the IRIS CONSORTIUM

IMPACT of WIND GENERATORS on the GLOBAL SEISMOGRAPHIC NETWORK (GSN) November 2016

Recommendation:

IRIS **recommends that a buffer of at least 15 km be kept between existing Global Seismographic Network (GSN) stations and wind-turbine emplacements to ensure acceptable recording conditions for seismic sensors.**

Supporting Information:

The GSN is the premier scientific infrastructure for recording and understanding ground motion from seismic events worldwide. All GSN data are freely and openly available. Society benefits from the GSN in several important ways in addition to the network's primary purpose of basic scientific research into the properties and processes of Earth's interior. GSN data are used to locate and characterize earthquakes and other seismic events worldwide, to refine hazard assessments and update building requirements in seismically active regions, to warn communities of impending tsunami-wave arrivals, and to detect illicit underground detonations of nuclear devices. The GSN represents an aggregate infrastructure investment of over $200M.

The basic data for seismological research includes extremely small ground vibrations from moderate to large seismic events occuring anywhere on Earth. Accordingly, a major criterion for selecting the location of GSN stations is the distance from vibrational noise sources, either anthropogenic or natural. Sites are generally placed far from inhabited areas where traffic or machinery could drown out the faint signals that GSN sensors are designed to detect and record.

Installation of wind turbines near GSN stations diminishes the value of data recorded at these sites. Research clearly indicates that the ground vibrations created by wind turbines through motion of the rotor or swaying of the support tower can be detected by seismic instruments many kilometers away. These vibrations have a range of frequencies that overlaps with signals important for understanding earthquake behavior and hazardous ground shaking. There is no fixed distance at which ground motion from wind turbines fully disappears. However, the ground noise generated by wind farms typically degrade the earthquake signals to distances of at least 15 km. An uncontrolled installation of wind turbines can therefore disturb the operation of the GSN sensors and adversely affect observational conditions for earthquake monitoring worldwide.

Founded in 1984 with support from the US National Science Foundation, IRIS is a consortium of over 100 US universities dedicated to the operation of science facilities for the acquisition, management, and distribution of seismological data. IRIS programs contribute to scholarly research, education, earthquake hazard mitigation, and verification of the Comprehensive Nuclear-Test-Ban Treaty.

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