

*Non multa, sed multum*

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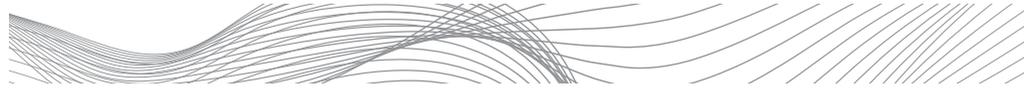
Global Edition

**Alexander Kolbin**

## Way Out of the Arms Control Pandemic



MOSCOW, 2022



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This research paper attempts to place nuclear disarmament and arms control in the context of the sustainable development agenda. In particular, the paper examines the possibility of applying the experience and specific mechanisms of the 1997 Kyoto Protocol to create new incentives for nuclear arms control and disarmament. Considering the devastating environmental consequences of nuclear weapons use, the nuclear-weapon states should take responsibility for possessing nuclear weapons just as they took responsibility for carbon emissions.

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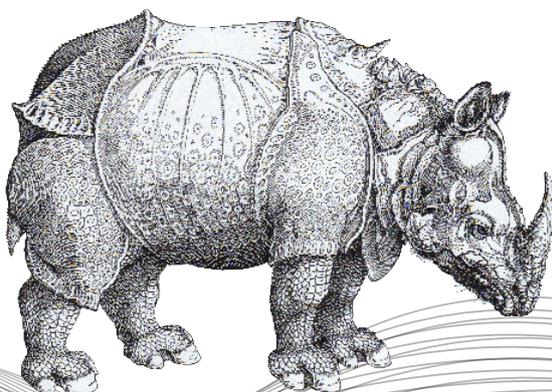
### Alexander KOLBIN

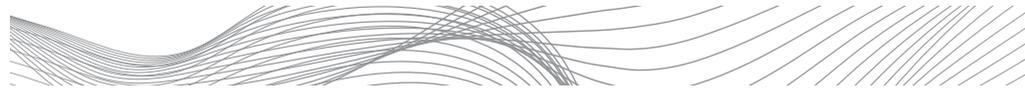
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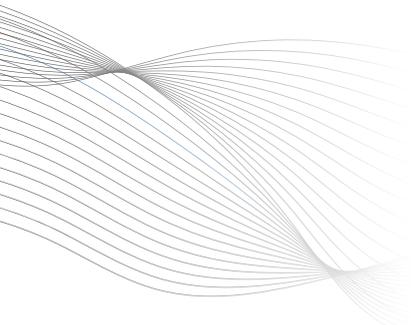
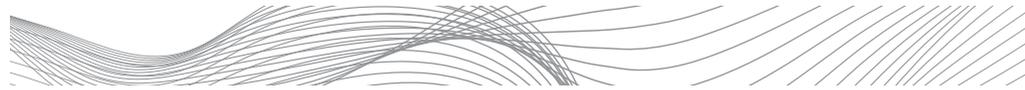


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## Highlights

- Just as in the case of SALT I, which prompted critics to argue that it fueled the nuclear arms race between the USSR and the US, New START without the ABM and INF Treaties is already fueling the new nuclear arms race between Russia and the US.
- In summer 2021, Russia and the US, despite geopolitical disagreements, continued to discuss green agenda, including long-term strategies under the Paris Agreement, and implementation of joint climate projects.
- For many decades, scientists have been assessing the environmental consequences of nuclear weapons use. The topics of climate action and sustainable development received a new impetus in 2020 because of the COVID-19 pandemic.
- What happened in Europe in February 2022 serves as a novel threat multiplier, urging us to generate new ideas and create new infrastructure for defeating *the nuclear arms control pandemic*. Those ideas may include possible consideration of environmental responsibility, nuclear safety and nuclear security matters in one complex solution.
- The Kyoto Protocol can help find the appropriate mechanisms for taking environmental responsibility for possessing nuclear weapons.



Alexander Kolbin

# Way Out of the Arms Control Pandemic

The topics of climate action and sustainable development received a new impetus in 2020 because of the COVID-19 pandemic and took a central place in discussions on global economy and international security. Governments, corporations, and individuals began to pay more attention to the importance of protecting the environment than ever before. At the same time, all those good intentions and initiatives can be nullified in a matter of seconds by only one event – a regional or global nuclear war, which, as the scientific consensus demonstrates, would have a multidimensional negative impact on the environment. Nuclear risks are acknowledged to have increased dramatically since February 2022.

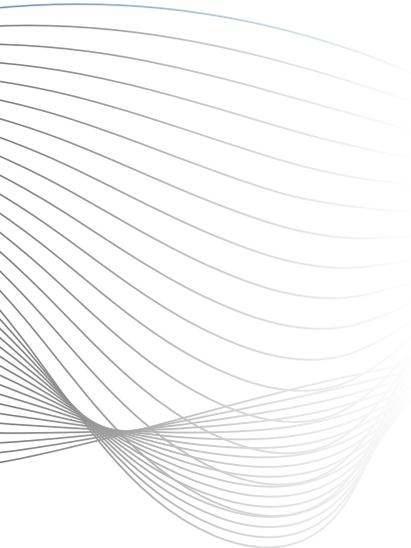
## NUCLEAR ARMS CONTROL PANDEMIC

The World Bank's COVID-19: *The Great Reset* report published at the height of the coronavirus pandemic in 2020 invited the world leaders, corporations, and local communities to consider this unprecedented healthcare crisis as an opportunity to rethink the fundamentals of societies we live in. The idea was that everything – from global sustainability efforts to our private workplace – can undergo positive changes that benefit humanity when the world proceeds to recovery.

“We are at a crossroads,” the authors of the report argued. “One path will take us to a better world: more inclusive, more equitable and more respectful of Mother Nature. The other will take us to a world that resembles the one we just left behind – but worse and constantly dogged by nasty surprises. We must therefore get it right. The looming challenges could be more consequential than we have until now chosen to imagine, but our capacity to reset could also be greater than we had previously dared to hope.”<sup>1</sup>

Those who authored the World Bank's report in 2020 could hardly foresee the scale and source of global challenges the planet would face two years later. Since February 2022, the focus of attention has clearly shifted from the health and environmental crises towards military security risks (primarily in Europe) that serve as a novel threat multiplier, leading to supply chain disruptions, food and energy insecurity, etc. More importantly, military threats are universal per

<sup>1</sup>Klaus Schwab and Thierry Malleret, COVID-19: *The Great Reset* (World Economic Forum Publishing, 2020), p. 3.



se, as the risk of nuclear war visibly diminishes prospects for peace and global development due to the destructive potential of nuclear weapons. As the world is sliding into unrestricted confrontation, humanity is now at another crossroads. It can either agree on novel arms control arrangements or sacrifice everything it has for political expediency.

Just as the world came unprepared for the COVID-19 pandemic, today's unprecedented geopolitical crisis is marked by the same unpreparedness challenge in controlling the deadliest weapons that have ever existed on Earth. Numerous warnings from arms control experts about the inevitable consequences of successive withdrawal of Russia and the United States from agreements fundamental to strategic stability and international security were ignored the same way as numerous warnings about the impending pandemic. Ironically, China, as in the case with COVID-19, has, in a sense, become one of the culprits for the current lockdown in nuclear arms control. China's refusal (albeit predictable) to join the bilateral nuclear agenda between the United States and Russia served as one of the formal reasons<sup>2</sup> why the previous US administration did not want to talk with Russia about nuclear arms control substantively.

Most nuclear arms control agreements – from the 1972 Anti-Ballistic Missile (ABM) Treaty and the 1987 Intermediate-Range Nuclear Forces (INF) Treaty to the 2000 Plutonium Management and Disposition Agreement and the 1992 Open Skies Treaty – have fallen victim to the ongoing nuclear arms control pandemic. The February 2021 New START extension (done at the very last moment) looks more like a quarantine measure designed to protect the remnants of what we still have.

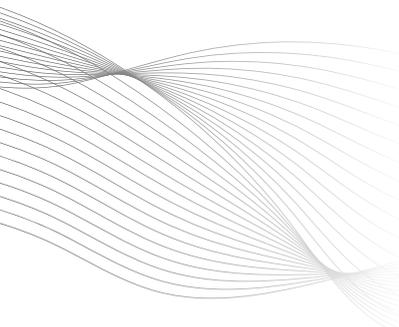
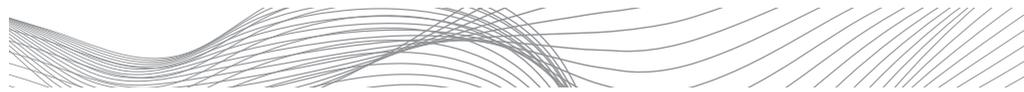
What will happen next? To paraphrase the authors of the World Bank report, will we build a world that is more respectful of Father Arms Control, or will we return to a world that resembles the one we just left behind – “but worse and constantly dogged by nasty surprises” (in the form of new uncontrolled nuclear weapon systems, nuclear terrorism, or the spillover of Russia-US crises into multilateral institutions, such as the IAEA or other multilateral non-proliferation mechanisms)?

The first road is, of course, preferable. However, as in the case of COVID, the situation is dangerous. With the ongoing conflict in Ukraine and only New START Treaty on hand, extended for five years, we are essentially left in a SALT I (the 1972 Interim Agreement on Strategic Offensive Weapons) situation without an ABM Treaty – when an imperfect agreement allows both parties to continue modernizing and developing new types of warheads and delivery systems. Just as in the case of SALT I, which failed to ban or restrict Multiple Independent Reentry Vehicles (MIRVs) and thus prompted



Just as the world came unprepared for the COVID-19 pandemic, today's unprecedented geopolitical crisis is marked by the same unpreparedness challenge in controlling the deadliest weapons that have ever existed on Earth

<sup>2</sup> Jonathan Landay, “Pompeo tells Russia's Lavrov any new arms control talks must include China,” *Reuters*, April 17, 2020. URL: <https://www.reuters.com/article/us-usa-russia-armscontrol-idUSKBN21Z2P9>.



critics to argue that SALT I fueled the nuclear arms race between the USSR and the US,<sup>3</sup> New START without the ABM and INF Treaties is already fueling the new nuclear arms race between Russia and the United States. For instance, the Treaty does not cover the newest Russian Burevestnik cruise missile and Poseidon unmanned underwater vehicles. The most advanced Avangard system, about which Russian Deputy Foreign Minister Sergei Ryabkov stated that “the counting rules within the framework of [New START] will, of

course, apply to such new warheads as *Avangard*,<sup>4</sup> was created by Russia on the treaty’s watch and Russia can freely deploy it on missiles within the Treaty’s ceilings. The same is valid for the newest weapon systems that are being developed by the United States.<sup>5</sup>

In this context of the nuclear arms control pandemic, when nothing is left except New START, the Treaty risks turning into a document of indefinite extension (as happened with the Non-Proliferation Treaty in 1995) – freezing the ceilings convenient for both parties for years to come without any additional obligations. However, just like COVID-19, the crisis in nuclear arms control can quickly



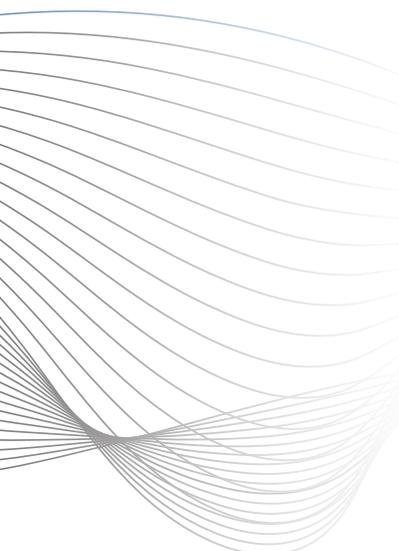
Sergei Ryabkov, Russian Deputy Foreign Minister, at the PIR Center XXI International School on Global Security, June 22, 2022

Source: [www.pircenter.org](http://www.pircenter.org)

spread to other countries. After all, why should other nuclear *haves* think of controlling their arsenals if the two largest nuclear powers have so easily parted with everything created by themselves in previous decades?

Good news is that we have enough time until 2026 to generate new ideas and create infrastructure for defeating the nuclear arms control pandemic.

This work will not be easy. It will most likely have to start from scratch in some crucial areas of nuclear arms control – from new technologies and verification methods to the inclusion of new security threats affecting strategic stability in the agenda. The years to come, just like the initial period of the bygone era of bipolar confrontation, may well present us with several bold and high-profile initiatives in the field of arms control, both from governments and academia. Some nations may come up with proposals for complete and universal disarmament, like those voiced in 1955-1962 from the rostrum of the United Nations General Assembly (including analogues of joint propaganda statements like the 1961 McCloy-Zorin Accords), or about the reincarnation of the 2008 Global Zero initiative launched when the first signs of the arms control



<sup>3</sup> Stephan Kieninger, “Diverting the Arms Race into the Permitted Channels,” *Wilson Center, NPIHP Working Paper #9*, November 2016. URL: <https://www.wilsoncenter.org/publication/diverting-the-arms-race-the-permitted-channels>.

<sup>4</sup> Mark Episkopos, “Russia Confirm Avangard Missile System Falls Under New START,” *National Interest*, January 27, 2021. URL: <https://nationalinterest.org/blog/buzz/russia-confirm-avangard-missile-system-falls-under-new-start-177181>.

<sup>5</sup> Sebastien Roblin, “The Pentagon Plans to Deploy An Arsenal Of Hypersonic Weapons In The 2020s,” *Forbes*, April 30, 2020. URL: <https://www.forbes.com/sites/sebastien-roblin/2020/04/30/the-pentagons-plans-to-deploy-an-arsenal-of-hypersonic-weapons-in-the-2020s/?sh=3e8216b3a5d7>.

pandemic only appeared.

Then, something more rational will apparently be born out of those good wishes, just like the strategic stability theory in the early 1960s emerged after all those universal disarmament proposals.<sup>6</sup> The priorities of international foundations and national development agencies supporting the international non-proliferation expert community may also change, allowing funding for new global initiatives towards nuclear zero. These proposals could nourish the agenda and give a new *raison d'être* to non-governmental disarmament organizations in all nuclear *haves*.<sup>7</sup>

One of such more rational proposals considered in this paper can be inclusion of the nuclear arms control agenda in a much broader *Green Agenda*, which has received a new impetus in recent years, including due to COVID-19, and which interferes in the increasing number of global economic and political issues in both public and private lives. It seems inevitable that the coming decades will be marked by an intensified combat of the international community against climate change. Meanwhile, all these efforts can go nowhere if only one event occurs – the actual use of nuclear weapons.

### POST-COVID-19 GREEN AGENDA

The *Green Agenda* and post-COVID-19 reality turned out to be closely interconnected. As OECD puts it, “The COVID-19 pandemic has revealed the inter-relationships between the environment and our livelihoods”.<sup>8</sup> Many governments, at least as is evident from the most recent developments, aim to use this pandemic to start their relationships with nature with a clean slate. The main goal of this new rhetoric and action is to combat climate change. It is an international consensus already that climate change and “observed increases in well-mixed greenhouse gas (GHG) concentrations since around 1750 are unequivocally caused by human activities” and that “human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years.”<sup>9</sup> Insurance companies are already recording a steady increase in the number of and economic loss from natural disasters. According to Swiss Re estimates, “global economic losses from natural catastrophe events in 2020 were USD 190 billion. In GDP-normalised terms, losses rose 1.6%

<sup>6</sup> Marc Trachtenberg, “The Past and Future of Arms Control,” *Daedalus*, Vol. 120, No. 1, *Arms Control: Thirty Years On* (Winter, 1991), p.207. URL: <http://www.sscnet.ucla.edu/polisci/faculty/trachtenberg/cv/daedalus.pdf>.

<sup>7</sup> Alexander Kolbin, “How Biden can make Russia’s nuclear policy nonprofits great again,” *Bulletin of the Atomic Scientists*, November 12, 2020. URL: <https://thebulletin.org/2020/11/how-biden-can-make-russias-nuclear-policy-nonprofits-great-again/>.

<sup>8</sup> “Focus on Green Recovery,” OECD *webpage*, accessed on December 12, 2021. URL: <https://www.oecd.org/coronavirus/en/themes/green-recovery>.

<sup>9</sup> “Climate Change 2021: The Physical Science Basis. Summary for Policymakers,” *Intergovernmental Panel on Climate Change Report*, 2021. URL: [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf).

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between 1970-2020 on a 10-year moving average basis.”<sup>10</sup> As Swiss Re puts it, “climate change is a systemic risk for the whole world. Unlike the COVID-19 crisis, it does not have an expiry date.”<sup>11</sup>

To counter the climate threat globally, extraordinary measures have been taken in recent years to reduce carbon dioxide emissions, and governments have gone to previously unimaginable costs and measures to reduce these emissions. The Kyoto Protocol – a milestone in global efforts to combat climate change – was adopted on December 11, 1997. The international community agreed on binding targets and measures for tackling climate change for the first time. In 2015, the Paris Agreement was adopted to keep the average temperature rise on the planet within 1.5°C from the pre-industrial level and to ensure a smooth transition to a low-carbon development model. All countries possessing nuclear weapons, including non-signatories to the NPT, signed the agreement.

Today, carbon emissions are regulated through regional and national quotas and emissions trading systems, carbon taxes, bans on the sale of fossil-fuel cars (which is steadily being introduced in developed countries),<sup>12</sup> and targets for developing renewable energy sources. In December 2019, a month before the pandemic began, the EU announced its Green Deal to achieve carbon neutrality by 2050. The European Green Deal was positioned as a “lifeline out of the COVID-19 pandemic.”<sup>13</sup> The EU Green Deal consists of proposals to make the EU’s climate, energy, transport, and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. The plan implies a EUR 1.8 trillion investments package.

Asia and North America are moving in the same direction. In September 2020, already in the midst of the pandemic, China declared its carbon neutrality goal by 2060.<sup>14</sup> In October 2020, Japan and South Korea made statements on the goal of achieving carbon neutrality by 2050.<sup>15</sup> Finally, in January 2021, the United States returned to the Paris Agreement and adopted its own Green Deal.

Corporations also consider decarbonization to be a key parameter of competitiveness. Even oil and gas companies commit themselves “to become a net-zero emissions energy business by 2050,”<sup>16</sup>

<sup>10</sup> Lucia Bevere and Andreas Wigle, “Natural catastrophes in 2020,” *Sigma* 1/2021. URL: <https://www.swissre.com/institute/research/sigma-research/sigma-2021-01.html>.

<sup>11</sup> Ibid.

<sup>12</sup> Nick Carey and Christoph Steitz, “EU proposes effective ban for new fossil-fuel cars from 2035,” *Reuters*, July 14, 2021. URL: <https://www.reuters.com/business/retail-consumer/eu-proposes-effective-ban-new-fossil-fuel-car-sales-2035-2021-07-14/>.

<sup>13</sup> “A European Green Deal,” *The European Commission webpage*, accessed on December 12, 2021. URL: [https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal\\_en](https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en).

<sup>14</sup> Steven Lee Myers, “China’s Pledge to Be Carbon Neutral by 2060: What It Means,” *The New York Times*, September 23, 2020. URL: <https://www.nytimes.com/2020/09/23/world/asia/china-climate-change.html>.

<sup>15</sup> Edward White and Song Jung-a, “South Korea follows Japan and China in carbon neutral pledge,” *Financial Times*, October 28, 2020. URL: <https://www.ft.com/content/185e5043-fd72-4fef-a05c-f2a5001c7f4b>.

<sup>16</sup> “Our climate target,” *Shell Company webpage*, accessed on December 12, 2021. URL: <https://www.shell.com/energy-and-innovation/the-energy-future/our-climate-target>.

## WAY OUT OF THE ARMS CONTROL PANDEMIC

while investors worldwide are refusing to finance sectors associated with high emissions. One group of investors controlling \$41tn puts it straightforwardly: “we stand at the beginning of a pivotal decade in which institutional investors and government leaders worldwide have the power to raise ambition and accelerate action to tackle the climate crisis. If we do not meet this challenge and change course immediately, the world could heat in excess of 3°C this century – far beyond the goal of the Paris agreement.”<sup>17</sup>

Innovative activities in the world are also being greened. In many countries, green innovation is increasingly becoming an integral part of strategies in various areas. Ecology stimulates scientific, technical and information interaction between nations. The depth and scale of environmental problems lead to the fact that even developed countries alone can no longer carry out costly research that requires the concentration of all humankind’s efforts and are forced to cooperate. In summer 2021, Russia and the US, despite geopolitical disagreements, continued to discuss “satellite monitoring of emissions and removals of greenhouse gases; forests and agriculture; climate and the Arctic, including black carbon; reducing emissions from non-CO2 gases, including methane; enhanced nationally determined contributions and long-term strategies under the Paris Agreement; energy efficiency; climate finance; nature-based solutions; and implementation of joint climate projects.”<sup>18</sup>



COP21 president Laurent Fabius (second left) and UNFCCC executive secretary Christiana Figueres (second right) celebrate the Paris Agreement

Source: [www.iiied.org/historic-agreement-paris](http://www.iiied.org/historic-agreement-paris)

## CLIMATE CHANGE AND NUCLEAR WEAPONS

In the 1960s, scientists began to assess the environmental consequences of nuclear weapons use. As a result, a vast body of research has been published. A robust framework has been created to investigate the potential impacts of nuclear weapons use and build appropriate simulation models – today scientists look in pretty much the same way into how carbon emissions impact the environment.

At first, nuclear-winter studies arose. The 1966 research by RAND Corporation stated that “it is possible that the weather can

[get.html#iframe=L3dlYmFwcHMvY2xpbWF0ZV9hbWJpdGlubi8;](https://www.ogci.com/carbon-intensity-target-pr/) “OGCI sets carbon intensity target,” OGCI webpage, July 16, 2020. URL: <https://www.ogci.com/carbon-intensity-target-pr/>.

<sup>17</sup> Jasper Jolly, “Leading investors urge governments to end support for fossil fuels,” *The Guardian*, June 10, 2021. URL: <https://www.theguardian.com/business/2021/jun/10/investors-governments-end-support-fossil-fuels-assets-net-zero-targets>.

<sup>18</sup> U.S.-Russia Joint Statement Addressing the Climate Challenge, The US State Department, July 15, 2021. URL: <https://www.state.gov/u-s-russia-joint-statement-addressing-the-climate-challenge/>.



be modified as a result of a nuclear war.” Although the authors noted that “the nature, extent, and magnitude of the changes are uncertain,” the study found that “the large quantities of debris injected into the troposphere and stratosphere seem to be the most likely instrument involved in the modification. The debris can act in several ways. It may provide an additional source of nonsoluble condensation nuclei and ice nuclei. As ice nuclei, it may increase the amount of thin cirrus clouds, thus affecting the radiation balance, or it may increase the efficiency of the ice-crystal mechanism of precipitation formation in super-cooled clouds. [...] In addition to the effects of the debris, fires ignited by nuclear detonations may, if extensive, change the surface characteristics and modify local weather patterns.”<sup>19</sup>

Carl Sagan, in his famous 1983 piece, was much more direct. Describing the “nuclear winter” effect of potential nuclear war, Sagan wrote: “Some of what I am about to describe is horrifying. I know, because it horrifies me. There is a tendency – psychiatrists call it “denial” – to put it out of our minds, not to think about it. But if we are to deal intelligently, wisely, with the nuclear arms race, then we must steel ourselves to contemplate the horrors of nuclear war. The results of our calculations astonished us. In the baseline case, the amount of sunlight at the ground was reduced to a few percent of normal – much darker, in daylight, than in a heavy overcast and too dark for plants to make a living from photosynthesis. At least in the Northern Hemisphere, where the great preponderance of strategic targets lies, a deadly gloom would persist for months.”<sup>20</sup>

Other researchers argued that even without actual use of nuclear weapons during wartime, the atomic tests conducted in the second half of the twentieth century had severe ecological consequences: “From the ecological point of view, at this stage, there are a few critically contaminated test sites both on land (the Nevada Test Site, Semipalatinsk) and in the marine environment (especially the Bikini, Enewetak, Moruroa, Fangataufa atolls, and Novaya Zemlya marine areas). 137Cs, 90Sr, 239–240Pu, 241Am, and 131I stand out among the radioactive isotopes released during nuclear tests, in terms of having caused a major impact on the environment and irradiation of the human body; these isotopes were predominantly found in most of the nuclear test sites worldwide. Since approximately two thirds of the Globe’s surface is covered by water, a significant share of these radionuclides has been transferred into the marine environment, as in the cases of radionuclides 137Cs and 90Sr, with negative consequences being primarily related to the bioaccumulation

<sup>19</sup> E.S.Batten, “The Effects of Nuclear War on the Weather and Climate,” *The Rand Corporation*, August 1966, p. 44. URL: [https://www.rand.org/content/dam/rand/pubs/research\\_memoranda/2008/RM4989.pdf](https://www.rand.org/content/dam/rand/pubs/research_memoranda/2008/RM4989.pdf).

<sup>20</sup> Carl Sagan, “Nuclear Winter,” in James W. Feldman, editor, *Nuclear Reactions: Documenting American Encounters with Nuclear Energy* (Seattle and London: University of Washington Press, 2017, p. 242

through food chain cycles.”<sup>21</sup>

Although some modern researchers assessing climate impact of a regional nuclear weapons exchange (like, say, a hypothetical one between India and Pakistan, or between Russia and NATO allies in Europe) argue that the long-term global impacts of regional nuclear weapons use on climate “are much less severe than predicted by previous studies,”<sup>22</sup> it is still broad consensus among scientists that the US-Russia global war scenario will represent “the hammer case, in which you hammer the entire Earth system.”<sup>23</sup> For instance, according to another modelling, “in one to two years after the nuclear war [...] global cooling would affect the oceans’ ability to absorb carbon, causing their pH to skyrocket. That’s the opposite to what is happening today, as the oceans soak up atmospheric carbon dioxide and waters become more acidic. [...] In the case of a US-Russia nuclear war, the dark skies would cause the trade winds to reverse direction and water to pool in the eastern Pacific Ocean. As during an El Niño, droughts and heavy rains could plague many parts of the world for as long as seven years. [...] The worst impact would come in the mid-latitudes, including breadbasket areas such as the US Midwest and Ukraine. Grain reserves would be gone in a year or two. Most countries would be unable to import food from other regions because they, too, would be experiencing crop failures.”<sup>24</sup>

Thus, while humanity tries to go through the energy transition and succeed in combatting climate change, the same humanity is sitting on an ecological bomb that can nullify all those good intentions and planning in seconds. What then is the alternative to the “world that resembles the one we just left behind?”<sup>25</sup>

The idea of emissions trading gives us a hint for finding such an alternative. It revolutionized governments’ approaches to climate change. Now, they can set a specific amount of total pollution as an environmental goal. After establishing restrictions on the emission of certain substances (for example, carbon dioxide) in a particular territory and for a specific period, the distribution of the corresponding number of emission quotas begins. The upper limit may gradually decrease over time. Thanks to free trade in those quotas, the price is demand-driven. Emissions made without a specified quota are subject to a fine.

The Kyoto Protocol, adopted in 1997, introduced an emissions

<sup>21</sup> Remus Prävälle, “Nuclear Weapons Tests and Environmental Consequences: A Global Perspective,” *Ambio*, 2014 Oct; 43(6): 729–744. URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4165831/>.

<sup>22</sup> Jon Michael Reisner, Gennaro D’Angelo, Eunmo Koo and others, “Climate impact of a regional nuclear weapons exchange: An improved assessment based on detailed source calculations,” *Journal of Geophysical Research: Atmospheres*, Journal Volume: 123; Journal Issue: 5, 2018. URL: <https://www.osti.gov/pages/servlets/purl/1422919>.

<sup>23</sup> Alexandra Witze, “How a small nuclear war would transform the entire planet,” *Nature*, March 16, 2020. URL: <https://www.nature.com/articles/d41586-020-00794-y#ref-CR2>.

<sup>24</sup> Ibid.

<sup>25</sup> Klaus Schwab and Thierry Malleret, *COVID-19: The Great Reset* (World Economic Forum Publishing, 2020), p. 3.



US-Russia global war scenario will represent “the hammer case, in which you hammer the entire Earth system”



trading system as a global practice. Those who were able to cut emissions could sell their quota. The commodity in this trade was carbon units, equated to a ton of carbon dioxide equivalent (CO<sub>2</sub>, which measures all greenhouse gas emissions), calculated under the so-called Global Warming Potential (GWP) coefficient. In addition, a quantitative target was set - to reduce total annual emissions by an average of 5% from 2008 to 2012 compared to 1990 levels. The Kyoto protocol had several mechanisms of implementation.<sup>26</sup> The first one was carbon trading between countries that have committed to controlling emissions. This mechanism was supposed to redirect funds from countries with costly emission reductions (estimated in US dollars per ton of carbon dioxide) to countries with low costs. Several deals were concluded for the sale/purchase of quotas. For instance, Ukraine sold quotas for 30 million tons of carbon dioxide to Japan under the condition to invest the funds received in further reduction of emissions.<sup>27</sup>

The second mechanism was sharing commitments. For example, the countries of the European Union took not only national obligations on greenhouse gas emissions but also a general commitment to reduce total emissions by 8% from 1990.<sup>28</sup>

Finally, the mechanism of joint projects was envisaged between developed countries and countries with economies in transition. The tool allowed developed nations to invest in targeted projects to reduce emissions in developing countries in exchange for certificates confirming that the projects actually helped lessen those emissions.

## KYOTO PROTOCOL MODEL FOR ARMS CONTROL COMMITMENTS

Considering the devastating environmental consequences of nuclear weapons use, the nuclear-weapon states should take responsibility for possessing nuclear weapons just as they took responsibility for carbon emissions. Again, the Kyoto Protocol can help find the appropriate mechanisms for that.

First, the coefficient similar to the Global Warming Potential (GWP) used in the Kyoto Protocol can be developed to calculate the potential effects of nuclear weapons use on the climate. GWP measures how much energy the emissions of 1 ton of a gas will absorb over a given period, relative to the emissions of 1 ton of carbon dioxide (CO<sub>2</sub>). The larger the GWP, the more a given gas warms the Earth compared to CO<sub>2</sub> over the period. GWPs provide a standard unit

<sup>26</sup> "Kyoto Protocol Reference Manual on Accounting Emissions and Assigned Amount," *United Nations Framework Convention on Climate Change*, 2008. URL: [https://unfccc.int/sites/default/files/08\\_unfccc\\_kp\\_ref\\_manual.pdf](https://unfccc.int/sites/default/files/08_unfccc_kp_ref_manual.pdf) >.

<sup>27</sup> Risa Maeda, "Japan buys 30 mln tonnes of CO<sub>2</sub> rights from Ukraine," *Reuters*, March 18, 2009. URL: <https://www.reuters.com/article/climate-japan-ukraine-idUKT1231820090318>.

<sup>28</sup> "Kyoto Protocol," *The European Commission MEMO/04/43*, March 4, 2004. URL: [https://ec.europa.eu/commission/presscorner/detail/en/MEMO\\_04\\_43](https://ec.europa.eu/commission/presscorner/detail/en/MEMO_04_43).

## WAY OUT OF THE ARMS CONTROL PANDEMIC

of measure, allowing policymakers to compare emissions reduction opportunities across sectors and gases. Regarding nuclear weapons use effects on climate change, theoretically, a similar “Nuclear Winter Potential” (NWP) can be introduced, measuring how much impact on climate change a certain amount of nuclear explosive yield may have.

Second, we will need to know the exact yield of each nuclear-weapon country’s nuclear arsenal per type of nuclear warhead and the exact number of those warheads.

Third, scientists will need to estimate through simulations the amount of energy released when a nuclear weapon is detonated, which is enough to lead to the “nuclear winter” effect. The nuclear winter is taken here as a basis because it seems to be the only effect of nuclear war persuasive enough to demonstrate the negative impact of nuclear war on climate. It is like global warming – unless you see the huge melting glaciers or actual “holes” in the ozone layer in the news, you will not pay much attention to a warmer winter in your neighborhood.

After that, just as in the Kyoto Protocol, the quantitative target can be set to reduce total NWP (or global nuclear weapons yield) to the level when even the detonation of all existing nuclear devices does not lead to a worldwide nuclear winter effect. Then, that target can be equally distributed among nine countries possessing nuclear weapons, thus creating national targets for each one.

Theoretically, the NWP for each non-nuclear country will be zero in this system. However, for each nuclear-weapon state, the NWP will be calculated according to the exact number and types of nuclear warheads it possesses.

The Kyoto Protocol also introduced an emissions trading system, as mentioned above. Those who were able to cut emissions could sell their quota. Countries with costly emission reductions could redirect funds to countries with low costs. The NWP system idea described here implies that countries with lower (or zero) NWP can sell their quota to those with higher NWP. The money received can only be used for supporting efforts to fight climate change – in the form of, for instance, developing the renewable energy sector (including nuclear energy) or funding research into innovations in sustainability.

Suppose a particular nuclear-weapon country’s NWP is above the defined national target. In that case, the government will have three ways of action to choose from: buying quotas from countries with lower NWP, paying a fine to some international fund (which is again used to support climate action) or disarming. Accordingly, if a state builds up its nuclear arsenal, its NWP increases, and it needs to choose among those three.



U.S. Vice Pres. Al Gore delivering the opening speech of the conference in Kyoto, Japan, that led to the Kyoto Protocol to the United Nations Framework Convention on Climate Change, December 1997

Source: [www.britannica.com](http://www.britannica.com)



Another mechanism of the Kyoto Protocol was the joint implementation of obligations. In the case of the NWP idea introduced here, some groups of states (for instance, NATO countries) can take a general commitment splitting the fine or paying jointly for buying the quotas rather than national commitments on reducing their NWPs.

Finally, the Kyoto Protocol implied another essential mechanism of joint projects, which in the case of the NWP system means that countries with higher NWPs can invest in projects to reduce the NWPs of other states (or, invest in the disarmament of those countries, just like the US did in the 1990s with regards to Russia) in exchange for certificates confirming that the projects achieved the goal of reducing global NWP (and accordingly, lessening the investors' own obligations with regards to reducing their own arsenals).

## CONCLUSION

The ultimate goal of this paper is to provoke reflections on new rationales and incentives for nuclear disarmament, which take into account current global efforts to combat climate change – the only area where nearly all states are ready to join their efforts to prevent a common threat. Thanks to an economically feasible model, numerous experts' warnings about an increase in global temperature and the consequences of human activities for the planet have been transformed into real (and, sometimes, beneficial for national economies) actions to save the world.

The model proposed here can help environmental scientists and disarmament experts to jointly form a consensus view on the extent to which a potential exchange of nuclear strikes affects the environment, as well as about what nuclear disarmament obligations should be taken to prevent climate change caused by actual nuclear weapons use.

# WAY OUT OF THE ARMS CONTROL PANDEMIC

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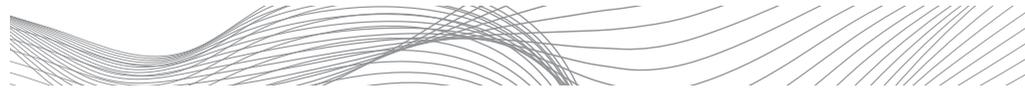
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## ARMS CONTROL AND SCENARIOS OF NUCLEAR DISARMAMENT

This occasional paper was made within the framework of the project *Arms Control and Scenarios of Nuclear Disarmament*, which is part of the Nuclear Nonproliferation & Russia Program. Within its framework PIR Center elaborates set of practical steps for the preparation of new international negotiations aimed at deep reduction of nuclear arsenals; develops recommendations on the issue of possible significant reduction of all types of nuclear weapons; analyses possibilities of cooperation between the Russian Federation and the USA in the field of missile defense.

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