

Nuclear Energy in Climate Resilient, Low Carbon Energy Systems

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Climate change impacts every aspect of the energy sector and its economics: the output of each energy generating technology, the volume of energy demanded, and the combined physical and nonphysical infrastructure that ensures safe and reliable operations during and throughout prevailing adverse weather conditions.

Increasingly frequent climatic events such as extreme heat, heavy precipitation, droughts, coastal and river floods, and tropical cyclones will make the design and the implementation of climate resilience plans for the global energy system even more complex, but all the more necessary. Ensuring the climate resilience of energy systems will require both actions to mitigate the impact of climate change — unlocking financing to deploy climate resilient energy technologies to act as a stabilising mechanism — and adaptation measures like technological improvements to support energy system operations in a climate volatile future.

Nuclear electricity and heat can play an important role in helping achieve and maintain climate-resilient energy systems. A diverse and resilient energy foundation, with nuclear energy as a key component, can unlock the successful integration of other low carbon energy technologies in global energy systems, minimise the cost of economy-wide decarbonisation, create meaningful and long-lasting jobs and strengthen energy security. Nuclear operational data reported to the International Atomic Energy Agency by its Member States show that extreme events have a minimal impact on the operations of nuclear power plants – in 2022, energy losses attributed to cooling water availability and other adverse weather-related events accounted for 0.3% of global nuclear generation. This paper will explore and quantify the ways in which nuclear energy can contribute to climate resilient, low carbon energy systems.

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