

CASE STUDY

Meridian Energy
New Zealand

New Zealand
Environmental Noise Monitoring
Noise Monitoring Solution

For the growing market of renewable energy production, Brüel & Kjær has made a successful solution for wind farm noise monitoring.

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Fig. 1 The site as it will look after the commissioning of the wind farm



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Project West Wind – Wind Farm Noise Monitoring

Wellington, the New Zealand capital, is one of the windiest cities in the Southern hemisphere, making it the ideal place for wind farming. Meridian Energy is New Zealand's largest producer of electrical energy and uses only renewable energy sources such as hydro and wind power generators. So it made good sense for Meridian Energy to choose Terawhiti Station and Makara Farm, 8 km west of Wellington, as the location for Project West Wind – its wind farm currently under construction. The wind farm will have 62 wind turbines and each turbine will have a capacity of 2.3 MW – a total output of 142.6 MW. Each turbine is on a 70 m tower and has a rotor diameter of 82 m. Together they will generate enough energy to meet the needs of about 70 000 average households.

Allaying Local Concerns

Understandably, the local community, concerned about the noise impact of the wind farm, asked Meridian Energy to monitor background noise at five locations around the site before any work

commenced. However, the background noise level at the proposed locations is consistently quite low, meaning no noise events are available to trigger sound recordings. Meridian had previously purchased sound level meters from Brüel & Kjær and being aware of the Brüel & Kjær Noise Monitoring Terminal (NMT) option, asked Brüel & Kjær to recommend an appropriate solution.

After initial discussions with Brüel & Kjær's New Zealand Sales Manager, Ross McBeath, it appeared that while the NMTs were capable of monitoring a number of the variables required to assess the noise from the wind farm, there were some important variables that they were not able to record. Meridian finalised its requirements for the noise monitoring equipment and sent these to the local Brüel & Kjær agent. The agent in turn took up the requirements with Denmark to recommend a system that could meet the specific requirements. The specific requirements requested were for a low noise floor, the recording of L95 1/3-octave spectra averaged over 10 minutes, the capability to trigger sound recording on a time based trigger rather than a level trigger and that the recorded sound files be in a .WAV format to allow narrowband analysis for identifying and quantifying tonal prominence to be undertaken. Data download is via GPRS, PSTN or USB memory stick.

The system was delivered on time with full customer satisfaction.

Installation and Training

The support from the local agent and Brüel & Kjær's willingness to modify the equipment to the customer's requirements were key criteria in Meridian's decision to select Brüel & Kjær as providers of their upgraded NMTs as a solution to the noise monitoring requirements for Project West Wind. The installation of the four permanent and one portable NMT went extremely well and was undertaken with support from Brüel & Kjær staff from Australia and New Zealand. During the installation phase, NMT software training was also provided.

The equipment has been operational since the middle of July 2008 and is currently measuring the background noise levels around the wind farm. Once the wind farm becomes fully operational the NMT units will be used to determine the change in the overall levels to ensure that the wind farm complies with its resource consent conditions (planning conditions). It is also hoped that due to the extensive noise information being collected around the site that the data can be used for other studies on wind farm noise.

Fig. 2
*Installing the Noise
Monitoring Terminal*



This project has provided valuable inside information about wind farm noise monitoring and will help Brüel & Kjær to develop solutions for the growing market of renewable energy production. The success of this project will lead to more orders from Meridian Energy for future wind farm projects. In addition, the time-triggered sound recording, WAV file quality for subsequent tone assessment and 1/3-octave periodical statistical analysis are now available in all standard noise monitoring systems based on Environmental Noise Management Software Type 7843 Noise Monitoring Terminals Type 3639-E as a benefit to

all future customers.

Thanks to Mr Paul Botha from Meridian Energy, Mr. Ross McBeath from AVIA Ltd and the Brüel & Kjær Environmental team for all their support and cooperation during this very interesting project.

The System

Standard products:

- Environmental Noise Management Server Type 3642 (Environmental Noise Management Software Type 7843 on a PC)
- 5 × Noise Monitoring Terminals Type 3639-E-203 with Type 4198 Weatherproof Microphone Unit
- Weather Stations MM 0256

We developed:

- A time trigger recording option for sound recording, and the recorded files are saved as WAV files (instead of MP3) for subsequent tone assessment
- 1/3-octave statistical analysis in the periodic report

For more information go to www.bksv.com.



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