Hitz
Hitachi Zosen

Environmental Data (English excerpt from Environmental Data Book 2021)

Hitachi Zosen Group

CONTENTS

(Photograph is at Sakai Works)

Material balance of business activities

INPUT

Energy

A heavy oil	2,399 KL
Gasoline	84.5 KL
Light oil	188 KL
Kerosine	79 KL
Town gas	445,000m³
Liquefied natural gas	80,390t
Purchased electric power	48,546,000kWh
Solar power generation	2,341,000kWh

Service water

Industrial water	920,000 t
Clean water	130,000 t

Materials

Steel materials	24,362 t
Paint usage	336 t
Solvent usage	790 t

Hitachi Zosen


Ariake Works


Ibaraki Works


Mukaishima Works


Maizuru Works


Innoshima Works


Chikko Works


Sakai Works

OUTPUT

Greenhouse gases etc.

CO_2	31,200 t-CO_2
NOx	28.3 t
SOx	2.6 t
PRTR substances	63 t
Wastewater	571,000 t-CO2
Transported CO2	3.100 t-CO2

Electricity sales

Net system energy demand	547,069,000 kWh
CO_2	219.500 t-CO_2

Industrial waste

Valuable	5,094 t
Waste	4,060 t
Recycle	3,660t
landfill	400t

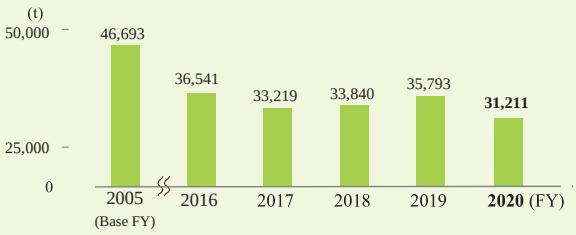
NOTE) The above are data of the head office, branch offices, factories, and group companies which are engaged in business activities on the premises.
Since FY2021, we have expanded the scope of management to include construction, and operation businesses for disclosure.

Prevention of global warming

CO_2 emissions

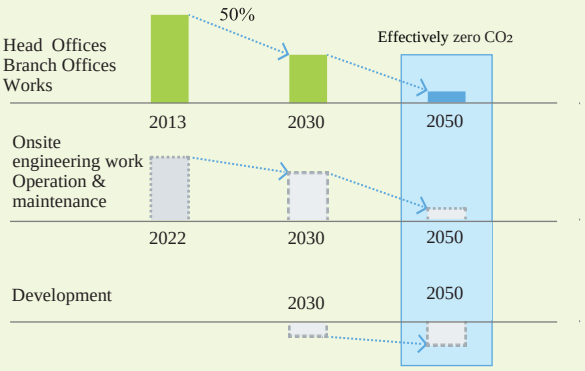
While there was a temporary upward trend due to fluctuations in production, we were able to improve both the total amount and the intensity of emissions by upgrading to high-efficiency equipment and conducting fuel conversion.
CO_2 emissions have decreased by 33% compared to 2005. (26% decrease compared to FY2013)

Trends in Carbon Dioxide Emissions (Scope1, Scope2)



NOTE) Electric power emission coefficient: The emission coefficient in FY 2019 after adjustment by electric power companies is employed. utilities is adopted.

Future Targets for Reduction of Carbon Dioxide Emissions (Image)



The Head Office, branch offices, and factories are targeting a 50% reduction by FY 2030 compared to FY 2013.

For on-site construction and operation projects, CO_2 emissions have been monitored since FY2021 and a target for FY2030 has been formulated, with FY2022 as the base year. By FY2050, we aim to achieve practically zero CO_2 emissions through CO_2 emission control and recovery technologies.

Initiatives toward 2050 Carbon Neutral

Hitachi Zosen Group strives to achieve “carbon neutrality by 2050” by improving production efficiency and promoting the conversion to renewable energy as well as by incorporating CO_2 controls and capture technology through technological development.

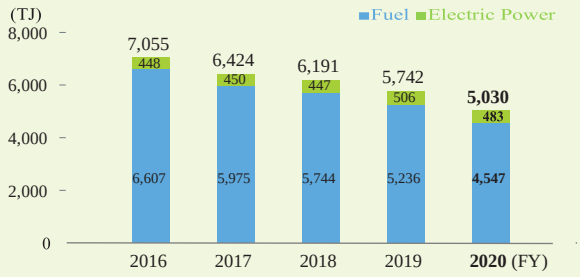
We aim for a 50% reduction in CO_2 emissions from our head offices, branch offices, and works by fiscal 2030 with fiscal 2013 as the year of reference. Proceeding with an assessment of actual CO_2 emissions from onsite engineering work and operation and maintenance services from this fiscal year, we are formulating our targets for fiscal 2030 with FY 2022 as the year of reference. We aim to be at effectively zero levels as of FY 2050 by utilizing our CO_2 controls and capture technology.

Energy saving

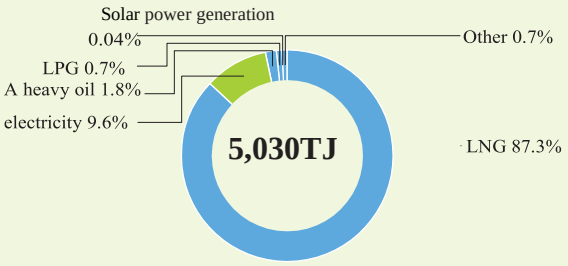
Energy consumption

Total energy consumption has been on a downward trend since FY 2016, and the amount used in FY 2020 was 5030 TJ, a decrease of approximately 29% from FY 2016. As an energy-saving initiative, solar power generation facilities were installed at the Nanko Head Office and four factories. The total amount of power generated in FY 2020 was 2,341,000 kWh. In the future, we will systematically promote the conversion to renewable energy and the reduction of environmental impact.

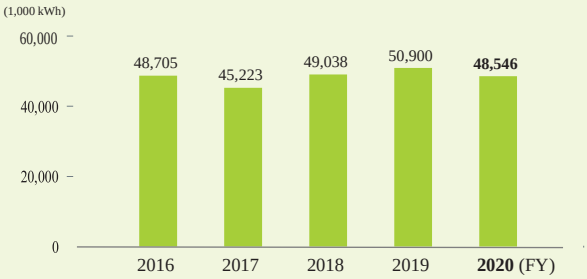
Energy Consumption (Head Office, Branch Office, Plant)



Breakdown of Energy Consumption in FY 2020



Electricity Purchased (Head Office, Branch Office, Plant)



Water Usage

Water consumption in FY 2020 was 1,050,000 tons, a decrease of 50000 tons from the previous fiscal year.
Water consumption has been on a downward trend since FY 2016.

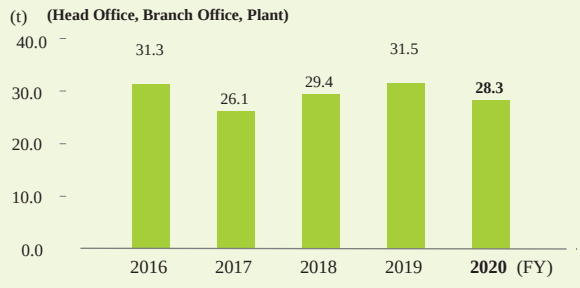
Water Usage (Head Office, Branch Offices, Plants)

Prevention of air pollution

NOx Emissions

NOx emissions have remained unchanged for several years, In FY 2020, the amount was 28.3 tons. We are striving to reduce emissions by switching fuels used for test runs of engines and electrifying other materials handling equipment.

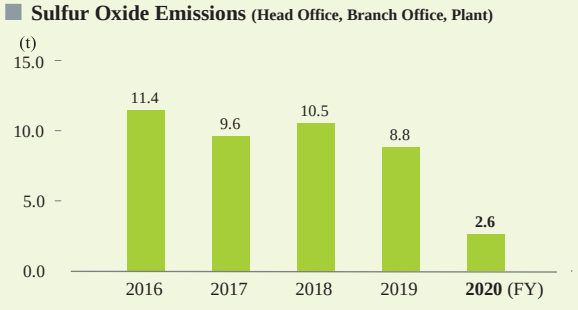
Changes in Nitrogen Oxide Emissions



SOx Emissions

SOx emissions in FY 2020 decreased by approximately 70% from the previous fiscal year.
This effect is due to the conversion of fuels for the commissioning of engines to fuels with low sulfur content.

Sulfur Oxide Emissions (Head Office, Branch Office, Plant)



Waste reduction

In FY 2016, we set a medium-term target for FY 2020, and have been working to "reduce the amount of waste generated excluding valuable resources by 10% compared to FY 2000" and "reduce the amount of final landfill by 70% compared to FY 2000." As a result, the target was achieved with a 14% reduction in waste generation, while the reduction in landfill volume was 60%, falling short of the target.Waste generation.

Waste generation

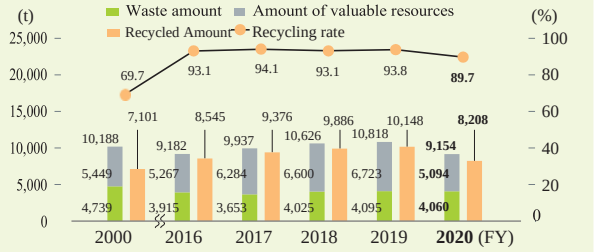
In FY 2020, the amount of waste generated (excluding valuables such as scrap) in FY2020 was 4, 060 tons, a reduction of approximately 14% compared to the target of a 10% reduction by FY2020 compared with FY 2000. We are aiming for a 15% reduction in FY 2025 compared to FY 2000.

Waste recycling rate

The recycling rate* in FY 2020 was 89.7%, a deterioration of 4.1 percentage points.

※ Recycling rate = Amount recycled (/amount of waste + amount of valuable resources) × 100

Waste Generation and Recycling Rate (Head Office, Branch Offices, Plants)

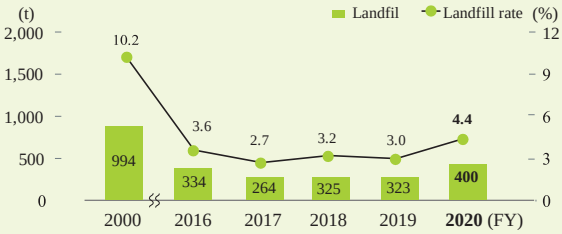


Amount of landfill waste

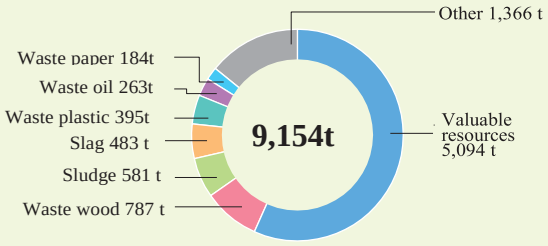
In FY 2020, the amount of landfill was 400 tons and the landfill rate was 4.4%, which did not reach zero emissions*. This was due to a decrease in the recycling rate for specific wastes. We will further promote 3R both inside and outside of our plants and work to maintain zero emissions.

※ Zero Emissions: The ratio of landfill waste to the amount of generated valuable waste is 3% or less.

Landfill Volume and Landfill Rate (Head Office, Branch Offices, Plants)



Breakdown of Waste (Head Office, Branch Offices, Plants)



Management of Chemical Substances

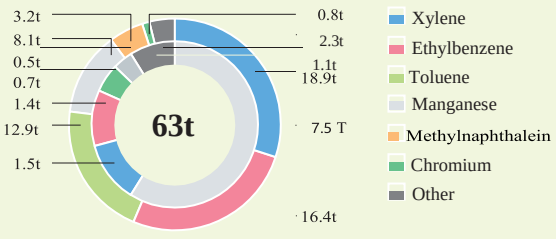
PRTR System (Pollutant Release and Transfer Register System)

The amount of chemical substances released and transferred was calculated based on so-called the PRTR Act, which came into force in April 2001.

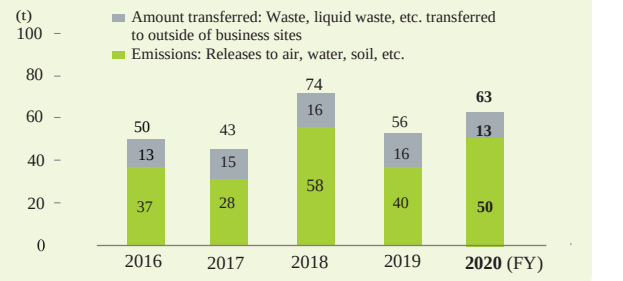
The most common emissions and transfers in our company are the solvents xylene, ethylbenzene and toluene in paints and manganese in welding materials.

We are making systematic efforts to reduce these substances by preparing voluntary management standards that stipulate plans to reduce hazardous chemicals, such as improving painting methods and preventing excessive welding leg lengths.

Breakdown of emissions and transfer of chemical substances in FY2020



Amounts Released and Transferred (Head Office, Branch Offices, Plants)



PRTR system is a system in which companies grasp the amount of chemical substances released into the environment (air, water, soil) and the amount transferred outside of business sites that may be harmful to human health or ecosystems, and report them to administrative agencies. Administrative agencies collect and disclose the amount released and transferred based on reports from businesses and estimates using statistical data.
PRTR"Pollutant Release and Transfer Register, VOC "Volatile Organic Compounds" and SDS: Safety Data Sheet Safety Data Sheet

Ariake Works

Major products and services ▶ Marine engines, pressure vessels and other processing equipment, nuclear power-related equipment

Major Energy and Resource Consumption

Energy consumption	242.5 TJ
Water consumption	70,000 t
CO_2 emissions	11,880 t

Waste	Amount generated	3,127t
	Amount recycled	2,799t
	Landfill rate	2.7 %

Water Quality

Public waters		Regulation value	Voluntary standards	Measured value
pH		5.0～9.0	5.8～8.6	7.6
BOD	mg/ℓ	—	—	—
COD	mg/ℓ	20	20	7.7
SS	mg/ℓ	70	60	6.4
n-hexane extract	Mineral oil mg/ℓ	5	3	0.5>
Nitrogen content	mg/ℓ	120	60	9.2
Phosphorus Content	mg/ℓ	16	8	2.7
Coliform group	quantity/cm³	3,000	1,000	89

Air Emissions

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	17.5	6.5	—
	m³N/hr	4.2	—	0.005
NOx	ppm	150	100	52
Soot and dust	g/m³N	0.25	0.1	0.01>

Noise

Item		Regulation value	Voluntary standards	Measured value
Morning and evening	dB	60	58	53.6
Noon	dB	65	60	52.2
Night	dB	50	48	44.7

Vibration

Section		Regulation value	Voluntary standards	Measured value
Noon	dB	65	Vibration distance damping calculation has confirmed that the value is within the regulated value.	
Night	dB	60		

Mukaishima Works

Major products and services ▶ Bridges, steel chimneys, food machinery

Major Energy and Resource Consumption

Energy consumption	38.8 TJ
Water consumption	8,000 t
CO_2 emissions	1,562 t

Waste	Amount generated	1,796t
	Amount recycled	1,684t
	Landfill rate	3.4 %

Water Quality

Public waters		Regulation value	Voluntary standards	Measured value
pH		—	(5.8～8.6)	(6.8)
BOD	mg/ℓ	—	—	—
COD	mg/ℓ	—	(85)	(14)
SS	mg/ℓ	—	(90)	(5)
n-hexane extract	Animal/vegetable oil mg/ℓ	—	(25)	Below the lower limit
Nitrogen content	mg/ℓ	—	(120)	(13)
Phosphorus Content	mg/ℓ	—	(16)	(2.5)
Coliform group	quantity/cm³	—	(1,000)	(-)

Air Emissions

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	Be not subject to total mass emission control without specified facilities		
NOx	ppm			
Soot and dust	g/m³N			

Noise

Item		Regulation value	Voluntary standards	Measured value
Morning and evening	dB	70	65	66.0
Noon	dB	70	65	67.9
Night	dB	60	55	48.3

Vibration

Item		Regulation value	Voluntary standards	Measured value
Noon	dB	65	Check and maintain 30dB or less in the past.	
Night	dB	60		

Innoshima Works

Major products and services ▶ Marine engines, boilers

Major Energy and Resource Consumption

Energy consumption	46.2 TJ
Water consumption	14,000 t
CO_2 emissions	2,673 t

Waste	Amount generated	751t
	Amount recycled	647t
	Landfill rate	5.2 %

Water Quality

Public waters		Regulation value	Voluntary standards	Measured value
pH		5.5～9.0	6.0～8.0	7.3
BOD	mg/ℓ	—	—	—
COD	mg/ℓ	20	18	18
SS	mg/ℓ	200	160	9
n-hexane extract	Animal/vegetable oil mg/ℓ	20	18	ND
Nitrogen content	mg/ℓ	120	108	19
Phosphorus Content	mg/ℓ	16	14.4	2.9
Coliform group	quantity/cm³	3,000	2,700	200

Pollution loading amount		Regulation value	Voluntary standards	Measured value
Volume of wastewater	m³/day	301	—	102.3
COD load	kg/day	4.5	—	1.05
Nitrogen load	kg/day	18	—	1.5
Phosphorus load	kg/day	2.4	—	0.2

Air Emissions

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	17.5	—	—
	m³N/hr	14.7	10	0.018>
NOx	ppm	170	100	5>
Soot and dust	g/m³N	0.25	0.1	0.002>

Noise

Concentration		Regulation value	Voluntary standards	Measured value
Morning and evening	dB	60	55	–
Noon	dB	60	58	57.7
Night	dB	50	50	36.7

Vibration

Item		Regulation value	Voluntary standards	Measured value
Noon	dB	65	63	Reference values in the past and check and maintain the following
Night	dB	60	58	

Sakai Works

Major products and services ▶ Shield tunneling machines, floodgate doors, offshore civil engineering (submerged box, etc.), Flap-gate type seawall against flood disaster

Major Energy and Resource Consumption

Energy consumption	67.3 TJ
Water consumption	50,000 t
CO_2 emissions	1,265 t

Waste	Amount generated	823t
	Amount recycled	698t
	Landfill rate	15.1 %

Water Quality

Public waters		Regulation value	Voluntary standards	Measured value
pH		5.8～8.6	6.0～8.0	7.2
BOD	mg/ℓ	25	20	3.7
COD	mg/ℓ	25	20	7.8
SS	mg/ℓ	40	20	3.5
n-hexane extract	Mineral oil mg/ℓ	4	2	ND
Nitrogen content	mg/ℓ	60	20	11.5
Phosphorus Content	mg/ℓ	8	5	1.3
Coliform group	quantity /cm³	3,000	1,500	870

Air Emissions

Pollution loading amount		Regulation value	Voluntary standards	Measured value
Volume of wastewater	m³/day	140	—	136.6
COD load	kg/day	2.61	2.09	1.17
Nitrogen load	kg/day	2.4	1.9	1.18
Phosphorus load	kg/day	0.26	0.209	0.12

Atmospheric relationship

Concentration		Regulation value	Voluntary standards	Measured value
Sox		Without specified facilities and not subject to total mass emission regulations		
NOx	ppm	150	90	39
Soot and dust	g/m³N	0.05	0.03	0.01>

Noise

Item		Regulation value	Voluntary standards	Measured value
Noon	dB	—	(70)	(68.6)

Chikko Works

Major products and services ▶ Food, pharmaceutical, plastic, and precision machinery

Major Energy and Resource Consumption

Energy consumption	73.3 TJ
Water consumption	40,000 t
CO_2 emissions	1,368 t

Waste	Amount generated	601t
	Amount recycled	457t
	Landfill rate	8.9 %

Water Quality

Public Waters		Regulation value	Voluntary standards	Measured value
pH		5.8～8.6	6.0～8.3	8.4
BOD	mg/ℓ	25	20	17
COD	mg/ℓ	25	20	21
SS	mg/ℓ	65	30	15
n-hexane extract	Mineral oil mg/ℓ	4	3	4
Nitrogen content	mg/ℓ	60	35	40
Phosphorus Content	mg/ℓ	8	3	5.6
Coliform group	quantity/cm³	3,000	—	0

Pollution loading amount		Regulation value	Voluntary standards	Measured value
Volume of wastewater	m³/day	321	—	74.1
COD load	kg/day	7.2	—	6.53
Nitrogen load	kg/day	11.3	—	16.26
Phosphorus load	kg/day	1.19	—	1.3

Air Emissions

Concentration		Regulation value	Voluntary standards	Measured value
SOx		No generating facilities and no total pollutant load control		
NOx	ppm	150	130	13
Soot and dust	g/m³N	0.05	0.01	0.001>

Noise

Item		Regulation value	Voluntary standards	Measured value
Noon	dB	—	(63)	(63)

Maizuru Works

Major products and services ▶ Precision machinery, control equipment, and control systems

Major Energy and Resource Consumption

Energy consumption	52.9 TJ
Water consumption	170,000 t
CO_2 emissions	2,188 t

Waste	Amount generated	886t
	Amount recycled	823t
	Landfill rate	1.7 %

Water Quality (Naka-Maizuru)

Public waters		Regulation value	Voluntary standards	Measured value
pH		5.8～8.6	5.8～8.6	8.2
BOD	mg/ℓ	—	—	—
COD	mg/ℓ	90	40	4.1
SS	mg/ℓ	120	40	13
n-hexane extract	Mineral oil mg/ℓ	5	3	0.9
Nitrogen content	mg/ℓ	120	40	4.3
Phosphorus Content	mg/ℓ	16	10	0.54
Coliform group	quantity /cm³	3,000	2,000	65

Air Emissions (Wakasa)

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	11.5	7.0	—
NOx	ppm	150	120	26
Soot and dust	g/m³N	0.2	0.16	0.01>

Noise (Wakasa)

Item		Regulation value	Voluntary standards	Measured value
Morning and evening	dB	—	(50)	46
Noon	dB	—	(55)	53
Night	dB	—	(50)	—

Vibration (Wakasa)

Item		Regulation value	Voluntary standards	Measured value
Noon	dB	65		25>

Maizuru Works's main energy and resource consumption is totaled including the Wakasa Works.
For water quality, air quality, noise, and vibration, indicate sites with strict regulatory standards.

Ibaraki Works

Major products and services ▶ Electricity wholesale

Major Energy and Resource Consumption

Energy consumption	4,433.6 TJ
Water consumption	802,000 t
CO_2 emissions	219,518 t

Waste	Amount generated	920t
	Amount recycled	920t
	Landfill rate	0.038 %

Water Quality relationship (( ) is data of Miyanosato)

Public Waters		Regulation value	Voluntary standards	Measured value
pH		5.8～8.6	6.0～8.5	8.2(8.6)
BOD	mg/ℓ	10(20)	10	1.9(10)
COD	mg/ℓ	—	—	—(8.8)
SS	mg/ℓ	20(30)	20	4.0(5.0)
n-hexane extract	Mineral oil mg/ℓ	5(5)	3(2)	0.5(0.5)
Nitrogen content	mg/ℓ	—	—	—(—)
Phosphorus Content	mg/ℓ	—	—	—(—)
Coliform group	quantity /cm³	3,000	2,000	62(8)

Air Emissions

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	13	6	—
NOx	ppm	180	150	85
Soot and dust	g/m³N	0.3	0.15	0.002

Air Emissions (Miyanosato)

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	17.5	1.0	—
NOx	ppm	150	100	79
Soot and dust	g/m³N	0.3	0.15	0.005

Noise (( ) is data of Miyanosato)

Item		Regulation value	Voluntary standards	Measured value
Morning and evening	dB	75(75)	70(70)	69.2(60.4)
Noon	dB	75(75)	70(70)	58.8(59.8)
Night	dB	60(60)	60(60)	57.0(58.6)

Kashiwa Works

Major products and services ▶ Electrolyzer, rubber lining, filter dehydrator

(Kashiwa Works was closed and integrated into Chikko works in December 2020.)

Major Energy and Resource Consumption

Energy consumption	17.4 TJ
Water consumption ※1	15,000 t
CO_2 emissions	244 t

※1 Water Consumption Only Total Portfolio

Waste	Amount generated	92t
	Amount recycled	76t
	Landfill rate	17.4 %

Water Quality

Public Waters		Regulation value	Voluntary standards	Measured value
pH		5～9	5～8.75	—
BOD	mg/ℓ	600	600	—
COD	mg/ℓ	—	—	—
SS	mg/ℓ	600	550	—
n-hexane mineral oil Extract mineral oil (mg/ℓ)／Animal and vegetable oil (mg/ℓ)		5 30	5 30	— —

Air Emissions

Concentration		Regulation value	Voluntary standards	Measured value
SOx	K value	Without specified facilities Be not subject to total mass emission regulations		
NOx	Ppm			
Soot and dust	g/m³N			

Noise

Item		Regulation value	Voluntary standards	Measured value
Morning and evening	dB	65	65	—
Noon	dB	70	70	—
Night	dB	60	60	—

Management of environmental impact data at each work

1. The list is limited to representative items.
2. Periodically measured values, such as water quality, have the highest readings.
3. Items "-" are those for which there is no regulated value or there is no subject facility, and parentheses are those for which there is no regulated value and voluntary measurement is carried out.
4. If there is more than one subject facility, the highest measured value is indicated.
5. Figures for pollution loadings are averages.
6. The Site Report covers eight domestic works and group companies conducting business activities on their premises.