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(/topics/small-modular-reactors)

Small modular reactors

Small and medium-sized or modular reactors are an option to fulfil the need for flexible power generation for a wider range of users and applications. Small modular reactors, deployable either as single or multi-module plant, offer the possibility to combine nuclear with alternative energy sources, including renewables.

Small modular reactors: flexible and affordable power generation

Global interest in small and medium sized or modular reactors has been increasing due to their ability to meet the need for flexible power generation for a wider range of users and applications and replace ageing fossil fuel-fired power plants. They also display an enhanced safety performance through inherent and passive safety features, offer better upfront capital cost affordability and are suitable for cogeneration and non-electric applications. In addition, they offer options for remote regions with less developed infrastructures and the possibility for synergetic hybrid energy systems that combine nuclear and alternate energy sources, including renewables.

Many Member States are focusing on the development of small modular reactors, which are defined as advanced reactors that produce electricity of up to 300 MW(e) per module. These reactors have advanced engineered features, are deployable either as a single or multi-module plant, and are designed to be built in factories and shipped to utilities for installation as demand arises.

There are more than 80 SMR designs and concepts globally. Most of them are in various



developmental stages and some are claimed as being near-term deployable. There are currently four SMRs in advanced stages of construction in Argentina, China and Russia, and several existing and newcomer nuclear energy countries are conducting SMR research and development.

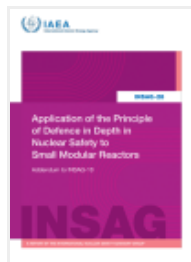
The IAEA is coordinating the efforts of its Member States to develop SMRs of various types by taking a systematic approach to the identification and development of key enabling technologies, with the goal to achieve competitiveness and reliable performance of such reactors. The Agency also helps them address common infrastructure issues that could facilitate the SMRs' deployment.

Publications



18 October 2024

Small Modular Reactors: Advances in SMR Developments 2024 (</publications/15790/small-modular-reactors-advances-in-smr-developments-2024>)



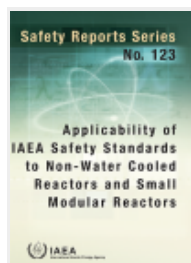
8 July 2024

Application of the Principle of Defence in Depth in Nuclear Safety to Small Modular Reactors (</publications/15676/application-of-the-principle-of-defence-in-depth-in-nuclear-safety-to-small-modular-reactors>)



21 December 2023

Considerations for the Back End of the Fuel Cycle of Small Modular Reactors (</publications/15519/considerations-for-the-back-end-of-the-fuel-cycle-of-small-modular-reactors>)



30 November 2023

Applicability of IAEA Safety Standards to Non-Water Cooled Reactors and Small Modular Reactors (</publications/15228/applicability-of-iaea-safety-standards-to-non-water-cooled-reactors-and-small-modular-reactors>)

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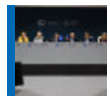
News



(/newscenter/news/accelerating-advanced-nuclear-deployment-meeting-the-supply-chain-challenge)

Accelerating Advanced Nuclear Deployment: Meeting the Supply Chain Challenge

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Nuclear Power in the COP29 Spotlight as Countries and Companies Eye Climate Solutions

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7 (/projects/coordinated-research-projects?)


Active
Coordinated
Research
Projects

type=3720&status=5017&topics=2936)

Related resources

 [Advanced Reactor Information System \(ARIS\) \(https://aris.iaea.org/\)](https://aris.iaea.org/)

 [Advances in Small Modular Reactor Technology Developments \(2020\) \(https://aris.iaea.org/Publications/SMR_Book_2020.pdf\)](https://aris.iaea.org/Publications/SMR_Book_2020.pdf)

 [Technical Working Group on Small and Medium Sized or Modular Reactors \(TWG-SMR\) \(https://www.iaea.org/topics/small-modular-reactors/technical-working-group-on-small-and--medium-sized-or-modular-reactors-twg-smr\)](https://www.iaea.org/topics/small-modular-reactors/technical-working-group-on-small-and--medium-sized-or-modular-reactors-twg-smr)

< [Nuclear power reactors \(/topics/nuclear-power-reactors\)](/topics/nuclear-power-reactors)

> [Small Modular Reactor \(SMR\) Regulators' Forum \(/topics/small-modular-reactors/smr-regulators-forum\)](/topics/small-modular-reactors/smr-regulators-forum)



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