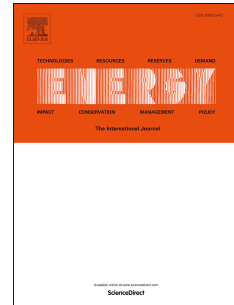


# Accepted Manuscript

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PII: S0360-5442(17)32113-8

DOI: [10.1016/j.energy.2017.12.075](https://doi.org/10.1016/j.energy.2017.12.075)

Reference: EGY 12024

To appear in: *Energy*

Received Date: 9 August 2017

Revised Date: 30 November 2017

Accepted Date: 14 December 2017

Please cite this article as: Yan S, Shi S, Chen X, Wang X, Mao L, Liu X, Numerical simulations of flow interactions between steep hill terrain and large scale wind turbine, *Energy* (2018), doi: 10.1016/j.energy.2017.12.075.

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# Numerical simulations of flow interactions between steep hill terrain and large scale wind turbine

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## Abstract

With the scale of wind turbine increasing, the obstructing effect of wind turbine to the surrounding flow of local terrain is getting more remarkable. This influence is seldom considered in current micro-siting of complex-terrain wind farms. The present paper investigates the flow around hills with different Height/Width (H/W) ratios, as well as the interactions between the surrounding flow using three dimensional numerical simulations. A 2 MW wind turbine is placed on five different locations. The simulation results show that the power production could be over-predicted by more than 10% if the wind turbine is not modeled in the computational processes. The H/W ratio which has significant influence on the flow structure around the hill. For the hill with a small H/W ratio, the surrounding flow has little variation with and without wind turbine. For the hill with a large H/W ratio, large scale flow separation occurs on the lee side under the wind turbine disturbances.

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