Valdai Discussion Club Report

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Global Green Transformation: How Will the World Change?

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** The platform of international foundations "Foundations 20" (F20) is a network of more than 65 foundations from 21 countries that work with the G20 countries for the implementation of the UN 2030 Agenda with the 17 Sustainable Development Goals (SDGs) and in compliance with the Paris Climate Agreement. The platform F20 was launched in Hamburg in 2017 on the occasion of the G20 summit in Germany and has now become an influential player in the G20 process (see: www.foundations-20.org).*

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Introduction

The number of natural disasters and industrial accidents caused by climate change is steadily on the rise. However, global climate policy remains plagued by differences. In 2019, during the 25th Conference of the United Nations Framework Convention on Climate Change (UNFCCC), the countries were unable to agree on Article 6, which describes, among other things, the financial mechanisms underlying the Paris Agreement. In 2020, it was decided to postpone the key UNFCCC 26th climate conference until 2021 due to the coronavirus pandemic.

However, the climate agenda is gaining ground despite the pandemic, and the green transformation that is based in many ways on digital technologies, is becoming a subject of rivalry between countries and corporations. Many countries, banks and international corporations have already become part of it with the EU being an undisputed leader.

Why is the global green transformation picking up pace despite the crisis and differences between the UNFCCC parties during UN climate talks?

The Paris Agreement with its goal of keeping global heating within well below 2 degrees Celsius and aspiring for 1.5 degrees has set a new trajectory for the global economy and formed a macro trend for decarbonisation. Despite the above UNFCCC differences on a number of issues, many leading economies and corporations have voluntarily declared carbon neutral targets. This is largely due to a growing demand from their populations for bold action to stop global heating but also due to companies that are wary that they may otherwise miss out on new technology developments and market opportunities.

Climate change and its impact pose a real threat to GDP and the well-being of most countries worldwide. The economic losses from natural disasters and extreme weather run into billions of US dollars annually. The effects of climate change also include melting permafrost and new diseases. To reduce damage from the ramifications of climate change, countries, regions, cities and companies are actively implementing

climate adaptation strategies and measures. Some of these measures, such as upgrading the healthcare system, have become part of the crisis recovery packages.

Climate records go hand in hand with all-time records in finance and technology. The expanding green assets and investment sector performed better financially during the crisis than traditional sectors. The volume of outstanding green bonds was up compared to the previous year and reached a record high of 350 billion in 2020. A PwC report shows that a new segment of venture capital market – climate technology – has fully established itself in 2020, and Amazon, Tesla, Google, Microsoft and other tech giants are investing in it.

These facts indicate that we are in the early phase of a long-term trend for global green transformation of the economy. Today, we are witnessing a race for the lead on key future markets and i nternational financial flows.

Who will lead and who will lose in this global race?

Adopting the European Green Deal is about firm adherence to the EU's target for full decarbonisation by 2050. At least 1 trillion euros will be invested in it over the next 10 years. Everything indicates that the EU is set to lead the green race in order to reduce its dependence on imported energy and remain an economic powerhouse that can set the standards on the promising new markets.

At the same time, the EU is introducing a cross-border carbon tax (or something similar) to protect its market and potentially replenish its budget. The tax poses a serious threat to Russia, the Middle East, the United States, China and other suppliers of energy, commodities and consumer goods to the EU, if these economies do not quickly decarbonise their exports. It is safe to assume then that the states and companies that manufacture products with a higher carbon footprint than their competitors will lose from the green transformation of the EU and the global economy in general.

In order not to fall behind, it is imperative to act symmetrically and put the available competitive advantages and technical potential of the fourth industrial revolution to good use. In fact, we are in a situation where both economic and technological paradigms are in the process of renewal and rapid development.

What role does digital technology play in green transformation and crisis recovery?

Digitalisation was a success during the pandemic, allowing tech companies to neutralise some of the crisis impacts. The role of technologies used for increasing transparency, digital identity, risk monitoring and assessment, as well as a contact-free economy, crowd investing, artificial intelligence and machine learning has increased during the pandemic.

Digitalisation was the key to many crisis recovery packages. For example, China announced a $1.4 trillion stimulus package.[1] Importantly, the focus there shifted to investing in the next-generation digital infrastructure. The EU also prioritises digitalisation together with decarbonisation in its pandemic recovery package which has an official Green and Digital Recovery tagline.

How can Russia take advantage of this trend to reduce risks and reap benefits?

The spread of the coronavirus and related restrictions have shown that companies that effectively manage environmental, social and corporate risks achieve better results and are more financially resilient. To minimise negative consequences, Russian business will need to pay much more attention to sustainable development strategies and go from declarations to actions. As for the Green Deal, it can also open up new opportunities, for instance in hydrogen trade, building smart cities, digitalisation and environmental investment projects.

The earliest possible adoption of national carbon regulation in Russia and introduction, at some stage, of a carbon price with the prospect of an international agreement on a globally coordinated carbon price can provide a reasonable response at the state level to the EU policy, many experts believe. Introducing domestic restrictions on CO_2 emissions in the form of a tax or a market, as well as building a transparent accounting system in the country with the use of digital instruments could be an important step towards this end. Global convergence of CO_2 emission regulating systems will provide additional benefits in the form of climate investment and technology transfer and minimise unfair competition.

[1] *Infrastructure Will Be a Top Priority for China in 2020*. URL: https://www.bloomberg.com/news/articles/2020-05-22/china-drives-home-commitment-to-new-infrastructure-investment

Russia enjoys global competitive advantages in the form of ecosystems, space and human potential. In order to attract green investment on the global markets, it is necessary to develop a green financial infrastructure, as well as verification systems for environmental and climate reporting and bring them in line with international standards. The domestic digital technology and research and technology potential will help ensure a high level of transparency, which will help to win foreign investors' confidence.

Paris Agreement and Global Green Transformation

Despite the pandemic and the postponement of the 26th Conference of the Parties to the UNFCCC until 2021, the climate agenda has become much more relevant in 2020. The growing green assets and the investment sector were more successful during the crisis than traditional sectors and showed greater financial sustainability. The volume of outstanding green bonds was up to an all-time high of $350 billion. Digital green transformation has become an important part of many national recovery strategies, as well as a subject of global competition for new markets. States, banks and international corporations have already become part of it.

However, 2019 was a controversial year for global climate policy. In November 2019, the United States launched the process of withdrawal from the Paris Agreement (but will now again join the Agreement under its new presidential administration).[2] The talks during the 25th COP of the UNFCCC, which took place in Madrid in December 2019, failed to live up to expectations.

Major discussions centred on Article 6 of the Paris Agreement, which regulates the rules for voluntary international cooperation between countries when implementing nationally determined contributions in order to increase the ambitious nature of their mitigation and customisation efforts.

[2] *On the U.S. Withdrawal from the Paris Agreement*. URL: https://www.state.gov/on-the-u-s-withdrawal-from-the-paris-agreement/

The adoption of this article was one of the primary goals of the 25th COP of the UNFCCC, but the countries faced major controversies. Numerous issues were left unresolved:

- Internationally Transferred Mitigation Outcomes (ITMO) and making them part of national reporting.

- Additionality and "baseline" criteria (that is, an assessment of how a climate project actually made a difference and what would have happened had it not been implemented).

- Contributions to the Adaptation Fund from Section 6.2 activities in addition to the contributions from Section 6.4.

- Whether to transfer "Kyoto" projects and units to the "Paris" period, as a number of countries, primarily Brazil, India and China, insisted upon. The EU countries and the environmental community were strongly against it fearing the collapse of the carbon market due to excessive numbers of "Kyoto" units.

The 26th UNFCCC conference, which was planned to be held in Glasgow in November 2020 but was postponed until 2021 due to the coronavirus pandemic, has taken on a particularly important dimension, as discussing new climate national goals and distributing financial flows of green investment under Article 6 will become its cornerstone.

Why is the global green transformation intensifying despite the crisis and the lack of international consensus in the Paris Agreement talks? There are several reasons for that.

1. The Paris Agreement has set a new trajectory for the global economy and consolidated the global macro-trend for decarbonisation.

The Paris Agreement was adopted at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP) in December 2015. It has changed the international

discourse about the planet's future over the past five years to a much greater extent than the coronavirus crisis.

In many countries, the UN Sustainable Development Agenda 2030, which includes the Sustainable Development Goals (SDGs), is becoming increasingly important in formulating national development policies and programmes. The rapidly expanding market for impact investment[3] and green bonds is indicative of the business and financial markets' interest in green growth. The EU countries and most business leaders have announced ambitious plans to achieve global carbon neutrality by 2050.

This is corroborated by the latest data. A recent report issued by the International Renewable Energy Agency cites data showing that investment in renewable energy sources (RES) could add $100 trillion to global GDP and reduce CO_2 emissions by 70 percent by 2050.[4] According to McKinsey estimates, investment in green energy and energy efficiency will also lead to a nearly three-fold increase in jobs as compared with conventional energy.

Importantly, as a result of the coronavirus crisis, society and politics saw a shift in preferences that took them from increasing margins at any cost to sustainability. The coronavirus crisis highlighted the need to improve transparency and to reduce risks in supply chains, to increase localisation, or "islandisation" of production and move from the just-in-time model to models that increase sustainability and minimise risks.[5]

Opinion polls conducted by Ipsos during the crisis showed that the international community is committed to resolving climate problems. Thus, 65 percent of respondents from 14 countries supported green recovery packages following the crisis, and 71 percent of respondents agreed that in the long term climate change and the coronavirus represent threats of similar magnitude.

[3] Social transformative investment in companies, organisations and foundations seeking to create measurable, socially or environmentally beneficial impacts and to generate financial returns.

[4] *Green energy could drive Covid-19 recovery with $100tn boost*. URL: https://www.theguardian.com/environment/2020/apr/20/green-energy-could-drive-covid-19-recovery-international-renewable-energy-agency

[5] *From just in time to just in case: Covid-19 brings supply chain resilience to the fore*. URL: https://www.gtreview.com/news/sponsored-statement/from-just-in-time-to-just-in-case-covid-19-brings-supply-chain-resilience-to-the-fore/

2. Environmental disasters cause damage to economies and corporations which embrace green transformation in order to adapt to them.

Climate change and its ramifications pose a real threat to GDP and individual well-being in most countries. Since the adoption of the Paris Agreement in 2015, the number of natural disasters and industrial accidents caused by the effects of climate change has been steadily increasing. The year 2019 was the second warmest year on record, according to WMO.[6] Ocean temperatures have hit an all-time high,[7] and the area of ice in the Arctic is down to an all-time low.[8] Wildfires in many countries have reached unprecedented proportions.[9] In response, many cities and countries, including the EU, have declared a "climate emergency."[10]

Natural disasters hit Russia as well. Abnormal rainfall caused a devastating flood in the Irkutsk Region in July 2019. At the same time, brutal wildfires destroyed an area of up to 2 million hectares in Siberia and the Russian Far East. The researchers have linked these disasters to global climate change and warned that cataclysms like that will recur with increasing frequency unless effective measures are taken to reduce CO_2 emissions and to adapt to climate change.

Climate risks are among the key drivers for expanding investment in the green sector. The recent accident at the thermal power plant in Norilsk is quite telling. Some experts believe that, among other things, it was caused by soil thawing and climatic changes in the Arctic zone.[11] At the same time, international investors, clients, partners and

[6] *WMO confirms 2019 as second hottest year on record*. URL: https://public.wmo.int/en/media/press-release/wmo-confirms-2019-second-hottest-year-record

[7] *Ocean temperatures hit record high as rate of heating accelerates*. URL:https://www.theguardian.com/environment/2020/jan/13/ocean-temperatures-hit-record-high-as-rate-of-heating-accelerates

[8] *State of the climate: 2019 set to be second or third warmest year*. URL:https://www.carbonbrief.org/state-of-the-climate-2019-set-to-be-second-or-third-warmest-year

[9] *Yes, Australia has always had bushfires: but 2019 is like nothing we've seen before*. URL: https://www.theguardian.com/australia-news/2019/dec/25/factcheck-why-australias-monster-2019-bushfires-are-unprecedented

[10] *2019 was the year of 'climate emergency' declarations*. URL: https://www.theverge.com/2019/12/27/21038949/climate-change-2019-emergency-declaration

[11] *V Minprirody svjazali razliv topliva v Noril'ske s izmeneniem klimata (Environment Ministry links Norilsk fuel spillover to climate change)*. URL: https://lenta.ru/news/2020/06/16/climate/

stock exchanges are demanding to disclose data on greenhouse gas emissions and to adopt concrete measures to reduce risks and to adapt to climate change.

3. Changed consumer preferences in the wake of growing environmental awareness.

Environmental protection has become one of the most topical issues for Russians aged 15 to 40. According to research centres, the number of Russians who are concerned with environmental conservation have almost tripled over the past five years. Environmental problems in Kamchatka, Norilsk, Kalmykia and other regions are among the leaders in citation rates. At the same time, according to some studies, more than half of Russians care about environmental friendliness of the production and operation of purchased goods and are even willing to pay more for the products manufactured by the companies that act responsibly with regard to the environment and society.[12] As many as 66 percent of young people in Russia aged 14 to 24 are concerned about the environment.

These trends are also typical beyond Russia. According to an EY study, at least 50 percent of consumers worldwide will pay more attention to the impact of the products they consume on society following the pandemic.[13] Younger generations, including Generation Z and millennials, are more likely to gravitate towards products and companies that show commitment to sustainability. Importantly, this generation already makes up half of the world's population.[14] Generation Z will account for nearly 35 percent of the world's population in 2021, and 41 percent of them say that climate change is the biggest problem.

[12] *Kak pokupateli vybirayut ekotovary (How consumers buy eco-goods).* URL: https://ecounion.ru/wp-content/uploads/2019/09/Issledovanie-Kak-potrebiteli-vybirayut-ekotovary-2018.pdf

[13] *Can business sustain itself without being environmentally sustainable?* URL: https://www.ey.com/en_mz/unlocking-ambitions-of-private-businesses-and-their-owners/can-business-sustain-itself-without-being-environmentally-sustainable

[14] *Now, more than half of Americans are millennials or younger. Will their size and activism impact the 2020 election?* URL:https://www.brookings.edu/blog/the-avenue/2020/07/30/now-more-than-half-of-americans-are-millennials-or-younger/

The zoomers are more worried about the environment (36 percent) than terrorism (31 percent).

To corroborate these trends, ESG investment funds have received over $70 billion during April-June 2020, thus bringing total assets under management to over $1 trillion.

Companies that make climate sustainability part of their strategy are appealing from an investment perspective, both because of the short-term benefits in the form of job creation and in the long run due to their ability to withstand systemic shocks.

4. There's a race going on for leading on new markets created by the green transformation.

The statistics of leading investment banks showed that companies and funds that include sustainable development goals in their strategies performed above the market average during the crisis. Moreover, according to JPMorgan, as of May 2020, there has not been a single week showing an outflow of capital from exchange-traded funds created in accordance with sustainable investment principles even at the height of the crisis in March 2020, when traditional assets were rapidly selling off.

Investors predict that the crisis will lead to an increase in sustainable financing over the next three years. If, according to the World Bank, the current economic crisis is comparable in its impact only to WWII, then it would be sensible to draw a parallel between current reconstruction plans and the Marshall Plan. Countries and companies that can afford to invest in sustainable infrastructure and green technology will be the first to adopt the new technological paradigm and secure their leadership for several decades to come.

Thus, we are at the early stages of a long-term trend towards green transformation of the economy. We are witnessing a race for key markets and international financial flows. This is one of the main causes of the drawn-out Paris Agreement talks.

Winners and Losers

Experts and politicians have repeatedly said that the coronavirus is just the beginning, a kind of dress rehearsal before upcoming global upheavals, the biggest of which is climate change. In this context, they suggested that the current crisis be viewed as an opportunity to create and test new models of the green transformation of the economy, which may be used in the future. It is already possible to determine first leaders and those who have fallen behind in the global race for the global green transformation.

The European Union is preparing to lead the green digital transformation to reduce its energy dependence and expand to new markets

The EU's new climate policy came out as particularly strong in contrast to the lost momentum of the UN climate conference. The climate coalition of the Conservatives and Social Democrats in the European Commission, including President Ursula von der Leyen and Vice President Frans Timmermans, had great success in the latest elections to the European Parliament in spring 2019. These elections were coined by many climate elections, as global heating had become the biggest issue in the pre-election campaign. Since then the EU has considerably stepped up its climate policy. It culminated with the announcement of the European Green Deal (EGD) at the 25th Conference of the United Nations Framework Convention on Climate Change in December 2019. It was presented as Europe's man on the moon moment.

The Green Deal is an ambitious European plan of action for sustainable development and low-carbon transformation, which was first announced in December 2019. At least 1 trillion euros is supposed to be used for its implementation in the next decade. The main goals of the deal are to achieve net-zero greenhouse gas emissions by 2050 and significantly increase the EU's current 2030 emissions reduction target of -40. In view of this, the majority of European economic sectors, primarily, energy,

transport, agriculture, industrial production and consumption of goods as well as housing are slated for restructuring.

As a consequence, trade in emission quotas will expand, and the price of carbon dioxide will continue growing, moving further away from today's 30+ euros for a tonne of CO_2. This will require full inclusion of new sectors, such as aviation and shipping, into the Emissions Trading System. As a result of more demanding targets for cutting greenhouse emissions, the decarbonisation of the EU transport system will be stepped up as well. This may lead to a significant reduction in oil consumption in Europe to practically zero by the 2040s (with the exception of petrochemistry and some other industries).

A broad coalition of those who want to take advantage of the crisis to accelerate the green transformation of the economy has taken shape in Europe. In April 2020, a number of EU countries (Germany, France, Ireland, Spain, Austria, Portugal, Italy and Latvia, among others) supported the green recovery and higher investment in renewable energy sources, the circular economy, protection of biodiversity, etc. In its recovery packages France has allocated over $17 billion to green projects. The relevant figure for Germany is $45 billion, and the UK has allotted $4 billion just for improving energy efficiency of buildings.[15]

The possible introduction of a carbon border tax (or a similar measure) is another Green Deal measure under consideration. Its goal, as its authors see it, is to prevent carbon leakage (the transfer of carbon-intensive production to jurisdictions with laxer emission regulations), to potentially attract additional funds for greening the EU (and partner countries') economies and to ensure that European companies can compete on the global market on equal terms.

In simple terms, the carbon border tax is imposed on imported foreign goods and its rate depends on the carbon emissions associated with their production. In the estimates of the European Commission, the introduction of the carbon tax may generate annual revenues of 5 to 14 billion euros, depending on its rate and configuration.[16]

[15] *Governments put 'green recovery' on the backburner.* URL: https://www.theguardian.com/environment/2020/jul/15/governments-put-green-recovery-on-the-backburner

[16] *Russia warns EU against carbon border tax plan, citing WTO rules.* URL: https://www.climatechangenews.com/2020/07/28/russia-warns-eu-carbon-border-tax-plan-citing-wto-rules/

Some EU countries stand to lose from energy transition and the carbon tax

Far from all EU countries are happy about the green agenda. Poland, for example, was the only country not to support the European carbon neutrality goal by 2050, which is only natural since it produces more coal than any other EU country. Most probably, Poland will have to sacrifice to the new project its advanced coal industry, which currently generates about 80 percent of all electricity in the country. This will require mass reprofiling of production facilities, regions and personnel. Poland will this have to invest more into changing its economy than the average EU member state. Poland is engaged in an active dialogue with the United States on building a nuclear power plant. However, experts believe this scenario is unlikely. They doubt that the Polish efforts will reverse the green transformation of the EU. And in fact, over the last 2 years, Poland has moved quicker towards changing its economy from the current brown to a future green than maybe any other EU country.

This policy will also affect other Eastern EU countries. For example, the Green Deal threatens the entire oil shale industry in Estonia, which may lead to the loss of thousands of jobs and provoke a social explosion.[17] At one time the Czech government also suggested giving up the Green Deal and focussing on coronavirus response (but has not followed this idea later on).[18]

The Green Deal is also fraught with very significant challenges for the EU as a whole. On the one hand, the EU stands to gain from the policy of active decarbonisation because it allows it to remain competitive politically and economically during the period of global instability and transition to the fourth technological paradigm. At present, hydrocarbons amount to a substantial part of the EU energy balance at a time when the share of renewables does not exceed 20 percent in the overall energy balance.[19] A transition to renewables in such conditions would be impossible without a powerful technological and economic transformation.

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[17] *"Zelenaya sdelka" ES udarit po ekonomike Pol'shi i Estonii (The EU Green Deal to damage economies of Poland and Estonia).* URL: https://www.rubaltic.ru/article/ekonomika-i-biznes/10032020-zelenaya-sdelka-es-udarit-po-ekonomike-polshi-i-estonii/

[18] *Will coronavirus torpedo the Green Deal?* URL: https://euobserver.com/coronavirus/147815

[19] Share of renewable energy in gross final energy consumption – Products Datasets. URL: https://ec.europa.eu/eurostat/web/products-datasets/-/t2020_31&lang=en

At the same time, the Green Deal implies substantial intra-EU solidarity and investment in transforming the economies that need restructuring most of all but cannot afford it. Thus, Eastern member states will receive additional support for implementing the EU's Green Deal. Non-EU countries may not have this option.

The introduction of the carbon tax may place many Russian companies in a difficult situation. According to the *Boston Consulting Group*, if the tax on CO_2 emissions is imposed, Russian exporters may lose from $3 to $4.8 billion every year, if they do not decarbonise their products. It will affect exporters of metal, paper and chemical products, who risk to lose about half of their profits. However, the biggest losses may be incurred by oil and gas and metals companies, due to the large scale of their exports. According to the forecast of KPMG International, gas suppliers may have to bear additional expenses of about 1.4–2.3 billion euros per year.

To join the green transformation leaders, other countries must adopt active countermeasures and strategies that take the current realities into account

From the European Union's point of view, the advantages from the Green Deal exceed the risks, so it is determined to actively promote the policy of decarbonisation in the region and the rest of the world. After all, gradual renunciation of hydrocarbons, as many in the EU believe, will also make it possible to improve ensure energy security and the health of people.

It is quite probable that the introduction of the carbon border adjustment by the EU will encourage exporters outside the EU to take additional measures. They may take similar steps on hydrocarbon prices and taxation in order to avoid being taxed by the EU. This kind of reaction is already discussed in a number of bigger trade partners to the EU, including California, South Korea, Morocco, Ukraine, China, India and South Africa.

As for the Trump government in the United States, it has criticised the new EU tax from the outset, comparing it to the digital taxation that is being drafted in a number of European countries, and threatened to impose additional taxes on EU goods.[20] Following the US withdrawal from the Paris Agreement, Europe risked losing its traditional ally in its efforts to introduce the carbon tax as soon as possible. However, the US position will now again change radically under the new president.

During his election campaign, Joe Biden promised that if he were elected, the United States would rejoin to the Paris Agreement. He also published an ambitious climate plan,[21] which stipulates investing $2 trillion in renewable energy and green technologies to achieve carbon neutrality by 2050, with the energy sector becoming carbon neutral by 2035.

At the same time, we should note that the US has always been one of the world leaders in developing the green economy. The differences lay in the approach to implementing this policy. In the US, it was primarily carried out at the level of state governments and private corporations. Thus, during Trump's presidency California Governor Jerry Brown and former NYC Mayor Michael Bloomberg expressed their readiness to support the climate agenda at the top level, up to and including by paying US contributions to the UNCCCF.[22] In 2018, Brown signed a bill on a 100 percent transition to carbon-free energy sources by 2045, and signed an executive order to reduce greenhouse emissions by 80 percent by 2050 as against 1990. Now, in light of the new US policy, California will also be able to introduce a ban on ICE cars by 2035, a move that the Trump administration resisted.

In addition, the east coast of the United States has a Regional Greenhouse Gas Initiative (RGGI) since 2005. In 2013, California launched a similar programme, but covering more sectors (transportation, agriculture and forestry, air quality, and others). California's emissions trading

[20] *US threatens retaliation against EU over carbon tax*. URL: https://www.ft.com/content/f7ee830c-3ee6-11ea-a01a-bae547046735

[21] The Biden plan to build a modern, sustainable infrastructure and an equitable clean energy future. URL: https://joebiden.com/clean-energy/

[22] *Kaliforniya hochet uluchshit' mirovoi klimat (California wants to improve world climae)*. URL: https://www.kommersant.ru/doc/3743983

system is also linked to the Quebec carbon market, allowing companies to generate additional revenue from emissions trading and to invest in clean technologies.

Therefore, we can conclude that the United States has never remained on the sidelines of the green transformation on a regional scale, and with Biden taking office, this agenda will come to the foreground at the national level, both in domestic and foreign policy. At the same time, since 2013 China has been closely cooperating with the EU in preparing for the negative consequences of the carbon tax introduction on exports to Europe (China is one of the EU's largest suppliers). China plans to launch a country-wide emissions trading system, which was drafted with the support of European experts. It already has emissions trading pilot systems established in a number of industrial regions.

The EU's ambitious plans on the fundamental transformation of its energy and economic setup will determine its subsidising policy in the foreseeable future. This will have a major impact on the global economy.

European investors from diverse industries are already giving high priority to environmental aspects in their portfolio companies. This means that the capital concentrated in the world's second biggest economy will gradually encourage businesses in third countries to follow the path of environmental protection.

The Role of Technology and Investment

Green finance is one of the most conspicuous forms of transforming traditional capital due to increased levels of the global economic agenda's greening. This category includes investment and financial instruments aimed at implementing climate, environmental and low-carbon projects as well as developing technology that helps achieve energy and resource efficiency. The most common green finance instruments include green

loans, green bonds, green banks and green funds. However, an even broader category of sustainable finance includes, in addition to the environmental, the social focus in accordance with one or more of the 17 sustainable development goals.

Green financial instruments are widely used to finance recovery packages

The sustainable finance market has become one of the world's fastest growing markets, with over $500 billion in impact investment in sustainable growth projects in 2019; the volume of green bonds reached a record high of $257 billion, and social bonds issuance amounted to $13 billion.

Many countries around the world, such as Poland, France, Indonesia, Chile, Egypt and Seychelles, to name a few,[23] issue sovereign green bonds in order to directly finance national projects and programmes aimed at combating climate change and resolving the most critical environmental problems.

In most cases, the priority financing areas include renewable energy, energy efficiency and low-carbon transport, as well as flood adaptation, forestry support, and so on. For corporations and other market participants, issuing green and social bonds has become a cheaper source for financing sustainable development strategies, which increases among other things, their credit ratings and investment appeal.

The EU plans to issue green and social bonds to cover a portion of its recovery programme costs.[24] This could potentially turn the EU into the largest green bond issuer. According to S&P Global Ratings, the total sales of EU green bonds can reach 225 billion euros, which is almost equal to the volume of all green bonds issued in 2019. In addition, in 2019 the EU

[23] *Sovereign Green Bonds Club: Mexico, Egypt, Spain set to join: Who else is in the 2020 pipeline: And who else should be?* URL:https://www.climatebonds.net/2020/02/sovereign-green-bonds-club-mexico-egypt-spain-set-join-who-else-2020-pipeline-and-who-else

[24] *EU Plans to Sell Green and Social Bonds for Recovery Fund*. URL:https://www.bloomberg.com/news/articles/2020-08-27/eu-plans-to-sell-green-and-social-bonds-for-recovery-fund

launched an ambitious Action Plan on Financing Sustainable Growth,[25] which is aimed at creating a clear taxonomy, developing proprietary green bond standard, supporting financing for sustainable projects and more. The EU also supports developing countries in their efforts to improve conditions for mobilising low carbon finance.

However, the newly available trend for mixing green finance with digital technologies of the fourth industrial order, including as part of the EU recovery strategy, is quite notable. According to a number of leading experts, this synergy is not only in line with the spirit of the times, but also makes it possible to ensure greater efficiency in achieving Sustainable Development Goals (SDGs).

The market for green technology is on the rise, because the fourth industrial revolution makes it possible to more effectively resolve a backlog of environmental problems

The UN Task Force on Digital Financing for SDGs under the UN Secretary- General notes that digitalisation of finance can expand the use of domestic savings for long-term growth, improve accountability of public finance, take into account sustainable development goals on global financial markets, finance small and medium-sized enterprises, and stimulate consumer spending aligned with sustainable development goals.

Digital technology can also help meet the challenge of transition towards low-carbon economy based on renewable energy. Traditionally, the energy sector has been among the first ones to introduce digital technology.[26]

Creating a new and flexible Smart Grid energy system is on of the keys to the "energy transition," i.e., replacing coal and hydrocarbon power generation with renewable energy sources. Smart grids make it possible to not only streamline consumption, but also

[25] *Renewed sustainable finance strategy and implementation of the action plan on financing sustainable growth*. URL:https://ec.europa.eu/info/publications/sustainable-finance-renewed-strategy_en

[26] *Digitalisation and Energy*. URL:https://www.iea.org/reports/digitalisation-and-energy

to increase the renewable energy sources' efficiency by damping the load and streamlining peaks in generation and consumption. The growth rates of renewable energy sources are exponential. The demand for energy storage systems outfitted with digital systems that allow for flexible control of connecting renewable energy sources to the grid is growing as well. At the same time, the level of grid centralisation has decreased and a transition is made to self-sufficient micro grid clusters that provide stable energy consumption.

Urbanisation so far continues unabated followed by greater urban energy consumption. As a result, the demand for Smart City systems that can streamline and reduce energy consumption is growing as well. Smart City provides city management with additional opportunities in terms of improving urban safety and comfort and reducing energy consumption and emissions (including with the help of smart buildings that use energy more sparingly based on projected needs, which improves energy efficiency).

During the pandemic, most of the educational, work-related, logistics and many other processes were transferred to e-format. The demand for technology to increase transparency and traceability was also up during the pandemic. The digital identification technology and blockchain help establish the necessary level of trust between the parties and avoid human errors in crisis, when it is necessary to quickly and transparently allocate resources between various economic actors.

COVID-19 revealed the supply chains' vulnerability and the potential of technology such as blockchain to improve efficiency and to build trust between parties, as well as the importance of monitoring and risk assessment technology, including GIS and satellite monitoring.

The use of technology in contactless economy and cybernetics has also become more important. Replacing human personnel with cyber-physical systems is one of the readily available methods to reduce the risk of infection transmission. Using automated drones to deliver goods, online training, telecommuting and remote events also minimise social contacts, which is critical if we want to properly respond to the pandemic.

It is necessary to develop digital and mobile banking services in order to fully involve the public in the digital economy. The crowd-investing decisions have gained traction during the massive social crisis, since banks were unable to provide funds to everyone in need.

Global players are using both of the above trends to gain leadership in a changing world

Digitalisation has shown its effectiveness during the pandemic. It made it possible to neutralise many of the crisis impacts and to reduce the burden on the environment by transferring key processes to electronic format and transitioning employees to remote work.

Importantly, digitalisation has been a key component of many crisis recovery packages. The measures are expected to fund artificial intelligence, data centres, 5G base stations, high-voltage power sources, charging stations for electric vehicles, the industrial internet of things and interurban transport.

The EU also has a special place for digitisation in its pandemic recovery package, which has an official slogan, Green and Digital Recovery. The president of the European Investment Bank said the bank will become the leader in digital climate banking. All of this suggests that digital infrastructure will have a central place on the economic and green agenda as the world continues to recover from the pandemic.

How Can Russia Benefit From the Green Trend?

The current crisis is an opportunity for Russia to embark on socioeconomic transformation by way of implementing recovery programmes in accordance with the UN sustainable development goals. Interaction with the EU in green technology and investment can play an important role.

The need to step up efforts on the climate agenda, which the EU inevitably runs into in light of the ambitious Green Deal, opens up new avenues for cooperation with Russia. So, it is not just a risk factor in Russian-European relations, but also carries a whole set of new opportunities for updating bilateral and multilateral ties even under the sanctions pressure.

Russia and its business will lose if they fail to adapt

The Russian Union of Industrialists and Entrepreneurs has sent its proposals to the Russian Ministry of Economic Development and Trade to reduce risks from the EU initiative to create a carbon border adjustment mechanism. They include, among other things (such as the need to ensure the EU measures' compliance with the WTO rules), the creation of a working group to participate in the talks and consultations in order to protect Russia's interests, the development of national reporting standards that are closely related to the international ones as well as the support for the renewable energy sector and reducing Russian companies' carbon footprint.[27] As a last resort measure, conflict resolution proceedings between Russia and the EU could be held at the WTO.

These strategies are becoming increasingly important for Russian companies, as international investors, clients, partners and stock exchanges demand disclosure of data on greenhouse gas emissions and actual measures to mitigate risks and adapt to climate change.

Mirror measures will be a smart response to EU policy

Creating Russian reporting mechanisms in accordance with the principles of the Paris Agreement can be an effective response to the EU climate policy, and the universalisation of carbon management systems can bring additional benefits in the form of eliminating competition threats, enhancing climate investment and technology transfer.

[27] *Uglerodstvennye uzy (Carbon ties)*. URL:https://www.kommersant.ru/doc/4443081

Transition from oil and gas exports to climate-neutral hydrogen is another example. Green hydrogen could be the oil and gas of the future. Currently, many EU experts and officials are considering prospective countries for importing green hydrogen and some are also looking at Russia and its pipeline infrastructure as an option.

Russia needs to take timely measures in order to get a foothold in this market and maintain its leading position as an exporter of energy to Europe. The development of a roadmap, Developing Hydrogen Energy in Russia for 2020–2024 by the Ministry of Energy can be considered a positive signal.[28] The government plans to work on building Russia's image as an exporter of hydrogen. Nevertheless, the new roadmap is criticised for not focusing enough on the EU's favourite hydrogen, namely green hydrogen, which is produced from renewable energy.

The EU can significantly reduce costs and accelerate transition to full carbon neutrality through enhanced cooperation and transformative trade relations with Russia. However, everything depends on whether both sides are willing to engage in that.

Russia has global competitive advantages and can put them to good use

To maintain the level of Russia's competitiveness, it is important to have the electricity system in significant parts reformed and digitised by the end of this decade. Experts offer the following solutions:[29] transition to renewable energy sources, development of smart grid technologies, decentralisation of energy production, the build-up of storage facilities, digitalisation of infrastructure, introduction of IoT technology and gradual transition to the concept of internet energy, creation of a single energy platform, implementation of predictive analytics systems and development of digital client services.

[28] *"Gazprom" i "Rosatom" nachnut proizvodit' "chistyi" vodorod v 2024 godu (Gazprom and Rosatom to start production of clean hydrogen in 2024)*. URL: https://www.rbc.ru/business/22/07/2020/5f1565589a794712b40faedf

[29] *Tsifrovaya transformatsiya v energetike. Problemy i perspektivy razvitiya (Digital transformation in th energy sphere. Problems and development prospects)*. URL: http://smartenergysummit.ru/novosti/czifrovaya-transformacziya-v-energetike-problemyi-i-perspektivyi-razvitiya

Russia can take advantage of green instruments to finance national projects and a crisis recovery programme with foreign investment. This will call for developing proprietary infrastructure and verification systems for environmental and climate reporting in accordance with international standards.

Thanks to digital technologies and available scientific and technological potential, it will be possible to ensure high levels of transparency and, as a result, to win credibility with foreign investors. The Russian Central Bank believes that developing the green bond market in Russia and bringing in foreign capital for the environmental projects can be a driver for lifting sanctions.[30]

Overall, Russia should continue to actively implement the Digital Economy programme and to apply its key goals to the sustainable development agenda, including the digitalisation of the green economy and finance. This will help maintain the competitiveness of Russian companies, goods and services amid the widespread greening and digitalisation race.

Conclusion

The impact of the pandemic has advanced the climate agenda. The green transformation with the use of industry 4.0 has become the foundation of recovery packages and long-term strategies in the global competition of countries and companies. It has been joined by many advanced and developing states, banks and international corporations. The European Union has become the leader of this green race.

Despite differences on Article 6 of the Paris Agreement, the international community is making a transition to the new trajectory of global economic development, having formed an economic macro trend towards decarbonisation. To promote their leadership that could bring decades of green growth, many advanced countries, corporations and

[30] *Zelenyi ryvok (The green breakthrough)*. URL:https://lenta.ru/articles/2019/04/09/green_world/

investors have announced voluntarily a transition to carbon neutrality, renunciation of hydrocarbon energy sources and the adoption of other active measures.

Why is the global green transformation growing stronger despite the crisis and disagreements on the Paris Agreement?

The short answer is that countries and corporations want to be the first to create a financial and technological infrastructure to occupy leading positions in the new growing markets, attract and lead on green investment flows, and use the opportunities created by adaptation to climate change. Their goal is to avoid bankruptcy and ensure long-term competitive advantages and sustainable development during the global green and digital transformation. Companies and investors that do not take this new megatrend into account now may quickly disappear. Countries may weaken their own global influence.

The current situation has taken shape under the impact of several factors:

- The Paris Agreement has created a new trajectory of the new economic development and consolidated the global trend towards decarbonisation.

- The growing damage from environmental disasters has created the need for the adaptation of countries and corporations.

- Consumer preferences have changed under the impact of the greening of public consciousness.

- New growing markets and financial flows have started appearing; they will give their leaders opportunities of long-term sustainable growth.

These factors show that the world has entered the phase of the long-term green transformation trend. In effect, we are in a situation where both the economic and technological paradigms are undergoing vigorous

renovation at the macro level. The race for key markets and financial flows is one of the main reasons for the protracted talks on the Paris Agreement.

The adoption by EU of the unprecedented and ambitious Green Deal with a price tag of a trillion euros and the goal of becoming carbon neutral by 2050 shows that Europe wants to lead the green race. In this way the EU hopes to reduce its dependence on imported energy sources, lay the foundation for long-term sustainable well-being for the coming decades and ensure its ability to set global standards, also in technology. Digitisation has become a key component of the programme for the EU's post-crisis recovery.

The states and companies that turn out products with a bigger carbon footprint than their competitors will be the first ones to lose from the green transformation of the global and European economies.

The EU is introducing a carbon border adjustment mechanism to protect its market. It is fraught with huge potential losses for the suppliers of carbon-intensive products to the EU, including Russia, the Middle Eastern countries, the United States and China, if these suppliers do not adapt. The 2020 crisis has led to the growth of green and social investment in technology and infrastructure. Public companies and funds that are carrying out sustainable development strategies posted better indicators than the market averages. Renewable energy and electric vehicles continue setting new records while climate technology has become the fastest growing sector in the global venture market. Representatives of transnationals have divided into two camps: those who have announced that they will introduce digital technology across the board to achieve environmental goals (Unilever, Mars, Bayer and others), and those who are going to sell them their solutions (Microsoft, Google, and Amazon, among others).

In order not to fall behind, Russia must act symmetrically, and make effective use of its competitive advantages.

In response to the EU policy Russia could offer mutually beneficial cooperation in implementing mirror-like measures adapted to Russia's own needs and strengths. This will make it possible to reduce the risks of carbon

protectionism for the exporters and will also promote the exchange of technology and investment. Partnership based on the hydrogen economy is another promising move.

Opportunities already exist for attracting green investment in the world markets for funding green programmes and projects. To take full advantage of them, it is necessary to urgently create a legal, technological and financial green infrastructure and accounting systems and tailor the environmental impact to international standards and trends.

The use of cross-cutting technology for creating the above infrastructure opens up an opportunity for Russia. Its use may increase the trust of international investors, transparency and efficiency of expenses. In turn, this may attract the much-needed flow of foreign investment and will alleviate the impact of sanctions.

If proper support is given to domestic technology and the development of scientific and technological potential, Russia may join the group of leaders that will receive long-term positive benefits from the green transformation.

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