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Possibilities of SMR Fuel Cycle in Brazil

The INB –Indústrias Nucleares do Brasil is a public company of Brazil which exercises the monopoly of the nuclear fuel cycle. Currently, we supply the demand of nuclear fuel for the Brazilian nuclear power plants – Angra 1 and Angra 2, and the planned Angra 3 NPP.

Given the energy targets established for Brazil, from 2GW in 2023 to 8-10GW by 2050 of nuclear power generation, according to the Brazilian Energy Research Office, combined with the 2050 Net Zero scenario. It can be stated that the nuclear power plays a fundamental role in the Brazil outlook of establishing a system without increasing carbonization and that different types of SMRs are under consideration by Brazil as showed in the study performed by the Idaho National Laboratory (INL), in collaboration with the United States Department of Energy and the Brazilian Energy Office (EPE).

This study explored the suitability of power reactors designs for the Brazilian market and selected four design categories that are under consideration, this includes a light-water SMR, high-temperature gas-cooled SMR and Microreactor.

The data available at IAEA Advanced Reactors Information System (ARIS) database together with the IAEA Booklet, was used to perform a comparison of the main technical parameters for three SMRs under evaluation with the current nuclear fuel produced by INB.

The comparison done showed that the fuels for the SMRs evaluated have enrichments and a technology platform very similar to the fuels currently manufactured by INB, with some modifications regarding the fuel rod length, fuel assembly array and components. Leading to the conclusion that it is expected only few adaptations for manufacturing SMR fuels at INB factory. So, we can say that INB is crucial to the future of SMR fuel fabrication landscape.

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