

# NUCLEAR IS PART OF THE NET-ZERO SOLUTION **OUR CALL FOR AN INCLUSIVE, SUSTAINABLE FUTURE FOR ALL**

## WHO WE ARE

**Women in Nuclear Global** (WiN Global) is a non-profit organization of women working professionally in various areas of nuclear energy and radiation applications. Since our foundation in 1992, we have been strong advocates for environmental sustainability, diversity and gender equality. For powering a thriving, inclusive future for all, we are committed to promote an evidence-based dialogue with the public to raise awareness about the essential contributions of nuclear technologies to people and society, especially as part of the solution to the climate crisis and as a key element to achieve the United Nations Sustainable Development Goals (SDGs).

## Contact us

**Ms. Dominique Mouillot**

President

[d.mouillot@gdes.com](mailto:d.mouillot@gdes.com)

**Ms. Melina Belinco**

Vice-President

[melina.winglobal@gmail.com](mailto:melina.winglobal@gmail.com)

# EXECUTIVE SUMMARY

Climate change is one of the most significant challenges facing humanity today. Its consequences have disproportionate impacts on different vulnerable groups, especially women and children. The widespread and catastrophic effects of climate change will manifest in increased severity and duration of natural disasters, further reducing access to vital natural resources. This adds to the systemic disadvantages vulnerable groups already face, including poverty and lack of opportunities, and will continue to infringe on human rights.

**WiN Global uses its voice as a network of experts to call for urgent action from policymakers to include Nuclear as part of the Net-Zero Solution and ensure that women are involved in all decision-making steps in addressing the climate crisis. We must act now. The world needs to hear women, and Net-Zero needs nuclear.**

Reasons behind this are as follows:

- ▶ The climate crisis will disproportionately impact women and girls. Women need to be involved in all steps of decision-making in addressing the climate solution.
- ▶ Climate change is a complex problem that needs a collaborative strategic approach to phase out fossil fuels quickly. We need to deploy all clean energy technology forms, including nuclear, as part of the solution to do this effectively.
- ▶ Policies need to change to progress towards evidence-based clean energy production. Maintaining the existing nuclear power plants is vital to support the transition to a Net-Zero solution.
- ▶ Climate action requires coordinated action across multiple industries to reduce emissions beyond electricity generation. Nuclear power can support the decarbonization of different sectors through hydrogen production, water desalination, and other industrial processes requiring heat.
- ▶ Climate change consequences will limit clean energy solutions in certain regions. Nuclear energy has a small environmental footprint and can offer solutions for resource-scarce and remote areas.
- ▶ Climate change is a long-term problem for us all. Advances in nuclear power technologies are fundamental for a long-term sustainable solution.

## BACKGROUND

Climate change is one of the most significant challenges facing humanity today. The effects of this crisis are already visible — rising temperatures, floodings, droughts, coastal storms, and hunger — and so are its effects on women and girls. They remain amongst the world’s poorest populations and are proportionally more dependent on threatened natural resources. The impact of climate change is deemed worse for these vulnerable groups, especially in regions with more significant gender and economic disparity, given the inequality between men and women regarding roles, responsibility, access to support, and participation in decision-making. <sup>1,2,3</sup>

Poverty, natural disasters, climate change, and inequality inadvertently affect women and children the most. <sup>4</sup>

According to the IPCC, human-induced climate change is already exacerbating weather and climate extremes in every region. We are experiencing unprecedented extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones. <sup>5</sup>

*“It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred.”* <sup>6</sup>

In Sub-Saharan Africa, resource scarcity and widespread drought are already responsible for forced migrations and displacement, leaving women and girls vulnerable to gender-based violence and exploitation. North-East Nigeria is an example of such vulnerability, where the terrorist group Boko Haram has targeted women displaced by extreme droughts.

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1. Osman-Elasha, B., 2012. “Women...In The Shadow of Climate Change”, UN Chronicle, Volume 46, Issue 4, abr 2012, p. 54 - 55. <https://www.un.org/en/chronicle/article/womenin-shadow-climate-change>

2. Osman-Elasha, 2008. “Gender and Climate Change in the Arab Region”, Arab Women Organization, p. 44.

3. UN Women, 2020. Climate change, gender equality and human rights in Asia Regional review and promising practices. [https://asiapacific.unwomen.org/-/media/field%20office%20eseasia/docs/publications/2021/02/ap-hrcc-report\\_online-compressed.pdf?la=en&vs=4426](https://asiapacific.unwomen.org/-/media/field%20office%20eseasia/docs/publications/2021/02/ap-hrcc-report_online-compressed.pdf?la=en&vs=4426)

4. UN Women, 2018. Turning Promises into Action: Gender Equality in the 2030 Agenda for Sustainable Development.

5. IPCC 2021, IPCC Working Group I – The Physical Science Basis.

6. Ibid.

Other consequences are that the women and girls become increasingly vulnerable to forced child marriage, domestic and sexual violence, and human trafficking due to climate change. Evidence suggests that climate change's economic impacts in Malawi have resulted in more girls being married young, with 1.5 million girls at risk of becoming child brides in the coming years.<sup>7</sup>

We face a critical time. Our nations need to come together and take action, transform the way we perceive climate, understand the significant impacts its changes have on women and people in energy poverty, and set us on the path towards achieving Net-Zero. WiN Global, as women and experts in the use of peaceful nuclear technologies - including nuclear energy- we emphasize the need to include nuclear, alongside renewables, as an integral part of the solution.

Nuclear energy is essential for achieving a just energy transition that satisfies the climate goals. It is also critical to address gender-based inequalities and deliver inclusive, sustainable development for all. Nuclear will enable women to access clean water to ensure sanitation and prevent the spread of diseases while offering a clean, affordable, reliable, and development-driven energy source.

*“Global climate objectives fall short without nuclear power in the mix”* UNECE.<sup>8</sup>

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7. EJS Center, 2020. “Why the voices of African women are so important in the fight against climate change”. <https://www.ejscenter.org/news/why-the-voices-of-african-women-are-so-important-in-the-fight-against-climate-change/>

8. UNECE, 2021, Technology Brief. Nuclear Power. [https://unece.org/sites/default/files/2021-08/Nuclear%20power%20brief\\_EN\\_0.pdf](https://unece.org/sites/default/files/2021-08/Nuclear%20power%20brief_EN_0.pdf)

## POLICY RECOMMENDATIONS IN DEPTH

**Climate change is a complex problem that needs a collaborative strategic approach to phase out fossil fuels quickly. We need to deploy all clean energy technology forms, including nuclear, as part of the solution to do this effectively.**

Integrating low-emissions technologies while maintaining energy security and affordable energy prices calls for strategic deployment decisions and collaboration to minimize carbon emissions, strengthen energy security, and ensure affordable energy prices.

*“...limiting human-induced global warming to a specific level requires limiting cumulative CO2 emissions, reaching at least net zero CO2 emissions, along with strong reductions in other greenhouse gas emissions.”<sup>9</sup>*

The Massachusetts Institute of Technology<sup>10</sup> found that nuclear power can prevent cost escalation in a deeply decarbonized electricity grid. Without nuclear, deep decarbonization’s cost and environmental impact increase significantly due to building substantial renewable capacities to maintain reliability. The study recognized the combination of nuclear and renewables as the most affordable solution for case studies considered. While the cost of building new nuclear plants in the west in recent years has been high, the study identified ways to reduce the cost of new nuclear. e.g., governments play a notable role in incentivizing cost reductions by providing well-designed energy and environmental policies and appropriate support in the early stages of new nuclear projects.<sup>11</sup>

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9. IPCC 2021, IPCC Working Group I – The Physical Science Basis.

10. Massachusetts Institute of Technology, 2018. “The Future of Nuclear Energy in a Carbon-Constrained World”, <https://energy.mit.edu/research/future-nuclear-energy-carbon-constrained-world/>

11. Ibid.

Policies need to change to progress towards evidence-based clean energy production. Maintaining the existing nuclear power plants is vital to support the transition to a net-zero solution.

Existing nuclear power plants must stay operational for as long as technically feasible. Evidence to date<sup>12</sup> shows that the premature closure of nuclear plants increases fossil fuel usage to compensate for the lost capacity. Therefore, countries must adopt policies to support operating nuclear plants and avoid unequal competition with renewables subsidies and cheap gas plants.

Policy design should be based on scientific evidence and create an equal playing field for all low-emission technologies. Funding mechanisms, such as the EU Taxonomy, need to be driven by science, not ideology.

**Climate action requires coordinated action across multiple industries to reduce emissions beyond electricity generation. Nuclear power can support the decarbonization of different sectors through hydrogen production, water desalination, and other industrial processes requiring heat.**

Widespread electrification of technologies that currently rely on the combustion of fossil fuels is needed to curb carbon emissions. However, with increased electrification will come a sharp rise in electricity demand and a higher need for various low-carbon energy sources. Nuclear energy offers an opportunity to reduce emissions from electricity generation and other sectors, such as those that can not be electrified or require high temperature, offering a low-carbon solution for numerous processes, such as water desalination and clean hydrogen production.

Climate change consequences will limit clean energy solutions in certain regions. Nuclear energy has a small environmental footprint and can offer solutions for resource-scarce and remote areas.

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12. Conca, J., 2019. "U.S. CO2 Emissions Rise As Nuclear Power Plants Close", Forbes. <https://www.forbes.com/sites/jamesconca/2019/01/16/u-s-co2-emissions-rise-as-nuclear-power-plants-close>

Nuclear energy and wind power have equal lowest median lifecycle carbon emissions (12 gCO<sub>2</sub>e/kWh)<sup>13</sup>, several times lower than solar power and 40 and 68 times lower than gas and coal, respectively. Taking into account that intermittent renewable technologies require significant backup/firming that also has a carbon cost, nuclear has the overall lowest climate impact when considering system emissions.

Nuclear resources requirements are much lower than those of other low-emission energy generation, needing substantially less land to generate the same amount of energy. Nuclear energy fuel needs are significantly lower than fossil fuels and produce considerably less waste (even less if recycled).

Nuclear energy performs highly in terms of environmental impact. Due to its energy density, nuclear energy requires less mining, transport, and material consumption than all other forms of energy. Furthermore, nuclear waste is highly regulated and controlled. It can be efficiently managed and recycled. A recent study by the European Commission Joint Research Council<sup>14</sup> concluded that *“the analyses did not reveal any science-based evidence that nuclear energy does more harm to human health or the environment than other electricity production technologies already included in the taxonomy as activities supporting climate change mitigation.”*

**Climate change is a long-term problem for us all. Advances in nuclear power technologies are fundamental for a long-term sustainable solution.**

Large light water reactors and other existing designs play an essential role in supplying clean, cheap, and reliable energy and will do so for many decades to come. Advances in nuclear energy technology will allow for greater versatility and additional benefits, thus enabling more countries to embark on nuclear power programs.

13. Climate Change 2014: Mitigation of Climate Change Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Annex III, Table A.III.2.

14. European Commission JR, 2020. Science for Policy Report, Technical assessment of nuclear energy with respect to the 'do no significant harm' criteria of Regulation (EU) 2020/852 ('Taxonomy Regulation').

Small modular reactors (SMRs) increase the flexibility of nuclear energy, allowing nuclear power to be used in more and even remote locations and for a wide range of purposes, including industrial processes. There are approximately 50 SMR designs and concepts globally in various development stages<sup>15</sup>, some even approaching operational use.

Advanced reactors such as high temperature and fast reactors increase the efficiency of nuclear energy, reducing waste. According to the World Nuclear Association, fast reactors could increase the already available fuel resources by about 60 times<sup>16</sup> by re-using today's spent fuel. Fast reactors are already in operation, including the Russian BN-800, which allows for disposing of weapons-grade plutonium, reducing global proliferation risks.

## **WE MUST ACT NOW.**

**The world needs to hear women, and Net-Zero needs nuclear.**

We are now in a climate emergency. We need to deploy all available clean energy technologies to avoid the IPCC's most gruesome scenarios. Nuclear energy must be part of the global energy portfolio to ensure that emission targets are met, lift people from energy poverty, improve the quality of life, and provide widespread access to essential services, such as healthcare and education for all, particularly for girls and girls women. Ensuring the long-term operation of existing nuclear power plants and supporting new builds is essential.

Women and girls are particularly affected by poverty, lack of opportunities, and the consequences of climate change will only worsen these prevailing inequalities. Therefore, women must be involved in all steps of decision-making in addressing the climate crisis. We must not be silenced. Women's voices need to be heard: The world and women need more nuclear energy.

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15. IAEA, 2021. Small Modular Reactors. <https://www.iaea.org/topics/small-modular-reactors>

16. WNA, 2021. Fast Neutron Reactors.

<https://world-nuclear.org/information-library/current-and-future-generation/fast-neutron-reactors.aspx>



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