

09. **NON-FINANCIAL DISCLOSURES**

ENVIRONMENTAL INDICATORS

Materials used by weight or volume

Consumption of raw materials by the Grupa LOTOS S.A. refinery in the production process in 2018

OIL

Name	Volume [t]	Share [%]
REBCO oil	7 532 950	78%
Oil from offshore LPB concessions	201 434	2%
PGNiG oil	275 752	3%
LITHUANIAN oil	41 531	0%
Others	1 574 408	16%

OTHER FEEDSTOCKS FOR REFINERY PRODUCTION

Name	Volume [t]	Share [%]
Demineralised water	332 046.152	22.57%
FAME (fatty acid methyl ester)	256 559.302	17.44%
Diesel oils	328 370.5974	22.32%
ETBE (ethyl tertiary-butyl ether)	11 535.553	0.78%
Ethanol	62 283.746	4.23%
MTBE (methyl tertiary-butyl ether)	47 595.059	3.24%
Natural gas	425 928.2325	28.96%
Additives	2 800.852	0.19%
Other	3 859.148	0.26%
TOTAL	1 470 978.642	100.00%

Internal consumption of the refinery

INTERNAL CONSUMPTION OF THE REFINERY

Name	Volume [t]	Share [%]
Fuel gas	349 190	37.25%
Residual gas	481 433	51.36%
Fuel oil	951	0.10%
Other	105 742	11.28%
TOTAL	937 316	100.00%

Gasoline final products

FINAL PRODUCTS

Name	Volume [t]	Share [%]
Gasoline (including reformates)	1 633 487.243	14.48%
Naphtha	537 766.072	4.77%
Xylenes	90 942.754	0.81%
Diesel oil (diesel)	5 379 740.792	47.68%
Diesel oil (gasoil)	243 982.26	2.16%
Fuel oil	1 333 262.037	11.82%
MGO bunker fuel	78 636.071	0.70%
JET aviation fuel	568 330.272	5.04%
Bitumen components	773 448.313	6.86%
LPG	185 755.436	1.65%
Base oils	255 611.908	2.27%
Slack wax	50 078.612	0.44%
Plasticisers	29 296.867	0.26%
Sulphur	89 852.188	0.80%
Other (including fuel gas sold to L. Asphalt)	32 185.294	0.29%
TOTAL	11 282 376	100.00%

Energy consumption within the organisation

Energy consumption within the organization

[GJ / MWh]

	2017	2018
Non-renewable sources	24 023 443	26 731 241
Renewable sources	0	0
Energy purchased	6 371 580	7 075 770
Energy sold	588 758	754 346
Overall energy consumption in the organisation	29 806 266	33 052 666

In 2018, more energy was used because more oil was processed than in 2017.

NON-RENEWABLE SOURCES

[GJ / MWh]

2018	Fuel equivalent for usable energy ¹
Coal	341 186
Natural gas	10 421 045
Diesel oil	419 281
Fuel gas	11 944 740
Residual gas, special gas and reservoir gas	3 530 341
Heavy oil	0
Light fuel oil	49 539
Marine oil	0
LPG	25 110
TOTAL	26 731 241

ENERGY PURCHASED FROM OTHER ENTITIES

[GJ / MWh]

2018	Fuel equivalent for usable energy ¹
Electricity	6 951 326
Heat (including steam and cooling)	124 445
TOTAL	7 075 770

ENERGY SOLD TO OTHER ENTITIES

[GJ / MWh]

2018	Fuel equivalent for usable energy ¹
Electricity	261 600
Steam (water vapor)	277 358
Heat (in water)	215 387
Cooling energy	0
TOTAL	754 346

¹ The fuel equivalent for a selected group of fuels in a given period is the product of the quantity (t or Nm³) of the burned fuel and its calorific value (GJ/t (or Nm³)).

In the case of electricity, the consumption of energy purchased on the market was brought to the fuel equivalent using the average efficiency of generation of the electricity sources in Poland.

Energy intensity

ENERGY INTENSITY RATIO

Primary energy expressed in [GJ/t]

EII/ TBD RATIO	2017	2018
WWE1 [MJ/t]	2 876	2 828
WWE2 [MJ/t]	4 025	3 937

A drop in ratios compared to December 2017 due to a record amount of processed oil in 2018.

The EII coefficient determines the ratio of consumption of all types of energy (liquid fuels, gaseous fuels and electricity) to the amount of processed feed-WWE1 (or WWE2- to the number of components produced).

Total water withdrawal by source

TOTAL WATER WITHDRAWAL BY SOURCE BY LOTOS GROUP

[m³]

	2017	2018
Surface water consumption (own intakes)	5 998 534	5 840 945
Aquifer and groundwater consumption (own intakes)	362 643	360 579
Rainwater collected and used	0	0
Water purchased from municipal water supply system and from local suppliers	378 981	417 441
Treated wastewater from other organizations	464	54 158
TOTAL	6 740 622	6 673 123

Percentage and total volume of water recycled and reused

PERCENTAGE AND TOTAL VOLUME OF WATER RECYCLED AND REUSED BY LOTOS GROUP

TOTAL [m³]

	2017	2018
Total volume of water withdrawn by the organisation [m ³]	7 431 519	7 589 356
Volume of water recycled or reused [m ³]	2 554 957	2 821 847
Total volume of water recycled and reused as a percentage of the total water withdrawal [%]	25.60%	27.1%

Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas

OPERATIONAL SITES OWNED, LEASED, MANAGED IN, OR ADJACENT TO, PROTECTED AREAS AND AREAS OF HIGH BIODIVERSITY VALUE OUTSIDE PROTECTED AREAS

Protected area	Type of LOTOS location	Area in km ²	Characteristics of biodiversity species occurring in the area
Ptasi Raj Nature Reserve, Natura 2000 area "Ostoja w Ujście Wisły" (PLH220044)	Grupa LOTOS refinery	235 ha refinery, 1015 ha reserve	Mud and water birds - the most numerous group of birds are various species of ducks and ducks, as well as swans and white-fronted geese. The Spit (Mierzeja) is primarily a habitat for various species of gulls, terns and seedlings (including non-breeding Sandpiper), also cormorants, ducks, geese and swans. Oystercatcher and seedlings nest in the reserve.

Total number of IUCN Red List species and national conservation list species with habitats in areas affected by the operations of the organisation, by level of extinction risk

TOTAL NUMBER OF IUCN RED LIST SPECIES AND NATIONAL CONSERVATION LIST SPECIES WITH HABITATS IN AREAS AFFECTED BY OPERATIONS, BY LEVEL OF EXTINCTION RISK

IUCN (Red Book of the International Union for the Conservation of Nature and its Resources):	Polish Red Book of Strict protection under the Act: Animals:	Partial protection under the Act:
EN - 1	CR - 4	123
NT - 6	EN - 2	61
LC - 131	VU - 3	

Data from the nature inventory carried out in 2015 at the refinery and in its surroundings .

Direct GHG emissions

DIRECT GREENHOUSE GAS EMISSIONS BY LOTOS GROUP

TOTAL [tCO₂e]

Direct greenhouse gas emissions	2017	2018
Emissions associated with electricity production	64 780	27 738
Emissions associated with heat production	1173 839	1 319 241
Emissions from cooling and steam generation systems	0	0
Emissions from physical and chemical processing	585 486	609 878
Hydrofluorocarbons (HFC) emissions	0	0
Emissions related to transport of materials, products and waste	0	0

GREENHOUSE GAS EMISSIONS BY LOTOS GROUP

TOTAL [tCO₂e]

Greenhouse gas emissions *	2017	2018
Production of heat and electric energy	287 208	321 714
Refining production	1 481 571	1 631 027
Emission from extraction processes – burning of fossil fuels to meet the rigs' energy needs	32 399	33 551
And burning of waste gas in the burner head	50 540	45 550

* Applies to companies: Grupa LOTOS S.A., Energobaltic, LOTOS Asphalt, RCEkoenergia, LOTOS Petrobaltic.

Indirect GHG emissions

INDIRECT GREENHOUSE GASES EMISSIONS BY LOTOS GROUP

TOTAL

	2017	2018
Electricity purchased from outside Group [MWh]	672 320	704 780
Purchase of heat from outside Group [GJ]	9 446	6 248
Emissions from electricity purchased for the organisation's needs [Mg]	541 945	545 877
Emissions from steam and cooling energy purchased for the organisation's needs [Mg]	1 087	61

EMISSION FACTORS IN 2018

	Poland	Lithuania
CO ₂ emission factor from electricity production [kg CO ₂ /MWh]	778	96
CO ₂ emission faktor from heat production [kg CO ₂ /GJ]	115.088	

GHG emissions intensity

GREENHOUSE GAS (GHG) EMISSIONS INTENSITY BY LOTOS GROUP

CO ₂ emission intensity	LOTOS Group		Energobaltic		RCEkoenergia	
CO ₂ emissions volume	1 884 570	Mg	6 643	Mg	32 015	Mg
Value of the production	10 763 978	Mg	125 124	GJ	291 863	GJ
CO ₂ emissions intensity ratio (in tonnes of CO ₂ /mboe or other production factor)	0.175	Mg CO ₂ /Mg ropy	0.053	Mg CO ₂ /GJ	0.11	MgCO ₂ /GJ

Emissions of ozone-depleting substances to air

EMISSIONS OF OZONE-DEPLETING SUBSTANCES (ODS)

LOTOS companies that emit substances	HFC [KG]
LOTOS Oil	0.74
LOTOS Paliwa	312
Grupa LOTOS	21

Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions

NITROGEN OXIDES (NO_x) OR SULPHUR OXIDES (SO_x) AND OTHER SIGNIFICANT AIR EMISSIONS

TOTAL [t]

	2017	2018
NO _x	936.31	981.05
SO _x	483.76	605.33
Persistent organic pollutants (POP)	0.00	0.00
Volatile organic compounds (VOC)	179.02	195.20
Hazardous air pollution (HAP)	0.00	0.00
Particulate matter (PM)	90.45	79.36
Other standard categories of air emissions	342.25	357.10

Total water discharge by quality and destination

TOTAL WASTEWATER DISCHARGE BY QUALITY AND DESTINATION AT THE LOTOS GROUP

TOTAL [m³]

Wastewater discharge destination

To groundwater	2 692
To surface water (lakes, rivers, etc.)	6 693 281
To municipal utilities outside the capital group	320 655
TOTAL	7 016 628

TOTAL VOLUME OF WASTEWATER TREATED BY THE ORGANIZATION

TOTAL [m³]

Wastewater treatment method

By the organization itself	6 656 908
By wastewater treatment plants	52 746
Total volume of treated wastewater	6 653 119

Total weight of waste by type and disposal method

WASTE BY TYPE AND DISPOSAL METHOD IN LOTOS GROUP

TOTAL [Mg]

Total weight of hazardous and non-hazardous waste by disposal method By disposal method	Hazardous waste Waste other than hazardous	
Reuse of waste	0.00	41.10
Recycling (including organic recycling, e.g. composting)	921.32	1 274.50
Recovery (including energy recovery)	5 296.40	8 461.27
Burning (or use as fuel)	1 255.21	8.83
Landfilling	0.00	109.37
Discharge to deep wells	0.00	0.00
On-site storage	0.04	0.03
Other	593.96	729.76
TOTAL	8 066.9	10 624.9

Total number and total volume of recorded significant spills

SIGNIFICANT SPILLS

Type/Cause	Leakage volume	The company affected by the leak	Comments
Fire of the 2080 gasoline pumping station on 20.05.2018	2.6 m ³	Grupa LOTOS	During the fire of the gasoline pumping station at the Gdańsk refinery, about 2.6 m ³ of this raw material was lost. Some were burned, which was associated with emissions to air, and some, together with fire extinguishing substances, flowed into the wastewater system and went to the refinery wastewater treatment plant. Wastewater contaminated with oil was properly treated, and the final concentrations of pollutants in wastewater discharged into the Martwa Wisła were well below the permissible values.
Leakage of oily water from the platform deck to the Baltic Sea while washing the deck - inadequate protection of deck dampers	0.3 m ³	LOTOS Petrobaltic	

It is worth noting that these were events on a relatively small scale. Removal of their effects lasted up to several hours in both cases. The specialist services acted quickly and did their work according to the procedures, ultimately ensuring that both spills had the least possible negative environmental impact.

Volume and disposal of formation or produced water

VOLUME AND DISPOSAL OF FORMATION OR PRODUCED WATER BY LOTOS GROUP

	Volume [m ³]	Share [%]
The total amount of produced water	241 515.61	100.0%
Reprocessed water	0.00	0.0%
Recycled water	0.00	0.0%
Re-injected water	241 279.81	99.9%
	Total volume of hydrocarbons discharged into the produced water	0.0%

Volume of flared and vented hydrocarbon

VOLUME OF FLARED AND VENTED HYDROCARBONS

Location	Volume of gases burned [thous. m ³]	Volume of gases released to the atmosphere [thous. m ³]
Poland	16 277	0
International waters, Poland's exclusive economic zone (LOTOS Petrobaltic platform and BB platform)	15 666	0
Lithuania	346	0
TOTAL	32 289	0

Amount of drilling waste (drill mud and cuttings) and strategies for treatment and disposal

THE AMOUNT OF PRODUCED DRILLING WASTES (DRILLING MUDS AND CUTTINGS) AND THE PROCEDURES OF HANDLING AND UTILIZATION

LOTOS companies, which the indicator applies to	Total amount of drilling muds and cuttings in tonnes	Disposal methods used
LOTOS Petrobaltic	140.42	Collected for recycling
LOTOS Geonafta	187.62	Collected for recycling

In 2018, companies from the upstream segment did not generate cuttings.

Benzene, lead and sulfur content in fuels

BENZENE, LEAD AND SULFUR CONTENT IN FUELS

	Unit of measure	Requirement	2017	2017	2018	2018
			- Quantity	- Quantity (average)	- Quantity	- Quantity (average)
Benzene (in gasolines)	% V/V	Max. 1.00	0.60÷1.00	0.81	0.46÷1.00	0.79
Sulphur (in gasolines)	mg/kg	Max. 10.0	0.1÷6.5	1.2	0.1÷4.9	1.1
Sulphur (in diesel oil)	mg/kg	Max. 10.0	2.0÷10.0	6.0	2.1÷10.0	5.8
Lead	mg/kg	Max. 5	<2.5	<2.5	<2.5	<2.5

Percentage of reclaimed products and their packaging materials for each material category

Percentage of products sold and their packaging materials that are reclaimed by category

LOTOS OIL

Data in Mg

Name	Lubricants	Hazardous packaging	Packaging	Lubricating preparations
Volume of products and packaging materials reclaimed during the reporting period	24 354.85	6.47	1 636.17	1 609.92
Volume of products sold during the reporting period*	28 652.76	8.088	2 682.238	2 639.209
Percentage of products sold and packaging materials that were reclaimed	85.0%	80.0%	61.0%	61.0%
Increase of reclaim compared to 2017	35.0%	50.0%	0.0%	31.0%

* For the calculation of the obtained percentage of reclaim products and packaging, the mass of introduced products/packaging in the year preceding the reporting year is taken into account. If you enter data from the reporting year, other than statutory percentages of waste subject to recovery will come out.

LOTOS PALIWA

Data in tones

Name	Plastic packaging	Aluminum packaging	Paper and board	Wooden packaging
Volume of products and packaging materials reclaimed during the reporting period	17.40	10	110	0.00%
Volume of products and packaging materials reclaimed during the reporting period	74.04	20	181	0.00%
Percentage of products sold and their packaging materials that is reclaimed	23.50%	51.00%	61.00%	0.00%

Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations

Total monetary value of significant fines	25 608
Total number of non-monetary sanctions	1
Cases brought through dispute resolution mechanism	LOTOS Petrobaltic - use of an agent for removal of spills on the basis of detergents without prior approval of the Maritime

Total environmental protection expenditures and investments

TOTAL ENVIRONMENTAL PROTECTION EXPENDITURES AND INVESTMENTS

[mln]

Expenses incurred by the LOTOS Group in 2018	The cost of waste disposal, emission treatment and remediation	The cost of prevention and environmental costs
Total PLN	5.86	37.6
Total EUR	0.22	0.01
Total PLN	6.8	37.7