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ORTECH Power Points™

Wind Farm O&M Cost Gamble

by

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Long term operating and maintenance (O&M) costs for wind farms are difficult to estimate, although the overall project economics are very sensitive to reductions in income. The equipment used in most new wind farms has only been in production for a few years, while the critical decisions on a project are based on 20 cash-flow forecasts. To manage this risk, careful consideration must be given to estimating repair, insurance, maintenance and service (RIMS) costs in the later half of the economic model.

A pro-forma analysis by ORTECH of a typical 100 MW wind farm project with a 20-year PPA indicates that a 5% reduction in income over the 20-year economic life of a project reduces the levered pre-tax IRR from 10% to 7%. A 10% reduction reduces the IRR to zeroⁱ. Unexpected RIMS costs are one of the main risks in the underperformance of projects.

The typical financial modeling assumptions on RIMS costs are based on a set of initial inputs that are extrapolated for 20-years usually using only inflation as an escalator. The initial inputs include land costs, property tax estimates, quotes for insurance premiums (including machinery breakdown, property perils and income loss) and the service contract offer of the turbine manufacturer. The 20 year inflation estimate is itself uncertain, but the real risk is that the RIMS costs could increase much faster than inflation.

A European study by ISETⁱⁱ, based on existing installations indicates that RIMS costs continue to rise in the first 5 years of the wind farm operation and then stabilize in years 6 to 10. However, almost no data is available for the next half of the 20-year economic life. A study by DEWIⁱⁱ estimates the repair costs over the entire 20-year period to be 54% of the initial equipment cost (projections ranged from 14% to 94% of the initial cost), most of it in the second half of the equipment life cycle.

The repair cost projection alone, at 54% of initial equipment cost is greater than the total RIMS cost assumption used for typical wind farm financing in Canada at this time. This would

indicate that the industry needs to track repair cost data carefully over the coming years. If the DEWI projections hold, evidence should appear in the existing install base as it ages.

It is inevitable that premiums for machinery breakdown will track claims rate experience and can greatly exceed inflation as the European experience has shown. Thus insurance policies offer little protection from underlying errors in failure rate and repair cost assumptions. Manufacturer warranty programs offer only limited protection, also. Typical extended warranty programs in North America are offered for up to 5 years (up to 12 years in Europe), leaving the most difficult period exposed.

A comparison of actual RIMS costs presented in the ISET study to the price of 5-year warranty programs suggests that these programs are expensive, particularly since the OEM warranty for 2 years is typically included in the equipment supply contract. An argument could be made for signing a 2-year basic agreement and placing the anticipated savings for years 3, 4 and 5 into a repair reserve, combined with a well tailored insurance product. The reserve, if unspent, could become a valuable offset to equipment failure in later years.

Estimating RIMS costs over a 20-year project life is difficult at best, but a significant amount of information exists that can help to improve the manner in which repair reserves are integrated into the financial and operational planning for the project. Given the sensitivity of levered pre-tax IRR to income, there is no doubt that this additional effort is time well spent.

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- ⁱ A full description of the pro-forma analysis is contained in the presentation entitled “Financial Sensitivity Analysis of Wind Farm Investment” available at <http://www.ortech.ca/html/power/papers.html> .
- ⁱⁱ References are listed in the presentation entitled “Warranty and Long Term Maintenance Risk of Wind Farms” available at <http://www.ortech.ca/html/power/papers.html> .