The Wind Energy Potential of Iceland

Downscaling simulations performed with the Weather Research and Forecasting (WRF) model were used to determine the large-scale wind energy potential of Iceland. Local wind speed distributions are represented by Weibull statistics. The shape parameter across Iceland varies between 1.2 and 3.6, with the lowest values indicative of near-exponential distributions at sheltered locations, and the highest values indicative of normal distributions at exposed locations in winter. Compared with summer, average power density in winter is increased throughout Iceland by a factor of 2.0e5.5. In any season, there are also considerable spatial differences in average wind power density. Relative to the average value within 10 km of the coast, power density across Iceland varies between 50 and 250%, excluding glaciers, or between 300 and 1500 W m\(^{-2}\) at 50 m above ground level in winter. At intermediate elevations of 500 e1000 m above mean sea level, power density is independent of the distance to the coast. In addition to seasonal and spatial variability, differences in average wind speed and power density also exist for different wind directions. Along the coast in winter, power density of onshore winds is higher by 100 e700 W m\(^{-2}\) than that of offshore winds. Based on these results, 14 test sites were selected for more detailed analyses using the Wind Atlas Analysis and Application Program (WAsP).

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

General information
State: Published
Organisations: Department of Wind Energy, Meteorology, Wind Energy Systems, Icelandic Meteorological Office, University of Iceland
Pages: 290-299
Publication date: 2014
Peer-reviewed: Yes

Publication information
Journal: Renewable Energy
Volume: 69
ISSN (Print): 0960-1481
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 5.38 SJR 1.847 SNIP 2.008
Web of Science (2017): Impact factor 4.9
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.83 SJR 1.661 SNIP 2.05
Web of Science (2016): Impact factor 4.357
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 4.51 SJR 1.767 SNIP 2.085
Web of Science (2015): Impact factor 3.404
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 4.51 SJR 1.925 SNIP 2.621
Web of Science (2014): Impact factor 3.476
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.63 SJR 1.989 SNIP 2.719
Web of Science (2013): Impact factor 3.361
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 3.97 SJR 1.787 SNIP 2.699
Web of Science (2012): Impact factor 2.989
ISI indexed (2012): ISI indexed yes
Original language: English
Keywords: Wind energy potential, Wind atlas, Mesoscale modelling, Wind resource mapping, Iceland
Electronic versions:
The_wind_energy_potential_of_Iceland.pdf
DOIs: 10.1016/j.renene.2014.03.040

**Bibliographical note**
This is an open access article under the CC BY-NC-ND license

Research output: Research - peer-review › Journal article – Annual report year: 2014