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Editorial
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Editorial

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Wind energy is expected to become an important clean and renewable source of electricity generation in the world. Although there has been a rapid growth in the use of onshore and offshore wind farms as sources of renewable energy, there are technical challenges facing the wind energy sector that could dampen its growth. Building economic and reliable foundations remains one of the main challenges for reducing the cost of wind energy and thus making it more competitive.

This themed issue of *Energy* is on wind turbine foundations. Its purpose is to provide researchers and practitioners from academia, industry and government with the latest scientific research on wind turbine foundations.

For this themed issue, papers were solicited on topics identified as critical knowledge gaps in the development of wind farms. These potential topics are

- foundation methods for onshore and offshore wind turbines
- construction methods for deep-sea wind turbine foundations
- dynamic soil–foundation interaction
- fatigue in concrete foundation
- design methods and standards for turbine foundation (onshore and offshore)
- scour around wind turbine foundation and protection and monitoring technologies
- integrated sensing technologies for health monitoring
- geotechnical methods for wind farm development and design
- maintenance and repair
- deployment and construction methods
- life-cycle cost analysis.

The submitted technical papers were thoroughly peer reviewed and only five papers were accepted for publication in this issue. The first paper, by Arshad and O'Kelly (2013), reviews several issues related to wind turbines with emphasis on foundations. These authors discuss different offshore foundation options in terms of general layout, loading characteristics and related natural frequency. In addition, they identify some new approaches/developments and areas for further research that may help reduce the cost of wind energy.

The second paper, by Löhning *et al*. (2013), shows how offshore wind turbines' grouted connections are generally used to install a transition piece between the steel tower and the monopile foundation. They use non-linear finite-element analysis to obtain a detailed insight into the structural behaviour of grouted connections. The third paper, by Currie *et al*. (2013), deals with structural health monitoring of onshore wind turbine concrete foundations. They provide a detailed review of possible damage and deterioration mechanisms of foundations with can-connection systems. The authors propose a novel condition-based monitoring solution to aid in early warning of failure.

In the fourth paper, Sumer and Nielsen (2013) present the results of an experimental study on scour protection around offshore wind turbine foundations, with special emphasis on the sinking failure of the scour protection adapted in Horns Rev 1 offshore wind farm, Denmark. The final paper, by Michalis *et al*. (2013), presents a new monitoring system designed to remotely detect scour around offshore wind turbine foundations using embedded capacitive sensors. Their experimental results include the effect of different types of soil and temperature on the response of the sensor during lab-simulated scour.

The guest editor of this themed issue would like to thank all of these authors for their efforts in preparing the papers, and also the reviewers for their valuable contribution to this issue.

REFERENCES

Arshad M and O'Kelly BC (2013) Offshore wind-turbine structures: a review. *Proceedings of the Institution of Civil Engineers – Energy* **166(4)**: 139–152, http://dx.doi.org/10.1680/ener.12.00019.

Currie M, Saafi M, Tachtatzis C and Quail F (2013) Structural health monitoring for wind turbine foundations. *Proceedings of the Institution of Civil Engineers – Energy* **166(4)**: 162–169, http://dx.doi.org/10.1680/ener.12.00008.

Löhning T, Voßbeck M and Kelm M (2013) Analysis of grouted connections for offshore wind turbines. *Proceedings of the Institution of Civil Engineers – Energy* **166(4)**: 153–161, http://dx.doi.org/10.1680/ener.12.00009.

Michalis P, Saafi M and Judd M (2013) Capacitive sensors for offshore scour monitoring. *Proceedings of the Institution of Civil Engineers – Energy* **166(4)**: 189–196, http://dx.doi.org/10.1680/ener.12.00010.

Sumer BM and Nielsen AW (2013) Sinking failure of scour protection at wind turbine foundation. *Proceedings of the Institution of Civil Engineers – Energy* **166(4)**: 170–188, http://dx.doi.org/10.1680/ener.12.00006.