



### YieldCo Asset Buying Spree Could Lead to Uptick in IP Infringements

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The strategy of YieldCo asset acquisition in renewables, and particularly wind, has the potential to trigger a significant amount of M&A. But a potential risk is lurking at re-sale time for some wind parks which comprises upgrades to the turbines.

Initially, when a wind turbine supply agreement (TSA) is signed the original equipment manufacturer (OEM) provides the turbine purchaser with a use license in the patents which are associated with that product. The rights associated with modification of the product must be explicitly given by the OEM, and this is typically not the case in TSAs.

Now in spite of this, the modify license does not have to be provided for owners / operators to do some upgrades on their turbines. Based on the well-known doctrine of exhaustion, or "first sale" doctrine, the owner of the purchased equipment can still make or modify the equipment to a certain extent so long as they do not re-sell it.

The only thing preventing certain upgrades from being utilized on a given wind park are the patent rights of the OEM which were not explicitly provided in the TSA. Those patent rights on specific types of blade features or gearbox tweaks extend beyond the TSA as well as the warranty period of the turbine, i.e. the patent survives beyond the 5 year warranty period and excludes the add-on of features covered in the patent, such as vortex generators, serrated trailing edge, etc.

These patent rights are the rationale behind many OEMs successfully negotiating Long Term Service Agreements (LTSAs). The OEMs know that they can exclude the third party independent service provider (ISP) supplied upgrades and ensure that spares and authorized aftermarket components do not bypass the OEM (or their revenue stream).

Now what if the wind park comprises upgrades which have indeed bypassed the OEM? What happens if those wind park assets are at a point of maturity that they become attractive for a YieldCo?

It is ultimately up to the OEMs to enforce their IP rights. While OEMs are unlikely to sue their potential customers for patent infringement (they would not likely sell them too many new turbines

any time soon if they did), the OEMs could technically block a sale of a wind park to a YieldCo if the re-sale includes upgrades which violate the OEMs' patent rights.

An intellectual property (IP) risk mitigation review as part of the due-diligence process can identify, quantify and mitigate this risk. Looking at all the patents in a particular cluster, such as noise mitigation or performance enhancement, which represent technology that can be applied as an upgrade will need to be evaluated for infringement risk potential.

Assignee	Count	Industry Relevance				Industry Relevance Annual Filings	Component Keywords by Assignee															
		L	M	M-H	H		Blade	Controls & Sensors	Drivetrain	Generator	Electrical	Tower	Pitch System	Foundation	Nacelle	Pitch Control	Condition Monitoring System	SCADA	Yaw System	Castings / Forgings	System	Installation / Service Vessel
1 General Electric Company	1442	307	946	163	26	340	327	103	94	154	100	35	16	29	59	57	57	18	30	6	3	14
2 Siemens AG	940	149	682	99	10	169	184	66	202	77	51	21	19	37	20	34	25	4	11	5	5	8
3 Vestas Wind Systems A/S	872	166	590	106	10	231	213	47	24	54	47	29	22	44	47	29	44	8	18	1	7	7
4 Guodian United Power Technology Co.	600	101	488	1		108	116	62	120	38	27	20	10	37	12	21	15	5	4	2		3
5 Mitsubishi Heavy Industries, Ltd.	527	181	292	50	4	85	104	81	21	24	23	39	15	34	35	12	11	17	5	5	6	10
6 Sinovel Wind Group Co., Ltd.	469	33	433	3		25	75	92	11	69	25	39	24	38	11	12	7	16	10	6	7	2
7 Enercon GMBH	274	74	173	24	3	64	42	3	23	31	38	7	12	8	7	4	7	5	11	6	4	2
8 Servion, SE	234	15	200	19		58	59	20	5	15	15	11	3	14	3	8	2	3	1			2
9 Gamesa Corporación Tecnológica	220	57	154	9		53	27	26	15	18	18	6	3	18	13	11	3	4	5			
10 Nordex Energy GmbH	174	30	121	20	3	44	38	25	4	1	9	7	2	7	14	3	6	4	6			4
11 LM Windpower	152	22	127	3		136	7			2		2	1		2	2						
12 Alstom Wind S.L.U.	126	23	95	7	1	14	16	15	24	9	7	18	9	4	2	3	1	2	1	1		
13 Hitachi, Ltd.	114	32	74	7	1	6	18	4	30	18	5	3	4	4	4	6	5	2	1	1		3
14 ABB	92	35	53	4		2	22		15	36				1		2	14					
15 United Technologies Corporation	79	57	22			19	7	12	12	2	2	11			7					2		2
16 SKF AB	74	15	58	1		2	6	47		1	1	7				10						
17 Clipper Windpower LLC	72	31	36	5		9	18	9	2	10	7	5		1	5	2	1	3				
18 XINJIANG GOLDWIND SCIENCE AND	69	2	62	5		7	13	5	16	8	4	3	5	1	2	1		1	2			1
19 Robert Bosch GmbH	58	7	49	1	1		12	24	3	2		9			1	4			1			2
20 Envision Energy	51	25	26			14			3	5	2		7	2	7	7					2	2
21 Willic S.A.R.L.	50	6	43	1		4	4	3	31	4	1			2	1							
22 Suzlon Energy GMBH	44	2	41	1		6	6	8		3	1	7		5	2	1		3	2			
23 ZF FRIEDRICHSHAFEN AG	40	7	33					37		1					1				1			
24 American Superconductor Corporation	32	10	22					2	10	7	6			4	3							
25 NTN Corporation	29	10	19					1	20					3								
26 Acciona Windpower, S.A.	27	6	19	2		2	9		2	1	5	1	4		1		2			1		
27 Northern Power Systems, Inc.	26	10	14	1	1	4	5		9	4		1	1	1					1			
28 SSB Wind Systems GmbH & Co. KG	26	4	22					9		1		12			3	1						
29 Aerodyn Engineering GmbH	24	9	15			2	1	9	1	1		2		3	2					2	1	
30 EADS	24	10	12	2		20	3									1						
31 SCHAEFFLER TECHNOLOGIES GMBH	24	2	22					19				2				3						
32 DELTA ELECTRONICS CO., LTD.	23	8	15					10		1	8			1		3						
33 MOOG INC.	22	1	19	2				12				10										
34 YEMC Darwind B.V.	22	1	19	2		4	1	3	6	2				2	1	1		1				1

The proprietary risk profiles developed exclusively by Totaro & Associates utilizing IP Analyzer are based on the assessment of the patent claim breadth for over 40,000 patent filings as well as the known use of a patent protected technology through a process known as Product Claim Mapping.

Patent #	Title	Component	Technology	Relevance to Utility scale WTG Industry	Company 1		Company 2		
					Risk to Product #1	Risk to Product #2	Risk to Product #1	Risk to Product #2	
USXXXXXXX	DC-DC CONVERTER CIRCUIT USING AN LLC CIRCUIT IN THE REGION OF VOLTAGE GAIN ABOVE UNITY	Electrical	Frequency / Voltage Regulation	M	Common technology, but design around possible.	M	Requires investigation, design alternatives exist.	M	Requires investigation, design alternatives exist.
USXXXXXXX	TURBINE	Drivetrain	Reliability	L	Older technology, limited industry applicability.	M	Requires investigation, design alternatives exist.	L	Technology not present.
USXXXXXXX	A PROTECTED WIND TURBINE BLADE, A METHOD OF MANUFACTURING IT AND A WIND TURBINE	Blade	Manufacturing	M	Only relevant if VARTM process is used.	L	Technology not present.	H	Similar design architecture.
USXXXXXXX	A WIND TURBINE AND A DIRECT-DRIVE GENERATOR	Generator	Efficiency	H	Widely used technology.	H	Similar design architecture.	H	Similar design architecture.

A composite risk score is determined based on the number of patents at each level of relevance.

Risk Categories	Product		Industry Average		Composite Risk Score
	#	%	#	%	
High	18	0.6%	32	1.0%	Below Average
Medium/High	167	5.2%	224	7.0%	Below Average
Medium	1,881	58.8%	1,728	54.0%	Above Average
Low	1,134	35.4%	1,216	38.0%	Below Average
<b>Total</b>	<b>3,200</b>	<b>100%</b>	<b>3,200</b>	<b>100%</b>	

From knowing the composite risk score and the specific technologies utilized, the financial impact can also be calculated. For a given technology, like serrated trailing edge for noise mitigation, the cost associated with utilizing this technology is known, as well as the performance delta.

Technology	# of Patents	Commercial Use	CapEx	OpEx	Noise
Serrated TE	27	GE, Siemens, Mitsubishi	Med	Low - Med	-2 - 4dB

The potential damages and liabilities incurred can be calculated based on this utilizing well-known methods for IP asset valuation and patent litigation damage award calculation. Therefore, the financial burden which the YieldCo would incur if they acquired an asset which has IP infringement risks can be quantified and it is likely to reach into the 8-figure range on certain upgrades applied across an entire fleet.

The industry has come to recently understand that the developer, and even EPC contractor can be liable for patent infringement, as we have seen when Enercon took Siemens, DONG, and A2SEA to court in the UK.

With £3.1B of projects at risk in that case, companies who bankroll wind parks or the YieldCos who acquire assets can ill afford to ignore patent infringement risk for their other major investments or forthcoming acquisitions.

Find out more at [www.totaro-associates.com/iprisk](http://www.totaro-associates.com/iprisk).