EREF European Renewable Energies Federation

A realistic energy investment approach means prioritising renewables

EREF input to the call for evidence on the Nuclear Illustrative Programme

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EREF welcomes the opportunity to provide input for the Call for Evidence on the Nuclear Illustrative Programme. Although nuclear power has its staunch supporters, namely the EU member states that still include/plan for nuclear energy to meet their energy demand, the reality of its environmental, economic, and operational challenges raises significant concerns. It therefore cannot be regarded as a sustainable tool for the European decarbonisation plans.

In contrast, renewable energy sources such as solar, wind and hydropower offer a truly sustainable and more cost-effective pathway to achieve the EU-goal of climate neutrality by 2050. Nuclear power generation is already on the decline in Europe, as many countries rely on aging reactors, most of which are not expected to operate beyond 2040. In fact, the International Atomic Energy Agency (IAEA) predicts that 325 GW of nuclear capacity will be closed between 2018 and 2050 due to ageing reactors.[1]

One of the most significant drawbacks of nuclear energy is the high initial cost and the extensive time required to build and bring power plants online. For instance, France's "Reaktor 3," in Flamanville, initially launched in 2007, has suffered from delays of over a decade, with costs increasing fourfold.[2] In another similar example, the Hinkley Point C project in the United Kingdom, which has been delayed by up to six years, is already projected to cost €54 billion.[3] These are just a couple of cases that illustrate the financial and operational challenges facing nuclear power projects.

In contrast, renewable energy sources such as wind and PV systems, have a levelized cost of energy (LCOE) that has steadily decreased over the past decades, and is currently lower than both fossil fuel and nuclear power cost ranges. The International Renewable Energy Agency (IRENA) estimates that the global LCOE of newly commissioned utility-scale renewable energy technologies in 2022 were as low as 0.049 USD/kWh (solar photovoltaic) and 0.033 USD/kWh

[1] International Atomic Energy Agency, 2018. Energy, Electricity and Nuclear Power Estimates for the Period up to 2050.

[2] France 24. (2024) France's most powerful nuclear reactor finally comes on stream, 21 December

[3] Lawson, A. (2024) 'EDF takes €12.9bn hit after Hinkley Point C delays and cost overruns', The Guardian, 16 February.

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(onshore wind).[4] This serves to further underline the economic importance of transitioning to a renewables-based energy system.

Due to high costs, nuclear power is heavily supported by governments around the world. The IAEA estimates that global investment in nuclear energy would need to increase significantly from the $50 billion per year invested between 2017 and 2023 to $125 billion annually by 2050 to meet high projections for nuclear capacity.[5] This continued reliance on subsidies raises questions about the long-term economic sustainability of nuclear power. Joe Kaeser, the Supervisory Board Chairman of Siemens Energy, has publicly stated that "there is not a single nuclear reactor in the world that is economically viable**."** In addition to this, the French Court of Auditors confirms that even the French nuclear fleet still has many economic challenges to overcome.[6] In this context, EREF believes that nuclear power should not be equated with other renewable energy sources to prevent diverting investment away from more flexible and cost-effective energy solutions.

From the perspective of independent renewable energy producers, this is a particularly urgent concern. While SMEs and citizen-led projects face administrative and financial hurdles to access support, nuclear investments continue to benefit from preferential treatment under the EURATOM Treaty. EREF has long called for a full revision of EURATOM, which currently shields nuclear from the transparency, democratic oversight, and conditionality that govern renewables. It is neither acceptable nor economically justifiable that a technology with decades of public support (and a legacy of waste and cost overruns), continues to enjoy privileged legal standing over truly sustainable options.

Nuclear power also faces challenges related to its operational limitations. Unlike renewable energy sources such as wind and solar, nuclear energy is not considered dispatchable - it cannot be quickly ramped up or down to meet fluctuations in energy demand. The topic of energy flexibility is becoming increasingly important as more renewable energy sources are integrated into national energy systems and intermittency becomes a more relevant issue. In contrast to nuclear power, renewable energy technologies are adaptable, can respond quickly to changes in energy demand, and are more effective at mitigating Greenhouse Gas emissions. Further, moving towards a decentralised and modernised grid system that incorporates renewables-based flexibility-resources will be considerably cheaper than continuing the nuclear path.

In another seminal report by the European Environmental Bureau (EEB), "How renewables, energy savings and flexibility can replace nuclear in Europe," a Paris-Agreement Compatible pathway is outlined, whereby the transition to a decarbonised energy system can be achieved through the deployment of renewables while phasing out nuclear power entirely. The report

[4] International Renewable Energy Agency (IRENA) (2023) Renewable Power Generation Costs in 2022.
[5] International Atomic Energy Agency (IAEA) (2024) Climate Change and Nuclear Power: Focus on Financing Nuclear Energy in Low-Carbon Transitions.
[6] Reuters (2025) *France 'far from ready' to build six new nuclear reactors, auditor says*. 14 January.

estimates that between 2022 and 2030, the coupled effects of energy efficiency savings and renewable energy deployment will be nearly 10 times greater than the reduction of nuclear power (in EU countries that still rely on nuclear energy).[7]

Small Modular Reactors (SMRs) are currently hailed by some as a solution to the aforementioned challenges, as SMRs are designed to be smaller, faster to deploy, and cheaper than their traditional counterparts. However, SMRs are not a novelty and the first SMRs concepts and pilots were already developed in the 1950ies, to make nuclear power usable as a propulsion technology for military submarines. A wide variety of SMR concepts and developments exist around the world today. The vast majority of these are still at the concept study level. Despite this long timeline and despite intensive funding, first commercial SMR projects are not expected to become operational until 2030. This lag-time further undermines the argument for nuclear energy as a viable solution to the pressing climate crisis, which requires urgent action. On the other hand, renewable energy systems are well-established and have already benefited from extensive troubleshooting. Additionally, even if SMRs are successfully deployed, the question remains whether nuclear power (which supplied only 4.7% of final energy consumption in the EU in 2022 according to the EEB) is worth the considerable investments when cheaper and more sustainable alternatives are available.

Finally, the geopolitical implications of embarking on the nuclear energy pathway must be considered due to the reliance on uranium imports, particularly from Russia. An increase in nuclear capacity will require diversifying global uranium supply and enrichment services due to security concerns. Furthermore, enriched fuel rods produced in Belarus, and reactors using Rosatom technologies have not been included in the list of sanctions against Russia. EREF welcomes the Commission's newly released Roadmap to phase out Russian oil, gas and nuclear energy imports[8] but believes that more needs to be done. To ensure energy sovereignty and resilience, the EU should prioritise investments in decentralised renewable solutions, local value chains and flexible energy systems. Nuclear energy does not support this goal — in fact, it reinforces dependence on vulnerable and often undemocratic suppliers.

The 2025 PINC should critically examine whether limited public funding should continue to be directed toward nuclear projects, especially given that newer technologies such as SMRs face the same problems of cost, waste, and timeframes as large-scale nuclear. From the viewpoint of project developers, it is unacceptable that new financial tools under the Clean Industrial Deal or Taxonomy frameworks would be opened to nuclear while more competitive renewable projects are delayed due to administrative or grid bottlenecks. The minimum demand must be,

[7] European Environmental Bureau (EEB) (2024) Nuclear Phase-out: How renewables, energy savings and flexibility can replace nuclear in Europe.
[8] European Commission, Roadmap towards ending Russian energy imports, COM(2025) 440 final, 6 May 2025.

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to at least amend the EURATOM treaty by a sunset clause, after which the Treaty would expire as has been the case of the European Treaty of Steel and Coal from 1951.

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