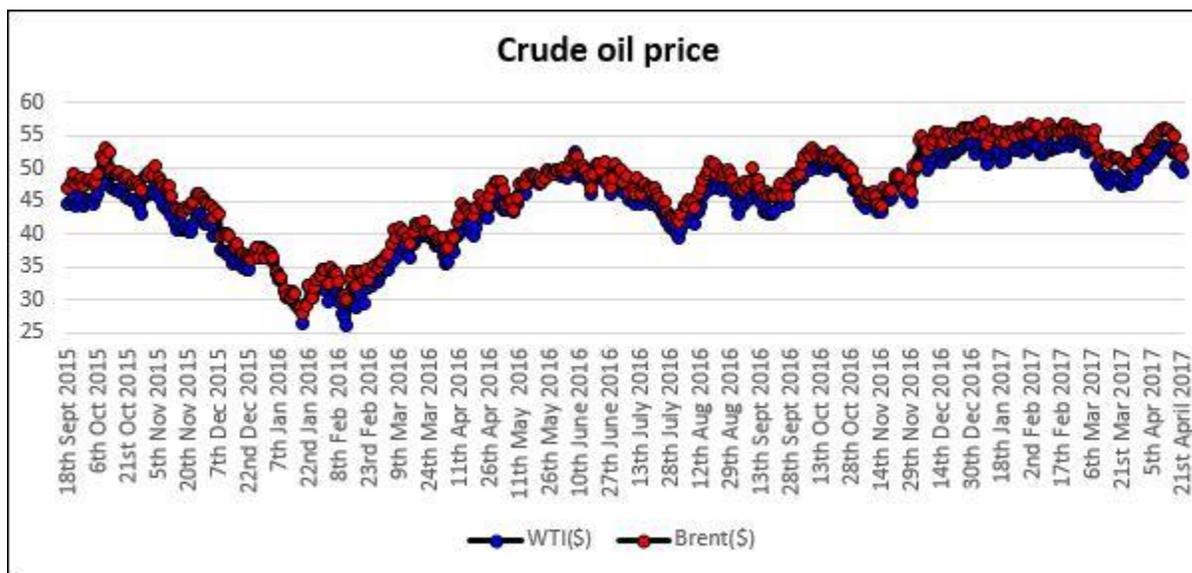


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Calgary, Canada

The price of oil has shown the following variation over the last week:



- Crude oil prices dropped to a 2-week low after an EIA report showed that the crude output rose and the US gasoline supplies increased as a result. As per the EIA forecast report, crude output from 7 major US onshore producing regions increased by 124,000 b/d in May to average 5,193 mb/d. Overall crude production rose to 9.25 million in the week ended April 14, which is the highest since August 2015. Refineries processed 16.9 mb/d, which is 241,000 b/d from the previous week and highest since January 2017, when it touched 17.1 mb/d. The decline in the crude oil price has also been due to a weak American dollar.
- According to Baker Hughes data, 11 more rigs were added in the US last week, taking the total to 683, which is the highest since 2011. The overall US rig count stood at 847, with 683 oil rigs and 162 gas rigs and 2 miscellaneous rigs.
- According to Saudi Aramco CEO, Amin Nasser, 'the combined inventories of OECD (Organization for Economic Cooperation and Development) are flattening and poised to drop'. This and other indicators are pointing to a more balanced market. Aramco is focused on growth in the area of refining, as it agreed to pay royal Dutch Shell \$2.2 billion, to get out of a 19 year refining partnership known as Motiva Enterprises LLC, and take its full ownership. Saudi Aramco is also expected to raise a 5% stake as IPO that is expected to raise \$100 billion, and may take place in the second half of 2018.

- Saudi Arabia's Al-Falih has said that OPEC's goal of cutting production was to reach a five-year average, and has not been reached. Consequently, OPEC and some other crude oil producing countries may extend their commitment to extend production cuts, a decision likely to be taken at their May 25 meeting according to OPEC Secretary General, Mohammad Barkindo. Russia is also likely to extend production cuts.
- Kuwaiti oil minister, Issam Almarzooq, has said if OPEC decides to extend its six-month agreement output cuts beyond June, Iran may be allowed to keep its oil production unchanged.
- After Goldman Sachs Group, now Citigroup says that the oil prices will rise to mid-\$60 by the end of the year. Even though the US shale output is expected to increase, OPEC and its allies could help offset that increase over the next six to nine months.

So much for the industry news this week.

### *For the lighter side this week*

Some months ago, I had written a column on the switch to electric or driverless automobiles and the efforts being devoted in that direction. At present the automobiles, trains and airplanes run on gasoline, but concerted efforts are being made for their switch to electric vehicles by every major car maker. For this to happen, batteries are required. We make use of lithium batteries in our cell phones, smart watches, laptops and e-cigarettes, and bigger and better rechargeable lithium batteries will be required for electric vehicles in the near term. It will also be a big step towards pollution-free transportation of tomorrow. The demand for lithium has already started increasing worldwide, and is expected to reach over \$46 billion by 2022. The leading mining companies are exploring cost-effective ways to extract lithium, so that they can gear up for meeting the growing demand for lithium batteries. At present lithium is produced by mining hard rocks and also by solar evaporation of brine in large ponds. The mining method is labour intensive to produce, and the brine evaporation method requires expenditure for setting up solar pools. Some of the companies engaged in exploring newer cost-effective methods for extraction of lithium are MGX Minerals, Albermarle Corp. Sociedad Quimica y Minera de Chile SA, FMC Corp. and Galaxy Resources Ltd.

An innovative patented method that MGX Minerals uses for extraction of lithium is called petrolithium, and uses the petroleum brine water for the purpose. The proprietary method uses the brine produced during crude oil extraction from the ground, removes contaminants, and employs its developed filtration and extraction technology for upgrading the concentration of lithium in it. The company has acquired large areas of land and tied up with major oil and gas companies across Canada and US for implementing its lithium extraction processes.

Brine water produced along with crude oil contains lithium content in the form of lithium carbonate. Certain aquifers producing the brine water are significantly enriched in lithium and thus prove to be profitable. Prior to its disposal, the brine water can be treated for extraction of lithium. Just

to cite an example, if a brine sample has a concentration of 50 mg/litre, and if a million litres of brine are processed per day, 14,000 tonnes of lithium carbonate can be produced per year. At the present conservative prices of \$12,000 per tonne, a revenue of about \$170 million per year could be generated. So various companies are scrambling to make the big bucks.

Lithium carbonate is one material that is used for making cathode material in lithium-ion batteries. Carbon (graphite) is usually used as the material for the anode. We may remember our school lessons in physics about lead acid batteries and their working, where the hydrogen ions (positive) and sulphate ions (negative) move in opposite directions during charging, and set up an inequality of electrons between the two plates which we utilize when we make use of the battery. In lithium-ion batteries (which are also rechargeable), lithium ions move from the cathode to the anode during charging, through the electrolyte, which is a lithium ion movement. The charging process continues till no more lithium ions move. During use, the lithium ions move in the opposite direction, and provide the energy so required. When all the lithium ions have been used up, the battery requires recharging.

*Did you know?*

*..... that hummingbirds have their tongues split into two near the tip?*

Yes, the tongue of a hummingbird is split into two near the tip, and each half is curled. When dipped into nectar, each half unfurls and serves as two thin straws for sucking up the liquid. When withdrawn, the two halves curl back once again.

I hope you find this interesting.