ENVIRONMENT IN TIMES OF WAR

Climate and Energy Challenges in the Post-Soviet Region

edited by **Aldo Ferrari** and **Eleonora Tafuro Ambrosetti**
introduction by **Paolo Magri**

ISPI

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Environment in Times of War: Climate and Energy Challenges in the Post-Soviet Region
Edited by Aldo Ferrari and Eleonora Tafuro Ambrosetti

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Acronyms

AC	Arctic Council
ACAP	Arctic Contaminants Action Program
AMAP	Arctic Monitoring and Assessment Program
AZRF	Arctic Zone of the Russian Federation
BRI	Belt and Road Initiative
CA	Central Asia
CADGAT	Central Asia Data-Gathering and Analysis Team
CBAM	Carbon Border Adjustment Mechanism (EU)
CIS	Commonwealth of Independent States
CLCS	Commission on the Limits of the Continental Shelf (UN)
COP	Conference of Parties
CSOs	Civil Society Organisations
DRC	Democratic Republic of Congo
EAEU	Eurasian Economic Union
EaP	EU-Eastern Partnership
EBRD	European Bank for Reconstruction and Development
EEU	Eurasian Economic Union
EEXs	Exclusive Economic Zones
EGD	European Green Deal

EPA	Environmental Protection Agency (US)
ESG	environmental, social and governance
EU	European Union
FAO	Food and Agricultural Organization (UN)
FAS	Foreign Agricultural Service (US)
FSB	Federal'naja služba bezopasnosti (Federal Security Service) (Russian Federation)
G20	Group of Twenty (19 countries and EU)
GDP	Gross Domestic Product
GHG	greenhouse gas
HFO	Heavy Fuel Oil
IEA	International Energy Agency
IMO	International Maritime Organization (UN)
IPC	Integrated Food Security Phase Classification
IPCC	Intergovernmental Panel on Climate Change (UN)
IWRM	Institute Integrated Water Resource Management
LNG	liquefied natural gas
MENA	Middle East and North Africa
MOSAiC	Multidisciplinary Drifting Observatory for the Study of Arctic Climate
NABOS	Nansen and Amundsen Basins Observational System
NATO	North Atlantic Treaty Organization
NGOs	Non Governative Organizations
NLR	Northern Latitudinal Railway
NSR	Northern Sea Route
OECD	Organization for Economic Co-operation and Development

OPEC	Organization of the Petroleum Exporting Countries
OPEC+	Organization of the Petroleum Exporting Countries (plus Russia)
PoU	Prelevance of Undernourishment
R&D	Research and Development
RF	Russian Federation
RUSALCA	Russian-American Long-term Census of the Arctic
SAR	search and rescue
UK	United Kingdom
UN	United Nations
UNCLOS	UN Convention on the Law of the Sea
US	United States of America
USSR	Union of Soviet Socialist Republics
WFP	World Food Programme (UN)

Introduction

Since February, Russia's invasion of Ukraine has upended our world. In doing so, it has also upended ISPI's editorial plans.

This is our last Report to have been commissioned before the war started. It is therefore a tragic irony that it deals with environmental problems in the post-Soviet region. And it is a testament to how unpredictable the invasion was until late last year, and how unprecedented its effects, that the Report does not touch upon hydrocarbon resources apart from a single chapter.

Already in 2021, but especially since the invasion, fossil fuels prices in Europe and in the world have skyrocketed. Crude oil, which in January 2021 hovered at around 50 dollars per barrel (for Brent), at the time of writing is aiming for 130. The spot price for natural gas in Europe has increased even more dramatically, from around 20 €/MWh (Dutch TTF) in January 2021 to 210 in early March, and now hovers at around 95 or five times higher than "normal".

For Russia, the rise in price of fossil fuels that preceded the invasion, and its strengthening and long-term support elicited by the invasion and by Europe's reaction (which, for the best part of the first three months since the invasion, consisted in European companies' self-sanctioning, i.e. actively avoiding Russian fossil fuels) has made it clearer than ever that a big share of Russia's public budget and external revenues depend on the international sale of hydrocarbons.

This could well prove to be a liability in the long term. However, in the short term it has allowed Russia to shelter its economy from the most immediate impact of sanctions. Over the past twelve months, Russia's revenues from the sale of fossil fuels have skyrocketed, more than tripling compared to pre-pandemic times. But the necessity of the transition is still on policymakers' minds. On the one hand, this is because Europe itself appears to be very determined to wean itself off Russian fossil fuels, and therefore in absence of alternative revenue sources short-term gains could well transform into long-term pain. On the other hand, Western sanctions on high-tech and energy-related technologies could make it increasingly difficult for Russia to continue to expand its hydrocarbon production in the future.

Apart from the imperatives of the energy transition, and the paradoxes of an oil- and natural-gas-dependent world, Russia's invasion brought to the forefront other environmental problems in the region. For one, it has shown how the Chernobyl disaster 36 years ago can still weigh on current events, as shown by the Russian capture of the plant and the region around it in March of this year, and by the frequent calls by the International Atomic Energy Agency (IAEA) to ensure the safety and security of Ukraine's nuclear plants.

From Europe's point of view, the dilemma associated with the green transition (how to make the energy system more sustainable, while keeping energy prices affordable to EU consumers and avoiding losing international competitiveness) has become a trilemma, with the necessity of decoupling from Russia complicating matters further. However, Russia's invasion has also complicated plans to help countries in the post-Soviet region address their domestic or international environmental problems, as resources and interest risk being redirected towards the effects of the invasion itself.

This is why this Report, which has been extensively reviewed by its authors in the light of the invasion, remains relevant today: because it aims to show that the post-Soviet region is

home to many environmental challenges that are too often neglected. Some of these challenges, perhaps, could even offer avenues for international collaboration in the future, opening up one path for the de-escalation of political tensions between Russia and the West.

Richard Sakwa opens the volume with a reflection on Russia's "green shift" and its significance both for the country and the larger region. After a long period of ambivalence if not outright denial about climate change, in the early 2020s Russia radically changed its stance. This was due to internal factors (Russia's vulnerability to extreme weather and climatic events) as well as external ones, above all the European Union's green agenda and carbon taxes, which are set to shrink future EU demand for Russia's fossil fuels. Hence, Russia devised new energy and climate strategies, at the same time seeking to maintain its position as one of the world's leading energy exporters and its competitive economic advantage. Russia's invasion of Ukraine in February 2022 changed it all: Western powers' decarbonisation efforts, plans to reduce imports from Russia and energy-related sanctions put the entire green shift in question.

Another casualty of the war seems to be the EU-Russia "green" cooperation, which had previously raised many hopes. Marco Siddi and Eleonora Tafuro Ambrosetti engage with this issue and the EU-Russia energy relationship at large. Following decades of trade and growing interconnections, thanks to which Moscow became the EU's main external provider of oil, natural gas, and coal, two highly significant developments are heavily impacting the relationship: the EU's own decarbonisation agenda and the unprecedented tensions following Moscow's invasion of Ukraine. While it is still unclear whether the EU will manage to break free from its energy dependence on Russia, the prospects of a possible cooperation on climate issues look bleak. This spells trouble not just for Russia, but for the whole world.

The Russo-Ukrainian war is also affecting the world's food security. This has become a worrying issue due to climate change, geopolitical shocks – such as conflicts and instabilities,

and borders closure due to the pandemic – as well as long-term trends such as a growing population at the global level and shifting patterns of food consumption ("protein diet", increasing food waste). In her chapter, Elena Maslova analyses the importance of Russia as a global actor in the food security system and the impact of the invasion for food security. Before the invasion, Russia (16%) and Ukraine (10%) accounted for around 26% of world wheat exports and about half of the world's sunflower oil export market. Maslova argues that the conflict entails, among losses of life and other primary effects, a "great decoupling" between Russia and the West, where food "weaponisation" could take new forms.

How will the war affect Russia's foreign policy and its role in the region? Given its strategic importance and the numbers of local and international players involved, a lot of international attention should focus on the Arctic. Pavel Devyatkin looks at the wide range of actors and interests that, despite political centralisation in Russia's decision-making, play a role in the formulation of Moscow's policy approach to the Arctic. He argues that climate change and political crises limiting Russian-Western cooperation impact heavily security and economy in the Arctic.

Will China take advantage of Russia's "distraction" in Ukraine to strengthen its role in the post-Soviet region? Aliya Tskhay argues that the main area to watch in this regard is Central Asia. Central Asia, being at the core of the China-Europe and South Asia routes, holds a particularly central location in China's Belt and Road Initiative (BRI) – a global vision of interconnections, revived historical trade routes, and infrastructure programmes launched by China in 2013. However, as the BRI is progressing in many regions in the world, it is important to pay attention to the environmental challenges that are posed by the proliferation of infrastructure projects. Tskhay considers that the main sectors covered by the BRI projects, including transport links, energy, trade, and manufacturing, are very carbon-intensive. As such, they pose a challenge in the transition to net-zero

targets. She also discusses potential opportunities that the BRI framework can facilitate, such as projects on renewable energy, waste management, and green investments.

Central Asia is on the spotlight also due to the phenomenon of desertification, which is aggravated by global environmental changes. As Stefanos Xenarios and Jessica Neafie report, Central Asia hosts extensive dryland areas where water mismanagement, land degradation and climate change have induced a threatening desertification process. Two of the most extensive inland water systems in the world situated in Central Asia, the Caspian Sea and the Aral Sea, face significant challenges due to lower precipitation and increased water recession in the last few years. With the occurrence of more frequent and more intense droughts, desertification, mainly in arid and semi-arid regions, can only get worse, potentially disrupting Central Asian economies and potentially exacerbating competition in the region. However, one can only hope, rising climate and energy challenges in the post-Soviet region may also encourage a degree of cooperation that is currently far from reach.

Paolo Magri
ISPI Executive Vice President

1. Russia's "Green Shift" and What It Means for Neighbouring Countries

Richard Sakwa

After a long period of ambivalence if not outright denial about anthropogenic climate change, in the early 2020s Russia radically changed its stance. This "green shift" is epochal in its significance both for the country and the larger region. It was prompted by overwhelming scientific evidence proving human-caused climate change and increasingly stark demonstrations of its effect, such as the increasing occurrence and intensity of extreme weather and climatic events (forest fires, floods, droughts, permafrost melting and icecap retreat). External factors also shaped the shift, above all the European Union's green agenda and carbon taxes. These will have a major disruptive effect on the existing carbon economy, including on the pattern and character of Russia's energy exports. Russia devised new energy and climate strategies, but at the same time sought to maintain its position as one of the world's leading energy exporters. Combining the green shift with the maintenance of a competitive economic advantage in conditions of renewed confrontation with the West poses fundamental questions about the coherence and consistency of Russian policy making. The potential impact on neighbouring countries includes issues of pipeline politics, the development of renewables across Eurasia, the lure of hydrogen and the role of multilateral forums in coordinating responses. The green shift represents a profound change in orientation, but the tension remains between attempts to achieve a fundamental

transformation of the traditional carbon-based domestic and export economy and contingent and reactive endeavours to manage (and thus mitigate) externally-imposed imperatives. These questions were intensified following the imposition of energy-related sanctions by the Western powers after Russia's invasion of Ukraine in February 2022 and put the whole green shift in question.

The Problem Defined

Industrial societies need power to drive transport and manufacturing, maintain comfortable building temperatures and sustain everyday life. In the face of rapidly intensifying climate change, the whole world faces an energy transition unprecedented in its scope and intensity. However, not all countries are adapting in the same way. For Russia, the challenge is particularly acute. It is at the sharp edge of climate change, with temperatures in its Arctic regions rising at more than double the rate of global averages, while extreme weather events are becoming more frequent and intense. In the summer of 2021, the forest fire in the Yakutia (Sakha) region was one of the biggest in recorded human history. That year over 13 million hectares burned, throwing up at least 970 million tonnes of CO2 equivalent.[1] Poor forestry practices were a contributory factor, but an extended heat wave provoked by global warming undoubtedly created conditions that in the past occurred once in 50 years but now once a decade, if not more frequently. At the same time, there were damaging floods in the south, with the Krasnodar region affected particularly badly.

In the face of overwhelming evidence that human activity is responsible for raising the level of greenhouse gases (GHGs), above all carbon dioxide but methane as well. The UN's Intergovernmental Panel on Climate Change (IPCC) warns

[1] T. Balmforth, "Vast Wildfires in Russia's Yakutia Set Emissions Record – Monitor", *Reuters*, 4 August 2021.

that if no action is taken, global temperatures could rise by an astonishing 4 degrees above pre-industrial levels by the end of the century. This could provoke unstoppable runaway greenhouse effects, making human life very difficult if not impossible. Nature would reclaim its patrimony, and eventually cities and other monuments to human activity would be wiped from the earth. However, the green shift in Russia and elsewhere is predicated on the view that humans made the mess and humans can solve it, or at least mitigate the effects. Some halting but important steps have been taken. Beginning in the 1990s, a series of meetings held under the auspices of the UN have devised strategies ultimately intended to contain the temperature increase within 1.5°C, the goal formulated by the Conference of Parties (COP)21 Paris Agreement in December 2015.

Confronted with the green energy transition, Russia faces some particularly difficult issues. Russia is one of the world's three largest energy exporters (alongside Saudi Arabia and the US), supplying 12% of the world's oil demand. In 2021 Russia provided the EU with 40% of its oil and a fifth of its natural gas consumption, with 47% of EU and 10% of Chinese gas imports came from Russia. In that year, Russian oil output averaged just over 10.3 million barrels a day, second only to the US (11.10 million), with Saudi Arabia coming in third at 8.27 million barrels a day. Oil accounts for around 40% of Russia's overall exports. Although crucial for export earnings, oil and gas comprise a declining proportion of GDP. Depending on energy prices, the oil and gas sectors contribute some 28% of federal budget revenues annually, a share that has fallen sharply in recent years. Much attention is focused on Russia's gas export market, including controversies over pipeline supplies through Ukraine and the danger of EU energy-dependence. In fact, only about 20% of Russia's energy income comes from piped and liquified natural gas (LNG). The great bulk – the other 80% – comes from oil. Given the fungibility of markets, in most cases oil supply is not an effective lever of influence.

The same increasingly applies to gas as spot market deliveries grow. The availability of LNG shipped by tanker makes it more a "market" rather than a "relationship" commodity, with the latter dependent on long-term fixed investment in pipelines. Russia's diversification strategy has had an effect, and today the share of oil and gas (including contributions to other sectors) in GDP has been falling. Most recent figures from the Russian statistical agency Rosstat suggest that it has fallen from 21.1% in 2018 to 15.2% in 2020 – about double the sector's 8% share of US GDP. There has historically been a close link between oil prices and the value of the rouble, but the "budget rule", whereby any income above $42 a barrel is diverted into the reserves, has weakened the link and reduced the risks associated with oil price volatility.

Russia finally ratified the Paris Agreement in September 2019. By then, the EU was moving much further, and the following year announced a Green Deal that would affect every aspect of its work. It announced that in 2023-24 it would introduce a Carbon Border Adjustment Mechanism (CBAM), a system of tariffs on imports from highly polluting industries. The direct and indirect taxation of carbon emissions includes gas transportation activities, something that affects Russia directly. This would affect not only energy exporters but also some major industries. EU carbon taxes were anticipated to cost Russia's metal industries over $1 billion in as little as five years.[2] Steel production is a major polluter and accounts for some 8% of global CO2 emissions annually. Alisher Usmanov was one of the first to see which way the wind was blowing and moved away from coal-fired blast furnaces to more environmentally friendly production methods in electric arc furnaces.[3] Russia is the world's fourth largest emitter of carbon dioxide, behind China, the US and India, and hence bears a special responsibility to deal with the problem.

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[2] V. Inozemtsev, "Unintended Consequences of Decarbonisation", *Riddle*, 1 November 2021.

[3] K. Rapoza, "Putin Skipped the COP26 Climate Talks: Why Russia's Biggest Industries Decided to Go", *Forbes*, 15 December 2021.

Energy transitions are never fast but the environmental catastrophe is accelerating. The world consumes over 4 billion tonnes of oil and 7.7 billion tonnes of coal annually, and demand is unlikely to decline in the next decade or two. Climate change is being managed by nation states, but short-term concerns trump long-term necessities.[4] The goal of the energy transition is to achieve "net zero", meaning that necessary use of carbon-based fuels is offset by investment in forest planting and other strategies. This market-based approach, developed by William Nordhaus, combines climate change models with growth projections.[5] It may not be enough to stop runaway greenhouse effects, but it is the framework within which net-zero goals have been devised. A cascade of announcements in 2021 saw countries proclaim target dates by which they would reach the blessed condition. China and Russia declared that they would reach net zero by 2060, India announced 2070 as its target date whereas the EU and the US aim to become carbon neutral by 2050.

The connection between climate change and energy policy is now clear. The Russian strategy paper on the issue argues that nuclear and hydroelectric power, which account for some 40% of the country's energy mix, should be internationally accepted as green. The issue was highly controversial elsewhere and, despite the protests of Green parties, the EU in January 2022 also accepted that nuclear would remain part of the green energy mix. Another 40% of Russian energy is derived from natural gas, which Moscow argues is a low-carbon fuel – and of course one of its major exports. The strategy also stresses that forests, which cover about two-thirds of the country and account for some 20% of the world total, should be part of the equation and used to offset Russia's CO2 emissions. Russia also has plans to become a major hydrogen energy producer.[6]

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[4] A. Lieven, *Climate Change and the Nation State*, London, Penguin Books, 2021.

[5] W.D. Nordhaus, *The Spirit of Green: The Economics of Collisions and Contagions in a Crowded Field*, Princeton, NJ, Princeton University Press, 2021.

[6] D. Trenin, *After COP26: Russia's Path to the Global Green Future*, Carnegie Moscow

The country wants its voice heard in shaping the international carbon trading regime. Russia's green shift is not simply about adapting to regulations devised elsewhere but about playing an active part in making the rules.

The Russian Dilemma

The fundamental dilemma for Russia is the obvious need to halt the increase in the global carbon stock balanced by fear that its enormous hydrocarbon reserves could end up as "stranded assets". In a world genuinely moving towards decarbonisation, Russia could find itself with at least $2.3 trillion of worthless reserves.[7] If oil and gas rigs, pipelines and other infrastructure is added, then Russia could be left with nearly $4 trillion in useless assets, and by 2030 lose around 40% of its oil and gas revenues.[8] One response is to sell as much as possible as quickly as possible, and in the current market conditions, this makes sense. EU gas production fell by 15% after 2018 as UK North Sea gas production declined and the Groningen gas field in the Netherlands closed, while China is switching 15 million homes a year from coal to gas. More buyers are chasing less gas. At the same time, Russia sends about 2.3 million barrels of Russian crude a day to the West, and demand is not going to reduce in the short term. This strategy not only damages Russia's environment but also undermines its credibility as a responsible member of the international community. However, it is a rational, even if it runs against ESG (environmental, social and governance) norms.

Russia is often perceived as a fading petrostate desperate to maximise its energy revenues before sinking under the waves.

Centre, 16 November 2021.

[7] M. Galeotti, *Climate Change: Russia's Evolving Stance*, Council on Geostrategy, 8 November 2021.

[8] J. Cordell, "Russia Faces $2tn in Stranded Hydrocarbon Assets in Net Zero World", *Moscow Times*, 5 November 2021.

In the mid-2000s there was much talk of Russia becoming an "energy superpower", but the ambition was always misconceived. Critics nevertheless argue that Russia uses income derived from the export of oil and gas to maintain its geopolitical status and to fuel its hegemonic ambitions in the neighbourhood. Up to 2021 Russia supplied the EU with between 35% and 40% of its natural gas needs. The anticipated transition to a clean energy economy would diminish Russia's status and its purported ability to hold consuming states hostage. Russia's economy has become more diverse, but the country has failed to use the good years of high energy revenues to modernise its economy and society. Russia remains hostage to its energy exports.[9]

This much is true, but the situation is more complex. Energy transition is a long-term process, and energy transition in the first period, lasting perhaps two decades or even more, may actually increase the bargaining power of energy exporting countries. As countries wean themselves off carbon fuels they will rely more on renewables, in some cases nuclear, and in the long-term hydrogen. But in the interim, markets will endure extreme price volatility as investment in carbon resources falls but demand fails to decrease at the same rate. Consumers were hit with unprecedentedly rapid price rises in the autumn of 2021, with spot market prices for gas increasing an extraordinary 10-fold. By February 2022, oil had reached $90 a barrel, last seen nearly a decade earlier, and in the early months of the war rose to well over $100 a barrel. Rapid recovery from the Covid-19 pandemic, low wind speeds in summer 2021, low gas reserves and insatiable demand from Asian markets, above all China, created a "perfect storm". LNG shipments were diverted from European to Asian markets where prices were higher. Much of Russia's gas exports are sold at non-spot market prices, tying in relations with its neighbours with long-term pipeline gas delivery contracts. It was this system that the European Commission's

[9] Analysed by T. Gustafson, *Klimat: Russia in the Age of Climate Change*, Cambridge, MA, Harvard University Press, 2021.

Third Energy Package of 2009 sought to destroy in favour of a more competitive and unified European gas market. Like so many other geopolitically driven neoliberal strategies, the price crisis demonstrated that this had been poorly implemented if not ill-conceived. Certainly, Russian commentators eagerly defended its traditional export model, stressing that, since Soviet times, the country had always fulfilled its contractual obligations.

The green shift needs to be planned, yet investment in renewable energy, insulation and infrastructure has clearly been inadequate. Precipitate actions, such as Germany closing down its nuclear industry after the Fukushima Daiichi disaster in Japan in March 2011, forced it to return to coal for electricity generation. Oil and gas consumption are still rising and are projected to do so for years. Global investment in oil and gas is at record low levels, while price rises have provided energy companies with windfall profits. Shell's profits quadrupled from $4.85 billion in 2020 to $19.3 billion in 2021.[10] Russia was a major beneficiary of the bounty, with Gazprom sales and profits increased. Export revenues filled Russia's coffers, with over $620 billion in Central Bank reserves by early 2022 and some $200 billion in the National Welfare Fund.

In comparison, the $10 billion cost of building Nord Stream II pales into relative insignificance. The controversy over the pipeline from Ust-Luga on the Gulf of Finland to Germany combined the various dilemmas in a concentrated form. It was opposed by the US on geopolitical grounds, arguing that dependence on Russian energy supplies reduced Europe's political freedom and hence reliability as a US ally. Germany long argued that such deals are purely commercial. Environmentalists opposed reliance on carbon fuels, even as a "transitional" fuel. Others question the basis on which the US claims to have the right to shape Russia's relations with its

[10] J. Ambrose, "Shell Profits Quadruple, Firing up Demands for Windfall Tax", *The Guardian*, 4 February 2022, p. 7.

neighbours. The pipeline was physically completed in September 2021, but the certification was postponed and then effectively cancelled by Chancellor Olaf Scholz immediately following the invasion of Ukraine. A whole era of energy relations between Russia and Europe was coming to an end.

New and cleaner pipeline infrastructure would appear to be a vital element to achieve the goals of the EU's Green transition. Its defenders argue that pipeline gas is both cheaper and cleaner than alternatives. The Baltic route between the Yamal peninsula and European consumers is 2,000 kilometres shorter than through Ukraine and is environmentally much cleaner than the dilapidated and more polluting southern route. By some estimates, the carbon footprint of gas transported via Ukraine is 60% higher than the Nord Stream route.[11] All of this appeared moot as the Western consumer countries looked for alternative sources of energy, and Russia diverted supplies to Asia. Even if the conflict were to be resolved it is clear that there will be no simple return to the traditional Russo-European energy relationship. Europe will build more LNG facilities, while Russia will look to alternative world markets.

Assuming some sort of energy relationship is restored, gas pipelines in the future could be used for the transport of hydrogen. Russia's environmental strategy envisages the expansion of hydrogen energy production to satisfy 20% of global demand. Hydrogen is seen as a possible pathway to a future in which Russia has some unique advantages – able to produce "green" hydrogen from its abundant hydroelectric power generating capacity. This is contrasted to grey hydrogen, in which CO2 is emitted during its production, blue (fossil-based production accompanied by carbon capture), purple (from electrolysers using nuclear power) and turquoise (generated by methane pyrolysis). The Russian government's hydrogen strategy released in August 2021 suggested that hydrogen as an

[11] D. Bochkarev, "Nord Stream 2 Could Provide Europe with Cheaper and Greener Energy: What Stands in the Way?", Valdai Discussion Club, 14 December 2021.

energy source could transform Russia's energy industry, with plans to export up to 50 million tonnes by mid-century.

Oil and gas production has shifted from traditional, Western, publicly listed, multinational corporations to state-owned companies. The so-called majors – Shell, Exxon, BP, Chevron and Total – produce only 15% of the world's oil and gas, and all are under mounting pressure to reprofile themselves towards renewables.[12] Basic logic suggests that if the Western majors reduce output and demand fails to fall commensurately, then the slack will be taken up by state-affiliated companies. These are less susceptible to environmental pressure groups and independent of private financing. Thus the power of OPEC+ (the traditional OPEC countries plus Russia) is liable to increase. Already Saudi Aramco, Abu Dhabi National Oil Company and Rosneft are investing to increase future oil production to take advantage of the energy transition, clearly a paradoxical situation.

A net-zero global economy will not be a carbon-free world, and oil and gas will continue to play an important part in the energy mix. The International Energy Agency estimates that even if the world reaches the stated goal of net-zero emissions by 2050 it will still be using roughly a quarter as much oil and half as much natural gas as it does today.[13] Countries with the lowest production costs and lowest carbon footprints will be able to take advantage of the new market opportunities, notably Russia and Middle Eastern producers. Even though Russian gas to the European market will remain competitively priced, geopolitical hazards (including US opposition to dependency on Russian gas) will ensure that commercial calculations are trumped by political concerns.

In the immediate term, Russia envisages increasing emissions to 2030, thus casting doubt on how substantially it understands what decarbonisation entails. Scepticism is fuelled by Russia's 2020 energy strategy, which still calls for the expansion of fossil

[12] M.L. O'Sullivan and J. Bordoff, "Russia Isn't a Dead Petrostate, and Putin Isn't Going Anywhere", *New York Times*, 27 January 2022.
[13] Ibid.

fuel industries. In addition, in 2021, government subsidies for the solar and wind energy industries were cut. At the same time the government pursued an aggressive export strategy. In December 2021 it signed a major energy cooperation deal with India, with Rosneft committed to supplying Indian Oil with 15 million barrels of crude by the end of 2022. This was part of Russia's strategy of increasing crude oil production and selling it to strategic partners at preferential prices. There were also plans to supply LNG, possibly via the Northern Sea Route (NSR). According to the International Energy Agency (IEA), India will drive at least a quarter of the world's growth in energy demand over the next two decades and overtake the EU as the world's third biggest energy consumer by 2030. India's energy consumption is expected to double as its GDP grows to an estimated $8.6 trillion by 2040. Domestic oil and gas production has been stagnant for years, fostering a greater reliance on imports.

The energy transition is a dynamic process, and the prospect of greater energy dependency on risky geopolitical producers will prompt responses in consumer markets. These include increased measures to reduce demand for oil and gas, increased investment in renewable and nuclear (which, as noted, the EU has categorised as "green"), more efficient building insulation and heating systems, strategic oil and gas stockpiles, and delaying the closure of existing energy infrastructure before alternatives are available (this applies in particular to nuclear plants). The political risks of the green shift are evident, notably in the *gilets jaunes* protests in France in 2018-19 when motorists were asked to pay more for their fuel to help fund the transition to renewables. The end of subsidised prices for domestic fuel consumers and the rapid transition to market prices in Kazakhstan provoked mass protests in January 2022, highlighting the global threat to regime stability posed by rising energy costs.[14] Gas pipeline conflicts over the decades fuelled

[14] N.K. Gvosdev, "What's Really Behind the Protests in Kazakhstan?", *The*

Russia-Ukraine tensions, and are likely to do so until Russia finally builds alternative routes. The politics of the green shift are as risky as the geopolitics.

Policies and Contradictions

The Kyoto Protocol climate change treaty of 1997 obliged developed countries to curb their GHG emissions, but until the green shift in 2021, Russia was slow to engage with climate change issues. President Vladimir Putin notoriously argued in 2003 that global warming could actually be advantageous for Russia.[15] There would be a longer growing season and the extension of agriculture to parts that had hitherto been inhospitable.[16] However, there was mounting evidence of the disruptions attending climate change, including more frequent and intense fires, droughts, blizzards, storms and floods. Russia's southern regions would endure prolonged droughts and desertification, while northern latitudes would endure greater unpredictability. Climate change accelerated the melting of permafrost, damaging infrastructure and buildings. Ground melting provoked a major diesel spillage in May 2020 at a Norilsk Nickel subsidiary in the Taimyr Peninsula, extensively polluting the Ambarnaya River and harming the local indigenous population. Warming releases methane, a far more damaging greenhouse gas than even carbon dioxide, accompanied by the opening up of giant sinkholes.

Russia is taking advantage of melting sea ice to open up the Northern Sea Route (NSR, the northeast passage) over Siberia to the Pacific. It has built a fleet of the world's largest nuclear icebreakers and developed staging posts, as well as military

National Interest, 6 January 2022.

[15] J. Tickle, "How Vladimir Putin Changed from Sceptic to Believer on Climate Change", *RT.com*, 4 November 2021.

[16] F. Schierhorn, "Will Russian Agriculture Benefit from Climate Change?", *Russian Analytical Digest*, no. 272, 25 October 2021, pp. 11-13.

installations, along the route as the opportunities and risks associated with greater accessibility in the north have become clearer. Various federal programmes outline ambitious plans for the development of the Arctic Zone (AZRF) including the exploitation of oil and gas deposits, extracting mineral and other resources, and creating the infrastructure to export these to global markets.[17]

Russia was slow to adopt climate change mitigation measures. Its first relevant document came only in 2009, the Climate Doctrine, and in 2013 a presidential decree called for a drastic cut in greenhouse gases to 75% of 1990 levels, which entailed hardly any change since deindustrialisation and new technologies had already achieved much of this. In November 2020, a presidential decree again called for a 30% GHG (Greenhouse gas) reduction against the 1990 level. The fundamental law "On restricting GHG emissions" was passed in summer 2020, including the mandatory disclosure of GHG emissions by major companies.[18] In November 2020, prime minister Mikhail Mishustin signed the Low Carbon Strategy, envisaging cutting GHG emissions by 60% from 2019 levels by 2050 (80% of 1990 levels) and eventually achieving carbon neutrality by 2060. Russia's energy strategy, adopted in 2020, envisages continued growth for hydrocarbon exports, with no serious plan to replace fossil fuels with green energy in the domestic market. The country rather belatedly woke up to the fact that the global decarbonisation agenda represents "a serious and long-term threat".[19] Putin admitted that "We will have to adapt the entire Russian economy to the changing climate" and called on Russian scientists to provide accurate data.[20]

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[17] T.E. Rotnem, *Infrastructure in Russia's Arctic: Environmental Impact and Considerations*, Kennan Cable No. 73, Wilson Center, November 2021.

[18] Details can be found in M. Poberezhskaya, "Russian Climate Change Policy: Increasing Ambitions", *Russian Analytical Digest*, no. 272, 25 October 2021, pp. 2-5.

[19] T. Mitrova, *Is Russia Finally Ready to Tackle Cloimate Change?*, Carnegie Moscow Centre, 27 July 2021.

[20] "Meeting of Council for Science and Education", 8 February 2022.

The green shift is not only about threats and challenges, but also about opportunities. The clean air agenda will mean more liveable and quieter cities as public transport moves from diesel to electric or hydrogen. A presidential decree called for a reduction in urban pollution by 20% by 2024.[21] Moscow has Europe's largest fleet of electric buses, with over 1,000 running by early 2022 and with plans for the entire transport sector to be eco-friendly by 2030. A trillion rouble ($15 billion) federal programme, initially began as an eight-year pilot but now extended to 2035, provides funding and other support for renewable energy startups. The funds have been used to build solar energy farms, wind power plants, and small hydroelectric projects.

Waste management has become an increasingly contentious issue, with protests against Moscow exporting its rubbish to distant regions. Russia has very little capacity for industrial composting, and its recycling industry is at best in its infancy. Landfill has been the preferred method, but this is not only wasteful but imposes environmental costs of its own in terms of ground water pollution. Western countries have traditionally shipped scrap metal and plastics to Asia and Africa, but China has banned such imports, shifting the problem to more poorly governed states. In Russia today environmental issues have the greatest mobilisation capacity and, as the environmental situation deteriorates, the Kremlin is forced to take public opinion into account.

Sakhalin island has become a trial laboratory for government ambitions, with plans for it to become carbon-neutral by 2025 through "gasification, alternative energy, clean transport, energy efficiency, and sustainable forest management programs", in the words of its governor, Valery Limarenko.[22] However, there is a long way to go. Renewable energy is already providing up to

[21] "Chistyi vozdukh v rezhime ruchnogo upravleniya" ("Clean air in manual mode"), *Kommersant*, 15 December 2021, p. 1.

[22] F. Weir, "Russia Changes its Tune on Climate Change: What's Behind the Shift?", *Christian Science Monitor*, 12 November 2021.

50% of electricity at peak times in the UK, and in 2020 provided about 29% of energy production globally, including 17% from hydropower.[23] In Russia, the total is some 17%, of which over 16% is generated by hydropower, with less than one per cent coming from all other renewables (excluding nuclear).[24] Even if all the goals are met at the current rate, renewables (excluding hydropower) will only supply some 6% of Russia's energy needs by 2035, compared to the European target of at least 20% by then.

The decarbonisation agenda is a game changer. Putin's scepticism about anthropogenic climate change has now gone. His announcement of Russia's 2060 target at the Russian Energy Week on 13 October 2021 was accompanied by a flurry of other announcements, including those addressed to the COP26 meeting in Glasgow in November.[25] Russia sent a large delegation of 312 people including representatives from the government and the presidential administration as well as from major industries and the financial services. The goal was to learn from the experience of others as part of the "wake-up" call prompted by the EU's decarbonisation policy.[26] Putin did not attend, but the delegation included some heavyweights. It was led by deputy prime minister Alexei Overchuk and included two ministers, the relative newcomer Ruslan Edelgeriev, special presidential envoy for climate change, and the veteran Anatoly Chubais in his capacity as special presidential envoy for relations with international organisations. The delegation made some important commitments, including halting deforestation by

[23] For the UK, see Department for Business, Energy & Industrial Strategy, "Energy Trends UK 2021", 31 March 2022; Global data from Center for Climate and Energy Solutions, "Renewable Energy".

[24] International Renewable Energy Agency (IRENA), *Renewables Energy Prospects for the Russian Federation*, Working Paper, April 2017. Data updated by H. Ritchie and M. Roser, "Russia: Energy Country Profile", *Our World in Data*.

[25] Vladimir Putin, "Plenarnoe Zasedanie Mezhdunardnogo Foruma 'Rossiiskaya Energeticheskaya Nedelya'" ("Plenary Session of the International Forum 'Russian Energy Week'"), Kremlin.ru, 13 October 2021.

[26] D. Trenin (2021).

2030 and affirming the 2060 net-zero target. Russia followed the lead of the US, China and India to remove any commitment to "phasing out coal" from the final agreement. Moscow also failed to commit to the target of reducing methane emissions by 30% by 2030 and instead advocated a "smoother" (i.e. slower) transition.

Trees are at the heart of Russia's climate commitments, so Russia was one of the 130 countries that pledged to halt deforestation by 2030. A new metric in 2021 measured the ability of its forests to absorb carbon, although their precise absorptive capacity has been questioned. In 2019 Russia reported the figure of 535 million tonnes CO2 equivalent annually, but in 2021 Viktoriya Abramchenko, deputy prime minister for environmental issues, gave the figure of 2.5 billion tonnes.[27] Either way, Russia's vast forested area is now counted as part of the equation measuring environmental impact. This generates an incentive to maximise the carbon sink potential of Russian boreal forest. After 13 years of work and at the cost of at least $142 million, Russia's forestry agency in 2020 completed its inventory of stocks, although its findings have not yet been made public.

Russia is challenged to shift from a carbon intensive and energy exporting economy to one that can play its part in fulfilling the Paris agreement to keep the rise in mean global temperature to no more than 1.5°C above pre-industrial levels. This means developing more sustainable energy generation. In addition to nuclear and hydropower (which already produce 40% of Russia's electricity), there is more emphasis on carbon offset, above all by managing its vast forests better and planting new ones. Does this really represent a fundamental shift in priorities or a rather belated and forced acceptance of necessity? Sceptics argue that Russia's policy shift is not much more than "greenwashing" to protect its industrial giants in the face of external threats.[28] The

[27] T. Titova and F. Jordans, "Russia Comes in from the Cold, Launches Forest Plan", *AP*, 9 November 2021.

[28] N. Ponomarenko, "Russia's Climate Epiphany May be Greenwashing", *Moscow*

planned EU tariffs represent a fundamental threat to Russia's energy exporters, most immediately to coal producers. The EU is Russia's largest trade partner, and thus restrictions would have a major impact, hence Russian businesses have clamoured for protection from tariffs.

Both versions may be correct – that the Russian leadership has genuinely come to appreciate the dangers of runaway climate change and that it is seeking to protect its energy sector in the interim. In July 2021 Putin signed the carbon emissions law, the first to limit emissions in Russian history. The target aimed to reduce total emissions to 70% of those in 1990, a modest target given the deindustrialisation that has in any case taken place since. Even this measure was criticised for having reduced the envisaged carbon fines on the biggest polluters at the request of the fossil fuel industries. The watered-down measure fell far short of what environmental activists had demanded. Russia's long-awaited climate strategy in 2021 went some way towards meeting environmental concerns, but failed to establish clear guidelines on how and when industries and regions would have to cut their emissions. Regions were tasked with presenting their own plans for climate adaptation in 2022.

Shifting Priorities

Moscow's green shift is substantial and serious, yet the contradictory imperatives – dealing with climate change and maintaining carbon exports – means that Russia still fails to treat the climate emergency as an existential threat, as suggested by the UN Secretary General António Guterres and others. In December 2021, Russia blocked a UN Security Council draft resolution that for the first time would have defined climate change as a threat to peace. The motion would have significantly expanded the criteria to justify intervention in armed conflict. Climate change has intensified droughts and desertification

Times, 30 December 2021.

and aggravated conflicts, but Moscow feared that it could be used as an excuse for Western powers to interfere in the internal affairs of other countries.[29] Unlike the EU, Russia is dealing with climate issues largely as a matter of national policy, with only a subordinate role for the Eurasian Economic Union.

Russia is intent on remaining an "energy superpower", although it will find this much harder following the tough sanctions imposed after the invasion of Ukraine and the various Western energy embargoes. It seeks to do this by finding new markets for carbon products in Asia and Africa; by finding new forms of energy exports (notably hydrogen, but also hydroelectric, nuclear and other renewable electricity sources); by ensuring that the continuing need for "transition" energy (notably gas) in the advanced economies is supplied by Russia until the shift to zero-carbon economies in the mid-century; and by rebranding itself as part of the global climate coalition by decarbonising its own economy. A "green" Russia supplying this fuel of the future to its neighbours makes sense, but geopolitical obstacles remain. There are also political challenges. In devising ambitious plans for hydrogen, Russia is in danger of missing out on the more mundane introduction of green technologies into everyday life. Technological innovation is moving fast in this area, and Russia – like the Soviet Union earlier – may be in danger of falling behind as the Fourth Industrial Revolution gathers pace.

Resistance to a substantive green shift in Russian policy remains high, and has been greatly reinforced by the sanctions imposed from February 2022. Chairing a meeting of the Arctic Council in December 2021, Dmitry Medvedev (the Deputy Head of the RF Security Council) acknowledged the environmental challenges but argued that the Western powers deliberately sought to undermine Russian interests in the region. The imposition of environmental standards was

[29] India also voted against and China abstained. R. Gladstone, "Russia Blocks UN Move to Treat Climate as a Security Threat", *New York Times*, 14 December 2021.

intended to limit economic activity and thus posed a "threat to Russian national security". His view was echoed even more forcefully by Council Secretary Nikolai Patrushev (a Former Head of the FSB), who condemned international investment in renewable energy. He argued that solar and wind power were not so environmentally friendly since they were constructed with harmful substances and both require significant space.[30] His argument was true to a point, but misleading, and reflects the larger Russian ambivalence about the energy transition. Despite the green shift, Russian companies (with Rosneft in the vanguard) remain committed to developing energy assets. As the West weans itself off Russian energy, the strategy will undoubtedly have to be rethought, yet fossil fuels will remain the bedrock of the Russian economy for the foreseeable future.

The common struggle against climate change can be compared to the global struggle against pandemics and terrorism, in which international cooperation is essential. However, common platforms on climate change are very unlikely – in the short-term at least – to provide a sufficient shock to force a geopolitical reset.[31] The Covid-19 pandemic from 2020 was unable to do so, and the war in Ukraine has provoked a complete rupture in relations between Russia and the West. However, the climate emergency may one day force adversaries to unite in the face of a common challenge.

[30] A. Staalesen, "Moscow National Security Chiefs Fight Western Windmills", *The Barents Observer*, 15 December 2021.

[31] A. Baunov, *Can COP26 Clear te Air Between Russia and the West?*, Carnegie Moscow Centre, 17 November 2021.

2. War and Decarbonisation: EU-Russia Energy Relations in Crisis

Marco Siddi, Eleonora Tafuro Ambrosetti

The early 2020s are proving to be a watershed for EU-Russia energy relations. Following decades of trade and growing interconnections, Russian gas accounted for over 40% of EU gas imports in 2021. In addition, around one quarter of the EU's oil imports and 40% of coal imports came from Russia.[1] Moscow was also the main external supplier of coal to the Union. This state of affairs seems to be about to crumble due to two highly significant developments: the EU's decarbonisation agenda and the unprecedented tensions between the EU and Russia following Moscow's military attack against Ukraine in February 2022.

The decarbonisation agenda of the EU cast the first dark clouds on the future prospects of fossil fuel trade with Russia. While the EU has had emission reduction targets since the 1990s, it was only recently that these targets became more ambitious. Following the launch of the European Green Deal in December 2019, the European Commission set a carbon neutrality target for the Union by 2050; this target was codified in the European Climate Law in 2021.[2] For the mid-term, the EU aims to reduce its greenhouse gas emissions by at least 55%

[1] Eurostat, https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2c.html (accessed 18 March 2022).

[2] M. Siddi, *The European Green Deal: Assessing its current state and future implementation*, Finnish Institute of International Affairs (FIIA), Helsinki, May 2020.

by 2030. Inevitably, this entails a significant reduction in coal, oil and gas consumption, and hence in imports of these energy sources from abroad.

Russia's attack on Ukraine in February 2022 marked a second turning point. The EU is now fast-tracking its reduction in fossil fuel imports specifically from Russia as a measure to decrease its energy dependence, punish Russia for its actions and prevent Moscow from using export revenues to finance the war.[3] While cutting energy ties with Russia will require time and drastic policy adjustments, and the picture remains fluid at the time of writing, it appears highly unlikely that the EU-Russia energy relationship will survive the ongoing crisis unscathed. The EU has already imposed an embargo on the import of Russian coal and sea-borne oil, and its RePowerEU Plan focuses on a drastic cut in oil and gas imports too.[4] This raises questions about both the future of the relationship and how present developments fit into the broader picture of global efforts to tackle climate change.

This chapter engages with these issues as follows. It starts by reviewing the impact of the European Green Deal and the energy transition on EU-Russia energy trade. It then examines how the beginning of the war in Ukraine has led the EU to accelerate its plans to switch to renewable energy, boost energy efficiency and especially diversify away from Russian supplies. At the time of writing, it remains unclear how these plans will be implemented, but there is little doubt that costs will be significant. Next, the chapter reviews recent developments in Russia concerning the climate agenda and explores areas where "green" cooperation with the EU could be possible – and functional to the multilateral climate agenda – when the political climate allows.

[3] M. Bianchi and P.P. Raimondi, *Russian Energy Exports and the Conflict in Ukraine: What Options for Italy and the EU?*, Istituto Affari Internazionali (IAI), March 2022.
[4] REPowerEU Plan. COM/2022/230 final, 18 May 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022JC0023&from=EN.

Energy Transition in Europe: Impact on EU-Russia Energy Trade

The European Green Deal and the energy transition in Europe will have two types of consequences for Russia. Firstly, as implementation of the energy transition in Europe proceeds, Russia's energy exports to the European market will be affected. European demand for Russian fossil fuels will decrease, even if the current confrontation over the war in Ukraine is eventually resolved. As the most polluting fossil fuel, coal has no future on the European market. Even prior to the EU's announcement of a 55% GHG reduction target for 2030, Makarov estimated that Russian coal exports to Europe would see a drastic reduction already in the 2020s. The embargo imposed by the EU on Russian coal in April 2022 has already halted this trade. Even in a post-Ukraine-war "low tension" scenario, oil and gas exports will decrease substantially in the late 2020s and 2030s at the latest.[5] Russian oil has a relatively low production cost and mid-range carbon intensity (the amount of carbon emitted per unit of energy produced). This suggests that, with shrinking global oil demand and more widespread carbon accounting mechanisms in the future, Russian oil will remain competitive, but it may also become less attractive to buyers than oil from producers with lower carbon intensity such as Norway, Saudi Arabia and the United Arab Emirates.

With regard to the gas trade, Russia faces the challenge of decreasing European demand, phasing out long-term contracts and addressing the issue of methane leakage, which has recently received much attention in multilateral efforts to tackle climate change (particularly through the launch of a Global Methane Pledge by the EU, US and a few other countries).[6] Following

[5] I. Makarov, *The External Dimension of the European Green Deal: Russia's Perspective*, Konrad Adenauer Foundation, 2021.

[6] J. Stern, "Will the Global Methane Pledge achieve critical mass in 2022?", in *Key Themes for the Global Energy Economy in 2022*, Oxford Institute for Energy Studies (OIES), January 2022, pp. 23-24.

Russia's war against Ukraine in 2022, estimates for Russian gas exports to Europe will most likely have to be revised, as the EU plans to decrease its imports significantly, even in the short run, for political reasons (see below). These developments will have an impact on the Russian state budget, which relies substantially on fossil fuel exports: while Russian energy exports to Asia and China in particular have increased in recent years, Europe remains the main destination market.

The second set of consequences of the European Green Deal concerns energy-intensive Russian exports to Europe, such as metals, chemicals and fertilisers. Beginning in 2026, the EU plans to introduce a carbon border adjustment mechanism (CBAM), namely a tax on imports commensurate with the volumes of emissions related to their production. The EU's declared aim is both to prevent the transfer of carbon-intensive production to countries with weaker environmental standards and to induce other countries to adopt similar standards. The tax is likely to affect the price of Russia's metallurgical (i.e. iron, steel, aluminium) and chemical products and of electricity sales on the European market. In 2019, Russia provided around 13% of the EU's iron and steel imports, 29% of fertiliser imports, 13% of aluminium imports and 12% of electricity imports.[7] This trade has been and will likely be further affected heavily by the ongoing political crisis even prior to the introduction of CBAM.

The EU's plan to introduce CBAM was met with criticism from Russia and other trade partners who tend to see it as "green protectionism", namely as a way of using environmental arguments for protectionist purposes. Some Russian policy actors mentioned that the issue could be taken to the World Trade Organization (WTO). Compatibility with WTO rules will depend on the final design of CBAM. The WTO itself has been weakened considerably by the posture of major actors in

[7] A. Assous et al., "A Storm in a Teacup: Impact and Geopolitical Risks of the European Carbon Border Adjustment Mechanism", *E3G*, pp. 6-7, 9, 45.

recent years (notably the US during Trump's presidency), and its effectiveness in a relevant dispute is not certain. In this context, if carbon border taxes become a common practice in the international arena, Russia's interests may best be served by the introduction of its own domestic carbon pricing mechanism. As argued by the Russian presidential advisor on climate issues, Ruslan Edelgeriyev, this would ensure that carbon fees are collected in Russia rather than abroad.[8]

Another key question stemming from the Green Deal concerns the speed of the energy transition in Europe and the "room" allowed for gas in the process. These will be important factors in determining the upcoming role of external gas suppliers in the European market. While European discourses on gas have become more critical in recent years, in early February 2022 the European Commission proposed including gas power (together with nuclear) in the bloc's sustainable finance taxonomy, even if subject to some limits and phase-out periods.[9] This suggests that the Commission, together with many European businesses and public stakeholders, continues to see an important role for gas during the energy transition. In this context, if the European market remains free and open to all external suppliers, Russian gas exports could continue to play an important role thanks to their competitiveness. At the moment, however, the European Commission is bent on limiting the role of Russian gas in the European market as a retaliatory measure for Russia's invasion of Ukraine.

[8] R. Edelgeriyev, "Tsena na uglerod kak instrument ekonomicheskoy i ekologicheskoy politiki" ("The price of carbon as an economic and environmental policy"), *Kommersant*, 11 giugno 2020.

[9] F. Simon, "EU puts green label for nuclear and gas officially on the table", *Euractiv*, 2 February 2022.

War in Ukraine: A Quick End to Energy Interdependence?

Russia's attack on Ukraine on 24 February 2022 came as a shock to most European policy makers and energy businesses. Prior to it, the political climate between Russia and the West had been deteriorating for months due to Moscow's official proposals for restructuring the European security architecture (by curbing and reversing NATO's military presence in Eastern Europe), Gazprom's reluctance to sell gas on spot markets in addition to the volumes guaranteed through long-term contracts, and the military build-up around Ukraine. On 21 February, Russia's decision to recognise the so-called Donetsk and Lugansk Peoples' Republics led *inter alia* to Germany freezing the certification process of the Nord Stream 2 pipeline.[10] This step was significant because Nord Stream 2 was the largest (and most controversial) new cooperative project between Russia's Gazprom and its European partners, and Germany had been its staunch supporter until then.

When Russia attacked Ukraine, the belief that energy trade was financially supporting Moscow's military efforts quickly became dominant in EU decision-making circles. This led the European Commission to draft the REPowerEU Communication, which focused on a drastic cut of gas imports from Russia in the short term (by the end of 2022). Despite the simultaneous energy crisis, unprecedentedly high energy prices and the existence of long-term supply contracts with take-or-pay clauses between Gazprom and numerous European companies, the Commission proposed to reduce imports of Russian gas by approximately 100 billion cubic metres (bcm) by the end of 2022.[11] The EU had imported around 155 bcm of Russian gas in 2021; therefore, the Commission's proposal was to immediately cut two thirds of normal import volumes.

[10] S. Marsh and M. Chambers, "Germany freezes Nord Stream 2 gas project as Ukraine crisis deepens", *Reuters*, 22 February 2022.

[11] European Commission, "REPowerEU: Joint European Action for more affordable, secure and sustainable energy", 8 March 2022.

According to the Commission, this goal is to be achieved primarily by substituting imports of liquefied natural gas (LNG) from other producers (Qatar, the US, Egypt and West Africa) for Russian gas. 50 bcm/year would be acquired in the form of LNG. In this respect, high prices and the actual market availability of LNG, most of which is sold to Asian buyers under long-term contracts, appears to be the main challenge. The Commission also hopes to import an additional 10 bcm/year via pipeline from Azerbaijan, Algeria and Norway, and to save the equivalent of 38 bcm by frontloading wind and solar energy deployment and implementing energy-saving measures. After 2022, further cuts in gas imports should be made possible by increased biomethane production (resulting in an additional 17 bcm) and the large-scale deployment of renewable hydrogen.[12]

It is unclear whether the EU will be able to (fully) implement these measures, some of which – such as saving energy by "turning down the thermostat of buildings' heating by 1 degree Celsius, saving 10 bcm"[13] – depend on citizens' behaviour and can be neither enforced nor monitored by the Commission. Energy prices, their consequences for the European economy and citizens' willingness to accept very significant costs will influence, and potentially constrain implementation of the Commission's plans. At the time of writing, the Commission appears to be sending a strong political message to Russia and Gazprom, possibly with the intent of signalling to Moscow that lucrative energy trade with the EU will be over in the short term if Russia continues its military campaign. Furthermore, the EU seems to be using the current political climate, including the widespread criticism of energy trade with Russia, to foreground and accelerate its "Fit for 55" climate agenda, which foresees a reduction in EU greenhouse gas emissions by at least 55% by 2030.[14]

[12] Ibid., pp. 6-8.

[13] Ibid., p. 6.

[14] See European Council, "Fit for 55".

A "Greener" Russia?

While at the time of writing, attention focuses on reducing the EU's reliance on Russian energy, the future of the global climate and energy agenda also leads us to look at Russia's reaction to shrinking fossil fuel markets and its possible contribution to multilateral climate commitments. According to the International Energy Agency (IEA), Russia is the world's third-largest oil producer, the largest exporter of oil to global markets and the second-largest crude oil exporter behind Saudi Arabia. In 2021, Russian crude and condensate output reached 10.5 million barrels per day (bpd), making up 14% of the world's total supply.[15] Also, due to its intense production of energy from fossil fuels, Moscow is often accused of having a heavy carbon footprint. Indeed, the Federation remains a strong polluter today, albeit to a lesser extent than other G20 countries. With 1,711 million tons of CO2 produced, Russia ranks fourth in the global polluters ranking, which is headed by China at around 30% of all global emissions, and the United States (14%).[16] Hence, it does not seem plausible to achieve global climate and environmental goals without the involvement of Russia.

For its part, Russia has a rational interest in participating in the energy transition, first and foremost because climate change is having severe repercussions for the country itself. Russia is particularly exposed to climate change: the permafrost that covers 65% of the continental mass is melting, with dire environmental consequences. The country has recently been the scene of severe accidents both related to climate change and due to human hand: from the oil spill in Siberia in June 2020 – which, with over 21,000 tons of diesel poured into the Arctic Ocean, is one of the most significant incidents of this type in the history of Russia[17] – to more frequent wildfires in Siberia. The

[15] International Energy Agency (IEA), *Oil Market and Russian Supply – Russian supplies to global energy markets*, Analysis.

[16] *Which countries are the world's biggest carbon polluters?*, ClimateTrade.

[17] "Russia races to clean up massive oil spill in Siberia", *News DW*, 6 June 2020.

2021 wildfire season was Russia's worst ever, but, according to Greenpeace, the number of wildfires in April 2022 was already twice as high as those of the same time last year, while wildfires in May 2022 alone killed 16 people.[18] Furthermore, given the global "green shift" that is occurring – at least rhetorically – in Russia too,[19] Moscow needs to develop green technologies and avoid widening the technological gap with competitors if it wants to remain a key energy player in the next decade. This happens in a context made even harder by international sanctions and the Green Deal, which is doomed to reduce EU demand for Russian energy regardless of possible embargoes.

In light of these and other considerations, in 2021, Russia adopted a strategy to reduce carbon emissions to achieve carbon neutrality by 2060, first cutting net greenhouse gas emissions to 80% of 1990 levels and 60% of 2019 levels by 2050. However, Russia has its own way of defining carbon neutrality. While the EU has chosen the paradigm of decarbonisation, the Russian approach is to adapt to the consequences of climate change and search for tools to reduce emissions by absorbing them, for example through Carbon Capture and Storage (CCS), but also by increasing forestry: the so-called strategy of reducing losses and utilising benefits.[20] The Russian recipe for decarbonisation is based on two pillars: 1) increasing the capacity of ecosystems to absorb emissions; and 2) decarbonising economic sectors through energy and resource efficiency, including in carbon-intensive industries. Furthermore, specific policies in technical regulation and financial and fiscal policy appear to be the engines of technological renewal. The first pillar implies, to a greater extent, the realisation of Russia's national potential, while the second – the modernisation of industries in a green key – was seen to involve a strong potential for cooperation

[18] "Summer Wildfires Ravage Forest-Rich Siberia, in Photos", *The Moscow Times*, 15 May 2022.

[19] See chapter 1 by Richard Sakwa in this volume.

[20] See E. Maslova, *What Does the Green Deal Mean For Russia?*, ISPI Commentary, ISPI, 14 April 2021.

between the West and Russia.[21] At least, before Russia invaded Ukraine.

War-related rollbacks are indeed doomed to make Russia's green targets harder to achieve. This is because the strong reaction against the war has imposed heavy economic costs on Russia and curtailed cooperation with the West. In general, state officials maintain the new political and economic situation will not alter Russia's green commitments, but high-profile figures have voiced their concern. For instance, Russia's energy ministry has stated that Western sanctions over Ukraine could prevent the country from achieving its plans to cut carbon emissions by 2050 and has developed a plan to support Russia's vast energy sector in the face of sanctions, including tax cuts and the possibility of dropping dividends.[22] In general, uncertain political and economic circumstances do not set a favourable climate for green investments and "the planning and implementation of systemic changes necessary for achieving meaningful progress toward decarbonisation".[23] Moreover, several politicians and lobbyists have already seized the moment to demand the cancellation of the Paris Agreement and domestic environmental programmes, asking to prioritise the interests of crisis-ridden businesses instead.[24] There are production challenges linked to Western sanctions; targeted sanctions on specific technologies, financial sanctions and "self-sanctioning" by private companies are already preventing Russia from obtaining or producing high-tech goods.

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[21] E. Maslova and E. Tafuro Ambrosetti, "La transizione verde russa e l'UE: rischi e opportunità" ("Russia's green transition and the EU: risks and opportunities"), *Focus Sicurezza Energetica*, edited by ISPI, Senato della Repubblica, Camera dei Deputati, Ministero degli Affari Esteri e della Cooperazione Internazionale, 2022.

[22] N. Davlashyan, M. Shibalova, C. Harris, and AP, "How are sanctions impacting everyday life in Russia?", *Euronews*, 11 March 2022.

[23] Ibid.

[24] A. Davydova, K. Doose, and A.Vorbrugg, "Other casualties of Putin's war in Ukraine: Russia's climate goals and science", *The Conversation*, 23 May 2022.

Moreover, domestic production and the diversification of suppliers appear insufficient to make up for the loss of Western markets, at least in the short term: Russia is highly reliant on imports of high-tech goods, the largest share (45%) coming from the EU.[25] Another substantial risk comes from the general shrinking of space for civil society action, which is crucial to countering dangerous and unlawful attempts to impose particular economic interests over some natural regions. This is a longstanding trend in Russia, but the war is worrisomely worsening it due to bans and restrictions on public protests, state targeting of high-profile figures, and difficulties for NGOs to carry out their work – both due to governmental regulations and the dropping of individual donations. This also applies to many environmental and climate activists and organisations that have been labelled as "foreign agents" since the invasion.[26]

Furthermore, under the current conditions of growing sanctions and a looming economic crisis, there have been attempts at state level to roll back some environmental regulation. Such attempts include further easing rules for infrastructure construction in protected natural areas, lowering standards for wastewater discharges – including in the Baikal lake area – and pushing forward deadlines for introducing Best Available Technologies and industrial pollution monitoring systems. All this leads to a need for further advocacy and media campaigns when pressure on Civil Society Organisations (CSOs) in general is increasing, criticism of state actions (especially from CSOs) can be met with severe oppression, and public protest campaigns are growing increasingly difficult.

The government has already enacted several worrying measures that reverse the "green path" on which Russia had set out. For instance, in April 2022, a law permitting Russian carmakers to temporarily produce cars of all environmental

[25] M. Grzegorczyk, J.S. Marcus, N. Poitiers, and P. Weil, *The decoupling of Russia: High-tech goods and components*, Bruegel, 28 March 2022.

[26] A. Davydova, Wounded But Not Broken: Russia's Civil Society in Times of War, ISPI Analysis, ISPI, 9 May 2022.

classes including Euro-0 was enacted. This need to roll back requirements to the level of the 1990s arose against the background of the suspension of supplies of electronic control units, according to the Russian daily Kommersant.[27] Another example is the March 2022 Ministry of Natural Resources' draft order providing for the actual elimination of forest spawning zones. Spawning zones are a particular category of protected forest around rivers and lakes in which valuable species of fish – such as salmon, sturgeon and whitefish – spawn. In addition, such areas preserve many aquatic and terrestrial ecosystems and maintain the cleanliness of water bodies. They make up about five per cent of all forests in Russia. As Greenpeace Russia reports,[28] officials propose to reduce spawning zones to the size of protected fishery areas. However, there are no such areas in Russia now, meaning that there will be no spawning zones either; as a result, forests will lose their protected status, allowing them to be cut down easily. Attempts to eliminate spawning zones have already been made in the past. Still, the active opposition of regular citizens as well as environmental and scientific organisations has so far prevented these attempts from succeeding. However, the current state of Russian civil society raises concerns over its ability to stand up against such decisions today.

Options for Implementing the Climate Agenda

Russia is widely seen as a "gas and oil superpower" thanks to its abundant resources of fossil fuels. The strong industrial sector and vested interests that were built around these natural endowments have consolidated this perception. However, the

[27] У машин обнуляется экология ("U mashin obnulyayetsya ekologiya") ("The ecology of cars is reset to zero"), no. 68 (7269), *Kommersant*, 19 April 2022.

[28] В России ослабляют экологическое законодательство ("V Rossii oslablyayut ekologicheskoye zakonodatel'stvo") ("Russia weakens environmental legislation", greenpeace.ru, 22 April 2022.

country also has vast resources that are functional to the energy transition, such as wind, hydro, geothermal, biomass and solar energy.[29] In 2019, Russia was the ninth largest producer of electricity from renewable sources, mostly thanks to installed hydropower capacity.[30] The country's potential in wind and solar energy production remains almost completely untapped. Solar, wind, geothermal and biomass account for only 1.4% of Russia's energy supply.[31] Despite the introduction of some decrees and modest funding to promote renewable energy production, ambition remains very limited. This was confirmed by Russia's Energy Strategy to 2035, which continued to assign a dominant role to fossil fuels in the country's energy future.[32]

Against this broader, not very encouraging backdrop, some positive developments have nevertheless occurred, even involving Western companies. For instance, Italy's Enel became involved in the Russian wind power sector and built the Azov wind farm in the Rostov region, in Southern Russia, which has a capacity of 90MW and became operational in 2021. Enel has been building a second wind farm in the Murmansk region, in the far North, with a capacity of 201 MW, but it is unclear whether it will stay in the Russian market due to the war in Ukraine.[33]

Besides its vast potential for wind and solar energy production, Russia could also become an important player in the hydrogen sector, where it already has a number of related R&D activities. Hydrogen is an energy carrier that can be produced from both fossil and green sources and is widely seen as essential to the decarbonisation of sectors such as heavy industry and

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[29] J. Henderson and T. Mitrova, "Implications of the Global Energy Transition on Russia", in M. Hafner and S. Tagliapietra (Eds.), *The Geopolitics of the Global Energy Transition*, Springer, 2020, pp. 93-114.

[30] International Renewable Energy Agency (IRENA), Renewable Capacity Statistics 2021; Renewable Energy Statistics 2020.

[31] Climate Transparency, Russian Federation 2021, p. 6.

[32] T. Mitrova and V. Yermakov, *Russia's Energy Strategy 2035: Struggling to Remain Relevant*, Institut français des relations internationales (Ifri), Paris, 2019.

[33] See Enel Green Power, Russia.

long-haul transport.[34] Green hydrogen allows energy produced from intermittent sources such as solar and wind to be stored and distributed. Russia could produce hydrogen from both hydrocarbons (for instance, "blue" hydrogen from gas, with carbon capture and storage technology to offset emissions) and from renewable sources ("green" hydrogen). While the EU is betting on green hydrogen, despite the currently higher cost of producing it, Russia appears to be keener on hydrogen production based on hydrocarbons. The Russian government has also proposed using some existing gas pipelines for hydrogen exports to Europe.[35]

Furthermore, Russia has substantial rare earth resources, which are essential in renewable energy and digital technologies. The Russian government has offered reduced mining taxes and cheaper loans to investors in eleven projects that are designed to increase the country's share of global rare earths output to 10% by 2030 (from 1.3% now). This would make Russia the second-largest producer after China. According to these plans, Russia would become nearly self-sufficient in rare earths by 2025 and start exports in 2026.[36]

Russia is rich in "energy transition metals", key elements in the green transition economy. Their prices and availability, however, are linked to political volatility as they are often located in high-risk contexts, and to international demand, which is rising due to the intensification of low-carbon energy production.[37] The Ukraine conflict is proving a significant stressor. For instance, Russia accounts for 7% of the world's

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[34] M. Siddi, *The Geopolitics of the Energy Transition: Global Issues and European Policies Driving the Development of Renewable Energy*, Finnish Institute of International Affairs (FIIA), Helsinki, 2021, pp. 6-7.

[35] B. Wehrmann, "Russia ponders adding hydrogen to Nord Stream 2 gas deliveries to Germany", *Clean Energy Wire*, 29 July 2020.

[36] A. Lyrchikova and G. Stolyarov, "Russia has $1.5 billion plan to dent China's rare earth dominance", *Reuters*, 12 August 2020.

[37] É. Lèbre et al., "The social and environmental complexities of extracting energy transition metals", *Nature Communication*, vol. 11, art. no. 4823, 24 September 2020.

mined nickel – used for electric vehicle batteries – and produces a third of the world's palladium – used in the car industry to control vehicle emissions. The global prices of both metals skyrocketed in the aftermath of the invasion, although there have since been market adjustments.[38] Furthermore, these metals could be hit by sanctions in the future. So far, the EU and the US have imposed sanctions on Russian oil and gas, coal and other commodities, often causing market shocks: in April 2018, the price of aluminium increased by a third after US sanctions – later removed – targeting Rusal, the world's largest aluminium producer after China.[39] However, even without direct sanctions, Russia's production could be jeopardised by "self-sanctioning divestment by non-Russian firms and sanctions affecting access to international banking and insurance markets".[40]

Russia could also play a role as a supplier of cobalt and lithium, minerals that are critical to the production of lithium-ion batteries, digital technologies and hence to the energy transition. In global cobalt production, Russia currently comes a distant second to the Democratic Republic of Congo, with over 6,000 metric tons of yearly production (compared to 95,000 in the DRC). However, Russia possesses reserves that are estimated at around 250,000 metric tons, mostly concentrated in the Altai Republic. Russian mining company Norilsk Nickel is among the world's top five producers of cobalt.[41] Russia also has its own lithium deposits in eastern Siberia and Yakutia. The major Russian actor in the field of lithium – state corporation Rosatom, which has its main business in the nuclear sector – has prioritised ownership of lithium resources abroad, particularly in Latin America and

[38] *Russia and Ukraine are important to the renewables transition. Here's what that means for the climate*, The University of Queensland.

[39] Russia's Potanin dodges politics and sanctions to flourish", *Reuters*, 4 May 2022.

[40] R. Johnston, *Supply of Critical Minerals Amid the Russia-Ukraine War and Possible Sanctions*, Columbia, SIPA, Center on Global Energy Policy, 19 April 2022.

[41] "Profiling the world's eight largest cobalt-producing countries", *NS Energy*, 22 February 2022.

Africa. Nonetheless, in 2020 Rosatom officials declared that Russia could achieve domestic lithium production equivalent to 3.5% of the world's output by 2025.[42]

As global supply chains of rare earths and critical minerals are to a considerable extent under China's influence or control, Russia could theoretically be an alternative supplier to Europe. While the ongoing confrontation between the West and Russia concerning the war in Ukraine makes this scenario implausible at the moment, the political situation may change in future. The energy transition is a long-term endeavour, and countries will have to navigate different conflicts and geopolitical reconfigurations while they implement it in coming decades. What is certain is that multilateral cooperation to tackle the climate crisis, or at least cooperative compartmentalisation of the climate agenda, will be in everyone's rational interest if the world wants to avoid catastrophic climate change. In light of this, it makes sense to exempt existing and potential green and climate cooperation from sanctions and escalatory spirals.

At the time of writing, the EU has managed to overcome Hungary's staunch resistance and adopted a sixth package of sanctions that prohibits the purchase, import or transfer of seaborne Russian oil, even if there are significant temporary exceptions for landlocked member states.[43] Yet, chances to impose sanctions on gas look slimmer. Moreover, Russian-sourced uranium and state nuclear energy company Rosatom has also been exempted from EU sanctions thus far, not least because it is essential for the supply, maintenance and radioactive waste disposal of several plants in EU member states. Rosatom also plays a role in non-proliferation, nuclear security, and nuclear safety projects around the globe, and is one of the few large stakeholders that have shown an interest in the energy transition in Russia. As long as some EU members continue to

[42] E. Bouckley, "Russia aims to supply 3.5% of world's lithium by mid-decade", *S&P Global*, 25 September 2020.

[43] https://www.consilium.europa.eu/en/press/press-releases/2022/06/03/russia-s-aggression-against-ukraine-eu-adopts-sixth-package-of-sanctions/

rely on nuclear power as part of their decarbonisation plans and depend on Russian-built technology, related cooperation will not be suspended.[44]

Conclusion

Russia's war against Ukraine has dramatic humanitarian, political, and economic consequences that go well beyond Russia and Ukraine, to the extent that it has been described as a "game changer".[45] Two war-related phenomena are already taking shape when it comes to the EU-Russia energy and climate relationship. First, among objective difficulties, EU states are trying to break away from energy dependence on Russia. This could either have a positive effect on the EU's green ambitions by boosting implementation of the Green Deal and fostering intra-EU energy cooperation, or a negative one involving a return to the use and even domestic production of highly polluting energy sources such as coal. The EU has laid out an ambitious plan – RePowerEU – to reduce and ultimately eradicate dependency on Russian energy imports. However, for the time being, Brussels is practically prioritising conventional energy – such as new or improved gas and oil deals from different sources – as an urgent and short-term solution to cope with energy shockwaves. The situation is also impacting the climate objectives of the US, which is "touting its oil and gas prowess" as it seeks to provide more LNG and oil to the EU but is also facing growing political pressure from soaring domestic energy prices and opposition to Biden's key climate legislation and funding for climate action in the Global South.[46]

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[44] "The wisdom of nuclear carve-outs from the Russian sanctions regime", *War on the Rocks*, 17 March 2022.

[45] Ł. Kamieński, M. Smólka, and W. Michnik, "Russia's invasion of Ukraine: A dramatic game-changer, *New Eastern Europe*, 3 March 2022.

[46] K. Mathiesen, Z. Colman, and Z. Weise "Climate goes missing in action in Russia's war", *Politico*, 11 May 2022.

Second, the war is reducing the ability of global governance efforts to deliver solutions to transitional problems – the climate crisis first and foremost. The Western-Russian spat will inevitably affect the outputs of upcoming key global governance summits such as the G20 Bali summit in November 2022.[47] One of the first "victims" could be Germany's G7 "international climate club" initiative – in Chancellor Scholz's words, an "open, collaborative club" to set "joint minimum standards, drive climate action that is internationally coordinated and ensure that climate action makes a country more competitive at the international level".[48] But questions about the initiative's viability and effectiveness remain: will Russia be allowed to participate in the club? Will Russia derail – directly or indirectly – the initiative and, more broadly, cooperation at the G20 level? What seems to be certain is that the conflict is fatally reducing space for EU-Russia green cooperation – a prospect that raised hopes before the war but now seems more distant than ever.

[47] See E. Tafuro Ambrosetti, "Should Russia Be Excluded from the G20?", ISPI Counterpoint, ISPI, 13 May 2022.

[48] A. Norton, "Responses to Putin's war risk impeding international cooperation on climate", *Climate Home News*, 25 March 2022.

3. Food as a "Silent Weapon": Russia's Food Security Strategy

Elena Maslova

Food security is one of the existential foundations of state and individual life. In this era of economic globalisation and widespread availability of goods, food security does not always receive the attention it deserves, unlike, for example, the climate agenda, the progress of which the whole world is now following. The surge of attention to food security in Europe came at the peak of the first wave of the Covid-19 pandemic, when border closures and a lack of seasonal workers led to tensions in the agricultural supply and food production chains. In addition, if the origin of coronavirus as a zoonotic infection in the Wuhan market is confirmed, it would mean that the coronavirus pandemic is nothing more than a consequence of food insecurity. With product flows moving at high speed and over long distances, regional food crises may well arise periodically, turning into epidemics and emergencies.

The coronavirus pandemic and the closure of borders have therefore made it clear that in the postmodern era in which we live, amid growing fears for our own lives and a consequent prioritisation of health, traditional challenges and threats have not lost their relevance. Food security is one of the main such challenges, as a threat to the life of the individual and the state.

The question of food security is becoming more and more challenging due to long-term trends such as a growing world population and global food consumption with changing

patterns ("protein diet", increasing food waste). All this is superimposed on climate change and unrelenting global warming. Other less trending, but no less important factors which affect global food security include conflicts and wars, poverty and socio-economic development. The UN notes that these factors overlap increasingly in problem areas around the globe. In other words, the solution to the problem of food security cannot be presented in isolation from other global problems of humanity.

Now more than ever, the problem of food security is entwined with others – the Covid-19 pandemic, global economic shocks and recessions, the climate crisis and armed conflicts. In this context the importance of Russia as a global actor in food security is growing, given the country's role as a major agrifood exporter (especially wheat) and the armed conflict between Russia and Ukraine, which has entailed, along with loss of life and other primary effects, a "great decoupling" between Russia and the West, and the possibility of food "weaponisation" assuming new forms. Before the conflict escalation in 2022, Russia (with 16%) and Ukraine (with 10%) accounted for around 26% of world wheat exports;[1] they also supplied about half of the world's sunflower oil.

Responses to the threat of global food insecurity are formulated primarily at the national level. The pandemic has already demonstrated that the demand for "Westphalian values" and the supreme role of the nation-state is not weakening. This chapter provides an overview of global (UN), regional (EAEU) and national approaches towards food security. It also examines the evolution of the Russian Federation's approach to the question, which has transformed from one of self-sufficiency to one of export-orientation.

[1] Foreign Agricultural Service (FAS), *Grain: World Markets and Trade*, March 2022.

The UN and FAO Approach

At the global level, food security is handled primarily by the UN and FAO, the Committee on World Food Security, and also by the World Health Organization and the World Trade Organization. Food is one of the central themes of the UN and is echoed in almost half of its Sustainable Development Goals (to eradicate poverty, achieve good health and well-being, reduce inequality, achieve responsible consumption and production, combat climate change, preserve marine ecosystems, preserve terrestrial ecosystems, and instigate partnerships for sustainable development) as the basis for human life. The UN calls for an end to "all forms of malnutrition" by 2030 and aims above all at eradicating hunger by ensuring "year-round access to safe, nutritious and sufficient food".[2]

Food security was seriously discussed for the first time at the World Food Conference in Rome in 1974, with a view to guaranteeing quantities and price stability for a basic set of products both at the national and international levels. This approach was in the spirit of the age: shortly before, the first Club of Rome report (1972) had come out, in which the authors defined the limits of population growth on Earth at a time when food restriction (hunger) was directly reducing the population. Accordingly, at the time, food security was interpreted in terms of national self-sufficiency, the ability of the nation-state to independently produce the necessary amount of food to meet the basic needs of the population.

In the 1980s, along with the liberalisation of trade and the development of global commerce and production chains, the approach expanded to cover not only access to food but also its availability – both physical and economic. The concept of food security was therefore complemented by economic factors. In the 1990s, a new period of rethinking food security began. A landmark event was the adoption of the Rome Declaration on

[2] Goal 2: Zero Hunger, Sustainable Development Goals.

World Food Security in 1996.[3] This document emphasises the multidimensionality of the concept itself which, in addition to access and availability of food, echoes themes of socio-political and economic development, such as stability, patterns of production and consumption, gender equality, environmental protection, corruption, conflict and war. Poverty and destitution were recognised as major factors impacting food security. At the same time, the "right to (adequate) food" introduced by the UN Declaration of Human Rights was evolving.[4] Liberalisation and appropriate trade policies were recognised as a key element in achieving food security, because food security does not imply "food autarchy".

Today, the UN and FAO approach combines food security, affordability, nutrition and quality with the principles of sustainable development throughout the food chain. There is a growing emphasis not only on sustainable production, but also on healthy diets accessible to all. Food insecurity is defined as "the lack of secure access to sufficient amounts of safe and nutritious food for normal human growth and development and an active and healthy life. For people to be food secure, food must be both consistently available and accessible in sufficient quantities and diversity and households must be able to utilise (store, cook, prepare and share) the food in a way that has a positive nutritional impact".[5]

Global, Regional and National Food Security

As has already been noted, the UN's second Sustainable Development Goal for 2030 is reaching "zero hunger" and achieving food security and improved nutrition by promoting

[3] Food and Agriculture Organization of the United Nations (FAO), *Rome Declaration on World Food Security*, 13 November 1996.

[4] Food and Agriculture Organization of the United Nations (FAO), *The Right to Adequate Food*, no. 34, April 2010.

[5] World Food Programme (WFP), *Global Report on Food Crises*, 2021.

sustainable agriculture. As things stand now in 2022, the UN itself already accepts that "the world is not on track" to reaching this goal by 2030.[6] Moreover, the dynamics are not encouraging: since 2014, the number of hungry people in the world is not decreasing, but actually beginning to rise.[7] This negative dynamic was evident long before the coronavirus pandemic, which only worsened the situation.

According to FAO reports for 2020, close to 12% of the global population was severely food insecure; nearly one in three people in the world (2.37 billion) did not have access to sufficient food;[8] and the prevalence of undernourishment reached almost 10%. These are the worst figures in the last five years.[9] In 2020, there was a sharp jump in the number of hungry people, which increased by 1.5% in one year. According to the UN, the main challenges and factors of food insecurity are: 1) conflicts, 2) climate shocks and extreme weather, 3) economic slowdowns and downturns, 4) poverty and inequality. These factors have not weakened and are increasingly found in combination with each other.

FAO's methodology for identifying food crises (the Integrated Food Security Phase Classification, IPC scale) highlights five phases of food insecurity, four of which are acute, from "stressed" with minimal adequate food consumption (IPC phase 2) to "catastrophe/famine" (IPC phase 5), mostly seen in African territories. None of the countries of the former Soviet Union experience acute food insecurity, though, according to the latest FAO Global Reports on Food Crises, some territories are indeed considered to be food insecure because people

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[6] Goal 2: Zero Hunger…, cit.

[7] Food and Agriculture Organization of the United Nations (FAO), *The State of Food Security and Nutrition in the World. Transforming food systems for affordable healthy diets*, 2020.

[8] The Food and Agriculture Organization of the United Nations (FAO), *The State of Food Security and Nutrition in the World. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*, 2021.

[9] Global Report on Food Crises…, cit., p. 11.

experience "food consumption gaps" or are "acutely insecure" and "in urgent need of food assistance" (IPC phase 3 "crisis"). The latter territories include the Donetsk and Luhansk regions (0.5 million people in 2019; 0.6 million people in 2020).[10] Apart from the pandemic and related economic effects, the main "anti-driver" is the protracted conflict which the country has experienced since 2014 with frequent military escalations. Since 2014 the conflict had already caused severe movement restrictions due to the "contact line" and has disrupted essential services.[11] Russia's 2022 "special military operation" in Ukraine has exacerbated the food crisis moving it far beyond the Dontetsk and Luhansk regions.

According to UN methodology, hunger is measured by the prevalence of undernourishment (PoU). In Eurasia, PoU is relatively low compared to the global rate of 8.8%. However, experts note that the reduction of hunger has slowed in the region in recent years, as it has in the world as a whole.[12] Nevertheless, Eurasia is expected to meet the 2030 target on time, though forecasts do not take into account the impact of the Covid-19 pandemic or the Russia-Ukraine conflict. To date, among the five nations of the Eurasian Economic Union (EAEU), only Kyrgyzstan has a high prevalence of undernourishment (6.4%).

[10] Ibid.

[11] Ibid., p. 86.

[12] Regionalnyj obzor sostoyaniya prodovolstvennoj bezopasnosti i pitaniya v Evrope i TSentralnoj Azii. Dostupnyj zdorovyj ratsion pitaniya dlya borby so vsemi formami nepolnotsennogo pitaniya v tselyah uluchsheniya zdorovya (Regional Review of Food Security and Nutrition in Europe and Central Asia. Affordable healthy diets to combat all forms of malnutrition to improve health), 2020.

Tab. 3.1 - Prevalence of undernourishment in the EAEU countries (%)

Country/year	2004-2006	2009-2011	2014-2016	2015-2017	2016-2018	2017-2019
Armenia	12,3	4,4	2,7	2,8	2,7	**2,6**
Belarus	<2,5	<2,5	<2,5	<2,5	<2,5	<2,5
Kazakhstan	7,4	3,6	<2,5	<2,5	<2,5	<2,5
Kyrgyzstan	9,1	8,4	6,1	6,3	6,4	**6,4**
Russia	<2,5	<2,5	<2,5	<2,5	<2,5	<2,5
EU-27	<2,5	<2,5	<2,5	<2,5	<2,5	<2,5
World	12,5	9,6	8,8	8,8	8,8	8,8

Source: https://www.fao.org/3/cb3849ru/cb3849ru.pdf, p. 7.

Another of the most authoritative indices (The Global Food Security Index) is managed by the *Economist's Intelligence Unit*. This index covers 113 countries and considers criteria such as food affordability, availability, the quality and safety of natural resources and resilience.[13] Ireland performs best in the latest ranking (2021) with an overall score of 84.0. It is followed by Austria (81.3) and the United Kingdom (81.0). The weakest performance is found in Mozambique (35.9), Yemen (35.7) and Burundi (34.7). Russia is ranked 23rd (74.8) – between Poland (74.9) and Spain/Qatar/Costa Rica, who are jointly ranked 24th (73.6).

Russia's "strengths", according to this ranking are: food safety-net programmes, market access and agricultural financial services, the proportion of the population under the global poverty line, protein quality, food safety, micronutrient availability, food loss, sufficiency of supply, variation in average food costs, and agricultural import tariffs. While no challenging

[13] Global Food Security Index, Explore the Index.

indicators are noted, the greatest risks concern political and social barriers to access in terms of availability, and water, oceans, rivers and lakes in terms of resilience. The prevalence of obesity in Russia is estimated at about 30%.

Indeed, the other side of food security involves problems such as increasing obesity, overconsumption, malnutrition, and a high proportion of food waste. Here too, poverty and economic inequality appear to be the main causes: the same factors actually seem the main threat not only for hunger but also for overeating and obesity.

The relatively high cost of healthy diets, combined with persistent high levels of income inequality, according to UN and FAO estimates, affects diet and nutrition type. In 2019, around three billion people could not afford a healthy diet. Most of these live in Asia (1.85 billion) and Africa (1.0 billion), though healthy eating also remains out of reach for many in Latin America and the Caribbean (113 million) and North America and Europe, including Russia (17.3 million).[14]

Economic affordability is another important indicator of food security. The purchasing power of Russians' incomes, including for food, has been declining, and for several years in a row, despite nominal income growth. According to a 2018 Rosstat study on the diet of the population (conducted every five years since 2013), on average, one-third of Russian families' spending (34.3%) goes on food purchases. Citizens of Belarus also spend about a third of their income on food. The situation is worse in the other EAEU countries: residents of Kyrgyzstan and Kazakhstan spend the most money on food (50% and 46% respectively); in Armenia the figure is 41%.[15]

[14] Food and Agriculture Organization of the United Nations (FAO) (2021).

[15] Eurasian Economic Union (EAEU), Proekt Koncepcii prodovolstvennoj bezopasnosti EAES (draft Concept of food security of the EAEU), 2019, p. 7.

In other words, expenditure on food is the largest in the consumption pattern of the population.[16] Economists attribute this to several factors, including rising food inflation, which exceeds growth in real income. From 2014 to 2020, food prices have increased by 51.7%, while per capita income has risen only by 34.3%.[17] This is confirmed by the so-called "borscht index" (officially the "borscht kit")[18] which assesses the cost of products needed to prepare a meal: in the five years from 2017 to January 2022, the vegetables in the kit have doubled in price.[19]

Another important indicator is households' subjective perception of their food security. For example, about 16.1% of Russian families participating in the Rosstat statistical survey reported that their nutritional situation had deteriorated. The proportion of families who have enough to eat has also fallen from 52.3% in 2013 to 51.7% in 2018.[20] The UN also calculates a similar indicator, the Food Insecurity Perception Scale.[21] For instance, in the EU and the UK, 1.1% stated a prevalence of acute food insecurity in 2019 and 6.2% stated a prevalence of moderate or acute food insecurity. Data for the EAEU countries are shown below.

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[16] "Sberbank sprognoziroval neizmennost' vysokih raskhodov rossiyan na edu" ("Sberbank predicted the immutability of the high spending of Russians on food"), *RBC*, 13 June 2019.

[17] I. Ushachev and A. Kolesnikov, *Ekonomicheskaya dostupnost prodovolstviya dlya naseleniya Rossijskoj Federacii* (*Economic accessibility of food for the population of the Russian Federation*), Institute of Economic Forecasting of the Russian Academy of Sciences, no. 4, 2021.

[18] When estimating the cost of a "borscht kit", only the cost of vegetables – potatoes, onions, carrots, cabbage and beetroot – is taken into account. The index is often criticised because the borscht turns out to be vegetarian.

[19] "Borshchevoj nabor podorozhal vdvoe za pyat let" ("Borsch set doubled in price in five years"), *TASS*, 17 February 2022.

[20] "V kazhdoj shestoj semje v Rossii stali pitatsya huzhe" ("Every sixth family in Russia malnourished"), *RBC*, 12 December 2019.

[21] This indicator assesses food insecurity based on people's direct responses to questions regarding their access to food of adequate quality and quantity.

Tab. 3.2 - Prevalence of acute food insecurity and moderate or severe food insecurity, according to the UN Food Insecurity Perception Scale, 2014-2019 (%)

	Prevalence of acute food insecurity				Prevalence of moderate to severe food insecurity			
Country/year	2014-2016	2015-2017	2016-2018	2017-2019	2014-2016	2015-2017	2016-2018	2017-2019
Armenia	3,7	4,3	4,4	4,1	28,7	33,4	35,9	34,9
Belarus	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Kazakhstan	n/a	n/a	n/a	<0,5	n/a	n/a	n/a	2,1
Kyrgyzstan	n/a	n/a	0,8	0,8	n/a	n/a	6,3	6,3
Russia	0,7	0,7	0,6	0,8	8,2	8,9	7,9	8,4
World	8,1	8,2	8,7	9,2	22,7	23,5	24,6	25,5

Source: https://www.fao.org/3/cb3849ru/cb3849ru.pdf

The paradox of global development is highlighted by the fact that, on average, the world produces enough food to adequately feed its entire population.[22] The food security problem manifests itself at two extremes – people in some countries go hungry while overconsumption, often of cheap, low-quality food, is on the rise in others. The number of hungry and obese people on the planet today is about the same.

[22] Food and Agriculture Organization of the United Nations (FAO) (2020).

Russia's Official Food Security Discourse: Food Sovereignty and Export

For Russia, food security is part of national security. Thus, food security concepts are reflected in the Russian Federation's 2021 National Security Strategy[23] especially in terms of "national interests" (sustainable development on a new technological basis, environmental protection, conservation and rational use of natural resources, adaptation to climate change) and "strategic national priorities" (economic security, environmental security and rational use of natural resources, scientific and technological development).

The first ever Food Security Doctrine of the Russian Federation was approved by President Medvedev in 2010. The strategic goal of this document was to maintain the stability of domestic production and ensure the necessary reserves of agricultural, fishery and other products from aquatic bioresources, as well as food.[24] The notion of food security is interpreted as "a state of the country's economy that ensures the food independence of the Russian Federation, guarantees the physical and economic accessibility to every citizen of the country of food products that meet the requirements of the legislation of the Russian Federation on technical regulations, in amounts not less than the rational norms of food consumption necessary for an active and healthy lifestyle".

On this basis, the main areas of food security include the economic and physical availability of foodstuffs, ensuring food safety and increasing production (through the improvement of soil fertility, development of animal husbandry, use of new technologies), and customs and tariff regulation. Various

[23] President of Russia, Ukaz Prezidenta Rossijskoy Federatsii No 400 (Decree by the President of the Russian Federation no. 400), Official Website, The Kremlin, 2 July 2021.

[24] President of Russia, Ukaz Prezidenta Rossiyskoy Federatsii No 120 (Decree by the President of the Russian Federation no. 120), Official Website, The Kremlin, 30 January 2010.

factors that reduce food security are also identified, in addition to macroeconomic, foreign trade and technological factors, and agro-ecological factors caused by unfavourable climatic changes and the consequences of natural and man-made emergencies.

In general, this approach is consistent with that of the UN and FAO. However, a particular feature of the Russian approach is the emphasis on so-called food sovereignty:[25] according to Russia's vision, food security forms part of national state security and sovereignty. This approach is especially important in the context of sanctions exchange between Russia and the West: Russia is able to impose "agrifood sanctions" because the country is confident of its ability to guarantee its own production and to source supplies from alternative countries.

Thus, the 2010 Doctrine introduces threshold (minimum) values to produce certain foods in the total volume of goods (including carry-over stocks) on the domestic market:

- grain – at least 95%
- potatoes – at least 95%
- milk and dairy products (in terms of milk) – at least 90%
- meat and meat products (in terms of meat) – at least 85%
- edible salt – not less than 85% and
- sugar – at least 80%
- vegetable oil – at least 80%
- fish products – at least 80%

In January 2020, a new Food Security Doctrine was approved to replace the 2010 Doctrine.[26] The concept of food security is interpreted in the same way as in the previous version, as

[25] Food independence is understood as "Sustainable domestic production of foodstuffs in amounts not less than the established thresholds for its share in the commodity resources of the domestic market of the respective products".

[26] President of Russia. Ukaz Prezidenta Rossiyskoy Federatsii No 20 (Decree by the President of the Russian Federation no. 20), Official Website, The Kremlin, 21 January 2020.

the physical and economic availability of food that meets requirements, including those of the EAEU. It also includes a separate reference to food independence, however. Compared to the previous version of the document, the list of foodstuffs guaranteeing food sovereignty has been expanded and the following categories added:

- vegetables and gourds – at least 90%
- seeds of major crops of domestic selection – at least 75%
- fruit and berries – at least 60%

The new document introduces a "green" connotation. Long-term objectives include: the sustainable development and modernisation of agriculture, fisheries and domestic market infrastructure; the development of agricultural production, raw materials and food that meet the established environmental, sanitary and epidemiological, veterinary and other requirements; restoration and improvement of agricultural land fertility, prevention of reduction of agricultural land, rational use of such land, and protection and preservation of agricultural land from water and wind erosion and desertification; and the creation of a highly productive agricultural sector developing on the basis of modern technologies and provided with scientific workers and highly qualified specialists.[27]

In contrast to the previous version, it is stipulated that one of the threats to food security is climatic. This threat is caused by unfavourable climatic changes, abnormal natural phenomena, land degradation and the reduction of land fertility.

It is noteworthy that one of the tasks in the Doctrine is to realise the full potential of agri-food exports – "to achieve a trade surplus of agricultural products, raw materials and foodstuffs". Another objective is to promote the principles of a healthy lifestyle among the population.

[27] Ibid.

Regional Discourse: CIS And EAEU

Parallel to the Russian national discourse, a regional concept of food security is also being developed in the post-Soviet space. In November 2010, the Commonwealth of Independent States (CIS) adopted a Concept of Improving Food Security.[28] In the run-up to 2010, the CIS countries had experienced a bad year, with agricultural production falling by 6.9% (the main reason being the abnormally hot summer).[29]

The document states that food security is not just a condition for ensuring the livelihood of the population of each state, but "a key factor in preserving statehood and *sovereignty*". Like the Russian Doctrine of 2010, it states that the goal is "reliable provision of the entire population with basic foodstuffs through the production of foodstuffs by the CIS member states, subject to mandatory conditions of physical and economic accessibility to food in the quantity and quality necessary for human life, with maximum possible independence from external sources of food supply". Thus, the key theses of the Concept are *food independence* (which is achieved by producing vital foodstuffs at the level of at least 80% of the annual requirement) and guaranteeing the physical and economic accessibility of these foodstuffs. Again, like the Russian Doctrine, thresholds for the production of certain groups of goods are set. These are identical in type and value to the Russian thresholds (with the sole exception that, compared to the Russian document, no figures are given for the production of potatoes and salt). Risks and threats

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[28] *Konceptsiya povysheniya prodovolstvennoy bezopasnosti gosudarstv-uchastnikov SNG* (*The Concept of Improving Food Security of the CIS Member States*), Rosselhoznadzor, federalnaya sluzhba po veterinarnomu i fitosanitarnomu nadzoru (Rosselkhoznadzor Federal Service for Veterinary and Phytosanitary Surveillance), 2010.

[29] "Prodovolstvennaya bezopasnost - prioritetnoe napravlenie mezhgosudarstvennogo vzaimodejstviya" ("Food security is a priority area of interstate cooperation"), Internet portal SNG (CIS internet portal), 2011.

include macroeconomic, technological, agro-environmental and foreign trade risks.

Through Eurasian integration and communities, the concept of food security has also evolved in parallel with CIS and national approaches. On 29 May 2013, the presidents of Belarus, Kazakhstan and Russia approved the Concept of a Coordinated Agro-Industrial Policy of the Member States of the Customs Union and the Common Economic Space. Subsequently, the main provisions of the Concept and the Agreement on Common Rules of State Support for Agriculture were incorporated into the Treaty on the Eurasian Economic Union of 29 May 2014.

In 2019, the draft Concept of Collective Food Security of the EAEU appeared,[30] in which the term is defined as "the ability to ensure a sufficient level of physical and economic access to food for the population of the member states in quantity and quality that meets the criteria of a high standard of living, mainly through the internal production of agricultural products and food, based on the rational use of the resource potential of the agricultural sector, innovative development of industries, interstate and interstate cooperation". At the same time, the implementation of export potential is also one of the objectives. However, the draft concept in this version has not yet been adopted.

In 2021, the Council of the Eurasian Economic Commission approved the Common Principles and Approaches to Food Security of EAEU Member States.[31] Four principles have been formulated: non-discrimination, combination of national interests and EAEU goals, ensuring sustainable development, and taking into account international experience when assessing the food security of member states. The general approaches include increasing the level of national security, realising the potential of mutual trade, and reducing the dependence of

[30] Eurasian Economic Union (EAEU) (2019).

[31] Reshenie Soveta Evraziyskoj ekonomicheskoy komissii No 89 (Decision of Council of the Eurasian economic commission no. 89), Consultant plyus (Consultant Plus), 14 September 2021.

member states on imports of material and technical resources from third countries.

Food as a "Silent Weapon"

In the early 1990s, the Russian Federation was the largest grain importer in the world. In 1992, the Russian Federation imported 30 million tonnes of grain. Such significant imports were due to nothing more than the need to supply domestic consumption. Grain production in Russia gradually increased and nowadays grain and legume crops are the country's main crop products (24.5% in 2020).[32]

Russia has moved from meeting domestic needs to exporting grain. This was a key focus of government policy (the Food Security Doctrine, the federal "Export of Agro-Industrial Products" project and others). In 2009, for the first time in many years, Russia declared that it was ready to export grain. It soon became a leader in grain exports (3rd place in grain exports after the EU and the US; 4th place in wheat exports).

Russia became the leading wheat-exporting nation in 2020 (38.3 million tonnes ahead of the US at 26.1 million tonnes and Canada at 26.1 million tonnes).[33]

The geography of Russian grain and leguminous crop exports is diverse. In 2020, Russia exported grain to 138 countries. The Middle Eastern nations are traditional consumers of Russian grain. In recent years, grain has also been actively supplied to Africa. Asian countries (primarily China) and South American countries (Colombia, Venezuela) are seen as promising markets. Growing household incomes and changes in consumption patterns (increased consumption of animal protein) in these countries are creating an increased demand for grain.

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[32] "Selskoe hozyajstvo v Rossii. 2021" ("Agriculture in Russia. 2021"), *Rosstat*, 2021, p. 24.

[33] "Dinamika na mirovom rynke zerna" ("Dynamics in the world grain market"), Valdai International Discussion Club, 31 March 2022.

The main consumer of Russian grain in 2020 was Turkey, which bought around 11.3 million tonnes of crops, the highest ever for exports from Russia.[34] Other key buyers (in descending order) are Iran, Egypt, Saudi Arabia and China.

Most (82%) of Russia's grain exports pass through ports in the Azov-Black Sea basin, of which a third pass through the port of Novorossiysk.[35] Russia's export opportunities are restricted by transport and logistic factors (limited throughput capacity and an insufficiently developed transport network). In connection with plans to expand exports, there are also plans to build a Far Eastern grain terminal, which would serve as a hub for the Asia-Pacific region.

The Ukrainian conflict has disrupted the main logistic chains in the Black Sea, and Ukrainian ports have suspended all commercial operations since 24 February 2022.[36] As a consequence, prices have already peaked, reaching levels last seen some 14 years ago during the global food price crisis, and have exceeded the highs that contributed to the emergence of the Arab Spring. Analysts warn that grain shortages, "bread riots" and "Arab Spring-style" revolutions could become a familiar feature again. In that case, energy trade from the MENA region would be at risk.[37]

Since 2020, Russia has been exporting grain through a special quota system to protect against price volatility. This system, however, does not apply to EAEU countries. This has created a backdoor for Russian exports through these countries, which buy Russian grain at favourable domestic prices and then resell it to third countries at world prices.[38] Following the conflict

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[34] "V Rossii eksport zerna vyros na 20%" ("In Russia, grain exports increased by 20%"), *Vedomosti*, 29 December 2020.

[35] "Put zerna" ("Grain path"), *RIA*, 24 October 2018.

[36] Foreign Agricultural Service (FAS) (2022).

[37] I. Zuenko, "Kak zapret eksporta zerna iz Rossii mozhet stat chastyu vojny sankcij" ("How a ban on grain exports from Russia could become part of a war of sanctions"), *Forbes*, 18 March 2022.

[38] "Eksperty usomnilis v effektivnosti ogranicheniya eksporta zerna iz RF" ("Experts question the effectiveness of restricting grain exports from Russia"),

escalation in Ukraine, the Russian government imposed an export ban on major grains in March 2022.[39] The decree is temporary (until 30 June 2022) and contains a number of exceptions; in particular it does not apply to Belarus, the DNR and LNR, Abkhazia and South Ossetia.

Dmitry Medvedev wrote the following in his Telegram channel on 1 April 2022: "It just so happens that many countries depend on our supplies for food security. It turns out that our food is our silent weapon ;) Quiet – but formidable. And in case anyone doesn't know or has forgotten, the export of our agricultural products exceeds the export of real armaments" (sic).[40] The Deputy Chairman of the Security Council also suggested that food and agricultural products should not be supplied to "unfriendly countries". Thus, food is being politicised and is becoming the subject of political bargaining.

Global Agrifood Chains and Dependencies in the Light of Russia-Ukraine Conflict

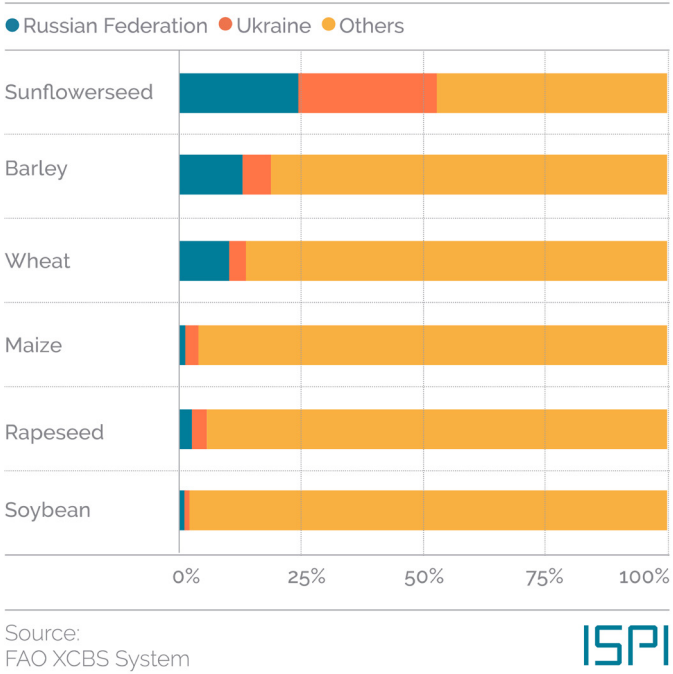
Russia and Ukraine are among the world's largest agricultural producers and net exporters. Both countries are major exporters of wheat, corn, rapeseed, sunflower seed and sunflower oil; Russia is the largest exporter of wheat, while Ukraine of sunflower oil. Both countries are in fact competitors in the global food market.

Interfax, 27 March 2020.

[39] Postanovlenie Pravitelstva RF ot 14 marta 2022 N 362 "O vvedenii vremennogo zapreta na vyvoz zernovyh kultur za predely territorii Rossijskoj Federatsii" (Decree of the Government of the Russian Federation of March 14, 2022 N 362 "On the introduction of a temporary ban on the export of grain crops outside the territory of the Russian Federation").

[40] D. Medvedev, "Nasha eda protiv ih sanktsij" ("Our food against their sanctions"), *Telegram*, 1 April 2022.

Fig.3.1 – Share in global production of selected crops (2016/17-2020/21 Avg.)

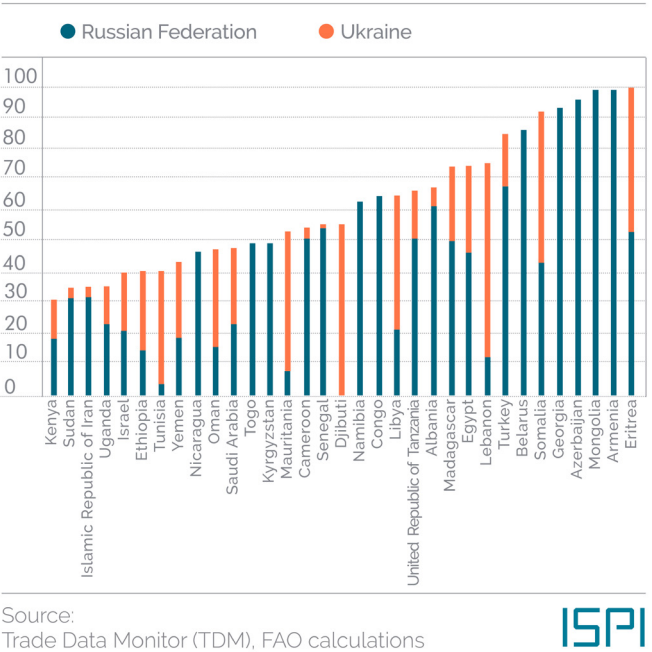


Source: https://www.fao.org/3/cb9236en/cb9236en.pdf, p. 5.

This is why an already volatile agricultural market reacted sharply to the Russian-Ukrainian escalation, with international export quotations for basic agricultural products reaching a historical maximum in February 2022. However, food prices have actually been rising uninterruptedly since the second half of 2020.

Many countries, especially in Africa and Eurasia, are dependent on Russian and Ukrainian imports, and some – such as Eritrea and Armenia – are totally dependent. Characteristically, these are non-Western countries, many of which are categorised as "Least Developed Countries" and "Low-Income Food-Deficit Countries".

Fig. 3.2 – Wheat import dependency, net



Source: https://www.fao.org/3/cb9236en/cb9236en.pdf, p. 10.

The future of the Ukrainian conflict contains too many unknowns. The only thing that is clear is that crop yields in Ukraine will decrease in the 2021-22 season. This is due both to Russia's military operation and to mined fields (a problem that has existed since 2014). Where the sowing campaign has begun, farmers face a shortage of resources – seeds, fertilisers, fuel and machinery. Logistics is another problem. Since the Black Sea ports remain closed, the Ukrainian government has started exporting agricultural products across the western border by rail, but the throughput capacity is relatively small – up to 600,000 tons of grain per month. Ukraine previously exported five million tons a month.

Reduced agricultural output in Ukraine creates a gap in global sunflower seed and grain markets. The main consequence is a higher price for many foodstuffs, not only grain and sunflower oils. This price hike will manifest itself most of all in developing countries. This in turn will create socio-economic tension and lead to a growing number of undernourished people. Thus, the gap between the global North and the global South will only increase.

Conclusion

Food security is back on the menu. After a pandemic that hit the food supply chain, in early 2022 the world was shaken by the Russia-Ukraine conflict, the effects of which remain to be seen. What is clear, however, is that the global community is moving farther and farther away from its goal of ending hunger.

Food security is one of the most important areas of national security, as explicitly stated in Russia's National Security Strategy. The goals and objectives are formulated in the 2020 Doctrine on Food Security, which describes food security as the achievement of food independence with physical and economic access to food that meets quality standards. The Russian approach adopts the global approach of the UN and FAO but emphasises self-sufficiency – not just achieving it but exceeding it – to maximise export potential. The notion of food self-sufficiency is one of the pillars guaranteeing sovereignty. The same approach is inherent in the Eurasian Union.

In realising food security, Russia faces two major interlinked challenges: 1) environmental (soil degradation and depletion, climate shocks and disasters, high vulnerability of agriculture to climate change); 2) resource-related (availability of skilled labour, technological dependence on imports, insufficient mechanisation and technological development, and fertiliser and seed imports).

There is no acute hunger problem in Russia, but there are areas where a large part of the population has only limited access

to food for economic reasons. Economic security and access to nutritious quality diets (unaffordability of healthy diets) is a significant problem in Russia and may increase due to the economic effect of Western sanctions. This will have a negative impact not only on the individual, but also on the social fabric of society. Economic shocks and inflation are increasing the population's expenditure on food, which is rising faster than real incomes, despite a background of increased gross yields of major crops. (The sharp fall in the value of the national currency has created additional incentives for producers to export). Vulnerable populations and low-income groups are particularly affected. According to FAO, unhealthy diets are one of the most important causes of non-infectious diseases in Europe.[41]

Grain production is the backbone of the agro-industrial complex of the Russian Federation and is the largest sub-sector of agriculture. In relatively few years, Russia has transformed from a net importer of grain into a major supplier, taking the lead in expanding its agri-food exports. Agricultural exports are not just becoming an important component of GDP, but are becoming a geopolitical resource, woven into the context of sanctions and counter-sanctions. At the same time, Russia's military operation in Ukraine will have global consequences and far-reaching impacts, including on food security.

[41] *Regionalnyj obzor sostoyaniya prodovolstvennoj bezopasnosti i pitaniya v Evrope i TSentralnoj Azii. Dostupnyj zdorovyj ratsion pitaniya dlya borby so vsemi formami nepolnotsennogo pitaniya v tselyah uluchsheniya zdorovya* (*Regional Review of Food Security and Nutrition in Europe and Central Asia. Affordable healthy diets to combat all forms of malnutrition to improve health*), The Food and Agriculture Organization of the United Nations (FAO), 2020.

4. How Is Climate Change Shaping Russia's Arctic Policy and Activities?

Pavel Devyatkin

Climate change is one of the greatest challenges of our century and Russia is one of the most affected countries. This chapter explores how immense transformations of the Arctic environment are reflected in the rhetoric and activities of Russian Arctic policy. The focus is on climate change and its effects on cooperation and diplomacy with other nations, security concerns, energy and natural resources, and shipping and transport.

Reports published by the Intergovernmental Panel on Climate Change (IPCC) reveal that climate change is affecting the whole world. Perhaps the most impacted region is the Arctic, generally defined as the polar region in the northernmost part of Earth above the 66°33'N latitude line. The effects of global warming are noticed sooner and with more severe consequences in the Arctic. These include melting sea ice, thawing permafrost, eroding coastlines and extreme weather. A 2022 report from the Russian Federal Service for Hydro-meteorology and Environmental Monitoring found that average temperatures along the Russian Arctic coast have increased by approximately 5 degrees Celsius since 1998.[1] Air temperatures have been

[1] Federal Service for Hydrometeorology and Environmental Monitoring of Russia (Roshydromet), *Doklad Ob Osobennostyakh Klimata Na Territorii Rossiyskoy Federatsii* (*Report about Climate Features Within the Territory of the Russian Federation*), 2021.

rising at a rate three times the global average over the past few decades, in part because of a phenomenon known as Arctic amplification, that is, the loss in sea ice that gives way to a darker, more heat-absorbent ocean.[2]

Climate change is also a political issue, and Russia's climate-related policies and interests in the Arctic are influenced by an array of governmental and non-governmental actors, including individuals and groups.[3] Russian climate scientists have been studying climate change since the late XIX century, with pioneering contributions to the field since the 1970s, and have produced many studies and analyses on the impacts of climate change in the Arctic.[4] Some Russian scholars believe that climate change is cyclical or natural, but newer generations of scientists recognise the anthropogenic sources of global warming.[5] Government bodies and agencies, such as the Ministries of Economic Development, Energy, and Natural Resources and Environment, promote the development and advocacy of climate policies and formulation of Russia's climate adaptation and mitigation. There are also conservative government actors, including close associates of President Vladimir Putin, influential in Russian legislative bodies, who are sceptical of climate change and block meaningful climate action beyond rhetoric. Several of Russia's richest business leaders have extensive ties to Arctic extractive industries.[6] Private, as well as state-owned or partially state-owned businesses are concerned with sustainability indexes, carbon taxes, regulation and foreign investment.[7]

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[2] Arctic Monitoring and Assessment Programme (AMAP), *Arctic Climate Change Update 2021: Key Trends and Impacts. Summary for Policy-makers*, 2021.

[3] A. Sergunin and V. Konyshev, "Forging Russia's Arctic strategy: actors and decision-making", *The Polar Journal*, vol. 9, no. 1-19. 2019.

[4] K. Doose, "Modelling the future: climate change research in Russia during the late Cold War and beyond, 1970s-2000", *Climatic Change*, vol. 171, no. 6, 2022.

[5] S.E. Jakobsen, *What is happening to Russia's climate policy?*, Forskning, 2021; O. Anisimov and S. Reneva, "Permafrost and Changing Climate: The Russian Perspective", *Ambio*, vol. 35, no. 4, 2006, pp. 169-75.

[6] B. Venditti, "Who are the Russian Oligarchs?", *Visual Capitalist*, 25 March 2022.

[7] T. Gustafson, *Klimat: Russia in the Age of Climate Change*, Harvard University

Human rights, Indigenous peoples' and environmental NGOs play some role in the debate on Arctic climate change, voicing concern about environmental consequences such as thawing permafrost. Indigenous peoples of the Russian North, who have lived in the Arctic for millennia, have long noticed the effects of climate change on animal migration, conservation of species important for fishing and hunting, and the health and well-being of communities.[8] The public and civil society are likewise involved, though public opinion surveys show mixed results regarding citizens' concern for climate change and environmental problems.[9] Given the strategic importance of the Arctic, there is a wide range of actors involved in formulating Moscow's approach to climate change at the national and regional level. In general, however, Arctic policy-making in Russia is a centralised affair, with the centre of decision-making concentrated in the Kremlin and executive agencies.[10] This chapter outlines how climate change has had an effect on Arctic cooperation, security and the economy. It is argued that climate is a key consideration of Russian Arctic policy in these fields.

Cooperation and Science Diplomacy

Addressing the effects of Arctic climate change has been central to Russia's circumpolar cooperation in international institutions such as the Arctic Council (AC) and International Maritime Organization (IMO). Russia has supported and participated

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Press, 2021; E. Wilson Rowe, *Russian Climate Politics*, New York, Palgrave Macmillan, 2014.

[8] T.V. Callaghan, O. Kulikova, L. Rakhmanova, et al., "Improving dialogue among researchers, local and indigenous peoples and decision-makers to address issues of climate change in the North", *Ambio*, vol. 49, 2019, pp. 1161-78.

[9] Levada Center, *Environmental Problems*, 2020; O. Anisimov and R. Orttung, "Climate change in Northern Russia through the prism of public perception", *Ambio*, vol. 48, 2019, pp. 661-71.

[10] A. Sergunin and V. Konyshev, "Forging Russia's Arctic strategy: actors and decision-making", *The Polar Journal*, vol. 9, 2019, pp. 1-19.

in United Nations environmental activities such as the IPCC, the UN Framework Convention on Climate Change, the Paris Accords and the 2030 Agenda for Sustainable Development.[11] Under the auspices of the IMO, Russia participated in the Sub-Committee on Pollution Prevention and Response and the ban on heavy fuel oil (HFO) in the Arctic. HFO is the dirtiest type of marine fuel and presents severe risks to the Arctic marine environment as a source of black carbon emissions. However, environmental groups criticise the ban for granting exemption to Russian-flagged ships in the Northern Sea Route (NSR) and allowing for the continued use of HFO until 2024.[12]

Russia aims to intensify the AC working groups' research, monitoring and assessment activities. As chair of the Council from 2021 to 2023, Russia plays a guiding role in setting the agenda of the AC in the areas of environmental protection and sustainable development. The chairmanship's priorities highlight the challenges of climate change and its goals include maintaining Arctic ecosystems, conserving biodiversity and sustainably managing natural resources.[13] Russia aims to intensify work in the AC working groups, the Arctic Monitoring and Assessment Program (AMAP) and the Arctic Contaminants Action Program (ACAP).[14] Climate-related cooperation with AC member states mostly happens in these working groups. Russia participated in the negotiation of legally binding agreements on environmental protection and scientific cooperation between 2011 and 2017.[15] One concrete objective of Russia's AC chairmanship is the establishment of the renewable energy-powered Snowflake International Arctic

[11] A. Davydova, *What Is Russia's Place in the Fight Against Climate Change?*, Carnegie Moscow Center, 2022.

[12] M. Humpert, "IMO Moves Forward with Ban of Arctic HFO But Exempts Some Vessels Until 2029", *High North News*, 3 September 2020.

[13] A.N. Vylegzhanin, O.R. Young, and P.A. Berkman, "Russia in the Arctic Chair: Adapting the Arctic Governance System to Conditions Prevailing in the 2020s", *Polar Record*, vol. 57, 2021, pp. 1-10.

[14] *Russian Chairmanship 2021-2023*, Arctic Council, 2021.

[15] *International cooperation in the Arctic*, Arctic Council.

Station, a research hub for international cooperation in the Russian North.[16]

The escalation of the Ukraine conflict in 2022 led to seven of the AC member states condemning Russia's actions in Ukraine and pausing the work of the Council during Russia's chairmanship as of March 2022.[17] International cooperation around environmental issues may be affected by the suspension of the Arctic Council's activities. Russia's Arctic officials called the suspension "regrettable" and said it was important to preserve the activities of the AC, "so that – when circumstances allow – cooperation can continue without prejudice to those who depend on these projects".[18] Despite the freezing of the Council's activities, there is an enduring need for transnational ocean protection and environmental stewardship.[19] Russia will reorient its chairmanship agenda towards domestic development of the Russian North.

So far, Arctic cooperation has been particularly successful in the area of climate science, with Russia taking a leading role in science diplomacy.[20] An example showing how valuable such cooperation can be is the problem of black carbon emissions. The goal of reducing black carbon emissions is difficult to achieve without working closely with Russia, considering the weight of government-led action in this space.[21] Between 2011

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[16] *The Snowflake International Arctic Station – A hub for energy innovation and cultural exchange*, Arctic Council, 2020.

[17] G. Dickie and T. Gardner, "Arctic Council in upheaval over Russia as climate change transforms region", *Reuters*, 3 March 2022.

[18] "MID osudil resheniye semi stran priostanovit' uchastiye v Arkticheskom sovete" ("The Foreign Ministry condemned the decision of seven countries to suspend participation in the Arctic Council"), *Interfax*, 5 March 2022.

[19] Y. Rosen, "Against tough odds, Bering Strait residents seek cross-border ocean protections", *Arctic Today*, 24 March 2022.

[20] P.A. Berkman, L. Kullerud, A. Pope, A.N. Vylegzhanin, and O.R. Young, *The Arctic Science Agreement propels science diplomacy*, Science, vol. 358, no. 6363, 2017, pp. 596-98.

[21] A. Minter, *The Climate Fight in the Arctic Needs Russia's Help*, Bloomberg, 18 March 2022.

and 2014, researchers from the US Environmental Protection Agency (EPA) successfully convinced experts from the Russian Ministry of Natural Resources and Ecology about the health risks of black carbon in northern communities. The exchange led to the Russian government funding a new black carbon emissions inventory based on EPA methodologies.[22] Russia has likewise played leading roles in scientific expeditions such as the Russian-American Long-term Census of the Arctic (RUSALCA for short, which can be translated as "water nymph" in Russian). As part of the programme, researchers studied the marine chemistry, glaciology, oceanography and ecosystems of the Bering and Chukchi Seas between 2004 and 2015.[23]

Russian scientists have taken part in the internationally-coordinated Nansen and Amundsen Basins Observational System (NABOS). Since the program began in 2002, there have been 13 expeditions – the most recent in September-October 2021 – aboard the Russian ice-class research vessel Akademik Tryoshnikov. The results of the NABOS cruises have improved our understanding of the mechanisms behind sea-ice reduction. The study of this process greatly depends on repeated and concurrent oceanographic calculations and the long-term upkeep of mooring buoys – both of which are more easily achieved with international collaboration.[24] Unfortunately, at the moment it is not clear if NABOS will continue.

Lastly, Russia also took part in the largest polar expedition in history, the Multidisciplinary Drifting Observatory for the Study of Arctic Climate (MOSAiC), from 2019 to 2020. MOSAiC scientists studied the causes and consequences of the changing Arctic Sea ice cover on the global and local ecosystems, oceans and atmosphere. The expedition, with

[22] *Black Carbon Diesel Initiative in the Russian Arctic*, U.S. Environmental Protection Agency (EPA), 2014.

[23] P. Devyatkin, *Environmental Détente: What can we learn from the Cold War to manage today's Arctic Tensions and Climate Crisis?*, The Arctic Institute, 2021.

[24] H. McFarland, *Expedition Embarks to Assess the State of the Eastern Arctic Ocean,* International Arctic Research Center (IARC), 2021.

an unprecedented budget of approximately €140 million, produced many terabytes of data and thousands of samples.[25]

Security Concerns

Defence and security likewise play a role in Russia's Arctic policy and foreign relations with Arctic states. Russia maintains a comprehensive land, sea and air presence in the Arctic, oriented towards protecting national sovereignty and securing its economic interests. Security concerns in the Arctic are also linked to tensions between NATO members and Russia in other parts of the world. Of the eight Arctic states, Canada, Denmark, Iceland, Norway and the United States are NATO members, while Sweden and Finland have signalled their willingness to join NATO.[26] In the context of global frictions, there has been a remilitarisation of the region, with the resumption of strategic bomber patrols, Russian naval manoeuvres close to Alaska and test launches of the Tsirkon hypersonic cruise missile in the Arctic.[27]

It is often claimed that the increasing accessibility to natural resources prompted by climate change will trigger a "bonanza" or geopolitical race among the Arctic states for reserves that were previously unreachable.[28] The idea of such an impending resource-driven conflict has largely been debunked in Arctic studies because there is a clear legal regime for the distribution of natural resources according to the exclusive economic zones (EEZs) and territories of the Arctic states.[29] There are no significant territorial or maritime disputes. Disagreements in

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[25] *MOSAiC Multidisciplinary Drifting Observatory for the Study of Arctic Climate Science Plan*, International Arctic Science Committee (IASC), 2016.

[26] "The Next NATO Expansion", *The Wall Street Journal*, 20 March 2022.

[27] M. Paul and G. Swistek, *Russia in the Arctic*, Stiftung Wissenschaft und Politik, 2022.

[28] I. Øverland, "Russia's Arctic energy policy", *International Journal*, vol. 65, no. 4, 2010, pp. 865-78.

[29] K. Dodds and M. Nuttall, "The scramble for the Poles: The geopolitics of the Arctic and Antarctic", *Polity Press*, 2016; A. Østhagen, "The Arctic security region: misconceptions and contradictions", *Polar Geography*, vol. 44, no. 1, 2021, pp. 55-74.

this area are resolved through negotiation and under the auspices of international bodies. Such was the case of the Norway-Russia Barents Sea delimitation dispute, which was resolved by treaty in 2010 after decades of disagreements.[30] Russia submitted scientific data to the UN Commission on the Limits of the Continental Shelf (CLCS) in 2021 to propose an extension of its continental shelf in the Arctic Ocean. After examining the data, the UN CLCS will make recommendations on the extension.[31]

In 2010, then-President Dmitry Medvedev, addressing Russia's Security Council, stated that "climate change can give rise not only to physical changes, changes in the natural environment, but also to interstate contradictions [related to] energy extraction, the use of sea transport routes, bioresources, and a shortage of water and food resources".[32] Since then, Russian publications on Arctic strategy reflect the view that there are no serious military threats originating from the Arctic. This is evident from the fact that defence and security concerns appear at the bottom of Russia's list of Arctic priorities in strategic documents.[33]

Russia remains a great power with first-rate military capabilities, but compared to the Soviet period, when the Arctic was another theatre for competition with NATO, Russia's current defence presence is more connected to providing search and rescue (SAR) capabilities and navigation assistance in an area of great economic importance and rapidly changing

[30] C. Peterson McDaniel, *Russia's Arctic Strategy: An Analysis of the Role of Diplomatic, Cooperative, and Domestic Policies*, The Arctic Institute, 2017.

[31] UNCLS, "Commission on the Limits of the Continental Shelf (CLCS), Outer limits of the continental shelf beyond 200 nautical miles from the baselines: Submissions to the Commission: Partial revised Submission by the Russian Federation", Oceans and Law of the Sea, United Nations, Division for Oceans Affairs and the Law of the Sea, 2022.

[32] President of Russia, Zasedaniye Soveta Bezopasnosti po voprosam izmeneniya klimata (Security Council meeting on climate change), Official Website, The Kremlin, 2010.

[33] A. Sergunin, *Thinking about Russian Arctic council chairmanship: Challenges and opportunities*, Polar Science 100694, 2021.

climatic conditions.[34] Russian security concerns in the Arctic are more in line with comprehensive security – an approach that takes into account economic, environmental and human security issues.[35]

Russia's 2021 National Security Strategy frames climate change adaptation as a national interest, but Russia has not securitised climate change as much as other states.[36] Unlike US Arctic policy, where climate change is seen as a "destabilizing force" in security and as a multiplier of "competition for resources and influence in the [Arctic] region",[37] Russia is against linking climate change to security. Russia vetoed the UN Security Council draft resolution on climate and security in 2021 because the Russian delegation saw the proposed document as "coercing the Security Council to take a one-dimensional approach to conflicts and threats to international peace and security … through the climate lens".[38] President Putin's adviser on climate change issues, Ruslan Edelgeriev, says Russia opposes the inclusion of climate change in the Security Council's agenda to avoid the imposition of "sanctions or other deterrents on supposedly 'unambitious' climate targets".[39] Russia sees climate concerns as a possible justification for Western unilateral actions.

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[34] P. Devyatkin, *Russia and the Arctic*, in NSI Team (Eds.), *Russian Strategic Intentions*, Strategic Multilayer Assessment, U.S. Department of Defense, 2019.

[35] G.H. Gjørv and K.K. Hodgson, *"Arctic Exceptionalism" or "comprehensive security"? Understanding security in the Arctic*, Arctic Yearbook, 2019.

[36] President of Russia, O Strategii natsional'noy bezopasnosti Rossiyskoy Federatsii (On the National Security Strategy of the Russian Federation), Official Website, The Kremlin, 2021; J.M. Godzimirski, "Energy, climate change and security: The Russian strategic conundrum", *Journal of Eurasian Studies*, vol. 13, no. 1, 2022, pp. 16-31.

[37] U.S. Department of Defense, *Secretary Austin Remarks at Climate Change Summit*, 2021.

[38] Press Statement on the Draft UN Security Council Resolution on Climate and Security, Permanent Mission of the Russian Federation to the United Nations, 2021.

[39] "Ruslan Edel'geriyev: Rossiya protiv smeshivaniya ponyatiy klimata i bezopasnosti" ("Ruslan Edelgeriev: Russia is against mixing climate and security concepts"), *RIA Novosti*, 28 December 2021.

Domestic Climate Policies

Looking inwardly, climate change has had a mixed effect on Russia's domestic Arctic policies and unilateral initiatives towards adaptation and mitigation. After ratifying the Paris Agreement in 2019, Russia unveiled its climate change adaptation plan in 2020. The national plan acknowledges the consequences of climate change in terms of public health risks, wildfires, ecosystem disruption, droughts, extreme precipitation, flooding and permafrost degradation and its risk to infrastructure.[40] In 2020, Russia's Audit Chamber reported that 56 million Russians across 143 cities suffer from exposure to air pollution, almost all rivers are poisoned by untreated sewage, the country is losing about 300,000 hectares of forest annually, and the damage caused by climate change may cost 2-3% of Russia's GDP per year until 2030. The Organization for Economic Co-operation and Development (OECD) has listed Russia as the world's worst affected country in terms of economic damage related to climate change.[41]

The Russian Arctic is particularly threatened by climate change and the aforementioned effects. The economic cost of climate change to Arctic infrastructure may amount to 9 trillion rubles (€90 billion) by 2050, according to the Ministry for the Development of Far East and Arctic.[42] Every year, the Russian Arctic loses about 7,000 hectares of land to coastal erosion – an area approximately the size of Central Moscow.[43]

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[40] P. Devyatkin, "Russia Unveils Climate Change Adaptation Plan", *High North News*, 2020.

[41] E. Mereminskaya, "Zagryazneniye vody, vozdukha i zemli v Rossii zamedlyayet rost ekonomiki" ("Water, air and land pollution in Russia slows economic growth"), *Vedomosti*, 13 January 2020.

[42] "V Minvostokrazvitiya otsenili pryamoy ushcherb ot global'nogo potepleniya v Arktike" ("Minvostokrazvitiya estimated direct damage from global warming in the Arctic"), *TASS*, 24 May 2020.

[43] "Arktika pod ugrozoy: kak global'noye potepleniye vliyayet na severnoye poberezh'ye Rossii?", ("Arctic under threat: how does global warming affect the northern coast of Russia?"), *MIR24*, 2021.

Indigenous peoples' and traditional occupations and the lives of Arctic residents are vulnerable to climate change. Dozens of apartment buildings have collapsed and hundreds of buildings have been severely damaged by degrading permafrost around populated areas such as Yakutsk, Norilsk, Pevek, Magadan and Vorkuta.[44] Natural disasters have also been increasingly noticeable consequences of global warming. President Putin and regional officials acknowledged climate change as a cause of unprecedented wildfires and flash floods across Yakutia and other parts of Siberia in 2021.[45]

For these reasons, Russia is organising a climate adaptation and monitoring policy for the Arctic region. A permafrost monitoring system consisting of 140 surveillance stations and meteorological "Arctic-M" satellites will be constructed to create forecasts and models of anthropogenic environmental change.[46] After wildfires affected 1.4 million hectares in the Russian North in 2021 and 3 million hectares in 2020, the Ministry of Natural Resources and Environment allocated an additional 4.3 billion rubles to forest fire prevention in 2022 – approximately a third of the ministry's budget.[47] Sustainable forest management in the Arctic receives considerable attention

[44] O.A. Anisimov and M.A. Belolutskaya, "Assessment of the Impact of Climate Change and Permafrost Degradation on Infrastructure in Northern Regions of Russia", *Meteorology and Hydrology*, vol. 6, 2022, pp. 15-22.

[45] "Scale of wildfires, flash floods in Russia largely connected to climate change, Putin says", *TASS*, 5 August 2021; "Glava Yakutii nazval osnovnuyu prichinu pozharov v respublike" ("The head of Yakutia called the main cause of fires in the republic"), *RIA Novosti*, 20 July 2021.

[46] Ministry of Natural Resources and Environment of Russia (Minprirodi), K 2024 godu gosudarstvennaya sistema monitoringa mnogoletney merzloty nakroyet vsyu territoriyu kriolitozony (By 2024, the state permafrost monitoring system will cover the entire territory of the permafrost zone), 2021.

[47] Ministry of Natural Resources and Environment of Russia (Minprirodi), Sozdaniye sistemy monitoringa vechnoy merzloty, plany nauchnykh ekspeditsiy ledostoykoy platformy, itogi raboty za god (Creation of a permafrost monitoring system, plans for scientific expeditions of the ice-resistant platform, results of work for the year-a meeting of the Public Council), 2021.

from Russia's Arctic officials.[48] In 2022, the Russian government announced a 5.9 billion ruble research program to study climate change adaptation, black carbon monitoring and emissions reduction.[49] The main goals of Russia's Arctic climate change adaptation programme include permafrost monitoring, the reduction of anthropogenic effects and pollution, and the maintenance and increase in surface albedo.[50]

Nonetheless, there remain political barriers to comprehensive climate action in the Arctic. Security Council Secretary Nikolai Patrushev and Security Council Deputy Chairman Dmitry Medvedev acknowledge man-made climate change, but argue that the West's push for environmental standards in the Arctic "are designed in such a way as to maximally infringe on [Russia's] economic interests ... and create a threat to national security",[51] This sentiment is also present in Russia's National Security Strategy, which states that the "attention of the world community to the problems of climate change … is used as a pretext for restricting the access of Russian companies to export markets, curbing the development of Russian industry,

[48] "Ustoychivoye upravleniye lesami v Arktike obsudili na konferentsii po sluchayu Mezhdunarodnogo dnya lesov" ("Sustainable forest management in the Arctic discussed at the International Day of Forests conference"), *Izvestiya*, 2022.

[49] V. Abramchenko, Na nauchnyye resheniya v oblasti ekologicheskogo razvitiya i klimaticheskikh izmeneniy vydelyat 5,9 mlrd rubley (5.9 billion rubles will be allocated for scientific solutions in the field of environmental development and climate change), Government of Russia, 2022.

[50] R.S.K. Edelgeriev and A.A. Romanovskaya, "New Approaches to the Adaptation to Climate Change: The Arctic Zone of Russia", *Russian Meteorology and Hydrology*, vol. 45, 2020, pp. 305-16.

[51] Security Council of the Russian Federation, Zasedaniye Mezhvedomstvennoy komissii Soveta Bezopasnosti Rossiyskoy Federatsii po voprosam obespecheniya natsional'nykh interesov Rossiyskoy Federatsii v Arktike (Meeting on ensuring the national interests of the Russian Federation in the Arctic), 2021; I. Grachev, "Sekretar' Soveta Bezopasnosti Rossii Nikolay Patrushev: 'Zelenaya' energetika ne dolzhna stanovit'sya orudiyem vmeshatel'stva Zapada v dela drugikh stran" ("Secretary of the Russian Security Council Nikolai Patrushev: Green energy should not become a tool for Western interference in the affairs of other countries"), *Komsomolskaya Pravda*, 30 October 2021.

establishing control over transport routes, and preventing Russia from developing the Arctic".[52] In its public messaging, Russia is portrayed as an environmentally responsible country, familiar with the consequences of anthropogenic climate change. At the 2021 Energy Week International Forum, President Putin declared that Russia will achieve carbon neutrality by 2060 and reduce greenhouse gas emissions. However, in the same speech, Putin criticised the "systematic flaws" and "major market crisis" of Europe's renewable energy transition.[53] Russia's socio-economic development is still largely dependent on non-renewable energy and will remain so for the foreseeable future.

Hydrocarbons and Natural Resources

As in other countries, energy plays a central role in Russia's economic growth and strategic decision making. It is an instrument of power projection, a significant source of state revenue and a means of shaping the international environment.[54] For Russia, the Far North has been a particularly important source of energy and natural resources throughout history. Oil seeps have been known for thousands of years, but the commercial exploitation of oil in the Russian Arctic only started in the 1920s and dramatically expanded in the second half of the XX century.[55] Soviet Arctic extractive industries were severely polluting, with hundreds of square kilometres of forest and tundra turned into treeless wastelands and "zones of sacrifice".[56] Today, some of Russia's largest ongoing and planned

[52] President of Russia, O Strategii natsional'noy bezopasnosti Rossiyskoy Federatsii…, cit.

[53] President of Russia, Russian Energy Week International Forum plenary session, Official Wbsite, The Kremlin, 2021.

[54] J.M. Godzimirski, "Energy, climate change and security: The Russian strategic conundrum", *Journal of Eurasian Studies*, vol. 13, no. 1, 2022, pp. 16-31.

[55] Arctic Monitoring and Assessment Programme (AMAP), *Arctic Oil and Gas*, 2007.

[56] A. Bruno, *The Nature of Soviet Power: An Arctic Environmental History*, New York,

oil and gas projects are located in the Arctic, especially around the Yamal and Gydan Peninsulas.[57] Offshore oil production currently occurs in the Prirazlomnoye and Yurkharovskoye fields.

The Arctic energy base is a key aspect of Russia's current and future economy as the region accounts for approximately 10% of Russia's GDP and 20% of Russia's exports.[58] Russian policymakers have repeatedly declared that the future of the country lies in the Arctic, with particular attention to the future of hydrocarbon production.[59] The aim to modernise and develop the region's resources is consistently reflected in Russia's official Arctic policy documents. One of the main government documents that outlines Russia's objectives in the Arctic, *Basic Principles of the Russian Federation State Policy in the Arctic to 2020*, underscores "using the Arctic zone of the Russian Federation as a strategic resource base of the Russian Federation" as the primary national interest and the utilisation of "hydrocarbon resources, water biological resources and other kinds of strategic raw materials" for social and economic development.[60]

These foci were reiterated in the 2020 renewal of the Basic Principles policy document for the period to 2035.[61] In

Cambridge University Press, 2016.

[57] R. McGee, *Mapping Russia's Arctic Hydrocarbon Development Scheme*, The Arctic Institute, 2020.

[58] "Rossiya investiruyet v Arktiku $86 mlrd" (Russia invests $86 billion in the Arctic), *Noviye Izvestiya*, 28 March 2019.

[59] President of Russia, Direct Line with Vladimir Putin, Official Website, The Kremlin, 2017; President of Russia, Vystupleniye na plenarnom zasedanii III Mezhdunarodnogo arkticheskogo foruma «Arktika – territoriya dialoga» (Speech at the plenary session of the III International Arctic Forum "The Arctic - Territory of dialogue"), Official Website, The Kremlin, 2013.

[60] Government of Russia, Ob Osnovakh gosudarstvennoy politiki Rossii v Arktike na period do 2020 goda i dal'neyshuyu perspektivu (On the Fundamentals of Russia's state policy in the Arctic for the period up to 2020 and beyond), 2008.

[61] President of Russia, Prezident utverdil Osnovy gosudarstvennoy politiki v Arktike (The President approved the Fundamentals of state policy in the following areas: In the Arctic), Official Website, The Kremlin, 2020.

the *Strategy of Development of the Arctic Zone of the Russian Federation and the Provision of National Security for the Period to 2035*, the strategic document for the realisation of the Basic Principles, the Russian Security Council also highlighted that "more than 80% of the Russian Federation's combustible natural gas and 17% of its oil" are produced in the Arctic and despite the danger of "intense climate warming in the Arctic," energy is still seen as a primary driver of economic growth and the Arctic as a strategic energy reserve.[62]

Climate Pressures on Arctic Energy

Given the importance placed on Arctic energy and resources, it is interesting to see how Russia's energy policy is balanced with increasing global pressure to decarbonise and adapt to the effects of climate change. Russia, heavily dependent on its energy exports for economic growth, is among the top emitters of greenhouse gases. Russia will be one of the few countries that may benefit economically from rising temperatures and their impact on improving prospects for agriculture and access to natural resources. In the short term, global warming will ease access to abundant natural resources in Russia's northern regions.[63]

On the one hand, the warming of the region and decrease in the duration of winter provides more favourable conditions for drilling operations and pipe laying. Operating costs will effectively be lower and equipment will perform more efficiently under warmer conditions.[64] Russia's climate change adaptation

[62] Security Council of the Russian Federation, Fundamentals of the state policy of the Russian Federation in the Arctic for the period up to 2035, 2020.

[63] B. Lo, *The Adaptation Game – Russia and Climate Change*, Russie.Nei.Visions, No. 121, French Institute of International Relations (Ifri), March, 2021; N. Kapoor, *Russia and the Future of the Arctic*, Observer Research Foundation (ORF), 2021; S. Kardaś, *Climate ambivalence: Russia's climate change policy*, Centre for Eastern Studies (OSW), 2020.

[64] A. Pikaleva and I. Shkolnik, "Assessment of Climate Change Impacts on the

plan from 2019 mentions the "possible positive consequences" of climate change, including greater access to the continental shelf.[65] On the other hand, climate change creates unfavourable conditions for energy and natural resource extraction. Global warming leads to increases in precipitation, wind and wave activity, storms and coastal erosion. These processes will negatively impact production infrastructure and machinery and therefore raise operating costs.[66]

In 2020, in what turned out to be the worst Arctic oil spill in history, 21,000 tons of fuel were spilled into the Ambarnaya river near the industrial city of Norilsk, causing a state of emergency. Though Russia's technical oversight agency Rostekhnadzor has since declared that the disaster was caused by technical faults and not by thawing permafrost (as was initially claimed),[67] the tragedy did draw greater attention to the fragility of Arctic infrastructure. In 2021, Russia's Minister of Natural Resources and Environment Alexander Kozlov said that about 65% of Russia's territory is located on permafrost, leading to great challenges in constructing railways and highways. Approximately 40% of buildings and structures built on permafrost in Russia have deformations and, according to some estimates, permafrost degradation is responsible for 23% of technical system failures and 29% of hydrocarbon production losses.[68] Scientists from Moscow State University and the Russian Academy of Sciences have estimated

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Economic Development of the Russian Arctic in the 21st Century", *Russian Meteorology and Hydrology*, vol. 43, no. 6, 2018, pp. 347-56.

[65] P. Devyatkin, "Russia Unveils Climate Change Adaptation Plan"…, cit.

[66] L.V. Nefedova and D.A. Solovyev, "Assessment of the global climate change impact on Fuel and Energy Complex infrastructure and adaptation opportunities in the Russian Arctic", *Earth and Environmental Science*, vol. 606, no. 012040, 2020.

[67] Federal Service for Environmental, Technological and Nuclear Supervision, Rostekhnadzor, *Tekhnicheskoye rassledovaniye avarii na «TETS-3» AO «NTEK» zaversheno* (Technical investigation of the accident at CHPP-3 of NTEK JSC completed), 2020.

[68] Ministry of Natural Resources and Environment of Russia, Minprirodi, *K 2024 godu gosudarstvennaya sistema monitoringa mnogoletney merzloty nakroyet vsyu territoriyu kriolitozony*..., cit.

that permafrost damage may cause $132 billion in damage to Russian infrastructure by 2050.[69]

For the foreseeable future, hydrocarbon production will remain a staple of Russia's Arctic energy complex. Russia's Energy Ministry estimates that Arctic oil production will account for 26% of overall output by 2035, up from 17.6% in 2017. By 2035, 92% of natural gas is expected to be sourced from the Arctic, up from the current share of 82%.[70] The focus on liquefied natural gas (LNG) is associated with climate change awareness as the use of LNG generates about 50% less carbon dioxide than coal and 30% less carbon dioxide than oil.[71] Tax breaks recommended by the State Duma Budget and Tax Committee for oil and gas companies willing to operate in the Arctic are intended to facilitate domestic business and hope to create hundreds of thousands of new jobs.[72] Encouraging migration to the Arctic, especially to work in extractive industries, is a key aspect of Russia's development strategy.

Global climate concerns have influenced Russia's Arctic energy plans and climate policies. The European Union's carbon border adjustment mechanism (CBAM), a tax on emissions caused by the production of imported goods, has prompted discussions among Russia's largest businesses on how to minimise losses on exports.[73] As a result of the conflict in Ukraine, the EU has the ambition to terminate energy dependence on Russia by 2027.[74]

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[69] V.P. Melnikov, V.I. Osipov, A.V. Brouchkov et al., "Climate warming and permafrost thaw in the Russian Arctic: potential economic impacts on public infrastructure by 2050", *Natural Hazards*, vol. 112, no. 7-9, 2022.

[70] CDU-TEK, *Neftegazovyy klondayk Arktiki* (*Arctic Oil and Gas Klondike*), Central Dispatching Department of the Fuel and Energy Complex, 2019.

[71] V.A. Fedorova and A.O. Mitryaykina, "Decarbonized LNG: Creating a path to sustainable Arctic development", *Materials Science and Engineering*, vol. 1201, no. 012067, 2021.

[72] P. Devyatkin, "Russian Government Supports Tax Breaks for Arctic Investments", *High North News*, 19 February 2020.

[73] O. Mordyushenko, "Rossiya mozhet torgovat' vozdukhom, ochishchennym ot CO2" ("Russia can sell CO2-free air"), *Kommersant*, 24 November 2020.

[74] European Commission, Joint Statement between the European Commission

China remains a major importer of Russian oil and gas, but also has the goal to achieve carbon neutrality by 2060. The global transition to renewable energy and internal pressure from climate scientists and select governmental groups have prompted Russia's energy giants to promote LNG and explore the development of renewables such as green and blue hydrogen.[75] Hydrogen production is expected to mostly derive from natural gas as well as nuclear and wind sources in the Murmansk region.[76] Russia is also establishing wind energy farms in the Murmansk region.[77] The Snowflake International Arctic Station, powered by hydrogen, is expected to be a hub for research into best practices and technologies to provide Arctic industries with renewable energy.[78] Russia's nuclear power agency Rosatom, which holds operational and development responsibility over the NSR, promotes the sustainability of atomic energy and has constructed the world's first floating nuclear power plant in the Arctic port town of Pevek.[79] The NSR is a shipping lane along the Russian Arctic coastline.

Finally, climate change is also affecting Russia's interests and policies in other Arctic resources such as fisheries and minerals. Commercial fishing is banned across most of the Arctic, but sanctions imposed on Russia and migration of fish and crab stocks due to ocean warming are inducing Russia to explore

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and the United States on European Energy Security, Brussels, 2022.

[75] K. Westphal and Y. Zabanova, *Russia in the Global Hydrogen Race*, Stiftung Wissenschaft und Politik, 2021; Government of Russia, Ob utverzhdenii Kontseptsii razvitiya vodorodnoy energetiki v Rossiyskoy Federatsii (On Approval of the Concept for the Development of Hydrogen Energy in the Russian Federation), Decree of the Government of the Russian Federation, 2021.

[76] A. Dmitrieva and R. Griffin, "Insight from Moscow: Russia aiming to take major role in global hydrogen markets", *S&P Global*, 1 March 2022.

[77] C. Digges, *Russia's largest wind park opens near Murmansk*, Bellona, 2019.

[78] Arctic Council, *The Snowflake International Arctic Station – A hub for energy innovation and cultural exchange*, 2020.

[79] Rosatom, *World's only floating nuclear power plant enters full commercial exploitation*, Rosenergoatom Communications Department, 2020.

fishing in its Arctic territories.[80] The Russian Arctic contains vast deposits of minerals, leading Russia to extract more rare metals and commodities than any other Arctic country. There are noteworthy projects in Norilsk (copper, nickel and platinum), Yakutia and Arkhangelsk (diamonds), and Chukotka (gold).[81] The degradation of permafrost and growth in industrial mining have increased pollution and the need for environmental protection in the Russian Arctic.

Arctic Shipping and Transport

Climate change is transforming the Arctic Ocean into a navigable sea, but this process is not without challenges. The changing ice conditions play a key role in the development of the Northern Sea Route, perhaps Russia's most ambitious Arctic project. The 5,500 kilometre-long NSR, consisting of dozens of straits from the Kara Sea to the Bering Strait, has served as a significant shipping lane along Russia's Arctic coastline since the late XIX century. Back then, navigating the length of the route took more than a year due to seasonal ice conditions. It was not until the construction of the first icebreaker vessel in 1932 that it was possible to traverse the NSR without long pauses.[82] Year-round navigation of the NSR began in 1978.

Moscow therefore regards the NSR as a historically established national transport passage under its exclusive jurisdiction. The UN Convention on the Law of the Sea (UNCLOS), particularly Article 234 concerning ice-covered areas in countries' EEZs, supports Russia's sovereign claim over the NSR.[83] However, as

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[80] K. Uryupova, *Perspectives of the Development of the Fisheries Sector in the Russian Arctic*, The Arctic Institute, 2021.

[81] Arctic Russia, *Not only gas: gold, diamonds and metals in the Arctic*, Investment Portal of the Arctic Zone of the Russian Federation, 2020.

[82] Universal Marine Company Arctic (UMCA), *Istoriya osvoyeniya Severnogo morskogo puti (SMP)* (*History of the Northern Sea Route (NSR) development – JSC*), 2022.

[83] P. Gudev, "The Northern Sea Route: Problems of National Status Legitimization Under International Law", *Arctic and North*, vol. 40, 2020, pp. 142-64.

the ice melts, some speculate that Russia's claim to the NSR may be at risk. Accordingly, scholars from the Higher School of Economics have called for "an expanded interpretation" of Article 234 under the auspices of the AC because of the fragility of the Arctic ecosystems.[84] However, other analysts have suggested that there may be no need for such a revision as the transpolar sea route through the Central Arctic Ocean is predicted to eventually replace the NSR with the advent of an iceless Arctic by 2050.[85]

Today, the NSR is mostly used to transport hydrocarbons sourced from the Arctic by companies such as Norilsk Nickel, Gazprom, Lukoil and Rosneft. With the establishment of the Yamal gas projects in 2017, the NSR has been largely used to transport LNG to East Asia.[86] However, there are more European shipping companies than Asian companies operating vessels on the NSR, contrary to media reports that claim otherwise.[87] Development of the NSR is a major objective in Russia's Arctic policy, as evidenced by the goal to transport 80 million tons of cargo along the NSR by 2024.[88] Russia's Basic Principles policy document highlighted the development

[84] A.B. Likhacheva, I.A. Stepanov, D.V. Suslov et al., *Russian Policy in the Arctic: International Aspects*, Report of the HSE University, Higher School of Economics, National Research University, XXII April International Academic Conference on Economic and Social Development, Moscow, 2021.

[85] T.C. Stevenson, J. Davies, H.P. Huntington, and W. Sheard, "An examination of trans-Arctic vessel routing in the Central Arctic Ocean", *Marine Policy*, vol. 100, 2019, pp. 83-89; A. Vylegzhanin, I. Bunik, E. Torkunova, and E. Kienko, "Navigation in the Northern Sea Route: interaction of Russian and international applicable law", *The Polar Journal*, vol. 10, no. 2, 2020, pp. 285-302.

[86] M. Gutenev, "Northern Sea Route in Arctic Policy of Russia", *World Economy and International Relations*, vol. 63, 2019.

[87] B. Gunnarsson, "Recent ship traffic and developing shipping trends on the Northern Sea Route - Policy implications for future arctic shipping", *Marine Policy*, vol. 124, no. 104369. 2021.

[88] President of Russia, O natsional'nykh tselyakh i strategicheskikh zadachakh razvitiya Rossiyskoy Federatsii na period do 2024 goda (On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024), Official Website, The Kremlin, 2018.

of the NSR into a "globally competitive national transport corridor".[89] The NSR has gained international interest as an alternative shipping route between the markets of East Asia and Western Europe. In the aftermath of the 2021 blockage of the Suez Canal route, Russian officials and international analysts hailed the NSR, highlighting the Arctic route's shorter distance and therefore lower fuel costs.[90] China has likewise published plans to integrate shipping along the Russian Arctic coast into the "Polar Silk Road", as part of the Belt and Road Initiative.[91]

However, the diminishing ice along Russia's Arctic coast may also present challenges to northern shipping. Floating ice floes or ice drift remain considerable dangers to ships' hulls. Vessels must adapt their route to avoid the risk of getting stuck or struck by ice. Sea ice may be thinner and younger, but it will also move faster with unpredictable movements.[92] Lack of infrastructure along the NSR, changing meteorological conditions and remoteness remain challenges to operating in the Russian Arctic. For this reason, Russia is building its fleet of powerful next-generation icebreakers and developing a comprehensive monitoring system with special "Arctic-M" satellites to track ice movement and weather conditions.[93] Rosatom operates the NSR and manages the fleet of icebreakers. Despite the melting

[89] President of Russia, Prezident utverdil Osnovy gosudarstvennoy politiki v Arktike..., cit.

[90] J. Cordell, "Could Russia Benefit From the Suez Canal Blockage?", *The Moscow Times*, 26 March 2021.

[91] State Council of the People's Republic of China, *China's Arctic Policy*, 2018.

[92] L. Fedi, O. Faury, and L. Etienne, "Mapping and analysis of maritime accidents in the Russian Arctic through the lens of the Polar Code and POLARIS system", *Marine Policy*, vol. 118, no. 103984, 2020; F. Lasserre and P.L. Têtu, *Transportation in the melting Arctic: contrasting views of shipping and railway development*, Cahiers de l'Institut IEDS, 2020.

[93] Government of Russia, Ob utverzhdenii gosudarstvennoy programmy "Razvitiye sudostroyeniya na 2013-2030 gody" (On approval of the state program "Development of Shipbuilding for 2013-2030"), Ministry of Industry and Trade, 2012; "Northern Sea Route online: How satellites monitor navigation", *TASS*, 31 March 2021.

ice, most vessels traversing the NSR still require icebreaker escorts.

Beyond Arctic shipping, climate change is impacting land-based transport routes in the Russian North. The structural integrity of infrastructure, including roads, pipelines and railways, are disrupted by degrading permafrost. Several Arctic land transport projects to connect Russian ports to Russian cities, such as the Northern Latitudinal Railway (NLR), the Belkomur Railway and the Murmansk Transport Hub, are in development, but the effects of climate change make them more expensive and difficult to implement.[94]

Conclusion

Climate change has had varied effects on Russia's policies and interests in the Arctic, with the most pronounced effect found in Russia's plans for economic growth. The consequences of climate change are becoming the cause of natural disasters, permafrost degradation and a shifting land and seascape. Local residents and Indigenous peoples' livelihoods and well-being have been impacted by such consequences. As a result, climate change adaptation is a noticeable part of Russia's Arctic policy. Despite the dramatic changes, the region will still be regarded by Moscow as a strategic resource base for hydrocarbon development and shipping along the NSR. Coastal development will continue to be prioritised.

Russia's oil and gas policies will likely remain in place, but there is a chance they will be affected by external forces, such as the global transition towards green energy and sanctions on Russia. These factors could have a deep impact on Russia's Arctic development at the international level. In the aftermath of the 2014 Ukraine crisis, Russia invited non-Arctic countries, such as China and India, to participate in joint projects

[94] Roscongress, *Rogozin: "Northern Latitudinal Railway and Belkomur are extremely important projects for Russia"*, The Arctic – Territory of Dialogue, 2017.

following the withdrawal of Western companies' investment.[95] The new sanctions in 2022 may have a similar effect. The Russia-China joint statement issued in February 2022 declared that "friendship between the two States has no limits" and affirmed the continuation of "consistently intensifying practical cooperation for the sustainable development of the Arctic".[96]

[95] P. Devyatkin, "Russia and India set to Deepen Trade and Investment in Arctic Energy", *High North News*, 4 September 2019.

[96] President of Russia, Joint Statement of the Russian Federation and the People's Republic of China on the International Relations Entering a New Era and the Global Sustainable Development, Official Website, The Kremlin, 2022.

5. Environmental Challenges and Opportunities Posed by the BRI in Central Asia

Aliya Tskhay

The Belt and Road Initiative (BRI), launched by President Xi Jinping in 2013, is a global vision of interconnections, revived historical trade routes and an infrastructure programme that spans continents. The BRI is also a massive investment programme with various financial tools used to propel the prospective projects, with spending estimated at $4 trillion. In this, Central Asia holds a particularly central place, being situated at the core of the China-Europe and China-South Asia routes. Moreover, the strategic importance of China for Central Asian states is ever increasing, thanks to the BRI and its investment and economic opportunities. The overall value of BRI projects in Central Asia is estimated at $41 billion, however, the exact figure is hard to assess due to the different stages of project development.[1]

As the BRI is progressing in many regions in the world, it is important to pay attention to the environmental challenges posed by the proliferation of infrastructure projects. If one looks at the main sectors covered by BRI projects, they include transport links, energy, trade, manufacturing and other projects, most of which are very carbon-intensive, and as such pose a challenge in the transition to net-zero targets.

[1] T. Kenderdine and N. Yau, "China's Policy Banks Are Lending Differently, Not Less", *The Diplomat*, 12 December 2020.

This chapter provides an overview of the environmental challenges and opportunities posed by the BRI in Central Asia. It aims to serve as conversation opener and an invitation for more in-depth research on the topic. The chapter begins with a short description of the BRI in Central Asia, its main projects and national peculiarities. It then discusses four major environmental challenges: energy and fossil fuel extraction, critical resources mining, construction pollution and transport pollution. The chapter also discusses potential opportunities that the BRI framework can facilitate, such as projects on renewable energy, waste management and green investments.

How can we define environmental challenge? Due to the limited nature of this research, in this chapter, I will only focus on a number of issues related to climate change and the environment – CO2 emissions from fossil fuel extraction and combustion and air pollution from infrastructure projects. Yet, one should also look into water and land pollution, as well as industrial waste recycling. It is noteworthy, that the environmental challenges are not restricted to Central Asia, but involve China as well. Thus, for instance, the hydrocarbons extracted from Central Asia are then used as fuels for combustion in China, hence, increasing emissions there.

There are methodological and data limitations in the research on the BRI and the environment in Central Asia. These limitations are due to the lack of reliable data and limited access to major contracts and agreements. In addition, some of the financial information on particular projects is not publicly available. Similar limitations apply to information on emissions and pollution. Thus, the chapter makes generic observations and comments, while a more complete quantitative analysis would require thorough data gathering and fieldwork.

Another important reason to look at the environmental challenges and opportunities brought by the BRI in Central Asia is also to assess how the situation can change under China's net-zero target to be reached by 2060. This strategy would mean a significant reduction of carbon emissions and a large-scale

energy transition. China has already stopped financing new overseas coal projects.[2]

BRI and Central Asia

Before proceeding to the discussion of environmental challenges, it is useful to have a solid understanding of how Central Asian states are involved in the BRI. First, the level of involvement in terms of number of projects and investment amounts differ state-by-state, with Kazakhstan as the largest recipient and partner.[3] However, Uzbekistan has been increasing its engagement in recent years with the economic reopening under President Mirziyoyev. Second, bilateral projects are predominantly preferred over multilateral ones. Third, not all of China's activities in Central Asia fall under the BRI framework, and some continue its long history of economic cooperation with regional states.

The BRI projects in Central Asia, as in other regions of the world, are utilised for political and strategic purposes by China and local governments. Thus, the projects fulfil China's strategic needs for resources, such as oil and gas, and help to sustain its economy by providing work opportunities for Chinese companies.[4] In Central Asia, the BRI allows the improvement of infrastructure, the building of new transport and trade links and manufacturing facilities, and the promotion of domestic economic development. China has been criticised for the heavy investment in and development of the fossil fuel sectors in the BRI host countries.[5]

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[2] Z. Ma, "China Committed to Phase Out Overseas Coal Investment. New Database Tracks Progress", *World resource Institute*, February 2022.

[3] F. Aminjonov et al., "BRI in Central Asia: Overview of Chinese Projects", *Central Asia Regional Data Review*, vol. 20, 2019, pp. 1-5.

[4] A. Tskhay, *China and Geoeconomic Dynamics in Central Asia: Balancing Global Strategies, Local Interests and Multiple Partners*, FIIA Geoeconomics Series, Working paper 126, October 2021.

[5] Q. Geng, "The Belt and Road Initiative and Its Implications for Global Renewable Energy Development", *Current Sustainable/Renewable Energy Reports*,

For example, if one looks at the state loans to the energy sector: in 2014-2017, 43% went to oil, gas and petrochemicals; 18% to coal; and only 3.4% to solar and 2.9% to wind.[6] At the same time, some studies indicate that China is investing more in green projects than it did before the launch of the BRI.[7]

The implementation of green projects within the framework of the BRI has been a major topic, especially with the intensified climate change debate and related activism. The Chinese government has also announced its plans to reach net-zero emissions by 2060, which would significantly change the country's energy requirements. Incorporating environmental components into BRI projects appears in the official discourse. Thus, in 2017 the Chinese government published a set of guidelines on promoting a Green Belt and Road.[8] These guidelines set out the framework for environmental cooperation and building more sustainable projects along the routes of the BRI.

Central Asia is a strategically important region in the Belt and Road framework not only due to its closeness to China, but also for the economic and political opportunities the region represents for Beijing. Yet, it would be misleading to characterise the relationship between China and Central Asian states as one-sided. Central Asia is one of the regions with the highest investment needs in road and energy infrastructure, at 7.8% of GDP according to the Asian Development Bank.[9] Therefore, the BRI partially meets these needs and serves as a tool for economic growth and domestic development programmes.[10]

The core goal of the BRI is to improve connectivity and infrastructure along land and maritime routes. The BRI spans

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vol. 8, no. 1, 2021, pp. 40-49.

[6] H. Chen, "Greener Power Projects for the Belt & Road Initiative (BRI)", *NRDC*, 2019.

[7] H. Liu et al., "How Green Is the 'Belt and Road Initiative'? – Evidence from Chinese OFDI in the Energy Sector", *Energy Policy*, vol. 145, 2020, pp. 1-12.

[8] Belt and Road Portal, *Guidance on Promoting Green Belt and Road*, May 2017.

[9] OECD, *China's Belt and Road Initiative in the Global Trade, Investment and Finance Landscape*, 2018, p. 6.

[10] A. Tskhay (2021).

across continents and has a truly global reach. Central Asia, thus, lies at the crossroads of Europe and South Asia and plays a pivotal role. As China operates through loans, investments and joint ventures in the region, it also adheres to the requirements of local governments in terms of the nature of the projects it conducts. At the same time, profitability and serving strategic interests are also part of Beijing's calculations for launching a particular project. Therefore, when we examine the nature of the projects in the next section, it will be evident that some less environmentally-friendly industries are prevalent.

Environmental Challenges

The BRI presents economic opportunities but also brings with it various environmental challenges to the Central Asia region, which hosts a number of world cultural heritage sites as well as natural reserves, and is home to several rare and endangered species of flora and fauna.[11] The impact on the natural world is often dismissed in the official political discourse of Central Asian states and China, however, this is where the danger lies. The more infrastructure projects, especially transport links, expand into the natural habitat of animals and plants, the more likely we will see the impact on animal migration patterns and biodiversity in the region.[12]

Although, the impact on flora and fauna is certainly noteworthy, the focus of this chapter will be on the projects and their impact on greenhouse gas emissions in the region, and on exploring the "green" investment opportunities in the region. The following section will look in detail at the sectors that the BRI is promoting in Central Asia.

[11] Zoï Environment Network, "Greening the Belt and Road Projects in Central Asia", September 2019, p. 10.

[12] G. Sciorati, *On the Practice Of China's Green BRI in Central Asia*, ISPI Commentary, ISPI, 14 April 2021.

Energy and fossil fuel extraction

Energy is one of the main areas of cooperation between China and Central Asia. Indeed, for China, this resource-rich neighbouring region is a source of stable supply of fossil fuels that are necessary to maintain its impressive economic growth. China's investment in energy infrastructure and extraction in Central Asia is a matter of national interest and importance. Accordingly, energy relations developed from the early 2000s, with initial involvements in oil and gas extraction and imports in the region.[13] Since then, China has expanded its cooperation and financed the construction of energy infrastructure, such as pipelines to facilitate direct supply of oil and gas.

China has made significant investments in the hydrocarbons sector in Central Asia both within the framework of the BRI and on the basis of bilateral agreements. It is important to note that China allocated $41 billion to mineral and hydrocarbon extraction for the period 2008 to 2023.[14] China is among the top export destinations for Central Asian oil and gas. In the case of Turkmenistan, China is the main gas export destination and, hence, this cooperation has a major impact on the country's economy.[15]

What are the environmental implications of oil and gas extraction? First, emissions from fossil fuel extraction contribute to the overall national CO2 emissions of Central Asian states,

[13] N. Yau, "Tracing the Chinese Footprints in Kazakhstan's Oil and Gas Industry", *The Diplomat*, 12 December 2020; N. Kassenova, "China's Silk Road and Kazakhstan's Bright Path: Linking Dreams of Prosperity", *Asia Policy*, vol. 24, no. 1, 2017, pp. 110-16.

[14] F. Aminjonov et al., "BRI in Central Asia: Mineral and Petroleum Exploration, Extraction and Processing Projects", *Central Asia Regional Data Review*, vol. 23, 2019, pp. 1-13.

[15] Wilson, quoted in R. Vakulchuk and I. Overland, "China's Belt and Road Initiative through the Lens of Central Asia", in F. Cheungand and Y. Hong (Eds.), *Regional Connection under the Belt and Road Initiative. The Prospects for Economic and Financial Cooperation*, Abingdon, Routledge, 2016, pp. 115-33 (p. 119); S. Pirani, "Central Asian Gas : Prospects for the 2020s", OIES Paper, Oxford Institute for Energy Studies, vol. 155, December 2019.

especially Kazakhstan, Turkmenistan and Uzbekistan. In 2019, total emissions in the region amounted to 710.5 million tons of CO2e, of which 80% came from energy production and consumption.[16] Methane emissions are also linked to oil and gas extraction since methane is 80 times more harmful than CO2 for the climate. Hydrocarbon production and export is particularly problematic in Central Asia due to its methane leakage issue. Thus, for example the International Energy Agency put Turkmenistan's methane emissions just below those of other major oil and gas producers like Russia, the US, Iran and Iraq in 2020.[17] Turkmenistan was responsible for 31 out the 50 most severe methane releases at onshore oil and gas operations in 2019.[18]

According to the CADGAT database, there are 47 projects, planned and underway, in the mineral and petroleum exploration, extraction and processing area.[19] The majority of the projects are concentrated in Kazakhstan. However, one important project within the BRI framework is the expansion of the Central Asia-China gas pipeline. The pipeline is already a significant regional energy project that crosses the borders of all five states and supplies China with natural gas originating in Turkmenistan. The extension of this pipeline, called Line D, will bring the total amount of natural gas exports to 85 million cubic meters, the largest gas transmission system in the region.[20] Thus, the expansion of oil and gas production to supply it to China will result in an increase in emissions that will have a negative impact on climate change in the region and globally.

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[16] United Nations Framework Convention on Climate Change (UNFCCC), "REdiCAP Regional Dialogues on Carbon Pricing: Central Asia 2 Report from the Regional Dialogue on Carbon Pricing (REdiCAP) in Central Asia", 2021.

[17] International Energy Agency (IEA), *Methane Tracker 2021*, 2021.

[18] A. Clark and M. Campbell, "Methane Gas Leaks in Central Asia Worsen Climate Change Crisis", Bloomberg, 19 October 2021.

[19] F. Aminjonov et al. (2019), vol. 23.

[20] China National Petroleum Corporation (CNPC), *Flow of Natural Gas from Central Asia*, 2021.

The energy sector includes not only oil and gas, but also coal and power generation facilities. The CADGAT database lists China's involvement in the coal mining and infrastructure modernisation projects in Central Asia.[21] Modernisation of heat and power facilities in Kyrgyzstan does not result in improving its emission levels, as the power plants still use fossil fuels (coal or gas) as their main energy source.[22]

Critical minerals

Another area of cooperation between China and Central Asian states with potential environmental impacts is in mining of critical minerals and rare earth metals. These resources are essential in supporting the renewable energy sector and electric vehicles, as well as batteries. Thus, the mining of rare earth metals and minerals would be required to intensify the spread of renewable energy in the region and the world in general.[23] Central Asia has the potential to provide such resources not only to China, but also beyond, especially if it wants to substitute its reliance on fossil fuel exports.[24]

China already dominates the renewable energy market, not only though its technological advantage in solar power,[25] but also by controlling major supplies of rare earth metals and minerals.[26] By mining domestically and also in major resource-rich suppliers abroad, combined with its production

[21] F. Aminjonov et al., "BRI in Central Asia: Energy Connectivity Projects", *Central Asia Regional Data Review*, vol. 22, 2019, pp. 1-14.

[22] International Energy Agency (IEA), *Kyrgyzstan Energy Profile*, Analysis, April 2020.

[23] International Energy Agency (IEA), *The Role of Critical Minerals in Clean Energy Transitions*, May 2021.

[24] R. Vakulchuk and I. Overland, "Central Asia Is a Missing Link in Analyses of Critical Materials for the Global Clean Energy Transition", *One Earth*, vol. 4, no. 12, 2021, pp. 1678-92 (p. 1678).

[25] S. Ladislaw and N. Tsafos, "Beijing Is Winning the Race to Build - and Sell - Clean Energy Technology", *Foreign Policy*, 2 October 2020.

[26] F. Chang, *China's Rare Earth Metals Consolidation and Market Power - Foreign Policy Research Institute*, Foreign Policy Research Institute, 2 March 2022.

of lithium-ion batteries and other spare parts for the renewable energy, China has a considerable lead in this sector over other countries.

In order to discuss cooperation in the supply of critical materials from Central Asia to China within the framework of the BRI, one should also pay attention to previous bilateral trade patterns. Central Asian countries already produce and export some critical metals, such as zinc, copper, lead and molybdenum, all of which are used in the production of solar and wind power technologies. Thus, Kazakhstan, for example, has been a growing supplier of zinc and nickel to China.[27] In 2019, 37% of Tajikistan's total exports were critical materials, and China owns the majority of licences for mining with eight companies operating in the country.[28]

Kyrgyzstan and Uzbekistan can also become potential suppliers to China. Through the BRI framework China established an additional avenue for collaboration with Central Asian states. Thus, it is not unrealistic to think that with the growing need for critical materials and increase in the implementation of renewable energy strategies, the Central Asia region can provide resources. The issue then remains that the region is further exacerbating its resource dependence and does not invest in industrial production.[29] However, with the opportunities for renewable energy in Central Asia, China can also explore investments in technology application in the region.

Transport pollution

Perhaps the key sector for the BRI is transport and logistics, and in Central Asia it is the most transformative sector. The region is notoriously vast and with poor transport connections that hinder economic activities. The investments that come through the BRI and bilateral projects with China focus on the

[27] R. Vakulchuk and I. Overland (2021), p. 1684.
[28] Ibid.
[29] Ibid., p. 1689.

construction of new roads and upgrading existing ones. There are 51 planned and executed projects in this sector across all five countries.[30]

The routes will form part of the New Silk Road linking China with Europe and South Asia and serve as facilitators of trade. With the huge trading zone built for the purpose of freight logistics, such as the one in Khorgos, the Central Asia region is expected to see an increase in the transit of Chinese goods towards Europe and South Asia.[31] This also facilitates the trade of goods from Central Asia to China, increasing yearly the number of trains going in that direction.[32] However, with the increased rail and lorry traffic, emissions levels also go up, further contributing to air pollution in the region. Thus, for example, Tajikistan and Uzbekistan already have the highest exposure to PM2.5 annually,[33] in the Europe and Central Asia region.[34]

Wider geopolitical implications

The above discussion of energy relations between Central Asian states and China should be also considered within the context of the global energy situation. The Covid-19 pandemic had a tremendous impact on the economic outlook and rate of recovery in China and the world. In addition, Russia's invasion of Ukraine in February 2022 further rattled global energy markets.[35] This certainly has implications for the energy prospects of Central Asian states. First, the Russia-China energy

[30] F. Aminjonov et al., "BRI in Central Asia: Rail and Road Connectivity Projects Background and Data Collection", *Central Asia Regional Data Review*, vol. 21, 2019, pp. 1-18.

[31] R. Vakulchuk and I. Overland (2016).

[32] M. van Leijen, Kazakhstan Moves More Cargo by Rail to China in 2018, *RailFreight.com*, 11 February 2019.

[33] PM2.5 are fine particles from emissions that cause major health problems upon constant exposure.

[34] UNDP in Europe and Central Asia, *Tackling Air Pollution in Europe and Central Asia*, 2021, p. 9.

[35] B. Fattouh, A. Economou, and A. Mehdi, *Russia-Ukraine Crisis: Implications for Global Oil Markets*, Oxford Institute for Energy Studies (OIES), March 2022.

relationship is being realigned due to the Western sanctions imposed on Russia.[36] This has resulted in new gas agreements between these states, but also involves enhanced transit of Russian gas through Kazakhstan.[37] Second, high oil prices will slow down economic growth and, hence, result in lower hydrocarbon imports by China, including from Central Asia. Third, in the present situation China is becoming even more important as a strategic partner and energy export destination, as transit of resources through Russia could be curbed due to current/future sanctions. Therefore, the situation with any planned pipeline projects in Central Asia and energy exports to China is certainly precarious and will depend on the global economic and geopolitical outlook. This, in turn, will certainly affect the region's economic growth and its emissions levels.

Opportunities

As discussed in the previous section, China's leadership in renewable energy technology can also provide a foundation for cooperation in this sector with Central Asian states. This is a promising field of collaboration, as it fits in with the regional commitment to curb carbon emissions and improve its infrastructure to align with global environmental standards. For China it presents another investment opportunity that can also support Chinese companies.

Renewable energy

Central Asian states have enormous potential for developing renewable energy on their territory. This has been demonstrated through scientific articles and by the regional states' official commitments and policies to install renewable energy

[36] M. Meidan, *The Russian Invasion of Ukraine and China's Energy Markets*, Oxford Institute for Energy Studies (OIES), March 2022.

[37] V. Yermakov and M. Meidan, *Russia and China Expand Their Gas Deal: Key Implications*, Oxford Institute for Energy Studies (OIES), March 2022.

technologies.[38] The region has good prospects for wind and solar power, as well as hydropower, especially in Kyrgyzstan and Tajikistan. In addition, differences in technology implementation are also combined with the different financial and political resource capabilities of each state. Thus, each state has its own national path for energy transition. In the cases of Kazakhstan and Uzbekistan, the initial steps for the transition are set for the period to 2030.[39] Kazakhstan's government aims to produce 50% of electricity from renewable energy sources by 2050, which is a significant increase from the currently produced 10.4%. Uzbek authorities have a similar trajectory, with the goal of generating 25% of electricity from renewable sources by 2030. This means not only that the potential to explore the opportunities for renewable energy exists, but also that regional states would require more investments and technology in order to reach their national goals.

If one looks at wind power potential, Central Asia has certain advantages, with the potential capacity of wind power to exceed hydropower and solar power potential.[40] However, the installation of wind power is very limited in the region, with the exception of Kazakhstan, which is increasing the number of projects in this area. In southern Kazakhstan, for instance, China is nearing completion of the biggest solar power plant in Central Asia to date, with 100 MW capacity.[41] It is a flagship project within the framework of China-Kazakhstan power capacity cooperation and is funded by multiple financial institutions. In Uzbekistan, the Chinese company "Xian Electric Engineering" has built a pilot windmill project in the Tashkent region with capacity of 750 kW.[42]

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[38] B. Eshchanov et al., "Renewable Energy Policies of the Central Asian Countries", *Central Asia Regional Data Review*, vol. 16, 2019, pp. 1-4.

[39] International Energy Agency (IEA), *Kazakhstan Energy Profile*, 2020; *Dentons*, "Transition of the Republic of Uzbekistan to a Green Economy", 30 October 2019.

[40] B. Eshchanov et al., "Wind Power Potential of the Central Asian Countries", *Central Asia Regional Data Review*, vol. 17, 2019, pp. 1-7.

[41] *Xinhuanet*, "Feature: Central Asia's Largest Wind Farm Built by Chinese Firm to Power 1 Mln Kazakh Homes", 12 June 2021.

[42] B. Eshchanov et al. (2019), vol. 17.

In addition to collaboration through the Asian Infrastructure Bank, which was designed to support financially the BRI and its members, China also collaborates with other development and financial institutions. The EBRD is one of the key partners that supports renewable energy projects in Central Asia through various programmes, such as the Green Climate Fund. These collaborations are driving the implementation of projects for the construction of two solar plants in Kazakhstan, which will help reduce CO2 emissions by 55,000 tonnes and 31,650 tonnes per year respectively.[43]

Green bonds

Chinese investments within the framework of the BRI can also be used as part of green financing. With the green agenda also in the mind of the Chinese authorities, and with implementation of the Guidance on Promoting Green Belt and Road Initiative, the use of green financial instruments can also play a significant role.[44] In the first half of 2021, the China Development Bank issued $3.1 billion of green bonds.[45] Central Asian states are also exploring financial instruments to facilitate the development of green projects and the transition to a green economy. For instance, Kazakhstan, through its Astana International Financial Centre, has developed the necessary infrastructure, legislative base and instruments to utilise green financing. It can thus incentivise BRI projects to fit in with the green agenda.[46]

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[43] A. Usov and M. Rozanova, *EBRD Supports China's Risen Energy Expansion in Kazakhstan*, European Bank for Reconstruction and Development (EBRD), 6 June 2018; A. Usov, *EBRD and Green Climate Fund Provide US$ 16.7 Million to Finance Solar Power Plant in Kazakhstan*, European Bank for Reconstruction and Development (EBRD), 26 April 2019.

[44] Belt and Road Portal (2017).

[45] World Economic Forum (WEF), "Advancing the Green Development of the Belt and Road Initiative: Harnessing Finance and Technology to Scale Up Low-Carbon Infrastructure", January 2022, p. 21.

[46] "Access to Capital: Green Projects from Kazakhstan Deserve Attention from China", *Global Times*, 21 July 2021.

Conclusion

This chapter has explored the environmental challenges and opportunities arising from the development of the BRI in Central Asia. As the region is situated at the heart of the BRI, this cooperation is important from an economic and political point of view. However, the majority of BRI projects in Central Asia will inadvertently contribute to increasing carbon emissions in the region. The development of further mining, exploration, and the export of minerals and hydrocarbons will contribute to increased CO2 and methane emissions. Transportation links through railways and roads will facilitate the trade of goods, but also result in increased traffic of lorries and trains that use petroleum-based fuels which are harmful to the environment.

At the same time, China and Central Asian states are also exploring opportunities in green projects. Thus, cooperation in renewable energy is developing, with China constructing wind and solar power plants. This area can prove to be a solution to emission problems and contribute to the achievement of national environmental commitments within the Paris Agreement. Chinese and Central Asian state authorities are working on financial instruments to facilitate green bonds issuance that can feed into the development of green projects in the region.

It is important to note that the environmental challenges posed by such a massive infrastructure programme as BRI are a threat to the indigenous flora and fauna. Central Asia is home to rare species, whose habitat can be disturbed if it is not taken into consideration at the project planning and project execution stages. With a deteriorating global climate change situation, and the region's special vulnerability to it, paying attention not only to the economic advantages of collaboration with China but also to its environmental impact is crucial.

6. Desertification of the Aral and the Caspian Seas: Patterns and Political Implications

Stefanos Xenarios, Jessica Neafie

The desertification of dryland areas has been aggravated by global environmental changes. The occurrence of more frequent and more intense droughts, as described in the latest report of the Intergovernmental Panel on Climate Change (IPCC),[1] will further exacerbate desertification, mainly in arid and semi-arid regions. Central Asia hosts extensive dryland areas where water mismanagement, land degradation and climate change have induced a threatening desertification process. Two of the most extensive inland water systems in the world, situated in Central Asia, the Caspian Sea, and the Aral Sea, face significant challenges due to lower precipitation and increased water recession in the last few years.

On the Caspian Sea, climate change plays a significant role in the desertification of the coastal regions. This area is historically focused on free-ranged livestock, but the oil boom has increased the industrial sector and the population, putting further strain on limited water resources. Poor water management is apparent in these semi-desert regions, where a natural shortage of drinking water resources is complicated by

[1] V. Masson-Delmotte et al. (Eds.), *The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Intergovernmental Panel on Climate Change (IPCC) Cambridge University Press, 2021.

a lack of research and development in water supply systems. Poorly designed management approaches have lacked the water quality requirements and stakeholder involvement necessary to address the problems in these regions. Current policy focuses on solving water shortages through large scale desalination and water diversion projects.

In the Aral Sea basin, the transboundary complexities of Central Asia, coupled with excessive agricultural water consumption due to poorly managed irrigation systems, is accelerating desertification. The Aral Sea disaster caused by the diversion of the Syr Darya and Amu Darya rivers – the primary water supply to the Aral – for agricultural purposes increased desertification in a vast area of Central Asia. Central Asian countries also have an unachievable expectation of rehabilitating farming to the volume and extent of the Soviet era, when they supplied many others of the Soviet republics.

These over-ambitious aspirations put further strain on irrigation and livestock water use by increasing the chances of water scarcity and desertification. There are already recorded migration trends from agriculture-dependent regions in Central Asia to large commercial centres due to the consecutive droughts in the region over the last few years. This study reviews the desertification conditions in Central Asia, focusing on the Aral and Caspian Sea water bodies and the stressors that may aggravate the process and identifying the socio-economic and political implications for the entire region.

Central Asian Landscape, Water Use and Livelihoods

Global environmental changes have affected socio-ecological norms worldwide, with significant impacts on human welfare. There is sound evidence that climate change increases the frequency and intensity of extreme weather, causing insurmountable damage to livelihoods and the natural

environment.[2] Weather extremes are bound to be exacerbated by several other factors like poor management and scarcity of natural resources, inadequate technical infrastructure, and lack of preparedness and awareness for such events. Water resources are among the most vulnerable systems and have already been decimated by human intervention; climate change will cause further disturbance to hydrological cycles, especially in freshwater systems.[3]

Central Asia (CA) is a region where water management systems have been heavily regulated since Soviet times, initially to irrigate "white gold", as the cotton crop was euphemistically named, and later for hydropower and food supply purposes.[4] Primary attention was given to engineering surface water management infrastructure for irrigated cotton production in downstream republics and partially for water storage and hydropower generation in upstream republics. The two major river basins of the Aral Sea – the Amu Darya and the Syr Darya – which pass through all present-day Central Asian countries, were heavily exploited in the Soviet era, resulting in the drying up of the Aral Sea.

Climate change has since led to land desertification issues in the Aral Sea basin and the regions around the Caspian Sea. Central Asia is already sensitive to desertification due to natural drought conditions and salinisation. These drought conditions are driven by increased evapotranspiration in these regions and reduced precipitation, which has led to a negative water balance.[5] Desertification has been linked to both climate change

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[2] V. Masson-Delmotte et al. (Eds.) (2021).

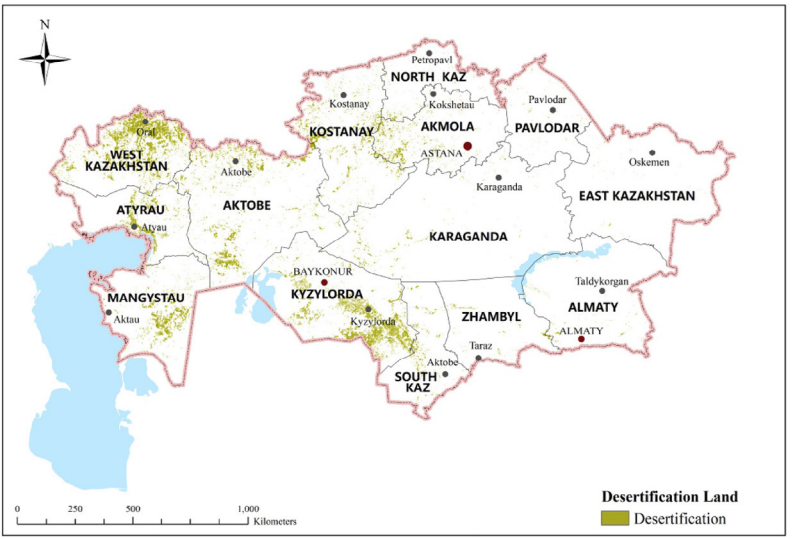
[3] J. Cisneros et al., "Freshwater resources", in C.B. Field et al. (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, United Kingdom and New York, pp. 229-69.

[4] S. Xenarios et al., "A bibliometric review of the water security concept in Central Asia", *Environmental Research Letters*, vol. 16, no. 1, 2020.

[5] H. Guo et al., "Spatial and temporal characteristics of droughts in Central Asia during 1966-2015", *Science of the Total Environment*, vol. 624, 2018, pp. 1523-38.

and anthropogenic actions that have increased sensitivity to desertification and loss of vegetation throughout these regions. For example, in Kazakhstan, from 2000 to 2015, desertification was found in seven of the fourteen regions around the Aral Sea and Caspian Sea basins, see Figure 6.1.[6] Desertification issues have been present since the time of the USSR due to poor land management, which has led to soil degradation, increased salinisation and dust storms.[7] After the disintegration of the USSR, the effects of climate change and socio-economic impacts have continued to intensify desertification.

Fig. 6.1 - Land desertification in Kazakhstan from 2000 to 2015



Source: Y. Hu, Y. Han, and Y. Zhang, "Land desertification and its influencing factors in Kazakhstan", *Journal of Arid Environments*, no. 180, 2020.

[6] Y. Hu, Y. Han, and Y. Zhang, "Land desertification and its influencing factors in Kazakhstan", *Journal of Arid Environments*, no. 180, 2020.

[7] R. Kraemer et al., "Long-term agricultural land-cover change and potential for cropland expansion in the former Virgin Lands area of Kazakhstan, *Environmental Research Letters*, vol. 10, no. 5, 2015.

The aggravation of climate change and weather extremes is bound to affect human livelihoods worldwide, especially among the weaker segments of society. Farming communities, especially subsistence farmers in CA, have already encountered significant challenges in their harvest and direct impacts on their livelihoods due to weather extremes. In the current study, we focus on the region surrounding the Aral and Caspian regions, where desertification has badly affected local communities.

Historical Background of Water Management in the Aral Sea Region

The Aral Sea region has undergone major socio-ecological transformations from early historical times until today. These can be divided into three distinct periods: a) early historical times until the 1930s, b) the massive agricultural industrialisation known as the "hydraulic mission" in the Soviet period from the early 1930s until the late 1980s, and c) the years of independence of the CA states, with different water priorities.[8] The first period, up to 1930, was characterised by small-scale and subsistence farming, administered mainly by local chieftains. After the invasion of the Russian empire and colonisation of the Aral Sea region in the mid-1880s, land and water administration remained almost unchanged until the early XX century, when newly irrigated lands were created for cotton plantations, mainly in the Ferghana Valley, between the countries of Uzbekistan, Kyrgyzstan, and Tajikistan. There was also a significant influx of Slavic peoples and other ethnicities from the Russian empire into the Aral region to participate in these irrigation projects, gradually changing the composition of the local population.

[8] I. Abdullaev, K. Wegerich, and J. Kazbekov, "History of Water Management in the Aral Sea Basin", in S. Xenarios et al. (Eds.), *The Aral Sea Basin: Water for sustainable development in Central Asia*, Routledge, 2019, pp. 8-24.

The most fundamental changes in water management in the Aral region occurred between 1930 and 1980 when enormous agricultural engineering interventions supported massive farming collectivisation. As Abdullaev et al. note, "Large scale water development projects, which often diverted water resources away from the river through large scale canals or pump stations… have totally changed both landscape and social fabric of the communities".[9] From 1939 to 1989, the area irrigated increased about fourfold from 1.8 million to 7.8 million hectares, with unprecedented consequences for water balance in the Aral Sea. Also, a water-energy nexus was established under which hydropower reservoirs in water-abundant upstream republics (Tajikistan and Kyrgyzstan) released water in the cultivation period for downstream riparian republics (Uzbekistan, Kazakhstan, Turkmenistan) in exchange for the provision of fossil fuels and staples in winter.

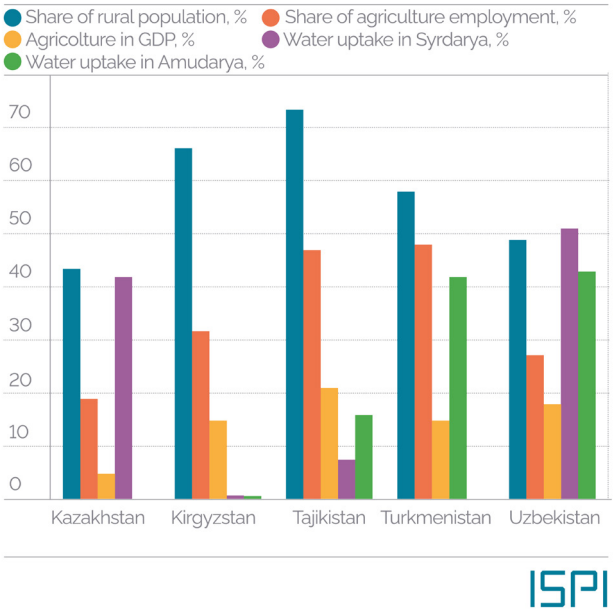
After the dissolution of the Soviet Union, different national priorities emerged for the water supplying the Aral region. Institutional reforms, driven mainly by foreign donor agencies, introduced Water User Associations and River Basin Management principles.[10] The interstate water-energy nexus was abandoned as each CA country prioritised its own energy and agricultural concerns. The water-rich upstream countries were interested in expanding hydropower energy by retaining water in reservoirs during the summer period. In contrast, the energy-rich downstream countries desperately needed water for irrigation in the dry season and requested releases from the upstream countries from late spring to early autumn. Kazakhstan and Uzbekistan are the downstream countries in the Aral region most affected by droughts and sandstorm incidents. However, because of its standing as the breadbasket of CA and its greater proximity to the Syr Darya and its tributaries, Uzbekistan

[9] I. Abdullaev, K. Wegerich, and J. Kazbekov (2019), pp. 8-24.

[10] R. Shenhav, S. Xenarios and D. Domullodzhanov, *The Role of Water User Associations in Improving the Water for Energy Nexus in Tajikistan*, OSCE Programme Office in Tajikistan, 2019.

exerted a higher leverage and was allocated the highest amount of water from the Syr Darya among all other CA countries. The water uptake for each CA country, the agricultural income in terms of GDP and the share of agricultural employment are presented in Figure 6.2 according to estimations for 2010 to 2017. Significant friction has occurred due to differing national water security priorities, while regional disputes on water allocation have been ongoing until today.[11]

FIG. 6.2 - AGRICULTURAL INCOME, EMPLOYMENT, AND WATER UPTAKE IN CA COUNTRIES



Source: AGRIWANET project database (2017), https://data.gesis.org/sharing/#!Detail/10.7802/2008

[11] A. Assubayeva, "Experts' Perceptions of Water Security in Central Asia: results from a Delphi study", *Central Asian Journal of Water Research*, vol. 7, no. 1, 2021, pp. 50-69.

Desertification Stressors in the Aral Sea Region

The Aral Sea region is highly susceptible to weather extremes due to divergent climate characteristics in the upstream and downstream areas. The mean annual temperatures in the Aral Basin vary greatly from below zero degrees in the Pamir mountains in the southeast to above fifteen degrees in the arid regions between Uzbekistan and Turkmenistan.

Although far away from the Aral Sea, the Pamir and Tian Shan mountains are considered the "water towers"[12] of CA as they provide water to the Amu Darya and Syr Darya rivers and their tributaries. Peak water discharges into the Amu Darya and the Syr Darya have historically occurred in the spring and summer seasons due to ice and snow melting in the Pamir and Tien Shan mountains. However, climate change has begun to reduce the ice accumulation in these mountain ranges, and the snow and ice melting period beginning in early spring is causing a reduction in the water discharged into the wider Aral Basin over the summer period.

The upstream countries have become quite concerned about the lower water volumes received during the summer period. Their concerns have been echoed in mounting pressure to retain more water upstream for hydropower and agricultural purposes.[13] The need for water retention upstream has exerted pressure on the intensive agriculture areas of Uzbekistan and south Kazakhstan downstream. Due to decreasing river flows, both Uzbekistan and Kazakhstan are currently exploring water management alternatives, such as groundwater reserves and the construction of water reservoirs to capture water runoffs from the hydropower releases upstream in the winter period.

[12] S. Manandhar, S. Xenarios et al., *Climate Vulnerability and Adaptive Capacity of Mountain Societies in Central Asia*, Research Report 1, Mountain Societies Research Institute, University of Central Asia, Bishkek, Kyrgyzstan, 2018.

[13] S. Xenarios, M. Laldjebaev, and R. Shenhav, "Agricultural Water and Energy Management in Tajikistan: a New Opportunity", *International Journal of Water Resources Development*, 2021.

Recurrent droughts in the period 2017-22 have accentuated a grim situation for the upstream and downstream agricultural regions. Recent conflicts between the Kyrgyz and Tajik borderline communities have been recorded, with fatalities occurring over access to water reservoirs and infrastructure.[14] The lack of border delimitation in some of these areas and the existence of border enclaves in both countries further strains water access challenges. Kazakhstan and Uzbekistan have experienced grave water scarcity problems in the summer and are struggling to make bilateral agreements with upstream countries for more water releases.[15] However, Kyrgyzstan and Tajikistan have protested about scarce water supply for livestock and crops and favouritism in the priorities of the countries downstream. Drought conditions in the Aral region have also had a significant impact on the overall food security of the CA region.

Droughts in the Aral region are predicted to become more intense and frequent. The average annual air temperature across Kazakhstan from 1976 to 2020 has increased at 0.32°C every ten years,[16] with higher variations in the southern provinces. Also, desertification and soil degradation in the former Aral seabed has increased the frequency of the dust storms known as "dry cyclones" in the region. A dust storm in Uzbekistan's capital, Tashkent, in November 2021, was the worst since meteorological records began in 1870; this illustrates the severe impact of droughts on agricultural and urban areas alike.[17] The recurrence of droughts in the southern regions of Kazakhstan, shown in Figure 6.3, is influencing migration patterns in Kazakhstan.[18]

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[14] "Cease-Fire Halts Deadly Clashes Along Kyrgyz-Tajik Border", *Radio Free Europe*, 28 January 2022.

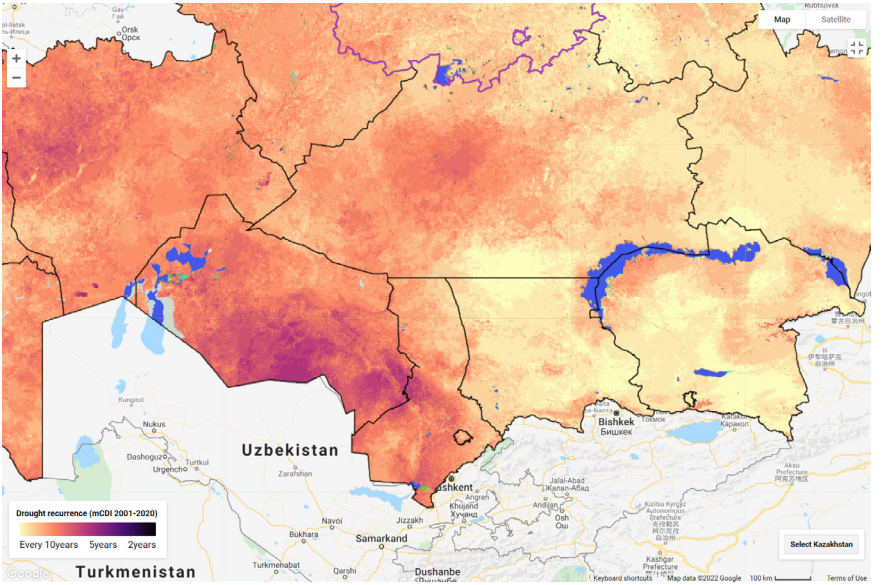
[15] "Water Under the Bridge? Kyrgyzstan's Liquid Transfer to Kazakhstan Causes Controversy Amid Major Shortages", *Radio Free Europe*, 11 December 2021.

[16] "Kazakhstan annual climate monitoring bulletin, Nur-Sultan", *Kazhydormet*, 2020.

[17] "Severe dust storm engulfs Uzbekistan", *Eurasianet*, 5 November 2021.

[18] V. Clement et al., *Groundswell Part 2: Acting on Internal Climate Migration*,

Fig. 6.3 - Drought recurrence in the south of Kazakhstan



Source: Adapted from Food and Agriculture Organization of the United Nations (FAO), Kazakhstan, 2019.

The worsening of climate change and weather extremes is bound to affect human livelihoods worldwide, especially in the weaker segments of society. Farming communities, especially subsistence farmers, have already encountered significant challenges in their harvests and seen direct impacts on their livelihoods due to weather extremes. There is sound evidence that subsistence farming communities, labour farmers, and even wealthier individuals may now be willing to migrate to other areas to improve their livelihoods.

Washington, DC, The World Bank, 2021.

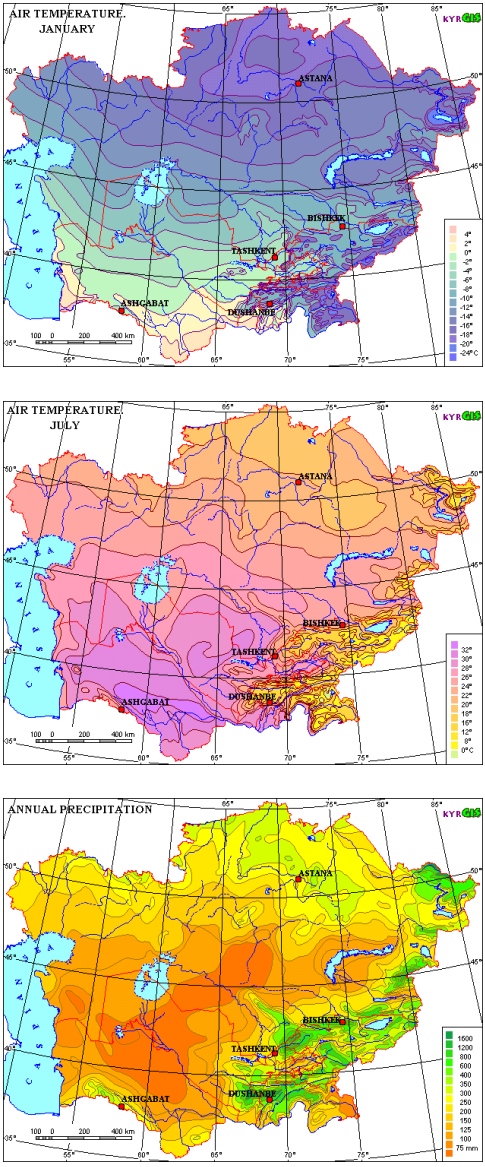
Desertification Stressors in the Caspian Sea Region

The Caspian Sea basin has become more important in recent history, with new opportunities to exploit its geopolitical location and natural resources. As with the Aral Sea, desertification and water issues on the Caspian Sea can be imagined across three periods, starting with livestock farming before the mid-XX century, followed by the discovery of hydrocarbons and the exploitation of agriculture and oil by the USSR, and lastly, in modern times, the period of economic reliance of the independent governments on hydrocarbon extraction for development.

The CA coastlines of the Caspian are arid steppe in the north (Atyrau, Kazakhstan) and arid desert in the south (Mangystau, Kazakhstan into Turkmenistan), with little surface water, elevated soil salinity, and high sensitivity to desertification. According to IPCC models,[19] temperature and precipitation predictions mean desertification and drought conditions will intensify along the Caspian coastline, as seen in figure 6.4. Desertification in the Caspian Sea basin is mainly linked to climate change in Kazakhstan and Turkmenistan, driven by pronounced warming and drying trends.

[19] O. Chepelianskaia, *Kazakhstan - Climate Change and Disaster Risk Profile*, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), 2021.

Fig. 6.4 - Annual temperature (January and July) and annual precipitation in Kazakhstan



Source: CAWaterinfo, *Aral Sea*.

Kazakhstan and Turkmenistan are two of the most water-scarce states in the CA region and are afflicted by water resources that are unevenly distributed across surface water and groundwater supplies. Groundwater is unevenly distributed and in small supply in the Caspian-bordering regions. In Kazakhstan, the western states have less than 20% of total groundwater resources.[20] Surface water is similarly distributed and is dependent on precipitation and upstream inflows dictated by seasonal fluctuations but affected by climate change as well as anthropogenic behaviours, such as dams, water extraction and diversion. One of the biggest concerns of climate change is that evaporation will increase as temperatures increase along the Caspian coastline and further reduce surface water.

The subsoil in the Caspian basin is largely salinised, and salinity is one of the main drivers of land degradation. About 70% of Kazakhstan is covered in salinised soil. These conditions are most widespread in the arid and semi-arid areas, but they also exist in the more humid parts of the country. Salinisation is particularly prevalent where there is poor drainage or in the presence of seawater ingress in coastal regions.[21] While salinised soils do occur naturally, anthropogenic stress can increase the degradation caused by them. For example, when the USSR collapsed, farmers were left mainly without collectives and knowledge about dealing with saline water resources. Groundwater extraction intensified as farmers tried to counter the salinised soil, resulting in an increased use of saline water and leading to further degradation of farmlands.[22]

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[20] Republic of Kazakhstan, *National report on the transition of the Republic of Kazakhstan to a "Green Economy" for 2017 - 2019*, 2020.

[21] G. Issanova, A. Saduakhas, J. Abuduwaili, K. Tynybayeva, and S. Tanirbergenov, "Desertification and Land Degradation in Kazakhstan", *Bulletin of the National Academy of the Republic of Kazakhstan*, vol. 5, no. 387, 2020, pp. 95-102.

[22] E. Strikeleva, I. Abdullaev, and T. Reznikova, "Influence of Land and Water Rights on Land Degradation in Central Asia", *Water*, vol. 10, no. 1242, 2018.

Caspian Water Challenges

The Caspian Sea is a fragile ecosystem, and the onshore hydrocarbon fields and industry developed under the USSR caused severe environmental damage that has been amplified by ongoing climate change and anthropogenic activities in the region. The Caspian Sea is the largest inland water body in the world and operates as a transport route for goods. It is also home to many endemic species, including seals, Caspian turtles, and beluga sturgeon. Desertification caused by climate change along the Caspian coastlines is just one of the water problems faced in the Caspian basin, where pollution, salination, and sea-level change are putting further pressure on the ecosystem and could affect the economy moving forward.

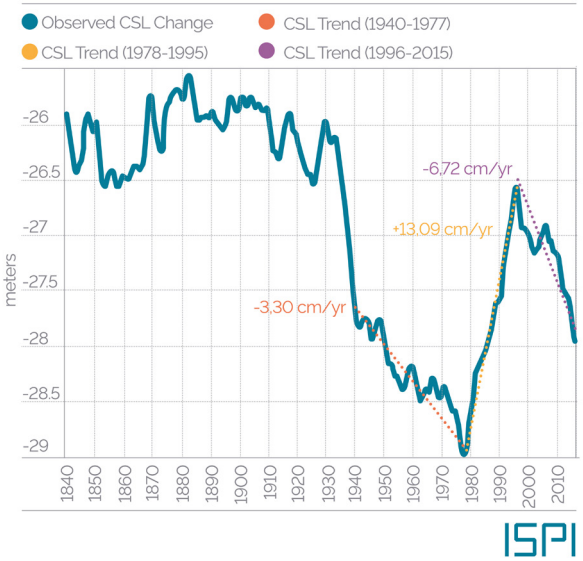
The decline of the water resources in the Caspian Sea may become as devastating as that of the Aral Sea as the surface is dropping about 7cm every year, as shown in Figure 6.5. As temperatures continue to rise in the region, climate change can damage economic development and physical infrastructure by impacting the local ecosystem and increasing limits on the size and capacity of ships exporting goods across the sea.

Moreover, drinking water has been an ongoing issue on the CA coastlines of the Caspian. While household water only accounts for about 4 to 6 % of total water withdrawn per year, a large amount of water is lost through transport and outdated water treatment infrastructure.[23] Water resources are low in the Ural-Caspian basin, and the growing urban populations are putting more pressure on these limited resources. To supplement a lack of surface water in these arid regions, three alternative sources supplement urban water needs: desalination, groundwater, and water conduits to carry water from other regions. Estimates of water resources and population growth in the region estimate a deficit of 14 billion m3 by 2030.[24]

[23] Republic of Kazakhstan (2020).

[24] *Transition to a "Green Economy" in Kazakhstan*, 2013, pp. 52.

Fig. 6.5 - Observed Caspian Sea level change, 1840-2015



Source: J. Chen et al., "Long-term Caspian Sea level change", *Geophysical Research Letters*, vol. 44, 2017.

Population growth will demand more resources, including drinking water.

The Oil and Gas Situation and Water Use

The subsoil of the Caspian Sea is rich in hydrocarbon reserves and contains some of the largest oil discoveries in recent history, including the Karachaganak, Tengiz, and Kashagan fields in Kazakhstan. The disintegration of the USSR led to a decline in trade and growing instability in the region, impacting the ability of countries to diversify, and making them increasingly reliant on the hydrocarbon markets. Hydrocarbon extraction impacts the environment and water in three main ways that can increase desertification and decrease water access. First,

hydrocarbon extraction is a source of greenhouse gases, and therefore accelerates the temperature and precipitation changes that are driving desertification.

Second, hydrocarbon extraction can also accelerate soil erosion and contamination. Soil erosion is widespread in the Caspian Sea basin and indeed occurs naturally, but anthropogenic behaviours increase pressure on the arid lands along the Caspian coastline. The building and exploitation of oil wells contributes to soil erosion and soil contamination. In western Kazakhstan, these activities can degrade soil cover by 80%, intensify soil erosion, and introduce new chemicals that can have long-term environmental ramifications.[25] Soil erosion also contributes to desertification and can hasten the loss of vegetation in a region. In areas like western Kazakhstan, it can be accelerated by strong winds, leading to more frequent and more intense dust storms.

Finally, hydrocarbon extraction can have a negative effect on water resources. Hydrocarbon extraction is the largest water user along the CA Caspian coastlines and is a significant polluter of water sources with industrial wastewater. The primary use of water in the oil and gas industry is as industrial water during extraction and accounts for around 20% of Kazakhstan's total water consumption. In the water-poor Ural-Caspian basin, the extractive industries are major consumers of water, particularly surface and groundwater resources. The oil fields around the Caspian have the most significant groundwater intake in Kazakhstan. However, surface water sources, like the Ural River, make up around 90% of the total industrial water supply, while the other 10% comprises groundwater and desalinated water.[26] The consumption of water by the hydrocarbon industry is not

[25] T. Alimbaev et al., "Ecology of the Western region in Kazakhstan: state and main directions of improvement", *Web of Conferences*, no. 217, 2020.

[26] S. Osipov, A. Yermenbai, A. Akylbekova, Y. Livinsky, and O. Anarbekov, "The Negative Impact of Anthropogenic Factors on the State of Groundwater of Kazakhstan", *News of the National Academy of the Republic of Kazakhstan*, vol. 2, no. 440, 2020, pp. 132-40.

insignificant but is nevertheless much less than that of the poorly irrigated agriculture sectors; in Mangystau, West Kazakhstan and Atyrau, it accounts for less than 5% of water usage.[27]

Hydrocarbon extraction also creates a large amount of wastewater that pollutes scarce water resources. Since the USSR era, wastewater pollution from hydrocarbon extraction has been a problem along the Caspian Sea. As wastewater is dumped into the water cycle, it becomes increasingly difficult for the state to provide clean drinking water. Wastewater is one of the main causes of groundwater pollution. One of the problems facing Kazakhstan is the discharge of wastewaters containing pollutants in excessive concentrations, contaminating an already scarce resource.[28]

Transboundary Aspects in the Caspian Sea Region

In this region, transboundary issues have only developed since independence. Under the USSR, the Soviet Union controlled the Caspian Sea, sharing it only with Iran. After independence, many countries began to identify their natural resources and consider their own national interests. As the primary oil producer in the region, Kazakhstan has focused its national interests on developing alternative export routes since oil exports have been directed through pipelines in Russia. At the same time, Turkmenistan has dealt with ongoing disputes over boundaries with Kazakhstan and Iran and has an interest in a natural gas pipeline to Azerbaijan.[29]

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[27] L. Nugtumanova, M. Frey, N. Yemlina, and S. Yugay, *Environmental problems and policies in Kazakhstan: Air pollution, waste and water*, Leibniz-Institut fur Ost-und Sudosteuropaforschung, IOS Working Paper, no. 36.

[28] I. Radelyuk, K. Tussupova, K. Zhapargazinova, M. Yelubay, and M. Persson, "Pitfalls of Wastewater Treatment in Oil Refinery: Enterprises in Kazakhstan - A System Approach", *Sustainability*, 2019.

[29] Z. Ayupova and D. Kusainov, "Some Questions of Kazakhstan's Diplomacy in Water Areas of the Caspian Sea", *News of the National Academy of the Republic of Kazakhstan*, vol. 6, no. 328, 2019; W. Sanchez, "A Rising Global Player:

Despite disparate national interests, since the early 1990s, the independent nations have expressed their willingness to cooperate over environmental issues in the region and sought financial and technical aid from the international community to solve them. The first agreement, the Tehran Convention signed in 2003, was a regional, legally binding document seeking to protect the marine ecosystem. Environmental cooperation has also led to agreements regarding biodiversity, pollution from oil and land-based activities, and environmental impact assessments.[30] However, negotiations of the protocols regarding pollution and hydrocarbon extraction, have stalled.[31] None of the states around the Caspian Sea wants to take responsibility for the degradation of water quality or natural resources and, as a result, the environment continues to deteriorate. Nevertheless, international environmental cooperation has led to more opportunities for international financial and technological help and encouraged an interconnectedness among Caspian states that has spilled over into the areas of security and economics.

Attempts to institute Integrated Water Resource Management (IWRM) in the Caspian Sea region have not been successful. In theory, the coastline states have recognised the concept since 1992, but the prioritisation of hydrocarbons to promote economic welfare and the lack of regional cooperation due to opposing national interests have caused the states to fail to implement IWRM strategies.

Kazakhstan's Foreign Policy in the 2020s", *Wilson Center: Kennan Cable*, no. 51, May 2020.

[30] A. Bayramov, "The reality of environmental cooperation and the Convention on the Legal Status of the Caspian Sea", *Central Asian Survey*, vol. 39, no. 4, 2020, pp. 500-19.

[31] Z. Akhmadiyeva and I. Abdullaev, "Water management paradigm shifts in the Caspian Sea region: Review and outlook", *Journal of Hydrology*, no. 568, 2019, pp. 997-1006.

Coping with Desertification in the Aral and Caspian Regions

State initiatives have been introduced in Kazakhstan, driven by national and international entities to address drought-related challenges more effectively. Projects targeting water conservation, improved irrigation systems, training in sustainable farming practices, digitising land-use plans, and reorienting farmers to new market practices have been introduced, especially in the southern drought-prone regions. International organisations, mainly the FAO Partnership and Liaison Office in Kazakhstan, have emphasised SDGs related to land use, food security, and sustainable land-use systems in the drought-prone region of Kazakhstan and the Central Asia as a whole. However, there are considerable challenges facing the identification, implementation and measurement of practical policy initiatives.

The desiccation of the Aral Sea and the creation of the desert area (Aralkum) in the former seabed resulted from overexploitation and mismanagement of the two major rivers of the Amu Darya and the Syr Darya for irrigation purposes. The communities residing in the surroundings of the Aral Sea were heavily impacted, with significant repercussions on their health, livelihood, and overall wellbeing. Water stress in the region is perpetuated through the cultivation of water-demanding crops, the low efficiency of irrigation systems and poor water governance. Climate change is a significant aggravating parameter in this worrying situation, as it increases the frequency and intensity of droughts. The transboundary complexities of the river basins in Kazakhstan and in CA in general exacerbate the effects of weather extremes by raising issues of water security in each country.

Developments in the Caspian Sea region are being driven by climate change forces, and if business-as-usual greenhouse gas releases continue, western Kazakhstan and Turkmenistan will face even worse desertification. As climate change affects this

region, temperatures will increase, and precipitation decrease; as a result, drought conditions will occur with higher frequency, contributing to a reduction in vegetation and more recurrent dust storms. The only effective way to counter these effects is to mitigate and manage water resources. Direct strategies related to water resource management and desalination to increase freshwater supplies, combined with livestock management and other indirect strategies, aim to make people less vulnerable to socio-economic change and promote poverty reduction and land rehabilitation plans.

One of the ways western Kazakhstan is dealing with water supply issues is through the desalination of Caspian Sea sources. However, increased desalination must consider environmental impacts and the use of cost-efficient technology. Desalination plants are energy-intensive and will therefore contribute to the climate change that is causing the region's desertification. A way around this is to investigate renewable energy sources to reduce the environmental impacts of desalination. Kazakhstan has been focused on using more renewable energies moving forward, and this must be a priority for the safe and efficient use of desalination.

Hydrocarbon extraction is the leading industry in Kazakhstan, yet in terms of development, it is a much smaller user of water resources than the agricultural sector. The hydrocarbon industry's impact on desertification must be monitored, and more work should be done to monitor the soil erosion and the land and water pollution caused by extractive industries. Continued contamination of land and water is due to the use of unsustainable resources. Adequate monitoring and enforcement mechanisms are currently lacking, and new technologies are the only way to ensure more environmentally friendly results.

Livestock farming is still prevalent in these regions, but a lack of water resources and reduced vegetation is having a negative effect on the ability of small-scale farmers to survive. Supporting the formation and growth of agricultural collectives could be key to establishing sustainable land and water management

practices throughout the Caspian region. A collective approach will allow farmers to share knowledge, significantly benefit the future of farming in the Caspian basin and implement more IWRM approaches in the region. Collectives can also increase farmers' appeal by providing an organised and coordinated route to national and international markets.

Domestic changes alone will be insufficient; work is needed to improve international integrated water resource management in the Caspian Sea. The Caspian Sea plays an essential role in the socio-economic development of western Kazakhstan and Turkmenistan and the decimation of this water resource will impact transport infrastructure, fisheries, and the availability of water for desalination. IWRM needs to be established to protect this vital resource, but international cooperation on IWRM goals will only be possible if environmental protection gets prioritised over economic targets.

The frequency and intensity of droughts in the Aral and Caspian regions are likely to become more pronounced in coming years. The surrounding countries must therefore reinforce their climate adaptation strategies by emphasising agricultural and water supply systems. The desertification trend could be halted and potentially reversed by adopting technological, institutional, and economic measures to enrich the degraded lands. The mobilisation and engagement of local communities in this endeavour is a significant determinant for any effort to confront desertification in the Aral and Caspian region.

Conclusions

Aldo Ferrari, Eleonora Tafuro Ambrosetti

Before Russia's invasion of Ukraine in February 2022, there were high hopes for a more fruitful "green cooperation" between Russia and the EU. Conditions indeed seemed favourable. As more and more states pledged their commitment to carbon neutrality goals, global momentum built: numerous countries demonstrated ambitious targets, especially among the most advanced economies which seemed intent on making the most of the opportunities for growth and innovation linked to carbon-neutral policies. In particular, the EU made the fight against climate change its foreign policy trademark, launching the European Green Deal (EGD) in 2020 and complementing this internal policy with an external action directed primarily at countries such as Belarus, Ukraine, Moldova, Georgia, Armenia, and Azerbaijan. The EU-Eastern Partnership (EaP) Summit in December 2021 marked an important step forward in this direction, officially making the green transition one of Brussels' objectives.[1] Moreover, many in Russia's political and business community had warmed to the idea of closer collaboration with the EU in green energy.

However, Moscow's full-scale attack against Ukraine has changed everything: the possibility of EU-Russian cooperation now looks improbable and global priorities have suddenly shifted, potentially jeopardising the EU's and post-Soviet countries' environmental plans.

[1] K. Pishikova, *Greening the EU Neighbourhood: Climate Policies for the Eastern Partnership in Times of War*, ISPI Analysis, ISPI, 18 May 2022.

For example, Dmitry Trenin, former Director of Moscow Carnegie Centre, eloquently stresses Russia's need to rethink the green deal in light of the dramatic change in the international scenario.

> Now it is necessary to move from retaliatory steps to initiatives that will strengthen Russia's position in the total economic war declared by the West, allowing it to inflict significant damage on the enemy. In this regard, a closer alignment of efforts of the state and the business community's activities is required, as well as implementation of a coordinated policy in such sectors as finance, energy, metallurgy, agriculture, modern technology (especially related to information and communications), transport, logistics, military exports and economic integration – both within the framework of the Eurasian Economic Union and the Union State of Russia and Belarus and taking into account the new realities in the Donbass and the northern Black Sea region. A separate task is to revise the Russian approach and policy position on climate change issues under the changed conditions.[2]

These words – written by a scholar traditionally prone to dialogue with the West but who, in today's situation, seems to shift to a more confrontational attitude – serve as a clear indicator of the radical political change that is taking place before our very eyes. As a matter of fact, the conflict in Ukraine is profoundly transforming the international scenario or accelerating existing political patterns dramatically. This applies in particular to relations between Russia and the West yet also bears important consequences in Asia, where an unfolding domino effect has potentially dramatic – and currently unforeseeable – effects.[3]

However, the war has devastating consequences not only in humanitarian and political terms, but also for the environment. Russian shelling and occupation increase the risk of nuclear

[2] D. Trenin, "How Russia Must Reinvent Itself to Defeat the West's 'Hybrid War'", *Russia in Global Affairs*, 24 May 2022.

[3] F. Fasulo and G. Sciorati (Eds.), *How the Ukraine War Fuels Great Power Competition in Asia*, ISPI Dossier, ISPI, 26 May 2022.

hazards in one of Ukraine's four operational nuclear power plants and toxic waste emissions from industrial facilities, particularly in heavily industrialised eastern Ukraine.[4] Initial estimates (May 2022) by the Ukrainian Ministry of the Environment on the war's environmental damage stand at $5.8 billion.[5] While existing legal protections need to be updated and strengthened, environmental destruction is already recognised as a war crime by the International Criminal Court, with a growing number of people calling for the indictment of the Russian leadership over "environmental war crimes".

Given the current situation, concepts like environmental policies in the eastern neighbourhood or EU-Russia "green" cooperation may appear like fiction. However, this very issue could offer an important opportunity for the necessary resumption of political relations with Russia at the end of the conflict. If the Kremlin stops its aggression against Ukraine and some degree of cooperation between Brussels and Moscow resumes, the EU ought to prioritise environmental issues. At the moment, this may be the only possible – and necessary – area for cooperation in light of the shared interests in this field and the transnational nature of the matter.

At the same time, the environmental dimension of EU foreign policy *vis-à-vis* the ex-Soviet space should also be intensified. First and foremost, this applies to policies aimed at the Eastern Partnership countries, many of which are deeply integrated in the EU single market, but also in Central Asia.[6] This is crucial in order not to make the EU's Green Deal and environmental foreign policy yet another casualty of this war.

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[4] Y. Zasiadko, *Polluted to Death: The Untold Environmental Consequences of the Ukraine War*, ISPI Commentary, ISPI, 29 May 2022.

[5] Ibid.

[6] See E. Tafuro Ambrosetti, "The 'Climate Dimension' of EU Foreign Policy in the Neighbourhood", Valdai Discussion Club, 17 December 2020; K. Pishikova (2022).

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