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Windaba 2017 focuses on energy transition and transformation

Windaba 2017, the annual conference of the South African Wind Energy Association, was held in Cape Town on 15 and 16 November 2017, with the theme of "Wind power building futures". This article summarises the main issues and themes of the conference and exhibition. The Windaba conference was accompanied by the WindAc conference, which focused on academic and technical presentations relating to wind energy.

Some sessions were closed to media, and it is therefore not possible to report fully on the conference.

The Windac conference was run in parallel to Windaba, which made it difficult to attend both conferences. Windac focused on academic and research papers, whereas Windaba aimed more at the industry and policy issues. A large portion of the conference was focused on the proposed transition of the power industry away from a coal based to a low fossil fuel based industry, focused around renewable energy, and the necessary transformation in the industry to adapt to this transition.

A quick glance through the topics discussed at WindAc revealed a focus on operational and planning issues rather than technology developments. Interaction of wind turbines with birds and the impact of wind farms on visual, aesthetics and scenic resources also featured amongst the topics. Holding two separate conferences at the same time and overlapping does not seem to work.

The wind industry in particular has been affected by the REI4P stasis, as 95% of the market share is in the utility scale sector in South Africa. This has caused investors and manufacturers to reconsider their possible involvement in the South African market. Wind energy does not have the extensive small user and private market that solar energy does. This is seen as a weaknesses of the market, and the development focus on larger and larger turbines is completely dependant on the utility area. The utility sector is largely driven by government policy and if this area stagnates the future of the wind turbine market is in jeopardy.

The market must eventually saturate in the long term, as has been noticed in several European countries, which will lead to a drop in demand, which will lead to many manufacturers having to reconsider a development path in the future towards small units and the private market. Relatively long lifetime products and diminishing demand must pose a threat to the industry in future. The European market is already seeing saturation and thus manufactures are focusing on developing markets such as Africa.

Discussion panel on financing.

The conference focus included transformation and skills development, energy transition and power sector reform as well as policy, regulatory framework and market trends. A strong focus was placed on pre-emptive moves that the sector can make to ensure targets in respect of local ownership are met; and how can socio-economic and enterprise development best be driven simultaneous to building a healthy bottom line? Transformation of the industry is seen to include a greater degree of local ownership and local production of equipment, with a reduction in percentage of proceeds from the wind farm program leaving the country. Skills development will ensure a lower reliance on foreign labour and specialists, not only in the construction field but in the O&M field as well. As more wind farms come into service, the need for O&M staff will increase, and this requires training and skills development. The construction market may slow down, but O&M services will be required for the full PPA contract period, and the more of this work done by local staff the better. Maintenance and asset management is a major topic that emerged in the technical presentations.

An interesting session dealt with financing of wind farm projects and the emergence of green bonds. Institutional investors are becoming involved in refinancing after the planning and construction phase has passed and the operational phase has been entered. Financing ranges from bank loans to bonds from institutional investors. Green bonds are becoming established in the sector. Investors are gaining confidence in the wind farm market in South Africa now that several farms are operational.

The current stasis situation in the REI4P seems to have resulted in a reductions of interest in the exhibition. Many of the exhibitors focused on operation and maintenance rather than technology and project development and planning systems. Large wind manufactures have a rather limited market, compared to solar which has a very wide range of usage, from utility scale to small users. There were no exhibitors in the small and medium scale wind turbine sector, which might indicate that the market for smaller units has not developed as expected.

General feedback from exhibitors in the O& M sector is that two areas of problems have emerged in the SA market:

- Pad transformer failures and operational problems.
- Gearbox servicing, maintenance and failure

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Pad transformer (step-up transformer) failure seems to be a common occurrence worldwide. Most installations have used standard distribution type transformers, which seems to be the cause of the problem. The yearly average load factor for a wind turbine can be as low as 35%. The relatively light loading of the transformer introduces two unusual problems that must be considered in their designs. When lightly loaded or idle, core losses become a more significant economic factor while the coil or winding losses become less significant. WTG transformers are subjected to frequent thermal cycling as a function of varying output. This causes repeated thermal stress on the winding, clamping structure, seals, and gaskets, which can lead to failure. Repeated thermal cycling also allows nitrogen gas absorption into the hot dielectric oil and release as the oil cools, forming bubbles within the oil which can migrate into the insulation and windings to create hot spots and partial discharges which damage insulation.

Thermal cycling also accelerates the aging of internal and external electrical connections. Harmonics from the inverters used with double conversion turbines are also a problem. This has resulted in the IEC having to review the specifications for wind turbine transformers.

According to some maintenance operators, wind farm operators still do not have a clear understanding of the servicing requirements of wind turbine gearboxes. subjected to constant and sometimes rapid changes to applied torque, and loading. The size of debris found in oil samples indicates extensive wear damage.

Mobile power systems are being used to provide power on-site power during construction and development phases. In addition to providing site power, the equipment is able to simulate the grid to allow the majority of grid code compliance tests to be undertaken before the grid connection is available, and can simulate a large selection of grid conditions, including harmonics, etc. Equipment provided includes generators, load banks and other test and simulation equipment.

Bird deaths continue to be an area of concern for operators and there are a number of systems available that warn of approaching birds or frighten birds away. A radar based tool detects and tracks birds approaching wind farms, assesses the collision risk and selectively shuts down wind turbines in the case if impending collisions. It is not known whether this is a requirement in South Africa or whether any operator is using this approach.

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