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Substantial resources are currently being spent on establishing offshore renewable energy systems such as wind and wave energy with recent trends to move sites to increased distances from shore and to greater water depths to exploit more energetic climatic conditions. The wind power industry has grown considerably over the past 15 years, but other technologies such as wave and tidal energy have also emerged as potential alternatives. With this trend to moving offshore, many associated technological and logistical challenges emerge. Currently, the relative immaturity of energy conversion technologies and operational uncertainties makes the cost of energy high compared to other more conventional energy sources and ongoing research will help reduce the cost of offshore renewable energy. Maintaining existing assets and developing strategies for new assets becomes a challenge and have a key impact on downtime and lost revenue. High quality research helps to ensure that offshore renewable energy becomes an economically viable alternative to conventional energy sources.

This special section of the Journal of Risk and Reliability contains a set of papers that provide a broad and in-depth analysis of some of the most recent advances in risk and reliability for offshore renewable energy.

Investment in the wind power industry has increased in recent years with major developments in offshore wind farms in the UK, Europe and Worldwide. The contents of this special section reflect this with four papers focusing on offshore wind energy. Harrison, Hawkins, Eager and Cradden investigate the influence that the reliability and availability of offshore wind farms in Great Britain. Shafiee and Finkelstein develop a proactive group maintenance policy for systems that are continuously monitored. Santos, Teixeira and Guedes Soares develop a mixed-method model, using generalized stochastic Petri nets with predicates coupled with Monte Carlo simulation, to support operation and maintenance decision making. Hawker and McMillan develop a quantified model to investigate how different vessel contractual models may impact on energy yields for different wind farms that are pulling from a common maintenance resource.

In addition to wind power, other offshore renewable energy such as wave and marine have emerged as viable alternatives and competitors to wind energy. Thies, Johanning, Karikari-Boateng, Ng and McKeever review different reliability prediction models and compare how tests are used to inform reliability estimates for marine energy systems. The special section is concluded by Ambühl, Marquis, Kofoed and Sorensen who explore a risk-based inspection and maintenance planning approach to minimise the overall cost of lost electricity production.

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