

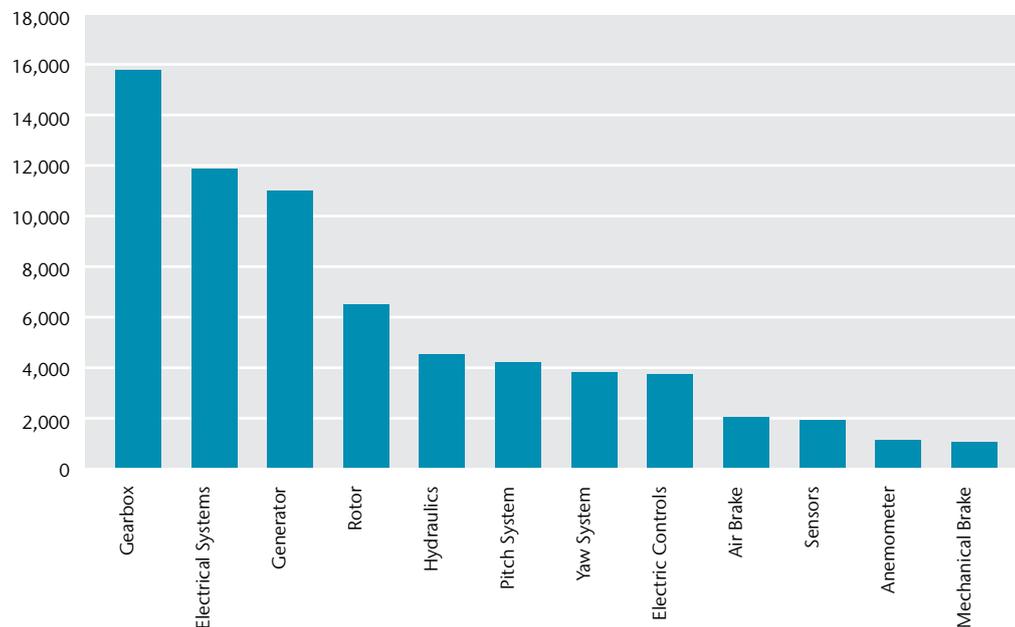
# Wind Energy Risk Engineering

The renewable energy market is rapidly expanding driven by a need to find cheaper and cleaner ways of producing electricity. According to the 2013 report issued by Clean Energy Australia, 14.76% of electricity came from renewables that year, with wind energy making up 27% of that figure. In 2013 655MW of wind energy was installed in Australia demonstrating a rapidly expanding sector. As this sector grows renewable energy technologies will become a feature of leading insurers risk portfolios.

## The Challenges

There are many challenges facing the Wind Industry, such as Planning, Grid Connection, Transport of Large Components to site, in addition to managing large construction projects in remote areas. Once operational there are ongoing issues such as security, fire and breakdown which may affect the efficiency and longevity of any wind farm. A fire within the substation or turbine will be severe in terms of property damage and business interruption, but are typically less frequent than machinery breakdown type claims. Identifying and mitigating breakdown claims is an important issue for both the insurer and the client.

The National Renewable Energy Laboratory in the US conducted a study looking at 27,000 different turbines to find out what the most common failures were. The study included wind turbines ranging in size from 500kW to 5MW. The data that they compiled is illustrated in the graph below.



As can be seen the common failures that occur involve the gearbox, electrical systems, generator and rotors. This would typically represent the claims profile experienced by Insurers who cover these types of risks. These failures could potentially be a result of inadequate maintenance, lack of condition assessment or serial type defects resulting from manufacturing flaws.

Repeated failures can accumulate over the life-time of the wind farm costing both the operator and the insurer considerable sums of money in both lost revenue and property damage claims. With the right knowledge and experience, controls can be put in place which will help identify potential breakdown issues.

Our specialist team can help you

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## The Costs

As indicated by NREL in their 2011 Data Collection for US Wind Energy Projects, the typical costs involved with the replacement of key components can be as follows, which includes labour and crantage where applicable. In addition to the costs below there will be loss of revenue and transit expenses.

| <b>Component Description</b> | <b>USD</b> | <b>AUD</b> |
|------------------------------|------------|------------|
| Blade Structural Repairs     | \$154,000  | \$169,974  |
| Main Bearing Replacement     | \$181,000  | \$199,775  |
| Gearbox Replacement          | \$383,000  | \$422,719  |
| Generator Replacement        | \$195,000  | \$215,222  |

*Costs are typical for Turbines ranging in size from 1.5 to 2MW*

## Aon's Solutions

Aon's Risk Engineering Team has the expertise to provide technical assessments on these types of assets that highlight key property, machinery breakdown and business interruption risks that are unique to Wind Energy Risks. These assessments can be carried out during the design, construction, commissioning and/or operational phase of a wind energy project's life cycle.

Aon will work with you to:

- Gain a better understanding of the inherent hazards associated with this technology.
- Mitigate construction stage risks such as component storage, fire, security and contractor management on site.
- Protect key assets such as the substation, transformers, switchgear and turbines in terms of fire and security.
- Evaluate maintenance activities and condition monitoring to verify if fit for purpose.
- Identify additional maintenance and testing activities which can help prolong turbine component life.
- Verify operational and maintenance quality procedures, and evaluate warranties and agreements in place with the equipment manufacturers.

## Our Experience

Aon's risk engineers have extensive technical knowledge in the area of renewable energies and in particular wind energy. This experience has been developed through extensive hands on site surveys, dealing with leading manufacturers and being extensively involved within the Wind Industry globally. We can assist insurers with reducing exposure to claims by understanding the issues specific to this technology, in addition to assisting the client to achieve high standards of asset management.