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# The Importance of Canadian Crude Oil to Refineries in the U.S.

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## Introduction

The refining industry<sup>1</sup> in the United States is one of the world's largest, with capacity to process 18 million barrels of oil per day. Canada plays a crucial role by supplying more than one-fifth of the crude oil refined in the U.S.

The U.S.–Canada cross-border crude oil trade is essential to North American energy security. Canadian crude oil exports and the U.S. refinery industry are highly integrated. In recent years, Canada's crude oil sector has been making a growing contribution to the operations of U.S. oil refineries.

U.S. refineries are converting Canadian crude oil, including heavy oil,<sup>2</sup> into products that North Americans use daily, such as transportation fuels (gasoline and diesel), chemicals, and plastics. Although the U.S. has increased its production of oil in recent years, U.S. refineries still rely on Canadian heavy crude oil to meet their feedstock (i.e., the raw materials and intermediate materials processed at refineries to produce finished petroleum products, otherwise known as refinery inputs) specifications.

In this CEC Fact Sheet, we examine several economic indicators that illustrate the importance of Canadian crude oil, particularly heavy crude, to U.S. refineries. This fact sheet also analyzes the refining industry's direct and indirect economic impacts on the U.S. economy.

## Imports of Canadian crude oil to refineries in the United States

The [physical characteristics](#) of crude oil determine how it is processed in refineries. Generally, heavy crude oil offers higher yields of low-value products (coke and asphalt) and lower yields of high-value products (gasoline). Heavy crude oil requires more complicated processing than lighter crude if it is to produce high-value products.

Overall, Canadian crude oil imports to U.S. refineries for processing have risen from over 1.3 million barrels per day in 2000 to just under 3.8 million barrels per day in 2022, an increase of 181 percent (see Figure 1). The percent of Canadian crude in U.S. refinery feedstock has steadily risen from nearly 9 percent in 2000 to over 23 percent by the end of 2022.

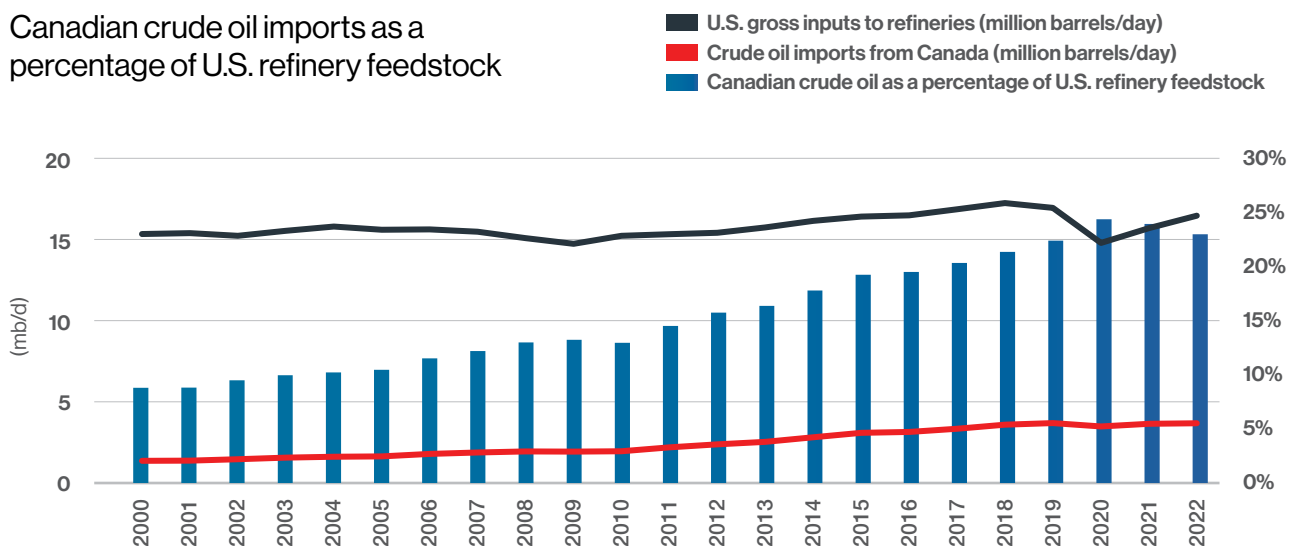
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1. NAICS Code 324110 (Petroleum Refineries): This industry comprises establishments primarily engaged in refining crude petroleum into refined petroleum.

2. A majority of the crude oil imported by the U.S. from Canada is heavy crude (between 15-25 API gravity). API gravity is a commonly used index for measuring the density of crude oil or refined products. Crude oil typically has an API between 15 and 45 degrees. The higher the API, the lighter the crude; the lower the API, the heavier the crude.

**Figure 1**

Canadian crude oil imports as a percentage of U.S. refinery feedstock



Source: U.S. Energy Information Administration (2024a, 2024b, 2024c).

## The U.S. refining industry

Since the first U.S. refinery [began operating](#) in 1861, the refining industry has been one of the largest manufacturing sectors in the United States. There are currently 129 petroleum refineries across the 5 U.S. PADDs<sup>3</sup> (125 operating refineries and five refineries that are idle but not permanently shut down) (see Table 1).

**Table 1**

Capacity of operable refineries in the U.S.

PAD District	Operable refineries	Crude oil distillation capacity (barrels per day)
PAD District I (U.S. East Coast)	7	877,800
PAD District II (U.S. Midwest)	22	3,948,885
PAD District III (U.S. Gulf Coast)	56	9,676,729
PAD District IV (U.S. Rocky Mountains)	13	650,164
PAD District V (U.S. West Coast)	26	2,694,571

Source: U.S. Energy Information Administration (2023).

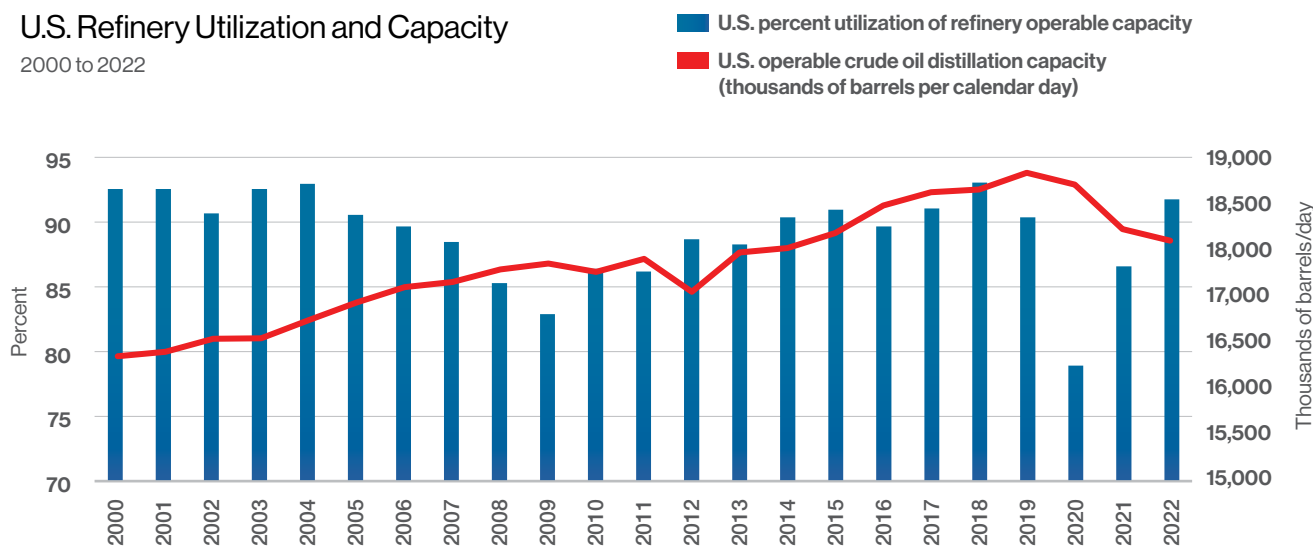
3. The United States is divided into five Petroleum Administration for Defense Districts (PADDs) for the allocation of fuels derived from petroleum products, including gasoline and diesel fuel. The geographic breakdown of PADDs enables U.S. policymakers to better analyze petroleum supplies in the country.

Total refining capacity in the United States has risen from 16.2 million barrels of crude processed in 2000 to nearly 17.8 million barrels per day in 2022, an increase of over 8 percent (see Figure 1). The refining utilization<sup>4</sup> has also recovered, growing from 79 percent during COVID-19 to a high of 91 percent in 2022.

**Figure 2**

**U.S. Refinery Utilization and Capacity**

2000 to 2022



Source: U.S. Energy Information Administration (2024b).

## The impact of the U.S. refining industry on the American economy

The estimated direct and indirect economic impacts of the U.S. refining industry in 2024 include 1.6 million direct and indirect jobs, \$206 billion in labour income, \$577 billion in direct and indirect value-added, and \$1.6 trillion in what is known as “outputs,” i.e., the value of goods and services produced by the industry (see Table 2).<sup>5</sup>

**Table 2**

**Estimated Economic Impact of the U.S. Refining Industry**

	Employment (number)*	Labour Income (US\$ billions)**	Value-added (US\$ billions)***	Output (US\$ billions)
<b>Direct</b>	64,486	23.91	188.17	917.47
<b>Indirect</b>	1,580,372	182.09	388.81	747.42
<b>Total</b>	1,644,859	206	577	1,665

**Notes:** \*Employment is defined as the number of payroll and self-employed jobs, including part-time jobs. \*\* Labour income is defined as wages, salaries, benefits, and proprietors' income. \*\*\*Value-added refers to the additional value created by the industry. It measures an industry's overall economic importance and represents its Gross State Product (GSP) portion. Value-added consists of employee compensation, proprietors' income, income to capital owners from property, and indirect business taxes (including excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses). ± Direct impact is measured as the jobs, labour income, and value-added within the natural gas distribution industry. The indirect impact is measured as the jobs, labour income, and value-added occurring throughout the supply chain of the natural gas distribution industry attributable to its operating and capital expenditures.

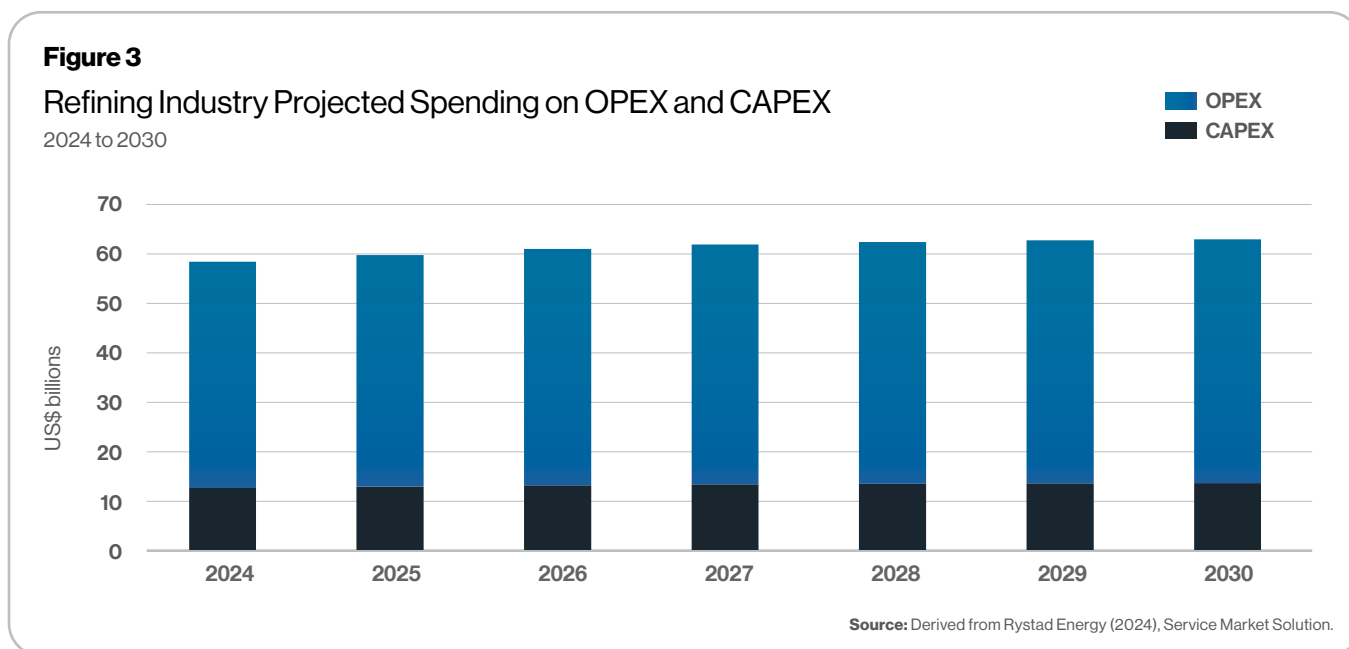
**Source:** Author's calculations using the IMPLAN modelling system. Details may not add up to totals due to rounding.

4. Capacity measures how much crude oil refineries are able to process. Utilization measures how much is actually being processed (as a percentage of maximum capacity).

5. These projected amounts are in nominal U.S. dollars.

## Projected spending by the U.S. refining industry, 2024-2030

Figure 3 illustrates the industry’s projected annual spending between 2024 and 2030. Industry spending is expected to be US\$58 billion in 2024, rising to US\$62 billion by 2030. This includes operating expenditures (OPEX) and capital expenditures (CAPEX). Cumulatively, between 2024 and 2030, the industry is projected to spend over US\$428 billion.<sup>6</sup>



## Conclusion

American refineries are critical to the country’s strategic interest. U.S. refineries are projected to spend more than \$428 billion in the next seven years on operating and capital expenditures. The industries support millions of jobs. Canadian crude is an important part of the equation. It supplies more than 23 percent of U.S. refinery feedstock.

Not only are Canadian crude oil supplies critical for the U.S. refining industry, but they are key to North American energy security. Limiting access to Canadian crude oil for U.S. refineries would require increased U.S. imports from less-free countries, which in turn would risk North American energy security.

6. These projected amounts are in nominal U.S. dollars and are calculated using the Rystad Energy UCube.

**References**

Rystad Energy (2024), Service Market Solution <<http://tinyurl.com/28fmv6a6>>; U.S. Energy Information Administration (Undated), Oil and Petroleum Products Explained: Refining Crude Oil <<http://tinyurl.com/3b2uwrhx>>; U.S. Energy Information Administration (2023), Refinery Capacity Report <<http://tinyurl.com/2s4ybz9z>>; U.S. Energy Information Administration (2024a), Petroleum and Other Liquids: PADD District Imports by Country of Origin <<http://tinyurl.com/58mzvts>>; U.S. Energy Information Administration (2024b), Petroleum and Other Liquids: Refinery Utilization and Capacity <<http://tinyurl.com/3wx957k4>>; U.S. Energy Information Administration (2024c), Petroleum and Other Liquids: U.S. Imports by Country of Origin <<http://tinyurl.com/bdcsbwhn>>; U.S. Environmental Protection Agency (Undated), Appendix A — Overview of Petroleum Refining, Proposed Clean Fuels Refinery DEIS <<http://tinyurl.com/dveyzc8k>>.

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