

6. Environment

A. Our influence and actions

By generating and distributing energy and heat, we affect environment every day. We are aware of this, hence we implemented a number of solutions that allow us to monitor and limit our environmental impact. Some of them are required by regulators, others are voluntary, bearing in mind the welfare of our environment, which directly affects us. We aim to use the best available solutions and technologies to minimize the negative impact on the environment. Taking care of the environment, we established one of the guiding principles of the "Code of Ethics for the Enea Capital Group", imposing an obligation on all employees to take actions aimed at environment protection.

G4-DMA. How the organization manages the "Compliance" Aspect.

Environment protection management

Policy of Integrated Quality, Environment and Occupational Health and Safety Management is binding in our organization. It is consistent with the requirements of PN-EN ISO 9001:2009, PN-EN ISO 14001:2005, PN-N-18001:2004, OHSAS 18001:2007, within generation and trade of electricity, generation and distribution of heat. It helps us, among others, to set goals and strategic directions for development. It allows to implement environmental processes at the highest level and ensure compliance with applicable laws.

Moreover, Enea Wytwarzanie has a number of procedures that regulate environmental monitoring, regulatory compliance, identification and evaluation of environmental aspects and goals management.

These are:

- Instructions of Monitoring the Environment in Enea Wytwarzanie sp. z o.o. - Location Świerze Górne.
 - Instructions of Data Management in the field of Environmental Protection in Enea Wytwarzanie sp. z o.o. - Location Białystok.
 - Procedure of Monitoring the Environment in Enea Wytwarzanie sp. z o.o. - Location Koronowo
 - The plan of monitoring CO₂ emissions approved by the decision of the Marshal of the Podlasie Province and Procedure of Monitoring CO₂ emissions in Enea Wytwarzanie sp. z o.o. - location Białystok.
 - The plan of monitoring CO₂ emissions approved by the decision of the Marshal of the Mazowieckie Province and Procedure of Monitoring CO₂ emissions in Enea Wytwarzanie sp. z o.o. - location Świerze Górne.
- Monitoring of CO₂ emissions from the combustion of coal and biomass,

- Monitoring of CO₂ emissions from the combustion of coal (mass-balance approach)
 - Monitoring of CO₂ emissions from the combustion of fuel oil
 - Monitoring of CO₂ emissions from the process of flue gas desulphurisation,
 - Monitoring emissions from propane combustion
 - The procedure for supervision of the implementation of the CO₂ monitoring plan
 - Documentation supervision procedure in monitoring CO₂ emissions
 - The procedure for risk management in monitoring CO₂ emissions,
 - The procedure for estimating the uncertainty of data regarding the monitoring of CO₂ emissions.
 - Instructions of the Principles of Waste Management in Enea Wytwarzanie sp. z o.o. - Location Świerze Gorne.
- Instructions on the handling of waste in the CHP Białystok.
 - Instructions of waste management in Enea Wytwarzanie sp. z o.o. - Location Koronowo.

G4-EN29

No significant fines or non-financial sanctions were imposed on us for non-compliance with laws and regulations relating to environmental protection in 2016. Charging MPEC Białystok with an additional fee for exceeding the conditions for the disposal of industrial wastewater to wastewater facilities in the amount of PLN 2 327.11 gross was the only marginal incident.

Key investments

We completed a number of investments in 2016 that allow us to modernize our installations and reduce impact on the environment. The most important were:

Generation

- Successive stages of the construction of a supercritical bituminous coal fired 1,075 MW_e power unit
- 14.1 MW Baczyna wind farm commissioning
- Unit No. 1 - obtaining the operating permit and commissioning of the installation of the catalytic denitrification of flue gases (SCR)
- Continuation of the SCR installation for units No. 4-8
- Commencement of the modernisation of cooling water intake - temporary stabilising checkdam on the Vistula River
- Commencement of the SCR installation and modernisation of electrostatic precipitators for units No. 9 and 10 as part of the 2 x 500 MW units modernisation programme
- Construction of industrial waste and rainwater treatment
- Continuation of the construction of flue gas desulphurisation plant

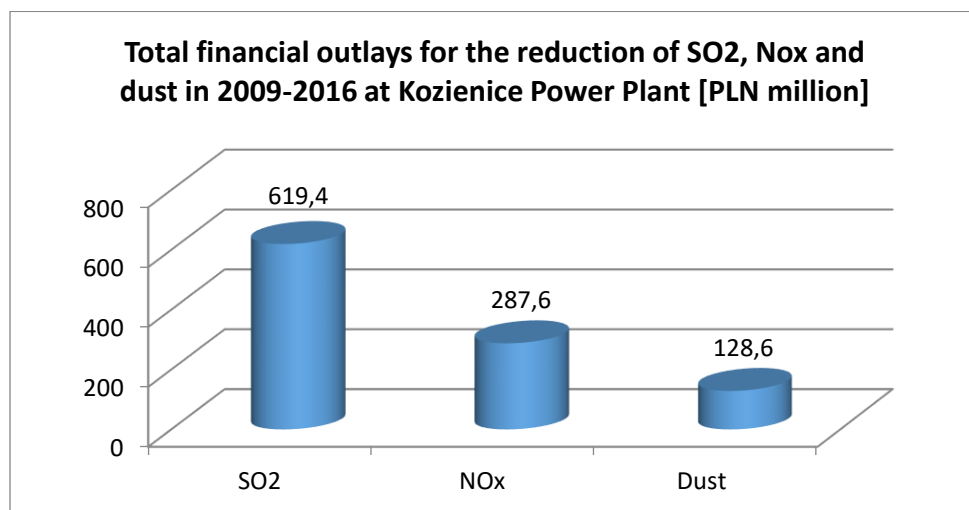
Distribution

- Completion of the realisation of a range of investments on medium and high voltage related to the extension, automation and modernisation of the unit and power grids
- Improvement of the connection processes and reduction of the negative impact on the environment of the used power equipment
- Development of information tools supporting grid management

The construction of a new 1,075 MWe unit at Koźienice Power Plant was one of our most important investments in 2016. 98% is the investment stage for May 2017. We shall launch the most modern power plant in Poland and Europe in 2017.

A new unit at Koźienice Power Plant:

- Shall increase by 1/3 capacity in the Koźienice Power Plant
- Will allow to eliminate deficits of energy on the market
- Shall guarantee high efficiency of energy generation and low failure rate
- Will be the largest in Europe power unit fired with bituminous coal



See how the construction of [Koźienice Power Plant](#) is progressing.

B. Energy

G4-DMA. How the organization manages the "Energy" Aspect.

G4-EN3

Table 11. Total electricity consumption (MWh) in 2016*

Company	MWh
Enea SA	2054.22
Enea Wytwarzanie	1 167 478
MEC Piła	4361.9
PEC Oborniki	671.43
MPEC Białystok*	5158.7
Enea Operator	company's own needs: 39 794 MWh company's network losses: 1 322 306 MWh
Enea Centrum**	0.545356
Enea Trading ***	no data
Enea Serwis	591.594
Enea Logistyka****	525.89
Enea Oświetlenie	194.233 MWh (including 21.041 MWh from own photovoltaic installation)
Enea Pomiary	162.3
PEC Zachód	70.9

* Much lower electricity consumption for thermal energy generation compared to 2015 is associated with a decrease in heat generation in 2016 by approximately 83%.

**Only a part of electricity consumption is included in the table. The remaining amount is included in the rent.

***All office spaces used by Enea Trading are rented by the company (from Enea SA, Enea Wytwarzanie Sp. z o. o. and Enea Serwis Sp. z o. o). Therefore, all operating costs are included as fixed fees in the amount of a monthly rent. As a result, it is difficult to define exactly how much water or electricity is used by the company.

****In some locations there is no metering and the cost of electricity is included in the rent.

How have we improved our energy efficiency in 2016?

1. We carried out modernization of our heating infrastructure in Białystok in 2016, which in turn resulted in lower energy consumption. We replaced parts of pipe distribution network in pre-insulated pipe technology, which contributes to increased power supply reliability and is associated with reduced heat transfer losses. We have also modernized pumping systems at the district heating substations, leading to a decrease in electricity consumption.
2. Due to the installation of the flue gas denitrification system at the 200 MW blocks 4 and 5 in Świerże Górne we have implemented a project consisting on the replacement of the drive exhaust fans on boilers 4 and 5 and we used a more economical way of adjusting their efficiency. Installation of new exhaust fans along with the replacement of the drive and the rotational speed regulation of the engine driving the fan by the inverter will save the amount of energy consumed by the engine. This contributes to reducing the internal load of blocks 4 and 5 alone.
3. Enea Oświetlenie modernized road lighting in the towns and districts: Obrzycko, Mieścisko, Wolsztyn, Choszczno, Przelewice, Dobiegniew, Barlinek, Międzyrzecz (replacement of old, worn out lighting fixtures to new energy saving fixtures).

The company's energy audit is a new requirement for large companies under the Energy Efficiency Act of 20 May 2016. This is a procedure to provide information on potential energy savings in an enterprise and to make calculations on proposed energy efficiency improvements. In case of Enea Wytwarzanie, audit covers all company's locations. We've started the audit in 2017, and we shall present its results in the next report.

C. Emissions

Tight emission standards

G4-DMA. How the organization manages the "Emissions" Aspect.

According to the EU directive on the industrial emissions (IED), more stringent emission standards have been introduced from 1 January 2016. However, the new law provides the possibility of delaying their application in the form of a derogation mechanism - Transitional National Plan (PPK) which is in force until 30 June 2020. PPK provides the possibility of aggregate settlement of limits within the group. Consequently, the Kozienice Power Plant accounts for with the Białystok Thermal Power Station as it regards SO₂ and dust limits. In addition, Kozienice Power Station benefits from the derogation of the Treaty of Accession on the NO_x emission standard (valid until 31 December 2017).

By taking into account all analyzes and investment carried out, we don't expect any unit shutdown in Enea Wytwarzanie due to tightened emission standards. All power units will be fully modernized and will also meet new emission standards.

G4-EN15

Table 12. Emission rate of carbon dioxide in the companies from the generation segment [Mg]*

	CO2 emissions [Mg]	Emission rate
Enea Wytwarzanie	12 372 636	872 kg/MWh (Świerże Górne); 190 kg/MWh and 62 kg/GJ (Białystok)
MPEC Białystok	5434	0.098 Mg/GJ
PEC Oborniki	14274.40	-
MEC Piła	82 481	88.05 kg/GJ
PEC Zachód	not applicable	not applicable

*Significant decrease of CO₂ emission in MPEC Białystok results from a significantly lower amount of coal burnt (16827.13 Mg in 2015 vs. 2500.41 Mg)

G4-EN21

Table 13. Emission of sulphur and nitrogen oxides in 2016 [Mg]*

Company	Nox emission	Dust emission	SO ₂ emission
Enea Wytwarzanie	14812		10833
MPEC Białystok*	4	3	1
PEC Oborniki	26.27		33.63
MEC Piła	107.38		155.90

*Significant decrease of CO₂ emission in MPEC Białystok results from a significantly lower amount of coal burnt (16827.13 Mg in 2015 vs. 2500.41 Mg)

Pollutant concentration in Kozienice Power Plant in 2016:

- SO_x lower by **71%** than the acceptable concentration
- NO_x lower by **23%** than the acceptable concentration
- Dust lower by **83%** than the acceptable concentration

What have we done to limit our emissions in 2016?

1. We rebuilt the district heating network to reduce energy losses in Białystok (we exchanged about 2.5 km of network) and modernized 44 district heating substations.
2. We completed the modernization of through-flow parts WP, SP, NP and other turbine parts, together with revitalization of the bodies and valve chambers WP and SP of block no.5 of 200 MW in Świerże Górne. The modification of the through-flow part of block 5 resulted in a reduction of a unit heat consumption by a turbine set of about 140 kJ/kWh. This reduces the amount of carbon used for the generated unit of energy and thus reduces the emission of pollutants into the atmosphere. In addition, the block capacity increased by 3 MW.
3. We completed the catalytic flue gas denitrification installation (SCR) for blocks 4 and 5 in Świerże Górne. We plan to build SCR installations on other blocks in the next few years. Catalytic flue gas denitrification installation for 200 MW boilers (OP-650) no. 1-8 and 500MW (AP-1650) no. 9 and 10 installed in Enea Wytwarzanie Sp. z o.o. aims to reduce NO_x emissions from the current level of 500 mg /m³ to a level of ≤ 100 mg/m³ NO_x (understood as the sum of nitrogen oxides per NO₂ at 6% of O₂ in dry exhaust), in the range of 50 - 100% of the maximum sustainable efficiency and burning of primary fuel and biomass co-firing in weight fraction not higher than 10%.

4. We have been working on the installation of flue gas desulphurisation plant no. 5 for the power unit no. 11 in Świerże Górne.
5. Construction of flue gas semi-dry desulphurisation plant on K7 and K8 boilers in Heat and Power plant in Białystok.

D. Water and raw materials

G4-DMA. How the organization manages the "Materials" Aspect.

G4-DMA. How the organization manages the "Water" Aspect.

Main raw materials that are used in our daily activities include: biomass, coal, fuel oil and light fuel oil. Basic fuel used to generate electricity in Enea is hard coal. 74% of coal supplies came from LW Bogdanka in 2016. In turn, the main fuel used by Enea Wytwarzanie - Heat Segment (Bialystok Thermal Power Plant) is biomass, in the form of forest chips, energy willow chips and sunflower husk pellets.

G4-EN1

Table 14. Main raw materials used by Enea Wytwarzanie in 2015 and 2016.

Fuel type	2015		2016		Change	
	Volume [thsd tons]	Cost [PLN mln]*	Volume [thsd tons]	Cost [PLN mln]	Volume	Cost
Bituminous coal	5 870	1 321	5 426	1 137	-7.6%	-13.9%
Biomass	634	172	427	79	-32.6%	-54.1%
Fuel oil (heavy)**	8	9	8	7	no change	-22.2%
Gas [thsd m3]***	13845	20	16 198	23	17%	15%
TOTAL		1 522		1 246		

*Including transport

**Light-up fuel in Koźienice Power Plant

***Used for the production of electricity and heat energy in MEC Piła and heat energy in PEC Oborniki

G4-EN8**Table 15.**Total water withdrawal in the companies of Enea Capital Group in m³ in 2016*

	Unit	Withdrawal	Sources
Enea SA	m ³	9256	wells - 837 m3 water supply system - 8419 m3
Enea Operator	m ³	75288.65	water supply system 75 010.99cm3 wells 277.66 m3
Enea Wytwarzanie	m ³	1 775 004 528	groundwater intake – 941 760 water from drainage – 5 010 700 surface water from Wisła river - returnable water withdrawal for cooling purposes and non- returnable water withdrawal for technological purposes - 1 769 003 928 water supply system intake - 48 140
MPEC Białystok*	m ³	7 936	water from deep wells [m3]: 5 628 water supply system [m3]: 2 308
MEC Piła	m ³	5 680	water supply system [m3]: 5 680
PEC Oborniki	m ³	2512	water supply system [m3]: 2 512
Enea Pomiary	m ³	770	no data
Enea Oświetlenie	m ³	727	water supply system Poznań- 589.

			water supply system Szczecin-138
Enea Logistyka**	m ³	1279	water supply system [m3]: 1279
PEC Zachód	m ³	2686	water supply system [m3]: 2686
Enea Centrum*	m ³	1575	water supply system [m3]: 1575
Enea Serwis	m ³	3968	water supply system [m3]: 3968
Enea Trading **	m ³	no data	

*Significant decrease of water consumption is due to reduced heat generation. 9352 m3 heat was generated in 2015 and only 116 m3 in 2016.

**In some locations there is no metering and the cost of electricity is included in the rent.

***Only a part of electricity consumption is included in the table. The remaining amount is included in the rent.

**** All office spaces used by Enea Trading are rented by the company (from Enea SA, Enea Wytwarzanie Sp. z o. o. and Enea Serwis Sp. z o. o). Therefore, all operating costs are included as fixed fees in the amount of a monthly rent. As a result, it is difficult to define exactly how much water or electricity is used by the company.

What have we done to reduce water consumption?

1. With the activities related to the current operation and modernization of transmission networks in the Heat and Power Plant in Białystok, the loss of heat carrier decreased from 172 thousand m³ in 2013 to 60.3 thousand m³ in 2016 i.e. by around 35%.
2. We launched the installation of water recycling from the cooling of technological drives to the holding tanks of raw water in Białystok.

G4-EN23

Table 16. Waste by type of waste [Mg] in 2016

	Type of waste	Unit	2016
Enea SA*			
	Hazardous waste	Mg	3.95
	Other than hazardous waste	Mg	0
Enea Operator **			
	Hazardous waste	Mg	21.926
	Other than hazardous waste	Mg	1182.731
MPEC Białystok*****			
	Hazardous waste	Mg	16.41
	Other than hazardous waste	Mg	1115.7
Enea Wytwarzanie			
	Hazardous waste	Mg	56.55
	Other than hazardous waste	Mg	512423.75
MEC Piła			
	Hazardous waste	Mg	9.707
	Other than hazardous waste	Mg	5323.6395
PEC Oborniki			

Corporate social responsibility report of Enea Capital Group 2016

	Hazardous waste	Mg	0.0433
	Other than hazardous waste	Mg	1201.949
PEC Zachód			
	Hazardous waste	Mg	didn't produce
	Other than hazardous waste	Mg	2.1
Enea Pomiary			
	Hazardous waste	Mg	0.06
	Other than hazardous waste	Mg	1
Enea Logistyka***			
	Hazardous waste	Mg	4.828
	Other than hazardous waste	Mg	12.7
Enea Trading****			
	Hazardous waste	Mg	no data
	Other than hazardous waste	Mg	no data
Enea Serwis			
	Hazardous waste	Mg	116.225

	Other than hazardous waste	Mg	333.968
Enea Oświetlenie			
	Hazardous waste	Mg	1.859
	Other than hazardous waste	Mg	192.24 (excluding municipal waste)
ENEA Centrum			
	Hazardous waste	Mg	no data
	Other than hazardous waste	Mg	no data

*No hazardous waste is identified as a result of transferring IT services to Enea Centrum. Since 2016, Enea Centrum is a waste generator associated with this activity and not Enea SA, therefore Enea SA doesn't generate this waste.

**Significant difference in the amount of hazardous waste in Enea Operator in 2016 and 2015 is due to the modernization of lines and power substations in 2015. Modernization concerned replacement of wooden poles, oil and transformers and power cables.

***The above values include waste collected by Enea Logistyka Sp. z o.o. from other Enea companies which result from provisions of the Waste Electrical and Electronic Equipment Act. The above figures do not include municipal waste. Hazardous wastes were handed over to ABBA Ekomed company Sp. z o.o., while non-hazardous waste are subject to recycling.

****Waste included in rent.

***** We reported a wrong value of non-hazardous waste produced in MPEC Białystok in the report for 2015, the correct value is 7910.69 Mg.

21 leaky transformer foundations 110/MV were modernized by Enea Operator in 2016 to prevent possible soil contamination with petroleum derivatives. Other leaky transformers are to be modernized and are already included in investment plans for future years.

Enea Logistyka introduced a new waste management procedure.

E. RES

We use renewable energy sources (RES) in our generation processes. 21 hydroelectric power plants, 3 wind power plants: Bardy, Darżyno and Baczyna, as well as 2 biogas plants in Gorzesław and Liszków belong to the Enea Group. In addition, we use biomass as fuel for power generation in our power plants and CHP plants.

- **212.8 MW**, RES capacity in Enea Group of which:
 - 134.3 MW in RES segment
 - 78.5 MW in Heat segment
- Amount of energy generated from RES in Enea Wytwarzanie: **302 730.330 MWh**
- Amount of energy generated from co-generation in Enea Wytwarzanie: **551 093.589 MWh**

Table 17. Generation of electricity (net) from renewable energy sources [GWh]* by Enea Capital Group

		2015	2016
Biomass co-firing		255	0
	Change [%]	-46.40%	-100%
Biomass combustion		309	256
	Change [%]	5.10%	-17.20%
Hydroelectric power plants		109	113
	Change [%]	-3.50%	3.70%
Wind farms		162	160
	Change [%]	14.90%	-1.20%
Biogas power plant		14	10.00%
	Change [%]	55.60%	-28.60%

Our investments in RES area

Table 18. Current and planned Enea CAPEX in renewable energy sources

	2014	2015	2016	2017
RES CAPEX	13.1 mln PLN	94.3 mln PLN	6.14 mln PLN	7.16 mln PLN

Key RES investments in 2016:

1. **FW Bardy II (9-10 MW)** - 3 turbines of 3 MW each and connection to the existing Bardy-Dygowo 50 MW wind farm (Zachodniopomorskie voivodship). Planned total capacity of 59-60 MW.
2. **FW Baczyna 15 MW** - construction of 6 turbines, 2.5 MW each in Lubno in the Gorzów district.

Planned investment outlays of the RES segment for 2017, including:

a) development investments:

1. construction of a 1MW photovoltaic power plant in Jastrów, provided that the auction organized by the ERO is won.

b) Maintenance investments:

1. **Modernization of power input, switching station and AKPiA (Control and Measurement Instruments and Automation) power station systems (EW Tryszczyn)** - modernization of excitation systems, modernization of the standard switching station air insulated on the switching station gas insulated, construction of the remote control and control system of the entire power plant.
2. **Generation optimization (WF Bardy)** - assembly of combs and flaps on turbine blades to increase aerodynamic efficiency of blades and upgrade of the turbine control software to optimize turbine operating parameters. The project aims to increase farm productivity by 1.9%.
3. **Automation of the power plant** - automation consisting on the installation of the central SCADA (Supervisory Control and Data Acquisition) system of the RES segment to optimize management / control of the operation of generation facilities.