U.S. Energy Markets - Volume III: Crude Oil

An Online Continuing Education Course for Engineers

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U.S. Energy Markets – Volume III: Petroleum

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Introduction

The primary energy markets in the United States are: Natural gas, electricity, and crude oil. These products are regulated by the Federal Energy Regulatory Commission (FERC) pursuant to its authority under the Natural Gas Act, the Federal Power Act, and the Interstate Commerce Act. This series of courses explores the workings of the wholesale markets for these forms of energy, as well as energy-related financial markets.

Energy markets consist of both physical and financial elements. The physical markets contain the natural resources, infrastructure, institutions, and market participants involved in producing energy and delivering it to consumers. The financial markets include the buying and selling of financial instruments that derive value from the price of the physical commodity. These financial markets have their own set of market structures and institutions, market participants, and traded products which have their own drivers of supply and demand. In general, physical and financial markets can be distinguished by the products and by the intentions of the market participants involved.

Much of the wholesale natural gas and electric power industry in the United States trade competitively, while some markets are *rate regulated* where their prices are established through administrative processes based on the cost of providing service. In competitive markets, prices are largely driven by the economic concepts of supply and demand. Underlying the supply and demand for energy are physical fundamentals - the physical realities of how markets produce and deliver energy to consumers and how they form prices.

Market participants buy and sell energy-based *financial contracts* for several reasons. Physical market participants, such as producers and large consumers, usually use financial contracts to manage price risk and to protect against price volatility. That is, financial contracts can serve as a tool for managing risk akin to insurance. Other market participants use the energy markets to speculate or to assume a market risk in the hope of profiting from market fluctuations. Additionally, companies turn to the capital markets if they need to raise or invest money.

This course is Volume III of a five-volume series of courses about the U.S. energy markets. This volume is comprised of four chapters. Chapter One provides an overview of the U.S. crude oil market. Chapter Two describes the supply and demand for crude oil in the U.S. Chapter Three explains the crude oil refining process and transportation of crude oil. Chapter Four is a brief look at the unique characteristics of the financial markets and trading of crude oil.

The following text box describes the entire series.

U.S. Energy Markets

Volume I explores the fundamentals of the wholesale natural gas markets.

Volume II describes the fundamentals of the wholesale electricity markets.

Volume III explains the fundamentals of the U.S. crude oil and petroleum products markets.

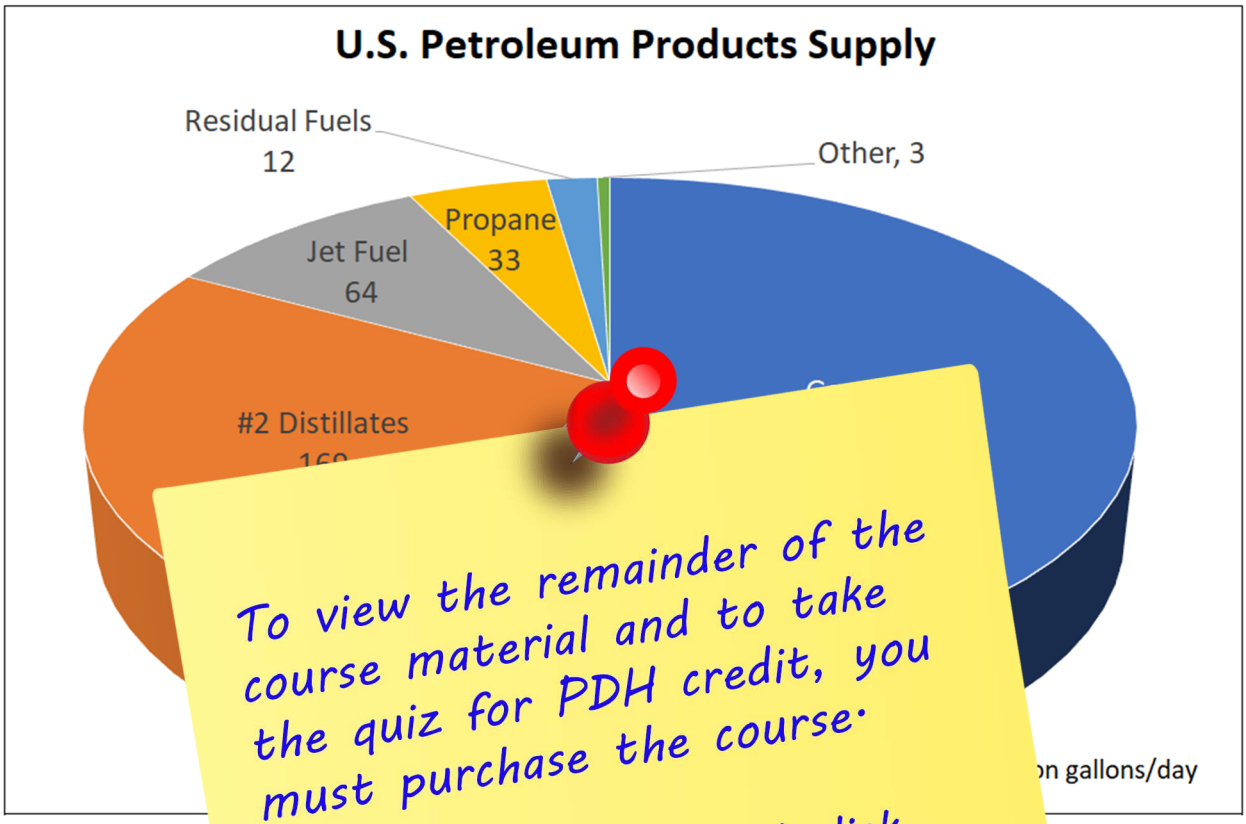
Volume IV describes the U.S. Coal Market.

Volume IV explores the market participants, products, market mechanisms and trading at work for natural gas and electricity in the financial markets as well as examples of market manipulation that may occur.

Chapter 1
Crude Oil and Petroleum Products Markets

Petroleum, or crude oil, and its derived products play a key role in the U.S. economy, accounting for approximately 22 percent of primary energy consumption in the U.S.

Petroleum is not directly consumed in its natural form but is distilled and refined into an array of products that can be used for various applications. These include fuels for transportation, power generation, and heating. Other applications include petrochemical feedstocks used to manufacture various products, such as plastics, pharmaceuticals, fertilizers, and construction materials. Petroleum is especially important in the transportation sector, where it accounts for 92 percent of all transportation fuels. Figure 1 shows the petroleum products supply in the U.S.



As you can see in pply at 375 million gallons per

Petroleum and petro both domestically produce g of imported petroleum and petroleum products has been dec g in recent years as U.S. crude oil production from shale has increased. Nearly 50 percent of the domestic U.S. crude oil production comes from two states, Texas and North Dakota. Alaska, California, New Mexico, Oklahoma, and the Gulf of Mexico are also significant sources of production. U.S. refineries, which separate crude oil into usable products, are found throughout the country but are most heavily concentrated on the Gulf Coast.