

RESILIENCE OF NET-ZERO ENERGY SYSTEMS AND INFRASTRUCTURES: METRICS AND MEASUREMENT METHODS

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The net-zero energy systems and infrastructure are considered as a vital part of the pathway towards a low carbon, sustainable and nature-friendly future. The net-zero energy infrastructure provides essential service of “clean” and “green” power supply to all the other critical infrastructure sectors such as telecommunications, water supply systems, transportation, government services, and public health. Disruptions and breakdowns of the net-zero energy systems from natural disasters, technical failures or man-made accidents can affect large segments of the population and cause significant damage to the environment and large-scale economic and social harm. This paper aims to provide a comprehensive overview of resilience definitions used across different energy-using sectors, followed by an in-depth analysis of resilience assessment and quantification in net-zero energy technologies (including renewable fuels for power generation, long-duration energy storage, and battery electric transportation systems). The current state-of-the-art in resilience assessment methodologies are examined and major gaps and potential research areas for future advancements are identified.

Keywords: Net-zero energy; resilience engineering; disruption; risk analysis; recovery; metrics.

References

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