INNOVATION IN NUCLEAR ENERGY DEVELOPMENT: ANALYZING THE BUILD-OWN-OPERATE MODEL IN THE TÜRKIYE-RUSSIA NUCLEAR POWER PLANT PROJECT

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The Türkiye-Russia nuclear power plant (NPP) project represents a significant departure from conventional nuclear power development practices by adopting a Build-Own-Operate (BOO) contract model. This innovative approach, which is unprecedented in the global nuclear energy sector, transfers full ownership and operational responsibility to the contractor-a Russian consortium-while challenging traditional paradigms of NPP development. This study investigates the implications of this novel contractual framework by conducting a comparative analysis of established NPP contracting models, including Turnkey (TK), Split, and Multicontract arrangements. While TK contracts simplify project management for the client, they often restrict technology transfer and may result in elevated costs. In contrast, Split and Multi contracts, though potentially enabling greater knowledge transfer, impose increased project management burdens on the client. The BOO model, as exemplified by the Türkiye-Russia agreement, introduces distinct advantages and challenges. Key benefits include accelerated project timelines and access to advanced Russian nuclear technology. However, the model also raises critical concerns, such as limited opportunities for domestic technology absorption, potential difficulties in cost control, and long-term operational reliance on the contractor. This study examines the specific provisions of the Türkiye-Russia BOO agreement, with a focus on technology transfer mechanisms, cost structures, and the degree of operational control retained by Türkiye. The analysis evaluates the potential implications of this model for Türkiye's longterm nuclear energy expertise, energy safety and security, and its capacity to make informed decisions regarding future nuclear power projects. Furthermore, the study explores how the lessons learned from Türkive's experience with the BOO model could inform global nuclear energy policy, particularly in addressing the complexities of knowledge and technology transfer, cost management, and the localization of manufacturing capabilities in the nuclear sector. By assessing the suitability of the BOO model for other nations pursuing nuclear energy programs. this research aims to contribute to a broader understanding of innovative contracting approaches in the context of sustainable and secure energy development.

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