

3 ENVIRONMENT

- 3.1 Goals and priorities
- 3.2 Energy
- 3.3 Emissions
- 3.4 Renewable energy sources
- 3.5 Water and raw materials

Key issues

ENE Capital Group's activities affect the environment. The most important environmental issues include: emissions of carbon dioxide and other greenhouse gas emissions, water and waste water management, energy efficiency and waste.

Investments in the development of renewable energy sources and cogeneration sources are key directions of the Capital Group investments.

Compliance with environmental regulations

ENE Capital Group reports to the competent regulators and bodies of the public administration information concerning environmental impact and complies with directives and other international guidelines.

No penalties were imposed on the ENE Capital Group for non-compliance with laws and regulations relating to environmental protection in 2013.

Investments in environmental protection

Implementation of objectives from the scope of environmental protection is reflected in investments that minimize negative environmental impact of the Capital Group. Key investments are accomplished by the generation segment companies and ENEA Operator.

Table. Examples of investments for environmental protection

Company:	ENEA Wytwarzanie
Investment:	Construction of ecological flue gas desulphurisation plant, reducing sulfur dioxide emissions - IOS IV. The investment value: more than PLN 182 million gross. Installation is to be completed in June 2015.
Investment objective:	Provision of more than 93proc. desulfurization efficiency, which enable the company to meet emissions standards and the implementation of production plans.

Company:	Elektrociepłownia Białystok
Investment:	Investment related to the combustion of biomass generating unit with Heat Accumulation System - finalization in 2013.
Investment objective:	Reduction of emissions to the atmosphere and thus increase of the heat supply security. Expected result of the investment is a reduction of CO2 emissions by 7000Mg/year and reduction of combustion waste by 400mg/year. At the same time, the company began construction of heat recovery system from the exhaust gas of the biomass boiler. It is to recover and utilize heat, which is now lost. The maximum boiler capacity shall amount to 18.4 MW. This is the first project of this kind in Poland, and the investment value is PLN 25.5 million.

Company:	ENEA Wytwarzanie
Investment:	Construction of the fourth flue gas desulfurization plant (IOSIV).
Investment objective:	Meeting the requirements of the Industrial Emissions Directive (IED). Provision of 100 percent desulfurization of discharged fumes.

3.1 Goals and priorities

Environmental management is extremely important for the functioning of the ENEA Capital Group.

Environmental issues are taken into account, inter alia, in the system of the ENEA Capital Group risk analysis. Moreover, individual companies implement environmental management systems and/or environmental policy.

Implemented standards and policies of environmental management in the ENEA Capital Group companies

ENEA Wytwarzanie – RES segment (Elektrownie Wodne company)

- Quality and Environment Policy ISO 9001 and 14001,
- Procedure of environmental aspects,
- Procedure of environmental monitoring,
- Waste management Instruction,
- Water management Instruction,
- Evaluation of environmental aspects,
- Evaluation of legal requirements of the environmental and quality management system.

ENEA Wytwarzanie – Power Plant in Koźienice

- Integrated Quality Management System, Environmental, Health and Safety in accordance 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, transmission and distribution of heat.

ENEA SA

- Environmental policy of ENEA SA

Eneos

- ISO 9001:2008

ITSERWIS

- ISO 9001:2009

MEC Piła

- ISO 14001

Elektrociepłownia Białystok

- ISO 14001:2004

ENERGOBUD Leszno

- Quality Management System, according to PN-EN ISO 9001:2001 and PN-EN ISO 14001:2005

PEC Oborniki

- Environmental policy, ISO 14001.

3.2 Energy

The Capital Group aims to minimize energy consumption. It mainly results from the optimization of energy generation and distribution processes. Furthermore, companies' energy efficiency is affected by the employees through daily habits and solutions implemented in office buildings. ENEA Capital Group also conducts targeted at customers educational activities in the field of efficient energy use. Examples of such initiatives can be found [HERE](#).

Table. Total electricity consumption (MWh)

Company	Total electricity consumption
ENEA SA	1535.31
ENEA Operator	company's own needs – 40 334
	company's network losses – 1 465 456
ENEA Wytwarzanie	931 907.97
Elektrownie Wodne	1500
PEC Oborniki	802
Elektrociepłownia Białystok	75 868.215
MEC Piła	3033
Annacond Enterprises*	no data
ENEA Centrum**	no data
ENEA Trading***	no data
ENERGOBUD Leszno	863
Eneos	182.191****
Energomiar	280.1
BHU	585.49
Hotel EDISON	237.199
Energetyka Poznańska Zakład Transportu	9494
ITSERWIS	0.38
Centrum Uzdrowskowe ENERGETYK	487.636
Energo-Tour	457.896

* Annacond Enterprises Company subleases office spaces and doesn't account for electricity consumption.

** ENEA Centrum doesn't keep records of energy consumption, since it doesn't own offices, which it uses. ENEA Centrum leases offices from other companies of the Capital Group and from Rental company.

*** ENEA Trading doesn't own office spaces which are rented from ENEA SA, ENEA Wytwarzanie and Zakład Transportu in Poznań. Operating costs are included in the rent.

**** Including 3,086 MWh photovoltaic installation.

Examples of activities that minimize energy consumption

ENEA Wytwarzanie

- replacement of the electrostatic precipitator in unit no. 8 equipped with energy saving program; saving of electricity consumption is 236.79 kWh/h;
- modernization of coal transfer buildings 500 MW (Phase I) and 200 MW (Phase II) in the field of lighting;
- Replacement of exhaust fans to exhaust fan system with an power inverter within the building of denitrification system for unit no. 8 in 2017. It is necessary because of the increased flow resistance caused by the building for denitrification unit catalytic converters.

PEC Oborniki

- combination of two coal-fired boilers and a gas boiler, which gives estimated electricity savings of 30%.

3.3 Emissions

Companies of the generation segment constantly monitor emissions of carbon dioxide, oxides of sulfur and nitrogen. ENEA Capital Group applied to Polish and international regulations in this regard.

ENEA Wytwarzanie implements investments in accordance with the present and prepares for the upcoming, more stringent EU guidelines.

MONITORING AND REPORTING SYSTEM OF CARBON DIOXIDE EMISSIONS MAKES USE OF THE FOLLOWING PROCEDURES:

- Monitoring procedure of CO₂ emissions from the combustion of coal and biomass in ENEA Wytwarzanie – Świerże Górze
- Monitoring procedure of CO₂ emissions from coal combustion (mass balance method) – Świerże Górze
- Monitoring procedure of CO₂ emissions from the combustion of fuel oil in ENEA Wytwarzanie – Świerże Górze
- Monitoring procedure of CO₂ emissions from flue gas desulfurization process in ENEA Wytwarzanie - Świerże Górze
- Supervision procedure over documents and records in monitoring of CO₂ emissions process – Świerże Górze
- Supervision procedure over implementation of the plan for monitoring CO₂ emissions – Świerże Górze
- Risk management procedure in the monitoring of CO₂ emissions process in ENEA Wytwarzanie - Świerże Górze
- Procedure for estimating the measurement uncertainty of the data in the monitoring of CO₂ emissions in ENEA Wytwarzanie - Świerże Górze

Main regulations in the management of greenhouse gas emissions

- "Directive 2003/87/EC of 13 October 2003 establishing a trading scheme for greenhouse gas emission",
- The Act of 28 April 2011 on the greenhouse gas emissions trading scheme (Journal of Laws of 2011 No. 122, Item 695)
- "European Commission Decision of 27 April 2011 on the establishment of transitional rules for the harmonized free allocation of emission allowances across the EU under Articles. 10a of Directive 2003/87/EC of the European Parliament and of the Council (OJ EU L 130, 17.5.2011, p. 1)".
- Commission Regulation (EU) No. 601/2012 of 21 June 2012 in the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and the Council.

Greenhouse gas emissions

Table. Emission of carbon dioxide in the companies from the Generation segment [Mg]

Company	2013
ENEA Wytwarzanie	10 230 491 (without biomass)
Elektrociepłownia Białystok	232 308
PEC Oborniki	15556.34
MEC Piła	80 047

Ratio of carbon dioxide emission in ENEA Wytwarzanie was 845 kg/MWh in 2013.

Table. Emission of sulfur and nitrogen oxides in the companies from the Generation segment [Mg]

Company	2013	
	SO _x	NO _x
ENEA Wytwarzanie	33 405	18 109
Elektrociepłownia Białystok	628.89	936.26
PEC Oborniki	62.61	28.18
MEC Piła	119	63

ENEA WYTWARZANIE IMPLEMENTS MEASURES TO MINIMIZE EMISSIONS:

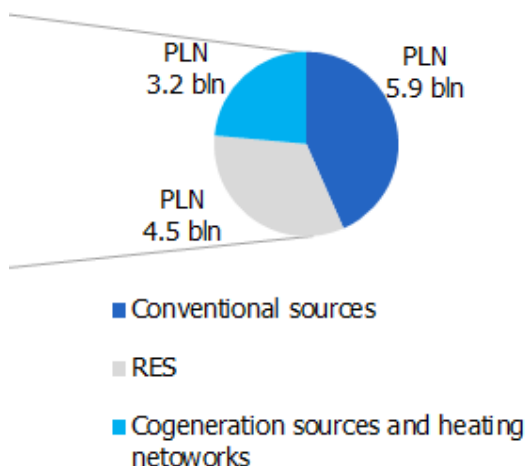
- modernization of high pressure steam generator for turbines 13K225 of units No. 1-8 at ENEA Wytwarzanie (reported under the National Investment Plan) - Its purpose is to reduce the unit heat consumption by 100 kJ/kWh, increasing power by 3 MW and increasing efficiency of the steam generator part to 85% which translates directly into a reduction of carbon dioxide emissions;
- change of the refrigerant from R22 to MO59-21 in air-conditioning, which reduces the amount of used ozone-depleting substances;
- generation of "green energy" in biomass co-firing installation of units 200 MW, resulting in the burning of 243 010 Mg of biomass and emissions avoidance of 376 949 Mg of carbon dioxide;
- replacement of the electrostatic precipitator at unit No. 8 of 200 MW – aim of those activities was to maintain the flue gas dust removal efficiency of above 99%;
- in connection with a necessity to adapt to the requirements of the industrial Emissions Directive (IED), the company is building a fourth flue gas desulphurization plant (IOSIV), which provides 100 percent of desulfurization. Furthermore, the company also implements development of catalytic denitrification system for Units No. 4-8 of 200 MW.

3.4 Renewable energy sources

ENEA Capital Group plans to increase capacity based on Renewable Energy Sources (RES).

120.048 MW – total installed capacity in RES segment in 2013

Figure: Planned investments in the generation segment:



Construction of the biogas plant Gorzesław with a capacity of 1.6 MW (2009-2014) is one of the key investments in RES segment. According to the strategy in the perspective of 2020, also the following investments are being accomplished:

- acquisition of renewable energy projects - investments in wind assets
- construction of Baczyna wind farm of 15 MW (2008-2016)
- construction of Bardy II wind farm with a capacity of 9-10 MW (2013-2016) - a continuation of the Windfarm Polska investment project

Table. Generation, by ENEA Wytwarzanie RES segment, of electricity (net) from renewable energy sources [GWh]

Hydroelectric power plants	144.823 GWh
Wind Farms Darżyno + Bardy	138.174 GWh
Liszkowo biogas plant	9.972 GWh
TOTAL:	292.969 GWh

Certificates of origin

- 147 316.222 MWh – Energy generated from RES, for which hydropower plants received green certificates of origin
- 11 111.264 MWh – Gross electricity generated by the biogas plant Liszkowo for which DOBITT Energia received green certificates of origin
- 14 421.708 MWh – Energy generated by the Wind Farm Darżyno for which Elektrownie Wodne company received green certificates of origin
- 135 454.99 MWh – Energy generated by the Wind Farm Bardy, for which Windfarm Polska company received green certificates of origin.

3.5 Water and raw materials

Key raw materials in the supply chain

Hard coal is the main raw material used to generate electricity at ENEA Wytwarzanie. Kozenice power plant used 4921 thousand tons of coal, approx. 243 thousand tons of biomass and 7.7 thousand tons of heavy fuel oil in 2013 to generate energy.

Lubelski Węgiel "Bogdanka" SA (supplier of 71% of coal for ENEA Wytwarzanie) and Katowicki Holding Węglowy SA are two main suppliers of this key for the ENEA Capital Group raw material. Power plant in Kozenice which belongs to ENEA Wytwarzanie also bought coal from Petrokol and JSW SA companies. Elektrociepłownia Białystok mainly used coal from suppliers abroad in 2013.

Light-up fuel - heavy fuel oil with a sulfur of up to 3 percent. - ENEA Wytwarzanie purchased exclusively from PKN ORLEN SA. Transport of coal to the power plant in Kozenice takes place mainly by rail. 98% of coal transport to ENEA Wytwarzanie was carried out by PKP Cargo SA.

ENEA Capital Group also uses Renewable Energy Sources to generate energy: biomass, hydropower and wind power. As far as biomass is concerned pellets from sawdust, pellets and briquettes from sunflower husk and straw pellets are used.

Biomass

Power plant in Kozenice which belongs to ENEA Wytwarzanie purchased 243 988.26 Mg of biomass in 2013.

Table. Amount of biomass used by ENEA Wytwarzanie SA [Mg]

Company	Unit	2011	2012	2013
ENEA Wytwarzanie	Mg	219 302.8	294 658.65	243 010

Main raw materials used by ENEA Wytwarzanie:

- **hard coal – 4 920 837 Mg**
- **biomass – 243 010 Mg**
- **mazut – 7721 Mg**
- **limestone powder – 90 094 Mg**

Water

Municipal water supply system is a major source of water intake for the companies. Companies of generation segment consume the majority of water in their basic business activity.

The greatest responsibility associated with the protection of water resources rests with ENEA Wytwarzanie SA. Power plant in Kozenice which belongs to ENEA Wytwarzanie is located in the

vicinity of the Vistula river and the protection of water is one of the priorities of the ENEA Wytwarzanie environmental management.

9 cubic meters of fuel oil leaked into the Vistula in Power plant in Kozenice in July 2014. A detailed description of preventive measures is [HERE](#).

Table. Total water withdrawal in the ENEA Capital Group companies.

Company	Total water withdrawal [m ³]	Main sources of water intake used by the Company in 2013	Water withdrawal by source [m ³]
ENEA SA	4701	water supply system	water supply system: 2813
		wells	wells: 1888
ENEA Operator	60 476	municipal wells and water supply system	water supply system: 57 701
			wells: 2775
ENEA Wytwarzanie	7 361 720	for industrial purposes: surface water (Vistula river)	surface water: 7 093 294
			ground water: 268 426
		for municipal-social purposes: groundwater	
Elektrownie Wodne	3500	water supply system	one source of water intake
PEC Oborniki	2172	municipal water supply system	one source of water intake
Elektrociepłownia Białystok	695 172	municipal water supply system	municipal water supply system – 40 100
		own deep wells	deep wells – 655 072
MEC Piła	no data	no data	no data
Annacond Enterprises*	no data	no data	no data
ENEA Centrum**	no data	no data	no data
ENEA Trading ***	no data	no data	no data
ENERGOBUD Leszno****	2680	no data	no data
Eneos	1273	municipal water supply system in Poznań and Szczecin	municipal water supply system Poznań – 835m ³ , municipal water supply system Szczecin - 438m ³
Energomiar	717,57	municipal water supply system	one source of water intake
BHU	1117	water supply system	one source of water intake
Hotel EDISON	2150	Sewage of Tarnowo Podgórze District	one source of water intake

Energetyka Poznańska Zakład Transportu	767	municipal water supply system	one source of water intake
ITSERWIS	470	municipal water supply system	one source of water intake
Centrum Uzdrowiskowe ENERGETYK	26 274	water supply system of Sewage Company in Inowrocław	one source of water intake
Energo-Tour	4466	municipal water supply system	one source of water intake

* Annacond Enterprises company subleases offices from Heat Engineering Technology Europe company and does not address the issue of water withdrawal.

** ENEA Centrum doesn't keep records of waste generation, since it doesn't own offices, which it uses. ENEA Centrum leases offices from other companies of the Capital Group and from Rentall company.

*** ENEA Trading doesn't own office spaces which are rented from ENEA SA, ENEA Wytwarzanie and Energetyka Poznańska Zakład Transportu. Operating costs are included in the rent.

Waste

Table. Waste by type of waste [Mg]

Company	2013	
	Hazardous waste	Other than hazardous waste
ENEA SA	0.031	1.061 (municipal waste 60.5)
ENEA Operator	444.66	5989.8
ENEA Wytwarzanie	44.39	783 985.23
Elektrownie Wodne	4.966	26.112
PEC Oborniki	Slag 1017.5	no data
	Batteries 0.002	
	Fluorescent lamps 0.0195	
	Toners 0.0053	
	Steel scrap 10.1	
	Plastic packaging 0.0029	
	Computers 0.013	
Monitors 0.013	no data	
Elektrociepłownia Białystok	0.384	25 632.686
MEC Piła	1	6415
Annacond Enterprises*	no data	no data
ENEA Centrum**	no data	no data

ENEA Trading***	no data	no data
ENERGOBUD Leszno	Produced 1095.063	Produced 817.757
	Collected 7.355	Collected 81.873
	Recycled 427.065	
Eneos	3.114	138.274 (without municipal waste)
Energomiar	0.0237	147.585
BHU	5.373	5.274
Hotel EDISON****	no data	no data
Energetyka Poznańska Zakład Transportu		
	2.81	2.085
ITSERWIS	0.4	0.291
Centrum Uzdrowiskowe ENERGETYK	Waste code 180103 – 0.035	Waste code 200301 – 670 m ³
Energo-Tour	0.2195	External contracts for export

* Annacond Enterprises company subleases offices from Heat Engineering Technology Europe company and does not address the issue of waste disposal.

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*** ENEA Trading doesn't own office spaces which are rented from ENEA SA, ENEA Wytwarzanie and Energetyka Poznańska Zakład Transportu. Operating costs are included in the rent.

**** In connection with the new law called "junk", the company doesn't receive invoices, and only pays a fixed fee to municipality by the declaration, which shows the capacity and the amount of owned containers. Hence the lack of data regarding the specific amount of waste collected.