

# Commentary

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## What Happened to Oil Product Demand in Saudi Arabia During the First Two Quarters of 2020?

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Anwar Gasim





**In fact, the demand for total oil products in 2020 increased by 7% and 3% in January and February, respectively, compared with the previous year**

## Introduction

In this commentary, we examine the effects of the COVID-19 pandemic and the various lockdown measures on domestic oil product demand in Saudi Arabia during the first and second quarters of 2020. We explore the pandemic's effects on six key categories of secondary oil products, as defined by the Joint Organisations Data Initiative (JODI) (2020):<sup>1</sup>

- liquefied petroleum gas (LPG)
- gasoline
- kerosene
- diesel
- fuel oil
- other oil products

The category 'other oil products' includes naphtha, ethane, refinery gas, petroleum coke, lubricants, and bitumen, among others. It also includes the direct use of crude oil, which accounts for a large share of this category in Saudi Arabia. 'Total oil product' demand is defined to be the sum of demand for all six product categories.

## January and February: Before the Global Spread of COVID-19

The demand for oil products during January and February was similar in both 2020 and 2019, as shown in Figures 1 and 2. In fact, the demand for total oil products in 2020 increased by 7% and 3% in January and February, respectively, compared with the previous year. These year-on-year (YoY) increases may have been driven by increases in population or income.

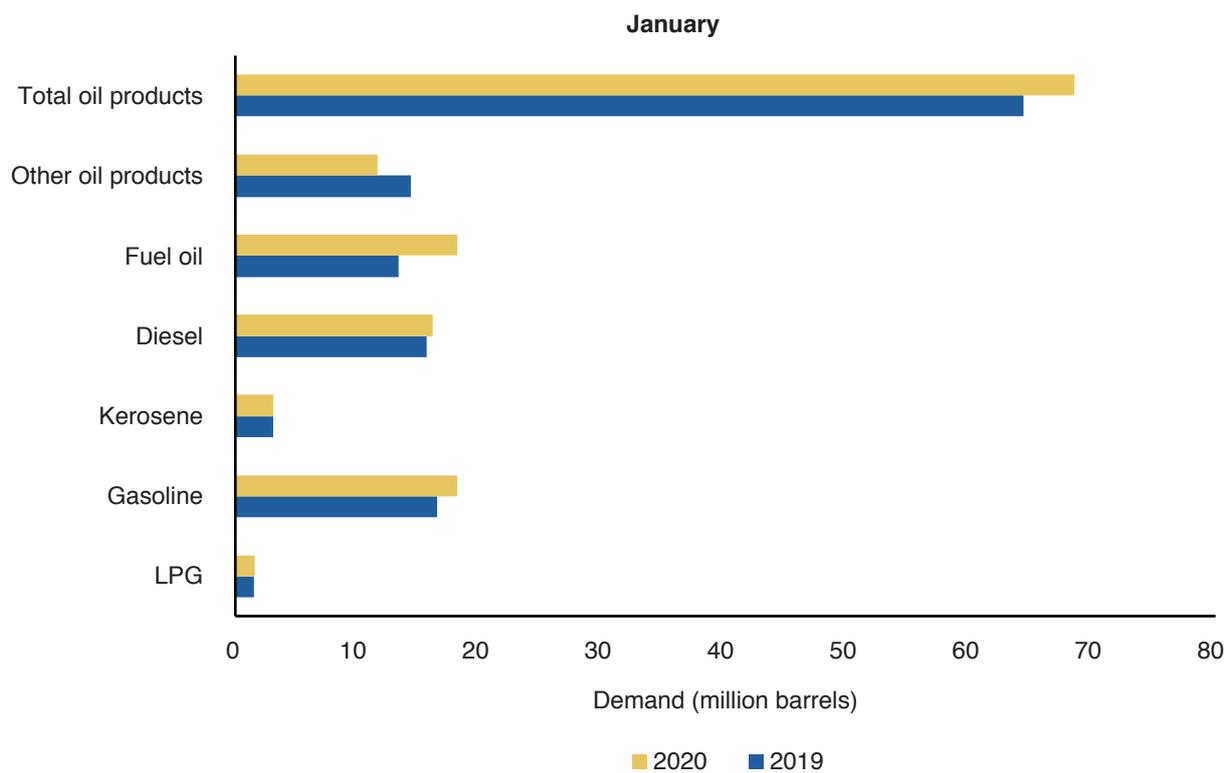
Nevertheless, there were some differences observed within the product categories between 2019 and 2020. Some of these differences may have been caused by monthly fluctuations in demand. The only exception appears to be the demand for fuel oil, which increased by 36% YoY in January 2020.

In Saudi Arabia, fuel oil is consumed in the power, water, and industrial sectors, and by international shipping. The 36% YoY increase in fuel oil demand in January 2020 was likely due to changes in the shares of natural gas, crude oil, and oil products used in the Saudi power and water sector. Fuel oil demand in this sector has been rising in recent years, with 7 gigawatts (GW) of fuel oil-fired plant capacity expected to have come online in 2020 (Shabaneh et al. 2020). Furthermore, the International Maritime Organization's (2020) mandate on limiting the use of high sulfur fuel oil in international shipping likely played a role, reducing the international market price for high sulfur fuel oil. The mandate went into force globally on January 1, 2020. A lower international price for high sulfur fuel oil likely encouraged greater domestic use of fuel oil, freeing up crude oil or diesel for export instead of being burned in the power and water sector. In fact, the JODI (2020) data reveal that the direct burn of crude oil fell by 23% YoY in January 2020, which was captured in the 19% YoY decrease in the 'other oil products' category.

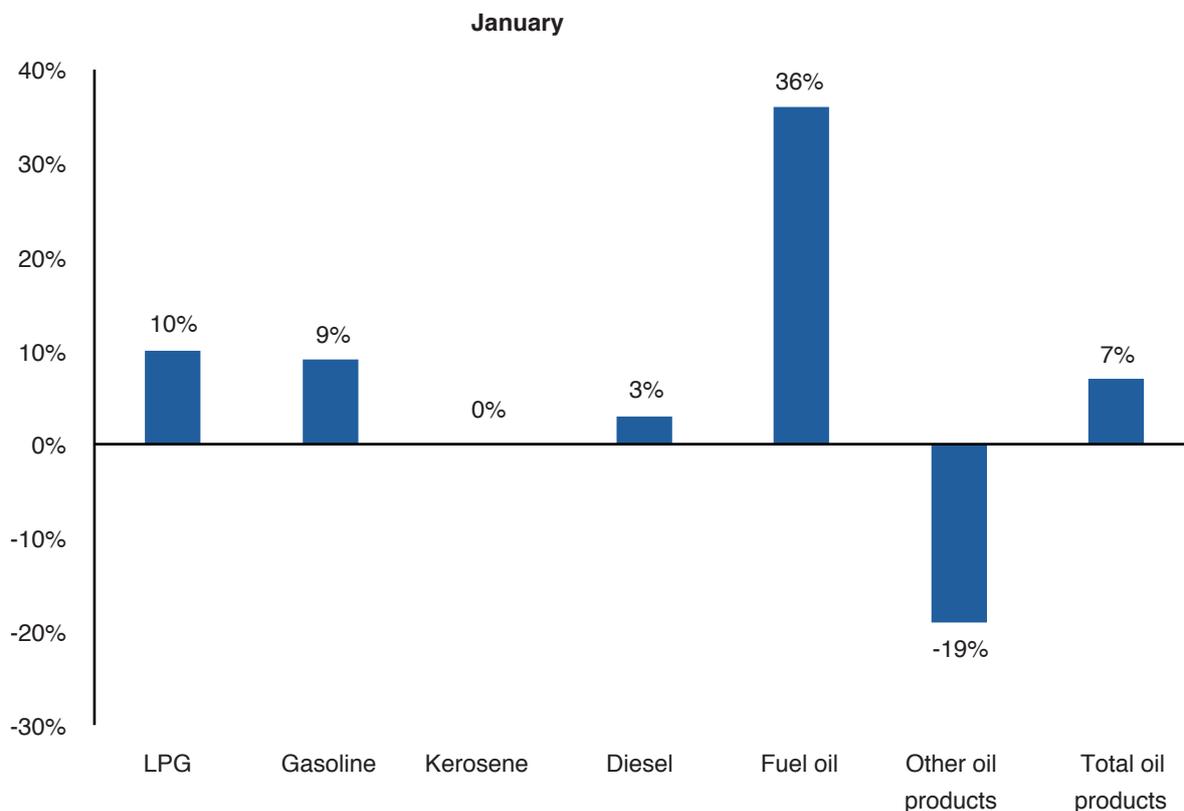
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<sup>1</sup> JODI (2020) included naphtha with other oil products for data published before 2009, but started reporting naphtha as a separate oil product category from 2009 on. In this paper, we include naphtha whenever we use the term 'other oil products.'

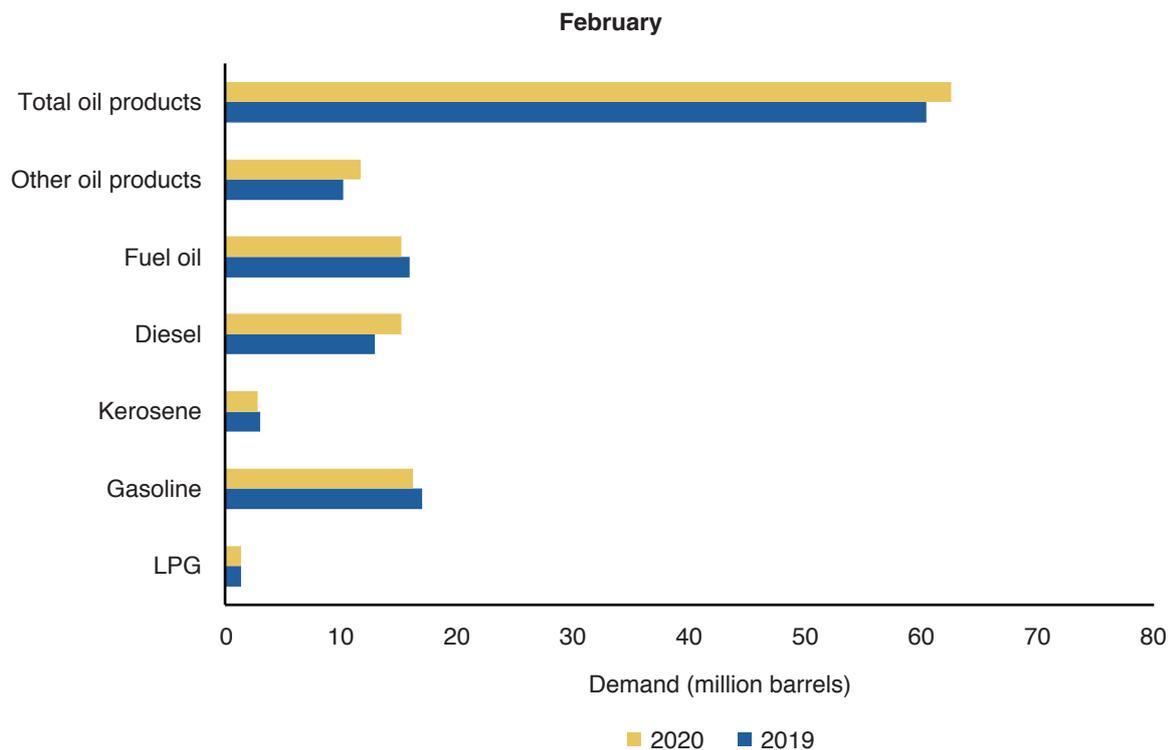
**Figure 1(a).** Monthly oil product demand by category, comparing 2019 and 2020.



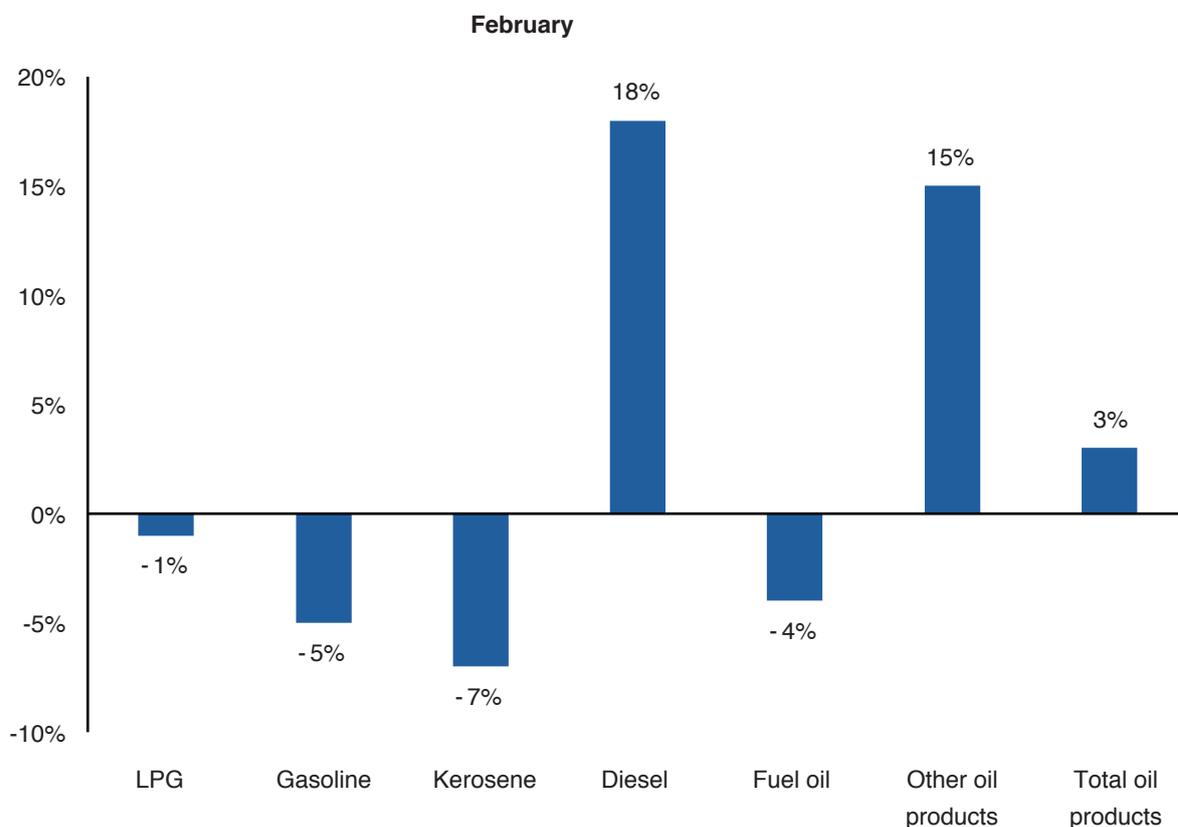
**Figure 1(b).** Percentage change in monthly oil product demand, year on year.



**Figure 2(a).** Monthly oil product demand by category, comparing 2019 and 2020.



**Figure 2(b).** Percentage change in monthly oil product demand, year on year.



## March: The Government Starts Implementing COVID-19 Interventions

The effects of COVID-19 on domestic energy demand started to be felt in March, as Saudi Arabia recorded its first case of the virus at the start of the month. By mid-March, Saudi Arabia had closed malls, banned the serving of food in restaurants, and suspended office attendance and prayers in mosques. On March 20, 2020, Saudi Arabia suspended flights and instated a national curfew three days later (SPA 2020a, 2020b, 2020c).

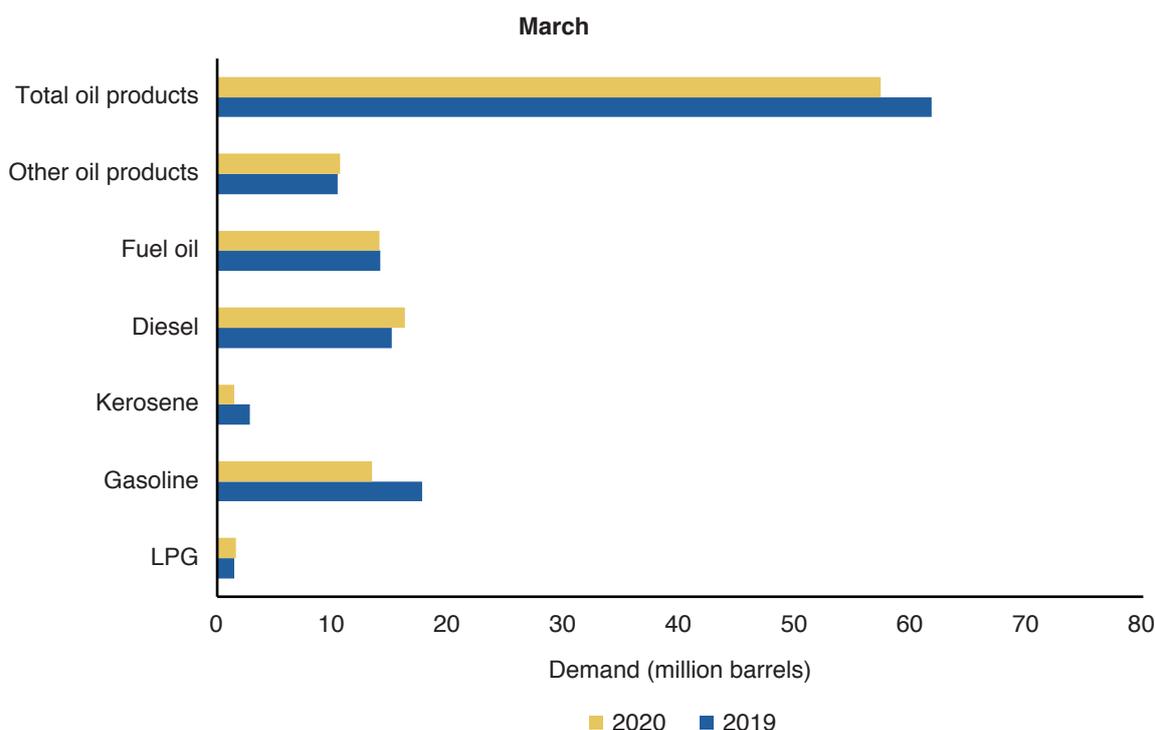
The two oil products whose demand was most affected by COVID-19 during March were kerosene and gasoline (see Figure 3). Demand for kerosene in March 2020 fell 46% YoY, while gasoline demand fell by 24%. These YoY decreases were caused by the interventions and curfew instated at the end of March, which reduced mobility in Saudi Arabia (Al Atawi 2020).

In contrast, the demand in March for LPG, diesel, fuel oil, and other oil products remained mostly unchanged. In Saudi Arabia, LPG is used in the residential sector and in bakeries as cooking gas, and in the petrochemical sector as feedstock. COVID-19 did not have a considerable impact on these uses of LPG in March.

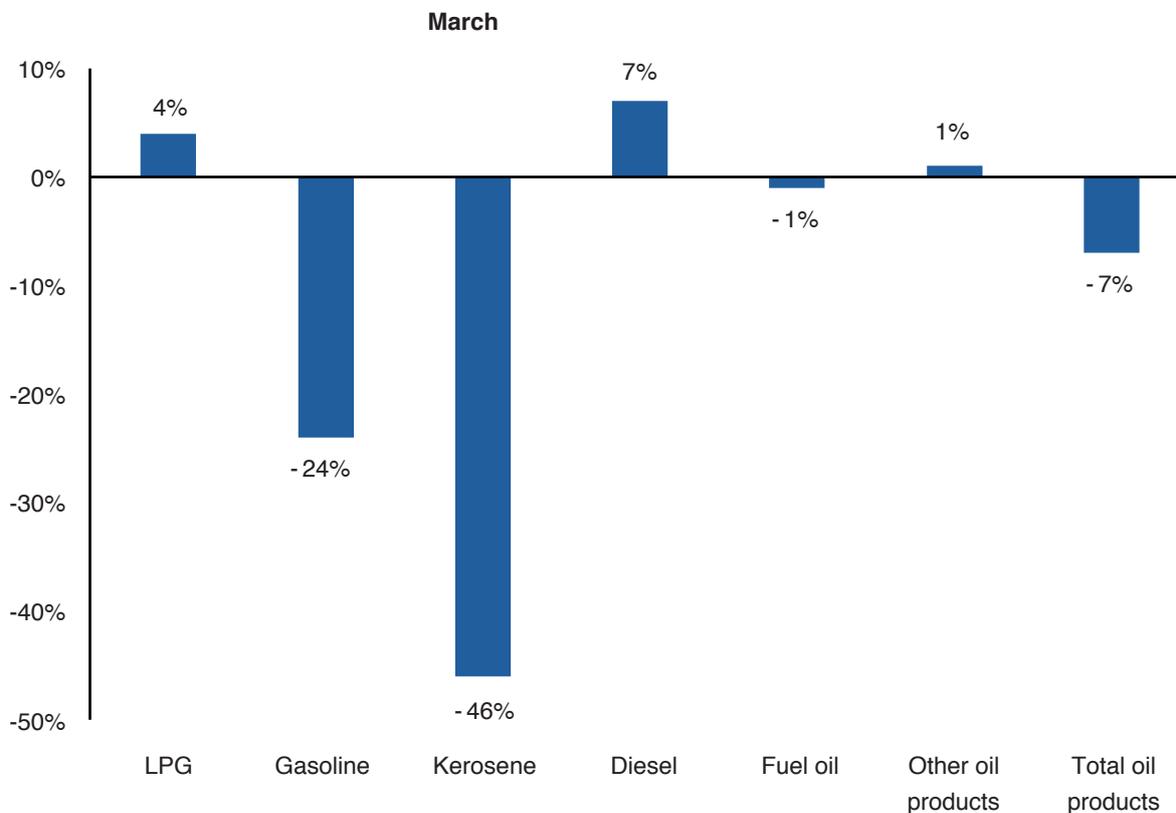
Since the restrictions aimed at stalling the spread of COVID-19 were implemented toward the end of March, their effect on total oil product demand was limited compared with the following months. Total demand for oil products in March 2020 was 7% lower YoY, equivalent to a 4.4 million barrel (MMb) YoY fall.

**The two oil products whose demand was most affected by COVID-19 during March were kerosene and gasoline**

**Figure 3(a).** Monthly oil product demand by category, comparing 2019 and 2020.



**Figure 3(b).** Percentage change in monthly oil product demand, year on year.



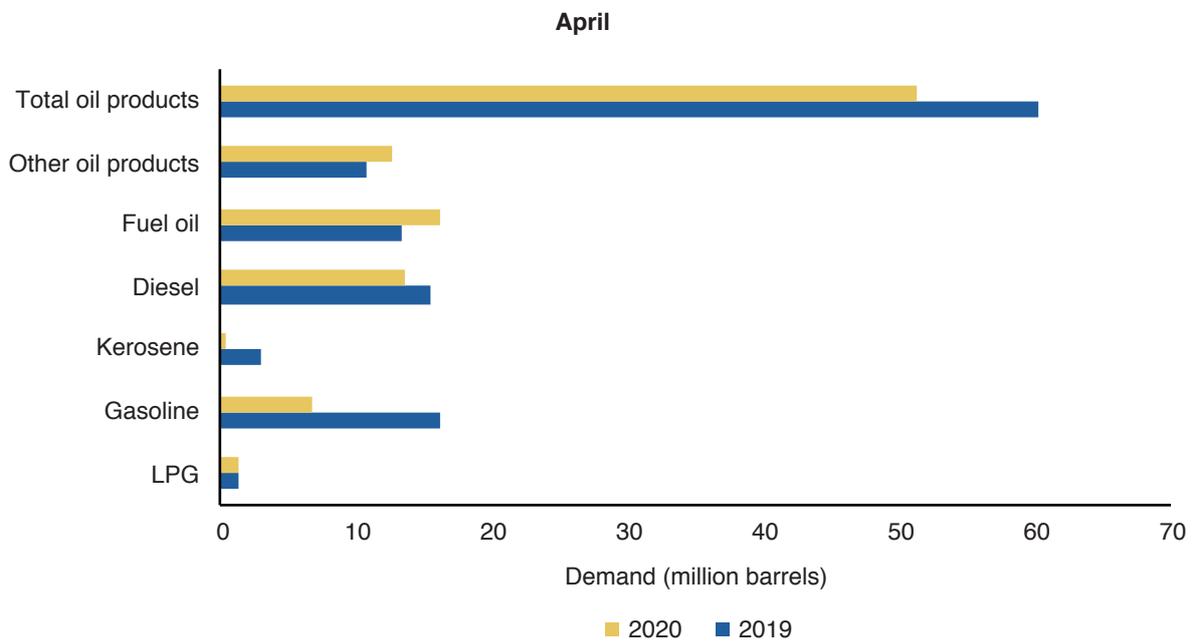
**The effect of the COVID-19 restrictions on oil product demand peaked in April 2020, the first entire month of lockdown**

**April: A Full Month of Lockdown**

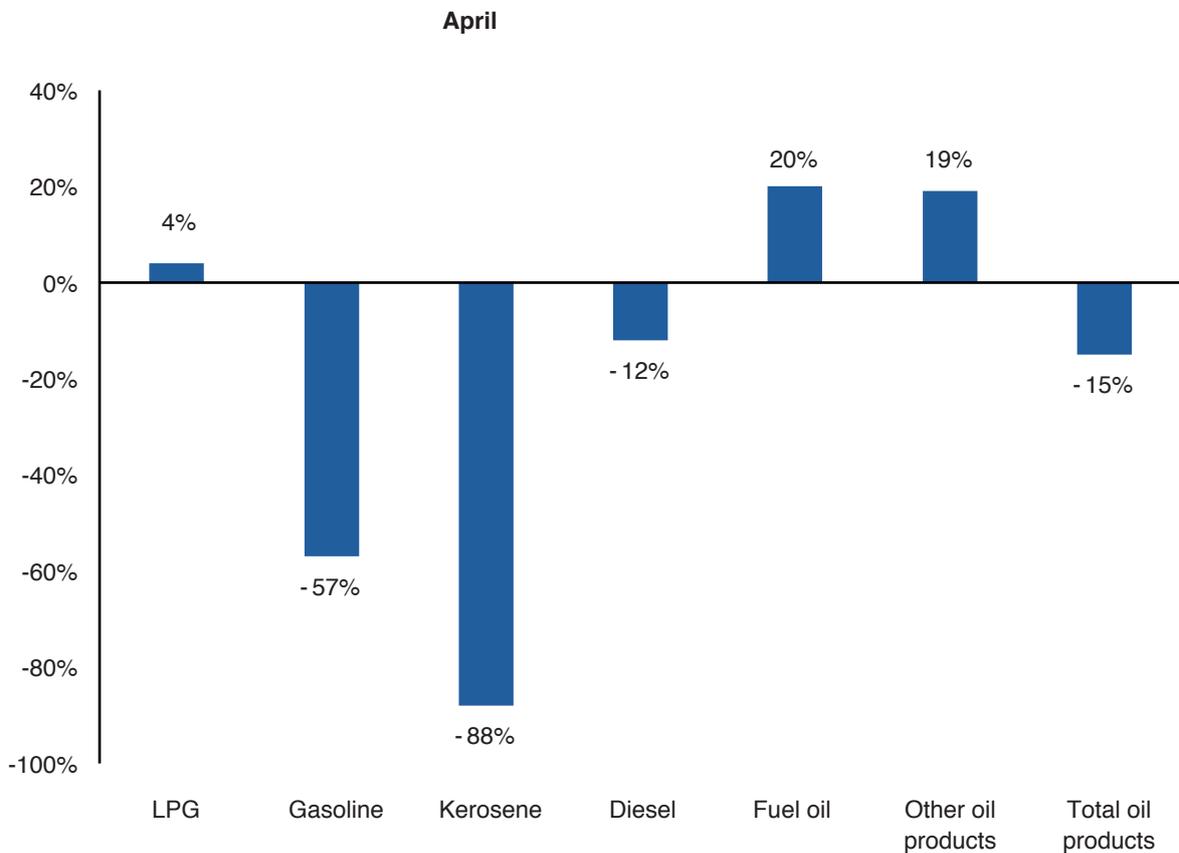
The effect of the COVID-19 restrictions on oil product demand peaked in April 2020, the first entire month of lockdown (SPA 2020f, 2020g). The curfew was only lifted partially on April 26, which roughly coincided with the start of the holy month of Ramadan.

During April, gasoline and kerosene again experienced the largest reductions in demand, falling by 57% and 88%, respectively, YoY (see Figure 4). Because of the curfew, most people worked remotely, limiting the need for driving, and domestic and international flights remained suspended. Air cargo and limited repatriation flights likely accounted for the 0.4 MMb of kerosene consumption in April 2020 (SPA 2020d, 2020e), a tiny quantity compared with the 3.1 MMb consumed in April 2019. Diesel demand fell by 12% YoY as freight activity slowed. Diesel is consumed in the Kingdom’s power, industrial, and transport sectors, with transport – truck freight in particular – accounting for the largest share of diesel consumption.

**Figure 4(a).** Monthly oil product demand by category, comparing 2019 and 2020.



**Figure 4(b).** Percentage change in monthly oil product demand, year on year.





**Because of the commercial activity generated by Ramadan and the implementation of a partial curfew instead of a full one, COVID-19's effect on total oil product demand was weaker in May than in April**

In contrast to the declining demand for kerosene and gasoline, fuel oil demand in April 2020 increased by 20% YoY. As noted previously, this increase was likely due to changes in the shares of fuels used in power generation and water desalination. With domestic refinery output down because of the COVID-19 demand shock and international fuel oil prices relatively low, Saudi Arabia increased its imports of fuel oil (68% higher YoY) to meet its increased demand, which was likely coming from the power and water sector.

The demand for other oil products was up by 19% YoY. The use of other oil products by Saudi Arabia's mining and quarrying industry may have increased in April: Data from the General Authority for Statistics (GaStat) shows that the sector's production index increased substantially YoY in April 2020. More importantly, according to JODI, 27% more crude oil was burned directly in the Kingdom in April 2020, YoY. Higher direct use of crude oil shows up in the 'other oil products' category, as defined by JODI.

In summary, the government interventions implemented to control the spread of COVID-19 were at their most stringent in April 2020, and so their effect on total oil product demand was strongest during this month. Total oil product demand fell by 15% YoY in April 2020, equivalent to an 8.9 MMb YoY decrease.

### **May 2020: Ramadan and the Partial Lifting of the Curfew**

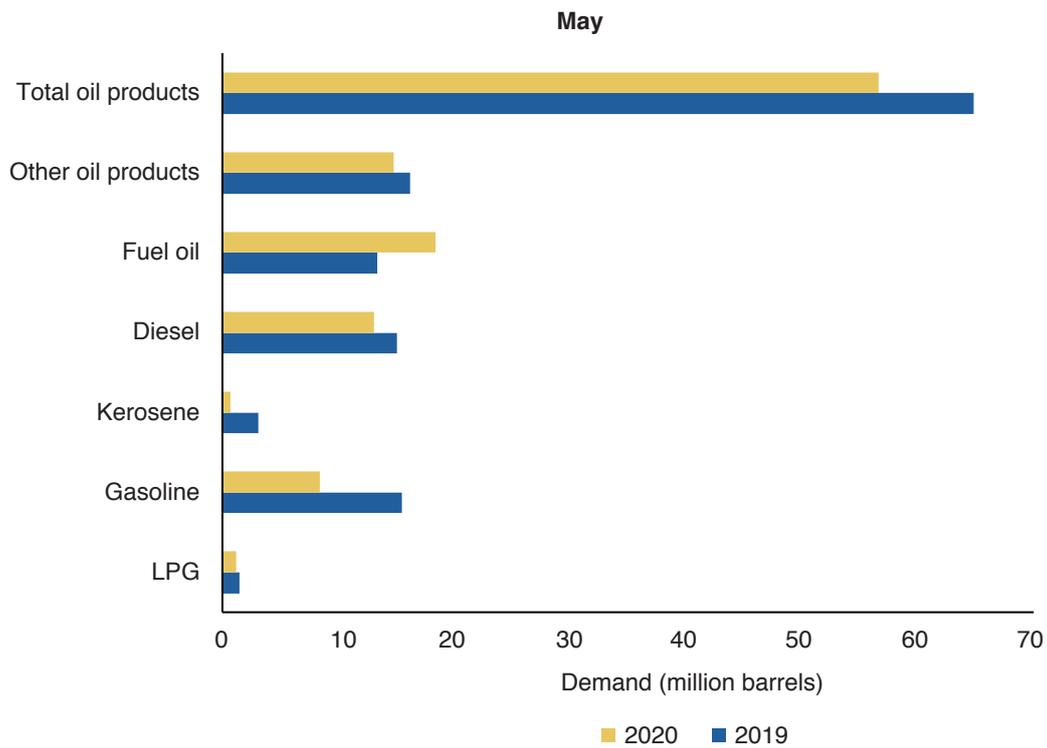
The partial curfew continued for most of May, which coincided with the holy month of Ramadan. Throughout this month, people had the flexibility to go out between 9 am and 5 pm, with many commercial activities returning (SPA 2020g, 2020h, 2020i).

During May, gasoline demand fell by 46% YoY (see Figure 5). Although this was a substantial decrease, it was less than the 57% YoY decrease recorded in April. In fact, between April and May, gasoline demand rose from 6.9 to 8.4 MMb. This month-on-month (MoM) increase was likely due to the additional economic activity generated by Ramadan and the partial lifting of the curfew. Once again, among all oil products, kerosene demand fell the most, by 77% YoY, as domestic and international flights remained suspended. However, as with gasoline, kerosene demand increased MoM with the increase in commercial activity.

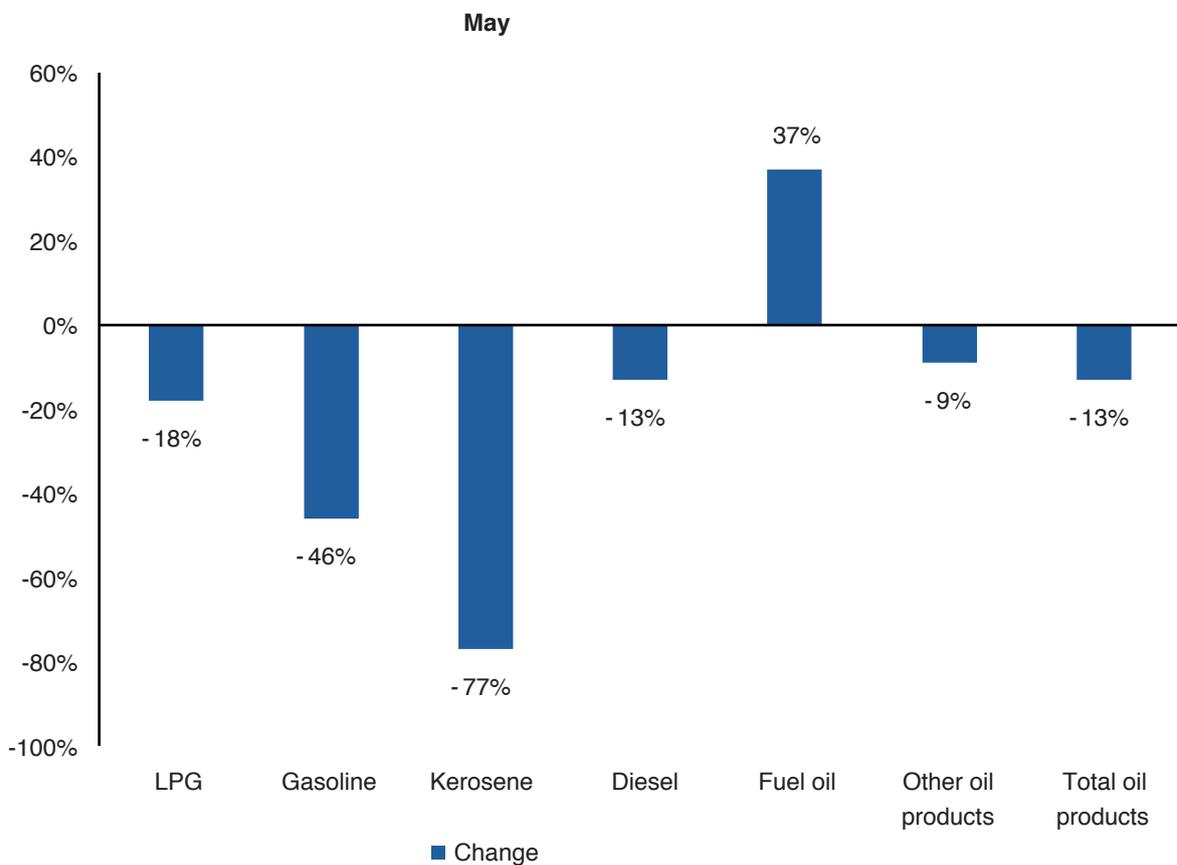
YoY decreases in demand were observed for all oil products in May except fuel oil, which increased by 37% YoY. This increase was likely driven by the same factors discussed previously. The data also reveal that Saudi imports of fuel oil increased by 114% YoY in May 2020 to meet increased domestic demand.

Because of the commercial activity generated by Ramadan and the implementation of a partial curfew instead of a full one, COVID-19's effect on total oil product demand was weaker in May than in April. Total demand in May 2020 was 13% lower YoY, equivalent to an 8.2 MMb YoY fall.

**Figure 5(a).** Monthly oil product demand by category, comparing 2019 and 2020.



**Figure 5(b).** Percentage change in monthly oil product demand, year on year.





### June 2020: Lifting of the Curfew and Returning to a ‘New Normal’

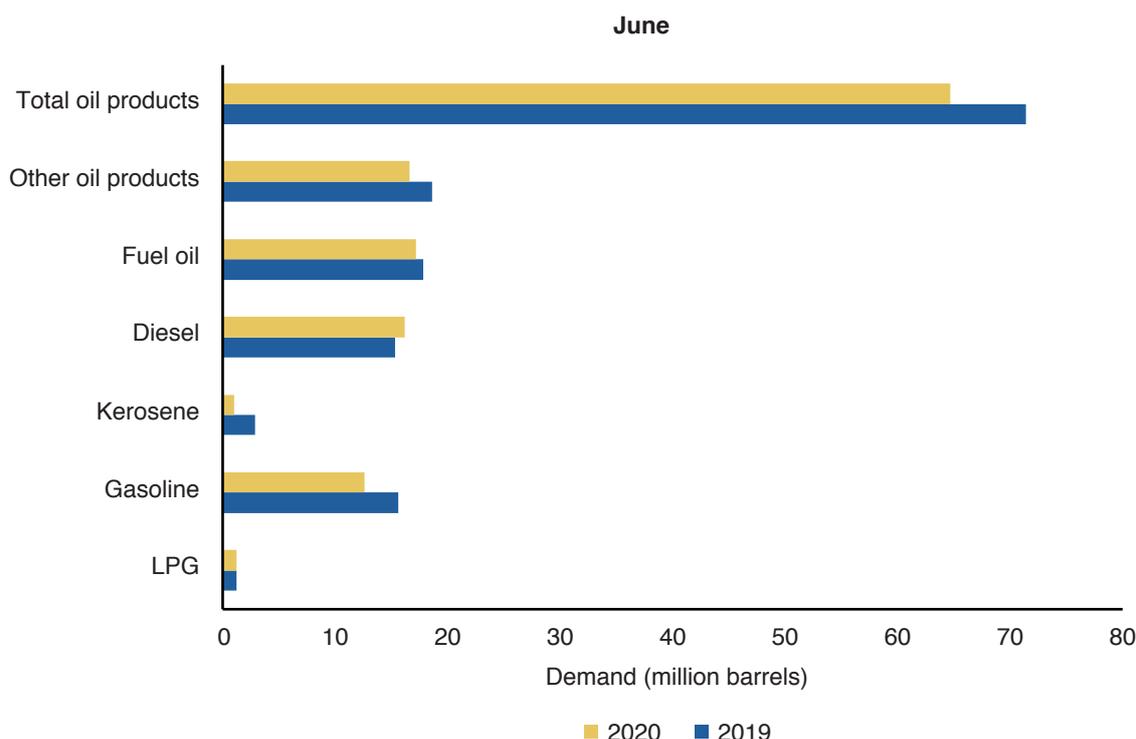
At the end of May, the government further relaxed the curfew, giving people the flexibility to go out between 6 am and 8 pm (SPA 2020j). It also lifted the suspension of office attendance for ministries and private companies. While some people continued to work remotely throughout June, others returned to their offices. The curfew was then fully lifted on June 21, 2020, with some restrictions remaining (SPA 2020l). This transition to a ‘new normal’ was accompanied by some recovery in the domestic demand for oil products (see Figure 6).

**The demand recovery in June is evident when looking at total oil product demand, which was 9% lower YoY in June compared with 13% in May and 15% in April**

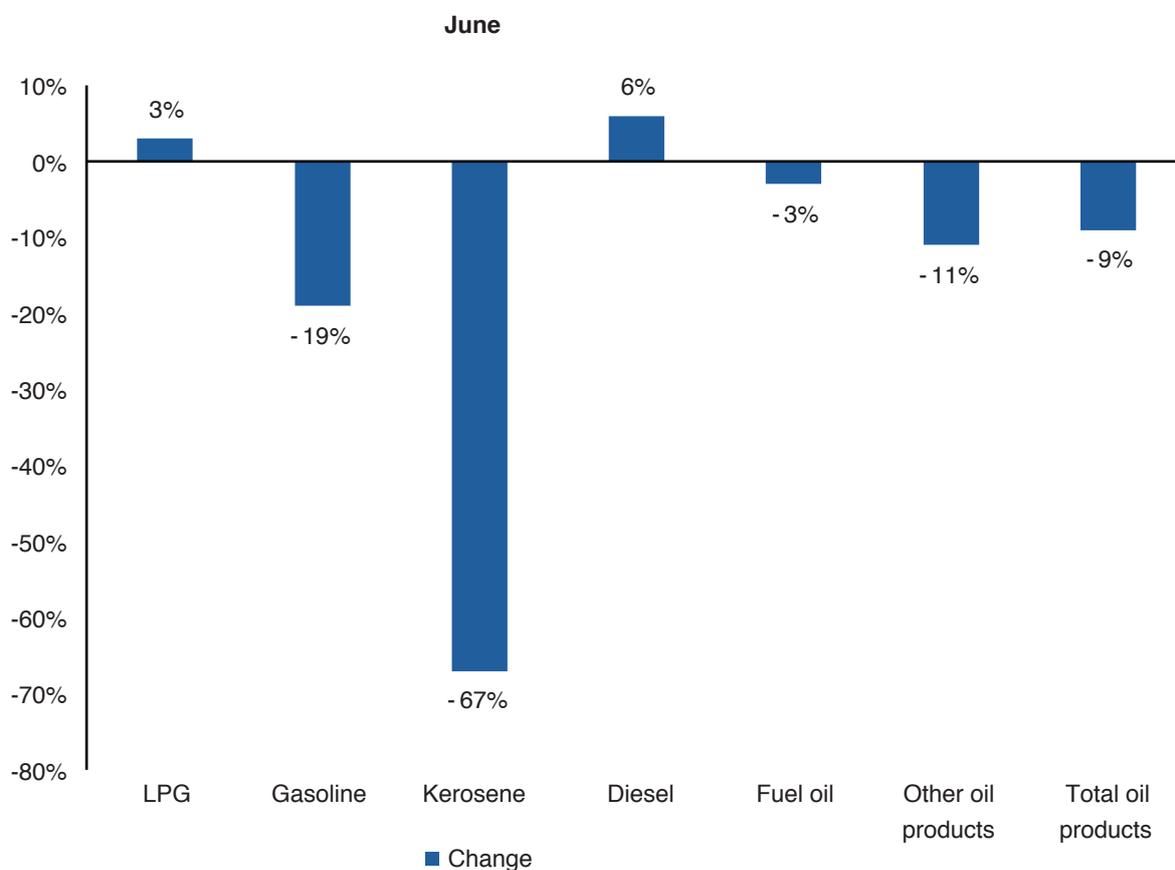
Although gasoline demand was still 19% lower YoY in June, consumption during the month was 12.6 MMb, compared with 8.4 MMb in May and only 6.9 MMb in April. With the resumption of domestic flights (SPA 2020k), kerosene demand was 1.0 MMb in June compared with 0.7 MMb in May and only 0.4 MMb in April. The recovery in diesel demand was less pronounced, as the impact of the COVID-19 restrictions had a weaker effect on it. Diesel demand was 16.2 MMb in June, compared with 13.1 MMb in May and 13.7 MMb in April.

The demand recovery in June is evident when looking at total oil product demand, which was 9% lower YoY in June compared with 13% in May and 15% in April. This 9% YoY fall translates to a 6.7 MMb YoY decrease in June.

Figure 6(a). Monthly oil product demand by category, comparing 2019 and 2020.



**Figure 6(b).** Percentage change in monthly oil product demand, year on year.



### Quarterly Demand Data: Eliminating Monthly Fluctuations

It is useful to look at quarterly demand to eliminate monthly fluctuations (see Table 1). Gasoline demand was 7% lower YoY in Q1 and 41% lower in Q2. Kerosene demand was 17% lower in Q1 and 78% lower in Q2. In contrast, demand for LPG, diesel, and other oil products did not change as much during these two quarters. Diesel demand was 9% higher in Q1 and 6% lower in Q2. Similarly, LPG demand was 5% higher in Q1 and 5% lower in Q2.

The demand for other oil products changed the least during the first half of 2020. It hovered around 34 to 35 million barrels in the first quarters of both years and 44 to 45 million barrels in the second.

In contrast to all other products, fuel oil demand was 9% higher YoY in Q1 and 16% higher in Q2. As noted previously, this was likely due to greater consumption of fuel oil by the power and water sectors and the effects of the International Maritime Organization’s (2020) mandate.

**Table 1.** Demand for oil products in MMb for Q1 and Q2, and the YoY percentage changes between 2019 and 2020.

Product	Quarter 1 (Q1)			Quarter 2 (Q2)		
	2019	2020	Change	2019	2020	Change
LPG	4.4	4.6	5%	4.1	3.9	-5%
Gasoline	51.2	47.7	-7%	47.3	28.0	-41%
Kerosene	8.9	7.4	-17%	9.2	2.0	-78%
Diesel	43.6	47.5	9%	45.9	43.0	-6%
Fuel oil	43.4	47.3	9%	44.7	51.9	16%
Other oil products	34.9	33.8	-3%	45.4	44.0	-3%
<b>Total oil products</b>	<b>186.3</b>	<b>188.3</b>	<b>1%</b>	<b>196.6</b>	<b>172.8</b>	<b>-12%</b>

Source: JODI.

Note: Due to rounding, the numbers may not add up precisely to the totals.

**Total oil product demand was 196.6 MMb in Q2 2019 and only 172.8 MMb in Q2 2020**

The overall effect of COVID-19 becomes evident by looking at total oil product demand. In the first quarters of 2019 and 2020, total oil product demand only differed by 1%. It was 186.3 MMb in Q1 2019 and 188.3 MMb in Q1 2020. On the other hand, total demand differed by 12% when comparing the second quarters. Total oil product demand was 196.6 MMb in Q2 2019 and only 172.8 MMb in Q2 2020. The COVID-19 restriction measures thus eliminated roughly 24 MMb of domestic oil product demand in the second quarter of 2020. Furthermore, this estimate can be considered a lower bound, as we do not account for any potential growth in demand that might have occurred in a counterfactual scenario in which COVID-19 never appeared.

### A Deeper Dive into Fuel Oil Demand

Fuel oil is consumed in power generation, thermal desalination, industrial manufacturing, and international shipping. Here we try to pinpoint where the additional fuel oil consumption occurred in the first half of 2020.

International shipping accounts for a small share of fuel oil demand. Because of the global pandemic, it is unlikely that there was a sharp increase in international shipping during the first half of 2020.

According to GaStat's (2020) monthly reports on industrial production, manufacturing output decreased YoY every month in the first half of 2020. For example, in May 2020, the non-oil manufacturing index fell by 25.9% YoY. Within this index, chemical manufacturing fell by 15.3% YoY while the manufacture of metals and non-metallic minerals (such as cement) fell by 17.5% and 31.5%, respectively. In contrast, fuel oil demand increased in May 2020 by 37% YoY. These factors likely eliminate the manufacturing sector as the additional source of fuel oil demand.

The power and water sector accounts for the largest share of fuel oil demand, and several producers in this sector could have accounted for the higher demand in 2020. The Electricity and Co-Generation Regulatory Authority (ECRA) (2020) categorizes the producers into five main groups: the Saudi Electricity Company (SEC), the Saline Water Conversion Corporation (SWCC), independent power producers, independent water and power producers (IWPPs), and 'others,' a group that includes companies such as Saudi Aramco. Among these groups, the SEC was the largest consumer of fuel oil (ECRA 2020). However, its earnings presentation for the first half of 2020 (SEC 2020) reveals that the company consumed slightly less fuel oil in the first half of 2020 compared with the same period in 2019. This fact suggests that the YoY increase in fuel oil demand in 2020 may have been due to increased fuel oil consumption for water desalination by producers such as the SWCC and the IWPPs.

## Summary

The effects of COVID-19 on oil product demand began to appear in March 2020. The Kingdom's strict lockdown measures that were subsequently implemented led in April 2020 to the biggest YoY decrease in oil product demand. Oil product demand in May 2020 remained substantially lower YoY, before starting to recover in June 2020. The overall effect of COVID-19 on oil product demand in the first quarter of 2020 was minimal, but it was substantial in the second quarter, with kerosene and gasoline being the two most affected fuels. We expect to see a recovery in domestic oil product demand in the third and fourth quarters of 2020.

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## About the Project

This commentary is part of the project titled 'Modeling Final Energy Demand and the Impacts of Energy Price Reform,' which examines how factors such as economic growth, income, energy prices, economic structure, and energy efficiency influence the demand for energy at national, sectoral, and household levels. This commentary focuses on describing the effects of the COVID-19 shock on domestic oil product demand.

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