

# SYNERGY

Bilkent Energy Policy Research Center Newsletter



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## Oil Prices in the Short Term

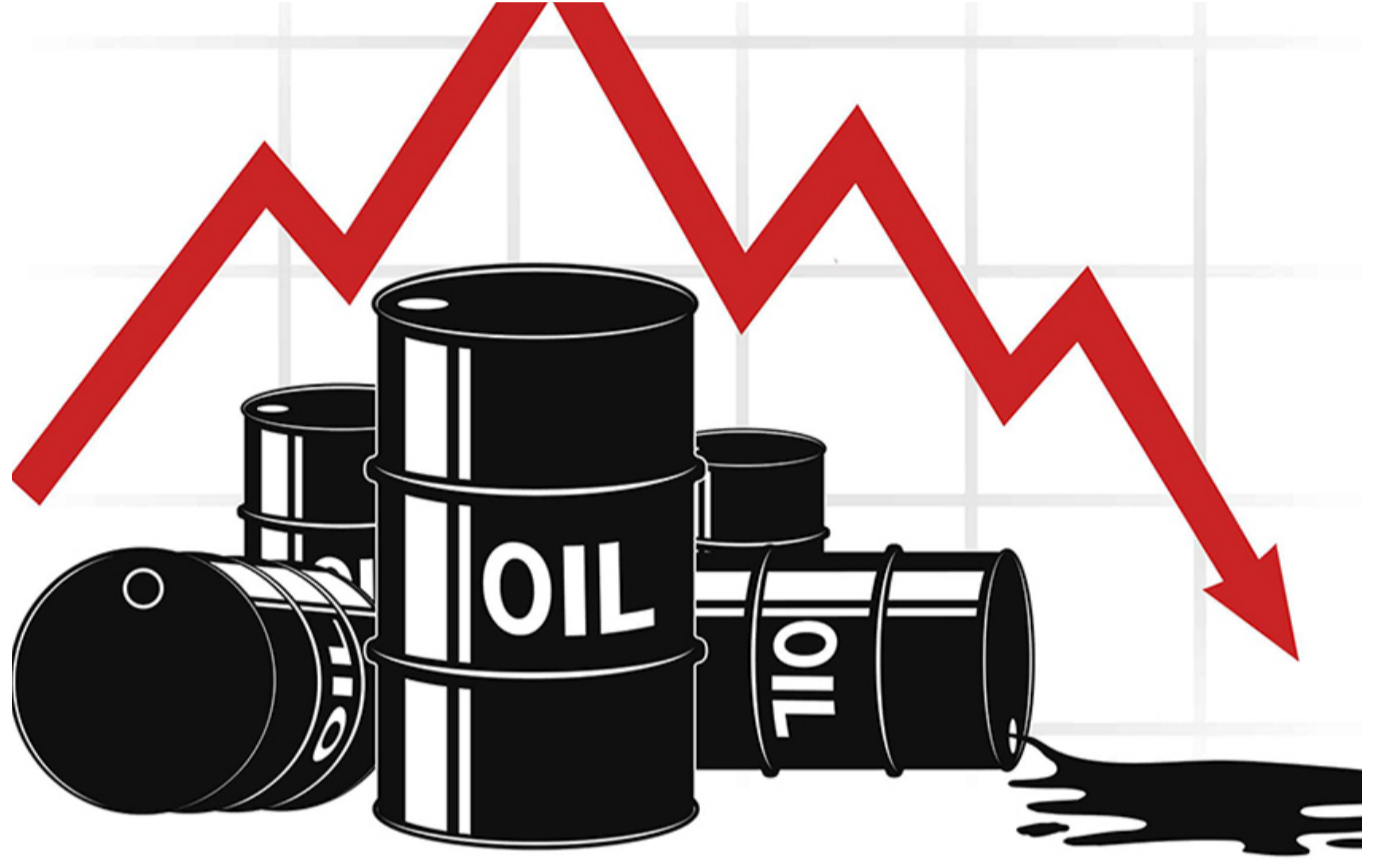
Predicting or even trying to predict oil prices is a nightmare for experts. Oil prices are interesting values that incorporate numerous information in a single, mostly two digit number. The compression of various geopolitical, economic, technical developments and expectations to such a number is chaotic, but predicting it is beyond chaos.

US elections are important. Some parts of Gallup polls are available online. The recent surveys show that Americans those "very satisfied" (%13) and "somewhat satisfied" (%31) are the highest since 2004. This is with a Trump administration. One other important source was Dallas Fed's energy surveys and studies. The number of "bankruptcies in the oil patch" is lower than 2019 2nd half and 2020 1st half. These two different numbers give us a different feeling of what has been going on.

The Dallas Fed survey is interesting. I personally enjoy comments at the end of each section. There are around 66% of the respondents believing that US oil production has peaked. The top 3 biggest concerns from E&P firms maintain production, grow production and reduce debt. Then on the fourth one, we see "find additional sources of capital."

On the comment side, 50\$/barrel looks like the new shale environment. The main theme is with these prices, supply can not grow, and if demand recovers, there will be some kind of problem with supply-demand balance.

There are political comments and expectations. But you can feel that the oil sector in Texas is in



pains, and prospects are not the brightest. But in the background, there are cost cutting-lean management going on. The shale is just like any other technology and has the potential to improve its cost curve. The biggest problem is the decline rate.

Therefore the election is not a done deal, and cost-cutting measures are working on the shale part. For the last two weeks, we see positive signs from rig numbers.

On the OPEC side, there is some kind of a settled balance between Russia and Saudi Arabia. This is assumed to last until mid-2021. But again, OPEC is full of surprises. The developments in Nigeria can be important. There is an increased fragility in OPEC countries with low oil prices. Adding to the injury, world food prices are expected to increase. This will lead us to another chaos in the making.

However, there are technical ways to provide some insight. Oil prices

in the short term were hovering around "magnetic 40\$/bbl". If you remember, the forward curves generally point to 60\$/bbl in the long term, but for the last weeks, 40 was the game in town. Now, this has been changed.

The seasonality of the oil prices points to a downward spiral in the fourth quarter. The prices may at least lose 5\$/bbl in the short term absent geopolitical turmoils. From 2021 January to 2021 June, a positive trend is to be expected, depending on Covid19 developments. The main question is how steep will be this upward trend.

For Brent, 38\$/bbl is a safe bet for the 4th quarter of 2020. If Biden is elected, we may see a recovery in oil prices. But for 2021 April-August, there are no safe bets. My biggest concern is food prices. With growing food prices and diminished financing capacity, the Middle East and Africa may attract more of our attention.

Bariş Sanlı

## Caspian Energy Geopolitics

The Caspian Sea, the largest salt lake globally, has been the subject of discussions about whether it is a lake or a sea for many years. This controversial area, which contains many energy reserves, is of great importance for the region. According to the estimation of the US Energy Information Office in 2012, there are 48 billion barrels of oil and 8.3 trillion m<sup>3</sup> natural gas deposits in the region. The Caspian Sea can help us understand the region's energy geopolitics. All the coastal countries have claimed and struggled for many years to take better advantage of the Caspian Sea. Negotiations had been held for many years about the Caspian Sea. The Caspian Sea was opened to use in 2018 when five coastal countries (Russia, Iran, Kazakhstan, Turkmenistan, Azerbaijan) reached an agreement on the Caspian Sea's legal status.

At this point, how we will define the Caspian Sea is a big mystery. The debate about whether it is a sea or a lake is mostly shaped around the economic interests of countries with coasts. Before we start talking about the countries in the region, we should point out that if this water body is in a lake's status, it is shared equally by all countries on the coast. However, if its status is considered the sea, the countries in the region share this region's resources compared to their coasts to the sea.

Countries like Kazakhstan, Turkmenistan, and Azerbaijan, which have rich oil deposits on their coastal borders, claim that this deposit is a sea. The common point of these countries is that they have gained independence after the Soviet Union's dissolution and do not have sufficient equipment and investment power to extract their energy resources. Besides, the fact that they do not have this equipment makes the region an investment focus of energy companies. We all know that the Central Asian countries do not have developed industry and suffer economically after the Soviets collapsed. Therefore, these countries need the oil income they will obtain from the Caspian Sea to sustain their economic growth. For these countries whose economies are mostly dependent on natural resources, the energy resources in the region must participate in their economies. From this point of view, the importance of the natural resources that have been discovered or to be discovered in the economy of these countries makes the Caspian Sea vital for these countries.

On the other hand, we can easily guess the common point of Russia and Iran, who argue that this body of water is a lake when we understand the first group's motivation: They do not have rich natural resources in their coastal borders. These two countries aimed to prevent Azerbaijan and Turkmenistan, which have rich oil and natural gas deposits on their coasts, from obtaining and using the region's resources alone. As we mentioned above, if it were accepted as a lake, all of the natural resources in the Caspian Sea would be shared in common. At this point, we can understand that these countries have the motivation to take advantage of the resources that other countries have. Russia, which completely controlled the energy resources in the region during



the Soviet Union period, lost some of its power in the region after its independence in the region. We can also evaluate Russia's actions in this region to obtain the big brother role that dominates the region.

Another motivation of Russia is to prevent Turkmenistan from emerging as an alternative to itself by selling Turkmenistan natural gas to Europe and Azerbaijan. As we mentioned earlier, we can understand that Russia does not want to lose its energy supplier role, which acts almost as a monopoly on Europe. Azerbaijan distributes most of its national resources via Turkey. Possible participation of Turkmenistan to Azerbaijan - Georgia - Turkey group may threaten Russia in economic terms. However, we must consider the benefits Turkey may get with the participation of Turkmenistan. Turkey is an important country, geopolitically. Turkey has been serving as a bridge for transferring energy from the east to the west for years. Turkmenistan's possible participation in that line will contribute to Turkey's geopolitical importance. At this point, establishing good relations with countries in Central Asia is crucial. Possible energy projects that Turkey's leadership may construct are likely to lead to new opportunities for the countries in the region. There is no doubt that every country that will participate in these projects will benefit.

In 2018, the countries that came together in Aktau, Kazakhstan, reached an agreement after many negotiations on the Caspian Sea's legal status. The agreement accepts the Caspian Sea as a sea, and countries with a coast get a share from the region according to their geographical location and the length of the coast they have. This agreement is a positive agreement for Turkmenistan and Azerbaijan. Another striking point in this agreement is the prohibition of the presence of foreign troops in the region. It is very meaningful to prevent the forces from outside the region from gaining power in the region. Although it has not solved all the region's problems, it is obvious that the agreement has reduced the tension developing in the region due to the Caspian Sea. It is not difficult to predict that the region will come to the agenda again in the coming years due to its energy.

## Innovative Technology: Industry 4.0 Mining Approach

As human society evolved over the centuries, their needs and their lifestyle evolved with them. To provide these needs, human and animal power was being used. But it wasn't much satisfactory or efficient. Because energy consumption was very high, and the whole process cost a lot of money. Step by step, some methods of production of supply chains began to change. Wealthy businesses bought small ones; natural resources were very substantial and perfect for the industrialization process. That entailed both technology and profound social developments. Therefore in the late 18th century, a revolution took its place—a revolution called; Industry 1.0.

With Industry 1.0, steam and water power were combined with mechanical production. It was more optimized and efficient. A new path was taking shape for the manufacturing sector.

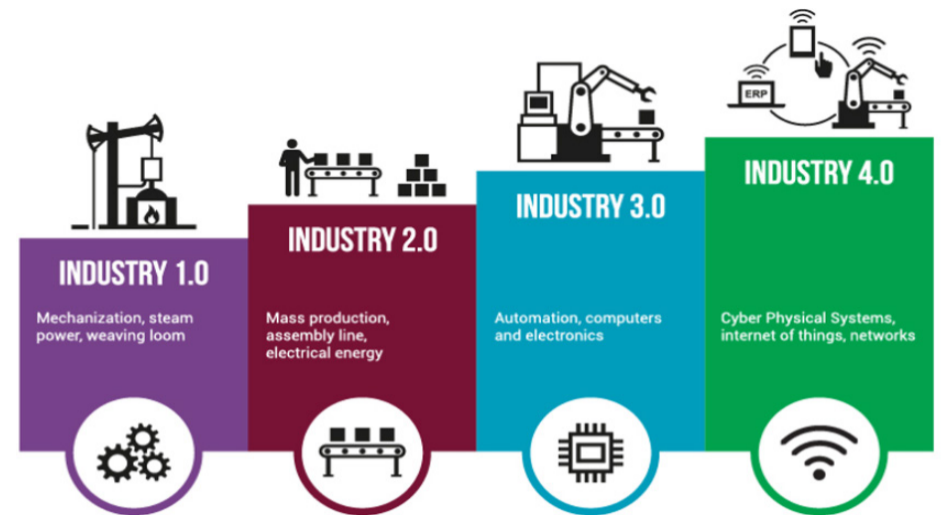
Industry 2.0 saw innovations in steel and electricity power. Machines powered by electricity was a facility for factories. They substantially increased their production.

As technology improved over the years, another revolution occurred. Industry 3.0, with more electrical devices, started to develop and started being used in the manufacturing industry. Which again increased efficiency. More and more data was being used. So, eventually, computers developed, and many companies emerged digital data and automation into their business.

Finally, the fourth industrial revolution has appeared. Industry 4.0 is the latest and the most promising one of all. With the Internet of Things (IoT), multiple computers could communicate and share data due to accomplish tasks more effectively and with high speed. With Artificial Intelligence (AI), Autonomous vehicles, nanotechnology, 3D printing, every industry have reached the next level.

Industry 4.0 brings physical operations and digital operations together, which improves productivity and safely provides data transformation. Also, it creates flexibility and the market he adaption process to any possible crisis easier. Especially when the current situation that the whole world is facing right now, Industry 4.0 is exactly the kind of work model that every industry should focus on and adapt to their organizations. There are a lot of benefits. Reducing the costs of production is one of the most important benefits of all. With the controlled use of resources, increasing manufacturing processes' speed leads to an inevitable decrease in overall costs. With the reliable data transition and storage, innovative opportunities can be created. Industry 4.0 creates a collaborative working system between departments. By means of analytical, up-to-date data transformation, every part of the team can easily and effectively manage their task. However, some organizations have barriers that hold them back to adapt the digital transformation in their work. Because not every organization has the same financial conditions and the cost of this transformation requires a large amount of investment. Also, it requires a coherent attitude to a changing, dynamic environment.

Mining activities are very different than it was years ago. Technology integrated organizations and for-



ward-thinking attitude bring innovations to the industry. It's more efficient, environmentally friendly, and also creates a safer workplace for employees.

Automation has many steps, and at each step, the main goal is the same, to maintain operations and employees' safety while increasing productivity. The integration of automated technologies allows companies to do their operations with remote control. Therefore the tasks require hard work and continuity, which can be done quickly by machines. Operations, which include machine to machine connectivity, reduce human activity needed. And remove mine workers and operators from the risky, complex underground or surface environment. That also creates an opportunity for mobility for other employees.

With the help of a data storage system that automation offers, huge amounts of data to enhance field operations can be produced. Another feature that automation offers to improve productivity is easy to access for resource exploration in unsafe environments. Basically, automation is the mining industry's future, and companies who quickly but surely adapt their projects will lead the way.

For instance, the first autonomous mine haulage systems were launched in 2008 by Komatsu. It's called FrontRunner Autonomous Haulage System. FrontRunner AHS's benefits to the mining industry have been very important. It provides mine-site safety with protocol designs and reduced operating costs, therefore improved the efficiency of the operations. After a year-long qualification program, comprehensive test studies were performed on Nokia's Future X infrastructure.

*"As the leader in autonomous haulage technology, we are firmly on our way to helping the industry move the next billion tons of material with autonomous technology. We have come together with Nokia to further this vision of delivering increased value to the mining industry,"* said Luiz Steinberg, Komatsu Global Officer and President/CEO of Modular Mining Systems.

The systems that have been used so far have continued to improve ever since. Not every big mining operations adapted their work concerning Industry 4.0 measures, but the ones who did succeed.

To manage the mining operations according to the futuristic trends and increase the overall value, companies should boost their workforce in terms of number and potential. Only that way can they implement the new technologies requirements.

## A Carbon-Neutral China by 2060: Is it possible?

Nearly a month ago, Chinese President Xi Jinping declared, in a video message to the United Nations General Assembly, that China would become carbon neutral by 2060. Alongside this ambitious goal, Xi put forward another: he also stated that China would reach its peak emissions before 2030.

This declaration coming from China is particularly significant as it is the source of approximately 28% of global carbon dioxide emissions, making China, by far, the world's largest emitter of CO<sub>2</sub>.

Xi's declaration also comes at an important time. Due to the wide-ranging impacts of the COVID-19 Pandemic, such as the postponement of the annual United Nations climate change conference, the Conference of Parties (COP), ambitious climate pledges were not expected, to say the least.

However, the actual impact of this declaration will be determined by whether or not and how quickly China acts to ensure the viability of the goals put forth by Xi.

How China can reach this goal of carbon neutrality can be examined by firstly looking at its current energy profile. According to data from the International Energy Agency (IEA) coal accounted for over 60% of China's total energy supply (TES) in 2018, while oil constituted nearly 20% and natural gas approximately 7%.

Given such dominance of carbon-emitting energy sources in China's TES, it will need to rapidly phase out such fuels and switch to zero-emission sources and also capture and permanently store, through carbon capture and storage (CCS) technologies, or offset CO<sub>2</sub> emissions from any remaining fossil fuel use.

According to one model developed by Tsinghua University's Zhang Xiliang, electricity production



would have to increase by more than two-fold and originate from mostly carbon-neutral sources by 2060 for China to be able to achieve its goal. More specifically, this increase in electricity would need to come from an immense growth in electricity generation from renewable sources, with solar energy needing to increase by 1600% and wind power 900%. Furthermore, in order to phase out coal-fired power generation, there would need to be an increase of 600% in nuclear power and 200% in hydroelectricity, according to Zhang's model.

Even if all of the aforementioned were to be made possible, carbon-emitting sources, such as coal, oil, and natural gas, would still constitute 16% of energy consumption. Consequently, the CO<sub>2</sub> emissions from these sources would either need to be offset, through measures such as new forest growth, or these fuels would need to be used in conjunction with CCS technologies.

Other estimates as to how China might reach its goal of carbon neutrality by 2060 are similar in that

they also stress the importance of increasing renewable energy and decreasing fossil fuels. One such estimate by Bernstein puts the figure that China's fossil fuel consumption must decrease to as below 25%. This estimate differs from Zhang's model in that it predicts oil and coal will see the majority of the reduction, and the relatively cleaner alternative, natural gas, will show some modest growth from its current levels, which can be characterized as comparatively low.

Another point on which most plans agree, besides China having to obtain a majority of its electricity from zero-emissions sources, is that it needs to expand the usage of this zero-emissions power to all possible areas. The importance of transitioning to electric vehicles here is particularly pronounced. However, this is a transition that is already ongoing; BNEF analysts predict that, by 2030, China will have more electric vehicles on its roads than internal combustion engines.

Another model for realizing a carbon-neutral China sees a much bigger role for nuclear energy. In



this scenario by Jiang Kejun, of the Energy Research Institute of the National Development and Reform Commission (NDRC) in Beijing, China's emissions would peak in 2022, and, by 2050, would plummet to net zero. While similar to Zhang's model in its timeline, it differs in that nuclear would be the leading force in China's electricity generation, accounting for 28%, followed by wind and solar, at 21% and 17%, respectively. As such, China's nuclear energy capacity would need to increase to five times its current levels. Though many are sceptical about the cost and time associated with building such nuclear powerplants, alongside general negative public opinion concerning them, Jiang argues that new nuclear powerplant designs are safe and produce minimal levels of radioactive waste.

When it comes to industrial sectors that are much too energy-intensive to function on electricity, the role of hydrogen

that is produced via renewable energy enters the picture. So-called "green hydrogen" will need to see its application increase and its cost decrease in order to decarbonize sectors such as steel production—a sector in which China is heavily involved.

Overall, it can be rightly assumed that the changes China needs to implement in order to reach carbon neutrality by 2060 will be quite expensive, to put it mildly. China will also need to factor in how it will handle the impact of these changes, especially in terms of the approximately 3.5 million workers involved in the coal mining and power sector. It will also need to consider the effects on those who depend on coal, a widely available and cheap fuel for heating and electricity.

However, there will also be certain benefits for China. Some of these include the boost that domestic renewable energy production will receive, given that China hosts some of the biggest solar and

wind power companies in the world. Another is the reduction in oil imports that will take place as electric vehicles become more widespread. Furthermore, China is already a leader in electric vehicles, so it will not have to go through the same catch-up process it did with regards to traditional car manufacturing.

Reducing its carbon emissions will also benefit China in terms of reducing the social costs of its economic growth. It is predicted that China will be one of the countries most impacted by rising sea levels if climate change is left unaddressed. A such, China's declaration to become carbon-neutral by 2060 will be beneficial both in the more concrete sense of decreasing global CO2 emissions (if the goal is reached), as well as more indirectly by setting an example and placing some necessary pressure on the rest of the world to follow suit.

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