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BRENT OIL

55.66 \$/BL

GASOLINE

7.28 ₺/LT

USD/TRY

7.17

DIESEL

6.66 ₺/LT

EUR/TRY

8.66

FUEL OIL

4.41 ₺

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A New Era for Energy Market Speculation

Bariş Sanlı



unstable energy markets.

We saw negative prices in the WTI markets last year. Also, record LNG prices and charter rates. If we look back further, we may also remember the speculation that led to the record rise in oil prices in 2008. The congress testimonies, academic writings didn't project a crystal clear picture. But we know for sure that there is an interaction between financial instruments and physical products, and that is all.

In each of these cases, there were fundamentals and interpretations

Gamespot's share value has stirred up a controversy in the financial markets and politics of regulation. Now we have seen that retail investors can beat the hedge funds. Short positions can be a matter of greater risk for institutional investors. The consequences will be felt in the energy markets and policies as well. The rise of the rest in the financial markets may create more chaos than stability for the already





of these fundamentals. The institutional investors bet on the rise of commodity prices due to the rise of China and Asia. Everyone has thought that there was a never-ending appetite for fossil and mineral resources. Now the times are changed, but the early signs of 2021 point to another commodities bull market. This time, the game is not confined to institutional investors, but retail investors may change or amplify the effect.

The closest example is the "Crude oil treasure" of the Bank of China. Just as everyone thought that oil reached its lowest price, individual investors started buying oil contracts through "Crude oil treasure." They couldn't get out of the physically settled contract before liquidity dried up. The losses were massive. The CFTC didn't publish a satisfying report. We still do not know whether London trading circles have a part in this trouble. Still, "the treasure" became a nightmare for small investors in China.

Gamestop or a company share is one thing, but the commodity world is another thing. The retail investors powered by Robinhood or other new trading platforms, with knowledge of sophisticated financial instruments, are already moving into silver and energy companies. They will not stop there and move into other energy arenas. Lots of individual investors can already buy crude contracts. But options were not that popular. This is a different game.

The negative prices in WTI was a complicated matter to understand. But some investors' have used a technical issue called Trading at Settlement (TaS) to their advantage. A much more technical tool called "options" is a different beast. Although the Mexican Government's Hacienda hedge involves options, Mexicans are the only ones to have a consistent process and gain success. More retail investors in the options world will

shake energy markets.

Now the bigger question is how the energy market speculation with retail investors will look like? The simplest answer will be more volatility. The negative prices were the product of financial mechanisms. The retail investors will increase the extreme price levels we have seen. They may target fossil fuel companies for activist purposes; who knows? But unlike Gamestop, the rise in silver prices will affect the clean energy market. So these new trader groups may affect oil companies as well as clean energy transitions. The risks are higher now.

But the biggest worry is not financial markets. This is a continuation of the anti-elitist movement to the financial world. Soon it will infect the internet, energy, and climate change, too. The clash is no more between left and right. There are no holy grails to fight for, but the joy of shaking established elites or institutions. This will shape our energy policies, too. Especially climate change...

Iraqi Energy Sector: A New Target for Chinese Investments?

Can Arihan 

To respond to the title's question, the Chinese interest in the Iraqi energy sector is not something new. However, in the last few months, China is moving from a major player in the sector to a dominant player in the sector.

As a part of its mega Belt and Road Initiative, which aims to revive the ancient Silk Road and connect Central Asia and Europe with a trade and infrastructure network, China has been investing in numerous projects in Asia, Africa, and Europe. Iraq, being at one of the last junctures in China-Central Asia-West Asia Economic Corridor (CCWAEC) of the Belt and Road Initiative, is a strategic country for Chinese investments. Therefore, in addition to many other infrastructure projects, China is heavily investing in the Iraqi energy sector.

According to Energy Intelligence, Iraq is China's third-largest oil supplier, and

it has shipped 1.25 million barrels per day to the world's largest importer in the first ten months of 2020. The giant deal between SOMO (a national company of Iraq that oversees oil exports) and Chinese Zhenhua Oil Company will only contribute to these figures. World Oil notes that Zhenhua will receive 130.000 barrels per day of Iraqi crude thanks to the deal. From July 2021 to June 2022, there will be a shipment of 48 million barrels, and the payment for that period will be over \$2.5 billion.

China is not only a buyer of Iraqi oil. It also helps to build energy projects. For instance, in a \$203.5 million engineering contract of March 2020, China Petroleum Engineering & Construction Corporation (CPECC) has pledged to undertake sour gas treatment at Majnoon oilfield. Energy Economic Times reports that this oilfield, which is operated by Iraq's

national Basra Oil Company, is set to increase its production to more than 400.000 barrels per day in 2021 with the Chinese investment's help.

Chinese investments are vital for Iraq, as a country is still recovering from a devastating civil war that left the Iraqi government in a very difficult financial situation. The Covid-19 Pandemic only worsened the crisis with the energy prices (Brent Crude hit almost \$20 per barrel in April 2020, which is the lowest figure in more than a decade) falling to historic lows. The Iraqi economy contracted nearly 10 percent last year, and the Iraqi Central Bank devalued the Iraqi Dinar 24 percent in December 2020 (Data of ECA International). In such an atmosphere, Chinese investments are of crucial importance. The country urgently needs to fund its infrastructure projects. China is interested in the country because of its key location (as Iraq is located in



the Western end of the Belt and Road Initiative) and the valuable commodity it produces so vastly: oil.

The words of the former Electricity Minister of Iraq, Luayal-Khateeb, quoted by Energy Intelligence, summarize Iraq and China's partnership quite well: "We do not just need power turbines. We need roads, schools, hospitals, airports, mega ports. We would like to see multibillion-dollar companies come and demonstrate interest. So far, it is China that has demonstrated that interest." This partnership has been continuing without major problems so far, but both parties (especially Iraq) must be aware of the future problems that might emerge.

For the reasons that were explained above, both Iraq and China were eager to further their cooperation. In this relationship, China has a rather safe position as long as its investments

are backed with oil (and given that oil preserves its value and does not nosedive as it did in 2020). On the other hand, Iraq may face difficulties if the country's economic situation worsens.

In other countries such as Djibouti, Angola, Venezuela, where China invested heavily, huge problems of repaying China's debts occurred. For example, in Djibouti, the public and publicly guaranteed debt is astonishing 104 percent of countries GDP, mostly due to the inability to repay mega infrastructure projects completed by China (Figures from The Globe and Mail). In another example, Reuters notes that as early as 2016, Angolan debt to China was at \$25 billion. Venezuela and many other countries that China invested in suffer from the same problem of repaying the Chinese debts.

Currently, Iraq is not dangerously indebted to China like the countries mentioned above. For now, China has mostly the role of the buyer of products of the Iraqi energy sector. Nevertheless, the Iraqi government should always keep in mind that both Angola and Venezuela are major oil producers, but they are now overwhelmed by their debt to China. Of course, the money to be generated from the Chinese investments in the Iraqi energy sector will be very useful in building the much-needed infrastructure in Iraq. Still, if the Iraqi government acts impatiently and engages with Chinese firms without due planning, the consequences may be dire. The Iraqi government shall take into account both countries' needs and also its financial capabilities.

Sustainable Mining

Hande Mert 

With the developing technologies and new mining operations trends, environmentally negative effects will be reduced; therefore, a harmonious state will be achieved with mining operations and the environment. To achieve sustainability on the mine site, consistency must be achieved between the environment and mining operations. In this paper, green mining techniques to maintain sustainability are examined. These techniques are greenhouse gas emission reduction with artificial intelligence, automation, and electricity usage in mine sites to provide energy and as another source of renewable energy.

After traditional mining techniques have come to a level where both technology and types of machinery used are the best ones, other important features like safety and the negative impacts of the mining activities on ecosystems have started to be examined. Therefore Green Mining has begun to upgrade the existing mining techniques by choosing

new and environmentally friendly pieces of equipment in extracting and processing ore stages, more efficient electricity usage plans, new methods on mine closures, and reduction of chemical use environmental impacts. And green Mining requires consistent research stages and developing new techniques to improve the project. Green Mining is not as prevalent as it should be right now. But it is promising to see that the mining industry is dedicated to implementing mining activities by green mining measures.

Environmental Impacts of Mining Activities

Mining operations have a lot of bad impacts on the environment when the operation stages are considered. Some of the bad impacts are instant, while other ones come further stages of the operation. One of the first impacts is, as can be imagined, removing the ore from the ground. The explosives that are being used to create the hole and water contamination caused by the

extraction. While disturbing or even destroying the wildlife underground, the whole process negatively affects the ecosystem that appears above the mine site and not to mention the issue of dangerous substances that mineworkers are exposed to.

Unfortunately, that is just the stepping stone of the negative impacts that mining operations cause. Because after the extracting part of the ore, the separation process comes. Many valuable mined minerals and metals like gold, nickel, and copper need to be separated from the waste rock by a chain of chemical processes. Those chemical processes waste acidifies the water and soil in and around the mine site, which causes hazardous effects on the ecology and biodiversity. With the dissolving characteristic of water, tailings and wastes become more dangerous.

Mining operations also affect the whole



area which surrounds the mining site. As the operation goes, soil, air, and water contamination increase due to chemical usage and greenhouse gas emission. Over time, local people who live near the mine site will be affected by the air, water, noise pollution, and ecosystem disruption, resulting in health and economic issues. The degree is dependent on the techniques that are being used. But every technique needs a huge amount of energy. And the energy usage daily means greenhouse gas release and, as a result, climate change. Climate change is not only dangerous for our environment, but it's also dangerous for the mining operations themselves. Yet, the fact that climate change implications will be acknowledged in further years other environmental impacts stated before are taken more seriously.[3]

Green Mining Applications

The development of technology changed the mining industry just like it changed every other industry—

sustainability concerns shaped this change slowly but surely. For example, autonomous vehicles started being used, and the environmental impacts started to get counted before the mining operations took place. These and innovations like this are the main concerns for mining industry giants. This game-changing series of techniques brings lots of other areas like economy, societal impacts into account.

- Better awareness and understanding among the public about Mining's environmental issues, including the danger from tailings dam disasters, and better information dissemination concerning environmental impacts when they occur (Jenkins and Yakovleva, 2006). [4]

- Global concern about climate change and greenhouse gas emissions, influencing both mining operations and mineral fuels being mined (coal and bitumen) (Odell, Bebbington and

Frey, 2018). [5]

Artificial Intelligence to Reduce Greenhouse Gas Emissions

The massive amounts of energy consumption that mining operations require is a big problem in so many ways. One of the most dangerous problems is greenhouse gas emissions. But with a reasonable approach to managing the energy consumption on mine sites, it is possible to decrease greenhouse gas emissions. In this technique, the energy amount required to transport the overburden is under investigation. Since transportation with shovels and trucks requires a huge amount of energy, by changing some parameters like load density, trucks route, and ground conditions, it is possible to control the energy usage.[5]

This study contains the correlation between fuel utilization and payload, total resistance, truck speed parameters. With the artificial intelligence technique Artificial Neural

(CO₂-e)Index kg/(h t)						
GVW (t)	Total resistance = 12%			Total resistance = 8%		
	S = 20 km/h	S = 15 km/h	S = 10 km/h	S = 20 km/h	S = 15 km/h	S = 10 km/h
340	0.599	0.589	0.581	0.559	0.556	0.554
360	0.591	0.586	0.578	0.556	0.554	0.549
380	0.589	0.583	0.575	0.554	0.551	0.548
400	0.589	0.583	0.575	0.554	0.551	0.548
420	0.591	0.586	0.578	0.556	0.554	0.551

Figure 1. Estimated Greenhouse Gas Emission by Artificial Neural Network (CAT 793D)

[GVS: Gross Vehicle Weight (t)]

Network, a model was created which shows the estimation and decreased fuel utilization. This model can forecast optimal amounts for the parameters mentioned above and make the operation more profitable. The field studies have been completed at a surface coal mine in Queensland, Australia.[6]

It can be seen from the table that, as the truck speed and total resistance increases, greenhouse gas emissions increases as well. To keep the greenhouse gas emission to a minimum amount, operators must use the trucks with a suggested payload. Because as the load increases, greenhouse gas emissions will increase.

Automation and Electrification

Automations advantages are really important for the mining industry.

It gives so many opportunities and enhances the operation's capacity while increasing the health and safety measures. Autonomous systems are the perfect choice to reduce the environmental impacts of mining operations. There are so many areas in Mining where autonomous systems can be used. Autonomous drilling systems, tunnel-boring systems, ventilation systems, transportation systems, and site monitoring systems are not only reducing the environmental impacts. Still, they are also increasing the productivity of the mining operations. By removing the employees from dangerous areas, deathly accidents can be prevented. That also means with remote control, fewer vehicles will be on the run, and the fuel consumption will be less. Overall, with the shortage of mobility of the employees and the energy consumption, environmental

effects will be reduced.[7]

Electrification usage is another huge benefit for mining operations. Because fossil fuel usage is increasing the operational costs and greenhouse gas release. However, as a new trend, electricity started being used as a power source for machines and vehicles at mining sites. Nowadays, hybrid mining plants and types of machinery/ vehicles are designed. Some machines are powered by diesel and electricity, and some are directly full of electricity. And the differences and simplicity of electrical motors result in decreasing the maintenance needs. Electricity usage can also reduce the ventilation requirement in underground tunnels. Exhaust fumes pose a health and safety hazard and must be continuously ventilated.



Renewable Energy

One of the most efficient ways of answering the energy consumption needs in mining sites is renewable energy usage. Even though this is a new and improving trend, it is still very important. With hybrid diesel renewable energy systems, it is possible to provide the cleanest energy for mining sites. By choosing solar and wind energy for mining operations, greenhouse gas emissions and fossil fuel usage can be decreased while decreasing the overall costs at the same time.

There is a case study in Chile. Due to the high electricity taxes in Chile (\$100 per megawatt/h), this copper mine's energy needs are received by solar panels, wind turbines. As the new source became popular, lots of more renewable energy centers started

being built. This shows that renewable energy sources help reduce the environmental effects and decrease operational costs.[8]

Conclusion

Sustainability is one of the most important things to ensure while mining operations. To do that, environmental effects must be considered before, during, and after a mining project. The mining plans, techniques, equipment, and energy sources must be chosen wisely. Green Mining is a new and enlarging trend that will be more popular in further years, because of the many advantages. With the help of artificial intelligence, heavy fossil fuel usage and greenhouse gas emissions can be reduced. Hence environmental impacts are reduced. As automation and electricity usage get more prevalent in mine sites, overall

costs will be decreased while the operation's profit and safety increase. Even though not many companies use renewable energy as the main energy source, the industry began to realize the asset of solar and wind power. Especially when the economic measures are considered, in the future, to get better results, the studies must be consistent and continuous. By doing more experiments, reliable results of essential operation parameters can be achieved. With more mining companies' support, green mining methods are going to be more popular, and this is going to help the whole industry to change. Finally, the mining industry will accomplish conformity in mining operations with the environment. And the new generation will have benefits of the natural resources safely.[9][10]

The Future of Oil and Natural Gas In the 21st Century

Gökberk Bilgin 

On January 30, we hosted Dr. Murat Fatih Tuğan and Dr. Okan Yardımcı in our YouTube talk, "The Future of Oil and Natural Gas in the 21st Century". Both of our guests have major experiences in the oil and natural gas sector and published a new book in Turkish named "21. Yüzyılda Petrol ve Doğal Gaz Mühendisliği" which discusses the recent development in oil and natural gas engineering. It is the first Turkish book published which elaborates the technical, economic, legal, and technological improvements in the sector.

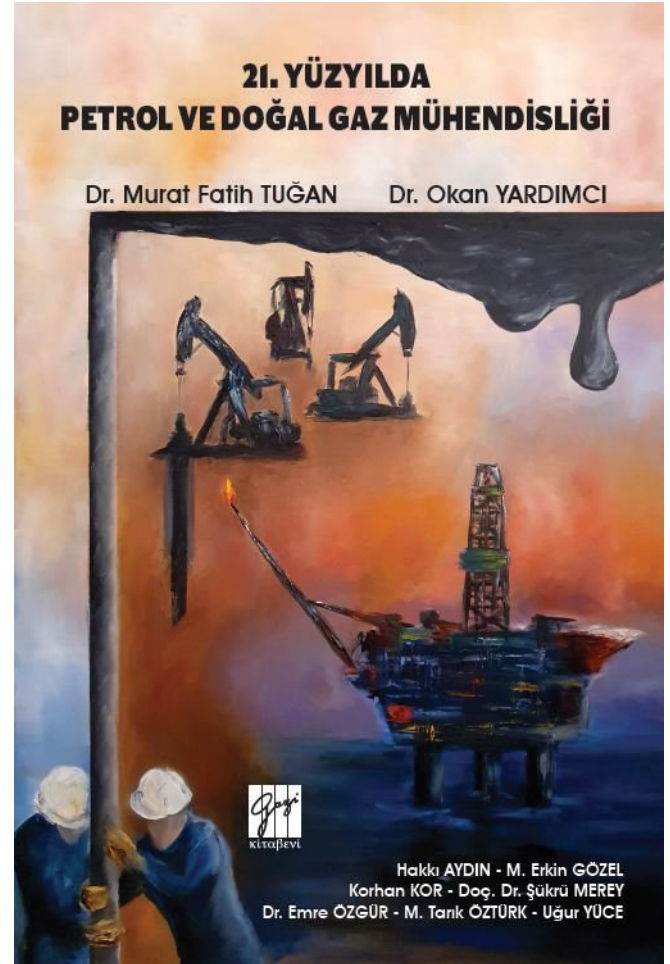
In the first part of the session, Dr. Okan Yardımcı discussed the role of oil among other energy resources and claimed that despite the share decreased, fossil fuels remain a vital source. Improvements in technology enabled additional discoveries on fossil reserves.

The main contribution to the oil and gas reserves came from the shale revolution at the beginning of the 21st century. At this point, Dr. Murat Fatih Tuğan explained the technical details behind the shale developments and showed how it affected oil and natural gas in the world.

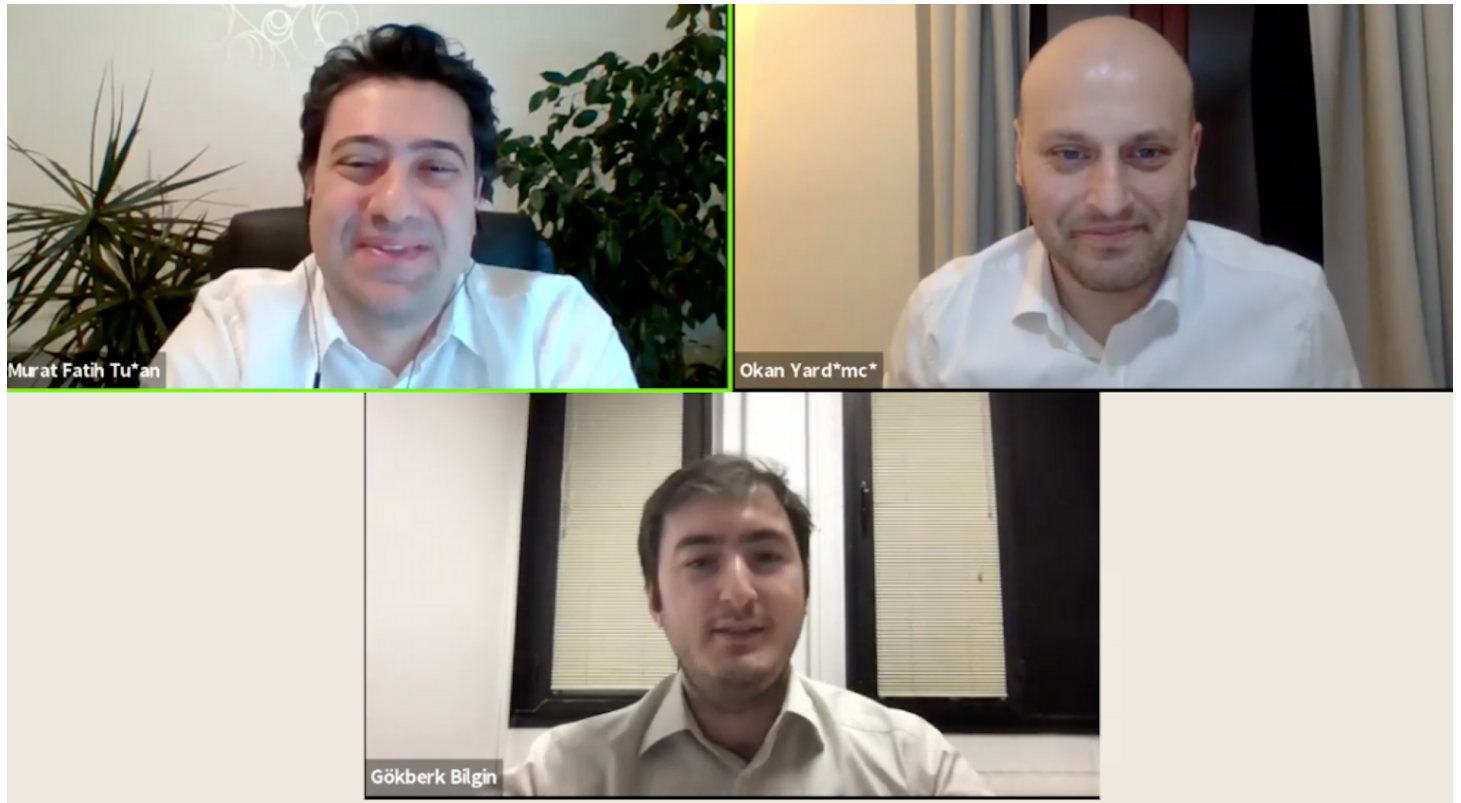
After discussing the recent developments on the technical side of the story, Dr. Okan Yardımcı discussed the financial role of oil globally by stating that there are oil-rich and rich oil countries. By providing data, Dr. Yardımcı showed that oil's share in the financial markets is three times larger than all the other commodities used in energy production.

In the Q&A part, we had a chance to discuss the recent oil and natural gas events in different parts of the world.

First, we discussed the status of oil production in Venezuela. Dr. Tuğan stated that Venezuela is the largest oil reserves. Since Venezuela has heavy oil, it can be blended with other light oils to have various types of petroleum products such as diesel. On the other hand, some of the chemical elements to produce Venezuelan oil is supplied from the United States.



In the United States, we had a chance to discuss Joe Biden's energy and climate policies from petroleum engineers' perspectives. Dr. Okan Yardımcı focused on the Obama administration. Dr. Yardımcı stated that Obama was also favored climate-friendly approaches yet supported the shale oil sector's developments to improve the American economy. In 2011, Environment Policy Agency (EPI) conducted a study to understand the impact of shale oil production on the environment. In the first draft report, when EPI claimed that the operations are not so friendly. In the end, EPI receives a budget cut from the Obama administration at the rate of 17 percent. Therefore, Dr. Yardımcı concluded that the Biden administration would be pragmatic when it comes to economic interests, similar to the Obama administration.



We also had a chance to discuss the impact of social media on commodities. Dr. Yardımcı stated that GameStop and silver speculations would lead American and British authorities to impose additional financial market regulations. In terms of prices, Dr. Yardımcı suggested that politicians' role will be significant in the upcoming years, as it happened at the beginning of the COVID-19 pandemic.

Finally, we had a chance to discuss the possible development opportunities of shale oil in Turkey. Dr. Tuğan claimed that there are differences between the United States and European countries in terms of oil legislation since the oil belongs to the estate owner in the United States while it belongs to the state in Europe. Therefore, it gives incentives to people to invest in the United States.

Another critical issue Dr. Tuğan mentioned is that in the United States, services in this sector is highly developed, which enables

costs to be lower compared to Turkey. It gives American investors feasible options. In the Turkish example, since the operations are so expensive, minor volatilities in oil price make projects infeasible.

Furthermore, in terms of equipment for shale operations, European countries have significantly fewer options compared to the United States. Therefore, mobilization costs also create a burden on the operations. Overall, European countries are not as developed as their American peers in terms of know-how.

Despite these differences, Dr. Tuğan concluded shale revolution can happen in anywhere that has reserves around the world if there is demand and economic feasibility.

Overall, it was a pleasure for our center to have two senior energy expert in our event. We had a chance to discuss many issues that awaits us in terms of energy in our future.



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