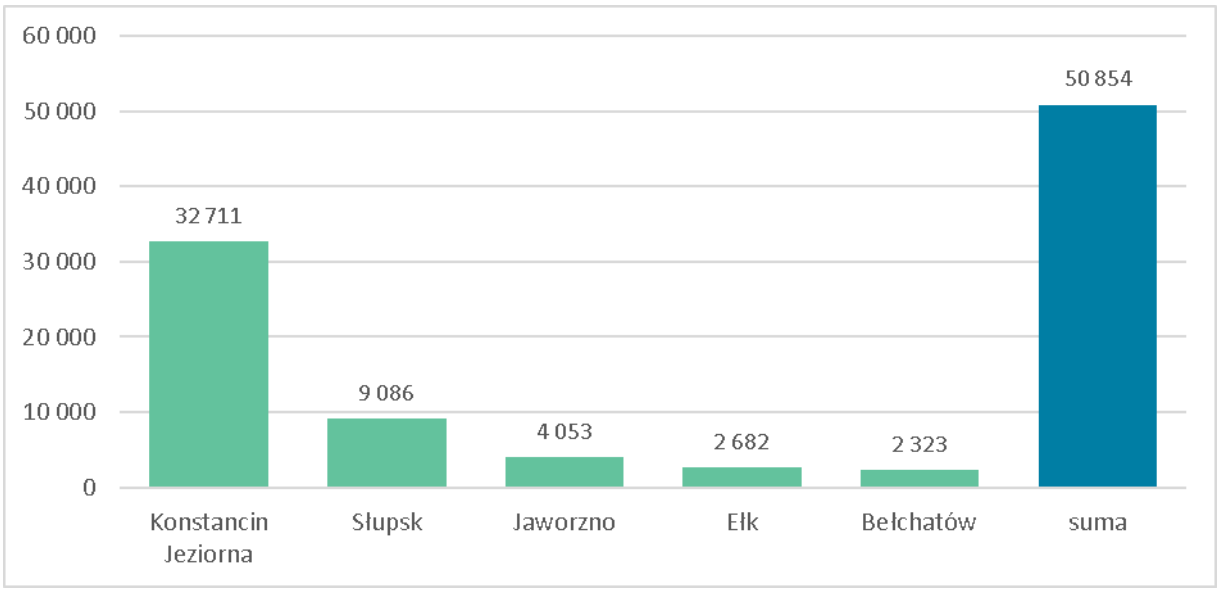


suma	total

<Docelowego dla tych danych wskazanych jest wykres kołowych procentowy>

In 2019, PSE paid **more than PLN 296.7 m** in taxes to commune budgets. The largest part of the amount, 11 percent, benefitted the budget of Konstancin – Jeziorna commune.

Total amounts paid by PSE to the budgets of the 5 largest tax beneficiaries at commune level (PLN '000s)



suma	total

<Docelowego dla tych danych wskazanych jest wykres kołowych procentowy>

Key messages

We are a guarantor of security and stability of the Polish Power System – today and in the future. We take care of the security of future generations.

Being aware of the condition of national infrastructure, challenges and trends that affect the development of the system, we undertake new build and upgrade projects in order to ensure its stability and security.

Our activities help to improve the operation of the PPS and to optimise energy costs incurred by consumers.

We do business locally, purchasing from local Polish suppliers, and thus have a positive influence on the development of the Polish economy.

Through the services provided, PSE supports the development of industry in Poland – creating infrastructure and providing facilities for business development.

4.2. Stable operation of the Polish Power System

Key figures

- **46,799 MW** – installed capacity w the PPS in 2019, **46,991 MW** – maximum capacity in the PPS in 2019,
- **26,504 MW** – maximum power demand in the PPS in 2019,
- **158,767 GWh** – national gross electricity production in 2019, which represents a decrease of 3.9 percent compared with 2018.
- **169,391 GWh** – national consumption of electricity in 2019, which represents a decrease of 0.9 percent compared with 2018,
- **141,297.33 GWh** – total electricity consumption by final consumers connected to the PPS,
- **97,228.13 GWh** – quantity of electricity supplied from the transmission network to domestic transmission service customers in 2019,
- **99.99 percent** – electricity supply continuity index in 2019. The level of this index confirms the certainty of power supply to all our transmission service customers.
- **ENS** (Energy Not Supplied by the system) – **601.26 MWh,**
  AIT (Average Interruption Time in the system) – **111.50 (minutes)**.
  Low levels of both ratios in 2019 testify to a high level of operational reliability of the transmission system and the certainty of supply to consumers connected to our network.
- **1.38 percent** – transmission loss rate. In 2019 it was the lowest ever.
- **99.77 percent** – availability index for transmission facilities (DYSU) in 2019. It reached a high value **at reference value of ≥ 97.5 percent**;
- **PLN 1,513.3 m** – capital expenditure in 2019,
- **164** – number of network infrastructure investment implemented in 2019.
- **PLN 8.4 bn** – capital expenditure planned until 2024.

4.2.1. Management of the power system in Poland

Ensuring common access to electricity requires an efficiently operating system for its seamless generation, conversion, transmission and distribution. All equipment connected to the system, including consumers' facilities, forms the Polish Power System.

The power system is a special type of critical infrastructure, as it determines the security of society, economy and the state. The system is centrally controlled. Operation of the Polish Power System is the responsibility of the National Power Dispatch Centre, i.e. PSE dispatching service.

How does the power system work?

[GRI 103-1] The Polish Power System (PPS) consists of three subsystems responsible for specific functions.

- **Electricity generation** – electric energy production by generating sources in the power system – power plants, CHP plants and distributed sources.
- **Electricity transmission** – performed over the transmission network in order to deliver electric energy to distribution networks or transmission-connected consumers. Electricity transmission is performed by the transmission system operator whose functions are performed by PSE.
- **Electricity distribution** – delivery of electric energy over distribution networks to institutional and individual distribution-connected consumers. Electricity distribution is performed by distribution system operators.

Cross-border interconnections

The Polish Power System operates:

- synchronously with the ENTSO-E Continental Europe countries (formerly UCTE),
- with dedicated generating units of the Dobrotvir power plant in the Ukrainian system,
- non-synchronously with the Swedish system via the DC submarine cable,
- non-synchronously with the Lithuanian system via the back-to-back DC link.

Synchronous interconnections

Western border (Poland-Germany)

- Krajnik-Vierraden 400 kV double-circuit line – the line in an interim configuration (1 line circuit and 2 serially-connected phase shifters on the German side),
- Mikułowa-Hagenwerder double-circuit 400 kV line with a phase shifter in Mikułowa.

Southern border (Poland-Czech Republic)

- Wielopole/Dobrzeń-Nosovice/Albrechtice double-circuit 400 kV line,
- Kopanina/Bujaków-Liskovec double-circuit 220 kV line.

Southern border (Poland-Slovakia)

- Krosno Iskrzynia-Lemesny double-circuit 400 kV line.

Asynchronous interconnections

Northern border (Poland-Sweden)

- DC Słupsk Wierzbięcino-Storno cable 450 kV line with a capacity of 600 MW.

Eastern border (Poland-Lithuania)

- Double-circuit 400 kV line interconnected with the Lithuanian system via the back-to-back DC link with a capacity of 500 MW.

Other interconnections

Eastern border (Poland-Ukraine)

- Zamość-Dobrotvir single-circuit 220 kV line operating in coordination with dedicated generating units on the Ukrainian side (the interconnection allows only electricity import to Poland),
- Rzeszów-Chmielnicka single-circuit 750 kV line – shut down.

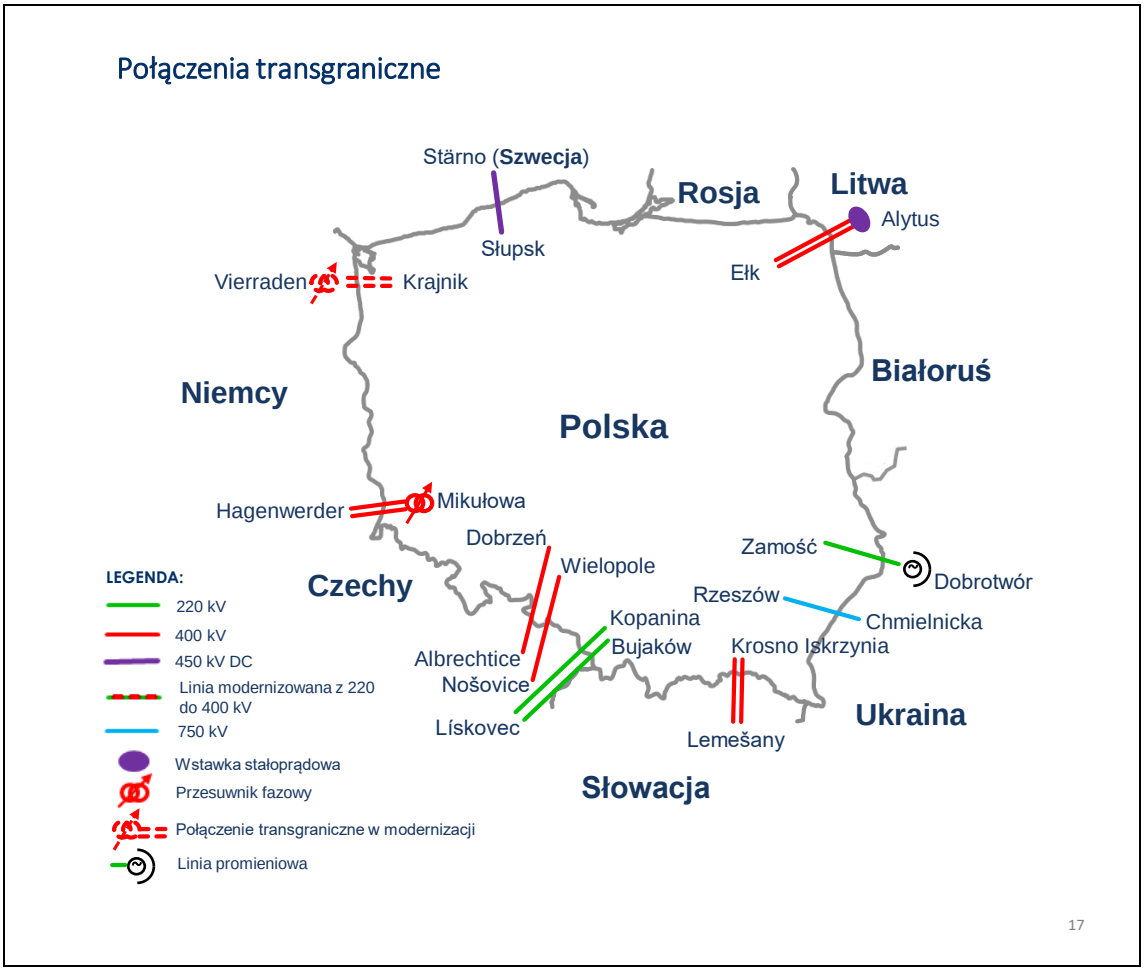


Fig. Cross-border interconnections

Połączenia transgraniczne	Cross-border interconnectors
Niemcy	Germany
Polska	Poland
Szwecja	Sweden
Ukraina	Ukraine
Słowacja	Slovakia
Rosja	Russia
Litwa	Lithuania
Białoruś	Belarus
Czechy	Czech Republic
LEGENDA:	LEGEND:
Linia modernizowana z 220 kV do 400 kV	Line being upgraded from 220 kV to 400 kV

Wstawka stałoprądowa	Back-to-back DC tie
Przesuwnik fazowy	Phase shifter
Połączenie transgraniczne w modernizacji	Cross-border interconnection being upgraded
Linia promieniowa	Radial line

[GRI 103-2] Transmission system management in the PPS

Transmission network operation management takes into account the needs of electricity consumers throughout the country.

Day-to-day power network security is ensured by hierarchically organised TSO and DSO dispatch services as well as generators' and consumers' O&M services.

The Polish Power System is organised into the following hierarchy of dispatch services:

- **National Power Dispatch Centre (*Krajowa Dyspozycja Mocy* – KDM)** – manages the operation of the 750, 400, 220 kV transmission network as well as selected 110 kV lines of system-wide significance,
- **Area Power Dispatch Centre (*Obszarowa Dyspozycja Mocy* – ODM)** – manages the operation of the 750, 400, 220 and 110 kV transmission network and switching operations
- **Central Power Dispatch Centres, Branch Power Dispatch Centres (CDM, OCD)** – manage the operation of the 110 kV distribution network and switching operations in the 110 kV and lower-voltage distribution network.

The TSO dispatch services cooperate directly with the DSO dispatch services (Central Power Dispatch Centres, Branch Power Dispatch Centres), and O&M personnel of enterprises dealing with electricity generation (Duty Power Plant Operation Engineer – *Dyżurny Inżynier Ruchu Elektrowni* – DIRE). The cooperation is based on the Instruction of Transmission System Operation and Maintenance (Transmission Network Code).

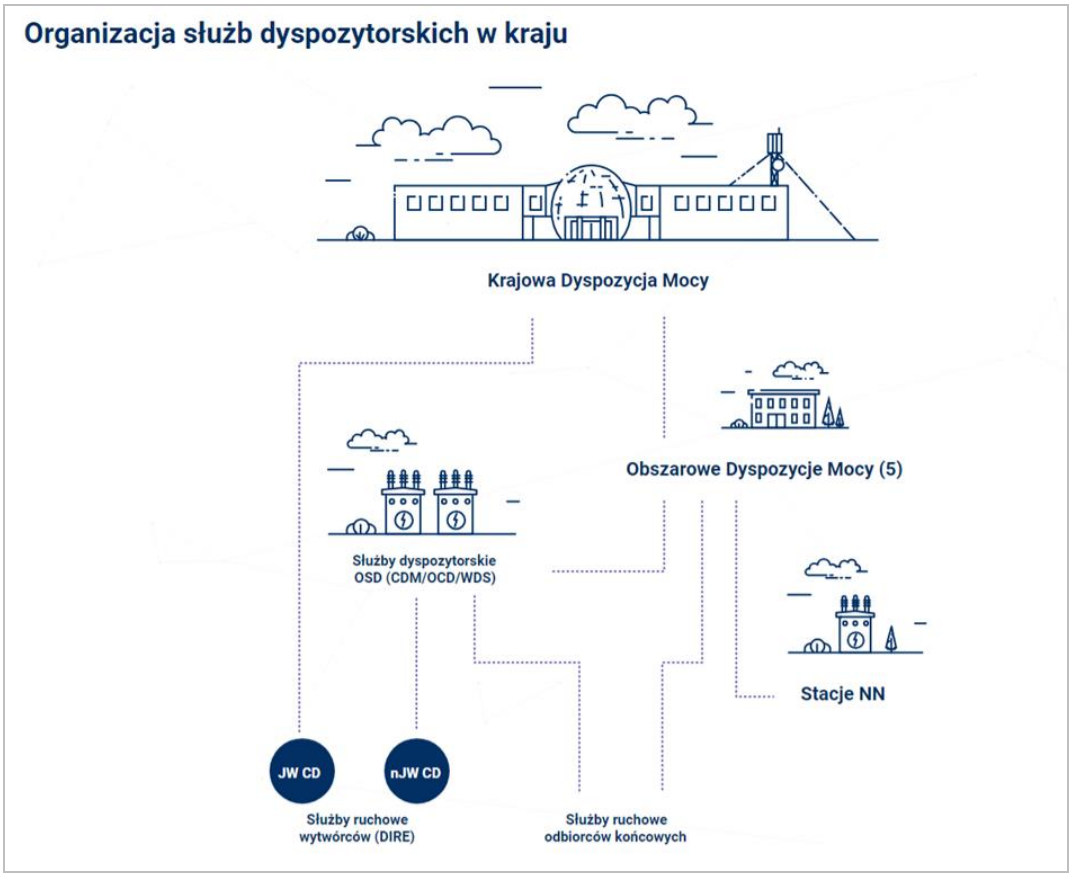


Fig. Organisation of dispatch services in Poland

Organizacja służb dyspozytorskich w kraju	Organisation of dispatch services in Poland
Krajowa Dyspozycja Mocy	National Power Dispatch Centre
Służby dyspozytorskie OSD (CDM/OCD/WDS)	DSOs' dispatch services (CDM/OCD/WDS)
Służby ruchowe wytwórców (DIRE)	O&M services of generators (DIRE)
Służby ruchowe odbiorców końcowych	O&M services of final consumers
Obszarowe dyspozycje mocy	Area power dispatch centres
Stacje NN	EHV substations

The TSO's cooperation with transmission system operators of the neighbouring countries in network operation management is based on the rules described in the ENTSO-E/UCTE network codes and conditions laid down in bilateral agreements.

Balancing power demand in the power system

GRI 103-2] Economic development of the country is associated with an increase of electricity demand. This makes it necessary to have appropriate generating and transmission capacity to ensure the security of supply.

In order to ensure generating capacity necessary to meet demand, we perform, as transmission system operator, the coordination planning process for different time horizons. The process covers annual, monthly and daily coordination plans.

The schedule of planning activities and the scope of forecasted and published data are set forth in the Transmission Network Code.

Coordination plans are intended to ensure the maintenance of surplus capacity levels required in a given period, available in excess of forecasted demand. This can be achieved through coordination of

plans of generating unit repairs and outages of meshed network elements, taking into account plant and network constraints and planned cross-border exchange constraints.

In order to ensure the continuity of electricity supply and balance the system even in unfavourable conditions, in periods of peak electricity demand we use:

- available capacity of generating units which are not centrally dispatched,
- additional capacity in power plants operating in overload, i.e. at a capacity higher than nominal (providing ancillary services),
- intervention power supply from pumped storage plants which allow power demand to be balanced (as part of ancillary services) within a short period (2-4 hours),
- dispatch electricity exchange with the neighbouring TSOs,
- cold intervention reserve,
- demand-side response (DRS) services.

4.2.2. Activities promoting reliable operation of the transmission system

[GRI 103-2, GRI 103-3] In order to ensure the secure and cost-effective operation of the system, in particular to ensure the required reliability/quality parameters of power system operation, PSE purchases ancillary services.

Ancillary services:

- Regulation ancillary services (RAS):
  - operating capacity reserve,
  - share in primary control,
  - share in secondary control,
  - underload or overload operation,
  - participation in automatic voltage and reactive power control.
- The Generating Unit activation service (hereinafter: "activation service").
- Regulation ancillary services involving the intervention reserve:
  - contingency operation,
  - intervention cold reserve.
  - demand-side response service.
- nJWCD reliability-must-run service (RMR service).
- Polish Power System restoration service.

Ancillary services and the generating unit activation service are provided by units dispatched by the TSO. TSOs conclude RAS agreements and activation service contracts with all generators operating Centrally Dispatched Generating Units. In 2019, PSE concluded 10 agreements for the provision of RAS services including activation services.

Regulation ancillary services involving the intervention reserve are activated on instructions from the TSO and are used to intervene to maintain the capacity balance throughout the PPS or – having regard

to the network operation conditions – in its selected areas, in order to ensure operational security of the PPS.

In 2019, PSE concluded 2 contracts for the provision of contingency operation service, 2 contracts for the provision of the intervention cold reserve service, and 48 contracts for the provision of the DSR service.

nJWCD reliability-must-run services are one of the tools used by the TSO to ensure the secure operation of the PPS and the active power and reactive power generation volume at individual "network nodes" (nodes or areas containing specific nodes). In 2019, PSE had reliability-must-run contracts concluded with 7 generators.

The Polish Power System restoration services consist in ensuring readiness to start-up a power plant without external power supply and continuous operation in islanding mode and readiness to execute the TSO's instructions to start-up additional power plants and to expand the island. The services are purchased by the TSO in the event of a large system-wide failure resulting in a blackout throughout the PPS or in its substantial part. In 2019, PSE had PPS restoration service contracts concluded with 4 generators.

4.2.3. Key system operation reliability indicators

Indicators that characterise the continuity of supply and duration of outages (ENS and AIT) have been calculated for a group of points of supply comprising final consumers and distribution system operators who have one transmission network supply point. Outage of a point of supply of those customers results in interruption of electricity supply from the transmission network.

To determine the reliability of network operation in accordance with the applicable laws and regulations, the ENS and AIT indicators are calculated for emergency outages

ENS, AIT indicators for emergency outages*	Unit	2019	2018	2017	2016
ENS	**MWh**	**439.34**	**0.00**	**125.22**	**0.00**
AIT	**minutes**	**81.47**	**0.00**	**20.72**	**0.00**

*The values of the ENS and AIT indicators presented in the table have been calculated for unscheduled (emergency) outages and do not include scheduled outages.

System operation reliability indicators
ENS – an indicator of electrical Energy Not Supplied by the power transmission system. It is expressed in MWh per year and represents a sum of products of power not supplied due to interruption and its duration. The indicator includes short, long and very long interruptions including and excluding disastrous interruptions.
AIT - an indicator of Average Interruption Time in the power transmission system. Expressed in minutes per year, it is a product of 60 and energy not supplied (ENS) by the power system, divided by the average power supplied by the transmission system, expressed in MW.

In 2019, one emergency outage resulting a lack of power supply to a customer. The outage lasted approx. 36 hours and it was due to tripping of the 110 kV line from which the customer receiving power from the transmission network was supplied. The direct cause of the outage was an earth fault due to contact with a tree in the line right of way.

In 2018, no incidents were reported, leading to interruptions of power supply to consumers at transmission network supply points, referred to above.

In 2017, one emergency outage occurred, which resulted in a 3-hour interruption of power supply to one of consumers fed from the transmission network. The outage was caused by an emergency manual disconnection of feeder lines. The reason for the power cut was an unauthorised person having climbed a 220 kV power line tower. The shutting down of other equipment, lines and transformers connected with the incident site was dictated by safety concerns.

Low levels of the ENS and AIT indicators testify to a high level of operational reliability of the transmission network managed by PSE and the certainty of supply to consumers connected to the network.

ENS and AIT indicators for all outages (planned and emergency)

ENS and AIT indicators for all outages (planned and emergency)*	Unit	2019	2018	2017	2016
ENS	**MWh**	**601.26**	**264.24**	**671.64**	**425.10**
AIT	**minutes**	**111.50**	**45.77**	**111.15**	**84.44**

*The ENS and AIT values have been calculated for emergency and scheduled outages resulting from necessary scheduled repair and maintenance work on transmission network elements supplying power to consumers.

The ENS and AIT values remaining at a steady low level has a positive effect on the confidence of consumers connected to the transmission network. The reduction of the number and duration of planned interruptions in electricity supply to consumers is attributable, among other things, to the implementation of a system optimising the schedule of repair and maintenance work on transmission network elements supplying power to consumers. Scheduled outages are performed by PSE at times agreed with consumers, usually in periods of no power consumption declared by consumers. Thanks to this, during outage periods, consumers adjust their demand or use other methods of electricity supply (e.g. from the DSO's network).

Electricity supply continuity index (WCD)

In order to determine the continuity of electricity supply, the WCD index is calculated.

WCD

The indicator is calculated as the total quantity of electrical energy delivered to transmission service customers (DSOs and final consumers) divided by the sum of the quantity of electrical energy supplied and not supplied to those consumers during a year.

Maintaining the supply continuity indexes at a high level results from the transmission assets maintenance and repair policy adopted by the TSO.

The quantity of electrical energy not supplied to transmission service customers in a year has been calculated taking into account both scheduled and unscheduled cuts in electricity supply to consumers. The indicator of total quantity of electrical energy supplied from the transmission network during a year used in the calculation represents the volume of electricity taken from the transmission network at all supply sites by final consumers and distribution system operators connected to the transmission network.

The values of the WCD index in 2016-2019 are shown in the table below.

Electricity supply continuity index *

WCD index	Unit	2019	2018	2017	2016
Electricity supply continuity index (WCD)	**%**	**99.9994**	**99.9997**	**99.9993**	**99.9995**

* The supply continuity index represents the certainty of power supply to all consumers connected to the transmission network

Maintaining the supply continuity indexes at a high level results from the transmission assets maintenance and repair policy adopted by the TSO.

[GRI 103-2, GRI 103-3] Measures taken by PSE in order to maintain continuity of electricity supply to consumers:

- Development of long- and short-term network operation coordination plans. Time schedules of both maintenance work and repair work on network elements and generating units in a manner that ensures the maintenance of surplus power levels required in a given period, available in excess of forecasted demand, as well as compliance with the required secure network operation criteria, including the reliability criterion (n-1).
- Development and implementation of a single maintenance model that allows the state of repair of equipment and its operational environment to be evaluated in a cyclic, standardised and measurable manner. Owing to those activities, the most depreciated and oldest grid assets – the potential source of emergency and fault conditions – are preventively replaced.
- Implementation of the maintenance personnel development programme. It supports the continuous competence improvement of the company's own maintenance personnel, including field personnel.
- Undertaking investment activities. Optimises the loading of transmission lines and eliminates overloads of transmission system elements.
- Systematic standardisation of network equipment and creation of storage facilities. Supports quick and cost-effective necessary replacements.
- Close cooperation and making arrangements with transmission service customers at each stage, i.e. from planning to execution.

Electrical energy losses in the transmission process

GRI EU12 Electric energy losses in the transmission process, showing loss causes					
	Unit	**2019**	**2018**	**2017**	**2016**
Technical losses	MWh	1,476,221	1,611,270	1,669,042	1,684,995
Non-technical losses (e.g. illegal consumption of electricity)	MWh	0	0	0	0
Transmission losses as percentage of total energy fed into the system (G.10.7 official data)*	%	**1.38**	**1.48**	**1.60**	**1.62**

* The value does not include energy consumed by substation auxiliaries.

Tab. Electric energy losses in the power transmission process, showing loss causes

In September 2019, the decision was taken to implement a new model of electricity purchase to offset losses in the transmission network. The existing form, including the acquisition of electricity through an annual auction, was replaced by cyclic purchase of electricity in the energy exchange market.

The main objectives of the change implemented were to:

- obtain an average exchange price (treated as a competitive market average) of electricity purchase to cover transmission losses,
- eliminate the risk of electricity purchase related to the purchase of a large volume of electricity in one or several moments in a year, e.g. through tendering procedures,
- rationalise the form of electricity purchase to cover transmission losses by switching from a one-off decision within an annual auction to:
  - multiple purchase spread over time,
  - the purchase of small volumes of electricity on the exchange market, according to strictly defined rules,
- improve the accuracy of the electivity volume planned to be purchased:
  - performing long, medium and short-term forecasts,
  - updating the electricity volumes planned to be purchased on the short-term market (e.g. a day ahead of real-time operation),
  - reducing the volume of deviations in the Balancing Market,
- practically eliminate the possibility of the purchase electricity to cover transmission losses influencing the market price of electricity by purchasing very small one-off volumes of electricity while meeting very strict requirements in terms of pricing and liquidity of the exchange market.

The purchase of electricity on the exchange to cover electricity losses in the transmission network has been performed since 13 November 2019 through the Brokerage House of Bank Ochrony Środowiska S.A.

4.2.4 Development of the transmission system

[GRI 103-1] The provision of the necessary quantity of electricity to all consumers is key to ensuring sustainable development of the national economy. We seek to ensure that the transmission system provides reliable electricity supply both currently and in the future. It is our responsibility.

Structural changes in the environment pose further challenges which could be taken into account in future plans for the development of transmission infrastructure. They are related, among other things, to:

- the growing decentralisation of the generation sector,
- an increase in the number of renewable sources and continuous development technologies in this area,
- offshore wind power plans,
- the Nuclear Power Programme,
- the gradual decommissioning of a part of conventional generation assets,
- an increase in the use of electricity in the transport and heat sectors,
- the progressing digitalisation.

What is also an important issue is an increased significance of cross-border interconnections and intra-country connections which allow electricity to be transmitted between potential new generation centres and consumption or storage locations. The inclusion of those elements requires a further development of the backbone transmission network based on 400 kV, supported by a 220 kV network. After the drafting and approval of PRSP 2018-2027, new legislation entered into force and draft new legislation was presented at both the EU and national level, which have a significant impact on the entire energy sector, i.e.:

- Regulations and Directives (EU) of the European Parliament and of the Council under the Clean Energy Package for All Europeans, which entered into force as of 4 July 2019 and, in principle, have applied since 1 January 2020.
- Key national sectoral documents setting the directions of changes in the Polish Power System:
  - → Draft Energy Policy of Poland until 2040 of 8 November 2019
  - → Draft National Energy and Climate Plan for 2021-2030 of 4 January 2019
  - → PRSP 2021-2030 takes into account the development directions of the energy sector in Poland looking to 2040, set by the Draft Energy Policy of Poland until 2040, one of nine strategies arising from the national development management system, and the Draft National Energy and Climate Plan (NECP) prepared pursuant to Regulation (EU) 2018/1999 of the European Parliament and of the Council.

[GRI 103-2] Transmission network development plan

The Transmission Network Development Plan (PRSP) sets forth the transmission network development projects which, when completed, are expected to meet long-term national capacity and energy demand. The main factors affecting the direction of transmission network development include growth of electricity demand, development of generating sources and the need to expand cross-border interconnections.

PRSP 2021-2030 continues the transmission network development directions set out in PRSP 2018-2027. **PSE's strategic objective is to build a backbone power network based on 400 kV lines, which will be capable of adapting the planned PPS development scenario, including in particular the development of the generating sector.**

Compared to the previous edition of PRSP, the analytical process for the identification of required infrastructural needs has also changed significantly. An improved methodology for the representation of the power system and its processes was developed and implemented. It took into account, among other things, market analyses with the use of the European market model, which resulted in a forecast of cross-border exchange between Poland and the neighbouring countries. In the tools and methods used, time granularity was increased significantly, the stochastic nature of processes in the PPS was taken into account, as well as the impact of weather conditions on the operation of the power system. Particular emphasis was placed on the integrity and cohesion of the values, databases and assumptions used.

The domestic generating sector is undergoing transformation and a future energy mix for Poland has not been defined by the time this document is prepared. The experience so far shows that under the existing legal and regulatory framework generating undertakings find it difficult to find an economic justification for the construction of new generating capacities. For this reason, in December 2017, the capacity market mechanism was introduced in Poland, which will enable investors to take decisions on

the construction of new generating capacities in the country. It must be emphasised, however, that **in 2017-2019 a new coal-fired unit was commissioned at the Kozienice Power Plant as well as a new combined cycle gas turbine (CCGT) unit in Płock and two coal-fired units at the Opole Power Plant, which has improved the resources of the Polish generating sector by approx. 3,240 MW.**

In preparing PRSP 2021-2030, the legal requirements were taken into consideration arising from:

- the National Spatial Development Concept,
- Voivodeship Spatial Development Plans,
- Poland's Energy Policy,
- ENTSO-E Ten Year Network Development Plan (TYNDP) 2018,
- implementation of connection agreements and defined conditions for connection to the transmission network,
- fulfilment of other commitments, including arrangements with DSOs,
- EU regulations.

Conditions arising from the NSDC

The National Spatial Development Concept (NSDC) in force was adopted by Resolution of the Council of Ministers of 13 December 2011 and by the Sejm of the Republic of Poland at a session held on 15 June 2012. The NSDC is the foremost national strategic document on spatial development of the country. It provides a framework for other strategic documents and plays a coordinating role with regard to proposed national and regional strategies, plans and programmes for social and economic development.

In practice, this means that the NSDC is binding upon public administration bodies and imposes the obligation to:

- take into account in the land use studies for communes the principles laid down in the NSDC,
- take the NSDC provisions into account in the Voivodeship Spatial Development Plans (VSDPs).

With regard to power infrastructure, the role of the NSDC is to provide conditions to ensure energy security by enabling the diversification of sources, indicating directions and corridors in which transmission and distribution networks will be developed, as well as the potential locations of new generating capacity. The NSDC identifies the space necessary for the development of transmission networks and the rules for the delimitation of space necessary for the utilisation of the potential of regional and local renewables, including the diversification of energy sources. The guaranteed capability of future exploitation of strategic deposits was also taken into account. The directions of investment measures were indicated in the NSDC without directly prejudging any locations, expenditure structure or financial inputs.

The NSDC currently in force signals the need to develop the national and cross-border power transmission network. Investments included in the NSDC require confirmation in development analyses performed at PSE S.A. based on the most up-to-date assumptions concerning proposed changes in the PPS.

However, it should be borne in mind that currently the document defining the basic considerations as well as current development objectives and directions for the country, including the spatial dimension,

is the Strategy for Responsible Development to 2020 (with prospects to 2030) adopted by the Council of Ministers in 2017.

Conditions arising from the VSDPs

From the point of view of the national transmission network expansion process, the voivodeship spatial development plans (VSDPs) are the basic planning documents prepared by regional (voivodeship) governments. The plans define, in particular, the infrastructural links, including the directions of cross-border links and the geographical distribution of public utility projects of supra-local significance.

PSE's cooperation with regional governments with regard to development plan consistency with the planning documents prepared by the governments, arises directly from the provisions of the Energy Law. Under the Law, our company consults the development plan with the interested parties, posting the draft plan on its website page and setting a deadline for the submission of comments. Regional government bodies participate in the consultations.

PSE also keeps correspondence with regional government bodies, participating this way in the Voivodeship Spatial Development Plan preparation procedure.

Facts worth knowing

Since the time the last edition of the transmission network development plan was prepared, **PSE has participated in giving opinions on the draft spatial development plans for 3 voivodeships:** Dolnośląskie, Śląskie and Świętokrzyskie. Besides, during that period, the VSDP amendment process ended with the adoption of new spatial development plans for 3 voivodeships: Mazowieckie, Opolskie and Wielkopolskie.

Conditions arising from the Energy Policy of Poland (EPP)

Along with the possible adoption of PEP2040, "Energy Policy for Poland until 2030" issued in 2009 and the "Energy Security and Environment - 2020 Perspective" Strategy of 2014 will be repealed. The main considerations for PRSP 2021-2030 under the draft PEP2040 provide for network expansion which allows to:

- evacuate power from the existing generating sources,
- connect new capacity, including nuclear units and onshore and offshore wind farms at a level that allows the required RES share to be achieved in the energy balance of the country,
- improve the reliability of power supply to consumers,
- create secure conditions for operation of intermittent sources in coordination with other PPS elements,
- provide capacity for power exchange with adjacent systems,
- increase the energy efficiency of electricity transmission.

Considerations arising from the Ten-Year Network Development Plan (ENTSO-E TYNDP) 2018

Every other year ENTSO-E publishes a Community-wide ten-year network development plan. The current Community-wide Network Development Plan was published in November 2018. The main objective of the investments included in TYNDP is to achieve the European climate targets by 2050 in a cost-effective manner, maintain operational security of the power system, taking into account the economic, political and social needs under conditions of uncertainty of future infrastructure

development. The development needs in the European power system, identified in the course of analyses conducted in the TYNDP 2018 creation process arise, among other things, from a dynamic development of renewable energy sources (mainly wind), energy storage technologies, electromobility, heat pumps, and the need to reduce CO_2 emissions.

TYNDP 2018 provides for six clusters of projects concerning the development of the national transmission network and cross-border interconnections.

PRSP 2021-2030 includes all investment projects within the territory of Poland provided for in TYNDP 2018 during the period ending in 2030.

Considerations arising from the implementation of connection agreements and defined conditions for connection to the transmission network

As at 2 December 2019, PSE had connection agreements signed for new generating units with a total capacity of 14,774.975 MW, including 10,785 MW for conventional generating units and the remaining capacity for RES (4,717.975 MW). PSE also has concluded connection agreements for distribution systems with a total capacity of 149.5 MW and power plant auxiliary transformers with a total capacity of 331.7 MW.

Our company has issued connection conditions for:

- RES with a total capacity of 5,163 MW,
- conventional energy sources with a total capacity of 2,754 MW,
- a distribution system with a capacity of 30 MW,
- power plant auxiliary transformers with a total capacity of 95 MW,
- energy storage facilities with a total capacity of 312 MW.

Considerations arising from the fulfilment of other commitments, including arrangements with DSOs

The 400 and 220 kV national transmission network together with a large part of the 110 kV distribution network **operates in the multiple-feed meshed network configuration**. One of the key aspects in planning the development of transmission infrastructure is to ensure the cohesive and coordinated development of the entire meshed network both at the EHV network level and the 110 kV network level . This approach makes it possible to ensure long-term operational security of the PPS and optimal, in technical and economic terms, dimensioning of needs for network expansion in different areas. This issue is provided for in the applicable laws and regulations, including the Energy Law (Article 9c(2)(5)) and the Transmission Network Code (Conditions for the network use, operation, maintenance and development planning - Section 3).

As a result of integrated planning of the development of the EHV and 110 kV closed network, in order to improve the reliability of power supply to different DSO areas, the TSO and DSOs have agreed and concluded or are in the course of concluding respective agreements addressing the need to strengthen the existing and construction of new connections of the 400 and 220 kV transmission network connections with the 110 kV network.

Integrated planning requires multi-variant analyses of an iterative nature for the entire meshed network, taking into account changing system conditions. In the run-up to the drafting of PRSP 2021-2030, analyses were completed concerning the EHV and 110 kV meshed network operation concept in

the operating areas of TAURON Dystrybucja S.A., PGE Dystrybucja S.A. and ENERGA Operator S.A. At the same time, analyses for the areas of ENEA Operator Sp. z o.o. and Innogy Stoen Operator Sp. z o.o. were also in progress.

Conditions arising from EU regulations

Article 16(8) of Regulation (EU) 2019/943 of the European Parliament and of the Council imposes the obligation on TSOs to make available to market participants, from 1 January 2020, cross-zonal capacity of not less than 70 percent of the transmission capacity for the border concerned (Coordinated Net Transmission Capacity, CNTC approach) or a critical network element (Flow-Based Allocation, FBA approach) determined respecting operational security limits. Analyses conducted by the PSE have shown that the provision of transmission capacity at the required level will require measures to eliminate related congestions. In implementing the provisions of the Action Plan (prepared by the Government pursuant to Article 15 of Regulation 943), PRSP 2021-2030 takes into account relevant network investments aimed to eliminate barriers related to cross-border exchange in the above-mentioned context.

Facts worth knowing

[GRI 103-3] The implementation of planned development projects included in the plan for 2021-2030, together with the expected development of the generating sector will significantly change the network structure and power distribution in the PPS.

By 2030, we are planning to:

- **systematically increase the share of 400 kV lines:**
  → 400 kV line circuit length increase by 3,701 km (retirements 648 km, new builds 4,349 km);
- **systematically reduce the share of 220 kV lines:**
  → 220 kV line circuit length reduction by 378 km (retirements 636 km, new builds 258 km);
- **increase of transformation capacity between voltage levels:**
  → 400/220 kV – increase by 1,440 MVA (retirements 1,060 MVA, new builds 2,500 MVA),
  → 400/110 kV – increase by 10,170 MVA (retirements 750 MVA, new builds 10,920 MVA),
  → 220/110 kV – increase by 2,460 MVA (retirements 5,030 MVA, new builds 7,490 MVA),
- **increase of reactive power control capacity.**

4.2.5. Improvement of the infrastructure investment project implementation model

<Ten rozdział docelowo zostanie linkowany z obszarem Infrastruktura i inwestycje w ramach modelu tworzenia wartości PSE>

[GRI 103-2] Network Investment Portfolio

In order to ensure more efficient implementation of projects in 2019, PSE cyclically updated the Investment Portfolio forming one of the basic tools used for investment project management. The projects included in the Investment Portfolio are grouped, categorised, prioritised and sequenced for implementation taking into account specific system conditions related to the possibility of required outages of transmission network elements.

The Portfolio is a set of network infrastructure investment projects grouped into investment programmes. In special cases, elements other than network infrastructure are allowed to participate in the programme.

All investment projects included in the Network Investment Portfolio are grouped into investment programmes depending on:

- strategic significance – strategic programmes,
- project location and interrelations – area programmes,
- the nature of work supporting the implementation of other investment projects (example: investor deliveries, legal and regulatory issues).

Strategic programmes

The Network Investment Portfolio includes six strategic programmes and three area programmes.

Programme 1.

Power evacuation from Kozienice Power Plant including the improvement of power supply conditions in north-eastern Poland 12 projects, PLN 574.6 m of total contracted budget.

Programme 2.

Power evacuation from Turów Power Plant including the improvement of power supply conditions in south-western Poland 16 projects, PLN 711.5 m of total contracted budget.

Programme 3.

Power evacuation from Dolna Odra Power Plant and RES including the improvement of power supply conditions in north-eastern Poland: 19 projects, PLN 1,110.2 m of total contracted budget.

Programme 4.

Power evacuation from RES including the improvement of power supply conditions in northern Poland: 22 projects, PLN 2 116 m of total contracted budget.

Programme 5.

Power evacuation from Bełchatów Power Plant including the improvement of power supply conditions in central Poland: 9 projects, PLN 133 m of total contracted budget.

Programme 9.

Strategic programme "Construction of Submarine Interconnectors and Energy Storage Facilities": 2 projects, no investment contracted.

Area programmes

Programme 6.

Area Programme North: 26 projects, PLN 1,283.5 m of total contracted budget.

Programme 7.

Regional Programme South: 32 projects, PLN 1,021.9 m of total contracted budget.

Programme 8.

Area Programme – Formal completion of investment projects: 12 projects, PLN 2,429.3 m of total contracted budget.

Programme 10.

Investor Deliveries: 14 projects, PLN 474.4 m of total contracted budget.

Key figures

- **164 projects under strategic and area programmes – 68 before contracting, 96 after contracting** as at 31 December 2019,
- **PLN 9.84 bn – total contracted budget for projects within the Network Investment Portfolio** as at 31 December 2019,
- In all the contracted projects, PSE partnered with **25 Contractors for construction and erection works, supplies and services.**

Implementation of projects

[GRI 103-1] In 2019, the company continued the implementation of projects based on a new investment implementation model which ensures transparency, flexibility, clear rules and standards, easier risk monitoring and ability to address them at an early stage, as well as more efficient supervision and cooperation with contractors.

The investment implementation model means significant benefits for PSE and its stakeholders, which include:

- For construction contractors:
  - introduction of non-price criteria in tendering procedures,
  - appropriate risk distribution (to avoid transferring all risk to contractors),
  - lending flexibility to contractual provisions and the capability to make modifications during the term of the agreement.
- For local communities and local governments:
  - transparent process of public consultations,
  - direct contact with PSE, i.e. the investor, at each project implementation stage including the easement acquisition stage.

In the course of further improvement of the project management model, network investments in progress were selected in our company at the end of 2018, representing key projects in terms of transmission system operation.

The projects require priority treatment in terms of granting outage permissions for PPS elements, allocation and priority of availability of resources, and they are subject to special monitoring, reporting and escalation of identified project risks.

Item	Project title
	PACKAGE 1
1	Construction of the Kozienice-Miłosna 400 kV line
2	Expansion of the Miłosna 400/220/110 kV substation

	PACKAGE 2
1	Construction of the Jasiniec-Grudziądz Węgrowo 400 kV line
2	Construction of the Pątnów-Jasiniec 400 kV line
3	Expansion of the Jasiniec 220/110 kV substation by adding 400 kV switchgear
4	Expansion of the Pątnów 400/220/110 kV substation together with the Kromolice - Pątnów 400kV line entry
	PACKAGE 3
1	Construction of the Gdańsk Przyjaźń-Żydowo Kierzkowo 400 kV line
2	Construction of the Żydowo Kierzkowo-Słupsk 400 kV line
3	Construction of the Żydowo Kierzkowo 400/110 kV substation including 220/110 kV transformer installation
4	Construction of the Gdańsk Przyjaźń 400/110 kV substation including the entry of one circuit of Gdańsk Błonia-Żarnowiec 400 kV line
	PACKAGE 4
1	Replacement of existing autotransformer at the Kopanina 220/110kV substation with 275 MVA units
2	Installation of a second autotransformer at the Siersza 220/110 kV substation
	PACKAGE 5
1	Construction of the Mikułowa-Czarna 400 kV line
2	Construction of the Czarna-Pasikurowice 400 kV line
3	Expansion of the Mikułowa 400/220/110 kV substation for 400kV line entry
4	Expansion of the Pasikurowice 400/110 kV substation in connection with the 400kV line entry and replacement of 400/110kV transformer
	PACKAGE 6
1	Construction of the Baczyna-Krajnik 400 kV line
2	Expansion of the Plewiska 400/220/110 kV substation in connection with the 400 kV line entry and installation of reactive compensation equipment
3	Construction of the Baczyna-Plewiska 400 kV line
4	Construction of the Baczyna 400/110 kV substation together with the Krajnik-Plewiska 400 kV line entry
5	Expansion of the Baczyna 400/110 kV substation in connection with the Baczyna-Plewiska 400 kV line entry and installation of reactive compensation devices
	OTHER PROJECTS
1	Construction of the 400 kV line including change of the EHV network configuration between Warsaw agglomeration and Siedlce
2	Construction of the Praga (Żerań) 220/110 kV substation including the Miłosna - Mory 220 kV line entry
3	Construction of the Ostrołęka-Stanisławów 400 kV line together with expansion of the Stanisławów 400 kV substation and Ostrołęka 400/220/110 kV substation including Wyszków 400(220)/110 kV substation entry
4	Suspension of the second 400 kV circuit of the Ostrów-Kromolice line
5	Construction of the Poland-Lithuania HVDC cable interconnector

Tab. Investment projects of key significance for the operation of the transmission system included in the Network Investment Portfolio

Capital expenditure incurred

[GRI 203-1] We have adopted and are implementing strategic and area programmes so as to ensure the effective achievement of strategic objectives based on sustainable development of the national transmission system. In doing so, we take into account the current conditions – especially system and formal/legal conditions of project implementation.

Formalities and legal issues related to line construction projects take 80 percent of the contract time, whereas the line construction phase itself accounts for no more than 20 percent.

Capital expenditure by Plan group (amounts)				
Description	**Expenditure (in PLN m)**			
	2019	**2018**	**2017**	**2016**
ICT		45.8	33.9	37.3
Construction and expansion of power lines and substations		1,728.3	1,250.8	1,024,3
Upgrade of substations and power lines			150.2	136.5
Buildings and structures		3.6	1.4	1.8
Purchase of finished capital goods		8.1	7.3	4.4
Investment preparation / investment proposals for conditional or later implementation		0.9	9.7	8.9
Purchase of network facilities		0.1	0.6	3.7
Provision		23.5	6.5	-
Total	**1,513.3**	**1,810.3**	**1,460.4**	**1,216.9**

Tab. Capital expenditure incurred by Plan group (amounts)

Key figures:

PLN 1,513.3 m – total capital expenditure incurred for the implementation of investment projects and proposals in 2019.

4.2.6. Maintaining the transmission network

<Ten rozdział docelowo zostanie linkowany z obszarem Infrastruktura i inwestycje w ramach modelu tworzenia wartości PSE>

We are owner of a transmission network consisting of over 14,822 km of extra-high voltage lines and 107 electrical substations. The availability of our network assets largely determines the operational security of the whole system. Being aware of this, we maintain the transmission network in a state of repair and operational setup meeting the applicable requirements.

Our network infrastructure also includes a 450 kV submarine cable line of 127 km in length. The length of the entire line connecting Poland with Sweden is 254 km.

GRI EU4 Length and number of overhead power lines	
2019	**2018**
Overhead (above-ground) **lines**	

Voltage	Length (in km) converted to 1 circuit	Number	Voltage	Length (in km) converted to 1 circuit	Number
750 kV	114 km	1	750 kV	114 km	1
400 kV	7,135 km	104	400 kV	6,826 km	102
220 kV	7,573 km	175	220 kV	7,755 km	164
110 kV	75 km	32	110 kV	75 km	34

Tab. Overhead (above-ground) lines

GRI EU4 Length and number of cable power lines					
2019			**2018**		
Cable lines					
Voltage	Length (in km) converted to 1 circuit	Number	Voltage	Length (in km) converted to 1 circuit	Number
450 kV DC	submarine 450 kV DC Poland-Sweden link with a total length of 254 km (of which 127 km belongs to PSE)	1	450 kV DC	submarine 450 kV DC Poland-Sweden link with a total length of 254 km (of which 127 km belongs to PSE)	1

Tab. Length and number of cable (underground) power transmission lines

Transformation ratio in kV/kV		**Transformers** in 2019		**Transformers** in 2018	
		Number (units)	**Capacity (MVA)**	**Number (units)**	**Capacity (MVA)**
750/400	installed	**2**	**2,502**	**2**	**2,502**
	spare inventory	**-**	**-**	**-**	**-**
400/220	installed	**32**	**17,290**	**30**	**16,790**
	spare inventory	**0**	**0**	**-**	**-**
400/110	installed	**53**	**17,108**	**52**	**16,578**
	spare inventory	**4**	**986**	**3**	**736**
220/110	installed	**121**	**20,610**	**120**	**20,450**
	spare inventory	**2**	**320**	**3**	**480**
Total	installed	**208**	**57,510**	**204**	**56,320**

	spare inventory	**6**	**1,306**	**6**	**1,216**

Tab. Number and capacity of transformers

The condition of the transmission network is confirmed by a high collective transmission equipment availability factor (DYSU) which reached 99.77 percent in 2019, with the reference value of 99.5.

Transmission equipment availability factor – DYSU (in percent)	Jan-Dec 2019	Jan-Dec 2018	Jan-Dec 2017	Jan-Dec 2016	Reference value of DYSU (internal calc.)
	[%]	[%]	[%]	[%]	
1. Category L1 transmission line availability factor [DL1]	99.93	99.97	99.77	99.64	
2. Category L2 transmission line availability factor [DL2]	99.89	99.92	99.58	99.63	
3. Generator outgoing line availability factor [DLB]	100.00	100.00	99.99	99.99	
4. Transformer availability factor for Category S11 substations [DS11]	99.31	99.85	99.85	99.85	
5. Transformer availability factor for Category S22 substations [DS22]	99.74	99.76	99.67	99.59	
DYSU	**99.77**	**99.90**	**99.77**	**99.74**	**≥ 97.5**

Tab. Transmission equipment availability factor – DYSU

The transmission equipment availability factor – DYSU – is calculated as the arithmetical average of availability factors for 5 groups of transmission equipment including groups of lines and transformers installed at our substations.

The availability of each of those equipment groups is calculated as the ratio of the actual working time of transmission equipment (in hours) during a year to the nominal number of hours in a year.

The DYSU factor is designed to monitor the readiness of transmission network elements to provide the electricity transmission service and takes into account the availability of the following 5 groups of transmission equipment:

1. Category L1 lines; includes international, radial lines and lines operating at 400 kV with peak load above 300 MW, as well as lines operating at 220 kV with peak load above 170 MW.
2. Category L2 lines; includes other lines.
3. Power plant lines LB; lines evacuating power from plants (connecting power plants with power plant substations).
4. Transformers at Category S11 substations; includes substations connected with systems of other countries, power plant substations and 400 and i 220 kV network coupling substations.
5. Transformers at Category S22 substations; includes other substations.

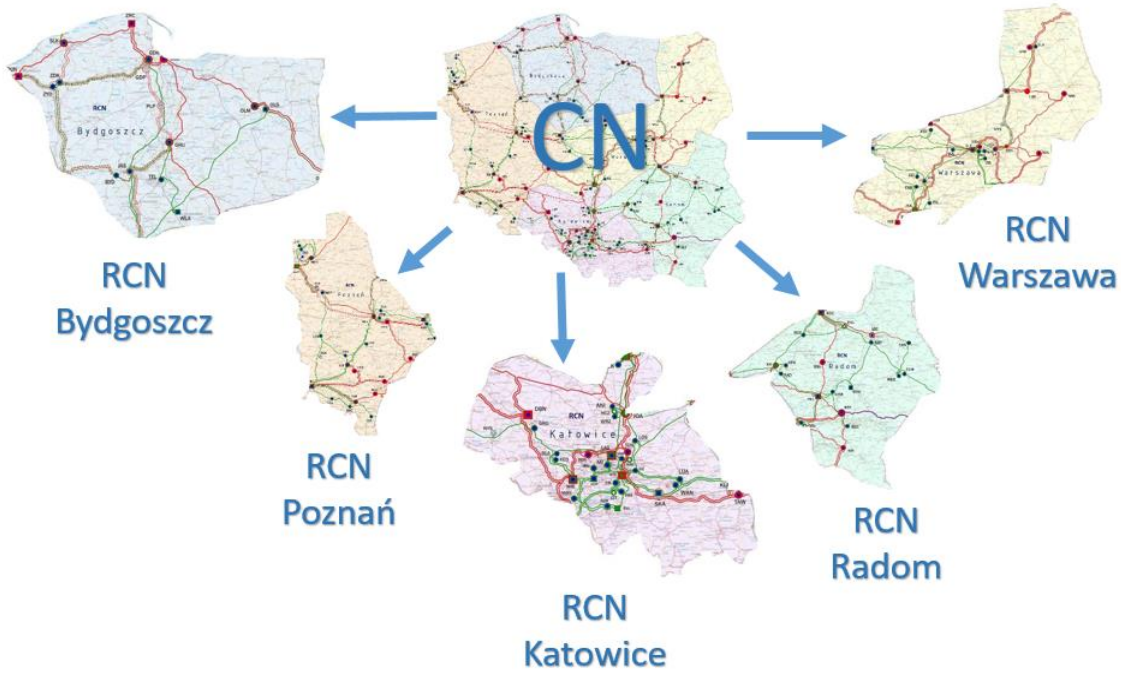
Network assets are situated on properties with a total surface area of **8,057,691.50 m²**, including those with the following legal status:

- ownership - 2,667,999 m2,

- joint ownership - 4,489 m^2,
- perpetual usufruct - 5,379,923 m^2,
- joint perpetual usufruct 4,399.5 m^2.

Supervision the operation and condition of the transmission network

[GRI 103-2] The maintenance of network assets requires permanent supervision of the operation and condition of individual elements of the transmission network. Operation supervision services were established for the purpose within the Operations Department in 2016: the Supervision Centre (*Centrum Nadzoru*, CN) in Konstancin-Jeziorna and five Regional Supervision Centres (RCN) in Warsaw, Radom, Katowice, Poznań and Bydgoszcz. The Regional Supervision Centres are functionally subordinate to the Supervision Centre and are responsible for their designated areas of PSE's network assets.



The main responsibilities of the operation supervision services include:

- Exercising ongoing supervision of the operation and condition of network assets owned by PSE (on a 24/7 basis);
- Ensuring the continuous controllability and observability of facilities, equipment and systems;
- Ensuring the availability and operational security of equipment;
- Supervision of work in progress;
- Performing switching and control operations in accordance with the operational allocation of responsibilities between the KDM/ODM dispatch services and the CN/RCN operation supervision services;
- The coordination by Regional Supervision Centres of operation instructions for substations and lines by performing the coordinator function pursuant to the provisions of the Occupational Health and Safety Manual for work on power equipment and systems;
- The planning and optimisation of maintenance and new build work on PSE network assets;
- Cooperation with units of Distribution System Operators, generators and contractors.

The CN/RCN operation supervision services play a key role in the event faults or failures occur in transmission network assets during which actions are initiated and fault elimination processes are activated on the basis of signals from SCADA systems or notifications from other entities. The services monitor the condition of transmission network equipment on an ongoing basis, defining time or quantitative constraints in their operation, affecting the operational management conditions.

Actions taken by CN/RCN services in the event of failure include:

- the analysis of causes, origin and extent of disturbance,
- organisation of incident site protection,
- taking the decision on the method of disturbance elimination,
- dispatching available resources of O&M Teams (ZES) and Specialist Engineers (I-SPEC) in order to organise the elimination of disturbance,
- supervising and coordinating disturbance elimination work.

In the event an extensive cross-zonal failure occurs (between responsibility areas of territorially competent RCNs), the individual RCNs cooperate with one another. In such a case, the Supervision Centre coordinates all activities of PSE's operation services from different areas and subcontractors commissioned by PSE.

In the interest of ensuring operational continuity, the CN/RCN operation supervision services are prepared to provide for a potential crisis situation that necessitates leaving the regular workplace, without losing the ability to perform basic tasks, primarily to exercise continuous supervision over the operation and condition of network assets. In 2018, the process of commissioning backup CN/RCN locations was completed. Since 1 January 2019, the centres have been providing full functional redundancy for the primary centres, owing to which they significantly improve the operational continuity of CN/RCN operation supervision services.

In the network assets maintenance process, the CN/RCN operation supervision services supported by O&M Teams (ZES) and Specialist Engineers (I-SPEC), who have the requisite knowledge and skills for direct work on equipment. There are 28 PSE O&M Teams established across the country. Through their work, ZES employees ensure the security of operating as well as diagnostic and maintenance activities. The competence and specialised skills of ZES employees are maintained at a high level owing to systematic technological training. Besides, owing to the maintenance personnel development programme launched, the training provided is comprehensive and systematic.

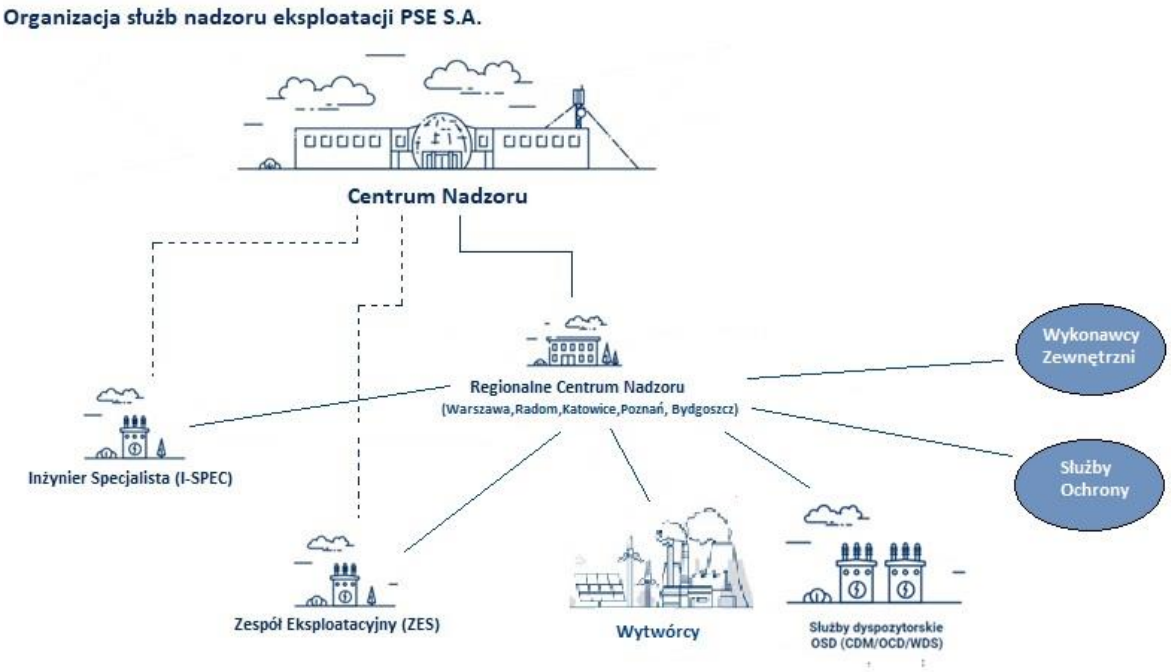


Fig. Organisation of PSE operation supervision services

Organizacja służb nadzoru eksploatacji PSE S.A.	Organisation of PSE operation supervision services
Centrum Nadzoru	Supervision Centre
Inżynier Specjalista	Specialist Engineer
Zespół Eksploatacyjny	O&M Team
Regionalne Centrum Nadzoru	Regional Supervision Centre
Wytwórcy	Generators
Służby dyspozytorskie OSD	DSO dispatch services
Wykonawcy Zewnętrzni	Third-party Contractors
Służby Ochrony	Security Services

[GRI 103-1] Of the 107 electrical substations owned by PSE as many as 73 are controlled and supervised remotely, which allows switching operations to be performed from KDM/ODM/CN/RCN superior centres, thus facilitating the operation of the PPS. Other substations are successively adjusted through upgrades to the remote control and supervision standard. In the substations in which the remote control and supervision function is restricted from superior centres; all operations are performed by substation or ZES personnel.

The O&M personnel work mentioned above allows the transmission network to be maintained in a proper operational condition, which enables dispatch services to fulfil their duties related to network operation management.

Cases of hazard to EHV transmission line operation caused by agricultural non-woven fabric

There are many external and environmental factors that pose a real hazard to the operation of EHV transmission lines, but what has become a growing problem in recent years is the non-woven fabric of various types used in agriculture/orchard growing. Due to the incorrect fastening to the ground and wind gusts, the fabric turns into a kite flying freely in the air, which, when coming into contact with an obstacle in the form of power line elements, effectively wraps around tower structures, isolators, current-carrying wires or earth wires. Strips of flying agricultural non-woven fabric are long enough to

simultaneously catch on current-carrying wires of all phases and touch the ground. This poses an obvious risk for transmission line operation and for members of the public. The identification of such a hazard necessitates the protection of the incident site by responsible services and emergency shutdown of lines (often classified as "must-run" in terms of system operation) in order to eliminate the hazard. Non-woven fabric removal work takes at least several hours, for reasons such as the need to prepare safe work zones, the use of aerial work platforms, and because the fabric is often intricately tangled with line elements. Every unscheduled line outage for such work generates high costs and involves personnel including O&M Teams, forcing them to interrupt scheduled work. In 2019 alone, 9 unscheduled lone outages caused by agricultural non-woven fabric were reported, with the number of such cases increasing year on year.

Item	EHV line route	Span or position number	Nearest locality	Commune/Town
1	L220 kV Konin-Sochaczew	289-290	Niedzieliska	Kiernozia
2	L220 kV double-circuit Kozienice-Mory, Kozienice-Piaseczno	11	Ryczywół	Kozienice
3	L400 kV Kozienice-Miłosna	39	Wola Ducka	Wiązowna
4	L220 kV Mory-Podolszyce	472	Ożarów Maz.	Ożarów Maz.
5	L220 kV Skawina-Klikowa	11	Nowe Brzesko	Nowe Brzesko
6	L400 kV Dobrzeń-Pasikurowice circuit 1	384	Smardzów	Oleśnica
7	L400 kV Pasikurowice-Ostrów Wielkopolski	34-35	Siekierowice	Dobroszyce
8	L400 kV Ołtarzew-Rogowiec	409	Marysinek	Błonie
9	L220 kV Abramowice-Puławy	127	Abramowice	Lublin

PSE inventory management

PSE inventory management for network assets is aimed to ensure that a necessary stock of equipment, devices, spare parts, subassemblies and items is kept for the correct maintenance of the company's network assets. In addition, inventory management is to enable the collection of stock for the purposes of ongoing tasks and the maintenance of the organisation's asset infrastructure.

Key figures:

- PSE's **7 main storage locations**: 2 each in Radom and Bydgoszcz and 1 in each of: Warsaw, Katowice and Poznań,
- **45 warehouses** throughout the country,
- 5 employees managing the warehouses.

Coordination of work as part of the network asset inventory management is the responsibility of the Equipment and Material Reserves Operator (hereinafter: Reserves Operator). The basic task of the unit is to maintain inventory at a sufficient level in accordance with the quantity standard set by PSE's Operations Department, specifying the minimum quantities of particular equipment types to be kept in stock in order to ensure the operational continuity of the company, e.g. in an emergency situation. In addition, inventory not subject to the quantity standard is also held in storage.

Currently, the following items are kept in storage:

- primary circuit equipment, including circuit breakers, instrument transformers, disconnectors, surge limiters, auxiliary transformers,
- secondary circuit equipment, including protection devices (distance, unit, earth fault, differential), power plant automatic voltage control (ARNE), transformer station automatic control (ARST), relays, transducers,
- HVDC components: equipment dedicated to the Słupsk DC Substation,
- line components, including EHV line supporting structures, glass and porcelain insulators, line accessories, wires, cables,
- power transformer components, including e.g. bushings and tap changers.

The withdrawal of equipment and materials from reserve stock together with the provision of required means of transport and loading is the responsibility of the Logistics Centre which operates on a 24 hour basis. Work of the Logistics Centre is performed jointly by the Reserves Operator (during the warehouse working hours) and by Radom RCN (in afternoon and night hours, on weekends and public holidays). Quick response and efficient transport may significantly reduce the time to repair major failures in the PPS.

Key figures:

- **PLN 109,184.5 k — maintenance and repair** expenditure incurred in 2019, of which the amount spent on maintenance of grid assets was **PLN 87,974.8 k**, and that spent on repair projects was **PLN 21,209.7 k.**

4.3. Strengthening innovation and implementing new technologies

[GRI 103-1]

As a company of strategi significance for the economic development of Poland, PSE cares for the stability of the operational security of the power system. The development of new technologies has a significant impact on security and therefore our company carries out many actions aimed to make an optimum use of new technologies in the power sector.

The following are of great significance for the implementation of new technologies:

- cooperation with scientific research institutes, central and local government units, foreign organisations as well as domestic and foreign energy enterprises,
- initiating, promoting and implementing new technical and organisational solutions, testing and supporting new technologies,
- leveraging domestic, European and international research programmes.

In accordance with the R&D Plan, PSE conducted 35 projects in 2019.

Item	Progress status of R&D projects	Number of projects in 2019		
		Research	Development	Total
1.	Continued projects	8	3	11
2.	New project, launched in 2019	20	4	24

	Total number of projects	**28**	**7**	**35**

Tab. Summary of progress status of R&D projects in 2019

Key projects in the field of innovation, research and technical development

- **Building the Fundamental Market Model (FMM) combining the FB/ATC MC and LMP market models, a network model and a remedial actions model for the European synchronous area**

The objective of the FMM project is to build an electricity market model simulator covering selected European countries of our region. The fundamental model of the European power system in the nodal design (i.e. at least the 220 kV and 400 kV network for a significant part of Europe) and the generating units model is detailed insofar as necessary for the resolution of the Optimal Power Flow and Unit Commitment problems. The tool will improve the quality of the PPS operation planning and management while meeting the security criteria and minimising the costs of energy supply to consumers by implementing planning tools and operational management of the PPS based on the full network model and locational marginal pricing of electricity.

- **EU-SysFlex research project co-financed under the EU programme "Horizon 2020"**

The objective of the project is to develop a catalogue of ancillary services which will allow for secure management of the power system operation with a high share of RES and a high proportion of distribute generation as well as simulation of system operation in the above-mentioned states with the use of the PPS Simulator.

Under the project, in 2019:

- a catalogue of flexibility-related market products was prepared,
- formal requirements were analysed with regard to information exchange in the power sector,
- a data exchange IT platform was developed for flexibility services management,
- work was continued on the development of the P Simulator.

The project is co-financed by the European Union under the Horizon 2020 programme. In 2019, PSE received the second tranche of funding in the amount of EUR 132,750.

- **OneNet research project co-financed under the EU programme "Horizon 2020"**

In the latter part of 2019, PSE S.A. joined a group of European companies aiming to set up a consortium for the implementation a Horizon 2020 research project titled "TSO – DSO – consumer: large-scale demonstrations of innovative grid services through demand response, storage-scale (RES) generation".

The objective of the project is to define, test and demonstrate in the power system environment the functioning of integrated, IT system-based markets and platforms which the TSO and DSOs form together for a defined set of ancillary services, where ancillary services can be purchased from system providers, aggregators and end users. An assessment of benefits for customers, including consumers participating in flexibility markets, will also be carried out under the project.

- **Demonstration project for the implementation of the PPS operation security support system based on the Special Protection Scheme (SPS) and battery electricity storage**

The objective of the project is to ensure the optimum curtailment of wind farm generation by the TSO in the event of failure of coordinated critical network elements of a coordinated network (with the use

of energy storage facilities) when high wind generation occurs. The monitoring of the SPS operation started on 1 October 2019 in order to draw experience from its operation.

The objectives of the project included confirmation of the feasibility of using hybrid battery energy storage to provide ancillary services, eliminate short-term generation fluctuations of wind farms, as well as price arbitrage.

The project is implemented in cooperation with the Japanese government agency New Energy and Industrial Technology Development Organization (NEDO).

- **Substantive support to analyses of European electricity market integration processes**

The objective of the project is to provide substantive support to PSE in developing regional methodologies required by network codes, related to the European electricity market integration process.

Analytical and visualisation tools are prepared under this project, including:

  - database and IT tools for the aggregation and visualisation of data from the Flow-Based Core testing process,
  - modules the analysis and aggregation of data on commercial flows, decomposition, cost sharing and mapping, and input files for the Wizualizator tool prepared on their basis,
  - a prototype tool for the coordination of phase shifter settings OpTap 2.0 together with the user and administrator manuals and the Wizualizator tool complete with documentation.

- **Support for the *ENTSO-E Market Design 2030* project**

The purpose of the work was to simulate and compare the functioning of the nodal and zonal market designs in Europe. Work under the project focused on quantitative analyses, calculations and acquisition of results which can be used for the description and illustration of different electricity market organisation arrangements in Europe.
Under the project, verification of the quality of simulation input data was first performed (data made available by ENTSO-E), and then calculations were made with the use of the PLEXOS program, based on internal data, models and resources available within ENTSO-E.

Two options of electricity market design were compares, i.e. the nodal market and the zonal market.

The measures taken allowed solutions and modifications to be applied as proposed by ENTSO-E. As a result of the work and calculations performed, the suitability of the nodal model was confirmed for the presentation of physical features of network flows and constraints in power systems. Proposals for new solutions are a step towards improvement of the existing zonal model.

- **Development of a model for new data acquisition from generating units for the purposes of modelling with the use of simulation tools.**

The work was aimed at the development of a new system for the collection of the parameters of generating units necessary to perform power system operational security analysis, including functions verifying their correctness on the basis of IEC/IEEE standards.

In the course of the work, new forms were developed for the acquisition of generating units' data concerning, e.g. the parameters of generators, unit transformers, voltage controllers, stabilisers, turbines and limiters. The competed work makes it possible to acquire information of appropriate quality and ensures the verification and correctness of information entered by default statement of admissible ranges for particular model parameters or relationships with other parameters.

- **Development of a standard range of voltage control tests and stabilisers of system generating units**

The work was aimed at developing a standardised method and scope of verification of generating unit parameters by means of on-site tests. Tests developed by the Institute of Power Engineering make it possible to identify parameters and structures of voltage control systems and stabilisers of generating unit systems, and enable the correctness of settings to be assessed. Parameters acquired this way and verified by tests are a basis to update the dynamic model of the PPS. The completed work makes it possible to verify parameters and structures of voltage control systems and stabilisers of generating unit systems in terms of optimisation of the control functions performed and ensuring the suppression of inter-generator and inter-system oscillations.

- **Selection and adaptation of sensors for the inspection of phase and earth conductors to existing and new-build EHV power lines.**

The purpose of the work was to define a recommendation for purchased sensors for ultrasonic detection of anomalies in the internal structure of conductors and sensors for the detection of anomalies in conductor diameter, and to define recommendations for the installation of designated sensors.

The work resulted in the identification of the MRT (Magnetic Rope Testing) diagnostic method as an effective non-destructive method is adaptable and allows further research to be conducted on the steel core discontinuity in ACSR conductors.

- **Market study in the operation areas of PSE and 50Hertz Transmission in the medium and long-term horizon**

The objective of the project was to present analyses for different market model scenarios reflecting long-term market trends – to 2025 and 2030 – as reference to the ENTSO-E TYNDP 2016, with a special focus on Poland and Germany (long-term horizon). In the medium term, the objective was to facilitate the coordination of operational processes of PSE and 50-Hertz. Special focus was focused on the coordination of the operation of phase shifters in the region (MIK/PL, HRA/CZ, ROE/DE, VIE/DE) including a cost sharing proposal.

- **Analysis of dynamic properties of Power Guardian/SmartValve devices and their interaction with the transmission network**

Ensuring uninterrupted power supply to customers requires a reliable and secure operation of the PPS, irrespective e.g. of repair work in progress. To this end, detailed analyses of the PPS operating conditions are performed, which allows potential hazards to be detected even before such danger materialises. One of the verified aspects of the PPS operation is the identification of the risk of transmission line overload in emergency states during the repair of other, neighbouring assets. Such risk is usually mitigated mainly by the appropriate selection of the topology of the PPS assets. However, in order to increase regulatory capabilities, a decision was taken to look for non-standard technical solutions for transmission line load shedding in the PPS. Innovative devices Power Guardian and SmartValve were identified as one of potential solutions. The Power Guardian and SmartValve devices can be treated as miniature single phase shifters. The devices make it possible to regulate the level of load on network assets, including load shedding, which prevents overloads on those assets. They are a novelty globally and their potential application in the PPS will be one of the first installations on the transmission network.

As part of preparatory activities, comparative analyses were performed of the dynamic properties of the Power Guardian and SmartValve devices. This facilitated the conduct of the decision-making

process, in which SmartValve was recommended for detailed simulation testing. The simulation tests performed were aimed at the identification of expected changes in the operating conditions of the transmission network after the installation of the SmartValve and focused on an analysis of dynamic states associated with normal and non-standard network operating conditions for different operating scenarios of the PPS and those devices. Multi-variant analyses made it possible to define application capabilities of SmartValve and to precisely specify the set of recommendations based on which project work can be continued, ultimately leading to the installation of the devices. Such activities are an important component of a comprehensive assessment necessary to take a business decision to use the SmartValve in the PPS.

The application of innovative SmartValve devices in the transmission network should contribute to increasing the operational security and flexibility of the PPS. The device allow, among other things, the existing capabilities to be expanded:

- control of power flows in the PPS (by reducing or increasing the load on network assets nearby the SmartValve installation site – a feature of particular significance in the situation of the increasing share of renewable energy sources being observed in the PPS);
- the determination of the fault current level in the network (by influencing the resultant impedance value of branches linking network nodes);
- local emergency load shedding of overloaded network assets (by reducing the load on such assets – a feature of particular significance in fault states during network repairs);
- network load symmetrisation (through separate control of the level of load on network assets in each phase);
- quick reduction of power swings accompanying dynamic states under non-standard PPS operation conditions (through quick control of the asset load level, opposite to the direction of swing – a particularly important feature in the situation of forecasted decreasing share of large-scale classical generating sources in the PPS).

Capital expenditure on research and development

Owing to dynamic changes in the area of technology and power systems, the need to secure certainty of power supply and to ensure the appropriate quality of electricity supplied, PSE needs close and extensive R&D cooperation with scientific and academic communities.

The cooperation consists in knowledge and experience exchange, but it also the implementation of specific R&D projects related to financial expenditure. The conduct of research, in particular the implementation of new technical solutions, involves expenditure on the upgrading of transmission infrastructure and broad-based ICT infrastructure.

Each year, our company earmarks PLN 5 to 10 million for research projects with the use of the R&D budget.

Item	Budget of R&D projects	Expenditure on R&D projects (in PLN '000s)		
		Research	Development	Total
1.	**2017**	2,390.0	3,092.6	**5,484.6**

2.	**2018**	2,565.1	6,420.0	**8,985.1**
3.	**2019**	2,279.7	8,290.2	**10,569.9**
	Total	**7,234.8**	**17,802.8**	**25,037.6**

Tab. Estimated value of research and development projects submitted for the R&D plan

Key figures

- **PLN 25 m–** total cost incurred by PSE in 2017-2019 for R&D projects, of which PLN 7.2 m for research and PLN 17.8 m for development work.

4.4. PSE as a solid business partner

4.4.1. Building business relations and partnerships

[GRI 103-1, GRI 103-2, GRI 103-3]

Legal regulations

As a contracting authority, PSE conducts contract award procedures for public and non-public supplies, services and works pursuant to the Act of 29 January 2004 – Public Procurement Law (hereinafter: "PPL Act") together with implementing measures and the PSE Contract Award Procedure (Procedure).

Conditions for participation in the procedure

Contract award from PSE can be sought by contractors who:

- have formal qualifications to conduct of a specific business or activity, where required by law,
- possess the necessary knowledge and experience,
- have at their disposal the relevant technical potential and personnel capable of performing the contract,
- be in a financial and economic condition that ensures the performance of the contract,
- are not subject to exclusion from the contract award procedure.

Contract award procedures

A detailed method of procurement is defined by the provisions of the PPL Act and the PSE Contract Award Procedure.

In order to maintain the transparency of activities related to the award of contracts, we prepare and conduct public and non-public procurement procedures in compliance with the principles of:

- fair competition,
- impartiality and objectivity,
- equal treatment of contractors,
- transparency.

We comply with the above principles in all stages of the procedure; in its preparation phase (preparing the terms of reference and appointing the tender evaluation committee) and in the course of the contract award procedure. In addition, activities related to the preparation and conduct of the contract award procedure are performed by persons who ensure impartiality and objectivity of the whole procedure.

Fair competition principle

The principle of fair competition is the foremost principle in managing tendering procedures and awarding contracts. Its application allows equal access to information on contracts and to contracts themselves of all the parties concerned. The principle concerns, among other things, the method of delivery of statements, applications, notices and information. It should also be taken into consideration at the stage of describing the conditions for participation in the procedure and when preparing the description of the object of the contract. The object of the contract must not be described in a manner that hinders fair competition. It should be described in an unambiguous and exhaustive manner, by means of sufficiently precise and comprehensible statements, taking into account all requirements and circumstances that may affect the tender preparation process.

Tendering procedures sometimes impose a minimum number of potential contractors in order to ensure compliance with the fair competition principle.

The conduct of the procedure in a manner that guarantees fair competition requires compliance with the following rules:

- admission of multiple contractors to participate in the procedure,
- specification of requirements that guarantee access to a contract only for credible contractors,
- defining terms of the contract in a manner that enables contractors to prepare a competitive tender.

The fair competition principle applies also to contractors. Submission of a tender that constitutes an act of unfair competition is a basis for the rejection of the tender.

Equality principle

According to the equality principle, also referred to as the "principle of equal treatment of parties seeking contract award", all contractors should be treated equally, based on identical criteria. The contracting authority may not apply requirements that give preference to a particular contractor. It should apply a single measure for all contractors, i.e. place the same requirements, verify compliance and enforce them in the same way.

When preparing the procedure, the contracting authority sets forth, in the terms of reference, the conditions for participation in the procedure which refer to the object of the contract (object-specific), manner of contract performance (contractual), and to the contractor (subject-specific). It should also define the method of confirming contractors' compliance with requirements. Upon receipt of tenders, in accordance with its rules, the contracting authority verifies contractors' compliance with requirements and takes contract award decisions according to the results of such evaluation.

The conduct of the procedure in a manner that guarantees equal treatment of contractors requires:

- definition of requirements in the same manner for all contractors interested in being awarded a contract,
- definition of the same method of confirming compliance with the requirements for all,
- resolving – by comparing information and documents submitted by contractors with the requirements – whether contractors meet the requirements, and taking decisions specified in the terms of the contract according to the evaluation results.

The principle applies both at the stage of putting forth conditions for participation in the procedure or during the evaluation of tenders or selection of the most advantageous tender. The equality principle means a ban on the discrimination of individual contractors on grounds of their legal status, the contractor's location or characteristics.

Transparency principle

Transparency means clear and unambiguous rules of the game. The principle of transparency is furthered by the openness of the procedure, defined as access of all interested participants of the procedure to related information on equal terms, as well as ensuring maximum impartiality and objectivism in all actions undertaken.

Contracts awarded

[GRI 102-9] Our organisation, as a socially responsible entity, cooperates with a large group of contractors and suppliers. **In 2019, we awarded 481 contracts for the implementation of investment projects, supply of goods and provision of services to 347 suppliers for the total amount of PLN 1,953,754.9 k.**

The main groups of PSE's suppliers include contractors for new build, upgrade and repair projects performing work on grid assets, suppliers of equipment and instruments, and service providers.

In 2019, PSE's counterparties (by contract value) came from:

- **97.5 percent – from Poland,**
- **2.5 percent – from EU countries,**

Our purchasing policy is pursued in compliance with the following provisions: the Act of 29 January 2004 – Public Procurement Law, together with implementing measures issued to the Act; Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors; Directive 2009/81/EC of the European Parliament and of the Council on the coordination of procedures for the award of certain works contracts, supply contracts and service contracts by contracting authorities or entities in the fields of defence and security; and Commission Interpretative Communication on the Community law applicable to contract awards not or not fully subject to the provisions of the Public Procurement Directives (2006/C 179/02).

All activities carried out by contractors are performed as PSE activities and affect our organisation's image as an investor. For this reason, it is particularly important to maintain high standards and coherent guidelines on the cooperation of contractors with local communities which we take care of every day.

Key figures

Completed contract award procedures	**2019***	**2018****	**2017**
Number of contracts	**481**	**448**	**427**
Value of contracts	**PLN 1,953,755 k**	**PLN 2,320,040 k**	**PLN 1,666,464 k**

* In 2019, contracts were signed for much lower values in terms of investment (construction works) than in 2018 (PLN 671 m less) and for a lower value in terms of transmission (decrease by PLN 111 m compared to the previous year). By comparison, the value of supply contracts at CJI increased by almost 100 percent to PLN 94 m.

** In 2018, contracts were signed for must higher values in terms of investment (construction works) than in 2017 (PLN 432 m growth) and for a higher value in terms of transmission, with a year-on-year growth of PLN 273 m. This shows that the result of contracts concluded in a particular year is mainly determined by investments and transmission agreements.

Impact indicator Number of contractors, subcontractors and suppliers with whom relationship continued for several years (2015-2019)	
Period of relationship	**Number of contractors**
1 year	**733**
2 years	**193**
3 years	**73**
4 years	**38**
5 years	**26**

Tab. Number of contractors, subcontractors and suppliers with whom relationship continued for several years (2015-2019)

4.4.2 Requirements and standards of relationship with contractors and subcontractors

[GRI 103-1, GRI 103-2] The performance of investment projects involving the construction, expansion and upgrading of network assets is the responsibility of a specialised unit established within our organisation, performing tasks within the framework of the project structure called Central Investment Unit (CJI). It is responsible for the management of investment projects throughout the project life – from the moment the project is included in the Investment Portfolio, through the contract award procedure, to its completion. The CJI purchasing processes are the responsibility of the Public and Non-public Procurement Division (WZ).

The PD plays a leading role in managing and awarding contracts for CIU projects. It also provides advisory and supporting functions to internal customers in all issues related to the management of both non-public and public procurement procedures.

Technical dialogue

In order to acquire extensive knowledge and to monitor technical solutions appearing in the market, in justified cases the CIU conducts technical dialogues with potential contractors. The technical dialogue (as distinguished from the competitive dialogue) is not a separate procedure, but it is a stage in preparing the contract award procedure.

The benefits arising from the technical dialogue are as follows:

- expanding competition by identifying barriers which could restrict contractors' access to public contracts,
- defining the best and latest technical, organisational and economic solutions in the field relevant to the object of the contract,
- innovation promotion through the public procurement system, supporting environmentally sustainable, modern and technologically advanced solutions,

- confronting the contracting authority's needs with the ability of entities providing specific supplies, services or works in the particular market to satisfy those needs,
- preparedness to the performance of the contract, in particular with regard to the detailed definition of its subject-matter, and consequently also ensuring purposeful, rational and economical disbursement of funds,
- identification of the factors determining the technical quality or economic value of a public contract; definition of optimal criteria for the evaluation of bids for the object of the contract required by the contracting authority, and the most suitable legal arrangements relating to the prospective future public procurement agreement to which the technical dialogue applies,
- detailed identification of the costs of public contract award, definition of possible contract risks, their optimal distribution between the contracting parties and an analysis of possible ways of mitigating them.

Competitive dialogue

In order to refine the needs and requirements under the investment projects pursued, the CIU has adopted the competitive dialogue procedure. The competitive dialogue is a contract award procedure in which, after the contract notice, contracting authority conducts a dialogue with selected contractors, and then invites them to submit bids.

The competitive dialogue is a procedure applicable mainly in a situation where procuring entities are able to define their needs and requirements, but are unable to specify how they should be satisfied, and additionally are not able to assess what technical, financial or legal solutions the market can offer them in this regard.

The competitive dialogue can also be useful in the case of works involving the construction of non-standard buildings or in situations where works include design work or innovative solutions and services or supplies which require adaptation or design work.

Standardisation of the conditions for participation

In order to optimise and standardise, as far as possible, procurement documentation and to increase the contractor market, the Procurement Department prepares standard terms and conditions for participation in investment procedures which, on the one hand, do not constrain the market of potential contractors and, on the other hand, will ensure the secure implementation of investment projects.

Defined this way, the conditions for participation in the procedure will make it possible to prepare procurement documentation faster and more efficiently, and to eliminate significant differences between different contract award procedures.

Standardisation and repeatability of the conditions for participation in the procedure significantly increases the probability of the contracting authority selecting contractors who will guarantee the correct performance (i.e. in accordance with the contracting authority's expectations) of the object of the contract. It is the contracting authority's obligation to ensure that the participant eligibility conditions make it possible to select a contractor who gives assurance of the proper performance of the contract, without breaching the principles of equal treatment of contractors and fair competition.

Additional arrangements

The CIU has introduced additional solutions aimed to guarantee the security of project implementation and cooperation with contractors by applying non-price criteria for the evaluation of bids, making it possible to select the most advantageous instead of the cheapest bid.

1. The criteria applied include the organisation, professional qualifications and experience of the individuals appointed by the contractor to perform the contract if these characteristics significantly affect the quality of the contract performed. The CIU evaluates the qualifications and experience e.g. of the site manager, designers, etc.

   The ability to perform a contract may largely depend on the professional value of persons obliged to perform it, and the value also takes into account the professional experience and education of those persons. Thus if a contract is to be performed by a crew, the competence and experience of its members determine the evaluation of capability.

2. Within the framework of non-public procurement procedures conducted in accordance with the PSE Contract Award Procedure it is possible to apply a non-price criterion – the BVP (Best Value Procurement) methodology.

   In procedures conducted with the use of the BVP model, the contracting authority evaluates bids in accordance with non-price criteria concerning:

   - the contractor's effectiveness based on the experience of its personnel defined as organisation, professional qualifications and experience of the persons designated to perform the contract concerned – owing to the fact that personnel characteristics have a significant impact on contract performance quality, and consequently on the economic value of the bid.
   - a description of identified project risks prepared by contractors and a plan for mitigating them,
   - description of the opportunities and value added which the contractor can provide to the contracting authority,
   - a meeting with the contractor, which allows the motivation of the project team to be evaluated, as well as their knowledge of the project, the ability to assess and manage risks related to the project and the value added they can provide.

Each of the above criteria is assigned a weighting and each of them is described on a point-based scale, which makes it easier to arrive at the total score for each contractor. The criteria must be connected with the object of the contract, mainly described in an objective, non-discriminatory and verifiable manner – so that the contracting authority does not have unlimited freedom of their interpretation and evaluation, which would distort the transparency of the process.

CHAPTER V: ENVIRONMENTAL IMPACT

Key messages

PSE endeavours to reconcile the reliable and efficient operation of the power system with its development whilst respecting the natural environment.

Our every power project meets the legal requirements for the impact of extra-high voltage infrastructure on the environment.

Polish safety standards for electric and magnetic field impact for areas intended for housing and locations accessible to the public are among the most restrictive in the world.

V. ENVIRONMENTAL IMPACT AND CLIMATE CARE

5.1 Integrated environmental, health and safety management system

[GRI 102-11, GRI 103-2] The directions of our company's activity in the field of environmental protection are determined by the Integrated Environmental, Health and Safety Management System Policy. The effective implementation of the integrated system was confirmed by a relevant certificate issued for the period from 13 July 2020 to 23 July 2021 (update of the certificate of 18 July 2018 related to the adoption of the PN-ISO 45001 standard for OHS).

[GRI 103-1] By maintaining the integrated management system, PSE voluntarily declares that it will reconcile the reliable and efficient operation of the power system with its development whilst respecting the natural environment and public interest. To achieve the above objectives, our organisation has committed itself to:

- preventing environmental pollution,
- continuously seeking to improve environmental protection through measures including the identification of hazards and risk management,
- monitoring the working environment for environmental safety,
- complying with the requirements of laws and other requirements applicable to the company,
- improving employees' skills, empowering their roles and engaging them in activities promoting the environmental health,
- developing and upgrading the network infrastructure in such a manner as to ensure the preservation of landscape, protected areas and areas of particular natural value.

A review of areas of potential impact of the company on nature, carried out in 2019, confirmed that environmental aspects had been identified correctly.

Significant environmental aspects:

- **electromagnetic field emissions,**
- **noise emissions,**
- **sewage and stormwater discharge into the ground and into waters (in emergency situations),**
- **generation of waste,**
- **hazardous substance spill (in an emergency situation).**

The main activities carried out in the environmental area in 2019 included an audit of oil separation systems at electrical substations, testing the protective properties of water-soluble varnishing systems

for anti-corrosion protection of supporting structures, and an analysis of available technical solutions which allow the use of SF_6 gas to be discontinued in PSE equipment. All activities in the environmental area were carried out as planned.

[GRI 307-1] In 2019, as in previous years, no fines were imposed on PSE for non-compliance with laws and regulations on environmental protection.

GRI 307-1 Monetary value of fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations	Value	
	2019	2018
Total monetary value of fines for non-compliance with environmental laws and regulations	0	0
Number of non-monetary, administrative and court sanctions imposed on the organisation for non-compliance with environmental protection laws and regulations, including:	0	0
– international declarations/conventions/treaties as well as national, regional, and local regulations	0	0
– voluntary environmental agreements with regulatory bodies that are considered binding and developed as a substitute for implementing new regulation	0	0
Cases brought against the organisation by dispute resolution bodies supervised by government authorities	0	0

5.2 PSE's priorities concerning environmental protection

Environmental aspects

[GRI 103-2] For identified significant environmental aspects, our company has defined the internal rules of procedure and supervision, aimed to ensure compliance with all legal requirements and the best possible conservation of natural resources.

- **Electromagnetic field emissions**

We pursue a number of activities which further the achievement of the following objectives:

- meeting the permitted electromagnetic field levels in the environment outside the line right of way, as required by law,
- selecting locations for new projects that make it possible to limit the construction of power facilities in residential development areas,
- maintaining systems and equipment in good working order,
- advanced technological solutions for equipment and systems.

- **Noise emissions**

We perform tasks that contribute to meeting the permissible noise levels in the environment as required by law. This is achieved through measures relating to:

- selecting network infrastructure locations that make it possible to limit the construction of power facilities in residential development areas,
- quality control of the work performed,
- maintaining systems and equipment in good working order.

- **Sewage discharge into the ground and waters**

As a result of our activities, sanitary sewage is generated which is discharged into the combined sewer system, septic tanks or, after treatment in a biological sewage treatment plant, into the ground or into waters. There are biological sewage treatment plants on the sites of network facilities, using various treatment methods, including active sludge and sprinkling bed.

After treatment, the sewage meets the requirements of law and water management permits. Sewage treatment facilities are designed and built in accordance with the applicable standards, laws and regulations, and, in order to ensure correct operation, they undergo periodic maintenance and inspections. The quality of the sewage released into the environment is also subject to periodic control.

GRI 306-1 **Total sewage volume* by treatment method and destination**		**Volume (m^3)**	
		2019**	**2018****
Sewage treated in the company's own biological sewage treatment plants	Sewage discharged into surface waters, including lakes and rivers	**399.00**	**886.00**
	Discharged into the ground	**1.886.49**	**1,084.33**
Carried off to municipal plants		**25,991.20**	**31,109.35**
Total sewage volume		**28,276.69**	**33,079.68**

*The indicator refers to sewage discharged from substation facilities and PSE headquarters and field locations. Not applicable to precipitation water.

**In 2018-2019, in the quantity of sewage carried off to municipal utilities included also liquid waste collected from septic tanks. Sewage parameters are monitored by the recipient.

We strive to minimise water consumption

We do not carry on any production activity and therefore water consumption at our headquarters and at the substations is small. Nevertheless, we monitor water consumption under the Environmental Management System. Water is supplied to substation facilities from our own deep wells and from municipal water mains.

Wells are a source of supply to our 13 extra-high voltage substations. At the substation facilities, water is used for personal purposes of the substation personnel and for firefighting purposes.

At the substations with transformer units equipped with fire extinguishing systems, a small quantity of reservoir water is consumed for sprinkler system tests which are performed once a year. The measurement of consumer water quantity is based on the main water meter readings.

At our headquarters in Konstancin-Jeziorna, we use our own water intake. We have two deep wells. Water supplied to PSE field units comes from municipal mains.

GRI 303-1 Water withdrawal by source	Quantity (m^3)	
	2019	2018
• Groundwater (own intakes)	**14,744.45**	**17,368.65**
• Water supply from municipal mains or from other external sources	**19,047.20**	**21,026.98**
Total water volume withdrawn from the above sources	**33,791.65**	**38,395.63**

Source: Own compilation based on water meter readings at the sites with their own water intakes and on water supply invoices for the facilities using water mains.

- **Waste generation**

For many years, we have performed selective collection of waste generated by the activities carried out at the site of grid assets and on the premises of PSE and its field locations. In order to standardise the rules of handing waste in our company, the "Instructions for waste management at PSE S.A." have been prepared which apply both to waste generated by PSE and by third parties in the course of operation, maintenance, failure recovery, and new build and repair projects. One of the appendices to the Instructions is dedicated in whole to the rules of correct sorting of municipal waste generated by human living activities.

PSE's office buildings and all electrical substations have been equipped with containers for selective collection of waste (including paper, plastics, glass, metals, spent life sources, batteries and contaminated absorbent). Most waste is collected at the place of generation. The rooms, areas and containers in which the different waste types are collected are duly marked.

Correct sorting of waste is also checked during inspections carried out on the sites of facilities. Presentation of the rules and obligations concerning waste sorting is one of the permanent training topics for the company's newly hired employees.

Typical hazardous waste generated at our substations include e.g. spent mineral oils, batteries and absorbents. The greatest amount of waste is produced during work related to the implementation of upgrade investment projects, in particular the upgrading and construction of power facilities. The generators of waste are contractors responsible for the management of the waste. In the case of waste with a value the waste producer is PSE.

To ensure that contractors' waste management activities comply with the applicable regulations, permanent supervision is maintained on the site of operating facilities and during the execution of investment projects.

Total weight of waste by type and disposal method (in Mg)**	**2019**	**2018**
Hazardous waste, including:	**673.14**	**331.93**
- stored on the premises	**19.09**	**15.50**
- handed over to authorised entities	**654.05**	**316.43**
Non-hazardous waste, including:	**1,108.43**	**86.43**

- stored on the premises	**1.15**	**0.36**
- handed over to authorised entities	**1,107.28**	**86.07**

*The indicator refers to substation facilities and PSE headquarters and field locations.

** No information is available to us on the further disposal of waste owing to a lack of specified handling procedures for waste taken over by their recipients – the waste disposal company. The data have been prepared on the basis of Waste Record Sheets.

- **Hazardous substance spill**

We engage in activities aimed to:

→ curtail the risk of emergency situation through preventive measures and the correct maintenance of facilities,

→ maintain readiness to mitigate the environmental impact of failures caused by infrastructure owned by the company.

GRI 306-3 Total number and volume of significant spills*	Value in 2019	Number of spills	Value in 2018	Number of spills
Number of spills and weight of oil-contaminated soil	**19.7 Mg**	**3**	**99.20 Mg**	**3**
SF_6 gas spills	**50.1 kg**	**44**	**69.25 kg**	**15**
Coolant spills	**142.68 kg**	**37**	**80.40 kg**	**10**

*"Significant spill" – with reference to our activities, means a spill resulting in environmental pollution

The volume of SF_6 gas which was emitted into the environment in 2019 was 28 percent smaller than a year before. In the case of insulating oil spills, an 80 percent decrease in the mass of oil-contaminated earth was reported compared with 2018.

Devices containing a significant quantity of insulating oil – transformers – are equipped with appropriate protection features, i.e. oil trays, which are designed to contain an emergency oil discharge in the event of an uncontrolled spill.
In 2019, no significant spill of insulating oil having a negative environmental impact was recorded.

GRI 306-3 Total number and volume of significant spills* in 2019					
Item	Calculation of SF_6 emissions from electrical power equipment				
	Network services field area	Substation	Number	Quantity (in kg)	CO_2 equivalent (in t)
1	Warsaw	Mory ES	1	0.4	9.12
		Ołtarzew ES	1	0.45	10.26
		Piotrków ES	2	13.2	300.96
		TOTAL	**4**	**14.05**	**320.34**
2	Radom	Abramowice ES	3	2.05	46.74
		Chmielów ES	3	4.85	110.58
		Kozienice ES	6	6.55	149.34

		Krosno Iskrzynia ES	1	1	22.8
		Radkowice ES	1	0.15	3.42
		TOTAL	**14**	**14.6**	**332.88**
3	**Katowice**	Bujaków ES	1	0.55	12.54
		Byczyna ES	3	4.65	106.02
		Joachimów ES	1	1	22.8
		Wielopole ES	9	9.65	220.02
		TOTAL	**14**	**15.85**	**361.38**
4	**Bydgoszcz**	Grudziądz Węgrowo ES	1	0.5	11.4
		Jasiniec ES	2	0.5	11.4
		Olsztyn Mątki ES	2	0.85	19.38
		Żydowo ES	3	0.5	11.4
		TOTAL	**8**	**2.35**	**53.58**
5	**Poznań**	Krajnik ES	1	0.95	21.66
		Mikulowa ES	1	0.7	15.96
		Morzyczyn ES	1	1.1	25.08
		Polkowice ES	1	0.5	11.4
		TOTAL	**4**	**3.25**	**74.1**
Total spills		TOTAL	**44**	**50.1**	**1,142.28**

*"Significant spill" – with reference to our activities, means a spill resulting in environmental pollution

Source: Own compilation based on the company's internal records and environmental reports.

GRI 306-3 Number and volume of spills in 2019						
Coolant spill				Calculation of hydrofluorocarbons		
Site locations	Electrical substation	Substance name	Number	Quantity (in kg)	CO_2 equivalent [t]	GWP calculated in accordance with Regulation (EU) 517/2014
Warsaw	Mory ES	R410A	1	1.5	3.13	2,088
	Mościska ES	R410A	1	1.5	3.13	2,088
	Narew ES	R407C	2	2	3.55	1,774
	Stanisławów ES	R407C	1	5	8.87	1,774
Konstancin-Jeziorna	Konstancin Jez. Headquarters	R134a	1	23	32.89	1,430
	TOTAL		**6**	**33**	**51.57**	**-**
Radom	Chmielów ES	R407C	1	1.5	2.66	1,774
	Kielce Piaski ES	R410A	1	0.8	1.67	2,088
	Kozienice ES	R410A	2	1.6	3.34	2,088
	TOTAL		**4**	**3.9**	**7.67**	**-**
Katowice	Byczyna ES	R407C	2	14	24.84	1,774

	Byczyna ES	R410A	1	1	2.09	2,088
	Klikowa ES	R407C	1	8	14.19	1,774
	Lubocza ES	R410A	3	11.85	24.74	2,088
	Łośnice ES	R407C	1	5	8.87	1,774
	Siersza ES	R410A	1	4.3	8.98	2,088
	Skawina ES	R410A	5	4.9	10.23	2,088
	Wanda ES	R407C	1	2	3.54	1,774
	Katowice Office	R407C	2	2.9	5.15	1,774
	Katowice Office	R410A	1	4.3	8.98	2,088
	TOTAL		**18**	**58.25**	**111.61**	**-**
Bydgoszcz	Bydgoszcz Office	R410A	1	12.8	26.73	2,088
	TOTAL		**1**	**12.8**	**26.73**	**-**
Poznań	Cieplice ES	R410A	1	5.3	11.07	2,088
	Pasikurowice ES	R410A	2	5.8	12.11	2,088
	Piła Krzewina ES	R410A	2	4.13	8.62	2,088
	Poznań Office	R422D	2	18	49.12	2,729
	Poznań Office	R407C	1	1.5	2.66	1,774
	TOTAL		**8**	**34.73**	**83.58**	**-**
TOTAL			**37**	**142.68**	**281.16**	**-**

GRI 306-3 Number of insulating oil spills and weight of oil-contaminated soil in 2019			
Location and type of significant spills		**Number of events**	**Quantity of replaced earth**
1	Siersza ES – AT1 failure	**1**	**1.5**
2	Żarnowiec ES – instrument transformer failure	**1**	**4.2**
3	Żarnowiec ES – AT2 failure	**1**	**14**
Total		**3**	**19.7**

Readiness and responding in environmental emergency situations (e.g. hydrocarbon spillage)

Equipment operated at PSE's substation sites contain substances which may cause contamination when released into the environment. Such substances include mainly:

- insulating oil (transformers, oil circuit breakers, instrument transformers, shunt reactors, circuit breakers, capacitors),

- diesel oil (power generating sets),
- acids (battery electrolytes).

Due to the risk of equipment failure and related risk of spill of the above-mentioned substances, we endeavour to reduce their negative environmental impact as much as possible. For this purpose, we have developed two documents:

- "Operational instructions for handling failures at an electrical substation of PSE S.A. posing the risk of environmental pollution with insulation oil".

- "Operational instructions for handling hazardous substance spillage" (which also applies to PSE field locations). Moreover, each facility is equipped with the so-called environmental first aid kits – portable sets of absorbents for the collection of small spills to prevent spillage from spreading.

5.3 PSE approach to biodiversity protection

[GRI 304-2] We are actively working towards preservation of biodiversity in areas where we undertake transmission system development projects. PSE's projects are conducted in such a way as to minimise interference with the environment.

By implementing in 2012 the Environmental Management System compliant with the ISO 14001 standard, we have committed to comply with legal regulations and to follow good environmental practices. We have also imposed this commitment on the contractors and subcontractors for our investment projects. We jointly endeavour to ensure that each stage of the project implementation process is characterised by care for the environment: from planning, to its operation, taking into account the whole range of aspects, such as remedial measures related to protection against soil and groundwater pollution, limiting losses in habitats and species, and emergency management, minimising noise emissions and proper waste management.

We deliver investment projects in a manner that allows key threats to nature to be minimised and the risk of biodiversity loss to be avoided. As early as the line route and substation location planning stage, we take care to ensure that infrastructure interferes as little as possible with areas of high natural value. In successive stages of project implementation, we analyse technical and technological options for minimising impacts related to the implementation and subsequent operation of network facilities. In the case of completed projects for which the environmental monitoring obligation has been prescribed in environmental decisions, we focus on performing such monitoring and analysing the results obtained. This allows us to assess whether the measures we take are effective, and thus whether we have managed to minimise impact on the natural environment. Thanks to this, in the next few years, we will be able to assess, e.g., which of the diverters used on ground wires designed to warn birds against collision with EHV lines prove the best.

Unavoidable consequences of PSE project implementation include a loss of a part of habitats due to tree removal in the impact zone, especially in forest areas. Owing to the use of over-forest or forest towers, we can significantly reduce the removal of trees (a "forest" tower is a pylon which, together with V-shaped insulator strings, allows wires to be suspended closer to the pylon structure, and thus to reduce the line width, whereas an "over-forest" tower allows wires to be suspended above tree canopies).

Both at the project implementation and operation stage, we endeavour to carry out tree clearance work in the line right of way in such a manner as to limit its impact, outside the breeding season and under naturalists' supervision. In consequence of EHV line construction, certain habitats are lost as a result of conversion of the land in which they occurred, but new habitats appear in their place, inhabited by other plant and animal species. Due to the removal of undergrowth under an EHV line, there are more plants typical of open areas and the quantity of insects on which birds feed increases.

As we try to run lines so as to minimise interference with areas inhabited by valuable and rare species, the need for nature compensation arises extremely rarely. Damage to stations of widely occurring species, which does not have a significant impact on population survival, does not require nature compensation (according to Article 75 of the Environmental Law) related to its regeneration.

Name of investment project	**Monitoring costs incurred in 2019**
Construction of the Bydgoszcz Zachód – Piła Krzewina 400 kV line	PLN 175,000,00
Construction of the Kozienice – Siedlce Ujrzanów 400 kV line	PLN 48,000,00
Construction of the Gdańsk Przyjaźń – Żydowo Kierzkowo 400 kV line	PLN 14,000,00
Construction of the Olsztyn Mątki – Ostrołęka 400 kV line	PLN 220.000,00
Construction of the Jasiniec – Grudziądz Węgrowo 400 kV line	PLN 92.780,00
Construction of the Czarna – Polkowice 400 kV line	PLN 5,916.65
Construction of the 400 kV line including change of the EHV network configuration between Warsaw agglomeration and Siedlce	PLN 58.000,00
Construction of the 400 kV line from Dobrzeń to the Pasikurowice – Wrocław line tap	PLN 5,500.00

Tab. Example costs of environmental monitoring for PSE infrastructural projects incurred in 2019

Examples of the nature compensation measures taken by PSE in connection with the destruction of habitats as a result of the construction and maintenance of network infrastructure and the status of their preservation in the years after the facilities were put into operation

5.4.1. Nature compensation in connection with line or substation construction

At both the construction and operation stages, negative impacts on plant and animal habitats can be observed, which can lead to reduced biodiversity.

In order to minimise the project impact on protected species, the implementation of investment projects is preceded, where required, by the procedure leading to the decision on environmental conditions, in accordance with the applicable laws and regulations. Decisions obtained by PSE confirm that the proposed investment projects comply with the requirements of applicable laws and regulations so as to minimise their environmental impact. In the case of projects for which the environmental impact assessment report is required, a comprehensive nature survey is carried out, covering the entire vegetation cycle. This makes it possible to determine whether a new project can affect plant, fungi and animal species occurring in a given area. The documentation also takes into account the impact of projects on people and other environmental components. Nature compensation can also be conducted in the case where interference with protected areas or habitats of protected species is unavoidable; ban exemption decisions are then obtained, i.e. derogation decisions under

which protected species are caught, transferred or destroyed in the project implementation process , and where possible, their habitats are restored. Compensation measures are aimed to restore natural balance in the area concerned and to compensate for environmental damage.

Examples of compensation measures

Expansion of the Byczyna Substation

In the course of the Byczyna substation expansion and upgrade project (including the 400 kV line exit in Jaworzno), it was necessary to destroy a stretch of meadow forming part of the Natura 2000 habitat – Molinia meadows (*Molinion*). There were 3 protected species in the destroyed area: the broad-leaved marsh orchid *Dactylorhiza majalis L*), Turkish marsh gladiolus (*Gladiolus imbricatus L.*), and Siberian iris (*Iris sibirica L.*).

In 2015, protected species were transplanted and pursuant to Decision WPN.6400.33.2014.MS.5 of 12 May 2015 mowing is performed at the species transfer locations. Mowing is carried out in a biannual cycle (2016, 2018, 2020...) always after 20 August in order to enable seeds to germinate and to sow valuable plant species. Pursuant to Decision WOOŚ-4242.108.2015.IŁ of 11 March 2016, once a year mowing is carried out on the remaining plots in the Byczyna Substation area with an area of approx. 3 ha with Molinia meadows. The above work is performed in order to preserve in in the long term the meadow habitat which is a natural site for the butterfly species: the dusky large blue (*Phengaris nausithous*) and the scarce large blue (*Phengaris teleius*), as the sites are at risk due to disuse and natural succession.

Construction of the Bydgoszcz Zachód-Piła Krzewina power line

During the construction of the Bydgoszcz Zachód-Piła Krzewina power line, pursuant to Environmental Decision WOO.4202.1.2014.KŚ.118 of 29 July 2016, early marsh-orchid (*Dactylorhiza incarnata*) specimens situated in the vicinity of Tower 185 were transplanted within the same habitat – lowland extensively used fresh meadows (*Arrhenatherion elatioris)*. The transplantation was performed in 2019 under nature conservation supervision. The plant was excavated with a sufficient excess root clump and manually transferred to a location meeting its habitat criteria.

Item	GRI EU 13 Biodiversity of nature compensation compared to the biodiversity of affected areas Biodiversity of compensatory habitats in terms of:			Period of biodiversity monitoring and reporting in distanced locations
	Habitat area (km^2)	Main protected species	Habitat description (e.g. wetlands, grasslands, forests etc.)	
1	0.59	No protected species. Plantings were made with the following species: Scots pine, silver birch, Norway spruce, black alder, English oak, larch, lime and hornbeam	agricultural and forest lands	2019

2	3.2	Dusky large blue (*Phengaris nausithous*), Scarce large blue (*Phengaris teleius*), Broad-leaved marsh orchid *Dactylorhiza majalis L*), Turkish Marsh Gladiolus (*Gladiolus imbricatus L.*), Siberian Iris (*Iris sibirica L.*) .	Molinia meadows	2019

Protection of the osprey

In 2019, PSE, together with the National Forest Holding, started another stage of measures for the protection of the osprey. 5 special platforms were installed on which birds can build their nests.

Osprey is one of the rarest birds of prey in Poland. According to statistics kept by the Eagle Protection Committee, there are only 25 to 30 pairs of those animals living in Poland today, and some of them inhabit areas in the vicinity of electric power infrastructure.

The installation of platforms for ospreys on power towers is a good and proven practice complementary to tree-mounted platforms. It is used e.g. in Germany, where approx. one third of the osprey population nest on high-voltage towers. Nests protected this way are more likely to be inhabited by birds

The construction of platforms for osprey brooding nests is a continuation of activities initiated by PSE in 2014. In the Lipka Forest District, our company's employees mounted a platform on an extra-high voltage line tower, on which ospreys living in the neighbourhood could build a nest.

New brooding nest platforms, installed in 2019, were mounted in Gryfino and Międzychód Forest Districts in Zachodniopomorskie, Wielkopolskie and Lubuskie voivodeships. They are all installed along the internal and cross-border extra-high voltage overhead lines:

- 400 kV Krajnik- Vierraden;
- 220 kV Krajnik- Plewiska;
- 220 kV Krajnik- Glinki.

5.4 Energy efficiency

At PSE, measures are taken on a regular basis, aimed at increasing the efficiency of energy use. They include increasing energy efficiency in our operating activities as well as in the area of property maintenance and pursuit of campaigns promoting the environmental awareness of our employees.

In accordance with the provisions of the Energy Efficiency Act, in 2019 activities were continued for the purposes of energy audit at the headquarters of our company in Konstancin-Jeziorna and at PSE field locations.

In September 2018, the audit was conducted by an external firm and its results included the specification of upgrade measures as well as outlining other measures aimed at increasing energy efficiency. Some of the audit recommendations are implemented on a current basis while other ones are at the planning stage.

In 2019, an external air cooling system for water chillers was commissioned at the PSE headquarters.

The following activities are successively carried out at PSE:

- replacement of light fixtures for LED units,
- installation of motion sensors in toilets,
- upgrade of the building services and lighting control method, etc.

All those activities gradually contribute to improving energy efficiency of the entire PSE organisation.

The audit also resulted in the assessment of a project planned by PSE, involving the replacement of seven 220/110 kV 160 MVA autotransformers for new transformer units to improve energy efficiency in terms of energy, ecological and economic effects achieved.

According to the audit report, as a result of the replacement of seven 220/110kV autotransformers, the total losses should be reduced by 3,336,770.615 kWh of final energy, i.e. 8,341,926.537 kWh of primary energy and the CO_2 emissions will be reduced by 2,702.784 tonnes/year. In percentage terms, the reduction of losses and reduction of CO_2 emissions will amount to 46.1%. The autotransformers are scheduled for delivery in 2020-2024.

302-1 Total energy consumption in the organisation	**2019**		**2018**	
	MWh	GJ	MWh	GJ
Total consumption of fuels from non-renewable sources at Konstancin-Jeziorna and PSE field locations:		34,059		35,446
• Petrol		14,716		15,536
• Diesel oil		11,937		11,730
• Natural gas		7,406		8,180
Total heat consumption		13,115		13,713
Total electricity consumption at Konstancin-Jeziorna and at PSE field locations.	10,889	39,201	13,169	47,408
Total energy consumption (total fuel consumption + total heat consumption + total electricity consumption at Konstancin-Jeziorna and PSE field locations)		**86,375**		**96,567**
Electric energy losses in the transmission process	1,476,221	**1,235,516**	1,611,270	**5,800,572**
Total electricity sales	1,842	**6,631**	2,413	**8,687**

5.5 Carbon footprint

PSE implements the strategy of sustainable development, which supports the achievement of business objectives and contributes to the achievement of the UN's ambitious Sustainable Development Goals, including Goal No 13 for climate-related measures.

PSE's activities contribute to the stable operation of the power system in Poland, and thus to some extent we influence the volume of greenhouse gas emissions. Like any organisation, our company also affects the climate through greenhouse gas emissions resulting from the combustion of fuels and the

use of electricity or heat. In order to measure the impact of PSE's activities on climate, we continue calculating our carbon footprint in line with our assumption, and we have included it as a permanent feature of the Impact Report. Carbon footprint is becoming one of the indicators taken into account in assessing the activities of our organisation and used in managing our company.

PSE carbon footprint calculations have been performed in accordance with the international GHG Protocol Corporate Accounting and Reporting Standard. Our base year – i.e. the year for which we have calculated greenhouse gas emissions, against which we will compare emissions in the coming years – is 2017.

We have performed calculations for:

- **business conducted by the entire organisation, that is by the headquarters in Konstancin-Jeziorna and PSE field locations in Bydgoszcz, Katowice, Poznań, Radom i Warsaw,**
- **execution of the transmission system operator's tasks specified in applicable regulations.**

The total amount of emissions generated by PSE in 2019 was 952,663 m tonnes of CO_2 equivalent (according to the market-based method*).

Almost 96 percent of greenhouse gas emissions at PSE is attributable to the consumption of electricity to cover transmission losses, i.e. resulting from our activities as transmission system operator.

The remaining 4 percent represents mainly the consumption of electricity for technical purposes by electrical substations, electricity and heat consumption in our buildings, emissions of SF_6 – the gas used as insulation in substation equipment, and fuel combustion by company vehicles.

Mainly owing to the reduction of electric energy losses in transmission, reduction of greenhouse gas emissions was recorded in Scopes 1, 2 (location-based), 3 by 9% year on year. Taking into account emission factors for electricity according to the market-based method, the change of electricity supplier additionally contributed to the achievement of a total reduction in the scopes concerned by 43 percent YoY.

PSE transmission network losses are lower each year. In 2019, the last year examined, the transmission loss ratio was 1.38 percent, the lowest ever. One of the company's undertakings that allow transmission losses to be reduced is PSE's investment programme for the development of electricity transmission infrastructure. At the end of 2019, the company had 164 in progress with an estimated value of PLN 9.84 bn.

Another significant undertaking that allows electricity consumption to be reduced is investment in depreciated electric power infrastructure. Replacement of seven 220/110kV autotransformers is planned for the years 2020-2024, which will allow CO_2 emissions related to their operation by as much as 46.1 percent.

GRI 305-1, 305-2, 305-3 Greenhouse gas (GHG) emissions	Mg CO_2e			YoY change 2019 vs 2018 in %	Change 2019 vs 2017 (base year) in %
	2019	2018	2017		
Scope 1 - Direct GHG emissions	**3,738**	**4,139**	**4,450**	**-10**	**-16**
Konstancin-Jeziorna, PSE field	3,738	4,139	4,450	-10	-16

GRI 305-1, 305-2, 305-3 Greenhouse gas (GHG) emissions	Mg CO_2e			YoY change 2019 vs 2018 in %	Change 2019 vs 2017 (base year) in %
	2019	2018	2017		
locations:					
• Petrol	1,020	1,077	883	-5	+15
• Diesel oil	885	869	827	+2	+7
• Natural gas	410	459	455	-11	-10
• SF_6	1,142	1,579	2,082	-28	-45
• HFCs	281	155	202	+81	+39
Scope 2* - Electricity indirect GHG emissions (location-based method)	**1,110,504**	**1,220,628**	**1,260,544**	**-9**	**-12**
Konstancin-Jeziorna, PSE field locations:	9,393	11,204	10,802	-16	-13
• Electric energy	7,885	9,627	8,957	-18	-12
• Thermal energy	1,508	1,577	1,844	-4	-18
Electric energy losses in the transmission process	1,177 838	1,177 838	1,220,070	-9	-12
Electrical substations**	32,138	31,587	29,672	+2	+8
Scope 2* - Electricity indirect GHG emissions (market-based method)	**948,606**	**1,659,709**	**1,714,399**	**-43**	**-45**
Konstancin-Jeziorna, PSE field locations:	5,736	9,861	9,553	-42	-40
• Electric energy	4,228	8,284***	7,708 ***	-49	-45
• Thermal energy	1,508	1,577	1,844	-4	-18
Electric energy losses in the transmission process	915,351	1,606,758	1,664,369	-43	-45
Electrical substations**	27,519	43,089	40,477	-36	-32
Scope 3 - Other indirect GHG emissions	**319**	**283**	**194**	**+13**	**+64**
Konstancin-Jeziorna, PSE field locations:	319	283	194	+13	+64
• Business travel of company employees by air	319	283	194	+13	+64
Scope 1 + 2 (location-based) + 3	**1,114,561**	**1,225,050**	**1,265,188**	**-9**	**-12**
Scope 1 + 2 (market-based) + 3	**952,663**	**1,666,464**	**1,719,043**	**-43**	**-45**

* For Scope 2 emissions, calculated in accordance with the location-based method, the emission factor for greenhouse gas emissions related to generation of an electric energy unit was the average factor for Poland, and for emissions calculated in accordance with the market-based method, emission factors specific to our electricity sellers were taken.

** In this year's edition, the calculation methodology was expanded to include electricity consumption at electrical substations. The GHG emission results for 2017 and 2018 published in the previous year have been updated by the emissions from that source.

*** Results updated from last year's publication as a result of an improved method for the calculation of the emission factor for electricity by its supplier

Sources of data and emission factors:

The energy and fuel consumption data came from invoices and internal registers. SF_6 and HFC (hydrofluorocarbons – greenhouse gases) were calculated on the basis of gas top-ups. The distance travelled by air was calculated on the basis of the internal register and flight routes.

For fuels, electric (location-based method) and thermal energy, emission factors and calorific values were taken on the basis of data from the National Centre for Emission Balancing and Management, whereas for SF_6 and HFC gases GWP100 factors were taken in accordance with the 4th Intergovernmental Panel on Climate Change (IPCC) report. The emission factors for electricity according to the market-based method were assumed on the basis of information on the fuel mix used as published in the websites or respective energy suppliers. The emission factors for air business travel were taken from the DEFRA (UK Department for Environment, Food & Rural Affairs).

No biogenic greenhouse gas emissions were identified. The greenhouse gas included in emission factors for fuels, electric and thermal energy is CO_2.

GRI 305-4 **GHG emissions intensity ratio per electric energy unit taken off the grid**	**Mg CO_2e**		
	2019	**2018**	**2017**
GHG Scope 1 + 2 emissions (location-based) + 3 [Mg CO2e]	1,832,858	1,225,050	1,265,188
Quantity of energy taken off the grid	130,375.25	130,375.25	130,375.25
GHG emissions/MWh of energy taken off the grid [Mg CO2e/MWh]	0.0105	0.0114	0.0123

Facts worth knowing

Carbon footprint is the sum of greenhouse gas emissions produced directly or indirectly by a person, organisation, event or product. It includes the emissions of carbon dioxide, methane, nitrous oxide and other greenhouse gases, expressed in CO_2 equivalent. Carbon footprint of an organisation includes emissions caused by all its activities. Its measure is $MgCO_2e$ – tonne (megagram) of carbon dioxide equivalent.

Carbon footprint is one of the key tools of contemporary environmental management. It is of an international nature and is used increasingly often by business operators as a basic method of improving business performance.

CHAPTER VI: IMPACT ON SOCIETY AND EMPLOYEES

Key messages

Our activities and ensuring the continuity of electricity supply determine the wellbeing of Poles.

It is PSE's particular concern to ensure the security of employees and contractors' personnel providing services to our company. To make this possible, we incessantly take care of the development and security of our technical infrastructure.

We are a modern organisation fostering an innovative working environment. We care about the development of internal competences of our employees. We want to constantly strengthen the unique knowledge base in the organisation and the expertise of the PSE staff responsible for maintaining a secure and stable power system.

We are keen to strengthen awareness and educate the public about the functioning of the electricity market.

VI. IMPACT ON SOCIETY AND EMPLOYEES

6.1. Development of regions and local communities

6.1.1. Investment in the development of regions

[GRI 203-2]

Public purpose infrastructure investments, including the construction of electrical substations and EHV lines significantly improve living standards throughout the region.

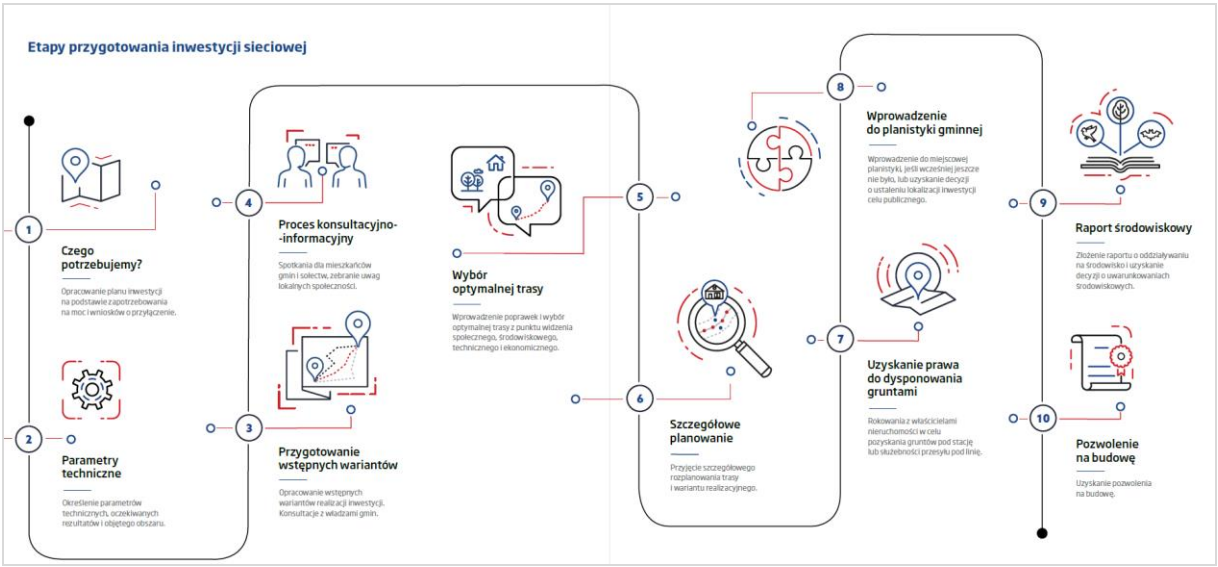


Fig. Network investment preparation stages (based on traditional method, does not take into account the application of the Special Act)

Czego potrzebujemy?.	What do we need?
Parametry techniczne	Technical parameters
Przygotowanie wstępnych wariantów	Preparation of preliminary variants
Proces konsultacyjno-informacyjny	Consultation and information process
Wybór optymalnej trasy	Optimum route selection
Szczegółowe planowanie	Detailed planning
Uzyskanie prawa do dysponowania gruntami	Obtaining the right to use land
Wprowadzenie do planistyki gminnej	Incorporation in commune planning
Raport środowiskowy	Environmental report

Pozwolenie na budowę	Building permit

1. What do we need?

Preparation of an investment plan based on power requirements and connection applications.

2. Technical parameters

Definition of the technical parameters of expected outcomes and the area covered.

3. Preparation of preliminary variants

Preparation of preliminary variants of project implementation. Consultations with commune authorities.

4. Consultation and information process

Meetings for residents of communes and villages, collecting opinions of local communities.

5. Optimum route selection

Making adjustments and selecting the optimum route having regard to social, environmental, technical and economic considerations.

6. Detailed planning

Adoption of a detailed route plan and implementation variant.

7. Environmental report

Submission of the environmental impact report and obtaining the decision on environmental conditions.

8. Obtaining the right to use land

Negotiations with property owners in order to acquire land for substations or transmission easement for a line.

9. Incorporation in commune planning

Incorporation in local planning, unless already made, or obtaining a decision on the location of a public utility project.

10. Building permit

Obtaining the building permit

By securing stable electricity supply in a given area, PSE helps to perform a number of functions which are important from the point of view of regions and local communities.

Benefits of infrastructure investment:

- ensuring energy security and energy supply to the region by increasing the availability of electricity,
- reducing the risk of failure by replacing end-of-life installations with modern facilities,

- increasing the investment attractiveness of the region by providing enterprises with appropriate conditions for the placement and development of business, generating new jobs and tax revenue for commune budgets,
- reducing electric energy losses and consequently also its costs by increasing the voltage of transmission networks and using high-quality materials for their construction,
- significant budgetary revenue from taxes paid to communes – each year, a commune receives property tax revenue of 2 percent of the value of the investment implemented in its territory,
- growth of local business – employing local companies as subcontractors,
- stimulating the modernisation and development of the local infrastructure of electricity distributors,
- increasing connection capabilities for local energy generation sources, in particular for RES,
- creating conditions for a further dynamic development of electromobility.

6.1.2. Cooperation with local governments

[GRI 103-1]

As a responsible investor and good neighbour, we attach special importance to establishing and developing relations with local authorities. In the course of project implementation, we involve representatives of voivodeship, poviat and commune authorities in the decision-making process, including the preparation of investment projects.

In coordination with the local and regional administration, we provide comprehensive and reliable information on investment projects, while presenting the benefits they offer to the commune concerned.

Activities pursued by PSE aimed at building awareness of the significance of investment:

- drafting route proposals in coordination with local authorities at the feasibility study preparation stage,
- direct discussions with municipality mayors and commune heads on the target investment design,
- presentations during commune council sessions devoted to investments issues,
- open information and consultation meetings for local communities, held to hear opinions and suggestions on the optimum route of a new line in a given area,
- engaging mayors, commune heads and councillors, as well as representatives of those units, in communication activities at later stages of the project (e.g. through educational programmes, participation in meetings, conferences, consultations with residents, etc.),
- arranging study visits by specialists from an accredited laboratory performing EMF impact measurements in the neighbourhood of the existing power infrastructure,.
- arranging site visits to demonstrate the immediate environment of a project after its completion,
- cooperating with local media journalists to keep them informed about the progress of projects,

- ongoing contact with project stakeholders via a helpline and information points to guarantee two-way communication between the investor and residents.
- distribution of information materials assisting discussions with residents (information folders, Q&A documents, information/educational videos).

Educational and information activities pursued by PSE to support building the awareness of investment significance:

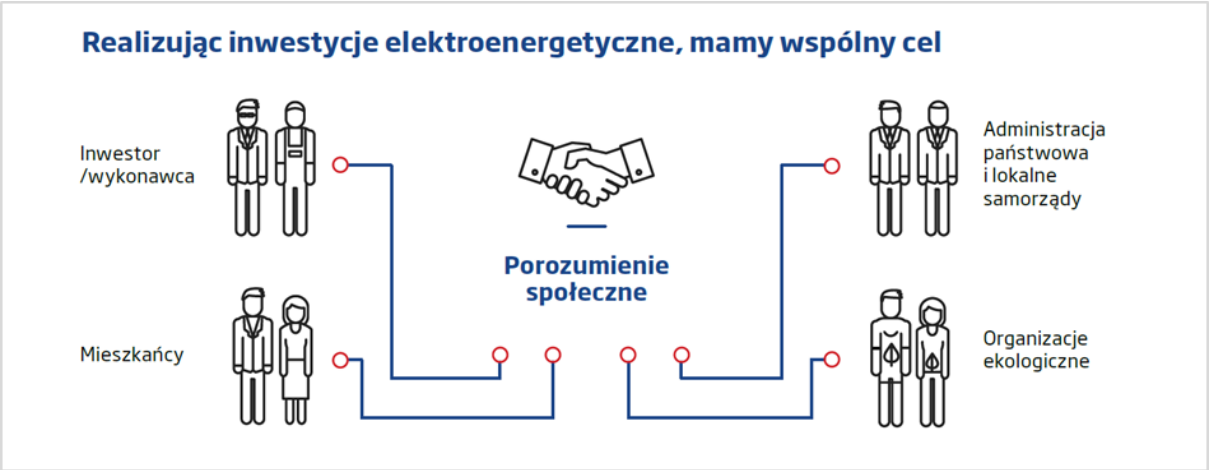
- organising local and regional conferences on investment projects,, with a special focus on aspects sensitive for communes,
- organising meetings with experts in the field of power engineering, impact on the health and life of people and animals, physicians, growers, etc., depending on demand and significance of the issue concerned in the particular area,
- winning support for investment projects from local media, associations and residents through meetings and by involving them in the communication process,
- creating special information points providing all necessary information on projects,
- conducting a local information and educational programme in the commune, tailored to communication needs and responding to queries and doubts raised in the commune concerned,
- supporting local social activities and initiatives undertaken by local or regional authorities.

Number of meetings with authorities and institutions related to project implementation in 2016-2019								
Site locations	2019		2018		2017		2016	
	Number of meetings	Number of investment projects	Number of meetings	Number of investment projects	Number of meetings	Number of investment projects	Number of meetings	Number of investment projects
Bydgoszcz	40	17	202	15	208	15	171	13
Katowice	84	21	112	30	91	30	125	17
Poznań	138	21	67	24	163	13	148	35
Warsaw and Radom	484	53	307	33	240	53	82	19
Total	**746**	**112**	**688**	**102**	**702**	**111**	**526**	**84**

Tab. 1. Meetings with authorities and institutions related to project implementation

Key figures:
2,662 meetings and events for projects implemented in 2016-2019, including **746** meetings in

2019



Example information and consultation process

Realizując inwestycje elektroenergetryczne, mamy wspólny cel	Implementing electricity projects, we have a common goal
Inwestor/wykonawca	Investor/Contractor
Mieszkańcy	Residents
Administracja państwowa i lokalne samorządy	Central government administration and local governments
Organizacje ekologiczne	Environmental organisations
Porozumienie społeczne	Social, agreement

Information and consultation activities carried out in the process are aimed to arrive at a consensus about the final line route.

Having this in mind, PSE mainly takes into account:

- environmental, planning, engineering and economic requirements,
- the interest of residents and property owners.

Broad social consultations with commune authorities, residents and social organisations are of key significance to the determination of an optimal line route. The consultations should allow all stakeholders to be provided with full information on the planned investment and develop a common position.

Completed actions with the participation of local communities

- Discussions with commune heads and municipality mayors to analyse local land use plans and development plans of communes in terms of possible location of transmission facilities. At that stage, we seek – in line with suggestions from members of the local and regional governments – to identify a project location that would not be in conflict with commune plans.
- Meetings with commune councils aimed to present basic information on a project, in particular on its significance for the region and the national economy, technological and legal conditions, time schedule, line impact and the public consultation model, as well as to gather opinions on the proposed line route across the commune.

PSE representatives agree with commune administrators on the continuation of the information and consultation process within the districts concerned;

- Open information and consultation meetings with residents, during which PSE representatives answer all questions from residents concerning the line, and analyse suggestions concerning the modification of the line route or location of power line pylons on specific properties. All meetings are open to the public. The timing of the meetings is agreed with individual village heads who indicate locations convenient for residents. No later than 7 days before each meeting, village heads receive information posters about the meeting. Property owners take the opportunity to ask individual questions concerning their properties, which often alleviates many concerns. On this basis, representatives of our organisation collect comments and requests of members of the public relating to the proposed route option. Suggestions are submitted by individual plot owners concerning minor route adjustments – tower locations. Each request is considered individually and, wherever technically possible, it is approved.
- Direct individual discussions with all owners along the route provide a basis for presentation of project assumptions and final agreement of the work execution method in the case of specific properties.

Throughout the investment process, information material is prepared and made available, such as:

- project leaflets (available e.g. in all commune offices and at information meetings),
- a folder on the operational security of power lines,
- maps dedicated to individual communes (available at meetings and from commune offices in the form of folder inserts),
- a dedicated project website,
- a helpline operating 5 days a week and managed by specialists with comprehensive knowledge of projects.

Information on information and consultation meetings is distributed through:

- project website,
- commune websites (depending on the commune's practice),
- information posters (on village notice boards, at commune offices),
- information points,
- commune heads, councillors and village heads,
- commune SMS-based messaging systems (if any).

Media activities – a project spokesman is always appointed for the purposes of media relations. The spokesman is responsible for providing information and addressing media questions. The individual steps and stages of the project implementation process are communicated through media publications in both the traditional and electronic form so as to deliver the message to the widest audience possible.

[GRI 203-2]

Key investments – best practices

Construction of the Ostrołęka-Stanisławów 400 kV line

Construction of the Ostrołęka-Stanisławów 400 kV power line is an investment of key significance for the Polish Power System. The length of the route is estimated at approx. 100 km. Currently, the Warsaw agglomeration and Ostrołęka are lined by a 220 kV line built in the early 1970s. Having regard to the growing demand for energy and planned changes in the generation profile it is no longer sufficient. In addition, due to its age, it is also more susceptible to failures and extreme weather conditions. The new 400 kV line can increase the quantity of electricity transmitted while reducing losses and environmental impact.

1. **Meetings with authorities and commune councils**

The information and consultation process addressed to residents and local government authorities of the communes situated along the route of considered line options started in mid-2019. As part of those activities, dozens of meetings were held which provided an opportunity to learn the contractor's proposals concerning various line route options. The first meetings were addressed to local government authorities, commune heads and mayors as hosts of the areas concerned. Representatives of the investor and the contractor visited 16 communes. The discussions with local governments focused on subjects such as the project objective, the proposed site location options, environmental impact, technical, and benefits. Working contacts (personal, by telephone or mail) are continued throughout the project implementation period (depending on needs).

2. **Open meetings with residents**

35 meetings were held with residents as part of the communication activities. In several cases, additional meetings had to be held with residents of the same commune.

3. **Study visits – EMF measurement**

In response to residents' needs, two study visits were arranged in the course of the consultation process for the residents of Jadów and Strachówka communes, where electromagnetic field (EMF) impact measurements were made under an operating 400 kV line.

4. **Study visits – KDM**

Another type of study visit was a visit by the Commune Head and councillors of Zabrodzie commune to the headquarters of the National Power Dispatch Centre (KDM), the place from which Poland's power system is managed. It was an opportunity to present the need to expand and upgrade the transmission network country-wide and the contribution of the expansion to the national development opportunities.

5. **Media activities**

Information on the project appeared in the following media: *Fakty WWL* biweekly, *Goniec Tłuszczański* weekly, *Kurier W* weekly, and *Życie Powiatu na Mazowszu* periodical. A number of articles on the course of consultations and the need to expand the EHV network were published e.g. by the Tuba Wyszkowa website and in the weeklies *Nowy Wyszkowiak* and *Tygodnik Ostrołęcki* .

6. **Geosurvey**

In connection with the outbreak of the COVID-19 pandemic and the related inability to conduct open meetings with residents while the epidemic threat persists, our company had implemented a new tool for communication with residents – the geosurvey. Thanks to this application, available on the project

website at https://liniaostrolekastanislawow.pl/geoankieta/, residents were able to get acquainted with the proposed line route options, measure the distance from the line to a particular point, indicate which solution they prefer, as well as make their own comments or corrections. The website also provides a set of frequently asked questions (FAQs) and answers, materials on project implementation rules, legal and environmental impact aspects.

Construction of the Mikułowa-Świebodzice 400 kV line

The construction of the Mikułowa- Świebodzice 400 kV power line is necessary to ensure sufficient, stable electricity supply to all customers in Lower Silesia. The new facility will replace a 220 kV line operating for more than 50 years. The route with an estimated length of approx. 107 km will cross a dozen or so communes.

The information and consultation process addressed to residents and local government authorities of the communes situated along the route of considered line options started in December 2017. It is also when the first meeting was held at Dolnośląskie Voivodship Authority. From January 2018, meetings were arranged with commune authorities (commune heads, mayors, and commune councils) during which the investor's representatives provided information on the information and consultation process and agreed details of information actions concerning the project with the authorities. As part of those activities, meetings were held which provided an opportunity to learn proposals concerning various line route options. Another step of the communication process was to obtain opinions from forest district authorities and relevant information on the presented line option, as well as the proposed construction method affecting the final course of the project (6 meetings).

Representatives of the investor visited 17 communes. The discussions with local governments focused on subjects such as the project objective, the proposed site location options, environmental impact, technical, and benefits of the project. Working contacts (personal, by telephone or mail) are continued throughout the project implementation period, depending on needs.

1. **Meetings with authorities and commune councils**

The first stage of the consultation process was a series of working consultations with commune authorities – 17 meetings held to consult the power line route held in January-December 2018. In the course of the meetings, thew line route was analysed and route adjustments were collected, reported by the commune planning body. The second stage of the consultation process was the presentation of the line route and project assumptions at commune council sessions. The meetings (16 events) were held in January-April 2019. Presentations of project assumptions at commune council meetings took place in a calm and constructive atmosphere. The rules of PSE's CSR programme Empower Your Environment were also discussed at the meetings. Councillors mainly asked questions about the issue of transmission easement and future use of property after the power line is constructed.

One of the outcomes of line route presentation during the commune council session was a proposal for adjustment in the village of Kłaczyna, in the Dobromierz village. It was taken into account and consulted with the local community, who approved of the proposed change.

2. **Consultation and information meetings with residents of villages situated along the line route**

The next stage of the process was the organisation of 20 information and consultation meetings with property owners and commune residents along the lone route, held in October and November 2019. The meetings were preceded by an information process on the planned time schedule (posters in

village notice boards, information on the project website, and on commune websites). Property owners were invited by registered mail to attend the meeting.

During the meetings, a detailed line route was presented as well as information on the investment project. Issues were also discussed related to the establishment of transmission easement.

In March 2020, the investor circulated letters to communes informing them about the completion of the information and consultation process, together with the line route map. The public consultations with property owners translated into almost 40 adjustments of the line route in response to proposals and expectations of the social partners regarding the design of the project.

3. Media activities

Information on the project appeared in the following media: Telewizja Echo24, TVP3 Wrocław, Radio Wrocław, Biznes Alert, cire.pl and on the websites: Dolnośląski Voivodship Authority, swidnica24.pl, www.eluban.pl i www.e-legnickie.pl.

Harmony Link – Poland-Lithuania submarine cable interconnection

The Poland-Lithuania submarine interconnection Harmony Link is a part of the EU strategic project for the synchronisation of the Baltic States' systems with the power network of Western Europe. The project is implemented jointly by PSE and LITGRID – transmission system operators of Poland and Lithuania. The interconnection will require the laying of two High Voltage Direct Current (HVDC) cables on the seabed in offshore area and underground over a short distance onshore. The point of connection to the national power system in Poland will be the Żarnowiec electrical substation (Żarnowiec ES) and in Lithuania – the Darbenai substation. The cable interconnection buried in the seabed will allow the investment impact on areas of high natural value in north-eastern Poland to be reduced.

1. Meetings with authorities, commune councils and institutions

The process of consultation with local authorities concerning, among other things, the location of the onshore part of the cable started in May 2019. In the period between May 2019 and June 2020, eight meetings were held. In addition, 4 meetings took place with the Pomeranian heritage conservation officer (in July 2019, December 2019 and January 2020), a meeting with the dean of the Faculty of Biology of the University of Gdańsk and OTOP (Polish Bird Protection Society) wildlife refuge guardian in June 2019, as well as a meeting with the Wejcherowo Forest District Authority in June 2020.

The meetings with the Pomeranian heritage conservation officer were held to determine conditions for running the cable line route across areas under conservation protection – Karwia's Mire. It is a listed heritage area owing to a unique rural system – drainage ditches constructed by Dutch settlers in the 17th century.

Other meetings with institutions were aimed to present the investment project and overview the environmental requirements related to the running of the cable line across forest areas and the Baltic nearshore waters.

Construction of the Piła Krzewina-Żydowo Kierzkowo-Dunowo 400 kV line

The construction of the Dunowo -Żydowo Kierzkowo-Piła Krzewina 400 kV power line is of major significance for increasing the transmission capacity of the Polish Power System in the norther part of the country. This will contribute to the improvement of power supply to Wielkopolskie and Zachodniopomorskie voivodeships and to the Piła and Koszalin agglomerations. It is an important element of the Transmission Network Development Plan to 2025. The power line with an estimated length of approx. 120 km will cross 12 communes of Wielkopolskie and Zachodniopomorskie voivodeships.

1. **Meetings with authorities and commune councils**

In 2019, the preliminary information and consultation process was launched for the planned project "Construction of the Piła Krzewina-Żydowo Kierzkowo-Dunowo 400 kV line". The activities undertaken were addressed to the authorities of each commune situated on the planned line route. They resulted in obtaining opinions from the authorities of each commune on the preliminary line route concept, which allowed adjustments to be made to the project taking into account the identified expectations of local governments. The meetings were held on 23-24 May and 27-28 May 2019 (12 meetings). They involved 12 communes: Polanów, Bobolice, Biały Bór, Złotów, Tarnówka, Okonek, Kaczory, Krajenka, Wysoka, Szczecinek, Świeszyno, Tychowo.

The meetings provided an opportunity to present the objective and scope of the planned investment project. Preliminary opinions were obtained from the commune authorities concerning the route design, taking into account local government investment and development plans previously not provided for in official planning documentation. Most of the communes visited provided their suggestions also in writing. The proposals for minor adjustments to the line route, collected in the course of the meetings, were taken into account by designers.

During meetings at administrative units of the Lasy Państwowe National Forest Holding, preliminary project assumptions concerning sections planned in areas managed by LP were discussed, as well as line construction methods possible to apply. The experience of the meetings and opinions gathered confirmed that the preliminary line concept is an optimal solution for local government authorities and for the forest resource manager.

The Offshore Wind Farm Project

PSE has been preparing for the implementation of projects for the evacuation of power from Offshore Wind Farms planned in the Baltic. Their expected capacity, defined in the draft Energy Policy of Poland to 2040, is approx. 8 GW, which represents a significant percentage of the total installed capacity in the country. Thus, Offshore Wind Farms will be the main element of Poland's energy transition. Therefore, they will be of high significance for the Polish Power System. No, however, they require a significant reinforcement of the transmission network in Pomerania. For this reason, PSE has been preparing feasibility studies for a number of projects which will allow for the secure and effective evacuation of power from wind turbines to every part of Poland. The projects will also improve in an unprecedented way the energy security of Pomorskie voivodeship and make it the largest supplier of renewable energy in the country.

1. **Meetings with authorities and commune councils**

January 2020 saw the beginning of the preliminary information and consultation process for projects related to the evacuation of power from Offshore Wind Farms. Of several dozen meetings prepared,

only some were held live. The restrictions due to the COVID-19 pandemic prevented the implementation of all plans in the previous form of direct presentations.

Therefore, the decision was taken to arrange some of the meetings via teleconference. Owing to this, more than 50 conversations with stakeholders could be held by June 2020, half of which involved the use of teleconferencing software. The initial concerns regarding transfer limitations, difficulties in arranging calls with such a large number of participants and the need to use dedicated software for the presentation and overview of maps proved to be challenges that could be managed. The material collected during the meetings allowed work to be continued on necessary full-scale feasibility studies.

6.1.3. Educational activities

[GRI 103-1, GRI 103-2] Examples of educational actions promoting energy security knowledge

A Friendly Network for the construction of the Chełm-Lublin Systemowa 400 kV line

In Q2 and Q4 2019, schools in areas situated on the route of the Chełm-Lublin Systemowa 400 kV line project held information and educational activities for primary school pupils titled Friendly Network. The objective of the programme was to raise the awareness level with regard to the special role and significance of PSE in the power system and to emphasise the importance of transmission network development.

Key issues were presented in each school, related to:

- The safe use of electric appliances, an in particular the rules for staying in the immediate vicinity of electric power facilities (transformer substations, towers, conductors) and the rules of conduct in case of failure;
- How electricity is generated and the purpose of transmission network facilities;
- How the transmission system operates;
- The objectives and ways of saving electricity.

Apart from educational activities, a small gift was presented to every pupil who prepared an art project on the safe use of power facilities and structures.

In Q2 2019, activities were conducted in the following communes: Spiczyn, Wólka, Wierzbica, Chełm. In Q4 2019, meetings were held in another four communes: Niemce, Łęczna, Siedliszcze, Puchaczów.

A Friendly Network for the construction of the Baczyna-Plewiska 400 kV line

For the Baczyna-Plewiska 400 kV line, the Friendly Network educational action was dedicated to Primary School Grade 1-3 pupils selected in coordination with commune administrators. The activities allowed the educational objectives defined in the core curriculum to be achieved. The action ended with an art competition. The winners received symbolic gifts.

Odyssey of the Mind

In 2019, activities and workshops were held in collaboration with the Odyssey of the Mind Foundation in communes situated on the route of the project titled Construction of the 400 kV Chełm-Lublin Systemowa Line and Expansion of the 400/110kV Chełm Substation.

Odyssey of the Mind is an international educational programme addressed to young people at different education levels, reaching several thousand schools in more than 20 countries. The

programme was established in the USA in 1978 in partnership with NASA, in order to complement school education with skills related to innovative thinking, non-standard approach to problem solving, group work and improvisation.

The participants of the programme operate in groups of 5 or 7 people representing each school. Under the guidance of teachers or educators (trainers), they solve problems that require unconventional thinking and creativity. The problems combine technical, artistic and human elements and are assigned to permanent, long-term categories such as vehicle mechanics, device engineering, reinterpretation of classical works and cultural content, technical constructions, art works and artistic performances (mainly theatrical). Spontaneous problems, the assumptions of which are presented to students on actual competition days, are an additional category.

The Polish edition of the programme was addressed in the first place to primary schools (age groups: up to Grade 5 and Grades 6-8). Other participants are secondary school and university students.

PSE managed to deliver the programme to schools in more than 40 communes in the investment areas, of which 9 are locations associated with the Chełm-Lublin Systemowa 400 kV line construction project. Owing to PSE's involvement, the schools and their teams were able to benefit from free-of-charge registration for the competition and participation in regional tournaments (Q1 2020). Depending on the reception of the competition in the regions, PSE is also considering the expansion of the programme to enable teams to compete in national tournaments.

6.1.4. Impact on local communities

[GRI 103-1, GRI 413-2] Standards and regulations relating to network assets

The impact of our company's operations on the social and natural environment is of particular significance in the case of new-build overhead line projects. The projects are implemented under the latest European standards PN-EN 50341 on designing overhead power lines. We respect all legal acts applicable in Poland in the fields of environmental protection, spatial planning and management, property management, construction law, etc.

European standards

The standards applied in designing and building new lines ensure a high level of operational reliability of lines, a high level of public security, and minimise line impact on the environment. In forest areas, we follow the practice of running line wires over the forest, owing to which tree clearance can be limited to small areas – exclusively to accommodate pylon sites.

For the construction of any line, it is necessary to obtain a decision on environmental conditions, according to which wires or pylons are marked with features visible to birds (representations of predatory birds on lighting arresters or diverter spirals suspended from wires). In compliance with the applicable law, lines are also marked as aviation obstructions.

Devices, instruments and systems installed at substations also meet the requirements of the European standards, which ensures a high level of their operational reliability. Solutions are also used which reduce the environmental impact of an electrical substation, including the natural environment. Each network transformer installed is equipped with an oil tray protecting the environment from oil spillage in the event of failure.

Establishment of rights to real property

In order to regulate legal relations concerning transmission facilities between transmission undertakings and property owners on whose land such facilities are situated, the term "transmission rights of way" was introduced in the Civil Code in 2008. The right of transmission easement defines the extent to which a transmission undertaking can use third-party property on which their transmission equipment is or will be situated, i.e. any structures and facilities forming power lines. The provisions adopted provide the investor with access to facilities, i.e. pylons, wires and substation elements situated on the property in cases of failure, repair and maintenance.

Transmission easement is a limited property right established on a real property in the form of notarial deed. Its scope is recorded in the land and mortgage register of the encumbered property.

According to the applicable law, remuneration and compensation for property value diminution resulting from the establishment of transmission rights of way is paid to each property owner.

Prior to the commencement of work, we have property appraisal reports prepared for property to be developed. The reports provide a basis for the determination of the amount of remuneration and compensation for the plot owner. The payment amount is influenced by factors such as the existing value and use of the property and damage to agricultural land, sown or gathered crops, caused by a part of property being occupied by transmission facilities. Additional compensation is payable for pylon placement. Owners usually receive the first compensation instalment after the civil-law agreement is accepted and concluded. The second instalment is paid after the signing of the notarial deed that provides the investor with access to the land and line. Compensations are also awarded for damage and losses caused in the course of construction and erection works.

In the absence of the landowner's consent to sign the public utility project easement agreement, following the completion of the entire negotiation process, the negotiation procedure is triggered in accordance with the requirements of Article 124 of the Property Management Act (PMA). However, the administrative procedure is the last resort in the negotiation process – before it is applied, steps are taken leading to a compromise solution.

We do not keep statistics of the number of transmission rights of way agreements concluded with property owners by contractors acting on our behalf.

This concerns thousands of plots every year. We estimate the percentage of agreements concluded at 94-98 percent, while the remaining 2 to 6 percent are administrative decisions issued under Article 124 of the Property Management Act.

Number of people physically or economically displaced and compensation for displacement

As early as the investment planning stage, we endeavour to ensure that our investment projects interfere as little as possible in human life. Wherever possible, we consider several options of project location. We also invite representatives of local communities and local governments to cooperate. We make all efforts to avoid displacement in consequence of our projects. In 2018, no case of displacement occurred.

GRI EU 22 Number of persons physically or economically displaced and compensations, by project type	Number of persons			
	2019	2018	2017	2016
	0	0	2*	0

* In connection with the expansion of the 400/220/110kV Grudziądz Węgrowo substation, two persons were displaced in 2017: father and daughter, who were co-owners of two plots of land necessary for the expansion of the substation. The purchase was finalised in Q1 2017.

Tab. Number of persons physically or economically displaced and compensations

Line impact

All electrical equipment generates an electromagnetic field around it, which is results from the presence of voltage and current flow. Extra-high voltage lines belong to this group of equipment. Low-frequency (50 Hz) electromagnetic field is created around the line, of the same type as that generated by a vacuum cleaner or washing machine – electrical appliances used in every home. The impact of electromagnetic fields is a common subject of discussions on the potential impact on human health.

The results of surveys carried out so far around the world do not confirm concerns about the negative impact of low-frequency electromagnetic fields on human health and other living organisms, nor do they rule out such impact. It is exactly for this reason that Poland and the whole of the European Union have adopted relevant laws and regulations specifying, with a large safety margin, the acceptable values of impact of power facilities. Our company strictly observes the law. Prior to putting a facility into service, electromagnetic field measurements are performed, which are then subjected to verification by environmental protection bodies, which eliminates the risk of non-compliance.

For each investment project performed, we prepare information guides addressed to local communities, which contain reliable information on the investment concerned, including its environmental impact. The impact of electromagnetic fields is always one of the elements of a programme of regional conferences organised by contractors in cooperation with us.

Noise

The emitted noise level depends on the power line design and weather conditions (it is much higher during drizzle and rain, which is beyond our control). Noise coming from newly designed lines outside the rights of way does not exceed environmental limits.

The main noise sources at our substations are transformers. We use equipment with a reduced sound power level and advanced cooling solutions. In special cases, noise screens are erected to suppress noise.

Landscape values

The problem of a power line view, even a distant one, from a window is one of the main causes of social protests. For each project, we aim to integrate the line into the landscape so as to minimise any negative aesthetic effect. By assumption, we avoid running power lines across areas of special landscape value.

Electric shock or lightning stroke

Our extra-high voltage lines are fitted with ground wires. This means that the risk of lightning stroke in their vicinity is reduced. However, elementary caution is always required to be maintained near a line – in particular when performing work with the use of farming equipment.

Failure removal

Owing to a lack of legal norms governing transmission rights of way for power lines built in previous years, sometimes problems arise on privately-owned land, as repair teams' access to the properties concerned is hindered or prevented. Hindering access to a site extends the time to remedy a failure or perform a repair, which causes problems, especially for the local electricity consumers.

[GRI 413-1] We analyse the impact of our investment projects on the local community (in 100 percent of cases)

[GRI 103-2] Minimising the negative social impact of projects being implemented

The Feasibility Study stage is aimed to perform a detailed, in-depth analysis of the implementation feasibility of an investment project option based on specific studies, in particular precise maps depicting the line route (including tower spacing) or the location of electrical substations in the commune. This makes it possible to analyse local conditions and identify specific needs of the party in order to minimise the adverse social impact of investment project undertaken.

In the course of the work, based on suggestions put forward by commune authorities, modifications (sub-options) of the preferred option are developed. They are subject to further consultations with local communities and, finally, assessed in the environmental procedure.

At this stage, it is important to acquire:

- development plans of communes in specific districts and localities (information source: commune study, Geoportal, land use studies, local area development plans, local development strategies, local government representatives),
- residents' life plans, building permits and outline planning permissions in different districts (information source: local government representatives, opinion leaders).
- potential problem situations in specific districts (information source: local government representatives),
- opinion leaders in specific districts (information source: local government representatives),
- number of real property owners in the area where a project is to be implemented (information source: County Administration Offices (*Starostwa Powiatowe*), land and building registers,
- estimated value of transmission easement (source of information: dedicated websites on transactional prices in the commune).

At this stage, public consultations are carried out on the final shape of the project. During consultation meetings, residents submit their comments and suggestions on the line route, tower foundation locations on plots, locations of electrical substations and access roads to the property on which construction works will be carried out. Suggestions are collected and analysed by the investor's representatives regarding the feasibility of implementation. The information collected provides a basis for the preparation of project options to be then subjected to assessment in the environmental procedure. At this stage, it is important to establish and maintain contact with stakeholders.

[GRI 102-40, GRI 102-42, GRI 102-43] Our stakeholders and forms of their involvement

Target group	Characteristics	Communication tools and techniques*

Direct activities		
Regulator	The President of ERO is responsible for regulation of the power sector and for competition promotion. We agree with the President of ERO, among other things, the Development Plan for meeting the current and future electricity demand and its updates.	Direct meetings, industry conferences, PSE Impact Report presenting in an integrated manner financial and non-financial data, website.
Contractors for investment projects	Third-party companies selected through public and non-public tendering procedures. They act for an on behalf of PSE, influence opinions of local communities and local authorities, and form the image of our company as an investor.	Direct meetings, industry conferences, internal training, efficient communication on investment tasks under Social Communication Programmes (folders, website, press briefings, conferences, films, educational programmes, etc.) defining communication good practices and guidelines, and cooperation under the principles of sustainable development.
Public administration, local authorities	Transparent and professional information and educational activities within the framework of social communication contribute to building proper relations.	Direct meetings, letters of intent, dedicated specialised conferences, general corporate, specialised and investment-related folders, an expert magazine, PSE impact report presenting in an integrated manner financial and non-financial data, website.
Public opinion, local communities	A key group from the point of view of infrastructural investments. Convincing immediate neighbours to accept an investment project and establishing the transmission easement are essential to the lead time of the project. Contact with the group makes it possible to win greater public acceptance or to work out a compromise.	Media relations, press articles, websites, Twitter, YouTube, PSE, folders, leaflets, educational programmes for inhabitants of the communes in which an investment is planned, meetings arranged by contractors and directly.
Protest committees, local leaders of protests and social actions	Local initiatives resulting from a lack of public acceptance of a solution being considered, and representing interests of the whole community or a selected group.	Official correspondence, participation in meetings and during protest actions.
Employees, management staff of PSE CG	Committed and motivated employees and management staff largely determine PSE's operating efficiency. Employees' level of being informed and their work satisfaction are of key significance to employee commitment building.	The code of ethics and value-guided conduct, intranet, PSE impact report presenting in an integrated manner financial and non-financial data, information leaflets, communication of strategic projects, questionnaire surveys, communication of changes being put into effect, direct meetings,

		integration meetings, corporate events, company newspaper *Przesył*, newsletter.
Employees of PSE CG involved in the investment process	Committed and motivated employees, management staff, and principles of business ethics largely determine the company's operating efficiency. Employees' level of being informed and their work satisfaction are of key significance to employee commitment building.	In addition to tools addressed to all employees, additional tools supporting their current work include specialist folders, dedicated training and Q&A documents.
Local and regional associations	Local and regional NGOs working towards development of a given area, e.g. commune, village or county.	Provision of comprehensive and reliable information on investments, with special focus on the planned line location and route and the opinion of representatives of local communities – direct meetings and promotional material (folders), and a website.
Environmental NGOs and associations	Local, regional and national non-governmental organisations for the protection of the natural environment or wildlife, or involved in green initiatives in particular areas.	Direct meetings with representatives of associations, provision of information materials, with special focus on environmental issues and the investor's related activities.
Business partners	Companies cooperating with PSE at the pre-investment stage and performing services ordered by the company.	Information on security policy, ISO certificates and anti-corruption policy provided by employees at meetings with partners and peers.
Indirect activities		
Media (national, regional, industry)	Provide information, form opinions on investments.	Press conferences, briefings, workshops for journalists, individual meetings (articles, interviews), Twitter, sponsored articles, trade supplements to newspapers, expert magazine, press kits, presentations, website, PSE impact report presenting in an integrated manner financial and non-financial data.
Central administration, Parliament	Ministries and central authorities, parliamentarians – especially those on parliamentary committees and teams.	Individual meetings, presentations, folders, industry and economic conferences, website, PSE impact report presenting in an integrated manner financial and non-financial data, expert magazine.
Contractors (generators, distributors, traders)	A group of entities cooperating with PSE on a permanent basis, bound by agreements.	Individual meetings, industry conferences, workshops, expert magazine, PSE impact report presenting in an integrated manner

		financial and non-financial data, website.

* In our activities, we attach special importance to building lasting relations and using various methods of dialogue with stakeholders.

We communicate with our partners through multiple channels. The frequency of contacts depends on PSE's needs and our stakeholders' queries.

Tab. Our stakeholders and forms of their involvement

[GRI 102-43] Key figures

- **37 industry conferences, debates, seminars and congresses** with the participation of PSE's experts,
- **69 PSE experts involved** in conferences, debates, seminars, forums and industry congresses (increase by 21 percent YoY),
- **more than 8,000 publications** on various areas of PSE's activity appeared in 2019, of which more than 99.2 percent were of a positive or neutral character,
- **51 reports** (including PPS operation data and BM actions) generated automatically on the PSE website in 2019,
- **1,684 followers of PSE's Twitter profile,**
- **monthly reach of approx. 700 k** (PSE posts could reach so many users)

6.2. Flagship social projects

Assumptions do PSE's social actions

Social actions conducted by PSE arise from the intention to stimulate the activity of residents of the communes in which the company performs investment projects. Through its social commitment, our organisation wants to build a positive dialogue in communes. We want to emphasise the good neighbourly character of our presence. This approach results in long-term benefits for the beneficiaries, which is aligned with the long-term presence of extra high voltage power grids in the regions.

We support long-term initiatives developing a common public space, in areas such as:

- **education** (e.g. by refurbishing classrooms and school daycare centres),
- **environmental protection** (co-creation of nature education trails in protected areas. walking and cycling trails),
- **health** (construction and upgrade of outdoor gyms, organising first aid workshops, including the purchase of live saving equipment),
- **assistance for socially excluded persons** (e.g. opening sensory therapy rooms, construction of driveways for disabled persons),
- **environment** (creating nature education trails, financing the purchase of tools for flora and fauna monitoring),

- **promoting social and cultural life** (e.g. supporting events of an educational nature such as science picnics, refurbishment of venues for activities of local interest groups, clubs, foundations and associations).

Objectives of PSE social projects in 2019 (percentage breakdown)

- Health and medical care – 36%
- Promoting active social and cultural life – 27%
- Common public space development – 16%
- Environment – 8%
- Education – 6%
- Innovation – 5%
- Social exclusion – 2%

<Docelowo ww. wskaźnik zostanie przedstawiony w formie wykresu kołowego pt. Podział projektów społecznych PSE w 2019 roku wg realizowanych celów >

EmPOWER Your Environment programme

The idea of the programme is similar to participatory budgeting, owing to which residents can proactively change their surroundings.

EmPOWER Your Environment is PSE's flagship initiative organised in order to:

- improve the condition of the existing social infrastructure or create a completely new form of such infrastructure at locations where the company operates;
- equip communes, their subordinate public institutions (e.g. commune cultural centres, community daycare centres, educational establishments, etc.) and local communities with tools which allow real social changes to be implemented with the use of new or upgraded infrastructure financed by PSE;
- build the recognisability and positive image of PSE as a good neighbour committed to working towards development and enhancement of the attractiveness of the regions in which it has a presence.

The programme is implemented in more than 80 communes in which PSE performs EHV line and substation projects. It reaches the communes in which PSE has been carrying out the following projects:

- construction of the 400 kV line between Warsaw agglomeration and Siedlce,
- construction of the Ostrołęka-Stanisławów 400 kV line,
- construction of the Kozienice-Miłosna 400 kV line,
- construction of the Mikułowa- Świebodzice 400 kV line,
- construction of the Mikułowa-Czarna 400 kV line,
- construction of the Poland-Lithuania HVDC cable interconnector,
- construction of the Gdańsk Przyjaźń-Żydowo Kierzkowo 400 kV line,
- construction of the Gdańsk Przyjaźń 400/110 kV substation,

- construction of the Baczyna-Krajnik 400 kV line,
- construction of the Mikułowa- Świebodzice 400 kV line,
- construction of the Chełm-Lublin Systemowa 400 kV line,
- construction of the 220/110 kV Praga (Żerań) substation including the 220 kV Miłosna - Mory line entry,
- upgrade of Byczyna-Jamki, Byczyna-Koksochemia 220 kV line,
- upgrade of the Żukowice 220/110kV substation,
- upgrade of the 220/110kV Rożki substation.

<Docelowo projekty zostaną zobrazowane z użyciem interaktywnej grafiki>

1. Time for theatre and film in Łęczna

In order to promote social and cultural activity in Łęczna, PSE supported the refurbishment of the cinema and theatre hall at the Cultural Centre in Łęczna. The Artistic Cellar space was furnished with multimedia equipment, a projection screen and a projector, a sound system, and seats on podiums. This allows films shows, theatrical rehearsals, dancing and gymnastics classes, as well as reciting and music competitions to be held in the hall. The new venue is used by members of local interest clubs and groups, pupils of Łęczna schools and senior citizens. The Artistic Cellar has already been used by participants of dancing workshops, the 23rd Autumn Reciting Competition, the 1st Commune Patriotic Song, Poetry and Prose Competition *Tu wszędzie Polska, tu – Ojczyzna!* and by the audience of film shows arranged in cooperation with the Friends of Łęczna Region Society. It is also a venue for rehearsals and performances of Gravite theatre which has been active in the commune for a dozen or so years.

Investment area: Construction of the Chełm-Lublin Systemowa 400 kV line

Amount of support: PLN 20,000

Category: Promoting active social and cultural life

Number of beneficiaries: 2,000 residents; members of local interest clubs and groups, pupils of Łęczna schools and senior citizens

2. Street Workout Park in Halinów

A ***Street Workout Park***, i.e. an outdoor gym for exercises with the use of one's own body weight, was created in Halinów Commune. The place allows various exercises to be performed on pull-up rods, which are a street variety of calisthenics, i.e. power training similar to sport acrobatics. The exercise equipment was selected so as to enable everyone to improve balance, agility and coordination, irrespective of their physical condition level. The gym was set up at the Municipal Social Assistance Centre at ul. Adama Mickiewicza 23.

Investment area: Construction of the Kozienice-Miłosna 400 kV line
Amount of support: PLN 20,000
Category: Health and medical care
Number of beneficiaries: 5,000 residents – youth and adults

3. Hałabala the Gnome Touring Poland and the World with e-Twinning

The Hałabała the Gnome Kindergarten in Buk received two new interactive boards donated by PSE. Thanks to them, children will be able to learn languages with the use of the modern e-Twinning platform. The interactive boards are a tool necessary to implement the Hałabala the Gnome Touring Poland and the World project with the use of the e-Twinning platform. It enables kindergartens from Poland and other European countries to cooperate and share ideas for educational activities, and teachers will be able to participate in cyclic professional workshops, conferences and e-learning courses.

Investment area: Construction of the Baczyna-Plewiska 400 kV line
Amount of support: PLN 19,400
Category: Innovation
Number of beneficiaries: 200 residents – teachers and children

4. Not Afraid to Save Life – Pre-medical First Aid

In August and September 2019, a series of 10 pre-medical first aid courses was delivered in Kuślin commune. The courses were addressed to the residents of Chraplewo, Dąbrowa and Dąbrowa Nowa, Michorzewo, Michorzewko, Wąsów, Kuślin, Głuponie, Śliwno, Trzcianka, Turkowo and Krystianowo. The participants were trained in the assessment of the injured person's condition, check of vital signs, and handling an unconscious victim. Each participant received a first aid kit, a certificate and a pre-medical first aid manual. The Not Afraid to Save Life – Pre-medical First Aid project increased thew residents' competence and awareness in the field of first aid and safety improvement.

Investment area: Construction of the Baczyna-Plewiska 400 kV line
Amount of support: PLN 19,800
Category: Health and medical care
Number of beneficiaries: 200 residents

5. Energetic Children Give Us Strength

The Primary School in Sulików needed a school sensory integration room with therapeutic activities – places with comprehensive facilities for the identification and reduction of negative results of developmental disorders in children. The grant provided by PSE for the Energetic Children Give Us Strength project made it possible to equip the room with training aids – swings, square and rotary rope ladders, a sensory path, tunnel and balls, exercise bags, kinaesthetic sand, rehabilitation roller, sand tray, textured balls, boards and cushions, a mattress and a mat. 20 children will participate in the activities during a year. The sensory integration room will also be made available for therapeutic activities organised by the White Eagle Primary School in Bierna and the Public Kindergarten in Sulików.

Investment area: Construction of the Mikułowa- Świebodzice 400 kV line
Amount of support: PLN 20,000
Category: social exclusion
Number of beneficiaries: 200 pupils in one school year

6. Eye on a Bird

PSE donated a grant to the Primary School in Rzekuń, which allowed teaching aids to be purchased for nature education for children. They included sets for online bird monitoring, TV sets and large nest

boxes. Thanks to the Eye on a Bird project, the primary school and kindergarten pupils in Rzekuń will be able to watch nature, learn basic bird species, their habitats and habits.

Investment area: Construction of the Ostrołęka-Stanisławów 400 kV line
Amount of support: PLN 20,000
Category: Environment
Number of beneficiaries: 150 pupils in one school year

7. POWER of Smart Environment Attracts Youth

Under the POWER of Smart Environment Attracts Youth initiative, we financed the installation of a smart Eco-Bench at the Proszówka village Integration Centre. The bench is equipped with photovoltaic panels, owing to which it can be used to charge a phone or access the Internet. A multimedia projector and a screen were also purchased under the project for the village daycare centre in Proszówka.

Investment area: Construction of the Mikułowa-Świebodzice 400 kV line
Amount of support: PLN 20,000
Category: Innovation
Number of beneficiaries: approx. 300 residents

8. Empowering the Spirit of Sport

PSE supported the project Empowering the Spirit of Sport, which involved the repair of flooring in a sports hall in Magnuszew commune. The commune sport shall is the centre of the local community's social life – a place where tournaments and celebrations are held, attended by residents of Magnuszew and the neighbouring communes. The hall floor had been in a very poor state of repair for some time, posing a threat to the users' safety. Sport training conditions improved considerably owing to the repair. Opportunities improved for the commune's residents of different age groups to develop sport activities.

Investment area: Construction of the Kozienice-Miłosna 400 kV line
Amount of support: PLN 20,000
Category: Health and medical care
Number of beneficiaries: approx. 1,000 residents and adultsa

9. I Want to Tell You

PSE's participation in the project "I Want to Tell You" stemmed from the intention to support children with illnesses preventing communication with people around them. Under the project, seven devices were purchased for non-verbal communication for pupils with aphasia, autism, dysarthria, intellectual disability and cerebral palsy. The direct beneficiaries of the project undertaken by a local association in partnership with PSE are persons who are unable to communicate in a comprehensible way. The ability to use modern equipment for communication is an opportunity for children and their families to make the daily lives easier. With the communicators purchased, the participants of the project can e.g. express their needs. Each message can be repeated any number of times. The communicators can record and hold up to several hundred messages. The devices enable dumb or speech-impaired persons to convey important information on their ideas and needs and participate in conversations. In addition, the communicators allow knowledge gained during lessons to be verified. On the other hand, a symbol printing program makes it possible to create books supporting communication.

Investment area: Construction of the Ostrołęka-Stanisławów 400 kV line
Amount of support: PLN 18,000
Category: Social exclusion
Number of beneficiaries: 100 pupils

10. Green Energy Centre

The Green Energy Centre was established **at the Primary School in Staw,** where "green lessons" can be conducted amidst nature. In is a garden with a total area of 600 m2, equipped with educational aids, such as weather instruments, information boards, as well as nest boxes, feeders, drinking boxes and insect houses. The Green Energy Centre consists of four separate stations with drees, an orchard and honey-yielding plants. The garden was also equipped e.g. with a gazebo serving a "green classroom", weather instruments, educational boards, as well as nest boxes and feeders for birds. It is the first place of this kind in Lubiszyn commune. A few dozen people from the Primary School in Staw and from PSE engaged in the project. The garden development work was carried out together by pupils and their parents, teachers and other school workers, as well as other residents of Staw and the surrounding villages, e.g. firemen, and members of the local country housewives' club. The volunteers took care of land levelling and setting out, laying paving blocks to the gazebo, transport and planting of plants, and construction of pathways. They also installed nest boxes, feeders and insect houses. The garden was also equipped with weather instruments: barometer, anemometer, rain gauge, and nature education boards.

Investment area: Construction of the Baczyna-Plewiska 400 kV line
Amount of support: PLN 20,000
Category: Environment
Number of beneficiaries: 1,200 residents

11. Mobile traffic park for children

A mobile traffic park for children was arranged on the premises of the Local Government Kindergarten in Celestynów. The park is used to foster and develop appropriate attitudes and habits related to the safe and responsible conduct of children on roads.

Investment area: construction of the Kozienice-Miłosna 400 kV line
Amount of support: PLN 16,250
Category: Health and medical care
Number of beneficiaries: 100 pupils

12. Smog No Joke – monitoring of air in the immediate surroundings and weather parameters

In Goworowo, PSE took part in the Smog No Joke practice – monitoring of air in the immediate surroundings and weather parameters. Under the practice, a weather station was purchased for the school with components including a Stevenson screen with measuring instruments, an automatic weather station and LCD screen for the display of data from the station, and a dust meter. The Stevenson screen contains thermometers, a hygrometer, a barometer, while a rain gauge and an anemometer are installed outside.

An information board on the front wall of the school building informs the pupils and all residents about the current air condition. The weather station is installed on the school roof and it shows measurement results automatically on-line. The results are also presented in a special tab on the

school's website. Owing to this project, the pupils have the opportunity to analyse weather parameters on an ongoing basis and carry out research projects. As a consequence of the initiative, a meteorology club was set up in the school.

Investment area: Construction of the Ostrołęka-Stanisławów 400 kV line
Amount of support: PLN 15,750
Category: Environment
Number of beneficiaries: 150 pupils

13. Polish School – Modern and Child-Friendly

Under the slogan "Polish School – Modern and Child-Friendly", the physics and chemistry lab was retrofitted and equipped at the Primary School in Bolków. Now the school has the only fully equipped physics and chemistry lab in the commune. The pupils will be able to acquire not only theoretical, but also practical knowledge through their own participation and experiments. The physics and chemistry lab with all facilities can be made available for open classes to other schools in the commune.

Investment area: Construction of the Mikułowa-Świebodzice 400 kV line
Amount of support: PLN 20,000
Category: Education
Number of beneficiaries: 150 pupils

14. Kozienice Bike Assistance

While cycling tourism is popular and promoted, many residents of Kozienice had no place where to repair a bike or make minor adjustments on their own. Also guests and tourists – enthusiasts of cycling excursions and rallies, frequently visiting the commune in the spring/summer season – sometimes found themselves in difficult situations. This need gave rise to Kozienice Bike Assistance – bicycle self-service bicycle infrastructure for residents and tourists, i.e. bicycle repair stations and open training in road safety. The stations were set up at the Vantage Point in Kępeczki, at Public Primary School No 4 in Kozienice and at the Delfin swimming pool. Not only cyclists find them useful – they also help parents with strollers, carers of disabled persons on wheelchairs, and can even be used to inflate sports balls or mattresses.

Investment area: Construction of the Kozienice-Miłosna 400 kV line
Amount of support: PLN 13,275
Category: Health and medical care
Number of beneficiaries: approx. 3,000 people annually

15. Refurbishment of library interiors

Equipment was purchased as part of the refurbishment of commune library interiors in Warmątowice Sienkiewiczowskie. Furniture was purchased for children, more than 200 books and recordings, and a corner was equipped for parents and guardians, who will be able to use comfortable armchairs and a collection of books with new acquisitions concerning child upbringing and education. With PSE's support, aids were also purchased for library lessons and art classes for children.

Investment area: Construction of the Mikułowa-Czarna 400 kV line
Amount of support: PLN 14,100

Category: Common public space development
Number of beneficiaries: approx. 200 residents

16. Looking forward with mechatronics – promoting equal educational opportunities in the commune

To expand the educational offering for children and youth in rural areas, PSE supported the purchase of a console with an LED matrix for programming exercises in schools in Męcinka and Piotrowice**.** Owing to this, pupils from the School and Preschool Complex in Męcinka and the School and Preschool Complex in Piotrowice will be able to use LED matrixes with replaceable boards and an English learning robot.

Investment area: Construction of the Mikułowa-Czarna 400 kV line
Amount of support: PLN 16,300
Category: Innovation
Number of beneficiaries: 150 pupils

17. Creating a table tennis section in Pielgrzymka with PSE

To promote sports activity of children and support the development of local sport/educational infrastructure. PSE donated table tennis equipment for the sport hall and daycare centre in Pielgrzymka. Thanks to thissport facilities were provided, needed to open the table tennis section in Pielgrzymka Commune.

Investment area: Construction of the Mikułowa- Świebodzice 400 kV line
Amount of support: PLN 20,000
Category: Health and medical care
Number of beneficiaries: 300 pupils

18. Choose a Bike and Wiązowna Cycling Routes

The growing interest in a healthy lifestyle, alternative means of transport and weekend tourism among resident and guests from outside the region underpinned the initiative to build a cycling route Wiązowna-Glinianka commune. Our organisation provided financial support to the establishment of the first (Central) route. It is the first of eight stages to be completed in Wiązowna-Glinianka commune.

A nearly 18-kilometre Central route was created, crossing a Natura 2000 site nearby nature preserves in the valley of the Świder and Mienia rivers. Just like the routes to be developed in the years to come, the first section runs along asphalt roads, dirt roads and, at places, along forest tracks. The route was marked and equipped with signposts, road signs, metal posts, and information boards. In future, benches, bicycle racks and rubbish bins are planned to be purchased. The route is suitable both for experienced cyclists and for cycling amateurs, families with children, or senior citizens.

The first cycling route starts at the Municipal Park in the centre of Wiązowna and runs through Piekło, Żanęcin, Pęclin, Kąck and Poręba. The section ends in Glinianka at Napoleońska St. The other seven routes are planned to be built in the coming years: Northern Route – from Zagórze to Kąck (over 15 km), Świder Route from Wiązowna to Glinianka (over 22 km), Partyzancki Route from z Kopki to Kąck (about 8 km), From Manor to Manor around Glinianka, Duchnów Link from Wiązowna to Duchnów (over 6 km), Warsaw Bridgehead Fortifications from Józefów to Stara Miłosna (about 19 km) and Michałów Link in Michałówek (about 1 km).

All the routes were set out by Paweł Ajdacki, tourism expert and councillor of Otwock poviat in collaboration with the Otwock Branch of the Polish Tourist and Sightseeing Society and the Tourist Information Centre. The route concept was consulted with residents and cyclists.

Investment area: Construction of the Kozienice-Miłosna 400 kV line
Amount of support: PLN 16,260
Category: Environment
Number of beneficiaries: Up to twenty thousand people annually

19. Educational and recreational trail across the Puszcza Biała forest

In order to encourage the community to engage in active leisure and make it possible to enhance and disseminate naturalist knowledge, our company designed and built a 7-kilometre nature education trail with educational stations, bike racks, birdhouses and directional boards. The trail runs across picturesque areas of Puszcza Biała, in the Wyszków Forest District. Apart from educational boards, different attractions are situated along the route, such as directional boards, bike racks, birdhouses and animal feeders

Investment area: Construction of the Ostrołęka-Stanisławów 400 kV line
Amount of support: PLN 19,900
Category: Environment
Number of beneficiaries: Up to twenty thousand people annually

20. Open Activity Zone at Łagiewniki spring

The Open Activity Zone at a spring in Łagiewniki is an outdoor gym which was set up to create a place for active leisure, physical activity and integration of residents. Previously, among 29 villages in Niemce commune only one had an outdoor gym. For access to a playground, residents of Baszki had to travel with their children to different parts of the region. The space for outdoor activity created with PSE's support addresses these inconveniences.

Investment area: Construction of the Chełm-Lublin Systemowa line
Amount of support: PLN 17,900
Category: health and medical care
Number of beneficiaries: 1,000 people annually

Ping-pong Dreams with PSE

Ping-pong Dreams with PSE is a unique nationwide initiative popularising table tennis among children aged 6-12 years. It is the first comprehensive offer of this kind in this field of table tennis in Poland, combining sport, educational and social values. The initiative is implemented through a multi-sectoral cooperation model which combines the objectives of: PSE (strategic partner engaged in the development of communes and their residents), the Polish Association of Table Tennis (PATT) together with local clubs (organiser initiating educational activities, selecting young talent, future national team members), communes and primary schools (building the region's brand and recognisability under the programme), and the Ministry of Sport and Tourism.

Objectives of the Ping-pong Dreams with PSE programme:

- Provide substantive and financial support to clubs by purchasing professional sport equipment, organising coach training sessions and activities with young participants.
- Create an efficient talent selection system which will cover selected regions of Poland, including locations where PSE implements investment projects;
- Improve the professional skills of PATT-affiliated coaches selected to conduct cyclic activities with young players – foster staff development, as an element necessary for training future national team members representing Poland in the European and international arena;
- Position the good neighbourly character of PSE's social projects focused on the developing and promoting activity of local communities – by providing equal opportunities in access to organised physical activity in cities, as well as in smaller communes;
- Develop the social dialogue with the inhabitants – direct recipients of PSE's activities, including the highlighting of the mission, role, tasks and significance of the company for the development of local economies;
- Foster empowerment by engaging employees in the strategic partner's social projects.

Ping-pong Dreams with PSE in 2019:

- PLN 250,000 project budget,
- 1,210 beneficiaries, including 1,120 players and 90 coaches,
- 70 clubs participating in the programme,
- 120 children from 15 schools situated in communes selected by PSE,
- 2 training sessions for coaches (in Warsaw and Zielona Góra) preceding autumn activities in clubs and schools,
- 10 Family Table Tennis Tournaments "Championship with PSE", organised for more than 140 pupils from 11 primary schools in PSE investment areas.

Communes in which the project was implemented:

- construction of the Kozienice-Miłosna 400 kV line,
- construction of the Lublin Systemowa-Chełm 400 kV line,
- construction of the Mikułowa-Czarna and Mikułowa- Świebodzice 400 kV line,
- construction of the Baczyna-Plewiska 400 kV line,
- construction of the 400 kV line from Skawina to the Tarnów-Tucznawa line tap, Rzeszów-Tucznawa line.

Schools – programme beneficiaries

- Dr Wanda Błeńska Primary School in Niepruszewo,
- Public Primary School in Cegłów,
- Public Primary School in Celestynów,
- Primary School in Deszczno,
- John Paul II Primary School in Chwarstnica,
- Polish Nobel Prize Winners Primary School in Pisarzowice,

- Polish Olympians Primary School in Baczyna,
- Primary School No 3 w Lwówek Śląski,
- Primary School in Niemce,
- Primary School in Zaręba,
- Henryk Sienkiewicz Public Integration Primary School in Świebodzice.

Social projects conducted when combatting COVID-19

In collaboration with the Ministry of Health, PSE has worked with healthcare establishments towards combatting and reducing the effects of the coronavirus causing the COVID-19 disease.

Owing to PSE donations, voivodeship and poviat healthcare units in Wielkopolska received equipment including ventilators, cardiac monitors, pulse oximeters, vital signs monitors and professional surface cleaning devices.

One of PSE's partners – the Central Depot for Sanitary and Anti-Epidemic Reserves in Poręby near Zduńska Wola – received a special vehicle for carrying RNA tests and extractors. This made it possible to accelerate testing of suspected COVID-19 patients.

PSE has also initiated the campaign #GiveCommunesPower (*#DajemyGminomMoc*). Under the campaign, we donated personal protection equipment consisting of disposable and multiple-use masks, face shields and protective overalls to over 40 local governments.

1. **Voivodeship Polyclinical Hospital in Konin**

- Owing to support from PSE in the amount of PLN 546,000, the hospital purchased:
  - masks for non-invasive ventilation,
  - non-invasive ventilators,
  - respiratory circuits,
  - respiratory circuit filters,
  - videobronchofiberoscopes,
  - airway suction devices,
  - cough assist machines,
  - oxygen therapy units,
  - portable pressure reducers,
  - pulse oximeters,
  - USG Doppler unit,
  - mobile surface disinfection unit.

2. **Specialist Medical Centre for Mother and Child in Poznań**

- Owing to support from PSE in the amount of PLN 546,000, the hospital purchased:
  - a ventilator, a decontamination unit,
  - vital signs monitors,

- small medical measurement devices (including finger pulse oximeters, touchless electronic thermometers, blood pressure monitors),
- personal protection equipment (FFP3 masks, surgical masks, waterproof overalls, protective aprons, protective goggles, face shields, disposable surgical gloves),
- disinfectants for hands (surfaces, rooms).

3. Central Depot for Sanitary and Anti-Epidemic Reserves in Poręby

- Owing to support from PSE in the amount of PLN 546,000, the depot received a vehicle for the transport of RNA tests and extractors.

Key figures

PLN 4.4 m– total value of PSE social projects in 2019 and in the 1st half of 2020.

6.3. Quality of Poles' lives vs electricity supply

Good practices and standards related to living and functioning in the vicinity of power lines

In using transmission facilities, it is very important to exercise maximum care and to be guided by common sense. Equipment forming power lines is designed so as to minimise the risk of negative impact on person present in the vicinity of the line. Line location is planned so that transmission equipment does not pose a risk to the surrounding human settlements and are integrated as much as possible into the landscape.

In order to eliminate possible threats, our qualified employees carry out cyclic line survey activities and asses their state of repair. In the event of circumstances requiring intervention, they take measures to eliminate situations that potentially threaten property and people in the vicinity of the line. Such actions are intensified especially in situations of increased risk or in critical situations, such as floods or hurricanes. In this aspect, cooperation between the company's employees and the owners of land neighbouring on power lines is also important. People living in the vicinity of a line are often the best source of information on any phenomena occurring. Their good will and assistance can significantly support the process of preventing potential risk or shorten the process of removing a failure.

In principle, the owners of properties on which transmission equipment is situated or over which there are power lines, have an unconstrained access to their properties which they can use freely subject to observing relevant precautions. Consequently, they can also, without time limitations, conduct business with the use of specific equipment and machinery, or carry on farming activities.

How to live in the vicinity of a line?

To live in the vicinity of a line in an undisturbed manner, one should simply exercise common sense and observe elementary precautions – especially within the right of way.

The right of way is the area directly under the power lines and on both sides of the line, in which work involved in line construction, conversion, upgrade and maintenance is allowed, and within which, for reasons of safety of line operation and the immediate surroundings, freedom of land management is restricted. The right of way can range between 50 m and 80 m, depending on the type of line.

For safety reasons, it is also necessary to refrain from any activities that could pose a risk to the efficient operation of the line and cause a potential hazard to people situated in its proximity. Any interference with the line and activities that could lead to its damage or electric shock, e.g. climbing pylons or performing field work with machines which have high booms or are high themselves.

PSE performs annual line surveys and assessments of their state of repair. In the event circumstances arise that may have an impact on the continuity of electricity supply or pose a risk to property or people in the vicinity of the line, we urgently implement remedial actions. All work – repairs, overhauls, clearing trees of excessive height – is performed by specialist teams of our organisation and at PSE's expense.

Facts worth knowing

The width of the right of way depends mainly on the line voltage rating and the type (series) of the towers used. The boundaries of the line right of way are set out on the basis of the requirements of regulations on the electric and magnetic field limits, and the noise limit.

The average width of the right of way for different types of extra high voltage lines operated in the country does not exceed: for **400 kV lines – 40 and 35 m from the axis**, depending on the line design; and for **220 kV – 25 m from the line axis on both sides**.

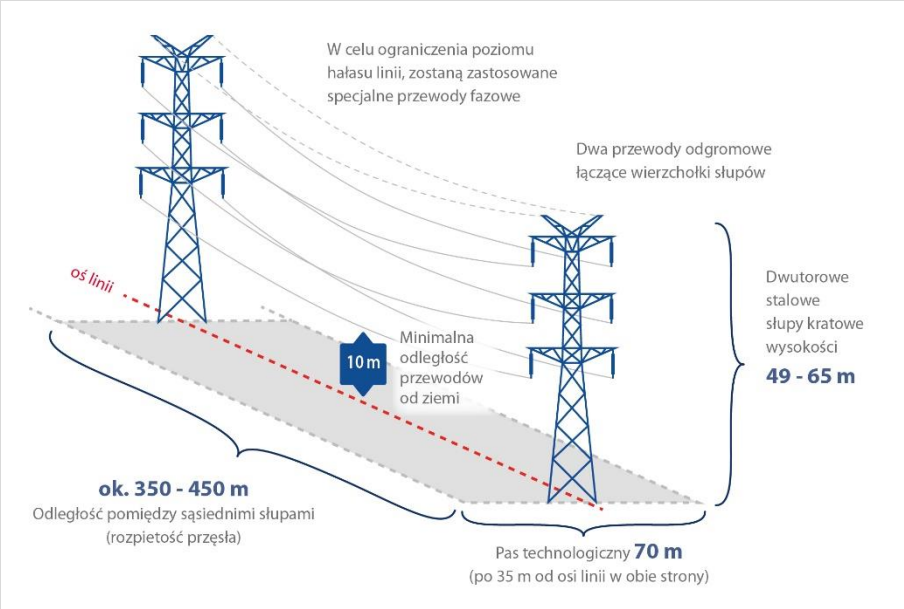


Fig. 1. Right of way for a 400 kV line. Source: http://liniapilaplewiska.pl/rozwi%C4%85zania-techniczne-i-technologiczne.html

W celu ograniczenia poziomu hałasu linii zostaną zastosowane specjalne przewody fazowe	In order to reduce line noise level, special phase wires will be used
Dwa przewody odgromowe łączące wierzchołki słupów	Two ground wires connecting pylon tops
Minimalna odległość przewodów od ziemi	Minimum wire-to-ground distance
oś linii	line axis
ok. 350 – 450 m Odległość pomiędzy sąsiednimi słupami (rozpiętość przęsła)	Approx. 350 – 450 m Distance between neighbouring pylons (span length)
Pas technologiczny 70 m (po 35 m od osi linii w obie strony)	70 right-of-way (35 m from line axis both ways)
Dwutorowe stalowe słupy kratowe wysokości 49-65 m	Double-circuit steel pylons of 49-65 m in height

Learn a few rules concerning conduct in the vicinity of power lines:

1. It is not allowed for unauthorised persons to climb towers and touch transmission equipment, in particular power lines.
2. It is not allowed to erect new residential buildings or new built structures with rooms intended for human occupation directly under the line or within its right of way (the area directly under the line and on its both sides).
3. Owners of properties used as cropland can freely cultivate crops and work with the use of heavy farming equipment (harvesters, tractors, sowing machines, and other mechanical farm machines). Precautions must be taken in doing so, especially in situations where the machines or equipment used have long booms or are high themselves.
4. Under overhead lines or in their immediate vicinity, there are no restrictions concerning cattle or other breeding animals grazing, nor any obstacles to setting up fishponds. According to reference studies and data published by the World Health Organisation (WHO), electromagnetic fields in the extra-high voltage line environment are not harmful to breeding animals.
5. It is not allowed to plant trees that could grow dangerously close to power lines – owing to the potential risk of power lines being touched by tree branches. PSE maintains ongoing monitoring of the facilities owned by the company. In case of above-standard growth of trees or shrubs in the vicinity of lines, relevant clearing work is carried out. The work is performed at the behest and expense of PSE, and the wood material obtained as a result of clearing is transferred to property owners. Our company conducts tree clearance based on a five-year standard, with the contractor giving a four-year warranty for its work. The distance of wires from tree crowns is thus determined according to the current crown dimensions, taking into account the five-year height growth specific to the particular tree species and habitat. In case of an above-standard growth during the warranty period, additional work is carried out immediately at the contractor's expense. Clearing work is required only under specific circumstances. In situations where decorative or orchard trees are planted, which do not reach significant heights, such work is not necessary.

Facts worth knowing

Outside the designated right of way, no adverse environmental impact of power lines can possibly occur. In addition, stringent requirements are met, imposed on residential development areas.

6.4. PSE's activities in the context of the transmission tariff and electricity bills

Electricity transmission from power plants to consumers is possible over an extensive transmission infrastructure. Responsibility for infrastructure on the part of PSE involves the need to carry out maintenance, inspection and repair work, and perform necessary, economically justified upgrades and expansions. This is aimed to address changes arising e.g. from an increase in demand and the energy consumption structure in the country, as well as the change of the structure and location of generating sources.

Maintaining the required quality parameters of electricity supplied and ensuring PPS operation security is associated with the need to purchase ancillary services provided by electricity generators.

Financing of expenses related to the transmission business, i.e. operating costs and capital expenditure, is based on the rules set forth in the applicable legal provisions, and expenses are covered by income from transmission services based on the application of the company's Tariff approved by the President of ERO.

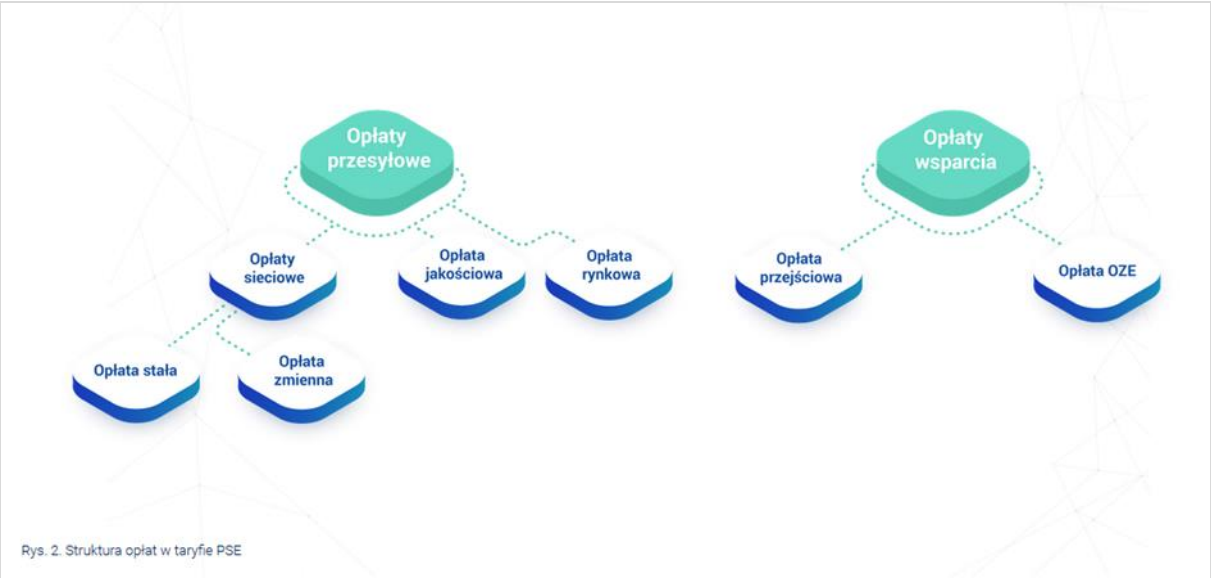
The tariff is a set of prices and at charge rates, and conditions for their use developed each year on the basis of planned, reasonable costs of business, as well as return on capital employed in transmission activities, intended for the financing of investment projects. The costs providing a basis for the calculation of charge rates for transmission services are subject to assessment by the President of ERO who approves the Tariff in an administrative procedure.

In 2019, PSE SA Tariff contained tariff charge rates:

- **calculated by the TSO** on the basis of the cost of PSE's transmission activities and return on capital,
- **set by the President of ERO, not related directly to PSE's activities** – RES charge connected with ensuring the availability in the PPS of electricity from renewable sources. In 2019, the RES charge rate was 0 PLN/MWh,
- **resulting from the Act on the promotion of electricity from high-efficiency cogeneration (in force since 25 January 2019) not related directly to PSE's activities** – cogeneration charge related to ensuring the availability in the PPS of electricity from high-efficiency cogeneration; the cogeneration charge rate for 2020 and the successive years will be set by the minister in charge of energy;
- **resulting from the Act on termination of long-term contracts (LTCs) not related directly to PSE's activities** – transitional fee related to the PPS access service.

All revenue collected by PSE in respect of the RES charge, cogeneration charge and the transitional fee is transferred to the Settlement Body, a company responsible for its redistribution to generators.

Structure of charges in PSE's tariff



Rys. 2. Struktura opłat w taryfie PSE

Rys. 2. Struktura opłat w taryfie PSE	Fig. 2 Charge structure in PSE tariff
Opłaty przesyłowe	Transmission charges
Opłaty wsparcia	Support charge
Opłata stała	Fixed charge
Opłaty sieciowe	Network charges
Opłata zmienna	Variable charge
Opłata jakościowa	Quality charge
Opłata rynkowa	Market charge
Opłata przejściowa	Transitional charge
Opłata OZE	RES charge

According to the electricity market operation model in Poland, **PSE settles accounts for transmission services with consumers physically connected to the transmission network within the territory of Poland, i.e.:**

- **distribution system operators (DSOs)**, for whom the costs of acquisition of services from PSE represent justified costs of business and are taken into account in calculating their tariffs for electricity distribution services,
- **final consumers.**

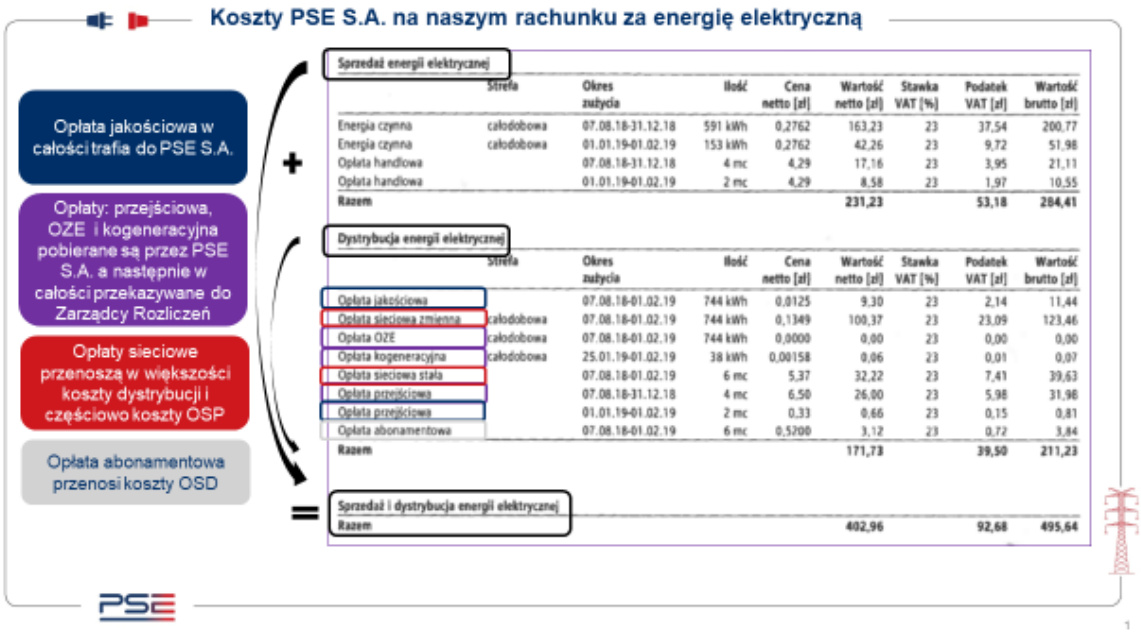
The consumers identified above – physically connected to the PSE network – are thus responsible for all costs taken into account in calculating the transmission charge rates.

Generators do not pay transmission charges in respect of feeding electric energy into the network. They only pay the quality charge – for the quantity of electricity consumed by final consumers connected to their networks, facilities and equipment, to whom they sell electricity.

Traders do not make any tariff payments to PSE, except the market charge, which is applied only to electricity imported into Poland from Ukraine.

Facts worth knowing

In the case of distribution-connected consumers (DSO network), including households, the cost of electricity supply, in addition to costs related to DSOs' activities also includes PSE's operating costs, i.e. those related to the purchase of transmission services from the TSO by DSOs.



Koszty PSE S.A. na naszym rachunku za energię elektryczną	PSE costs in our electricity bill
Opłata jakościowa w całości trafia do PSE S.A.	The quality charge is received in whole by PSE S.A.
Opłata przejściowa, OZE i kogeneracyjna pobierane są przez PSE S.A. a następnie w całości przekazywane do Zarządcy Rozliczeń	The transitional, RES and cogeneration charges are collected by PSE S.A. and then transferred in whole to the Settlement Body
Opłaty sieciowe przenoszą w większości koszty dystrybucji i częściowo koszty OSP	Network charges shift mostly distribution costs and partly TSO's costs
Opłata abonamentowa przenosi koszty OSD	The subscription charge shifts DSOs' costs

Facts worth knowing

The average net rate of the charge for transmission services provided by PSE in 2019 (without the rates for support charges, i.e. without the transitional fee, the cogeneration charge and the RES charge, which amounted to PLN 0/MWh in 2019) represented only approx. 5.3% of the average gross rate for households. The net rate of support charges (transitional fee, cogeneration charge and RES charge) represented 0.5% of the average gross rate for households.

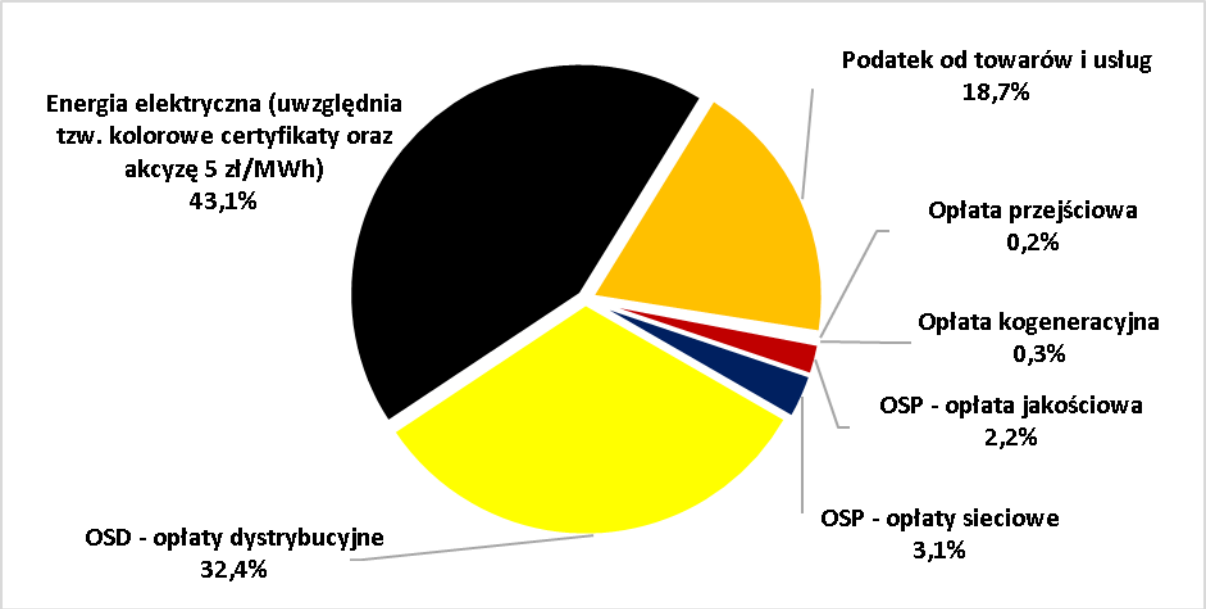


Fig. Structure of the household consumer's electricity bill in 2019.

Energia elektryczna (uwzględnia tzw. kolorowe certyfikaty oraz akcyzę 5 zł/MWh)	Electric energy (includes "colour certificates" and excise duty at PLN 5/MWh
Podatek od towarów i usług	Value added tax.
Opłata przejściowa	Transitional charge
Opłata kogeneracyjna	Cogeneration charge
OSP - opłata jakościowa	TSO - quality charge
OSP - opłaty sieciowe	TSO – network charges
OSD – opłaty dystrybucyjne	DSO – distribution charges

Facts worth knowing

The bill amount for households is influenced mainly by:

- the electricity price,
- distribution service costs,
- value added tax.

6.5. PSE's HR development priorities

<Ten rozdział docelowo zostanie linkowany z obszarem Ludzie i relacje w ramach modelu tworzenia wartości PSE>

[GRI 103-1] One of basic objectives is the sustainable and consistent support to the development of employee's competences leading to the achievement of results in line with strategic plans.

The Personnel Policy defines the areas on which the effective implementation of PSE's strategy depends. The Personnel Policy is founded on PSE values and corporate culture, which expand into three Personnel Policy **Pillars**.

Personnel Policy Pillars:

I. **The values we observe** and the related attitudes and conduct rules we respect are:

- **Reliability**
- **Credibility**
- **Responsibility**

II. **High quality**

We value and promote high quality combined with performance, reliability and efficiency.
High quality is characterised at PSE by:

- **Cooperation**
- **Knowledge exchange**
- **Drawing on the potential of employees** working in a collaborative manner and meeting their responsibilities.
- **Continuous improvement of processes and efficiency.**

III. Improvement

We develop and improve by combining tradition with modernity. For us, improvement means:

- **Innovation and flexibility**
- **Developing ourselves and the organisation**
- **Creating and accepting change;**
- **Improving while respecting what has proven to work.**

PSE's success is determined primarily by knowledge, skills and competence of our employees. Therefore, we attach great importance to how we treat each other, how we define our values and objectives, and what attitudes are desirable among employees.

The Policy is addressed to all PSE employees. The provisions of the Policy are widely communicated across the Company. They are also an element of the induction programme for new employees.

As part of the implementation of the Personnel Policy and promotion of appropriate attitudes, in the spring of 2019 meetings were held with employees in Konstancin-Jeziorna and in all ZKO locations, during which the Personnel Policy assumptions were presented. In addition, employees had an opportunity to listen to two lectures on values: "How to cope in a world of uncertainty and change" and "Effective and satisfied, or looking at the engineer's way".

Table GRI 102-8 Information on employees and other workers in the organisation, by duration of employment, gender and region

Dane w tabeli można ukazać poprzez ikonografię	Total number of employees by gender	
	2019	2018
Women	551	510
Percentage of women (%)	21.71	21.46
Men	1,987	1,866
Percentage of men (%)	78.29	78.54
Total	**2,538**	**2,376**

GRI 102-8	Total number of employees by duration of employment, gender and region	Number of employees 2019			Number of employees 2018		
		Women	Men	Total	Women	Men	Total
Konstancin-Jeziorna	Employed under fixed-term contracts	33	78	111	41	94	135
	Employed under indefinite-term contracts	328	684	1,012	321	733	1,054
	Total	**361**	**762**	**1,123**	**362**	**827**	**1,189**
Warsaw	Employed under fixed-term contracts	3	35	38	0	16	16
	Employed under indefinite-term contracts	23	197	220	26	197	223
	Total	**26**	**232**	**258**	**26**	**213**	**239**
Bydgoszcz	Employed under fixed-term contracts	2	21	23	3	16	19
	Employed under indefinite-term contracts	35	167	202	28	151	179
	Total	**37**	**188**	**225**	**31**	**167**	**198**
Radom	Employed under fixed-term contracts	6	35	41	3	13	16
	Employed under indefinite-term contracts	35	209	244	30	197	227
	Total	**41**	**244**	**285**	**33**	**210**	**243**
Poznań	Employed under fixed-term contracts	11	23	34	3	30	33
	Employed under indefinite-term contracts	26	238	264	26	206	232
	Total	**37**	**261**	**298**	**29**	**236**	**265**
Katowice	Employed under fixed-term contracts	8	34	42	1	21	22
	Employed under indefinite-term contracts	41	266	307	28	192	220
	Total	**49**	**300**	**349**	**29**	**213**	**242**
Total	Employed under fixed-term contracts	63	226	289	51	191	242
	Employed under indefinite-term contracts	488	1,761	2,249	459	1,675	2,134
	Total	**551**	**1,987**	**2,538**	**510**	**1,866**	**2,376**

Table GRI 102-8 Information on employees and other workers in the organisation, by working time and gender

GRI 102-8	Number of employees	Number of employees 2019	Number of employees 2018

	by working time:	Women	Men	Total	Women	Men	Total
Total	Full-time	536	1,969	2,505	493	1,849	2,342
	Part-time	15	18	33	17	17	34
	Total	**551**	**1,987**	**2,538**	**510**	**1,866**	**2,376**

GRI 102-8	Number of employees and associates (converted to persons) by form of employment	Number of employees and associates					
		2019			2018		
		Women	Men	Total	Women	Men	Total
Employed under contracts for services		18	17	**35**	0	1	1
Employed under contracts for specific work		0	0	0	0	0	0
Employed under internship contracts		0	0	0	0	0	0
Self-employed		0	0	0	0	0	0
Employees under supervision and/or seasonal workers		0	0	0	0	0	0
Total		**18**	**17**	**35**	0	1	1

[GRI 103-2]

Recruitment and internship programmes

In 2019, PSE offered internship positions for university students and graduates to gain their first professional experience under three different programmes for the first time.

Energy Internship

Since 2013, the Energy Internship programme has been pursued, under which the most talented power engineering students and university graduates are acquired to work with the company. The programme provides for the employment of selected persons under contracts of employment for a period of 10 months. During that period, each intern develops his or her knowledge under the guidance of a mentor assigned to them. Following the internship, the candidate has an opportunity of permanent employment with our organisation. In 2019, our company hired 13 people after they completed their internships. In the six editions of the programme held so far from the beginning of the programme, 37 interns have been employed in total, 32 of whom are continuing employment with PSE.

Energy for the Future

In 2019, PSE joined the Energy for the Future internship programme undertaken in coordination with the Ministry of Climate (previously the Ministry of Energy) and energy sector companies (PLN Orlen, PGNiG, PGE).

The objectives of the programme are as follows:

- build human resources for the Polish energy sector by acquiring the best student of technical universities interested in working in the energy sector;
- familiarise interns with the specificities of work in the country's key energy companies and in the Ministry of Climate;
- prepare interns for work in the energy sector.

The Energy for the Future internship programme was developed so as to enable each intern to gain specific skills and experience in the energy-related areas of interest to them and to plan their career path. In 2019, PSE recruited 6 interns under the programme.

Energy Academy

It is one of the training/educational programmes of Lesław A. Paga Foundation, addressed to those who see their professional future in the energy sector. The objective of the Energy Academy is to enable young people to lean best industry practices and draw experience from experts. Those invited to participate in the project include students of graduates of engineering, economic, legal and related studies who are under 27 years of age.

Under the project, on 29 March 2019, we hosted lectures by our by our experts for more than 30 participants of the programme at PSE headquarters in Konstancin-Jeziorna. The future specialists could learn about the role of the transmission system operator in the power system and familiarise themselves with the electricity market operation rules and the challenges facing PSE. The workshop was received enthusiastically by the participants and effectively encouraged many of them to apply for participation in the Energy Internship programme.

Job fairs

In 2019, in order to increase the effectiveness of the recruitment processes and to attract the best candidates, PSE took part in a number of job fair events :

- *Absolvent Talent Day* – an event hosted by the Electronic Youth Activity Promotion Centre in Poznań (April 2019),
- Work Stricken. Employees' Panel – an event hosted by the SEP (Association of Polish Electrical Engineers) Student Club at the University of Science and Technology in Bydgoszcz (May 2019),
- *Data Science Summit 2019* – an event addressed to the IT industry (June 2019),
- IT Job Fairs IT at Warsaw University of Technology – an event addressed to the IT industry (November 2019),
- IT Job Fairs at University of Warsaw MIM Department – an event addressed to the IT industry (November 2019),
- What the Hack – a conference combined with a trade fair – an IT Security event (November 2019).

Other initiatives supporting recruitment

In 2019, our organisation increased its activity related to building the employer's brand. As part of these activities, we started promoting job offers through the company's LinkedIn profile. Another initiative was the Fridays with Recruiter information campaign on LinkedIn. The addressed the action to all those interested in working with PSE. On each Friday, Joanna Wójcik from the Recruitment, Training and Development Department was answering questions for 3 hours, encouraging those interested to participate in recruitment processes.

Another activity aimed to strengthen PSE's positive image as an employer was a set of training events improving managers' recruitment skills in terms of legal aspects and internal recruitment rules. All staff in managerial roles were invited to participate in the training.

Delivery of training

[GRI 404-2, GRI 103-1, GRI 103-2] In 2019, we continued development work through a **training catalogue** addressed to all employees of the company. The training offer is being updated and expanded on a continuous basis so as to best address the needs of the organisation and employees.

PSE's training catalogue has been prepared in such a way as to optimise the selection of training within the available budget in terms of effective fulfilment of tasks and the employee's diagnosed needs, as well as the company's objectives. It is a tool that facilitates the systematic development of knowledge, skills and qualifications of our employees, which has already become a permanent feature of our organisation.

Training products are divided in the catalogue into five categories:

1. **Manager Academy management training** – improving managerial and leadership skills of the executive and managerial staff and tailored to the needs of each manager;
2. **Specialised/expert training** – concerning the subject matter closely related to the substantive nature of work in a given area or in a given job position;
3. **Training developing soft skills** – improving personal skills and supporting effective, task-oriented work;
4. **Induction, introductory, periodic and on-the-job training** – addressed to all employee groups irrespective of functional areas and hierarchies; provide basic, universal knowledge indispensable in work;
5. **Industry conferences.**

In 2019, workshop activity proposals appeared in the training catalogue, designed to improve the social skills or managerial staff and employees in five subject-matter groups:

- leadership,
- management,
- employee motivation and development,
- communication,
- efficiency.

The latest proposals in the training catalogue include:

- 5 Decisions – Exceptional Performance,
- Assertive Communication and Defence against Manipulation,

- Managerial Stress,
- Difficult Management Conversations,
- Feedback.

In addition to the development of social competences, the proposals addressed to PSE employees include project management training and procurement law training. In 2019, specialist training was also delivered on other topics:

- Construction Law,
- Environmental Protection Law,
- Cultural Differences in Business.

The need to increase the availability of training for employees outside the offices in Warsaw and Konstancin-Jeziorna, diagnosed in 2018, prompted the provision of training also in other locations of the company. 9 training events were delivered at ZKO offices for employees and managerial staff.

As in the previous year, in the course of training preparations we adopted environmentally-friendly arrangements – most training material is provided to participants in electronic form. Only materials needed for classes are printed, which substantially allows paper consumption to be significantly reduced.

Table GRI 404-1 Average hours of training per year per employee by gender and employment structure

GRI 404-1	Total hours of training by gender					
	2019			2018		
	Women	Men	Total	Women	Men	Total
Total hours of training by gender	7,328	33,648	**40,976**	5,272	23,448	**28,720**
Number of employees (values identical to the data from GRI 102-8)	551	1,987	**2,538**	510	1,866	**2,376**
Average hours of training by gender	13.30	16.93	**16.14**	10.34	12.57	**12.09**

GRI 404-1* Employment structure	Total number of employees by employment structure	Total training hours by employment structure	Average training hours by employment structure
	2019		
Assistant	**7**	**64**	9.14
Director	**34**	**200**	5.88
Dispatcher	**130**	**1,768**	13.60

GRI 404-1* Employment structure	Total number of employees by employment structure	Total training hours by employment structure	Average training hours by employment structure
	2019		
RCN Duty Officer	**5**	**0**	0.00
Substation Duty Officer	**132**	**3,256**	24.67
Expert	**97**	**256**	2.64
Electrical Fitter	**10**	**0**	0.00
Main Specialist	**260**	**3,736**	14.37
Trader	**3**	**16**	5.33
Inspector	**46**	**1,736**	37.74
Equipment Maintenance Inspector	**4**	**48**	12.00
Engineer	**24**	**352**	14.67
Equipment Maintenance Engineer	**8**	**136**	17.00
Section Manager	**50**	**720**	14.40
Division Manager	**196**	**3,336**	17.02
Junior Specialist	**149**	**3,040**	20.40
Legal Counsel	**42**	**576**	13.71
Clerk	**6**	**0**	0.00
Secretary	**3**	**16**	
Specialist	**470**	**8,392**	17.86
Specialist Coordinator	**360**	**5,280**	14.67
Senior Inspector	**8**	**96**	12.00
Senior Engineer	**7**	**32**	4.57
Senior Specialist	**405**	**7,344**	18.13
Senior Technician	**9**	**96**	10.67
Intern	**14**	**16**	1.14
Technician	**3**	**16**	5.33
Deputy Director	**46**	**192**	4.17
Other positions*	**10**	**256**	25.60
TOTAL	**2,538**	**40,976**	

*The employment structure adopted takes into account the common Company Collective Bargaining Agreement applicable to the whole company since 2018. In previous years, PSE reported this indicator in accordance with the CCBAs in force at the individual ZKOs. The data presented apply to all locations.

Development programmes

In 2019, as well as a year before, the development programme for the executive staff, PSE Manager Academy was conducted in a manner tailored to the individual needs of persons holding managerial roles. Each manager could choose 3 14 training subjects improving soft skills. This formula was met with appreciation from the management, all the more so as new, interesting subject proposals for this employee group appeared in 2019.

Apart from catalogue training, in 2019 we continued development programmes operated for years, focused on ensuring the correct operation of the Polish Power System. Traditionally, significant elements of development activities included 2 dedicated development programmes for the O&M and dispatching personnel.

New education and development platform

In 2019, PSE started work to implement a training management tool, which was also an educational platform. The first stage of work made it possible to provide access to e-learning functionalities in February 2020. In June, the expanded employee profile was implemented as well as the option to create and provide access to knowledge guides, collections and tests.

Building the feedback culture

In 2019, PSE took steps towards building open communication among employees as well as feedback giving and receiving skills. An information campaign was organised featuring a series of humorous posters promoting appropriate attitudes. We also invited third-party experts who delivered lectures titled:

- "The Art of Giving and Receiving Feedback",
- "Feedback in the Organisation: Towards the Dialogue Culture".

In addition, workshop activities were included in the training catalogue, concerning feedback at different levels of the organisation: for senior and mid-level managerial staff and for employees. The new training options were met with interest.

HR Newsletter

Since 2017, the Human Resources Management Department has been issuing a weekly HR Newsletter providing in a clear and transparent way all significant up-to-date HR information. This form of communication is addressed directly to directors, who cascade it to managers and employees, as necessary.

PSE health diagnosis

The OHI (Organisational Health Index) survey is a part of the programme which is aimed to create an innovative organisation capable of quick adaptation. In 2019, the OHI survey was carried out for the fourth time. 1,305 employees took part in the survey, which meant a turnout rate of 49 percent.

According to the survey, **PSE's organisational health level remained at the same level as a year before**. However the difference in health assessment between senior executives and other employees increased. The results for individual departments change in different directions, which may be indicative of a low level of coordination of improvement initiatives.

According to surveys, **responsibility** remains a strength of our organisation. The lowest-rated element of the organisational health is **motivation.** The strengths mentioned most often include **development, competence, responsibility, technologies and investments.** The positive values indicated during the survey also included **direction and vision, innovation and knowledge**.

Last year and over a span of 4 years, internal orientation has also significantly improved, both in terms of the practices followed and effects witnessed by employees.

Despite the fact that performance was maintained at the same level, employees can see may activities pursued by the company towards improvement of its corporate culture. PSE is viewed as a stable and responsible organisation.

Employee appraisal system

As in the previous years, all PSE employees underwent periodic appraisals based on a simplified performance appraisal system introduced in 2017. Performance appraisal of employees in specialist positions is carried out on a quarterly basis (provided that at least 1 month has been worked) against a 3-degree scale, where the ratings are as follows:

N – not acceptable,

A – acceptable,

S – special.

The executive staff, legal counsel and experts were covered by the Management by Objectives system which provides for the achievement of strategic objectives cascaded by the Management Board to individual managers and based on the company's strategy. Management by Objectives is a complex and performance-oriented method of appraisal, but also, very importantly, it is conducive to boosting the commitment of the staff to the pursuit of strategic objectives and facilitates the monitoring of the achievement of objectives.

GRI 404-3	Percentage of employees receiving regular performance and career development reviews, by gender	2019 (%)	2018 (%)
Percentage of employees of the organisation receiving regular performance and career development reviews, by gender:		100	100
Women		100	100
Men		100	100

Table GRI 102-41 Employees covered by collective bargaining agreement

GRI 102-41 Total number of employees by:	Number of employees in 2019	Number of employees in 2018
Total number of employees covered by collective bargaining agreement	2,536	2,165
Total number of employees	2,538	2,376
Percentage of employees covered by collective bargaining agreement	99.92	91.1*

*The Company Collective Bargaining Agreement (CCBA) covers all employees hired under contracts of employment and the employees of PSE Inwestycje, who were successively covered by the agreement as part of their employment within the PSE structure in the transitional period. Two employees of PSE Inwestycje were not subject to all provisions of the CCBA.

The CCBA governs, first of all, the mutual rights and obligations of the parties to the contract of employment, including benefits closely related to work.

Table GRI 401-1 New hires in 2019

GRI 401-1	Total number of new hires by:	Number of employees		Number of newly hired employees		Percentage of newly hired employees (converted to persons)	
		2019	2018	2019	2018	2019	2018
Gender							

Women	551	510	67	60	12.16%	11.76%
Men	1,987	1,866	240	186	12.08%	9.97%
Age groups						
<30	297	214	134	79	45.12%	36.92%
30-50	1,662	1,603	154	149	9.27%	9.30%
>50	579	559	19	18	3.28%	3.22%
Total	**2,538**	**2,376**	**307**	**246**	**12.10%**	**10.35 %**

Table GRI 404-1 Departures in 2019

GRI 401-1	Total number of employee departures by:	Number of employees		Number of employee departures		Percentage of employee departures	
		2019	2018	2019	2018	2019	2018
Gender							
Women		551	510	22	23	3.99%	4.51%
Men		1,987	1,866	115	61	5.79%	3.27%
Age groups							
<30		297	214	13	21	4.38%	9.81%
30-50		1,662	1,603	55	47	3.31%	2.93%
>50		579	559	69	16	11.92%	2.86%
Total		**2,538**	**2,376**	**137**	**84**	**5.40%**	**3.54%**

Table GRI 202-1 Remuneration of the lowest-level employees by gender relative to the minimum pay

GRI 202-1	Minimum wage at a given location (gross value in PLN)		Average remuneration of the lowest-level employee WOMEN		Ratio of lowest-level remuneration to the minimum pay WOMEN		Average remuneration of the lowest-level employee MEN		Ratio of lowest-level remuneration to the minimum pay MEN	
Location	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Konstancin-Jeziorna	2,250	2,100	5,752.91	5,627.00	2.56	2.68	5,637.08	5,805.00	2.51	2.76
Bydgoszcz	2,250	2,100	5,076.89	4,769.00	2.26	2.27	4,941.35	4,786.29	2.20	2.28
Katowice	2,250	2,100	4,785.08	3,853.00	2.13	1.83	4,981.24	3,700.00	2.21	1.76
Poznań	2,250	2,100	4,605.70	5,404.16	2.05	2.57	5,217.70	5,190.60	2.32	2.47
Radom	2,250	2,100	4,969.79	5,966.65	2.21	2.84	5,075.41	5,997.28	2.26	2.86
Warsaw	2,250	2,100	5,312.83	4,000.00	2.36	1.9	5,252.55	3,500.00	2.33	1.67

Impact indicator

Equivalent of additional benefits

[GRI 103-1, GRI 401-2] Employee health-promoting benefits and programmes

PSE provides an extensive welfare package to its employees and their families. The benefits that PSE's employees could receive in 2019 included: The Employee Pension Scheme, meal subsidies, prevention scheme, leisure subsidies for employees and their children, housing loans, subsidies to school residential trips, nurseries and kindergartens, as well as cultural activity subsidies.

Employee health-promoting benefits and programmes			
Type of additional benefit	Number of persons who received a benefit		Purpose of benefit
	2019	2018	
Leisure subsidies for employees and their children	2,300	2,325	Maintaining work-life balance, arranging holiday trips for employees' children, helping employees to spend time with their families during holiday trips.
Medical care	2,192	2,077	Providing employees with better access to health prevention, improving employees' health.
Subsidising forms of sport, recreational and cultural/educational activities.	2,341	2,134	Improving physical and health condition, creating opportunities for employees to foster their interests, opportunities to participate in interesting cultural events, support in maintaining work-life balance.

Aid schemes in the transitional period supporting retirement

Employees acquiring pension rights at PSE have the opportunity to receive several mandatory and optional benefits:

Obligatory benefits:

- retirement severance pay in amounts dependent on years of service at PSE and the time of termination of the contract of employment (up to 500 percent of the pay base);
- compensation for the loss of funding of electricity costs (twice the average wage at the company).

Optional benefits:

- base pay rise by up to 10 percent during two years before retirement.

GRI EU 15 Percentage of employees eligible to retire in the next 5 and 10 years				
Employee categories	Number of employees eligible to retire in 5 years	Percentage of employees eligible to retire in 5 years	Number of employees eligible to retire in 10 years	Percentage of employees eligible to retire in 10 years
Assistant	1	0.04%	2	0.08%
Director	3	0.12%	5	0.20%
Dispatcher	10	0.39%	18	0.71%
RCN Duty Officer	0	0.00%	1	0.04%
Substation Duty Officer	10	0.39%	48	1.89%
Expert	13	0.51%	22	0.87%
Electrical Fitter	0	0.00%	2	0.08%

Main Specialist	25	0.99%	39	1.54%
Trader	0	0.00%	0	0.00%
Inspector	1	0.04%	4	0.16%
Equipment Maintenance Inspector	1	0.04%	2	0.08%
Engineer	3	0.12%	4	0.16%
Equipment Maintenance Engineer	2	0.08%	2	0.08%
Section Manager	2	0.08%	8	0.32%
Division Manager	18	0.71%	36	1.42%
Junior Specialist	1	0.04%	3	0.12%
Legal Counsel	1	0.04%	3	0.12%
Clerk	3	0.12%	4	0.16%
Specialist	44	1.73%	71	2.80%
Specialist Coordinator	41	1.62%	63	2.48%
Senior Inspector	5	0.20%	6	0.24%
Senior Engineer	1	0.04%	1	0.04%
Senior Specialist	23	0.91%	41	1.62%
Senior Technician	0	0.00%	3	0.12%
Intern	0	0.00%	0	0.00%
Technician	3	0.12%	3	0.12%
Deputy Director	3	0.12%	8	0.32%
Other positions	2	0.08%	4	0.16%

6.6. Highest safety standards

[GRI 103-1] Activities promoting work safety

In order to strengthen the safety culture at PSE, the Life Saving Rules (LSR) have been developed. It is a set of general rules of conduct which refer to the greatest risks related to the company's activities. The rules specify the responsibilities of the personnel performing tasks, prohibited activities and responsibilities of work supervisors. The rules are addressed to PSE employees and associates. The rules are formulated as catch phrases demanding specific actions, which are listed below:

1. Keep safe distance! – due to the risk to health and life caused by electric shock and arc burning while live working or working near live equipment;
2. Follow the work order and use checklists! – for work on grid assets under conditions of special risk based on a written order;
3. Observe safe organisation of work in the power sector!;
4. While working at heights, protect yourself and your tools against falls!;
5. Always use working clothes and shoes, as well as personal protective equipment where required!;
6. Drive safely!;
7. React to and report dangerous situations!;

The LSRs are displayed both at our offices and at substations, in the form of relevant posters and animations. We know from our colleagues that the materials are often a reference point for talks on safety as part of internal and external meetings (safety moments).

Professional risk assessment

At PSE, professional risk assessment has been performed for identified groups of job positions. Risk documentation has been developed according to the PN-N-18002 methodology in the three-degree scale and the Risk Score. All employees newly hired in 2019 and employees changing job positions

were informed about the professional risk occurring in a particular position. They acquired knowledge of threats, preventive measures, methods and organisation of work.

Number of persons acquainted with risk assessment in 2019	
Field units	**Number of persons**
Konstancin-Jeziorna	99
Bydgoszcz	48
Katowice	35
Poznań	32
Radom	45
Warsaw	33
CENTRAL INVESTMENT UNIT (CIU)	45

Tab. Number of persons acquainted with risk assessment taking into account groups of job positions

Preventive health protection

Medical examinations are mandatory for every employee working at PSE and are conducted on an ongoing basis. Pre-placement, periodic and follow-up medical examinations are conducted by a physician authorised to perform preventive examinations on the basis of a referral containing information on all harmful factors and noxious conditions existing in a given job position. Preventive medical examinations are conducted under an agreement with the Lux Med occupational medicine centre. Periodic medical examinations are conducted at dates designated by a physician authorised to conduct preventive examinations. In 2019, no contraindications were found for work in existing job positions nor any case of occupational disease was recorded.

Number of preventive examinations conducted in 2019						
	Number of persons covered by the contract*	**Total annual cost of preventive healthcare [PLN net]**	**Number of preventive examinations conducted**			
			Total	**Pre-placement/Change of job position**	**Periodic**	**Follow-up**
Katowice	264	185,440	161	40	113	8
Warsaw	258	185,379	159	47	99	13
Bydgoszcz	213	148,779	111	44	64	3

Radom	276	191,052	126	40	74	12
Poznań	270	199,094	129	24	101	4
Konstancin-Jeziorna	784	654,183	367	99	231	37
CENTRAL INVESTMENT UNIT (CIU)	364	255,529	169	60	104	5
TOTAL	**2,419**	**1,819.456**	**1,222**	**354**	**786**	**82**
*As at 31 December 2018						

Tab. Number of preventive examinations conducted

Active monitoring – facility inspections

Field units	Number of inspections scheduled	Number of inspections performed	Number of follow-up recommendations issued
Konstancin-Jeziorna	5	5	10
Bydgoszcz	18	21	139
Katowice	34	43	258
Poznań	28	36	147
Radom	21	23	90
Warsaw	25	27	76
TOTAL	**131**	**155**	**760**

[GRI 103-2] All activities aimed at improving OHS performance that we had planned for 2019 were completed. At the same time, a number of additional measures were taken, i.e.

- improvement of the integrated OHS management system according to the PN-N-18001:2004 standard,
  - → preventing accidents at work, occupational diseases and near misses – preventive and adjusting measures,
  - → identification of hazards and risk management – analysis of HSEQ hazard notifications,
  - → monitoring the working environment - OHS and fire protection inspections,
  - → improving employee skills – participation in training,
  - → development and upgrading of the network infrastructure – giving opinions on standards and design documentation;
- periodic training in OHS was conducted. Training was provided for employees working in administrative/office, engineering/technical positions and managers was delivered in the form of guided self-study while training in blue-collar positions was conducted in the form of on-the-job instruction.

Tab. Number of OHS training events delivered

Number of employees trained in OHS in 2019						
	Introductory training	Periodic training				
		White-collar positions	Engineering/ technical positions	Blue-collar positions	Managerial personnel	Total
Konstancin-Jeziorna	104	100	80	0	50	230
Bydgoszcz	44	4	59	48	90	201
Katowice	33	6	51	85	14	156
Poznań	32	1	0	86	107	194
Radom	42	7	31	83	7	128
Warsaw	33	9	54	82	104	249
CENTRAL INVESTMENT UNIT (CIU)	45	134	87	0	96	317

Evacuation training with the participation of the National Fire Service in 2019		
	Number of evacuation training events	Number of National Fire Service exercises
Konstancin-Jeziorna	1	1
Bydgoszcz	4	0
Katowice	2	2 (3-day)
Poznań	3	2 (3-day)
Radom	4	1 (3-day)
Warsaw	3	0
CIU (Cracow)	0	0
Total	**17**	**6**

Evacuation exercises with the participation of the National Fire Service

OHS Committee

The OHS Committee operates at our company, which is composed of equal numbers of the employer's representatives (including representatives of the OHS function and a physician providing health care services to employees), and employees (including the Social Labour Inspector). The Committee operates at PSE level, with local organisational units.

The Committee's responsibilities include performing reviews of working conditions and periodic status assessments of OHS, issuing opinions on measures taken by the employer to prevent accidents at work and occupational diseases, and drafting conclusions concerning the improvement of working conditions.

GRI 403-1 **Workers representation in formal joint management–worker health and safety committees**	**Unit**	**2019**	**2018**
Number of OHS committee members	number	**10**	**19**
Percentage of employees who work for organisations represented in formal committees for occupational health and safety (consisting of management and employees), advising on occupational health and safety schemes and monitoring such schemes	%	**100%**	**100%**

GRI 403-2 **Type and rate of injuries*, occupational diseases, lost days and absenteeism, and total number of work-related fatal accidents, by region and by gender**	**YEARS**	
	2019	**2018**
Total number of accidents (incidents) at work, of which	4	5
– Women	0	3
– Men	4	2
Number of serious accidents (incidents)	0	0
– Women	0	0
– Men	0	0
Number of light accidents (incidents)	4	5
– Women	0	3
– Men	4	2
Accident frequency rate	1.65	2.10
– Women	0	1.26
– Men	1.65	0.84

GRI 403-2 Type and rate of injuries*, occupational diseases, lost days and absenteeism, and total number of work-related fatal accidents, by region and by gender	YEARS	
	2019	2018
Accident severity rate	7.5	79.6*
– Women	0	17
– Men	7.5	146
Number of declared occupational diseases	0	0

* In PSE's 2018 Impact Report, the accident severity rate was reported at 42.8. The discrepancy in the determination of this rate results from the fact that an employee who suffered an accident in 2018 was a on sick leave which continued in 2019. After the completion of treatment, the absence period was included in the 2018 rate, i.e. the year when the accident occurred.

Accident rates

Work accident frequency rate at PSE against average employment.

$$WW = \frac{liczba\ wypadków \times 1000}{śr.zatrudnienie}$$

$\mathbf{WW_{2019}} = \mathbf{4x1000/2419} = 1.65$

Wskaźnik częstotliwości wypadków przy pracy	Work accident frequency rate
liczba wypadków x 1000	number of accidents x 1000
śr zatrudniene	avge employment

Work accident severity rate at PSE

$$WC = \frac{liczba\ dni\ zwolnienia\ lekarskiego}{liczba\ wypadków}$$

$\mathbf{WCW_{2019}} = \mathbf{30/4} = 7.5$

Wskaźnik ciężkości wypadków przy pracy	Work accident severity rate
liczba dni zwolnienia lekarskiego0	sick leave days
liczba wypadków	numer of accidents

HSEQ in figures

Number of detected unsafe conditions (UCs) and unsafe acts (UAs); number of HSEQ checks

The following were recorded during the period between January and December 2019:

- 2,215 HSEQ observations,
- 1,881 unsafe conditions (UCs),
- 282 unsafe acts (UAs),
- 52 positive observations.

During the period between January and December 2019, 409 HSEQ checks were carried out on the new build projects in progress.

GRI EU18 **Percentage of contractor employees that have undergone relevant OHS training (estimate based on HSEQ checks)**	**Unit**	**2019**
Percentage of contractor employees that have undergone relevant OHS training, working on active electrical substations (training conducted by Substation Duty Officers)	%	100
Percentage of contractor employees that have undergone relevant OHS training required by law (estimate based on HSEQ checks)*	%	99

*The data apply to employees hired by PSE suppliers, which means that the OHS training obligation rests with the suppliers.

New HSEQ requirements for Contractors implementing PSE investment projects

In 2019, work was continued to improve the effectiveness of supervision over contractors in the field of HSEQ, encompassing OHS, fire protection, and environmental protection. In particular, standard contractual clauses were developed containing HSEQ requirements. The clauses were elaborated in three versions, with the subject matter and level of detail being graded according to the requirements imposed on contractors. The variation of clause versions makes it possible to adjust contractual provisions to risks arising in implementing a particular contract. HSEQ clauses are used by PSE in all investment contracts, also for operation and maintenance work, which is possible owing to their universal character. The use of HSEQ clauses arises from standards implemented at the company, its strategy and policy, as well as broad-based responsibility for the safety of people and the natural environment. The improvement of contractual conditions is also an element of cooperation with PSE's contractors. We are seeking to jointly enhance the awareness of the significance of safety of people and the natural environment, as well as solidarity-based commitment to matters related to the safety of employees, equipment, infrastructure in the working environment, and the environmental protection.

Since 2019, PSE has been using a rate system of liquidated damages for discovered cases of beach by the contractor of specific rules and regulations on occupational health and safety, fire protection rules and regulations, as well as environmental protection rules and regulations. The rate system is incorporated in new contracts entered into with contractors for investment projects and O&M work.

Activities promoting work safety

"Safety Leadership, or safety in contract performance" is the title of a conference on safety culture which was held in 2019 by the Working Environment Management Office at PSE for contractors engaged in investment projects and O&M work for us. The conference was aimed to enhance the awareness of the significance of safety of people and the natural environment, as well as commitment to matters related to the safety of employees, equipment, infrastructure in the working environment, and the environmental protection issues. The meeting was held at the company's headquarters in Konstancin-Jeziorna. Representatives of 32 contracting firms who participated in the meeting were welcomed by members of PSE's Management Board. On behalf of PSE, the conference was also attended by directors of the Central Investment Unit, Operations Department, Administration Department, ICT Department, Communication Department, and the Legal Office. The meeting was divided into a conference part and a workshop part. In the first part, the participants discussed OHS, environmental protection and quality guidelines as well as the HSEQ penalty rates, approved by the Management Board of PSE as contract requirements for contractors. In the workshop part, contractors' representatives and the company's employees jointly performed a hazard and risk assessment (HRA) analysis and a root cause analysis (RCA) for set event scenarios.

VII. ABOUT THE REPORT

CHAPTER VII: ABOUT THE REPORT

Key messages of the chapter

PSE sets reporting standards for its own impact on the environment in the domestic market and in the industry.

The 2019 Report presents in an integrated manner the impact of PSE on the economy and the market, the natural environment, as well as society and employees.

The report was prepared in compliance with the IIRC Guidelines and GRI Standards.

7.1. About the reporting process

We are unceasingly improving the reporting process

We are proud to be able to again present to you our report on PSE's impact on the development of the national economy and society. The publication presents in an integrated manner the financial and non-financial data enhanced with calculations of the company's impact on the economy and public finances, society and natural environment. This is already the sixth social report of our organisation, and the fourth report which is integrated and published in an interactive version.

The main objectives of the publication are to demonstration the challenges facing PSE and the entire power sector and the measures taken by the company in response to these challenges, in particular regarding the implementation of new and continuation of existing strategic initiatives. We also wanted to show the scale of PSE's impact on the social and economic environment, meeting stakeholders' expectations regarding the presentation of expected financial and non-financial issues, and strengthening the transparency of our company.

[GRI 102-54] With the aim to ensure the high reporting quality, in preparing our report we followed the guidelines of the International Integrated Reporting Council and the Global Reporting Initiative Standards (GRI Standards), Core compliance option. In financial reporting we followed the requirements of the Accounting Act of 29 September 1994. (Journal of Laws of 2016, item 1047, as amended).

We prepared the chapter on PSE's impact on the market and the economy in accordance with the methodology developed by a third-party expert on the basis of the Wassily Leontief's model, also called the inter-branch flow model or Input-Output model. The method focuses on studying the interdependencies between branches of the economy and enterprises. The model was based on the most recent inter-branch flow tables in current basic prices for domestic production in 2010, published by the Central Statistical Office in 2018. To demonstrate how strongly our activity affect the economy and society, we used three areas of key importance for its growth: added value, jobs and wages.

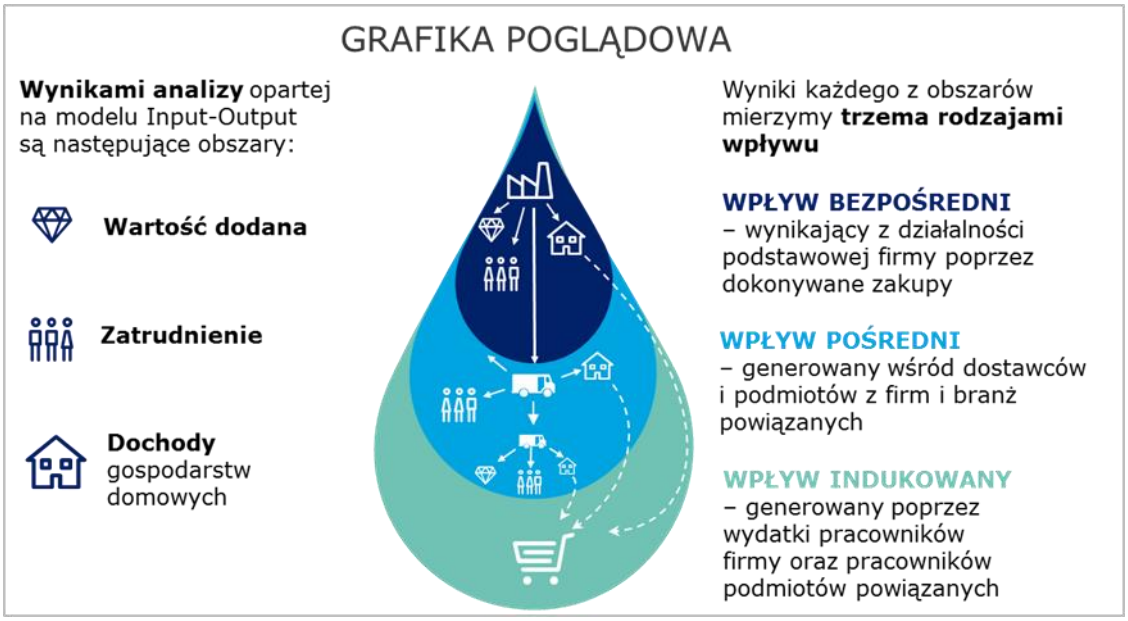


Fig. 1. Inter-branch flow model visualisation

GRAFIKA POGLĄDOWA	ILLUSTRATIVE GRAPHIC
Wynikami analizy opartej na modelu Input-Output są następujące obszary:	The results of the analysis based on the Input-Output model are the following areas:
Wartość dodana	Added value
Zatrudnienie	Employment
Dochody gospodarstw domowych	Household income
Wyniki każdego z obszarów mierzymy trzema rodzajami wpływu	We measure the outputs of each area with three types of impact
WPŁYW BEZPOŚREDNI - wynikający z działalności podstawowej firmy poprzez dokonywane zakupy	DIRECT IMPACT - resulting from the company's core business through purchases made
WPŁYW POŚREDNI - generowany wśród dostawców i podmiotów z firm i branż powiązanych	INDIRECT IMPACT - generated among suppliers and entities from related companies and industries
WPŁYW INDUKOWANY - generowany poprzez wydatki pracowników firmy oraz pracowników podmiotów powiązanych	INDUCED IMPACT - generated by expenditure of the company's employees and related employees

[GRI 102-50, GRI 102-51, GRI 102-52] In the report, we present issues which are important for our environment. They include data from 1 January 2019 to 31 December 2019 and selected 2020 data showing an up-to-date and complete picture of Polskie Sieci Elektroenergetyczne. No significant changes occurred in the reported period in the company's size, structure or form of ownership. The Report does not include any adjustments to information from the previous report.

As regards indicators, our report covers the 2017-2019 period, and even a four-year perspective, in order to depict the trends that have taken place as a result of a number of changes that have taken place within the organisation, processes implemented and standards improved each year.

We committed ourselves to publish successive reports every year as integrated reports enhanced with impact indicators.

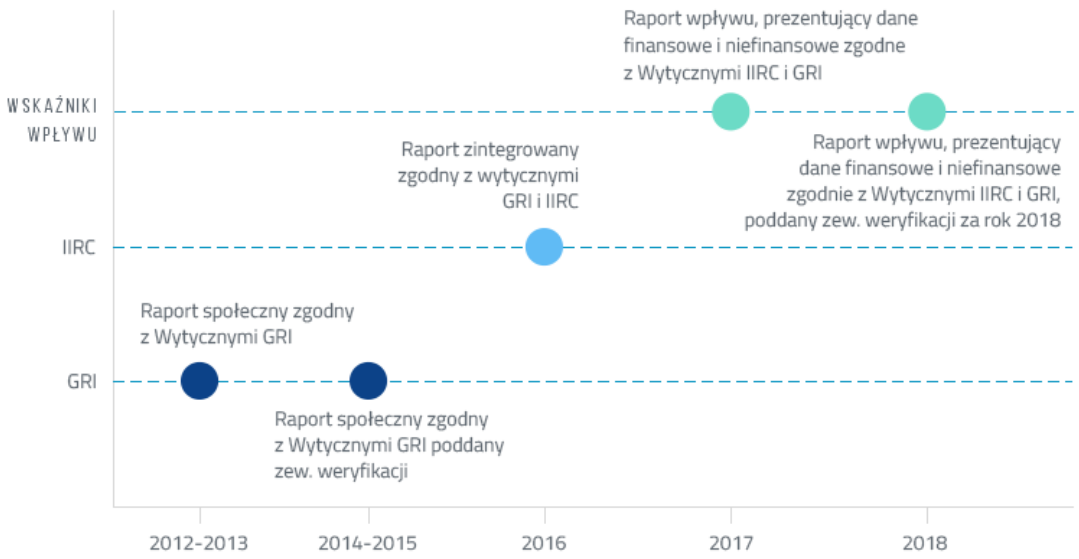


Fig. PSE reporting process

WSKAŹNIKI WPŁYWU	IMPACT INDICATORS
Raport wpływu prezentujący dane finansowe i niefinansowe zgodnie z Wytycznymi IIRC i GRI, poddany zew. weryfikacji za rok 2018	Impact Report presenting financial and non-financial data in accordance with IIRC and GRI Guidelines, subjected to external verification for 2018
Raport zintegrowany zgodny z Wytycznymi GRI i IIRC	Integrated Report consistent with GRI and IIRC Guidelines
Raport społeczny zgodny z Wytycznymi GRI	Social Report consistent with GRI Guidelines
Raport społeczny zgodny z Wytycznymi GRI poddany zewn. weryf.	Social Report consistent with GRI Guidelines and subjected to external verification

[GRI 102-46] Selection of issues for the report

In line with the international guidelines, the process of selecting issues proceeded in three stages:

1. Identification

The identification of issues relevant for sustainable development as well as areas of the company's impact on the environment was based on:

- an analysis of our company's responsibility to the economy and the market, society and the natural environment,
- a review of challenges for the power sector,
- an analysis of foreign and domestic energy companies' reporting trends,
- the standards adopted by PSE for integrated reporting,
- a review of the issues reported so far,
- an analysis of key impact indicators, GRIs, and PSE's own indicators,
- a review of documents defining business challenges in the context of sustainable development – Sustainable Development Goals,
- analysis of internal documents.

[GRI 102-42] The analysis of internal strategic documents and internal consultations with representatives of PSE's organisational units enabled us to identify our stakeholder groups.

2. Prioritisation

[GRI 102-43] The development of the report is one of the elements of the social dialogue that PSE periodically conducts with its stakeholders based on the AA 10000 SES standard. The fourth dialogue session was held on 22 May 2019 at the company's headquarters in Konstancin-Jeziorna. The event was attended by more than 100 participants, of whom 75 percent of the stakeholders had already previously participated in our sessions two or three times. During the meeting, our partners assessed the way PSE operates and its impact on the environment, and identified key issues which influenced the structure of this edition of the Impact Report. In creating the Report, we also took into account the results of the web-based questionnaire survey conducted in the latter part of 2019.

Our stakeholders include primarily:

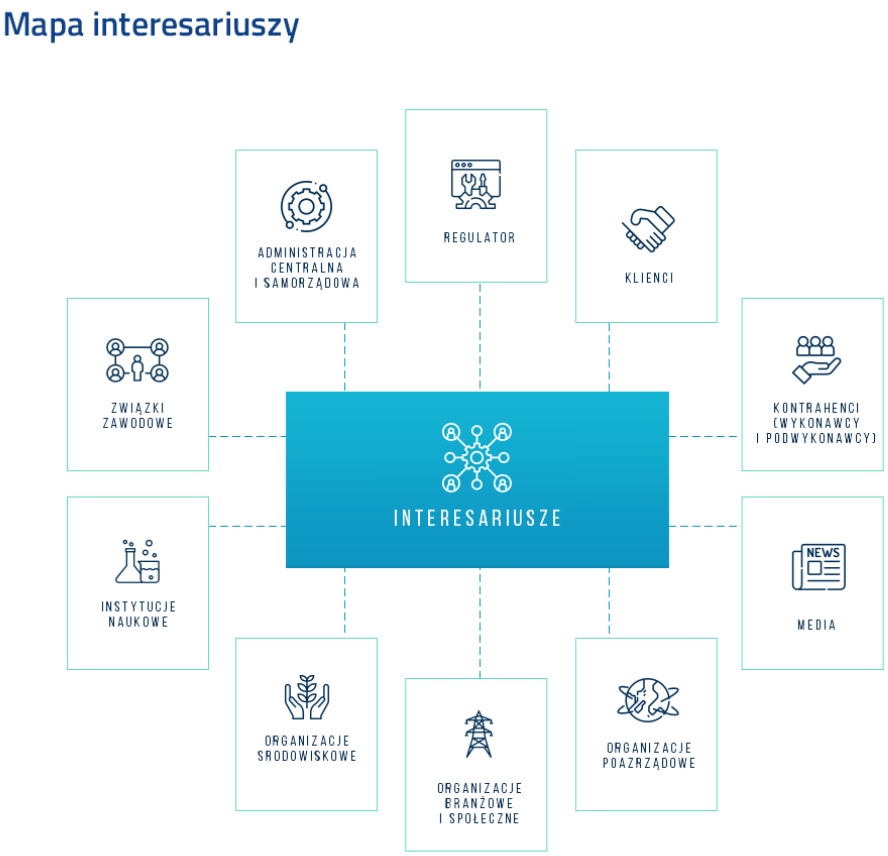


Fig. PSE's stakeholders

Interesariusze	Stakeholders
Administracja centralna i samorządowa	Central and local administration
Regulator	Regulator
Klienci	Customers
Związki zawodowe	Trade unions
Kontrahenci (wykonawcy i podwykonawcy)	Counterparties (contractors and subcontractors)
Instytucje naukowe	Research institutions
Organizacje środowiskowe	Environmental organisations
Organizacje branżowe i społeczne	Industry and civic organisations
Organizacje pozarządowe	Non-governmental organisations
Media	Media

3. Validation

We also performed a questionnaire survey among PSE's management staff in order to identify what they consider key issues to be discussed in our company's next impact report.

In the course of internal meetings and consultations with PSE's organisational units, we confirmed the materiality matrix including the key topics to be reported and the report content structure.

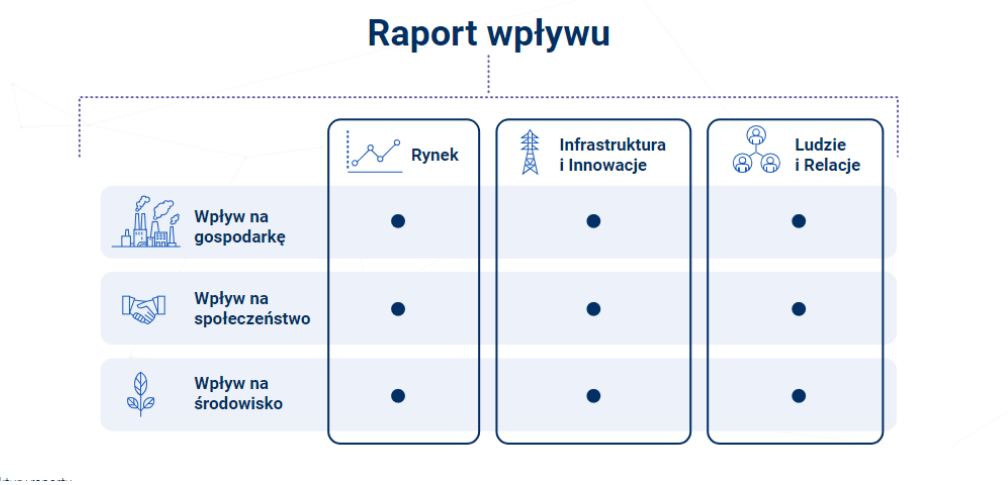


Fig. Approach to the report structure

Raport wpływu	Impact Report
Rynek	Market
Infrastruktura i Innowacje	Infrastructure and Innovations
Ludzie i Relacje	People and Relationships
Wpływ na gospodarkę	Impact on the economy
Wpływ na społeczeństwo	Impact on society
Wpływ na środowisko	Impact on the environment

Materiality Matrix

[GRI 102-47] Based on the results of a dialogue session with stakeholders and web-based questionnaire surveys, as well as in-house studies and a quality analysis, **16 key issues were identified in 4 areas of responsibility:**

- to the market,
- at the workplace,
- to society,
- to the natural environment.

Material issues which should be included in the report, in the opinion of our company and its stakeholders, are presented in the matrix.

Fig. Materiality Matrix (to be completed)

Environment assessment – external stakeholders (results of dialogue session and questionnaire survey),
Organisation interior assessment (questionnaire survey results and internal consultations).

Responsibility to the market	
1	Long-term security of electricity supply (preventing the blackout risk) – implementing the capacity market and supporting tools
2	Transmission system development plan
3	Requirements and standards of cooperation with contractors and subcontractors (new method of contracting – implementation of the Contractor Qualification System)
4	Structure of the power system in Poland and the role of PSE
5	Strengthening innovation and implementing new technologies
6	Representing the interests of the national electricity market in the European electricity market
7	Focus on solutions aimed at adjusting the Polish Power System to the new design of the markets and new technologies (including the energy storage methods, e-mobility, distributed generation – energy from RES)
8	Improvement of the new model of infrastructure project implementation
9	Management of the regulatory risk arising from provisions of the Clean Energy Package for All Europeans (substantive support to government administration)
10	Management of the risk of infrastructure unavailability, including critical infrastructure assets
11	PSE CG Cybersecurity Programme
Responsibility at the workplace	
12	Adaptive capacity of the Company: know-how, structures and internal procedures prepared for quick legislative changes taking place in the energy market, and the technical and organisational requirements of new solutions.
Responsibility to society	
13	Winning social acceptance for line routes (including the acquisition of transmission easement) and social communication around investment projects
14	Minimising the negative social impact of projects being implemented (noise, interference with the landscape)
15	Promoting energy security knowledge and implemented educational programmes

Responsibility to the natural environment	
16	Responsibility to the natural environment in project implementation, minimising impact on the natural environment in PSE's operations, including preservation of biodiversity in investment project implementation areas.

[GRI 102-44] Tab. Topics material to PSE and the environment

[GRI 103-1, GRI 102-44] Key topics for PSE and boundaries of their impact included in the report

Topics material to PSE and boundaries of their impact included in the report			
Topics defined as material	Topics covered by GR standards	Impact of topic within the organisation	Impact of topic outside the organisation
Responsibility to the market			
Long-term security of electricity supply (preventing the blackout risk) – implementing the capacity market and supporting tools*	Indirect economic impact	PSE S.A.	In particular material to customers
Transmission system development plan	Strategy	PSE S.A.	In particular material to suppliers, customers, contractors and subcontractors
Requirements and standards of relationship with contractors and subcontractors (new method of contracting – implementation of the Contractor Qualification System)	Procurement practices	PSE S.A.	In particular material to contractors and subcontractors
Structure of the power system in Poland and PSE's role*	Organisation profile Economic performance	PSE S.A.	In particular material to customers
Strengthening innovation and implementing new technologies	Strategy	PSE S.A.	In particular material to customers
Representing the interests of the national electricity market in the European electricity market	-	PSE S.A.	In particular material to owner and participants of the electricity market
Focus on solutions aimed at adjusting the Polish Power System to the new design of the markets and new technologies (including the energy storage methods, e-mobility, distributed generation – energy from RES)	Strategy	PSE S.A.	In particular material to the owner and participants of the electricity market as well as RES, environmental and social organisations

Topics material to PSE and boundaries of their impact included in the report			
Topics defined as material	Topics covered by GR standards	Impact of topic within the organisation	Impact of topic outside the organisation
Improving the new infrastructure investment implementation model*	Strategy	PSE S.A.	In particular material to contractors, subcontractors and suppliers
Management of the regulatory risk arising from provisions of the Clean Energy Package for All Europeans (substantive support to government administration)	-	PSE S.A.	In particular material to owner and participants of the electricity market
Management of the risk of infrastructure unavailability, including critical infrastructure assets*	-	PSE S.A.	In particular material to customers
PSE CG Cybersecurity Programme	-	PSE S.A.	In particular material to owner and participants of the electricity market
Responsibility at the workplace			
Adaptive capacity of the Company: know-how, structures and internal procedures prepared for quick legislative changes taking place in the energy market, and the technical and organisational requirements of new solutions.	Employment Regulatory compliance	PSE S.A.	In particular material to potential employees and the regulator
Responsibility to society			
Winning social acceptance for line routes (including the acquisition of transmission easement) and social communication around investment projects	Local community	PSE S.A.	In particular material to local communities
Minimising the negative social impact of projects being implemented (noise, interference with the landscape)	Local community	PSE S.A.	In particular material to local communities
Promoting energy security knowledge and implemented educational programmes	Indirect economic impact	PSE S.A.	In particular material to local communities
Responsibility to the natural environment			
Responsibility to the natural environment in project implementation, minimising impact on the natural environment in PSE's operations, including preservation of biodiversity in investment project implementation areas.	Compliance with environmental regulations Environmental assessment of suppliers	PSE S.A.	In particular material to local communities

***** A broad-impact aspect

Tab. Topics material to PSE and boundaries of their impact included in the report

In the report, we have described in detail the key topics specified above, presenting both our approach to dealing with them and the corresponding indicators.

We have also decided to present other topics of significance to reporting so as to best reflect their nature and importance to our company. These include issues such as:

- **Climate challenges and measures taken by PSE in this area;**
- **PSE's activities during the COVID-19 pandemic;**
- **The circular economy;**
- **PSE's approach to risk management.**

Prudence principle

[GRI 102-11] Detailed issues presented in the report are based on the Strategy of Polskie Sieci Elektroenergetyczne, adopted by the Management Board, endorsed by the Supervisory Board and approved by the General Meeting of Shareholders. The management approach was presented in accordance with the procedures described in corporate governance regulations and standards in force at PSE. All published information presented in the report has been verified for compliance with internal documents of the company, and supervision of activities in the different areas is exercised by management staff. Strategic decisions are taken at the Management Board level.

Credibility of the report

[GRI 102-56] The report was subjected to the internal and external assurance process. Reliability of the report, its content and compliance with guidelines was examined by the PSE CG Sustainable Development Team. External assurance was carried out by an independent unit whose choice was approved by the Management Board.

VIII. GLOSSARY

AIT	an indicator of Average Interruption Time in the power transmission system; expressed in minutes per year, it is a product of 60 and energy not supplied (ENS) by the power system, divided by the average power supplied by the transmission system, expressed in MW.
ATC allocation method	a method of capacity calculation and allocation on the border between systems or zones, where commercial volumes of capacity are offered on the basis of arrangements made between operators of two neighbouring bidding zones in the period prior to capacity allocation (i.e. before the capacity auction), taking into account physical properties of the zones and having regard to congestions and expected demand for trading capacity
CACM	Capacity Allocation and Congestion Management
CEE	Central and Eastern Europe region
CJI	Central Investment Unit (*Centralna Jednostka Inwestycyjna*
CERT PSE	PSE Computer Emergency Response Team
CORE	a region created by merging the CEE and CWE regions
CORE CCR	the Core Capacity Calculation Region
CWE	the Central-West Europe region
Report date .....October 2020	
ENS	an indicator of electrical energy not supplied by the power transmission system. Expressed in MWh per year, it represents a sum of products of power not supplied due to interruption and its duration. The indicator includes short, long and very long interruptions, including or excluding catastrophic interruptions.
ENTSO-E	European Network of Transmission System Operators for Electricity
EV	electric vehicle
FBA	Flow-Based Allocation
FBA MC	Flow-Based Market Coupling
PSE CG	PSE Capital Group
Main location of the organisation	Head Office based in Konstancin-Jeziorna
GRI Standards	Global Reporting Initiative Standards

HSEQ	Health and Safety, Environment and Quality
IEC	International Electrotechnical Commission)
CI	critical infrastructure
IoT	Internet of Things
DSR IP	DSR Intervention Programme
IRiESP	Transmission Network Code
ICT	Information and Communication Technology
IT	Information Technology
OU	organisational unit – PSE's organisational structure including department, office and the Central Investment Unit.
JWCD	Centrally Dispatched Generating Units
EC	European Commission
PPS	Polish Power System, also referred to as "power system"
Co-optimisation	simultaneous procurement of energy and reserves
LIP	Local Implementation Project
MW	megawatt
NCBiR	National Centre of Research and Development (*Narodowe Centrum Badań i Rozwoju*)
nJWCD	Non-Centrally Dispatched Generating Unit (*jednostka wytwórcza niebędąca jednostką wytwórczą dysponowaną centralnie*)
EHV	extra high voltage
LV	low voltage
ODM	Area Power Dispatch Centre (*Obszarowa Dyspozycja Mocy*)
ORed	reduction facilities (*obiekty redukcji*)
ORM	Operating Power Reserve (*Operacyjna Rezerwa Mocy*)
DSO	distribution system operator

TSO	transmission system operator, also referred to as "operator"
OT	Operational Technology
RES	Renewable Energy Sources
PEC	Prosumer Energy Cloud)
EMF	electromagnetic field
PZI	Investment Projects Plan (*Plan zamierzeń inwestycyjnych*)

PRSP "Development Plan for meeting the current and future electricity demand", also referred to as "Transmission Network Development Plan", drawn up by the Transmission System Operator for a period of 10 years.

PRSP is a directional document containing a plan of transmission network investment proposals of a upgrading/development nature, the implementation of which contributes to the improvement of the technical and economic operation conditions of the Polish Power System.

PRSP takes into account the strategic domestic development objectives of the power sector as well as the EU regulations and plans for the development of cross-border interconnections.

At its preparation stage, PRSP is subject to consultation with the interested parties and it is agreed with President of the Energy Regulatory Office.

Redispatching	a measure activated by one or more system operators where the generation or load pattern is changed in order to change physical flows within the transmission system and reduce congestions
RCM	Reliability Centred Maintenance
RCN	Regional Supervision Centre (*Regionalne Centrum Nadzoru*)
IDM	Intraday Market
DAM	Day Ahead Market
CM	capacity market
ROC	Regional Operation Centre
RSCI	Regional Security Coordination Initiatives

ES	Electrical substation
MV	medium voltage
Company	PSE
SwePol	Poland-Sweden interconnection
PSE field locations	locations of PSE S.A. in Bydgoszcz, Katowice, Poznań, Radom and Warsaw.
TSCNET	TSCNET Services GmbH, a company whose activities include the services of technical support to transmission system operators in operational planning processes and support in carrying out concept work under the regional initiative TSO Security Cooperation. The shareholders of TSCNET Services are a dozen or so European transmission system operators
TSC	Transmission System Operators Security Cooperation; an initiative established in December 2008 whose objective is to improve the operational security of the interconnected power systems in Central Europe through the intensification of cooperation between operators
TSO	technical system owner
EU	European Union
ERO	Energy Regulatory Office
HV	high voltage
WCD	electricity supply continuity index
XBR	bilateral redispatching
XBID Platform	IT trading platform for cross-border Single Intraday Coupling, based on a central IT system connected with local trading systems of NEMOs and Transmission System Operators, supporting Single Intraday Coupling.
NEMO	Nominated Electricity Market Operator. An entity designated by the President of ERO or a competent regulatory authority in another member state to perform tasks related to Single Day-Ahead or Single Intraday Coupling”;

SIDC	Single Intraday Coupling. A process in which orders placed are matched in a continuous manner and simultaneously cross-zonal capacity is allocated to different bidding zones in the Intraday Market.