

From Reservoir to Refinery



To meet a daily global oil demand of 80 million barrels, produced crude oil must be moved from oilfields, often in remote areas, to refineries located in consuming countries.

Land Transportation

Wherever overland routes are available, crude oil is traditionally shipped to the refinery by pipeline or truck transport or a mix of these.

Pipelines

Much of the world's crude oil starts its journey in pipelines. Gathering pipelines, which are 2 to 8 inches in diameter, extend from individual wellheads to central points in or near oilfields. Gathering pipelines connect with trunk pipelines, typically 8 to 24 inches in diameter, which carry crude oil from oilfields to shipping hubs or refineries.

The United States' crude oil pipeline system is the largest in the world with more than 30,000 miles of gathering pipelines and 55,000 miles of trunk pipelines. These pipelines carry more than 7.6 billion barrels of crude oil each year. (www.pipeline101.com; www.shellpipeline.com)



(photograph courtesy of Occidental Petroleum Corporation, www.oxy.com)

Crude oil moves through pipelines at up to six miles per hour; pumps along the lines provide the force to move the oil.

(U.S. Energy Information Administration, www.eia.doe.gov)



(map modified from Association of Oil Pipe Lines, www.piersystem.com)



The 48-inch-diameter, 800-mile-long Trans Alaska Pipeline System moves crude oil from northern Alaska to Valdez marine terminal.

(Alyeska Pipeline Service Company, www.alyeska-pipe.com)

(photograph courtesy of Hemco Industries, www.hemcoind.com)



Tank Trucks

Tank trucks operate mostly on short-haul routes and are the smallest of the crude oil carriers.

(U.S. Energy Information Administration, www.eia.doe.gov)

The Price of a Barrel of Oil

The price of a barrel of oil depends on its quality (API gravity) and its geographic location. The price of crude oil is generally tied to the price of a "marker" crude having a consistent grade and a high liquidity in the market. The price for a crude oil to be traded is calculated using the spot price of the marker crude oil as a base price, then applying a grade differential relative to the marker crude oil determined by factors such as specific gravity and sulphur content, and a supply discount or demand premium based on current market conditions.

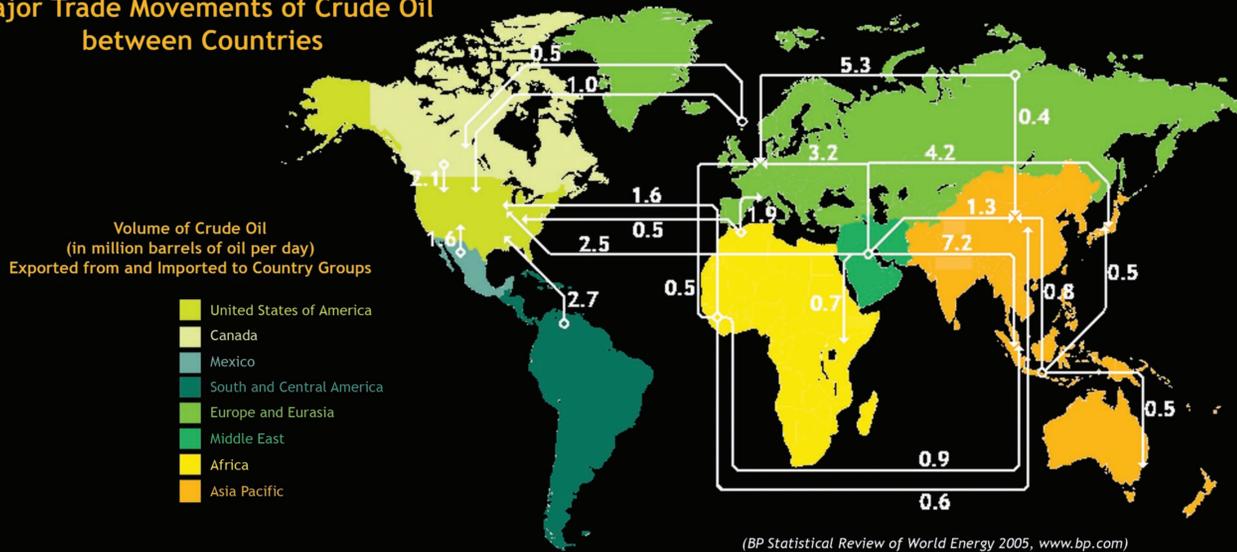
(The Trinidad Guardian, November 2004, www.guardian.co.tt)

Trading Crude Oil

Crude oil is the world's most actively traded commodity. In 2003, more than 14 billion barrels of crude oil were traded from oil-producing countries to oil-consuming countries.

(U.S. Energy Information Administration, www.eia.doe.gov)

Major Trade Movements of Crude Oil between Countries



(BP Statistical Review of World Energy 2005, www.bp.com)

NYMEX

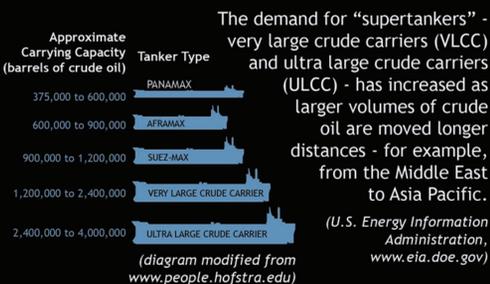
Most of the crude oil sold in the United States is traded on the New York Mercantile Exchange (NYMEX), which uses West Texas Intermediate (WTI) crude oil, delivered to Cushing, Oklahoma, as its marker crude oil. Worldwide, other crude oil exchanges include the International Petroleum Exchange of London Limited (IPE), the Amsterdam - Rotterdam - Antwerp ports (ARA), the Tokyo Commodity Exchange (TOCOM) and the Singapore Exchange Limited (SGX).

Marine Transportation

Tankers

More than 43 million barrels of crude oil are transported by tankers each day from oil producing countries to consumer countries. (U.S. Energy Information Administration, www.eia.doe.gov)

As of January 2005, the global fleet of crude oil tankers with capacities of 200,000 barrels or more numbered 1,764. (McQuilling Services, LLC, www.mcqservices.com)



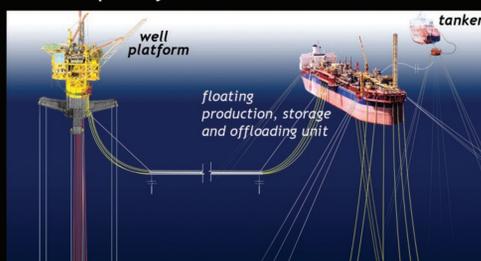
The demand for "supertankers" - very large crude carriers (VLCC) and ultra large crude carriers (ULCC) - has increased as larger volumes of crude oil are moved longer distances - for example, from the Middle East to Asia Pacific.

(U.S. Energy Information Administration, www.eia.doe.gov)

(diagram modified from www.people.hofstra.edu)

FPSOs

Floating production, storage and offloading (FPSO) vessels are mobile marine terminals, moored near the offshore oilfields that they service. Crude oil is pumped directly from wells through undersea pipelines to the FPSO. Crude oil is stored onboard until it is offloaded to a tanker for transport to a refinery. Some FPSOs have storage capacity of over two million barrels.



(diagram courtesy of Atlantia Offshore Limited, www.atlantia.com)

Strategic Petroleum Reserve

The U.S. Strategic Petroleum Reserve (SPR) is the largest stockpile of government-owned emergency crude oil in the world. The SPR has a maximum storage capacity of 700 million barrels, distributed in 62 solution-mined underground salt caverns at four sites in Texas and Louisiana along the Gulf Coast. Storage locations along the Gulf Coast were selected because they provide the most flexible means for connecting to the U.S.'s commercial oil transport network. SPR oil can be distributed through interstate pipelines to nearly half of the Nation's refineries, or loaded into tankers for transport to other refineries. The underground caverns offer the best security and are the most affordable means of storage, costing up to ten times less than aboveground tanks and twenty times less than hard rock mines.

(U.S. Energy Information Administration, www.eia.doe.gov)



(photograph courtesy of U.S. Office of Fossil Energy, www.fe.doe.gov)

Marine Terminals

Marine terminals provide transfer and storage facilities for shipments of crude oil. Hose and pipeline systems at the terminal transfers crude oil between trunk pipelines servicing the terminal, storage systems at the terminal, and tankers.



(photograph courtesy of Port of Los Angeles, www.portoflosangeles.org)

