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SYNERGY

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Energy Policy Research Center

Synergy Begins!

What makes energy such a challenging and interesting issue? It has several aspects, sub-topics to discuss to answer that question. But, here is a tip for you: There is no one right answer. This is not an issue only for economists, political scientists, foreign policy analysists or engineers and surely they can address these issues alone. However, having a synthesis of insights and offerings of all disciplines are needed for energy and should be evaluated with a critical eye to reach the best.

Energy plays a significant role in every stage of the economy and, energy security is a fundamental part of international conflicts. Oil, natural gas, coal, nuclear energy, and all types of renewable energies have their own advantages and disadvantages. Besides, not all sources are substitutes for each other. The primary concern is to acknowledge these advantages and disadvantages and, design an optimum policy mix for Turkey. In this way, we will bring both energy security issues to our attention. Reaching an optimum policy also requires that we take the advantages of our geopolitical location, young population, and increasing domestic aggregate demand on the energy sources.

Turkish energy policy choices are also important for other countries. For example, Baku-Tiflis-Ceyhan (BTC) Pipeline undoubtedly very valuable for Azerbaijan and Georgia. Eight percent of world crude oil pass through Turkish straits which are very important for rest of the world since the BTC Pipeline is one way to feed European countries. We are the second largest gas importer of Russia and, we are the top customer for Indian gasoil. All these raise another question of how we can design the Turkish energy policy as an advantage for us and our allies.

Emerging new trends in the energy sector will make the world completely different places in the following decades. Thus, understanding these trends and taking strategic positions on each part of the energy sector is essential for any firm or country. In this bulletin, volunteers will report the new developments, trends, and issues that the world had been following. I wish the volunteers from Bilkent Energy Policy Research Center (EPRC) would bring various issues to Bilkent community to create an awareness of optimum energy policy and the international dimension of Turkish energy policy. I wish all my best for the new challenging but enjoyable process.

M. Hakan Berument

Iran Nuclear Crisis

In July 2015; China, France, Russia, United States, United Kingdom and High Representative of the European Union for Foreign Affairs and Security Policy created a deal with Iran to maintain Iran's nuclear enrichment and ensure the peace in Iran's Nuclear Programme. The Nuclear Deal, which is officially named as Joint Comprehensive Plan of Action (JCPOA), was aimed to contribute to the regional and international security and peace by preventing Iran to build nuclear weapons. Yet, it has turned to a different direction.

The nuclear deal was comprehended the lifting economic sanctions on Iran and the parties of the deal agreed to cooperate with Iran in further joint projects in different areas. By the deal, Iran obtained access to the international market in return for redesigning its nuclear programme. The deal was seen critical by other states because before the agreement, it was believed that Iran was expanding its nuclear capability to be able to create a nuclear weapon in few months. (Al Jazeera, 2019). As Iran being a threat for other powers, by this deal, Iran's enrichment of uranium was restricted. Iran agreed to keep its uranium levels to be complied with the determined level and it would be inspected by International Atomic Energy Agency which is partner of United Nations.

The deal was also restricting Iran's engagement to

the research and development for nuclear weapons. According to the BBC's news (2019), Obama administration revealed that the nuclear deal would decrease the chance for Iran to create a nuclear bomb in a short timeframe.

However, in May 2018, US President Donald Trump declared US' unilateral withdrawal from the Nuclear Deal in his speech at White House. He claimed Iran not being complied with the Nuclear Deal. He demanded the removal of the deal's time limit and some restrictions on Iran's ballistic missile programme.

Other parties of the agreement are opposed to Trump's actions and they did not consider the withdrawal from agreement. They support the continuation of the Nuclear Deal in order to keep Iran's nuclear power under control and international oil trade, as Iran being one of the most important oil suppliers in international area.

In May 2019, Iran responded to Trump's action by giving 60 days to the other parties for securing the Iran's economy and the agreement from US sanctions. Iran claimed that otherwise they will continue to their Nuclear Programme step by step.

According to IAEA's record on Iran's nuclear enrichment, the enrichment level of Iran exceeded the percentage that was determined in the Nuclear Deal. Plus, Iran declared that they will go further in their incompliance with the deal, unless US lifts the sanctions.

Recently, the tension between Iran and US has been continuing. Iran does not want to negotiate with US on the nuclear deal and pushes other signatories to make US remove the pressure on Iran's economy.

Feyza Ünal

A Survivor of Cold War: The NATO Pipeline System

Did you know that NATO has a pipeline system that is designed to ensure that its requirements for military-grade fuel supply and its distribution across the Alliance can be met at all times 7/24?

The NATO Pipeline System (NPS) was set up during the Cold War to supply NATO forces with fuel, and today it continues to satisfy the fuel requirements of not only the militaries but as well as several commercial aerospace outfits.

NPS runs across the territories of 13 member states and has a length of nearly 12.000 kilometers with a storage capacity of 5.5 million cubic meters. Even though today's focus shifted NATO away from its static pipeline infrastructure to adapt towards a concept that requires rapidly deployable support to sustain allied expeditionary activities, thanks to a combination of fourteen distinct but interoperable modules, the static infrastructure maintains its importance. Thus member states can receive, store, and distribute fuel at any place, any time.

NATO member states extensively use this system for military purposes in peacetime as well, mainly for swift, fast and secure delivery of aircraft fuel to military airbases. The spare capacity is used to support commercial traffic with the condition that the primary concern of meeting military needs is not affected.

NPS integrates the fuel supply of depots, military airbases, civilian airports, pumping stations, and entry/discharge points. It consists of eight national pipeline systems and two multinational systems stretching across Europe, including Turkey whose system consists of two separate pipeline systems known as the Western Turkey Pipeline System and the Eastern Turkey Pipeline System.

The command, control and operating rights of the Turkish Pipeline System (TUPS) solely lies on the Ministry of National Defence which has a separate departmental-level branch that is tasked to deal with

issues concerning TUPS and its use, named as the Presidency of Fuel Supply and NATO POL Facilities. One of the four deputy-ministers is solely tasked to oversight this department only along with two minor units whereas the other three deputy-ministers are responsible for several numerous departmental-level groups within the ministry. That explanation perhaps can signify the vital importance of these pipelines for any host member-state.

The Turkish Pipeline System was constructed and declared operational at the late 1950s. Today it has a length of over 3.200 kilometers with a storage capacity over one million cubic meters. These storages are also reinforced with fuel refined at TÜPRAŞ facilities to be distributed to military bases via TUPS to support and meet the supply needs of Turkish Armed Forces and NATO allies.

Since the end of the Cold War, the NPS has been used for several civilian and military purposes. Today's increased demand for fuel, mostly arising to meet the needs of the aerospace sector, can only be achieved by the NPS, which remains as the most cost-effective, secure and environmentally safe method of storing and distributing fuel to Alliance forces.

Ercan Emre Çelik

The Dragon & The Women In Shiny Armor

Many people who are interested in oil business have probably heard of the Standard Oil Trust and it's founding father John Davison Rockefeller. Vertical integrated monopoly of Standard Oil controlled the railways, refineries and oilfields among many other businesses in US while pushing other players out of the market. Running the risk of economic loss in return of power and total control of the whole value chain of oil, the Standard Oil Company was portrayed as a ruthless dragon. When the trust was broken up into 34 independent(!?) companies by the Supreme Court of the US in 1911, the dragon was said to be finally slain. What less people might know is the story of the knight who led the attack on the dragon. And to my surprise that knight was a woman. Ida Minerva Tarbell's expose of Standard Oil is a great example for a case when pen proves to be mightier than the sword.

Born in 1857 in Pennsylvania, Ida Tarbell was an eyewitness to the Pennsylvanian Oil Rush (starting with the first discovery of Colonel Drake in 1859) which later affected her life greatly. She was the only woman to graduate from her class of Biology at Allegheny College in 1880. Since science wasn't really welcoming for women she couldn't become a scientist. Instead she took a job at a magazine where later on she developed her passion for writing.

By the time she took on the biggest trust of all time she had already written many articles at various magazines. The fact that she began working on the case of Standard Oil in 1890 but wasn't able to publish anything before 1902 shows how much effort she needed to put in. But even though the legwork was exhausting she also had the chance of having an ace in her sleeve. Mr. Henry Rodgers, who had worked for John D. Rockefeller, was willing to talk with Miss Ida Tarbell in private. Miss Tarbell's 19 articles, written by the help of Mr. Rodgers and her assistant John Sidel, were put together as a book of 2 volumes in 1904 under the name of "The History of Standard Oil Company".

Miss Tarbell's work has greatly influenced the federal lawsuit in 1906 against Standard Oil based on 1980 Sherman Antitrust Act, and in 1911 caused the dispersion of the greatest trust of all time. She became one of the pioneering journalists of her time (the progressive era of US) called the muckrakers. Even more importantly, being a woman in the early 20th century and achieving such success she became an inspiring role model for the upcoming generations. She is the proof that true commitment eventually pays. "*A mind which really lays hold of a subject is not easily detached from it.*" — Ida TarbellI

Hasan Gürsel

EPRC Volunteers Designs Energy Policies For A Better World

Nowadays, if you visit the A building at Bilkent University, you will encounter many people studying energy issues in the Energy Policy Research Center (EPRC) very hardly. Since we could not fit 52 volunteers and one cat, Cobb-Douglas, to our office, we spread all around the building.

Starting from June, people from various departments such as economics, political science, and engineerings collaborated to resolve the ongoing energy issues both in the national and global level. The volunteers worked on nearly 15 different projects that required the

attention of the world. The interdisciplinary structure of the team provided different perspectives on developing solutions. When the lack of experience arose, the volunteers received support from government officials and other experts from different parts of the energy sector.

Even the adaptation process was severe at the beginning; our volunteers managed to learn the structure in the energy sector rapidly and created new information by combining their resources. During the summer period, up to now, we have published seven different energy notes and made three separate presentations. Işık Zeynep Cebe, Dilay Alpaydın, and Eylül Özsoy proposed Nigerian gas to reach Europe in the note named An Alternative Pipeline To Europe From Nigeria: Bilkent Gas Pipeline Project. Volkan Aslanoğlu, Esin Poyrazoğlu, Muhammed Aykan Koçak, and Gökberk Çolakoğlu, on the other hand, worked on the Iranian sanctions and its effects on Turkey's supply security.

In some studies, our volunteers and specialists from the professional world worked together. Ebru Selderesi and Barış Sanlı from the Ministry of Energy and Natural Resources worked on the Electricity Production and Consumption in Turkey Change in Weight Balance Point: 2016-2018 Period.

Besides the publications in Bilkent Energy Notes, three groups made presentations on their topics. Aria İdil Kadirli and Sıla Sofuoğlu made a presentation on the supporting mechanisms of renewable energy systems. Hilal Taşkan made a presentation about the structure of the Russian energy companies and their future goals. Finally, Alpcan Efe Gencer, Javid Hasanzade, and Muhammed Saad Rasool made a presentation about the alternative energy projects in the Caucasian region for the supply security of the European countries.

In the upcoming weeks, we are going to publish more of our studies, and we will make additional presentations. You can get the latest news from our social media accounts and bilkenteprc.com.

Gökberk Bilgin

BRENT OIL	59.04 $/BL	GASOLINE	6.83 ₺/LT
USD/TRY	5.83	DIESEL	6.37 ₺/LT
EUR/TRY	6.40	FUEL OIL	3.70 ₺

Soilless Agriculture

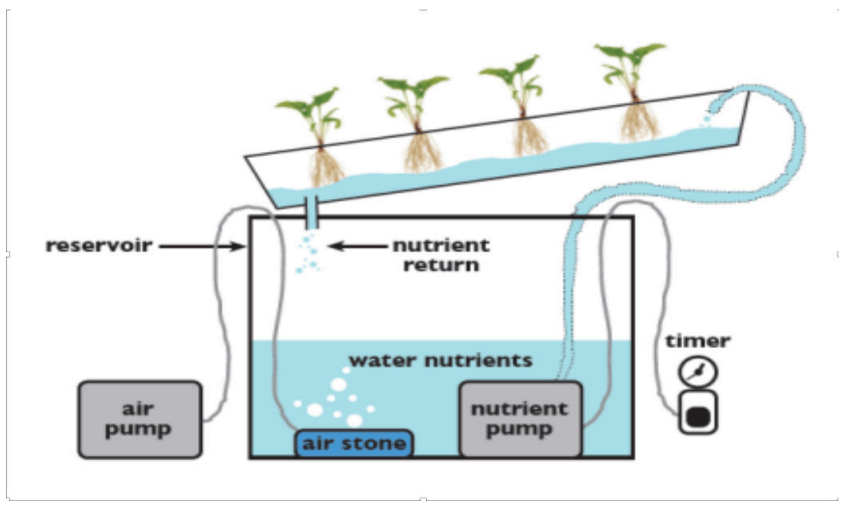
Soilless agriculture (hydroponics) has a key role to provide demand security. Soilless agriculture allows harvesting regardless of season or natural disasters, such as flood and drought. Whether agricultural foods are grown using soilless or soil methods, all plants need fundamental nutrients to grow. In that case, water is a critical factor in the growth process, nutrients, light and air are also major complements.

Why soilless agriculture?
-Soilless agriculture allows feeding high populations in limited land.
-Lower energy costs and less water consumption compared to conventional agriculture.
-Less labor cost due to the help of technology.
-Less greenhouse emission.
-Profit gained from the unit area, soilless greenhouse agriculture model is approximately 50 times more profitable than conventional agriculture models (Denizbank). Especially, vertical farming allows to better usage of land.
There are several ways to grow plants without soil. Plants are grown by hydroponics method. With hydroponics method, the plant grows without soil itself but obtains needed nutrients from the water.

Most successful and commonly used hydroponic systems:

NFT Hydroponics System

In Nutrient Film Technique (NFT), plants are planted on a container placed with a slight slope. Nutrient water is pumped and the water circulates. NFT systems recirculate. Nutrient pump constantly flows. In NFT method it is crucial that water keeps flowing and in case of a failure of movement of water, whole plants soon after start to show drought problems.



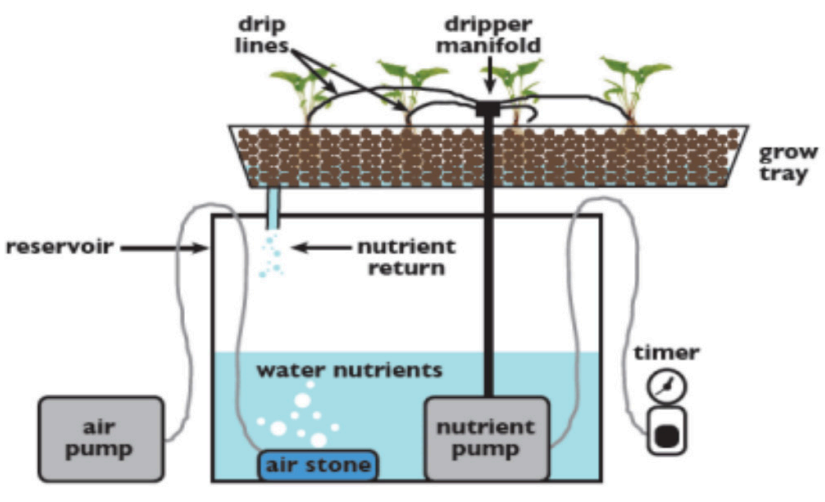
Conventional Hydroponics Grow System

The most conventional hydroponics grow method is to replace the soil with other possible inert substitutes. The two best-known small rocks in conventional hydroponics are clay pebbles and rock-wool. Rock-wool has better absorption properties and clay pebbles drain very well. Conventional hydro systems are either recirculating or drain-to-waste.

All soilless agricultural methods have the same requirements, such as providing water and nutrients to the plant roots and light in a convenient temperature environment. Soilless agricultural facilities look like laboratory and the main reason is that growers have to observe plants growing process and control the system so as not to cause any failure of mass plant death.

Economic benefits (higher profitability and less land use), environmental benefits (no fertilizer used and less water consumption) outweigh conventional agriculture. However, although soilless agricultural foods have the same quality without chemical intervention, soilless agricultural foods are not qualified as organic agricultural food.

Selin Güngör



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Recent News on Energy Sector

Americas

- Venezuela wants massive adoptation of crypto petro gold. Announced in 2018, Petro Gold is a gold-backed cryptocurrency owned by the Venezuela government. It is different from Dollar, which seeks to shiled and protect savings. (CryptoKnowmics)

Asia

- China’s July Crude oil imports from Malaysia near record levels in July, customs data showed, with traders and a tanker tracking anaylst citing oil either transshipped from Venezuela or blended with Venezuelan crude for the unusual growth. (Bloomberg)
- Saudi Aramco has confirmed reports of a drone attack on the 1 million b/d Shaybah oil field. (Saudi Aramco)

Europe

- Germany, Denmark and The Netherlands are building island to house 7000 wind turbines. It could provide electricity for 80 million Europeans. (TEMET)
- Russia’s Rosneft has notified buyers of oil products that futre tender contracts will be in Euros, not Dollars.
- As the share of foreign sources declined %15.4 compared to last year, Turkey saved $1.4 billion.
- Frontline sees opportunity in tanker market: So far in 2019, 41 VLCCs and additional 33 VLCCs are scheduled to be delivered with 43 more in 2020. (World Energy News)

Africa

- Morocco is building a solar farm as big as Paris. It will provide clean energy 24 hrs a day. (PBS)

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