



An Icelandic wind atlas

Nikolai Nawri (1), Gudrun Nína Petersen (1), Halldór Björnsson (1), Þórður Arason (1), and Kristján Jónasson (2)
(1) Icelandic Met Office, Reykjavik, Iceland, (2) Department of Computer Science, School of Engineering and Natural Sciences, University of Iceland, Reykjavík, Iceland

While Iceland has ample wind, its use for energy production has been limited. Electricity in Iceland is generated from renewable hydro- and geothermal source and adding wind energy and wind energy has not be considered practical or even necessary. However, adding wind into the energy mix is becoming a more viable options as opportunities for new hydro or geothermal power installation become limited.

In order to obtain an estimate of the wind energy potential of Iceland a wind atlas has been developed as a part of the Nordic project “Improved Forecast of Wind, Waves and Icing” (IceWind). The atlas is based on mesoscale model runs produced with the Weather Research and Forecasting (WRF) Model and high-resolution regional analyses obtained through the Wind Atlas Analysis and Application Program (WAsP). The wind atlas shows that the wind energy potential is considerable. The regions with the strongest average wind are nevertheless impractical for wind farms, due to distance from road infrastructure and power grid as well as harsh winter climate. However, even in easily accessible regions wind energy potential in Iceland, as measured by annual average power density, is among the highest in Western Europe. There is a strong seasonal cycle, with wintertime power densities throughout the island being at least a factor of two higher than during summer. Calculations show that a modest wind farm of ten medium size turbines would produce more energy throughout the year than a small hydro power plants making wind energy a viable additional option.