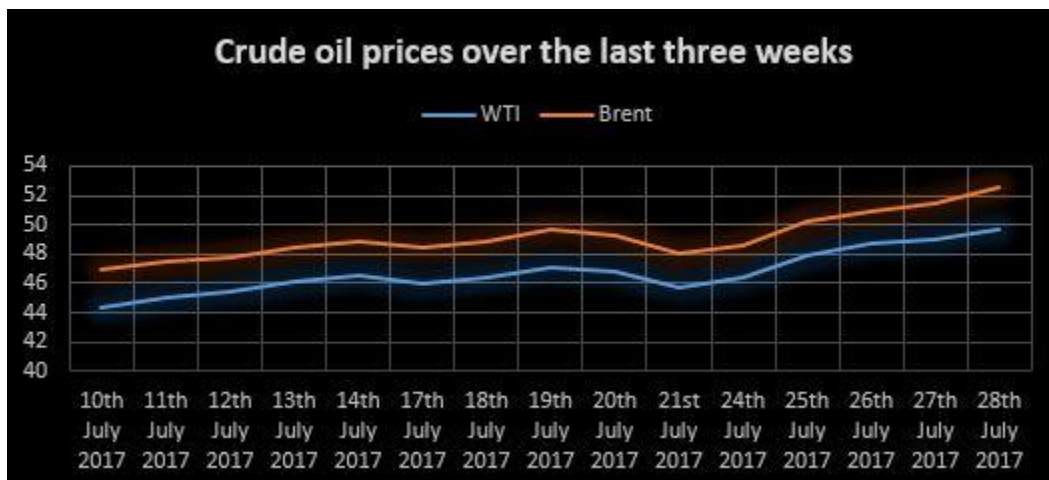
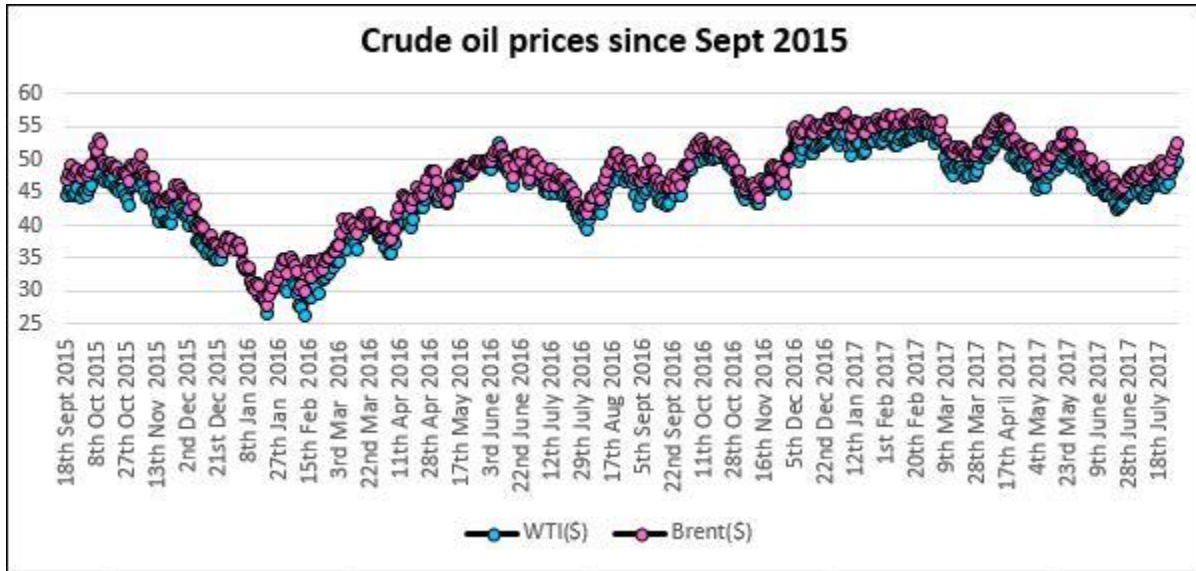


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Some of the news items for this week are as follows:



- The price of oil gained strength this week after industry data showed that US crude stockpiles dropped. Other contributory factors are UAE's clear message that it is committed to the OPEC agreement on production cuts, and would deepen its own share. Russia's energy minister also said that major oil producers need to show greater discipline in sticking to the individual cuts so as to raise the price of crude oil.
- Six OPEC and non-OPEC members met at St. Petersburg, Russia on Monday for suppliers to abide by their pledged reductions. In addition, they agreed to let Libya and Nigeria to keep increasing output. There was speculation before the meeting that Libya and Nigeria would be asked to come into capping their production at some agreed level. Emphasizing its commitment to eliminating the global oversupply, Saudi Arabia has promised deep cuts to crude exports next month. Meanwhile, UAE Energy Minister Suhail Al Mazrouei has said that OPEC will need to consider extending its oil-cuts agreement when the group meets again in November.

- Halliburton has reported a net profit of \$28 million in Q2, 2017, as the company's revenue from North America surged to \$2.77 billion in Q2.

ConocoPhillips reported a loss of \$3.4 billion in Q2, 2017, compared with a loss of \$1 billion in the same quarter last year. The high loss is due to impairment items that the company has adjusted in Q2.

Statoil generated a net cash flow of \$4 billion that resulted in net earnings of \$1.29 billion in Q2. The company has reduced its 2017 spending forecast to \$1.3 billion from \$1.5 billion, and expects to drill 30 wells this year.

Shell reported an adjusted profit of \$3.6 billion in Q2.

Repsol has reported a January to June profit of 1.05 billion euros or \$1.23 billion.

ExxonMobil, Chevron and Total are also expected to return profits in Q2.

- The forecast for the next 12 months can be based on some facts that are emerging. Come September, the demand for oil will slow down after the summer months all over. At present the US is pumping 9.4 mb/d, which is expected to rise to 9.6 mb/d by the end of 2017. Production from Brazil, Kazakhstan, West Africa and Europe is expected to increase in the first half of 2018. What does this suggest?

So much for the industry news this week.

For the lighter side this week

When you look up at the clouds, or while travelling by air your airplane passes through the clouds while gaining or losing height, they come across as nice, puffy and fluffy, and give the impression that they can't weigh much. But that is not true. We understand that clouds are made from water, which has weight, but how much could that weight be?



(The clouds some time extend to huge heights (>34000 ft) at which big aircrafts fly)

A good way to find that out is to perform a quick calculation. Let us say a cloud is at 1000m, is 1000m thick, and is 1000m long and 1000m wide, so that it has a volume of 1 cubic km, or 1 billion cubic meters. One can easily measure the shadow of a cloud while driving a car, when the sun is directly overhead for a more accurate measurement of length and breadth. But we are just assuming numbers for a quick calculation. The density of water in the cloud would depend on the type of cloud, and for a cumulus cloud it could be taken as 0.5 g/m^3 . Thus, the weight of a cumulus cloud of size 1 cubic kilometer is 500,000,000 or 500,000 kg, or 5 million kg. An average weight of an adult Asian elephant is about 5000 kg, and thus the weight of the cloud would be the weight of 500 elephants.

So, how does this weight hang up in the sky? It is because it is distributed over trillions of tiny droplets of water that are spread out in the air. The size of the individual water droplets may be about 2 microns. To get an idea of what thickness we are talking about here, a micron is 1 millionth of a meter, and the average thickness of a human hair is about 60 microns. As the weight of the individual particles is very small, gravity has negligible effect on them, or these particles have no fall velocity. Another interesting thing is that clouds are less dense than dry air, and that is why they can ride on a cushion of warm dry air, and float around. As the rising clouds gain height, they experience lower pressure and thus expand, causing cooling. Such cooling, or when the clouds run into mountains, makes the fine droplets get condensed into water droplets, and they fall as rain. It is this much weight of the water that comes down as rain, and is spread over a large area on the ground.

Again, you may not realize, but dry air is heavier than humid air. Air is made up of nitrogen and oxygen molecules to an extent of 99%. Nitrogen gas has two atoms in each molecule, has a molecular weight of 28. Similarly, oxygen gas with two atoms per molecules, has a molecular weight of 32. Individual water molecules, with two atoms of hydrogen and one atom of oxygen has a molecular weight of 18, and thus much lighter than the air molecules. As equal volumes of all gases at the same temperature and pressure

contain equal number of molecules (Avogadro's law we studied on chemistry at school), for equal number of molecules of air and water, the weight of water molecules is less than the air molecules.

Weight of dry air = $1000 \times 1000 \times 1.07 \text{ kg/m}^3 = 107 \text{ million kg}$.

Weight of cloud = $1000 \times 1000 \times 1000 \times 0.9975 \text{ kg/m}^3 = 106.7 \text{ million kg}$.

[When the humidity is 100%, the density of completely humid air can be taken as 0.9975 times that of dry air]

I hope you find these interesting.

So much for this week! Till the next post, stay safe and happy!