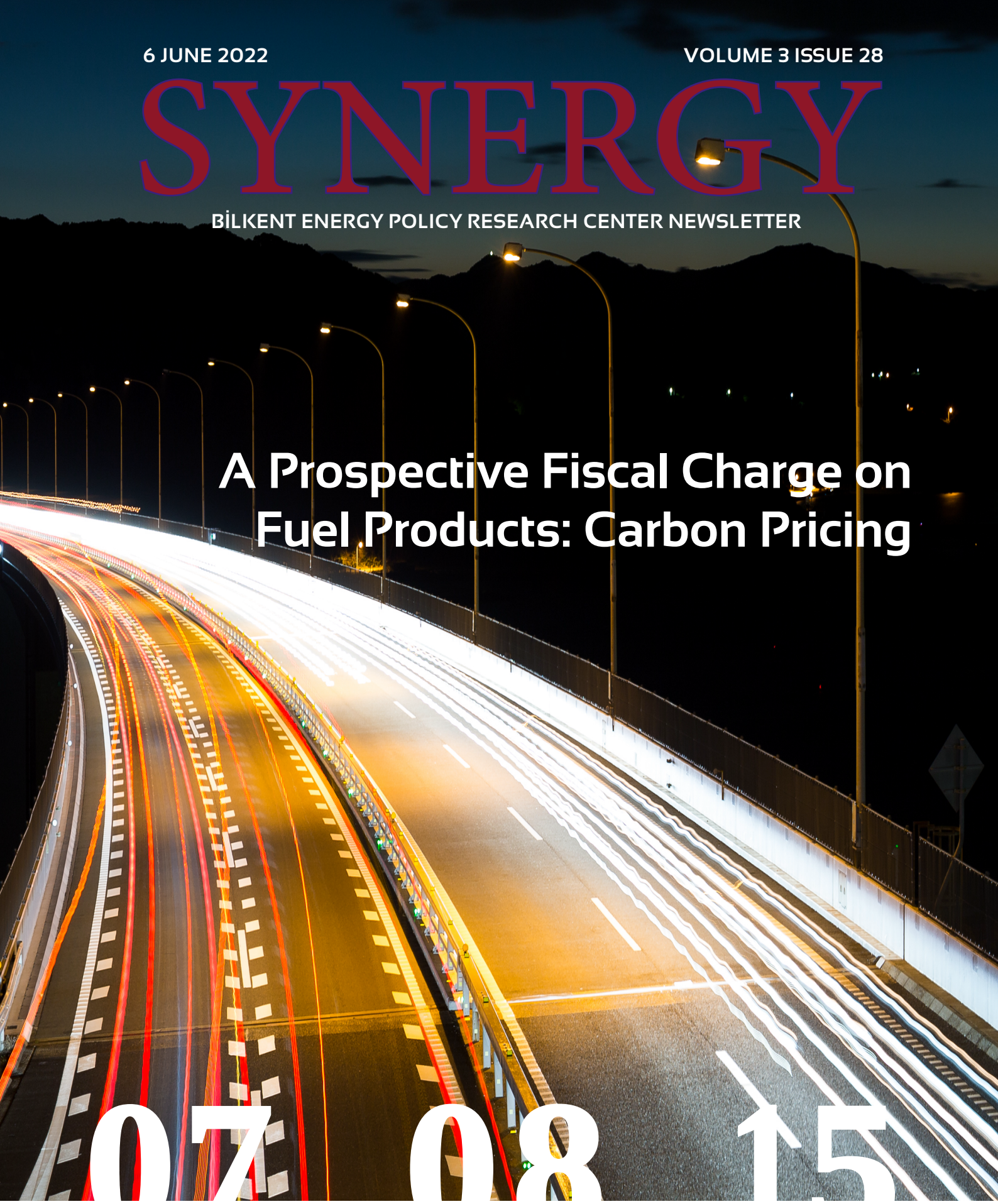
6 JUNE 2022 VOLUME 3 ISSUE 28

SYNERGY

BİLKENT ENERGY POLICY RESEARCH CENTER NEWSLETTER



A Prospective Fiscal Charge on Fuel Products: Carbon Pricing

SYNERGY
6 JUNE 2022 **VOLUME 3 ISSUE 28**
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In This Issue...

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ABOUT US

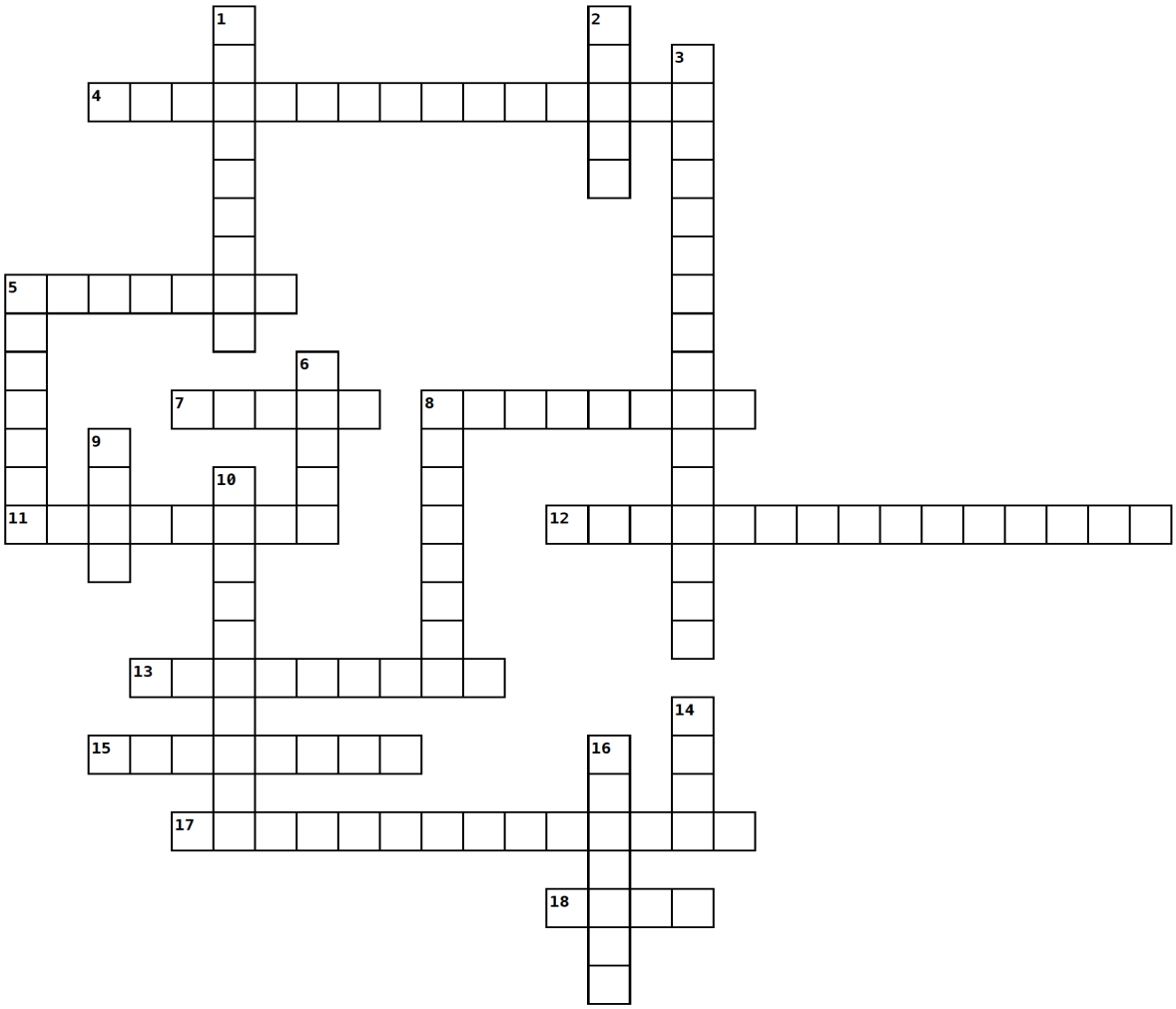
Energy Policy Research Center

Synergy is a weekly online newsletter published by volunteers on bilkenteprc.com. It welcomes feedback from readers. Please submit your letters to eeps@bilkent.edu.tr. The Editorial Board will review the letters and print them as space permits. The contents of this newsletter are the author's sole responsibility. They do not necessarily represent the views of the Bilkent Energy Policy Research Center or any of its Members.

BRENT OIL	120,51 $/BL	GASOLINE	26.05 ₺/LT
USD/TRY	16.58	DIESEL	26.35 ₺/LT
EUR/TRY	17.86	FUEL OIL	16.90

Weekly Puzzle

Prepared by Büşra Öztürk



Across

4. The process of replacing fossil-fuel-based technologies with technologies that use electricity as a source of energy

5. The country which has had the highest recycling rate since 2016

7. The country which is a major producer and exporter of natural gas, oil and oil products

8. The name of the meeting where climate and energy policies cooperation was also discussed by seven developed countries

11. The group of wind turbines used for electricity generation

12. The shift from an energy system based on fossil fuels to one based on renewable energy sources that produce low carbon emissions

13. A unit of volume measurement that is mostly used to describe amounts of oil and gas by U.S. industry

15. A synthetic fuel that can be produced from water, fossil fuels and biomass to obtain energy by the methods of combustion and fuel cell

17. The term related to concerns about the inequitable outcomes of climate impacts and the fairness of policies to address climate change

18. An abbreviation for the group of elements that have diverse energy applications such as use in magnets and electric motors in wind turbines or in petroleum refining

Down

1. The conversion of waste materials into new materials and objects

2. The country which has had the lowest recycling rate since 2018

3. The term for ensuring a reliable energy supply against the event of collapses such as price increases or fluctuations in supply

5. The city where the 2021 United Nations Climate Change Conference or COP26 was held

6. Finnish state energy company that sells the nation's natural gas

8. A refinery product made from a mixture of petroleum liquids used as an engine fuel in vehicles

9. A non-profit organization aiming to exchange ideas on key energy issues in Southeast Europe

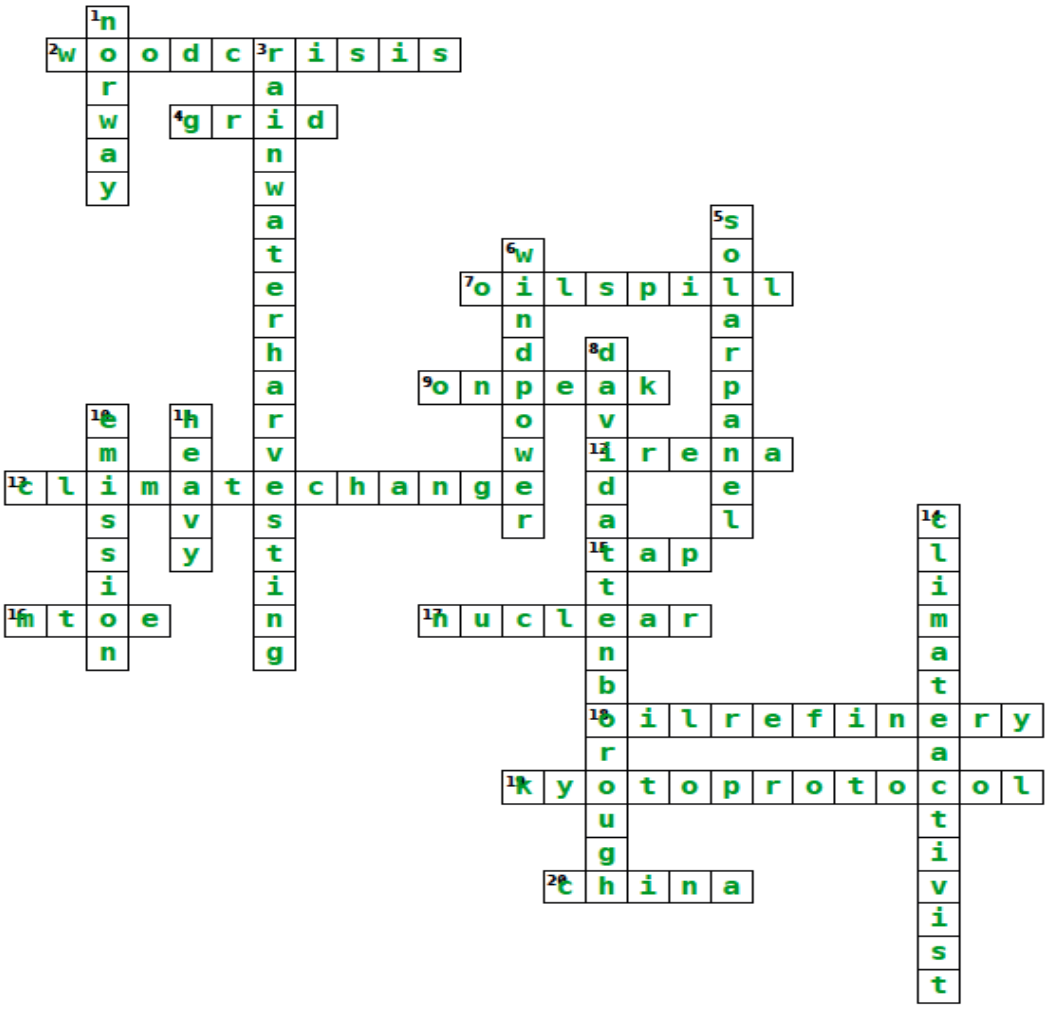
10. Executive Director of the International Energy Agency since 2015

14. An organization that aims to coordinate and unify petroleum policies of its Member Countries

16. The term for achieving a carbon balance in which the amount of carbon added to the atmosphere equals the amount removed

Previous Week's

Correct Answers



Across

2. The shortage of the most fundamental and first natural resource

4. A network system that provides transmission within the city

7. Pollution form caused by leakage of petroleum into the environment

9. Time interval when energy demand and price is high

12. An intergovernmental foundation mandated to enable cooperation and promotion of the use of renewable energy sources.

13. Longterm shifts in weather conditions and temperatures

15. An abbreviation of the European leg of the Southern Gas Corridor that is transporting natural gas from Azerbaijan to Europe

16. The measure of energy released by burning million tons of crude oil

17. A form of energy released from the core of an atom

18. An industrial plant that refines crude oil to produce fuels such as gasoline

19. Name of United Nations Framework Convention committed by countries to adopt policies on reducing the emission of gases.

20. The country which has the biggest hydroelectric facility in the world

Down

1. The country embracing recently an increment plan of gas supply to Europe

3. A system that helps to restore rain for the further reuse

5. Module that is designed to collect sun's rays to produce energy

6. Electricity produced by using aerodynamic force

8. Producer of very striking documentaries about how humanity destroy nature and cause climate change

10. A release of greenhouse gases to the atmosphere

11. The property of crude oil when API gravity is low

14. An individual who actively campaigns for the problems related to climate change

Enerji Politikaları Araştırma Merkezi

Enerji Söyleşileri

Nigar Gökmen

Esin Avukatlık Ortaklığı
Enerji, Madencilik ve Altyapı Birimi Yöneticisi

9 Haziran 2022
21:00 zoom

Kayıt için:

How Resource to Technology Shift Change in Energy Geopolitics?

Barış Sanlı

In the energy system, there are two major trends. The first one is more renewables, and the second one is more electric. Whether nuclear will create another trend needs more time. But from a very macro point of view, we are shifting from burning underground resources to materializing these resources.

Fossil fuels are concentrated sunlight. It provides an essential service that other resources lack: control. The natural resources are evidently not quite controllable. We are more in the realm of "predicting" them. This prediction and prediction horizon provides us the time span to manage control strategies.

The burning of fossil fuels is a big contributor to global warming. If we are to transition from fossil fuels to renewables, our need for mining will surely increase. Instead of burning them, we will be molding the natural resources into 3D objects like panels, turbines, and overhead lines. The hydrocarbon age is transitioning to the age of a new metal. But the requirement for metals may be huge. There are enough resources around the world. But their location is fixed. That means some countries will be more advantaged compared to others.

There is also another perspective of it. In the Standard Oil and Rockefeller story, there is an interesting point about the supply chain strategies. Rockefeller didn't bother with oil drilling in the beginning. He controlled the midstream. This control gave him enormous leverage over the drillers and the markets. Today China is using the same strategy as Standard Oil.

The world is shifting from an efficient economy to a resilient economy. Resilience is not cheap. Efficiency was fine with flooding the world PV markets with Chinese PVs. On the other hand, resilience requires diversification, idle capacities, storage, and other "not very efficient" tools. Someone has to pay for these tools, and it is consumers.

Energy resources are a mixture of two major components: Technology and resource. When you have coal, technology need was not the major component of this investment. But when you have solar and wind, it is all about technology. So the share of a resource-technology dilemma varies from fossil to renewable resources. If the technology is more exotic (requiring rare earth materials), resources to materialize that technology becomes critical. There is always a possibility to invent new technologies by changing the structure of carbon atoms or nanotechnology. But reality dictates a new kind of resource dependency.

So there will be a competition between two kinds of resources for the transition period. One is the resources for combustion, and the other is resources for materials and technology. This will also create a competition of geographies. The major tested strategy is to control the midstream for all these resources, whether it is lithium or oil.

Therefore geography is returning with a vengeance. The technological shift can be faster, but bottlenecks are not visible in the Excel sheets or models. They will be more visible as demand surges. We are creating a new resource dependence on the top of the current dependence. This is what we will discuss in the following decade.

Book Review: Emerging Technologies: Value Creation for Sustainable Development

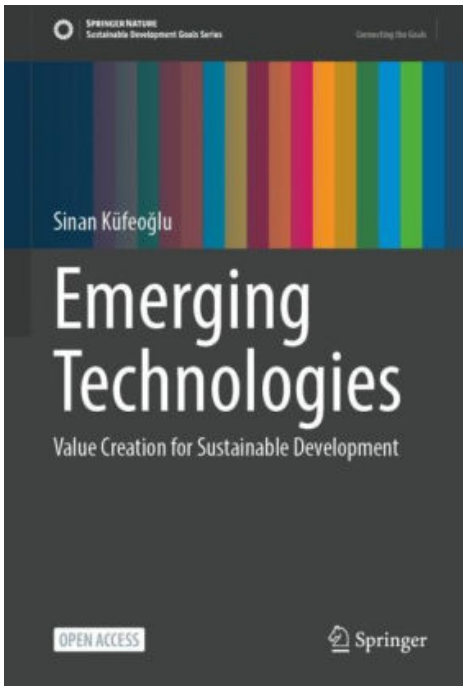
Büşra Öztürk

The book Emerging Technologies: Value Creation for Sustainable Development, written by Sinan Küfeoğlu describes emerging technologies and business models that follow technological innovation to provide social development in the face of Sustainable Development Goals (SDGs), has been recently published. What excites me to study on this book is the informative work on many different sectors, including energy and climate issues. Furthermore, it could be used as a guideline by enterprises and investors and regulators to take action through SDGs.

SDGs, representing a doctrine to enable prosperity and peace globally, have become a global language for expressing sustainability impacts and contributions. SDGs were developed in 2012 when United Nations Conference on Sustainable Development was held in Brazil. The goal was to establish a set of global plans to address humanity's environmental, political, and economic challenges. In this way, the United Nations (UN) chose 17 objectives by defining the world's most urgent problems. Then, SDGs have become the commitment globally to providing sustainable development.

The UN considers that development is possible under the balance between social, economic, and environmental sustainability. In this sense, the goals are adopted from different areas that are all interrelated, as some goals have the same indicator as other goals. The book clearly explains the relation between them by referring 'triple bottom line' term, which is a reporting impact through the three degrees of economic success, environmental preservation, and social equality. In this way, it is possible to achieve another SDG target while achieving one SDG target since SDGs are combined. On the other hand, there could exist tension among SDGs when the targets are desirable but incompatible. However, the other goals or indicators could provide a tool for cooperation. A prominent example of such trade-offs is the incompatibility between the SDG9: Infrastructure, Industry & Innovation, which aims to increase the share of the manufacturing sector in global employment, and the SDG13: Climate Action, which combats increase in carbon emission. The book highlights that policymakers and stakeholders should make strategic decisions about achieving economic growth while also preserving the environment for achieving these two goals at the same time by considering the term the triple bottom line.

The book also focuses attention on the need for the cooperation of enterprises and businesses and regulators to achieve SDGs. The fundamental justification for acceleration in the increase of enterprises is the rapid



spread of emerging technologies that incorporate immense value and potential to make our lives easier. The book discusses and describes 34 emerging technologies which have market diffusion and are commercially available. Some of these emerging technologies listed in this book are directly related to low-carbon energy transformation and sustainable development. At the same time, others also identify significant implications for global carbon neutrality and sustainable development from a broad system perspective. Furthermore, the book affirms that emerging technologies also have significant environmental benefits, as incorporating innovative solutions into urban infrastructure can reduce greenhouse gas emissions by 10-15%. Integrating technologies into SDGs could expedite mitigating climate change while protecting the economies and supporting green business growth.

Sustainable developments could also be investigated as value creation, so how the companies create value is the leading research topic of this book. Values are classified as economic, social, and environmental values in the triple bottom line. The book also brings business models of 650 noteworthy and innovative companies worldwide. While investigating business models, briefly value proposition, value creation, and value capture by responding to the questions what, how, and what kind of revenue respectively are presented, which may inspire the readers who are considering starting a business and contributing to society by achieving SDGs.

Thanks to today's massive data sharing, the book has collected data from various companies. One of the striking results shared based on this data is that SDG9: Infrastructure, Industry & Innovation, SDG13: Climate Action, and SDG7: Affordable and Clean Energy are the top three SDGs integrated with emerging technologies, respectively. Another result is that among these SDGs, companies' most used emerging technologies are Artificial Intelligence, the Internet of Things, Big data, Energy storage, and recycling Technologies. As a result of examining all these business models, it has been observed that developed countries such as the U.K., U.S., Netherlands, and Nordic countries take the lead in adopting emerging technologies and converting these into business cases for ensuring sustainable development.

This 'Emerging Technologies: Value Creation for Sustainable Development' could greatly assist anyone interested in identifying viable established innovations that deliver sustainable outcomes and help justify their inclusion in each investment by identifying and quantifying SDG contributions.

What is Davos Saying About Environmental Risks?

Gülce Özdilekcan

Looking at the world's current situation, we all have predictions about what is going to happen in the next period as well. Risk itself has many definitions; however, we see them beforehand and are prepared for them. World Economic Forum was established in 1971, and it is known for its summit, Davos. It is held in Switzerland and Davos, and in my opinion, it is one of the unique kinds of the summit for them. They define their uniqueness by "bringing together the world's foremost CEOs, heads of state, ministers and policy-makers, experts and academics, international organizations, youth, technology innovators and representatives of civil society in an impartial space to drive positive change." It is an environment with all kinds of points of view, and they have one idea in common: the benefit of the world. In their Global Risk Report, which is published every year, they aim to address five main topics, which are economic, environmental, geopolitical, societal, and technological.

Many things have changed from 2020 to 2022. Still, some hot topics have remained the same. Therefore, it is rightful to say that the definition of risk through these two years has changed. I wanted to observe the environmental risks mentioned in the report especially. Some of the environmental topics we see are often mentioned, like global warming. However new environmental crisis has arisen. Therefore new risks have been interpreted. These reports are usually published in January. This means that the report published in 2020 doesn't involve the period of COVID19 since it became a hot topic in mid-February and March. According to the WEF, the hot topic of the environment is not affected by pandemics. However, still, it is open to discussions if COVID19 has affected the environment thoroughly or not.

A Decade Left: Confronting Runaway Climate Threat (2020)

On January 15, 2020, that year's Global Risk Report was published with two topics on environment and climate change. Other than the climate threat, there is a part called "Save the Axolotl," which is about biodiversity loss. According to a survey done by WEF, "failure of climate-

change mitigation and adaption is this year's number one long-term risk by impact and number two by likelihood."

The studies show that the last five years have been the warmest in many years. Once a week, a climate change-related natural disaster happens. Not only have we faced losing biodiversity, but the lives of human beings are also in danger. It also yields in a food and water crisis. Agriculture becomes affected by climate change, which also leads to healthcare problems. Environment-related markets lose their value, and these investments become less profitable. This type of value loss strains central banks and forces them to act according to the changes.

Disorderly Climate Transition (2022)

It is not a surprise that we are still talking about the same issues in the year 2022 as well. There is a striking chart about the temperature increase and the expectation of an increase this year in the report. With the striking advancements with the COVID19, there were slight changes in risk expectations, but the ones about carbon emissions have decreased. In 2021 and 2022, we have observed goals of zero carbon emissions. During the lockdown period, it is not hard to say that carbon emissions have decreased used to less transportation usage and decreased production levels in the period. I can vividly remember the dolphins in the Bosporus, which seemed too good to be true, to be honest. However, behind the scenes, there was a more upsetting fact. Global Risk Report 2022 claims that the COVID19 has become the priority of the states for so long that they forgot about holding their promises regarding CO2 emission.

From the Global Risk Reports and the view of WEF, it is true to say that environmental issues have long-term risks and effects. Therefore, the topics discussed in the reports are nonetheless the same. However, 2020 was a different year than the others, as we all know. We weren't aware of the full effects and risks of the pandemics; however, it is surprising how this whole situation has even differentiated our actions and expectations against the environment.

A Prospective Fiscal Charge on Fuel Products: Carbon Pricing

Muhammet Ali Ateş

The steep increase in demand in the post-COVID-19 period and the uncertainty caused by the Russia-Ukraine war brought an unprecedented surge in energy commodity prices. Crude oil prices were also affected by this uptrend, and as a result, fuel prices reached record levels in Turkey and all over the world. It is possible to explain the high level of fuel prices reached today basically with the world's current political and economic conditions. However, the new financial obligations imposed on fossil fuels in the coming years within the scope of tackling climate change indicate that fuel prices may remain at high levels in the medium-long term as today.

The transportation sector, in which fuel products are used the most, is the second sector that causes the most carbon emissions only after the electricity and heat generation sector. For this reason, to mitigate carbon emissions in the transportation sector, some countries have already introduced carbon pricing on fuel products.

In principle, carbon pricing can be done either by levying a tax (carbon tax) on the sector or product that causes carbon emissions or by subjecting those to the emission trading system. Whether through taxation or an emission trading system, a financial burden is added to the price of fuel products, and in this way, usage of these products is discouraged. Instead, other alternatives which emit less or no CO2, such as electric vehicles, are desired to become common.

Although the number of countries applying carbon tax for various sectors and products that cause carbon emissions is quite high, the number of countries applying carbon tax directly for fuel products is limited. Nevertheless, the OECD treats special consumption taxes on fuels like a carbon tax. Indeed, the tax imposed on fuel products, whether called carbon tax or otherwise, increases the price of the product on which it is imposed and is expected to decrease the demand in one way or another. From this point of view, it is possible to say that carbon pricing on fuel prices is quite common, albeit implicitly, since fuel products are subject to special consumption tax in many countries worldwide. For example, among the countries that apply tax directly under the name of "carbon tax," countries such as France, Luxembourg, Ireland, and Mexico can be mentioned. In France, the tax amount, which started at 7 EUR/tCO2 in 2014, is currently at 44.67 EUR/tCO2. Luxembourg introduced the carbon tax at the beginning of 2021, and the tax amount is 31.56 EUR/tCO2 for gasoline, 34.16 EUR/tCO2 for diesel, and 20 EUR/tCO2 for other fuel products. In Ireland, the current

amount of the tax (33.5 EUR/tCO2 on gasoline and diesel) is planned to be increased to 100 EUR/tCO2 by 2030.

Regarding emission trading systems, these systems currently cover mostly electricity and heat generation plants and some other energy-intensive industrial sectors around the world. However, apart from these sectors, some countries are also implementing or planning to implement emission trading systems for fuel products. For example, with the Law on the Trade of National Certificates for Fuel Emissions (Brennstoffemissionshandelsgesetz -BEHG) adopted in Germany at the end of 2019, it is foreseen to establish a national emissions trading system for fuels used in the road transportation sector and buildings. Thus, in Germany, besides the emissions trading system at the EU level covers electricity and heat generation, industry, and aviation sectors, a separate emissions trading system at the national level for the fuels used in the road transportation sector and buildings. The system was introduced at the beginning of 2021. Accordingly, for fuels used in road transportation and buildings (such as gasoline, diesel, natural gas, fuel oil, and liquefied petroleum gas), suppliers of those fuels are obliged to purchase an emission certificate in return for each ton of CO2 emitted by fuels they place on the market. A transition period has been foreseen in the system, and certificate prices have been fixed for the first five years (2021-2025), increasing each year. The certificate prices foreseen for the transition period and their approximate effect on the liter price of gasoline and diesel fuels (including 19 % VAT) are shown in the table below (Approximately 2.35 kg of CO2 is emitted by burning 1 liter of gasoline mixed with air, and 2.65 kg of CO2 1 liter of diesel).

Year	Price CO_2/Tonne	Price Increase Liter Gasoline	Price Increase Liter Diesel
2021	25 EUR	7 Cent	8 Cent
2022	30 EUR	8,4 Cent	9,5 Cent
2023	35 EUR	9,8 Cent	11 Cent
2024	45 EUR	12,6 Cent	14 Cent
2025	55 EUR	15 Cent	17 Cent

Source: ADAC

Moreover, a fixed price corridor (55-65 EUR/ tCO2) has been determined for 2026. It has been regulated that from 2027 onwards, prices will occur according to supply and demand in a tender method, whereby prices may reach higher levels.

Like Germany, the EU is also planning to introduce an emission trading system for fuels used in road transportation

and buildings. With the "Fit for 55" package prepared by the EU Commission, in parallel with the emissions trading system currently being implemented in the EU covering the electricity and heat generation, industry, and aviation sectors, an independent EU-level emissions trading system will be established for the fuels used in road transportation and buildings. According to the draft prepared by the EU Commission, the new system is planned to be introduced in 2026 and to work based on reducing the amount of emissions from year to year. Thus, by 2030, it is aimed to reduce the amount of greenhouse gas emissions caused by these fuels by 43% compared to the amount in 2005. In addition, the draft also establishes an aid fund, so-called the "Social Climate Fund," to alleviate the burden that the additional costs of the new system will create on vulnerable segments of society. The draft is expected to be negotiated in the EU Parliament and the EU Council in the coming months.

The legal taxpayers or responsible parties before the tax offices or relevant authorities both in carbon taxes and emissions trading systems are the undertakings placing fuel products on the market. However, since the undertakings placing these products on the market reflect the costs they bear to the price of the products, this burden is carried by the end-users (e.g., vehicle drivers). Ultimately, the end-users are responsible for the CO2 emitted by these fuels.

How the revenues from the carbon tax or the emission trading system will be spent is at the discretion of the relevant state. It is possible to spend them primarily on financing the measures taken within the scope of tackling climate change or reducing the costs of these measures for citizens.

As a result, within the scope of tackling climate change, it is estimated that many states worldwide will impose new financial obligations on fossil fuels used in the transportation sector (and buildings) in the near future. The method for this may be to impose a special carbon tax on the fuels, increase the currently applied special consumption taxes, or subject these products to the emission trading system.

International Investments in Turkey in the Energy Sector

Sarper Göksal

According to the United Nations' Sustainable Development Goals, one of the most visible and pressing concerns that need immediate attention is the issue of universal access to cheap and clean energy. Sustainable Development Goal 7 (SDG 7) is vital. It provides affordable access to modern energy services, increases the global share of renewable energy, and integrates countries into cleaner and modern energy states. Collaborations to achieve the goal of universal access to energy resources are critical since strengthening international cooperation is vital in investment in clean energy and in ending support for fossil fuel-based energy infrastructure. Developing international cooperation by 2030, as part of the United Nations' SDG 7, is an essential part of facilitating access to renewable energy, energy efficiency, and advanced and cleaner energy technology.

According to the United Nations Economic and Social Council, emerging states cannot improve themselves since they have limited financial resources. Therefore, developing countries must provide international financial assistance in integrating renewable energy. In this sense, Turkey has substantial potential in terms of renewable energy. However, the high cost of obtaining renewable energy types, the difficulty in storing the energy obtained, and the limited renewable energy infrastructure prevent widespread use. In this context, financial aid made to developing countries such as Turkey is essential in facilitating the integration into cleaner and more affordable energy and maximizing the potential and using it most effectively. International cooperation should not be considered financial aid only. The bilateral or multiple relations of countries with international institutions and organizations create energy diplomacy and pave the way for future energy cooperation.

By the Republic of Turkey's Ministry of Foreign Affairs, Turkey has taken technical cooperation as a primary target in energy production. First of all, a "Positive Agenda" was created for the energy cooperation between the European Union and Turkey. Turkey has also decided to utilize nuclear energy in energy production to meet its energy demand and reduce foreign dependency on energy. In addition, the European Union is willing to establish a stable partnership and cooperation with Turkey according to its strategic objectives. Finally, the European Green Deal is one of Turkey's most recent collaborations with the European Union. This energy cooperation between the European Union and Turkey will develop, and a non-carbon-based economy can be built with a "net-zero" plan by 2053. Following the Paris Agreement held in 2015, the European Union determined its roadmap and published the European Green Deal in

2019; this plans to reduce Europe's carbon emissions by 55 percent by 2030. Briefly, the European Green Deal makes it indispensable for states to work together and make a collective effort to reduce net greenhouse gas emissions cooperatively.

As part of the United Nations' Affordable and Clean Energy target, international financial flows that support clean energy research and development and renewable energy production, including hybrid systems, are directed toward developing countries. Turkey has adopted a self-sufficient policy rather than being dependent on foreign sources as a developing country. However, Turkey has regularly received financial aid from 2000 to 2019 and has been a supported country in international cooperation for years, not a supporter. In the twenty years from 2000 to 2019, Turkey received $7.11 billion in financial aid from the United Nations for affordable, sustainable, and modern energy. In addition, Turkey received financial support of 1.32 million euros for 164 projects from the European Union from 2002 to 2006. Between 2007 and 2013, the period was called the IPA I Period, and Turkey continued to be supported by the European Union. Moreover, although there were fluctuations in the financial assistance provided by the European Union to Turkey between the years 2014-2020, Turkey continued to receive external support in the energy sector.

On the other hand, the International Finance Corporation (IFC) invested 1.8 billion dollars in Turkey in 2016 to support the infrastructure required for sustainable energy and increase the quality by creating an environment where energy companies in Turkey can compete. IFC, for example, will enable Akfen Energy, a subsidiary of Akfen Holding, virtually treble its investment in renewable energy generation and leverage Turkey's domestic energy resources for sustainable manufacturing by acquiring a 16.67 percent ownership in Akfen Energy.

To conclude, many international and supranational organizations such as the United Nations and the European Union provided financial assistance to developing countries such as Turkey and fulfilled their duty. At this point, the integration of renewable energy in Turkey's energy transformation depends on implementing the financial aid it has received over the years by creating a good quality policy and planning. One of the essential factors in energy transformation is cost. As an economically fragile and financially limited country, Turkey needs international cooperation and financial support to transition to renewable energy, particularly for energy transformation. However, the financial resources provided are not enough on their own for the transition to renewable energy. The critical point is that Turkey plans to use this financial resource most effectively and efficiently, creating mechanisms to encourage its citizens to use clean energy and invest in renewable energy. Thus, a green, reliable and modern future can be made possible for Turkey.

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