

A Hybrid Energy Harvester for Pipeline Remote Sensing Applications in Qatar

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Qatar's rapid growth in industrialization and infrastructure comes forward with a diversification of the economy. Among the many available projects, Qatar has thousands of kilometers of pipeline dedicated to water, oil, and gas transmission as shown in Figure 1. Reliable pipeline inspections are ultimately crucial to monitor potential risks of failure that may seriously affect the pipeline integrity as well as human health, safety, and the environment. Recent advances in materials, wireless sensing technologies, and data analysis methods have allowed for the innovation of smart wireless networks. Remote sensors can be used to detect corrosion, leak, vibration, sudden pressure, or temperature variations that may disrupt or damage the normal pipeline operation.