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Before the
Energy and Natural Resources Committee
United States Senate
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Chairman Murkowski, Ranking Member Manchin, and Members of the Committee, I appreciate the opportunity to provide testimony on the status of the Strategic Petroleum Reserve and related energy security issues. My discussion will include EIA's current view of the global oil market, which is reflected in last week's update of our *Short-Term Energy Outlook*.

To summarize that view, although recent crude oil supply disruptions caused short-term price increases, slowing global economic growth continues to put downward pressure on oil prices, which we expect will outweigh concerns about supply stability.

On Saturday, September 14, 2019, crude oil and liquid fuels infrastructure was attacked in Saudi Arabia, causing damage to Saudi Aramco's Abqaiq oil processing facility and the Khurais oil field. The Abqaiq oil processing facility has a 7 million barrel-per-day capacity, which is about 5% of the world's crude oil and liquid fuels production capacity. The Khurais oil field produces about 1.2 million barrels per day of Arab Light crude oil. EIA estimates that Saudi Arabia's crude oil production averaged 9.9 million barrels per day in August 2019 and that it fell to 8.5 million barrels per day in September.

The attack caused an immediate disruption of about 5.7 million barrels per day of crude oil production, which is about 6% of total global supply, and an additional 1.1 million barrels per day of non-crude liquids production. It also raised vulnerability concerns about Saudi Arabia's spare production capacity, which represents more than 85% of the world's spare capacity. Crude oil prices responded immediately to the magnitude and location of the production outages. Increasing sharply on the first full day of trading following the attack, the Brent crude oil price rose more than \$7.00 per barrel to \$68.42 per barrel on September 16, and the West Texas Intermediate crude oil price rose more than \$8.00 per barrel to \$63.10 per barrel. This was the largest single-day crude oil price increase in the past decade.

In general, planned and unplanned production outages happen for a variety of reasons and are usually offset by spare crude oil production capacity and oil inventories. The effectiveness of these two mitigating factors depends on the size of the outage and the prevailing market conditions. These market conditions include possible changes in global supply growth patterns and the economic outlook, which would result in a different global demand growth forecast than we currently expect. Currently, spare crude oil production capacity is relatively constrained, but oil inventories are at relatively plentiful levels.

Before the outage, EIA expected global spare crude oil production capacity to average 2.2 million barrels per day in the fourth quarter of 2019. In our October *Short-Term Energy Outlook*, which included the recent Saudi Arabian outage, we estimated that global spare crude oil production capacity fell by 1 million barrels per day in September. The October outlook also forecasts global spare crude oil production capacity to average 1.6 million barrels per day in the fourth quarter of 2019. Historically, spare capacity at less than 2.5 million barrels per day would indicate a relatively tight global oil market;

however, our October forecast shows global supply growth outpacing demand growth, which makes the low surplus capacity less of a concern for the remainder of 2019.

Inventories can also act as a cushion for supply disruption. The United States has two types of crude oil inventories: those held by private firms for commercial purposes and those held by the federal government in the Strategic Petroleum Reserve. EIA data for the week of September 27 estimates the total U.S. commercial inventories were equivalent to 26 days of current U.S. refinery crude oil inputs and the Strategic Petroleum Reserve holds the volume equivalent of about 40 additional days, resulting in a total U.S. inventory of about 66 days of production.

Aside from U.S. data, the best available measure for global oil inventory is the Organization for Economic Cooperation and Development (OECD) data. Collectively, the OECD, which includes the United States, held about 2.9 billion barrels of crude oil and other liquids in inventory as of the end of September, equivalent to about 61 days of supply. The total for all OECD commercial inventories was about 1% lower than the previous five-year (2014-2018) average. Globally, crude oil stock data for countries that are not members of the OECD are difficult to acquire with consistent timing and quality.

A few days after the September 14 attack, Saudi Aramco, Saudi Arabia's national oil company, announced that about 2 million barrels per day of previously shut-in volumes had already returned to production and that the remainder would be restored within weeks. Within days, industry sources reported that Saudi Arabia had restored crude oil exports to pre-attack level by augmenting a partial restoration of production with exports from storage and with volumes diverted from domestic refineries. In response, Brent and West Texas Intermediate crude oil prices fell to \$65.59 per barrel and \$59.26 per barrel, respectively, by September 17. The price declines continued as it became clear the outage would last days instead of weeks or months. By September 30, prices had fallen below the pre-disruption levels, averaging about \$61.00 per barrel for Brent and \$54.09 per barrel for West Texas Intermediate.

In our September *Short-Term Energy Outlook*, released before the outage in Saudi Arabia, we forecast that Brent crude oil prices would average \$63.39 per barrel in 2019 and \$62.00 per barrel in 2020. In our September outlook, we expected that global supply would outpace global demand in both years, leading to average global oil inventory builds of 240,000 barrels per day in 2019 and 360,000 barrels per day in 2020. At the time, we also expected that declining OPEC oil production would be more than offset by rising non-OPEC production, led by the United States. In addition, our September forecast crude oil price declines reflected concerns about the global economy, and our global oil consumption growth forecast was only 0.9 million barrels per day in 2019, the lowest level since 2011.

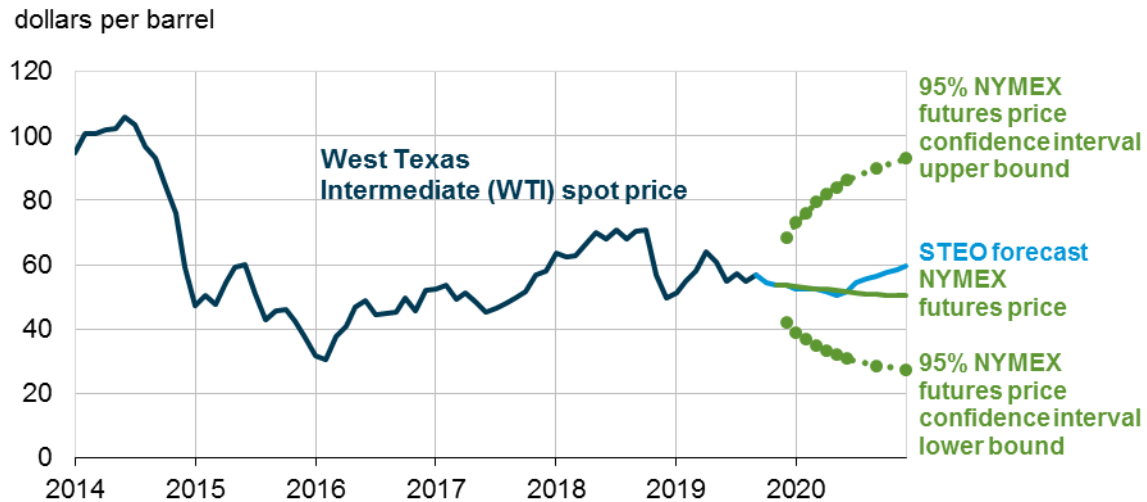
The October update of our *Short-Term Energy Outlook*, released last week, shows a lower crude oil price forecast compared with the September outlook. We estimated that OPEC crude oil production fell from 29.8 million barrels per day in August to 28.2 million barrels per day in September, largely driven by the disruption in Saudi Arabia. Even before this latest outage, OPEC crude oil production was at a relatively low level, driven by declining production in Iran and Venezuela. We also recognized a higher level of risk for oil supply disruption than previously assumed. However, we also included lower global economic growth and the resulting lower liquid fuels demand growth in 2019 and in 2020 in the forecast. In effect, our view is that downward oil price pressure from slowing global economic growth will outweigh increased supply stability concerns in the coming months.

We forecast that OPEC spare production capacity will return to pre-attack levels of 2.1 million barrels per day by January 2020. Although the disruption was short-lived, lower spare crude oil production capacity does leave the global crude oil market more vulnerable to supply outages elsewhere. Should another supply outage occur before spare crude oil production capacity is restored, the market will rely on inventories to provide additional supply needed to meet demand, including commercial inventories, and potentially, government-held stocks.

Chairman Murkowski and Members of the Committee, thank you for the opportunity to present this information and this concludes my testimony.

Appendix

Figure 1. West Texas Intermediate crude oil price

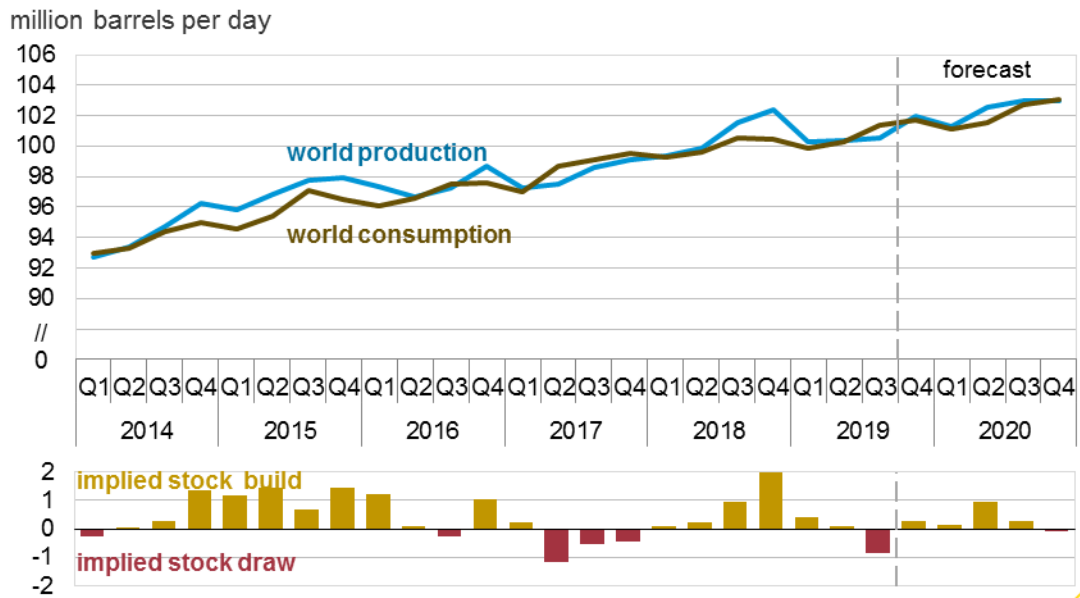


Note: Confidence interval derived from options market information for the five trading days ending Oct 3, 2019. Intervals not calculated for months with sparse trading in near-the-money options contracts.

Sources: Short-Term Energy Outlook, October 2019, and CME Group



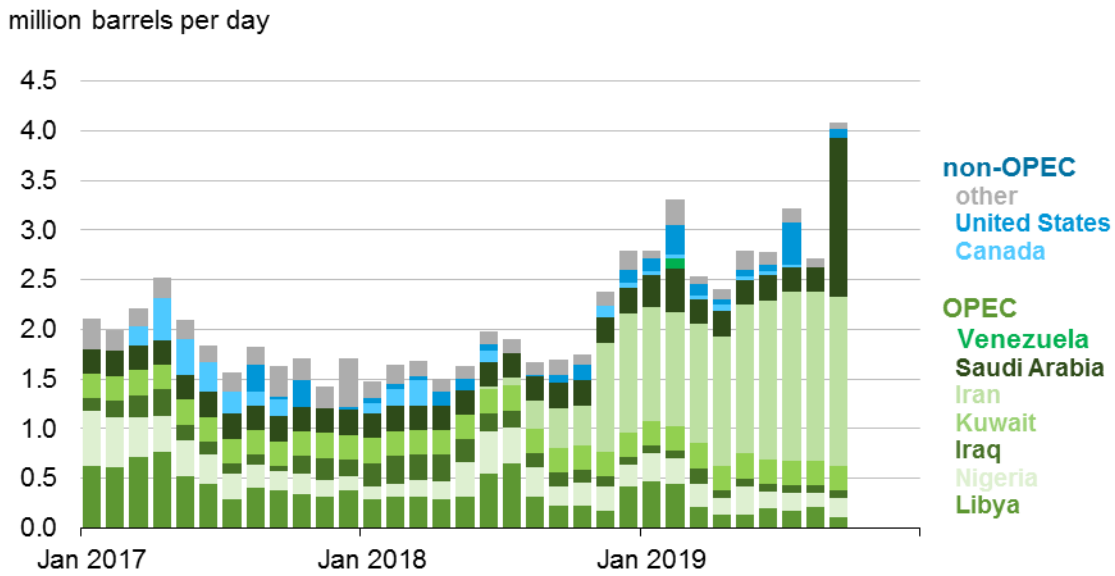
Figure 2. World liquid fuels production and consumption balance



Source: Short-Term Energy Outlook, October 2019



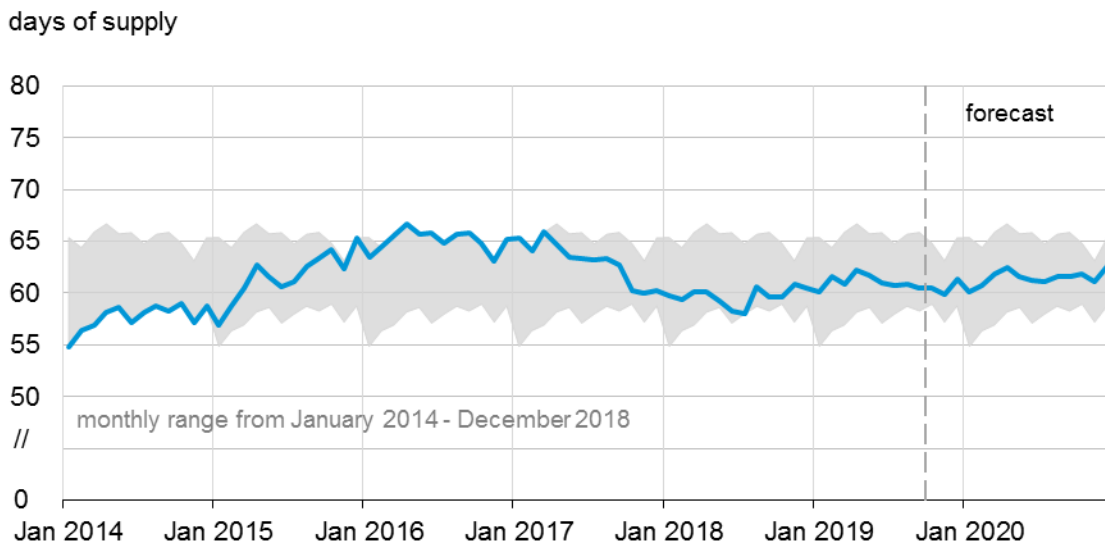
Figure 3. Estimated unplanned liquid fuels production outages



Source: Short-Term Energy Outlook, October 2019



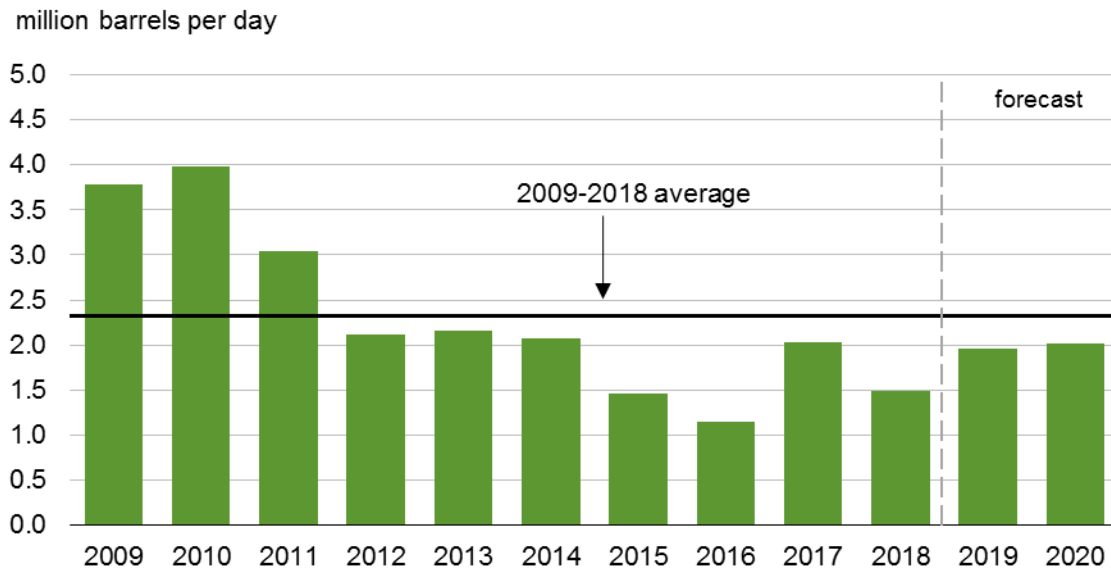
Figure 4. Organization for Economic Cooperation and Development (OECD) commercial inventories of crude oil and other liquids



Source: Short-Term Energy Outlook, October 2019



Figure 5. Organization of the Petroleum Exporting Countries (OPEC) surplus crude oil production capacity



Note: Black line represents 2009-2018 average (2.3 million barrels per day).

Source: Short-Term Energy Outlook, October 2019

