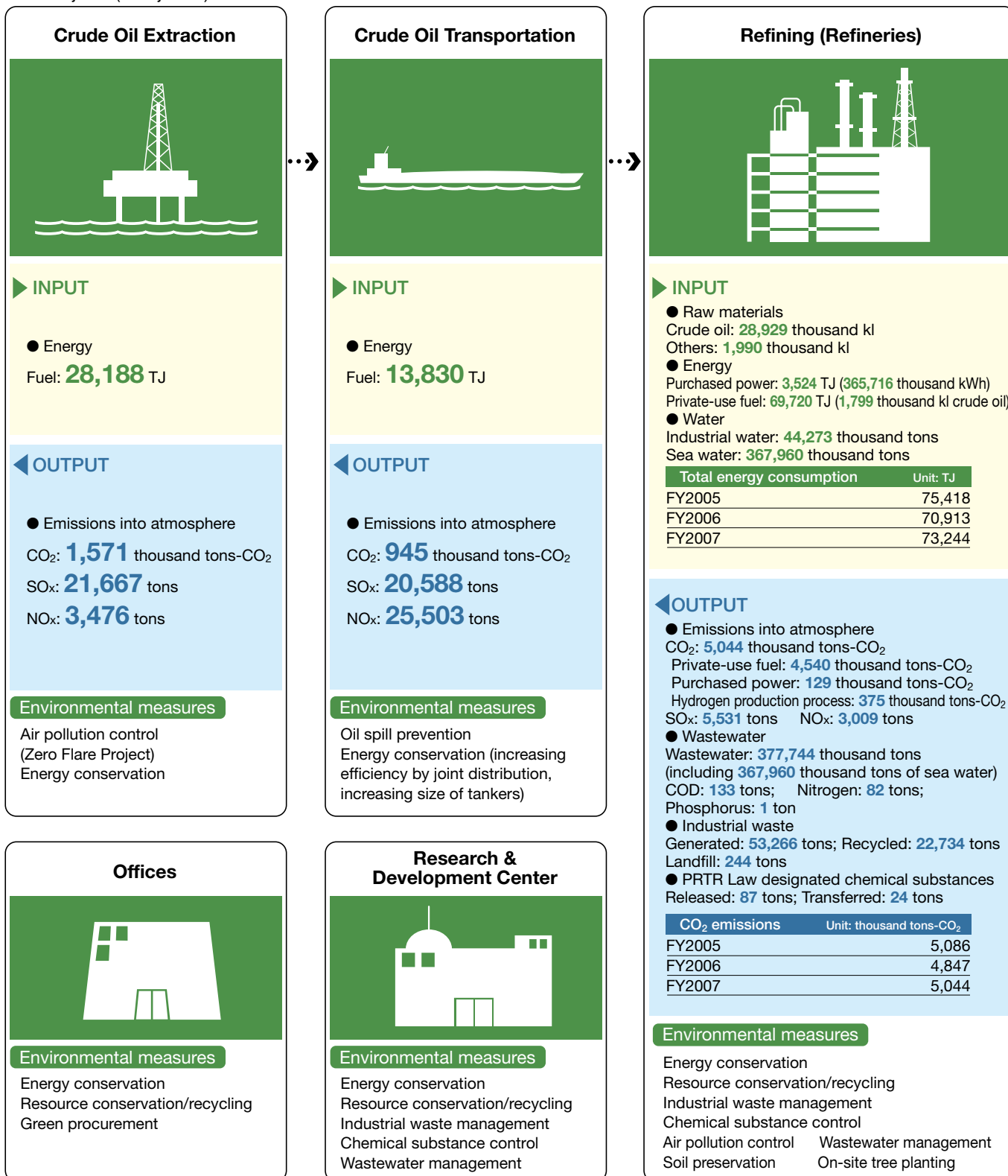


# Environmental Impacts of Business Activities

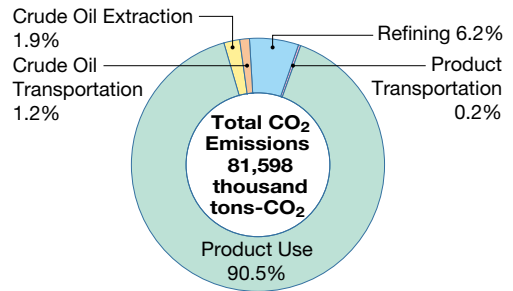
To offer products with less environmental impact, the Cosmo Oil Group works to reduce the environmental load of oil throughout its life cycle, including when used by customers. The Group not only ascertains the environmental impacts at every stage along the way, but also strives to reduce these impact through continuous improvements.

TJ: Terajoule (10<sup>12</sup> joules)



- SOx and NOx Figures for "Crude Oil Extraction," "Crude Oil Transportation," and "Product Transportation and Stockpiling (Oil Depots)" (SOx and NOx only) are estimated based on *LCI for Petroleum Products by Fuel and Environmental Impact Assessment for Petroleum Products*, published in March 2000 by the Japan Petroleum Energy Center (JPEC).
- CO<sub>2</sub> emissions for "Refining (Refineries)" and "Product Transportation" were calculated in accordance with the *Guidelines for Accounting Greenhouse Gas Emissions from the Industry (Draft)*, published by the Ministry of the Environment and the Ministry of Economy, Trade and Industry.
- See the Web site for methods and the basis of "Product Use" calculations.
  - Detailed data on environmental accounting can be found at the following Web page: [http://www.cosmo-oil.co.jp/eng/csr/accounting/ev\\_calculation.html](http://www.cosmo-oil.co.jp/eng/csr/accounting/ev_calculation.html)
  - Energy consumption is calculated in accordance with the stipulations of the Energy Conservation Law regarding the rational use of energy.
- "Refining (Refineries)" includes data from the Yokkaichi Kasumi Power Station and Cosmo Matsuyama Oil Co., Ltd.
- "Electricity sold" refers to power sold by Chiba Refinery, Yokkaichi Kasumi Power Station, and Cosmo Matsuyama Oil Co., Ltd. CO<sub>2</sub> emissions for "Refining (Refineries)" were calculated after deducting the portion of CO<sub>2</sub> emissions that results from generating electricity sold. Conversely, the purchased power portion of CO<sub>2</sub> emissions is included in "Refining (Refineries)" data.
- "Steam sold" refers to steam sold by the Chiba Refinery and Cosmo Matsuyama Oil Co., Ltd. CO<sub>2</sub> emissions for "Refining (Refineries)" were calculated after deducting the portion of CO<sub>2</sub> emissions that results from generating steam sold.
- CO<sub>2</sub> emissions attributable to the construction of facilities are not included in calculations.
- SOx emissions for "Product Use" are included for reference, and were estimated from the sulfur content of products without accounting for sulfur reduction during use. Accordingly, actual SOx emissions are lower than the estimate.
- With regard to CO<sub>2</sub> for "Product Use," in addition to CO<sub>2</sub> emissions resulting from the use of products, CO<sub>2</sub> emissions attributable to generating electricity and steam sold are estimated separately.
- Naphtha used mainly as a petrochemical material does not directly emit CO<sub>2</sub> or SOx. However, naphtha is included with other petroleum products when calculating CO<sub>2</sub> and SOx emissions for "Product Use."

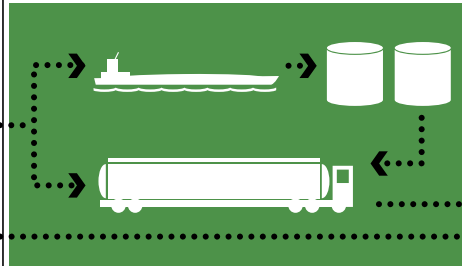
## CO<sub>2</sub> Emissions throughout the Life Cycle of Oil



### Products

- Production: **29,627** thousand kl
- Sulfur recovered: **258** thousand kl (by-product)
- Electricity sold: **1,538,105** thousand kWh (**15,012** TJ)
- Steam sold: **1,964** TJ
- CO<sub>2</sub> sold: **144** thousand tons-CO<sub>2</sub>

### Product Transportation and Stockpiling (Oil Depots)



#### INPUT

- Energy  
Fuel: **2,319** TJ

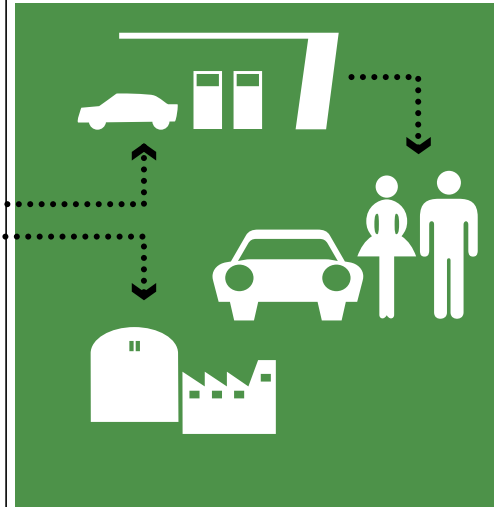
#### OUTPUT

- Emissions into atmosphere  
CO<sub>2</sub>: **159** thousand tons-CO<sub>2</sub>  
SOx: **1,866** tons  
NOx: **3,614** tons

#### Environmental measures

- Maritime transportation (ships)  
Oil spill prevention  
Energy conservation  
(increased efficiency through mutual accommodations, larger tankers for coastal routes)
- Land transportation  
Energy conservation (larger vehicles and high stowage rates)
- Stockpiling (oil depots)  
Energy conservation  
Resource conservation  
Chemical substance control  
Soil preservation  
Oil spill prevention

### Product Use



#### OUTPUT

- Emissions into atmosphere  
CO<sub>2</sub>: **73,878** thousand tons-CO<sub>2</sub>  
(The figure above does not include CO<sub>2</sub> emissions of 1,049 thousand tons-CO<sub>2</sub> attributable to generating electricity sold and CO<sub>2</sub> emissions of 96 thousand tons-CO<sub>2</sub> attributable to generating steam sold.)

- SOx: **152,896** tons

CO <sub>2</sub> emissions	Unit: thousand tons-CO <sub>2</sub>
FY2005	77,015
FY2006	68,253
FY2007	73,878

#### Environmental measures

- Service stations  
Energy conservation  
Resource conservation/recycling  
Industrial waste management  
Chemical substance control  
Air pollution control  
Wastewater management  
Soil preservation