CASE STUDY

Environmental Noise Monitoring

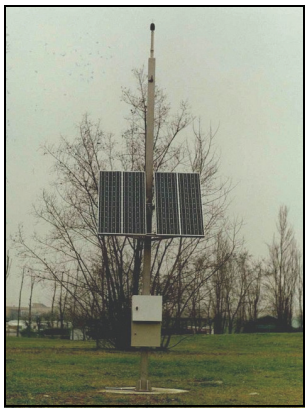
Solar/Wind Power for Noise Monitoring Terminals

In many locations' ideal noise monitoring positions may not be ideal from a point of view of connection to local power services and data communication lines. While the requirements of power and telecom for noise monitoring terminals are not onerous, long runs of cables from the utility companies can be undesirable and very expensive.

Solar Power Solutions

A noise monitoring terminal's (NMT) low power consumption and its ability to operate fully without power hungry cooling and heating units inside its enclosure mean that it is suitable for power from solar panels. The NMT may be continuously powered by battery which in turn is kept charged via solar energy. This solution is most appropriate in areas where there is a large amount of solar energy. Such solutions have been installed in Italy, Greece and Southern France.

Solar/Wind Hybrid Solutions



Three solar panels are mounted half way up the microphone mast

However, as latitude increases it becomes less viable to operate units continuously with solar power only. An installation, for example, in Manchester, UK would require six solar panels and a large battery array to operate continuously throughout reduced daylight hours in winter.

An alternative solution is a hybrid solar energy and wind power system which, with a battery pack, can provide a viable source of continuous power for NMTs remote from land line power.

For the Manchester area, three solar panels, each measuring approximately 1.2 m high by 0.5 m wide would be required. The panels would be mounted on each side of the microphone mast, approximately half way up.

The installation would have an additional enclosure mounted on the concrete base to house a 135 Ahr lead acid 12 V battery to provide up to five days of battery backup to power the unit at night time and in times of low solar energy.

Solar energy would be used to charge the NMT's battery pack during the months of March to September. During the other months a wind generator would provide the power requirements.

The wind generator could either be mounted half way up the microphone mast or on its own mast. The generator itself makes a small amount of noise but this is typically below the wind induced noise at the microphone due to the same wind speed. However, for very low level measurement (<30 dB), caution over mounting arrangements may be needed.

The number of solar panels needed and the additional wind generator and backup battery requirements will depend upon the location, historical amount of solar radiation, wind speed profiles and the allowable downtime in periods of low solar radiation.

This hybrid arrangement would provide an effective means of continuously powering NMTs over a wide range of locations without the need for costly land lines. Coupled with the options available for wireless communication, this would enable a complete stand alone installation that would eliminate expense and the risk of delays to the NMT installation.

The following considerations should be taken into account:

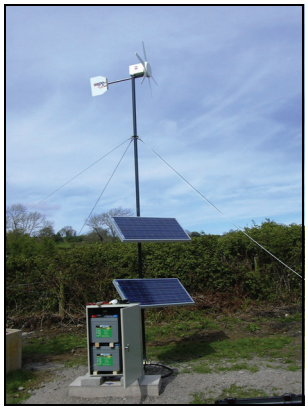
- Even slight shading significantly reduces the output from the solar panels. For reliable operation a free aspect must be present
- Solar panels will be prone to vandalism and should not be used in built up areas
- Installation may be subject to additional planning restrictions
- A security fence may need to be installed around the equipment

The full range of NMTs from Brüel & Kjær support the use of solar panels and wind generators for supplementary power.

For more information, contact your local Brüel & Kjær representative.

Bristol Airport, UK

The noise monitor is required to operate 24 hours a day 365 days a year. Two 65 W solar panels and a wind turbine provide the required power



In 2007, Bristol Airport needed to supplement their airport noise monitoring system with additional monitoring locations. Suitable locations were identified but these were far away from power and communication alternatives. Estimates of over £16 000 for power alone led the airport to look at an alternative approach. Additionally, it was felt that powering the equipment from renewable energy aligned very well with the environmental programmes of the airport.

In this application, the noise monitor is required to operate 24 hours a day 365 days a year. To provide the required power continuously at this location, two 65 W solar panels and a wind turbine were required. These were mounted on a single mast. Two 135 Ahr deep cycle gel batteries provide power backup in case of no wind or solar energy for prolonged periods of time. The batteries along with a charge controller and regulator for the solar panels were located in a ground mounted cabinet. The mast itself is supported by guy lines and designed to withstand expected maximum wind speeds for the area.

The NMT is located on a separate monitoring mast away from the wind turbine to limit any noise from the turbine at the measurement point. Depending on the application, this may not be necessary as the turbines are barely audible at low speeds and difficult to discern against much ambient noise at higher wind speeds. For the measurement of low noise levels, separate mounting is recommended.

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Local representatives and service organisations worldwide

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