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SYNERGY

Bilkent Energy Policy Research Center Newsletter

Energy Policy Research Center

Anonymous Cyber Threats in the New Decade

The 2010s was the era of the development of new actors in world politics. China, India, and Russia strengthened their position and began challenging the American hegemony. This process also created alternative areas for new technologies to develop, and different countries started to have comparative advantages on different technologies. The leading sector in this area was the development of the cyber world. In the last ten years, the number of anonymous attacks increased rapidly, and militaries began to use this domain as a combat tool.

One of the most striking attacks was to Iranian nuclear facilities with the virus named Stuxnet. In the Stuxnet case, the attack was going to be successful if the Russian company, Kaspersky had not identified where the virus was targeted by which states. Also, we saw that if the anonymity time increases before getting caught, the respond of the receiving end becomes more aggressive as it happened in the Iranian case. Instead of eliminating an enemy, if the attack does not succeed, in the long run, the strength of the opponent increases. After they realized the attack, they heavily invested in the cyber domain, and become a significant actor. Therefore, in the cyber domain, the actors that can improve the anonymity of the products, they will have a tremendous influence on the global agenda. Their actions can change our understanding of stability forever.

For instance, the United States declared that they reserve the right to respond to cyber-attacks using all means at their disposal, including the military operation. It means that, by creating a fake attack, they might get a chance to involve in other countries through their military power. On the other hand, some other state or non-state actors can attack the US, and it may show it as some other country did. These types of actions can harm the peace in the whole world, and every day, more actors are capable of conducting such policies.

Theoretically, one can even assume that, by using this technique, the states can damage other countries' alliances and make them go into the conflicts. Furthermore, instead of directly attacking infrastructure, the states can manipulate other countries through surveillance and disinformation. They can hack their data systems, change the numbers, and control the policies of the enemy while the opponent was thinking they are following the right policy for their benefit.

In 2013, Snowden leaked the pieces of evidence that show how the American government is watching the ally countries through the internet network and social media and NSA's control over the electricity system of Japan and Germany. Combined with the Stuxnet attack, these events lead to other countries to invest in the cyberweapons.

In 2016, the Russians were accused of intervening in the American Elections. However, the pieces of evidence were not enough to prove the Russian involvement. On the other hand, even though since there is insufficient evidence, we can never be sure that no one will generate false evidence to create necessary conditions for military intervention.

Up to know, according to our reasoning, combined with the evidence from the cases, state actors will have difficulty responding to the cyber-attacks openly, but they will continue to invest in technology and weapons. However, they are highly likely to conduct attacks through non-state actors. Since there is not enough evidence for them to respond officially, they will do it with the help of the companies, private soldiers, and secretly state-funded organizations. The main concern for these actors will be maintaining anonymity; therefore, we expect them to locate in different regions and with different purposes. Of course, this structure will completely change the understanding of the concepts we use in traditional international relations. War, alliances, engagements, transnational actors, and many other features will need new definitions.

As the number of cyber-attacks increased in the last years, the necessity of regulations in the area started being discussed by the different parties. Our experiences showed that in this type of war, the difficulty of identifying actors and their capabilities limits our cooperation. Furthermore, different countries have different technologies in cyber domains. Therefore, the regulation requires extensive effort to gather every actor under one set of rules.

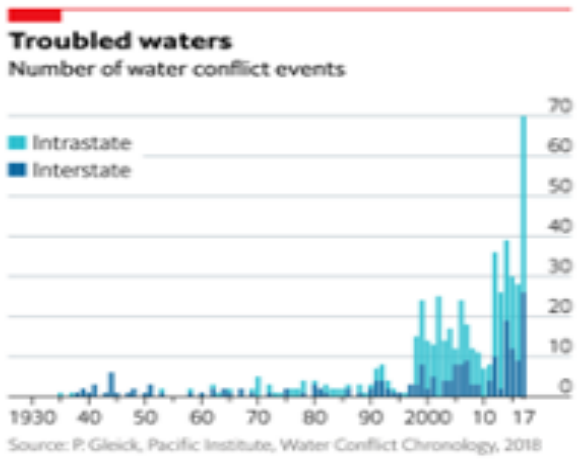
Gökberk Bilgin

Resource Wars

Inter and intrastate conflicts can be caused by the desire to control lootable products such as timber, drugs, and gemstones, natural resources like water, or hydrocarbons. Yet, in general, they are not the primary initiators of a conflict. The development of natural resources impacts states' power, foreign policy, and human security, political and social stability. Thus controlling resources change world politics by creating new regional and global dynamics by forming new alliances or changing the structure of the existing alliances.

Sometimes natural resources itself can be used as a weapon during the war times, and this is not a new trend. For instance, in 430BC during the Peloponnesian war, Spartans poisoned the drinking water in Athens. As a more recent example al-Shabaab's (a terrorist group), the action of diverting water from the Jubba River in Somalia and causing a flood that forced opposing forces to move to higher ground, where they were ambushed can be given. Resources can also be served as the triggering factor in inter- and intrastate conflicts. In the lack of democratic or stable state structures, if a state owns natural resources, religious or ethnic tensions, and poverty, these resources serve as fueling or triggering factors of conflict. Many countries in Africa, such as Angola, Rwanda, and the Central African Republic, Democratic Republic of Congo, Sierra Leone, and Liberia diamonds, have funded brutal wars. Only alone in the Central African Republic Blood diamond conflict taken more than 3.7 million lives.

These resources do not have to be lootable, ones which cannot be easily transported can be as important as transportable resources such as water. For instance, fighting over grazing land in central Mali over water resources caused the massacres and the displacement of more than 50,000 people. Cauvery water dispute between Karnataka & Tamilnadu is another inter-state water dispute that emerged regarding the share of Mahanadi River. Water installations can also be the target of military action. Literature indicates that the importance of water resources is rapidly increasing, and actors are targeting these resources in the cases of dispute periods. Chronologically speaking, most water conflicts are subnational disputes, and there is a



significant increase in attacks on civilian water systems.

During the conflict periods, lootable like gemstones and drugs usually becomes the primary source of income. In the case of intra-state disputes controlling hydrocarbon resources may not be the primary aim of the sides or at least rebellions. Due to their easy to transport and sell off advantages, narcotics, and gemstones were favored more in compare to hydrocarbon resources by the rebel forces. Control of lootable commodities plays a significant role in the course of affairs during the conflicts because states cannot invest in their technological, industrial development, or education of its citizens during the conflict times, and rebels can use these resources to finance their activities or to attract more supporters. That's how these lootable commodities become extra crucial for states. Politicians can also use these resources to bribe other states, statesmen, and civilians or use them to finance their military activities too. Just like hydrocarbon resource dependency, leaders can also depend, exploit lootable resources to consolidate their regimes too. Third parties can also support the civil wars to get a share from these lootable; they can either take a side with the government or with the rebellions according to their interests. For instance, in the Democratic Republic of Congo, Kabila Government offered timber concession to Zimbabwe to get their military assistance. Depending on their resources, states may become stronger or vulnerable. Having natural resources in one's territory does not make that state a strong player in international politics. To secure its citizens' security and needs, states have to be able to control and maintain the safety of its resources. We hope to see fewer resources triggered or caused conflicts in the upcoming years.

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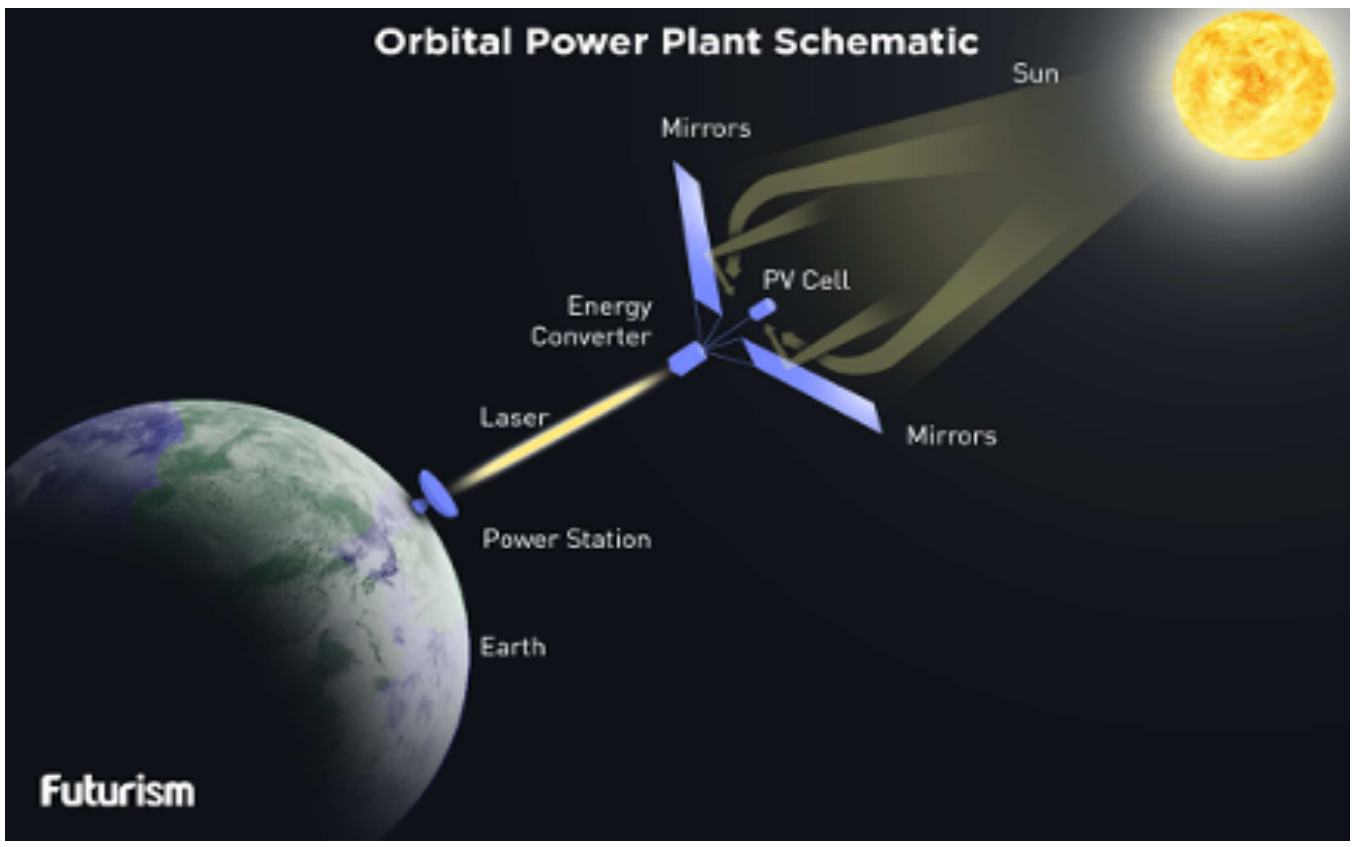
An Update to The Solar Energy Production: Space-Based Solar Power Systems



Solar power plants are considered to be a crucial component of the renewable energy sources crew. It can be argued that it is one of the most promoted ones out of the other renewable energy sources as it has minimal adverse effects on the environment compared to others. Yet, its most significant disadvantage is the fact that energy cannot be produced from the sun 7/24. Also, because of the resistant effect of the atmosphere, about 30% of the solar radiation does not make it to the ground.

As a consequence, the energy produced from the sun on the Earth is not fully efficient. This problem cannot be underestimated as day by day we are running out of energy sources, and paradoxically the demand for energy is getting higher. Fortunately, a solution for this problem has been found and is planned to be constructed in the future to be based in the space named as space-based solar power (SBSP).

According to the European Space Agency, the ideas of the SBSP have started in the 1970s by the Czech-US engineer Dr. Peter Glaser, and throughout the years, it has caught a great deal of attention from the US, Japan, China, and Europe.

To roughly talk about how it works, according to the US Department of Energy, initially, satellites are sent to space along with reflectors and with a microwave or laser power transmitter. Then, the reflectors direct solar radiation onto the panels. Later, panels convert the radiations into a microwave or a laser, and finally, energy is sent to the Earth-directed to an electric grid.

The good news is that in early 2018, scientists from the California Institute of Technology reported that they created a prototype of utilizing and carrying solar energy from the space. They had succeeded in carrying out this project. This step oils the wheels for future big-budget projects concerning SBSP.

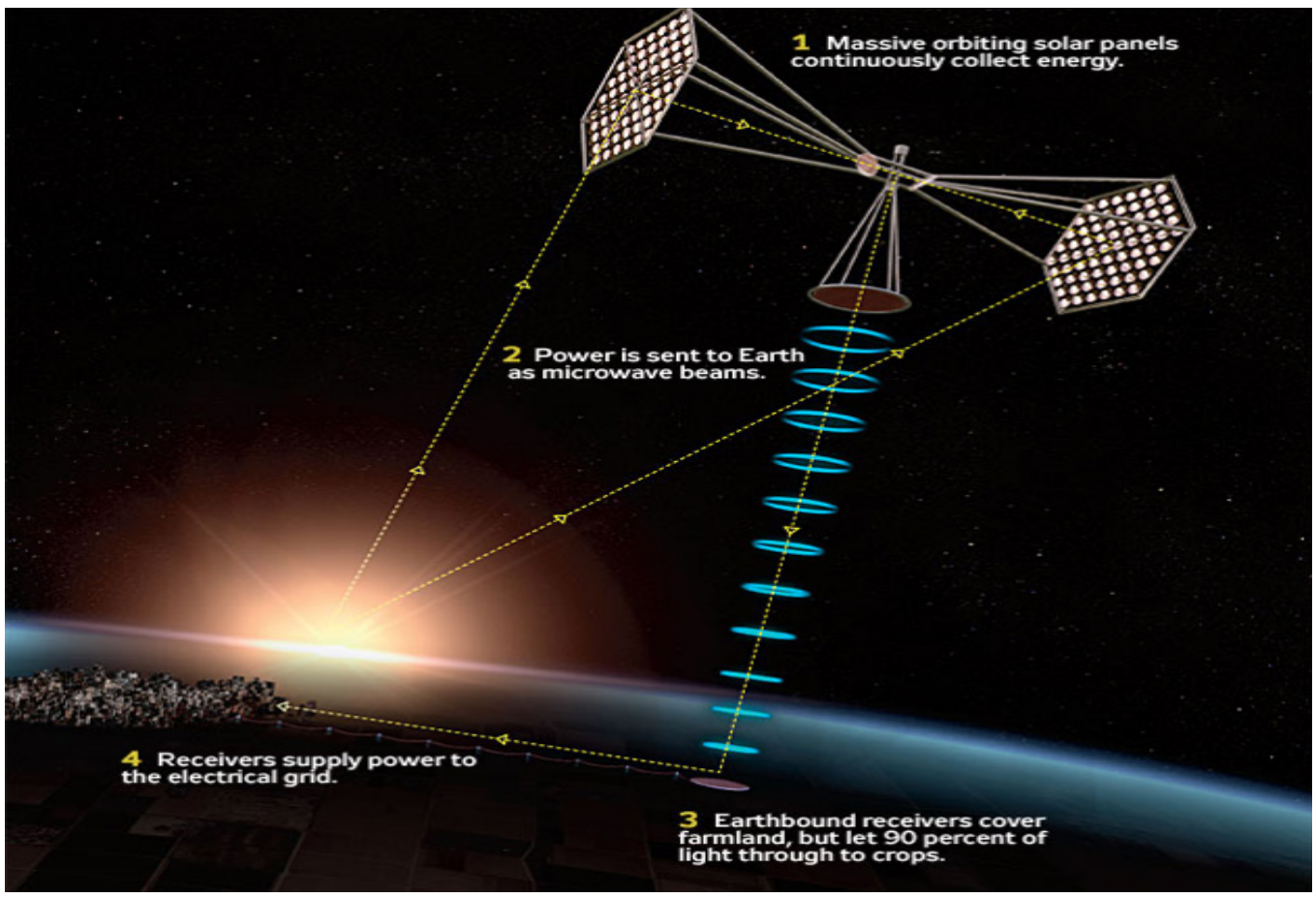
SBSP, when constructed, will bring political and environmental changes. It is safe to argue that today some states which own energy resources within their boundaries use this chance to consolidate their power in their relations with other countries. States that purchase energy from the energy supplier states nowadays prefer producing their energy, and hence SBSP might be a good chance for them to eliminate their energy dependence on other countries. An example of this would be the EU and Russia case. EU wants to cut its oil dependence on Russia, and hence SBSP would be a utilizing tool for the EU.

Additionally, according to Oryza Astari (2019), as mentioned in her article "Shoot for the Sun: Why the US should prioritize space-based solar power", deployment of the Space-Based Solar Power System will consolidate the superpower of the USA in the international system. It is essential to mention that China and Japan are planning to launch its solar space stations within 25 to 30 years. States owning SBSP's can change the energy consumption patterns in the future.

To talk about the environment, SBSP might be helpful as a significant step in this subject as it could help to eliminate carbon dioxide emissions by preserving the Earth from heavy industry.

Unsurprisingly, experts are divided into two concerning the SBSP; most argue that we do have the basic science and the basic design to construct the power systems in the space yet, opponents such as Elon Musk from Tesla argue that upfront costs are too high. The costs cannot be underestimated as solely one equipment weighs around 10,000 tonnes, and getting it to the orbit is undoubtedly quite expensive.

Aria İdil Kadirli

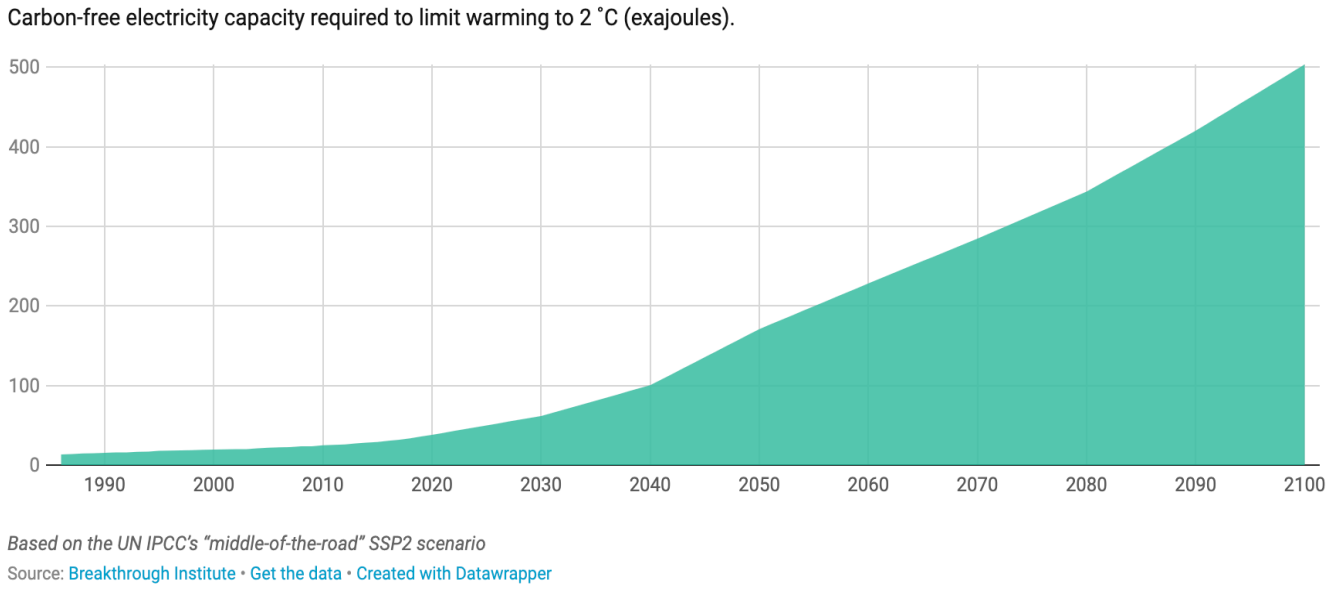


What Awaits Renewables in the Next Decade

With the help of social media activists, the war against climate change and lack of renewable energy have gained a lot of momentum during this decade. Even though the U.S. and China are investing more and more in renewables to reduce their Greenhouse Gas (GHG) emissions, we still lack the speed and the money needed to preserve our planet.

In the U.S., war on climate change is mainly being led by private companies and local governments instead of the federal government. It is because investing in renewable resources and campaigning for a cleaner world is a win-win situation for the companies. By investing in renewables, they are making a long-term investment to power their infrastructure while creating good content for their marketing campaigns. After a while, they don't even have to advertise their long-term plans for zero emissions, and loyal customers will do it for them. Therefore, it is viable both from an ethical perspective and a pragmatist perspective, making it the perfect business plan.

On a more general note, according to a new report by researchers from Stanford University, globally reaching 100% renewable energy would require 73 trillion USD. Still, they claim it will pay for itself in seven years while also creating 28.6 million jobs globally. The report foresees countries may be able to reach 80% renewables during the upcoming decade. This initiative would require a total of 0.65% of 143 most polluting countries (responsible for 99.7% of the pollution). According to the report, it would save 63.000 lives a year just in the U.S. alone. The decarbonization plan would also reduce energy costs by $1.3 trillion per year because renewable energy is cheaper to generate over time than fossil fuels. Besides, the proposal would cut health and climate costs by $700 billion and $3.1 trillion annually, respectively, compared to current fossil fuel infrastructure.



These kinds of incentives will have to be taken into account during the upcoming decade. Volkswagen has accelerated its electric car plans from 1 million electric vehicles in 2025 to 1.5 million. With fast-growing Tesla, electric vehicles (EV) will be seen more and more over time, resulting in a decline for oil. According to the Houston Chronicle, the oil sector might be heading for the last decade of growth. Although OPEC claims demand will rise into the 2040s, Royal Dutch Shell and others believe it could even reach its peak before 2030. Also though U.S S&P 500 Index is up 25% in 2019, the index of oil and gas producers has decreased by 15%, and the energy sector only represents 4% of the index, dropping from a peak of 14%. The oil giant Exxon Mobil has also dropped from top 10 company list for the first time, and even though Saudi Aramco has taken place as the biggest company in the world, even reaching 2 trillion valuations during the boom in its opening, they have returned to 1.7 trillion with its stock value same as the opening, expected to drop further over time.

According to MIT Technology Review, our shift to clean energy during this decade has been pathetic. The cost of wind and solar farms has dropped by 70% and 90% meanwhile producing four times more electricity compared to a decade ago. But they're not still being preferred over precious fossil fuels. Global electricity generation is still being led by fossil fuels, with 64.2% of the total, plunging only 3.2% from 67.4% in 2008. Nuclear energy's place decreased by 3% as well, accounting for 10.2% of the total production. Meanwhile, renewable energy's percentage increased from 2.7 in 2008 to 9.3 in 2018, still being the least used method even though they improved vastly with the help of technology.

EV's are growing incredibly, but they are still a sliver of total car sales globally. Sales increased by over %100 by 1.2 million sales in 2017 (plug-in hybrid and battery electrics) to 2.6 million in 2019. But these are only out of a total of 85 million car sales. But with this growth, competition in the field is increasing as prices drop for the cars, helping the customers choose the environmental-friendly vehicles for the future.

For the future, building a system that fulfills zero-carbon needs, generating enough electricity for expected population growth while growing the economy, and making it fast enough to limit global warming to 2 ˚C would require our annual rate of clean energy additions to quintuple by 2040. It means that we are in trouble, and everything is not going great. With very few incentives and investments by governments, expecting private entities to do the investing, we won't be able to reach any of the goals and live with little changes in our world.

Canberk Taze

BRENT OIL	67.36 $/BL	GASOLINE	7.11 ₺/LT
USD/TRY	5.95	DIESEL	6.59 ₺/LT
EUR/TRY	6.66	FUEL OIL	4.54 ₺

Japan's Nuclear Question - Part I: Historical Background

Despite the painful memories of Hiroshima and Nagasaki, Japan's commitment to nuclear energy dates back quite early to the 1950s. In the year 1954, the first budget for nuclear researches was approved in the diet, two years later, in 1956, the law called 'Long-Term Basic Plan for Nuclear Power Development' was passed, and finally, in 1958, the first nuclear power plant started to operate.

From then on, the utilization of nuclear power has steadily increased. This short series of essays aims to give an idea about Japan's use of nuclear energy with a particular focus on pro and anti-nuclear actors in domestic politics. It will examine the arguments of both camps and the debates revolving around the concepts of energy security and nuclear risk. This part starts with the projection of a brief historical background.

The first anti-nuclear sentiments appeared in the face of Hibakusha (survivors of Hiroshima and Nagasaki) had been campaigning against nuclear weapons from the victim's perspective discourse. However, interestingly, anti-nuclear discourse in Japan gained momentum as a result of the emergence of consumerist and materialist-oriented opposition to the nuclear bombs. In 1954, twenty-three fishermen aboard the vessel named Lucky Dragon No.5 were exposed to radioactive fall-out caused by a US hydrogen bomb test in Bikini Atoll. In the aftermath of the Bikini Atoll Incident -the first global environmental crisis of the Cold War era-, contaminated water, and fish caused panic in the fishing industry and the household.

Especially the prices in the tuna fish markets plummeted after the publication of the radiation spread and contaminated the Pacific ocean where most tuna fishers operate. The profit loss of the fishing industry frustrated the people who make their livelihoods, the anger towards both the US government who tested the hydrogen bombs and the Japanese government that had been unable to protect fishermen's interests had grown.

On the other end of the chain, consumers -overwhelmingly housewives- were alarmed by the 'contaminated fish.' The traditional role of the women in Japanese society had been articulated as 'good wives and wise mothers' who had to take care of consumption and health issues at home for their husbands and children. These housewives thus felt threatened by the 'contaminated fish' in their kitchen. The growing discomfort with the contamination of livelihoods and food, as Higuchi verbalized as 'trouble of fishermen and housewives,' led the emergence of much inclusive anti-nuclear grassroots activism than that of the traditional discourse voiced by Hibakusha, left-wing and the anti-US nationalists.

During the 1980s, the Three Mile Island and Chernobyl accidents worried many Japanese. However, the LDP reassured them by confidently saying that these would never take place in Japan, relying on technical superiority, skillful and motivated staff, and in-depth safety controls. Expansion of nuclear energy continued nearly three decades with full-speed until the 2011 Great Eastern Japanese Earthquake that comes along with a devastating tsunami that damaged the Fukushima Daiichi nuclear power plant. The amount of radioactive materials spread into the atmosphere is ten times higher than Chernobyl and at least one hundred times that of the Hiroshima bombing. On the eve of the 3/11, Japan had the third largest commercial nuclear power program worldwide, with 54 active power plants operating nationwide that generate nearly one-third of its electricity.

Hikmet Can Çakan

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Future of Natural Gas

Having become an integral part of national energy security plans, the development of the natural gas markets is of concern to both producers and consumers. Setting out its main pillars as accessibility, availability and acceptability, natural gas trade has shaped largely around establishing stable trade regimes between nations. Although still not as internationalized as oil when it comes to its end-users, the progress of the natural gas markets is well underway. How that development will play out is a different story. The gas markets initially developed on the concerns of long-term stability of the trade deals as it required massive investments into the physical infrastructure. Having political stability on its transit routes was another matter that nations had to figure out. Building on this, the initial contracts in the industry were long-term in their nature and some even went as far as becoming depletion contracts.

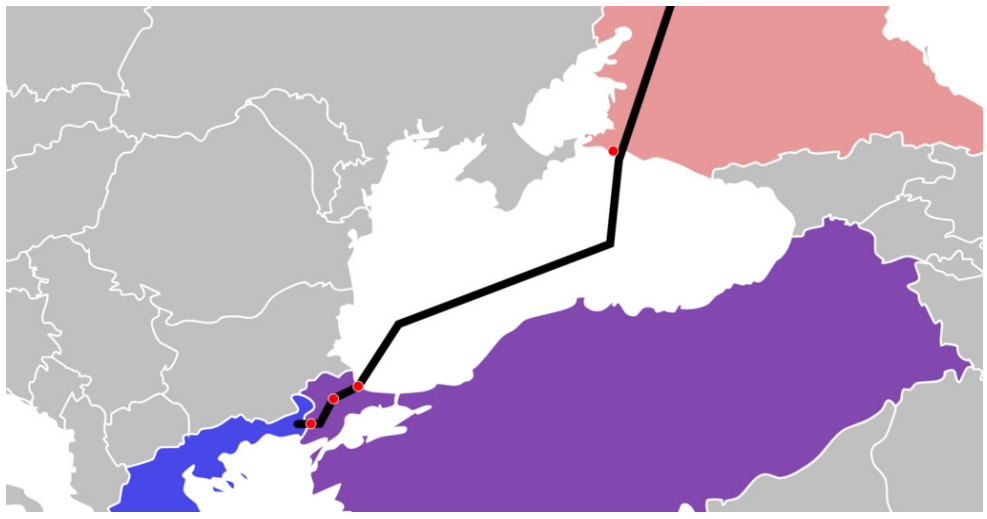
As transaction costs defined most of the primary constraints in the sector, the advancement of local markets into national markets created nationwide energy policies that outlined the transition for the international markets stage. Meanwhile, due to their geographies, the Asia-Pacific nations also created a parallel market for LNG demand contrasting to the widely used pipeline transport. This occurrence had much more pronouncing effects in the future. As markets and demand grew larger, the transcontinental market period had begun and it brought upon many new challenges as market participants had new needs. The growth of LNG is still continuing and interdependence between producers and consumers is increasing at a fast pace. With new pipelines being built and increased LNG vessel traffic coming online, the issue of achieving stability in transit countries has once again become a common goal.

An innovative market-based approach for the new energy system has been the involvement of all parties as shareholders in joint energy projects. This way, a single producer does not have to shoulder the burden of a large investment while giving leverage for the consumer. Transit countries on the other side also gain stakes as they now have to ensure the stability of their geography for the success of the projects. While potentially losing advantage at the bargaining table, consumers also make equity gains and achieve a common point of convergence amongst all concerned parties. Vertical integration on the other hand bring about an old business method that can potentially be exploited in the marketplace.

To understand how a dynamically priced natural gas market can behave and perform in the future, a more profound approach could be followed by focusing on the similarities of the progress in oil markets throughout time, including the many crises that has taken place. The economies of scale however should be taken into account when making this analysis. With the growth of the spot markets of LNG, the status quo of long-term projects is to be challenged. How swiftly will the markets be able to respond to the challenges of the upcoming price volatilities? Will it take the parties as long as it did for long-term contracts to align their mutual outcomes or will a more practical approach be followed having understood the benefits a cooperation-based business model has on reducing the transaction costs? Many other questions remain yet to be answered. As is with most other things, time will tell how it will play in out in the real world but speaking in general terms, accurate forecasts can be deemed to be of viable standing as of today considering the track LNG markets have followed and the spot market dynamics that followed suit.

Alpcan Efe Gencer

Sanctions are coming: The Future of TurkStream



Throughout 2019, the US Congress has approved numerous legislative measures to stop Russian energy expansion towards Europe. With the 2020 National Defense Authorization Act (NDAA), which passed Congress on this December, sanctions will take place on companies involved in TurkStream. NDAA is the annually enacted legislation to specify and regulate federal laws on the budget and expenditures of the US Department of Defense

Section 7503 of the Act includes sanctions targeting maritime companies that provide pipe-laying services for the construction of Nord Stream 2 and TurkStream pipelines. These sanctions were part of a broader bipartisan effort in the legislative branch, and they were previously a draft law of their own dubbed as the Protecting Europe's Energy Security Act of 2019. Still, congressmen integrated it within the NDAA to prevent it from hitting any obstacles whether from President Trump or the Department of State, meaning that the likelihood of facing any opposition for the enactment of the Act is very low.

The ultimate impact of the sanctions concerning TurkStream would be minimal as the underwater part of the construction process is primarily completed as recently, the Turkish Energy Minister announced that TurkStream would be launched on the 8th of January with the participation of Turkish President Erdogan and Russian President Putin. But the Nord Stream 2, however, is very likely to be negatively affected by these sanctions as the project faced several delays due to weather conditions at sea to lay downpipes.

With 930 kilometers of it laid down offshore, TurkStream will transfer Russian gas to Europe through Turkey. Although with this pipeline, Russian gas will enter Europe through the Balkans, with facing sanctions and delays, the problems arising for Nord Stream 2 can increase the importance of TurkStream, thus indirect reliance of Europe to Turkey for the Russian supply of natural gas.

Another aspect of this project is its geopolitics. The pipeline is laid on the Black Sea, which has become a significant area of interest and importance to divert resources for NATO which for the first time after the end of Cold War has designated excellent power competition as its primary conventional doctrine again this year, targeting Russian political-military expansion towards West.

A joint venture of BOTAŞ and Gazprom, the Turkey-section of the project in terms of engineering and pipeline platforms, is carried out by Petrofac and Tekfen Holding of Turkey, which could be among the targets of the sanctions.

Ercan Emre Çelik