

ABS approves Korean SMR power barge design

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A design for a floating offshore nuclear power barge from HD Korea Shipbuilding & Offshore Engineering and Kepco Engineering & Construction has received approval in principle from the American Bureau of Shipping.



From left to right: Young Tae Moon, Senior Director of Sustainable Growth Department, Nuclear PE, Kepco E&C; Patrick Ryan, ABS Senior Vice President and Chief Technology Officer; and Sang Min Park, Research Director of Marine Energy Technology Lab, HD KSOE (Image: ABS)

Project collaborators include ABS, HD KSOE, KEPCO E&C and the Liberian International Ship & Corporate Registry (LISCR).

The floating small modular reactor (SMR) barge is intended to serve as offshore power generation for remote communities and island electrification. HD KSOE provided basic designs for the marine systems, then ABS and LISCOR completed design reviews based on class and statutory requirements. Kepco E&C will continue to work on risk assessments for future applications.

As part of the Novel Concept Class Approval process, ABS grants an approval in principle at an early conceptual design phase to assist the client in demonstrating project feasibility to its project partners and regulatory bodies. Approval in principle confirms that the proposed novel concept that includes the new technology complies with the intent of the most applicable ABS Rules and Guides as well as required appropriate industry codes and standards, subject to a list of conditions.

"Modern nuclear technologies are increasingly suggested as a potential solution to lower carbon emissions," said ABS Senior Vice President and Chief Technology Officer Patrick Ryan. "Floating production platforms like this barge from HD KSOE have the possibility to scale more easily than what can be done on land. ABS is proud to apply our research and experience to innovative projects such as this one."

"This barge design not only eliminates the inconvenience of selecting onshore sites by being installed at sea but also offers the advantage of an integrated design for thermal energy production," added Kim Sung-Jun, Director of Future Technology at HD KSOE. "This increases the potential to support the production of eco-friendly ship fuels like ammonia or methanol. Furthermore, HD KSOE has invested USD30 million in the fourth-generation SMR company, TerraPower, and we have plans to accelerate the development of future nuclear-powered ships by establishing an SMR research team."

Kepco E&C Senior Director Moon Young-Tae said: "Kepco E&C developed the APR1400, which received design certification from the US Nuclear Regulatory Commission in 2019 and has continuously designed more than 30 nuclear power plants at home and abroad over the past 40 years.

"In addition, we have our own marine SMR, BANDI, and we are making efforts to

develop marine SMR technology as well as onshore SMR. Based on our abundant experience in the nuclear power business and accumulated technology, we will actively contribute to decarbonisation for the environment and future generations."

The BANDI-60 - under development since 2016 - is a block-type pressurised water reactor with a power output of 200MWt/60MWe. According to Kepco E&C, the block-type design - in which the main components are directly connected, nozzle-to-nozzle, instead of using connecting pipes - can eliminate the risk of a large-break loss-of-coolant accident and also provides improved operational surveillance and maintenance as compared with the integral type design. The reactor would operate at a temperature of around 325°C. To enhance the safety and performance, Kepco C&E says several advanced design features are adopted such as soluble boron-free operation, an in-vessel control rod drive mechanism, and top-mounted in-core instrumentation.

South Korean shipbuilder Samsung Heavy Industries (SHI) announced in January that it had completed the conceptual design for the CMSR Power Barge - a floating nuclear power plant based on compact molten salt reactors - and obtained an approval in principle for the design from the ABS.

In April last year, SHI and Danish company Seaborg Technologies signed a memorandum of understanding to manufacture and sell turnkey power plants combining SHI's ship-building expertise and Seaborg's compact molten salt reactor. It also covered the development of hydrogen production plants and ammonia plants.



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