

## APPENDIX 2. ENVIRONMENTAL INDICATORS

	Production			Transportation			Refining		
	2017	2018	2019	2017	2018	2019	2017	2018	2019
<b>Greenhouse gas (GHG) emissions</b>									
Direct GHG emissions (CO <sub>2</sub> , mln tonnes)	2.7	2.5	2.3	1.6	2.4	2.7	4.2	4.4	4.8
GHG emission intensity (tonnes of CO <sub>2</sub> per 1,000 tonnes of RWC)	110	101	93	–	–	–	221	216	229
<b>APG flaring</b>									
Flaring (CO <sub>2</sub> , mln tonnes)	0.7	0.3	0.2	–	–	–	–	–	–
Flared gas per unit of produced RWC (tonnes per 1,000 tonnes of produced RWC)	11.0	6.0	2.95	–	–	–	–	–	–
Flaring (bln m <sup>3</sup> )	0.3	0.15	0.08	–	–	–	–	–	–
<b>Energy intensity</b>									
Energy consumption (mln GJ)	39.1	55.2	55.5	37.4	55.6	66.0	43.0	56.8	61.3
<b>Pollutant emissions</b>									
Sulphur oxides (SO <sub>x</sub> ) (thousand tonnes of SO <sub>2</sub> )	7.8	6.7	4.8	0.2	0.2	0.2	6.8	6.5	7.2
Nitrogen oxides (NO <sub>x</sub> ) (thous. tonnes of NO <sub>2</sub> )	5.9	4.8	5.3	3.5	5.5	6.2	3.9	5.9	6.9
<b>Water</b>									
Total water withdrawal (mln m <sup>3</sup> )	49.4	52.2	52.4	30.9	33.5	24.9	12.2	16.2	16.2
Water discharge (mln m <sup>3</sup> )	1.1	1.1	0.9	1.4	1.0	1.0	6.5	8.8	9.2
<b>Waste</b>									
Hazardous (thous. tonnes)	273	220.6	846.4	8.9	2.9	46.6	41.2	39.1	62.2
Non-hazardous (thous. tonnes)	2.7	5.9	12.6	3.4	5.2	4.9	6.6	8.0	7.3
Total waste (thous. tonnes)	276	226.5	859	12.3	8.1	51.5	47.8	47.1	69.5
* of them drill cuttings, onshore (thous. tonnes)	186	174.2	193.2	–	–	–	–	–	–
* of them drill cuttings, offshore (thous. tonnes)	2.05	2.2	0	–	–	–	–	–	–

**Environmental costs \***

Costs	2016		2017		2018		2019	
	KZT mln	USD mln	KZT mln	USD mln	KZT mln	USD mln	KZT mln	USD mln
<b>1</b> <b>Costs associated with waste, emissions, pollutant discharge handling and other measures, total</b>	<b>6,682.8</b>	<b>19.5</b>	<b>10,929.4</b>	<b>33.5</b>	<b>11,844.6</b>	<b>34.3</b>	<b>14,847.3</b>	<b>38.79</b>
1.1 Waste treatment and disposal	2,330.6	6.8	5,285.1	16.2	5,833.9	16.9	9,733.2	25.43
1.2 Purification of emissions and pollutant discharges	3,778.3	11.0	5,398.4	16.5	4,531.5	13.1	3,177.6	8.3
1.3 Costs of development and approval of GHG emission documents	52.6	0.15	91.5	0.3	104.4	0.3	101.9	0.27
1.4 Environmental liability insurance	365.5	1.1	97.2	0.3	58.6	0.2	118.2	0.31
1.5 Costs of elimination of environmental damage, including spill response costs	152.1	0.45	1.3	0.004	1,278.8	3.7	1,460.7	3.8
1.6 Costs of environmental compensatory measures	n/a	n/a	55.8	0.17	34.3	0.1	255.7	0.7
<b>2</b> <b>Investments in prevention of environmental impact and environmental management, total</b>	<b>1,394.7</b>	<b>4.08</b>	<b>1,398.7</b>	<b>4.3</b>	<b>1,035.8</b>	<b>3</b>	<b>1,198.1</b>	<b>3.1</b>
2.1 Employee training and education	246.3	0.7	76.4	0.2	58.6	0.17	18.8	0.5
2.2 External certification and environmental management system development	41.3	0.11	50.0	0.16	47.8	0.14	43.4	0.1
2.3 General environmental management activities	2.1	0.006	3.7	0.01	2.6	0.008	196.7	0.5
2.4 Research and development	263.1	0.76	839	2.6	548.5	1.6	366.0	1.0
2.5 Additional expenses on introduction of cleaner technologies	0.0	0.0	0	0	158.4	0.5	123.5	0.3
2.6 Additional expenses on "green purchasing"	6.1	0.01	68.7	0.2	2.3	0.007	360.3	0.9
2.7 Other environmental management costs	835.6	2.5	360	1.1	217.6	0.6	89.4	0.2

\* Disaggregated indicators may differ slightly from aggregate indicators due to rounding to decimal places

**Environmental payments (regulatory)**

	2016		2017		2018		2019	
	KZT million	USD	KZT million	USD	KZT million	USD	KZT million	USD
Air emissions from APG flaring	4,325	12,655.8	3,886	11,917.2	1,998	5,795.2	1,054	2,752.9
Air emissions (other than APG flaring)	1,064	3,113.5	1,217	3,733.9	1,258	3,633.5	1,584	4,138.8
Water pollution	40	117.0	43	131.1	30	97.9	63	164.7
Waste disposal	412	1,205.6	178	547.2	258	749.0	131	342.4

**Location and scope of operations in respect of key biodiversity zones** GRI 304-1

Site	Location	Key biodiversity areas (KBA)	Location in relation to KBA	Contract territory (sq. km)	Impact mitigation plan
Kansu	Karakiya District of Mangystau Region	Kenderli-Kayasan Nature Conservation Area and Ustyurt Nature Reserve	Located in the nature conservation area and near the reserve	4,374.6	Decision is made to exit the Project
Samtyr	South-west of Mangystau Region	Kenderli-Kayasan Nature Conservation Area and Ustyurt Nature Reserve	Located close to the nature reserve	10,396.9	Exploratory design stage
Urichtau	Mugalzhar District of Aktobe Region	Kozhide-Kumzhargan Local State Nature Reserve	Covers part of the territory	239.9	Hydrogeological monitoring
Alibekmola and Kozhasai	Mugalzhar District of Aktobe Region	Kokzhide Sands Kokzhide underground water	Located in close proximity	156.5	Hydrogeological monitoring
Zhambyl	Kazakhstan Sector of the Caspian Sea, Atyrau District	Special environmentally sensitive zone of Kazakhstan Sector of the Caspian Sea, Novinsky nature reserve	Located in the nature conservation area and covers part of the territory	1,935.2	Regular environmental monitoring, restrictions on offshore oil operations
Isatay	Central part of Kazakhstan Sector of the Caspian Sea, North Mangystau Region	Special environmentally sensitive zone of Kazakhstan Sector of the Caspian Sea	Located in the nature conservation area	1,060.0	Seasonal baseline environmental studies, regular environmental monitoring
Satpayev	North-west of Kazakhstan Sector of the Caspian Sea, Atyrau District	Special environmentally sensitive zone of Kazakhstan Sector of the Caspian Sea	Located in the nature conservation area	1,481.0	Procedures to return the territory and surrender the Contract have started