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Evaluating Wind Turbine Patent Infringement Risk Exposure
Quantifying Risk for Patent Infringement Liability Insurance

by Philip Totaro, Principal, Totaro & Associates

Major international corporations are increasingly becoming the targets of IP infringement suits. This has driven the need for indemnification of patent infringement liability in component/product supply agreements, particularly in business-to-business (B2B) market sectors. In addition, patent infringement liability insurance is becoming more commonplace for makers of industrial equipment who are hoping to sell their wares into several international markets.

In order to obtain an accurate picture of the potential risk of infringement, insurers have relied on the equipment suppliers and other domain subject matter experts to provide them a sense of the liability exposure. However, in some industries which are still maturing, there is a need for a more robust solution, since some of the companies competing in the industry may not have an established protocol for this type of risk mitigation activity.

As such, we have tracked and evaluated the market conditions in a specific vertical industry of the wind turbine supply chain, and we have identified the need for better visibility around the infringement risk potential as well as mitigation strategies for the turbine suppliers and acquirers.

Current Wind Industry Market Conditions

Within the wind turbine industry, we see that falling demand has caused greater pricing pressure and that increased competition is forcing consolidation as well as manufacturing capacity reduction. We can expect that as the Tier 1 wind turbine OEMs struggle to maintain profitability and fend off the Tier 2/3 competitors from taking away their market share, we will see those Tier 1 companies assert their IP rights to protect their revenue streams, or even to create new ones.

Also, Asian turbine manufacturers who have suffered the slowdown of turbine sales in their domestic markets have looked to overseas markets for new sales opportunities, and the US is one of the favored sectors. Some of these Asian manufacturers may have patent licensing agreements with European or US companies for their wind turbine designs, but that does not completely alleviate the risk of infringement for their product platform. At present, freedom-to-operate (FTO) clearance efforts are not being undertaken as consistently as one might expect of an international company entering a new market. There may be a belief that due to the licenses already held on the technology platform, the infringement risk is minimal. It may also be a lack of cognizance that a FTO assessment is a prudent protection against willful infringement and treble damages.

Lastly, as mentioned before the current trend in wind is for turbine suppliers to indemnify turbine purchasers from third party infringement. While a sensible and necessary precaution, that may not preclude a wind farm project from being delayed, curtailed or otherwise taken offline if a patent owner seeks an injunction on the turbines because of a component or a means of turbine / wind farm control which is potentially infringing on the rights of that third party.

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In the case of licensed technology, an adjustment in the project economics is likely made if technology/patent licenses are in place, since one would expect the turbine purchase price will typically include the cost of licenses being passed on by the turbine supplier to the purchaser.

However, while licensing mitigates the IP infringement risk and might therefore reduce the insurance risk premium, this is really just cost shifting. Depending on the licensing fees and to what extent they are passed on in the price, the overall competitiveness of the project cost of energy may still be adversely affected, since a turbine with less risk exposure may introduce better project economics at a given wind site assuming turbine product commoditization and an otherwise relative equivalence of CapEx cost.

As the industry faces the expansion of regional Tier 1/2 companies and the increased competition and potential consolidation, we could see aggressive assertion of IP rights in the hopes of securing a market-leading position. Precedent is already being set for the kinds of conditions which will exist in certain markets regarding the protection of intellectual property rights.

Recent Assertion of IP Rights in Wind

Lately, we have seen the very public results of the assertion of IP rights within the wind industry. Most recently, a dispute having implications on international trade arose when AMSC discovered that certain employees of their former customer, Sinovel, had orchestrated the theft of trade secret source code for controlling the converters. Sinovel has had large orders put on hold with a well-known European project developer pending the outcome of the arbitration with AMSC. It is also well-known that General Electric Company (GE) asserted their rights and sought licensing deals with their peer group over variable speed wind turbine controls patents.

We have also seen GE go to court over the same patents with Mitsubishi Power Systems, and have witnessed the resultant drop-off in sales for Mitsubishi largely due to the IP infringement risk. According to the 2010 Wind Technologies Market Report released by Lawrence Berkeley National Laboratory in June 2011, Mitsubishi was #3 in US market share going back to 2005 behind GE and Vestas, but dropped down due to increased competition from Siemens, Gamesa and Suzlon, as well as the rise of Clipper. While we may not be able to directly attribute Mitsubishi's loss of US share solely to the IP matter with GE, it was certainly a major factor.

One of the key patents in this GE licensing / litigation matter was US5083039, which deals with field oriented control of an induction generator as well as dynamic volt-ampere reactive (VAR) control of the turbine. Since doubly-fed induction generators (DFIGs) utilizing field oriented control were largely utilized by many turbine manufacturers in the '90s and '00s, GE felt justified in the wide-spread assertion of the '039 patent, amongst others.

Over the past 10 years or so, the wind industry has largely moved away from DFIG based turbines to permanent magnet generators (PMGs). This technology offers numerous advantages for electrical as well as system efficiency, and the full power conversion architecture enables better turbine control and more opportunity for grid stability.

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But since this move away from the '039 patented technology, there has been a buildup of IP around the turbine architecture of PMG and full power conversion by numerous Tier 1 turbine OEMs as well as the Tier 2/3s, sub-component suppliers, universities and others.

Thus, FTO initiatives are already underway by the proactive companies in the industry. They are hunting for the next potential '039 patent in the hopes of guarding against the widespread assertion which we feel is highly likely given the market conditions.

Patent Landscape Analysis

Last year we decided to conduct an investigation of the patent landscape of the utility scale, horizontal-axis wind turbine industry to gain insight into what technology trends have emerged thus far, and what might be in store for the future. The results have also proven to be useful in examining the infringement risk exposure of turbine manufacturers and their product platforms.

Aggregation of these results has now led to a total set of 2450+ US patents and 2250+ published US applications dealing with utility scale, horizontal-axis wind turbine technology. While the scope of these search results was limited to US issued patents and applications, most of these have equivalent foreign filings. The Global patent landscape is still under investigation, so at present the US jurisdiction is the only set of comprehensive results we can present.

For the set of results obtained, an assessment of the relevance of each patent to the industry was performed and the results were classified as low, medium, medium/high, and high. Definitions of this classification method are below. The assessment of industry relevance serves the purpose of indicating the degree to which the patent owner has already, or is likely to assert their rights and seek licenses or otherwise enforce a particular patent. This should be an indication of the proverbial landmines to watch out for when navigating a technology and product roadmap through the landscape.

Low	Medium
Patent / Application is not relevant to the currently pervasive set of technologies and products in the industry.	May have been relevant in the past or is simply not broadly applicable. As technology evolves these patents / applicaitons will become less prevalent and are likely to shift to Low in the future.
Medium/High	**High**
Important items which the industry needs to be cognizant of, but these can likely be avoided / mitigated. Influence of technology trends and grid standards will ultimately determine relevance of these patents and applications. These will likely be re-classified as either High or Medium.	Critical item which has been asserted, licensed or enforced, or is otherwise highly likely to be in the future.

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Wind Turbine Risk Profiles

Now, even with newly published patents and applications on a weekly basis, we are able to sustain a comprehensive assessment of the industry relevance of a particular technology. In addition to this industry relevance, if we look at the turbine architecture of manufacturers' product offerings we can establish a risk profile for those products being offered.

The risk profile is established in one of two ways, but always requires a detailed understanding of the turbine manufacturer's product architecture. Unless a technical specification or operational profile along with a component sourcing list is provided to facilitate evaluation during a project finance due diligence effort, we are able to take advantage of our market research and competitive intelligence gathering efforts to construct a reasonably good picture of the competitive landscape and the turbine technology platforms offered by the OEMs.

Next, the methodology outlined above for the industry relevance assessment can be utilized in assessing the infringement risk of each patent. The specific technology architecture can be evaluated against the claim breadth of the patent, the presumption of validity of the patent as well as the likelihood of assertion in order to come up with an overall risk profile for each turbine. These results are consolidated to provide an overall relative ranking and provide an understanding of the scope of mitigation work required, or the risk premium which can be assessed.

As wind turbine technology becomes more mainstream, IP infringement risk mitigation will become essential to the industry. Continued technological innovation and the commercialization of it will drive down energy production costs to a point where wind is the energy source of choice.

About the Author

Mr. Philip Totaro is the Principal at Totaro & Associates, a consulting firm focused on innovation strategy, patent search, competitive intelligence and product development. To find out more, or get in touch please visit www.totaro-associates.com.

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