Polskie Sieci Elektroenergetyczne

Integrated Impact Report

Polskie Sieci Elektroenergetyczne S.A.

We supply Poland with power

EDITION: 2022

INDUSTRY: POWER ENGINEERING

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I. LETTER FROM THE PRESIDENT OF PSE

[GRI 102-14, GRI 102-15]

Dear Sir/Madam,

I am honoured to present the Impact Report of Polskie Sieci Elektroenergetyczne for 2021. The publication shows the company's financial and non-financial data in an integrated manner, but above all it presents the impact of operations of PSE on the economy, public finances, society and environment.

Last year was dominated by events that particularly affected the global economy and the oil and power sector that is part of it. In the spring and autumn of 2021, the impact of the pandemic was felt, while in the second half of the year, political and economic tensions began to build up in relations with Russia, which were reflected in the prices of energy resources, in particular gas. Russia's invasion of Ukraine has exacerbated these phenomena. The power system has been influenced by both global and regional market-driven factors, as well as by the regulatory changes that determine the operations of PSE. At the same time, the discussion about the future shape of the energy market in the EU has been continued for several years.

Regardless of the environment and external situation, the priority for our organisation is and will be to ensure the safe and economical operation of the power system. Its stable operation means a reliable supply to all consumers. This would not be possible without investing in the development and maintenance of the extra high voltage infrastructure. In 2021, infrastructure investments amounted to PLN 969.7 million. Between 2023 and 2032, we plan to allocate approx. PLN 36 billion for this purpose.
In the face of a growing energy crisis, PSE has a number of tools at its disposal to balance the system. Four years ago, the capacity market was implemented to support the security of operation of the NPS. The assumption is that it should guarantee generation adequacy in the medium and long term, providing the financing necessary to maintain the existing and build new generation sources. Therefore, the capacity market is also an important part of the transformation of the power sector. In 2021, we carried out a number of processes to enable the signing and execution of capacity agreements. A total of 128 capacity agreements were concluded as a result of the main auction, including 17 for a period of more than one year. This allowed for achieving 7.2 GW of total capacity obligations resulting from the concluded agreements for the 2026 delivery year. In addition, as a result of the capacity auctions held in previous years, we have contracted capacity obligations in the range of 23.65 GW – 24.46 GW for the upcoming 2023.

PLN 12 billion of added value for the economy

In 2021, the direct added value generated by PSE in the power sector, calculated using the Wassily Leontief input-output model, amounted to PLN 3.04 billion. The total added value generated by our company in the domestic economy is almost PLN 12 billion — 82% more as compared to 2020. Such a significant difference is the result of the implementation of the capacity market. It is also worth noting that PSE operations have contributed to maintaining 39,395 jobs in Poland. We paid PLN 1.08 billion of taxes and contributions to the state budget and budgets of local government authorities. In 2021 PSE paid almost PLN 327.5 million of taxes to municipal budgets.

During the reporting period, we measured our organisation's carbon footprint for the fifth consecutive time. In the last year, we have expanded the analysis of the volume of greenhouse gas emissions resulting from operations of PSE by further categories. According to the *location-based* method, we

recorded an 11% reduction in emissions in relation to 2017, when we had calculated emissions for the first time. As compared to 2020, there was an increase of 16%. In turn, the reduction calculated using the *market-based* method reached 19% relative to the base year, with an increase of 8% relative to 2020. Emissions are greatly influenced by the electricity transmission process, which is inextricably linked to energy losses. 2021 was a record year for PSE in terms of energy flows in the network, with a year-on-year increase of 12% in input energy. Thanks to adequate investments in network infrastructure, the record flows did not significantly affect the loss ratio, which reached 1.47%.

Responsible development

The directions and scope of PSE development are determined by the organisation's successively implemented strategy until 2030. It is consistent with the vision of a modern electricity market and includes, i.a., the strengthening of cyber security and the development of services to make our electricity system more resilient to disturbances that could affect its reliable and stable operation. The strategy also focuses on preparing and implementing the organisation for the new role of Energy Market Information Operator imposed on PSE by law.

On 1 January 2021, PSE implemented stage I of the balancing market (BM) reform. At the same time, our organisation has commenced works on the implementation of stage II of the balancing market reform. Simultaneously, preparations are in progress to connect Poland to the European balancing platforms: MARI, PICASSO and TERRE.

The release of the Impact Report for 2021 coincided with the 4th edition of the PSE social project "WzMOCnij swoje otoczenie" [Enhance your surroundings]. In 2021, we allocated around PLN 4.6 million for projects serving local communities. We supported, i.a., education, environmental protection, health promotion, improvement of the quality of life and elimination of inequalities. In turn, as part of the "PoMOCni w walce z COVID-19" [Helpful in the fight against COVID-19] campaign, we made in-kind and financial donations worth PLN 1.6 million in total.

The study before you is the eighth social report of our organisation and the sixth publication integrated and presented in an interactive version. To ensure high quality reporting, the document has been prepared – as all previous publications – according to the highest market standards and verified by independent auditors.

Wishing you a pleasant read

Eryk Kłossowski

President of the Management Board

Polskie Sieci Elektroenergetyczne S.A.

BUSINESS AND FINANCIAL RESULTS

ECONOMY AND MARKET

Impact indicators for 2021

- **PLN 11.95 billion** of added value for the Polish economy. Year-on-year increase of 81.6%.
- **39,395** jobs retained in the domestic market due to PSE operations. Year-on-year increase of 119%.
- **PLN 1.08 billion** – the amount of taxes and contributions paid to the national budget and the budgets of local government authorities. Year-on-year increase of 8.5%.

NPS operation

- **146,018.3 GWh** – the total electricity consumption by the end users connected to the NPS in 2021, nearly **68%** of which was electricity drawn from the PSE's transmission network, i.e:
  - **99,210.2 GWh –** the total amount of electricity delivered from the transmission network to the domestic buyers of transmission services in 2021.

Data on the power and balancing markets

- **7,188.58 MW** – the volume of capacity obligations under **128 capacity agreements** concluded, covering the delivery year of 2026 under the **main auction in the Polish capacity market** organized in 2021. Only units meeting the CO_2 emission limit of 550 g/kWh were admitted to the auction.
- **100%** failure-free functioning of the balancing market.
- **126 participants** in the balancing market in 2021.

Indicators of reliable system operation

- **99.99%** continuity of electricity supply.
- **1.47%** losses in the transmission network. Despite the increase in electricity flows in the network, the volume of losses has remained at the same level as in the recent years.
- **12%** year-on-year increase in electricity in-put into the transmission network.
- **99.87%** availability of transmission equipment (DYSU).

Capital expenditures

- **approx. PLN 36 billion** in capital expenditures planned by PSE for 2023-2036.
- **PLN 969.7 million** in capital expenditures incurred by PSE in 2021.
- **PLN 1,962.2 million** in the total value of contracts awarded to contracting parties in 2021.

Projections as well as research and development

- **185.74 TWh** of projected net electricity demand in Poland in 2039 according to the baseline option.
- **186.63 TWh** of projected net electricity demand in Poland in 2039 according to the option of significant increase in energy demand.

- **PLN 28.34 million** in total PSE expenditures incurred in 2018–2021 for research and development, including PLN 3.04 million in 2021.

Financial data for 2021

- **PLN 17,191 million** in net revenues from sales.
- **PLN 1,180 million** in net profit.
- **PLN 2,097 million** in EBITDA profit.
- ROE ratio of **6.90%** (net profit/equity).

NATURAL ENVIRONMENT AND CLIMATE

- **11%** reduction in PSE's carbon footprint in 2021 as compared to 2017 (the first year of calculating emissions) according to the *location-based* method, and on the year-on-year basis – emission increase of 16%.
- **19%** reduction in PSE's carbon footprint in 2021 as compared to 2017 according to the *market-based* method, and on the year-on-year basis – emission increase of 8%.
- **1,712,542 MWh** – the amount of electricity losses in the electricity transmission process in 2021. The loss ratio remained at 1.47%.
- **23.6%** year-on-year increase in the amount of SF_6 gas emitted by PSE to the environment.
- **85.12%** year-on-year decrease in the mass of soil contaminated with electrical insulating oil following leakages of the same at EHV stations.

CHAPTER I: PSE AND THE ENVIRONMENT

Key messages of the chapter:

PSE is the only electricity transmission system operator in Poland and one of the largest operators in Central and Eastern Europe. Our company also acts as the Energy Market Information Operator. We are actively involved in the preparation of new market solutions to ensure the integration of the European electricity market.

We care about the reliability of electricity supply to all regions of the country, we have a real impact on the development of Polish economy and businesses. We ensure safe and economic operation of the National Power System which is part of the common European system.

Key figures (as of the end of 2021)

- **2,708** PSE employees.
- **8.05%** women among the employees.
- **91.95%** men among the employees.
- **PLN 17,191 million** in net revenues from sales.
- **PLN 1,180 million** in net profit.
- **PLN 25,523 million** – total assets.
- **PLN 4.6 million** in capital expenditures incurred for the community.
- **15,693 km** of transmission lines (EHV).
- **110** extra high voltage (EHV) substations.
- **8,555,493.5 m²** of surface area with the PSE network infrastructure in place.

I. PSE AND THE ENVIRONMENT

1.1. PSE's role in the power sector

Polskie Sieci Elektroenergetyczne manages the operation of the entire National Power System. For years, we have been ensuring the smooth operation of this system, which consists of units that generate, process, transmit and distribute energy. Thus, we ensure continuity of energy supply and its public availability.

Our organisation feels responsible for the proper functioning of the Polish economy and domestic companies. In view of recent developments, including those relating to the geopolitical situation, power and energy security is a priority for us.

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

The National Power System (NPS) is made of three subsystems responsible for specific tasks.

- **Electricity generation** – the production of electricity by generation sources, which – in the power system – are power plants, combined heat and power plants and distributed sources.
- **Electricity transmission** – is carried out by the transmission system operator whose functions are performed by PSE through the transmission network in order to supply energy to distribution networks or to consumers connected to the transmission network.

- **Electricity distribution** – is carried out by distribution system operators, and consists in the supply of energy through distribution networks to institutional and individual consumers connected to the network.

Electricity sources in the power system

The electricity supplied to our homes is generated mainly at power plants and combined heat and power plants. In Poland, the primary sources for electricity generation are thermal power plants in which electricity is obtained by burning coal – usually hard coal or lignite. Larger cities have combined heat and power (CHP) plants fired predominantly with coal, but also with natural gas. Energy generation using renewable energy sources (RES) – wind, water, biomass and solar energy – is also growing.

Electricity transmission

The transmission of electricity from a generating entity to different groups of consumers requires the operation of a complex structure comprising multiple power equipment and lines, called a power system. In this system, a distinction is made between the transmission network and the distribution networks.

The transmission network, used to carry electricity over long distances, uses extra high voltage lines, allowing the reduction in energy loss. This stems from the fact that the higher the voltage, the lower the loss of electricity. The extra-high voltage (EHV) transmission network – in Poland operating under 750, 400 and 220 kV – covers the entire country. The network is owned by our company, PSE. The transmission network provides the capability to transmit electricity over significant distances, taking into account possible rapid changes in the direction and amount of electricity transmitted. It can be compared to highways carrying electricity to smaller "roads", i.e. high, medium and low voltage distribution networks, from where it flows to our homes through low voltage lines. Voltage is changed using substations equipped with transformers and autotransformers.

The transmission network is used to supply electricity to distribution system operators and large industrial consumers.

Distribution of electricity

Distribution networks are regional, and consist of high-voltage (110 kV), medium-voltage (6–30 kV) and low-voltage (230 and 400 V) lines as well as substations to supply electricity to consumers.

In order for the electricity to be supplied in the right amount and to meet the specified parameters, the voltage level is first changed at substations using transformers.

Distribution networks are managed by distribution system operators. The ~~medium-voltage~~ distribution network is used to supply electricity to business and industrial consumers, and most importantly, to end users making use of low-voltage lines.

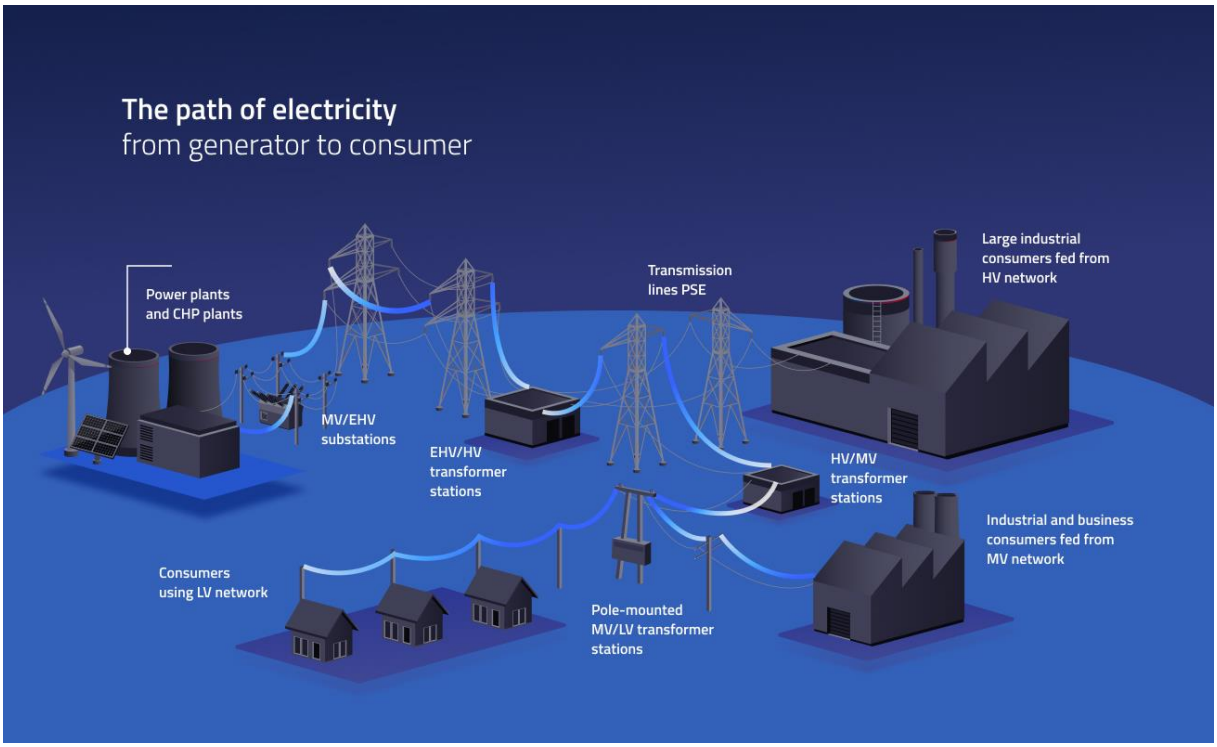


Figure 1: The electricity path from the generating entity to the consumer

Worth knowing:

→ The national transmission network is supplied with AC voltage at 50 Hz.

→ In Poland, the following voltage standards are most commonly used to transmit electricity:
- **220, 400 kV** (the so-called extra high voltage levels) – for long-distance transmission,
- **110 kV** (the so-called high voltage) – for transmission over distances not exceeding several dozen kilometers,
- **6, 10, 15, 20 or 30 kV** (the so-called medium voltage) – in local distribution networks,
- **400/230 V** (the so-called low voltage) – to supply power to end users.

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

1.2. PSE as a transmission system operator

As the only transmission system operator in Poland, we manage a territorially extensive power system. Since 2021, we have also acted as an energy market information operator.

PSE is the transmission system operator (TSO) in Poland. In the light of the Energy Law, one TSO is designated on the territory of the Republic of Poland. Our company has been appointed by the President of the Energy Regulatory Office (ERO) to perform this function until December 31, 2030.

[GRI 102-6, GRI 102-4, GRI 103-1] We render services in the field of transmission of electricity and provision of the power system, while maintaining the required criteria for the safe operation of the National Power System (NPS). As the electric power transmission system operator (TSO), our company is expected to take effective actions to ensure the required quality and security of electricity supply and economic operation of the system. The operator's actions are

directly dictated by the technical development of the electric power transmission systems and the legal regulations concerning the power sector. Consequently, we are an enterprise of considerable importance to the public order and safety, and of particular significance to the Polish economy. PSE is also a member of the European association of operators (ENTSO-E).

In 2021, in accordance with the Energy Law, PSE, as the TSO, was entrusted with the function of energy market information operator (OIRE). The main tasks of energy market information operator are to manage and administer the central energy market information system, to obtain energy market information and other information from the power system users for the implementation of energy market processes, to process information collected in the central energy market information system and other information to which it is entitled for the implementation of energy market processes and to support the implementation of these processes. The above activities will be fully performed by the energy market information operator from 1 July 2024, once the central energy market information system (CIRE) is launched.

Tasks of PSE as the transmission system operator

The Polish power system is part of the electricity system of the Continental Europe. The stability of this system is maintained by the actions of all transmission system operators and the resilience of local transmission systems. From the National Power Dispatch Centre we manage the operation of the power system, of the transmission network and of the 110 kV coordinated network. We forecast, calculate and determine parameters for safe system operation over a variety of time horizons.

[GRI 102-2] The tasks carried out by PSE as the transmission system operator come down to five basic categories:

1. Quality and ongoing security of electricity supply.
2. Sufficiency of the national transmission network.
3. Operation of the national central commercial balancing mechanism.
4. International cooperation as part of interconnected electricity systems and a single European electricity market.
5. Acting as the energy market information operator.

Tasks in the scope of ongoing security of supplies

Legal regulations applicable to the transmission system operator define the technical standards for the operation of the transmission system and the technical resources that the operator should have at their disposal to meet the requirements in this regard. Tasks performed by PSE in this area:

- **Balancing (of the electricity generation against the actual demand)**

  Balancing applies to both very short periods (measured in seconds) and very long periods (expressed in hours), and is carried out through the use of power reserves maintained specifically for this purpose. The TSO is required to maintain specific amounts of reserves measured in seconds, minutes and hours. The first two forms of the reserves are obtained by concluding appropriate contracts with generating entities for the so-called system control services – this action is preceded by a tender procedure. The source of the hourly reserve is the balancing market (commercial offers). The activation of reserves takes place automatically

or remotely (depending on the type and location) from the central power control system, based on a command given by telephone or using a different method that has been agreed upon.

- **Ensuring compliance with the network operation security criteria**

  As the TSO, we are obligated to plan the operation of the network and the distribution of generation at its individual nodes in such a way so that a critical disturbance does not cause a system failure and limitation of electricity supply to consumers. To this end, we develop coordination plans with time horizons ranging from three years to a single day. The plans include both maintenance schedules for network elements and overhaul schedules for generating units. As part of the planning process, we identify constraints on the operation of generating units at the individual network nodes. We manage these constraints by using the balancing market mechanism or by entering into appropriate agreements with generating entities.

- **Application of preventive and restorative automatic control systems, and development of NPS defense and restoration plans**

  The TSO also prepares measures to prevent the occurrence of conditions that threaten the stability of the NPS operation, including in particular the propagation of failures in the transmission system. For this purpose, we use various types of system-related automatic controls that enable quick changes in the network operation or production level of generating units, plans for shutting down consumers or limiting supply and consumption of electricity, e.g. based on power supply levels transmitted through radio communication. In the event of a transmission system failure, we have restoration scenarios in place, even anticipating the need to restore the entire national system. To enable these scenarios, the system operator contracts generating entities capable of starting up without external power supply (system service).

Tasks regarding the adequacy (sufficiency) of the national transmission network

As a TSO, we are responsible for the expansion and maintenance of the national transmission network and its interconnection with the systems of the neighboring countries. To ensure network sufficiency, our company performs the following tasks:

- Transmission network expansion planning, taking into account the anticipated changes in the size and geographic distribution of the domestic demand, locations of new generating sources, and network expansion plans of the neighbouring country operators and distribution system operators.
- Maintenance of the technical condition of network equipment to ensure high availability

Tasks in the scope of operation of the national central commercial balancing mechanism

The specific nature of electricity as a product requires the existence of a central balancing mechanism and an entity responsible for the balancing. The balancing mechanism is to provide real-time commercial balancing of electricity market participants, and settlement of electricity used for balancing. In Poland, this role is fulfilled by the balancing market mechanism in which the current balancing of electricity market participants is carried out based on offers submitted by entities actively participating in the market. The balancing market mechanism very much affects other segments of the electricity market, as well as decisions on how to use generating resources.

The rules of the balancing market should ensure:

- equal treatment of all participants,
- transparency of settlement price determination process,
- the possibility of consumer participation (consumption reduction offers),
- creating price signals that promote efficiency of operation of the entire sector.

Tasks in the scope of international cooperation

We are a member of ENTSO-E (the European Network of Transmission System Operators for Electricity). ENTSO-E consists of 39 transmission system operators from 35 countries in Europe.

Figure: ENTSO-E member states

The mission of ENTSO-E is to promote reliable operation, optimum management and sustainable development of the pan-European electricity transmission system to ensure security of supplies, and to meet the needs of the internal electricity market.

In-house indicator **Almost 80 representatives of PSE are involved in the work of ENTSO-E, and actively participate in all important tasks at various levels of the organisation.**

As part of their regular activities within ENTSO-E structures, representatives of PSE are actively involved in the preparation of the following documents:

- SO (Seasonal Outlooks, winter – summer) – a seasonal generation adequacy assessment developed twice a year.
- ERAA (European Resource Adequacy Assessment) – a technical and economic generation adequacy analysis, which is a medium-term pan-European assessment of power system adequacy. This assessment is carried out on the basis of stochastic analyses using advanced analytical tools.
- TYNDP (Ten Year Network Development Plan) – a plan essential for the effective development of European cross-border interconnections. The main objective of the investments included in the TYNDP is to achieve European energy goals such as security of supply, sustainable power system development and creating conditions for the operation of the European energy market.
- Regional Investment Plan – Regional Groups operating within the structures of the System Development Committee develop investment plans from a regional perspective. These plans perform an intermediate function between pan-European and national objectives, ensuring that national and regional actions are consistent with the pan-European ones.

Representatives of PSE participate in the above processes by providing data, creating and co-creating analytical solutions, performing calculations and cooperating in the development of documents.

1.3. Our company in numbers

[GRI 102-1, GRI 102-6] We operate nationwide as Polskie Sieci Elektroenergetyczne Spółka Akcyjna (PSE S.A.).

Our clients include:

- **electric utilities** engaged in the generation, storage and trading of electricity,
- **power distribution system operators** (DSOs) with delivery points from the transmission network (DSOp) and without delivery points from the transmission network (DSOn),
- **end users** connected to the transmission network,
- **power exchanges** that operate an exchange-based energy market for the wholesale trading of electricity.

GRI 102-7 The scale of PSE operations in numbers	2021	2020	2019	2018
EMPLOYMENT				
Number of PSE employees	**2,708**	**2,627**	**2,538**	**2,376**
FINANCIAL DATA				
Net revenues from sales (in PLN million)	**17,191**	**9,178**	**9,106**	**10,097**
Net profit (in PLN million)	**1,180**	**1,170**	**729**	**490**
Total assets (in PLN million)	**25,523**	**22,471**	**20 640**	**20,377**
EBITDA (in PLN million)	**2,097**	**2,092**	**1,513**	**1,188**
TAX EBITDA (in PLN million)	**1 841**	**1,905**	**1,552**	**1,312**
ROE (net profit / equity)	**6.90**	**7.26**	**4.82**	**3.37**
NETWORK INFRASTRUCTURE				
Total length of transmission lines (in km)*	**15,693**	**15,318**	**14,822**	**14,695**
Number of transmission lines (EHV)	**295**	**281**	**280**	**267**
Number of extra-high voltage substations	**110**	**109**	**107**	**106**
SERVICES				
Number of transmission service agreements with the entities:	**122**	**124**	**127**	**127**
- connected to the transmission network	**45**	**39**	**37**	**34**
- operating on the electricity balancing market, but not connected to the transmission network	**77**	**85**	**90**	**93**
Number of agreements on the provision of access to the NPS with DSOs not connected to the transmission network	**169**	**157**	**157**	**158**
Number of concluded agreements on the connection of new sources to the transmission network	**38**	**32**	**29**	**31**
In-house indicator **Total capacity of new generating sources with valid connection agreements**	**22,390 MW**	**18,007 MW**	**14,775 MW**	**15,102 MW**
Number of agreements on the connection of new generating sources to the transmission network, for which PSE has initiated investment tasks aimed at performing the works necessary for the connection	**32**	**19**	**20**	**22**
	[GRI 102-5] 100% of shares are held by the State Treasury			
	The share capital of PSE amounts to PLN **9,605,473,000** and has been fully paid-up.			

* The line lengths are given on a per-circuit basis.

Tab. 3. The scale of PSE operations in numbers

Economic performance

[GRI 103-1] We implement our strategic objectives and directions by constantly monitoring the results achieved and the level of achievement of key economic and financial indicators. We prepare projections for a medium-term horizon, which allow us to assess the ability to finance the level of expenditures assumed in the Investment Project Plan, considering full implementation of the strategic objectives and operational activities.

GRI 201-1, GRI 102-7 Direct economic value generated including revenues, operating costs, employee remuneration, subsidies and other community investments, undistributed profit and payments to capital owners and state institutions	**Value (in PLN)**		
	2021	**2020**	**2019**
Revenues (all revenues and profits included in the financial statements):	**17,536,117,157**	**9,522,394,255**	**8,966,229,522**
Net revenues on sales	17,191,431,351	9,178,228,605	8,801,428,991
Other operating revenues	335,538,851	324,060,880	130,523,044
Financial revenues	9,146,955	20,104,770	34,277,487
Operating expenses:	**16,088,570,746**	**8,075,708,779**	**8,064,622,038**
Operating expenses	16,000,844,778	7,981,538,598	7,962,397,582
Other operating expenses	69,410,137	77,062,477	94,602,127
Financial expenses	18,315,831	17,107,704	7,622,329
Operating expenses (after considering the excluded costs)	**15,280,129,392**	**7,290,479,696**	**7,311,788,488**
exclusions:	,	,	,
Remuneration, social insurance and other benefits	464,407,870	470,484,824	435,833,392
Taxes and charges	312,297,912	310,543,328	312,472,104
Community investments*	26,884,370	2,226,343	0
Interest costs	4,851,202	1,974,588	4,528,054
Payments to investors:	**0**	**0**	**0**
Dividend	0	0	0
Payments to state institutions:	**737,390,438**	**714,241,457**	**598,670,720**
Taxes and charges	312,297,912	310,543,328	312,472,104
Interest costs**	4,851,202	1,974,588	4,528,054
Income tax (current liabilities)	238,952,191	217,318,493	172,249,354
Payment from the profit	181,289,133	184,405,048	109,421,207
Retained value	**1,027,305,087**	**1,044,961,935**	**619,936,923**

* Including donations to counteract COVID-19 and public communication costs incurred during the investment process.

*** In 2021, 91%of PSE's interest costs went directly to the state budget; similarly, in 2020, 99%of PSE's interest costs went directly to the state budget, and in 2019, 98%of PSE's interest costs went directly to the state budget.

GRI 201-4 The total monetary value of financial support received by the organisation from the state during the reporting period, including at least the amounts of the following:	Value (in PLN) 2021	2020	2019
- subsidies, investment and development grants, other	**398,635,676**	**579,094,500**	**218,437,990**
- other financial benefits received from the state	**0**	**86,499**	**243,805**

1.4 Membership in organisations

[GRI 102-12, GRI 102-13] International industry organisations and associations to which PSE belongs

- **ENTSO-E** – European Network of Transmission System Operators for Electricity, which plays an important role in building a common electricity market. The core business of the organisation is to undertake activities for the reliable operation and development of interconnected power systems, while ensuring security of electricity supply within the common EU electricity market. ENTSO-E plays an important role in the implementation of the EU's third and fourth energy package, taking responsibility for the development of a number of documents – in particular network codes containing provisions necessary for the development of a single EU electricity market.

  PSE representatives are involved in the organisation's activities at all levels of its structure, i.e. from the General Meeting, through the Management Board and Committees, to groups, task forces and working groups.

  The working structure of ENTSO-E consists of committees. PSE is represented in each of the following:

  - Market Committee,
  - System Development Committee,
  - System Operations Committee,
  - Research, Development & Innovation Committee,
  - Legal and Regulatory Group operating as a committee.

  In October 2021, ENTSO-E established a project team to launch a new Information and Communication Technologies Committee.

  The active presence of PSE representatives in ENTSO-E structures strengthens the position of the Polish transmission system operator in the international arena.

- **Polish Committee of Large Electrical Networks (PKWSE)** – one of 58 national committees acting on behalf of *Conseil International des Grands Réseaux Électriques* (CIGRE), the world's largest international association of experts dealing with issues related to the generation, transmission and distribution of electricity. PKWSE acts on behalf of CIGRE by promoting the association's activities in Poland. It currently has 6 supporting members and over 112 regular members.

- **Cooperation within CCR –** Poland is included in three Capacity Calculation Regions (CCR): CORE, Baltic and Hansa, formed at the request of all TSOs by the decision of the EU Agency for Cooperation of Energy Regulators (ACER) in November 2016. In the working structures established in the aforementioned regions, representatives of the individual TSOs, including PSE, are conducting works

aimed at implementing market mechanisms the design of which will ensure the ability to effectively, freely and securely trade electricity across borders. The actions cover all market segments – from long-term markets, through the Day-Ahead Market (in the form of the Market Coupling mechanism), to the Intraday Market – and are related, among other things, to the implementation of a coordinated transmission capacity calculation process, a coordinated security analysis process including the division of costs of countermeasures applied in the process, and the implementation of the Market Coupling mechanism at the NPS interconnections.

- **Central Europe Energy Partners (CEEP)** – an international non-profit association representing the Central European power sector, which aims at promoting the integration of the Central European power sector within the common EU energy policy. The Chairman of the CEEP Board of Directors is a representative of PSE.

[GRI 102-12] National industry organisations and associations and CSR initiatives to which PSE belongs

- **Association of Polish Electrical Engineers (SEP)** – a non-governmental creative organisation of scientific and technical nature, acting for social and public benefit. It is a voluntary association of electricians of all specialties, persons whose professional activity is related to widely understood power engineering, as well as legal persons interested in the association's activities. The scope of the SEP activities includes: electrical engineering, power engineering, electrical power engineering, electronics, radio technology, optoelectronics, bionics, information technology, computer science, telecommunications, automation, robotics and other related fields.
- **Polish Power Transmission and Distribution Association (PTPiREE)** – an organisation whose main objective is to take actions for the comprehensive development and rational use of networks and equipment for transmission and distribution of electricity. The association strives to initiate, promote and utilize technical and organisational progress in the transmission and distribution of electricity, and supports the development of the electricity market.
- **Polish Economic Society** [Polskie Towarzystwo Gospodarcze] **(PTG)** – an association of employers that focuses on community building and responsible business based on conservative values. They are a guarantee of personal and professional success. The aim of the Polish Economic Society is to protect the rights and represent the interests, including the economic interests, of its members towards trade unions, governmental authorities and local government authorities. The mission of the organisation is to represent the interests of its members, to work for the improvement of business conditions and to restore Polish entrepreneurs to their rightful place in economic and social life.
- **Partnership for the implementation of Sustainable Development Goals (SDGs)** – an initiative started by the Ministry of Entrepreneurship and Technology and representatives of over 100 entities, including PSE, for the implementation of sustainable development goals. These goals correspond to the content of the United Nations' 2030 Global Agenda for Sustainable Development, or – in short – the 2030 Agenda, adopted in 2015. The Agenda has set out 17 Sustainable Development Goals (SDGs), the implementation of which is to contribute to building a more sustainable future, in particular to eliminating social and economic inequalities, while ensuring simultaneous development connected with preserving the natural environment in the best possible condition, and limiting the negative effects of climate changes (goal No. 13).

- **Responsible Business Forum –** the largest non-governmental organisation in Poland, dealing with CSR (Corporate Social Responsibility). Its mission is to take actions aimed at sustainable development, inspire business that changes the world, and integrate people who change business. The association was founded in 2000 as a result of the initiative of business, academic and non-governmental circles, and has the status of a public benefit organisation. Since 2002, the Forum is a national partner of *CSR Europe* – a network of organisations promoting the concept of responsible business in Europe.
- **Sports and Tourism Society „Sport i Energia" ("Sport and Energy")** – sports organisation founded by PSE employees in 1998. The organisation pursues its statutory objectives by providing affiliated and non-affiliated employees of PSE with the following: access to sports facilities, opportunities to participate in organised sports competitions and to represent PSE in sports competitions within the power sector, and by supporting the integration of company employees.

CHAPTER II: OUR STRATEGY

Key messages of the chapter:

In the PSE Strategy for 2020-2030, we have identified challenges, strategic objectives and initiatives and a set of lines of action, whose degree of implementation we present in this chapter.

PSE Strategy for 2020-2030 is consistent with the vision of a modern electricity market. The demand for green energy is growing in Poland and worldwide. At the forefront is the need to ensure system balancing with a significant contribution from distributed generation. Our strategy responds to these challenges.

We build the value of PSE based on the financial, productive, human, intellectual, social and natural capitals.

Key figures (as of the end of 2021)

Market / Area

- **100%** failure-free functioning of the balancing market.
- **126** balancing market participants.
- **128** capacity agreements covering one delivery year 2026 in the main auction in the Polish capacity market. Only units meeting the CO_2 emission limit of 550 g/kWh were admitted to the auction.
- **125** capacity agreements concluded as a result of additional auctions in the capacity market.

Infrastructure and investment area

- **PLN 969.7 million** of expenditures incurred for the completion of investment tasks in 2021.
- **PLN 113,569.8 thousand** – expenditures incurred for operation and repair tasks of network facilities in 2021.

People and relationships area

- **PLN 1,962,192 thousand –** the total value of contracts awarded to contracting parties.
- **100%** employees covered by the incentive pay system.
- **127** training sessions on the NPS Simulator for dispatchers, including 125 online training sessions with 428 dispatchers from the PSE CG and 2 on-site training sessions for dispatchers from Poland and the Baltic States.

II. OUR STRATEGY

2.1. Key global trends

[GRI 103-1]

2.6.1 Key global trends and changes in the environment affecting the power system and PSE

Global trends and changes in the environment affecting the power system and PSE

In 2021, the Polish power sector was still influenced by the COVID-19 pandemic and the actions taken by the Polish government and other governments to mitigate its health effects (including *lockdowns*, mobility restrictions, etc., and the resulting changes in energy supply and demand). The impact of the pandemic on the economy was felt in the spring and autumn of 2021. However, unlike in 2020, the scale

of the slowdown caused by the reduction in mobility was small and its impact on the power system was negligible. In the second half of the year, political and economic tensions in relations with Russia also began to rise, which had an impact on the prices of energy resources.

The operation of the power system was affected by global and regional market-driven factors (prices of energy, energy resources, technology) and regulatory changes influencing the framework in which PSE operates. Discussion was also in progress about the shape of the EU energy market in the future. In 2021, the prevailing view was that at most minor adjustments and short-term crisis moderation measures were needed to improve its operation. This view has evolved in 2022 as a result of the energy crisis the EU is experiencing – there have been successive proposals for solutions to change the functioning of the market, including proposals to reform its entire organisation. The primary stimulus for these discussions comprised price speculations in the energy market, dynamic increase in end-user energy prices and the so-called *infra-marginal* profits of companies – generators and distributors.

In the medium to long term, technological trends relating, most of all, to the decarbonisation of the sector will play a fundamental role in the evolution of the power system and its environment. Already in the last year, the renewable energy, energy storage and electromobility sectors continued to develop strongly, and the introduction of new metering technologies that open up opportunities for the use of high frequency data (HFD) was in progress.

Key trends

- **Technological advancement in the area of data collection and processing will impact the importance of TSOs as HFD owner**

  In the modern economy, data acquired with high frequency, showing economic activity, play an increasingly important role. With technological advancement in metering, it is becoming increasingly possible to collect and analyse data from the real economy, including energy suppliers. PSE acts as the Energy Market Information Operator and supervises the establishment of the Central Energy Market Information System, which will soon enable the collection and analysis of detailed high frequency data from the Polish energy market and its development.

- **Technological transformations in the area of energy storage and generation change the structure of generation and the nature of the transmission network and the role of the TSO**

  Until recently, the development of RES primarily included the dissemination of the onshore wind power generation industry. For several years, new RES technologies have been gaining ground as well: offshore wind power generation industry and photovoltaics. Offshore wind power generation industry reduces the generation uncertainty problem in part because the windiness of sea and ocean areas is greater than that of land, but it is only available to countries with access to the coast. Offshore wind power generation industry development will also force necessary adjustments to the transmission network to receive energy from new sources. The Polish Baltic coast offers medium-term potential for the development of this type of power generation industry.

  The growth of photovoltaics is primarily based on the development of small, residential prosumer installations and small commercial installations. 2021 was the last year in which the current support rules for prosumers were maintained. In 2022, the rules have been changed. Government and local government support programmes have contributed to the development of this form of distributed civic energy and the emergence of a group of active prosumers. Serving this group of consumer-generators within the existing distribution and transmission network infrastructure is an increasingly serious challenge, which is reflected in new regulatory solutions.

A barrier to the development of renewable power generation industry remains the problem of energy storage during periods of its overproduction, so that the energy gained can be used at times when generation from RES sources is not possible (when the wind is not blowing, at night, etc.). Until recently, the lack of efficient storage technologies prevented this problem from being solved. In recent years, the commercial use of energy storage has become increasingly common. Technology development is supported by falling component costs, the growth of commercial energy storage facilities for power systems, and the rapid development of information and metering technologies that enable distributed source management. At the same time, other energy storage technologies are developing, particularly *power-to-gas* and hydrogen electrolysis technologies. Hydrogen is increasingly being touted as a future energy storage and transfer technology.

In Poland there is a dynamic development of prosumer energy based on photovoltaics. Since it began to play a noticeable role in the national energy mix in 2020, its importance has been growing. Generation companies are gearing up for *off-shore* wind power projects. The first commercial energy storage facilities, such as the BESS storage facility in Pomerania, are already in operation. As a result of the dissemination of new technologies, it will become necessary to adapt to the new model and spatial allocation of generation both the distribution networks managed by distribution companies and the transmission network managed by PSE.

- **The development of the European market and the increase in international trade influence the long-term process of price convergence in Europe**

  The development of the European market, supported by successive regulations, results in an increase in the scale of cross-border exchange. Until recently, the effect was still the progressive convergence of energy prices in Europe. From the second quarter of 2021 onwards, however, it has been disrupted by turbulence in European and global energy resources markets. The acceleration of building a common market based on price zones through subsequent regulatory packages affects the process of development of the national transmission network and forces its adaptation to the new scale and directions of cross-border flows. In the medium term, it may also be a source of additional costs for transmission operators, due to the need for more frequent use of remedial actions taken outside the market, such as *redispatching*.

  The energy crisis triggered by the decrease in the supply of energy resources and the abrupt increase in their prices (see below) has triggered an European discussion on the correction of the market model. In the second half of 2021, the discussions focused on ad hoc remedial solutions, leaving issues of systemic change outside the debate.

- **European climate policy increasingly driving up the cost of generation from emitting sources**

  The situation of the national power system, and especially the condition of generators using conventional generation sources, is increasingly affected also by EU climate policy. The primary tool of this policy is the ETS – emission allowances, the prices of which are determined by the market. ETS prices have been rising for several years now. In the first half of 2021, the CO_2 ETS price level exceeded EUR 50, and in the second half of the year EUR 80. This resulted in a significant increase in the price of energy generated in emission sources, triggering a price increase effect caused by the situation in the energy resources market. The ultimate effect thereof was a significant increase in prices in European markets.

- **The imbalance in the gas and coal markets has led to spectacular increases in the raw material prices**

- The ARA market price of coal almost doubled in 2021 (with a short-lived autumn peak at more than 3 times the price at the beginning of the year) and the price of gas increased 3 times (with an autumn peak when prices were 7 times higher than at the beginning of the year).

  As a result of Russian natural gas supply constraints and very high price levels, the uncertainty regarding the medium-term role of natural gas in Europe as an intermediate fuel increased in the second half of 2021. The growing energy crisis already suggested that the still relatively high share of gas power generation industry in the EU energy mix would have a negative impact on the EU energy independence and price levels in the short to medium term. In 2022, as a result of Russia's aggression against Ukraine, sanctions and Russia's export policy, there were further very sharp increases in energy and gas prices in commodity markets, which began to affect end-user prices from the second half of the year under review.

2.1.2 Our response to global trends and changes in the environment

GRI 103-2 Key actions taken at PSE

PSE is currently implementing a number of measures to ensure the proper functioning of the NPS now and in the future, under conditions of dynamic technological and regulatory changes.

The company's activities comprise, in particular:

1. Works at the international forum (ENTSO-E, CCR) relating to the development and agreement of methodologies, tools and method to conduct regional (international) processes implemented under EU law to protect the interest of PSE and Polish market participants.
2. Optimisation of the implementation of European market regulations (CEP, Network Codes), including the CEP70 trajectory.
3. Implementation of the OIRE function – construction of a metering data centre (CSIRE).
4. Implementation of changes in the manner of the balancing market operation, including the way the system services are procured, and the resulting modification of operational processes, in IT applications, data management and hardware infrastructure.
5. Development of methods and tools for short- and medium-term forecasting, with particular focus on the implementation of tools and a process for forecasting photovoltaic generation and the transition from gross demand forecasting to net demand and ultimately also to nodal forecasting.
6. Development of methods and implementation of tools for static and dynamic simulation between facilities and between facilities and the NPS. The need to develop methodologies to optimise the operation of the NPS and to assess the safety of power system operation under different conditions (network models, SCUC process, SCED) is also indicated, for the targeted implementation of the nodal market.
7. Development of NPS metering, including obtaining measurements from reference photovoltaic farms and increasing the possibility of assessing the condition of the NPS in real time (new SCADA-EMS system), obtaining information on the status of flows at each node of the transmission network and obtaining detailed data (including generation of local sources) from DSOs (in accordance with the SOGL code).
8. Exploration of the feasibility of HVDC connections, including a comparison of different configurations of such connections *(point-to-point*, *multi-terminal connections*) and their technical and economic assessment.

9. Actions to facilitate the investment process, optimisation of shutdowns and management of network assets, including the application of BIM technology in the investment project life cycle phases and integration of BIM technology with spatial information systems, *asset management* and shutdown planning.
10. Testing and introducing new methods of controlling network operation in emergency situations, testing the use of energy storage facilities in the NPS, etc.
11. New tools to support dispatching activities; identification of reasons for failures, optimisation of phase shifter settings, use of synchrophasors (PMUs), etc.
12. Construction of a cross-border submarine interconnection with Lithuania (700 MsW interconnectors).
13. Connection of offshore wind farms (10.9 GW).

The measures outlined respond to the changes taking place and cover virtually all areas of PSE operations. An effective response from our organisation to the new challenges requires action in nearly every organisational unit of PSE involved in NPS operations and development planning.

Presentation of measures taken by PSE to adapt the NPS to the new market shape and new technologies

GRI 103-3 Implemented projects in the area of research and technical development (applied, development and industrial works)

Definition of rules for the selection and setting of new excitation criteria for commercially available disturbance recorders

The aim of the works was to determine the rules for selection and setting of new Excitation Criteria of Disturbance Recorders which are commercially available, enabling the recording of types of disturbances appearing in the Power System – determined by the changing structure and operating conditions of this system (new network, generation and receiving facilities) – previously unidentified by the Disturbance Recorders. Determination of the rules for selection and setting of new Excitation Criteria of Disturbance Recorders will make it possible to monitor and record dynamic phenomena during disturbances occurring in networks saturated with power electronic components. It is emphasised that such disturbances can be caused by, i.a., failures or mismatches in the control systems of converter elements. The project ended in May 2021.

Development of a pilot virtual station and line environment

The aim of the works was to identify in practice and in detail the most significant benefits for the PSE CG of using 3D models (including BIM models and geoinformatics data) acquired in the investment process in a virtual reality (VR) and augmented reality (AR) environment, to identify the necessary IT tools and competence development needs relating to the development of a virtual substation and line environment for use in the PSE CG. The project concluded with the development of a prototype solution in October 2021. Efforts are currently underway to implement the solution in the company. The completion of works is scheduled for December 2022.

Pilot implementation of a VR360 substation in the Substation Simulator training area

As part of the works, a training module in VR360 technology was created and implemented into the Operation Services Simulator installed at ZKO in Warsaw. VR360 technology allows for visual presentation of the implementation process for the control of a given network element, as well as the activities performed by the substation's duty officer on site. As part of the project, a virtual section of

the Miłosna 400/220/110kV substation was developed, extended to include the possibility of controlling switches in the AT-3 400/220 kV autotransformer feeder. The project ended in July 2021.

RES generation forecasting

The aim of the works was to develop and test a prototype of a proprietary tool for forecasting generation of renewable energy source (RES) wind sources (WF) and photovoltaic sources (PV) with enhanced resilience to external disturbances, particularly in terms of communications, characterised by a mild degradation of forecast quality with increasing scale of disturbance or failure. The project ended in July 2021. We plan to continue our efforts to implement this solution at PSE.

Projects carried out in international consortia

Demonstration of system integration with smart transmission grid and storage technologies with increasing share of renewables (acronym: EU-SysFlex)

The EU-SysFlex project is funded by the EU framework programme for research and innovation Horizon 2020 and carried out by a consortium of 33 partners from 15 countries. Project activities started in November 2017. The objective of the research project was to design the future shape of the pan-European system, to maximise the economic and environmental value, assuming a high share of renewable energy sources (RES). The objective planned to be achieved was to use new approaches and solutions aimed at providing system flexibility instead of costly asset redundancy. The consortium's works were completed at the end of February 2022.

In May 2021, as part of the research work, activities on the implementation of the *Real Time Simulations (RTS)* were completed. Tasks in this area were carried out by PSE Innowacje. In the RTS area, the introduction of new resources and new system services into the operational management of the power system was simulated. The financial effects of the project were reported to the European Commission. We are currently awaiting acceptance of the report and approval of the amount of the grant awarded.

TSO – DSO – Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation (acronym: OneNet)

Our organisation, together with PSE Innowacje, participates in the international One Network for Europe (OneNet) project, which aims to build a technical and commercial platform for the competitive contracting of services for power system management. The project received support from the EU's Horizon 2020 programme.

OneNet is a demonstration project for testing a market-based approach to procuring services offered by resources connected to the distribution network. One such demonstration area is being established in Poland. The project is planned to be completed in September 2023.

In addition to PSE and PSE Innowacje, Energa Operator (OSD), Enspirion (aggregator), the National Centre for Nuclear Research and Transition Technologies-Systems also participate in the project. Under the project, DSOs and TSOs use services provided by consumers and distributed generators and their aggregators. Various actions will be tested that can be used by operators - both DSOs and TSOs - to influence the power network to adjust the way it operates to changing network and balance conditions. The project is intended to develop, test and recommend solutions and mechanisms that will enable future use of flexibility resources. A key element of the project is testing the solutions developed in the demonstration implementations. They will involve the implementation of IT platforms used by market participants to provide services, which will be acquired by operators as needed.

Pilot demonstration project for the implementation of a system supporting safety of the NPS operation under conditions of a large share of generation from wind sources based on the Special Protection Scheme (SPS) and battery-powered electricity storage facility (acronym: NEDO).

The NEDO demonstration project comprised the implementation of the Special Protection Scheme (SPS) in a limited area of northern Poland, together with an electricity storage facility. The project concept was developed with the involvement of the New Energy and Industrial Technology Development Organisation (NEDO), a Japanese government agency that co-financed the project.

At the end of September 2020, the part of the project aimed at testing, in a dedicated area of the NPS, the SPS that performs the function of automatically relieving the high-voltage transmission and distribution network as a result of the occurred network disturbance. The elimination of overloads on network components is achieved through the use of wind farms and electricity storage facilities. In November 2020, the ownership of the SPS equipment was transferred by NEDO to PSE free of charge and thus the demonstration project in this part was completed.

In cooperation with ENERGA OZE S.A., the functionality of the hybrid electricity storage facility, built and connected to the internal network of the Bystra wind farm, was also tested. In the sub-demonstration period, until the end of the first quarter of 2024, PSE plans to make operational use of the electricity storage facility built at the Bystra WF and to develop the SPS in terms of equipping it with additional functionalities, which will include photovoltaic systems in addition to wind farms. They will enable the TSO's operation services to apply a non-market reduction mechanism for wind farms and PV system in an optimal manner, safe for the network. The new SPS functionalities will cover the entire National Power System, in particular the high-voltage transmission and distribution network.

Key figures

- **12 research and development works** performed by PSE in 2021, including 10 development works and one work each carried out through applied research and industrial research.
- **PLN 28.34 million** in total PSE expenditures incurred in 2018–2021 for research and development, including PLN 3.04 million in 2021.

2.2. Business strategy for 2020-2030

PSE Strategy for 2020-2030 is consistent with the vision of a modern electricity market. It is focused on priority needs: ensuring cyber security and developing Energy Market Information Operator services, as well as power system resilience services. Meeting the challenges within the next years will require a major mobilisation of PSE executives and employees.

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

PSE's core values are reliability, credibility and accountability.

Reliability

PSE is a reliable partner for energy consumers, generators, distribution system operators, market operators, capacity markets, the regulator and the Polish Government. The Company ensures continuity of electricity supply in the short and long term based on measures to effectively manage threats to the continuity of electricity supply from the transmission grid.

Credibility

By its actions, PSE confirms that it has all the necessary competences to perform the function and mission entrusted to it. The stability of our operations and the sustainability of our relationships with business partners are guaranteed by our organisation's strict adherence to corporate governance and internal procedures.

Responsibility

In all activities undertaken, our organisation cares about future generations, the natural environment, the country's energy security, and the position of the Polish economy in the world.

Defined values of PSE give rise to ideas which at the same time are guidelines for conduct for all employees of our company. These are: **modernity, professionalism, partnership, development, openness**. Acting in accordance with these ideas allows to work calmly and effectively and to grow professionally and personally in an uninterrupted manner.

Challenges and strategic objectives of PSE

[GRI 103-1] PSE Strategy for 2020-2030 is a vision of a modern energy market. It was prepared using a strategic planning by business capability method called *capabilities based planning*. This method, developed by the U.S. RAND Institute, involves defining challenges, identifying goals and initiatives, allocating resources to initiatives, and tracking the progress of initiatives and their results.

The PSEs identified **6 major challenges and 17 goals** that should be achieved over a 10-year horizon.

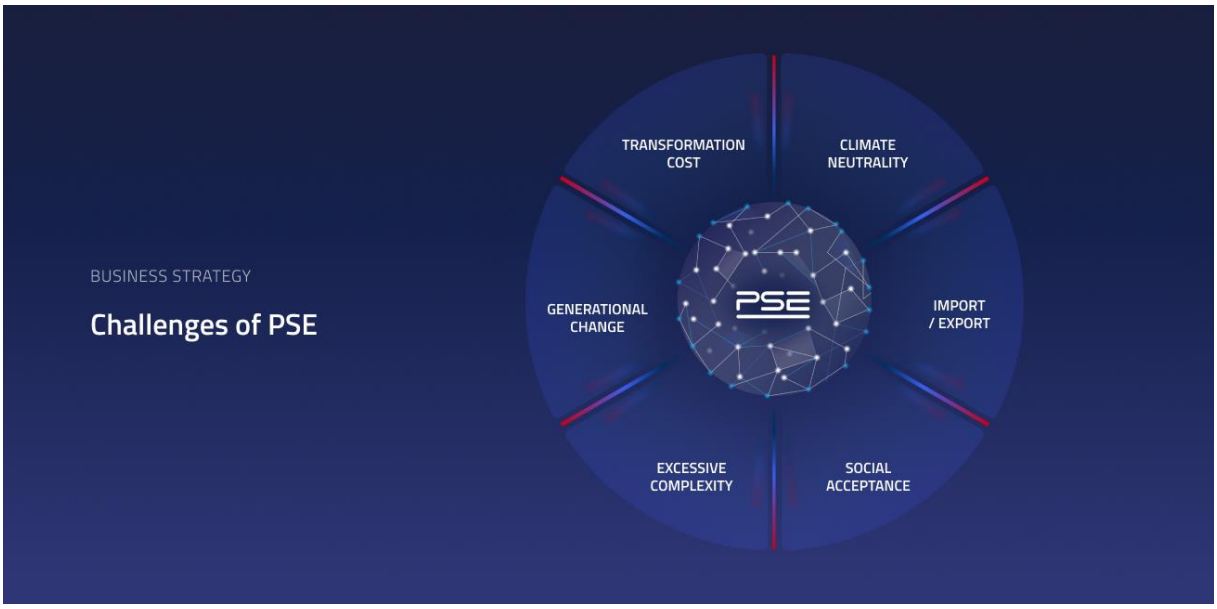


Fig.1. PSE's challenges

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

1. **Transformation cost**

   The electricity transition in the current model of the European electricity market, where large price zones are treated as a copper plate, where only electricity is traded in the market, and where wind and solar are preferred among non-carbon sources, will put pressure on transmission system operators, including PSE, to bear more risks and costs. These costs arise from the discrepancy between the market model and its actual implementations, which are significantly affected by physical phenomena. The activity of operators, understood as ensuring the feasibility of electricity flows and securing its supply "of last resort", becomes at the same time the subject of interest from the exchanges, regional coordination centers for safe operation of the system, as well as European regulators: ACER and the European Commission. Meanwhile, the cost of failing to adapt to the coming changes will be incurred primarily by society (households) and the economy (industry). For PSE, the key to proper participation in the electricity transition will be the fair allocation of costs to individual users of the European electricity system. Cost relationships in terms of market infrastructure will also be important, i.e. cost sharing between exchanges, distribution system

operators and transmission system operator, and on a pan-European basis between transmission system operators, in terms of a joint effort to keep synchronously interconnected power systems operating by all TSOs.

2. Climate neutrality GRI 103-2

The currently promoted concept of climate neutrality moves away from technology neutrality toward a preference for two types of renewable energy sources: wind farms and photovoltaics, which over time are assumed to be complemented by hydrogen and chemical battery storage. The preferred types of RES will be dispersed and characterized by variability of generation depending on weather conditions, which will result in growing uncertainty as to the level of generation in the transmission grid and distribution networks.

Due to the development of prosumers, the level of demand will also be subject to great uncertainty. Nuclear generation will be an important element in the implementation of climate neutrality, as supporting the operational security of the electricity system due to its ability to operate stably.

3. Import / Export

The increasing costs of purchasing carbon emission allowances, the increasing share of zero-variable-cost units, and the surplus of renewable electricity generation in neighboring countries have led to a situation where the utilisation rate of fossil-fueled generation capacities is declining. For this reason, aging and successively phased out domestic generating units are not fully replaced by new sources that would allow them to meet the power and energy demand of the NPS on their own in the future. In addition, legal changes at the European level increase the pressure to maximize cross-border exchange opportunities, which may also reduce the use of domestic fossil fuel-fired generation sources in favor of increased imports of cheaper foreign-generated electricity.

The possible division of the market into price zones and the division of zones into smaller zones raises a legitimate concern about domestic generating units and their competition within zones for energy market access and interconnection transmission capacity.

It will be a major challenge for PSE to develop its cooperation with neighbouring countries in such a way as to ensure the security of system operation in a situation where balancing cannot be achieved with the use of domestic sources alone, and it will not lead to excessive development of the grid and cross-border interconnections, the role of which may decrease in time.

4. Social acceptance

New infrastructure investments are becoming more challenging. This is due to increasing public involvement caused by a lack of acceptance of investment projects or a lack of acceptance of the way the investment projects are implemented.

Therefore, a challenge for PSE is to carry out effective actions aimed at increasing social acceptance for investments in transmission infrastructure among local communities while guaranteeing reliable operation and development of the NPS.

5. Excessive complexity

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

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

The system is much more likely to be operating at its limits. This approach obviously increases its vulnerability to external threats, including cyber-attacks. The likelihood of cyber-attacks is high due to the far-reaching digitisation and automation of processes.

6. Generational change

The labour market is witnessing a generational change that is having a huge impact on how companies operate and how they approach hiring. Representatives of the youngest age group present different attitudes and expectations towards work than older generations of workers. In addition, the labour market has become an employee market, which is also confirmed by the demographic changes occurring in Poland. The challenge for PSE remains to create an offer that meets employees' expectations regarding terms and conditions of employment and at the same time secures the employer's needs, including in the following areas:

- Effective talent management – securing qualified and prepared successors for all key positions;
- changes in incentive systems – in attracting employees, as important as the amount of remuneration is the work atmosphere and development opportunities;
- managing multi-generational teams – diversity management policies should take into account increasingly diversified workforces, also in terms of age;
- new technologies – making the work environment more flexible, offering employees a greater sense of freedom while increasing efficiency and providing communication free from the traditional constraints of time and location;
- *work-life balance* – the employer should make it possible to reconcile professional and private life, e.g. by providing flexible working hours or the possibility of remote work;
- *employer branding* – representatives of the younger generation of employees are guided in their career choices by the image of the organisation, which gives rise to the need for appropriate employer brand management.

  The labor market is witnessing a generational change that is having a huge impact on how companies operate and how they approach hiring.

Based on the defined challenges, the **strategic objectives** were set to be achieved by PSE in the near future.

1. Increase in the share of non-tariff revenues

PSE is developing new branches of non-tariff services while maintaining the required service quality of the core business.

2. Integration with RCCs within the SOR based on reservation and verification of RCC functions

PSE's operation is aimed at regionalizing key operator processes and transferring selected ones to regional coordination centers (RCCs).

3. Improving the accuracy of tariffs

PSE is working on optimizing the process of planning and forecasting volumes necessary to develop the company's tariff for the next period.

4. Improving the accuracy of budgets

PSE is working to assign budgets to processes (activities and tasks) and projects.

5. Maintaining the *churn rate* at a negligible level

PSE seeks to calculate transmission fees for large consumers in the transmission grid, that reflect the actual costs of providing services to those consumers, taking into account the costs of energy transmission and necessary system services.

6. Implementation of the Transmission Network Development Plan

The implementation of the baseline scenario for the transmission grid development takes into account the basic requirements and challenges facing the NPS.

7. Creating balancing mechanisms and system services to support the transition to a low-carbon electric power industry

GRI 103-2 As conventional sources decline, the system must be much more flexible to accommodate RES generation.

8. Ensuring compliance with CEP70

PSE will make inter-area capacity available at the maximum allowable level due to the need to maintain the required reliability and quality parameters of power system operation, while implementing tools to comply with the requirements of Regulation 2019/943.

9. Ensuring the accuracy of schedules

PSE will implement a methodology for managing the company's human resources and handling a portfolio of investment initiatives to improve their use in the investment process, managing investment risks and their mitigation plans.

10. Regulation of legal status of infrastructure

PSE, taking care to regulate the legal status of real properties under its infrastructure, intends to ensure participation of property owners in benefits resulting from locating the infrastructure.

11. Optimisation of capital expenditures

The Company strives to manage its finances so that funds are spent optimally at each stage of investment.

12. Accounting for uncertainty in planning

The Company intends to improve the efficiency of the system planning process by implementation of probabilistic tools.

13. Accounting for criticality

PSE is taking steps to develop computational methods whose main task will be to identify the "weakest links" of the NPS.

14. Provision of internal *back-up* for *outsourced* functions

New EU regulations are aimed at increasing coordination among TSOs by regionalizing key operator processes and transferring them to regional coordination centers.

15. Reduction of incident management time

The Company ensures maximum quality of service to electricity consumers, including, most importantly, system resilience to disturbances.

16. Implementation of a competency model and competitiveness of salaries

The competency model will be the basis and guidepost for new skills and behaviours for employees to assume the responsibilities of their current and expected roles.

17. Building the knowledge-based organisation

PSE initiates changes in organisational culture - improving the operating model, changing management systems and practices, and promoting an attitude of openness to change and innovation.

2.3. Implementation of the business strategy for 2020-2030

Strategic directions

Automation and robotics of the accounting records

The company has an electronic accounting document workflow, crucial for the efficient handling of accounting records with the territorially dispersed structure of PSE. In 2021, works were completed to optimise the previously implemented solution integrating the document workflow system with the document recording system. Improvements in the handling of purchase invoices for grant-funded projects and the automatic monitoring of upcoming payment dates were implemented. A number of works were performed to optimise the process of accepting documents and sending them to the accounting system. These measures accelerated the handling of accounting documents, improved their security and ensured the continuity of the entire system.

Building a competence centre capable of implementing innovations

In order to adapt our organisation in technological and market terms to changes in the environment, efficient and effective management of the research and development area is essential. In 2021, activities were carried out to improve the management of research and development (R&D) planning, execution and monitoring process, so that it is able to efficiently search for new, valuable and possible future implementations in the PSE CG. Thus, works were continued, which had started already in 2017-2019, at the implementation of the previous strategy (objective: Responsible Development). So far, it has been possible to strengthen the competences of PSE Innowacje as a centre for the creation of an R&D agenda in the PSE CG, i.a. by defining a new framework for the R&D area. An R&D portfolio coordinator in the PSE CG and an R&D team to support his work were also appointed.

The activities carried out in 2021 were focused on streamlining the process of clearing and monitoring completed R&D projects and implementing a system to supervise the implementation of the deliverables of these works, in order to gain benefits and achieve the intended results.

At the same time, works were carried out to introduce mechanisms for accumulating and sharing new knowledge and the deliverables of the R&D works carried out within the PSE CG, and to promote an attitude among PSE CG staff that is open to change and innovation. The objective is to activate the potential to implement new technologies to provide the PSE CG with advantage in the market and to consolidate its leadership position.

We paid and continue to pay great attention to increasing the involvement of the PSE CG in international R&D projects in new market services and power technologies (2017 – EU-SysFlex, 2020 – OneNet).

Construction of the electricity quality management system in the NPS

The purpose of this course of action is to implement solutions that will serve to ensure that PSE can provide the required electricity quality (JEE) parameters and, if necessary, provide the information necessary to determine the source of JEE disturbances and implement corrective measures.

The main objective of the course of action, i.e. the construction of a electricity quality management system in the NPS, will be achieved through the implementation of the following specific tasks:

- providing electricity quality monitoring systems (SMJEE) for all points of electricity delivery to consumers and all substations of the TSO – so that monitoring covers each voltage level in at least one measuring point;

- implementation of the master electricity quality measurement and billing system (SPRJEE), which integrates measurement data from SMJEE systems and is used to process, report and make available JEE indicators and information on JEE parameters to the CSIRE system.

The SMJEE system currently in place consists of 169 metering devices (analysers) and covers about 39 percent of the required metering points. Implementation of the investment task entitled Extension of the electricity quality monitoring system will enable electricity quality monitoring to be carried out at all transmission grid facilities.

As part of this task, 2 SMJEE systems are being implemented within separate packages, each covering 130 metering points (260 metering points in total). Upon completion of the task, monitoring of the electricity quality parameters will be carried out at a total of 429 metering points. The currently implemented SMJEE systems will meet very high IT security standards and will implement a number of additional functionalities in line with the standards applicable at the TSO.

In 2021, following a tender process, contracts were signed with two contractors and the works planned for the next 3 years began. As part of stage 1, the contractors developed and agreed detailed work schedules and began developing and agreeing detailed design documentation for the substation equipment to be installed (stage 2) and the SMJEE IT systems together with the pilot metering equipment system at a total of 4 substations (stage 3).

The SMJEE system will make it possible to identify predominant sources of disturbance, determine the parties' contribution to their introduction, and determine discounts, and in the future – if regulated by law – also penalties for exceeding the level of permissible individual parameters. Works on this task are scheduled to start in 2023, once the IT part of the SMJEE system has been implemented in the production version as part of the SMJEE system extension.

Electricity quality management in the target system will be based on the following key systems:

- SMJEE – performing data reading from the metering devices installed in the transmission grid facilities and serving for their verification,
- SPRJEE - performing the integration of data from the SMJEE systems and responsible for processing, reporting, and sharing JEE indicators and JEE parameter information with the CSIRE system.

Implementing an electricity quality management system in the NPS will bring benefits and opportunities such as:

- verification of compliance of power quality parameters with the requirements of the system regulation and other applicable regulations at all facilities,
- verification of relevance of applications, claims and notifications of end users, DSO and other NPS users concerning non-compliance with electricity quality parameters, including those related to discounts and grid events,
- identification and prevention of new sources of disturbances within the completed connections of RES generators and customers to the transmission grid,
- issuing opinions on wind farm impact test reports on the power system in terms of electricity quality parameters,
- identification of causes of disturbances for electricity quality parameters and identification of the entity responsible for their introduction,

- using the collected measurement data to determine corrective measures and eliminate identified disturbances,
- collecting information on the electricity quality status to determine appropriate requirements for future connections,
- provision of data and recorded events for the evaluation of operation of the equipment in substations and switching operations within the scope of the work of the Commission for Investigation of Disturbances and evaluation of their impact on the plants of entities connected to the transmission system,
- evaluation of applied control automation systems operation - analysis of problems concerning the maintenance of voltage levels and voltage imbalance in the power system.

Total SAP replacement

In 2021, the SAP System Transformation programme was launched at PSE. The aim of the programme is to optimise business processes by modernising, modifying and developing the currently operating SAP environment applications. The chosen course of action ensures the evolutionary development of SAP systems at PSE, resulting from advances in information technology and the development of the organisation's existing competences. The fundamental objective of the transformation is to simplify business processes and make the widest possible use of system (IT) solutions.

As part of the transformation programme, *an upgrade* and update of the SAP systems will be carried out with a view to standardise and optimise processes on a company-wide level. State-of-the-art system solutions will cover financial accounting and tax processes, so that all transactions are recorded and accounted for within a single IT solution. This will reduce the manual work involved in duplicating data entry and also reduce financial risks.

The SAP System Transformation is also an opportunity to implement a modern IT solution to allow further works in the area of transferring manual, paper-based processes to digital solutions. The programme provides the company with new opportunities relating to managing data analytics for management accounting and analysis.

Development of the scope and implementation of regular reviews to assess the consistency of defence and restoration plans

In addition to the requirement set out in Article 50 section 3 (System Defence Plan) and in Article 51 section 3 (Restoration Plan) of Commission Regulation (EU) 2017/2196 of 24 November 2017 establishing a grid code on electricity emergency and restoration, the TSO developed internal documents setting out the rules for the review, amendment and release of the System Defence Plan and the Restoration Plan.

Implementation of the portfolio of projects to support the implementation of the new rules for managing the NPS operation (PPKSE)

In 2022, PSE continued its activities relating to the implementation of stage II of the balancing market reform (hereinafter referred to as BM), which included design and implementation works in two areas:

- regulatory area – with regard to acts and regulations approved by the President of the Energy Regulatory Office;

- ICT systems on the part of the TSO, DSO and balancing market participants.

A number of tasks relating to achieving business capabilities linked to the implementation of stage II of the balancing market reform and in the areas of coordination planning, NPS operation and NPS transmission and access services were initiated. The works included adapting the company's business processes and the IT systems supporting them to the new requirements resulting from the implementation of stage II of the balancing market reform and selected legal regulations.

The scope of works in the area of implementation of stage II of the balancing market reform carried out in 2022 as part of the portfolio of projects to support the implementation of the new rules for managing the NPS operation (PPKSE) included, in particular:

- participation in the public consultation process for the draft system regulation on detailed conditions for the power system operation;
- development of draft Balancing Conditions and Transmission Grid Code for public consultation, taking into account solutions implemented under stage II of the balancing market reform;
- continuation of design works and commencement of implementation works in the IT area, relating to development of runtime environments for business systems and applications, and standards for data exchange systems;
- continuation of design works and commencement of implementation works relating to the implementation of systems and applications for the business areas covered by the changes resulting from stage II of the balancing market reform.

In addition, our organisation carried out a number of activities relating to national and European regulatory obligations as part of its project portfolio. Already on 8 June 2022, we completed works on the launch of a single electricity market coupling mechanism in the CORE region using a method that optimises *flow-based market coupling* in the *Day-Ahead* market. The *flow-based* method allows the interdependence between commercial transactions and physical technical constraints across the region to be taken into account, which was not possible in the previously used *Available Transfer Capacity (ATC)* method.

In the past year, PSE continued design works and started works on the development of runtime environments and the implementation of the *Network Model Management System (NMMS)*, and commenced design works on updating the software of the SCADA and EMS subsystems of the DYSTER System.

Implementation of investment tasks resulting from PRSP

PSE earmarked around PLN 1 billion for investment tasks in 2021. The most important tasks completed were:

- construction of the double circuit Piła Krzewina-Plewiska 400 kV line (circuit No. 2, which operates temporarily at 220 kV, was connected),
- construction of the double circuit Pasikurowice-Czarna/Mikułowa 400 kV line (from the Pasikurowice substation to the introduction to the Czarna substation),
- construction of the double-circuit Pątnów-Jasiniec 400 kV line (circuit No. 1, which operates temporarily between Kromolice and Jasiniec, was connected),
- construction of the double-circuit Grudziądz Węgrowo-Pelplin-Gdańsk Przyjaźń 400 kV line,
- construction of the double-circuit section of the Kromolice-Pątnów 400 kV line (circuit No. 2 was introduced to the Pątnów substation, circuit No. 1 operates temporarily between Kromolice and Jasiniec),

- construction of the single-circuit Glinki-Recław 220 kV line,
- construction of the single-circuit Radkowice-Kielce Piaski 220 kV line,
- upgrade of the Janów-Rogowiec, Rogowiec-Piotrków 220 kV line,
- upgrade of the Byczyna-Jamki, Byczyna-Koksochemia 220 kV line,
- upgrade of the Joachimów-Łagisza/Wrzosowa 220 kV line,
- replacement of the OPGW lightning protection wire on the Połaniec-Chmielów 220 kV line, circuit I and circuit II,
- replacement of the OPGW lightning protection wire on the Rożki-Puławy 220 kV line,
- construction of the 400(220)/110 kV Pelplin substation,
- construction of the Żydowo Kierzkowo 400/110 kV substation,
- construction of the Praga (Żerań) 220/110 kV substation,
- extension of the Recław 110 kV substation by addition of a 220 kV switching station,
- extension of the Mikułowa 400/220/110 kV substation for the introduction of the 400 kV line,
- extension of the 110 kV switching station in the Kromolice 400/110 kV substation for the connection of the Wielkopolska WF.

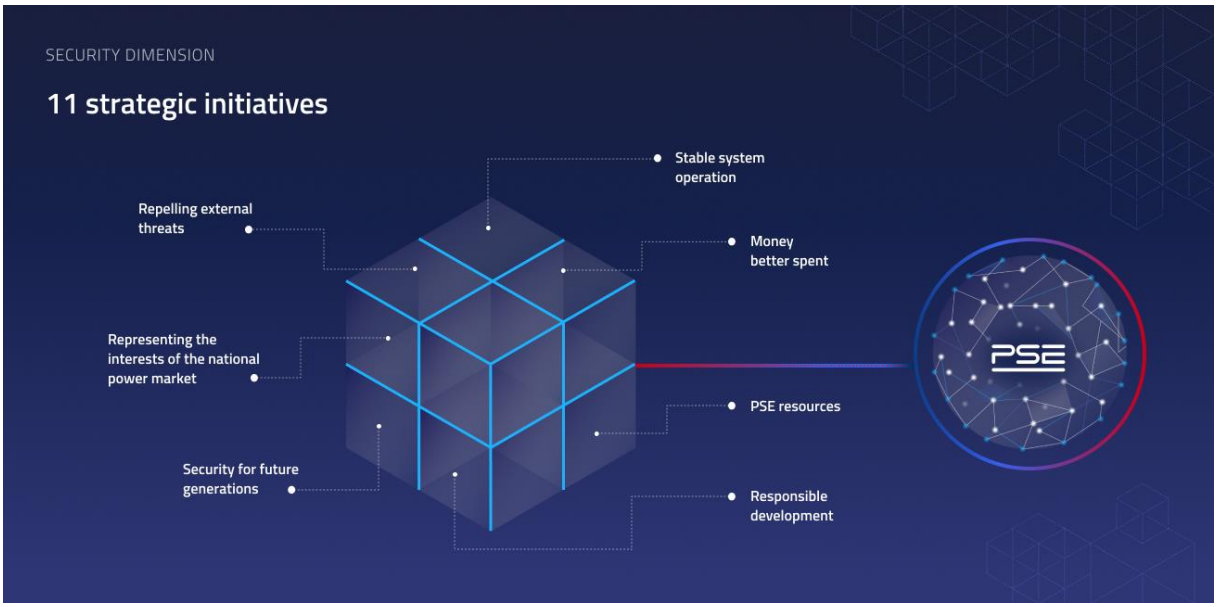
Network segmentation

Objective: Ensuring IT and technical security of the power system

Cybersecurity plays – due to its significant impact on the security of the national power system – a key role in our business strategy. One of the strategic initiatives identified in the previous PSE Strategy has been to **repel external threats.** Activities relating to this initiative are continued as part of the ongoing projects and tasks aimed at improving safety. This includes, i.a., managing the risk of losing the ability to control or manage the NPS operation associated with cyber attacks on the IT/OT systems of the TSO and DSOs, generators, trading companies, exchanges or industrial consumers.

The measures taken are a response to the growing threats in the cybersecurity sphere. This approach is becoming increasingly important in the light of the increasing use of new technologies and communication methods, as well as the growing threats from the company's and the country's external environment. Recent years have seen an increase in threats relating to intensification of targeted attacks using dedicated tools to carry them out, especially on critical infrastructure. Phishing attacks are also becoming more frequent and sophisticated in response to growing user awareness, and ransomware attacks (extorting a ransom under threat or after making ICT systems or the data itself unusable). The increase in attacks is also related to the epidemic situation, and the increased digitalisation of life opens up new opportunities to exploit weak points in new solutions and reduced user vigilance. Geopolitical factors are also important, which significantly influence the level of threats originating from the environment.

By adopting and continuing the actions arising from the ongoing cybersecurity strategy, we have identified possible situation development directions, so that the portfolio of actions needed to manage the defined risks and ongoing needs could be developed adequately and in a timely manner. The growing number of cyber threats and specialised attack tools have confirmed the validity of our assumptions and the need to continue our efforts in this area.



ICT security and cyber threat area management – approaches and projects

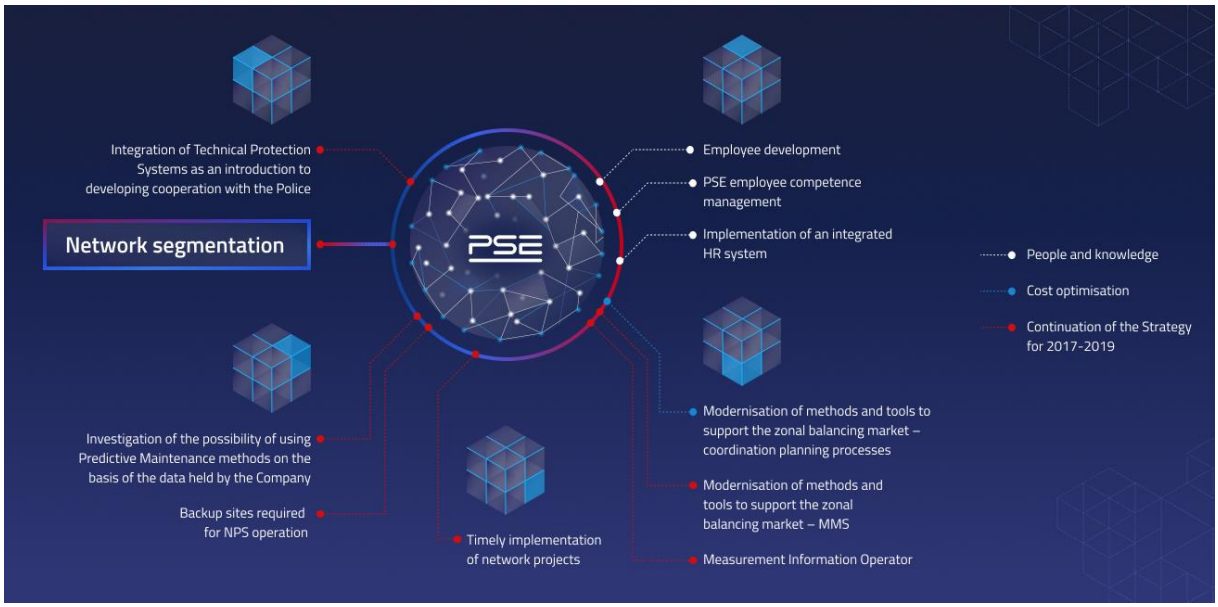
In the reported period, the ICT Department continued its activities in the area of information and communication technology security assurance. The assumptions pointed to the inevitable and interdependent cybersecurity of our company, market partners in Poland and abroad, as well as capital group entities and subcontractors, while indicating the aggregate impact of cybersecurity on the stability of NPS operation. The pillar of the undertaken activities was ICT security, i.e. business continuity understood as availability and resilience of systems as well as integrity and confidentiality of data in IT solutions.

ICT Security and Cybersecurity

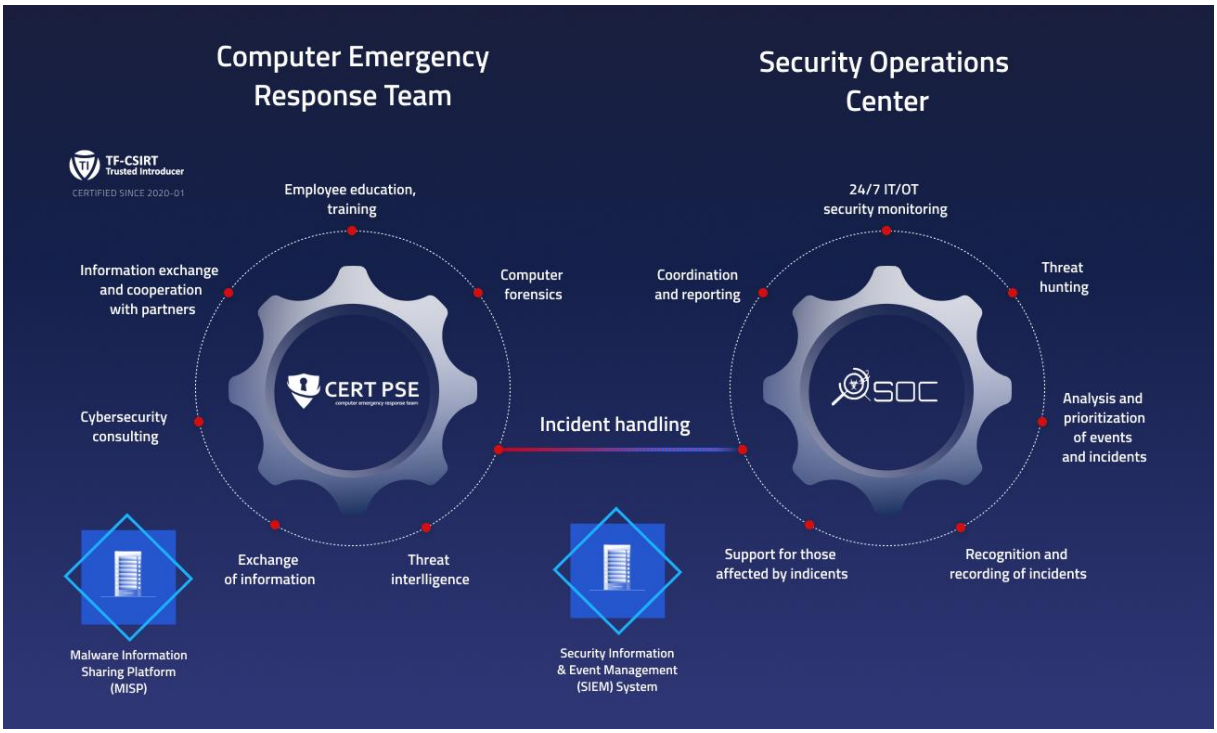
Business continuity as availability and resilience of systems and data integrity and confidentiality in IT solutions

Priority areas of ongoing projects:

- **Network segmentation** – projects aimed at ensuring adequate separation of resources with different levels of vulnerability, including ICT systems at the substations and central critical systems – both through actions at the level of technological standards (e.g. EAZ, SSiN), ICT architecture, high-level technical projects for rebuilding ICT network segmentation and appropriate shaping of business projects, and the infrastructure itself;



- **Workstation** - projects that provide secure work tools to maintain performance and functionality according to business needs, with malware protection and control of permissions and data flow;
- **Internet connection** – our external perimeter providing the company's employees and visitors, subject to rules derived from separation and rights management, with functional and unified access to the Internet (including via a secure WiFi network, implemented at both the company's head office and at the remote organisational units) and adequate, secure remote access;
- **Detection and response** – the work of the Security Operations Centre (SOC) and Computer Emergency Response Team (CERT) to ensure ongoing ICT security. A dedicated SOC team conducts continuous (7x24 h) threat monitoring, taking applied actions and countermeasures for IT and OT network incidents. In turn, CERT's task is to raise awareness among employees, publish alerts and warnings on threats, report information on incidents and cooperate with external entities (e.g. CERT NASK, CERT.GOV.PL, RCB) in the field of ICT security.



The technical measures carried out at PSE and the adaptability of our organisation enabled us to enter the first period of the pandemic with minimal disturbance and to operate the organisation normally without disturbance or impact on the processes carried out in the following year. Already in the first year, after analyses, the missing elements were supplemented by purchases or process modifications, so that they could be implemented without the need for 80 percent of employees to be present in the offices.

As part of the measures undertaken we adapt organisational and technical solutions to legal requirements (Act on the National Cybersecurity System) and current ICT security standards, as well as industry standards.

Collaboration

In cooperation with our stakeholders, we constantly work to ensure an appropriate level of collective ICT security and strategic harmonisation of efforts. We also cooperate closely with entities responsible for the cybersecurity of the power sector – both domestically and internationally. To deepen this cooperation and to spread awareness of cybersecurity threats and approaches to combat them, we actively participate – in 2021 mainly remotely – in numerous conferences and seminars as well as national and international sector cooperation forums. Since 2018, we have been organising the PolEx/Cyber Conference For Energy Sector (CC4ES), with industry experts from Poland and abroad. In June 2021, despite the difficulties associated with the pandemic, PSE organised the next edition of CC4ES.

A key forum for international cooperation is the European Network of Transmission System Operators for Electricity (ENTSO-E), under which PSE representatives are involved in projects aimed at ensuring energy security in Europe, developing new solutions or concepts and rules for critical infrastructure in various ENTSO-e working and project groups. They include, i.a.:

- Digital committee Cyber Security Strategy Initiative – a strategic direction initiative to ensure the cyber security of ENTSO-E, led by the Director of PSE's ICT Department.

- ENTSO-E Cyber Security Working Group – a group that deals with ICT security issues. Its task is to monitor information about threats in the world and to cooperate in projects where it is necessary to take care of safety and shape rules for safe operation of systems and operators.
- Working group responsible for development of the Network Code for Cyber Security regulations.
- ENTSO-E Enterprise Architecture Team – a Digital Committee task force whose mission is to ensure proper coordination, coherence and decision support on architecture issues within the ENTSO-E/RSC/TSO cooperation.
- ENTSO-E CIM Expert Group (Common Information Model) – a group that has developed and maintains standards for the electronic information exchange in the European electricity market.

PSE members also join the work of other groups, supporting them with their competence in the areas of IT interconnection management and designing future solutions that will be created to meet the growing needs of operator systems and the market. As part of this work, concepts are developed for new connections for data exchange between transmission system operators and existing connections are developed. Cooperation in the groups has a significant impact on the security and stability of the power systems in Europe. It also helps to improve employee competence and support partners in this process and fosters the exchange of knowledge and experience.

Thanks to this activity, our employees have an impact on the formation of global standards in the field of IT security of industrial systems, as well as significantly improve their competence in this area. It also helps to adapt the ICT environment to meet growing security requirements and improve resilience to threats.

Coherent security system

The substations are equipped with Technical Protection Systems (SOT) executed in accordance with the Technical Protection System Standard in PSE facilities in force at the date of the project. Technical Protection Systems are an element of physical protection implemented in the form of technical security.

In 2021, PSE carried out the day-to-day operation of the Technical Protection Systems and scheduled maintenance under the service agreements concluded. Investment tasks were planned to be launched to comprehensively implement the Technical Protection Systems by 2026, and the scope of the Technical Protection System submissions were completed on an ongoing basis for investment tasks carried out by other organisational units. The Technical Protection Systems will be further developed in line with the PSE Strategy for 2020-2030.

Selling the infrastructure overflights

Market analysis indicates that there is demand from other concerns and companies, including energy and raw material distributors and suppliers, to use aircrafts to monitor the infrastructure condition. PSE has the organisational and infrastructural potential to provide aerial monitoring services of transmission and distribution infrastructure facilities, including critical infrastructure belonging to other entities.

In February 2022, the company entered into an agreement with the Gas Transmission Operator Gaz-System S.A., under which PSE will provide visual overflight services to Gaz-System, Poznań branch, from March 2022. By the end of May this year, PSE carried out 3 full overflights of gas pipelines in the Poznań branch, with a total flight time of approx. 80 hours and 24 flying days. Our company is organisationally prepared to expand both the volume and scope of the provision of external aviation services.

Inclusion of the FNM in market mechanisms and implementation of innovations resulting from research work

PSE, as the TSO, for the purpose of covering the power demand of end consumers and the balance of cross-border electricity exchange, plans the operation of the national power system (NPS) using balancing market mechanisms. We minimise the total costs of balancing energy, the costs of commissioning generating units and the costs of providing the required balancing capacity, while taking into account the principles of safe operation of the NPS. The accuracy of the consideration of network operating conditions in balancing market mechanisms directly affects the efficiency of NPS operation planning as regards safety of NPS operation and costs. Overdimensioned restrictions on network operation unduly increase costs and, in an opposite situation, reduce costs, but may result in failure to meet the conditions for safe operation of the NPS.

In order to ensure the efficient use of network resources in balancing market mechanisms, PSE works to implement IT tools to manage the Full Network Model (FNM) and to include the FNM directly in balancing market mechanisms. In the English literature, the optimisation task – used in planning the operation of the power system taking into account the FNM and other system *constraints* – is referred to as the *security constrained unit commitment* (SCUC). The balancing market mechanisms based on the SCUC solution integrated with the NMMS, i.e. the module for FNM management, is designed as part of PSE research work, in cooperation with PSE Innowacje and the National Centre for Nuclear Research (NCBJ).

Implementation of control and verification mechanisms for financial liabilities of the company

As part of the control mechanisms, a model for setting up and verifying counterparty data in SAP was introduced, which minimises the occurrence of the risk of financial frauds. The main idea behind the implemented model was to introduce two stages of setting up and editing master data in the SAP system, according to the principle of separation of roles. A mechanism was also implemented for the regular verification of the master data by a dedicated team responsible for managing this area. The transfer of agreements, annexes and orders relating to cost liabilities into the SAP system in the form of contracts, the implementation of regular monitoring of the financial use of agreements and the verification of orders increase the control over the company's liabilities in terms of both amounts and deadlines.

Implementing a new market model

On 1 January 2021, PSE implemented stage I of the balancing market (BM) reform. The comprehensive implementation of new balancing market rules required adjustment of secondary legislation to the Energy Law, i.e. the Regulation on detailed conditions for the operation of the power system, balancing conditions, the Transmission Grid Code, and adjustment of contracts between PSE and system users. The operational implementation of stage I of the balancing market reform required significant changes in the IT systems of PSE as well as, to a lesser extent, in the IT systems of the balancing market participants.

In parallel with the refinement of business capabilities, associated with the implementation of stage I of the balancing market reform from the beginning of 2021, our organisation started works on the implementation of stage II of the balancing market reform. The aim of this stage is to meet the legal and regulatory requirements in the area of balancing market operation that were not implemented as part of stage I of the balancing market reform, as well as to introduce changes to support these requirements and to improve the quality of the balancing market mechanism. As part of stage II of the balancing market reform, the following changes will be implemented in the balancing market, of major importance for the operation of this market segment and other segments of the wholesale electricity market:

- New balancing market entity and facility structure, including the introduction of balancing

service providers;
- Market-based mechanisms for sourcing power reserves;
- Changes of the rules for planning the operation of the national power system, including:
  (i) implementation of net volume planning,
  (ii) introduction of operating orders expressed in power "per point" instead of energy per period,
  (iii) reducing the planning period from 15 to 5 minutes;
- *Scarcity pricing* mechanism;
- New rules for the valuation of balancing energy and imbalance energy;
- Imbalance settlement period equal to 15 minutes.

The implementation of stage II of the balancing market reform will require adaptation of the TSO's business processes and IT systems in the area of commercial and technical data reporting, acquisition of balancing capacity, co-ordination planning and operation of the NPS, acquisition and processing of metering and settlement data, balancing capacity and energy settlements and the conclusion and handling of transmission contracts. The implementation of the changes of stage II of balancing market reform will also require significant adaptation of IT systems of market participants.

In 2021 and the first half of 2022, the scope of works performed by PSE in the area of implementation of stage II of the balancing market reform included, in particular:

- Participation in the public consultation process for the draft system regulation on detailed conditions for the power system operation;
- Development of draft Balancing Conditions and Transmission Grid Code for public consultation, taking into account solutions implemented under stage II of the balancing market reform;
- Commencement of design and implementation works in the IT area.

In parallel to the balancing market reform work, preparatory activities are underway to connect Poland to European balancing platforms: MARI, PICASSO and TERRE. Internationally, PSE as the TSO, continues to cooperate with other TSOs in developing these platforms. Domestically, the connection to the platforms must be preceded by the implementation of stage II of the balancing market reform, to ensure that the domestic balancing market can be properly integrated with these platforms.

Implementation of independent aviation operations

Our company owns three Robinson R66 helicopters, the parameters of which perfectly match the needs of PSE, and additionally met the conditions for low purchase and operating costs. Since 5 February 2021, we have the permit PL.SPO.058-HR issued by the President of the Civil Aviation Authority to carry out commercial high-risk specialized operations. This permit allows for patrolling substations, power poles and lines, gas pipelines, other pipelines, and to fly for site inspection and for strategic security patrolling of the power infrastructure. We employ trained, experienced pilots and task specialists. Helicopters and crews are based in three locations around the country, allowing for quick access to all of the power lines. The aerial operations we have carried out have confirmed the high efficiency and speed of transmission infrastructure inspections.

Implementation of risk preparedness

Regardless of the ongoing activities undertaken in the organisation as part of the risk management, PSE is engaged in tasks aimed at proper 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 purpose of the aforementioned regulations is to implement measures aimed at preventing electricity crises, preparing for them and managing them in a transparent, joint and several manner and with full regard to the requirements of a competitive European electricity market.

PSE supported the Ministry of Climate and Environment, acting as the Competent Authority, in its work on the plan for risk-preparedness in the electricity sector. The plan, published on 5 January 2022, defines general policies and measures to prevent, prepare for and mitigate electricity crises. It refers to regional and national electricity crisis scenarios, including in particular 28 out of 31 regional electricity crisis scenarios (SRKEE) provided by ENTSO-E and considered relevant (including possible) under Polish conditions.

Implementation of solutions to make fixed asset records more consistent

The area of fixed assets is a significant item in PSE's balance sheet and as such requires the support of IT solutions. In order to minimise the occurrence of differences in the records of fixed assets in accounting, taxation and local taxation terms, mechanisms were implemented for the system verification, monitoring and analysis of the differences shown using IT solutions. The implementation of solutions that make the records of fixed assets in three dimensions more consistent is part of a broader transformation, the primary objective of which is to create system solutions that use IT to support business processes. The work will result in reduction of the risk of errors or mistakes in the company's records of fixed assets and to improve reporting in the aforementioned area of fixed assets.

Implementation of the outage planning system

In 2021, our organisation completed the first stage of works including the design and implementation of the Outage Management System (OMS-W), to the extent that it enables the recording and management of outage needs reported within the scope of investment and operation tasks by the Central Investment Unit and the Department of Operation of PSE's network assets.

The system for managing the unavailability of elements of the OMS-W power system will be implemented on a modern IT platform. It will use the NPS element data contained in the RBES database. Entities to directly report the needed outages of NPS elements will be: organisational units at DE, CJI and DSO. At the PSE level, the OMS-W will be the next step towards future integration of the corporation's outage planning processes (with the AM system). Ultimately, the system will be equipped with a support module for the Shift Management sub-process (integrated with the OMS-R and OMS-OS system) and will have an additional module allowing for the creation of operating systems assigned to individual outage requests in the NPS.

The OMS-W system is intended to replace the SEW Rejestr system currently in use, developed more than 25 years ago. In the longer term, it will not be possible to operate the SEW system due to, i.a., changing environmental conditions (e.g. new versions of MS Office packages and operating systems) and the challenges faced by PSE (e.g. international coordination of outages as part of the OPC process).

A further stage of works was also initiated to enable the grouping of outage needs, and the creation and presentation of outages and outage sheets (associated with the reported outages and outage needs).

Implementation of a tool for probabilistic analysis in the process of planning NPS development

The fundamental objective of transmission grid development planning is to develop such a schedule for the implementation of investment activities that, when completed, will allow the NPS to continue to operate in a reliable and economically justified manner in the future. The direct effect of development activities is to ensure a balanced development of the transmission infrastructure which, on the one hand, will increase the efficiency of the market by reducing the impact of technical constraints in the

transmission grid and, on the other hand, will not lead to an overinvestment in the transmission infrastructure and the creation of unjustified financial burdens for system users.

The extent of the required investment in the transmission infrastructure depends on a number of external factors, among which are the demand side, the supply side and economic and socio-political conditions. Some of these factors are by their nature random. In the current realities of power system operation, there is an increasing demand to include probabilistic elements in the grid development planning process as a good representation of the environment.

Probabilistic analyses (analyses that take into account elements of uncertainty in the occurrence of events) on the one hand better reflect reality, but on the other hand are characterised by greater complexity and time-consuming calculations. For this reason, PSE saw the need to develop a dedicated tool to effectively incorporate probabilistic elements into the transmission grid development planning process. This led to the development of a functional concept and the subsequent development of the aPRSP IT tool.

aPRSP is designed to assist planners in selecting cost-effective schedules for implementing grid investments while taking into account random factors affecting power system operation. The tool works in two stages. The first stage automatically identifies so-called candidates, i.e. potential investments involving the construction of new or the modernisation of existing grid infrastructure elements. At this stage, the capital expenditure and potential market returns from the construction of a grid element are compared in a simplified manner. At the second stage, the resulting list of candidates is the input to the actual optimisation process. The process is intended to determine the time and task schedule for the implementation of investment activities that minimize the total investment costs and the costs of market operations, while ensuring that the criteria for the safety of system operation are met.

Purchase of aircrafts

Increasing the number of aircrafts and purchasing helicopters with more favorable maneuvering parameters will allow to: execute more complex aerial operations, use specialized on-board monitoring and reconnaissance equipment, expand tasks in the sphere of security performed in the situation of transmission line failures and unauthorized violation of power substation borders. The increased number of helicopters will enable an increase in the scope of tasks to include, among other things, inspection of the condition of investments and analysis of the terrain during the design and delineation of new lines. Increasing our aerial equipment resources will result in faster arrival of our specialists to failure/outage sites and enable faster response to the incident, thus reducing the time of power outage.

Provision of maintenance and operation of the power output from northern Poland

In 2021, work was carried out at PSE on the concept for the operation and maintenance of the transmission grid in northern Poland (ZKO Bydgoszcz area) following the extension of the transmission grid for the connection of offshore wind farms (OWF) and the HVDC Harmony Link. The concept has been accepted and is currently in the approval phase.

The concept assumes, among others, the establishment of the OWF/HVDC Division and defines the scope of the main tasks for this team. As a result, the OWF/HVDC Division was introduced into the design of the new SRO DE and recruitment applications for this organisational unit were prepared. The Tricity area was chosen as the location for the necessary office space, where an office lease agreement was concluded. The Division employees are currently being recruited. The next step will be the onboarding

of the hired candidates as part of their duties and training that will equip the new hires with unique competences of the TSO staff nationally.

In order to ensure the operation and maintenance of the power out system for northern Poland, it is also planned to form the Gorzów/Baczyna Team within the structures of ZES Krajnik, and to establish the ZES Żarnowiec Division responsible for the operation of the Choczewo substation, the Żarnowiec substation and the Żarnowiec DC substation (Harmony Link).

In line with PSE's strategy, building its own maintenance services will result in partial independence from the external market. In the longer term, the initiative to create and develop our own engineering and technical services, especially to handle the most complex tasks such as installation and commissioning of secondary circuits of power substations and HVDC facilities, will allow us to effectively manage the operation of facilities and incidents, i.e. it will contribute to a more efficient removal of faults and failures.

Managing data on the cost of acquiring and holding the legal title

The identified strategic objective will be achieved through the following actions:

- Optimising the costs of utility and land easements established on DSO properties.
- Optimising legal costs associated with litigation in the claims process.
- Aggregating legal titles to properties acquired as part of the claims process and implementation of the investment projects carried out in the company, as well as their comprehensive handling.
- Introduction of an IT system with a functionality covering the following: management of rights to real properties and handling of court proceedings to which PSE is a party, as well as claims submitted to PSE at the pre-court stage.
- Regulating the use of third-party real properties on which PSE infrastructure is sited, including the properties of the State Treasury under the management of the State Forest Holding (Państwowe Gospodarstwo Leśne Lasy Państwowe).

Financial management

In the area of financial management, a system tool was implemented in 2021, enabling managers to obtain instant information on the company's liquidity. The tool is a report based entirely on data from the SAP system and showing the company's future receivables and payables for various time criteria. The implementation of the tool has eliminated the activities associated with the manual acquisition and processing of data from various substantive units, which has optimised data generation and processing and reduced the company's operational risks. The use of the reports allows efficient management of spare cash, which is crucial for the active investment of free financial surplus.

Building OIRE

In 2021, PSE has been appointed as the Energy Market Information Operator (OIRE) that will implement the Central Energy Market Information System (CSIRE) and will be responsible for its operation. The appointment was made under the Act of 20 May, 2021 on amending the Energy Law and certain other acts (Journal of Laws, item 1093), effective 3 July, 2021. In accordance with the provisions of the Energy Law, the CSIRE system is to be launched from 1 July, 2024.

The project to create the OIRE function and implement the CSIRE system, as carried out within PSE, aims at achieving the objectives of the retail market stakeholders and meeting the obligations indicated in the legislation. Its main objective is to ensure an efficient and secure exchange of information in the area

of the retail electricity market, covering the acquisition, storage and sharing of energy market information (including metering data).

The operation of OIRE and the functioning of CSIRE will support the implementation of statutory rights and obligations of the individual entities operating in the retail electricity market. CSIRE will process, among other things, information on contracts functioning in the retail market and metering data from electricity meters. The processed information will be used to carry out processes such as changing the seller of electricity and making settlements for its sale and supply. With the launch of the system, energy market processes, including the switching of electricity sellers, will be simplified and their implementation time will be shortened.

Expected benefits of OIRE and CSIRE:

- **Benefits to end users, including prosumers:**
  - providing free access to their data (including metering data) related to energy delivery points,
  - make it easier and more efficient to achieve electricity consumption goals, including switching energy retailers,
  - the ability to verify individual consumption data and electricity input to the grid,
  - the ability to obtain detailed, reliable and user-friendly information to support decision-making as regards the use of electricity, optimizing consumption and reducing the cost of electricity use,
  - the ability to make own energy market information, including metering data, available to selected entities, e.g. in order to receive more favorable, individually tailored commercial offers, including those concerning additional services,
  - ensuring information security and personal data protection in accordance with the requirements applicable in the European Union.
- **Benefits to electricity market participants:**
  - reducing the cost of operation for entities in the retail electricity market and lowering the barrier to entry by reducing the number of interfaces and creating a single point of access to energy market information,
  - the ability to exercise statutory rights and obligations through the efficient and secure exchange of information in the retail energy market through CSIRE,
  - unification of rules for execution of retail electricity market processes within the framework of legally defined division of roles and responsibilities,
  - guarantee of data processing efficiency and sustainability in the CSIRE solution,
  - enabling the creation and development of new services by facilitating access to energy market information, including metering profiles for electricity consumption and generation,
  - transparency of retail energy market processes supported by CSIRE,
  - the possibility of obtaining energy market information on potential customers (only upon the customer's consent), e.g. for the purpose of preparing personalized offers.
- **Benefits to the National Power System and Power System Operators:**

- improving the efficiency of NPS resources use, among others through better matching of energy consumption to its generation, in particular from RES,
- the ability to perform integration of retail and system market processes using metering data available in CSIRE,
- improvement of metering data quality through the use of uniform standards and quality *benchmarks*,
- the ability to use a uniform standard of aggregated metering data to meet statutory obligations.

In order to implement the provisions of the Act, our company is implementing a project for the construction and implementation of the CSIRE system and is implementing the next stages of the creation of the OIRE function.

As part of the OIRE project:

- In December 2020, PSE announced a public negotiated procedure with notice for the *Development, implementation and deployment of a central electricity market information system with supporting services*. The procedure was conducted throughout 2021 and continues into 2022. It will result in the selection of a contractor for the CSIRE system. The contract with the contractor is expected to be signed in the fourth quarter of 2022.
- In July 2021, PSE announced a public negotiated tender procedure for the *Provision of services of data migration to the CSIRE system*. The negotiations ran from November 2021 to February 2022. In March 2022, the bids were opened. The contract with the selected service contractor is expected to be signed in June 2022, following the necessary corporate approvals.

At the end of December 2021, the CSIRE Implementation Plan was published, allowing energy market participants to plan the activities they are required to carry out in connection with the construction and commissioning of CSIRE. The document takes into account the deadlines specified in the Act, presents the process of developing and agreeing on the documents that form the formal basis for CSIRE implementation and operation, and the process of migrating the initial data necessary to launch CSIRE. The latest version of the document was produced in April 2022, and is available on the OIRE website (www.pse.pl/oire).

At the end of 2021 and in March 2022, further versions of the draft CSIRE Information Exchange Standards (SWI) were published on the PSE website. The Information Exchange Standards (SWI) are that element of TGC-OIRE which will enable obligated or entitled entities to use the CSIRE system to become familiar with the content of the draft TGC-OIRE in advance and to provide comments.

Amongst other things, the SWI standards define how the electricity retail market processes are implemented, the role model, and the rules for communication through CSIRE, as well as scenarios for the use of CSIRE processes to achieve the business objectives of energy market actors, in particular the needs of electricity consumers. The works performed on the draft SWI were carried out with respect to the opinions expressed by market participants, with whom PSE continues to cooperate within the Team working under the Minister of Climate and Environment, as well as in working groups established by PSE.

The CSIRE Technical Standards for Business Communication (TSKB) have been extracted from the latest version of SWI. The TSKB standards clarify the technical and business requirements of the energy market processes and energy market information exchange implemented through CSIRE. They will provide professional users – e.g. Distribution System Operators (DSOs) and energy sellers (ES's) – with clear rules of communicating using standardized messages and executing business processes in a standardized

manner. The TSKB standards consist of four documents: The information scope of central energy market information system messages, Consequence Matrix, Prioritisation Matrix and XSD diagrams. .

In May 2022, the TSKB standards were made available on the OIRE website. In parallel, a public consultation was held on their content. As a technical document in support of SWI, the TSKB standards do not require any external approval.

In December 2021, the CSIRE Migration Data Model was published. This document covers issues related to feeding the CSIRE system with initial data. The current version of the document, in line with CSIRE SWI, is dated April 2022, and is available on the OIRE website.

On 10 May, 2022 PSE launched a public consultation on the draft Transmission Grid Code – the Manner of Operation of the Central Energy Market Information System and Cooperation with the Power System Users and Other Entities Obligated or Entitled to Use the Central Energy Market Information System (TGC-OIRE).

We are required to submit the entire draft TGC-OIRE to the President of the Energy Regulatory Office for approval by 3 January, 2023 (pursuant to Article 17(2) of the Act of 20 May, 2021 amending the Energy Law and certain other acts; Journal of Laws item 1093, as amended).

Definition of CC process with specification of resources, parallel execution in PSE

The new methodology for determining parallel exchange transmission capacity in the Day Ahead horizon has been adopted in accordance with Commission Regulation (EU) 2015/1222 of 24 July , 2015, laying down guidelines for capacity allocation and congestion management, and Regulation (EC) 714/2009.

In 2021, testing of the new methodology for determining parallel exchange transmission capacity in the Day Ahead horizon was underway, as well as work to develop the tools needed for the productive deployment of the method on both the PSE and RSC sides.

In 2021, as part of the Basics Phase, the IT Implementation Project to support the *precoupling* phase for the Flow Based MC task was developed, and the Evolutionary Development Phase commenced. An IT Project to implement a Capacity Calculation Analysis (CCA) tool to support the Day-ahead Flow-based Capacity Calculation process in the CORE region was also developed as part of the Basics Phase.

Definition of OPC process with specification of resources, parallel execution in PSE

In 2021, PSE was developing IT tools towards the target functionality to enable Regional Security Coordinators (RSCs) and Transmission System Operators (TSOs) to coordinate Outage Planning Coordination (OPC) on a weekly basis and Short-Term Adequacy (STA) assessment in a weekly horizon.

Outage Planning Coordination (OPC) and Short-Term Adequacy (STA) are two of the five mandatory services provided by Regional Security Coordinators (RSCs) and Transmission System Operators (TSOs) for electricity under the European Commission regulation establishing guidelines for the operation of the electricity transmission system. The services are intended to increase the operational security of Europe's power system.

Changing the tariffing process

In order to meet the dynamic changes in the functioning of the electricity market and the expectations of the stakeholders, our company undertakes a number of actions aimed at optimizing the process of planning and acquiring input data necessary for the process of developing and approving tariffs. At the same time, a revenue regulatory account mechanism has been implemented to protect consumers from excessive or abrupt fee increases. Work is currently underway to implement a cost regulatory account mechanism.

PSE's strategy (2-year horizon) – Supplement

In an organisation as significant as ours, business continuity, meaning a secure and uninterrupted supply of electricity to all consumers now and in the future, is a priority. The COVID-19 pandemic and its consequences have led our organisation to reformulate its priorities for the coming years. This resulted in a supplement to the PSE Strategy for 2020–2022 with 6 challenges and 8 strategic objectives.

PSE's challenges for 2020-2022

1. Limited redundancy of critical teams
2. Maintaining business continuity
3. Decrease in demand
4. Electricity generation adequacy
5. Decontamination of the electricity market
6. Import and export

PSE's strategic objectives for 2020-2030

1. Retraining some of the available workforce
2. Attracting and recruiting new employees
3. Provision of facility redundancy
4. Reducing operating costs
5. New system services
6. Developing a methodology for assessing the risk of maintaining electricity generation sufficiency
7. Playing for time (ongoing analysis of the financial condition of energy market participants)
8. Maintaining the continuity of the investment process

Strategic directions

Adequate integration with RSCs / RCCs

The deepening regional integration of electricity systems is prompting PSE to intensify its efforts to model mutual interactions with its partners accordingly. PSE's activities are geared towards

regionalisation of key operator processes and transferring selected ones to Regional Coordination Centres (RCCs), which will start operating on 1 July, 2022, replacing the Regional Safety Coordinators that have been in place up to now. TSCNET Services GmbH will assume the function of the Regional Coordination Centre to which PSE will belong. The company has been adapted organisationally to fulfil its new function. PSE will seek to systematically strengthen RCCs while developing tools to verify actions taken at regional level.

Digitalisation and virtualisation of the office

The pandemic caused by corona virus (COVID-19) has helped to accelerate the digitisation of PSE processes. In the area of the strategic course of action the digitalisation and virtualisation of the office, activities are implemented, as a result of which the traditional workflows are replaced by electronic ones. The conventional signature has been replaced by electronic approval or e-signature, and the records are distributed through electronic channels. The digitisation of processes to date has caused significant reduction in paper and purchase of consumables. During the pandemic period, the amount of printer paper used was reduced by as much as around 70%. Saving paper, using less printer toner and ink, and reducing the use of multifunctional devices (printers, faxes, copiers) not only add to the financial benefits for PSE (energy savings, reduced waste generation), but also has a beneficial effect on the surrounding environment.

Adaptation of the balancing market security system to new conditions

In terms of adapting the balancing market hedging system to the new conditions, the IT tool currently implemented in the SAP system needs to be adapted. The new tool, to be adapted to regulatory changes, will be developed and implemented as part of the project entitled "Total SAP replacement – i.e. SAP transformation to SAP 4Hana".

Maximising the scope implementation of European market regulations (CEP, Network Codes)

European legal regulations impose a number of obligations on the Transmission System Operators (TSOs) and Market Operators (NEMOs) to implement electricity market mechanisms and power system management. Regulations concerning the energy market and system management are contained both in the legal acts that form part of the Clean Energy Package (CEP) – Regulation 2019/943 on the internal market in electricity and Directive 2019/944 on common rules for the internal market for electricity – and in the subordinate acts, the so-called Network Codes, developed on the basis of Regulation 714/2009 on conditions for access to the network for cross-border exchanges in energy.

The aforementioned legal regulations set out the general requirements for the mechanisms to be implemented, which are then further specified in detailed methodologies developed by TSOs or NEMOs. Implementation of regulations and methodologies takes place through dedicated international implementation projects led by TSOs or NEMOs. PSE staff are actively involved in implementation projects that are important to our organisation, to ensure that they are carried out in line with regulatory requirements and the energy market needs. PSE also carries out internal implementation projects to ensure alignment with the requirements of the European market regulations.

Correct implementation of the new market mechanisms will increase the efficiency of energy exchange, resulting in lower energy costs on a European scale and providing benefits to consumers. Properly designed and implemented market mechanisms will also enhance security of energy supply by allowing access to a wider pool of resources and increasing the reliability of market mechanisms. A properly implemented European market should also reduce the need for TSOs to use contingency measures, as by properly coordinating the transmission capacity allocation process, the results of the energy market should better reflect the physical conditions of the transmission system.

Conducting the procedure and conclusion of the contract for the SCADA system

On 29 September 2022, a contract was signed for an upgrade of the application software of the SCADA and EMS subsystems of the currently used DYSTER system, including the transfer of the so-called extensions. The subject of the contract will be carried out on PSE's hardware and software infrastructure. The project involves carrying out the system upgrade within 24 months. The scope of the contract includes the provision of a post-warranty service for a period of 5 years. SCADA is the primary IT system used to conduct electricity transmission activities, perform TSO tasks and manage the operation of the NPS in real time. IT supports the dispatching services of PSE by enabling effective performance of tasks in the area of the NPS operation, including monitoring of the system operation status, identification of threats to the NPS operation, remote control of network facilities, exchange of real-time data with other transmission and distribution system operators.

The modernisation of our company's SCADA system is due, among other things, to the need to implement IT security requirements, to meet legal obligations under European regulations for the electricity sector, and due to the physical depletion of the hardware and system infrastructure currently used by the system.

The new system will be equipped with advanced EMS computational tools, performing tasks related to the execution of NPS safety analyses in real time and in the study mode based on the received telemetric measurements. The new SCADA/EMS system will meet high ICT security requirements and its architecture will be in line with the segmentation project underway at PSE.

Implement a revenue and expense adjustment account

From 1 January, 2021, the first balancing market reform changes were implemented. They were correlated with measures enabling protection of consumers against excessive or abrupt increases of fee rates in subsequent tariffs, while mitigating the risks associated with deviations of the actual revenues and costs from the planned ones, included in the calculation of tariffs approved by the president of ERO.

As part of the cooperation with DSOs and public administration, in 2020, principles were developed for the functioning of the mechanism of the so-called revenue adjustment account, covering adjusted revenues of companies providing electricity transmission and distribution services. The mechanism consists in recovering in subsequent years the uncollected revenues or giving back the surplus of revenues obtained from the application of tariff rates in relation to the planned values, while maintaining the specified maximum level of variability of tariff rates in subsequent years. The agreed provisions regarding the revenue adjustment account have been implemented in the Regulation of the Minister of Climate and Environment of 13 November, 2020 amending the Regulation on the detailed rules for shaping and calculating tariffs and settlements in electricity trade.

As a next step, PSE developed the concept of a so-called cost adjustment account model. In 2021, our company submitted to the Energy Regulatory Office a proposed solution for the cost adjustment account for the quality charge. Subject-matter consultations with the ERO have been scheduled for 2022.

Implementing Interim Market Coupling and Core Flow-Based Market Coupling mechanism

Interim Market Coupling (Interim MC)

The aim of the Interim MC project was to couple the electricity markets of Poland and the 4MMC countries (Czech Republic, Hungary, Romania, and Slovakia) with the Europe's largest MRC market. The coupling was to take place by introduction of implicit capacity allocation based on the NTC method at

six borders (PL-DE, PL-CZ, PL-SK, CZ-DE, CZ-AT, HU-AT). Thus, the completion of the project has led to the implementation of the Single Day-Ahead Coupling (SDAC) in this area.

Interim MC was launched operationally on 17 June, 2021, as an interim solution towards implementation of the Core Flow-Based Market Coupling.

Core Flow-Based Market Coupling (Core FBMC)

The aim of the DA Core FBMC project is to implement a target solution for SDAC in the Core Region, i.e. to introduce implicit transmission capacity allocation based on the Flow-Based Allocation (FBA) method. The FBA mechanism allows for market coupling in a way that is based on electricity distribution. The Core Region (CCR Core) is the Capacity Calculation Region (CCR) covering the borders of the market areas between the following EU Member States: Austria, Belgium, Croatia, Czech Republic, France, Germany, Hungary, Luxembourg, Netherlands, Poland, Romania, Slovakia and Slovenia. The operational launch of the DA Core FBMC took place on 8 June, 2022.

Implementing coordinated security analyses and a cost-sharing mechanism for countermeasures

Core Regional Operational Security Coordination (Core ROSC) and Core Cost Sharing (Core CS)

The aim of the Core ROSC and Core CS projects is to implement a process in the Core region for carrying out security analyses of network operation and activating countermeasures agreed through this process. In 2021, the Core Region TSOs, together with representatives of the CORNET project team (Coreso, TSCNET), started work on the business requirements for the implementation of the ROSC and CS processes, on the basis of which a tender procedure will be carried out in 2022 for the construction of a central tool to support these processes. The aim of the tender will be to select contractors for the construction of an IT platform (ROSC and CS) and a module for determining countermeasures in the best way (RAO). The implementation work has been divided into two stages, which include a day-ahead horizon (ROSC v1) and a intra-day horizon (ROSC v2). According to the work schedule, stage 1 will be completed by Q2 2024 and phase 2 by Q3 2025.

Implementation of the mechanism to obtain flexibility from the distribution network

Member States were required to implement a mechanism for procuring flexibility services from the distribution network and frequency-independent services under the provisions of the Directive of the European Parliament and of the Council (EU) of June 5, 2019 concerning common rules for the internal market for electricity and amending Directive 2012/27/EU (hereinafter: Directive 2019/944). The implementation of the mechanism is aimed, among other things, at reducing the risk of blackout, thanks to the increased participation of system users connected to the distribution network in the provision of system services and balancing of the NPS, system operators will have a wider range of options to ensure secure operation of the power system.

In 2021, comments were prepared on the proposal to implement Directive 2019/944 (draft amendment to Law No. UC74) proposed by the Ministry of Climate and Environment. At the same time, as part of the implementation of works related to broadly defined flexibility services, PSE participates in a research and development project, which received EU funding. The objective of the project is to formulate and execute a concept for the completion of works, with a particular focus on the Polish demonstrator, i.e. to define, test and demonstrate the procurement of services from flexibility sources that can be used in the future to support network management by system operators.

The OneNet project started on 1 October, 2020 and will run until 30 September, 2023. Our company has identified products of their interest in terms of test purchasing from entities connected to the MV and LV distribution networks. An online platform is being built to enable test purchases of services.

Implementing a full network model management module (NMMS)

The Network Model Management System (NMMS) is a CIM-compliant system that allows the creation and verification of different time variants of the network model, indicating the duration of changes, and the generation of a production model based on accepted changes. The system is equipped with mechanisms to check the correctness and consistency of the network models created.

NMMS will be the primary system for creating, maintaining and developing the network model. It will feed data into the individual coordination planning and operation processes and the basic dispatching applications

Stage I of the work, completed on 21 February, 2022, involved the technical design and installation of the base system. FAT tests were also carried out with positive results. Work is currently underway to implement extensions to the NMMS System (Stage II). A programme of training and workshops for system users is also being implemented. At the same time, work is underway to install NMMS in PSE's IT systems – scheduled for completion in May 2022.

Ensuring an adequate level of reactive power compensation

One of the elements associated with the operation of RES, including offshore wind farms, is the balancing of the power system under conditions of high RES generation. The reduction in the number of operating centrally dispatched generating units of the JWCDc type and the associated change in the allocation of active power generation sources simultaneously results in a reduction in reactive power resources in various parts of the National Power System (NPS). These resources cannot be compensated by the operation of reactive power sources coupled with offshore farms, as these are concentrated in a small and remote area. Both the phenomenon of a reduction in reactive power resources after the shutdown of conventional generators and the increase in reactive power losses lead to a deterioration in voltage stability under high load conditions in the NPS. Therefore, the issue of ensuring adequate reactive power control resources is very important to secure the operation of the NPS with large RES generation.

This issue was addressed in a research paper entitled. "The concept of linking the NPS with offshore wind farms in a long-term perspective". The research paper, carried out by the Institute of Electrical Power Engineering in Gdansk, will be completed in Q2 2022. The analyses were divided into three stages:

1. Analysis for steady states (completed).
2. Analysis for transients (completed).
3. Development analyses for s2030+ (in progress).

The aim of this research is to assess the operational security of the NPS after the connection of offshore wind farms, together with a recommendation of technical measures required to eliminate the identified risks to system operation and to minimise restrictions on the full power output from offshore farms.

The solutions proposed in Stages 1 and 2 of the research, primarily aimed at increasing the reactive power control resources, are as follows:

- use of reactive power resources from offshore wind farms;
- use of reactive power resources from the planned Harmony Link converter station;
- starting up conventional units in the compensation mode;

- installation of synchronous compensators in existing and planned substations in the north of the country; these compensators, in addition to providing reactive power resources, provide an increase in the level of short-circuit power in the NPS, thereby increasing the stability of the system operation;
- installation of new compensation chokes in the following existing and planned substations: Żydowo Kierzkowo, Dunowo, Baczyna, Gdańsk Przyjaźń, Pelplin, Jasiniec (or Bydgoszcz), Gdańsk Błonia. The installation of STATCOM-type equipment for bidirectional voltage control is also being considered.

Ensuring adequate European market and system methodologies

European energy regulations in many cases provide for the clarification of specific solutions by means of methodologies created by TSOs and NEMOs, and the approval of National Regulatory Authorities (NRA) or the European Agency for the Cooperation of Regulators (ACER). Since, in many cases, regulations are created at a very general level, these are the methodologies that determine the actual shape and quality of many power engineering solutions. Properly prepared methodologies are, therefore, crucial for market processes and other TSO activities; they have a direct impact on the quality of solutions, costs for individual entities and countries, and security of electricity supply. Therefore, PSE's active participation in the preparation of the methodologies and their approval process by the relevant regulatory authorities is crucial for the quality of the market and power system solutions implemented.

PSE employees take an active part in the work of teams developing methodologies at the European and regional level to ensure the high quality of the solutions developed and, therefore, the efficient operation of the market and the power system at the national and European level.

Ensuring adequate stock levels

The main task of the Operation Department's (DE) storage management is to ensure that adequate storage reserves are available in the event of an emergency. In order to determine the quantities of each type of devices and materials, the DE has developed a normative document. This document, which is updated periodically, indicates which stocks are sensitive to PSE in the event of an emergency.

The Operation Department’s stock management is the responsibility of the Devices and Materials Reserve Operator (ORUiM), which, through its ongoing activities, fulfils its obligation to keep DE stock at an appropriate level. The stock is replenished through targeted purchases made by ORUiM, devices and materials from investment tasks (new, constituting a reserve in accordance with the provisions of the ToR), and devices and materials from dismantling as part of operational, repair and modernisation tasks.

In pursuit of the objective of ensuring adequate stock levels, ORUiM prepares tender procedures that result in contracts for the supply of devices and materials indicated in the normative document. As the Operation Department is unable to predict when a failure will occur and what devices will be affected, contracts are usually for a period of three years where possible, allowing purchases to be made based on DE's actual needs. Where such contracts are not available, one-off purchases are made to replenish stock. A timetable of procurement procedures has been developed for the period 2022–2030.

Liquidity risk management

As part of liquidity risk management, a systematic report was implemented in SAP to periodically monitor and manage the company's ongoing financial liquidity. On the basis of the implemented solution, spare funds can be efficiently allocated in secure deposits with different maturities. The solution covers both the revenue side (sales) and the expenditure side (purchases) at the company-wide level and all events recorded in SAP. PSE have put in place a permanent mechanism to verify data having a direct impact on the scope and quality of the data used in liquidity risk management.

Increase resource redundancy in critical and rare areas

As part of this course of action, as set out in the business strategy for 2020–2030, an analysis of indisposition of PSE employees was carried out in the company, in cooperation with the Human Resources Department. The aim of this exercise was to identify risks in the individual operating entities that could pose a future threat to the company's business continuity.

As part of the initiative the characteristics of the reasons for indisposition have been analysed in detail, taking into account the employment structure.

Sizing of possible investment needs in reactive power management devices in view of the likely decrease in power demand as a result of the COVID-19 pandemic. Initiation of relevant devices

As a result of the COVID-19 pandemic, reactive power management needs were sized as part of the analytical work at PSE. In connection with the planned expansion of the transmission grid, the needs concerned the installation of chokes to offset voltage spikes in load valleys and at other times of the day due to the likely drop in power demand as a result of the COVID-19 pandemic. The location and required power levels were determined as follows: Narew (150 Mvar), Olsztyn Mątki (150 Mvar), Ostrów (100 Mvar), Rzeszów (100 Mvar), Siedlce Ujrzanów (100 Mvar), Tarnów (100 Mvar), Jasiniec (or Bydgoszcz) (150 Mvar), Pelplin (100 Mvar), Gdańsk Przyjaźń (150 Mvar), Gdańsk Błonia (100 Mvar), Żydowo-Kierzkowo (150 Mvar), Dunowo (150 Mvar), Baczyna (150 Mvar), Lublin (100 Mvar).

For the implementation of the above projects, investment tasks have been set up to ensure the realisation of reactive power management in a specific perspective:

- Procurement and installation of reactive power compensation devices in the following substations: Narew, Olsztyn Mątki, Ostrów, Rzeszów, Siedlce Ujrzanów, Tarnów.
- Extension and upgrade of the Rzeszów 750/400/110 kV substation together with installation of reactive power compensation devices.
- Extension of the Jasiniec 400/220/110 kV substation together with the installation of the 400/110 kV autotransformer and reactive power compensation devices and creation of the Grudziądz Węgrowo–Bydgoszcz Zachód 220 kV line.
- Extension of the Pelplin 400/110 kV substation with the installation of reactive power compensation devices.
- Extension of the Gdańsk Przyjaźń 400 kV substation together with the installation of reactive power compensation devices.
- Extension of the Gdańsk Błonia 400/110 kV substation with the installation of reactive power compensation devices.
- Extension of the 400 (220) / 110 kV Żydowo Kierzkowo substation along with the installation of reactive power compensation devices and switching of the circuit of the Dunowo-Żydowo

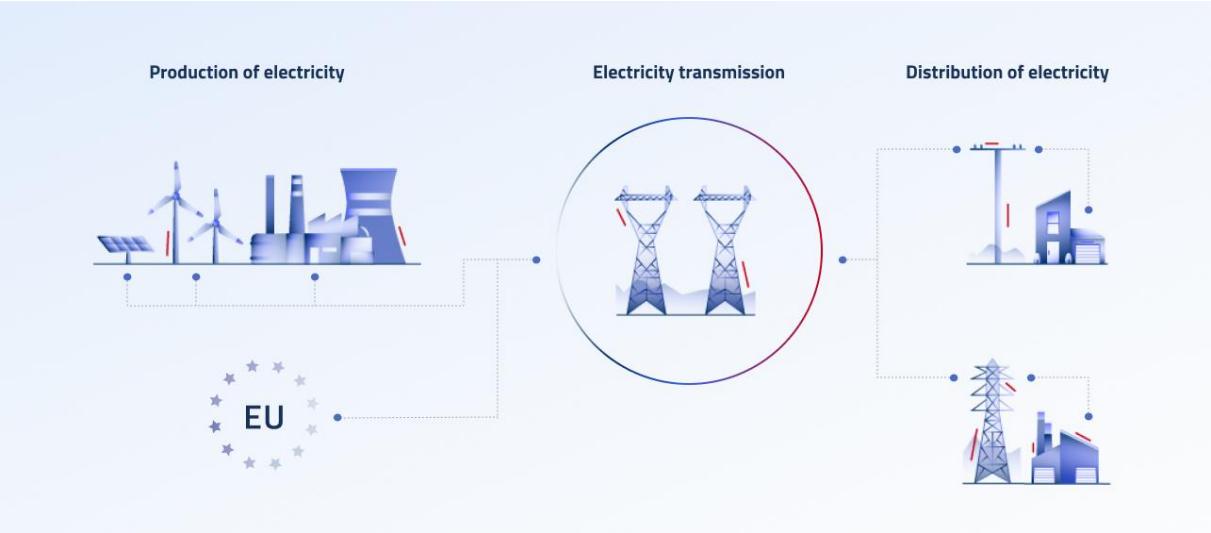
Kierzkowo-Gdańsk I and Piła Krzewina-Żydowo Kierzkowo 400 kV lines to 400 kV (previous name: Replacement of the 220/110 kV transformer at the Żydowo Kierzkowo substation with a 400/110 kV unit).

In addition, the tasks of purchasing and installing reactive power compensation devices (Stages II and III) will be set up in this area.

2.4. Business model

Polskie Sieci Elektroenergetyczne is the only transmission system operator (TSO) in Poland. It is a single-shareholder company owned by the State Treasury, being of key importance to the national security, and responsible for the reliability of electricity supply to all regions of Poland. PSE ensures stable operation of the National Power System (NPS), which is a part of the common European system.

Power system



The company manages over **15,000 km** of extra-high voltage **lines** and **110 substations**.

The PSE's network infrastructure is located on real properties with a total area of **8,555,493.5 m²**.

Principles of operation of the operator in Poland

The basic obligations of the Transmission System Operator are set out in EU legislation, in particular in the so-called network codes. Under the domestic law, the TSO's obligations are determined in particular by the provisions of the Energy Law and the executive acts issued on its basis, which define both the tasks to be undertaken by PSE and how they are to be financed, as well as the applicable technical standards and reliability criteria.

The costs of performing our tasks are regulated costs, covered by transmission fees paid by the transmission system users according to the tariff approved by the president of the ERO. As an operator, we perform tasks using the technical resources of entities connected to the transmission system. These entities are obligated to make the resources available under applicable laws or appropriate civil law agreements.

2.5. Value creation model

- **Financial capital**. Company's financial resources – held or obtained in the course of financing.
- **PSE's intellectual capital**. Unique, expert knowledge accumulated in the organisation; extensive *know-how* acquired over the years. We take care of our intellectual capital and continuously expand it, among other things, through development programs, investing in employee education and conducting research and development.
- **Human capital**. Intangible asset of the organisation, which consists of the individual types of competence, experience and motivation of employees and associates, as well as their development aspirations. We are constantly building the PSE's human capital through various forms of professional qualification improvement and competence development, and an employee-friendly employment policy, including a wide range of employee benefits and fringe benefits. **It is through the experience and commitment of our employees that we are an organisation that combines social responsibility with business goals.**
- **Social and relational capital**. Cooperation with an extensive group of stakeholders and constant care for fairness in relations with the environment allow PSE to ensure safe and economic operation of the National Power System and reliable electricity market, as well as to supply electricity to all areas of the country in a manner ensuring coverage of current and projected mid- as well as long-term demand for electricity and power in the entire national system.
- **Natural capital**. The non-renewable and renewable natural resources we use to safely and reliably transmit electricity to all regions of the country. In our investment activities, we make efforts to minimise key threats to nature and to avoid the risk of biodiversity loss.
- **Productive capital**. The organisation's tangible assets include critical infrastructure facilities (extra-high voltage lines and substations), buildings and equipment, as well as measurement and process infrastructure, which allow the company to perform the tasks of the electricity transmission system operator in Poland.

CONTRIBUTION – market

Areas of value creation

I. **We are actively involved in shaping market mechanisms as part of building a European electricity market, taking into account the conditions of the domestic electricity market.**

II. **We make efforts to develop favorable market conditions to ensure effective and safe operation of the National Power System as an element of the European market.**

III. **We support the active participation of consumers in market mechanisms.**

I. We are actively involved in shaping market mechanisms as part of building a European electricity market, taking into account the conditions of the domestic electricity market.

- PSE is involved in the process of building the electricity market in Europe, in particular in the scope of creation of the following:
  - Flow-Based Market Coupling for day-ahead and intra-day markets,
  - cross-border balancing market.

- We are working to strengthen the coordination of cross-border exchange in Europe, including in terms of reducing unscheduled flows through the NPS.

II. We make efforts to develop favorable market conditions to ensure effective and safe operation of the National Power System as an element of the European market.

- PSE is involved in the process of building the electricity market in Europe, in particular in the scope of the following:
    - capacity market and conducting subsequent auctions.
- We are implementing further segments of the target European electricity market model on the borders of the NPS (the Target Model).
- We are effectively balancing the power system, particularly with respect to the following:
    - fault-free execution of the balancing market processes,
    - development of the balancing market mechanisms.

Our contribution

- **We have implemented a mechanism allowing for operation of more than one NEMO in the Polish market area (MNA)** – 2020 was a year of intensified work on implementation of mechanisms enabling operation of more than one Nominated Electricity Market Operator (Multi NEMO Arrangements – MNA) in the Polish area. The intention for the activities of multiple NEMOs is to increase the competitiveness of services in the electricity market. The production deployment of the MNA and the entry of the new NEMOs into the Polish electricity market occurred on February 9, 2021.
- **Since 8 June, 2022, the CORE region has had a single electricity market coupling mechanism in place**, using a method that optimises available transmission capacity based on physical electricity distribution (flow-based). This will make electricity trading more efficient, and also responding to the challenges of the energy transition. Sixteen Transmission System Operators and ten power exchanges were involved in the preparations for the launch of the CORE Flow-Based Market Coupling. The CORE region covers the market areas of Austria, Belgium, the Czech Republic, Croatia, France, Netherlands, Luxembourg, Germany, Poland, Romania, Slovakia, Slovenia and Hungary.
- **We are working to develop the SIDC and SDAC –** we have created a class of initiatives that fit into the area of Market Coupling implementation and development. The most important of these, planned for implementation within the next few years, are: (i) adding the PL–SK border to the SIDC, (ii) implementation of 15-minute market products in the SDAC, (iii) implementation of 15-minute market products in the SIDC, (iv) introduction of intra-day auctions, (v) implementation in the SIDC of a solution to automatically account for transmission losses at HVDC connections, and (vi) implementation of a flow-based method in the SIDC.
- **PSE representatives are involved in the work of European institutions and agencies:**
    - **European Network of Transmission System Operators for Electricity (ENTSO-E).** ENTSO-E consists of 42 transmission system operators from 35 countries. The most important elements of the ENTSO-E working structure are as follows:
        - System Operation Committee,
        - System Development Committee,

- ❖ Market Committee,
- ❖ Research, Development and Innovation Committee,

PSE is represented in each of them.

- **European Commission.** Cooperation on the identification of critical infrastructure in accordance with Council Directive 2008/114/EC of December 8, 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.

- **Nearly 80 representatives of our company actively participate in the work of ENTSO-E.**
- **Overview of cross-border exchange transmission capacity offered by PSE in 2021:**
  - The transmission capacity made available in the annual auction:
    - synchronous profile
      - export: 0 GWh,
      - import: 0 GWh;
  - The transmission capacity made available in the monthly auction:
    - synchronous profile
      - export: 223 GWh,
      - import: 120 GWh;
    - connection with Ukraine (Zamość–Dobrotvir line) – the auctions concern only the import direction

      import: 1,532 GWh.
  - Inter-system exchange day-ahead market transmission capacity made available:
    - synchronous profile
      - export: 17,898 GWh,
      - import: 8,833 GWh;
    - LitPol Link connection with Lithuania
      - export: 3,786 GWh,
      - import: 3,830 GWh;
    - SwePol Link connection with Sweden
      - export: 4,988 GWh,
      - import: 5,102 GWh;
    - common balancing constraint
      - export: 15,677 GWh,
      - import: 19,032 GWh.
  - Inter-system exchange intra-day market transmission capacity made available:
    - intra-day market single coupling process
      - Poland – Czech Republic
        - export: 4,326 GWh,
        - import: 3,829 GWh;

        - Poland – Germany
            - export: 9,671 GWh,
            - import: 613 GWh;
        - Poland – Lithuania
            - export: 1,959 GWh,
            - import: 2,504 GWh;
        - Poland – Sweden
            - export: 1,775 GWh,
            - import: 1,396 GWh;
        - common balancing constraints
            - export: 4,284 GWh,
            - import: 4,404 GWh;
    - intra-day explicit allocation process
        - Poland – Slovakia
            - export: 17 GWh,
            - import: 22 GWh.

- **In-house indicator** **The sixth main auction in the Polish capacity market** took place in 2021, and covered the delivery year 2026. It resulted in a total of 128 capacity agreements signed, including 17 agreements for more than one year.

Delivery year	Auction closing price (in PLN/kW/year)	Number of concluded capacity agreements	Volume of capacity obligations under the concluded capacity agreements, MW	Auction closing round
2026	400.39	128	7,188.584	1.

Table 1. Summary of the main auction conducted in 2021.

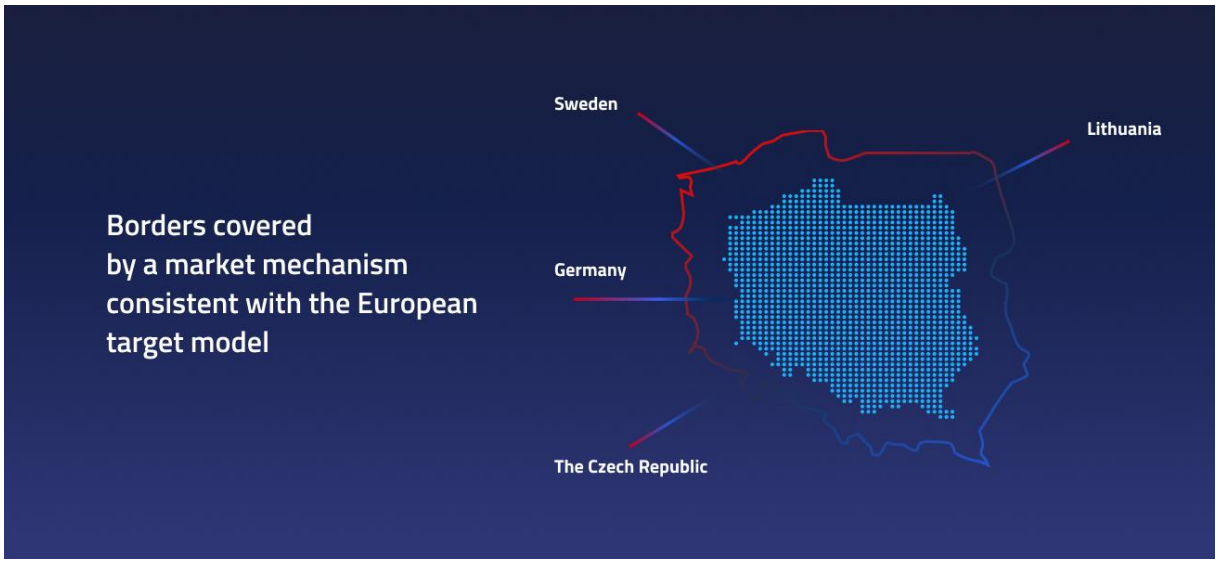
- **In-house indicator** As a result of the **additional auctions in the Polish capacity market** held in 2021 for the individual quarters of the 2022 delivery year, a total of 125 capacity agreements were concluded. In Tab. 5 a summary of the supplementary auctions conducted is presented.

Quarter of the year 2022	Auction closing price [PLN/kW/year]	Number of concluded capacity agreements	Volume of capacity obligations under the capacity agreements concluded [MW]	Auction closing round
I	186.70	40	1,020.674	5.
II	320.00	23	379.771	1.
III	320.00	22	360.921	1.
IV	240.02	40	887.804	3.

Table 2. Summary of supplementary auctions conducted in 2021.

- **Number of borders covered by a market mechanism consistent with the European target model – four borders:**

- Poland – Sweden,
- Poland – Lithuania,
- Poland – Germany,
- Poland – Czech Republic.



- **Number of balancing market emergency procedures applied – 0 (zero).**

III. Promoting active participation of consumers in market mechanisms

- We develop mechanisms for active participation of consumers in the NPS balancing.
- We develop mechanisms for active consumer participation in the electricity market.
- We support various forms of market functioning of consumers, such as prosumers, aggregators and energy clusters.

Our contribution

- IRP service — the implementation of the capacity market from 1 January, 2021 and other changes in the national electricity market, have necessitated the development and implementation of a new system service related to the reduction of electricity consumption by consumers in the NPS, which is the **Contingency Reduction of Power Consumption by Consumers Based on a Bidding Process** (IRP). The new service replaced the existing DSR programmes, which expired on 31 December, 2020. On 28 December, 2020, PSE launched public proceedings conducted as an open tender for the provision of contingency reduction of power consumption by consumers based on a bidding process, for the period from 1 April, 2021 to 31 March, 2022. On 4 February, 2021, the bids were opened – a total of six potential Contractors presented their bids: Polenergia Obrót S.A., Enel X Polska Sp. z o.o., Enspirion Sp. z o.o., Tauron Sprzedaż Sp. z o.o., CMC Poland Sp. z o.o. and Lerta S.A. After a formal evaluation and verification, on 1 March, 2021, PSE resolved the proceedings and decided to accept all correctly submitted bids in the aforementioned proceedings, and concluded agreements with the selected Contractors. As a result of the above, between 1 April, 2021 and 31 March, 2022, PSE had six IRP service agreements in place with contracting parties: Polenergia Obrót S.A., Enel X Polska Sp. z o.o., Enspirion Sp. z o.o., Tauron Sprzedaż Sp. z o.o., CMC Poland Sp. z o.o. and Lerta S.A. In the contingency reduction of power consumption by consumers based on a bidding

process (IRP), the volume of reduction volumes is not specified – the products and capacities become known to the TSO after the collection of sales proposals offered by the service providers in response to the request. The IRP service is entirely voluntary and flexible – the suppliers are not obligated to make a sales proposal in response to a request.

- In 2022, PSE has implemented a new contracting model for the contingency reduction of power consumption (IRP) service for the period from 25 March, 2022 to 28 February, 2023. – the IRP Service Provider Qualification System. It enables efficient and effective vetting of suppliers and contracting of the IRP service. Entities meeting the criteria for the service, as set out in the IRP Service Provider Qualification System Regulations, can apply for a contract via the PSE Purchasing Platform at https://przetargi.pse.pl/. Applications are accepted on a rolling basis from 25 March, 2022 to 28 February, 2023. The duration of a given contract may vary between the suppliers, depending on when the contract is signed – however, service provision could start no earlier than on 1 April, 2022. All contracts will be in force until 31 March, 2023.

RESULTS – market

Areas of value creation

I. We are actively involved in shaping market mechanisms as part of building a European electricity market, taking into account the conditions of the domestic electricity market.

II. We make efforts to develop favorable market conditions to ensure effective and safe operation of the National Power System as an element of the European market.

III. We support the active participation of consumers in market mechanisms.

I. We are actively involved in shaping market mechanisms as part of building a European electricity market, taking into account the conditions of the domestic electricity market

II. We make efforts to develop favorable market conditions to ensure effective and safe operation of the National Power System as an element of the European market

Results of our activities

- **99.99%** – **electricity supply continuity index** (defines reliability of power supply to all consumers connected to the transmission grid).
- **100%** – **failure-free functioning of the balancing market.**
- **126 balancing market participants in 2021**.
- **Overview of cross-border exchange transmission capacity offered by PSE in 2021**
  - The transmission capacity made available in the annual auction:
    - synchronous profile
      - export: 0 GWh,
      - import: 0 GWh;

- The transmission capacity made available in the monthly auction:
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      - export: 4,284 GWh,
      - import: 4,404 GWh;
  - intra-day explicit allocation process
    - Poland – Slovakia
      - export: 17 GWh,

- import: 22 GWh.

III. We support the active participation of consumers in market mechanisms

- We reduce the risks of not being able to balance power and electricity in the NPS.
- We acquire tools to enhance the security of electricity supply.
- We increase the flexibility of the NPS operation.

Results of our activities

- IRP service — the implementation of the capacity market from 1 January, 2021 and other changes in the national electricity market, have necessitated the development and implementation of a new system service related to the reduction of electricity consumption by consumers in the NPS, which is the **contingency reduction of power consumption by consumers based on a bidding process** (IRP). The new service replaced the existing DSR programmes, which expired on 31 December, 2020. On 28 December, 2020, PSE launched public proceedings conducted as an open tender for the provision of contingency reduction of power consumption by consumers based on a bidding process, for the period from 1 April, 2021 to 31 March, 2022. On 4 February, 2021, the bids were opened – a total of six potential Contractors presented their bids: Polenergia Obrót S.A., Enel X Polska Sp. z o.o., Enspirion Sp. z o.o., Tauron Sprzedaż Sp. z o.o., CMC Poland Sp. z o.o. and Lerta S.A. After a formal evaluation and verification, on 1 March, 2021, PSE resolved the proceedings and decided to accept all correctly submitted bids in the aforementioned proceedings, and concluded agreements with the selected Contractors. As a result of the above, between 1 April, 2021 and 31 March, 2022, PSE had six IRP service agreements in place with contracting parties: Polenergia Obrót S.A., Enel X Polska Sp. z o.o., Enspirion Sp. z o.o., Tauron Sprzedaż Sp. z o.o., CMC Poland Sp. z o.o. and Lerta S.A. In the contingency reduction of power consumption by consumers based on a bidding process (IRP), the volume of reduction volumes is not specified – the products and capacities become known to the TSO after the collection of sales proposals offered by the service providers in response to the request. The IRP service is entirely voluntary and flexible – the suppliers are not obligated to make a sales proposal in response to a request.
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CONTRIBUTION– infrastructure and projects

Areas of value creation

I. We take care of the development of the transmission grid, necessary for the operation of the company and the power system, through projects in progress.

II. We perform maintenance and repairs on the transmission grid.

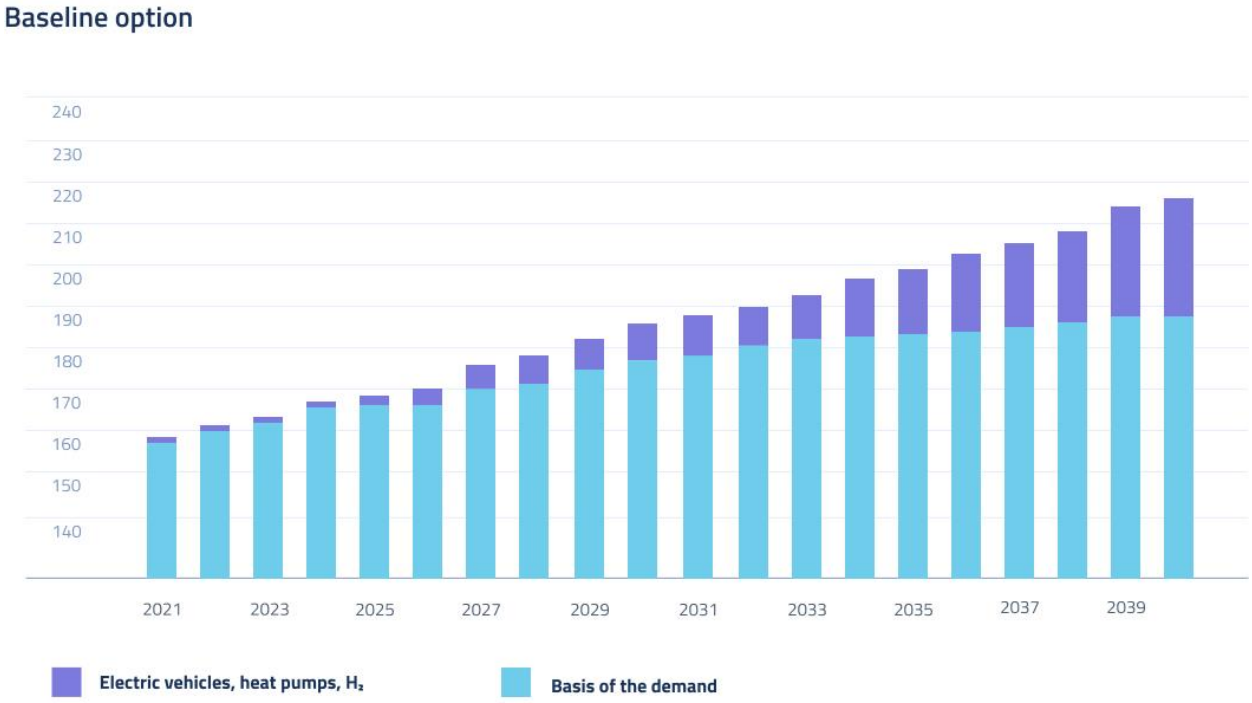
III. We conduct public communications regarding the implemented infrastructure projects.

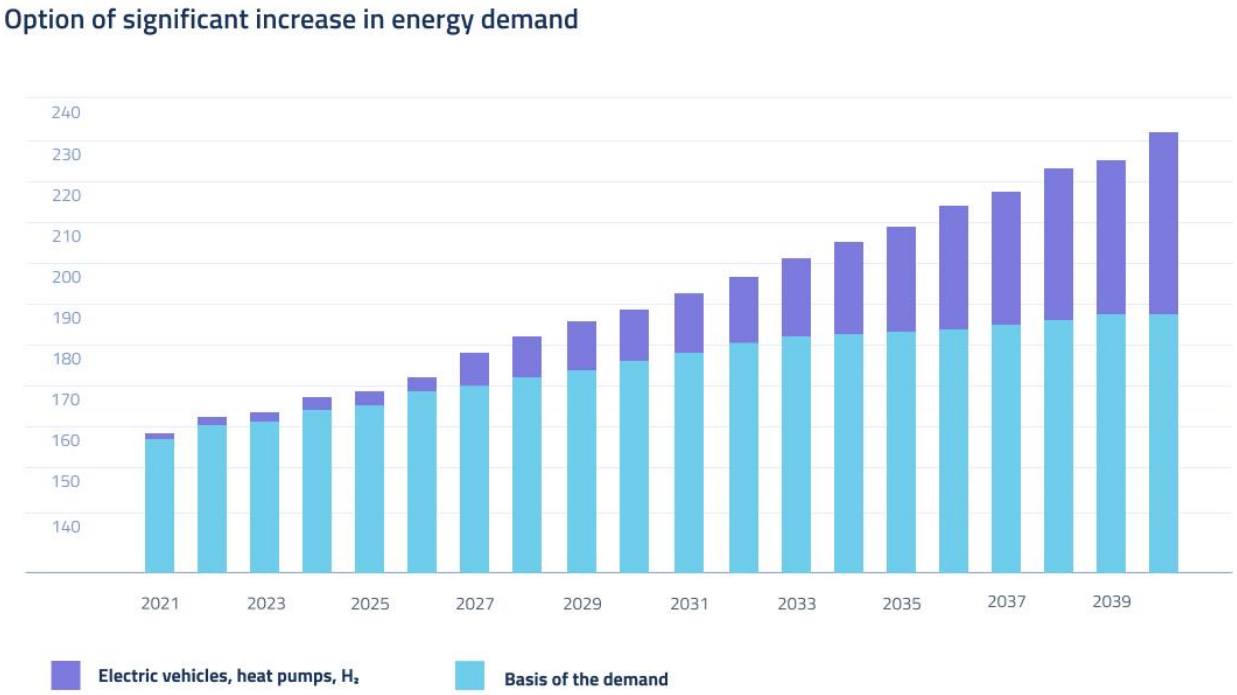
I. We take care of the development of the transmission grid, necessary for the operation of our company and the power system, through investments in progress.

- We implement projects to construct, expand and modernise the network infrastructure.
- We make efforts to ensure the continuity of electricity transmission.
- We invest in IT.
- Our expenditures to improve safety conditions for the work of contractors include:
  - contractor supervision,
  - developing a procedure to be followed during implementation of projects,
  - HSEQ contractor training,
  - conducting activities in the area of social communication.

Our contribution

- **Projection of annual net electricity demand in Poland for 2021–2040 (in TWh):**





** H_2 – electricity demand resulting from hydrogen production*

Source: TNDP for 2023–2032 – a consulted document.

- **approx. PLN 36 billion in capital expenditures** planned by PSE **for 2021–2032** until 2036.
- **PLN 969.7 million** in capital expenditures incurred by PSE in 2021.
- **PLN 1,962.2 million** in the total value of contracts awarded to contracting parties in 2021.
- **169 environmentally-friendly network infrastructure investment projects** in 2021, for **58 of which contracts with contractors have been already signed.**
- **4,458** meetings and outreach events for projects held in 2016–2021, including **937** meetings in 2021.

II. We perform maintenance and repairs on the transmission grid.

- We perform maintenance and repairs on the transmission grid.
- Our activities and expenditures to improve contractor health and safety, including:
  - contractor supervision,
  - HSEQ contractor training,
  - conducting activities in the area of social communication (activities of PSE and subcontractor companies).

Our contribution

- **85 of the 110 PSE's substations are controlled and monitored remotely.**
- **PLN 113,569.8 thousand** – expenditures incurred **for the operation and maintenance tasks of network facilities** in 2021.

- **7 major storage locations** of PSE: 2 in Radom and Bydgoszcz and 1 in: Warsaw, Katowice and Poznań,
- **45 storage depots** all over the country.
- **8,555,493.5 m²** – the total area of the real property on which the PSE's network assets are located.

III. We conduct public communications regarding the implemented infrastructure projects.

- We conduct activities in the area of social communication (activities of PSE and subcontractor companies).

Our contribution

- **We evaluate impact of our projects on local communities in 100% of our investment operations.**

RESULTS – infrastructure and projects

Areas of value creation

I. We take care of the development of the transmission grid, necessary for the operation of the company and the NPS, through projects in progress.

II. We perform maintenance and repairs on the transmission grid.

III. We conduct public communications regarding the implemented infrastructure projects.

I. We take care of the development of the transmission grid, necessary for the operation of the company and the NPS, through projects in progress.

- We make efforts to restore and develop the network assets.
- We manage the reliability and continuity of electricity transmission.
- We provide cybersecurity for the operation of the NPS systems.
- We improve the operational safety of the NPS by implementing the PSE's investment tasks.

Results of our activities

- **1,216.49 MWh** – ENS (Energy Not Served) for all planned and unplanned outages in 2021.
- **162.07 (minutes)** – AIT (Average Interruption Time) for all planned and unplanned outages in 2021.
- **99.87 percent availability of transmission equipment (DYSU).** The indicator reached a high value in 2021 with a reference value of ≥ 97.5 percent.
- **1.47 percent** – **transmission grid loss indicator** as a percentage of the total electricity introduced into the system.
- **Average age of equipment: 22 years for EHV substations, 41 years for EHV lines.**

- **PLN 1,962.2 million** in the total value of contracts awarded to contracting parties in 2021.
- **PSE's major groups of contracting parties:**
  - investment, modernisation and repair contractors carrying out work on network assets,
  - gear and equipment suppliers and service providers.
- **The contractors for works and services (by contract value) come from Poland in 99,66%, from EU countries in 0.31%, and from outside the EU (0.03%).**

II. We perform maintenance and repairs on the transmission grid.

- We keep network assets in proper working order.
- We make efforts to improve reliability and safety of operation of the transmission grid through regular maintenance and repairs.
- We build and try to maintain the PSE's reputation for attention to the network operational safety.

Results of our activities

- **99.87% availability of transmission equipment (DYSU).** The indicator reached a high value in 2021 with a reference value of ≥ 97.5 percent.

III. We conduct public communications regarding the implemented infrastructure projects.

- We gain public acceptance.
- We strive for timely completion of projects.
- We build community awareness and a sense of security regarding the implemented projects.
- We optimize the line routes to make them acceptable to local communities.

Results of our activities

- **4,458** meetings and outreach events for projects held in 2016–2021, including **937** meetings in 2021.
- **Increasing awareness of the importance of electric power infrastructure in the project areas.** Social communication is carried out based on a participatory model – involving all interested parties in the process of project implementation.

CONTRIBUTION - People and relationships

Areas of value creation

I. We create responsible and friendly workplaces by managing human resources.
II. We build competencies by providing opportunities for employee development and strengthening innovation.
III. We actively cooperate with the company's environment.

IV. We conduct community education.

I. By managing human resources, we create a responsible and friendly workplace.

- We provide an attractive remuneration policy and non-wage benefits for employees, as well as social security.
- We are committed to safe job performance.
- The culture of our organisation is based on the values of reliability, trustworthiness, accountability and respect.

Our contribution

- **We offer an attractive benefits package.**
- **100 percent of employees are covered by a salary incentive scheme.**
- **We provide broad access to diverse forms of professional development.**

II. We build competencies by providing opportunities for employee development and strengthening innovation.

- We provide training and care for the development of employees in all functional areas of the organisation in terms of substantive topics and soft skills.
- Our organisation has a staff of internal trainers responsible for training employees in key positions.
- We implement an internship programme, subsidise employee studies, etc.

Our contribution

- **E-learning platform – we develop a training tool for employees, providing access to materials covering various topics and enabling broadening of knowledge and development of skills.**
- **"Energy for the Future"** – we continue the PSE internship programme in cooperation with the Ministry of Climate and Environment and companies from the power industry. In 2021, our company took on four interns as part of this programme.
- **Coalition for Friendly Recruitment** – our company belongs to the group of approximately 350 employers promoting good, friendly recruitment practices and building better standards in this area.

III. We actively cooperate with the company's environment.

- We are improving the implementation model for infrastructure projects.
- We share our knowledge and the company's unique *know-how* in meetings with contractors.
- We cooperate with local and central government administration at the stage of project preparation and implementation.

- We cooperate with industry organisations.

Our contribution

- **We are perfecting the delivery of infrastructure projects across the country. The Central Investment Unit (CJI), operating within PSE's internal organisational structure, is responsible for coordinating this process.**

IV. We conduct community education.

- We implement educational and social projects.
- We publish a journal called „Elektroenergetyka" (Electrical Power Engineering).

Our contribution

- **In 100 percent of municipalities located along the routes of planned line projects, we conducted information meetings with local communities.**
- **We run consecutive editions of the nationwide grant programme WzMOCnij swoje otoczenie (EmPOWER Your Environment**). Link to the programme website: http://wzmocnijotoczenie.pl/.
- **We have launched an educational project under the following theme: Power Academy, addressed to young people from the Lower Silesian province**. In the educational programme, we prepare issues related to power generation industry, electricity transmission and energy security, as well as concern for the environment.
- **We publish the journal „Elektroenergetyka" ("Electrical Power Engineering").**

RESULTS - People and relationships

Areas of value creation

I. We create responsible and friendly workplaces by managing human resources.

II. We build competencies by providing opportunities for employee development and strengthening innovation.

III. We actively cooperate with the company's environment.

IV. We educate local communities.

I. We create responsible and friendly workplaces by managing human resources.

- We strive to increase employee satisfaction and motivation.
- We promote *work-life balance*.

- We care about the safety of workplace - the effectiveness of our actions is confirmed by the negligible number of accidents at work.

Results of our activities

- PSE, as an employer, undertakes a number of activities aimed at building a work-life balance approach among its employees, such as: financial support allocated for housing purposes, medical care, co-financing of holidays for employees and their children, co-financing of sports, recreation, cultural and educational activities.
- The average length of service for employees performing maintenance works in ZES is 25 years.
- Employees' implementation, knowledge and application of the safety work procedure in EHV substations - 100 percent.

II. We build competencies by providing opportunities for employee development and strengthening innovation.

- We take care to raise the level of competence of our staff.
- We aim to increase employee motivation, and we want to retain competence in the organisation.
- We partner with colleges and universities.

Results of our activities

- **85.7 percent** – percentage of employees with higher education.
- **125 training sessions** conducted on a simulator, spanning over 148 training days, attended by **428 dispatchers from the PSE CG** (KDM/ODM and CN/RCN/ZES).
- **382 employees** took part in a series of practical fire protection training courses for persons appointed to carry out evacuation and fire fighting.
- **99.99%** continuity of electricity supply.

III. We actively cooperate with the company's environment

- We strive to increase the efficiency of mutual cooperation with the environment, including electricity market participants.
- We maintain a partnership with the community.
- We are committed to increasing the efficiency of the implementation of industry initiatives.

Results of our activities

- **17 webinars** for more than **1800** participants in 2021.
- **27 conferences, debates, seminars and professional congresses** with PSE experts in 2021.

- **26 PSE experts involved** in professional conferences, debates, seminars, forums and congresses in 2021.

IV. We educate local communities.

- Building understanding and public acceptance of PSE's activities as an independent national electricity system operator.

Results of our activities

- **Social Communication Programmes are implemented in 100 percent of the municipalities located in the areas of projects carried out by PSE.**
- **Conducting another, 3rd edition of the nationwide grant programme "WzMOCnij swoje otoczenie"** (http://wzmocnijotoczenie.pl/).
- Conducting educational activities as part of **the "WzMOCnij swoje otoczenie"grant programme**, with a record reach of **more than 130 local authorities** from PSE project and operating areas.
- **PLN 4.6 million** donated for **community activities** in 2021.
- **215 awarded projects in 9 provinces** in 2021.
- **207 beneficiaries** — entities that benefited from the PSE's social support in 2021.

2.6. Sustainable development strategy

Our sustainable development strategy is designed to support the achievement of the *Sustainable Development Goals* (SDGs) and support the implementation of PSE's mission and our organisation's business strategy.

The priority roles, which are also areas of sustainability for our organisation, include:

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

Figure 2: Priority areas for sustainable development of PSE

01. Guarantor of energy security

Objective: To maintain an appropriate level of energy security in a socially and environmentally responsible manner

Our primary regulated activity is fulfilling our obligations as the national transmission system operator. We manage the national power system by balancing the demand for electricity with the generation of electricity from generation sources available in the NPS.

We take part in the creation of the European electricity market and actively participate in the development of Europe-wide initiatives undertaken by operators associated in ENTSO-E.

The power transmission grid must take into account changing energy generation technologies and locations of generation sources both in Poland and Europe.

We are aware of the challenges of climate, environmental and social changes and the need to adapt all our activities to meet these challenges.

02. Exemplary investor

Objective: Winning the favor of the investment environment

We plan and implement transmission grid projects across the country. This is the fundamental condition for ensuring continuous and reliable operation of the transmission system and maintaining national energy security. Regardless of the type of our business impact on the environment, we always listen to the needs and expectations of all stakeholders.

The highest diligence in conducting investment tasks is to ensure that the values of the natural environment will remain available for future generations, and projects will be implemented with the acceptance of local communities, in a manner that does not collide with the broadly understood public interest.

03. Responsible employer

Objective: Providing employees with professional development opportunities and building corporate culture based on accepted values

PSE employees - their knowledge and commitment - are the foundation of the company's success and sustained growth. We focus on providing our company with high-class specialists who, by fulfilling the

company's mission and strategic objectives, build its high market value. **We offer a safe and friendly work environment. We focus on reliability, credibility and accountability.**

04. Reliable partner

Objective: Focusing on transparency and ethics in dealing with partners

We attach significant great significance to the way we build relationships with our partners. We play a leading role in the power sector, which translates into responsible decision-making and actions towards other participants of the electricity market in Poland.

We strive to create a sustainable future for all our internal and external stakeholders. Transparency and diligence, equal treatment of all market participants, and preventing corruption through transparent and effective procedures in cooperation with other electricity market participants are of great importance to us.

05. Industry expert

Objective: Building and maintaining the TSO's image as an expert in key legislative and opinion-making forums

Thanks to the competence and experience of our employees, we are perceived as a partner for cooperation with legislative bodies, state and local administration units, as well as with scientific institutions and industry organisations.

We take an active role in lawmaking. We care about the development of the electricity market and its transparency.

III. MANAGEMENT (G)

3.1 Governance principles – corporate governance and organisational culture

PSE is a single-shareholder company owned by the State Treasury, operating as a joint stock company with its registered office in Konstancin-Jeziorna at ul. Warszawska 165. The company has been operating as an independent electricity Transmission System Operator for 18 years now.

GRI 102-6 The Polish power system is part of the power system of the Continental Europe. The stability of this system is maintained by the actions of all Transmission System Operators and the resilience of local transmission systems. From the National Power Dispatch Centre we manage the operation of the power system, the operation of the transmission grid and the 110 kV coordinated network. We forecast, calculate and determine parameters for safe system operation over a variety of time horizons.

Company's governing bodies

[GRI 102-5] The sole shareholder of PSE is the State Treasury. The State Treasury powers are exercised by the Government Plenipotentiary for Strategic Energy Infrastructure with the Ministry of Funds and Regional Policy.

In the case of both subsidiaries of the PSE Capital Group, i.e. PSE Inwestycje and PSE Innowacje, the function of the General Meeting of Shareholders is performed by the Management Board of PSE with the assistance of appointed proxies.

Supervisory Board

[GRI 102-18, GRI 102-22] The PSE Supervisory Board (Supervisory Board) continuously oversees the company's activities in all areas. The members of the Supervisory Board are appointed by the General Meeting of Shareholders for a term of office of three years.

The Supervisory Board acts pursuant to the Commercial Companies Code and other laws, the Company's Articles of Association, resolutions of the General Meeting and the Rules of the Supervisory Board passed by this body.

The **composition of the Supervisory Board** as at the date of this publication is as follows:

1. Paweł Łatacz – Chairman of the Supervisory Board
2. Marcin Czupryna – Vice 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
6. Michał Wierzchowski – Member of the Supervisory Board
7. Andrzej Toborowicz – Member of the Supervisory Board
8. Konrad Fischer – Member of the Supervisory Board

[GRI 102-22]

Composition of the Supervisory Board by age and diversity	Percentage distribution in each category in 2021

	Females	Males
< 30 years	0	0
30–50 years	2	3
>50 years	0	3
Total % by gender	25	75
Foreigners	0	0

Audit Committee

The Committee was appointed by the Supervisory Board. It consists of at least 3 members appointed for the term of office of the Supervisory Board from among its members.

The Audit Committee supports the Supervisory Board in particular in supervising:

- implementation and control of financial reporting processes in the company and the capital group,
- functioning of internal control systems in the company,
- operation of risk identification and management systems,
- independence of internal and external auditors,
- the company's relations with the related entities within the meaning of the Accounting Act of September 29, 1994.

[GRI 102-5] Management Board

The **composition of the Management Board** as at the date of this publication is as follows:

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

The Management Board of PSE manages the affairs of the company and represents it in any proceedings before the court as well as in any out-of-court proceedings. Members of the Management Board are appointed by the General Meeting or the Supervisory Board for a three-year term of office.

The Management Board acts pursuant to the Commercial Companies Code and other laws, the Company's Articles of Association, resolutions of the General Meeting, and the Rules of the Management Board adopted by the Management Board and approved by the Supervisory Board.

[GRI 102-22]

Composition of the Management Board by age and diversity*	Percentage distribution in each category in 2020	
	Females	Males
< 30 years	0	0
30–50 years	0	4
>50 years	0	2
Total % by gender	0	100

Foreigners	0	0

* Data source: Resolution of the Extraordinary General Meeting

GRI 102-18, GRI 102-20 Organisational structure of PSE as at the report publication date

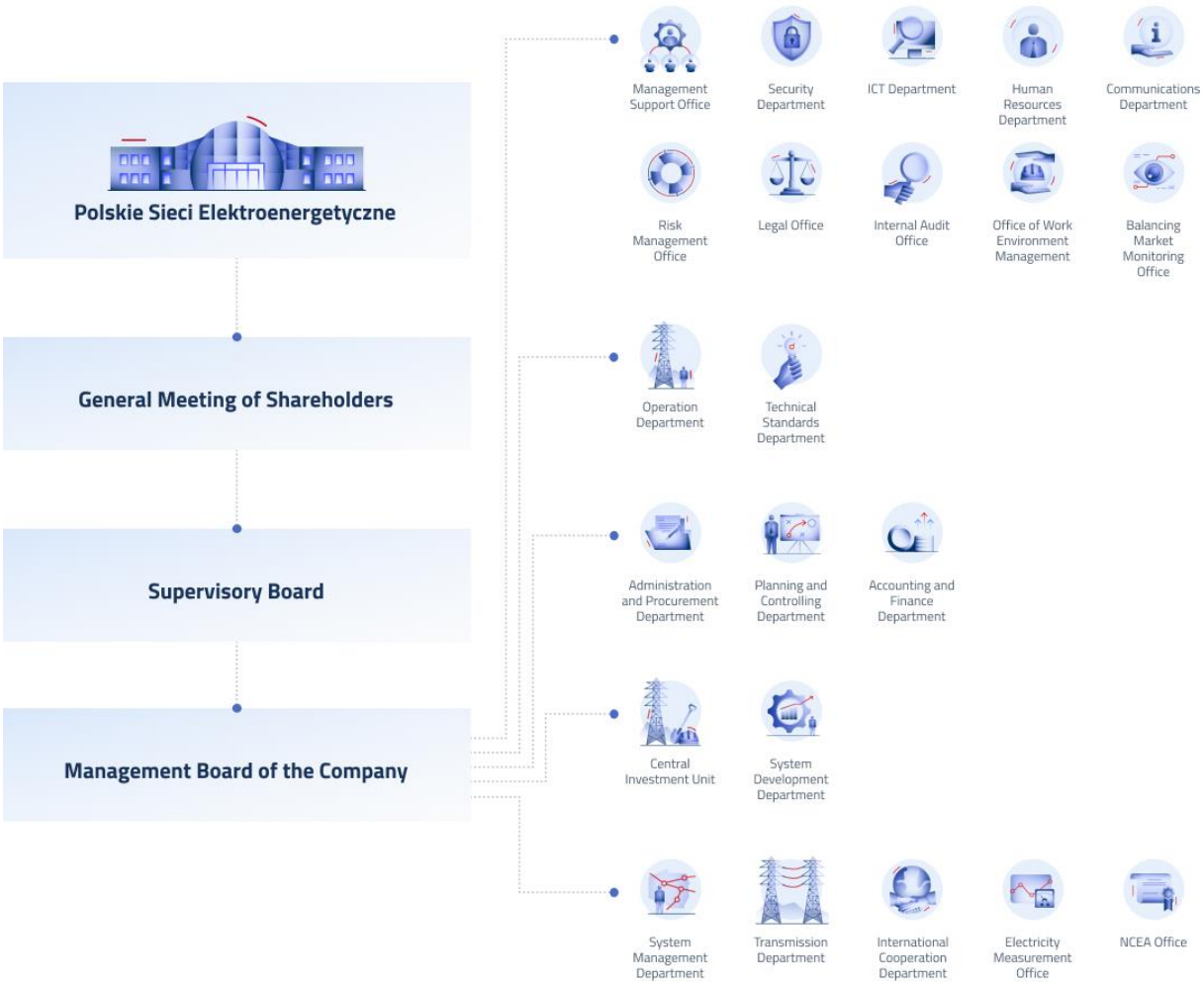


Figure 1: Diagram of PSE's organisational structure

GRI 102-18 Regular supervision and coordination of activities in areas of particular importance to the company are carried out by Committees established by the Management Board. Committees, as opinion-giving, advisory and decision-making bodies, support the Management Board in designated areas under strictly defined (by the Management Board) powers and responsibilities. Environmental issues fall under the purview of several Committees, as they concern many different aspects of the company's operations. There is a clear environmental impact, for example in the work of the Investment Committee and the Standards Committee.

The Committees are composed of the President and Vice Presidents of the PSE Management Board responsible for the respective areas and managing the units, as well as experts in a given field:

GRI 103-2 Investment Committee – the area related to management of the investment process in the PSE Capital Group, and taking key decisions concerning PSE's projects from the portfolio of the company's projects assigned to the programmes implemented as part of the Committee. The Committee is chaired by the President of the Management Board;

Standards Committee – the area related to typification of technical solutions used in electric power transmission and distribution systems. The Committee is chaired by the Vice President of the Management Board overseeing the unit responsible for defining the aforementioned standards;

Security Committee – the area related to maintaining and enhancing physical security at the PSE Capital Group. The Committee is chaired by the President of the Management Board;

Data Governance Committee – data governance area. The Committee is chaired by the President of the Management Board;

GRI 103-2 Innovation Committee – the area related to adequacy and continuity of research and development projects. The Committee is chaired by the Vice President of the Management Board overseeing the unit responsible for research and development;

REMIT Committee – the area related to coordination of the implementation of obligations under the REMIT Regulation and secondary legislation. The Committee is chaired by the Vice President of the Management Board overseeing the organisational unit responsible for communications;

Network Codes Implementation Committee – an area for regular supervision and coordination of PSE's activities concerning implementation of the rights and obligations under the Network Codes and Guidelines. The Committee is chaired by the Vice President of the Management Board overseeing the organisational unit responsible for the area of international cooperation;

GRI 103-2 Social Activity Committee – the area related to Corporate Social Responsibility in the PSE Capital Group. The Committee is chaired by the Vice President of the Management Board;

GRI 103-2 Cyber Security Committee – the area related to coordination of ICT and cyber security in the PSE Capital Group. The Committee is chaired by the President of the Management Board;

GRI 103-2 Department of System Management Committee – the areas related to the following:

- ✓ coordination and supervision of the work of the System Management Department, in particular the effective integration of the various activities carried out by the department, i.e. technical as well as those related to market and decision-making process support tools;
- ✓ policy making and effective integration of project and operational activities;
- ✓ making key decisions resulting from the power sector transformation process, requiring collective decisions within DO.

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

GRI 102-18 Special functions are performed in the company to carry out specific tasks. The existence of most of them is a direct result of the requirements of the relevant standards.

Special function	Area
Management Board Representative for Environmental Management System and Occupational Health and Safety Management System	PN-EN ISO 14001 and PN-ISO 45001 (until June 2020, PN-N 18001)
Representative for Management System at the Measurement and Research Laboratory in Radom	PN-EN ISO/IEC 17025
Quality Manager	PN-EN ISO/IEC 17025
Laboratory Manager	PN-EN ISO/IEC 17026
Information Security Management System Coordinator	PN-ISO/IE 27001:2014-12
Business Continuity Management System Coordinator	PN-ISO/IE 22301:2012
Management Board Anti-Corruption Representative	Preventing the occurrence of violations in the area of unfair practices or behaviour of employees as well as contracting parties

Representative for Critical Infrastructure Protection	The Act of 18 March, 2010 on special powers of the minister responsible for state assets, and their exercise in certain capital companies or groups operating in the electricity, oil and gas fuel sectors Regulation on the Representative for Critical Infrastructure Protection
Data Protection Officer	Regulation (EU) 2016/679 of the European Parliament and of the Council 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
Representative for Sustainable Development in the PSE Capital Group	Updating and implementing the Strategy for Sustainable Development
Chief Power Engineer	Main, emergency and secure power supply systems
Representative for Protection of Classified Information	Act on protection of classified information
ICT Security Inspector	Act on protection of classified information
IT System Administrator	Act on protection of classified information
Head of the Confidential Office	Act on protection of classified information
Management Board Compliance Representative	Minimising the risks of behaviour that is beyond the current regulations
Aid Representative	Obtaining and settlement of aid funds

3.2. PSE Capital Group

[GRI 102-45] The PSE Capital Group was established in order to perform the tasks resulting from the programme for the power sector adopted by the Council of Ministers on 28 March, 2006. The programme assumed equipping the electricity Transmission System Operator with transmission assets and tools for maintenance, operation and expansion of these assets in the form of specialised companies.

Name of the company	Object of activity	The share of PSE in the share capital
Polskie Sieci Elektroenergetyczne S.A.*	The electric power transmission system operator in Poland. According to the decision of the President of the ERO of June 2014, PSE will act as the TSO in the country until 2030. www.pse.pl	
PSE subsidiaries		
PSE Inwestycje S.A.	A specialised company responsible for the design work, organisation and supervision over the implementation of investment tasks related to the construction, expansion and modernisation of enclosed buildings for the amenity and office needs, and the technical facilities of the transmission system of PSE S.A. Due to changes in the business strategy regarding the entities of the PSE Capital Group, effective 1 January, 2019, the company suspended its business activity. http://www.pse-inwestycje.pl	**100%**
PSE Innowacje Sp. z o.o.	A provider of consulting services for analysis, research, new technologies and IT solutions in the power sector. The company's operations provide support for safe and economic operation of the NPS. http://www.pse-innowacje.pl	**100%**
Companies with PSE capital		
Joint Allocation Office S.A.	The company, established by 20 TSOs from the CEE and CWE regions and Norway, was created through a merger of the regional auction offices	**4%**

Name of the company	Object of activity	The share of PSE in the share capital
	Central Allocation Office GmbH and *Capacity Allocation Service Company.eu S.A.* *Joint Allocation Office S.A.* (hereinafter referred to as JAO) provides cross-border capacity allocation services to PSE, among other entities. As required by the Network Codes, they are provided as part of a centralized common European platform operated by JAO. At the end of 2021, the company's shareholders included 25 entities http://www.jao.eu	
TSCNET Services GmbH	TSC development initiative covering a large part of the synchronous area of the Continental Europe. The objective of the TSC's activities – to improve the operational security of the coupled power systems (including the NPS) – is fully in line with the European regulations and the single European electricity market that is being created. The activities of *TSCNET Services GmbH* (hereinafter referred to as TSCNET) include support services for transmission system operators in operational planning processes, as well as support for the development and implementation of new regional processes. TSCNET, within the meaning of the SO GL regulation, is one of the Regional Security Coordinators (RSCs), who, according to the SOGL and CACM/FCA regulations, are to handle five regional processes: building common network models, security analyses, capacity designation, outage planning and assessing the sufficiency of the coupled systems. Currently, 14 TSOs are shareholders in TSCNET. PSE owns a 6.7% stake in TSCNET. http://www.tscnet.eu	**6.7%**

***Polskie Sieci Elektroenergetyczne S.A. – parent company. The company has field organisational units of PSE units and field work places of PSE units in Bydgoszcz, Katowice, Poznań, Radom and Warsaw.**

Tab. 5. PSE Capital Group as at the report publication date

In the financial statements and equivalent documents, PSE is reported together with ZKO, excluding the Capital Group companies.

3.3. Ethics management and anti-corruption

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

In our organisation, we have implemented and have been improving the compliance system ensuring that the company's actions comply with the law, internal regulations and ethical standards. In 2021, a new version of the Compliance Policy was created, which additionally covered environmental impact, health and safety and compliance with competition and anti-trust law. In addition, a new dedicated Anti-Corruption Policy has been created to emphasise the role of corruption prevention.

PSE employees are bound by the Code of Ethics, which is publicly available in the internal network (intranet). The Code is an important element of the HR Policy defining the attitudes expected from the employees. In addition, having our contracting parties in mind, we have posted the Rules of Conduct for Business Partners in the external network (on the website).

GRI 103-1 The implemented and applied PSE Code of Ethics also takes into account elements of diversity. We comply with the law on non-discrimination in employment based on, among others,

gender, age, disability, race, religion, nationality, political views, trade union membership, religion, and based on the form or duration of employment.

We have adopted a zero-tolerance policy on all types of fraud and inappropriate behaviour, which includes situations such as accepting material benefits from service providers, theft and failure to keep company secrets, as well as other forms of unacceptable behaviour such as mobbing and harassment. Every PSE employee is required to unconditionally adhere to a zero tolerance policy regarding fraud and inappropriate behaviour.

Our employees can report any fraud anonymously to an e-mail address provided on the home page of the intranet site, as well as using the contact phone number of the Compliance Representative. We have also started work on launching a dedicated external reporting platform. We have planned an educational campaign on this topic for 2022.

406-1 Total number of incidents related to discrimination, and corrective actions taken on this issue in 2020		
Description	Number of incidents	Percentage of incidents
Discrimination and unequal treatment*	1	0.037

* In 2021, the company received one report on discrimination. It concerned a complaint about having to work in the company's office, as juxtaposed with other employees working from home office. The standard adopted by PSE in this respect was to set a maximum percentage of the number of employees allowed in the registered offices. It was, however, up to the individual entity directors to appoint specific people to work in each location. The selection of employees was dictated by the criteria of their independence, the need for control, the need to perform tasks at a particular location or to access tools. In such situations, individual discussions are held to explain the rules in place.

We operate a regular "Compass Towards a Start" programme dedicated to new hires. Its component is the compliance system, including ethical behaviour. In 2021, mandatory e-learning training was provided to all new PSE employees, separately on the Code of Ethics and on the Compliance Policy.

A conference on corruption prevention, values and ethics of our company is planned for PSE contracting parties in 2022. Implementation of the plan will depend on the epidemiological situation.

Our anti-corruption efforts

In 2021, the anti-corruption and anti-fraud system in place at PSE was supported by a new internal regulation – the **Anti-Corruption Policy**. The basic premise behind the introduction of this document was the need to send a message both inside and outside the company (contracting parties, suppliers and contractors): **"Zero tolerance for corruption and fraud".**

GRI 103-2 **GRI 103-3**

Actions taken in 2021 to prevent corruption in PSE

A service provider has been selected for the delivery of software to handle reports from whistleblowers. Thus, outsiders as well as employees, partners and other parties will gain a tool for anonymous reporting of irregularities in the area of corruption and compliance. Until the aforementioned reporting platform is introduced, a dedicated e-mail address (sygnal@pse.pl) will remain one of the company's channels for reporting irregularities. The information on the reporting channels, together with the telephone number of the Management Board Representative for Counteracting Corruption, has been published on the official PSE website under the subsection „System przeciwdziałania zagrożeniom korupcyjnym i nadużyciom [A system for prevention of corruption and fraud threats]. PSE also publishes a permanent announcement with the contact details of the Representative for Counteracting Corruption on the

intranet site (PSE's internal website). The way and opportunity to communicate irregularities that one has witnessed is also part of the information for new PSE employees as part of a training course called "Compass Towards a Start".

For transmission grid development projects that are subsidised-with funds coming from the Operational Programme Infrastructure and Environment, irregularities or fraud may be reported by e-mail at naduzycia.POIS@mfipr.gov.pl or by using the form published on the following website: www.pois.gov.pl/strony/zglaszanie-nieprawidlowosci.

GRI 205-1 Percentage and total number of business units analyzed for corruption risks, and the risks identified in 2020		
1	Total number of business units in the organisation	22
2	Total number of business units analyzed for corruption risk	5
3	Percentage of business units analyzed for corruption risk	25%

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

[GRI 205-2] Communication and training on the organisation's anti-corruption policies and procedures in 2021	
Total number of employees in the organisation (according to GRI 102-8)	2,708
Percentage of employees who have familiarised themselves with the organisation's anti-corruption policy and procedures	No data available
Percentage of members of the Management Board who have familiarised themselves with the organisation's anti-corruption policies and procedures	100%
Percentage of employees who have received anti-corruption training	25%
Percentage of business partners to whom anti-corruption procedure has been communicated	100%

All members of the Management Board of PSE S.A. have accepted the Anti-Bribery and Anti-Corruption Policy of PSE.

The introduction of the Anti-Bribery and Anti-Corruption Policy has been communicated to all PSE employees.

As part of every contract we conclude (a new one or an annex), through the relevant contractual clauses, PSE requires our business partners to familiarise themselves with the Anti-Bribery and Anti-Corruption Policy. In addition, PSE requires our contracting parties to always confirm in writing that they are committed to the prevention of corruption offences and that their actions are not and will not be affected by such fraud.

The company has also undertaken work in 2021 to broaden the scope of the contracting party credibility testing, also in the context of corruption risks. Agreements, draft internal regulations, agreement annexes and Requests to the Management Board are reviewed for potential irregularities or abuse.

[GRI 205-3] Confirmed corruption cases	2021
Dismissal or disciplinary punishment of employees	0
Total number and nature of confirmed corruption cases	0
Non-renewal of agreements with contracting parties due to corruption policy violations	0

Corrupt litigation brought against the reporting organisation or its employees during the reporting period	0
In total	0

In 2021, our company neither reported nor was a party to any proceedings related to a possibility of a corruption offence.

[GRI 206-1] Proceedings concerning anticompetitive behavior, antitrust and monopolistic practices	
Number of pending (unfinished) court and administrative proceedings regarding conduct infringing free competition or antitrust regulations, in which the organisation acts as a participant	0
Main results of completed legal actions, including any decisions or judgments.	0

3.4. Risk management

Risk management is – in accordance with the PSE's **Risk Management Policy** – an integral part of all operational and decision-making processes carried out by our organisation.

When initiating and then implementing activities in various business areas – including power system management, system development, ICT, maintenance and projects – PSE takes into account risks whose materialisation could contribute to the failure to achieve the intended strategic and operational objectives, including affecting the organisation's ability to ensure the continuous operation of the National Power System (NPS) and the company itself.

Risk management consists of the systematic application – in all areas of our business – of planned and coordinated actions, procedures and practices to reduce or eliminate the possibility of risks materialising, and to minimise the negative effects of their occurrence or to capitalise on their positive consequences.

The methodological approach used to identify and assess the risks most relevant to NPS and PSE is defined in the **Methodology of Risk Assessment at PSE S.A. and its Subsidiaries**.

The methodology and accompanying tool solutions support the following:

- identification of key risks associated with the functioning of the organisation, including those relating to operational, maintenance and investment activities,
- assessment of identified risks, their quantification and presentation in the form of ranking,
- determining the relationship between the identified risks,
- conducting ongoing monitoring of risks, including trends in their value, and generating synthetic management information on risks.

The risk management process is supported by a risk monitoring system (SMR) that provides a base of up-to-date knowledge of the risks associated with the company's operations and the NPS.

As part of continuous improvement of the organisational, process and technological solutions, initiatives are taken at PSE aimed at both increasing the efficiency and safety of the NPS and the company's functioning, and at reducing or managing risks more effectively.

Corporate bodies and organisational units involved in the process

The activities that make up risk management are carried out, among others, by:

- Audit Committee of the Supervisory Board,
- Management Board,
- Managers of the company's organisational units,
- Risk Management Office (BR).

Audit Committee of the Supervisory Board

The Audit Committee supports the Supervisory Board in overseeing the functioning of the risk identification and management systems.

Management Board

The Management Board is responsible for establishing a systematic approach to risk management in the company, approves the Risk Management Policy, and takes note of the periodic reports on risks associated with PSE's activities and the risk management actions taken.

Managers of the company's organisational units

Each manager of the company's organisational unit is responsible for managing the business area assigned to that unit. An element of management activities undertaken is identification of risks and formulation as well as implementation of the defined approach to management of risks that may affect the functioning of a given area and the achievement of its objectives.

Risk Management Office (BR)

BR is responsible for providing the Management Board with a holistic view of the risks most relevant to the operation of NPS and the company. Ensures that a systematic approach to the identification and assessment of risks is in place and makes recommendations on the risk management activities implemented by the company's individual organisational units.

GRI 102-15 Company risk register – selected risks at the end of 2021

The risk register includes the risks that are most important from the PSE's point of view, and are key for the NPS functioning. According to the methodology adopted, for each identified risk, the potential causes and consequences of its materialisation are identified, and the expected frequency of materialisation as well as the measure of risk are estimated. With regard to the cause of the risk, i.e. the specific event or circumstance whose occurrence could lead to the materialisation of the risk, the frequency of occurrence and the conditional probability of materialisation after the cause occurs (i.e. the so-called vulnerability) are determined. In turn, the effects of the materialisation of risk, i.e. any negative and positive consequences, are presented in five dimensions:

- financial and material,
- related to the NPS operational continuity and quality,
- related to image and law,
- related to impact on health and life,
- related to environmental impact.

When identifying all risks relevant to the company and NPS, we determine in each case whether a negative impact on the natural or social environment is likely to be recorded as a consequence of the materialisation of a given risk. Negative impact is expressed directly, as an effect on human health and life and on the natural environment, or indirectly, as an effect on the image. Thus, all aspects of PSE's operation are analysed for potential negative social or environmental impacts. At the same time, factors of an environmental and social nature can be considered as causes for the materialisation of specific risk scenarios.

PSE's risk register also includes risks that are regional electricity crisis scenarios (SRKEE), as defined by ENTSO-E and deemed adequate in the case of Poland. Some of them are directly influenced by environmental factors, including extremely low temperatures, severe storms and hurricanes, torrential rain and floods, heat waves and drought.

GRI 205-1 The PSE's approach to management of all basic risks inherent in the activities of a Transmission System Operator primarily includes activities and solutions provided for in the Transmission Grid Code (TGC), the Balancing Conditions (WDB) and the Guidelines for the Operation of the Electricity Transmission System (SOGL). It is common to risks that involve any disturbance in the transmission grid operation. It covers all the master processes of the TSOs, including processes of the transmission grid development planning, operation planning and coordination (also accounting for the cross-border exchange), network asset maintenance management, providing access to platforms and market mechanisms, with time horizons ranging from many years to real time.

In Q1 2022, our organisation completed a comprehensive update and redesign of the composition of the company's risk register resulting from the implementation of risk preparedness initiated in 2021.

The company's risk register also includes the Regional Electricity Crisis Scenarios (SRKEE) published in the National Electricity Emergency Preparedness Plan provided by ENTSO-E and considered possible under the Polish conditions.

PSE also implemented preventive measures to address the risk of loss of continuity of the company's operations due to factors related to the COVID-19 pandemic.

Below is a summary of selected risks relevant to the company, including the impact on the social environment and natural environments.

SUMMARY OF SELECTED RISKS RELEVANT TO THE COMPANY			
RISK NAME	**RISK DESCRIPTION – BASIC INFORMATION**	**MAIN EFFECTS OF MATERIALISATION**	**APPROACH TO RISK MANAGEMENT – KEY ASSUMPTIONS**
UNPLANNED UNAVAILABILITY OF A LARGE VOLUME OF EXISTING CONTROLLABLE DOMESTIC AVAILABLE CAPACITY	Loss or significant reduction of available controllable capacity of generating units to generate, or no or limited power output possibilities. Initiating events can be a failure of more than one unit, generating unit or the infrastructure necessary for power output from the units. Failures can have many root causes – they can result from, among others, the following factors: manufacturing defects, workmanship errors, improper operation, human errors, progressive degradation of infrastructure associated with years of use, environmental impact and structural collapse.	• Undelivered energy • Increased cost of removing the congestions • **Physical injury or loss of life to third parties due to the occurrence of a blackout** • **Negative impact on the balance of the natural environment**	• Actions provided for in the Transmission Grid Code (TGC), Balancing Conditions (WDB) and the Guidelines for the Operation of the Electricity Transmission System (SOGL), aimed at ensuring an uninterrupted energy supply to consumers, including the application of measures and procedures provided for in the defence and restoration plans

SUMMARY OF SELECTED RISKS RELEVANT TO THE COMPANY			
RISK NAME	**RISK DESCRIPTION – BASIC INFORMATION**	**MAIN EFFECTS OF MATERIALISATION**	**APPROACH TO RISK MANAGEMENT – KEY ASSUMPTIONS**
LOSS OF ABILITY TO MANAGE THE NPS ON AN ONGOING BASIS	Loss of use of a hardware or software component or large-scale absenteeism of the dispatching staff, making it difficult or impossible to carry out dispatching tasks. As a result, remedial solutions are being put in place; switching to "manual" management of the NPS is effected or the work mode for dispatchers is changed to ensure the minimum safe staffing levels. The ability to monitor and identify changes in the NPS status on an ongoing basis, to make decisions and issue orders relevant to ensuring secure network operation and system balancing is reduced. Human errors can occur, which is exacerbated by the possible failure of telecommunications links. There may be a loss of control over the NPS operation.	• Restrictions on energy supply to consumers • Increased costs of removing the congestions • **Negative impact on the balance of the natural environment** • **Physical injury or loss of life to third parties in the area affected by the blackout** • **Negative effects on the image**	• Actions and solutions provided for in the TGC, WDB and SOGL • Solutions and actions that make up the company's comprehensive approach to management of the following: information systems, environment, human resources as well as health and safety at work
CYBER ATTACK ON CRITICAL ICT INFRASTRUCTURE OF ENTITIES DIRECTLY CONNECTED TO NPS	Successful attack on at least one critical ICT systems belonging to a TSO, DSO, power plant or major industrial consumers. The effect can be for an attacker to gain access to one or more of PSE's or other entities' critical ICT systems. As a result of an attack, the following may occur: unavailability of data or a breach of data integrity leading to an inability to control the NPS or to erroneous decisions resulting in improper NPS operation, a breach of the confidentiality of data in the system that may affect market processes or the proper operation of the NPS, or a lack of communication between PSE and the attacked entity to the extent required to control the NPS. Depending on the motivation of the attacker	• Restrictions on energy supply to consumers • Increased costs of removing the congestions • The cost of engaging specialist companies to conduct a detailed analysis of the scale of the cyber attack • **Negative effects on the image**	• Technical and organisational solutions based on the highest safety standards • Network segmentation, separation of assets with different sensitivity • Design and implementation of ICT solutions including high availability and redundancy mechanisms at multiple levels • Monitoring by SOC (Security Operations Centre) of security incidents, monitoring of ICT/business processes, ongoing monitoring of IT/OT systems • Certification of the Operational Continuity Management System's compliance with ISO 22301, and of the Information Security Management System's

SUMMARY OF SELECTED RISKS RELEVANT TO THE COMPANY			
RISK NAME	**RISK DESCRIPTION – BASIC INFORMATION**	**MAIN EFFECTS OF MATERIALISATION**	**APPROACH TO RISK MANAGEMENT – KEY ASSUMPTIONS**
	and their expected benefits/effects, the extent and impact can vary.		compliance with ISO 27001.
INCREASE IN BALANCING MARKET COSTS	A situation in which the factors influencing the level of costs of the removal of system congestions develop much more unfavourably than in the assumptions made for the TSO's Tariff and the company's financial plan. This is the case, for example, when a number of Balancing Market Participants (URB) adopt contracting strategies assuming under-contracting, determined by internal (e.g. business and corporate decisions) or external factors (e.g. changes in the level of fuel prices, CO_2, changes in energy prices on the wholesale markets, etc.). The occurrence of such a situation, especially if the activation of generating units with high bid prices (high variable costs) and the reduction in units with low bid prices (low variable costs) prove to be necessary, may lead to PSE's having to incur additional, over-budgeted costs for the removal of system congestions. This situation may persist for many months to come, which will significantly affect the size of the company's aggregated costs over the entire TSO Tariff period. In extreme cases, this can alter the financial liquidity of the company.	• Increased costs of removing system congestions • **Negative effects on the image**	• Monitoring of the company's financial exposure in the context of the rules of balancing market mechanisms • A solution which provides for a possibility to submit a request for the Tariff adjustment to the ERO President during the year
FAILURE TO COMPLETE ON TIME THE NETWORK PROJECTS THAT ARE KEY TO THE POWER OUTPUT / IMPROVING POWER SUPPLY CONDITIONS	Delays in the planning or implementation phase of the investment tasks that make up the network investment portfolio in relation to the deadlines assumed in the baseline schedules. This is the result of, among others, the following: errors or delays in carrying out the	• Costs associated with e.g. the need to extend the line route, increased time to engage staff resources, legal services. • **Negative effects on the image**	• Solutions comprising a comprehensive approach to the management of the investment process, including: project schedule and budget, contracts with contractors and subcontractors, identification and assessment of risks,

SUMMARY OF SELECTED RISKS RELEVANT TO THE COMPANY			
RISK NAME	**RISK DESCRIPTION – BASIC INFORMATION**	**MAIN EFFECTS OF MATERIALISATION**	**APPROACH TO RISK MANAGEMENT – KEY ASSUMPTIONS**
	construction and erection work in the related projects, faulty or delayed deliveries of materials and equipment, restrictions or inability in effecting the necessary shutdowns, delays in carrying out and awarding tenders, hindrances or failures during the planning work, extreme weather events, conflicts with contractors, impediments and delays in obtaining land titles, structure collapse, fire, prolonged processes of obtaining administrative and environmental decisions, errors or delays in the preparation of the design documentation or errors and delays in the completion of construction and erection work by contractors. Delays pile up and are recorded for the following network projects (also on related projects).		planning of network element shutdowns to carry out the investment works, and progress monitoring
UNPLANNED UNAVAILABILITY OF AN NPS ELEMENT – KEY ELEMENT OF AN EHV SUBSTATION	Activation of substation safety systems, direct damage or automatic shutdown of one or more key components of an EHV substation – as a result of a technical failure of substation devices or gear, loss of power supply for the substation's auxiliaries, error in readings or signals relating to the status of substation devices or electricity parameters, human error, intended actions, environmental events or structure collapse. As a result, the substation's ability to transform or distribute electricity may be prevented or significantly reduced.	• Cost of restoring the substation • **Negative impact on the balance of the natural environment** • **Accident incidents, including fatalities** • **Negative effects on the image of varying magnitude**	• Comprehensive approach to network asset management, including periodic assessments of the technical condition of substation gear and replacement of the most worn-out and oldest elements and devices • Having an experienced and knowledgeable team to ensure safe maintenance • Application of physical security solutions and substation access restrictions (technical protection systems, fixed fire-fighting systems) • Direct supervision of external companies carrying out work on the substation facilities
UNPLANNED UNAVAILABILITY OF AN NPS ELEMENT – EHV TRANSMISSION LINE	Unplanned shutdown of one or more EHV line current circuits, direct damage or automatic shutdown of one or more EHV line current	• **Negative impact on the balance of the natural environment**	• Comprehensive approach to network asset management, including periodic assessments of the technical condition of

SUMMARY OF SELECTED RISKS RELEVANT TO THE COMPANY			
RISK NAME	**RISK DESCRIPTION – BASIC INFORMATION**	**MAIN EFFECTS OF MATERIALISATION**	**APPROACH TO RISK MANAGEMENT – KEY ASSUMPTIONS**
	circuits, as a result of a technical failure of the components making up the EHV line, human errors, intended actions, environmental events or structure collapse. As a result, the ability to transmit electricity using the EHV network may be prevented or significantly reduced.	• **Negative effects on the image of varying magnitude** • Accidents • Costs of replacing or repairing damaged line elements	the network asset and replacement of the most worn-out and oldest elements • Direct supervision of external companies carrying out work on the line facilities
SOCIAL CONFLICTS PREVENTING/OBSTRUCTING TIMELY IMPLEMENTATION OF KEY PROJECTS	Social conflicts may result from a large and active involvement of associations / non-governmental organisations /specialised entities, a lack of inclusion of projects and plans in the zone planning and formal documents, mistakes or failures by the contractor in connection with the project in progress, a formation or operation of strong social groups with a negative approach, including landowners, mistakes in the communication process made by the contractor or the company, lack of understanding and cooperation on the part of local government authorities, a large and active involvement of politicians at a local or national level. This translates into the ability of the company or key projects contractors to initiate or continue investment tasks, including their continuation based on existing assumptions/schedules. It is possible for conflicts to spill over into further investment tasks.	• Costs related to engaging communication and dispute resolution specialists • Physical injury to the company employees or third parties in the event of an uncontrolled escalation of conflicts • **Negative effects on the image**	• Selection of the best route or location of the project with the involvement of local communities • Mapping of stakeholders of key projects in order to identify precisely the recipients of the communication activities • Supervision of the project contractor • Development and implementation of a social communication programme at the level of the individual investment tasks, including a dialogue with stakeholders • Implementation of grant activities aimed at solving local community problems

CHAPTER IV: ECONOMIC AND MARKET IMPACT

Key messages of the chapter:

Our core business and additional undertakings generate positive impulses in the Polish economy. We contribute significantly to the creation of added value, jobs, income for the population, and through the taxes we pay – we also contribute to the development of the region.

IV. ECONOMIC AND MARKET IMPACT

4.1. Our impact on Poland's economic development

We are a strategic company, but also a key client and a business partner for many economic entities, and an important employer. Through its daily activities, PSE has a significant impact on the entire Polish economy and individual industries.

The scale and scope of our operations make our company also a significant payer of contributions, fees and taxes to the national and local governments. These funds go to both the central and local government budgets and are then used for projects and activities to improve the lives of Poles, e.g. investments in infrastructure, education or the safety of citizens.

The input-output model (Leontief model) was used to analyze the economic impact of PSE activities. By using it, the impact of PSE's activities was calculated in three categories:

- **Generated added value**
- **Remuneration**
- **Employment**

For each of the categories listed, the impact of PSE was shown in three dimensions:

- **Direct effect** – resulting from PSE's core business
- **Indirect effect** – generated among suppliers and entities from related industries
- **Induced effect** – further growth generated due to household revenue growth

In this year's report, similarly to the previous year, in addition to the impact of operations, the impact of capital expenditures (CAPEX) was calculated. Investment demand is the component of final demand in the economy that provides the momentum for global output. Using Leontief's model, input-output multipliers were calculated to show how an increase in final demand translates into an increase in global output.

Added value

Value added is the difference between global output and indirect consumption.

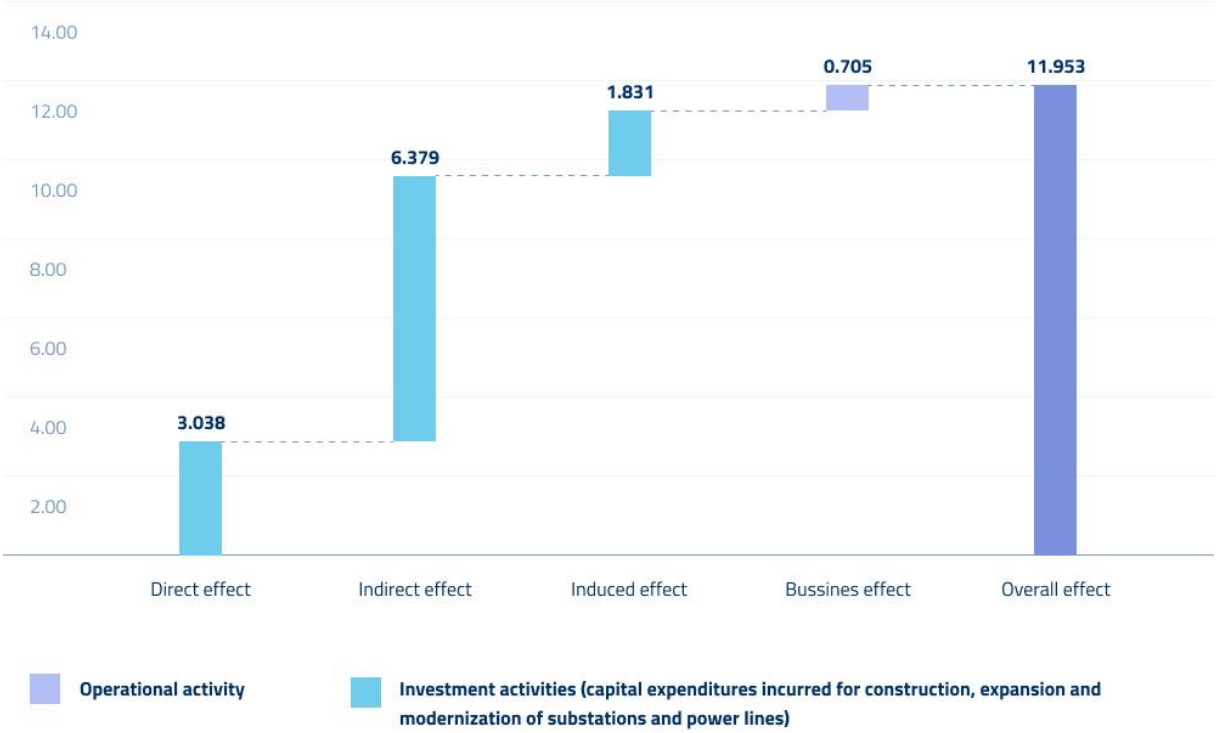
Global output is the sum of:

- revenues from sales of products (goods and services) of own production,
- change in inventories,
- manufacturing cost of products for internal purposes,
- trading margin on goods purchased for resale.

Indirect consumption includes the total of: the value of net materials used, raw materials, fuels, energy, industrial gases, third-party services, business travel expenses and other costs[1].

Added value generated due to the PSE's operating and investment activities:

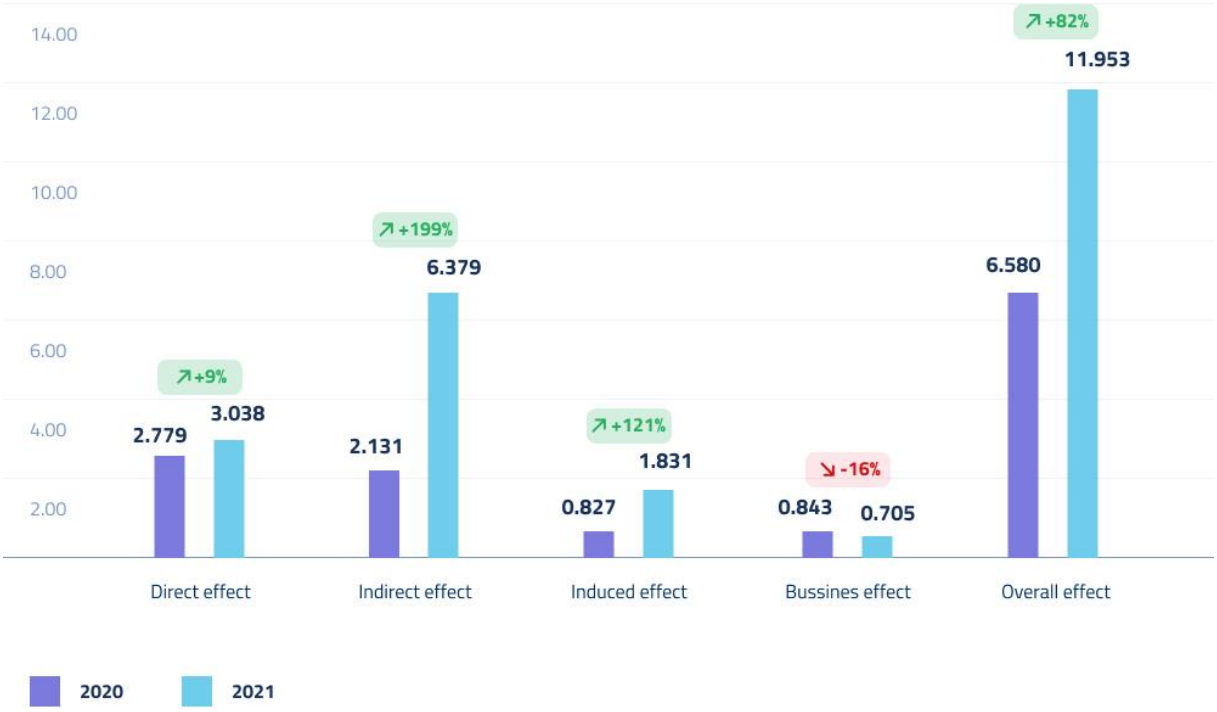
- **PLN 11.953 billion** – total added value generated in the Polish economy in 2021 thanks to the PSE's operating and investment activities.



In a year-over-year comparison, the added value generated in the economy due to the PSE's operating and investment activities was **82% higher.**

[1] *For PSE, indirect consumption was calculated from the profit and loss account data by aggregating costs to the level of the industries included in the model. Next, the so-called stranded costs and the funds transferred by PSE to the Settlement Administrator under the RES fee were subtracted, as these costs are not an element of indirect consumption. This approach was also used in the calculations for previous years (2017, 2018 and 2020).*

Added value generated in the economy due to the PSE's operating and investment activities excluding in 2020–2021 (in PLN billion)

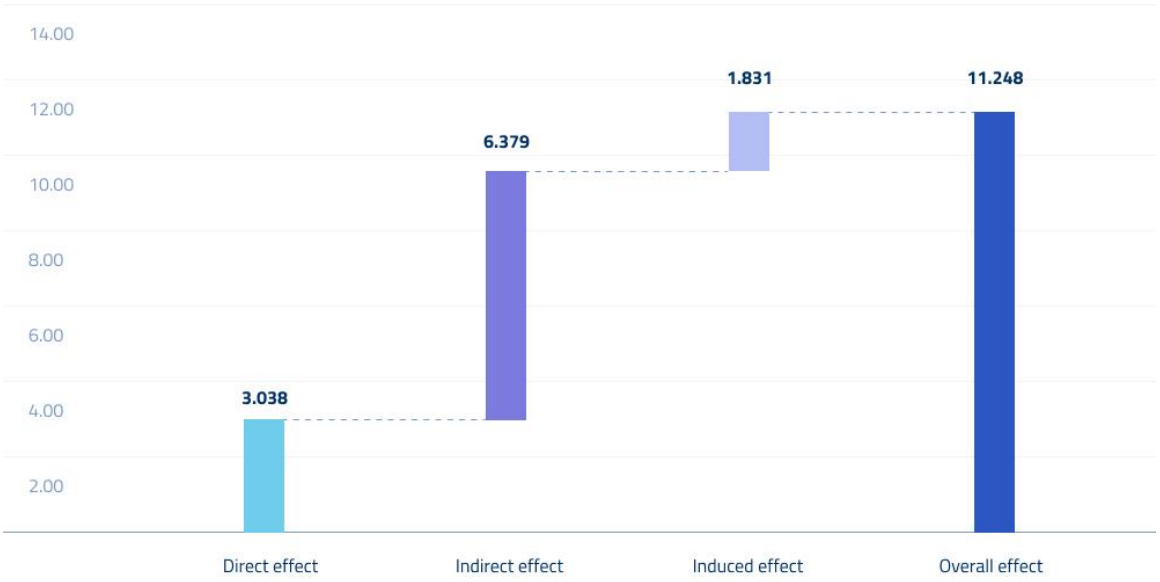


Added value generated due to the operating activities:

- **PLN 11.25 billion** – total added value generated in the Polish economy in 2021 thanks to the PSE operations. *For this amount, five combined cycle power plants, with a total capacity of over 2,815 MW, could be built*[2].
- **PLN 3.04 billion** – direct added value generated by PSE in the power sector (generation and transmission of electricity).
- In the industries where PSE purchases equipment, materials and services, and in related industries, the company contributed to a total of more than **PLN 6.38 billion** in added value.
- The remuneration paid to PSE employees as well as the employees of suppliers and subcontractors throughout the supply chain created a demand stimulus and generated an additional induced added value of **PLN 1.83 billion** in 2021.

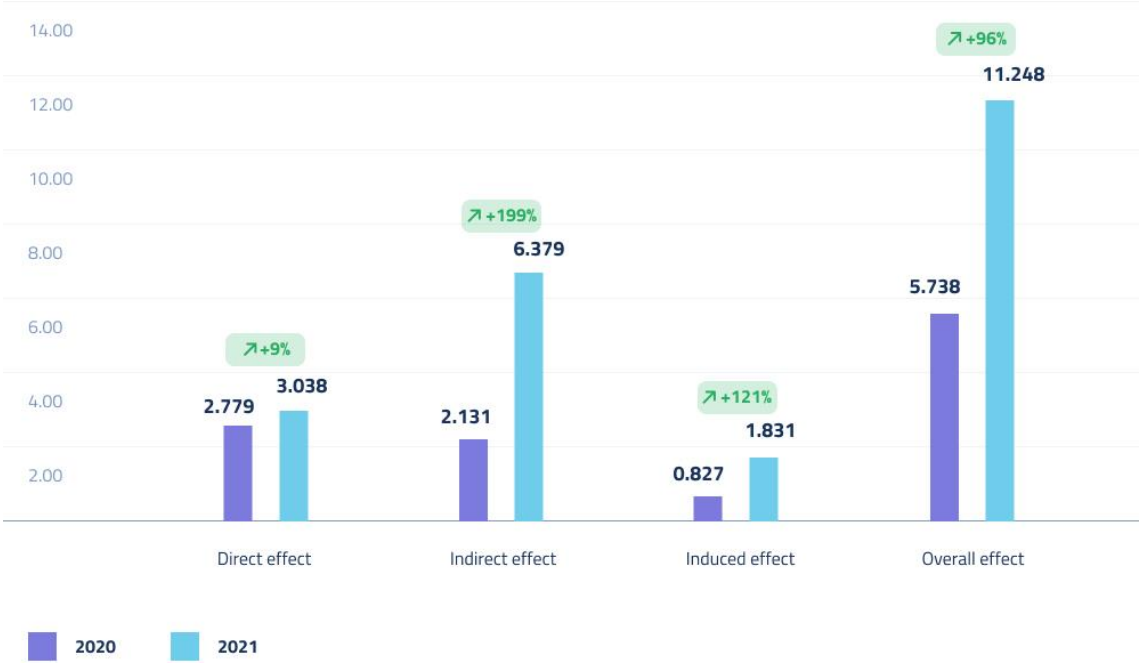
[2] *The cost of designing and building a 563 MW combined cycle power plant in Grudziądz by Energa was used as a reference cost.*

Added value generated in the economy due to the PSE's operating activities in 2021 (in PLN billion)



Compared year over year, the added value generated in the economy due to the PSE's activities was **higher by PLN 5.51 billion.** *This is an amount that could allow more than 80,400 applications to be granted maximum funding under the third part of the Clean Air Programme*[3]. Such a significant difference between 2020 and 2021 is the result of the launch of the capacity market, which also influenced the significantly higher results compared to 2020 for other indicators, as well.

Added value generated in the economy due to the PSE's operating activities in 2020–2021 (in PLN billion)



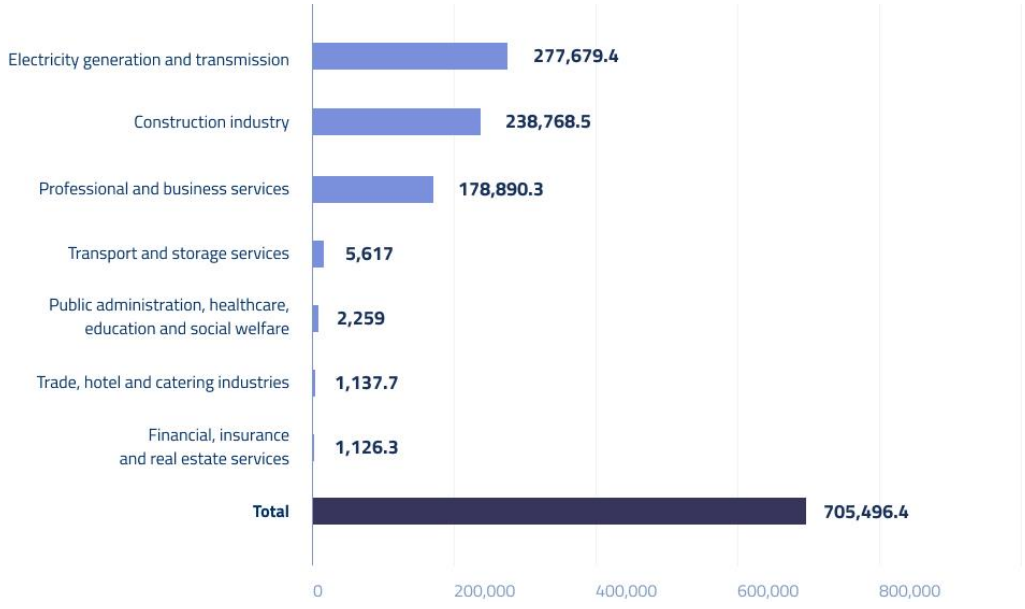
[3] *The maximum possible grant is PLN 69,000. In total, 80,449 applications could receive this funding. Data on the amount of funding based on: https://czystepowietrze.gov.pl/nowa-czesc-programu-czyste-powietrze-wsparcie-nawet-do-69-tys-zl/*

Added value generated in the individual industries due to the PSE's operating activities in 2021 (in PLN thousand)

Value added generated by PSE's investment activities:

- **PLN 705.5 million** – the total added value generated in the Polish economy in 2021 due to the PSE's investment activities related to the construction, extension and modernisation of substations and power lines. *For this amount, one could buy 20 electric train sets[4].*

Added value generated in the individual industries due to the PSE's investment activities in 2021 (in PLN thousand)



[4] *The cost of the purchase of two train sets by the Pomeranian Voivodeship from Newag in 2022 was taken as the reference cost*

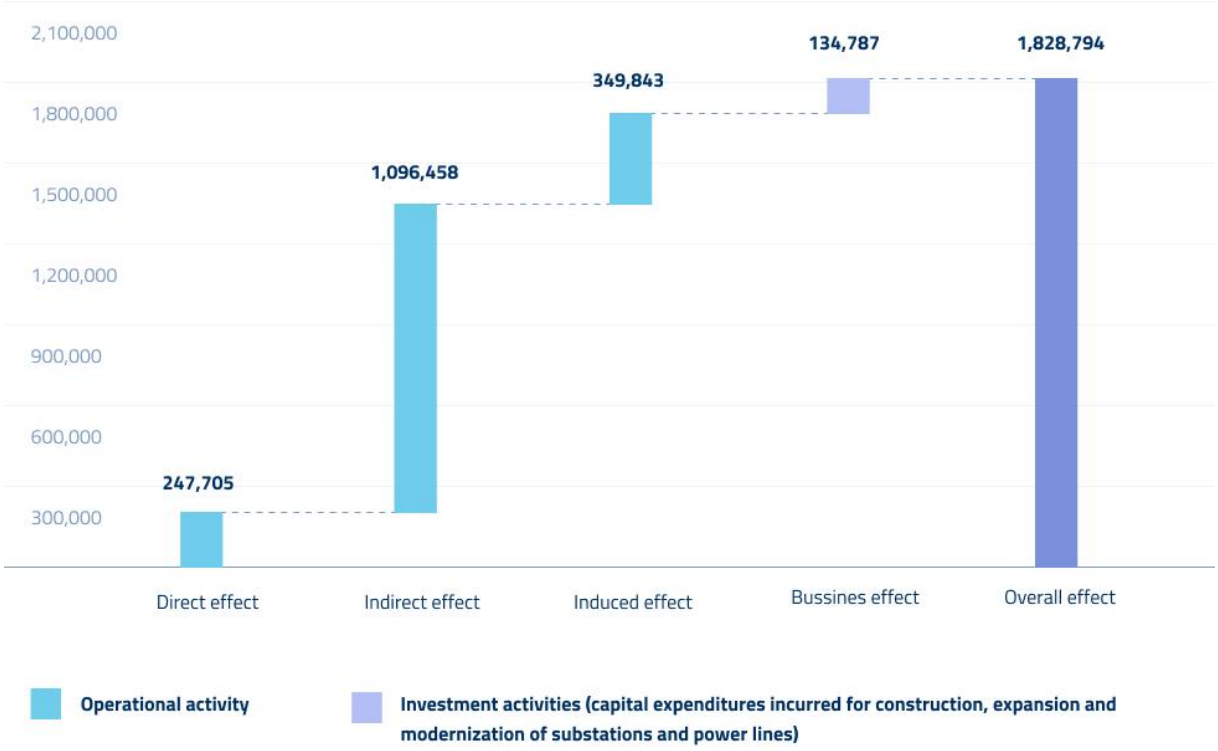
Remuneration

PSE employs more than 2,700 people, to whom it pays remuneration. Through its activities, it also influences suppliers and other related parties in the economy, thereby generating additional remuneration in the economy.

Remuneration generated due to the PSE's operating and investment activities:

- **PLN 1.829 billion** – total value of remuneration generated in the Polish economy in 2021 due to the PSE's operating and investment activities. *For this amount, more than 13,850 expert power line designers could be employed for a year*[5].

Remuneration generated in the economy due to the PSE's activities in 2021 (in PLN thousand)



In a year-over-year comparison, the remuneration generated in the economy due to the PSE's operating and investment activities was **100% higher.**

[5] *Monthly remuneration of PLN 11,000 gross was assumed based on: https://www.bankier.pl/wiadomosc/Zarobki-w-branzy-energetycznej-8265018.html*

Remuneration generated in the economy due to the PSE's operating and investment activities in 2020 and 2021 (in PLN thousand)

Remuneration generated due to the PSE's operating activities:

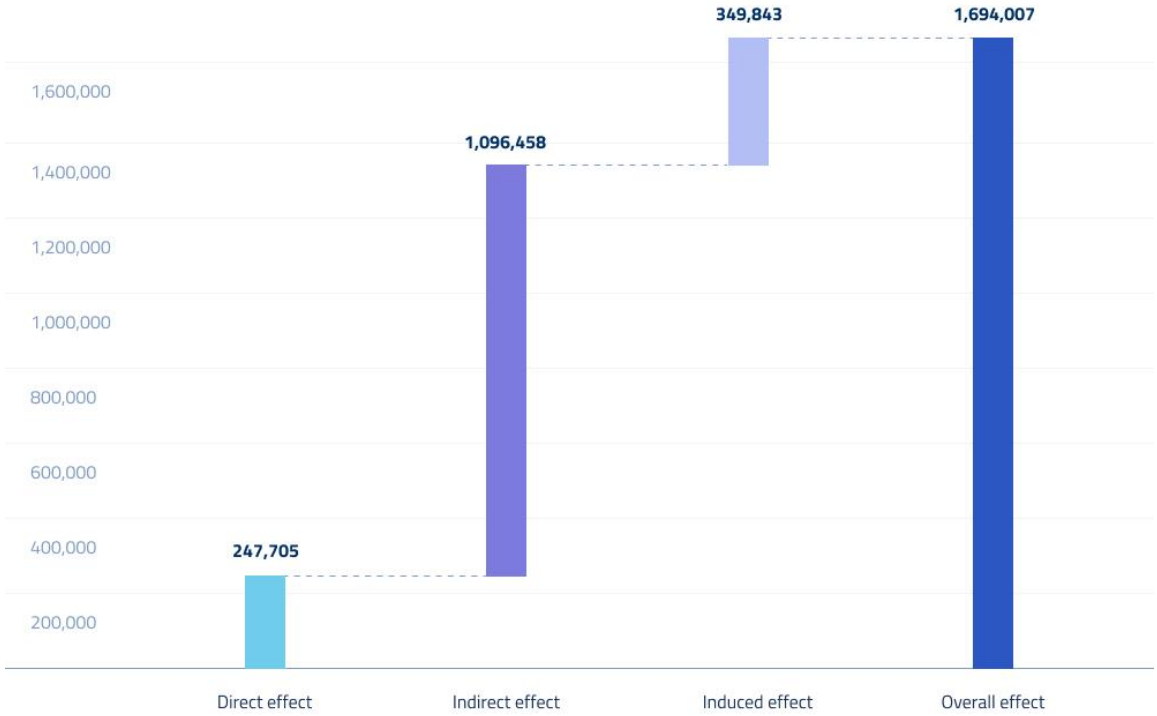
- **PLN 1.694 billion** – the total value of remuneration generated in the Polish economy in 2021 due to the PSE'a activities, *is more than 4 times the budget allocated by the National Centre for Research and Development (NCBiR) under the second competition for projects in the field of solar power, use of waste and heat from spent process gases for energy generation purpose and geothermal energy under the programme "New energy technologies"*[6].
- **More than 247.7 million** in net remuneration at PSE in 2021.
- Thanks to purchases from suppliers and links across the economy between the individual branches, suppliers and sub-suppliers were able to pay their employees remuneration of over **PLN 1.096 billion**.
- The national economy saw further remuneration growth driven by increases in income and household consumption. These are induced generated wages. Their value in 2021 amounted to **over PLN 349.8 million**.

Multiplier effect: 6.84

- Every PLN 1 spent on net remuneration at PSE is **almost PLN 6** of remuneration generated across the economy.

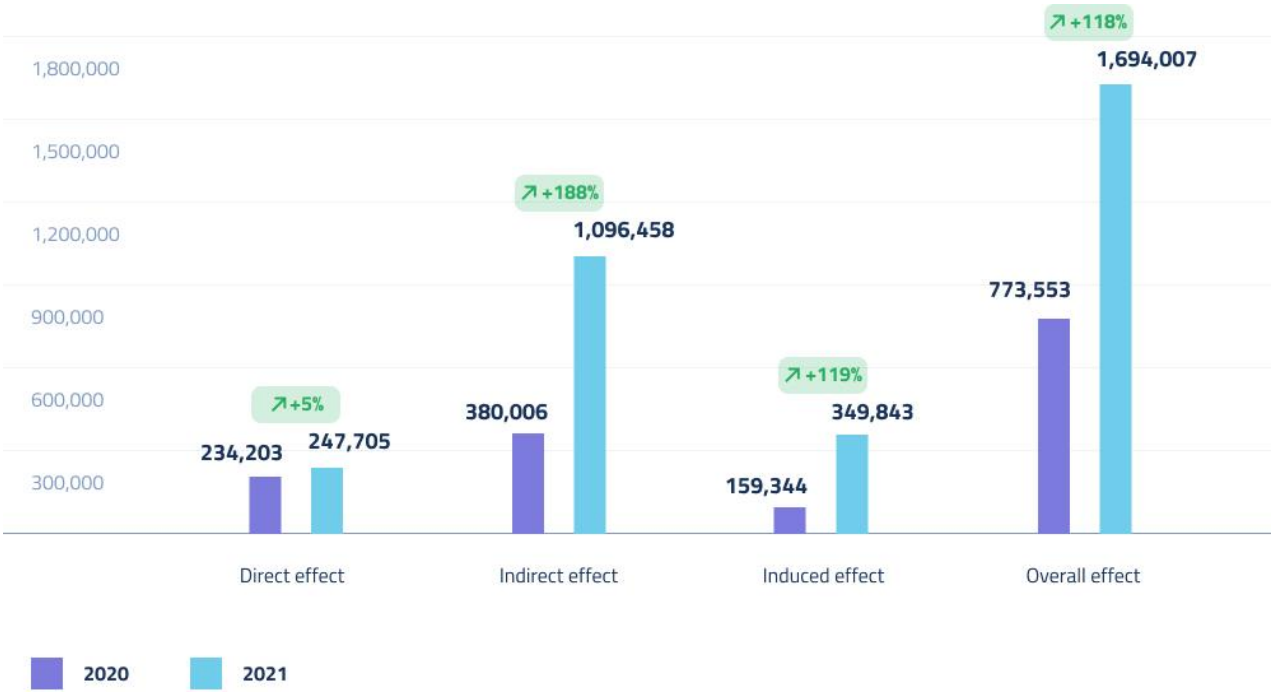
[6] *The budget allocated by NCBiR for projects as part of the strategic programme "New Energy Technologies" is PLN 390 million. Data based on: https://naukawpolsce.pl/aktualnosci/news%2C91606%2Cncbr-ponad-390-mln-zl-na-projekty-dotyczace-energetyki-odnawialnej-trafi-do*

Remuneration generated in the economy due to the PSE's operating activities in 2021 (in PLN thousand)



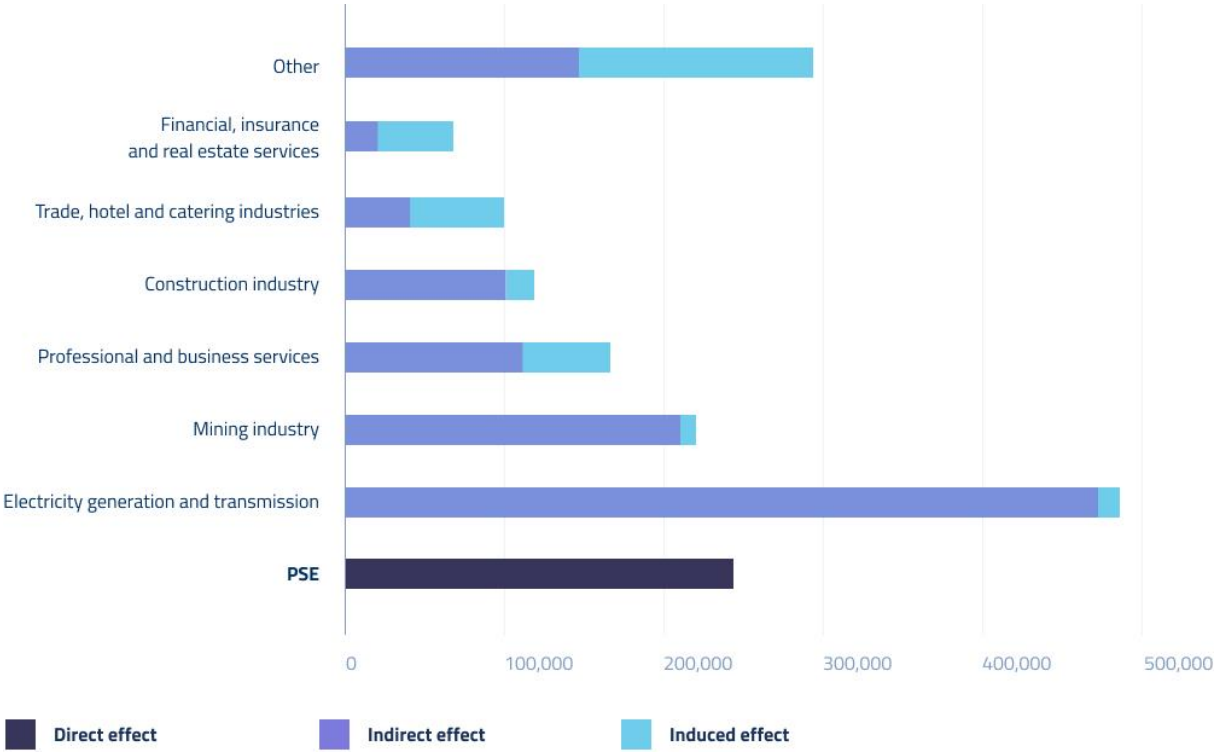
Compared to 2020, remuneration generated in 2021 in the economy due to the PSE's activities were higher by **PLN 920,454 thousand.** *This is almost half of the budget planned by the City of Warsaw for 2022 for cleaning and environmental protection*[7]

Remuneration generated in the economy due to the PSE's operating activities in 2020–2021 (in PLN thousand)



[7] *The City of Warsaw's budget for cleaning and environmental protection is PLN 2 billion. Data based on: https://um.warszawa.pl/kierunki-wydatkow-2022*

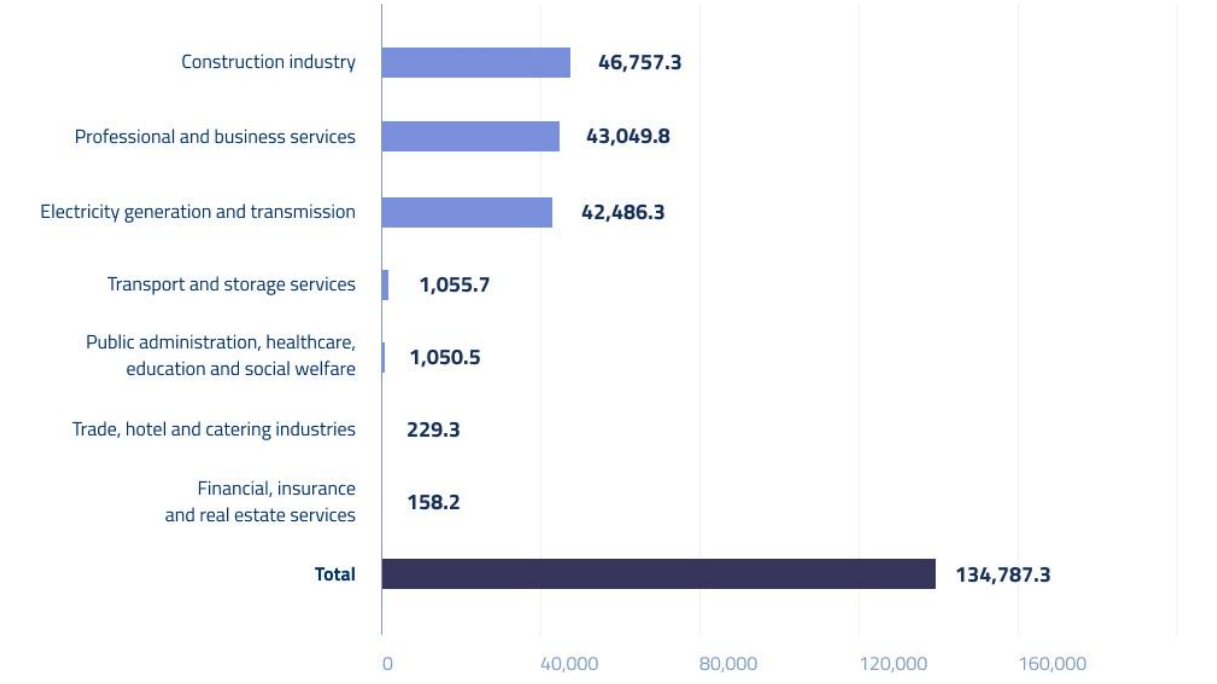
Remuneration generated in the individual industries due to the PSE's operating activities in 2021 (in PLN thousand)



Remuneration generated due to the PSE's investment activities:

- **PLN 134.8 million** – the total value of remuneration generated in the Polish economy in 2021 thanks to the investment activities of PSE in the scope of construction, extension and modernisation of substations and electrical power lines.

Remuneration generated in the individual industries due to the PSE's investment activities in 2021 (in PLN thousand



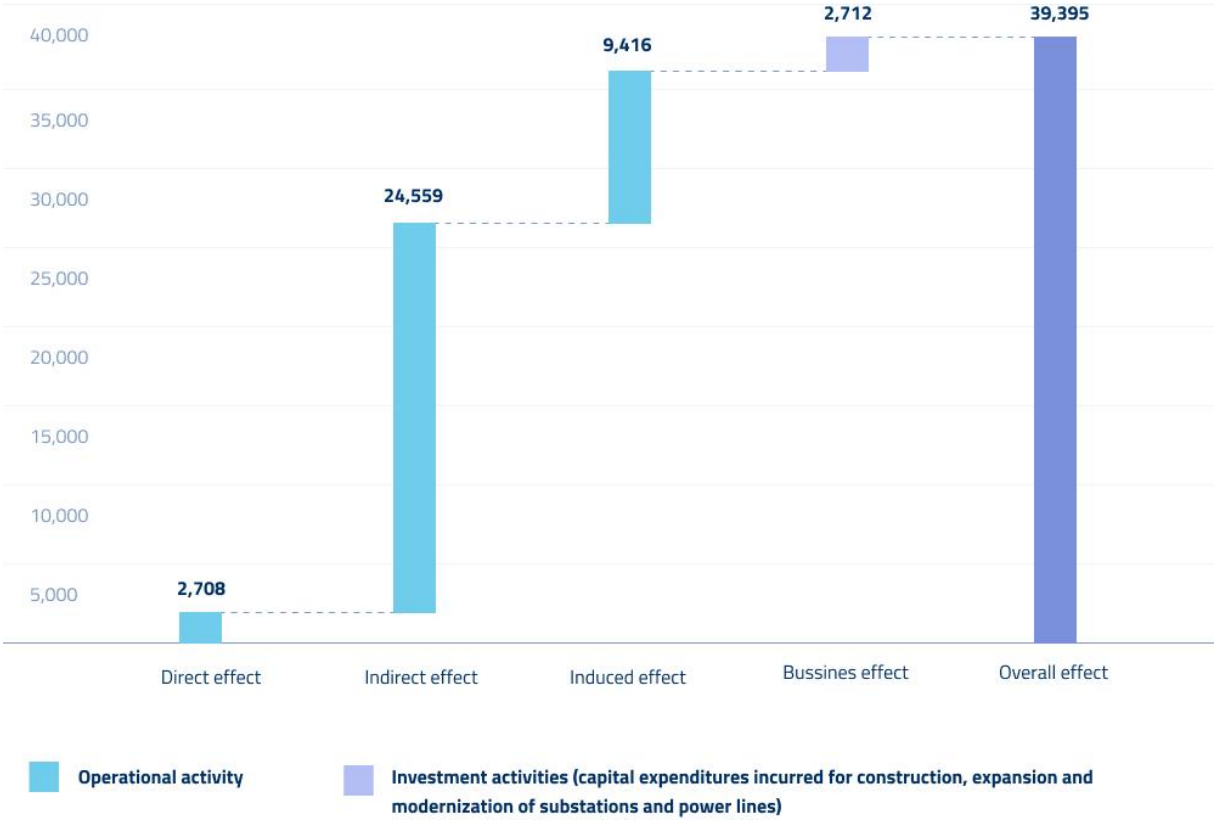
Employment

Employment is a significant area of both economic and social impact. PSE, through its activities, not only creates and maintains jobs within its organisation, but also impacts employment at suppliers and related entities throughout the economy.

Number of jobs maintained due to the PSE's operating and investment activities:

- **39,395 jobs** – the total number of jobs maintained in the Polish economy in 2021 due to the PSE's operating and investment activities.

Jobs maintained in the economy due to the PSE's activities in 2021 (number of jobs)



Compared to 2020, the number of jobs maintained in 2021 in the economy due to the PSE's operating and investment activities was **higher by 119%**.

Jobs maintained in the economy due to the PSE's operating and investment activities in 2020–2021 (number of jobs)

Number of jobs maintained due to the PSE's operating activities:

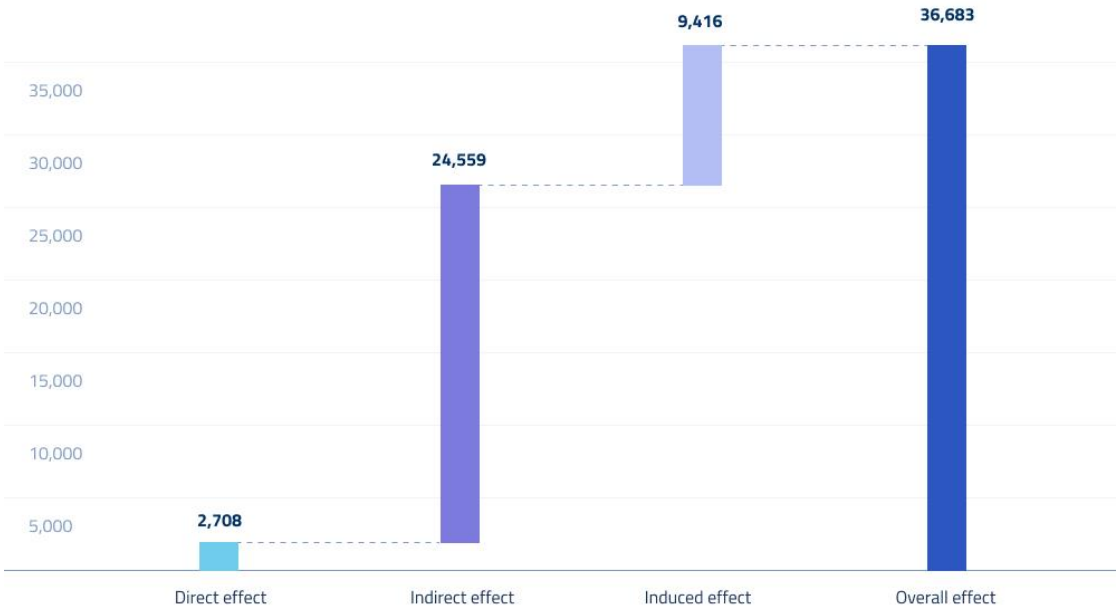
- **36,683 jobs** – the total number of jobs maintained in the Polish economy in 2021 due to the PSE's activities. *This is twice as many people as the Widzew stadium in Łódź could hold*[8].
- In 2021, the average number of employees at PSE was **2,708**.
- Through daily operations, projects and other tasks where PSE cooperates with many companies in various industries, we maintain **24,559** jobs in the individual industries.
- The induced effect of the PSE's activities is **9,416 jobs** in the overall economy.

Multiplier effect: **13.55**

- 1 job at PSE equals almost **13 (12,55)** additional jobs created in the overall economy.

[8] *The stadium seats 18,018 people. Data based on: stadiony.net/stadiony/pol*

Jobs maintained in the economy due to the PSE's activities in 2021 (number of jobs)

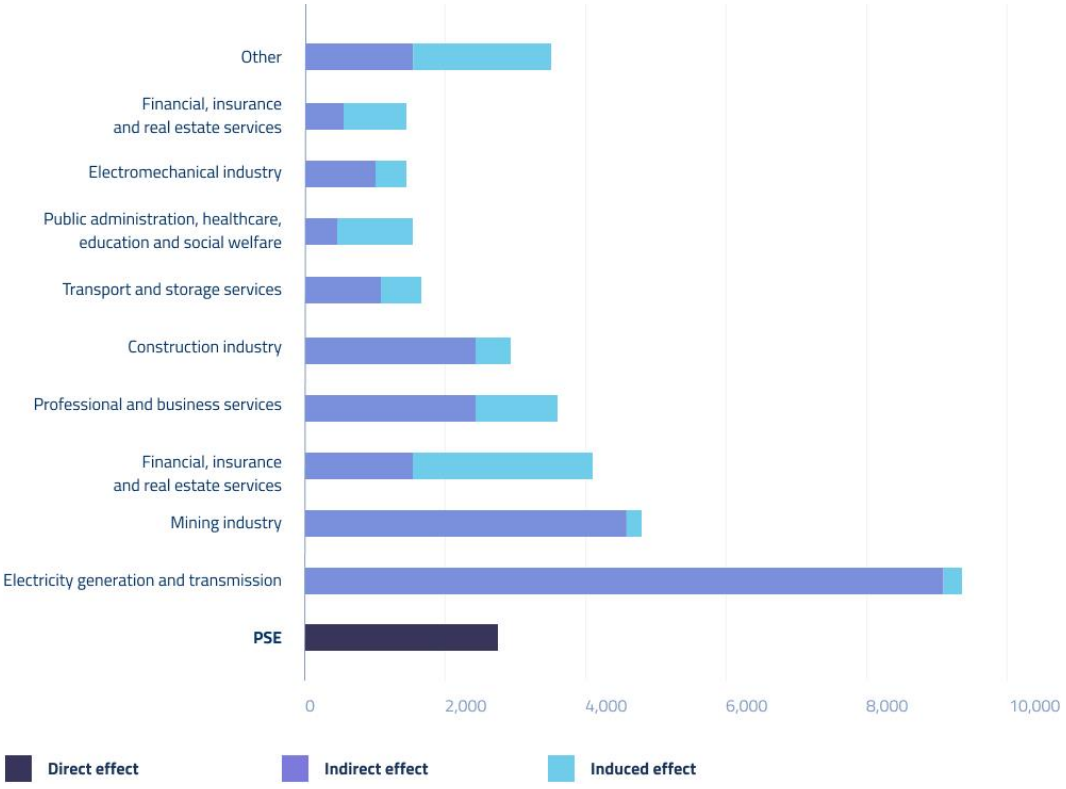


Compared to 2020, the number of jobs maintained in 2021 in the economy due to the PSE's activities was **higher by 21,262**. *This is more than the number of all undergraduate and graduate students at the Wrocław University of Science and Technology*[9]

Jobs maintained in the economy due to the PSE's activities in 2020–2021 (number of jobs)

[9] *There are 20,431 undergraduate and graduate students at the Wrocław University of Science and Technology. Data based on: https://pwr.edu.pl/uczelnia/informacje-ogolne/fakty-i-liczby*

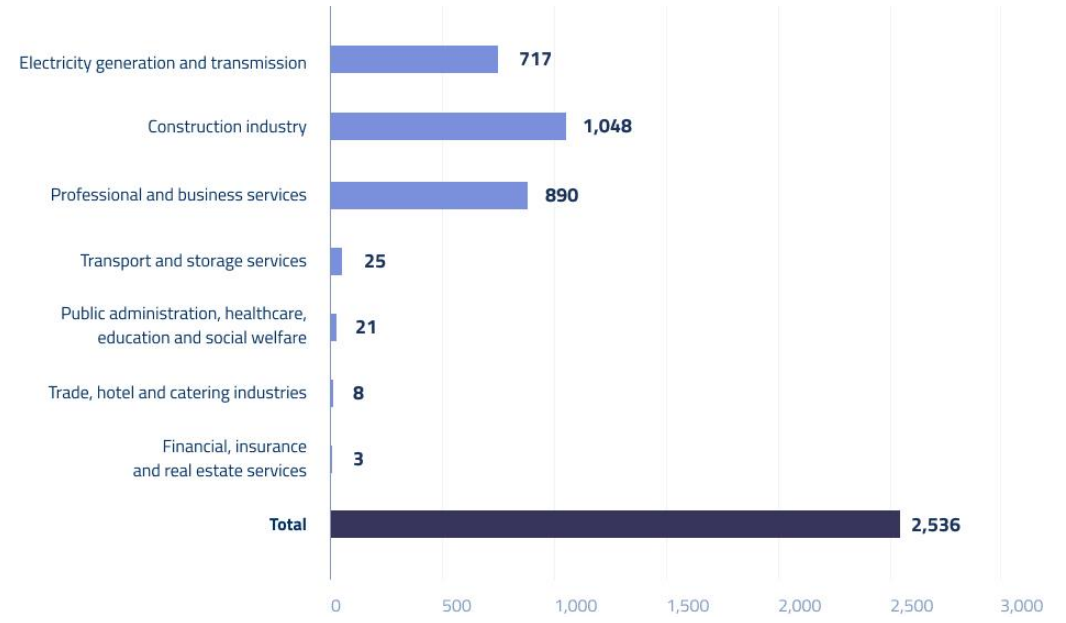
Jobs maintained in the individual industries due to the PSE's activities in 2021 (number of jobs)



Number of jobs maintained through PSE's investment activities:

- **2,712 jobs** – the total number of jobs maintained in the Polish economy in 2021 due to the PSE's investment activities in the construction, extension and modernisation of substations and power lines.

Jobs maintained in the individual industries due to the PSE's investment activities in 2021 (number of jobs)

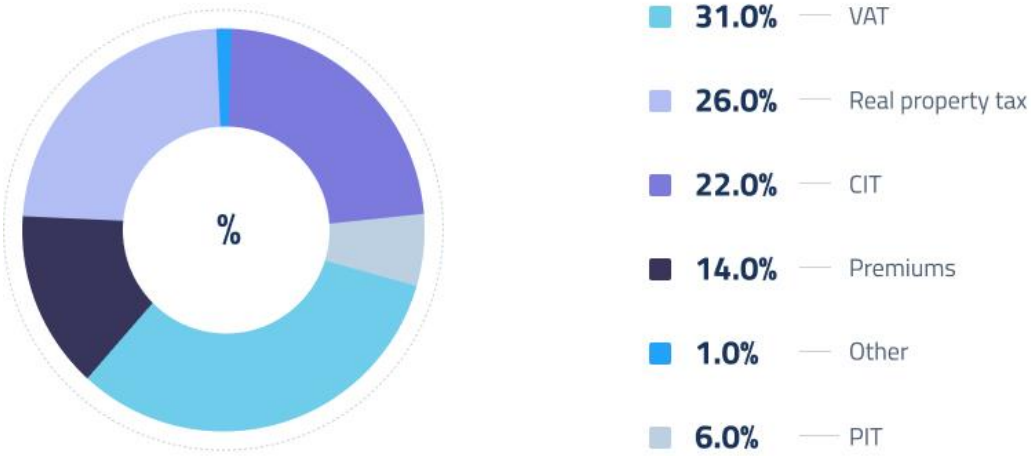


Taxes and charges

Conducting business activity, including selling products and services or hiring employees, results in the need to pay certain taxes and premiums to the state, which are then passed on to citizens in the form of projects, social programmes, health care services, education and much more.

- **PLN 1.081 billion** – total amount of taxes, fees and social security premiums paid to the state budget, budgets of local government authorities and the Social Security Fund in 2021 by PSE. *For this amount, more than 27,000 buildings of 100 m^{2}could be thermally upgraded.*[10]
- The total amount of taxes, fees and premiums was **85,584 million** higher than in 2020. *For this amount, almost 430 pocket parks could be designed and created*[11]
- **PLN 301.911 million** – the sum of payments for income taxes (PIT and CIT) in 2021.

Breakdown of taxes, fees and premiums paid by PSE in 2021 (%)

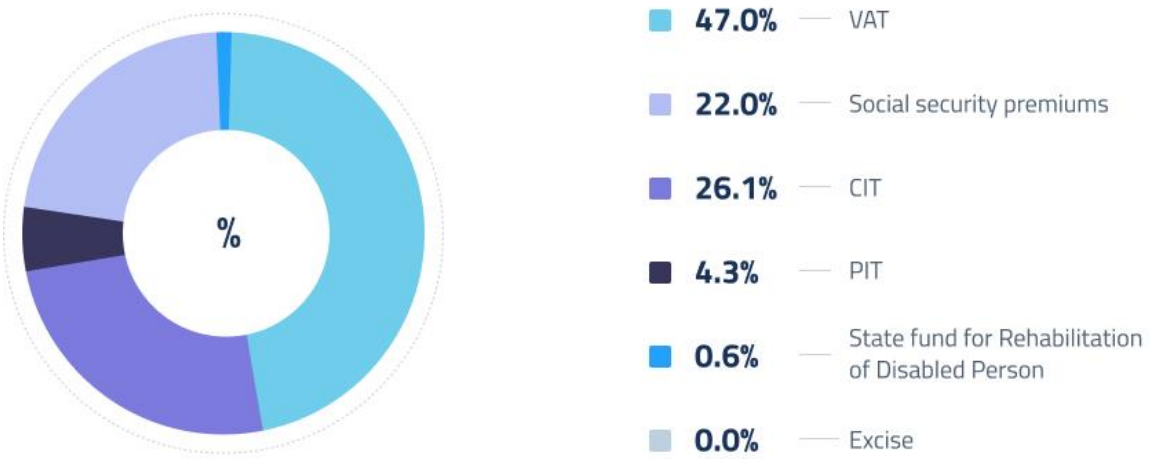


This is the breakdown of all taxes paid by PSE to the state. The central budget receives 65.4% of the total amount of taxes, while local budgets receive 34.6%[12].
Compared to 2020, the taxes paid in 2021 to the central budget were **higher by PLN 63.5 million**, and the taxes paid to local budgets were higher by a total of **PLN 21 million.**

More than **65%** of the taxes, fees, and premiums paid by PSE in 2021 are paid to the central budget. These were paid for the following taxes:

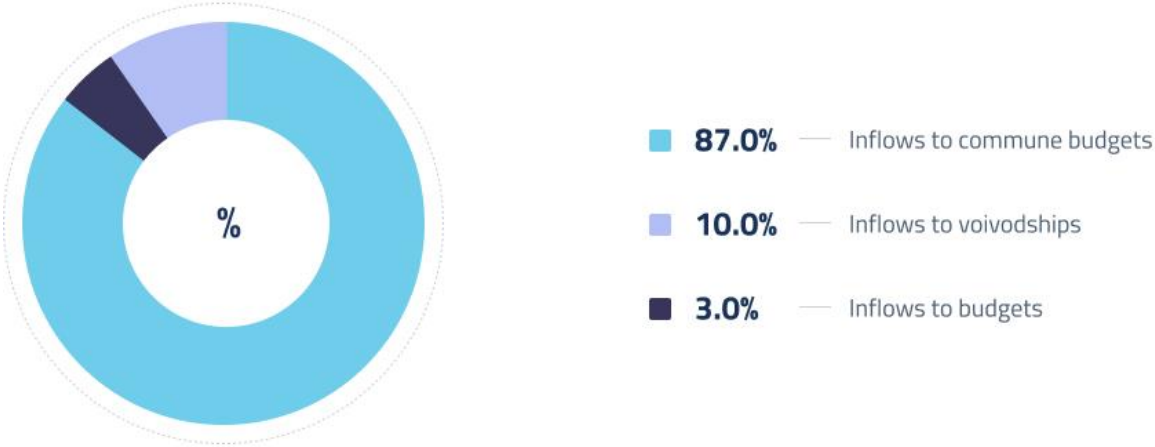
[10] *The cost of thermal upgrade was assumed to be PLN 400 per square metre, based on: https://www.gridw.pl/naszym-zdaniem/271-warto-wykonac-termomodernizacje-domu-jednorodzinnego*
[11] The cost of designing and creating one park was assumed at PLN 200,000; for an amount of 85,584 million, exactly 427 parks could be created. Data based on: https://bo.um.warszawa.pl/site/costs
[12] *The calculation takes into account the breakdown of CIT and PIT inflows between the central and local government budgets.*

Breakdown of taxes, fees and premiums paid by PSE to the central budget in 2021 (in %)



The remaining **34.6%** are premiums paid to local budgets, broken down as follows:

Breakdown of taxes, fees and premiums paid by PSE to local government authority budgets in 2021 (in %)



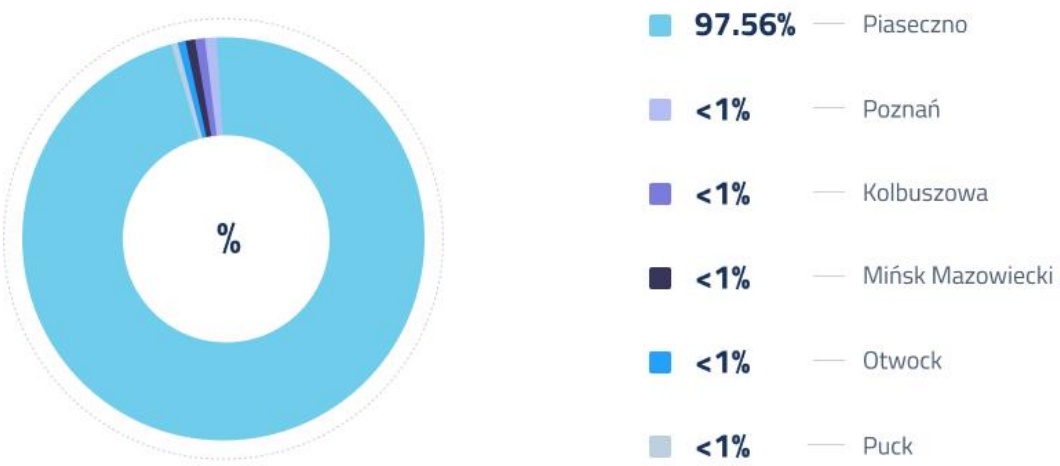
The largest local tax beneficiaries

In total, **more than PLN 36,27 million** reached the voivodship budgets from the taxes paid by PSE. **This is almost 10 million more than in 2020.** *For this amount, 5 kWp photovoltaic panels can be installed on almost 400 buildings.*[13]

Almost PLN 10.5 million has been paid into county budgets by PSE in 2021.

[13] *The average cost of 5 kWp was assumed at 25,000, based on: https://lepiej.tauron.pl/zielona-energia/ile-kosztuje-fotowoltaika-koszt-instalacji-i-urzadzen/*

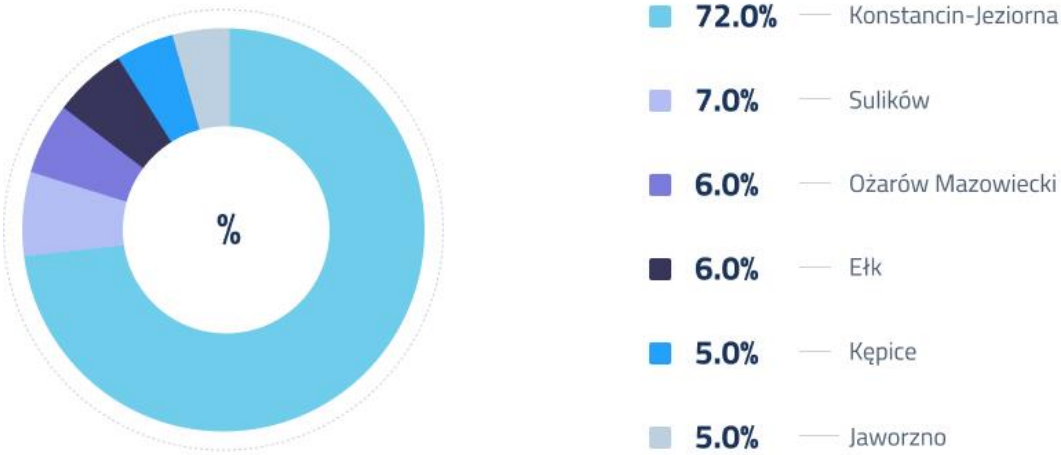
The total payments made by PSE to the budgets of the 6 largest tax beneficiaries at the county level (in %)



In 2021, PSE paid almost **327.5 million** in taxes to municipal budgets. *For this amount, more than 16 km of bike path could be built*[14]

The largest part of this amount – 12% – went to the budget of the municipality of Konstancin-Jeziorna.

The total payments made by PSE to the budgets of the 6 largest tax beneficiaries at the municipality level (in %)



[14] *Assumed cost of 1 km of bike path at PLN 2,000,000, based on =: https://budzet.krakow.pl/207751,artykul,twoje_bo.html/247637,artykul,cennik_2021.html*

4.2. Stable operation of the national power system

Key messages:

We remain steadfast in our efforts to ensure the safe and stable operation of the power system. We monitor and maintain the system reliability and continuity of supply indicators at a high level. We take a variety of measures to enable our organisation to maintain the continuity of electricity supply to consumers.

Key figures

- **173,583 GWh** of gross domestic electricity production in 2021, which represents an increase of 13.97% from 2020.
- **174,402 GWh** of domestic electricity consumptions in 2021, which represents a decrease of 5.36% from 2020.
- **146,018.3 GWh** of total electricity consumption in 2021 by end users connected to the NPS.
- **99,210.2 GWh** of electricity delivered from the transmission grid to domestic consumers of transmission services in 2021.
- **99.99%** – electricity supply continuity index for 2021.
- **1,216.49 MWh** – ENS (Energy Not Served) for all planned and unplanned outages.
- **162.07 (minutes)** – AIT (Average Interruption Time) for all planned and unplanned outages.
- **1,47%** – transmission grid loss index for 2021.
- **99,87%** – transmission device availability index (DYSU) for 2021. It reached a high value with **a reference value ≥ 97.5%**.
- **PLN 969.7 million** in capital expenditures incurred in 2021. **In-house indicator**
- **169** network infrastructure investment projects implemented in 2021.
- **approx. PLN 36 billion PLN 14.2 billion** in capital expenditures planned for 2023–2036. **In-house indicator**

4.2.1. Power system in Poland

Ensuring access to electricity requires an efficiently operating system that enables its seamless generation, processing, transmission and distribution. All the equipment connected to this system, together with consumers' installations, form the national power system.

The power system belongs to a special type of critical infrastructure, as it determines the security of society, the economy and the state. This system is centrally controlled. The National Dispatching Center, the so-called dispatching service of PSE, is responsible for the operation of the Polish power system.

Cross-border connections

The national transmission system operates:

- synchronously with the systems of the states of the Continental Europe (ENTSO-E),
- with dedicated power units of the Dobrotwór power plant of the Ukrainian system,
- non-synchronously with the Swedish system via a DC submarine cable,
- non-synchronously with the Lithuanian system through a DC back-to-back converter station.

Synchronous connections

Western border (Poland-Germany)

- 400 kV Krajnik-Vierraden double-circuit line - the line operates in the transient mode (1 line circuit and two phase shifters on the German side connected in series),
- 400 kV Mikułowa–Hagenwerder double-circuit line – with two shifters connected in series in each circuit at the Mikułowa substation.

Southern border (Poland-Czech Republic)

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

Southern border (Poland-Slovakia)

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

Non-synchronous connections

Northern border (Poland-Sweden)

- DC 450 kV Słupsk Wierzbięcin-Storno cable line with transmission capacity of 600 MW.

North-eastern border (Poland–Lithuania)

- 400 kV double-circuit line inter-operating with the Lithuanian system through a DC back-to-back converter station with a transmission capacity of 500 MW.

Other connections

Eastern border (Poland-Ukraine)

- 220 kV Zamość–Dobrotwór single-circuit line inter-operating with dedicated generating units on the Ukrainian side (the interconnection only allows importing electricity to Poland),
- 750 kV Rzeszów–Chmielnicka single-circuit line – work is underway to convert the line from 750 kV to 400 kV and to bring the line back to service.

Fig. Cross-border connections

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

The operation of the transmission grid takes into account the needs of electricity consumers nationwide.

The current operational security of the power network is ensured by the dispatching services of the TSO and DSO as well as the operational services of generators and customers operating in a hierarchical system.

The national power system has the following hierarchy of dispatching services:

- **National Dispatching Center (KDM)** - manages the operation of the 750, 400, 220 kV transmission grid, as well as selected 110 kV lines of system importance,
- **Area Dispatching Center (ODM)** - manages the operation of the transmission grid and the switching operations of the 750, 400, 220 and 110 kV transmission grid,
- **Central Dispatching Centers, Branch Dispatching Centers (CDM, OCD)** - manage the operation of the 110 kV distribution network and switching operations in the distribution network of 110 kV and below.

The dispatching services of TSOs cooperate directly with the dispatching services of DSOs (Central Dispatching Centers, Branch Dispatching Centers) and with the operational services of power generation companies (Power Plant On-Duty Engineer - DIRE). This cooperation is carried out in accordance with the Transmission Grid Code.

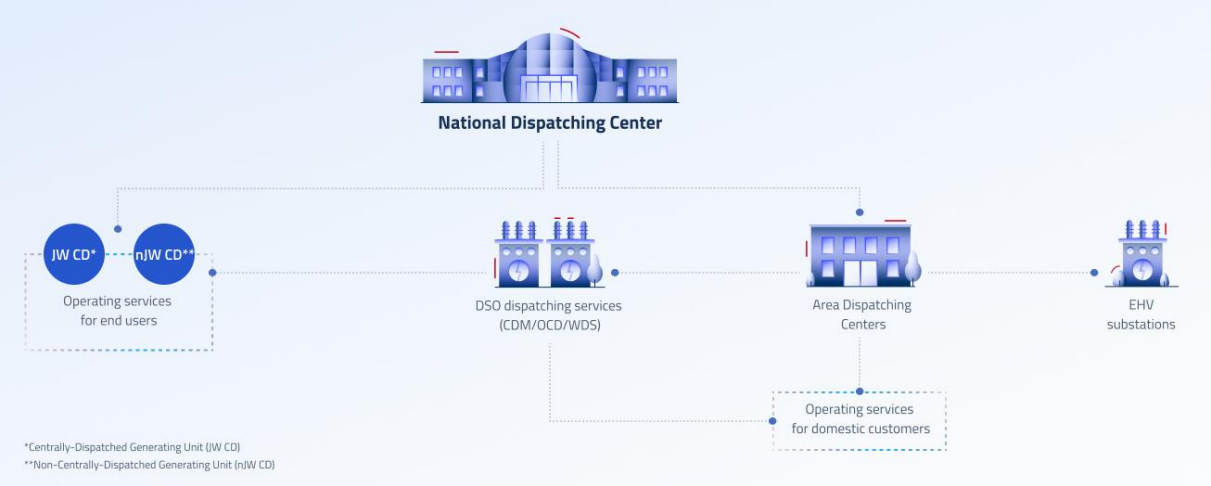


Fig. Organisation of dispatching services in the country

The cooperation of TSOs with TSOs of neighboring countries with respect to network operation is carried out in accordance with the terms and conditions set out in the ENTSO-E/UCTE network codes and conditions specified in bilateral agreements.

Balancing of power demand

[GRI 103-2] In order to provide the generation capacity necessary to meet the demand, as a Transmission System Operator, we implement a coordination planning process for different time horizons. This process includes annual, monthly, and daily coordination plans.

The schedule of activities related to the development of plans and the scope of forecast and published data is defined in the Transmission Grid Code.

Coordination plans are designed to allow the levels of excess capacity available over forecast demand to be met as required during the assumed period. This is achievable by coordinating the repair and maintenance schedules of generating units and shutdowns of meshed network elements, taking into account plant and network constraints and planned inter-system exchange restrictions.

To ensure continuity of energy supplies and balance the system even under adverse conditions, we have a number of tools at our disposal during periods of peak electricity demand:

- the capacity available in generation units that are not centrally dispatched units,
- additional capacity at power plants in overload conditions, i.e. with more than nominal capacity (as part of system services),
- contingency capacity supply from pumped storage power stations, which allow for short-term (2–4 hours) balancing of power demand (as part of system services),
- dispatching capacity exchange with neighbouring TSOs,
- *Demand Side Response* service provided on behalf of the TSO, i.e. DSR.

Measures to ensure reliable operation of the transmission system, including reliability metrics

[GRI 103-2] **[GRI 103-3]** PSE purchases system services to ensure secure and economic operation of the power system and, in particular, the achievement of the required reliability and quality parameters.

System Services:

- Control System Services (RUS):
  - participation in primary control,
  - participation in secondary control,
  - under- or overload operation,
  - participation in automatic voltage and reactive power control.
- Start-up service for Generating Units (start-up service).
- Control-related system services representing pumped storage generating units:
  - participation in automatic voltage and reactive power control (ARNE),
  - compensation operation.
- Control system services as part of the contingency reserve:
  - Contingency reduction of power consumption by consumers based on a bidding process (IRP).
- Participation in the automatic voltage and reactive power control for generating units not actively participating in the balancing market.
- Availability service for non-Centrally-Dispatched Generating Units (GWS service).
- National power system restoration service.

Contracts for services ordered by PSE in 2021			
Type and name	Service Provider	Description	Number of contracts or agreements for services in 2021.

Control-related system services and generating unit start-up service	Provided by the units at the disposal of TSOs	TSOs enter into agreements for the provision of control-related system and start-up services with all producers owning Centrally Dispatched Generating Units.	11 agreements for the provision of control-related system services, including the provision of the start-up service.
Control-related system services for participation in the automatic voltage and reactive power control (ARNE)	Provided by generating units	TSOs conclude contracts for the above services with producers owning generating units actively participating in the balancing market (BM) and those not actively participating in the same. These services are procured to ensure the ongoing operational security of the National Power System (NPS) and the restoration of voltage in the NPS.	6 ARNE service contracts (including 2 contracts for ARNE services and compensation operation).
Control-related system services concerning the contingency reduction of power consumption by consumers (IRP service)	Activated on a TSO's order	They are used for contingency balancing of power in the entire NPS or, due to network operating conditions, in selected areas of the same, in order to ensure operational security of the NPS.	6 IRP service contracts.
nJWCD generating unit availability services		They are one of the TSO's tools necessary to ensure secure operation of the NPS and the generation of active and reactive power in the individual "network points" or "network areas".	11 generating unit availability service contracts.
National Power System (NPS) restoration services		They consist in ensuring readiness to start up a power plant without external power supply and permanent operation in the island mode as well as readiness to carry out TSO's instructions regarding starting up further power plants and increasing the size of the isolated system. They are purchased by the TSO in case of a large system failure resulting in a blackout in the entire NPS or a significant part of thereof.	Contracts with 4 producers.

On 5 April, 2021, the need to ensure that the NPS could be balanced necessitated the use of a countermeasure in the form of a non-market reduction in the generation of wind sources, amounting to approximately 1,000 MW, between 10:00 a.m. and 2:00 p.m. The need to reduce generation from wind sources was triggered by a large surplus of electricity supply over demand for electricity, due to the accumulation of high generation from wind and PV sources with a low electricity demand on that day.

The reduction was applied as a last resort, after other remedies available to the TSO had been exhausted. The non-market generation reduction was performed at the recommended level. It made it possible to balance the NPS and, in particular, to achieve the necessary controllability of the negative power reserve.

The formal basis for the TSO's non-market generation reduction were the provisions of Regulation (EU) 2019/943 of the European Parliament and of the Council, Commission Regulation (EU) 2017/1485, as well as the Energy Law and the Transmission Grid Code.

[GRI 103-3] System operation reliability indices (ENS, AIT)

The indices describing the continuity of power supply and the duration of power interruptions (ENS and AIT) were calculated for a group of delivery points, which include end users and electricity DSOs with one delivery point from the transmission grid. Shutting down the delivery point of these customers results in an interruption of energy supplies from the transmission grid.

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

ENS and AIT indices for emergency outages*	UoM	2021	2020	2019	2018	2017	2016
ENS	**MWh**	**0.00**	**0.00**	**439.34**	**0.00**	**125.22**	**0.00**
AIT	**minutes**	**0.00**	**0.00**	**81.47**	**0.00**	**20.72**	**0.00**

** The ENS and AIT index values shown in the table were calculated for unscheduled (emergency) interruptions and outages and do not include scheduled interruptions and outages.*

System operation reliability indices
ENS - the index of energy not supplied by the power transmission system. It is expressed in MWh per year and is the sum of the products of the capacity not supplied due to the interruption and its duration. This index includes short, long and very long interruptions and outages with and without consideration of catastrophic outages.
AIT - index of the average interruption time in the power transmission system. Expressed in minutes per year, it is the product of 60 and the index of energy not served (ENS) by the power transmission system divided by the average capacity supplied by the power transmission system expressed in MW.

In 2020-2021 and 2018, there were no events resulting in emergency power interruptions and outages to consumers at delivery points from the transmission grid identified as above. The indicators calculated for 2017 and 2019 reflect emergency interruptions and outages, the reasons for which are described below.

There was one emergency interruption resulting in no power to the consumer in 2019. The interruption lasted approximately 36 hours and was caused by a spontaneous shutdown of the 110 kV line from which the consumer drawing power from the transmission grid was supplied. The immediate cause of the interruption was a ground fault due to a tree coming close along the line section.

In 2017, there was one emergency interruption that resulted in an approximately 3-hour failure in electricity delivery to one consumer supplied from the transmission grid. The interruption was caused by an emergency manual shutdown of the power supply lines. The cause of the power cut to the consumer was a third party's climbing a 220 kV line tower. The shutdown of other devices, lines and transformers associated with the site was dictated by safety concerns.

Low levels of the ENS and AIT indices demonstrate a high level of operational reliability of the transmission grid managed by PSE, as well as to the reliability of power supplies to customers connected to that grid.

GRI INDEX

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

ENS, AIT indices for all outages (planned and emergency)*	UoM	2021	2020	2019	2018	2017	2016
ENS	**MWh**	**1,216.49**	**124.35**	**601.26**	**264.24**	**671.64**	**425.10**
AIT	**minutes**	**162.07**	**22.18**	**111.50**	**45.77**	**111.15**	**84.44**

** The values of ENS and AIT indices shown in the table have been calculated for emergency and scheduled outages resulting from the necessary repair and maintenance works of transmission grid elements that supply consumers.*

In 2021, there was an increase in the values of the ENS and AIT indicators calculated for all shutdowns, when compared to the previous years. It was mainly due to a scheduled outage, a much longer one than in previous years, for one of the consumers supplied from the transmission grid, due to an extensive scope of work carried out by the TSO on the consumer's power supply assets (extension and modernisation of an autotransformer bay in the 110 kV switchgear). The date of the outage was agreed in advance with the consumer.

The low values of ENS and AIT indices have a positive impact on the confidence of consumers connected to the transmission grid. The reduction of the number and duration of planned outages in the supply of electricity to consumers results, among other things, from the implementation of a system to optimise the schedule of repair and maintenance works of transmission grid elements supplying the consumers. The shutdowns in the case of scheduled outages are carried out by PSE at times agreed with the consumers – usually during periods of no energy consumption as declared by the consumers. As a result, during outages, customers adjust their demand or use other methods of supplying electricity (e.g., from the DSO network).

WCD – electricity supply continuity index

Electricity supply continuity index

To determine the continuity of electricity supplies, the so-called WCD index is calculated.

WCD

The index was calculated as the total amount of electricity supplied to transmission service consumers (DSOs and end users) divided by the sum of the amount of electricity not served and supplied to these consumers during the year.

Maintaining the supply continuity indices at a high level is the result of the TSO's operation and maintenance policy for transmission assets.

The amount of electricity not supplied to transmission service consumers during the year was determined taking into account both scheduled and unscheduled interruptions in energy supplies to consumers. The index used in the calculation of the total amount of electricity supplied from the transmission grid during the year is the volume of electricity taken from the transmission grid at all delivery points by end customers and DSOs connected to the transmission grid.

Electricity supply continuity index*							
WCD index	**UoM**	**2021**	**2020**	**2019**	**2018**	**2017**	**2016**
Electricity supply continuity index	**%**	**99.9988**	**99.9999**	**99.9994**	**99.9997**	**99.9993**	**99.9995**

** The supply continuity index defines the certainty of supplies to all consumers connected to the transmission grid.*

Maintaining the supply continuity indices at a high level is the result of the TSO's operation and maintenance policy for transmission assets.

[GRI 103-3] Actions taken by PSE to maintain continuity of electricity supplies to consumers:

- Preparation of coordination plans for network works in the long and short term horizons.
  The work schedules for both the maintenance and repair of network elements and generating units are prepared in such a way as to ensure that the required levels of surplus capacity available over the forecast demand are met over the assumed period and that the required criteria for safe operation of the network, including the reliability criterion (n-1), are met.
- Development and implementation of a uniform operating model allowing for cyclic, standardised and measurable assessment of the technical condition of equipment and its operating environment. Thanks to these actions, the most worn-out and oldest elements of network assets – potential sources of emergency and disturbance conditions – are preventively replaced.
- Implementation of the operating services development programme. It allows for continuous improvement of the competence of our own maintenance services, including those performing work in the field.
- Taking investment activities. Optimises the load on transmission lines and eliminates overload conditions on transmission system elements.
- Systematic standardisation of network equipment and creation of a storage base. It allows to make necessary replacements quickly and in a financially optimal way.
- Working closely and making arrangements with the transmission service consumers at every stage, from planning to implementation.

Index of electricity losses in the transmission process

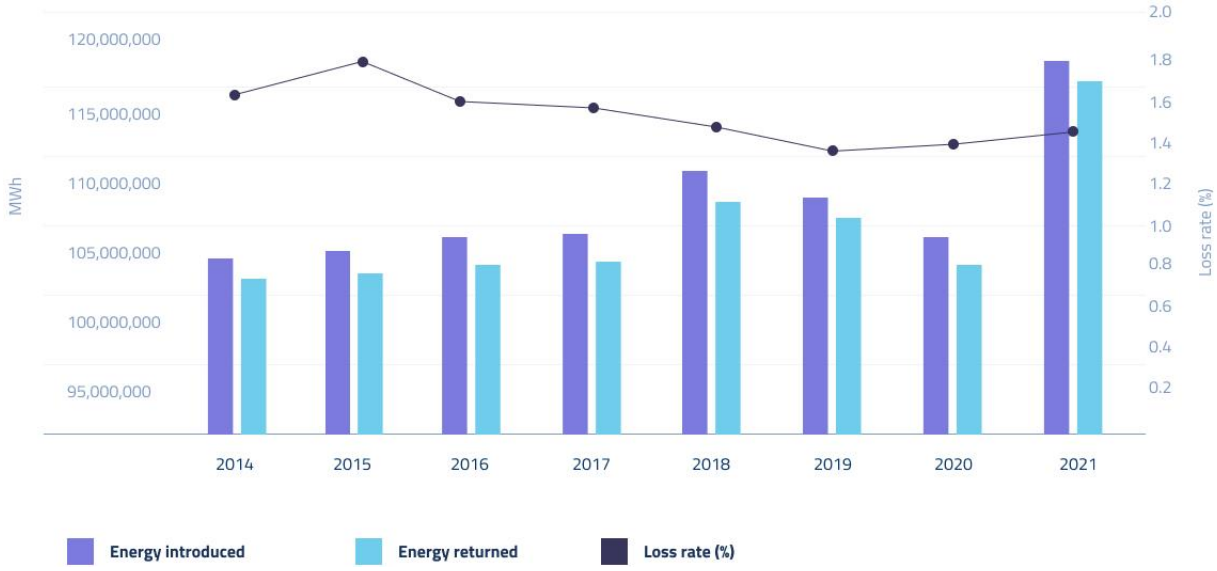
GRI EU12 Electricity losses in the transmission process, specifying causes of losses							
	UoM	**2021**	**2020**	**2019**	**2018**	**2017**	**2016**
Technical losses	MWh	**1,712,542**	**1,457,807**	**1,476,221**	**1,611,270**	**1,669,042**	**1,684,995**
Non-technical losses (e.g. illegal consumption of electricity)	MWh	0	0	0	0	0	0
Transmission losses as a percentage of total energy supplied to the system (official data G.10.7)*	%	**1.47**	**1.40**	**1.38**	**1.48**	**1.60**	**1.62**

* The value does not include electricity for substation auxiliaries.

Tab. Electricity losses in the electricity transmission process, specifying the causes of losses

The process of electricity transmission is inextricably linked to energy losses. They result from technical losses, which are caused by physical phenomena occurring in the electrical power network (voltage and current losses). The magnitude of the losses depends on a number of factors, the most important of which is the electricity flow in the network – the amount of generation and demand, and weather conditions.

TSO-owned networks have managed to maintain a low proportion of losses in recent years. When compared with previous years, this indicator has been significantly reduced in terms of the TSO network flow. This is best represented by a chart showing electricity input and output to the TSO network.



2021 was a record year for PSE in terms of energy flows in the network – the year-on-year electricity input increased by as much as 12%. Thanks to adequate projects in grid infrastructure, the record flows did not significantly affect the loss ratio. In 2021, the loss amounted to 1,712,542 MWh, representing 1.47 % of the total electricity input to the system.

Engineering security of critical infrastructure and a coherent protection system

GRI 103-1 We are an enterprise of strategic importance to the national security. Our company is:

- a critical infrastructure operator,
- the owner of facilities subject to mandatory protection,
- the owner of facilities of particular importance for the safety and defense of the state,
- an enterprise of particular economic and defense importance.

Certain tasks and responsibilities have been imposed on PSE in connection with these functions.

As an operator of critical infrastructure, PSE is required to ensure the protection of the company's facilities[15]. In accordance with *the National Programme for Critical Infrastructure Protection*, this obligation is understood very broadly and includes activities aimed at ensuring physical, technical, personal, ICT and legal security, as well as ensuring continuity of operations and the ability to restore critical infrastructure.

GRI 103-2, **GRI 103-3**

[15] *Such obligations are imposed on PSE under the Act of 26 April 2007 on crisis management, the Act of June 10, 2016 on anti-terrorist activities, the Act of March 18, 2010 on the special powers of the minister responsible for state assets and their exercise in certain capital companies or capital groups operating in the electricity, oil and gas fuel sectors, and the Act of August 22, 1997 on the protection of persons and property.*

The standard of our company's substation fencing reduces the risks arising from the analysis of the potential hazards that may occur in relation to PSE facilities. Principles have been adopted as the basis of the technical specification to ensure the security and protection of all PSE assets, i.e. employees, equipment and sensitive information. In 2021, PSE inspected the technical condition of substations on an ongoing basis according to the *Instructions of organisation and performance of maintenance works on EHV lines and substations*. In addition, the Technical Protection Department has completed the Technical Protection System (SOT) pre-commissioning tests at the individual EHV substations, after which it monitors the performance of the aforementioned systems on an ongoing basis. The technical condition of the Technical Protection Systems is directly linked to the use of appropriate forms and methods of applying or reinforcing existing physical protection at the individual facilities.

4.2.4. Development of the transmission system

[GRI 103-1] The basis for the sustainable development of the national economy is to provide the necessary amount of electricity to all consumers. We are committed to ensuring that the transmission system provides a reliable electricity supplies both now and in the future. It is our responsibility.

The Transmission Grid Development Plan (TGDP) defines transmission grid development projects, the implementation of which is expected to ensure that the national demand for capacity and electricity is met in the long term. The main factors influencing the directions of the transmission grid development include: the increase in electricity demand, the development of generation sources, and the need to increase the usage of cross-border connections.

The draft TGDP for 2023–2032 brings the first major technological revolution in line with patterns from highly developed power systems with a large share of RES in the generation mix. It is the construction of an HVDC line connecting the north and south of Poland. The aim of the project is to be able to send electricity from the north of the country, generated by onshore and offshore wind sources, to the south of Poland, to the industry located there. An alternative to this project would be an extension of the 400 kV network line, with significant and costly constraints.

The draft TGDP for 2023–2032 is the result of several years of experience in applying innovative technical and economic analyses to the transmission grid project planning. The methods and computational tools used in the development of the previous edition of the TGDP were used to create it. The outline of the set of grid projects was preceded by a fundamental scenario analysis of the development of the environment and the interior of the power system. It was all with the aim of selecting projects that would contribute to the security of power supply to consumers under all conditions.

The projects presented in the draft TGDP are intended to support the following:

- the commitments of Poland to achieve the national target for the share of energy from RES in final energy consumption,
- the government's plan to build offshore wind farms in the Baltic Sea,
- the government's plan to build nuclear capacity,
- the connection of new generating units in accordance with the results of the 2023–2026 capacity market auction,
- improvement of power supply conditions, including minimisation of network congestion in the entire system – particularly in the context of the planned construction of renewable (wind) sources in northern Poland, both off and on the shore.

[GRI 103-2] In preparing the TGDP for 2023–2032, legal considerations resulting from the following were taken into consideration:

- concept of spatial development of the country,
- voivodeship spatial development plans,
- Poland's energy policy,
- ENTSO-E TYNDP 10-year development plan,
- performance of connection agreements and specified conditions for connection to the transmission grid,
- performance of other obligations, including arrangements with the DSO,
- EU regulations.

Planned capital expenditures, including the number of investments, construction and modernisation of EHV lines

In the Development Plan for Meeting the Current and Future Electricity Demand for 2023-2032 in the perspective of 2036, we included **260 investment tasks for the expansion and modernisation of the transmission grid**. The estimated value of the planned expenditure for all investments for this period is approximately **PLN 35.9 billion**.

[GRI 103-3] Systemic effects to be achieved as a result of the implementation of the investments by 2032 and by 2036

Type of effect	2023-2032	After 2032	2023-2036
Increase in HVDC line circuit length [km], of which:	**775**	**0**	**775**
• Poland-Lithuania HVDC cable connection	175	0	175
• north-south HVDC overhead connection	600	0	600
HVDC converters [pcs]	**3**	**0**	**3**
Increase in 400 kV line circuit length [km], of which:	**4,339**	**886**	**5,225**
• new lines	4,875	886	5,761
• lines being decommissioned	536	0	536
Increase in 220 kV line circuit length [km], of which:	**-259**	**0**	**-259**
• new lines	233	0	233
• lines being decommissioned	492	0	492
Length of the modernised 400 kV line circuits [km]	1,784	0	1,784
Length of the modernised 220 kV line circuits [km]	1,334	150	1,484
Increase in 400/220 kV transformation capacity [MVA], of which:	**4,500**	**1,000**	**5,500**
• new transformers	4,500	1,000	5,500
• transformers being decommissioned	0	0	0
Increase in 400/110 kV transformation capacity [MVA], of which:	**20,220**	**1 770**	**21,990**
• new transformers	23,220	1 770	24,990
• transformers being decommissioned	3,000	0	3,000

Type of effect	2023-2032	After 2032	2023-2036
Increase in 220/110 kV transformation capacity [MVA], of which:	**3,758**	**-205**	**3,580**
• new transformers	11,155	275	11,430
• transformers being decommissioned	7,370	480	7,850
Increase in 110/MV kV transformation capacity [MVA]:	**80**	**0**	**80**
Increase in reactive power compensation capacity [MVar], of which:	**2,100**	**0**	**2,100**
• new reactors [MVar]	1,050	0	1,050
• new synchronous compensators [MVar]	1,050	0	1,050

4.2.5. Implementation of infrastructure investments

[GRI 103-2] Network investment portfolio

In 2021, PSE periodically updated the Investment Portfolio, which is one of the main tools for managing investment projects.

PSE's Investment Portfolio is a collection of network infrastructure investment projects grouped into investment programmes. All investment projects included in the Network Investment Portfolio are grouped into investment programmes according to the strategic importance (strategic programmes), the location and interdependence of the projects (area programmes), and the nature of the work supporting the implementation of the remaining investment projects (e.g. investor deliveries, formal and legal issues). In special cases, affiliation of projects other than those related to network infrastructure is allowed.

The Network Investment Portfolio includes 5 strategic programmes and 5 area programmes (as at 25 January 2022):

Programme 1.

The strategic programme "Power output system from Kozienice Power Plant and improvement of power supply conditions in north-eastern Poland": 13 investment projects.

Programme 2. The strategic programme "Power output system from Turów Power Plant and improvement of power supply conditions in south-western Poland": 16 investment projects.

Programme 3. The strategic programme "Power output system from Dolna Odra Power Plant and RES and improvement of power supply conditions in north-western Poland": 17 investment projects.

Programme 4. The strategic programme "Power output system from RES and improvement of power supply conditions in the northern Poland - eastern part": 24 investment projects.

Programme 5. The strategic programme "Power output system from Bełchatów Power Plant and improvement of power supply conditions in central Poland": 28 investment projects.

Programme 7. "South" Area Programme: 27 investment projects.

Programme 8. Area Programme "Formal Completion of Investments." 14 investment projects.

Programme 9. Strategic Programme "Building submarine connections and energy storage facilities." 2 investment projects.

Programme 10. "Investor's Deliveries" Area Programme: 18 investment projects.

Programme 11. The strategic programme "Power output system from RES and improvement of power supply conditions in the northern Poland - western part": 10 investment projects.

Key figures

- **169 projects under strategic and area programmes**, of which **contracts for 58 projects have already been signed with contractors.**
- In all contracted projects, PSE worked with a total of **25 construction, supply and service contractors**.

Impact on employment in various sectors of the economy and on Poland's economic growth

[GRI 103-2] Of the 169 investment projects implemented by PSE, 72 investments implemented in December 2021 were given priority 1.

Examples of priority investments implemented under investment programmes

Priority 1 investment projects are implemented under the following investment programmes:

- **Strategic Programme 1 – "Power output system from Kozienice Power Plant and improvement of power supply conditions in north-eastern Poland"**
  The objective of implementing the investment projects included in Programme 1 is to ensure reliable power output from Kozienice Power Plant following its extension with a new 1,000 MW power unit and to improve the reliability of power supply in the northern and north-eastern parts of the Polish Power System and Warsaw agglomeration.

- **Strategic Programme 2 – "Power output system from Turów Power Plant and improvement of power supply conditions in south-western Poland"**
  The objective of implementing the investment projects included in Programme 2 is to ensure reliable power output from Turów Power Plant following its extension with a new 480 MW power unit and to improve the reliability of power supply in the south-western part of the Polish Power System, specifically for the largest recipient in this area – Kombinat Górniczo-Hutniczy Miedzi (KGHM). The investment projects included in Programme 2 also have a significant impact on the possibility of energy transmission and power supply in the northern areas of the country and on the possibilities of cross-border exchange in the synchronous section (connections between Poland and Germany, the Czech Republic and Slovakia), especially in the import direction.

- **Strategic Programme 3 – "Power output system from Dolna Odra Power Plant and RES and improvement of power supply conditions in north-western Poland"**
  The objective of implementing the investment projects included in Programme 3 is to ensure reliable power output from Dolna Odra Power Plant as well as from the wind farms and photovoltaic sources existing or planned in the northern part of the country and to improve the reliability of power supply in the north-western part of the Polish Power System. The investment projects included in Programme 3 also have a significant impact on the possibility of cross-border

exchange in the synchronous section (connections between Poland and Germany, the Czech Republic and Slovakia), especially in the import direction.

- **Strategic Programme 4 – "Power output system from RES and improvement of power supply conditions in northern Poland – eastern part"**
  The objective of implementing the investment projects included in Programme 4 is to ensure reliable power output from wind farms located in the northern part of the country, to improve the reliability of power supply in the northern part of the Polish Power System and to ensure the possibility of cross-border exchange with the Swedish and, in the future, Lithuanian power systems.

- **Strategic Programme 5 – "Power output system from Bełchatów Power Plant and improvement of power supply conditions in central, eastern and north-western Poland"**
  The objective of implementing the investment projects included in Programme 5 is to ensure reliable power output from Bełchatów Power Plant and to improve the reliability of power supply in the central, eastern and north-western parts of the Polish Power System, including Łódź and Szczecin agglomerations. The investment projects included in Programme 5 also have a significant impact on improving the reliability of telecommunications and communications infrastructure. Some of these investment projects are local in nature and are primarily related to the expansion and modernisation of the existing network assets.

- **Area Programme 7 – "South"**
  The purpose of implementing the investment projects included in Programme 7 is to ensure the reliability of the transmission grid operation in the southern part of Poland located below the conventional Warsaw–Poznań line. These are both investments of a local nature, which are related primarily to the expansion and modernisation of the existing network assets, and larger investments related to the construction of new 400 kV lines in the north-south direction.

- **Strategic Programme 9 – "Building submarine connections and energy storage facilities"**
  The objective of implementing the investment projects included in Programme 9 is to ensure the reliability of the operation of the transmission grid and to enable the synchronisation of Baltic countries with continental Europe.

- **Area Programme 10 – "Investor deliveries"**
  The objective of implementing the projects included in the Programme 10 is to ensure investor's deliveries of autotransformers and reactors for implemented network investments as well as deliveries of selected equipment and instrumentation for investment projects and operating tasks. These projects – with regard to the supply of circuit breakers, disconnecting switches, busbar protection, feeder protection, transformers, phase conductors, cable lines and systems, low voltage surge arrester, MTS and SSiN (Control and Monitoring System) circuit-breaker modules – are intended to optimize the Company's purchasing processes and reduce investment and operating expenses by achieving the economies of scale.

- **Strategic Programme 11 – "Power output system from RES and improvement of power supply conditions in northern Poland – western part"**

  The objective of implementing the projects included in Programme 11 is to ensure reliable power output from wind farms and photovoltaic sources existing or planned in the northern part of the country on the western side and to improve the reliability of power supply to areas in the north-western part of the NPS.

Key figures:

PLN 969.7 million – capital expenditures incurred in 2021.

4.2.6. Maintenance of the transmission network

The transmission grid owned by PSE consists of 15,693 km of extra-high voltage lines and 110 power substations. We maintain the technical condition and operating system of the network to meet applicable requirements. We are fully aware that the level of availability of our network facilities largely determines the operational safety of the entire system.

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

GRI EU4 Length and number of overhead power lines					
2021			**2020**		
Overhead lines (above ground)					
Voltage	Length (in km) given on a per-circuit basis	Number	Voltage	Length (in km) given on a per-circuit basis	Number
750 kV	114 km	1	750 kV	114 km	1
400 kV	8,227 km	125	400 kV	7,824 km	111
220 kV	7,352 km	169	220 kV	7,380 km	169
110 kV	75 km	33	110 kV	75 km	33

Tab. Overhead lines (above ground)

GRI EU4 Length and number of cable power lines					
2021			**2020**		
Cable lines					
Voltage	Length (in km) given on a per-circuit basis	Number	Voltage	Length (in km) given on a per-circuit basis	Number
450 kV DC	450 kV DC Poland-Sweden submarine connection with a total length of 254 km (of which 127 km belong to PSE)	1	450 kV DC	450 kV DC Poland-Sweden submarine connection with a total length of 254 km (of which 127 km belong to PSE)	1

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

Transmission ratio in kV/kV		In-house indicator: Number and power rating of transformers			
		2021		2020	
		Number (pcs.)	Power rating (MVA)	Number (pcs.)	Power rating (MVA)
750/400	installed	**2**	**2,502**	**2**	**2,502**
	reserve	**-**	**-**	**-**	**-**
400/220	installed	**32**	**17,790**	**32**	**17,790**
	reserve	**-**	**-**	**-**	**-**
400/110	installed	**60**	**19 578**	**58**	**18 918**
	reserve	**3**	**736**	**3**	**736**
220/110	installed	**123**	**201,390**	**123**	**201,390**
	reserve	**-**	**-**	**-**	**-**
In total	installed	**217**	**241,260**	**215**	**240,600**
	reserve	**3**	**736**	**3**	**736**

Tab. Number and power rating of transformers

The condition of the transmission network is confirmed by the high combined availability index for transmission facilities (DYSU), which reached 99.87 percent in 2021 with reference value of 97.5.

Availability index for transmission facilities – DYSU (in percent)	January-December 2021	January-December 2020	January - December 2019	January-December 2018	January - December 2017	January - December 2016	Reference value (prepared internally)
	[%]	[%]	[%]	[%]	[%]	[%]	
1. Availability index for L1 category transmission lines [DL1]	99.77	99.51	99.93	99.97	99.77	99.64	
2. Availability index for L2 category transmission lines [DL2]	99.88	99.73	99.89	99.92	99.58	99.63	
3. Availability index for generator output lines [DLB]	99.97	100.00	100.00	100.00	99.99	99.99	
4. Availability index for transformers in S11 category substations [DS11]	99.92	99.79	99.31	99.85	99.85	99.85	
5. Availability index for transformers in S22 category substations [DS22]	99.79	99.62	99.74	99.76	99.67	99.59	
DYSU	**99.87**	**99.73**	**99.77**	**99.90**	**99.77**	**99.74**	**≥ 97.5**

Tab. Availability index for transmission facilities - DYSU

Availability index for transmission facilities - DYSU - is calculated as the arithmetic mean of the values of the availability indices of 5 groups of transmission equipment including groups of lines and transformers installed at our substations.

The availability of each group of these facilities is calculated as the ratio of the actual operating hours of the transmission facilities (in hours) per year to the nominal number of hours per year.

The DYSU index is intended to monitor the readiness of transmission network elements to provide electricity transmission service and takes into account the availability of the 5 groups of transmission facilities listed below:

1. Category L1 lines – international, radial and 400 kV lines with a peak load of over 300 MW, and 220 kV lines with a peak load of over 170 MW.
2. Category L2 lines – other lines not mentioned in points 1 and 3.
3. LB power unit lines – power output lines from power plants (connecting power plants with large near-plant substations).
4. Transformers in category S11 substations – transformers in substations with interconnections to the systems of other countries, in near-plant substations and in substations coupling 400 kV and 220 kV grids.
5. Transformers in category S22 substations – transformers in other substations not mentioned in point 4.

Monitoring of the transmission network

[GRI 103-2] Conducting monitoring of the operation and technical condition of the transmission grid

Maintaining network assets requires the performance of ongoing monitoring of the operation and technical condition of various components in the transmission grid. The following operations monitoring services were set up for this task within the structures of the Operations Department: Monitoring Centre (CN) in Konstancin-Jeziorna and five Regional Monitoring Centres (RCN) at the head offices of branch divisions in Warsaw, Radom, Katowice, Poznań and Bydgoszcz. The monitoring services model has a hierarchical structure. The Regional Monitoring Centres functionally report to the Monitoring Centre and are responsible for a designated area of PSE's network assets.

The primary role of operation monitoring services is:

- ongoing monitoring of the operation and technical condition of components of network assets owned by PSE S.A. (24/7 on duty),
- provision of continuous control and preview of facilities, equipment and systems,
- ensuring the availability and safety of equipment operation,
- supervision of work in progress,
- execution of switching and control operations in accordance with the adopted operational division of competence between KDM/ODM dispatching services and CN/RCN operation monitoring services,
- coordination by the Regional Monitoring Centres of work orders at substations and lines by performing the coordinator function in accordance with the provisions of the Occupational Health and Safety Manual for power equipment and systems,
- planning and optimisation of maintenance and investment works carried out on PSE's network assets,
- cooperation with DSO units, generators and contractors.

The CN/RCN operations monitoring services play a key role in the event of disturbances or failures of components of the transmission grid assets, during which, based on e.g. signalling in SCADA systems or notifications from other entities, actions are initiated and disturbance elimination processes are activated. They continuously monitor the condition of the transmission grid facilities, defining temporary or quantitative limitations in their operation affecting operational conditions.

Actions taken by the CN/RCN service in an emergency situation include:

- analysing the causes, location, and magnitude of the disturbance,
- organising measures to secure the location of the incident,
- deciding how the disturbance will be resolved,
- having available resources of Operations Teams (ZES) and Specialist Engineers (I-SPEC) to organise the elimination of the disturbance,
- monitoring and coordinating work related to the elimination of the disturbance.

In the event of a widespread inter-area failure (between the areas of responsibility of the territorially competent RCNs), individual RCNs cooperate with each other. In this case, the Monitoring Centre coordinates all activities of PSE's operating services (from different areas) and subcontractors working on behalf of our organisation.

In order to maintain the continuity of operations, the CN/RCN operations monitoring services are prepared for a possible crisis situation forcing them to leave their primary workplace without abandoning the performance of their core tasks and, above all, for carrying out uninterrupted monitoring of the operation and technical condition of components of network assets. Full continuity of operation is maintained through back-up CN/RCN locations put into operation, which provide functional redundancy for the primary centres. Currently, due to the prevailing pandemic conditions in the country, the activities of the CN/RCN services are carried out in a dispersed manner, i.e. in both primary and back-up locations, in compliance with the sanitary and epidemiological requirements in force.

In the process of maintaining network assets, CN/RCN operations monitoring services are supported by Operations Teams (ZES) and Specialist Engineers (I-SPEC), who perform tasks directly on the equipment.

On the national level, 28 Operations Teams (ZES) were set up in the structures of our organisation for individual ZKOs, covering subordinated substations:

- **ZKO Warsaw – 6 Teams:** ZES Janów (3 substations), ZES Miłosna (4 substations), ZES Mory (4 substations), ZES Ostrołęka (5 substations), ZES Płock (3 substations), ZES Rogowiec (3 substations);
- **ZKO Radom – 5 Teams:** ZES Lublin (5 substations), ZES Kielce (3 substations), ZES Kozienice (2 substations), ZES Połaniec (4 substations), ZES Rzeszów (3 substations);
- **ZKO Katowice – 7 Teams:** ZES Bujaków (4 substations), ZES Byczyna (4 substations), ZES Dobrzeń (4 substations), ZES Joachimów (4 substations), ZES Łagisza (4 substations), ZES Skawina (5 substations), ZES Wielopole (4 substations);
- **ZKO Poznań – 6 Teams:** ZES Czarna (4 substations), ZES Krajnik (5 substations), ZES Mikułowa (2 substations), ZES Pątnów (3 substations), ZES Plewiska (6 substations), ZES Wrocław (6 substations);
- **ZKO Bydgoszcz – 4 Teams:** ZES Bydgoszcz (5 substations), ZES Gdańsk (5 substations), ZES Olsztyn (2 substations), ZES Slupsk (4 substations).

ZES field staff ensure safe performance of switching, diagnostic and maintenance operations on substation and line facilities. The high level of their competence and specialised skills is maintained through systematic and regular process training. Equipped with personal health and safety protective equipment and suitably adapted equipment (including operating vehicles), ZES staff carry out their tasks to the highest safety standards.

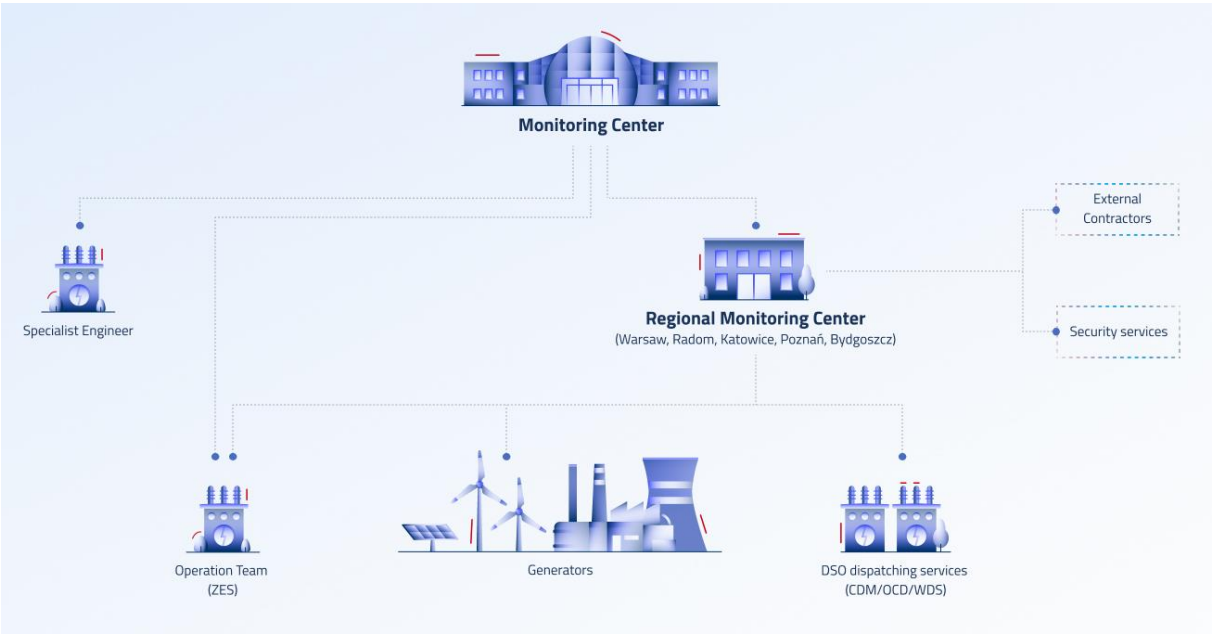


Fig. Organisation of PSE S.A.'s operations monitoring services.

As many as **85 of the 110 substations owned by PSE are controlled and monitored remotely.** This allows switching operations to be performed from KDM/ODM/CN/RCN master centres, improving the operation of the Polish Power System. Substations are gradually being brought up to the standard of remotely controlled and monitored facilities as part of the modernisation. In facilities not deemed to be remotely controlled and monitored, all operational activities are carried out by ZES. The above-

mentioned activities of the operations services allow the transmission grid to be maintained in good condition ensuring full transmission capacity.

Warehouse management as an environmentally friendly initiative in line with the concept of a circular economy

Warehouse management at PSE primarily prevents the generation of a large amount of waste. This is achieved through, among other things:

- Warehousing of dismantled operable equipment; where dismantling involves operable equipment, the equipment is transferred for warehousing in a warehouse reserve, to be reused for troubleshooting or ongoing repairs.
- Refurbishment of inoperable equipment. Once a failure or a fault has occurred, inoperable equipment is dismantled and, where possible, examined and sent for refurbishment. After refurbishment, the equipment is transferred to the warehouse reserve as operational and reusable.

In cases where equipment or materials have become obsolete and the company has decided not to carry out the refurbishment, tenders are organised for appropriate waste management. Insulating medium in equipment is often a hazardous waste according to the Waste Act. For this reason, PSE as the generator is responsible for the waste until its final disposal.

Waste management is carried out by transferring waste to companies which, within the scope of their activities, hold environmental decisions for final disposal. Our company requires proof from waste collectors not holding appropriate decisions on final disposal of hazardous waste that the treatment process has been carried out and that hazardous waste has been handed over for final disposal.

Some equipment includes recyclable materials. These include, for example, oil, steel, copper and porcelain. These materials are subject to processing, recovery and reuse.

Our activities are in line with the concept of a circular economy, which makes the warehouse management process an indirectly environmentally friendly activity.

Key figures:

- **7 major warehouse locations** of PSE: 2 in Radom and Bydgoszcz each and 1 in Warsaw, Katowice and Poznań each,
- **45 storage depots** all over the country.

Cases of threats to the operation of EHV transmission lines caused by agrotextiles

Among the many external and environmental factors posing a real risk to the operation of EHV transmission lines, various types of agrotextiles used in agriculture and industrial film have come to the fore in recent years. As a result of improper attachment to the ground and due to gusts of wind, agrotextiles float freely in the air and when they encounter an obstacle in the form of power line elements, they effectively wrap themselves around pole structures, insulators, live or lightning conductors. Similar risks are posed by inadequately secured industrial films used by businesses and individuals. Sections of flying agrotextiles or film are often so long that they catch on the live conductors of all phases, touching the ground. This poses an obvious danger to the operation of the transmission line, but also to bystanders, posing a hazard of electric shock caused by very high voltage electric current. The identification of such a threat always involves appropriate services securing the incident site and emergency shutdown of lines – often including lines that cannot be shut down from the point of view of the system operation – in order to eliminate the problem. Work on removing agrotextiles or film takes

at least several hours due to, among other things, the need to prepare the working area for safe execution of the work, the involvement of lifting equipment or complicated entanglement of the agrotextiles or film in the line components. Each unplanned line shutdown to carry out such work generates high costs and involvement of, among others, the Operations Teams, whose staff are diverted from carrying out their planned work.

In 2021, only 3 hazards from agrotextiles and film were reported (including 1 involving agrotextiles and 2 involving film), which is a significant decrease in the number of hazards compared to 2020, when 13 cases were reported. Our company's activities, such as publishing warnings in local newspapers and putting up hazard information posters, have had a significant impact on lowering the number of dangerous incidents.

No.	Route of EHV line	Span or stand number	Nearest town/village	Commune/City/ Town
1	L400 kV Morzyczyn–Dunowo	32-33	Małkocin	Stargard
2	L220 kV Konin–Sochaczew	306	Brzozówek	Iłów
3	L220 kV Olsztyn–Włocławek	167	Truszczyny	Rybno

Tab. Locations of recorded incidents of hazards caused by agrotextiles or film in 2021.

Key figures:

- **PLN 113,569.8 thousand** – expenses incurred **for the operation and maintenance tasks of network facilities** in 2021.

4.3. Active participation in the development of the electricity market

4.3.1. Capacity market

GRI 103-1 One of the company's primary responsibilities as a Transmission System Operator (TSO) is to ensure the operational security of the power system. This objective is supported by the implementation of a capacity mechanism, i.e. a capacity market, which should guarantee generation adequacy in the medium and long term. The capacity market should also provide available capacity for further development of renewable energy sources (RES) without adversely affecting the security of electricity supplies to end users.

The capacity market is an important part of the power industry transformation. Its operation can generate investment incentives to support the construction of new generating units, the replacement of decommissioned units and the modernisation of the existing units. It should also allow the implementation of an effective and competitive mechanism to coordinate the construction and decommissioning of generating units and the development of demand side response services, while ensuring that the costs to end users are minimised.

Capacity Market Rules

In 2021, PSE amended the Capacity Market Rules twice (Update Sheet No. RRM/Z/3/2021 and No. RRM/Z/4/2021), clarifying its provisions and bringing it in line with current legislation. The changes mainly included the inclusion of the required capacity reserve in the formula used to determine the

volume of the adjusted capacity obligation, the implementation of the provisions of the amended Power Market Act and the clarification of provisions and interpretation uncertainties related to capacity market processes.

Launch of further functionalities of the ICT system supporting operational processes in the capacity market

All capacity market processes are conducted in electronic form only, using the capacity market register. Despite achieving the capacity to handle all capacity market processes before the first year of supply falling in 2021, the register was successively expanded with new functionalities and adapted to the changing regulatory environment. PSE developed the register, among others, with regard to functionalities supporting the handling of certification processes, replacement of demand side response units for scheduled system stress events and test system stress events, verification of performance of capacity obligations, conducting settlements in the capacity market, and enabling the import and handling of metering and settlement data. Work was also conducted to integrate the register with other PSE systems and those of Zarządca Rozliczeń S.A. (the Settlement Body).

Handling of capacity market processes in 2021

GRI 103-2 Since the beginning of 2021, a number of processes have been carried out to enable the conclusion of further capacity agreements, as well as the implementation of the current agreements.

In 2021, the implementation of the capacity market processes began with the **general certification**, conducted between January 5 and March 12. Participation in the general certification is mandatory for all existing physical generating units with a gross generating capacity of not less than 2 MW, and compliance with this obligation is monitored by the President of ERO. Participation of scheduled physical generating units, physical demand side response units and scheduled demand side response units is optional, but is a prerequisite for subsequent participation in auction. A unit which has successfully completed the general certification process is entered into the register.

For the 2021 general certification, applicants submitted 1254 applications for entry into the register. A total of 1,223 units were successfully verified and entered into the register, including 1,020 physical generating units and 203 demand side response units. The summary of the 2021 general certification is presented in Tab. 3.

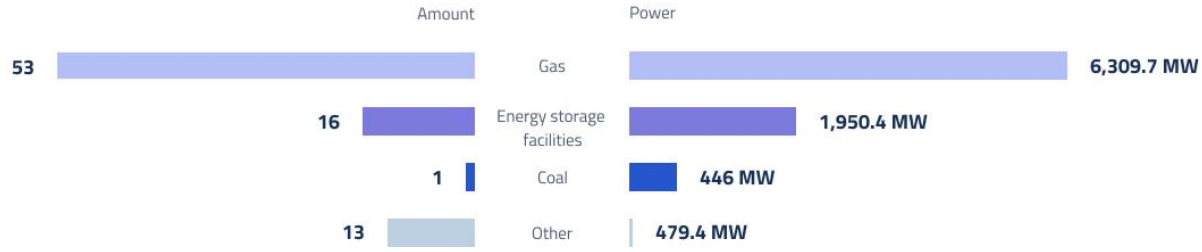
	Number of registered units	Total net available capacity of registered units [MW]
Existing physical generating units	937	38,826.073
Scheduled physical generating units	83	9,185.506
Physical demand side response units	54	416.077
Scheduled demand side response units	149	3,440.000
In total	**1,223**	**51,867.656**

Tab. 3. Number and net available capacity of units entered into the registry as a result of general certification in 2021.

The following charts show information on the number of physical generating units entered into the register in the 2021 general certification year, by primary energy source used.

Net available capacity of existing physical generating units entered into the register

Net available capacity of scheduled physical generating units entered into the register



Within 14 days of completion of the general certification, PSE submitted a detailed report summarising the general certification to the Minister responsible for energy and to the President of ERO. Furthermore, within 28 days of the completion of the general certification, PSE prepared a proposal for the parameters of the main auction for the delivery year 2026 and the parameters of supplementary auctions for individual quarters of the delivery year 2023, and also submitted the proposal to the President of ERO and the Minister responsible for energy.

The final values of the parameters were published in the Regulation of the Minister of Climate of 12 August 2021 on the parameters of the main auction for the delivery year 2026 and the parameters of supplementary auctions for the delivery year 2023.

On February 16, 2021, **certification for supplemental auctions** ended for individual quarters of the delivery year 2022 that began back in 2020 (November 24, 2020). As part of the certification for supplementary auctions for individual quarters of the delivery year 2022, power suppliers submitted 94 requests for certification, of which 52 were for the existing generating capacity market units and 42 for unconfirmed demand side response capacity market units. As a result of verifying the requests, PSE issued 83 certificates allowing capacity market units to participate in the capacity auction or the secondary market. Tab. 4 includes detailed information on the number of certificates issued.

	Number of capacity market units created			
Quarter of the delivery year 2022	**I**	**II**	**III**	**IV**
Existing generating units of the capacity market	30	11	10	30
Unconfirmed demand side response units of the capacity market	17	17	17	17
In total	**47**	**28**	**27**	**47**

Tab. 4. The number of capacity market units for which a certificate allowing them to participate in supplementary auctions for each quarter of the delivery year 2022 was issued

On 16 March 2021, PSE held **supplementary auctions** for the second time in the history of the capacity market. Four supplementary auctions for individual quarters of delivery year 2022 were held simultaneously.

Auctions in the capacity market are conducted according to the Dutch form, with a uniform closing price for all capacity market units that have won the auction. They consist of a set number of rounds during which participants can make an exit bid. Failure to submit a statement that is an exit bid is considered acceptance of the next round starting price. Capacity market units that win a given auction conclude capacity contracts.

Supplementary auctions for individual quarters of the delivery year 2022 resulted in a total of 125 capacity agreements. Tab. 5 presents a summary of supplementary auctions conducted.

Quarter of the year 2022	Auction closing price [PLN/kW/year]	Number of concluded capacity agreements	Volume of capacity obligations under the capacity agreements concluded [MW]	Auction closing round
I	186.70	40	1,020.674	5.
II	320.00	23	379.771	1.
III	320.00	22	360.921	1.
IV	240.02	40	887.804	3.

Tab. 5. Summary of supplementary auctions conducted in 2021.

Immediately after the announcement of the preliminary results of the supplementary auctions for individual quarters of the delivery year 2022, PSE launched the possibility of reporting in the register of **secondary trading transactions** concerning the delivery year 2022 (implementation of the provisions of Article 48(1)(1) of the Act). Each secondary trading transaction must be reported to the PSE for verification for compliance with the requirements of Article 48(2) of the Act. The minimum volume of the transferred capacity obligation covered by a single transaction is 0.001 MW and the minimum duration is one hour from 7:00 a.m. to 10:00 p.m. on business days. A transaction conducted in secondary trading must be reported no later than 24 hours before the start of the period to which it relates.

GRI 103-3 In mid-2021, the provisions of the Act were amended to allow secondary trading transactions between power market units of a single power supplier. A total of 5,671 secondary trading transactions were reported from 1 January to 31 December 2021. PSE objected to 20 transactions in connection with formal and legal deficiencies. As part of secondary trading transactions, 13,975,102.235 MWh of capacity obligations with a total value of PLN 876,840,572.66 were transferred for the period from 1 January to 31 December 2021.

In parallel to the certification processes, PSE continued the process of **replacing scheduled demand side response units**. This process is conducted in cooperation with the DSO and is intended to obtain information on physical demand side response units replacing scheduled demand side response unit and to enter these units into the register. Capacity suppliers may submit replacement requests no later than 3 months prior to the start of the delivery period for which the capacity agreement was concluded, or 3 months prior to the start of the last quarter of the delivery year specified in the certificate – this applies to units not covered by the capacity agreement. Ultimately, 17 scheduled demand side response units were replaced in 2021.

After the scheduled demand side response units replacement process was completed, PSE proceeded with demand side response testing for unconfirmed demand side response capacity market units. For unconfirmed demand side response units of the capacity market that do not receive a confirmed demand side response capacity test before the start of the delivery period specified in the capacity agreement, the capacity agreement is terminated. Demand side response tests are conducted at the request of the capacity supplier submitted through the registry. Capacity delivered at the level of at least 80% of the product of the net available capacity and the corrective availability factor is considered a positive test result. In 2021, 17 units received a positive result and changed their status to a confirmed demand side response unit.

On 26 August 2021, PSE conducted the second **preliminary auction** in the history of the power market via the Capacity Market Participant Portal. Foreign physical units located in countries where power system is directly connected to the NPS may participate in the preliminary auction. The Act allows units located in three areas to participate: in the synchronous profile zone (part of the transmission system of the Federal Republic of Germany, the transmission system of the Czech Republic and the transmission system of the Slovak Republic), in the Republic of Lithuania and in the Kingdom of Sweden. The preliminary auctions are carried out for each zone separately and the maximum volume of capacity obligations for a given zone is determined under the ordinance of the minister responsible for energy issued pursuant to Article 34 of the Act. In a preliminary auction, bids are accepted starting with those with the lowest price until the maximum volume for a given zone is reached. The bids selected in the preliminary auction are then replaced with capacity market units in the auction certification.

The preliminary auction in 2021 concerned the admission of foreign physical units located in the territory of the Kingdom of Sweden to participate in the main auction for the delivery year 2026. The auction ended with 39 bids accepted. Within 21 days from the end of the preliminary auction, PSE submitted a detailed report summarising the auction process to the Minister responsible for energy and the President of ERO.

The next capacity market process conducted in 2021 was **certification for the main auction** for the 2026 delivery year. Participation in the certification for the auction is not mandatory, but is necessary to set up the capacity market units and allow them to participate in the auction or in the secondary market for a given delivery period. As a result of successful verification of the applications, PSE issued certificates authorising the capacity market units to participate in the main auction and the secondary market. As part of the certification for the main auction for the 2026 delivery year, power suppliers submitted 221 certification applications, of which 157 were for generating capacity market units, including 39 foreign generating capacity market units, and 64 were for demand side response capacity market units. Following the certification, PSE submitted a detailed report summarising this certification to the minister competent for energy and the President of ERO for the auction.

As a result of the verification of the applications, PSE issued 219 certificates allowing the capacity market units to participate in the capacity auction or the secondary market. Tab. 6 includes detailed information on the number of certificates issued.

	Number of capacity market units created
Delivery year	**2026**
Existing generating units of the capacity market	134
Modernised generating capacity market units	10
New generating capacity market unit	11
Unconfirmed demand side response units of the capacity market	60

	Number of capacity market units created
Delivery year	**2026**
Confirmed demand side response capacity market units	4
In total	**219**

Tab. 6. The number of capacity market units created for which a certificate allowing them to participate in the auction for the 2026 delivery year was issued.

The **main auction** for the delivery year 2026 was also conducted in 2021. It was the sixth main auction on the Polish capacity market. It resulted in a total of 128 capacity agreements, including 17 capacity agreements for more than one year. For the first time, only capacity market units meeting the carbon dioxide emission limit of 550 g/kWh were admitted to the main auction for the 2026 delivery year. Tab. 7 presents a summary of the main auction conducted.

Delivery year	Auction closing price [PLN/kW/year]	Number of concluded capacity agreements	Volume of capacity obligations under the capacity agreements concluded [MW]	Auction closing round
2026	400.39	128	7,188.584	1.

Tab. 7. Summary of the main auction conducted in 2021.

The rules for conducting main auctions are similar to the rules used for supplementary auctions. Unlike the supplementary auctions, however, in the main auctions, capacity market units may - depending on the type of capacity market unit and the duration of the capacity obligation offered by the unit - enter into multi-year capacity agreements. Existing generating capacity market units may offer capacity obligations for only one delivery period. Modernised generating capacity market units and demand side response capacity market units declaring to have carried out investments and to have met unit investment expenditure levels stipulated in the Regulation may offer the obligation for up to 5 delivery periods, and new generating capacity market units declaring to have met unit investment expenditure levels stipulated in the Regulation – for up to 15 delivery periods. In addition, it is possible to extend the term of the capacity agreement by an additional 2 years for low-carbon generating capacity market units (the so-called green bonus).

Tab. 8 presents a breakdown of capacity agreements by the duration of capacity obligations.

Duration of the capacity obligation [in years]	Number of agreements concluded in the main auction for the delivery year 2026
1	111
7	9
17	8
In total	**128**

Tab. 8. Number of capacity agreements concluded in the main auction held in 2021.

Meeting the statutory time limit of 3 business days after the end of the capacity auction, PSE published preliminary results of the auction in the register and made them public. Subsequently, a detailed report summarising the auction process was submitted to the competent minister for energy and the President of ERO. The final results of the main auction were announced by the President of ERO in the Public

Information Bulletin on January 7, 2022. As a result of concluding capacity agreements, capacity obligations for the years **2025-2042** were contracted.

Work continued in 2021 as part of the process of monitoring the implementation of capacity agreements. According to the amendment to the Act, a power supplier which has entered into a capacity agreement for a new or modernised capacity market unit as a result of the main auction is required, no later than 24 months from the date of announcement of the final results of the main auction, to demonstrate that the unit owned has reached the so-called Financial Commitment Milestone (FCM). The FCM is achieved by demonstrating that investment expenditures of at least 10 per cent of the required investment expenditures have been incurred and investment agreements with a total value of at least 20 per cent of the required investment expenditures have been entered into (Article 52(1)(1) and (2) of the Act). As a result of the amendment to the Act, in order to comply with these requirements, power suppliers which entered into capacity agreements as a result of the main auction for the delivery year 2025 are required to provide statements through the register confirming their compliance with the FCM in 2022. Therefore, no FCM statements were submitted to the PSE for verification in 2021.

Additionally, according to the Act, a power supplier which has entered into a capacity agreement for more than one delivery year as a result of the main auction is required to demonstrate – no later than before the beginning of the first delivery period, and in the case of a new generating capacity market – no later than before the end of the third delivery year or before the end of the term of the capacity agreement if it has been entered into for less than three delivery years – that the capacity market unit owned has reached the so-called Substantial Commitment Milestone (SCM). The SCM is achieved by presenting documents confirming the realisation of the material scope of the investment and the required investment expenditures, as well as the ability of the unit to deliver power in an amount of not less than 95 per cent of the capacity obligation resulting from the capacity agreement concluded for this power market unit in the course of the main auction, with continuous operation of the unit, for a period of at least one hour (Article 52(2)(1) and (2) of the Act). In addition, an independent expert's report containing information in accordance with Article 52(2)(3) of the Act must be submitted and accompanied by information on the amount of public assistance provided and, in the case of new capacity market units, also a list of metering points. In 2021, PSE positively verified the statements on the SCMs for 2 capacity market units with capacity agreements concluded in the course of the main auction for the delivery year 2022 and for 4 capacity market units with capacity agreements concluded in the course of the main auction for the delivery year 2021 which did not meet the SCMs before the start of the first delivery year.

As part of the process of monitoring the implementation of power agreements, investment reports submitted within 10 working days after the end of 6 full months starting from the third calendar year after the main auction were reviewed. The reports allow us to monitor whether timely achievement of the SCMs is at risk. In July 2021, 37 investment reports were positively reviewed, and in January 2022 – 34 reports.

2021 was the first delivery year for the capacity contracted as a result of the capacity auction. In view of this, PSE started to handle subsequent power market processes, i.e. demonstration of capacity, test system stress events and capacity obligation payments. In 2021, there was no situation in which the amount of excess capacity available to the operator in the daily scheduling processes of the system operation required intervention by declaring an emergency period. For this reason, the performance of capacity obligations during the emergency period was not settled in 2021 and no bonus was calculated for the performance of a capacity obligation in excess of that required during the emergency period.

Pursuant to Article 67 of the Act, after the end of each quarter in the delivery year, the power supplier which was a party to the capacity agreement demonstrates to the operator its capacity to fulfil its capacity obligation in relation to each of the capacity market units to which the agreement relates. The demonstration of the ability to fulfil the capacity obligation consists in indicating to the operator the day

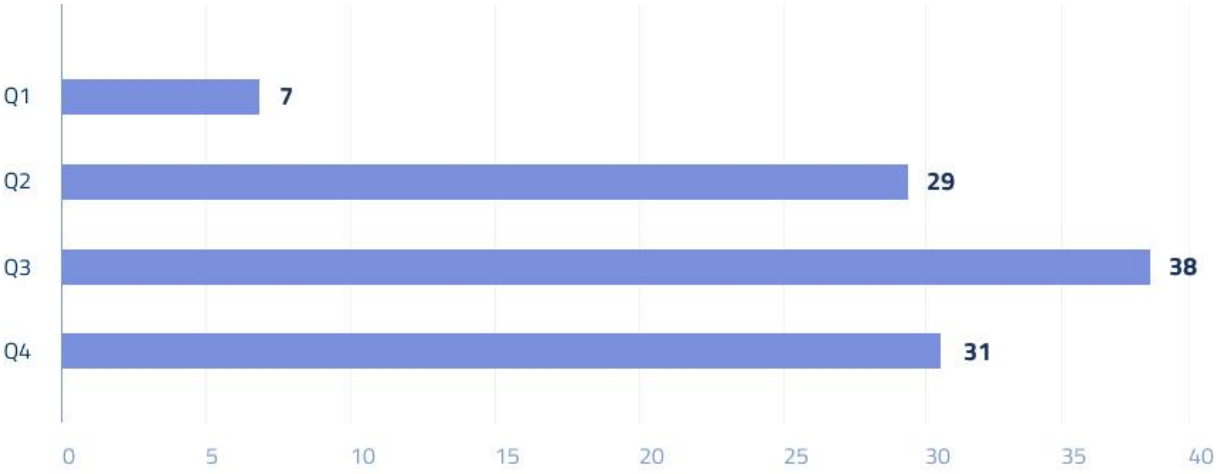
and time when the capacity market unit delivered power to the system in the required volume (the so-called demonstration). Tab. 7 presents the number of capacity market units (CMUs) subject to the demonstration obligation in 2021 and their performance on a quarterly basis.

	Quarter I	Quarter II	Quarter III	Quarter IV
Number of CMUs subject to the demonstration obligation	212	202	204	210
Positive outcome of the demonstration	211	201	203	210
Negative outcome of the demonstration	1	1	1	0

Tab. 7. Demonstration results in each quarter of 2021.

Due to negative results of the demonstration, power suppliers returned remuneration totalling £6,646,577.54 net.

In addition to the demonstration, the second process related to the implementation of the capacity obligation is, according to Section 67(5) of the Act, the **test system stress event**. PSE may declare a test system stress event for one capacity market unit subject to the capacity obligation no more than once per quarter. The chart below shows the number of test system stress events announced in each quarter of 2021.



Out of a total of 105 test system stress events announced, 102 cases resulted in a positive outcome and three in a negative outcome. In view of the above, pursuant to Article 68(8), in the case of a negative result of a test system stress event, PSE charged power suppliers penalties for non-performance of the capacity obligation at a total net amount of PLN 91,835.15. In the event of a positive outcome of the test system stress event, PSE reimburses any reasonable costs associated with its execution at the request of the power supplier. Tab. 8 presents the amounts reimbursed by PSE to power suppliers following the approval of reasonable expense requests in each quarter of 2021.

Delivery year 2021	Total reimbursements [PLN]
Quarter I	753,434.06
Quarter II	775,928.91
Quarter III	1,307,425.38
Quarter IV	1,083,673.88
Total:	**3,920,462.23**

Tab. 8. Reimbursements of reasonable expenses in 2021.

GRI 103-3 2021 was the first year of settlements in the capacity market, including in particular the payment of remuneration for the performance of the capacity obligation and the calculation of penalties for non-performance of the capacity obligation and the SCMs. The table below presents the remuneration earned by power suppliers in 2021 on a monthly basis.

Settlement month	Net amount of remuneration [PLN]
January	401,537,415.57
February	422,979,921.57
March	486,381,633.10
April	430,228,960.09
May	414,120,977.40
June	435,427,609.91
July	454,279,886.60
August	456,866,282.23
September	456,921,515.15
October	447,019,031.44
November	425,622,566.37
December	496,041,922.89
Total[16]	**5,327,427,722.32**

Tab. 9. Amounts of power market remuneration in 2021.

At the same time, PSE charged penalties for delays in SCMs at a total net amount of PLN 19,437,217.21.

In early 2022, PSE began another **general certification**, which was conducted between 3 January and 11 March 2022. During the **certification** , applicants submitted 1412 applications for entry into the register. A total of 1,379 units were successfully verified and subsequently entered into the register, including 1,144 physical generating units and 235 demand side response units. A summary of the number and net generating capacity of units in the register is shown in Tab. .

	Number of registered units	Total net available capacity of registered units [MW]
Existing physical generating units	977	39,542.126
Scheduled physical generating units	167	9,040.559

[16] The remuneration data for the months of January, March, April and May are incomplete due to pending information on the volume of energy resulting from support granted under support schemes other than the capacity market. The figures presented are as at 30 April 2022.

Physical demand side response units	38	401.510
Scheduled demand side response units	197	4,770.000
In total	**1,379**	**53,754.195**

Tab. 10. Number and net available capacity of units entered into the registry as a result of general certification in 2022.

Within 14 days of completion of the general certification, PSE submitted a detailed report summarising the general certification in 2022 to the Minister responsible for energy and to the President of ERO. Additionally, within 28 days of the completion of the general certification, PSE prepared proposed parameters for the main auctions for the delivery year 2027 and parameters for supplementary auctions for each quarter of the delivery year 2024. The proposal of parameters was submitted to the President of ERO and the Minister responsible for energy.

At the same time, between November 23, 2021 and February 18, 2022 PSE conducted **certification for supplementary auctions** for individual quarters of the delivery year 2023. As in the certification for the main auction, participation in the certification was not mandatory, but was necessary in order to establish the capacity market units and allow them to participate in the supplementary auctions for each quarter of the delivery year 2023 or in the secondary market for that delivery year. As a result of successful verification of the applications, PSE issued certificates authorising the capacity market units to participate in the above mentioned processes. Following the certification, PSE submitted a detailed report summarising this process to the Minister responsible for energy and the President of ERO.

Supplementary auctions were conducted for the third time by PSE on 17 March 2022. Four supplementary auctions for each quarter of the delivery year 2023 were held simultaneously. The process resulted in a total of 159 capacity agreements. Tab. presents a summary of supplementary auctions conducted.

Quarter of the year 2022	Auction closing price [PLN/kW/year]	Number of concluded capacity agreements	Volume of capacity obligations under the capacity agreements concluded [MW]	Auction closing round
I	333.68	48	1,254.185	1.
II	190.00	32	488.506	6.
III	212.40	29	435.256	5.
IV	364.00	50	1,226.563	1.

Tab. 11. Summary of supplementary auctions conducted in 2022.

Meeting the statutory time limit of 3 business days after the end of the capacity auction, PSE published preliminary results of the auction in the register and made them public. Subsequently, a detailed report summarising the auction process was submitted to the competent minister for energy and the President of ERO. The final results of the supplementary auctions for the delivery quarters in 2023 were announced by the President of ERO in the Public Information Bulletin on April 8, 2022.

After the announcement of the preliminary results of the supplementary auctions for the individual quarters of the delivery year 2023, implementing the provisions of Article 48 (1) (1) of the Act, PSE launched the possibility of reporting in the register of secondary trading transactions concerning the delivery year 2023.

4.4. Integration of the Polish market with European markets

GRI 103-1 Integration of the Polish energy market with European markets (Market Coupling) takes place in several key areas:

a) Single Day-Ahead Coupling (SDAC);
b) Single Intraday Coupling (SIDC);
c) coupling of balancing markets;
d) Bidding Zone Review.

PSE's involvement in the areas mentioned includes implementation and development activities at the European, regional and local levels. Coordination of activities aimed in particular at ensuring that the required business capabilities in the area of Market Coupling are achieved in a timely manner is carried out within the framework of a dedicated business task set up in the company and carried out by subject-matter staff supported by an organisational and competence team set up for this purpose. This way, in addition to the ongoing tasks in the area of Market Coupling, competences are being built up in our organisation to enable smooth implementation of changes in the future.

In addition, PSE is involved in the Bidding Zone Review (BZR) process, which is important for the operation of combined markets. The main objective of the BZR is to identify the optimal configuration of market areas in Europe, i.e. one that fulfils the criteria set out in the CACM.

SDAC

GRI 103-2 **GRI 103-3** SDAC is a mechanism for uniform pooling of European-wide Day-Ahead Markets whereby complex orders are pooled in a simultaneous process, within available transmission capacity.

The central segment of the European electricity market model is to be a Day-Ahead Market based on the *Market Coupling* (MC) process, with a trading gate at 12:00 p.m. This is a mechanism whereby exchange prices for each market area in Europe are to be determined in a coordinated manner, in a common process, and with a single calculation point. Transmission capacity allocation is to be based on the price differential between market areas. It is therefore an *implicit* auction model, i.e. combining trading of transmission rights and electricity. Market participants do not book transmission capacities to execute their cross-border transactions, but only to buy/sell energy in the market to which they are geographically assigned. The allocation of transmission capacity by the MC mechanism takes place automatically when energy is traded, in a way that maximises the total market surplus. A graphic illustration of *Market Coupling* can be found below.

The implementation of the European Market Coupling takes place through regional projects, which are then combined into a pan-European project (SDAC). For PSE, the most important project implemented in June 2022 was the CORE FBMC project, consisting of Market Coupling based on implicit capacity allocation methodology according to the FBA (Flow-Based Allocation) in the area of Continental Europe. The FBA mechanism enables the Day-Ahead Markets to be coupled in a manner that is based on electricity distribution.

The Core Region (CCR Core) is the Capacity Calculation Region (CCR) covering the borders of the market areas between the following EU Member States: Austria, Belgium, Croatia, Czech Republic, France, Germany, Hungary, Luxembourg, Netherlands, Poland, Romania, Slovakia and Slovenia.

The operational launch of the DA Core FBMC took place on 8 June 2022.

Following the implementation of the FBA method, the next step in the development of the SDAC will be the implementation of 15-minute market products.

Price Coupling of Regions (PCR)

Price Coupling of Regions (PCR) is an initiative of European power exchanges to create a single market coupling solution for electricity pricing across Europe and the allocation of cross-border day-ahead transmission capacity. Such an integrated European electricity market is expected to provide increased liquidity and efficiency of trade and increased social welfare.

The power exchange initiative originally included day-ahead markets in: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The initiative itself was established in 2009 and the PCR parties signed a cooperation agreement in June 2012. It is open to other European power exchanges that want to join. In 2016, the Polish Power Exchange joined the PCR.

SIDC

GRI 103-2 **GRI 103-3** SIDC is a mechanism for uniform pooling of European-wide Day-Ahead Markets whereby complex orders are pooled in a simultaneous process, within available transmission capacity.

The Polish market area has been operationally integrated into the SIDC since 19 November 2019.

Activities currently underway are intended to ensure proper operational performance and proper development of the SIDC. These include European-wide initiatives. In parallel, local initiatives are implemented, with the primary goal of expanding SIDC's reach into additional market areas.

- **European initiatives**

  Our company is involved in European-wide initiatives through participation in steering committees and SIDC expert groups. Major SIDC development initiatives over the horizon of the next few years include:

  i. introduction of an Intraday Auctions (IDA) mode, whereby prices will be set for individual market areas as the basis for determining the congestion rent for each border,
  ii. implementation of 15-minute market products,
  iii. implementation of a solution to automatically take into account transmission losses on HVDC connections,
  iv. implementation of the FBA method as the target solution for the SIDC.

  The implementation of the FBA in the SIDC will be preceded by several phases of Intraday Capacity Calculation (IDCC) implementation, whereby NTC capacity for each border will be extracted from the Flow-Based domain designated for the Intraday market.

- **Local initiatives**

  Italy was included in the SIDC mechanism in September 2021. In Q4 2022, as part of the so-called fourth wave of implementation, the market areas of Slovakia and Greece are planned to join the SIDC.

  Joining the Slovakian market area to SIDC will mean that the PL-SK border will be added to the four Polish borders (CZ-PL, DE-PL, LT-PL, PL-SE) currently covered by the SIDC mechanism, thus ending the temporary solution for the Intra-Day Market based on the *explicit* auction mechanism.

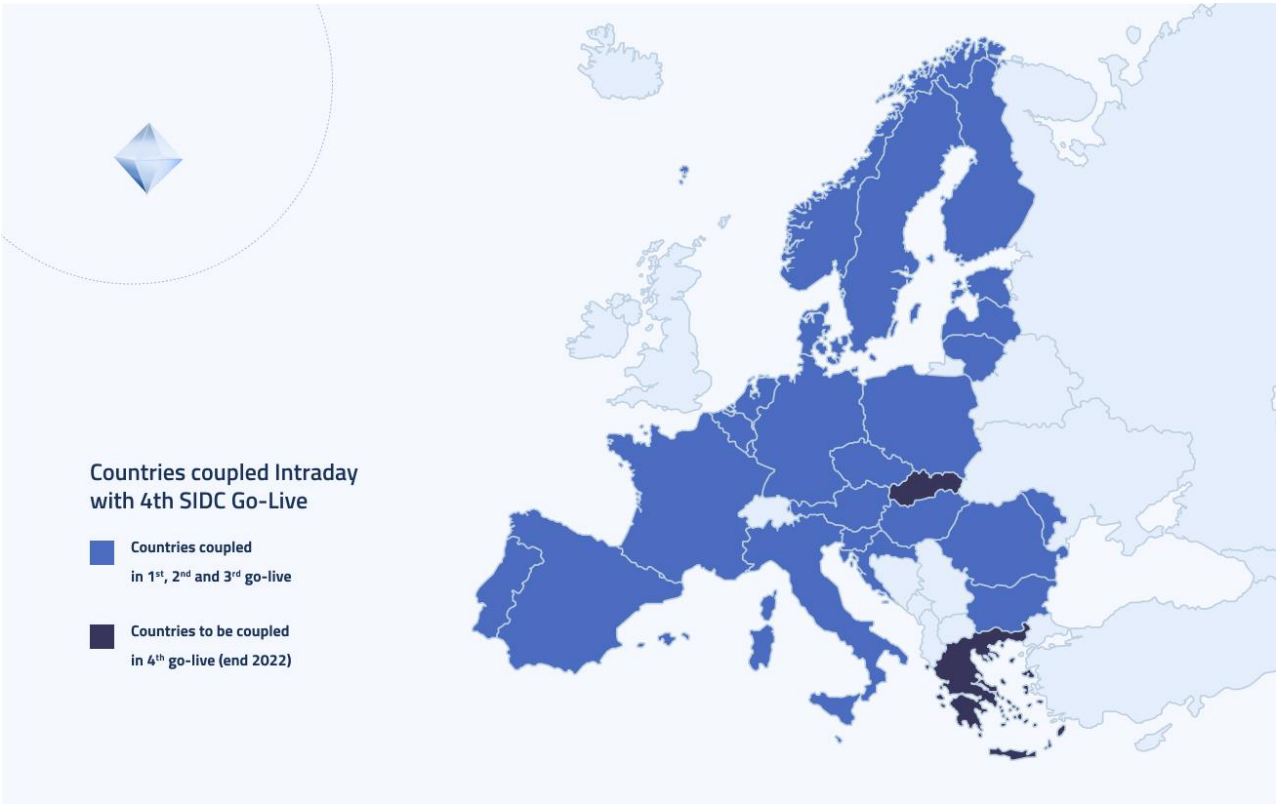


Fig. Evolution of coupling individual market areas to the SIDC mechanism.

Balancing markets

In addition to the integration of the Day-Ahead and Intraday Market segments, PSE is also actively working on the integration of balancing markets in Europe, as required by Commission Regulation (EU) 2017/2195 of 23 November 2017 establishing a guideline on electricity balancing (hereinafter the EBGL). **GRI 103-2** **GRI 103-3** The EBGL regulation provides for the 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 January 15, 2020.

2. **European platform for exchange of balancing energy from frequency restoration reserves with non-automatic activation**
   - Required activation time: 15 minutes.
   - Implemented as part of the MARI project, scheduled launch in July 2022.

3. **European platform for exchange of balancing energy from frequency restoration reserves with automatic activation**
   - Activation via automatic controller in up to 5 minutes.
   - Implemented as part of the PICASSO project, with launch scheduled in June 2022.

4. **European platform for the imbalance compensation process**
   - Based on avoiding activation of balancing energy from automatic reserves in opposite directions by neighboring TSOs.

- Implemented as part of the IGCC project (operating in Germany and neighbouring countries).
- The European launch of the IGCC process took place in June 2021.

Our organisation actively participates in all implementation projects of European balancing platforms. As part of our work at ENTSO-E, we participate in the preparation of detailed methodologies required under the EBGL Regulation. Since February 2020, our organisation has been operationally active in the IGCC project. Joining the TERRE platform is planned for 2023, and the MARI and PICASSO platforms for July 2024.

Bidding Zone Review

PSE is actively participating in the European Bidding Zone Review process, launched under Article 14 of EP and Council Regulation (EU) 2019/943. A market area review is the TSO's task that consists in simulating, analysing and comparing the performance of the energy market for the current and alternative market area configurations. The task aims to identify opportunities to improve the operation of these areas by creating new market areas that are more economically efficient and cross-zonal trade opportunities, while maintaining the security of energy supply. The new market areas should reflect energy supply and demand, enable efficient management of network congestion, and improve the overall efficiency of the market and its operational security.

According to the methodology adopted by ACER for the Bidding Zone Review process, ENTSO-E, in cooperation with the TSOs, determined Locational Marginal Prices (LMPs) for the development of the aforementioned alternative market area configurations by ACER. ACER is currently working on determining alternative market area configurations in Europe. Once these alternative market area configurations have been received from ACER, Transmission System Operators will have 12 months to complete the Bidding Zone Review.

The market area review concludes with a joint proposal by the involved TSOs to change or maintain the market area configuration. The proposal of the TSOs involved is subject to adoption by unanimous decision of the TSOs and is then be submitted to competent Member States or competent authorities designated by them.

Key achievements of international cooperation

Operational launch of Interim Market Coupling (SDAC)

The operational launch of the Interim Market Coupling project took place on 17 June 2021. The project connected the Day-Ahead Capacity Markets in Poland and 4MMC countries (Czech Republic, Slovakia, Hungary, Romania) with Europe's largest MRC market by introducing implicit capacity allocations on six borders (PL-DE, PL-CZ, PL-SK, CZ-DE, CZ-AT, HU-AT). The Interim MC project did not change the manner of determining cross-zonal capacity, which is still determined by the TSO using the NTC (Net Transfer Capacity) method, but changed its allocation method.

The implementation of the project resulted in the implementation of Single Day-Ahead Coupling almost across Europe. This implies the introduction of a single common auction on the power exchanges for market participants in all countries covered by the MRC and 4M MC areas as part of the Day-Ahead Market Coupling mechanism.

Thanks to the Interim MC project, Poland is fully integrated in the European mechanism of the Day-Ahead Market Coupling. The target solution for the Polish Day-Ahead Market will be to switch to the Flow-Based method of capacity determination, which is planned to be operational in June 2022.

Implementation of joint governance for SDAC and SIDC (SDAC/SIDC)

The SDAC/SIDC joint governance was implemented to ensure proper coordination and improve the efficiency of decision-making process regarding the implementation, development and operational

handling of the SDAC and SIDC. The first element of the SDAC/SIDC joint governance was the creation of a joint Steering Committee – the Market Coupling Steering Committee (MCSC) – which became operational in early 2022. As the next step, the implementation of Qualified Majority Voting (QMV) decision-making in the MCSC is planned. A forum has also been established for the exchange of knowledge and views between SDAC and SIDC stakeholders – the Market Coupling Consultive Group (MCCG). Entities that can participate in the MCCG are: Regulators (NRAs), ACER, EC, TSO, NEMO and market participants.

Determination of Locational Marginal Prices in Europe

ENTSO-E in cooperation with TSOs simulated the nodal market in Europe. The objective of the exercise was to determine Locational Marginal Prices (LMPs), which ACER will use to develop alternative market area configurations in Europe for the Bidding Zone Review process.

The nodal market in Europe was simulated for a representative eight weeks of 2025. This was the first LMP simulation to be so advanced and conducted on such a large scale. On 4 March 2022, its basic results were submitted to ACER, and a month later, supplementary simulations and a sensitivity analysis for changing the simulation assumptions were submitted to ACER.

Implementation of activities under the TSC/TSCNET initiative

We are actively working with European operators under the TSO *Security Cooperation* (TSC) initiative. TSC members include 14 operators from Central Europe. The goal of the initiative is to enhance the operational security of the interconnected power systems in the region, including the NPS, by intensifying regional inter-operator cooperation, which currently includes processes for identifying risks and applying appropriate inter-operator countermeasures.

We are a shareholder of TSCNET. We have a representative in the General Meeting and in the Supervisory Board of TSCNET, which currently consists of 5 members. Several PSE representatives are involved in the implementation of activities resulting from the tasks of the TSC decision-making and working structures.

Synchronisation of the Baltic states' systems

PSE is actively involved in the process of extending the synchronous system of Continental Europe (CE) with the systems of the Baltic states (BS). In October 2018, the Plenary Meeting of the European Network of Transmission System Operators Regional Group Continental Europe (ENTSO-E RGCE Plenary) agreed to the launch of a relevant extension procedure. A working group to coordinate the process, headed by a representative of PSE, was set up.

In May 2019, an agreement specifying the conditions for the future synchronous connection of the BS system to the CE system entered into force. The agreement contains the so-called set of requirements – a list of detailed technical conditions required to be implemented by BS TSOs to ensure secure operation of the systems after synchronisation. One of the main infrastructural elements included in the set is the Poland–Lithuania DC submarine link (Harmony Link). In 2021, a number of studies were launched to prepare the systems and BS TSOs for synchronisation. PSE is the leader of the TSO Consortium established to implement this task. The completion of all works is planned for the end of 2022.

In December 2019, PSE and LITGRID received €10 million in funding from the EU's *Connecting Europe Facility* (CEF *)* for activities carried out as part of the preparatory phase of this project.

In December 2020, PSE and the BS TSOs signed a grant agreement with the EU's Innovation and Networks Executive Agency (INEA) awarding EUR 719.7 million in funding for Phase II synchronisation projects, including EUR 492.5 million for Harmony Link's implementation phase. In May 2021, PSE and LITGRID took decisions on proceeding with the investment project. The project thus moved from the

preparatory phase to the implementation phase. In July 2021, PSE announced a tender through competitive dialogue for the selection of a contractor for converter stations in Poland and Lithuania. In August 2021, LITGRID launched a tender to select the HVDC cable contractor. In Q3 and Q4 2021, most of the study work was completed, including marine, environmental, archaeological and geological studies. In 2021, all critical design work was on schedule for the project. In Q3 2022, the process of obtaining key permits and administrative decisions for the project was completed.

In addition, a tender was launched in May 2022 for the Employer's Representative to support PSE and LITGRID in supervising the work of the main contractors.

Currently, BS systems operate under the IPS/UPS system, which geographically covers areas of the former Soviet Union Republics. The synchronisation of the BS systems with the CE scheduled for 2025 is part of the European Energy Union concept and an example of solidarity in the area of energy security. The implementation of the project is critical to completing the integration and increasing the scope of connecting BS system markets to the European system. This is confirmed by the roadmap implementing the synchronisation project signed in June 2019 by the President of the European Commission and Prime Ministers and Presidents of Poland, Lithuania, Latvia and Estonia.

Synchronisation of the systems of Ukraine and Moldova

PSE was also involved in a project to expand the system of Continental Europe to include the systems of Ukraine and Moldova. We were a member of the TSO Consortium established to perform additional studies and work to align the technical operating standards of these systems, as well as to comply with applicable EC regulations on running the system operation and market rules. The PSE representative chaired a working group responsible for performing system dynamic analyses.

In December 2021, analytical work determining the feasibility of connecting the UA/MD system to Continental Europe was completed. The dynamic study indicated countermeasures to be implemented by UA/MD TSOs for oscillation suppression.

One of the conditions for synchronisation was an island operation test, confirming the UA/MD system's ability to maintain stable operation. The test for the winter period took place on 24-26 February 2022 and was successful. On the day the test began, Russia attacked Ukraine. The test for the summer was planned for June 2022.

On 27 February 2022, Ukrenergo (TSO in Ukraine) requested emergency synchronisation from TSOs in Continental Europe. On 28 February 2022, Moldelectrica joined this request. An extraordinary meeting of the ENTSO-E RGCE was held on 11 March 2022 approving the emergency synchronisation, which was carried out on 16 March 2022.

Cooperation between the AU/MD and Continental European systems is monitored on an ongoing basis by a task team operating in the ENTSO-E RGCE area. Based on the recommendations developed by the team, ENTSO-E RGCE decides, among other things, on the acceptable level of trade at the systems' borders.

Following an agreement signed in June 2022 between the governments of Poland and Ukraine–PSE and Ukrenergo launched activities on the reconstruction at 400 kV of the Rzeszów–Chmielnicka connection, which has been closed since mid-1990s. The launch of the connection will increase trade opportunities between Poland and Ukraine and strengthen the connection between UA/MD and Continental European systems.

4.5. PSE as a reliable partner
Building business relationships and partnerships

[GRI 103-1, GRI 103-2, GRI 103-3]

Legal Regulations

As the Employer, we conduct proceedings for the award of public and non-public contracts for supply, services and construction works on the basis of the Act of 11 September 2019 – Public Procurement Law (the PPL Act) together with secondary legislation and on the basis of PSE S.A. Procurement Procedure (the Procedure).

Conditions of participation in the procedure:

The PSE contract may be awarded to contractors which fulfil the conditions concerning the possession of licences to conduct a specific activity or activities (if legal regulations impose the obligation to possess such licences), knowledge and experience, as well as which have at their disposal appropriate technical potential and personnel capable of performing the contract, a suitable economic and financial situation and are not subject to exclusion from the contract award procedure.

Contract award procedures

The manner of conducting the procedures is specified in detail in the PPL Act and the PSE Procurement Procedures.

Principles of award of contracts

We prepare and conduct public and non-public procurement procedures in accordance with the following basic principles:

- fair competition,
- impartiality and objectivity,
- equal treatment of contractors,
- transparency.

These principles are fundamental to public and non-public procurement and follow from the provisions of the PPL Act and the Procurement Procedures.

As the Employer, we comply with the above-mentioned principles both in the preparatory phase and in the conduct of procurement procedures, among others, by preparing the terms of reference for the contract and appointing the tender committee. Activities associated with the preparation and conduct of the procurement procedure are performed by persons who ensure impartiality and objectivity.

Contracts awarded

PSE collaborates with a wide range of suppliers, taking care to meet social responsibility standards. In 2021, our company awarded 445 contracts for the implementation of investment tasks, supply of goods and purchase of services to 256 contractors at a total amount of PLN 1,962,192,415.

In-house indicator PSE's main groups of suppliers were: investment, modernisation and maintenance contractors for network assets, suppliers of instruments and equipment, and service providers.

GRI 102-9 In 2021, **99.66 per cent of the contract value was awarded to Polish contractors, 0.31 percent to contractors from European Union states, and the remaining 0.03 percent to contractors from outside the European Union.**

Our procurement policy is implemented in accordance with all applicable provisions of law, the Act of 11 September 2019 – Public Procurement Law together with secondary legislation 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 of 13 July 2009 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 subject or not fully subject to the provisions of the Public Procurement Directives (2006/C 179/02).

When working with suppliers, we are committed to building lasting relationships and partnerships.

All activities performed by our contractors are carried out as PSE S.A.'s activities and affect the perception of the company's image as an investor. Why is it so important to have high standards and consistent guidelines for contractors to collaborate with local communities, which we take care of every day.

Key figures

	Completed contract award procedures (in PLN thousand)			
	2021	2020	2019	2018
Number of contracts	445	421	481	448
Value of contracts	1,962,192	863,462	1,953,755	2,320,040

In 2021, our company signed transmission agreements for twice the value of 2020 (mainly system service and availability agreements). We also concluded a number of large investment agreements (CJI – agreements for construction works) and investor supply agreements (phase wires, transformers and circuit breakers). CJI expenditure for the year increased by PLN 872 million (from PLN 283 million in 2020 to PLN 1,155 million in 2021). Expenditure in the Operations Department has also increased by PLN 65 million.

Effect index Number of contractors, subcontractors, and suppliers with whom cooperation has been conducted for several years (2017-2021)	
Period of cooperation	Number of contractors
1	660
2 years	194
3 years	87
4 years	43
5 years	18

Tab. Number of contractors, subcontractors, and suppliers with whom cooperation has been conducted for several years (2017-2021)

CHAPTER V: ENVIRONMENTAL AND CLIMATE IMPACT (E)

Key messages

We value the environment. We are investing in the development of the transmission grid with a view to respecting the landscape, protected areas and areas of special natural value.

Each of our infrastructural projects meets legal requirements for the environmental impact of extra high voltage infrastructure.

We support the implementation of the UN Sustainable Development Goals, including Goal 13: Climate Action. We design, build and operate to increase energy performance and reduce carbon footprint.

Key figures (as of the end of 2021)

- **11%** reduction in PSE's carbon footprint in 2021 as compared to 2017 (the first year of calculating emissions) according to the location-based method.
- **19%** reduction in PSE's carbon footprint in 2021 as compared to 2017 according to the market-based method.
- **16%** increase in emissions in 2021 on a year-on-year (y-o-y) basis according to the location-based method.
- **8%** increase in emissions in 2021 on a year-on-year basis according to the market-based method.
- **23.6%** year-on-year increase in the amount of SF_6 gas emitted by PSE to the environment.
- **85.12%** year-on-year decrease in the mass of soil contaminated with electrical insulating oil following leakages of the same at EHV stations.

V. ENVIRONMENTAL IMPACT AND CLIMATE ACTIONS (E)

5.1 PSE's priorities in the area of environmental protection

[GRI 102-11]The priorities of our organisation's actions for the natural environment are set out in the Policy for an Integrated Environmental and Occupational Health and Safety Management System. Successful implementation of the integrated system has been confirmed by an external certification body with a relevant certificate issued for the period from 24 July 2021 to 23 July 2024.

GRI 103-1 In line with the Management Board's strategic decision, the company strives to reconcile reliable and efficient operation of the power system and its development, while respecting the natural environment and public interest. In furtherance of these objectives, we are committed to:

- pollution prevention and continuous efforts to improve actions for natural environment protection, including through hazard identification and risk management,
- environmental monitoring of the work environment,
- comply with legal and other requirements applicable to the Company,
- improvement of employee skills, taking into account their role, and involving them in the improvement of environmental protection,
- development and modernisation of network infrastructure in a way that ensures respect for the landscape, protected areas and areas of special natural values.

GRI 103-3 At the beginning of 2022, PSE's actual and potential areas of environmental impact were reviewed. As a result, the list of environmental aspects was supplemented with the item "Generation of electricity from renewable sources". Power is generated for the grid infrastructure auxiliary systems using photovoltaic panels and mini wind turbines to power obstruction lighting on lines and substations.

The company has **identified 12 environmental aspects, of which 4 are significant**:

1) **electromagnetic field emission,**

2) **noise emission**,

3) **generation of waste,**

4) **hazardous substance leakage.**

Priorities in the area of the environment

GRI 103-2 The significant aspects listed above are PSE's priority environmental areas. In order to ensure that the activities of a Transmission System Operator comply with environmental protection regulations, constant monitoring is carried out on the premises of the facilities operated, as well as during the implementation of investment tasks, and measures are introduced to reduce harmful effects on the environment. Periodic environmental training is carried out to update and consolidate knowledge and skills in the field of environmental protection and to familiarise employees with technical and organisational solutions. Training topics include, among others, environmental legislation, environmental aspects, waste management, dealing with hazardous substance leakages, noise emissions into the environment, EF emissions into the environment, air emissions, water and wastewater management and internal environmental inspections.

Environmental aspects

GRI 103-2 With regard to the most significant environmental aspects identified, our company has internally defined rules of conduct and supervision to ensure meeting of all legal requirements and sustainable use of natural resources – as far as possible.

- **Electromagnetic field emissions**

We carry out a number of activities that are conducive to achieving our objectives:

- meeting the legally required permissible levels of electromagnetic fields in the environment outside the right-of-way of the line,
- selection of locations for new investment projects allowing to limit construction of power facilities in residential areas,
- maintaining the efficiency of systems and equipment,
- modern technological solutions of equipment and systems.

- **Noise emission**

We perform tasks affecting the compliance with permissible levels of noise in the environment required by law, such as:

- selection of network infrastructure locations to limit the construction of power facilities in residential areas,
- quality inspections of the works performed,

- maintaining efficient systems and equipment.

- **Waste generation**

Waste generation has been classified at PSE as a significant aspect. The rules for dealing with waste generated from operations at network facilities, the head office and field units are regulated in PSE S.A. Waste Management Manual. Employees are informed of updates and changes to the document resulting from adaptation to applicable provisions of law.

To enable selective waste collection, the company's head office building, branch offices and substations have been equipped with containers for selective collection. Waste is stored on site until it is collected by authorised parties. Waste storage areas – warehouses and containers for storing different fractions – have been appropriately marked. One of the regular training points for the company's employees is the presentation of rules and responsibilities regarding waste segregation. Maintaining proper segregation is also the subject of inspections at the facilities.

The Waste Management Manual applies both to waste generated by PSE and to waste generated by PSE-owned external entities as part of operation. It is applicable at the stages of operation, disaster recovery, investment, overhaul and decommissioning. Agreements with external entities include an HSEQ appendix, which sets out, among other things, waste management rules applicable to contractors. In order to ensure that contractors' waste management activities comply with the regulations, constant supervision is carried out on the premises of operated facilities and during execution of investment tasks.

GRI 306-2* Total weight of waste by type of waste and disposal method (in Mg)**	**2021**	**2020**	**2019**
Hazardous waste, including:	**146.69**	**308.29**	**673.14**
- stored on the plant premises	**2.66**	**0.00**	**19.09**
- transferred to authorised entities	**144.03**	**308.29**	**654.05**
Non-hazardous waste, including:	**688.72**	**389.39**	**1,108.43**
- stored on the plant premises	**9.62**	**0.00**	**1.15**
- transferred to authorised entities	**679.10**	**389.39**	**1,107.28**

* This index refers to substation facilities as well as head offices of PSE its branch units (ZKO).

** These data have been prepared based on Waste Record Sheets. We do not have information on how the waste will be further managed as the manner of handling waste taken over by its recipient, i.e. the waste management company, has not been defined.

- **Leakage of a hazardous substance**

Another aspect identified as significant is a hazardous substance leakage occurring in emergency situations. Our company is working to reduce the likelihood of an emergency through preventive measures, appropriate operation of facilities and maintaining readiness to reduce the environmental impact of failures caused by PSE-owned infrastructure.

Due to the possibility of failure of equipment containing hazardous substances that could cause pollution, and because of the associated risks, the company makes every effort to reduce the negative impact on the environment as far as possible. For this purpose, Instructions on the hazardous substance

leakage response and the use of sorbents during the leakage at PSE S.A. network facilities were implemented for use at network facilities and the Instructions on the hazardous substance leakage response were implemented at the head office and field units.

Each site has been equipped with environmental first-aid kits – handy sorption kits for cleaning up oil and acid leakages – and protections installed on the rain water drainage system draining substation facilities as protection against the spread of leakages into the environment.

There are also online workshops on handling hazardous substances, storing hazardous materials, as well as practical training in the use of handheld firefighting equipment and hazardous substance leakage clean-up activities. As part of the exercise, hazards that may arise at the substation are discussed. The practical part includes a mock hazardous substance leakage and exercises on how to use available sorbents.

GRI 306-3 Total number and volume of major leakages*	Volume in 2021.	Number of leakages in 2021	Volume in 2020.	Number of leakages in 2020	Volume in 2019.	Number of leakages in 2019
Number of leakages and mass of oily soil	**0.05 Mg**	**1**	**0.336 Mg**	**1**	**19.7 Mg**	**3**
SF_6 gas leakages	**44.005 kg**	**28**	**35.6 kg**	**24**	**50.1 kg**	**44**
Refrigerant leakages	**57.30 kg**	**9**	**77.40 kg**	**17**	**142.68 kg**	**37**

*"Major leakages" in our business means a leakage that results in environmental contamination.

In 2021, the amount of SF_6 gas emitted by PSE into the environment was 23.6 percent higher than the previous year. For electrical insulating oil leakages, there was a significant decrease in the mass of soil contaminated with electrical insulating oil as much as 85.12 percent compared to 2020.

Equipment with a considerable amount of electrical insulating oil, i.e. transformers, autotransformers, glands, are equipped with suitable protection devices, i.e. the so-called oil pits, which in case of an uncontrolled leakage are designed to take over the emergency discharge of oil and fire water, if any. In 2021, there was no significant electrical insulating oil leakage with negative environmental impacts.

GRI 306-3 Number and volume of significant leakages* in 2021			Calculation of SF_6 emissions from electric power equipment		
ZKO name	Name of EHV substation	Number	Quantity [kg]	CO_2 equivalent [t]	GWP from IPCC Fifth Assessment Report, 2014 (AR5)
ZKO Warsaw	SE Piotrków	2	10.515	247.1025	23,500
	TOTAL	**2**	**10.515**	**247.1025**	-
ZKO Radom	SE Chmielów	2	1.9	44.65	23,500
	SE Krosno Iskrzynia	6	10.84	254.74	23,500
	SE Stalowa Wola	1	0.2	4.7	23,500
	TOTAL	**9**	**12.94**	**304.09**	-
ZKO Katowice	SE Siersza	1	0.8	18.8	23,500
	SE Skawina	1	0.3	7.05	23,500
	SE Wielopole	5	14.45	339.575	23,500
	SE Wrzosowa	1	0.7	16.45	23,500

	TOTAL	**8**	**16.25**	**381.875**	-
ZKO Bydgoszcz	SE Włocławek Azoty	4	0.15	3.525	23,500
	TOTAL	**4**	**0.15**	**3.525**	-
ZKO Poznań	SE Gorzów	1	0.6	14.1	23,500
	SE Leszno	1	0.6	14.1	23,500
	SE Mikułowa	1	0.8	18.8	23,500
	SE Plewiska	1	1.3	30.55	23,500
	SE Piła Krzewina	1	0.85	19.975	23,500
	TOTAL	**5**	**4.15**	**97.525**	-
Total of all leakages	**TOTAL**	**28**	**44.005**	**1,034.1175**	-

*"Major leakages" in our business means a leakage that results in environmental contamination.

Source: In-house study based on the company internal records and environmental reports.

ZKO name	**Number and volume of leakages in 2021.**			**Calculation of hydrofluorocarbon emissions**		
	Name of EHV substation	**Substance name**	**Number**	**Quantity [kg]**	**CO_2 equivalent [t]**	**GWP from IPCC Fifth Assessment Report, 2014 (AR5)**
ZKO Warsaw	SE Sochaczew	R410A	1	2	3.848	1,924
	Registered office in Konstancin Jeziorna	R134a	1	28	36.4	1,300
	TOTAL		**2**	**30**	**40.248**	-
ZKO Radom	SE Kozienice	R410A	1	0.8	1.5392	1,924
	SE Rożki	R419A	1	2	5.376	2,688
	TOTAL		**2**	**2.8**	**6.9152**	-
ZKO Katowice	Head office in Katowice	R407C	1	12	19.488	1,624
	SE Byczyna	R407C	1	2	3.248	1,624
	SE Lubocza	R410A	1	7.9	15.1996	1,924
	TOTAL		**3**	**21.9**	**37.9356**	-
ZKO Poznań	SE Pątnów	R410A	1	1	1.924	1,924
	SE Ząbkowice	R410A	1	1.6	3.0784	1,924
	TOTAL		**2**	**2.6**	**5,0024**	-
	TOTAL		**9**	**57.3**	**90.1012**	

GRI 306-3 Number of electrical insulating oil leakages and mass of oily soil in 2021.			
Location and type of major leakages		Number of events	Amount of soil replaced [Mg]
1	SE Konin – failure	**1**	**0.05**

Other environmental aspects

- **Discharge of wastewater into waters or soil**

Our operations generate domestic wastewater. They are discharged into the combined sewerage system, septic tanks, or, after treatment in a biological treatment plant, into water or soil. Biological wastewater treatment plants using various treatment methods, including activated sludge and spray bed, are in operation at our network facilities.

When treated, the wastewater meets the requirements of the law and water permits. Wastewater treatment facilities are designed in accordance with applicable standards and laws. They undergo periodic maintenance and inspection to ensure proper operation. The quality of wastewater discharged into the environment is also periodically monitored.

GRI 306-1 Wastewater disposal site*	Volume (in m^3)	
	2021**	2020**
To groundwater	**2,978.00**	**2,523.00**
To surface water (lakes, rivers, etc.)	**5,065.00**	**175.00**
To utility companies	**25,215.36**	**22,027.00**
Total amount of wastewater	**33,258.36**	**24,725.00**

GRI 306-1 Wastewater treatment method	Volume (in m^3)	Volume (in m^3)
	2021	2020**
By the organisation	**8,043.00**	**2,698.00**
By wastewater treatment plant	**25,215.36**	**22,027.00**
Total wastewater treated	**33,258.36**	**24,725.00**

*The index refers to wastewater discharged from substation facilities and PSE headquarters and branch units. Not applicable to stormwater.

**In 2020-2021, the amount of wastewater discharged to the utility companies also includes liquid waste collected from septic tanks. Wastewater parameters are monitored by the recipient.

- **We strive to minimise water consumption**

Water consumption at our corporate headquarters and substations is low, as we have no manufacturing operations. Nevertheless, as part of our Environmental Management System, we monitor water consumption. To supply water to the substation buildings we use our own deep water intakes and municipal or city water supply pipelines.

GRI 303-1 Total water consumption by source	Volume (in m^3)	
	2021	2020
• Groundwater (own intakes)	**8,870.90**	**12,032.00**
• Supply of mains water or from other external sources	**27,268.92**	**18,372.50**
Total volume of water taken from the above sources	**36,139.82**	**30,404.50**

Source: Own study based on readings from water meters in facilities equipped with their own water intakes and on invoices for water supply to facilities using the water supply system.

[GRI 307-1] In 2021, as in previous years, PSE was not fined for non-compliance with environmental laws and regulations.

GRI 307-1 Monetary value of fines and total number of non-financial sanctions for non-compliance with environmental laws and regulations	Value	
	2021	2020
Total value of fines for non-compliance with environmental laws and regulations	0	0
Number of non-financial, administrative and judicial sanctions imposed on the organisation for non-compliance with environmental regulations, including:	1*	0
– international declarations/conventions/treaties and national, regional and local laws	0	0
– voluntary environmental agreements with regulators that are considered binding and designed to replace the implementation of new regulations	0	0
Cases sued to the organisation by dispute resolution bodies supervised by governmental authorities	0	0

*Violation concerning late submission to the Voivodeship Inspectorate of Environmental Protection (WIOŚ) of a report on electromagnetic field measurements carried out for environmental protection purposes in the vicinity of a 220 kV, 50 Hz overhead power line. The measurements were taken after reconstruction associated with the raising of one of the poles along the line's route had been completed. The 30-day deadline from the date of measurements to the date of reporting these results to the Voivodeship Inspectorate of Environmental Protection (WIOŚ) was exceeded.

Reducing PSE's environmental impact resulting from the operational activity

The environmental management system regulates PSE's activities in the area of environmental impact at all levels of management. In the environmental policy document (The Integrated Environmental and Occupational Health and Safety Management System Policy), the Management Board declared that the Transmission System Operator's activities are carried out with respect for the natural environment. In operational terms, the tasks carried out by the units are governed, among other things, by procedures and instructions taking into account legal requirements and good practice. The most important of these documents set out the rules for waste management and handling of hazardous substance leakages.

Wherever required, PSE has implemented fire safety manuals as part of prevention against the emission of environmentally harmful gases and discharge of fire water. Agreements with contractors include environmental protection clauses. Investments provide for the use of modern technologies and environmentally friendly solutions. The company carries out ongoing supervision of the implementation of environmental requirements, performs audits and inspections of PSE's facilities and work in progress. Each unit is responsible for complying with environmental requirements within the scope of its own tasks. Once a year, all offices and departments independently carry out an assessment of the fulfilment of these requirements, taking into account legislation, administrative decisions, company regulations and concluded agreements. Reports with information on compliance assessment and action for non-compliance are submitted to the Management Board of PSE.

5.2 Protection of biodiversity

GRI 304-2, GRI 103-1

We implement all investment projects in a way that minimises key threats to nature and avoids the risk of biodiversity loss. Already at the stage of planning the route of lines and the location of substations, we ensure that the infrastructure collides as little as possible with environmentally sensitive areas. In subsequent phases of project implementation, we analyse the technical and technological feasibility of minimising impacts associated with the construction and subsequent operation of network facilities. In case of completed investments, for which the environmental decisions indicate the obligation to conduct environmental monitoring, we focus on its performance and analysis of the obtained results. This allows us to assess whether the solutions we have implemented are effective, and thus - whether we have managed to minimise the impact on the natural environment.

The unavoidable consequences of our investments include the loss of some habitats due to tree cutting in the technological strip of the line, among others, in forest areas. However, by using over-forest or forest pole technology, we manage to significantly reduce tree cutting – sometimes only to pole locations. 'Forest' poles are poles that, together with V-shaped insulator chains, allow the wires to be hung closer to the pole structure, i.e. allowing the width of the line to be reduced, which translates into cutting fewer trees. By contrast, the use of 'over-forest' poles means that the line conductors are suspended above the treetops.

At the stages of project implementation and operation, we endeavour to ensure that tree cutting works in the technological strip of the line are carried out in a way that limits their impact on the natural environment. These works are carried out outside the breeding season and, if necessary, under the supervision of naturalists, in particular ornithologists or chiropterologists.

As a consequence of the construction of the EHV lines, some habitats are destroyed. This is due to the transformation of the land where they were present. However, it is important to remember that new habitats are created in place of old ones as a result of other plant and animal species colonising the area. As a result of the removal of undergrowth below the EHV line, the amount of plants characteristic of open areas increases and the number of insects providing a food base for birds rises.

Replacement planting was carried out in 2021 due to tree cutting as part of the construction of Praga substation and the introduction of 220 kV Miłosna–Mory line and the construction of Jasiniec–Grudziądz Węgrowo line. The cost of replacement planting in connection with the construction of SE Praga was approximately PLN 694,000 in 2021, and for Jasiniec–Grudziądz Węgrowo line – PLN 210,000.

With a view to protecting the biodiversity and abundance of birds in power line location areas, warning markers or bird warning spirals are used on line conductors. This reduces bird mortality by reducing the

number of bird collisions with line conductors. As part of the activities carried out in 2021 on Baczyna–Krajnik, Chełm–Lublin Systemowa, Morzyczyn–Recław, Czarna–Pasikurowice and Mikułowa–Czarna power lines, markers in the form of bird warning spirals were installed on designated sections of these lines.

Environmental monitoring expenses

In 2021, as part of the investment tasks for the 400 kV line between Warsaw agglomeration and Siedlce, bird and bat mortality monitoring was carried out on Pelplin–Gdańsk Przyjaźń, Grudziądz–Pelplin, Jasiniec–Grudziądz Węgrowo and Ostrołęka–Olsztyn Mątki lines. The table below shows, among other things, the costs of the monitoring incurred by PSE in 2021.

Name of the investment task	Description	Costs incurred in 2021 (in PLN)
Construction of the 400 kV line along with the change in the EHV network layout between Warsaw agglomeration and Siedlce	Costs of monitoring	45,000
Construction of the 400 kV line from the 400/110 kV Czarna substation to the 220/110 kV Polkowice substation	Costs of monitoring	28,000
Substation modernisation	Costs of building an autotransformer stand	800,000
Substation modernisation	Costs of installing the separator	80,000
Construction of 400 kV Jasiniec–Grudziądz Węgrowo line,	Costs of monitoring, replacement planting, construction of a platform for the white-tailed eagle and cleaning of nesting boxes.	248,000
Construction of 400 kV Olsztyn Mątki–Ostrołęka line.	Costs of monitoring	209,600
Construction of 220/110 kV Praga (Żerań) substation and introduction of 220 kV Miłosna–Mory line	Costs of replacement planting	694,390
TOTAL		**2,104,990**

Tab. Examples of the costs of environmental monitoring, planting and other measures implemented in connection with PSE infrastructure investments in 2021.

5.3. Compensation measures in connection with the construction of a line or substation

GRI 103-3

Compensation measures in connection with the construction of a line or substation

At the stage of network infrastructure execution and operation, a negative impact on the habitats of fauna and flora can be observed, which may result in a decrease in biodiversity. In order to reduce this negative impact, the implementation of a project is preceded by a planning and analysis phase, which allows limiting its impact on protected and other species. Where required by applicable provision of law, environmental decisions confirming that the works and operation of the projects will be carried out in a way that minimises the impact on the environment are obtained. Where it is not possible to avoid environmental impacts, efforts are made to reduce them. In a situation where this does not have a

measurable effect, environmental compensation measures are implemented after obtaining decisions allowing derogations from prohibitions, the so-called derogation decisions. On the basis of derogation decisions, protected species are trapped, relocated or destroyed during project implementation, and their habitats are subject to restoration. Compensation measures are aimed at restoring the environmental balance of the area and compensating for the damage done to the environment.

Construction of Jasiniec–Grudziądz Węgrowo line – as part of environmental compensation for the disturbance of 91E0 willow riparian forests and 9170 oak-hornbeam forests natural habitats, by virtue of the environmental decision obtained, nesting boxes and roosts were provided in Toruń and Żołędowo Forest Districts in 2019 for:

- the common redstart, the European pied flycatcher, the Eurasian nuthatch, the Eurasian tree sparrow, the great tit, the willow tit, the coal tit – a total of 29 A- and A1-type boxes,
- the starling – 6 B-type boxes,
- the black redstart – 10 semi-open-type boxes,
- the short-toed treecreeper and the Eurasian treecreeper – 4 boxes,
- the common goldeneye – 1 box near the Vistula River on the height of pole No. 32, 1 box at the Papowskie Lake near pole No. 113,
- bats – Issel-type boxes (intended for, among others, the common long-eared bat, the grey long-eared bat, the lesser noctule, the mouse-eared bat, the common noctule, the Nathusius' pipistrelle) – 20 roosts,
- bats – Stratmann-type boxes (intended for, among others, the common pipistrelle, the soprano pipistrelle, the brown long-eared bat, the common noctule and the Nathusius' pipistrelle) – 20 roosts. In 2021, our naturalist carried out the cleaning and maintenance of nesting boxes and bat roosts as part of the annual box inspection. During the work, traces of nesting in the form of nest material or abandoned egg shells were found in most nesting boxes. No individuals were found in the bat roosts, as they are not breeding or permanent sites for bats – they are only periodic hideouts.

In September 2021, 2 nesting platforms for the white-tailed eagle (*Haliaeetus albicilla)* (Photograph 1) were provided in the area of Żołędowo Forest District as part of environmental compensation measures. The locations proposed by the Forest Inspectorate were approved by the Regional Director for Environmental Protection in Bydgoszcz. The work was carried out under the supervision of an ornithologist. The platforms were located in the stand of an approximately 114-year-old Scots pine and in a clump of old-growth forest, which includes an oak aged approximately 129 years.

Construction of Bydgoszcz Zachód–Piła Krzewina line – protection of the early marsh-orchid (*Dactylorhiza incarnata*) species present within habitat 6510 – lowland and mountain fresh meadows used extensively.

During the construction of Bydgoszcz Zachód–Piła Krzewina electrical power line, the early marsh-orchid (*Dactylorhiza incarnata*) species present in the vicinity of pole 185 was replanted on the basis of the environmental decision obtained. The replanting was carried out in 2019, under the supervision of a naturalist, in the area of the same habitat 6510 – lowland and mountain fresh meadows used extensively. In 2021, a botanist assessed the condition of the replanted orchid specimen and the abundance status of specimens of this species as part of environmental monitoring (Photograph 2). During the monitoring, two specimens of the early marsh-orchid belonging to the family Orchidaceae were found, which developed generative shoots in 2021.

GRI 304-3 Protected or revitalised habitats						
Item	Type of revitalised or actively protected area (form of protection, type of habitat, etc.)	Information on protected or revitalised habitats		Were the revitalisation (conservation) measures approved by an external organisation/experts?	What was the status of the area at the end of the reporting period?	Data source
		surface area [ha]/pc.	location			
1	Greater butterfly-orchid (*Platanthera chlorantha*)	2	pole numbers: US-29, US-30	Measures were approved.	In the following two growing seasons (July 2020 and May 2021), the success of the replanting was inspected, finding the plants in a very good condition and no threats to their further functioning. Due to the successful completion of the measure and the absence of threats, no additional measures related to the protection of these plants were recommended.	Report on the replanting and monitoring of the greater butterfly-orchid (*Platanthera chlorantha*) in connection with the implementation of the project under the name of "Construction of 400 kV Plewiska–Krzewina line":
2	6510 – lowland and mountain fresh meadows used extensively. *(Arrhenatherion elatioris*) – specimens of the early marsh-orchid (*Dactylorhiza incarnata*)	1	LE BYD – PKW	Measures were approved.	Monitoring of the early marsh-orchid site is planned for 3 years after the relocation (relocated in 2019).	Environmental Monitoring Report Environmental Decision No. 19/2016 sign WOO-4202.1.2014.KŚ.118

GRI EU 13 Biodiversity of natural compensation compared to the biodiversity of affected areas						
Item	Please identify the biodiversity of compensatory habitats in terms of:			Please compare the biodiversity of the primary habitat prior to the company's activities with the biodiversity of the compensatory habitat (information collected under indicator 304-2 can be used).	Please explain the reason for the differences between primary and compensatory habitats and describe what measures were implemented to improve the biodiversity of the compensatory habitat.	Please indicate the period of biological biodiversity monitoring and reporting at offset sites.
	Habitat surface area (km^2)	Main protected species (natural habitat types)*	Habitat description (e.g., wetlands, grasslands, forests, etc.).			
1	0.2104	9170 Oak-hornbeam forests	Forest habitats: mixed forest fresh, mixed humid forest, fresh forest, humid forest.	A comparison of biodiversity, i.e. the conservation status of the habitat, will only be possible once a comparative study has been carried out, which is planned to start during the 2024 growing season.	It will be possible to analyse the reasons for the differences based on the results of the studies, which are planned to start during the 2024 growing season.	In accordance with the provisions of the Decision on Environmental Constraints, monitoring surveys have been scheduled in the 3rd, 5th and 10th year after the project completion.
2	0.1005	9190 Acid oak forest	Forest habitats: mixed fresh coniferous forest, mixed humid coniferous forest, mixed fresh forest, mixed humid forest.			
3	0.0102	*91E0 Riparian forests	Forest habitats: riparian forest, ash alder forest, alder forest.			

Conservation of the common osprey

PSE, together with the State Forests, implemented measures to protect the osprey (*Pandion haliaetus*). In total, 9 special platforms were installed where birds can build their nests. Two platforms were inhabited by 2 osprey couples out of 22 recorded in Poland.

This project contributes to increasing the breeding area of the osprey (*Pandion haliaetus)*, which should have a direct impact on increasing the population of this species.

Ospreys (*Pandion haliaetus*) are one of the rarest birds of prey in Poland and are under strict protection. According to the statistics kept by the Eagle Protection Committee, our country is currently inhabited by only 22 couples of these animals, and some of them inhabit areas near power infrastructure.

The installation of osprey platforms on power poles is a good and proven practice in addition to the installation of platforms on trees. It is used, among others, in Germany, where about one third of the

osprey population nests on high voltage poles. Protecting nests in this way increases the chance of birds settling in.

The construction of nesting platforms for ospreys is a continuation of measures commenced by PSE in 2014. Installation of another 3 nesting platforms was carried out in 2021 on supporting structures (poles) of EHV lines: Krajnik-Glinki, Morzyczyn-Police and Krajnik-Vierraden. Since the start of the project, 9 platforms have been successfully installed on power poles.

5.4 Energy efficiency

GRI 103-1, GRI 103-2 We are systematically working to increase efficient use of energy. This includes improving energy efficiency in spheres related to the modernisation of equipment and buildings and the way they are used.

Last year, activities for the energy audit in accordance with the provisions of the Energy Efficiency Act of 20 May 2016 continued at the branches (ZKO) and at the head office of our company in Konstancin-Jeziorna. During the year under review, an audit was carried out by an external company and one of the outcomes was the identification of modernisation measures and outlining of other energy efficiency measures. Some of the audit recommendations are implemented on an ongoing basis, while other are at the planning stage. In addition, other initiatives are carried out to improve energy efficiency.

In-house indicator Below is a summary of energy efficiency measures **implemented in 2021** and measures to be implemented in the following years, broken down by location:

Konstancin-Jeziorna

Measures implemented last year:

- replacement of the luminaires in some circulation paths and in a part of the KDM room with LED luminaires,
- continuous training and optimisation of the way electrical and sanitary installations are controlled from the BMS.

Measures planned for the following years:

- replacement of UPS devices with modern energy-saving ones (the design is in place, we are finalising the tender to select the contractor),
- continued successive replacement of luminaires,
- replacement of 5 condensing units (with two refrigeration circuits/each) serving the air handling unit coolers of the KDM (design is in place, a tender to select the contractor is being prepared).

ZKO Bydgoszcz:

Measures implemented last year:

- modernisation of office lighting by replacing fluorescent luminaires with LED luminaires,
- modernisation of the central heating substation including expansion of central heating substation control automation and replacement of valves with control fittings,

Measures planned for the following years:

- modernisation of the central heating system in the administration building and garage premises,
- replacement of fluorescent lighting with LEDs – multi-storey outdoor car park,

- modernisation of the supply system, including UPS devices.

ZKO Poznań:

Measures implemented last year:

- replacement of internal lighting in offices and corridors from fluorescent to LED luminaires,
- replacement of external lighting luminaires from sodium vapour to LED.

Measures planned for the following years:

- comprehensive thermomodernisation of the Main Building is planned for the forthcoming period (2023),
- modernisation of the supply system, including UPS devices,
- continued successive replacement of luminaires.

ZKO Katowice

Measures implemented last year:

- replacement of LED lighting in buildings B1, B2, B4, B5,
- renovation of the moat and water pipes between building B1 and B2.

Measures planned for the following years:

- modernisation of the supply system, including UPS devices.

ZKO Radom

Measures implemented last year:

- replacement of LED lighting in corridors on floors III, IV, V in the BUT building,
- installation of compensation systems in BG and BUT.

Measures planned for the following years:

- construction of new modern premises with an eye to maintaining high energy efficiency,
- continued successive replacement of luminaires.

All of these measures are successively contributing to improving the energy efficiency of PSE head offices.

302-1 Total energy consumption in the organisation	**2021**		**2020**	
	MWh	GJ	MWh	GJ
Total consumption of fuels from non-renewable sources in Konstancin-Jeziorna and ZKO:		34,413		30,554
• Gasoline		10,641		10,707
• Diesel fuel		14,611		11,395
• Natural gas		9,161		8,452
Total heat consumption		13,773		10,933

Total electricity consumption in Konstancin-Jeziorna and ZKO	10,281.05	37,012	10,540.90	37,947
Total energy consumption (total fuel consumption + total heat consumption + total electricity consumption in Konstancin-Jeziorna and ZKO)		**85,198**		**79,434**
Electricity losses in the transmission process	1,712,542	**6,165,151**	1,457,807	**5,248,105**
Electricity consumption at substations	46,723	**168,203**	44,355	**159,678**
Total electricity sales	1,744.9	**6,282**	1,689.4	**6,082**

5.5 Carbon footprint

GRI 103-1, **GRI 103-3**

PSE influences the stable operation of the electricity system in Poland with its activities. While ensuring the continuity of energy supplies to all regions of our country, our organisation recognises the impact of its activities on the climate and takes steps to monitor this impact on an ongoing basis. The tool PSE uses to measure this impact is to calculate its carbon footprint. Carbon footprint was adopted as a fixed indicator taken into consideration in evaluating the performance of our organisation and is used in managing the company.

PSE's carbon footprint calculations were performed in accordance with the international GHG *Protocol Corporate Accounting and Reporting Standard*. We used 2017 as our baseline year – the year for which we calculated greenhouse gas emissions for the first time and against which we compare emissions in the following years.

In this year's calculations, we have decided to extend the analysis of the volume of greenhouse gas emissions resulting from our activities to include further categories related to our value chain (scope 3). Compared to the previous year, this year's calculations have also included emissions from the production and distribution of the fuels and energy used (the so-called Well-to-Tank emissions) and the production and losses arising from the transmission of electricity returned from the grid to end users. We have also calculated emissions associated with the management of the waste we generate. We have also included these aspects in the results for 2017-2020 by way of recalculation in order to maintain comparability of results and consistency in the methodology used. We aim to broaden our view of our company's climate impact and more accurately identify opportunities for action that PSE can take to reduce this impact.

We performed the calculations for:

- **activities carried out by the entire organisation, i.e. the Headquarters in Konstancin-Jeziorna and branches (ZKO), excluding ZKO in Warsaw,**
- **the tasks of the transmission system operator set forth in the regulations.**

In 2021, PSE's carbon footprint was:

- According to the location-based* method – **3,765,290 tons** of carbon dioxide equivalent. In year-on-year (YOY) comparisons, emissions increased by **16 percent**, and compared to 2017 – decreased by **11 percent**.
- According to the market-based* method – **3,762,934 tons** of carbon dioxide equivalent. There was an **8 percent** increase in **emissions** from 2020, and a **19 percent** reduction from 2017, which is the baseline year.

PSE's lower emissions compared to the baseline year according to the location-based method are largely due to a reduction in the amount of energy returned from the grid to end users and a decrease in the average carbon intensity of electricity in Poland. Taking the emission indices for electricity according to the market-based method into account, a change of electricity provider resulting from a modification of the method of contracting energy purchases contributed to a 33 percent emission in scope 2 as compared to the baseline year.

The year-on-year increase in emissions was due to an increase in the amount of energy transmission losses, as well as an increase in the amount of energy returned from the grid to end users. Nearly 99% of PSE's scope 1, 2 and 3 emissions result from the operations of the power system operator.

The remaining emissions are mainly due to electricity consumption for technical purposes by substations, electricity and heat consumption in our buildings, emissions of SF_6 – the gas used as an insulator in substation equipment, and fuel combustion in company cars. Greenhouse gas emissions associated with business travels and the management of the waste generated together account for less than 0.1 percent.

GRI 305-1, 305-2, 305-3 **Greenhouse gas (GHG) emissions**	**Mg CO_2e**					**Year-on-year change 2021 vs 2020 in %**	**Change 2021 vs 2017 (baseline year) in %**
	2021	**2020**	**2019**	**2018**	**2017**		
Scope 1 - Direct GHG emissions	**3,452**	**3,012**	**3,738**	**4,139**	**4,450**	**+15**	**-22**
Konstancin-Jeziorna, ZKO:	3,452	3,012	3,738	4,139	4,450	+15	-22
• Gasoline	737	742	1,020	1,077	883	-1	-17
• Diesel fuel	1,083	844	885	869	827	+28	+31
• Natural gas	508	468	410	459	455	+8	+11
• SF_6	1,034	812	1,142	1,579	2,082	+27	-50
• HFC's	90	146	281	155	202	-38	-55
Scope 2* - Indirect energy GHG emissions (*location-based* method)	**1,155,159**	**1,026,522**	**1,110,504**	**1,220,628**	**1,260,544**	**+13**	**-8**
Konstancin-Jeziorna, ZKO:	8,062	8,201	9,393	11,204	10,802	-2	-25
• Electricity	6,704	7,146	7,885	9,627	8,957	-6	-25
• Thermal energy	1,358	1,055	1,508	1,577	1,844	+29	-26
Electricity losses in the transmission process	1,116,632	988,253	1,177,838	1,177,838	1,220,070	+13	-8

GRI 305-1, 305-2, 305-3 Greenhouse gas (GHG) emissions	Mg CO_2e					Year-on-year change 2021 vs 2020 in %	Change 2021 vs 2017 (baseline year) in %
	2021	2020	2019	2018	2017		
Substations	30,465	30,068	32,138	31,587	29,672	+1	+3
Scope 2* - Indirect energy GHG emissions (*market-based* method)	**1,152,803**	**1,270,712**	**948,606**	**1,659,709**	**1,714,399**	**-9**	**-33**
Konstancin-Jeziorna, ZKO:	5,705	5,492	5,736	9,861·	9,553·	+4	-40
• Electricity	4,347	4,437	4,228	8,284	7,708	-2	-44
• Thermal energy	1,358	1,055	1,508	1,577	1,844	+29	-26
Electricity losses in the transmission process	1,116,632	1,246,227	915,351	1,606,758	1,664,369	-10	-33
Substations	30,465	18,993	27,519	43,089	40,477	+60	-25
Scope 3 - Other indirect GHG emissions	**2,606,680**	**2,222,682**	**2,454,066**	**2,612,307**	**2,949,771**	**+17**	**-12**
Cat. 3. Emissions related to energy and fuel not included in scopes 1 and 2**	2,606,656	2,222,636	2,453,719	2,612,018	2,949,573	+17	-12
• Konstancin-Jeziorna, ZKO – Well-to-Tank emissions of burnt fuel and purchased energy	2,516	1,728	1,949	2,401	2,356	+46	+7
• Electricity transmission losses – Well-to-Tank emissions	311,062	166,398	180,214	213,767	219,245	+87	+42
• Power substations – Well-to-Tank emissions	8,487	5,063	5,418	5,733	5,332	+68	+59
• Energy returned from the grid to end users – energy production	1,786,831	1,754,100	1,939,213	2,022,966	2,307,310	+2	-23
• Energy returned from the grid to end users – Well-to-Tank emissions	497,761	295,348	326,924	367,150	414,729	+69	+20
Cat. 5. Waste from operations**	14	12	29	7	3	+18	+317
Cat. 6. Business trips	10	34	319	283	194	-72	-95
• Air travel	10	34	319	283	194	-72	-95
Scope 1 + 2 (*location-based*) + 3	**3,765,290**	**3,252,217**	**3,568,308**	**3,837,074**	**4,214,764**	**+16**	**-11**
Scope 1 + 2 (*market-based*) + 3	**3,762,934**	**3,496,406**	**3,406,411**	**4,276,154**	**4,668,619**	**+8**	**-19**

* For Scope 2 emissions calculated using the *location-based* method, the average index for Poland was used as the GHG emission index associated with the generation of a unit of electricity, and for emissions calculated using the *market-based* method, emission indices specific to our electricity sellers were used.

** Emission categories added during the 2021 calculation. The GHG emission results for 2017-2020 published in previous years have been updated with the emissions resulting from this source.

Data sources and emission indices

Data on energy and fuel consumption are based on invoices and internal records. Emissions of SF_6 and HFC gases (hydrofluorocarbon greenhouse gases) were determined based on gas refilling levels. The distance traveled by airplane was determined based on internal records and flight routes. Information on the types of waste transferred to third parties for disposal in 2021 came from internal records. Due to difficulties in obtaining data for previous years, emissions were calculated based on the total mass of waste transferred in previous years and assuming the same structure of this waste as in 2021.

For fuels, electricity (location-based method) and heat (until 2019), emission indices and calorific values based on data from the National Centre of Emission Balancing and Management were adopted in the calculations, for heat since 2020 – the index published by the Energy Regulatory Office was adopted, for SF_6 and HFC gases – GWP100 indices were adopted according to the 4th (until 2020) and 5th (2021) Report of the Intergovernmental Panel on Climate Change(IPCC). Emission indices for electricity according to the *market-based* method were adopted based on the information on the structure of fuels used as published on websites of relevant energy providers. Emission factors for air travel (until 2020) and for fuel and energy on a Well-to-Tank basis (emissions associated with oil extraction and processing, transport of used fuels to stations/end user, and transmission losses in the case of electricity) were adopted from the DEFRA (Department for Environment, Food and Rural Affairs in the UK Government) database. Emissions associated with air travel in 2021 were calculated by the delegation management system used.

No biogenic greenhouse gas emissions were identified. The greenhouse gas included in the emission indices for fuel, electricity and heat is CO_2. The greenhouse gases included in the emission factors from the DEFRA database (air travel, emissions for fuel and energy on a Well-to-Tank basis, waste management) are CO_2, CH_4, N_2O.

GRI 305-4 **GHG emission intensity index per unit of electricity returned from the grid**	**Mg CO_2e**				
	2021	**2020**	**2019**	**2018**	**2017**
GHG emissions, scope 1 + 2 (location-based) [Mg of CO2e]	1,158,611	1,029,535	1,114,242	1,224,767	1,264,993
GHG emissions, scope 1 + 2 (location-based) + 3 [Mg of CO2e]	3,765,290	3,252,217	3,568,308	3,837,074	4,214,764
Amount of energy delivered from the grid - [MWh]	115,153,482	102,639,157	105,739,380	107,089,437	102,646,083
GHG emissions, scope 1 + 2/MWh of energy returned from the grid [Mg of CO2e/MWh]	0.0101	0.0100	0.0105	0.0114	0.0123
GHG emissions, scope 1 + 2 + 3/MWh of energy returned from the grid [Mg of CO2e/MWh]	0.0327	0.0317	0.0337	0.0358	0.0411

Worth knowing

The **carbon footprint** is the sum of greenhouse gas emissions caused directly or indirectly by a person, organisation, event or product. It includes emissions of carbon dioxide, methane, nitrous oxide and other greenhouse gases expressed in CO_2 equivalent. An organisation's carbon footprint includes the

emissions caused by all of its operations. Its measure is $MgCO_2e$ - a ton (megagram) of carbon dioxide equivalent.

Carbon footprint **is one of the key tools of modern environmental management. It is international in nature and** is increasingly being used by entrepreneurs as one of the primary methods to improve the efficiency of business operations.

5.6. Compliance with the EU classification of sustainable activities (Taxonomy)

The EU Taxonomy (Regulation 2020/852/EU of the European Parliament and of the Council) is a classification system that establishes a list of environmentally sustainable economic activities. Under the Taxonomy Regulation, the European Commission has developed a de facto list of environmentally sustainable activities, defining the technical eligibility criteria for each environmental objective through delegated acts. The EU Taxonomy is a system that enables a uniform classification of sustainability measures to support investors in their investment decisions.

TURNOVER KPI

Based on analysis of each business segment, PSE has analysed the revenues generated in 2021 and allocated a corresponding proportion thereof to Taxonomy-eligible activities. The sales revenue figures are taken from the financial and accounting records and are consistent with the figures in the Report.

The allocation of revenues and costs according to the Taxonomy was made possible by the new controlling model implemented in 2019, facilitating a multi-faceted analysis of financial performance. The main product was a revised layout of the controlling objects, including cost locations. The new controlling objects reflect the functioning of our organisation in a better and more precise way, and therefore enable more precise analyses regarding the activities of each area of the company.

The analysis showed that 99.8 percent of the company's consolidated revenues are derived from business activities that are Taxonomy-eligible.

Percentage share of Taxonomy-eligible business activities in total turnover	99.8
Share of non-Taxonomy eligible business activities in total turnover	0.2

CAPEX KPI

Accounting principles

Based on the provisions of Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021, PSE analysed the capital expenditures in 2021 and allocated them to Taxonomy-eligible activities.

To calculate the above indices, the value of capital expenditures consistent with the values reported in PSE's consolidated financial statements for 2021 was used, respectively, in the denominator. The value of the increase in tangible and intangible assets during the financial year before revaluation (including the calculation of impairment) and deduction of depreciation for the year was defined as the basic value of capital expenditures.

In the next step, the value of the numerator, i.e. capital expenditures related to assets or processes associated with Taxonomy-eligible business activities, was determined.

100% of the capital expenditures incurred by the company is related to Taxonomy-eligible business activities. These are capital expenditures incurred for investment tasks included in the 2021-2025 Investment Intentions Plan adopted by the company, resulting from the Transmission Network Development Plan.

As the analyses show, 100.0 percent of the total capital expenditures are Taxonomy-eligible.

Percentage share of Taxonomy-eligible economic activities in total capital expenditures	100
Share of non-Taxonomy-eligible economic activities in total capital expenditures	0

Contextual information

Due to the transitional nature of the disclosures for 2021, including:

- no period for comparison
- no reports on the alignment of activities to the taxonomy – no qualitative information are disclosed on material modifications that occurred during the reporting period in relation to the implementation of capital expenditure plans, quantitative breakdown – at the aggregate business activities level – of the amounts included in the numerator and qualitative explanation of the key elements of changes in the capital expenditure KPIs during the reporting period.

OPEX KPI

Value of the EU Environmental Taxonomy-eligible expenditures – the value of costs associated with a business activity that is deemed Taxonomy-eligible.

Based on the provisions of Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021, the Company analysed its operational expenses in 2021 and allocated a corresponding portion thereof to Taxonomy-eligible activities.

Operational expenses and operating costs are understood in the same way.

The figures for the operating costs incurred are taken from the financial and accounting records and are consistent with the Financial Statements.

According to the Regulation, only costs directly related to the maintenance of fixed assets and infrastructure are the denominator, and they include costs related to:

- research and development,
- building renovation activities,
- short-term leases, maintenance and repairs, and any other direct expenses related to day-to-day running of the property, plant and equipment by the company or a third party outsourced to perform the activities necessary to ensure continuous and efficient operation of those assets.

The company conducted a cost structure analysis and identified the costs given below.

Due to the impossibility of assigning a single cost item within a cost type, the Company included in the denominator only those cost types which were attributable in whole or in their majority to the denominator.

The following cost categories were adopted in accordance with the guidelines described in the Regulation:

Technical materials	Technical materials consumed for the operation of buildings and structures and equipment installed in buildings and structures.
Consumables	Materials purchased for maintenance work or taken from the warehouse of reserve apparatus equipment worn out in maintenance work.
Transmission grid rehabilitation services	Costs of rehabilitation work carried out on transmission grid facilities (lines and substations).
Transmission grid maintenance services	Costs of work related to the provision of maintenance of substation power equipment by external contractors.
Other operating services	Costs of work related to the operation and inspections of other assets used by the Company.
Other refurbishment	Costs of refurbishment of fixed assets not directly used in energy generation and distribution (buildings and structures, machinery and equipment).
Research and development works	Costs of research, development, innovation works.
Cleaning services	Costs of cleaning services on transmission grid facilities (lines and substations) and at the Company's head offices.
Property security	Costs of property security services, supervision of transmission grid facilities (lines and substations) and the Company's head offices.
Training	Specialised training necessary for employees to do their jobs.

This indicator was determined by dividing the total operational expenses related to activities eligible for the Taxonomy systematics by the total expenses allocated the aforementioned cost categories.

According to the calculation carried out in the reporting year, 97.5 percent of total operational expenses are Taxonomy-eligible expenses.

The percentage of operating costs related to activities that are not eligible for the Taxonomy systematics is 2.5 percent.

Percentage of Taxonomy-eligible business activities in total operational expenses	97.5
Share of non-Taxonomy-eligible business activities in total operational expenses	2.5

CHAPTER VI: IMPACT ON SOCIETY AND EMPLOYEES (S)

Key messages

The quality of life of Poles depends on our actions and ensuring the continuity of electricity supplies.

We support the development of local communities in areas where we implement network investments or carry out maintenance work on our infrastructure.

In our day-to-day operations, we shape an innovative working environment. We want to continually strengthen the unique knowledge base and expertise of PSE's staff responsible for maintaining a safe and stable power system. A very important area of management for us is the health and safety of PSE employees.

Key figures (as of the end of 2021)

- **Approx. 4.1 percent** of the fee transferred to PSE for transmission services included in the bills of residential electricity customers in 2021.
- **PLN 4.6 million** — total value donated by PSE for social actions in 2021.
- **180** beneficiaries – entities that benefited from PSE's social support.
- **4,458** meetings and information events for projects implemented between 2016 and 2021, including **937** meetings in 2021.
- **91.9%** of employees benefited from holiday subsidies in 2021.
- **86.8%** of employees benefited from health care subsidies in 2021.
- **89.9%** of employees benefited from subsidies for sports, recreational and cultural and educational activities in 2021.
- **0.66** – the Total Recordable Incident Rate (TRIR) value relative to the number of hours worked at PSE.

VI. IMPACT ON SOCIETY AND EMPLOYEES (S)

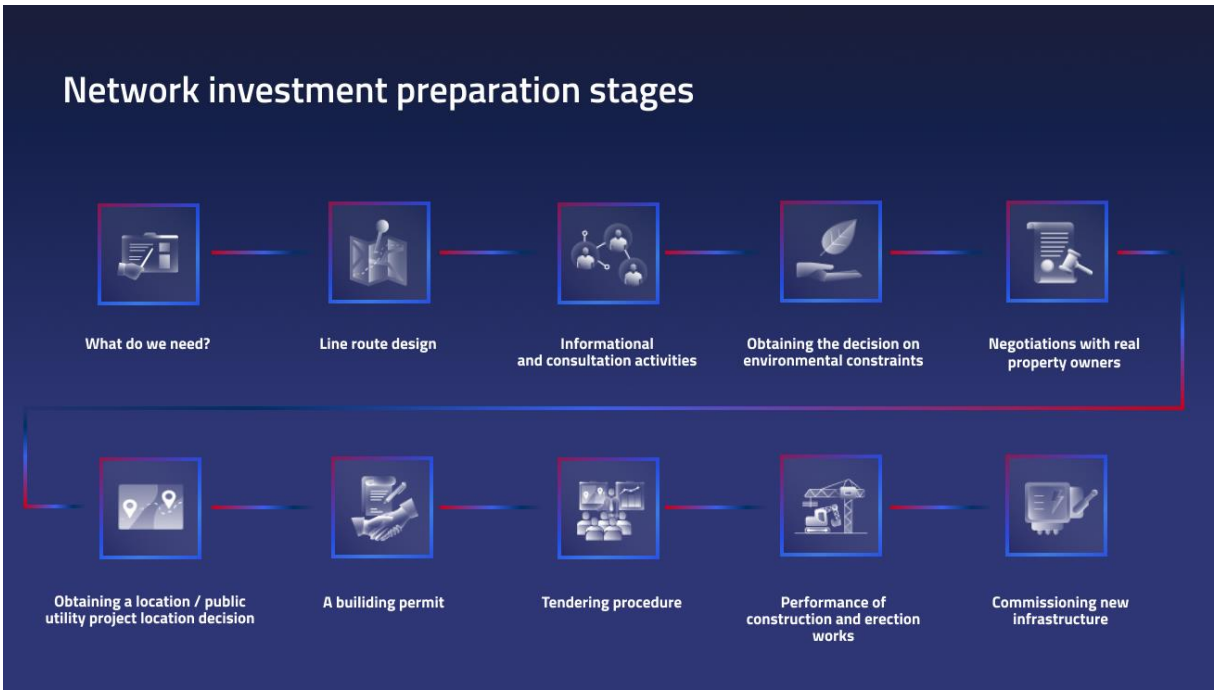
6.1. Development of regions and local communities

6.1.1. Investments in regional development

[GRI 203-2] GRI 103-1

Investments in regional development

Public purpose infrastructure investments, including the construction of power substations and extra-high voltage lines, significantly raise living standards in the entire region.



1. What do we need?

Development of an investment plan based on power demand and connection requests.

2. Line route design

Definition of the technical parameters of the expected results and the area covered.

3. Informational and consultation activities

- Consultation of the line route with public administration and local authorities.
- Public consultation with residents and owners of real properties along the line route.
- Public consultation as part of the Environmental Impact Assessment procedure.

4. Obtaining the decision on environmental constraints

GRI 103-2 Conducting an environmental survey in the areas identified during consultations as optimal for the line route and the substation location.

5. Negotiations with real property owners

Acquisition of rights to administer real properties and establish utility easements.

6. Obtaining a location decision or a public utility project location decision

Introduction to the local planning scheme, if not done before.

7. A building permit

Obtaining a building permit.

8. Tendering procedure

Tender process - selection of a contractor.

9. Performance of construction and erection works

The stage of performance of construction and erection works.

10. Commissioning new infrastructure

Energising/final technical acceptance.

By guaranteeing stable electricity supplies in a given area, PSE helps to perform a number of functions that are important for regions and local communities.

Benefits of infrastructure investments:

- ensuring energy security and supplies for the region by increasing electricity availability,
- reducing the risk of failure by replacement of worn and used systems with ones of modern designs,
- increasing the region's investment attractiveness by providing suitable conditions for enterprises to locate and develop their business activities, which results in new jobs as well as tax revenues for commune budgets,
- reducing electricity losses and, consequently, electricity costs, by increasing the voltage levels in transmission grids and using high quality materials for their construction,
- significant budget revenues from taxes paid to communes - every year the commune budget receives a fee in the amount of 2% of the value of the projects completed in its area in the form of real property tax,
- development of local businesses - hiring local companies as subcontractors,
- the impetus for modernisation and development of local electricity distributor infrastructure,
- increasing connection possibilities for local energy generation sources, including RES in particular,
- creating conditions for further dynamic development of electromobility.

6.1.2. Cooperation with local governments

GRI 103-1, GRI 103-2 As an exemplary investor and good neighbour, we attach great importance to establishing and developing relationships with local government authorities. We engage representatives of voivodeships, counties and communes in the entire investment process.

We provide the local government administration with comprehensive and reliable information on the projects, while presenting the benefits for the commune.

PSE's ongoing efforts to build awareness of the importance of the projects:

- designing route proposals in cooperation with local authorities during the Feasibility Study preparation stage,
- direct talks with mayors and commune leaders regarding the final shape of the project,
- presentations as part of commune council sessions dedicated to projects,
- on-call information sessions for local communities to hear out the opinions and suggestions on the optimum project route in a given area,

- involving mayors, heads of communes and councillors, as well as representatives of these authorities, in downstream communication activities during further project steps (e.g. educational programmes, participation in meetings, conferences, consultations with residents, etc.),
- organisation of study visits in the surroundings of the existing energy infrastructure in the region conducted by specialists from an accredited laboratory specializing in the measurement of the electromagnetic field (PEM) impact,
- organisation of site inspections showing the immediate surroundings of the project after its completion,
- cooperation with local media journalists in order to inform about the progress of the project,
- constant contact with investment stakeholders via hotlines and information points, ensuring two-way communication between the investor and residents,
- distribution of informational materials to help in talks with residents (project website, information brochures, Q&A documents, information and educational videos).

PSE's educational and information campaigns in support of building awareness of the importance of the project:

- establishment of special project information points,
- implementation of local educational programmes in the schools of the communes covered by projects to answer questions and address concerns,
- supporting local social action and initiatives of local government authorities,
- organisation of meetings with experts in the field of energy, impact on human and animal health and life, doctors, breeders, etc. – as required,
- gaining the support of local media, associations and residents for the project through meetings and engaging them in the communication process.

In-house indicator
Number of meetings with authorities and institutions as part of project implementation between 2016 and 2021

ZKO PSE areas	2021		2020		2019		2018		2017		2016	
	Number of meetings	Number of projects	Number of meetings	Number of projects	Number of meetings	Number of projects	Number of meetings	Number of projects	Number of meetings	Number of projects	Number of meetings	Number of projects
Bydgoszcz	60	21	84	21	40	17	202	15	208	15	171	13
Katowice	181	23	126	23	84	21	112	30	91	30	125	17
Poznań	98	17	106	25	138	21	67	24	163	13	148	35
Warsaw and Radom	598	50	534	54	484	53	307	33	240	53	82	19
In total	**937**	**111**	**850**	**123**	**746**	**112**	**688**	**102**	**702**	**111**	**526**	**84**

Tab. 1. Meetings with authorities and institutions as part of project implementation.

Key figures:
4,458 meetings and information events for projects implemented between 2016 and 2021, including **937** meetings in 2021.

GRI 103-3 Impact of projects on the local economy

Construction of the 400 kV Ostrołęka-Stanisławów line

The construction of 400 kV Ostrołęka–Stanisławów electrical power line is a project of strategic importance for the Mazovian Voivodeship. The estimated length of the route is about 100 km. Currently, the Warsaw agglomeration and Ostrołęka are connected by a 220 kV line built in the early 1970s. With increasing energy demand and planned changes in the generation profile, the current line is no longer sufficient, and due to its age, it is also more susceptible to failures and extreme weather conditions. The new 400 kV line will help to increase the volume of energy transmitted while reducing losses and having less impact on the environment.

I. Meetings with authorities and Commune Councils

The information and consultation process provided for residents and local authorities of communes along the considered line route variants started in July 2019. Nearly 100 meetings were held as part of these campaigns to hear the contractor's proposals for various line route options. The first meeting is always addressed to local government authorities, heads of communes and mayors as the hosts of the area. Representatives of the investor and the contractor visited a total of 16 communes. The subject of talks with local governments included, for example, the purpose of the project, proposed location options, environmental impact, technical aspects, and benefits. Working contacts (face-to-face, telephone, correspondence) continue throughout the entire period of the project implementation, as required.

II. Meetings with residents

As part of the campaigns conducted, several dozen meetings were held with commune residents. In several cases, follow-up meetings were required for residents of the same commune.

III. Study visits – EMF measurements

In response to the needs of residents, two study visits for the residents of the Communes of Jadów and Strachówka were organised during the consultation process, where measurements of electromagnetic field (EMF) impact under the operating 400 kV line were taken.

IV. Study visits – KDM

Another type of a study visit was the visit of the mayor and councillors of the Commune of Zabrodzie in the headquarters of the National Dispatch Centre (KDM), from where the Polish power system is managed. It was an opportunity to present the need for expansion and modernisation of the transmission grid nationwide and present its impact on the state's ability to grow.

V. Media activities

Information on the project appeared, among others, in the following media: fakty.wwl, *Goniec Tłuszczański*, *Kurier W*, *Życie Powiatu na Mazowszu*; a number of articles on the course of the consultation were published in *Tuba Wyszkowa* and *Nowy Wyszkowiak*, among others. Publications on the need to expand the EHV grid appeared in *Wyszkowiak*, *Tuba Wyszkowa* and *Tygodnik Ostrołęcki*.

VI. Geo-survey

In the wake of the COVID-19 pandemic outbreak, a new tool was also implemented to communicate with residents – the geo-survey. It is an application available on the project website: liniaostrolekastanislawow.pl/geoankieta, allowing the proposed route options to be examined. Residents could measure the distance from the line to a selected point, indicate which solution they preferred, and make their own comments or rectifications. The website also provides a set of the most important questions and answers (FAQ), materials concerning the terms and conditions for the project implementation, legal aspects and environmental impact. The new tool was implemented in response to the inability to conduct open meetings with residents during the epidemiological emergency period.

Harmony Link – submarine cable connection between Poland and Lithuania

The Poland–Lithuania power connection known as Harmony Link is an element of a European Union strategic project concerning the synchronisation of the Baltic countries with the power network of Western Europe. The project is implemented jointly by PSE and LitGrid – the Transmission System Operators of Poland and Lithuania. This connection will require laying two High Voltage Direct Current (HVDC) cables on the seabed and burying them (in the onshore part). The connection point to the Polish Power System in Poland will be Żarnowiec power substation (SE Żarnowiec) and in Lithuania it will be Darbenai substation.

The cable connection is a modern technology that allows to reduce transmission losses, and owing to the marine connection the impact of the project on the environmentally sensitive areas in the north-eastern Poland will be limited.

I. Meetings with authorities and commune councils and institutions

The consultation process with local government authorities regarding, among other things, the onshore part of the cable part began in May 2019. In 2021, 28 field meetings were held with authorities and institutions. Numerous meetings were held with the Mayor of Krokowa, Krokowa Commune Council, the Staroste of Puck, the Voivode of the Pomeranian Voivodeship, the Heritage Inspector of the Pomeranian Voivodeship, forest inspectorates, and other parties interested. Information and consultation meetings were also organised for the residents of two villages. Due to the ongoing epidemic emergency and government-imposed restrictions on meetings, one-on-one meetings were organised.

During the meetings, comments on the line routing were collected. PSE representatives presented arguments justifying the project implementation, its formal and legal conditions and concepts for the

line routing options. Further steps necessary to reach an understanding with real property owners on the servitude of conveyance set out in the agreement were also outlined.
The meetings were very popular. PSE representatives held individual online meetings or telephone conversations with some of the owners who could not attend on the scheduled dates.
PSE, as the investor, tried to take into account all feasible comments made by residents and owners. Adjustments were made to the line routing where possible.
Discussions with owners of real properties on which the HVDC station in Tyłowo is planned also ended in 2021; all owners signed agreements to sell the land for the substation.

Negotiation and amicable acquisition of property titles

In early 2022, negotiations began with the owners of properties located along the line route to establish the servitude of conveyance for the cable line. During individual meetings with each owner, our company's attorneys presented the location of the installation on the real property, the appraisal report and the resulting amount of remuneration for the establishment of the servitude of conveyance, and also answered questions. In April 2022, notarial deeds establishing the servitude of conveyance were signed with the owners, who then received compensation for this. In the case properties for which it was not possible to establish the servitude of conveyance in agreement with the owners, also due to incompatible entries in land and mortgage registers, a restriction on the use of the real property in favour of PSE will be established by means of administrative procedure.

II. Media and information activities

In 2020, harmonylink.eu website was launched. It contains information on projects and investors, i.e. TSOs in Poland and Lithuania, as well as the agreement form and a dedicated infoline number. The infoline operates daily on weekdays and enables all parties concerned to obtain detailed information about the project. National and local newspapers also feature press releases on the progress of the project. In addition, the company prepared a brochure about Harmony Link, which was distributed to representatives of the commune and later also to residents and owners of real properties located along the line route.

Offshore Wind Farm Project

Our organisation is preparing to carry out projects related to power output from offshore wind farms (OWF) planned in the Baltic Sea. The projected capacity of the OWF was determined in the draft Polish Energy Policy until 2040 at more than 8 GW, or nearly 20 percent of the country's total rated capacity. Offshore Wind Farms will be a major component of Poland's energy transition and will therefore be of considerable importance for the Polish Power System. However, for the Offshore Wind Farms to be constructed, the transmission grid in the Pomeranian area requires significant reinforcement. PSE will analyse a number of projects that will enable safe and efficient power output from wind turbines to every corner of Poland. These projects will also improve the energy security of the Pomeranian Voivodeship and make it the largest supplier of renewable energy in the country. The scale of the projects is best demonstrated in numbers: the investment projects cover 1 voivodeship, 5 counties, 22 communes, and nearly 80 villages. With as many as 250 km of lines to be built in that area, there are thousands of properties along the routes of completely new runs.

I. Meetings with authorities and commune councils

In 2020 and 2021, an information and consultation process was carried out for projects related to power output from the OWFs. By the end of 2021, more than 250 meetings were held, including 220 with representatives of communes and various institutions. Constraints related to the COVID-19 pandemic meant that some meetings were held via teleconference, but whenever possible, PSE representatives

met directly with heads of communes, mayors, commune councils and representatives of counties and offices from the Pomeranian Voivodeship.

II. Meetings with residents

Information campaigns addressed to residents were conducted primarily through information points, where representatives of the investor, including design engineers, answered individual questions and presented the preferred routes of the designed lines. More than 400 comments on the routes presented were collected during 50 on-call sessions involving more than 200 hours of one-to-one discussions with real property owners and residents of the villages affected by the projects. Comments were also collected during online meetings, on the infoline or by e-mail. Once the process was complete, they were analysed and, where possible, taken into account.

III. Media activities

In June 2021, a press meeting addressed to editors from the Pomeranian Voivodeship was held in Gdańsk. At the meeting, the planned projects were presented and details of activities, including the information process addressed to residents, were given. Publications appeared, among others, in *Dziennik Bałtycki*, on kartuzyinfo.pl and expresskaszubski.pl websites, on the Kaszëbë radio and on TTM TV. The manner in which the information and consultation process was carried out was also the subject of materials published by TVP, TTM, Kaszëbë radio and local news portals.

IV. Transparency in action

In our dialogue with local authorities, institutions and residents, we place particular emphasis on transparency in action and providing reliable information about projects. At the end of the information and consultation process, all stakeholders in our projects received letters summarising the activities. We have published the developed routes of the lines on a dedicated website. The maps – in paper and digital form – have been distributed to communes and county offices, and the dialogue with the community is maintained using an infoline and a contact box.

Construction of the 400 kV Dunowo-Żydowo Kierzkowo-Piła Krzewina line

The currently existing single-circuit overhead 220 kV Dunowo–Żydowo–Piła Krzewina electrical power line, built in the 1960s and 1970s, is an important component of the Polish Power System. The project concerns the construction of a new 400 kV double-circuit overhead electrical power line on Dunowo–Żydowo Kierzkowo–Piła Krzewina route. This line will eventually replace the 220 kV line entirely.

The estimated length of the new line is to be around 171 km (Dunowo–Żydowo Kierzkowo section – 53.12 km, Żydowo Kierzkowo–Piła Krzewina section – 118.18 km). The project assumes connecting the network under construction to the retrofitted Dunowo substation, the newly built Żydowo Kierzkowo substation and the retrofitted Piła Krzewina substation.

The construction of the line is an element of a project consisting in creating a transmission system for the purpose of synchronising Lithuanian, Latvian and Estonian power systems (Harmony Link).

I. Meetings with authorities and commune councils

The information and consultation process addressed to residents and local government authorities began in 2019. Nearly 80 meetings were organised as part of the campaign, which provided an opportunity to learn about the proposed route of the line. The first meeting – as always – was addressed to local government authorities, heads of communes and mayors as the hosts of a given area. The final stage was the presentation of the designed line route during the sessions of the municipal councils, the meetings of the competent commissions and the meetings with the groups of councilmen. Due to the epidemic situation, depending on the expectations of local authorities, meetings were held both in traditional and online formats.

Investor representatives visited a total of 13 communes. The subject of talks with local governments included the purpose of the project, proposed line route, environmental impact, technical aspects and benefits. Working contacts (face-to-face, by phone and correspondence) continue throughout the entire period of the project implementation, as required.

II. Meetings with real property owners and residents

As part of the campaign conducted in 2021, approximately 20 meetings were held with owners or real properties located along the planned line route and with commune residents. Due to epidemic restrictions, it was not possible to organise meetings in larger groups. The consultation took the form of hours-long on-call sessions in each village (we received around 80 comments and requests). PSE employees were present at the site to provide information on all aspects of the project and design engineers presented the planned line route. In 2022, contact with real property owners was maintained in relation to the need for geological surveys for the building permit design.

III. Media activities

Information about the project appeared in local printed media, on social media, and on websites of respective communes.

6.1.3. Impact on local communities

[GRI 103-1, GRI 413-2] Standards and regulations in the area of network assets

The social and environmental impact of our company's activities is particularly important in the construction of new overhead lines. Implementation of projects is based on the European standards PN-EN 50341 for the design of overhead power lines. We comply with all applicable national regulations on environmental protection, planning and zoning, real property management, construction law, and other provisions of applicable provisions of law.

European standards

The standards used for the design and construction of new lines ensure a high level of reliability for the line operation, a high level of public safety, and minimisation of the line's nuisance to the surrounding environment. In order to reduce tree cutting, in forested areas, we follow the practice of running the line conductors above the forest, so that cutting can be limited to small areas – only at pole post locations.

For the construction of each line, it is necessary to obtain a decision on environmental constraints. According to that decision, at selected points of the line, the conductors or poles are marked with elements visible to birds (silhouettes of birds of prey on lightning towers or warning spirals suspended on conductors). Obstacle marking of the line as an aerial obstacle is also used. Devices, instruments and systems installed in the substations also meet the requirements of European standards, which ensures a high level of reliability of their operation. Solutions are also used to reduce the impact of the substation on its surroundings, including the natural environment. Each grid transformer installed is fitted with an oil pit to protect oil from leaking to the environment in the event of failure.

Establishment of rights to real property

In order to regulate legal relations regarding transmission facilities between transmission companies and real property owners on which such facilities are located, the concept of "utility easement" was introduced to the Civil Code in 2008. The right of utility easement defines the extent to which a transmission entrepreneur may use someone else's real property on which its transmission facilities, i.e. all structures and systems forming power lines, are located or are to be located. The provisions

introduced provide the investor with access to the equipment, i.e. poles, conductors and elements of the substation, located on the real property in case of failure, repairs and maintenance.

The servitude of conveyance is a limited right in rem established in the form of a notarial deed on the real property. Its extent is recorded in the land and mortgage register of the encumbered real property.

For the establishment of the servitude of conveyance as part of the investment process, compensation is paid to each real property owner, as well as indemnity for the reduction in the value of the real property.

Before the works begin, we commission valuation reports for each real property involved in the project. The valuation reports are the basis for determining the amount of remuneration and compensation for the land owner. Factors such as the existing value and use of the real property and losses in farmland, crops or harvests caused by the occupation of a portion of the real property by transmission facilities affect the amount of payments. Additional compensation is available for the foundation of a pole. Typically, upon approval and conclusion of a civil contract, owners receive the first installment of compensation. The payment of the second installment is made after the signing of the notarial deed that allows the investor access to the land and the line. Compensation is also granted for damage and loss caused during construction and erection works.

If the landowner does not agree to signing a servitude agreement for a public utility project, after full negotiation has been carried out, a negotiation procedure in accordance with the requirements of Article 124 of the Real Property Management Act is initiated. However, this administrative procedure is the last resort in the negotiation process, and before it is used, efforts are made to find a compromise solution.

We do not maintain statistics on the number of servitude of conveyance agreements concluded with real property owners by contractors acting on our behalf. Many thousands of plots are affected annually. We estimate the percentage of concluded agreements at 94-98 percent, with the remaining 2 to 6 percent being administrative orders issued in accordance with Article 124 of the Real Property Management Act.

Number of persons physically and economically relocated and compensation for relocation

As early as at the planning stage of the project location, we make efforts to minimise interference in the area inhabited by people. Where possible, we consider several project location options. We invite representatives of local communities and local authorities to cooperate with us. We strive to ensure that our investments do not involve relocations. Relocation took place in 2021.

GRI EU 22 **Number of people physically or economically relocated and compensations by project type**	**2021**	**2020**	**2019**	**2018**	**2017**	**2016**
Number of persons relocated	**1***	**0**	**0**	**0**	**2****	**0**

*One real property owner within the planned protective strip of 400 kV Mikułowa–Świebodzice line was relocated in 2021.

**As part of the extension of 400/220/110 kV Grudziądz Węgrowo substation in 2017, two people were relocated – a father and daughter, who were co-owners of two plots of land necessary for the extension of the substation. The repurchase case was finalized in the first quarter of 2017.

Tab. Number of people physically or economically relocated and compensations

Special act

The Transmission Special Act was created to accelerate and facilitate the process of obtaining administrative orders for the implementation of projects related to the expansion and modernisation of electrical power networks. However, it does not release the investor from the obligation to obtain legally required decisions of competent public administration authorities, including the environmental decision. The main purpose of the application of the special act is therefore to discipline administrative procedures and orders. Despite the procedure under the special act, the investor carries out negotiations with real property owners to establish the servitude of conveyance. Projects covered by the special act must be preceded by extensive public consultation, including dialogue with the authorities of relevant local government authorities, with the statutory rights of real property owners fully guaranteed. In the absence of consent from the owner, the investor has the option of forwarding the application to the voivode, who conducts proceedings on determining the location of the Transmission Grid Strategic Project in accordance with the provisions of the special act, specifying to what extent the investor may use the real property in question.

The Transmission Special Act is one of the legal acts designed to facilitate the implementation of projects of strategic importance to state security. Among other things, its provisions make it possible to concentrate the competence to issue key decisions and permits in the hands of a single authority and to regulate the legal issues of individual real properties more quickly. However, the basis of the investor's action is always the amicable establishment of titles to the real property for the needs of project implementation. Administrative procedures are only used after other options have been exhausted.

Impact of the line

All electrical equipment generates electromagnetic field in its vicinity, created by the presence of voltage and by the flow of current. The group of these devices includes the extra high voltage lines. A low-frequency (50 Hz) electromagnetic field is created around the line - the same as that produced by a vacuum cleaner or washing machine, electrical appliances used in every home. The electromagnetic field impact is often discussed in terms of its potential effects on human health.

The results of research conducted around the world so far do not confirm the concerns about the negative impact of low-frequency electromagnetic fields on human health or other living organisms, but neither do they exclude such an impact. For this reason, in Poland and throughout the European Union, appropriate regulations have been established, specifying the permissible impact of power facilities with a large margin of safety. Our company strictly adheres to applicable regulations. Before a facility is put into operation, electromagnetic field measurements are taken, the results of which are then verified by environmental authorities, ruling out the possibility of non-compliance.

For each implemented project, we prepare guides for local communities with reliable information about the project and its impact on the environment. The impact of electromagnetic fields is always on the agenda of regional conferences organized by contractors in cooperation with us.

Noise

The level of noise emitted depends on the design of the power line and weather conditions (it increases significantly during drizzle and rain, which is beyond our control). Noise from the newly designed lines outside the right-of-way does not exceed environmental limits.

Transformers are the main sources of noise in our substations. In order to reduce noise, we use equipment with a reduced sound power level and modern technological solutions for cooling systems. In special cases, noise barriers are built.

[GRI 413-1] We evaluate the impact of our projects on local communities for all our operations related to project implementation.

GRI 103-1, GRI 103-2, GRI 103-3 Minimising the negative social impact of the projects implemented

The purpose of the Feasibility Study (FS) development phase is to provide a detailed, in-depth analysis of the feasibility of the project route. It is based on specific studies, in particular accurate maps showing the route of the line (including pole spacing) or the location of the power substation in the commune. This allows analysing local conditions and identifying specific needs of the party in order to minimise any negative social impact of projects implemented.

As part of the work, modifications will be made to the foundation of electricity infrastructure on the basis of suggestions made by commune authorities.

These are subject to further consultation with local communities and, ultimately, to assessment within an environmental decision procedure.

At this stage, it is important to obtain information on:

- commune development plans in specific districts (source of information: municipal study, Geoportal, study of conditions and directions of spatial development (SUiKZP), local land development plan (MPZP), local development strategies, local government authority representatives),
- life plans of residents, building permits and individual planning permissions in specific districts (source of information: local government authority representatives, opinion leaders),
- potential problem situations in specific districts (source of information: local government representatives),
- opinion leaders in specific districts (source of information: local government representatives),
- the number of real property owners in the area where the project will be implemented (source of information: County Offices, land and building records),
- estimated value of utility easement (source of information: dedicated web portals regarding transaction prices in the commune).

At this stage of works, public consultations on the final form of the project are carried out. During the consultation meetings, residents provide their comments and suggestions on the line route, location of poles on the plots, location of the power substation, and access roads to the real properties where construction works will be carried out. The information is collected and analysed by the investor's representatives for possible implementation.

The information gathered in this way forms the basis for the development of the line route, which is assessed in an environmental decision procedure. Establishing and maintaining relations with stakeholders is important at this stage.

The Feasibility Study phase is intended to conduct a detailed, in-depth analysis of the feasibility of the investment option based on specific studies, in particular on detailed maps showing the line route (including spacing of poles) or the location of the substation in the commune area. This allows to analyze local conditions and identify specific needs of the party in order to minimize negative social impact of projects being implemented.

[GRI 102-40, GRI 102-42, GRI 102-43] Our stakeholders and how they are engaged

Stakeholders	Description	Communication tools and methods*
Direct action		
Regulator	The President of the ERO is responsible for regulating the energy sector and promoting competition. Among other things, we agree with the President of URE on the Development Plan in meeting current and future electricity demand and its update.	Face-to-face meetings, professional conferences, PSE impact report presenting financial and non-financial data in an integrated manner, website.
Contractors of investment tasks	Third party companies selected through public and non-public tenders. They act for and on behalf of PSE, influence the opinions of local communities and local authorities, and shape the image of our company as an investor.	Face-to-face meetings, industry conferences, internal training, efficient communication in investment tasks as part of the Social Communication Programs (brochures, website, press briefings, conferences, films, educational programs, etc.), defining good communication practices and guidelines, and cooperation as part of the sustainable development principles.
Public administration, local authorities	Transparent and professional information and education activities as part of public communication influence the building of proper relations.	Face-to-face meetings, letters of intent, dedicated specialist conferences, company-wide, specialist and investment task folders, expert magazine, PSE impact report presenting financial and non-financial data in an integrated way, website.
Public opinion, local communities	A key group from the point of view of conducting infrastructure investments. Convincing its immediate neighbours to accept the project and establishing a utility easement are crucial to the completion date of the investment task. Contact with the group allows to gain the most social acceptance or work out a compromise.	Media relations, press articles, websites, Twitter, YouTube, PSE, folders, brochures, educational programs for residents of communes where the project is planned, meetings held through contractors and directly.
Protest committees, local protest and social actions leaders	Local initiatives resulting from public disapproval of a proposed solution and representing the interests of the entire community or a selected group.	Formal correspondence, attendance at meetings and during protest actions.

Employees, managerial staff of PSE Capital Group	Committed and motivated employees, managers and business ethics are the key to a company's effectiveness. The degree to which employees are informed and their level of job satisfaction are critical to building employee engagement.	Code of ethics and conduct in line with the values, intranet, PSE impact report presenting financial and non-financial data in an integrated manner, information leaflets, communication of strategic projects, surveys, communication of implemented changes, face-to-face meetings, team building meetings, company celebrations, "Przesył" magazine, newsletter.
Employees of PSE Capital Group involved in the investment process	Committed and motivated employees, managers and business ethics are the key to the company's effectiveness. The degree to which employees are informed and their level of job satisfaction are critical to building employee commitment.	In addition to tools intended for all employees, additional tools to support ongoing works include: specialized folders, dedicated training courses, Q&A documents.
Local and regional associations	Local and regional non-governmental organisations working for the development of a particular area, such as a commune, village or district.	Providing comprehensive and reliable information on the project with particular attention to the planned location and line route, as well as the opinions of representatives of local communities - face-to-face meetings, promotional materials (brochures) and a website.
Non-governmental environmental associations and organisations	Local, regional and national non-governmental organisations working for the environmental protection, flora or fauna conservation, or active in the development of environmental initiatives in the areas concerned.	Face-to-face meetings with association representatives, provision of informational materials with particular emphasis on environmental aspects and related investor activities.
Business partners	Companies working with PSE at the pre-investment stage and performing services on PSE's behalf.	Information on security policies, ISO certifications in place and anti-corruption policies provided by employees at meetings with partners and associates.
Indirect action		
Media (national, regional, professional)	They provide information and shape opinions about projects.	Press conferences, briefings, workshops for journalists, one-on-one meetings (articles, interviews), Twitter, sponsored articles, newspaper professional supplements, expert magazine, press materials, presentations, website, PSE impact report presenting financial and non-financial data in an integrated manner.

Central administration, parliament	Ministries and central offices, members of parliament – especially those involved in parliamentary committees and teams.	One-on-one meetings, presentations, brochures, professional and economic conferences, website, PSE impact report presenting financial and non-financial data in an integrated manner, expert magazine.
Contracting parties (generating entities, distributors, trading companies)	A group of contractually bound entities cooperating with PSE on a regular basis.	One-on-one meetings, professional conferences, workshops, expert magazine, PSE impact report presenting financial and non-financial data in an integrated manner, website.

*In our activities, we attach special importance to building lasting relations and using various methods of dialog with stakeholders.

We communicate with our partners using multiple channels. The frequency of contact depends on PSE needs and inquiries from our stakeholders.

Tab. Our stakeholders and how we engage them

[GRI 102-43] Key figures

- **27 conferences, debates, seminars and professional congresses** with PSE experts,
- **26 PSE experts involved** in professional conferences, debates, seminars, forums and congresses in 2021,
- **16,388 publications** on different areas of PSE's activities were published in 2021, including 99.6 percent of materials with positive and neutral overtones,
- **4,014** followers on Twitter, **approx. 3,000** views of each of PSE's Twitter posts,
- **19,500** podcast streams,
- **47,000** views on YouTube, **971** subscribers,
- **17 webinars** for more than **1,800** participants.

6.2. Flagship community projects

GRI 103-, GRI 103-2, GRI 103-3

Assumptions of PSE social action

As PSE, we understand that we share responsibility for the development of local communities in areas where we carry out activities related to network projects or the operation of the existing infrastructure. We therefore carry out campaigns for them in order to improve the quality of life of residents of the communes and counties where we are active.

In 2021, PSE supported long-term initiatives in areas such as:

- **environmental protection,**
- **health promotion,**

- **security,**
- **Education;**
- **Improving the quality of life for citizens;**
- **action to eliminate inequalities.**

In-house indicator

Objectives of PSE social projects in 2021 (in %)

- **Environmental protection – 4.27%**
- **Health promotion – 20.12%**
- **Security – 15.24%**
- **Education – 11.59%**
- **Improving the quality of life for citizens – 44.51%**
- **Action to eliminate inequalities – 4.27%**

Initiative area: ENVIRONMENTAL PROTECTION

Creation of a green belt and purchase of an external air quality monitoring device

PSE business area:

- Construction of 400 kV Kozienice–Miłosna line.

Project value: PLN 20,000.

The Socio-Cultural Association 'Razem dla gminy Wilga' ('Together for the Commune of Wilga') installed an air quality monitoring device in the centre of Wilga village. The aim of this campaign was to contribute to the environmental awareness of the commune residents – this device shows air quality, which is affected by, among other things, the burning of rubbish in furnaces.

The newly created green belt and the vegetation planted there have a positive effect on air quality. In addition, the site serves insects by providing them with shelter and food and enhances the aesthetic value of the area. The association has committed to replenishing the planting on an annual basis.

The project was completed in September 2021. The project reached approximately 5,000 beneficiaries.

Initiative area: HEALTH PROMOTION

Cash donations for local governments to fight COVID-19

PSE business area:

- construction of 400 kV Ostrołęka–Stanisławów line,
- construction of 400 kV Mikułowa–Świebodzice line,
- modernisation of 400 kV Krajnik–Morzyczyn and Morzyczyn–Dunowo line,
- modernisation of 400 kV Ostrów–Kromolice line,

- extension of 220/110 kV Rożki power substation,
- investment project to connect Offshore Wind Farms to the Polish Power System,
- construction of 400 kV Baczyna–Plewiska line,
- construction of 220 kV line between Nysa and Ząbkowice-Groszowice tap, including the construction of 220/110 kV Nysa substation,
- construction of 2 x 400 kV line between Trębaczew and the tap into Joachimów (Rokitnica)–Wielopole line.

Value of the donation: PLN 422,301.

Provision of 23 donations for the purchase of personal protective equipment for commune offices in PSE investment areas. The aim of the initiative was to provide necessary devices and equipment to improve the safety of their employees.

The equipment purchased included ozonators, air sterilisation and purification devices, UV-C lamps, disinfection mats, portable virus and germicidal lamps, decontamination devices and non-contact thermometers.

Among the local authorities which received the support were the Communes of: Choczewo, Długosiodło, Dobromierz, Gryfino, Jadów, Jaraczewo, Kowala, Krokowa, Krotoszyn, Linia, Lubiszyn, Łęczyce, Nysa, Odolanów, Platerówka, Przodkowo, Siekierczyn, Słupsk (rural commune), Strachówka, Sulików, Świerzawa, Zabrodzie and the City of Zabrze.

Availability of rehabilitation services for seniors

PSE business area:

- construction of 400 kV Ostrołęka–Stanisławów line.

Project value: PLN 20,000.

The aim of the Senior+ Club project in Dzwonek, in the Commune of Czerwin, was to provide, free of charge, specialised rehabilitation equipment for physiotherapy at the place of residence. A multifunctional apparatus for electrotherapy, magnetotherapy and ultrasound laser therapy was purchased along with a mobile massage bed.

Dzwonek is an agricultural village located 20 km from the nearest town. Limited access to health centres and the lack of public transport contribute to the abandonment of preventive medicine measures. The project aimed at giving support to club members and residents of Dzwonek and surrounding villages whose injuries and deteriorated body condition contributed to illnesses and problems in advanced age.

The project ended in November 2021. More than 1,100 people can benefit from the specialised equipment.

Initiative area: EDUCATION

Purchase and installation of a virtual chemistry laboratory

PSE business area:

- Construction of 400 kV Kozienice–Miłosna line.

Project value: PLN 20,000.

Primary School No. 4 in Otwock launched a virtual chemistry laboratory. The facility does not have a chemistry fume hood or student stations to carry out experiments by traditional means, so the virtual laboratory has created learning opportunities for children and young people.

As part of the funding, a computer with software and VR goggles were purchased to enable chemistry experiments in line with the core curriculum. The use of innovative technology makes it possible to ensure the safety of pupils.

The package includes programmed experiments for primary schools, lesson plans for the teacher and laboratory cards with instructions and tasks for pupils.

The project implementation was completed in October 2021 and reached approximately 500 pupils.

Pilot edition of the 'POWER Academy' programme

PSE business area:

- construction of 400 kV Kozienice–Miłosna line,
- construction of 400 kV Ostrołęka–Stanisławów line.

Project value: PLN 349,145.

The Power Academy educational programme is aimed at primary school pupils in Years 7 and 8 with physics, geography and biology in the core curriculum.

It involves raising general knowledge of electricity, the safety of energy use and building awareness for the needs of Poland's energy infrastructure expansion and modernisation. Its main goal is to familiarise pupils in Years 7 and 8 with the ins and outs of energy, power generation and energy transmission using content-intensive educational events.

The intermediate goal is to build acceptance for the projects implemented by PSE and to raise awareness of their importance for the functioning and development of the economy, while building public acceptance for these projects.

Many spectacular experiments were prepared for the pupils: with the use of a Van De Graaff generator, they were able to produce their lightning by themselves, investigate what plasma is, check the power consumption of various devices and the electromagnetic field strength. They could also run a high-voltage line between the power station and the city on a special diorama.

As part of the first phase targeting pupils from 16 communes, 51 events were held in 24 schools. A total of 1,357 Year 7 and 8 pupils from 82 sections benefited from the lessons.

Pilot classes were held in the Communes of: Wiązowna, Magnuszew, Sobienie-Jeziory, Wilga, Stanisławów, Strachówka, Urle, Zabrodzie, Wyszków, Poręba, Długosiodło, Goworowo, Ostrołęka, Wąsewo, Czerwin and Troszyn.

The campaign was carried out in September and October 2021.

Initiative area: IMPROVING THE QUALITY OF LIFE FOR CITIZENS

Purchase of life-saving equipment and gas detectors for seniors

PSE business area:

- Construction of 400 kV Kozienice–Miłosna line.

Project value: PLN 20,000.

The Sulejówek Volunteer Fire Brigade is strengthening the safety of the residents of the "Senior+" Day Care Centre – the unit purchased 24 carbon monoxide detectors for them. They were installed in the homes of the elderly people, which also had an impact on the comfort of their daily lives.

In addition, technical rescue gloves for 22 firefighters and rescue equipment – firefighters' discharge hoses and an electric submersible pump – were purchased within the project. Increasing the unit's firefighting readiness has been beneficial to the residents of the commune. With the right emergency preparedness, the volunteers can focus on helping where they are needed.

The project was implemented in August 2021 and reached approximately 20,000 people.

Organisation of a free kayak rental service for residents of the Commune of Halinów

PSE business area:

- Construction of 400 kV Kozienice–Miłosna line.

Project value: PLN 20,000.

The "Halinów Team" Pupils' Sports Club purchased six double kayaks with a set of oars and life jackets and trailers to transport them. The club car was also adapted so that equipment can be transported safely.

The aim of the project was to increase access to tourist kayaking also among people with limited financial possibilities, to popularise this form of physical activity and to encourage the residents of the Commune of Halinów to spend their free time in beautiful natural surroundings.

As part of the promotion of this project, kayaking trips were organised on the surrounding rivers – the Świder, Vistula, Długa and Liwiec.

The project implementation ended in August. Around 100 people used the equipment during the first summer season.

Marking out bicycle routes in Wiązowna

PSE business area:

- construction of 400 kV Kozienice–Miłosna line.

Project value: PLN 20,000.

The project of the Commune Cultural Centre in Wiązowna is part of a long-term project, the concept of which consists is developing sightseeing tourism in the commune areas of special natural beauty.

In 2021, PSE supported the realisation of the third stage of the cycle routes in the Commune of Wiązowna, which lead along asphalt roads, dirt roads and, at exceptional points, forest tracks and cycle paths.

By creating trails, residents will be able to walk through the commune, passing historic buildings, natural monuments and sports infrastructure, such as playgrounds, outdoor gyms, and newly created street workout areas, along the way. The routes are suitable for experienced riders as well as amateurs, families with children or seniors.

Thanks to PSE support, directional signposts typical of bike routes were installed along this route. The plaques are made of metal, which is resistant to weather conditions. This will help them last longer in the field. The trail runs along the route Glinianka–Czarnówka–Rzakta–Bolesławów–Kruszówiec–Wola Karczewska–Glinianka.

The project was implemented from August to December in cooperation with 'Mazowsze' Branch of the Polish Tourist and Sightseeing Society (PTTK) from Warsaw, with the technical support of the Social Cooperative "Odmiana" from Wiązowna. It reached over 4,000 people.

Initiative area: ACTION TO ELIMINATE INEQUALITIES

Purchase of computers and a projector for the Public Library in Mińsk Mazowiecki

PSE business area:

- construction of a 400 kV line between the Warsaw agglomeration and Siedlce.

Project value: PLN 20,000.

The Public Library in Mińsk Mazowiecki acquired 7 computer sets and a projector for educational activities addressed to people at risk of digital exclusion, mainly seniors.

As part of 'From Library to Media Library' project, workshops were held for the elderly and people with disabilities, during which participants learned the basics of how to use the equipment, including starting up a computer and using a mouse, logging on to Windows, familiarising themselves with the word processor, as well as creating and printing text. The workshop participants were wards of the CARITAS Day Care Centre of Warsaw-Praga Diocese in Minsk Mazowiecki and seniors from CENTRUM Medical Day Care Centre.

The project was implemented in September 2021. 12 people participated in the workshops. Approximately 20 visitors to the library used the equipment per day.

Construction of an outdoor gym and extension of an inclusive yard with stations for people with disabilities

PSE business area:

- construction of 400 kV Baczyna–Plewiska line.

Project value: PLN 19,999

The Community Self-Help Home in Pszczew created an outdoor gym adapted to the needs of people with mobility impairments, including those in wheelchairs.

The main concept of the project was to create a place for safe activation of adults with disabilities through the purchase and installation of suitably adapted exercise stations. Being able to use external equipment contributes to removing architectural barriers in the community and reduces divisions that prevent people from enjoying social life.

The outdoor exercise space further promotes the integration of residents and provides an opportunity to build self-reliance and a sense of independence. The main beneficiaries were the wards of the Community Self-Help Home.

The project was implemented in August 2021 and reached 31 people.

Key figures

PLN 4.6 million — total value donated by PSE for social actions in 2021.

164 projects, including 120 projects through community sponsorship, 43 through donations, and 1 through service outsourcing implemented in 115 communes and counties in 11 voivodeships.

180 – beneficiaries – entities that benefited from PSE's social support in 2021.

PLN 1.6 million – value of in-kind and financial donations for the fight against the COVID-19 pandemic.

6.3. Quality of life of Poles vs. electricity supply

GRI 103-1, GRI 103-3 Living in the vicinity of electrical power lines – standards and good practice

The owners of real properties, on which transmission facilities are located or over which electrical power lines run, have, in principle, free access to their real properties, which they may use freely while maintaining suitable precautions. They may run their business activities freely using certain equipment and machinery or engage in farming without time limitations. However, it is always important to exercise elementary caution and apply common sense when using transmission facilities.

The equipment included in electrical power lines is designed to minimise the risk of negative effects on persons in the vicinity of the lines. The location of lines is planned so that the transmission facilities do not pose a threat to surrounding human habitats, and so that they blend into the landscape to the greatest extent possible.

In order to eliminate possible hazards, our qualified employees take periodic preventive measures consisting in line surveys and inspection of their condition. If the event of circumstances requiring an intervention, they take actions to eliminate situations that potentially threaten property and people present in the vicinity of the lines. These activities are especially intensified in situations of increased risk or crisis, such as floods or hurricanes. In this aspect, cooperation of the company's employees and the owners of real properties adjacent to electrical power lines, who are often the best source of information regarding the phenomena occurring there, is also important. The goodwill and help of those people can significantly help to address potential risks or shorten the process of remedying a failure.

How to organize your life next to a line?

In order to live undisturbed in the vicinity of the line, it is enough to use common sense and observe elementary precautions – especially in the area of the buffer zone.

The buffer zone is an area directly underneath and on both sides of an electrical power line, where construction, alteration, modernisation and operation work is allowed, and within which – due to the safety of the line operation and its immediate surroundings – the freedom of land use is restricted. Depending on the type of line, the width of the buffer zone ranges from 50 to 80 m.

For the sake of safety, one should also refrain from any activity that could jeopardise undisturbed operation of the line or cause potential danger to the persons present in its vicinity. It is forbidden to interfere with the lines in any way and to carry out activities that may lead to line damage or electrocution, such as climbing on poles or carrying out field work using machinery that is high or has long booms.

PSE conducts periodic surveys of lines and assessments of their technical condition. In the event of recording circumstances that may affect the continuity of electricity supply or pose a threat to property or people present in the vicinity of a line, we immediately take remedial measures. All work – repairs, renovations, clearing of trees exceeding height standards, etc. – is done by qualified teams of professionals from our organisation and at the PSE's expense.

Worth knowing

The **width of the buffer zone** primarily depends on the rated voltage of the line and the type (series) of poles used. The boundaries of the buffer zone for lines of a specific voltage are determined based on requirements included in regulations on permissible values of electric and magnetic field intensity, and noise level.

The averaged width of the buffer zone for different types of extra-high voltage lines operated in the country is a maximum of – for **400 kV lines** (depending on the line design): **40 m, 35 m and 30 m from the centreline** in the case of a 400 kV line built on Z52 poles, and **25 m from the centreline in both directions for 220 kV lines**.

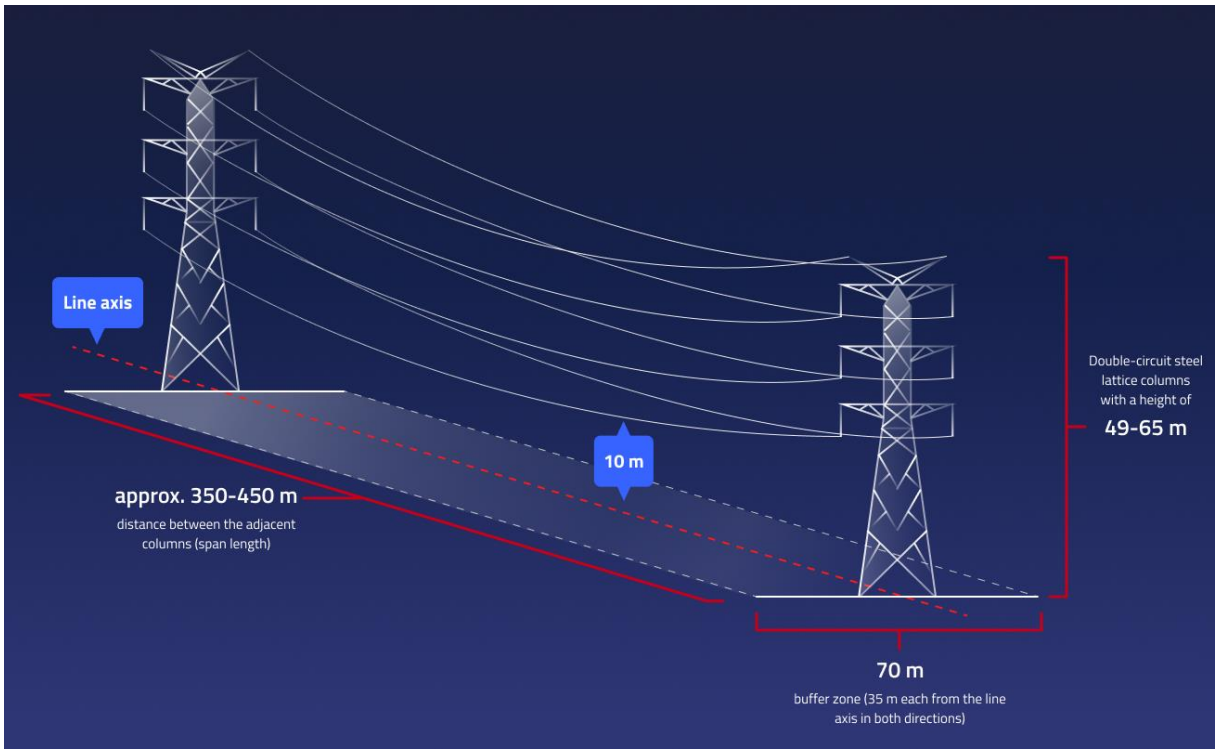


Figure 1: The buffer zone for 400 kV lines.

GRI 103-2 Rules to follow in the vicinity of electrical power lines

1. Unauthorized climbing poles and touching of transmission equipment, especially power lines, is forbidden.
2. It is prohibited to erect new residential buildings or new civil structures with rooms to be regularly occupied by people directly under the line or in its buffer zone (the area directly under and on both sides the line).

3. Owners of properties that are farmlands may freely cultivate crops on their land and work using heavy farming equipment (combines, tractors, seeders, and other mechanical farming machinery). Caution is required at the same time – especially in situations where the machinery or equipment used has long booms or is tall by design.
4. There are no restrictions on grazing cattle or other livestock under or right next to overhead lines, nor are there any impediments to the creation of fish ponds. According to review papers and data published by the World Health Organisation (WHO), electromagnetic fields in the vicinity of extra high voltage power lines are not harmful to livestock.
5. Plantings that would come dangerously close to electrical power lines are not permitted due to the potential risk of tree branches touching the electrical power lines. PSE conducts continuous monitoring of company-owned equipment. In case of excessive growth of trees or shrubs near lines, appropriate cutting works are carried out. This work is conducted at the expense of PSE, and the wood obtained during cutting works is transferred to the real property owners. Our company currently performs tree cutting according to a five-year standard, for which the contractor provides a four-year guarantee. The distance of the conductors from the tree crowns is, therefore, determined based on the current crown dimensions, taking into account the five-year growth appropriate to the tree species and the site. In the event of above-normal growth during the guarantee period, additional work is performed immediately at the contractor's expense. Cutting work is only required under strictly defined circumstances. In situations where ornamental or orchard trees that do not reach significant heights are planted, the work mentioned above is not necessary.

Worth knowing

There is no potential for adverse environmental impacts outside the designated buffer zone area. In addition, stringent requirements imposed for residential development areas are met.

6.4. PSE operations vs. transmission tariff and electricity bills

GRI 103-1, GRI 103-2, GRI 103-3 Transmission tariff and electricity bills

As the only TSO in Poland, our company is responsible for the transmission of electricity to consumers throughout the country. For PSE, this means responsibility for the transmission infrastructure, and the need to perform operational, maintenance, overhaul, modernisation and expansion works. The transmission grid must address changes resulting from, among other things, an increase in the demand and the structure of electricity consumption in the country, as well as changes in the structure and location of generating sources, including RES.

Maintaining the required quality parameters of the supplied electricity and ensuring the safety of the NPS operation involves the need to purchase system services provided by electricity producers.

Expenditures related to transmission activities, i.e. operating costs and capital expenditures, were financed according to the principles set forth in applicable legal regulations, and the expenditures are covered with revenues from the provided transmission services, received on the basis of the company's Tariff approved by the President of ERO.

The company's Tariff is a set of prices and fee rates as well as the terms and conditions for their application, prepared annually based on planned, justified costs of business, and the return on capital employed in the transmission activities to finance investment projects. The costs forming the basis for the calculation of the transmission service fees are subject to an assessment by the President of the ERO, who approves the Tariff in the course of the administrative proceedings.

In 2021, the PSE's tariff included the tariff fee rates:

- **calculated by the TSO** based on the costs of PSE's transmission activities and return on capital;
- **determined by the President of ERO and not directly related to PSE's activities:**
  - a **RES fee** related to ensuring the availability of electricity from renewable sources in the Polish Power System; in 2021, the RES fee rate was PLN 2.20/MWh,

  - a **capacity fee** related to remuneration for the service of maintaining readiness to supply electrical power to the power system and supply that power to the system during periods of emergency;
- **determined by the minister responsible for energy and not directly related to PSE's activities** – a co-generation fee related to ensuring availability of electricity from high-efficiency co-generation in the Polish Power System – in 2021, the co-generation fee was PLN 0.00/MWh;
- **defined in the Act on the rules for the compensation of costs incurred by generating entities in connection with early termination of long-term agreements, not directly related to PSE's activities** – a transitional fee related to the service of making the Polish Power System available.

Revenues from the capacity, RES, co-generation and transitional fees collected by PSE are transferred in full to the Settlement Body for further redistribution to electricity generators.

Structure of fees in the PSE Tariff applied for settlements in 2021

According to the Polish electricity market model, **PSE settlements for transmission services are made with consumers physically connected to the transmission network in the territory of Poland, i.e:**

- **distribution system operators (DSO)**, for which the costs of purchasing the services from PSE constitute justified business costs, and are included in the calculation of their tariffs for electricity distribution services,
- **end users**.

Therefore, the aforementioned consumers physically connected to PSE's network bear the entire costs included in the calculation of transmission fee rates.

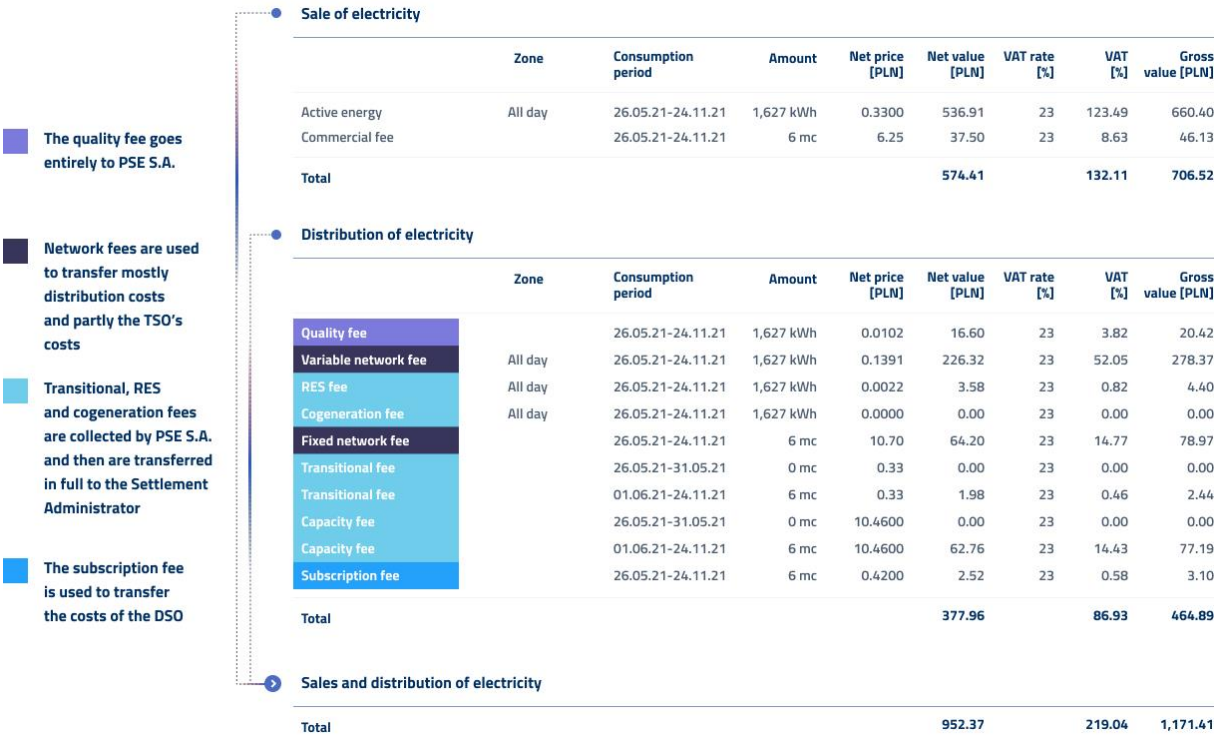
Generating entities do not pay the transmission fees for introducing electricity into the network. They only pay a quality fee for the amount of electricity consumed by the end users connected to their network, systems and equipment, to whom they sell electricity.

Trading companies do not pay any tariff fees to PSE with the exception of the market fee applied only to electricity imported to Poland from Ukraine.

Worth knowing

In the case of consumers connected to the distribution network (the network owned by the DSO), including for example households, the cost of electricity supply, in addition to the costs related to the DSO's business, also includes the PSE's business costs, i.e. the costs related to the DSO's purchase of transmission services from PSE.

The costs of PSE S.A. on electricity bills



Sale of electricity

	Zone	Consumption period	Amount	Net price [PLN]	Net value [PLN]	VAT rate [%]	VAT [%]	Gross value [PLN]
Active energy	All day	26.05.21-24.11.21	1,627 kWh	0.3300	536.91	23	123.49	660.40
Commercial fee		26.05.21-24.11.21	6 mc	6.25	37.50	23	8.63	46.13
Total					**574.41**		**132.11**	**706.52**

Distribution of electricity

	Zone	Consumption period	Amount	Net price [PLN]	Net value [PLN]	VAT rate [%]	VAT [%]	Gross value [PLN]
Quality fee		26.05.21-24.11.21	1,627 kWh	0.0102	16.60	23	3.82	20.42
Variable network fee	All day	26.05.21-24.11.21	1,627 kWh	0.1391	226.32	23	52.05	278.37
RES fee	All day	26.05.21-24.11.21	1,627 kWh	0.0022	3.58	23	0.82	4.40
Cogeneration fee	All day	26.05.21-24.11.21	1,627 kWh	0.0000	0.00	23	0.00	0.00
Fixed network fee		26.05.21-24.11.21	6 mc	10.70	64.20	23	14.77	78.97
Transitional fee		26.05.21-31.05.21	0 mc	0.33	0.00	23	0.00	0.00
Transitional fee		01.06.21-24.11.21	6 mc	0.33	1.98	23	0.46	2.44
Capacity fee		26.05.21-31.05.21	0 mc	10.4600	0.00	23	0.00	0.00
Capacity fee		01.06.21-24.11.21	6 mc	10.4600	62.76	23	14.43	77.19
Subscription fee		26.05.21-24.11.21	6 mc	0.4200	2.52	23	0.58	3.10
Total					**377.96**		**86.93**	**464.89**

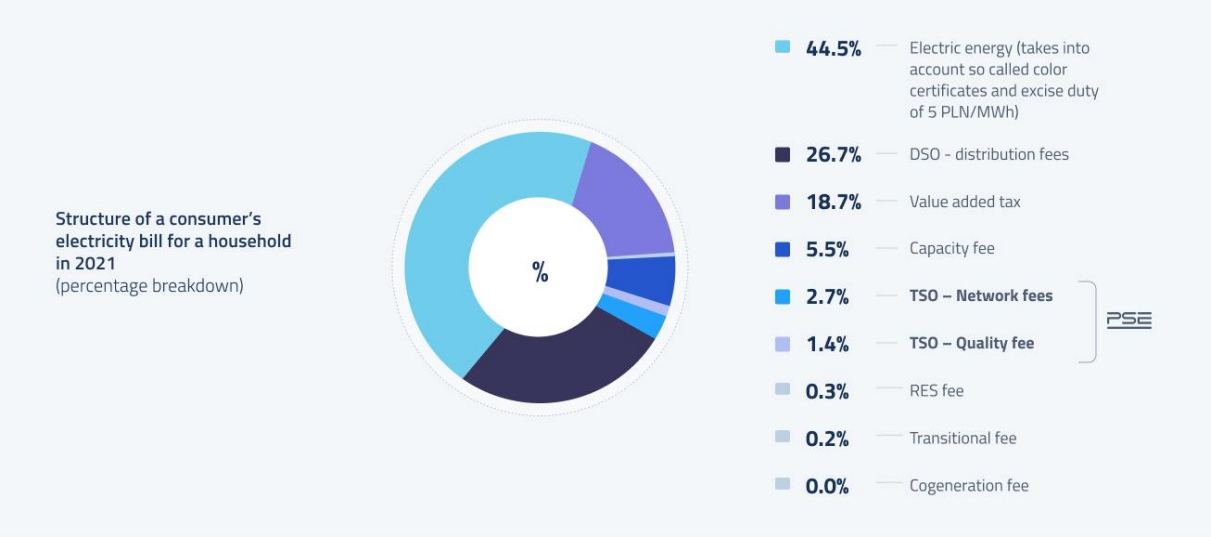
Sales and distribution of electricity

Total					**952.37**		**219.04**	**1,171.41**

Worth knowing

The average net rate of the fee for the transmission services provided by PSE (excluding the rates of support fees, i.e. excluding the capacity, transitional and RES fees, as well as the co-generation fee, which in 2021 was PLN 0.00/MWh) was in 2021 only approx. 4.1 percent of the average gross rate for households. The net rate of the support fees (capacity, transitional, co-generation and RES fees) was 6 percent of the average gross rate for households.

Structure of a consumer's electricity bill for a household in 2021.



Worth knowing

The amounts of bills for households are mainly influenced by the following:

- electricity price,
- distribution service costs,
- Value Added Tax.

6.5. PSE's priorities for HR development

GRI 103-1 We ensure balanced and consistent support of employee competency development to achieve results compliant with strategic objectives.

GRI 103-2 HR policy and presentation of HR priorities

The fulfilment of the Transmission System Operator functions by PSE requires a number of unique competencies, including in the area of power dispatch, project implementation and ensuring the maintenance of network assets and transmission grid availability on an expected level. High levels of expertise and education are the strengths of our company's human capital.

Our organisation supports the development of competencies. PSE's professional development activities for employees are aimed at meeting current and future needs in terms of the skills, experience and knowledge necessary to achieve the strategic objectives pursued by the company. The implemented solutions support long-term development of competencies, serve succession planning for key positions, and enable the identification of the best employees. At the same time, we do not forget about measures to promote work-life balance.

The HR policy in force at PSE is addressed to all PSE employees and defines key areas on which the effective implementation of the strategy depends. The foundation of the HR policy are PSE's values and corporate culture, and its pillars are values, high quality and improvement.

Competency model

GRI 103-2 In 2021, the organisation developed a proposal for the Personal Competency Catalogue, which includes company-wide, managerial and job competencies. Work was also underway to develop professional competencies, encompassing the knowledge and professional skills required to perform tasks assigned to a particular job. Our goal for the coming year is to identify the competencies that are key from the perspective of maintaining the continuity of the company's business processes.

The solutions worked out as part of the competency model are developed in close cooperation with the business side, also because business employees will be the key beneficiaries. From a strategic perspective, we are set on developing tools to support the achievement of our strategic objectives by effectively managing people as one of the key project resources.

Table GRI 102-8: Data on employees and other persons working for the organisation, broken down by duration of employment, gender and region

GRI 102-8	Total number of employees by gender		
	2021	2020	2019
Females	218	581	551
Percentage of women (%)	8.05	22.12	21.71
Males	2,490	2,046	1,987
Percentage of men (%)	91.95	77.88	78.29
Total	**2,708**	**2,627**	**2,538**

GRI 102-8	Total number of employees by duration of employment, gender and region	No. of employees 2021			No. of employees 2020		
		Females	Males	In total	Females	Males	In total
Konstancin	Employed for a definite period	43	57	100	35	56	91
-Jeziorna	Employed for an indefinite period	382	786	1,168	354	723	1,077
(headquarters)	**Total**	**425**	**843**	**1,268**	**389**	**779**	**1,168**
ZKO	Employed for a definite period	3	29	32	6	27	33
in Warsaw	Employed for an indefinite period	24	228	252	25	216	241
	Total	**27**	**257**	**284**	**31**	**243**	**274**
ZKO	Employed for a definite period	3	10	13	4	17	21
in Bydgoszcz	Employed for an indefinite period	33	184	217	35	178	213
	Total	**36**	**194**	**230**	**39**	**195**	**234**
ZKO	Employed for a definite period	2	16	18	1	19	20
in Radom	Employed for an indefinite period	34	227	261	39	233	272
	Total	**36**	**243**	**279**	**40**	**252**	**292**
ZKO	Employed for a definite period	5	17	22	8	16	24
in Poznań	Employed for an indefinite period	30	247	277	29	254	283
	Total	**35**	**264**	**299**	**37**	**270**	**307**
ZKO	Employed for a definite period	12	21	33	5	27	32
in Katowice	Employed for an indefinite period	36	279	315	40	280	320
	Total	**48**	**300**	**348**	**45**	**307**	**352**
Total	Employed for a definite period	68	150	218	59	162	221
	Employed for an indefinite period	539	1,951	2,490	522	1,884	2,406
	Total	**607**	**2,101**	**2,708**	**581**	**2,046**	**2,627**

Table GRI 102-8: Data on employees and other persons working for the organisation, broken down by work time and gender

GRI 102-8		No. of employees 2021	No. of employees 2020

	Number of employees by work time	Females	Males	In total	Females	Males	In total
Total	Full-time	592	2,079	2,671	568	2,025	2,593
	Part-time	15	22	37	13	21	34
	Total	**607**	**2,101**	**2,708**	**581**	**2,046**	**2,627**

GRI 102-8	Number of employees and associates (per person) by the form of employment	Number of employees and associates					
		2021			2020		
		Females	Males	In total	Females	Males	In total
Employed based on contracts of mandate		5	10	**15**	4	9	**13**
Employed based on specific task contracts		0	0	0	0	0	0
Employed under apprenticeship contracts		0	0	0	0	0	0
Self-employed		0	0	0	0	0	0
Supervised and/or seasonal workers		0	0	0	0	0	0
Total		**5**	**10**	**15**	**4**	**9**	**13**

Employee development

PSE conducts development activities on an ongoing basis to continuously improve the competencies of employees and to ensure that the company's strategic objectives are met. These activities focus primarily on providing the knowledge and skills needed to ensure the proper functioning of the Polish Power System. As every year, two dedicated programmes aimed at the Operations Services and the Dispatching Services were important elements of the development activities in 2021.

We also continued to implement development activities as part of the training catalogue addressed to the employees of our company. Importantly, everyone at PSE has access to training on an equal footing, allowing all employees to benefit from various forms of development regardless of their position or job seniority.

The following forms of development are available as part of this solution:

- GRI 404-2**Manager's Academy managerial training** to improve managerial and leadership skills of the top management or managers. The choice of training depends on individual needs of each manager.
- **Specialised/expert training** covering topics related to the tasks carried out by individual employees.
- **Training to develop soft skills** aimed at improving personal skills and supporting effective task performance.
- **Adaptive/initial/periodic/on-the-job training** covering all groups of employees regardless of the functional area and hierarchy and providing the baseline, universal knowledge necessary for the job.
- **Professional conferences**

Due to the ongoing pandemic, most of the training was delivered online, which provided the opportunity to meet training objectives while ensuring safety. At the same time, to meet the expectations of employees, PSE has implemented a new training solution in 2022, the so-called EDU-MIX training, which combines participation in workshops conducted by trainers with the possibility of enhancing knowledge on one's own through e-learning.

In addition to attending various training courses and industry conferences, employees improve their qualifications also by taking advantage of subsidised study and language courses.

E-learning courses

In 2021, PSE provided employees through its own platform with training on a variety of topics to improve their knowledge and skills, which they can use as and when they need it or as recommended by their superiors.

Some of the material made available is mandatory training on issues such as information security, occupational health and safety and compliance. Optional training courses to choose from include, for example, organisation of remote work, problem solving and innovative thinking, and personal effectiveness. The training library is constantly being enriched with new items. In 2021, due to the ongoing pandemic, these were in particular suggestions on mental resilience and building a good atmosphere.

Personal Development Plans – PDP

One of our organisation's priorities is to enable employees professional development and to support them in this process. In the Pulsometre survey conducted at the end of 2020, PSE employees identified as important the need for personal development and improvement of existing solutions in this area. In response to these needs and suggestions, we launched a pilot of the Personal Development Plan (hereinafter the PDP) initiative in Q2 2021.

GRI 103-3 The PDP is a two-way process of creating a development action plan to improve competencies in the context of the organisation's goals, involving both the supervisor and the employee. A properly implemented PDP engages employees and makes clear what is expected of them. Through systematic feedback, it also provides an opportunity to communicate the expectations of both sides of the process.

The PDP consists of a development plan in the area of personal and professional competencies, as well as an indication of the development goal and how the employee will achieve it.

Table GRI 404-1 – Annual average number of training hours per employee by employment structure and gender

GRI 404-1	Total number of training hours by gender					
	2021			2020		
	Females	Males	Total	Females	Males	Total
Total number of training hours by gender	13,868.5	59,415	**73,283.5**	9,399	35,239	**44,638**
Number of employees (the same values as in GRI 102-8)	607	2,101	**2,708**	581	2,046	**2,627**
Average number of training hours by gender	22.85	28.28	**27.06**	16.18	17.22	**16.99**

GRI 404-1* Employment structure	Total number of employees by employment structure	Number of training hours by employment structure (instructor-guided training)	Number of training hours by employment structure (e-learning)	Total number of training hours by employment structure	Average number of training hours by employment structure
2021					
Assistant	4	38.0	49	**87.0**	21.75
Director	33	553.0	179	**732.0**	22.18
Dispatcher	131	604.0	1,850	**2,454.0**	18.73
Expert	142	2,529.5	680	**3,209.5**	22.60
Head Specialist	349	6,687.0	2,171	**8,858.0**	25.38
Inspector	12	441.0	153	**594.0**	49.50
Head of Section	49	1,163.0	319	**1,482.0**	30.24
Department Manager	198	5,266.5	1576	**6,842.5**	34.56
Junior Specialist	150	3,402.5	1409	**4,811.5**	32.08
Legal Advisors	47	662.0	216	**878.0**	18.68
Clerk	3	80.0	39	**119.0**	39.67
Specialist	523	12,156.5	3,774	**15,930.5**	30.46
Specialist Coordinator	388	6,561.0	2,418	**8,979.0**	23.14
Senior inspector	3	0,	30	**30.0**	10.00
Senior Specialist	612	12,885.5	4,183	**17,068.5**	27.89
Apprentice	8	46.0	95	**141.0**	17.63
Deputy Director	51	731.0	300	**1,031.0**	20.22
Other positions*	5	0,	36	**36.0**	7.20
TOTAL	**2,708**	**53,806.5**	**19,477**	**73,283.5**	**,**

* The list shows the number of training hours received throughout 2021 by staff members employed as at December 31, 2021. The "other positions" group includes positions with fewer than 3 employees.

The e-DeK system – current status and development plans

2021 was the first year of using the platform with the full range of functionalities provided, following the completion of the SAP SuccessFactors – Learning Management System (SAP SF LMS) module implementation project at PSE.

A modern tool such as the SAP SF platform enables, among other things, comprehensive handling of training processes. It enables training to be more effective thanks to unrestricted access to educational content for employees, streamlines the document flow, and allows quick access to information.

Currently, the platform is widely used to make various forms of training available to employees (e-learning, training with a trainer, and mixed, sequential, cyclical training, etc.).

In 2021, due to the constraints of the continuing epidemic situation, training with a trainer offered in an online format was very popular. E-learning courses have now become a regular feature of the extensive training offer. The system's ability to provide ongoing reporting and performance monitoring means that the e-learning formula is also increasingly being used to design and conduct mandatory training.

Thanks to the automation of activities and processes, the new tool also proves its worth in the area of managing periodic OH&S training and supports the implementation of the training plan.

The platform is used by all PSE employees on an ongoing basis.

Given the capabilities of the system and the positive experience of its operation to date, the next planned step is work on the implementation of a module to support the management of goals and employee appraisal (SAP SF PMGM), which enables planning and monitoring of tasks, projects and development goals.

Recruitment and employer branding activities

The ongoing COVID-19 pandemic in 2021 had a significant impact on how recruitment processes were conducted and on employer branding activities, including PSE's participation in job fairs. During that time, our recruitment processes were conducted mainly remotely, which allowed us to acquire new employees without any interruptions. PSE also offered places in internship programmes allowing university students and graduates to gain their first work experience.

Internship programmes

GRI 103-3 'Energy for the Future' internship programme

In 2021, our organisation continued its participation in the 'Energy for the Future' internship program carried out in cooperation with the Ministry of Climate and Environment and companies from the power sector (PKN Orlen, PGNiG, PGE).

The goals of the programme are as follows:

- building human resources for the Polish power sector by attracting the best students from technical universities interested in working in this sector;
- familiarizing interns with the specifics of working in the country's key power companies and the Ministry of Climate and Environment;
- preparing interns for employment in the power sector.

During the year, PSE took on 4 interns under this programme. Internships were organised remotely or onsite, while meeting sanitation and safety restrictions.

GRI 103-3 Energy Internship programme

In 2021, PSE launched the eighth edition of the Energy Internship programme for students and graduates who can demonstrate very good academic results.

The goals of the programme are as follows:

- sourcing young talent from the market;
- building a positive image of PSE as a responsible employer.

In 2021, PSE took on 9 interns under the programme.

Energy Academy

In 2021, the 10th edition of the Energy Academy took place. It is a training and educational project of the Lesław A. Paga Foundation addressed to those who see their future professional careers in the power sector. Its purpose is to provide an opportunity to learn about the best practices in the industry.

This year's edition featured meetings with managers and experts from the System Management Department and the International Cooperation Department, who told the Academy participants about the activities of the Electricity Transmission System Operator and, in particular, about its role in the development of the electricity market and maintaining safe operation of the Polish Power System.

Job fairs

In order to increase the effectiveness of recruitment processes and attract the best candidates, in 2021, PSE participated in selected job fair events: Energy Week in cooperation with the SGH Energy Students' Scientific Circle, online IT Job Fair (spring and autumn editions), Warsaw IT Days, Data Science Summit ML Edition and Data Science Summit (autumn edition).

Apart from participation in the fairs, PSE presented its offer in the Catalogue of the 25th Job and Internship Fairs for IT and Electronic Engineers at the Faculty of Electronics and Information Technology of the Warsaw University of Technology in an online format.

Other initiatives to support the recruitment

We continued our employer branding efforts by promoting job offers on the company's LinkedIn profile, and by conducting the 'Fridays with a Recruiter' information campaign on LinkedIn to encourage participation in our hiring processes.

In March/April 2021, Digital+ advertising campaign was carried out in cooperation with Pracuj.pl service, with the aim of promoting PSE's job offers, among others, in social media (Facebook, Messenger, Instagram).

In order to improve the quality of recruitment activities, our company also made a dedicated e-learning course 'Recruitment for Managers' available on e-DeK educational platform. The training course consists of two parts. The first one deals with the recruitment process and the second one with conducting the recruitment interview. The complete training is obligatory for all those participating in recruitment processes.

Employee Performance Appraisal System

In 2021, as in previous years, all PSE employees were subject to a periodic performance appraisal. The performance appraisal of employees in specialist positions is conducted on a quarterly basis (provided that they have worked for at least 1 month), and focuses on the task completion level.

Persons in managerial and executive, expert and legal advisor positions are covered by the 'Management Through Objectives' individual salary incentive system. It is a comprehensive and result-oriented method of evaluation, but also, and very importantly, it fosters increased staff commitment to the achievement of strategic objectives, and it helps to monitor their achievement. The settlement of objectives takes place on a six-monthly basis.

GRI 404-3	Percentage of employees subject to regular job quality assessments and career development reviews by gender	2021 (in %)	2020 (in %)
Percentage of employees in the organisation subject to regular job quality assessments and career development reviews, by gender:		100	100
Females		100	100
Males		100	100

Creating a space for employee development – mentoring

It is in the DNA of our organisation that sourcing of unique external expertise is difficult, as many processes and systems operate only in PSE. The role of the Transmission System Operator requires us to manage multiple areas systemically, which is often what makes for success in the role, while also being difficult for junior staff due to the need to understand many relations and dependencies. An additional obstacle to employees acquiring knowledge other than strictly job-related expertise is the complex organisational structure of our company.

As a panacea for these ills, we decided to launch an initiative combining the needs of sourcing expertise and meeting new people from other organisational units. Thus, we launched a mentoring programme in November 2021.

Recruitment to the programme was spontaneous. Any employee who wanted to participate could apply. It was the HR Department's task to organise the process in such a way that the mentee's development needs were matched with a specific mentor.

60 mentees and 33 mentors signed up. After analysing the possibility of matching mentoring pairs, it became clear that we needed to recruit additional mentors – so that each mentee had the best development option. In the end, the mentoring group was composed of 48 mentors.

All participants – mentors and mentees – had the opportunity to participate in preparatory workshops. The workshop programme covered various topics, such as the philosophy and types of mentoring, the roles and responsibilities of the mentor and mentee, defining mentoring objectives, introducing the MaxieDISC competency testing methodology (gives guidance on identifying behavioural and collaborative styles), etc.

In the end, 60 mentoring pairs were created. The pairs would meet with varying frequency, minimum once a month, and the most active ones – even 2–3 times a month. The programme was planned for 7 months with the possibility to change the mentor after 4 months. This option was used by 15 mentees.

To further enrich our offer of gaining knowledge and meeting new people, mentoring lectures were additionally held; 2–3 times a month, experts in various fields presented selected issues or case studies. On average, 20–25 people attended the lectures each time.

A survey among the participants confirmed that the initiative received a very good evaluation and deserves to continue. We hope that this practice will become a permanent part of our organisation's culture.

Pulsometre

This year's Pulsometre Opinion and Organisation Health Survey was conducted in November/December 2021. The survey has been conducted for several years, and from 2020 onwards, using a new formula developed by the Human Resources Department. The flexibility of our Pulsometre methodology allows us to proactively relate to reality and ask adequate questions to receive answers that will allow us to improve our organisation and working conditions. The survey was expanded to include 2 aspects and covered 5 areas:

1. Evaluation of task performance and engagement-building behaviour: Leadership and Strategy, Management Quality, Competence and Development, Knowledge Management, Work Structure and Organisation, Cooperation and Employee Relations, Remuneration and Recognition, Communication and Openness, Safety, Working Conditions and Resources, and Commitment.
2. Assessment of the company's behaviour during the COVID-19 pandemic.
3. What builds and influences employee motivation.
4. Building positive employee experiences (new in 2021).

5. Evaluation of the onboarding process (carried out by people with less than one year of seniority; new in 2021).

The first parameter enabling the assessment of the so-called responsiveness of an organisation, i.e. the willingness to dialogue, is attendance. This year, it is **59 per cent and is 14 per cent higher than in 2020**. A total of 1,687 of the 2,864 eligible employees, i.e. those hired before 1 October 2021, participated in the survey.

At the heart of the Pulsometre, is the first research area encompassing 11 aspects that make up ENGAGEMENT-building. The areas of MANAGEMENT QUALITY (with an average of 81 per cent positive responses), SAFETY (83 per cent) and ENGAGEMENT (80 per cent) were rated the highest. Areas with the lowest score were WORK STRUCTURE and ORGANISATION (37 per cent), COMMUNICATION and OPENNESS (47 per cent) and REMUNERATION and RECOGNITION (49 per cent).

The indicator that examines the so-called overall content/satisfaction is an index made up of positive responses to 3 questions:

- PSE is an employer I identify with and I care about the success of my company (90 per cent).
- I do not intend to change employer in the next few years (60 per cent).
- My work gives me a sense of satisfaction, I feel comfortable in my role (my team) (80 per cent).

This year, it is **77 per cent,** while last year it was 82 per cent.

In summary, the difficult year of the continuing pandemic and the related general fatigue have also translated into employee sentiment.

The evaluation of the company's behaviour during the pandemic and crisis management was, as in the previous year, very positive. More than 90 per cent of respondents rated the behaviour and actions as 'very good' and 'good'.

In the area of 'Motivation', employee opinions also remain similar to last year's opinions.

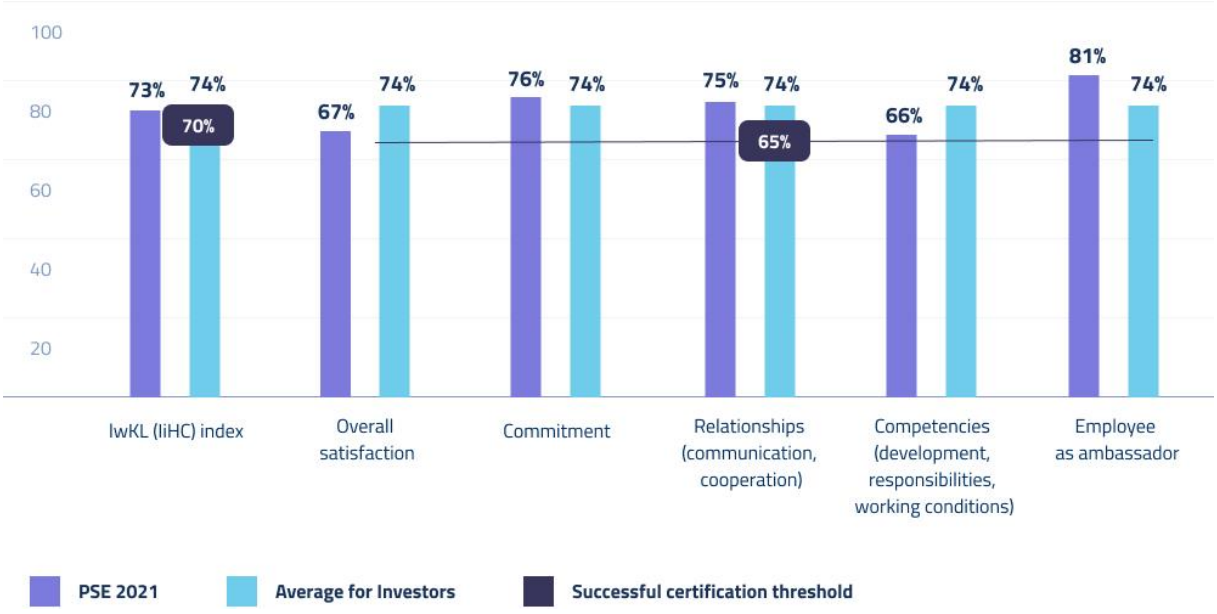
Another element surveyed was the **creation of positive employee experiences** which make up organisational effectiveness – so as to create conditions that complement commitment, i.e. good relations of employees and superiors and a positive working atmosphere.

Over the past 2–3 years, an average of approx. 200–250 people joined our company each year. The scale of recruitment and, as a result of it, the onboarding of new employees are worth, in our view, an examination of how employee onboarding is assessed. Last year, newly recruited employees mostly did not have the opportunity to work onsite, so their remote or hybrid onboarding was more challenging. Approximately 125 people took part in this part of the survey. Of those surveyed, more than 70 per cent rated the onboarding process positively and felt they had been well prepared for the job.

The 'Investor in Human Capital' emblem

In 2021, our organisation subjected the human capital management area to external certification. Underlying this decision was the conviction that our practices in this area can be counted among the best market practices. We applied to the 'Investor in Human Capital' programme run by the independent research company Experience Institute since 2006 (until 2019, the company operated on behalf of the Digital Knowledge Observatory Foundation). The programme is intended for all companies and institutions, as well as branches/subsidiaries of corporations operating in Poland that think responsibly about the development of the competencies of their employees and, through this, the entire organisation.

The analysis carried out as part of the PSE assessment was based on Pulsometre results for 2021, corresponding to the certification questions in each area. The Human Capital Investor Index was 73 per cent, placing PSE above the threshold for positive certification. As a result, the Jury of the programme decided to award our company the **Investor in Human Capital** emblem in 2021.



PSE's being awarded the emblem objectively confirms the fact that we are a company which cares about its employees and invests in human capital, and thus that we are an attractive employer in comparison with the market.

Table GRI 102-41: Employees covered by a collective labor agreement

GRI 102-41 Total number of employees by:	No. of employees in 2021	No. of employees in 2020
Total number of employees covered by the collective agreement	2,708	2,626
Total number of employees	2,708	2,627
Percentage of employees covered by a collective agreement	100	99.96*

*The Corporate Collective Labor Agreement (CCLA) covers all employees employed under employment contracts and employees of PSE Inwestycje who, during their employment within the PSE structure, were successively covered by this agreement in the interim period. An employee of PSE Inwestycje was not subject to all provisions of the CCLA.

The CCLA primarily regulates the mutual rights and obligations of the parties to the employment relationship, including benefits closely related to work.

Table GRI 401-1: New hires in 2021

GRI 401-1 Total number of new hires by:	No. of employees		Number of new hires		Percentage of new hires (per person)	
	2021	2020	2021	2020	2021	2020
Gender						
Females	607	581	59	53	9.72,%,	9.12,%
Males	2,101	2,046	143	159	6.81,%	7.77,%

Age groups						
<30	317	311	79	76	24.92%	24.44%
30-50	1,767	1725	105	124	5.94%	7.19%
>50	624	591	18	12	2.88%	2.03%
Total	**2,708**	**2,627**	**202**	**212**	7.46%	8.07%

Table GRI 404-1: Leavers in 2021

GRI 401-1 Total number of leavers by:	No. of employees		Number of leavers*		Percentage of leavers	
	2021	2020	2021	2020	2021	2020
Gender						
Females	607	581	37	21	6.10 %	3.61 %
Males	2,101	2,046	88	100	4.19 %	4.89 %
Age groups						
<30	317	311	22	22	6.94%	7.07 %
30-50	1,767	1,725	50	54	2.83 %	3.13 %
>50	624	591	53	45	8.49 %	7.61 %
Total	**2,708**	**2,627**	**125**	**121**	**4.62 %**	**4.61 %**

*The data on leavers include all employment contract terminations, including those related to retirement.

Table GRI 202-1: Remuneration of entry-level employees by gender, in relation to the minimum wage

GRI 202-1	Minimum wage in a given location (gross value in PLN)		Average remuneration of an entry-level employee FEMALES		Ratio of the entry-level remuneration to minimum wage FEMALES		Average remuneration of an entry-level employee MALES		Ratio of the entry-level remuneration to minimum wage MALES	
Location	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Konstancin-Jeziorna (former headquarters)	2,800	2,600	5,897.94,	5,780.37,	2.11	2.22	6,126.46,	5,875.13,	2.19	2.26
Bydgoszcz	2,800	2,600	5,360.50,	5,201.25,	1.91	2.00	5,586.71,	5,238.08,	2.00	2.01
Katowice	2,800	2,600	5,238.89,	5,175.00,	1.87	1.99	5,541.02,	5,139.04,	1.98	1.98
Poznań	2,800	2,600	5,247.68,	5,116.65,	1.87	1.97	5,402.52,	5,401.91,	1.93	2.08
Radom	2,800	2,600	5,379.82,	5,372.27,	1.92	2.07	5,275.53,	5,183.43,	1.88	1.99

Warsaw	2,800	2,600	5,789.78,	5,553.71,	2.07	2.14	5,721.31,	5,518.76,	2.04	2.12

Effect index

Fringe benefit equivalent

GRI 401-2 Health benefits and programmes for employees

Our organisation provides employees with an extensive social benefits package. In 2021, PSE employees could use such benefits as: Employee Pension Scheme, meal subsidies, preventive program, holiday subsidies for employees and their families, housing loans, subsidies for nature schools as well as nurseries and kindergartens for the employees' children, and subsidies for cultural activities. 'You Can Count on us' employee support programme is a novelty offered from 2021. This programme allows employees and their immediate family members to benefit from free consultations with psychologists, financial advisers and lawyers.

Health benefits and programmes for employees			
Type of fringe benefit	Number of people who received benefits		Purpose of the benefit
	2021	2020	
Holiday subsidies for employees and their children	**2,490**	**2,422**	Maintaining a work-life balance, allowing the employees' children to go on holiday trips, and allowing the employees to spend time together with their families during holiday trips.
Health care	**2,350**	**2,273**	Increasing employee access to preventive health care, improving the employee's health.
Subsidies for sports, recreational, cultural and educational activities	**2,435**	**2,300**	Improving physical fitness and health, opportunity to pursue the employee interests, opportunity to participate in interesting cultural events, assistance in maintaining work-life balance.

Work-life balance measures

Based on the assumption that the life roles of our employees influence each other and that maintaining a work-life balance is an important element influencing job satisfaction, PSE implements measures to support the work-life balance approach. These include cultural subsidies (available to every employee) and the possibility to use Inspiro audiobook library. As part of the spring 2022 offer for parents, PSE organised two webinars on building relationships with young children and teenagers. The webinars were very popular (nearly 200 participants) and very well received. As it does every year, the Internal Communications Department organised competitions for employees' children serving not only to unleash the creativity and ingenuity of the youngest, but also to spread knowledge about the power industry through play. Thus, children up to the age of 18 could take part in 'Pssstryk' recitation competition and 'Świąteczny choinkosłup' art competition.

The task in the 'Pssstryk' competition organised on the occasion of Children's Day was to recite any fragment of Julian Tuwim's poem entitled 'Pstryk'. Parents recorded the little artists, and a video of several minutes was created from the edited footage featuring 37 children of different ages. The video was shared on the company's LinkedIn profile. The competition was very popular, with 140 reciters

signing up for the poetic challenge, and each little artist was awarded a prize. In the 'Świąteczny choinkosłup' competition, children had to decorate a template of an electricity pole using any technique in such a way that it resembled a Christmas tree. As many as 250 works were submitted for the competition. Each participant received a sweet gift – chocolate in the shape of an electricity pole, and the jury additionally awarded 25 special prizes. A gallery of all the works could be admired on the Intranet, and the awarded Christmas trees could also be seen in the pages of our in-house magazine *Przesył* (*Transmission*).

GRI EU 15: Percentage of employees eligible in 2020 for retirement within the next 5 and 10 years				
Employee categories	Number of employees eligible for retirement within 5 years	Percentage of employees eligible for retirement within 5 years	Number of employees eligible for retirement within 10 years	Percentage of employees eligible for retirement within 10 years
Assistant		0.00%		0.00%
Director	2	6.06%	6	18.18%
Dispatcher	7	5.34%	14	10.69%
Expert	19	13.38%	38	26.76%
Head Specialist	34	9.74%	61	17.48%
Inspector		0.00%		0.00%
Head of Section	1	2.04%	9	18.37%
Department Manager	17	8.59%	46	23.23%
Junior Specialist	3	2.00%	5	3.33%
Legal Advisors	2	4.26%	4	8.51%
Clerk		0.00%		0.00%
Specialist	32	6.12%	71	13.58%
Specialist Coordinator	45	11.60%	69	17.78%
Senior inspector	2	66.67%	2	66.67%
Senior Specialist	38	6.21%	92	15.03%
Apprentice		0.00%		0.00%
Deputy Director	3	5.88%	8	15.69%
Other positions	4	80.00%	4	80.00%

6.6. Highest safety standards

The approach to managing employee health and safety at PSE

GRI 103-1, GRI 103-2, GRI 403-1, GRI 403-3

Employee health and safety is a very important area of management in our organisation.

The occupational health and safety management system was implemented based on the recognised standard PN-ISO 45001:2018-06 'Occupational health and safety management systems – Requirements with guidance for use'.

The management of health and safety of PSE employees is based on the integrated environmental and occupational health and safety management system implemented in the company. All employees are covered by the system and its objectives are pursued by all organisational units. In addition, the requirements imposed by the system must be met by contractors working with PSE, who are obliged to

comply with the organisation's policy. The Office of Work Environment Management is a dedicated unit responsible for OH&S management as well as for meeting the requirements of the system.

Objectives of the Office of Work Environment Management:

- Ensuring compliance with legal requirements and following available practice regarding HSEQ (work environment with reference to employees, environmental protection, equipment and infrastructure maintenance) at PSE CG, and regarding company operations, network asset maintenance, and investment process implementation.
- Exercising supervision and control over work conditions and environment, as well as over the observance of OH&S and environmental protection regulations and rules for PSE CG's assets, in accordance with applicable provisions of law, also during the investment process.
- Minimising the probability of incidents in the work environment by implementing incident prevention solutions at PSE CG.
- Performing tasks related to determining the circumstances of potential incidents and accidents in relation to the work environment: persons, environment, maintenance of equipment and infrastructure at PSE CG, as well as analysis and determination of root causes of incidents.

Tasks of the Office of Work Environment Management:

- Building a system and culture of safety and quality regarding the functioning of PSE CG, including the maintenance of network assets and the implementation of the investment process.
- Performing the duties of the OH&S services.
- Organising and maintaining a system related to the supervision of the HSEQ work environment.
- Organising and maintaining a fire protection system for PSE S.A. facilities and developing PSE CG's standards.
- Identifying and analysing risks at PSE S.A., as well as carrying out occupational risk assessment for work positions.
- Collaborating with the company's employee representatives in OH&S consultations.
- Ensuring compliance with environmental protection requirements at PSE S.A. facilities and developing standards at PSE CG.
- Supporting the investment process with regard to the preparation of tender documentation for investment projects and the execution of HSEQ tender procedures.
- HSEQ supervision of the work of contractors and subcontractors on investment projects.

GRI 103-2, GRI 403-3 The unit responsible for occupational health and safety management at PSE is the Office of Work Environment Management (BH). BH performs the duties of the occupational health and safety service, and has a leading role in identifying risks and developing standards regarding occupational health and safety. It also engages other units in activities related to this area. All OHS activities undertaken at PSE are included in the occupational health and safety management system, implemented and certified with reference to the requirements of PN-ISO 45001. A recertification audit of the integrated environmental and health and safety management system was conducted in June 2021, which the organisation successfully passed.

Communication with the employees is carried out, among others, by sharing documents – instructions, guidelines, orders – and current information on the intranet, through direct mailing to employees and publications in the corporate newspaper. BH analyzes the actual incidents and shares the knowledge about the identified causes of the incidents with the relevant persons in the organisation. The company

also provides a wide range of training courses in OH&S, fire protection and first aid – those required by law and those resulting from additional company needs.

GRI 403-2 The identification and assessment of work-related risks is conducted based on the Manual for Hazard Identification and Occupational Risk Assessment at PSE. New risks are also identified following accidents at work. The quality of this process is guaranteed by the Occupational Risk Assessment Team (ORAT), which is composed of occupational health and safety experts, the company's Social Labour Inspector, a representative of the Human Resources Department, representatives of the staff and relevant organisational units and, where appropriate, the physician in charge of medical care and industry experts from outside the workplace.

Information on the results of the occupational risk assessment is communicated to employees individually (by reading the occupational risk assessment card), during the initial OH&S training, on-the-job training and periodic OH&S training, as well as other workshops relating to OH&S and fire protection. The effect of occupational risk assessment are actions taken to reduce the risk, taking into account the hierarchy of hazard controls (e.g. elimination, substitution, engineering safety measures, organisational and administrative measures, personal protective equipment).

PSE has an HSEQ observation reporting system in place, as well as a HSEQ reporting platform on the Intranet. The employee has the option to report anonymously (no blame policy). Information about a risk can also be reported by calling the HSEQ contact number operated by a BH employee.

According to the provisions of the Labor Code and the Instruction for reporting incidents and hazards in the work environment, an employee has the right to refrain from work if the working conditions do not comply with the provisions of occupational health and safety. The aforesaid issues are always subject to initial and periodic OH&S training. PSE has a stop work policy, which is implemented each time in the safe work organisation manuals.

Accidents at work are investigated in accordance with the provisions of the Regulation on determining the circumstances and causes of accidents at work. Each time the employer appoints an accident investigation team consisting of an employee of the occupational health and safety service and a social labor inspector. In addition to accident investigation, PSE conducts a root cause analysis (RCA) after an incident to identify and assess the risks associated with an accident. Accident analysis is performed using PSE's HSEQ hazard and risk matrix. After the analysis of the incident, corrective recommendations are made, taking into account the hierarchy of controls indicated in the accident investigation report. Following the conclusion of accident investigation, orders are issued by the President to implement the recommendations identified in the protocol.

[GRI 103-1] Workplace safety promotional activities

HSEQ platform

One of the objectives arising from the Company Strategy and the tasks of the Office of Work Environment Management (BH) is to build a safety system and culture for the work environment – both in the area of PSE's core business and in the investment process. In practice, this means the establishment of the Health Safety Environment Quality (HSEQ) standard in relation to employee safety, environmental protection, and safety of equipment and infrastructure in the work environment. The HSEQ platform allows employees to report anonymously on one of the selected categories:

- **POS** – positive observation,
- **UC** – a near miss – unsafe working conditions,
- **UA** – a near miss – unsafe acts,
- **NM** – an actual incident without damage,

- **AC** – an actual incident involving damage (accident).

Based on the data obtained, the **TPR** (Total Prevention Rate) is calculated:

Observation type	2021	2020	2019	2018
POS	567	647	386	71
UC	1,518	2,132	1,569	933
UA	31	93	54	25
NM	2	3	4	11
AC	3	5	9	4
TPR	**998**	**997**	**994**	**986**

The increase in the value of the prevention rate demonstrates a continued increase in the involvement of all employees in monitoring the work environment. Each report is analysed by BH staff and a response is sent back to the reporting person regarding the implementation of the case. In 2021, a total of 2,121 applications were received on the HSEQ platform.

Given these statistics, it is important to note that incidents are reported on an ongoing basis by employees, which demonstrates their commitment to building a safety culture at work. As a result, the prevention rate is increasing year on year.

Workshops

A Safety Leadership workshop for PSE contractors and employees on the responsibility of managers for safe work conditions was held in 2021. The webinars covered the following thematic blocks:

- statistics and trends,
- responsibility of the employer and those in charge of employees, rights and obligations of employees, criminal liability concerning the organisation of work,
- workshop on root cause analysis (RCA).

In addition, a series of practical fire training courses for those designated to carry out evacuation and fire fighting took place between October and December 2021. The series consisted of 43 sessions attended by a total of 382 employees. The implementation of the training took place under the sanitary regime associated with the COVID-19 epidemic.

Key figures

382 employees took part in a series of practical fire training courses for those designated to carry out evacuation and fire fighting.

116 communications from the Office of Work Environment Management on OH&S and environmental protection were published on the Intranet.

7 webinars as part of the 'Be Healthy' series on health topics (vaccinations, complications after COVID-19, addictions, diet, sleep, rest) and ergonomics were organised for PSE employees.

GRI 403-4

In accordance with the applicable regulations, our organisation has an Occupational Health and Safety Committee in place. Meetings between the employer representatives and the community representation are held on a quarterly basis. In addition, the company's occupational medicine physician attends the meetings to analyze and advise on problems in the area of occupational medicine and health care. Meetings of the Occupational Health and Safety Committee are documented in the form of minutes.

The Occupational Health and Safety Committee meetings are an occasion to discuss occupational health and safety issues related to, but not limited to the following:

- periodic reviews of the working conditions,
- proposals to improve the working conditions,
- analysis of potential hazards reported by employees,
- analysis of the conclusions and recommendations from cross-checks performed by the social labor inspectors and the OHS service, as well as the decisions made by the accident investigation teams,
- review and evaluation of specifications for the purchase of PPE, etc.

PSE has elected social labor inspectors divided into regional SLIs and the company's SLI. The role of the SLI is described in the Act on the social labor inspection.

Employees can report their observations, problems, or risks in several ways, i.e. by:

- e-mail to HSEQ@pse.pl,
- using the HSEQ reporting platform,
- contacting the BH staff directly,
- contacting the Social Labor Inspector directly.

When drawing up instructions related to occupational health and safety, contract reviewers whose work is related to the subject of the document are always appointed.

OHS communication is effected, among others, through intranet publications, mailing to staff at every level of the organisation, training, webinars and the company's magazine entitled "Transmission".

GRI 403-5

General training in our organisation includes the following:

- initial occupational health and safety training provided on the employment date in the form of an induction training,
- periodic training in occupational health and safety, conducted for:
    - administration and office employees: first within 1 year as of the employment date, next every 5 years;
    - engineering and technical employees: first within 1 year as of the employment date, next every 5 years;
    - engineering and technical employees working in particularly hazardous conditions: every year;
    - employees on managerial positions: first within 6 months as of the employment date, next every 5 years;
    - blue-collar workers: once a year.

  Form of training: self-directed learning, except for training for blue-collar workers (induction training).

Training on specific work-related hazards included:

- Safety leadership workshop: an annual workshop for employees and contractors on the responsibility of those in charge of employees for safe work conditions:
    - Block 1 – Statistics and trends;
    - Block 2 – Responsibility of the employer and those in charge of employees, rights and duties of employees, criminal liability concerning the organisation of work;
    - Block 3 – Workshop on root cause analysis (RCA) of incidents.
- Webinar on hazards, ergonomics and work environment as part of the 'Be Healthy' series (7 webinars were held in 2021).
- 'Occupational health and safety instructions for work on energy equipment and installations – a month of experience' webinar.

The hazardous activities training provided in our organisation includes:

- induction training,
- workplace safety training,
- training (induction training) before handing over a work area (each time),
- training based on reports of the Disturbance Investigation Committee and accident investigation reports.

Training on hazardous situations includes:

- workplace safety training,
- periodic training in occupational health and safety,
- training (induction training) before handing over a work area (each time),

- training based on reports of the Disturbance Investigation Committee and accident investigation reports,
- e-learning training regarding the procedure in case of a COVID-19 infection (training on e-DeK platform, based on PSE guidelines).

Other trainings:

A mandatory e-learning on e-DeK platform included:

- training in the Instructions on the Hazardous Substance Spill Response,
- training to update knowledge on the IMS,
- training for evacuation coordinators,
- practical training in the use of hand-held firefighting equipment and in hazardous substance spill clean-up operations.

GRI 403-6

Our company offers employees subscription health packages from one of the leading providers of such services. Employees have the option to choose the scope of services. Occupational medicine is fully funded by the employer and other services for the employee are partially funded. In June 2021, the prevention programme was modified by extending it to include the possibility to apply for a rehabilitation stay after a COVID-19 infection.

In addition, the organisation's 'You Can Count on us' programme offers free consultations with psychologists, financial advisers and lawyers. They are available to PSE employees and immediate family members, including children up to the age of 25, where they have the legal status of pupils or students.

Another form of support is the free 'Be Healthy' webinar series addressed to all PSE employees.

GRI 403-7

Our organisation conducts planned and ad-hoc inspections of the work environment to identify hazards and risks, and to minimise the occurrence of hazards. Technical condition assessments are conducted. The organisation provides measurements of work environment factors, such as, for example, noise, electromagnetic field and fire hazards. The results of the measurements are analysed and actions are taken to ensure that the negative effects on the health and lives of employees are minimised.

Risks and hazards are managed by controlling the hierarchy of hazards, starting with elimination. In the area of electric power facilities, particularly hazardous work is carried out by licensed and authorized persons as part of the process of safe organisation in working with power equipment and systems, while ensuring multi-level verification and assurance of the activities carried out. In addition, employees have access to the 'Be Healthy' webinar series on ergonomics and occupational health.

GRI 403-8: Workers covered by the occupational safety management system	
Number of employees who are subject to the system	2,708
Percentage of employees who are subject to the system	100
Percentage of workers who are not employees, but whose work and/or workplace is controlled by the organisation, and who are subject to the system	100
Number of employees who are subject to a system that has been internally reviewed/audited	2,708
Percentage of employees who are subject to a system that has been internally reviewed/audited	100

Percentage of workers who are not employees, but whose work and/or workplace is controlled by the organisation, and who are subject to a system that has been internally reviewed/audited	100
Number of employees who are subject to a system that has been audited or certified by an external body (based on an audit sample)	2,708
Percentage of employees who are subject to a system that has been audited or certified by a third party	100
Percentage of workers who are not employees, but whose work and/or workplace is controlled by the organisation, and who are subject to a system that has been audited or certified by a third party	100
Employees/groups of employees who were excluded from this indicator	No exclusions

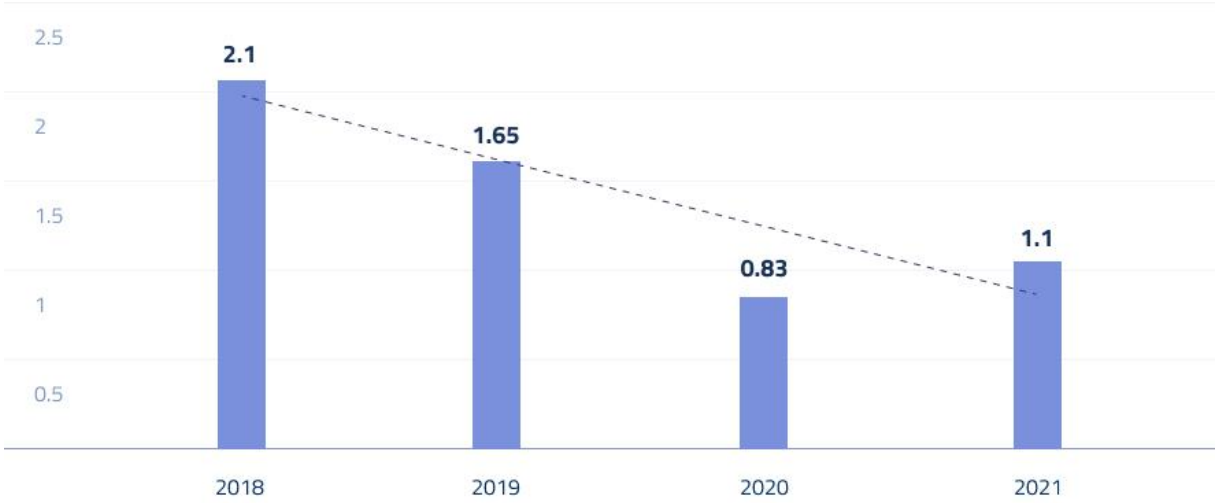
GRI 403-9 Work-related injury rate		
1.	**For all employees**	Values or description
1a	Number of fatalities due to work-related injuries	0
1b	Rate of fatalities due to work-related injuries	0
1c	Number of serious work-related injuries (excluding fatalities)	0
1d	Rate of serious work-related injuries (excluding fatalities)	0
1e	**Number of work-related injuries**	**3**
1f	**Work-related injury rate**	**0.66**
1g	Main types of work-related injuries	Ankle joint sprain and rupture, open wound of the knee, triple fracture of the right lower leg with dislocation at the ankle joint and tibiofibular syndesmosis injury.
1h	Number of hours worked	**4,577,130**
2.	**For all workers who are not employees but whose work and/or workplace is controlled by the organisation**	
2a	Number of fatalities due to work-related injuries	0
2b	Rate of fatalities due to work-related injuries	0
2c	Number of serious work-related injuries (excluding fatalities)	0
2d	Rate of serious work-related injuries (excluding fatalities)	0
2e	Number of work-related injuries	**2**
2f	Work-related injury rate	PSE started the process of collecting man-hours for tasks carried out by contractors, however, due to the lack of comprehensiveness (no obligation to collect data for all projects), the indicator is not calculated.
2g	Main types of work-related injuries	No injuries found.
2h	Number of hours worked	We do not keep complete statistics related to man-hours.

3	**Work-related hazards that pose a risk of serious injury, including**	Hazards due to moving, sharp, loose, protruding parts; electric shock hazard; fire and explosion hazard; fall hazard; the hazard of getting buried in an excavation.
3a	Hazard identification method	There were 752 O&HS, fire and environmental protection inspections carried out by BH employees, during which 2,821 cases of unsafe working conditions (UC) and 221 cases of unsafe acts (UA) were observed. Environmental notifications made by PSE employees through the dedicated HSEQ platform – 823 UC, 110 UA.
3b	Which of these hazards caused or contributed to causing serious injury to workers during the reporting period	No serious injuries to employees during the reporting period
3c	Actions taken to eliminate or reduce these hazards, using a hierarchy of controls	1. Safety leadership workshops for employees and contractors. 2. Analysis of circumstances and causes of accidents at work, including corrective actions developed. 3. Analysis of all reported potential (AC, NM) and actual (NM, AC) incidents in relation to persons, environment and infrastructure. 4. Initial and periodic training. 5. Alerts/lessons learned from incidents. 6. Providing opinions on project documentation for the construction and modernisation of the company's network assets in terms of OH&S, environmental protection and fire protection.
4.	**Measures taken to eliminate other work-related hazards and minimize risks using a hierarchy of controls.**	1. Safety leadership workshops for employees and contractors. 2. Analysis of circumstances and causes of accidents at work, including corrective actions developed (2). 3. Participation in KBZ. 4. Periodic training, initial training, induction training, on-the-job training.
5.	**Please indicate if the rates were calculated based on 200,000 or 1,000,000 hours worked.**	1,000,000

Accident rates

PSE's rate of severity of accidents at work

$$WW = \frac{\text{number of accidents x 1,000}}{\text{average employment}} \qquad WW_{2021} = \frac{3 \times 1000}{2705} = 1.1$$

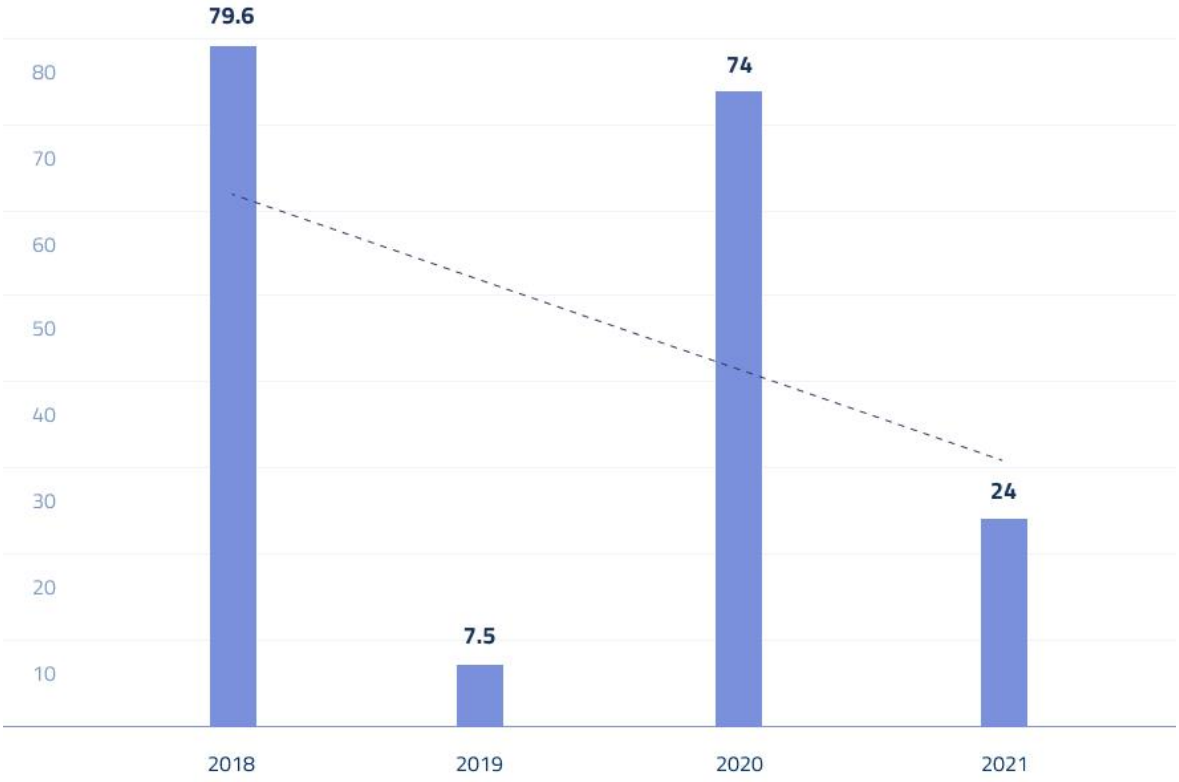


The accident frequency rate shows a decreasing trend.

Rate of severity of accidents at work at PSE

$$WCW = \frac{\text{number of sick leaves days}}{\text{number of accidents}}$$

$$WCW_{2021} = \frac{72}{3} = 24$$



The accident severity rate shows a decreasing trend.

Total recordable incident rate (TRIR)

$$TRIR = \frac{FAT + LTI + RWC + MTC}{\text{number of man-hours}} \times 1{,}000$$

[FAT] Fatality: a single fatality; a fatal accident or death due to a work-related injury or illness.

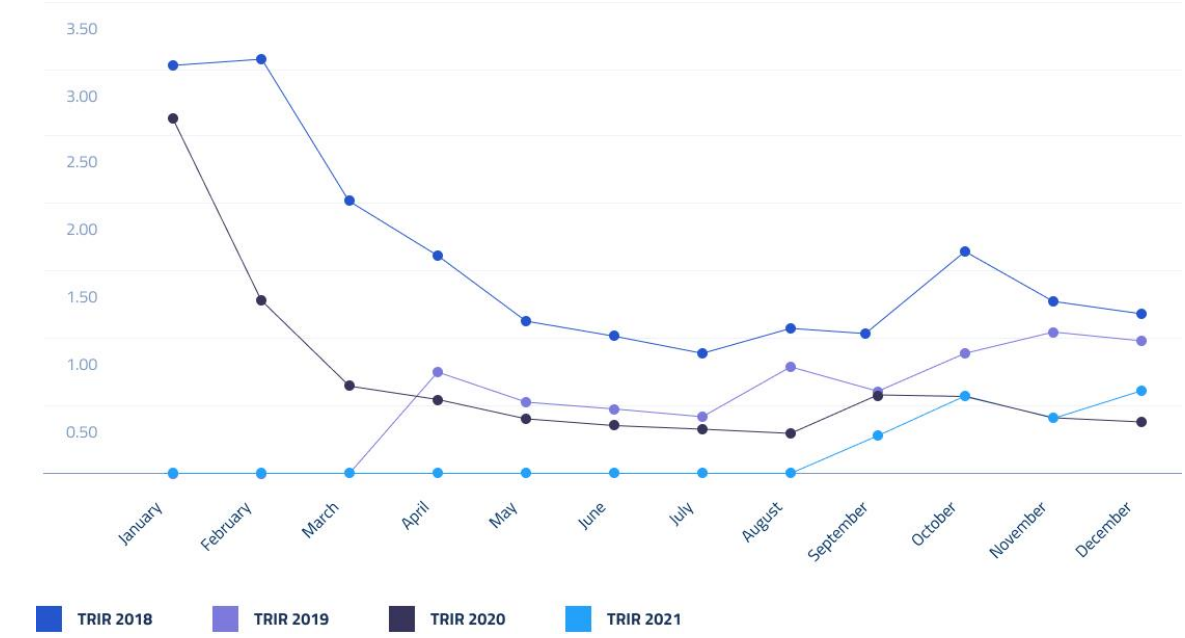
[LTI] Lost Time Injury: a major injury, illness; work-related injury or illness which prevents the employee from taking up any work the day after the incident.

[RWC] Restricted Work Case: qualified medical assistance required; the employee cannot perform his/her work the next day, but is able to take another job or work in his/her position part-time or without performing all of the duties.

[MTC] Medical Treatment Case: a minor injury, illness.

Year	Man-hours	FAT	LTI	RWC	MTC	LTIF	TRIR
2018	3,921,900	0	0	1	4	0.00	1.27
2019	4,142,200	0,	0,	0,	4,	0.00	0.97
2020	4,529,824	0,	0,	2,	0,	0.00	0.44
2021	4,577,130	0,	1	0,	2,	0.00	0.66
Total	**17,171,054**	**0,**	**1,**	**3,**	**10,**	**0.00**	**0.83**

Table 2. TRIR in relation to hours worked



HSEQ in numbers

Number of cases of unsafe conditions (UC) and of unsafe acts (UA) recorded; number of HSEQ checks

Figures recorded from January to December 2021:

- 2,413 HSEQ observations (1,995 for projects and 418 for operation);
- 1,958 cases of unsafe working conditions – UC: 1,735 for projects and 223 for operation;
- 213 cases of unsafe acts – UA: 196 for projects and 17 for operation;
- 242 positive observations: 64 for projects and 178 for operation.

At the same time, 552 HSEQ checks were carried out for ongoing investment and operational tasks.

Percentage of supplier employees who have received appropriate OH&S training (estimate based on HSEQ checks)*	UoM	2021
Percentage of supplier employees trained in OH&S and working at active power substations (training provided by substation duty officers)	%	100
Percentage of supplier employees who have received appropriate occupational health and safety training required by law (estimated based on HSEQ checks)*	%	99

**The data are for employees hired by PSE suppliers, which means that responsibility for the OH&S training lies with the suppliers.*

OH&S and fire inspections

Field units	Number of inspections scheduled	Number of inspections performed	Number of post-inspection recommendations
Konstancin-Jeziorna	3	9	33
Bydgoszcz	24	27	132
Katowice	38	47	380
Poznań	36	37	277
Radom	27	27	345
Warsaw	33	33	144
TOTAL	**161**	**180**	**1,311**

In 2021, OH&S and fire protection inspections were carried out on the basis of an inspection plan approved by the President of the Management Board. These inspections were carried out using checklists, following the regime applicable during the COVID-19 epidemic.

HSEQ requirements for contractors carrying out investment tasks for PSE

GRI 103-3 Work continued in 2021 to improve the effectiveness of HSEQ oversight of contractors, i.e. OH&S, fire and environmental protection. Standard contractual clauses developed, which include HSEQ requirements, are part of contractual provisions. These clauses were developed in three variants, depending on the subject matter and the level of detail of the requirements imposed on contractors. The diversity of clause variants makes it possible to tailor contractual provisions appropriately to the risks encountered during the performance of a particular agreement.

HSEQ clauses are used in all investment agreements entered into by PSE, as well as for maintenance and operation works (it is possible thanks to their universal nature). Their use results from the standards, strategies and policies implemented in the company, but also from a broadly understood responsibility for the safety of people and the natural environment. We aim to collectively raise awareness of the importance of safety and to engage in solidarity in issues related to the safety of employees, equipment and infrastructure in the work environment, and to environmental protection.

For several years, PSE has been applying a tariff of contractual penalties to identified breaches by contractors of specific OH&S, fire protection, and environmental protection regulations and rules. The tariff of penalties is part of agreements concluded with contractors carrying out investment and operational tasks.

The Employer's staff – in accordance with the adopted HSEQ check schedule – verifies the contractors' compliance with OH&S, fire and environmental protection regulations during the execution of investment and operational tasks.

GRI 403-10 Occupational disease rate		Description
1.	**Please specify for all employees**	
1a	Number of people who died as a result of an occupational disease	0
1b	Number of identified cases of occupational diseases	0
1c	Main types of occupational diseases	None
2	**Please specify for all workers who are not employees but whose work and/or workplace is controlled by the organisation**	
2a	Number of people who died as a result of an occupational disease	No access to Contractor data
2b	Number of identified cases of occupational diseases	No access to Contractor data
2c	Main types of occupational diseases	No access to Contractor data
3.	**Please indicate work-related hazards which pose a health risk**	Exposure to electromagnetic fields, noise, vibrations, working in conditions of special risk at electrical power equipment.
3a	Please describe how these hazards were identified	Analysis of the conditions of work performance
3b	Which of these hazards contributed to or caused occupational diseases which occurred during the reporting period	No occupational diseases identified

3c	Actions taken to eliminate or reduce these hazards, using a hierarchy of controls	Identification and assessment of work-related risk, carried out on the basis of the Manual for the Identification of Hazards and Assessment of Occupational Risks at PSE S.A., regular measurements of work environment factors, planned and ad-hoc inspections.
4.	**Whether, and if so – why, there are employees/groups of employees who have been excluded from this indicator (please indicate these categories of employees)**	No
5	**Contextual information necessary to understand how the data were compiled, such as the standards and methodologies used and the assumptions made**	Not applicable

GRI EU18: Percentage of supplier employees who have received appropriate occupational health and safety training (estimated based on HSEQ checks)

GRI EU 18 Percentage of contractor and subcontractor employees who have received occupational health and safety training				
1.	Percentage of the total number of contractor and subcontractor employees who have received occupational health and safety training	No. of employees		Data source
		2021	2020	
1.	Investment (construction) activity	99%	99%	HSEQ checks

PSE Life Saving Rules

The development and dissemination of Life Saving Rules (LSRs) among employees and associates is an element of building a safety culture at PSE.

This is a set of rules of conduct that address the biggest hazards associated with the company's operations. The documents indicate the responsibilities of persons performing the work and their supervisors, as well as prohibited actions. The LSRs are published in the form of posters and flyers. The rules are formulated as slogans calling for specific actions, namely:

1. Keep a safe distance! – due to the risk to health and life posed by electric shock and arc flash burns, for work on live equipment and near voltage sources;
2. Follow the work order instructions and use checklists! – for work on network assets carried out under particularly hazardous conditions, based on a written order;
3. Observe safe organisation of work on power equipment and systems!
4. When working at heights, protect yourself and your tools from falling!
5. Wear work clothing, safety footwear and personal protective equipment whenever required!
6. Drive safely!
7. React to and report dangerous situations!

VII. ABOUT THE REPORT

CHAPTER VII: ABOUT THE REPORT

Key messages of the chapter

In the integrated 2021 PSE Report, we describe how we manage our impact on the economic, environmental and social development of the country.

This is already the eighth social report our organisation has produced using best practice and standards. This report ensures high-quality data reporting, in line with the guidelines of the International Integrated Reporting Council and the Global Reporting Initiative Standards.

7.1. About the reporting process

We continue to improve our reporting process

We are proud to once again present to you the report on PSE's impact on the economic, environmental and social development of our country. This is already the eighth social report our organisation has produced, and the sixth report which is integrated and published in an interactive version. The publication presents financial and non-financial data in an integrated manner, enhanced with calculations of the company's impact on the economy, the public finances, the society and the natural environment.

Impact reporting is a disclosure of complete, reliable and transparent data to stakeholders on the company's economic, market, social and environmental impact.
The information is compiled based on selected impact indicators, Global Reporting Initiative Standards (GRI) and our own standards, using the indicator calculation methods and taking into account the market situation.

The main objectives of this publication are to show the challenges faced by PSE and the entire power sector, especially those related to energy transformation, and to present the measures taken by the company to face these challenges, in particular with regard to implementing new and continuing the current strategic lines and initiatives. We also wanted to show the scale of the PSE's impact on the social and economic environment, to meet the expectations of stakeholders in terms of presenting the expected financial and non-financial issues, and to increase the transparency of our company.

[GRI 102-54] To ensure high quality reporting, we have prepared our report in accordance with the guidelines of The International Integrated Reporting Council and the Global Reporting Initiative Standards (GRI Standards) – the Core Compliance option. In the financial reporting, we have followed the requirements of the Accounting Act of September 29, 1994. (Journal of Laws 2016, item 1047, as amended).

Chapter title: We have prepared the report on the PSE's impact on the market and economy according to a methodology developed by an external expert based on the Wassily Leontief model, also called the inter-industry flow model or Input-Output model. This method focuses on examining the relationship between industries and companies. The model is based on the most recent inter-industry flow tables at the current base prices for domestic output in 2010, published by the Central Statistical Office in 2014. We used three key areas to show how our business impacts the economy and the society: added value, jobs and wages.

Fig. 1. Visualisation of the inter-industry flow model

[GRI 102-50, GRI 102-51, GRI 102-52] In this report, we present issues relevant to our environment. They cover data from January 1, 2021 to December 31, 2021, and some selected aspects for 2022, allowing to present the current and complete picture of Polskie Sieci Elektroenergetyczne. There were no significant changes in the company's size, structure or form of ownership during the reporting period. The report does not include adjustments to information from the previous report.

As regards the indicators, we report data for 2020–2021, and even the data in a five-year perspective to show the trends that have occurred as a result of a number of changes that have taken place within the organisation, processes implemented and standards improved every year.

We have made a commitment to publish successive reports every year as integrated reports enhanced with impact indicators.

[GRI 102-46] Selection of issues to report

In accordance with the international guidelines, the issue selection process was conducted in three stages:

1. Identification

The identification of issues relevant to a sustainable development and to the areas of the company's impact on the environment was preceded by the following steps:

- an analysis of our company's responsibility towards the economy and market, the society and employees as well as the natural environment and climate,
- a review of global challenges for the power sector,

- an analysis of the reporting trends in foreign and domestic power companies,
- PSE's accepted standards for integrated reporting,
- a review of the previously reported issues,
- an analysis of key impact indicators, GRI indicators and PSE's own indicators,
- a review of documents defining the challenges for business in the context of sustainable development – Sustainable Development Objectives,
- an analysis of internal documents.

[GRI 102-42] The analysis of internal strategic documents and internal consultations with the representatives of the PSE's organisational units made it possible to identify our stakeholder groups.

2. Prioritisation

[GRI 102-43] The development of the report is one of the elements of the social dialog that PSE periodically conducts with its stakeholders based on the AA1000SES standard. The fifth dialog session was held on June 15, 2021 in an online format. Nearly 40 people attended the event. During the meeting, our partners assessed the way PSE operates and what is its impact on the environment; they also identified key issues that influenced the structure of this edition of the impact report. In the process of preparing the report, we also took into account the results of an additional online survey, which can be accessed from the Impact Report website.

Our stakeholders primarily include the following:

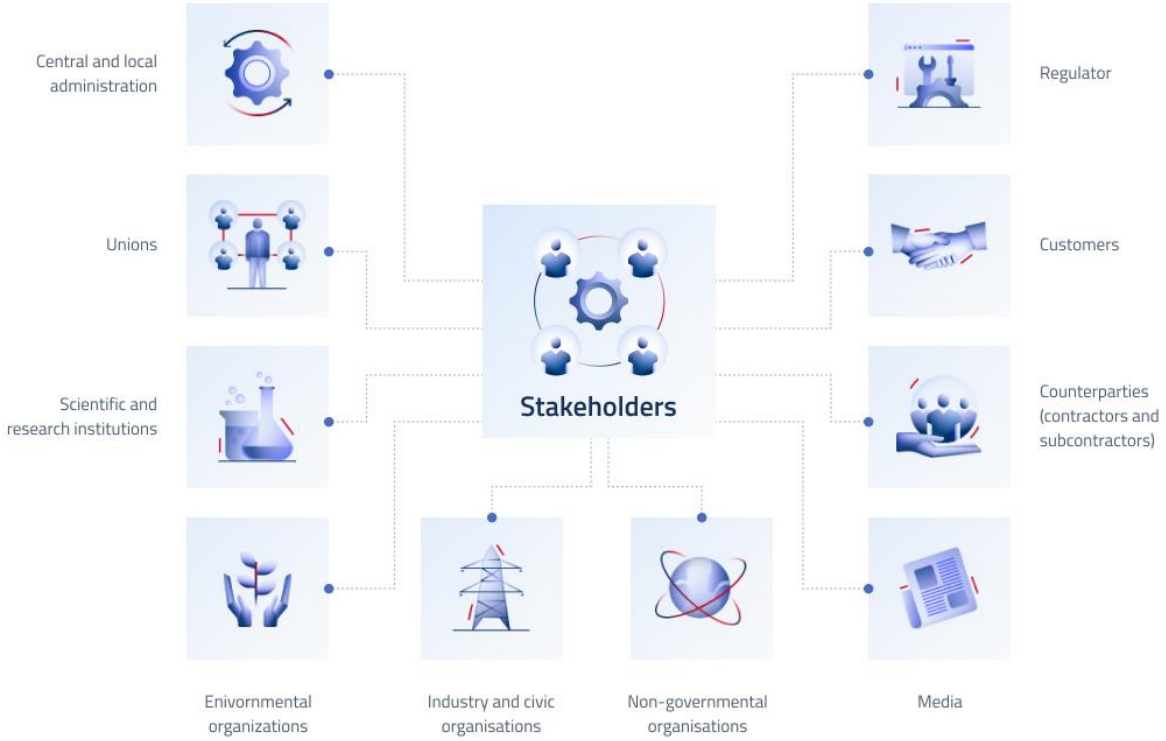


Figure: PSE stakeholders

3. Validation

We also conducted a survey among the PSE managerial staff 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 containing the key topics to be reported and the concept of the report structure.

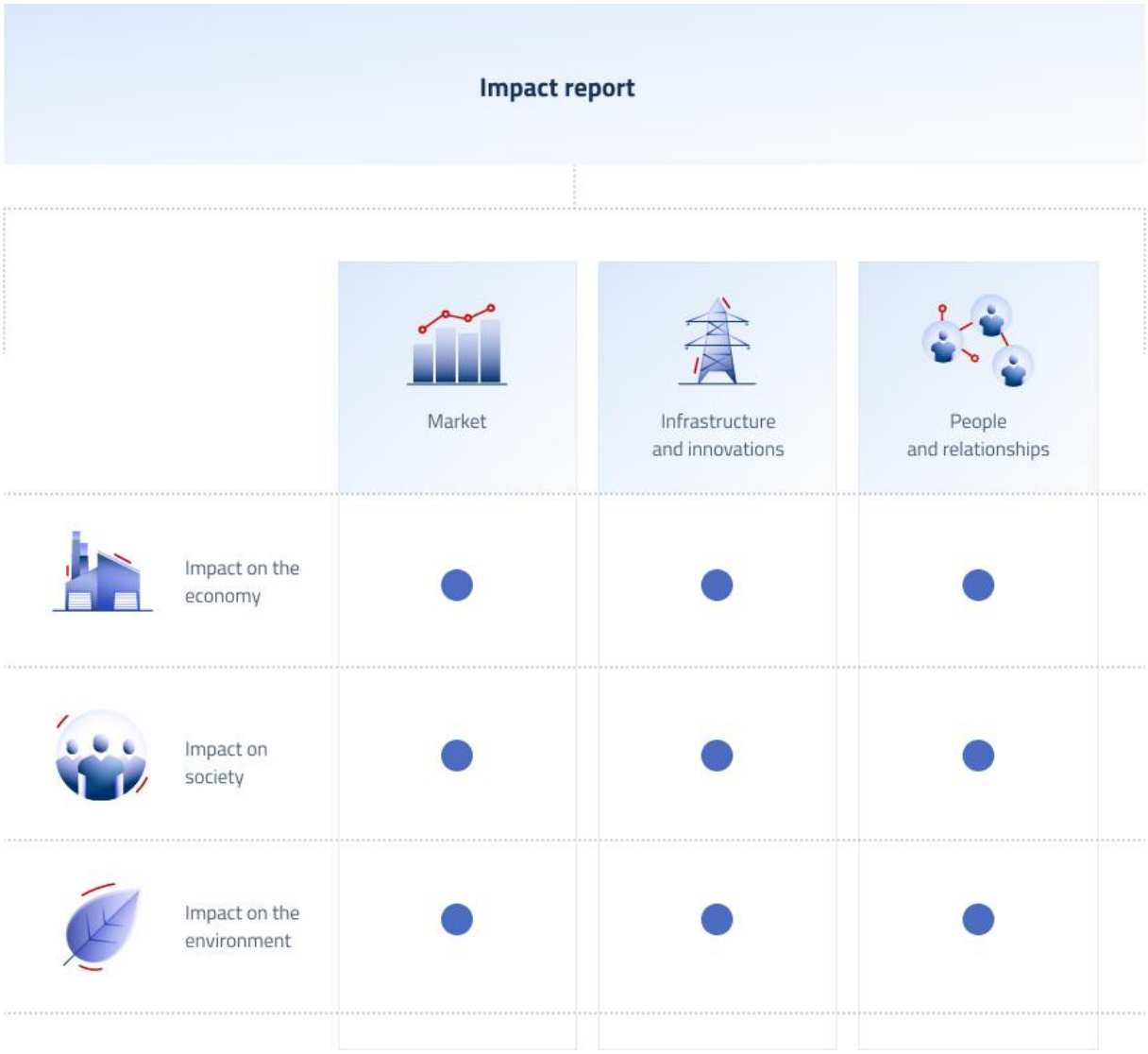


Figure: Approach to the report structure

Materiality matrix

[GRI 102-47] Based on the results of the stakeholder dialogue session and web-based surveys, as well as internal research and qualitative analysis, **17 key issues in 4 areas of responsibility** were indicated:

- towards the market,
- at the workplace,

- towards the society,
- towards the natural environment.

The material issues that our company and its stakeholders believe should be included in the report are presented in a matrix.

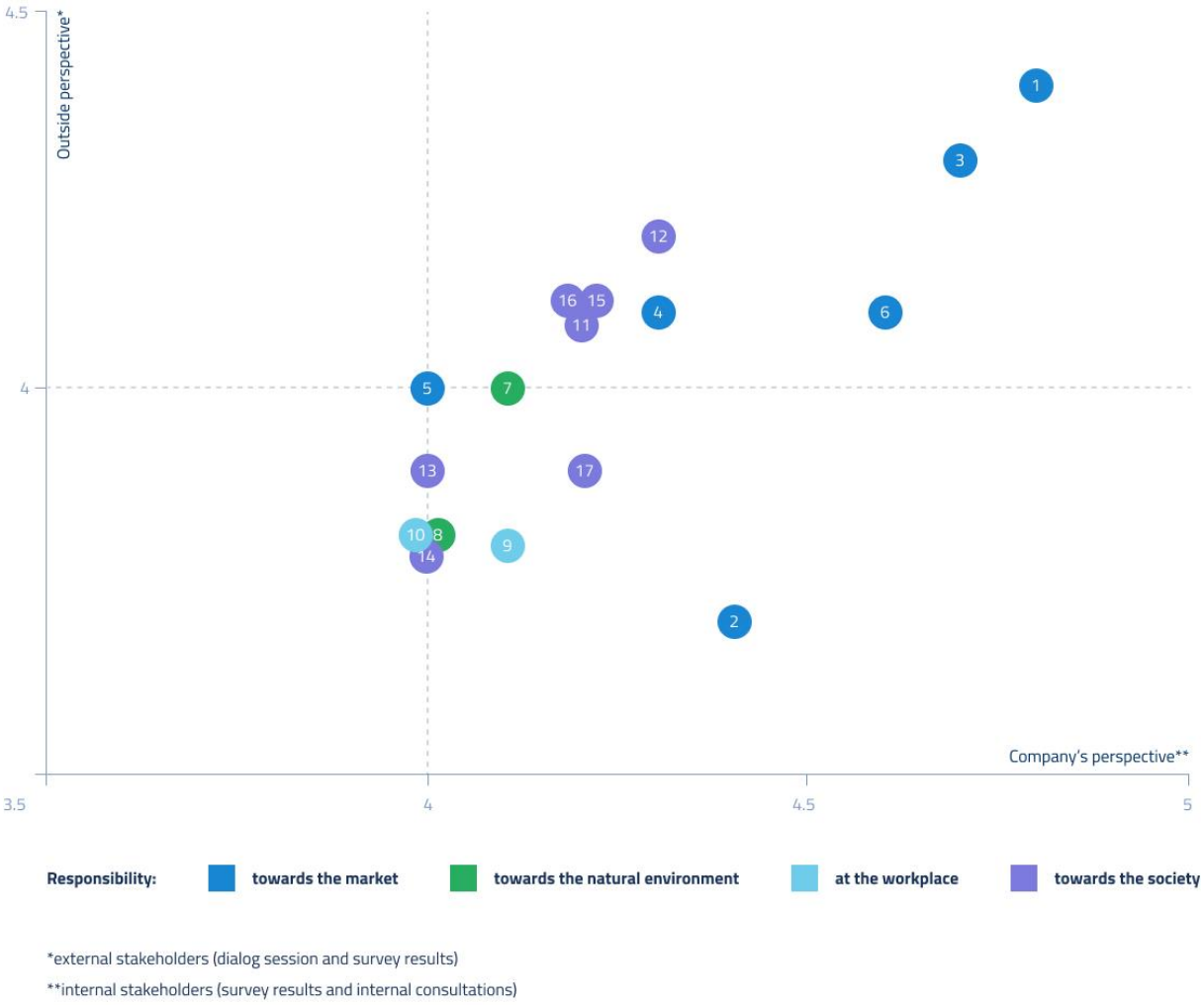


Figure: Materiality matrix

Outside perspective – external stakeholders (dialog session and survey results),
Company's` perspective – internal stakeholders (survey results and internal consultations).

Responsibility towards the market	
1.	Measures for reliable and economic operation of the power system to ensure long-term security of electricity supply (prevention of a blackout risk)
2.	Conducting more Capacity Market processes
3.	Transmission system development and Poland's Energy Policy
4.	Integration of the Polish market with European markets

5.	Ensuring IT and technical security of the power system
6.	Presentation of actions taken by PSE to adapt the NPS to the new shape of markets and new technologies (including energy storage methods, distributed generation – energy from renewable sources)
Responsibility towards the natural environment	
7.	Responsibility towards the natural environment in implementation of projects, including preservation of biodiversity in the project areas
8.	PSE's carbon footprint
Responsibility at the workplace	
9.	The approach to managing employee health and safety at PSE
10.	Diversity and equal opportunity in access to positions/jobs, including the management board; equal pay for men and women
Responsibility towards the society	
11.	Winning public acceptance for line routes (including obtaining utility easements) and public communication concerning projects
12.	Minimisation of the negative social impact of the implemented projects (noise, interference with the landscape)
13.	Investments in regional development
14.	Flagship community projects of PSE
15.	Good practices and standards of living and functioning in the vicinity of power lines
16.	Promoting knowledge about energy security and educational programs implemented
17.	PSE operations vs. transmission tariff and electricity bills

[GRI 102-44] Tab. Topics relevant to PSE and the environment

[GRI 103-1, GRI 102-44] Key topics for PSE, including their impact boundaries considered in the report

Topics relevant to PSE, including their impact boundaries included in the report			
Topics defined as important	Topics as part of the GRI standards	Impact topic within the organisation	Impact of the topic outside the organisation
Responsibility towards the market			
Measures for reliable and economic operation of the power system to ensure long-term security of supply*	Indirect economic impact	PSE S.A.	Particularly relevant to customers
Conducting more Capacity Market processes	Indirect economic impact	PSE S.A.	Particularly relevant to customers

Topics relevant to PSE, including their impact boundaries included in the report			
Topics defined as important	Topics as part of the GRI standards	Impact topic within the organisation	Impact of the topic outside the organisation
Transmission system development and Poland's Energy Policy	Strategy	PSE S.A.	Particularly relevant to the regulatory authorities, customers, contractors and subcontractors
Integration of the Polish market with European markets	Strategy	PSE S.A.	Particularly relevant to the regulatory authorities, customers, contractors and subcontractors
Ensuring IT and technical security of the power system	Strategy	PSE S.A.	Particularly relevant to the regulatory authorities, customers, contractors and subcontractors
Presentation of actions taken by PSE to adapt the NPS to the new shape of markets and new technologies (including energy storage methods, distributed generation – energy from renewable sources)	Strategy	PSE S.A.	Particularly relevant to the owner, the electricity market participants, as well as RES and environmental and social organisations
Responsibility towards the natural environment			
Responsibility towards the natural environment in implementation of projects, including preservation of biodiversity in the project areas	Compliance with environmental regulations Biodiversity	PSE S.A.	Particularly relevant to local communities
PSE's carbon footprint	Emissions Impact on climate	PSE S.A.	Particularly relevant to the owner, the employees as well as environmental and social organisations
Responsibility at the workplace			
The approach to managing employee health and safety at PSE	Occupational Health and Safety	PSE S.A.	Particularly relevant to the employees and potential employees
Diversity and equal opportunity in access to positions/jobs, including the management board; equal pay for men and women	Diversity and equal opportunities	PSE S.A.	Particularly relevant to the employees and potential employees

Topics relevant to PSE, including their impact boundaries included in the report			
Topics defined as important	Topics as part of the GRI standards	Impact topic within the organisation	Impact of the topic outside the organisation
Responsibility towards the society			
Winning public acceptance for line routes (including obtaining utility easements) and public communication concerning projects	Local community	PSE S.A.	Particularly relevant to local communities
Minimisation of the negative social impact of the implemented projects (noise, interference with the landscape)	Local community	PSE S.A.	Particularly relevant to local communities
Investments in regional development	Local community	PSE S.A.	Particularly relevant to local communities
Flagship community projects of PSE	Local community Sponsorship	PSE S.A.	Particularly relevant to local communities
Good practices and standards of living and functioning in the vicinity of power lines	Local community Customer health and safety	PSE S.A.	Particularly relevant to local communities
Promoting knowledge about energy security and educational programs implemented	Indirect economic impact	PSE S.A.	Particularly relevant to local communities
PSE operations vs. transmission tariff and electricity bills	Indirect economic impact	PSE S.A.	Particularly relevant to the society

***Aspect with a broad impact**

Tab. Topics relevant to PSE, including their impact boundaries included in the report

In the report, we describe the aforementioned key topics in detail, presenting both the approach to managing them and the corresponding indicators.

Precautionary principle

[GRI 102-11] Detailed issues presented in the report are based on the Strategy of Polskie Sieci Elektroenergetyczne adopted by the Management Board, reviewed by the Supervisory Board and approved by the General Meeting of Shareholders. The management approach was presented in accordance with the procedures of conduct described in PSE's corporate governance regulations and standards. All the published information presented in the report has been verified for consistency with the company's internal documents, and supervision of activities in particular areas is provided by the management. Strategic decisions are made at the Management Board level.

Reliability of the report

[GRI 102-56] The report has been internally and externally reviewed. The PSE Capital Group Sustainable Development Team worked on the accuracy of the report, its content and compliance with the guidelines. The external review was conducted by an independent entity whose selection was approved by the Management Board.

VIII. GLOSSARY

AIT	the Average Interruption Time index for a power transmission system; expressed in minutes per year, it is the product of 60 and the index of electricity not supplied (ENS) by the power transmission system, divided by the average capacity supplied by the power transmission system expressed in MW
ATC allocation method	a method of calculating and allocating the transmission capacity at a boundary between systems or zones, in which commercial transmission capacity is offered based on arrangements made between operators of two adjacent price zones in a period before the capacity allocation (i.e. before a capacity auction), based on physical characteristics of these zones, and taking into account the network congestion and the expected demand for commercial transmission capacity
BIM	Building Information Modelling
CACM	Capacity Allocation and Congestion Management
CEE	the region of Central and Eastern Europe
CUI (CJI)	Central Investment Unit (Centralna Jednostka Inwestycyjna)
CERT PSE	PSE Computer Emergency Response Team
CORE	region formed after the merger of CEE and CWE regions
CORE CCR	Core Capacity Calculation Region
CWE	the region of Central and Western Europe
Date of report	October 2021
ENS	the index of electricity not supplied by the power transmission system. It is expressed in MWh per year, and is the sum of the products of the capacity not supplied due to an interruption and the duration of this interruption. It includes short, long and very long interruptions with and without consideration of catastrophic interruptions.
EMS	Management Systems
ENTSO-E	European Network of Transmission System Operators for Electricity
EV	electric vehicles
FBA	Flow-Based Allocation

FBA MC	Flow-Based Market Coupling
PSE CG	PSE Capital Group
Main location of the organisation	Headquarters 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
IP DSR	DSR Intervention Program
TNC	Transmission Grid Code
ICT	Information and Communication Technology
IT	Information Technology
JWCD	Centrally Dispatched Generating Units (in Polish: Jednostki Wytwórcze Centralnie Dysponowane)
EC	European Commission
NPS	National Power System, also called the power system
Co-optimisation	simultaneous purchase of electricity and reserves
Locations of ZKO PSE	locations of branch divisions (organisational units) in Warsaw, Radom, Katowice, Poznań and Bydgoszcz
LIP	Local Implementation Project
MW	megawatt
NCBiR	The National Center for Research and Development (Narodowe Centrum Badań i Rozwoju)
nJWCD	a generating unit that is not a centrally dispatched generating unit (in Polish: jednostka wytwórcza niebędąca jednostką wytwórczą centralnie dysponowaną)
EHV	Extra High Voltage
LV	Low Voltage
ODM	Area Dispatching Center

ORed	DSR managed objects
ORM	Operational Capacity Reserve
DSO	Distribution System Operator
TSO	Transmission system Operator, also referred to as: the operator
OT	Operational Technology
RES	Renewable Energy Sources
PEC	Prosumer Energy Cloud
EF (PEM)	electromagnetic field
PZI	PSE Investment Project Plan
PRSP	A development plan for meeting the current and future electricity demand, also known as the "Transmission Network Development Plan", is prepared by the Transmission System Operator for a period of 10 years. PRSP is a guidance document that contains a plan of projects related to modernisation and development of the transmission network, the implementation of which contributes to the improvement of technical and economic conditions of the national power system operation. PRSP takes into account strategic national objectives for the development of the power sector, as well as EU regulations and plans for the development of cross-border connections. During the preparation stage, PRSP is subject to consultations with stakeholders, and is agreed with the President of the Energy Regulatory Office.
Redispatching	A measure triggered by one or more system operators by changing the generation or load patterns to alter physical flows within the transmission system, and to reduce physical congestion.
RCCs	Regional Coordination Centres
RCM	Reliability Centered Maintenance
RCN	a regional monitoring center
IDM	Intra-Day Market
DAM	Day-Ahead Market
CM	capacity market

ROC	Regional Operation Centre
RSCI	Regional Security Coordination Initiatives
SE	substation
MV	Medium Voltage
SOGL	System Operation Guideline
The Company	PSE
SwePol	Poland - Sweden connection
TSCNET	the company TSCNET Services GmbH, whose business includes technical support services for transmission system operators in operational planning processes and support for conceptual tasks carried out within the framework of the regional initiative TSO Security Cooperation. The shareholders of TSCNET Services include several European transmission system operators
TSC	Transmission System Operators Security Cooperation – an initiative established in December 2008, aimed at increasing the operational security of the interconnected power systems in Central Europe by intensifying cooperation between operators
TSO	Transmission System Operator
EU	European Union
ERO	Energy Regulatory Office
HV	High Voltage
WCD	electricity supply continuity index
XBR	a two-way redispatching
XBID Platform	An IT trading platform for cross-border Single Intra-Day Coupling, based on a central IT system connected to the local trading systems of NEMOs and Transmission Operators, enabling Single Intra-Day 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 the tasks related to the Single Day-Ahead or Intra-Day Market coupling.
SCADA	Supervisory Control and Data Acquisition
SCED	Security Constrained Economic Dispatch

SCUC	Security Constrained Unit Commitment
SIDC	Single Intra-Day Coupling. The process in which complex orders are matched on a continuous basis while the inter-area capacity is allocated.
SDAC	Single Day-Ahead Coupling. The process in which orders submitted are matched simultaneously with the allocation of inter-area transmission capacity.
SOGL	System Operation Guidelines

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