

# Chiba Oil Refinery

Address: 2 Goi-Kaigan, Ichihara-shi, Chiba-ken

Start of operations: July 1963

Area: 1,209,585 m<sup>2</sup>

Employees: 370

Crude oil processing capacity: 240,000 barrels/day  
(as of March 2003)



## Regulated pollutants

Air pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	Nox (m3n/hour)	Pollution control agreement	Total pollutant load	141.1	117.8	84.8
	Sox (m3n/hour)	Pollution control agreement	Total pollutant load	189.7	151.4	116.0
	Particulate( boiler )(g/m3n)	Pollution control agreement	Concentration	0.07	0.029	0.023

Water pollutants	Pollutant	Regulation	Type of control	Standard	Actual performance	
					Maximum	Average
	COD (kg/day)	Pollution control agreement	Total pollutant load	223	168.4	100.3
	COD (mg/l)	Prefectural ordinance	Concentration	25	3.6	3.1
	SS (mg/l)	Prefectural ordinance	Concentration	50	8.4	6.6
	Oil content (mg/l)	Prefectural ordinance	Concentration	3	0.8	0.7
	Nitrogen (mg/l)	Prefectural directive	Concentration	( 10 )	2.2	1.9
	Phosphorus (mg/l)	Prefectural directive	Concentration	( 1 )	0.16	0.09
	Phenol (mg/l)	Prefectural ordinance	Concentration	0.5	Below measurement threshold	

## Environmental performance

Figures in parentheses = daily average

	Amount	Amount per unit of production
Energy	678,632 kl-crude oil/year	8.81 kl-crude oil/thousand kl
CO <sub>2</sub>	1,967,623 t-CO <sub>2</sub> /year	25.55 kg-CO <sub>2</sub> /kl
SO <sub>x</sub>	2,900 t/year	37.7 g/kl
NO <sub>x</sub>	1,524 t/year	19.8 g/kl
COD	36.6 t/year	0.48 g/kl
Industrial waste generated	15,862 t/year	
Industrial waste recycled	4,722 t/year	
Industrial waste sent to landfill	391 t/year	

PRTR Law designated chemical substance	Releases/transfers
Ethyl benzene (atmospheric releases)	380 kg/year
Xylene (atmospheric releases)	1,400 kg/year
1,3,5-trimethylbenzene (atmospheric releases)	22 kg/year
Toluene (atmospheric releases)	6,200 kg/year
Benzene (atmospheric releases)	870 kg/year
Nickel compounds (transfers)	60,000 kg/year
Molybdenum and its compounds (transfers)	100,000 kg/year
Dioxins (atmpsheric releases)	2 mg-TEQ/year
Dioxins (releases to water bodies)	49 mg-TEQ/year
Dioxins (transfers)	0.0098 mg-TEQ/year

## Environmental accounting

Item	Environmental costs (million yen)	
	Investments	Expenditures
1.Business area costs	6	3,815
Global environment costs	6	1,216
Pollution prevention cots	0	2,299
Resource circulation costs	0	300
2.Upstream/downstream costs	156	13,845
Green procurement costs	0	0
Product environmental impact reduction costs	156	13,845
Product sulfur reduction costs	89	11,741
Gasoline	19	2,557
Naphtha	8	1,063
Jet fuel	7	938
Kerosene	14	1,866
Diesel fuel	20	2,601
Heavy fuel oil A	9	1,127
Heavy fuel oil C	9	1,203
LPG	3	386
Cost of substituting toxic substances in gasoline	67	2,104
Cost of reducing aromatics in petrochemical products	0	0
3.Management activity costs	0	194
4.Research and development costs	0	0
5.Social activity costs	0	1
<b>Total</b>	<b>162</b>	<b>17,855</b>

Cost of purchasing recycled paper 2 (million yen)

## Economic effects( 408 million yen )

Cost savings through energy conservation (cogeneration) : 848

Cost savings from recycling of catalyst (reduction in disposal costs, etc.) : 22

Effects of R&D (royalty revenues, etc.) : 0

Item	Environmental protection effects	
	Reduction of environmental impacts (2001 value minus 2002 value)	Intensity/unit Environmental impact
1.Business area effects		
Effects of reduction in resource inputs	( kl-crude oil /thousand kl )	( TJ )
Energy input	0.18	-1,164
Water input	( kg/kL )	( thousand t )
Effects of reduction in emissions and waste generation	2	-435
Releases to the atmosphere ( kg-CO <sub>2</sub> /kL ) ( thousand-CO <sub>2</sub> )		
CO <sub>2</sub>	0.50	-85
SO <sub>x</sub>	( g/kL )	( t )
NO <sub>x</sub>	-1.7	-299
Benzene	1.6	26
Releases to water bodies ( g/kL )	0.00	0.12
COD	( g/kL )	( t )
Industrial waste emissions ( g/kL )	-0.08	-7.9
Generated	( g/kL )	( t )
Recycled	133	8,608
Sent to landfill	13	624
Total	2	114
2.Upstream/downstream effects		
Effects of reducing environmental impacts of products		
Reduction of sulfur in products ( % sulfur by weight )	( potential SO <sub>x</sub> emissions, t )	
High octane gasoline	0.0000	0
Regular gasoline	0.0002	6
Naphtha	-0.0010	-73
Jet fuel	0.0056	4
Kerosene	0.0012	27
Diesel	0.0172	615
Heavy fuel oil A	-0.0138	-850
Heavy fuel oil C	0.2590	2,413
LPG	0.0000	0
Total	0.0269	2,142
( % by weight )	( t )	
Reducing benzene in gasoline	0.0603	1,478
Effects of reducing aromatics in petrochemical products ( t-CO <sub>2</sub> /kL ) ( thousand-CO <sub>2</sub> )	( kL )	( kL )
CO <sub>2</sub> emissions from product use	0	0
	-0.0109	-1,950