Weekly Fundamental Market Report April 29- May 3, 2019

Market Update

PRODUCTS	4/29/19	4/30/19	5/1/19	5/3/19	5/4/19
WTI Crude Oil	63.39	63.91	63.60	61.81	61.94
Brent Crude Oil	71.22	72.80	72.79	70.75	70.85
Natural Gas	2.58	2.58	2.62	2.59	2.57

CME Group

Headlines

North Dakota

- **Bigger than some of OPEC: North Dakota on track to reach 2 million barrels of oil per day by 2030.** **Inforum**
  - North Dakota's soaring Oil Patch has placed it squarely in the midst of output levels for members of the Organization of Petroleum Exporting Countries — and it already would rank 18th in the world if the state were a country. North Dakota produces an average of 1.4 million barrels of oil per day, a level that places it ahead of seven of OPEC's 13 member countries, including Libya, Algeria and Venezuela. Now, as North Dakota's oil production continues to grow, it is knocking at the door of a major producer in the North Sea. "It's pretty astounding when you think about it," said Ron Ness, president of the North Dakota Petroleum Council, which represents the oil and gas industry. "We're producing nearly as much energy, and with our growth will surpass Norway," which produces more than 1.5 million barrels of oil per day, he said. "Bakken oil is making an imprint on the world. Our role in world oil supply is substantial and significant." North Dakota's emergence as a producer of oil and gas on a global scale is the result of a dramatic upswing in the Bakken oil formation from hydraulic fracturing, or fracking, which unlocks oil in shale deposits deep underground. Production in the state's Oil Patch surged more than eight-fold since 2008, when it produced 170,000 barrels per day. North Dakota's increased oil production matters to and benefits consumers, Ness said. "It's lower gasoline prices," as well as more stable prices at the pump, he said. "You don't see huge jumps" in oil prices anymore. The growth in North Dakota oil production helped push the United States to become the world's top oil-producing nation, at more than 10.9 million barrels per day. Russia ranks second, producing 10.7 million barrels per day, followed by Saudi Arabia at 9.8 million barrels per day. In the United States, Texas far outpaces No. 2 North Dakota; it produces 3.49 million barrels per day, or almost 2 ½ times North Dakota's level. But thanks to advances in technology, North Dakota's production continues to climb. The industry was forced to become more efficient during a slump in oil prices earlier this decade. The cost of drilling a well is around $8.5 million, down from $10 million before 2011. Drilling a well, which once took 33 days, now can be completed in 11 days. The North Dakota Pipeline Authority closely tracks oil production because it has to plan for the Oil Patch's transportation needs. It predicts North Dakota's Oil Patch will be producing 2 million barrels per day by 2030. "This model does not assume any kind of technology advancement," so it's a conservative projection, said Justin Kringstad, a geological engineer and the pipeline authority's director, who calculated the projection. Price is another important variable. The break-even price for producing oil in the Bakken formation is $30 to $40 per barrel, though it ranges from $40 to $70 per barrel outside the core area, where the most productive wells are found. As of February, the most recent figures posted by the U.S. Department of Energy, Bakken crude was selling for $51.76 per barrel. The 1 million barrels per day production mark was reached in April 2014. Technological advances have been integral to the Bakken boom, which now has matured into a steady growth trajectory, he said. The project does not include the possibility of enhanced oil recovery — injecting

carbon dioxide, under pressure, underground to help force hard-to-pump oil from shalestone deposits. Enhanced oil recovery is a technique used to recover oil in mature oil fields that conventional methods cannot produce. So far, enhanced recovery technology has not been used in North Dakota, but a pilot project has been announced for a mature oilfield in the state’s southwest corner, outside the Bakken formation. Denbury Resources Inc. has announced it will invest $400 million to recover oil from the Cedar Creek Anticline in eastern Montana and the western Dakotas, including Cedar Hills South in North Dakota. The project aims to ultimately produce 400 million barrels of oil, beginning as early as late 2021, according to the company. The project will carry carbon dioxide from Wyoming over a 110-mile pipeline. The Energy and Environmental Research Center at the University of North Dakota is researching enhanced oil recovery applications in the Oil Patch using carbon dioxide emitted from coal-fired power plants in western North Dakota. The U.S. Department of Energy estimates the Bakken’s recoverable reserves total 7.6 billion barrels of oil. Continental Resources, the pioneer in bringing fracking to the Bakken, estimates recoverable reserves at between 30 billion to 40 billion barrels. The Department of Energy is working on a revised estimate, expected later this year or early next year, that will take into account current technology. North Dakota now has more than 15,000 oil wells, and officials predict another 50,000 wells will be drilled. Each well has a lifespan of about 50 years, but production diminishes over time.

- **Burgum: 2019 session had highs, lows. Grand Forks Herald**
  - For North Dakota Gov. Doug Burgum, the 2019 session of the state Legislature produced several successes and a few missed opportunities. Burgum discussed what he considers the highs and lows with the Herald editorial board Thursday, shortly after signing the last 53 bills of the session. Most of those bills were appropriations-related, including $33 million to support development of an unmanned aerial systems (UAS) sector throughout the state. A breakdown from the state Department of Commerce on Wednesday reported $3 million will pay for upgrades at the Grand Sky technical aviation park by Grand Forks Air Force Base, $2 million will support operations at the Northern Plains UAS Test Site and $28 million will fund a statewide air traffic control system, to help incorporate UAS into a sky already occupied by manned aircraft with their own traffic control systems. "We achieved last year being one of the few places in the country where you can fly beyond the (visual) line of sight," Burgum said, referring to a stamp of approval the Northern Plains test site received from the Federal Aviation Administration. "Well, that generated a bunch of interest in terms of people that are building companies that do the applications. ... All of a sudden, people are saying, 'Hey, we want to come (to your) test sites.' Maybe they want to come and create an office here, maybe they want to put a team of researchers here." Although most of the Burgum's bill-related actions ended favorably for the Legislature, the governor issued his third veto on a section of Senate Bill 2015, relating to the state's Legacy Fund — a state savings account funded by a portion of oil and gas revenue. Section 19 of the bill will hurt the rating North Dakota receives from bonding agencies such as Moody's, said Burgum and his staff, ultimately leading to higher property taxes in areas that will have to pay higher interest rates to bond for large, local construction projects. When the Legislature transfers Legacy Fund earnings into the state's general fund at the end of each biennium, Section 19 says that money will be recognized "as part of the general fund beginning balance for the subsequent biennium" rather than revenue of the biennium in which the transfer was made. According to Burgum, bonding agencies don't like this, and the state's current dealings with Legacy Fund transfers could be hurting the state's rating and, therefore, the ability of the state and its political subdivisions to borrow money through bonding. That's why Burgum and the state's executive branch proposed earlier this year the Legislature move Legacy Fund earnings into the general fund with a "more transparent allocation," he said. The governor also recommended the Legislature directly allocate $1 billion from the Legacy Fund to balance the budget. "In the end, the Legislature actually used significantly more oil revenues than that to balance the general fund," OMB Director Joe Morrisette said during Thursday's meeting with the editorial board. "Just about $1.2 billion." That included an original direct allocation of $400,000, followed on April 26—shortly before legislators adjourned—with a late transfer of at least $700 million more. "We weren't proposing that the state spend more money. We were saying 'Hey, this is what we've always used, we should just acknowledge that and put it in,'" Burgum said. "Then, (the) rating agencies will give us a lower bond rating for the state." Policy Director Levi Bachmeier said that has implications to taxpayers across the state, who likely will have to foot the higher price of construction projects. "Whether it's schools, local cities, there's a lot of debt across the state at the local

political subdivision level," Bachmeier said. Meanwhile, a bill Burgum signed in early April could alleviate property tax woes for cities and counties across eastern North Dakota. The Prairie Dog Bill, officially passed as House Bill 1066, provides funding for infrastructure projects throughout non oil-producing communities like Grand Forks. Drawing from an estimated $250 million in oil and gas tax collections, state legislators have projected the city of Grand Forks could receive roughly $12 million for infrastructure by late 2020 or early 2021. "And that's enough lead time that cities and political subdivisions can plan for when they start receiving those checks, to make sure they're investing that money in a way that drives property taxes down, not up," Burgum said. "For communities like Grand Forks, (this is a) big opportunity to support some of the work that's going into revitalizing the downtown."

Domestic

- **Oil market will tighten sharply when U.S. refineries return from maintenance: Kemp. Reuters**
    - U.S. commercial crude oil inventories have been rising in recent weeks, which some observers have interpreted as evidence the global oil market is adequately supplied and blame for a sudden decline in oil prices. But this narrative cannot explain the steep backwardation in futures prices for global grades such as Brent, which is usually associated with a market that is significantly under-supplied. In fact, U.S. commercial inventories have been rising much less than normal for the time of year - even though refiners are undertaking heavy maintenance, which would otherwise have resulted in a larger stock build. Refiners have been undertaking more maintenance than normal to avoid autumn and winter shutdowns in the run up to the introduction of new IMO marine fuel standards ("U.S. refiners planning major plant overhauls in 2nd quarter", Reuters, April 19). The limited increase in U.S. commercial crude stocks despite heavy spring maintenance tends to confirm that the global market has tightened significantly since the start of the year and will tighten even more in the second half. U.S. commercial crude stocks had increased by almost 30 million barrels by April 26 compared with the end of last year, according to the latest weekly data from the U.S. Energy Information Administration. The stock build was much larger than the 12 million-barrel increase at the same point in 2018 but well below the 10-year average increase of 45 million barrels and otherwise the smallest seasonal build since 2011. The United States produced an estimated 211 million barrels of domestic crude oil in the 17 weeks to April 26, which was more than offset by a reduction in net oil imports of 239 million barrels, according to the EIA. However, U.S. refiners cut their crude consumption by almost 28 million barrels compared with 2018, which more than accounted for the faster rise in stocks compared with last year. So far this year, U.S. refiners have processed an average of just 16.32 million barrels per day compared with 16.55 million at the same point in 2018, according to EIA data. Once refiners complete their maintenance and return to full production in preparation for the summer driving season, crude consumption is likely to surge, and stocks will draw down quickly. Brent futures prices are trading in a backwardation of more than $2.70 per barrel between July and December as traders anticipate a big drawdown in global oil inventories during the second half of the year. Hedge funds and other money managers have amassed a bullish position in Brent and WTI futures and options contracts equivalent to 723 million barrels by April 23, in the expectation prices will rise further. Hedge fund long positions outnumbered short ones by a margin of almost 11:1, up from less than 2:1 at the start of the year, according to position reports published by the U.S. Commodity Futures Trading Commission. Reduced U.S. net oil imports and the limited build up in stocks despite heavy refinery maintenance is consistent with other indicators that the global oil market is under-supplied. The global market will become very tight later this year unless consumption growth slows or Saudi Arabia boosts output to offset production lost from Venezuela and Iran because of U.S. sanctions.

Oil and Gas Analysis

- **Rotary Rig Count Summary**

Location	Date	Week	+/-	Week Ago	+/-	Year Ago
United States	26-Apr-19	991	-21	1012	-30	1021
	3-May-19	990	-1	991	-42	1032
North Dakota	26-Apr-19	58	-3	61	3	55
	3-May-19	56	-2	58	-1	57
Canada	26-Apr-19	63	-3	66	-22	85
	3-May-19	61	2	63	-25	86
International	Apr-19	1062	23	1039	84	978

  - **Baker Hughes**

- **Weekly Petroleum Status Report**

Stocks (Million Barrels)			
	Four Weeks Ending		
	4/26/2019	**4/19/2019**	**4/27/2018**
Crude Oil (Excluding SPR)	470.6	460.6	436.0
Motor Gasoline	226.7	225.8	238.0
Distillate Fuel Oil	125.7	127.0	118.8
All Other Oils	434.3	431.1	395.0
Crude Oil in SPR	648.6	649.1	664.3
Total	1,905.9	1,893.7	1,852.0

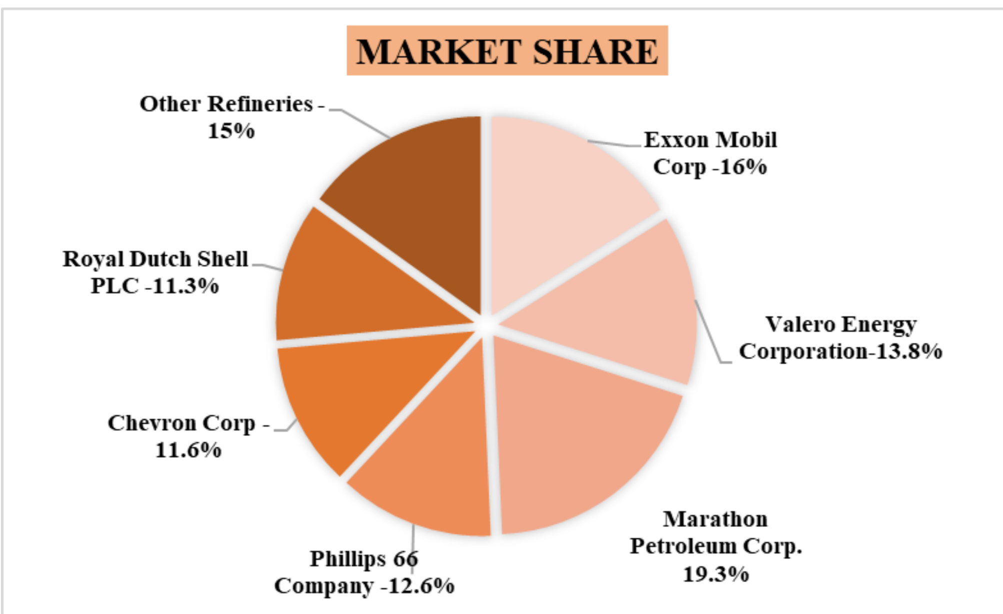
Products Supplied (Thousand Barrels per Day)			
	Four Weeks Ending		
	4/26/2019	**4/19/2019**	**4/27/2018**
Motor Gasoline	9,466	9,442	9,326
Distillate Fuel Oil	3,786	3,771	4,190
All Other Products	6,951	6,952	6,587
Total	20,202	20,164	20,103

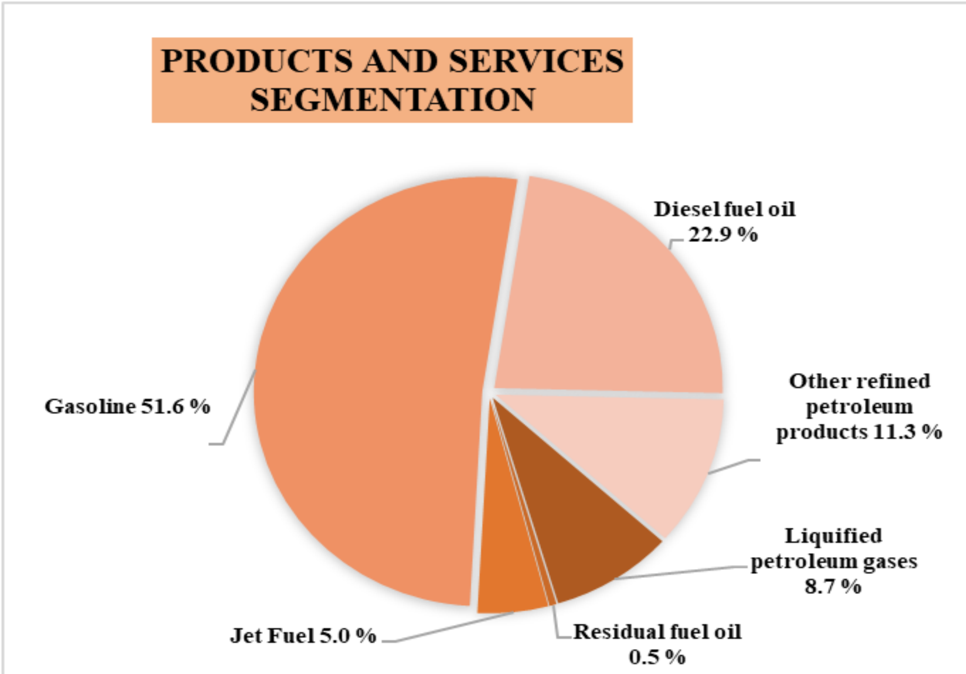
Refinery Activity (Thousand Barrels per Day)			
	Four Weeks Ending		
	4/26/2019	4/19/2019	4/27/2018
Crude Oil Input to Refineries	16,302	16,153	16,788
Refinery Capacity Utilization	88.6	87.9	91.9
Motor Gasoline Production	9,948	9,920	10,071
Distillate Fuel Oil Production	5,013	4,949	5,080

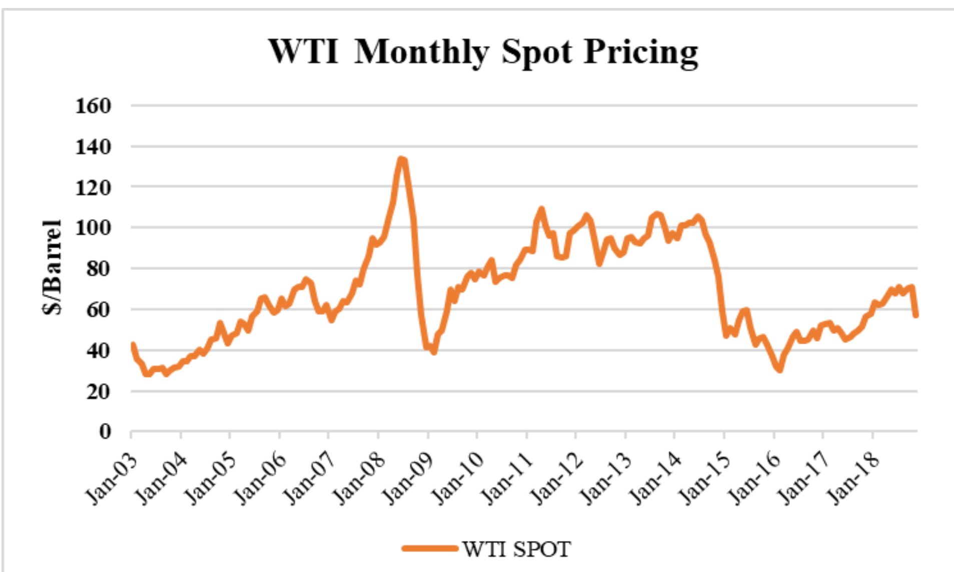
Net Imports (Thousand Barrels per Day)			
	Four Weeks Ending		
	4/26/2019	4/19/2019	4/27/2018
Crude Oil	4,278	4,087	6,541
Petroleum Products	-2,840	-2,806	-3,247
Total	1,438	1,282	3,295

- **EIA**

- **US Petroleum Refining at a Glance**




PRODUCTS AND SERVICES SEGMENTATION
Diesel fuel oil 22.9 %
Other refined petroleum products 11.3 %
Liquified petroleum gases 8.7 %
Residual fuel oil 0.5 %
Jet Fuel 5.0 %
Gasoline 51.6 %


WTI Monthly Spot Pricing
$/Barrel
160
140
120
100
80
60
40
20
0
Jan-03
Jan-04
Jan-05
Jan-06
Jan-07
Jan-08
Jan-09
Jan-10
Jan-11
Jan-12
Jan-13
Jan-14
Jan-15
Jan-16
Jan-17
Jan-18
WTI SPOT

- **EIA**