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Time vs. Yield Based Production Warranties

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Introduction

- For offshore wind farm projects, long term availability or yield warranties are a key requirement (5 year contracts are typical, 15 year contracts are not unheard of).
- There are two principal means by which the production of wind turbine generators is assessed, measured and warranted: the time based or the yield based production.
- Choosing and negotiating the right production warranty is particularly important for the success (and profitability) of offshore wind farm projects due to the high cost and weather risk of maintenance work. Furthermore the warranty should offer the right protection from revenue loss balanced against the cost of the service agreement.
- Most importantly, the warranties must encourage the right relationship between the contracting parties and the right behaviours to work towards optimal project performance, rather than partisan scope delivery.

Discussion

Fundamentally, yield and time based performance assessments and their related warranties have very similar aims, however the way in which either method goes about achieving these differ in many ways. Both approaches fundamentally aim to accurately measure the wind farm's performance relative to the ideal 'no downtime' scenario. This assessment is then used to determine compensation (and often also incentive) payments between the contracting parties giving the asset operator confidence in the WTG technology and assuring any investors that the project is bankable.

The approaches differ in the data which is analysed and how representative and readily available this data is. Data on WTG uptime and downtime is easily gathered, but WTG curtailment is less easily captured by a time based methodology and so this approach does not always translate into a representative estimate of lost performance. On the other hand, while actual WTG yield can be measured directly, theoretical yield (and the resulting yield loss) has to be calculated based on the wind speed and a WTG yield model, neither of which is always accurate.

While time based warranties have been an industry standard for many years, yield warranties have less of a track record. The combination of these factors tends to result in time based warranty levels being higher than those for yield based warranties.

More recently, the yield warranty concept has become a popular new approach following the realisation that the availability warranty has not delivered the desired result on some projects where both the operator and the service contractor work jointly towards optimising asset performance. One factor is that yield warranties look attractive when viewed at a high level; however the full implications on daily project activities can be difficult to understand unless analysed in detail.

Comparison & Conclusions

	Availability Warranty	Yield Warranty
Pros	• Well understood track record on a large number of projects. • Easy to calculate the theoretical and actual availability of one or more WTGs. • A flat rate damage / incentive fee can be employed to calculate the compensation / incentive payments which are due.	• Encourages the O&M Contractor to service WTGs during low wind periods and carry out unplanned work as efficiently as possible. • Actual wind farm yield can be measured easily. • Curtailment is taken into account. • Looks attractive when viewed from a high level (e.g. senior management level).
Cons	• Can lead to the O&M Contractor (the OEM) focusing on returning WTG to service regardless of the lost yield (winter maintenance). • If the actual availability falls below the warranted level, it is not easy to calculate the resulting yield losses (and compensation payments) due to the inaccuracies in the wind speed measurements. • Curtailment of a WTG is generally not considered in the calculation.	• Relatively new concept for the industry. Furthermore each WTG OEM has its own way to measure WTG production and this can make it difficult to compare the available offerings. • Generally lower warranty levels offered by OEMs (roughly 1% lower than time based). • Heavily dependent on confirming an accurate project power curve and transfer function. • Generally difficult to calculate the theoretical wind yield accurately (measurement and wake/array loss accuracy is low). • Full implications can be difficult to understand unless analysed in detail (which is often not done at senior management level).
Key considerations	• Error codes which relieve the OEM from time under the warranty need to be clearly understood and agreed. • Other mechanisms to encourage servicing during low wind speed periods should be considered (e.g. KPIs linked to incentive payments encouraging the performance of planned maintenance in the summer months). • Compensation mechanism under the availability warranty in case of curtailment should be considered.	• Error codes which relieve the OEM from time under the warranty need to be clearly understood and agreed. • Nacelle transfer function and regular recalibration of the nacelle mounted anemometry are vital to minimise the uncertainty factor.

The similarities and differences between time based and yield based performance assessments are complex and have unique implications on every project. Choosing the right approach for a project requires a clear understanding of the objectives, detailed analysis of the options and level-headed negotiations with the warranty provider. Most importantly, the full impact of the decision on the way in which data is gathered and analysed, routine maintenance work is planned and commercial relationships will develop needs to be fully understood.

Acknowledgements & Notes

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Please note that the above analysis is based on first hand experience of a number of European offshore windfarm projects during both the planning/negotiations and the operational phase, however because these projects are currently still in development or operational under active warranty agreements, specific details of these projects cannot be discussed here formally, however the author would welcome any informal discussion on this subject.