Net zero needs nuclear energy: Tripling nuclear energy needs finance

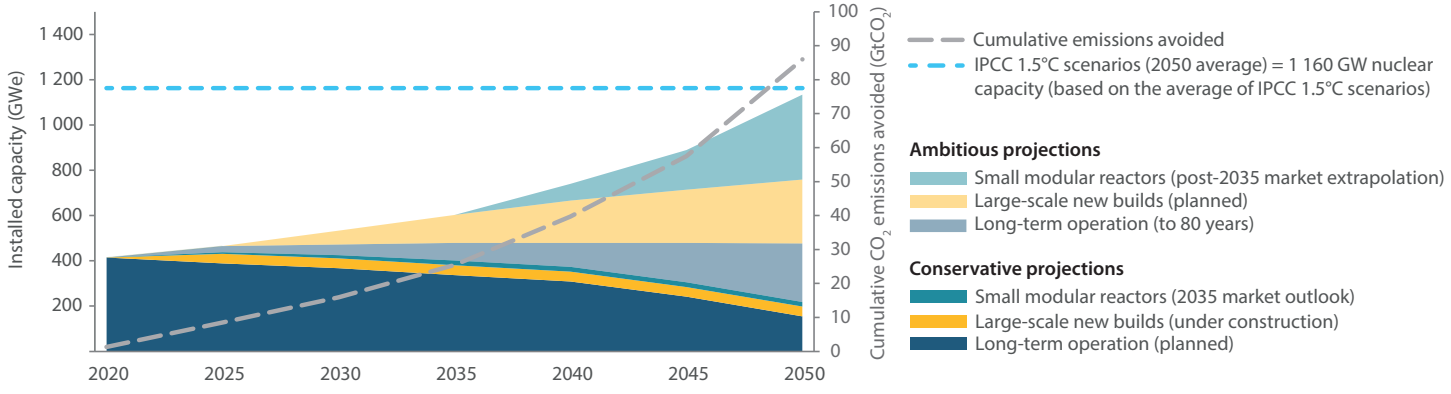
- **Nuclear Energy Agency (NEA) analysis finds that tripling global installed nuclear capacity provides a clear and realistic path to reach net zero by 2050.**
- **The world is not on track to meet this target, with under-investment in the energy transition creating significant barriers to reaching net zero.**
- **Climate finance, including from multilateral development banks, must be scaled up and opened to nuclear energy to maintain hope of limiting global warming to 1.5°C.**

Under-investment in clean energy, including nuclear energy, puts net zero at risk

According to the Intergovernmental Panel on Climate Change (IPCC, 2018), carbon emissions must peak this decade before reaching net zero by 2050 to achieve the objectives of the Paris Agreement (IPCC, 2018). However, the world is not on track and energy-related carbon emissions continued to grow in 2021 and 2022. Under-investment in low-carbon clean energy technologies remains a key reason for this trend in emissions as more than 40% of energy investments continue to flow toward fossil fuels (IEA, 2023).

Nuclear energy plays a significant role in climate change mitigation efforts. Today, nuclear energy is the second-largest source of low-carbon electricity in the world after hydropower, and the largest in OECD countries. Over the past 50 years, the use of nuclear power has avoided more than 70 gigatonnes of CO_2 emissions – about two years' worth of current energy-related emissions. Analysis by the NEA concludes that nuclear energy can and should play an even larger role. Pathways considered by the IPCC for limiting global warming to 1.5°C require, on average, that installed nuclear energy capacity triple to 1 160 gigawatts by 2050, up from 394 gigawatts in 2020 (NEA, 2022).

Figure 1. Full potential of nuclear contributions to net-zero



Source: NEA (2022).

Urgent action is required to scale up affordable financing for nuclear energy

Urgent action is required to scale up investment into new nuclear capacity. NEA analysis shows that a tripling of installed nuclear capacity by 2050 would imply the rate of annual new builds to at least quadruple, from about 7 GWe on average over the last decade to 25-30 GW over the coming decades. Investment in the nuclear sector will need to increase by a similar order of magnitude to meet this target (NEA, 2022). This rate of nuclear new build is roughly similar to that experienced in the US and Europe in the 1970s and 1980s.

Those investments will also need to be secured at affordable rates, considering that nuclear energy, like renewables, is highly capital intensive. Figure 2 illustrates how financial costs can represent two-thirds of the costs of nuclear electricity when the cost of capital reaches 9%. However, financial costs drop to less than one-third if the cost of capital falls to 3%.

Innovative public-private financing models enable nuclear energy projects

All capital-intensive infrastructure projects – including, but not limited to, nuclear energy projects – depend to some extent on direct or indirect support and risk-sharing from governments. This can include direct funding, but also enabling policy frameworks and risk sharing measures, to allow nuclear energy projects to compete on equal footing with other non-emitting energy options.

A number of financing frameworks can be considered for nuclear new build projects where governments actively help to mitigate risks and support financing as part of public-private partnerships. For example, the Regulated Asset Base (RAB) model in the United Kingdom will enable investors to share some of the project's construction risks with consumers, significantly lowering the cost of capital. This will attract private investors and reduce the costs of electricity, which will ultimately benefit consumers. In the United States, the Inflation Reduction Act (IRA) presents several measures to support new nuclear projects, including tax credits on zero-carbon electricity generation, loan guarantees from the Department of Energy, and financial support for developing fuel cycle capabilities in the area of high-assay low-enriched uranium (HALEU).

International financial institutions also have a role to play, alongside national governments, particularly to support access to financing for nuclear energy projects in emerging economies.

Challenges to international developmental finance for nuclear energy

The World Bank's principles for Development Policy Financing (DPF) presently exclude nuclear energy projects from international development finance eligibility (World Bank, 2021). This World Bank policy towards nuclear energy carries cascading impacts on nuclear financing around the world:

i. It affects the availability of international developmental finance for nuclear energy projects more broadly due to the traditional alignment of taxonomies among multilateral development banks and international financial institutions. Today, all international financial institutions but one (the European Investment Bank) either formally exclude or omit nuclear energy from their lists of eligible projects.

ii. It indirectly influences the availability of private financing as commercial banks often follow World Bank policies and guidelines for infrastructure projects' environmental, social, and governance (ESG) appraisals. In particular, private financial institutions have developed the Equator Principles by building on the World Bank guidelines.

The imperative to align financial flows with net zero objectives is currently leading multilateral development banks and international financial institutions, including the World Bank Group, to review their strategies in this area, creating opportunities for evidence-based discussions about the contribution of nuclear energy to climate change mitigation and the importance of financing nuclear energy projects.

To engage on these priorities, e-mail us at: roadmapsnewnuclear@oecd-nea.org

Further reading

IEA (2023), *World Energy Investment 2023*, IEA, Paris, www.iea.org/reports/world-energy-investment-2023.

IPCC (2018)," Global Warming of 1.5°C", www.ipcc.ch/sr15.

NEA (2022), *Meeting Climate Change Targets: The Role of Nuclear Energy*, OECD Publishing, Paris, www.oecd-nea.org/jcms/pl_69396.

World Bank (2021), *2021 Development Policy Financing Retrospective: Facing Crisis*, Fostering Recovery, World Bank, Washington, D.C.

Figure 2. Levelised costs of nuclear electricity depend on the cost of capital