

## Applying Systems Thinking and a System of Systems Approach to Facilitate Sustainable Grid Integration of Variable Renewable Energy

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**Abstract :** This paper presents a Systems Thinking and System of Systems (SoS) viewpoint for managing requirements complexity in the grid integration of Variable Renewable Energy (VRE). To achieve a SoS approach, it is often necessary to inculcate a Systems Thinking (ST) perspective in the planning and design of the attendant system. We show how this approach can support the enhanced integration of VRE (wind, solar small hydro) for which intermittency is a key inhibiting factor to their sustainable grid integration. The results indicate that a ST and SoS approach are a critical tool for decision makers in the planning, design and deployment of VRE Sources for their sustainable grid-integration in accordance with relevant techno-economic, social and environmental requirements.

**Keywords :** sustainable grid-integration, system of systems, systems thinking, variable energy resources

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