

## DEPLOYMENT OF SMALL MODULAR REACTORS IN EAST ASIA

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Small Modular Reactors (SMRs) are classified by the International Atomic Energy Agency (IAEA) as advanced reactors that produce electricity of up to 300MW. An SMR is a fraction of the size of a conventional nuclear power reactor and will produce carbon-free electricity. The development of SMR technology offers an alternative source of clean energy from nuclear power for Northeast Asian and Southeast Asian countries where energy demand continues to grow rapidly. The Asia-Pacific region has seen renewed interest in nuclear power. In particular, Northeast Asian countries are involved in business and technological investments in developing SMR projects while Southeast Asian countries, as possible commercial users, are exploring SMRs as a future clean energy source.



Nuclear SMR Company	Country	SMR Project
<b>Korea Hydro &amp; Nuclear Power Co., Ltd. (KHNP)</b>	South Korea	Currently developing a System-integrated Modular Advanced Reactor (SMART)
<b>Hyundai Engineering</b>	South Korea	Collaborating with US-based Holtec International on developing SMR-160 that factors in the local natural environment and characteristics, such as climate, temperature, and humidity.
<b>Samsung C&amp;T, Doosan and GS Energy</b>	South Korea	Entered into investment and technological agreements with NuScale Power of the US for the development of NuScale SMR and its coordinated deployment to East Asia.
<b>Mitsubishi Heavy Industries (MHI)</b>	Japan	Completed in 2020 a conceptual design for an integrated small reactor which will be potentially deployed in 2040.
<b>China Huaneng Group Company (CHGC)</b>	China	Successfully commenced in Dec 2023 the operation of the 200 megawatt (MW) high-temperature, gas-cooled reactor (HTGCR) plant developed jointly by state-run utility Huaneng, Tsinghua University and China National Nuclear Corporation
<b>China National Nuclear Corporation</b>	China	Currently constructing and installing its ACP-100 small modular reactor (SMR) in Hainan which is expected to be completed by 2026.



Sources: Compiled from

1) Colleen Howe. 2023. "China starts up world's first fourth-generation nuclear reactor." Reuters, 8 Dec. <https://www.reuters.com/world/china/china-starts-up-worlds-first-fourth-generation-nuclear-reactor-2023-12-06/> (accessed 23 Feb 2024);

2) Holtec International. 2023. "Holtec International and Hyundai Engineering & Construction Company Sign Portentous Agreements with Korea's National Financial Institutions to Support Deployment of SMR-160 Nuclear Reactors Around the World." 2 May. <https://holtecinternational.com/2023/05/02/holtec-and-hyundai-engineering-construction-company-sign-agreements/> (accessed 23 Feb 2024); and

3) Nuclear Engineering International. 2023. "Containment shell installed at China's ACP100 SMR." 7 Nov. <https://www.neimagazine.com/news/newscontainment-shell-installed-at-chinas-acp100-smr-11277895> (accessed 23 Feb 2024).

### Recent SMR Business Deals in Southeast Asia

Country	Foreign Company	Nature of Partnership with Southeast Asian Entities	SMR-oriented Business Projects
Philippines	NuScale	Local partner, billionaire Mr Enrique Razon, representing his Prime Infrastructure Capital, Inc. (Prime Infra). President Marcos met NuScale executives at least 3 times during his 1st yr in office.	They are expected to invest USD6.5 billion to USD7.5 billion (PHP415.5 billion) to provide 462 megawatts to the country by the early 2030's.
Philippines	Korea Hydro and Nuclear Power	Partnered with PHL Dept of Energy (DOE) on SMR pre-feasibility study.	Continued collaboration on any proposed repowering of the idled Bataan Nuclear Power Plant (BNPP) as well as targeted deployment of SMART SMR.
Indonesia	NuScale	Selected by PLN Indonesia Power to carry out the assistance to assess the technical and economic viability of the proposed nuclear power plant in West Kalimantan.	The proposed 462-megawatt facility would utilize NuScale's SMR technology and advance Indonesia's clean energy transition.
Indonesia	Copenhagen Atomics, Topsoe, Alfa Laval Copenhagen, and Aalborg CSP	In May 2023, 4 Danish nuclear companies signed a MOU with Pertamina New and Renewable Energy and Pupuk Kaltim (Indonesian state firm producing ammonia).	These six companies agreed to collaborate on a study related to green ammonia development (for agriculture) using 25 small modular reactors (SMR) powered by thorium in Bontang, East Kalimantan.
Myanmar	Rosatom	Partnered with Myanmar military regime on SMR pre-feasibility study.	Ministry of Electric Power and Rosatom outlined a joint feasibility study on SMRs, under a Memorandum of Understanding (MOU) signed in November 2022 in Sochi, Russia.

Sources: Compiled from

1) Marlon Ramos. 2023. "US firm plans to build small nuclear power plants in PH." 3 May. <https://globalnation.inquirer.net/214302/us-firm-plans-to-build-small-nuclear-power-plants-in-ph#ixzz8SYUj0sYp> ;

2) Nuclear Business Platform. 2023. "Indonesia Opens Doors to More SMR Projects: Wants to Co-Develop SMR Technologies Which Are Still In Development Stage." 21 Sept. <https://www.nuclearbusiness-platform.com/media/insights/insights/indonesia-opens-doors-to-more-smr-projects-wants-to-co-develop-smr-tech-nologies-which-are-still-in-development-stage> ; and

3) Nikkei Asia. 2022. "Myanmar turns to small Russian nuclear reactors for energy solution." 22 Dec. <https://asia.nikkei.com/Spotlight/Myanmar-Crisis/Myanmar-turns-to-small-Russian-nuclear-reactors-for-energy-solution>.