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## **Tailored MBSE Approach for SMR Gen IV Architecting**

The accelerating energy transition requires rapid access to decarbonized sources. Although Gen IV SMRs present a potential solution, they face challenges such as complex licensing processes and architectural issues, as they must align with diverse global regulations and adapt to varied site-specific requirements, complicating standardization and deployment.

In the face of these challenges, the need for a scalable, agile project structuring and organization is becoming increasingly apparent. This structure must be able to support the rapid expansion characteristic of Gen IV SMR projects, while also having the necessary flexibility to adapt to a dynamic reallocation of responsibilities.

The core of our approach is the initial structuring of enterprise data models, core engineering processes and methodologies. By adopting a holistic Model-Based Systems Engineering (MBSE) approach that integrates key domains, with safety as the cornerstone, it is ensured that the resulting structuring of engineering data can meet demonstration expectations.

In addition, we are discussing the creation of a nuclear-specific layer in numerical tools, enhancing the consideration of safety concerns during architecture definition. This materializes in the creation of a customized profile in an MBSE tool, which incorporates nuclear safety terminology and aligns with industry usage.

By focusing on digital continuity, our approach guarantees a seamless transition between the various development phases, systems engineering processes and lifecycle phases. This means preserving the reliability of information (traceability) and promoting uniform communication (modelling).

The presentation will conclude by illustrating the potential benefits of our approach, particularly in safety demonstrations.

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