



## ESG Data

## Environmental Data of Refineries and Complexes

## Hokkaido Refinery

	Unit	FY2016	FY2017	FY2018	FY2019
Crude oil throughput	thousand kL	7,450	8,235	6,750	7,768
Crude oil equivalent <sup>*1</sup>	thousand kL	549	608	522	578
Unit energy consumption	L/kL <sup>*2</sup>	8.21	8.46	8.73	8.24
Seawater	thousand t	116,515	138,293	121,659	128,835
Industrial water	thousand t	10,234	11,114	12,693	12,484
Tap water	thousand t	-	-	-	60
Underground water	thousand t	-	-	-	356
CO <sub>2</sub>	thousand tCO <sub>2</sub>	891	990	894	1,664
SO <sub>x</sub>	t	2,809	2,086	1,877	2,397
NO <sub>x</sub>	t	1,202	1,231	1,037	1,224
Soot/dust	t	2.0	5.3	15.3	8.0
Wastewater	thousand kL	126,749	149,407	134,352	141,380
COD	t	29.8	36.3	30.9	33.0
Total nitrogen	t	-	-	-	-
Total phosphorus	t	-	-	-	-
Total waste	t	12,372	12,003	9,155	9,584
Reduced by intermediate treatment	t	1,526	1,026	1,800	1,006
Recycled	t	10,842	10,973	7,351	8,575
Final disposal	t	4	4	4	3

## Chiba Complex (Only oil refining until FY2017)

	Unit	FY2016	FY2017	FY2018	FY2019
Crude oil throughput	thousand kL	11,310	10,321	11,122	9,351
Petrochemical product manufacturing (Ethylene equivalent)	thousand t	-	-	2,056	1,661
Crude oil equivalent <sup>*1</sup>	thousand kL	904	833	1,555	1,315
Unit energy consumption	L/kL <sup>*2</sup>	8.53	8.65	8.42	9.11
	kL/t <sup>*3</sup>	-	-	0.317	0.345
Seawater	thousand t	355,018	349,977	503,972	418,108
Industrial water	thousand t	18,311	18,131	22,513	21,064
Tap water	thousand t	-	-	-	0
Underground water	thousand t	-	-	-	364
CO <sub>2</sub>	thousand tCO <sub>2</sub>	1,380	1,727	3,148	3,072
SO <sub>x</sub>	t	2,460	2,205	2,579	2,541
NO <sub>x</sub>	t	1,634	1,440	2,752	2,342
Soot/dust	t	206	150	160	128
Wastewater	thousand kL	373,329	368,108	524,140	437,723
COD	t	32	30	40	40
Total nitrogen	t	60	57	80	59
Total phosphorus	t	0.3	0.4	0.6	0.5
Total waste	t	83,181	78,087	66,850	51,488
Reduced by intermediate treatment	t	19,138	20,149	21,213	18,993
Recycled	t	64,038	57,916	45,630	32,470
Final disposal	t	5	22	7	27

## Chiba Complex (Petrochemicals)

	Unit	FY2016	FY2017	FY2018	FY2019
Petrochemical product manufacturing (Ethylene equivalent)	thousand t	2,054	1,838	Aggregate in Chiba Complex	Aggregate in Chiba Complex
Crude oil equivalent <sup>*1</sup>	thousand kL	662	611		
Unit energy consumption	kL/t <sup>*3</sup>	0.322	0.332		
Seawater	thousand t	127,806	109,444		
Industrial water	thousand t	3,447	3,303		
CO <sub>2</sub>	thousand tCO <sub>2</sub>	1,379	1,274		
SO <sub>x</sub>	t	17	16		
NO <sub>x</sub>	t	913	804		
Soot/dust	t	6	8		
Wastewater	thousand kL	129,233	110,987		
COD	t	8	9		
Total nitrogen	t	11	12		
Total phosphorus	t	0.1	0.1		
Total waste	t	8,842	8,730		
Reduced by intermediate treatment	t	2,219	3,200		
Recycled	t	6,613	5,524		
Final disposal	t	10	6		

## Aichi Refinery

	Unit	FY2016	FY2017	FY2018	FY2019
Crude oil throughput	thousand kL	8,435	7,049	7,699	8,577
Crude oil equivalent <sup>*1</sup>	thousand kL	676	586	608	681
Unit energy consumption	L/kL <sup>*2</sup>	8.70	9.40	9.76	8.51
Seawater	thousand t	233,974	207,469	242,389	241,254
Industrial water	thousand t	12,379	12,438	12,375	12,396
Tap water	thousand t	-	-	-	103
Underground water	thousand t	-	-	-	0
CO <sub>2</sub>	thousand tCO <sub>2</sub>	1,291	1,146	1,187	1,870
SO <sub>x</sub>	t	845	851	789	904
NO <sub>x</sub>	t	1,257	1,270	1,267	1,278
Soot/dust	t	53	52	38	60
Wastewater	thousand kL	246,353	219,907	254,764	253,753
COD	t	8	6	8	11
Total nitrogen	t	6	6	11	8
Total phosphorus	t	0.3	0.3	0.4	0.9
Total waste	t	80,904	81,988	99,762	94,556
Reduced by intermediate treatment	t	46,398	47,787	64,417	59,115
Recycled	t	34,493	34,149	35,321	35,410
Final disposal	t	13	52	24	31

\*1 FY2019 result is the figure subtracted from sales of by-product energy.

\*2 Unit energy consumption = Crude oil equivalent (L) / Atmospheric distillation equipment converted throughput(kL)

\*3 Unit energy consumption = Crude oil equivalent (L) / Ethylene equivalent production(t)



## ESG Data

## Tokuyama Complex

	Unit	FY2016	FY2017	FY2018	FY2019
Petrochemical product manufacturing (Ethylene equivalent)	thousand t	1,656	1,986	1,814	1,888
Crude oil equivalent <sup>*1</sup>	thousand kL	835	958	898	920
Unit energy consumption	kL/t <sup>*3</sup>	0.504	0.474	0.486	0.487
Seawater	thousand t	397,790	452,264	420,355	431,407
Industrial water	thousand t	13,741	13,069	11,962	10,554
Tap water	thousand t	-	-	-	193
Underground water	thousand t	-	-	-	0
CO <sub>2</sub>	thousand tCO <sub>2</sub>	1,816	2,051	1,928	2,002
SO <sub>x</sub>	t	927	835	821	1,006
NO <sub>x</sub>	t	1,557	1,712	1,583	1,624
Soot/dust	t	17	15	18	14
Wastewater	thousand kL	411,531	465,332	432,508	442,154
COD	t	19	23	18	13
Total nitrogen	t	15	19	14	17
Total phosphorus	t	0.4	0.4	0.5	0.4
Total waste	t	28,278	34,573	34,061	31,786
Reduced by intermediate treatment	t	17,743	19,091	20,175	19,046
Recycled	t	10,430	14,621	12,537	12,187
Final disposal	t	105	861	1,348	553

\*1 FY2019 result is the figure subtracted from sales of by-product energy.

\*3 Unit energy consumption = Crude oil equivalent (L) / Ethylene equivalent production(t)