

Dr. Wolf-Gerrit Fruh
Associate Professor
School of Engineering & Physical Sciences
Institute of Mechanical, Process & Energy Engineering
Postal address:
Riccarton
Edinburgh
United Kingdom
Email: W.G.Fruh@hw.ac.uk



Research interests

My research continues to contribute to fundamental research in the transition to geophysical turbulence alongside more recently developed focus on wind turbine and wind farm aerodynamics, wind energy resource assessment, and the integration of variable power generation into the grid.

An example of the wind turbine and wind farm aerodynamics was a development of a high-resolution computational fluid dynamics model of a wind turbine in its domain used for evaluating the effect of turbulence on the decay of the wake behind the rotor. This is currently being extended to modelling a full operational offshore wind farm in collaboration with that wind farm's operator.

The work on wind resource assessment has recently addressed the long-term stability of the wind resource in Scotland, and a current PhD student with industrial funding is developing a novel type of MCP wind resource assessment.

Most recently, I have begun to be interested in the dynamics of an entire grid. be it the national grid or a micro-grid, when supplied with a substantial contribution from variable renewable generation.

Research output

A model for optimum prioritisation of energy storage use. I: Optimum local use of local generation

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Kyle, R., Lee, Y. C. & Früh, W-G., Aug 2020, In: *Renewable Energy*. 155, p. 645-657 13 p.

The effect of energy storage on the residual load duration curve (rLDC) of a system with high renewable energy contribution

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Using magnetic fluids to model convection of planetary or stellar interiors in laboratory scale

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