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BRIDGING HUMAN COGNITION AND SYSTEM FUNCTIONALITY

COGNITIVE DECISION SUPPORT IN ENERGY SYSTEMS ACROSS THE LIFE CYCLE

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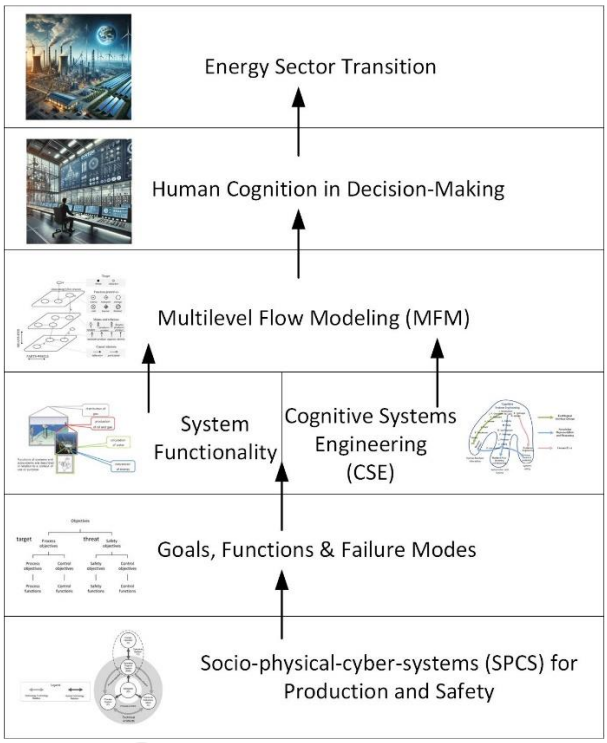
As the energy sector transitions toward sustainable alternatives, ensuring the safety and reliability of energy systems becomes increasingly critical. Throughout the life cycle of energy systems, understanding the essential role of human cognition in decision-making processes is vital for effective risk management and enhanced situation awareness.

Multilevel Flow Modeling (MFM) was developed alongside Cognitive Systems Engineering (CSE) to address the complexities inherent in system functionality. While CSE techniques often focus on work domain analysis, the coupling between work domain analysis and system functionality can be weak. MFM aims to provide a structured framework for understanding and analyzing the functional relationships within complex systems. By bridging the gap between cognitive processes and system functionality, MFM represents how different elements of a system interact, facilitating improved decision-making and operational effectiveness.

Through MFM, we can identify goals, functions, and potential failure modes within a system, thereby enhancing safety and performance. This modeling approach offers a clearer understanding of how human operators can effectively engage with system functionalities, ultimately supporting a safer and more efficient energy infrastructure. Over the years, MFM has also been integrated with other methodologies, emphasizing the need for dynamic assessments that improve design, operation, maintenance, and risk management.



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