ECOSYSTEM REVIEW

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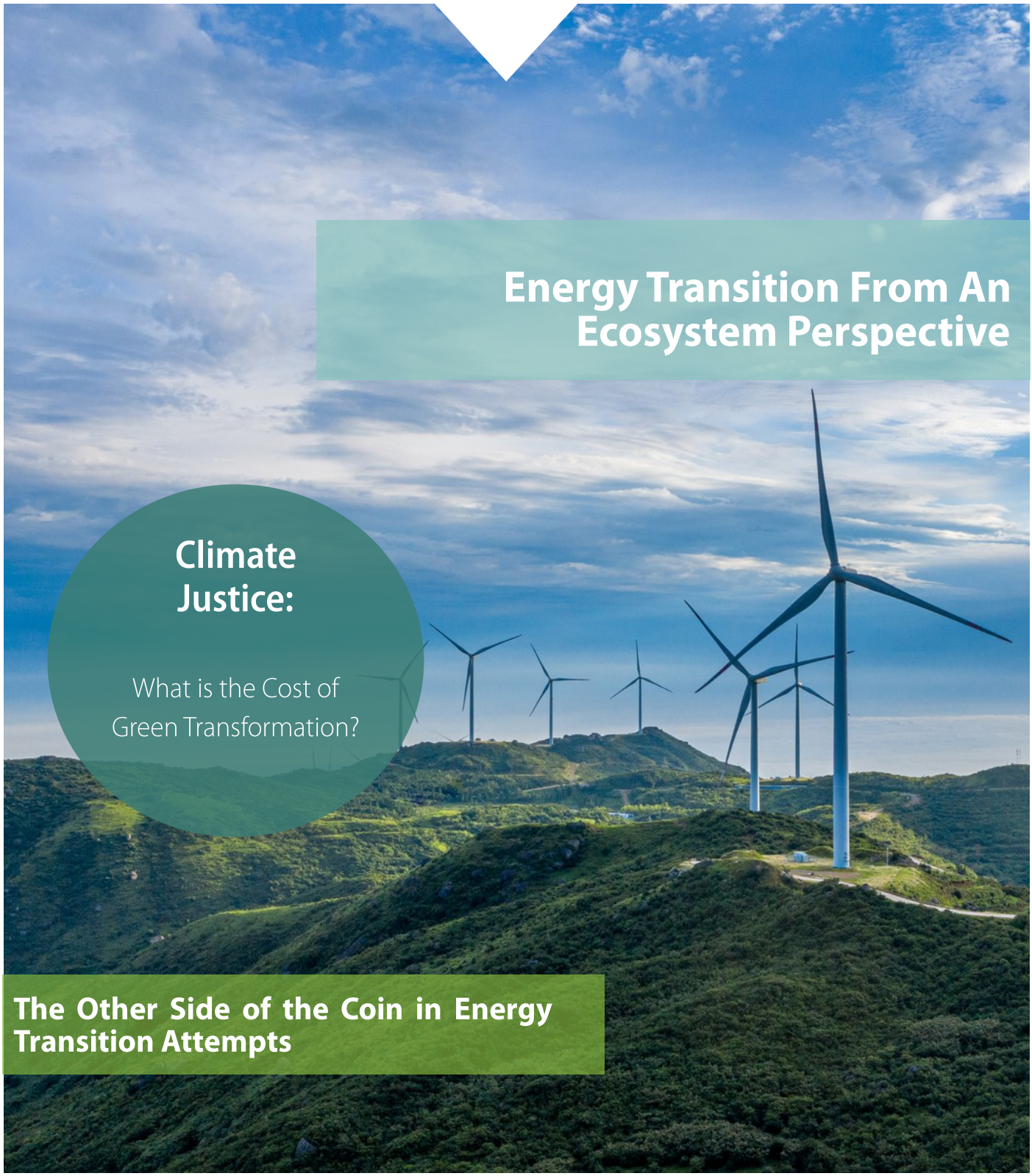

Energy Transition From An Ecosystem Perspective

Climate Justice:

What is the Cost of Green Transformation?

The Other Side of the Coin in Energy Transition Attempts

The content of Climate Review was written by Onur Bülbül, PhD.
under the supervision of TSKB Economic Research

About TSKB Advisory Services

While TSKB supports Turkish private sector investments with its thematic loans and innovative financing products, we continue to create added value for the business world and all of the drivers of development with our sector specific advisory services which we have been offering for 35 years. With our advisory teams consisting of financial advisors, engineers and economists, we guide the companies operating in the sectors driving the Turkish economy in its journey of transformation, development and sustainability. TSKB supports businesses to assess the risks and opportunities with data-based methods associated with environmental, social and governance (ESG) policy and to analyse the public and political expectations.

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What Do I Know About Batteries?

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Upcoming Events

Sustainable Investment Forum Europe 2024 will take place in Paris on May 2.

The Bonn Climate Change Conference is being held between 3-13 June.

Greetings from our 14th issue!

Let me tell you how I fell victim to TSKB Economic Research (aka "The Team") this month. I am sure many of you may already feel that you know them, since you have been reading their reports, but perhaps it would be better if I introduce them. Even the moon has a dark side, as they say!

They work in a private corner in a partitioned office, so that they can concentrate and read in silence. And indeed, that's what they do. They have access to leading data bases which they utilize intensively in an effort to follow their fields of research, whether it is macroeconomics, energy and natural resources or development. They spend their days (and sometimes their nights!) reading, calculating, writing and explaining.

Although this may sound all well and good at first, if you got to know them better you would also understand how meticulous they are when they study a new topic, such as the one they chose for this issue of the Ecosystem Review. (Attention! Sign of trouble!)

Seeing that side effects of the energy transformation are being overshadowed by the popularity of the subject, the Team devoted the current issue of the Ecosystem Review to a discussion of these transformation efforts, shedding a light on the side effects. So far, so good. But you can imagine my consternation when they requested the foreword from me, since I am not *au fait* with this technical topic. To make matters worse, they underlined the importance of batteries in this context, hinting that I should write something about batteries as well. Knowing they would not take "no" as an answer, I had just one thought on my mind: what do I know about batteries? The answer - not much! However, I have since been reading up on the subject, so let me share my first thoughts.

Before we start, an important disclaimer: we are not questioning the need for either an energy transformation or a green transformation. Still, aware of the need for a just transition, we are urging a debate over the externalities associated with this transformation, so we are able to manage the risks.

Transformation can be likened to a demand side shock, creating inflationary pressure, which should be followed by central bankers – but there are also are more technical issues to consider as well. For instance, the manufacture of electrical vehicles and their batteries trigger a wave of mineral mining activities, carrying the risk of habitat loss and deforestation if not regulated. Similarly, renewable energy investment requires a significant waste management strategy, as the technology is developing rapidly, shortening the life of the equipment. Lacking such a strategy presents risks, such as biodiversity loss and pollution of underground water.

So have I been a victim of the Team's request for this piece? Well, yes, in the sense that I needed to read a lot about a technical subject that is ignored by many. And yet, I also learned a lot. To conclude, I still do not know much about batteries, but at least now I know that if we talk about batteries, there are both positive and negative aspects. Through the current issue of the Ecosystem Review, I learned that the energy transformation has both pros and cons. Thanks to the Team, I learned that we should always check both sides of the story, lest we want to solve a problem by creating another problem. Join us and spread the news!

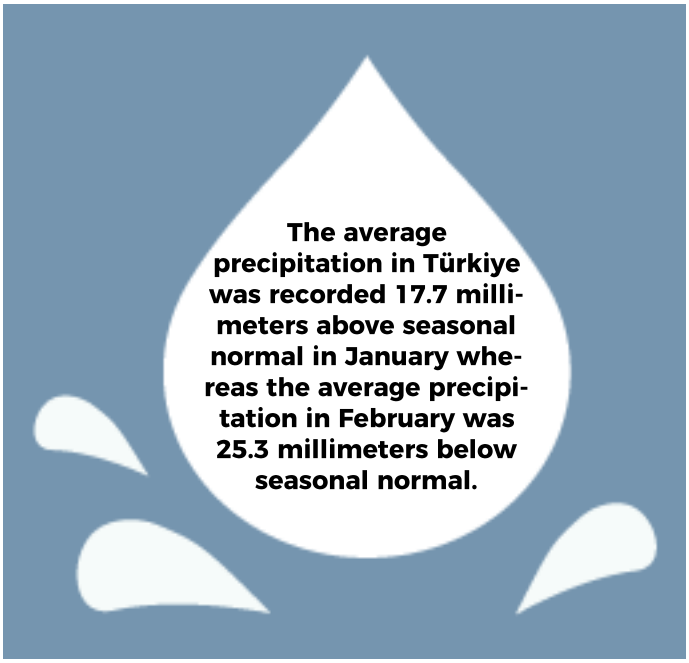
Cut Your Coat According to Your Cloth

Renewable energy offers promising prospects in tackling the climate crisis. The question is how far renewable energy can go to help us deal with the ecosystem crisis. The good news is we are deploying unprecedented levels of solar, wind and battery power to help mitigate the worst impacts of our increasing footprint on this planet – but how long can we keep building renewables? Do we, in other words, have enough resources to continue this energy transformation?

Answering these questions brings us to the issue of the raw materials required to keep on building clean energy resources. Critical minerals, for instance, are the backbones of this energy transformation and the demand-supply dynamics will determine how long we can continue deploying them. These minerals include around 30 different materials with lithium, graphite, cobalt, copper, nickel, manganese and aluminum being the most needed. The International Energy Agency (IEA) predicts that mineral demand for clean energy production will double by 2040 under a business-as-usual growth scenario and nearly triple if the world aims to increase clean energy production to reach the Sustainable Development Goals. The bulk of this demand is expected to come from wind energy, followed by solar, electricity grids, electrical vehicles (EVs) and battery storage.

This massive surge in demand naturally raises the question of whether it can be met, and if so, how. After all, a number of mining practices can have adverse ecosystem effects. Studies show that developing mining projects from the discovery to the initial extraction takes an average of 16 years, depending on the minerals being mined, the location and the type of the mine. These long lead times raise the risk of price volatility in relation to rising demand. Additionally, the geographical concentration of minerals such as lithium, nickel, and cobalt among others carries the risk of physical disruptions as well as regulatory and geopolitical perils in the source countries. These risks lead to countries forming alliances to enable the secure supply of these materials. The energy intensity, water use, land use change and extensive environmental risks from hazards (such as floods that may lead to chemical contamination) in the mining business also stand as major hurdles in supply chains.

Hence, the environmental and social impacts of mining forces all stakeholders to consider ways of cleaning renewable energy supply chains. Activities such as fuel switching, investing in low carbon electricity and energy efficiency in operational practices as well as reducing or eliminating the use of diesel in trucks offer significant efficiency gains in the sector. Studies reveal that electrification and the use of renewable based electricity from the mining site to the refining and smelting in copper mining carry the potential to reduce emissions intensity by over 80%.



Hence, besides the risks that critical mineral mining poses for the ecosystem, it would appear that we need to cut our coat according to our cloth in our efforts to achieve the energy transition. For instance, Toyota's decision to switch to hybrid vehicles instead of full EVs due to the company's expectation that raw mineral supply will not be able to keep up with demand, leading to shortages and higher costs, warrants closer consideration. The company argues that the volume of raw materials required to manufacture one long-range full EV could instead be used to produce 6 plug-in hybrid EVs or 90 hybrids, leading to 37 times the overall carbon reduction over their lifetimes than a single full EV.

Even though the world is working relentlessly on ways to minimize the worst impacts of the ecosystem crisis, there are no clear-cut solutions to our problems. Monitoring and evaluating the outcomes of our actions throughout therefore appears to be the best option to implement optimal solutions.

ESG Debt Neared a Record $6 Trillion in 2023

Total environmental, social and governance (ESG) labeled debt approached a record $6 trillion in 2023 globally, despite comprising less than 2% of the global debt according to the Institute of International Finance (IIF). The term covers sustainable debt instruments such as (i) green bonds/loans, where proceeds are channeled to climate and environmental projects, (ii) green asset-backed securities, where cash flows related to low-carbon assets or the proceeds are used in low-carbon asset investments, (iii) sustainability bonds, the proceeds of which are channeled to environmentally sustainable outcomes, (iv) social bonds, where the proceeds are allocated to social projects, (v) green municipal bonds, which enable local governments to finance infrastructure projects to help the environment and (vi) sustainability-linked bonds and loans, where the terms are aligned with the issuer or borrowers' sustainability performance targets.

The $6 trillion figure in 2023 marks a 25% increase from 2022, although this rate of growth marks a slowdown from the average 60% market growth rate witnessed in 2021-2022. Total ESG debt issuance (within the total ESG "labeled" debt market) stood at around $1.2 trillion, its second consecutive annual decline since 2020, mainly caused by declines in the U.S., China and supranational segments of the market. However, ESG debt issuance in emerging markets (excluding China) spearheaded by Türkiye, Saudi Arabia and the United Arab Emirates (UAE) reached an all-time high of approximately $150 billion.

According to IIF, the diminishing ESG premium between ESG and conventional debt instruments has been an important factor reducing the appeal of ESG debt markets for some issuers, which contributed to ESG share in global debt markets falling to 5.6% in 2023 from a record high of 6.4% in the previous year. This decline coincides with global energy transition investments reaching a peak of $1.8 trillion in 2023, suggesting that capital investments in clean energy may have recently been sourced from corporate balance sheets and conventional debt markets.

In the first half of the year, as inflationary pressures decline and central banks hold back reducing policy rates, a potential rise in real interest rates could compel borrowers to postpone their issuance plans until later in the year. Against this backdrop, the IIF expects ESG debt issuances to reach $1.2 trillion in 2024 before rising slightly to $1.3 trillion in 2025.

Electric Vehicles Are Still Very Much A Part of Ecosystem Discussions

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Thanks to the increasing awareness on greenhouse gas emissions and wider range of car options, growth in global electric vehicle market continues. Electric vehicles accounted for 17% of light vehicle sales around the world in 2023. The outstanding global sales volume of about 14 million vehicles also highlights an area that the majority of consumers are unfamiliar with: battery production.

When considering the life cycle of their vehicle, electric vehicles promise a significant reduction in emissions compared to vehicles with internal combustion engines; however, this does not mean that electric vehicles, particularly the production of batteries, have no negative impact on the environment. The fact that coal is such a major source of energy in China, the world's largest producer of lithium-ion batteries, is merely one aspect of the issue.

Lithium-ion batteries provide an excellent balance between price and electricity storage capacity because of their high energy density and comparatively low cost of production. Each battery requires, on average, 8kg of lithium and 14kg of cobalt to produce. However, the methods of mining these basic materials can hardly be considered clean.

Lithium mining in saltwater reservoirs entails pumping the water to the surface and allowing it to evaporate. Nearly 2,000 tonnes of water need to be extracted from the Earth to produce each tonne of lithium. Lithium-rich countries, particularly those in South America, are suffering from worsening water deficits, hampering the agricultural and livestock activity for people living in these regions. Substances used in the extraction process, such as sulfuric acid and sodium hydroxide, infiltrate the water and soil, harming local wildlife and ecosystems. For example, two flamingo species in Chile are currently at risk of extinction due to mining activity.

The Democratic Republic of Congo (DRC), which produces nearly 70% of the world's cobalt, faces its own set of problems. First and foremost, the process of smelting cobalt ore releases hazardous compounds into the atmosphere, endangering human communities and other living creatures in the surrounding areas. The working conditions in these mines also require consideration. Cobalt mining, which is highly labor-intensive, is usually associated with occupational accidents, mistreatment, long working hours and health issues.

People, as well as the ecology, living near mining operations in South America and the DRC are paying a high price for a technology that they are unlikely to use. Establishing a circular battery economy over time will potentially lower demand for these raw materials, which come with heavy social and environmental costs, while also expanding consumer access to electric vehicles through pricing changes. The development of new battery technologies has the potential to clean up the production process by eliminating at least some essential minerals. Until these plans are completely realized, the wide application of best practices in energy, water, and waste management in mining is of critical importance. We also believe that policymakers and industry should work together to enhance working conditions as part of the development process.

Average temperatures in Türkiye were recorded 2.8˚C and 3.4˚C above seasonal averages in January and February respectively.

The Other Side of the Coin in Energy Transition Attempts

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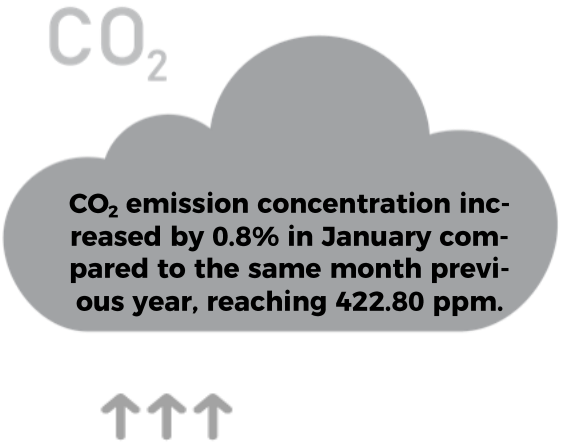
The importance of renewable energy resources, a crucial tool in speeding up the energy transition, is growing by the day. The impacts of renewable energy investments on decarbonization goals, as well as their impact on the ecosystem, have recently come under criticism. The discussions center on the influence of renewable energy resources on the ecosystem, not only through waste management, but also throughout the supply chain. When seen from this viewpoint, the process of delivering minerals for renewable energy power plants, which marks the initial stage of the supply chain, becomes critical.

Higher wind and solar power capacities are expected to play a significant role in meeting the targets for decarbonization in the future years. The International Energy Agency (IEA) predicts that wind capacity will expand 4.8-fold and solar power capacity 9.1-fold compared to 2022 levels, to reach 14,752 gigawatts (GW) by 2035. The increasing number of renewable energy power plants around the world will in turn necessitate the improvement and renewal of electricity grids.

The rises in wind and solar capacities will drive the need for minerals and metals. Under the IEA's Net Zero Scenario, the need for zinc in solar panels and wind turbines will grow 3.1-fold by 2035 compared to its 2022 level. Furthermore, integrating solar and wind power plants into the electricity grid is expected to increase the amount of aluminum and copper required for grid renewal by 2.2-fold and 3.2-fold, respectively.

Higher demand for minerals results in an increase in mining activities. The negative effects of these activities required for the supply of the stated minerals on the ecosystem include habitat loss and degradation, increased emissions, deforestation, deterioration in water and air quality and risks of pollution, erosion and scarcity of water. However, these activities can negatively impact not just the land immediately surrounding the mines but also the broader areas. According to a study carried out by the World Wildlife Fund (WWF), mining activities have a 33% impact on the world's forest ecosystems, leading to deforestation and degradation within a 70-kilometer radius.

While the importance of solar and wind power is growing in an environment of net zero targets and accelerating decarbonization efforts, it is critical to consider the environmental impact of the minerals required for these power plants. As a result, it is expected that the work to develop and upgrade technologies will be stepped up in order to limit the damage to ecosystems caused by mining activities.



*ppm: parts per million

More Trouble Than It is Worth?

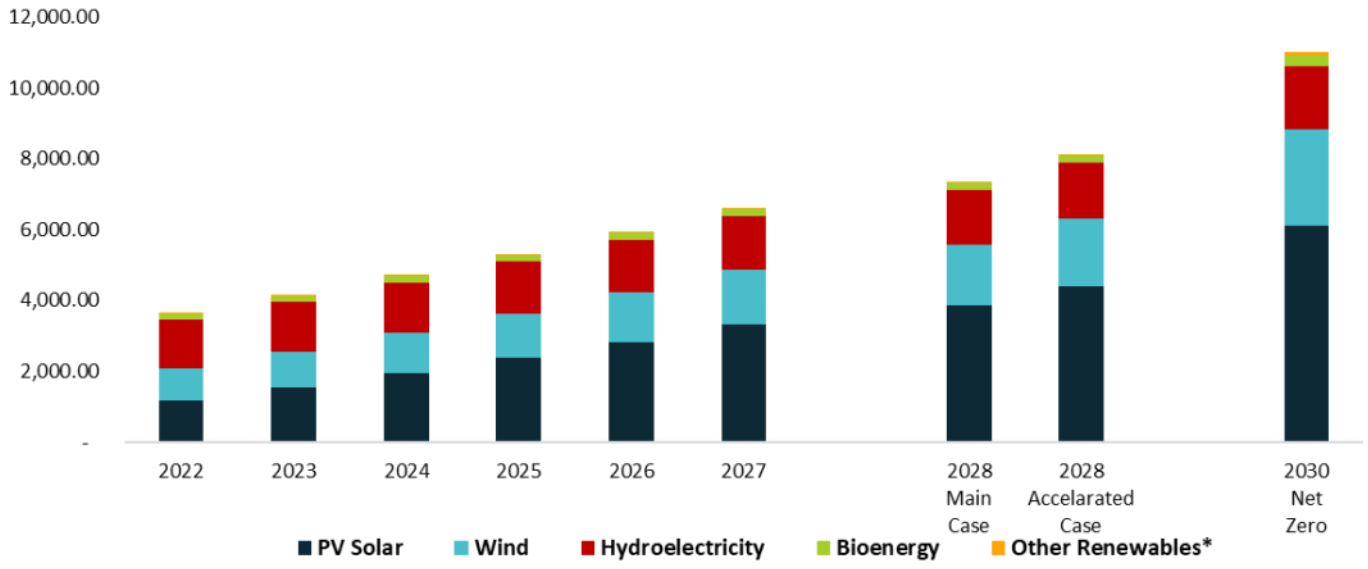
Even though we still have a long way to go to achieve the net zero target in the global energy sector by 2050, we should also celebrate the fact that we have already added huge amounts of renewable capacity. Last year, for instance, we witnessed the fastest growth rate in renewable power generation with the installation of 510 gigawatts (GW) of capacity, with global renewable capacity on course to reach 7,300 GW by 2028, accounting for 42% of global electricity generation capacity. This is good news from a climate crisis perspective. From an ecosystem crisis perspective, though, we must dig deeper.

The green transformation is an evolving process. When we first started deploying renewable energy sources back in the 90s, the major aim was to cut greenhouse gas emissions and tackle global warming by reducing our carbon footprint. The landscape today has changed, where we now realize that we are also witnessing a biodiversity crisis and our footprints on this planet go beyond a climate domain to encompass our overall relationship with nature. This perspective, therefore, requires a more overarching look covering the impacts of renewables on nature as well.

Solar farms, for instance, require vast acreages of land per unit of electricity. This not only harms the biodiversity of the land they are installed on, but also degrades the soil. In addition, the safety requirements in power generation, such as fencing around these power plants, interferes with migratory routes of larger animals. Hence, solutions such as building wildlife friendly fencing which enables the migration of larger animal over raised or interrupted barriers are already being implemented. Even though wind farms also require significant areas of land, their impact on soil is less concerning than for solar forms, since they are less obstructive on the land they are established on. However, onshore wind farms have impacts on birds and bats while offshore wind farms have impacts on marine life. The regulatory aspect of renewable energy deployment, however, currently overlooks its impacts on the ecosystem.

We have come a long way in transforming our electricity generation to be more climate friendly. Now is the time to consider becoming more ecosystem friendly. This requires a focus beyond our carbon footprint. The challenge today is to become nature positive by considering the ramifications of our efforts on nature. The new era of electricity generation from renewable resources should, therefore, aim to not only become bigger and more efficient but also more nature friendly. Only then can the outcome be worth the trouble.

Cumulative Renewable Energy Capacity (GW)



Source: IEA, TSKB Economic Research

Are We Sowing Dragon's Teeth?

As we are working to revolutionize our production systems from food to energy, or other industrial processes to cope with the ecosystem crisis, climate considerations have been at the forefront of such endeavors. The mind-blowing pace of this transformation suggests that we will need to transform our old habits of production and leave them behind.Power generation is at the heart of this revolution. However, only considering the climate may fall short of slowing the process of ecosystem degradation, let alone stopping it. If we are to have a broader ecosystem perspective, resorting to renewable energy, for instance, not only requires building renewable energy infrastructure to cut carbon emissions but perhaps thinking about how to build that infrastructure to be nature positive.

The challenge is massive! The first generation of solar panels, wind turbines and lithium-ion batteries - the most prominent sources utilized for energy transition - are now reaching the end of their operational lives, bringing the challenge of how to handle this new kind of waste. Solar panels for instance, which are assumed to have a lifespan of around 30 years, are expected to create 1.7 million metric tonnes of waste globally by the year 2030 in a regular loss scenario. This figure is estimated to reach 8 million tonnes in an early loss scenario that takes the possibility of malfunction or early wear-out into consideration. By 2050, these figures are projected to reach 60 and 78 million tonnes in regular and early-loss scenarios respectively. Nevertheless, it is calculated that recycling and injecting the valuable materials in these panels back into the economy would bring more than $15 billion of additional value by 2050. Hence, a new but complicated recycling industry is emerging.

The case for wind turbines and batteries is no different. While wind turbine blades – the most difficult parts to recycle – are projected to create around 12 billion tonnes of waste by 2050, first generation lithium-ion batteries are expected to create 11 million tonnes of waste worldwide by 2030.

Still, recycling is tricky. This is due to wind blades being enormous—some reach 60 meters in length and weigh 15 tonnes individually. Solar panels are made to last, but this presents a hurdle to decommissioning valuable materials. Chemical wastes, generated by the improper recycling of toxic substances such as cadmium, arsenic and silicon found in panel cells, accumulate and damage the ecosystem, soil fertility and groundwater. However, estimates show that the value of recovering raw materials from solar panels could finance 2 billion new panels by 2050. Besides, aged lithium-ion batteries can even be reused for power storage for the electrical grid. Additionally, an emerging renewable energy recycling industry not only carries the chance of yielding future employment opportunities, but also presents the prospect of rethinking the way we produce materials to be more recyclable.

Nevertheless, regulations regarding the end-of-life use of these materials remain undeveloped, and vary between countries. Europe is leading the pack with its Waste Electrical and Electronic Equipment (WEEE) Directive as the most stringent, banning electronic products (read batteries and solar panels) from being sent to landfill. Still, the newly emergent renewable power recycling industry is key to shifting our perspective from the climate to the ecosystem.

Our journey started by realizing that we are facing a climate crisis. Now we are at a stage where we understand that this crisis goes beyond climate, forcing us to re-evaluate our relationship with nature. Let's continue to revolutionize our way of climate friendly electricity generation, mindful of the need for this to be done by focusing on the impacts of the whole life cycle of these technologies - including their recycling - on ecosystems instead of sowing dragon's teeth by solely focusing on the aspect of their emissions.

	Photovoltaics	**Wind Energy**	**Energy Storage and Mobility**
	1.5 million tonnes of glass, metals, and silicon	**4.75 million tonnes of concrete, metals and composites**	**240,000 tonnes of lithium-ion batteries**
Principal materials	Aluminium Glass and silicon Silver Copper	Steel and iron Glass/carbon composites Copper Zinc	Graphite Aluminium Copper Nickel
Critical raw materials	Indium Germanium	Dysprosium Neodymium	Cobalt Lithium
Recyclable rate	95%	90%	100%

Source: European Energy Agency, TSKB Economic Research

Climate Finance

Global Clean Energy Investment reaches a new record of $1.8 trillion in 2023

BloombergNEF reports that global clean energy investments reached $1.8 trillion in 2023, marking an annual increase of 17%, driven mainly by renewable energy, electric vehicles (EVs), hydrogen and carbon capture. While China accounted for 38% of total clean energy investments with $676 billion invested in 2023, the European Union (EU), U.S. and the U.K. together accounted for $718 billion of investments, surpassing China.

A sectoral breakdown of clean energy investments in 2023 reveals that electrified transport, including EVs (cars, busses, two and three-wheeled vehicles and commercial vehicles) and the associated infrastructure were the largest sector with $634 billion in investments, accounting for a third of the total. This sector was followed by renewable energy ($623 billion) and power grid investments ($310 billion).

In 2023, debt issued by companies and governments to fund the energy transition rose by 4% year-on-year to $824 billion. These debt issues had dropped %10 in 2022.

Japan Introduced World's First Sovereign Transition Bonds

Japan introduced the world's first sovereign transition bonds in February with an aim to help the country meet its goal of net-zero greenhouse gas (GHG) emissions by 2050. UK bank Barclays defines transition bonds as bonds that focus on activities that support emissions reduction, "directly or indirectly, in high-emitting and hard to abate sectors".

Even though these kinds of bonds received cold shoulder from environmentalists for financing sectors such as natural gas in transitioning away from coal, the International Capital Markets Association (ICMA) defines best practices for this kind of finance to be in line with the Paris Agreement Goals provided that issuers provide proper transparency about their investment programs.

The first issuance of Japan's transition bonds, brought in $5.3 billion for 10-year yields at a rate of 0.74%. Even though such pricing fell short of expectations, the yield was just a little lower than 10-year Japanese government bonds yields stood at 0.76% on the week the transition bonds were issued.

Nature Law Passes the EU Parliament

The European Parliament passed a landmark nature law on February 27th. The law aims to increase the European Union (EU) members' efforts to restore nature on a fifth of their land and sea by 2030. With 81% of Europe's natural habitats currently classified as being in poor health, actions on biodiversity and ecosystem preservation to improve the health of soil and water are among the main goals of the legislation.

The legislation was passed despite a political backlash from center-right members of the European Parliament who managed to water down several parts of the law such as the requirements to introduce more trees, ponds and taking other actions to enhance biodiversity on farmland. The law is expected to be approved by member states.

The timing of the law coincides with large-scale farmer's protests that have shaken EU members over the last couple of months. Farmers in France, Italy, Spain, Romania, Poland, Greece, Germany, Portugal, Belgium and the Netherlands have been fiercely protesting Europe's new environmental standards arguing that the continent's agricultural and climate regulations are putting the Union's farmers in a disadvantaged position against cheap imports. Energy transition policies such as taxing diesel fuel and other carbon emission requirements as well as strict regulations on pesticides, water and land use have also been blamed for harming farmers' livelihoods. Meanwhile, extreme weather events such as droughts and wildfires, especially in Southern Mediterranean, have also impacted European agricultural production.

Ecosystem 101

mineral

naturally occurring homogeneous solid with a definite chemical composition and a highly ordered atomic arrangement

photovoltaics

the process of generating power by converting energy from light into electricity through semiconducting materials

rare earth elements (REEs)

soft and easily processable elements generally used in electronics, nuclear and solar energy (such as lanthanum, cerium and praseodymium)

renewable energy

energy derived from natural sources that are replenished at a higher rate than they are consumed

lithium-ion battery

rechargeable battery consisting of an anode and cathode (storing the lithium), a separator, electrolyte and two (positive and negative) current collectors

The protests come just before the European Parliament elections, which are scheduled for June this year, leading policymakers to scale back the ambition of new ecosystem related regulations. Hence, the passage of this nature law in this unclear atmosphere is significant.

Taskforce on Nature Related Financial Disclosures Published Its Recommendations

The Taskforce on Nature Related Financial Disclosures (TNFD) released its financial disclosure recommendations that include both general requirements for nature-related disclosures and governance, strategy, risk and impact management, as well as metrics and targets.

Taking the impacts of companies' activities on nature at its heart, the recommendations aim to support a shift in global financial flows toward nature-positive outcomes. The TNFD argues that society, economies and financial systems depend on nature's assets and services, and that nature related risks and opportunities have financial impacts on revenues, expenses and capital expenditure, as well as access to capital and the cost of capital and company balance sheets.

The report also states that although climate and environmental risks are identified as the most significant risks for companies by executives over the next decade, nearly 70% of companies disclosing data through the Carbon Disclosure Project, for instance, did not assess the impact of their value chain on biodiversity in 2022. TNFD Recommendations, therefore, aim to provide companies and financial institutions with a risk management and financial disclosure framework to identify, assess, manage and disclose nature-related issues.

Climate Justice

What is the Cost of Green Transformation?

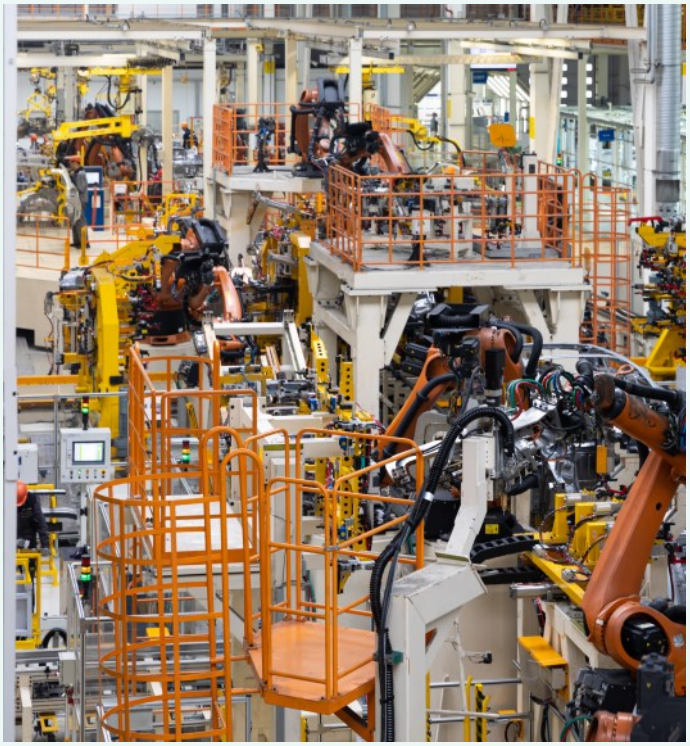
"We have communities that don't own a single electric car, but the amount of destruction is beyond humanity." This is the punchline behind the protests against Tesla's gigafactory in Brandenburg, Berlin.

The climate justice perspective on building electric vehicles (EVs) versus the opportunity cost certainly warrants attention. While the Tesla factory in Germany employs around 12,500 people to produce 1,000 EVs a day, the damage it is inflicting on the surrounding ecosystem cannot be ignored. After all, electrification has been cast as the key to staying in the game in our efforts to tackle the ecosystem crisis, but the amount of natural capital it consumes and the damage it imposes on nature is causing unrest, especially for the vulnerable.

EVs appear one of the best ways to cut emissions in the transport sector, but the amount of natural capital they consume during the production process is usually overlooked. Tesla's gigafactory in Germany, for instance, has been criticized for using and polluting water. The company has been warned that the amounts of phosphorus and nitrogen detected in the wastewater from its factory are six times higher the permitted limits, even though the company argues that the factory's water use is 33% lower per vehicle than the industry average.

The discussion has morphed into a "green capitalism" debate which, at its core, carries a dispute over the benefits of EVs – and, by extension, all ecosystem friendly products - and the damage they inflict on natural resources during their production processes. Berliners are not happy to see big companies exploiting their natural resources such as forests and water. With the aim of expanding their factory, Tesla aims to buy and clear 100 hectares of state-owned forested land as well, while the factory poses contamination threat to the drinking water in the region.

The conundrum about the green transformation, therefore, encompasses a balance between natural and economic capital. The Green transformation is a must - but at what cost?



European Union Sues Greece for Outdated Flood Risk Plans

The European Commission took Greece to the European Court of Justice for failing to review, adopt or report its flood risk management plans despite being warned to do so a year ago. EU rules require member states to update their flood management plans once every six years to help them mitigate their impacts. The Commission's action followed last year's deadly floods in Greece that devastated entire towns, dealing a considerable human and economic toll on the country. At the beginning of this year, the Commission also sued several other member states for failing to comply with their reporting obligations. The legal action coincided with the timing of European Environment Agency's stark report finding that as the fastest warming continent in the world, Europe was not sufficiently prepared for environmental challenges ahead.

Company Highlights

As the focus of the ecosystem crisis starts to shift from a mere climate perspective to include the nature dimension as well, companies creating nature-based solutions to restore and regenerate ecosystems while working to scale back the worst impacts of this crisis flourish. In this vein, Loam is an Australian microbial biotech company working at the intersection of agriculture, microbial science and climate and which provides solutions to boost soil carbon sequestration.

Loam's primary aim is to increase the carbon storage capacity of agricultural soil to decrease the amount of carbon in the atmosphere, while boosting agricultural soil productivity. In doing so, the company utilizes beneficial microbes, such as fungi, to increase aggregate and mineral associated carbon which will eventually help improve soil structure and nutrient retention, and therefore productivity.

The company currently employs two main solutions, CarbonBuilder Canola and CarbonBuilder Barley, that are applied as a treatment during planting to create fungal networks within the soil to efficiently draw carbon from the plants and the soil and incorporate it into stable soil aggregates. CarbonBuilder Canola was first used in 2022 in Australia resulting in an average increase of 5.2% in total soil carbon, 5.6 tonnes of additional CO_2 retention per hectare and a 5.1% increase in grain yields. Introduced during the 2021 and 2022 planting seasons, Carbon Builder Barley, led to a 3.6% increase of total organic carbon, 3.9 additional tonnes of CO_2 per hectare and an increase of 2.9% in grain yields.

While Loam uses sequencing technology and genetic manipulation techniques for research purposes, the company's products are free of genetically modified organisms. Loam uses more than 2,000 unique fungal and bacterial isolates sourced from both natural and managed landscapes throughout the Northern and Southern Hemispheres. Following the successful implementation of barley and canola programs, the company expanded its solutions to wheat in 2023 resulting in 5.4% improvement in carbon buildup and 3.6% grain yield increase.

These successful activities helped Loam attract $15 million in investment from the Australian Government and $73 million from the private sector in a Series B investment round to expand its seed coating tech. Loam's solutions carry the potential for farmers to turn their farms' carbon sequestration into cash with carbon credits as well. The company is currently testing its solutions beyond Australia to include the U.S., Canada and Brazil.

In Short...

$1 Billion for Climate Tech Finance

HSBC and Google announced a climate technology partnership worth $1 billion to finance companies working on promising solutions to cope with the ecosystem crisis. According to the deal, Google will assess the quality and efficacy of technologies introduced by smaller companies in areas such as electric vehicles (EVs), battery storage, and sustainable food systems to minimize HSBC's credit risks associated with the applicability and scalability of new technologies.

Fossil Fuel Giant Suing Its Investors Over Climate Proposal

U.S. fossil fuel giant, Exxon Mobil, filed a lawsuit against several of its investors for their "extreme climate agenda" of pushing the company to set Scope 3 emissions targets that would require it to track and reduce emissions generated by users of its products. The company argues that such proposals neither serve the interests of investors nor do they promote long-term shareholder value. Shareholders, on the other hand, argue that setting Scope 3 targets would prevent future risks of losing access to capital markets, facing policy interventions, or losses related to stranded assets. The company chose to continue its legal action, despite investors taking the decision to abandon their resolution.

Reforesting Rio by Drones

The municipality of Brazil's famous city, Rio de Janeiro, and Morfo, a drone start-up, are partnering to accelerate reforestation efforts in the city. Following the designation of eligible areas, the AI powered technology outlines specific targets and determines the number of seeds to be dropped. As well as having the capability of dispersing 180 seed capsules per minute - 100 times faster than traditional human centered seeding - drones can also access areas hard to reach areas by humans.

All systems go for Clean Tech Competition

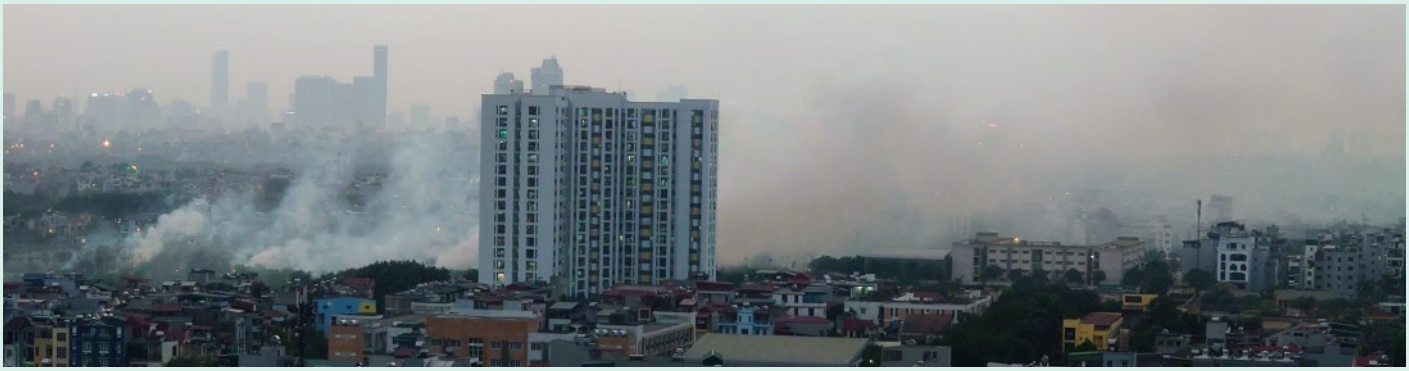
European Union (EU) policymakers agreed on a Net-Zero Industry Act (NZIA) that will allow public authorities to buy clean tech products based not only on their price but also on environmental criteria and their supply source. Regarded as the EU's response to China's dominance in global solar manufacturing and the U.S. Inflation Reduction Act, the NZIA requires the EU countries to apply non-price criteria for 30% of their auctions for renewable energy projects. The EU plans to set a target of 40% of the clean tech products needed to reach its climate targets by 2030 will be manufactured in the bloc.

Vietnam Halts Flights at Hanoi Airport due to Air Pollution

Flights to and from Hanoi Airport in Vietnam were halted due to worsening air pollution in early February. The levels of $PM_{2.5}$, small particles that pose significant health risks, reached an extreme high of 257 micrograms per cubic meter ($\mu g/m^3$) in the city, also limiting visibility for air traffic to risky levels.

Fossil Fuel Financing also Brought to Court

Friends of the Earth, a Dutch climate group, announced its intention to hold the country's banking giant ING legally accountable for its financing of the fossil fuel industry. Even though ING has plans to phase out its financing of oil and gas development projects by 2040, Friends of the Earth argues that those plans fall short of the required pace. In 2021, Friends of the Earth won a case against Shell leading a Dutch court to rule that the company must cut its emissions. The climate group has also called on ING to halve its own emissions by half by 2030, when compared to its 2019 levels.



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