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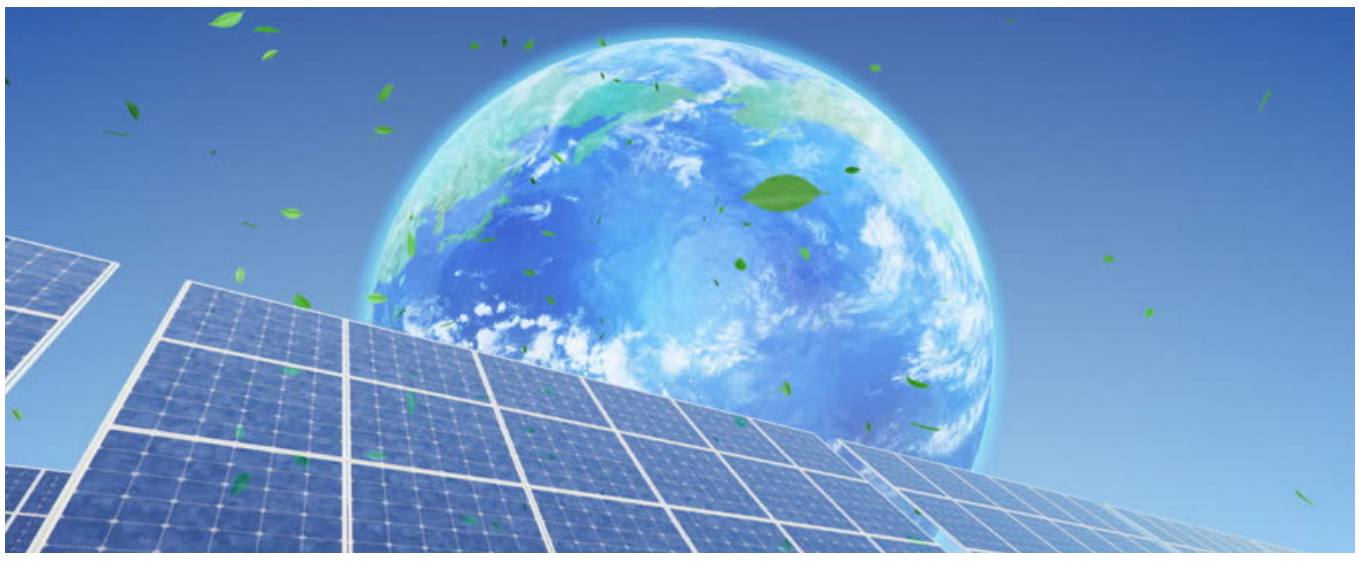
SYNERGY

Bilkent Energy Policy Research Center Newsletter

Energy Policy Research Center

A Rough Road Ahead for Energy Transition



Energy systems are large, techno-economic systems. We are lucky to witness the transition of one of these systems, or should we say three? Electric, natural gas, and oil systems will change forever, as forecasted by some experts in a few decades. A clean and more renewable energy system is good for everyone. But we have an engineering problem, and this may lead to the replay of the late 70s.

The simplistic logic for energy transition is straightforward. More renewables, end coal, more efficiency, more grids, and hydrogen, then you achieve the energy transition in one sentence. The story is like one of these too good to be true stories. Then you have to dig down for details. And details are not that positive.

Whenever we talk about the "coming hydrogen future" with well-known experts, they say "cross your fingers." One other expert claimed, "when I entered this business, hydrogen was the fuel of the future, after many years, hydrogen is still the fuel of the future." Michael Liebreich also points to failed attempts about hydrogen in his article "Separating Hype from Hydrogen" at BNEF.

What if hydrogen fails again? Then we still have solar but no inter-seasonal storage. Storage solutions are promising, and scaling these solutions in a timely manner may happen. Emerging solar technologies are also well in the pipeline. But last week, during a web conference at CFR, Daniel Yergin claims all these (solar, wind, storage) technologies are like 50 years old, and the newest energy disrupter is shale technology like 30 years or so.

Therefore we have to think about the innovation cycle of new technologies. We are focusing more on the supply side, but energy transition requires a change in the demand side technologies as well. We have one demonstration plant for green steel. And this is just one plant and production. Then we have to think about all the steel manufacturers, then cement and other industrial materials. Can electrification solve these problems efficiently? Not sure either.

You can find new plans to accelerate innovation. As more money will pour into targeted innovations, new technologies will pop up. This is likely, but commercializing these technologies may take a long time. After the commercialization, widespread usage will take more time.

My primary concern is cost. What if too ambitious policies push for the wrong technologies. Then the result will be massive failures and backlash. We have seen US synthetic liquid fuels program in various periods to be failed. As the cost of new technologies is understood to be too high, more oil drilling continued. This time the world is going towards a climate apocalypse, but during that time, it was an oil apocalypse. Most probably, alerts do not work.

So what should be done? The first step is to create a nimble market for these technologies in blend with existing technologies. Therefore hydrogen blending is an excellent option for the transition. But then we have to make ready the standards and workforce with training. This will take at least a generation. But the biggest problem is on the demand side. How to change all burning technologies to hydrogen, or are we ready for electrification of heat? There is also one more problem regarding energy transition. To replace other resources, you have to install much more solar and wind. But they age like different types of equipment and may need to be replaced every 15-20 years. It creates a perpetual investment cycle. So it needs credit. Credit is cheaper in developed countries than in developing countries. Renewable credit rates should be fixed worldwide.

The single biggest step to achieve this mission is to start today. One step at a time will produce better results than ambitious targets. Cost controls will cement the rise of new energy technologies. Alarmism never helps. Tesla, solar cost reductions are not happening because of alarmism but cool, calculated steps forward. We need more of these now. Otherwise, we may be left alone with geoengineering.

Barış Sanlı

Corporate Nationalisations?

In an unforeseen move last week, the U.S. took a stake in a battery metals mining company through a funding agreement. Being a preacher of free-market dynamics that tries to keep its state affairs out of the frontlines of business matters, the move could be hailed as fitting in perfectly with the new narrative being applied by President Trump. The execution of the project is also another point that should be examined closer. The U.S. took a position in the said company through a direct equity investment. Furthermore, the position was taken through the U.S. International Development Finance Corporation who can more than just fill the role of the funding partner should the basic business cycles fall short of supporting the operations.

If funding was the question, then why didn't the DFC just provide credit with strong loan covenants to TechMet-the mining company? To answer this question, we must first understand what's happening right now in the rare earth and battery metals commodities. Similar to how oil import-dependent nations looked for ways to kickstart local production against the OPEC to combat over-reliance and supply-side shocks, the same story is also developing in the metals industry. Loan agreements can be worked around, credits can be defaulted on, but the operations could still ensue. To ensure the complete measure plan against any disruptions to a stable supply chain, taking an equity stake is the most effective method. We're right now seeing a continuing fall in prices of lithium year-over-year, and the future forecasts for the upcoming five years are indicating further fall in prices due to oversupply. An investor would have to be in it for the long haul to be making an investment right now in this area, or the investor could have further motives that go beyond profit-making, such as what we see right now. To provide the factor and comfort of reliability, a partner with sizeable funding opportunities is vital for companies such as these. Which is again another supporting factor for equity investments in mining companies.

China has been the prime contender against the U.S. in this space, and by the looks of how the events are unfolding, the industry is unlikely to settle any time soon. European Union has expanded its list of critical commodities to include lithium, and China has been active for a long time in mining in Africa. The fact that the transaction was done through a development financial institution sets the U.S. example apart from the Chinese cases. In many Chinese mining investments in Africa, we could see the transactions being done through actual Chinese mining companies making overseas investments. Leaving the operations to the production company while maintaining executive oversight might sound advantageous if the priority is on keeping time and energy invested to a minimum. But having personnel on the ground 24/7 with constant oversight could also be more effective if technological and operational efficiencies are to be monitored. A case in point is, the U.S. has entered into the race for a hold over the rare earth and battery metals market with regards to ensuring the reliable and affordable flow of materials towards itself. Having seen how market dominance can have a shocking effect on the lessons learned from the oil embargo, the stakes are high for all players involved in this field.

Alpcan Efe Gencer

Cooperation for Hydrogen

An energy world with the dominance of hydrogen is not impossible thanks to the developments in technology. However, only technical developments are not enough to achieve a blue and green hydrogen energy world. At that point, firstly, national hydrogen strategies emerge as a factor. In the fight against climate change, many governments believe that hydrogen made by renewable electricity is the main actor to get rid of carbon emissions. On the industry side, using blue and green hydrogen is crucial for sustainable economies besides environmentally-friendly industry targets.

Nowadays, most European counties present their national strategies regarding hydrogen and approve these papers through state institutions. These strategies involve long-term targets for energy, environment, industry, and economic development. Among other countries, Germany stays the course to be a global leader in hydrogen technologies while its institutions take firm actions to achieve the ambitions. The governments and industry leaders highly state that hydrogen can stay at the core components of decarbonization strategies only if technology, production, electricity, and raw material storage capacity, and infrastructure can be associated with hydrogen.

Besides all these necessary governmental steps, the cooperation between the state and public, companies, industrial and trade unions, civil societies, and academia is one of the most important elements for hydrogen governance. Some joint ventures have salient targets to become more attractive in hydrogen-related studies.

Firstly, these targets involve creating a global responsibility in the CO2 emissions issue while emphasizing the character of hydrogen to reduce the impacts of emissions thanks to its production and using techniques. Secondly, it is studied on the competitive market structure for hydrogen within the cost reductions. In this way, it is aimed to make great progress on the technological side. In conjunction with this concern, having a well-established domestic market is significant too.

At that point, the number of renewable projects is expected to increase in the near future, especially in the North Sea location due to its wind capacity and ongoing projects. Next, improving the current electricity and gas infrastructures may be a future concern for transport and distribution companies to continue using them without any energy security risk. The fifth is about training the personnel who do or will study in a hydrogen network, and the sixth is promoting research and development studies on hydrogen for now and the next generation. However, it shouldn't be forgotten that all these can be achieved with strong cooperation among the parties.

Due to the capacity to offer a growing industry, clean environment, and sustainable electricity generation, the policies and common actions, at least in the EU, are inevitable things for the welfare. In order to exploit some associated economic opportunities, the number and efficiency of hydrogen cooperation should be increased because it is unlikely to be possible to reach the aims and ambitions for the energy transition in Europe. Joint ventures not only at the national and regional level but also at the global level is also significant to secure energy supply since renewable generation capacities are limited because of the weather conditions.

As many experts claim, European countries will remain one of the prominent hydrogen and energy importers; so, this is the main reason why they aim to create and boost regional and then international cooperation via several partnerships in the whole value chain. Moreover, after the impacts of the pandemic start to decrease, we will see many insightful hydrogen cooperation among the EU, US, and Asia-Pacific countries while they will try to help the governance of the future energy world.

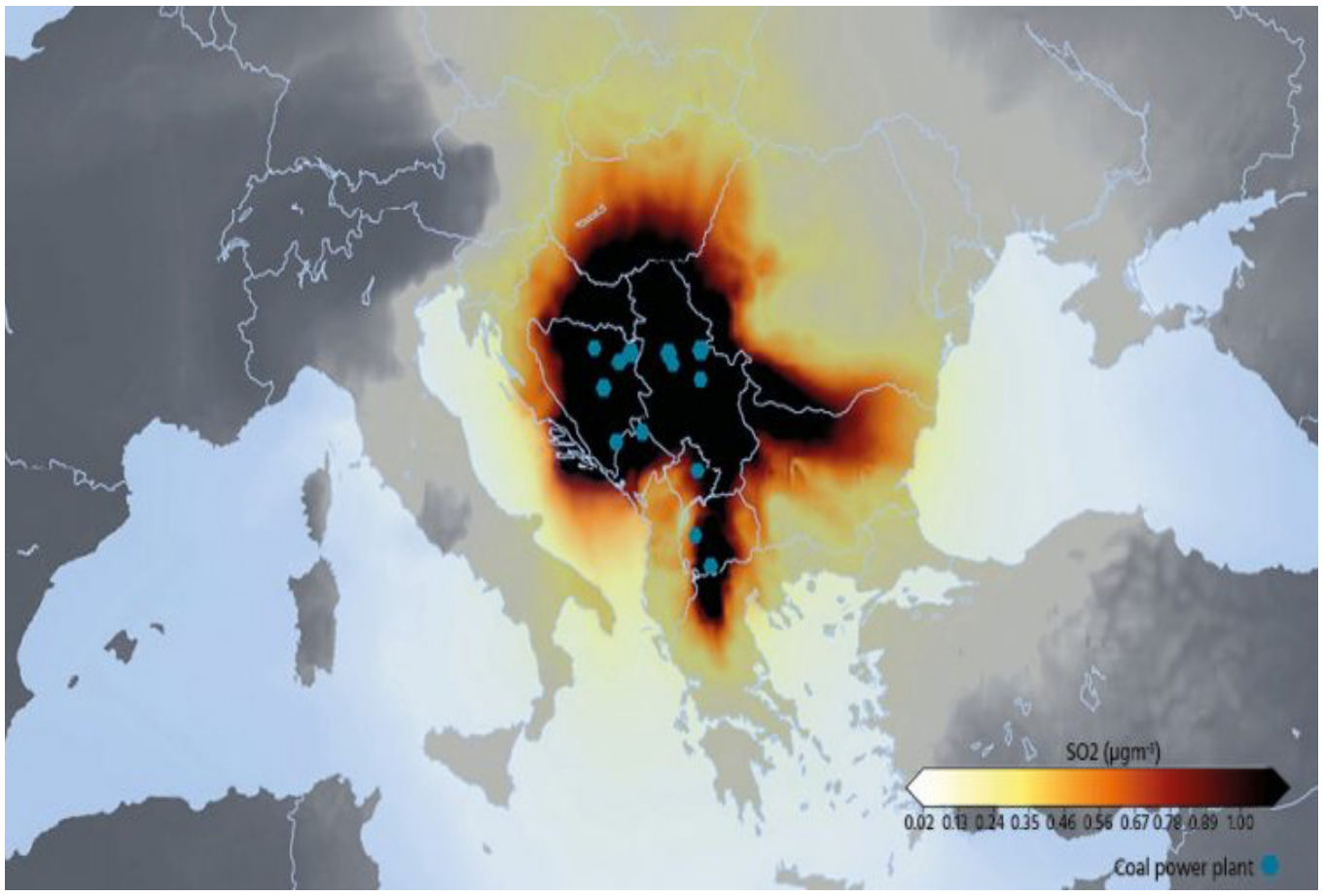
Yazgı Nur Akın

The Problem of Coal Thermal Power Plants in the Western Balkan

The burning of coal is the primary source of air pollution in the world as coal-powered thermal power plants are such an important part of the Balkan energy production, that poses a problem. “If all the countries of the Western Balkans became a part of the EU tomorrow, all the coal thermal power plants would go bankrupt. “ Those are the words of Energy Association’s director, Janez Kopač. The Western Balkans rely heavily on thermal power plants, and that does not come without a price.

Bosnia and Herzegovina, Kosovo, Serbia, Montenegro, North Macedonia have, for years, been investing almost 170 million euros of subsidy per year for the extraction of energy from coal. If let’s say tomorrow, they all entered the EU, that investment would have to be a billion dollars higher. The reason is the emission tax. In the EU, the companies that pollute the air with greenhouse gasses have to pay a certain amount to be able to continue doing so. In other words, they have to pay taxes. I.e., the price of producing one tonne of CO2 is 25€. And since coal plants in the West Balkan have especially high CO2 release, the price would be very high and quite unsustainable. A solution for that, as Kopac says, could be putting a significantly less tax on those powerplants, a couple of euros per tonne. That money would then be invested in renewable energy sources. And as a result, the energy sector would slowly prepare for entering the EU and its standards.

The Balkans aren’t the only countries that are struggling with coal power plants. EU countries like Poland and Germany have also got a massive subsidy towards coal plants each year. On the other hand, however, the European Commission has, for years, been calling for more energy production from renewable sources. Until 2020. the percentage of electrical energy spent in the EU made



from renewable sources had to be 20%. Until 2030 that number has to be 32%. Renewable energy is not cheap, however. Solar panels are very expensive and are not be profitable for most EU countries. It also doesn’t help that the EU put a significant fee on imported Chinese solar panels, which are 45% cheaper than EU produced ones. With an intention to encourage the buying of locally produced solar panels, the EU missed the opportunity of having additional 55 000 workplaces in the sector.

Despite EU’s policy, most countries haven’t achieved that goal. Countries that are looking to join the EU also need to try to reach that point. Now, because of that, there are plans on constructing around 2700 mini-hydropower plants with a capacity maximum of 10MW. The locals have reacted very poorly to this news. Mostly because these power plants ruin the environment around them, they redirect and pollute the rivers that are a cultural heritage and very meaningful for the local population. The destruction of the environment is catastrophic, and building permits are often given without or with a wrong assessment of environmental impact. Another reason is that, without significant subsidy, those power plants will not be sustainable, and because of their small size, they don’t improve the energy security of the region.

The Balkan region makes a lot of profit exporting that electrical energy to the EU. Therefore there are already plans to build new coal power plants. The point is this: “Most of the energy produced by coal power plants is exported to the EU. That energy is cheaper than the one produced in EU power plants since they have to pay fees for greenhouse gas emissions. “Says Kopac. A solution to Balkan’s problem might be instead of the investments in mini-hydropower plants and a giant subsidy towards other power plants, that money could be redirected towards solar energy and wind turbines.

As the whole world is trying to adapt to new renewable and clean energy sources, everyone needs to make a change. Balkan being no exception. In the last couple of years, all across Western Balkan, we saw improvements on the question with the appearance of new wind turbines, which have never been talked about before in the region. It’s a big step forward, but there is still a long way to go if we really want to reach at least the EU’s standard.

Mihael Gubas

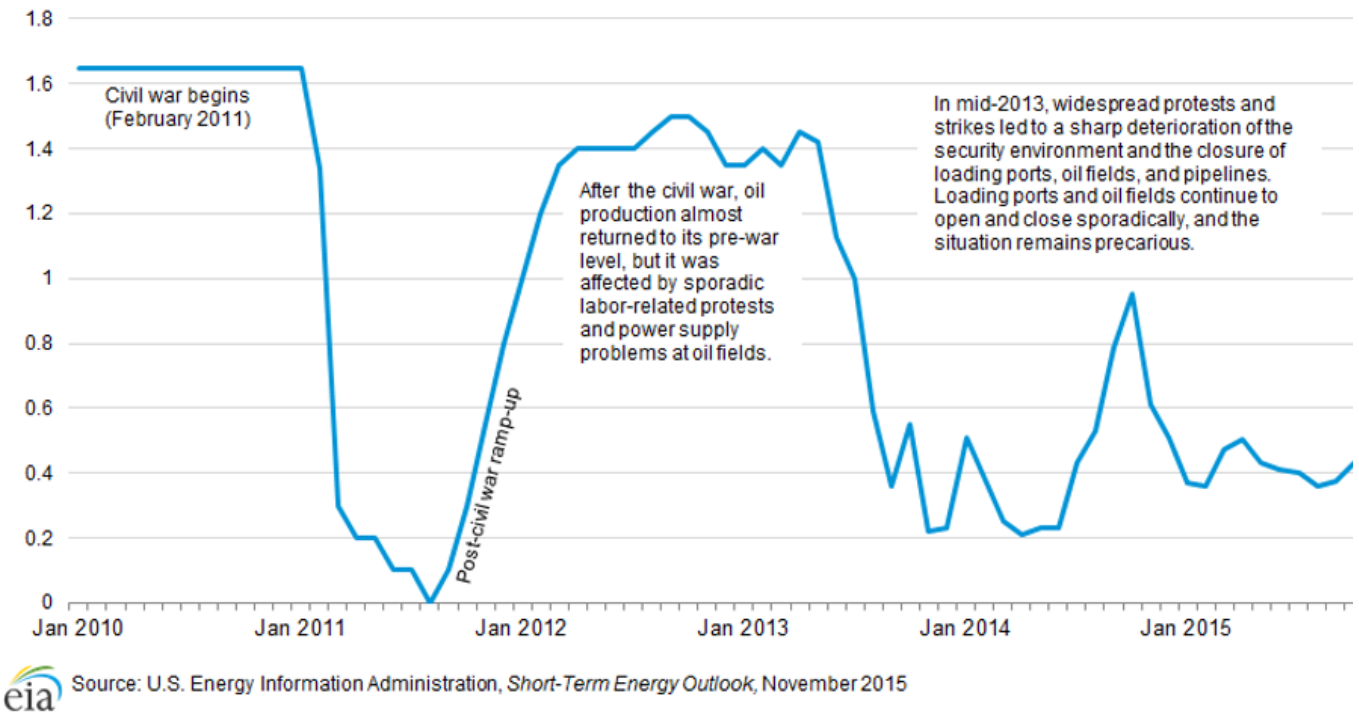
Oil and Civil Wars: Libya Case

Libya is a country located in Northern Africa and suffering from a resource curse outside of the Arabian Peninsula. To understand authoritarianism, civil wars, the wave of democratization, and the relationship between the sustainability of political regime and the existence of natural resources, it is a region that is worth focusing on. As it is known, Libya occupied the agenda of world public opinion for decades due to the Muammar Gaddafi's ruling with an iron fist and the importance of Libya oil until 2011. During the Arab Spring, Libya was one of the most prominent countries shaken by the demonstrations. As a consequence of this breakpoint, Gaddafi has lost his power, and the country has been dragged on violence between post-revolution armed groups. At this stage, Libya is a battleground of ongoing proxy war, which is conducted by many actors. This essay will shed light on the structure of Libya's economy, processes that they go through, and the oil-civil war relationship concerning warnings of the governor of Tripoli-based Central Bank.

Likewise, the other OPEC countries, Libya's economy is primarily based on revenues that come from the petroleum sector. Such that over 90% of the export proceeds and around 60% of the GDP consists of the petroleum sector. Thanks to the low population and high oil revenues, Libya performs quite well compared to other African countries in terms of nominal per capita GDP. When we look at the country's growth trend from the early 2000s to early 2010s, we see that they have enjoyed favorable growth rates. However, this trend has been interrupted by the civil war, which occurred in 2011. Libya's economy shrank by 62.1% in 2011. Although they experienced a recovery by 104.5% with the base effect, the Second Libyan Civil War hit the country again. As a consequence, as of 2019, per capita, PPP GDP of the country is around 67% of its pre-2011 level. There is no doubt that the most appropriate sector to observe the dramatic contraction in Libya's economy is petroleum. Figure 1 shows the change in crude oil production between 2010 and 2015.1

Today Libya is a country that hosts two governments (Tripoli and Tobruk) and witnesses a civil war since 2014. After Gaddafi's fall, no groups could have been managed to control all of the countries, and several obstacles to peace do exist.

Figure 1. Crude oil production in Libya, January 2010 to October 2015



However, according to experts, oil is one of the most important factors that fuel military conflict. This situation can be explained with two points. Firstly, since Libya is the country that has the highest proven oil reserves in Africa and, thanks to proximity and geopolitical location, they are an important supplier of crude oil to European countries. Naturally, domestic politics and turmoil in the region draw other global actors' attention and encourage them to interfere. This situation extends both sides, and conflict gets all balled up. Secondly, the trajectory of the military conflict is depended on strategic oil reserves. For example, General Haftar, thanks to their territorial domination, controls the majority of oil extraction camps, he is not able to gain economic advantage. He cannot earn a proportional part of income since oil companies refuse to negotiate with LNA (Libya National Army). On Tuesday, governor of the Tripoli-based Central Bank of Libya Al-Saddiq al-Kabir issued statements and expressed his concerns about Libya's economy. He says that the shutdown of oil production and exportation had led to a $180 billion loss since 2013. According to him, the country should produce 1.7 million barrels per day to afford today's spending levels. He also emphasized that Libya's debt reached 270% of its GDP. In addition to this, the Tripoli-based central bank declared that the burden of Haftar's blockade on the country's economy is at least $9 billion. It can be said that the governor's and institution's statements are clarifying where we stand now in terms of Libya's economy.

In conclusion, it can be said that Libya is a case from which other countries (especially developing and undeveloped countries) should take lessons from. These lessons can be classified into four points.

Firstly, an oil-dependent economy is highly vulnerable to international and political conjuncture. A country should not rely on the existence of natural resources in the country because, in the case of foreign intervention or domestic turmoil. In this context, revenue that has been gained from oil exports should be converted to the production of other goods and services and other investments.

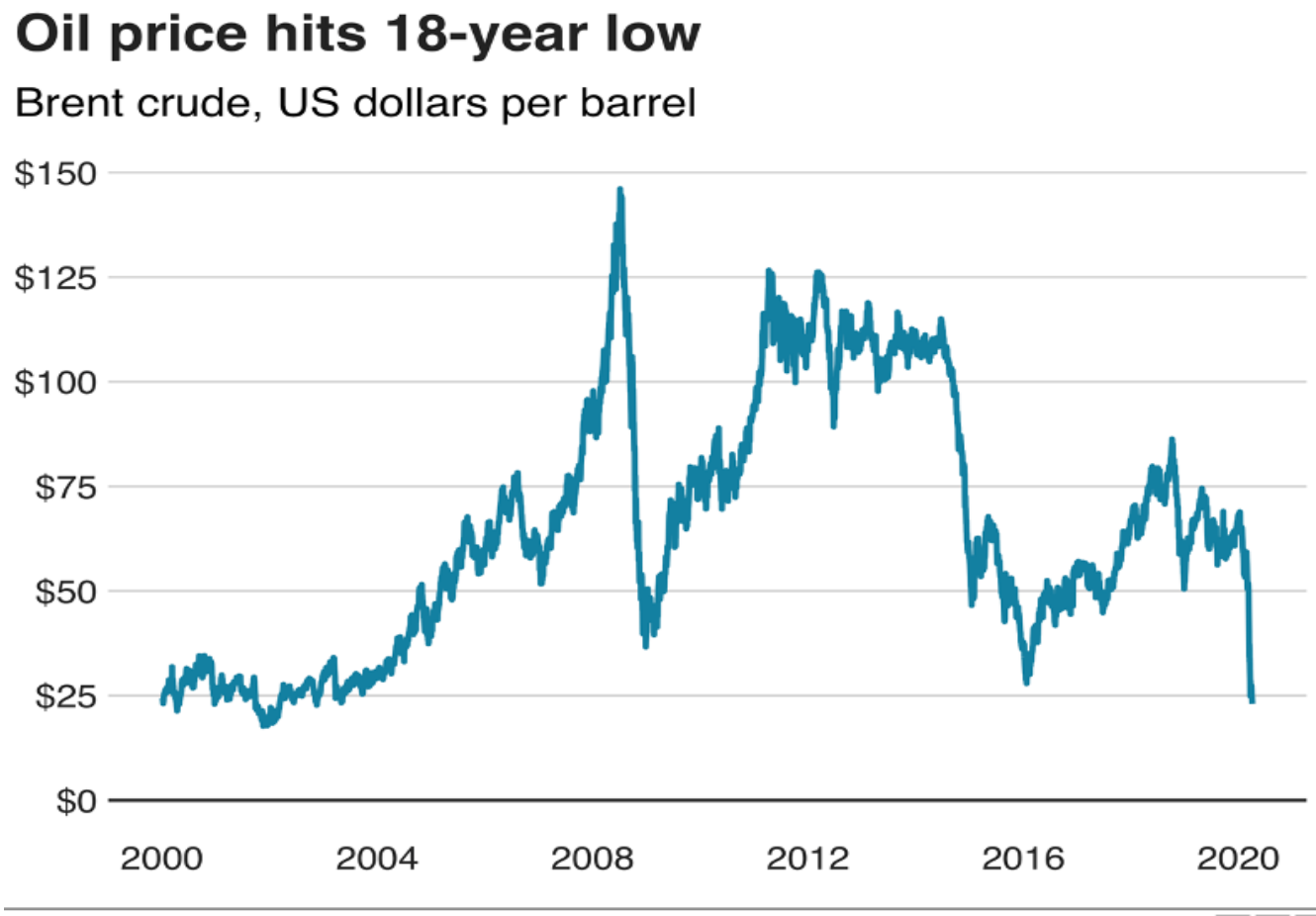
Secondly, the promotion of the electoral process and other civil/democratic rights is highly important in the 21st century because the fall of Gaddafi and the following political instability shows that these concepts are vital. Such that democratization process may lead to chaos that threatens the country's national security, territorial integrity, and economic welfare.

Thirdly, the importance of moderate actors that can contribute to the negotiation process and peacemaking in the solution of disagreements. Since Libya could not manage the crisis within the country, the country became more fragile day by day and opened to foreign intervention.

Finally, the establishment of energy security is as important as the existence of reserves and extraction of the resource. In this context, not only the conflict zone around the world but also other pipelines and reserves should have reliable frameworks.

Batuhan Özkan

The Effects of COVID-19 on Oil and Gas Industry and Responses



As the COVID-19 continuing it's spread rapidly around the world, countries are taking more precautions to slow down the spread. The first and actually, the most effective way to slow down the spread of the virus was lockdowns. Even though this still is the best way, the impacts on our economy are undeniable. Therefore with the social distancing guidelines, a big step has been taken towards the new normal. Companies reduced the number of working people, but at least they are back in business. Little by little, the recovery phase started, which is going to take a long time and have serious and lasting impacts.

The continuing rise in COVID-19 cases has tied up with the demand for oil and gas. Because with transport and air travel restrictions, worldwide usage is decreasing. Therefore the physical operations both upstream and downstream are slowing down. As a result, in a short period of time market value of oil and gas has dropped. That is why the industry is taking one of the biggest and hardest hits in over a decade.

World's biggest oil and gas companies have lost billions of dollars during the pandemic. That is reasonable when the oil refining process stages are considered. With the lack of workers, the maintenance and repairs of drill machines, pumps, refiners, and pipes would be delayed, which is a serious problem for a project to be decided as risky or deferred. So many companies are in huge debt, and the recovery phase is not going to be easy. Even though the "new normal" provide workers to go their jobs (with a reduction of the number of workers in a shift), there is still a possibility of a local lockdown, which results in a delay in the production and shipping stages. When we consider the uncertainties of this crisis, these companies should take smart and efficient action.

The recovery phase is an opportunity to learn from previous achievements and mistakes, to make better, technological, and environmentally friendly decisions in the production of oil and gas, especially for reducing the impact on the environment. With the lockdowns and decrease in production, CO_2 emissions have dropped. Which is a good head start to investigate new methods to keep the reduction of the CO_2 emission after the pandemic is over. Therefore the impact on climate change will be reduced. Even when this problem is compared with the COVID-19 outbreak, it may seem way down the road and does not need and immediate action, but still, for a better future, every possible outcome should be defined before it is too late.

To create a better environment for the industry after the COVID-19 pandemic, logical and long-term decisions should be made. Companies should invest their money in further operations and projects. To get back on their feet economically, they should implement new and more effective strategies to help turn the negative impacts of COVID-19 on their business into a positive trend. New partnerships with other industries such as the mining and automotive industry can help the sustainability of the oil and gas industry. Even the oil and gas will be one of the biggest energy sources in the future as well as right now, renewable energy production projects must be in the plans of the companies. Just like in history, the industry should respond to this crisis, adapt to it, and turn it into an opportunity in a futuristic way.

Hande Mert

BRENT OIL	42.17 $/BL	GASOLINE	6.89 ₺/LT
USD/TRY	7.86	DIESEL	6.16 ₺/LT
EUR/TRY	9.28	FUEL OIL	3.82 ₺

Economic and Energy Dimension of Armenian Aggression

The occupation of the Nagorno-Karabakh region by Armenia, supported by forces outside of the region, is crucial to understanding the region. It has affected the psyche of both Azerbaijani and Armenian people. Those who have only started paying attention to the region with recent news might fail to see the implications. Still, an occupied Karabakh is a threat to Azerbaijan's energy-based economy. Armenia carried out attacks against the Tovuz province of Azerbaijan in July.

Armenia's attacks on Azerbaijan were not a surprise, but this time the region's distance from the front line (Nagorno-Karabagh border) revealed a different dimension of the conflicts. Tovuz was home to two energy lines of Azerbaijan. This situation strikingly showed us that Armenia's aggression is not ethnic reasons but for economic reasons. Armenia wanted to increase its economic power in the region by taking the important energy and transportation lines in Tovuz under its control. They wanted to control Azerbaijani gas. Tovuz serves as an important chokehold of Azerbaijan's energy efforts as it is one of the passage points for TANAP and BTC Pipeline. Establishing large-scale economic partnerships in the region by excluding Armenia makes Russia and Armenia very uncomfortable. What disturbs Russia here is the potential of Azerbaijani gas to be an alternative to Russian gas. Russia, which was exposed to the European Union's reaction, especially after the Crimea invasion, may not want any country in the region to be an alternative to her. If we connect the dots at this point, we can interpret the power behind the Armenian aggression. Russia can see as a danger that Azerbaijan shows itself to the European market, especially with the European Union and the United States of America's support recently.

Russia might also feel threatened by Azerbaijan's gas prospects and is inclined to use her influence over Armenia to stop an alternative gas supplier from reaching Europe.

The Russian economy, already dependent on energy exports, has been hit by sanctions imposed due to the Russian annexation of Crimea. Therefore, one can interpret Russia's intent in supporting Armenia not for the sake of status-quo but the well-being of Russian energy exports. Even though Russia didn't intervene initially, they called for a ceasefire after successful Azerbaijan attacks. We can interpret this late intervention as the punishment of Russia. At the beginning of the conflict, Putin gave a very important message by saying that clashes are not going in Armenian territory. The reason behind this punishment can be Armenia's efforts to establish close relations with the West in recent times. For such reasons, we should interpret Russia's non-intervention as support for Azerbaijan.

Here, we should also examine the reasons behind France's support for Armenia. Now France openly supports Armenia in the Armenia-Azerbaijan conflict, which is an interesting situation. The fact that the two NATO allies have such different interests at NATO's borders raises many questions. France acts in contrast to Turkey for a long time. At first in Libya, France supported Haftar. Then in the Eastern Mediterranean Sea, France actively took apart by the side of Greece. We can interpret this as France's attempt to prevent the possibility of Turkey to emerge as an energy power since the reason for all these conflicts were about energy sources. We all know that Turkey, especially in recent times, shows the potential to become the hegemonic power in the region. The main driving force in the emergence of this potential is undoubtedly the discovery of the new energy field in Turkey. The discovery of Three hundred twenty billion cubic meters of natural gas fields in the Black Sea and the expected forecast of possible discoveries in the Mediterranean Sea have increased the expectations. Possible close ties with Azerbaijan could mean that the two will play a key role in Europe's energy needs, and with it, they will have great power in the region.

If we mention Israel at this point, it can be beneficial to us for understanding the situation in the region. Israel actively supports Azerbaijan in this conflict. Of course, the reason why they support Azerbaijan is political. A powerful Azerbaijan can be a threat to Iran, and this situation pushes Israel to support Azerbaijan. However, the interesting point here is the partnership between Turkey and Israel. They both have mutual interests in the situation.

Turkish and Israeli drones play an important part in the clashes. Even one can say that they are

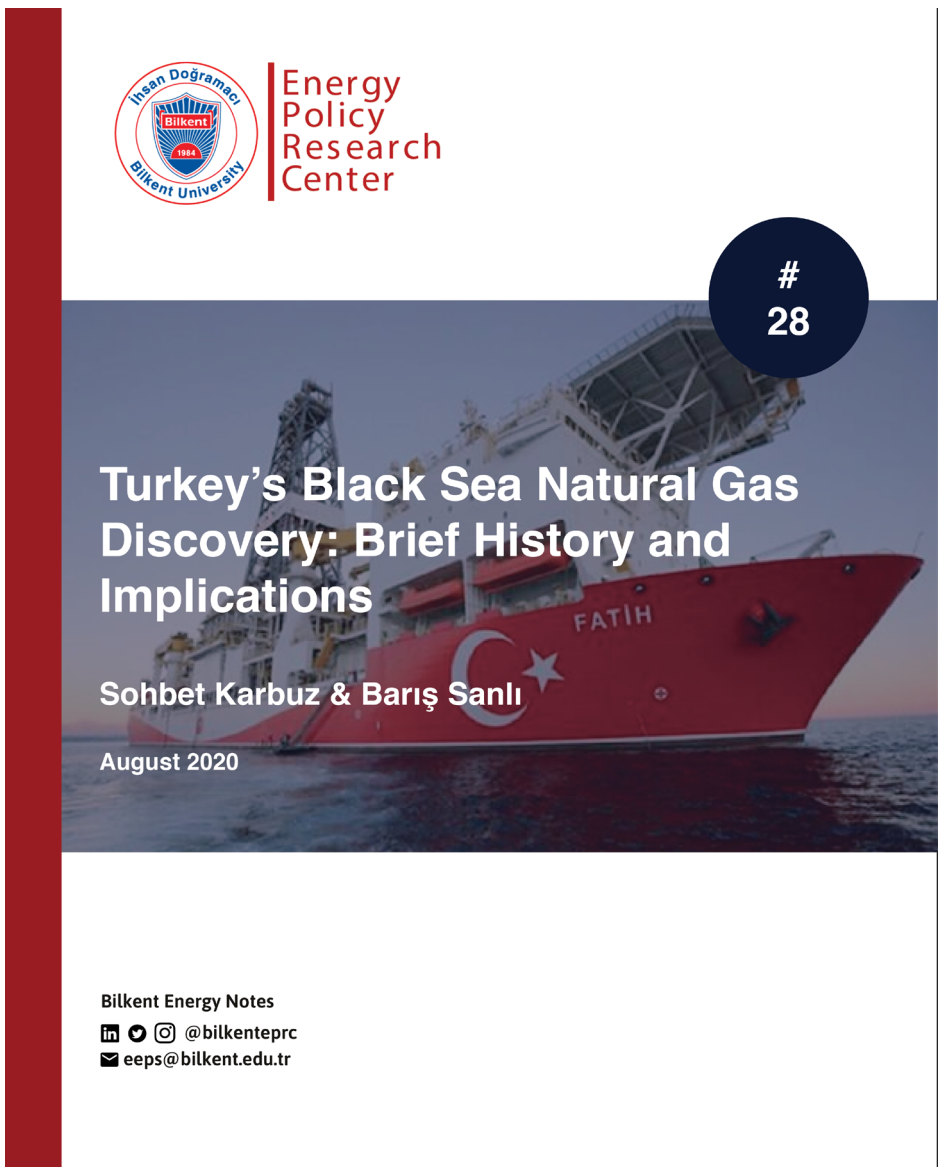
determining the winner. Armenia gave important casualties due to the power of Turkish and Israeli drones. This circumstance raises questions about whether it can be turned into a partnership in the Eastern Mediterranean as well. We shouldn't forget that some important names in the Eastern Mediterranean policy of Turkey think it is necessary to establish an Exclusive Economic Zone (EEZ) agreement with Israel since it is beneficial for both countries.

Here it is necessary to refer to Turkey. Turkey, which shares a common language and common culture, and especially in energy, housing most of her economic partnership, there is nothing more natural than to support Azerbaijan. In addition, a strong partnership that may arise between Turkey and Azerbaijan can reveal economic opportunities for both countries and allow them to increase their power in the region. At the same time, there is no doubt that this partnership can be a powerful alternative to Russia's energy hegemony over Europe.

As a result, we should interpret this situation considering that Armenia is the weakest country geopolitically in the region, has demographic difficulties, and does not have any important economic center, which shows their economic weakness. It seems that despite the last ceasefire decision, clashes will continue in the region. As everywhere in the world where there is conflict, energy and economic reasons play a big role here. I hope the unjust occupation of Armenia and the conflicts in the region come to an end.

Atahan Tümer

New Bilkent Energy Notes Are Available



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