CAN
CLIMATE ACTION NETWORK
Eastern Europe, Caucasus and Central Asia

Position on Nuclear Energy

In the region of Eastern Europe, Caucasus and Central Asia

Who we are

CAN (Climate Action Network) EECCA is the largest climate NGO network in Eastern Europe, Caucasus, and Central Asia. Our network exists since 2008 and is an integral part of the Climate Action Network International, an alliance of over 1,800 NGOs in over 130 countries.

At present, 58 NGOs in 11 countries of the region (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine, and Uzbekistan) are members of the network.

It is our job to support, develop, and build the capacity of NGOs in the EECCA region so that the countries can be more efficient in tackling the climate crisis as well as developing and implementing climate policies necessary for climate justice.

Why we came up with this Position

Despite CAN International, along with numerous governments, international organizations and financial institutions, having long recognized nuclear power as a false solution to the climate crisis, there is still much discussion in the EECCA region about further development of this technology.

Our goal is to piece together the most relevant expert opinions on the nuclear power industry as means of solving the climate crisis. We would like to not only compile a list, but also give specific examples of EECCA countries why the focus on developing NPPs in our countries is a very dangerous, impractical, and inefficient measure.

Over the recent years, the EECCA region has witnessed intensification in the debate over the development of nuclear power, in particular, due to commissioning of a nuclear power plant in Belarus. At present, there are plans of building new NPPs in Kazakhstan, Kyrgyzstan, and Uzbekistan. The public debate on the matter, including expert round tables and media debates, is often riddled with numerous stereotypes and inaccuracies. We would like to provide ample evidence, so that the decision-makers and the general public alike could see for themselves that, when it comes to tackling the climate crisis, the development of nuclear energy in the EECCA region has already caused more problems than it offered solutions.

Nuclear Power and the Climate

Nuclear power's potential of tackling climate crisis is very limited, while the cost and the environmental risks are tremendous.

- **Nuclear energy is not a zero-emissions industry**

On average, the nuclear power industry generates the equivalent of 66[1] to 146[2] grams of CO_2/kWh. Which, a number of estimates say, is slightly higher than the energy intensity value

[1] Sovacool (2008) reports that average life cycle GHG emissions from nuclear power are 66 g CO2-eq/kWh with a range of 1 to 288 g CO2-eq/kWh. Source: Ethan S. Warner, Garvin A. Heath. Life Cycle Greenhouse Gas Emissions of Nuclear Electricity Generation//Journal of industrial Ecology - April 2012 https://onlinelibrary.wiley.com/doi/10.1111/j.1530-9290.2012.00472.x

[2] Source: https://dont-nuke-the-climate.org/reports/climate-change-and-nuclear-power.pdf

of wind farms and offshore power plants[3], and is comparable to the footprint of photovoltaics-based solar power plants[4]. Given that wind and solar power plants do not come as laden with problems associated with nuclear power, those alternatives are obviously preferable.

- **The adoption speed of nuclear energy technologies is too low to provide for any considerable emissions reduction**

The average construction period of one nuclear power unit spans 7 to 9 years[5], while terms for commissioning wind and solar energy projects are 10 to 15 times shorter and do not require solving such complex issues as ensuring radiation safety and handling radioactive waste. Non-nuclear EECCA countries like Uzbekistan and Azerbaijan have proven experience that launching RES development programs is much simpler in terms of technologies involved and, as a result, such programs are on the rise[6]. Indicatively, in Azerbaijan, 100 MW of solar and wind generation plants[7] were set in operation between 2013 and 2020, besides, a concept of increasing the share of renewable energy to 30% in the electric power industry by 2030 is underway[8]. The government of Uzbekistan has set a similar goal of increasing the share of RES to 30% by 2030[9]. The feasibility of that goal is proven by the experience of commissioning the first two solar power plants in Uzbekistan in 2021–2022, with an overall capacity of 200 MW[10].

- **Power production dynamics reveal a number of reasons why NPPs are less effective compared to wind and solar plants**

While in 2010 the global generation of nuclear energy compared to wind and solar energy combined amounted to about 2.7 and 0.3 trillion kWh respectively, in 2021, green energy generation beat the NPPs, 2.9 versus 2.7 trillion kWh[11]. By the estimates of the International Energy Agency, by 2025, generation of the wind and solar energy combined will exceed 50 trillion kWh, amounting to about 70% of total power produced globally, while the NPPs will be producing 5.8 trillion kWh[12] (and even that estimated output can turn out overly optimistic).

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[3] For onshore and offshore wind power respectively, the mean energy intensity value is 0.063 (±0.061 standard deviation on either side of the mean) and 0.055 (±0.037) kWh/kWh; mean GHG emissions are 20 (±14) and 16 (±9.6) g CO2e/kWh; and mean CO2 emissions **16 (±14) and 12 (±7.3) g**/kWh. Source: Anders Arvesen, G. Hertwich. Assessing the life cycle environmental impacts of wind power: A review of present knowledge and research needs// Renewable and Sustainable Energy Reviews – October 2012, p. 5994-6006 https://www.researchgate.net/publication/234101386_Assessing_the_life_cycle_environmental_impacts_of_wind_power_A_review_of_present_knowledge_and_research_needs

[4] The median published life cycle GHG emissions estimate for c-Si PVs is **57** g CO2-eq/kWh. Source: David D. Hsu, Patrick O'Donoughue, Vasilis Fthenakis, Garvin A. Heath, Hyung Chul Kim, Pamala Sawyer, Jun-Ki Choi, and Damon E. Turney. Life Cycle Greenhouse Gas Emissions of Crystalline Silicon Photovoltaic Electricity Generation//Journal of industrial Ecology - March 2012. https://onlinelibrary.wiley.com/doi/10.1111/j.1530-9290.2011.00439.x

[5] The mean time from construction start to grid connection for the six reactors started up in 2021 was 7.1 years, comparable to 2020 (7.2 years), a clear improvement over the 9.9 years in 2019. In the case of the five units connected in the first half of 2022, the duration was nine years. Source: The World Nuclear Industry Status Report 2022. https://www.worldnuclearreport.org/IMG/pdf/wnisr2022-v3-lr.pdf (p. 53)

[6] Source: https://www.eprussia.ru/news/base/2022/2128198.htm

[7] Source: https://www.eeseaec.org/energeticeskij-profil-azerbajdzana

[8] Source: http://interfax.az/view/879926

[9] Source: https://uza.uz/ru/posts/o-merax-po-povysheniyu-effektivnosti-reform-napravlennyx-na-perexod-respubliki-uzbekistan-na-zelenuyu-ekonomiku-do-2030-goda_431600

[10] Source: https://neftegaz.ru/news/Alternative-energy/763168-v-uzbekistane-poyavitsya-3-novye-solnechnye-stantsii-obshchey-moshchnostyu-500-mvt/

[11] Source: World Energy Outlook 2022 https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf (p. 448)

[12] Source: World Energy Outlook 2022

- **Nuclear Power Plants increasingly show malperformance**

NPPs have proven their vulnerability to new challenges, such as weather and climate anomalies, with the risks of forced and unplanned shutdowns of NPPs due to the abovementioned issues constantly increasing. That, in turn, has a drastic effect on the economics of nuclear power. According to the IPCC, there has been a global surge of failures in the operation of NPPs associated with climate change over the past decades[13]. In particular, the operation of NPPs is affected by heat waves that can cause problems with reactors cooling, which can lead to the suspension of their operation. In addition, for cooling purposes, NPPs also depend on sources of water, which may become unavailable due to droughts. A report by the OECD Nuclear Energy Agency concluded that the cooling water being too cold or too warm was the most common natural (specifically weather-related) occurrence to cause NPPs shutdowns all over the globe from 2004 to 2013, while the total number of such weather-related shutdowns in 2004–2013 amounted to 2,690[14]. As global mean annual temperatures continue to rise, this problem may get exacerbated. That is also true for many of the EECCA countries and should be taken into consideration during nuclear energy-related decision-making. In addition to climactic factors, poor quality of new nuclear power unit projects also contributes to failures in NPPs operations in Finland and Belarus.

Additional risks of nuclear power production

- **Despite improvements in NPP safety systems, risks of new major radiation accidents persist**

The unavoidable "residual risk" of major radiation accidents cannot be considered acceptable. While the probability of a major catastrophe is low, the harm it can cause to both the environment and the economy of the host nation will be tremendous. In the event of a catastrophe, radioactive contamination is likely to spread to neighboring countries, which may cause international conflicts. In addition, one cannot rule out the possibility of accidents and incidents at other nuclear infrastructure facilities (uranium mining and enrichment, nuclear fuel fabrication, and radioactive waste management).

- **In addition to radiation accidents, enterprises of the nuclear fuel chain are themselves sources of radiation exposure**

That includes, for example, radioactive ores mining and processing facilities in Russia, Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan, where over 800 million tons of waste from mining and processing of radioactive ores have been amassed[15].

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https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf (p. 448)

[13] Climate Change 2022. Mitigation of Climate Change. Working Group III contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Full_Report.pdf (p. 6-75).

[14] NEA. Climate Change: Assessment of the Vulnerability of Nuclear Power Plants and Approaches for their Adaptation, 2021. https://www.oecd-nea.org/jcms/pl_61802/climate-change-assessment-of-the-vulnerability-of-nuclear-power-plants-and-approaches-for-their-adaptation?details=true (p. 51)

[15] Source: «Урановые хвостохранилища в Центральной Азии: местные проблемы, региональные последствия, глобальное решение». Результаты региональной электронной дискуссии Сети CARNet https://www.caa-network.org/wp-content/uploads/2015/04/UraniumTailings.pdf

- **Nuclear technologies are dual-use, and developing them can lead to the proliferation of nuclear weapons**

Despite international efforts to limit the spread of nuclear weapons, India, Pakistan, North Korea, and possibly Israel have built and tested nuclear explosive devices. The spread of nuclear weapons could seriously destabilise the international relations and raise the possibility of its usage.

- **To this day, there are no known methods for reliable long-term contained isolation of radioactive waste**

Such waste remains dangerous for centuries and millennia.

- **Technologically speaking, high-capacity nuclear power units are difficult to integrate into the power systems of smaller states**

The recent manifestation of that was the 1.2 GW nuclear power unit being connected to the grid in Belarus (the capacity of the nation's entire power grid is about 11 GW). The project designers failed to make allowance for the high proportion of cogeneration-based district heating (about half of the entire grid capacity is cogeneration-based). That, in turn, resulted in the grid having a hard time passing through the winter nighttime lows, as the NPP shouldered the bulk of the operational load, leaving the TPPs running idle. In addition, the BelNPP's integration into the national power grid required a significant increase in peaking backup capacities (over 800 MW), which toppled the engineering challenges with the addition of extra costs.

- **Cheap and accessible uranium reserves as a limiting factor**

As of today, most of the world's NPPs run on uranium fuel. According to the IAEA and the Nuclear Energy Agency (NEA), given the current NPPs' operating capacitance remains unchanged, our uranium resources should last for about another 135 years[16]. That said, the uranium mining capacities, both existing and planned, would likely be unable to meet the demand for raw uranium (without resorting to secondary sources of uranium) as early as by 2030–2035 even under the conservative scenario of nuclear power generation, given that the current capacity is maintained[17].

- **Nuclear power generation demands heavy subsidizing due to its negative appeal to investors, in the view of long implementation periods and high risks**

Investors are drawn to technologies that are low-cost, have a short payback period, and are cost-efficient. According to the World Nuclear Industry Status Report, the 2019 investment decisions for the construction of new nuclear plants amounted to around USD31 billion for 5.8 GW, while both wind and solar power have drawn about four times as many investments —

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[16] "Identified recoverable resources, including reasonably assured resources and inferred resources, are sufficient for over 135 years, considering uranium requirements of about 59 200 tU (data as of 1 January 2019)", A Joint Report by the Nuclear Energy Agency and the International Atomic Energy Agency Uranium Resources, Production and Demand, 2020 https://oecd-nea.org/upload/docs/application/pdf/2020-12/7555_uranium_-_resources_production_and_demand_2020__web.pdf (p. 113)

[17] A Joint Report by the Nuclear Energy Agency and the International Atomic Energy Agency Uranium Resources, Production and Demand, 2020. https://oecd-nea.org/upload/docs/application/pdf/2020-12/7555_uranium_-_resources_production_and_demand_2020__web.pd (p. 109)

each[18]. The total reported and estimated investment for the construction of the 2021 nuclear power projects was around USD 24 billion for 8.8 GW — about 7% of investments in RES[19]. The cost of nuclear power is rising, while the cost of renewable energy is decreasing. In the USA, for example, unsubsidized average electricity generating costs between 2009 and 2021 declined on average by 90% in the case of solar power, and by 72% in the case of wind power, while nuclear power costs went up by 36%[20]. The increased cost of nuclear power often goes unnoticed since many of its components are financed from the state budgets, while the governments can introduce socialized pricing. Management cost for spent nuclear fuel (SNF) and radioactive waste is an entirely separate matter. Present-day Belarus, for instance, only has its SNF management strategy adopted but is yet to calculate the cost of the entire SNF management cycle. The cost of creating infrastructure for managing SNF can reach tens of billions of Euro, which makes the nuclear energy even less appealing.

Risks associated with nuclear energy in the EECCA region

- **Both nuclear power plants and other infrastructure in the nuclear fuel chain are highly vulnerable to terrorist attacks and in case of an armed conflict**

There are several examples of how the nuclear power industry in the EECCA region became an instrument of nuclear terrorism. Russia's full-scale invasion of Ukraine in 2022 was accompanied by hostilities directly on the premises of Zaporizhzhia NPP, which could have led to an accident in the reactor zone, or to the destruction of spent nuclear fuel storage facilities. In the case of Pivdennoukrainsk NPP, projectiles and rocket missiles were flying in unacceptably dangerous proximity to nuclear power units. In November 2022, as a result of a massive attack by Russia, the Khmelnitskyi NPP and one of the four units of the Rivne NPP were cut off from the power supply. Any such violation is unacceptable, as it can lead to an accident.

- **Risks connected with the lack of transparency in some countries**

With the Belarus NPP (located at an 18 km distance from the town of Astravets and 40 km from Vilnius), the lack of transparency also calls the safety of its operation into question. For instance, in March 2023, Lithuanian intelligence claimed that both the Rosatom and the government of Belarus were withholding information about several incidents in its power units. Indicative of problems in the NPP's operation are numerous "scheduled" shutdowns of power units. For the entirety of its short operation, the nuclear power plant never actually generated any energy for the power grid.

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[18] The World Nuclear Industry Status Report 2020.
https://www.worldnuclearreport.org/IMG/pdf/wnisr2020-v2_lr.pdf (p. 267)

[19] The World Nuclear Industry Status Report 2022.
https://www.worldnuclearreport.org/IMG/pdf/wnisr2022-v3-lr.pdf (p. 278).

[20] The annual Levelized Cost of Energy (LCOE) analysis for the U.S. last updated by Lazard, one of the oldest banks in the world, in October 2021,1074 suggests that unsubsidized average electricity generating costs declined on average between 2009 and 2021 in the case of solar PV (crystalline, utility-scale) from US$359 to US$36 per MWh, a fall of 90 percent, and for wind from US$135 to US$38 per MWh (a 72 percent fall), while nuclear power costs went up from US$123 to US$167 per MWh, an increase of 36 percent (see Figure 52). Source: The World Nuclear Industry Status Report 2022.
https://www.worldnuclearreport.org/IMG/pdf/wnisr2022-v3-lr.pdf (p. 208)

Unfavorable climatic conditions, seismic activity, armed conflicts, and the advanced age of nuclear power units in operation (most of them were built in the 1970s and 80s during the Soviet era) all contribute to making nuclear power in the EECCA region unsafe.

- **Many countries continue to be heavily influenced by the Russian monopoly State Corporation Rosatom**

Rosatom's loans for the construction of NPPs withhold other nations from achieving energy independence through RES, narrow their choices, and become a means of political pressure in their decision-making.

- **Lest we forget the negative collective memory associated with nuclear power**

The accident on April 26, 1986 on Chornobyl NPP became a tragedy for the entire EECCA region. National identities of Belarus and Ukraine were largely based on reflections following that accident; that catastrophe forever changed the lives of thousands, led to contamination of vast territories (including most of Polissia/Polesie), and became the symbol of fighting for environmental rights and free access to environmental information.

- **That said, Soviet nuclear power brought an array of unsolvable problems upon other EECCA countries, too**

Examples of those include uranium mines in Kyrgyzstan and Kazakhstan, with the environment of those countries already significantly affected by nuclear power. They are currently in a climate danger zone due to growing issues with water resources necessary for cooling reactors. With abnormal temperatures revving, NPP construction projects pose a threat to the environment and the community alike.

The civil society has already started to raise its criticism of NPPs. For example, the Green Alliance of Kyrgyzstan has recently launched a dedicated position.

Our vision for the energy transition

With faster, cheaper, and safer alternatives available, choosing in favor of nuclear power plants becomes irrational. To achieve the Paris Agreement's goals, the EECCA region's energy sector should be decarbonized by reducing energy consumption, increasing energy efficiency, and ensuring a just transition (primarily to decentralized solar and wind energy) as the most cost-effective solutions[21].

For that reason, we deem it necessary to relinquish any new projects in nuclear energy and fossil fuels, and stop subsidizing them, be it directly or indirectly.

The EECCA countries need to redirect funding and other supporting measures to the energy transition, with a focus on renewable energy; promote international cooperation, and share experience and technologies in RES and energy efficiency.

[21] Source: https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf


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