



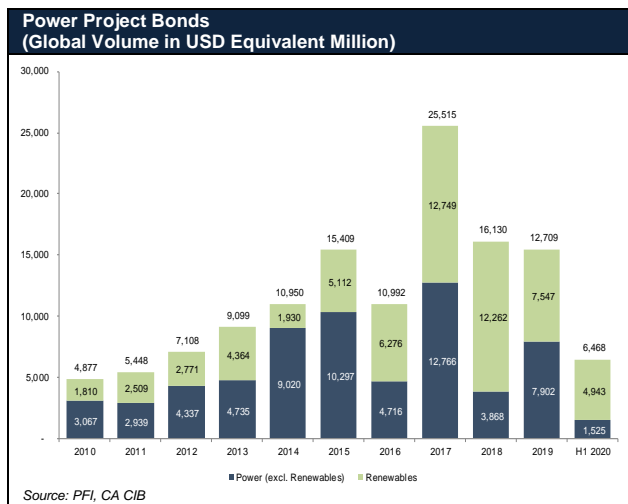
# Project Bonds: Wind

## Renewable Energy

The Capital Markets first opened its doors to renewable energy projects with a wind Project Bond in 2003, followed by solar Project Bonds a few years later in 2010.

These trail-blazing transactions allowed investors to gain familiarity with the technologies, risks, and contractual arrangements related to renewable assets. They also paved the way for future issuances, as rating agencies started publishing specific methodologies dedicated to this newly accessible asset class.

Globally, renewables have grown to represent about 50% of power Project Bond volumes and 15% of total Project Bond volumes since 2010.



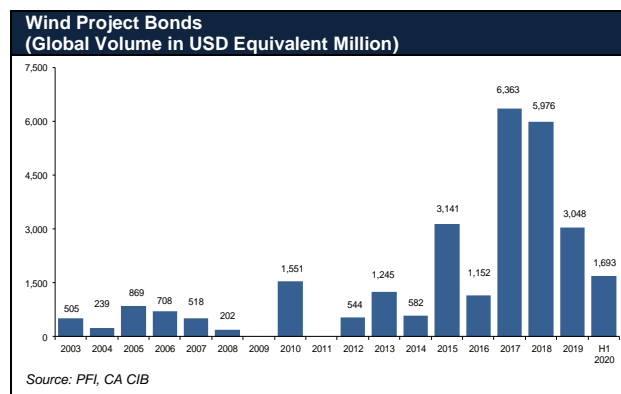
Renewable Project Bonds first gained traction in North America, followed by projects in Europe, Latin America and Asia, demonstrating the increasing comfort and global appetite among investors for renewable assets.

While renewables offerings have gained wider acceptance over time, there are challenges that need to be considered prior to approaching the Capital Markets. Lessons learned from past renewable financings can help ensure future successful executions.

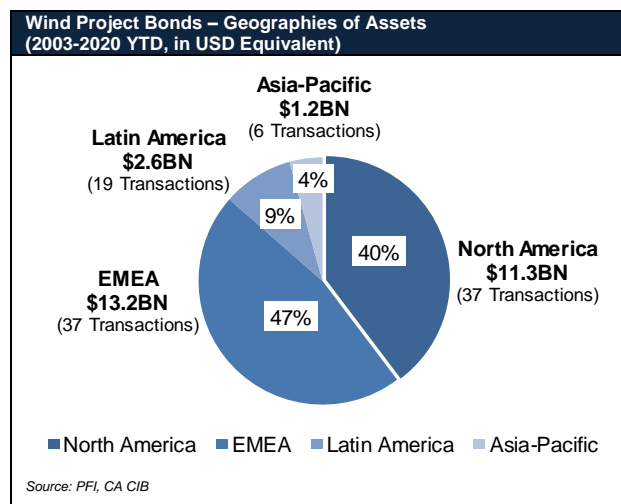
This article provides a review of historical Project Bond issuances for wind assets globally.

## Wind Project Bonds

In 2003, the \$380MM 144A Project Bond for FPL Energy American Wind, a portfolio with an aggregate capacity of 697MW across 7 projects in 6 US States, marked the opening of debt Capital Markets for wind projects. Since then, more than \$28.3BN has been raised globally through 99 structured transactions backing over 32GW of wind assets. Individual transactions of over \$1.0BN have been successfully executed such as the \$1.7B issuance to finance the extension of the 659MW Walney Offshore Wind Project in the United Kingdom in 2017. Wind Project Bonds represent 22% of total power Project Bond volume since 2010.

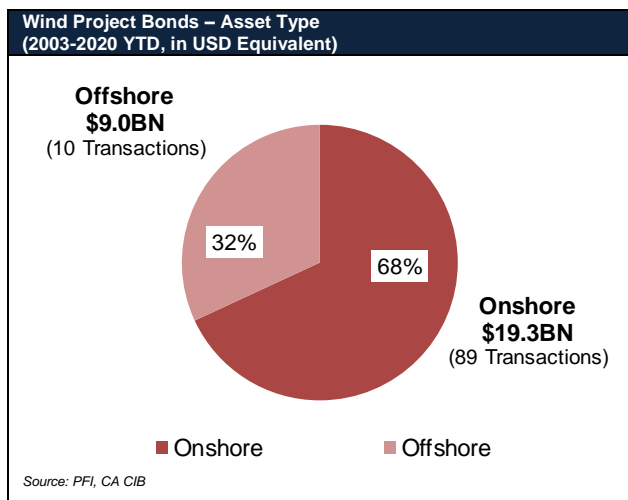


With over \$13.2BN issued, Europe is now the largest wind Project Bond market globally, largely driven by offshore wind – an asset type with the largest wind transactions executed to-date. With 37 transactions and \$11.3BN issued, North America closely follows Europe (and used to lead the wind Project Bond market, until recently).

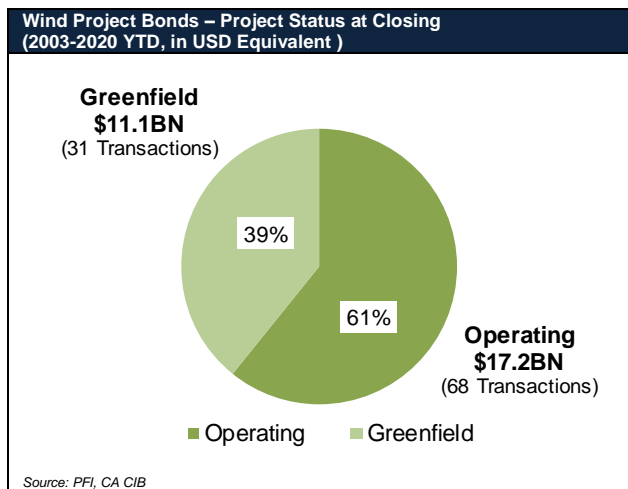


Wind Project Bonds have also been successfully placed for other markets as well. The first wind assets to tap the Capital Markets outside of North America or EMEA were located in Mexico with the \$149MM and \$150MM 144A offerings for Oaxaca II and IV, respectively in 2012. In Asia, an Australian wind farm was refinanced in 2015 with a Project Bond which included a \$99MM (USD) tranche and an A\$76MM tranche.

Onshore wind accounts for most of the transactions to-date, with \$19.3BN issued across 89 transactions, but Capital Markets have also welcomed offshore assets since 2015 with some of the largest wind-related issuances to-date. In less than 5 years and with only 10 transactions (all issued from EMEA), offshore wind has grown to represent about 32% of total wind Project Bond volume.



The majority of transactions have refinanced operating projects. However, offerings partially exposed to construction risk have also been successfully placed. Project Bonds for 100% greenfield wind assets have been less common with only \$11.1BN issued to date, but have increased in frequency with the rise of offshore wind – with approximately half of greenfield wind Project Bonds issued for offshore assets.



Wind assets are mostly contracted through long-term Power Purchase Agreements (“PPAs”) with an offtaker such as a utility or a public entity (State, municipality, etc.). Project Bonds have allowed issuers to fully monetize these contracts with amortizing structures over the full tenor of the underlying PPA. Maturities of 20 years or more are the norm for this type of transaction, with average weighted lives of 10 years.

## Trends and Highlights

A wide variety of wind assets has been financed through the Project Bond market. Depending on the characteristics of the project, different structures have been successfully placed. The following section discusses some of these trends.

### Construction Financing for Wind Assets

Historically, wind projects in the Capital Markets have primarily been operating or brownfield assets. The first transaction with significant construction risk exposure closed in 2010 for the Alta Wind Holdings wind farms in California (see Case Study below); however, construction risk exposure was largely mitigated with a fully wrapped EPC contract in this case.

Rating agencies perceive construction risk for onshore wind projects as relatively low compared with other power plants. The construction period tends to be one to two years, and entails limited technological challenges. Provided the project relies on experienced EPC contractors and equipment suppliers, rating agencies note that construction risk is not a limiting factor in itself to achieve an investment-grade rating.

Offshore wind projects are more complex. In particular, they entail more interconnection challenges and a greater number of contractors due to maritime logistics. Despite these additional challenges, Fitch and Standard & Poor’s have indicated that investment-grade ratings can be achieved for greenfield offshore wind projects.

### Approaching Construction Risk: Case Study

In July 2010, Alta Wind Holdings issued \$579MM in 144A senior secured notes to finance the construction of three wind farms located in the US. Moody’s and Standard & Poor’s highlight that construction risk was mitigated given that the project’s turbines were provided by a reliable turbine manufacturer and the project’s EPC contractor was well-experienced. Construction risk was further mitigated with a fixed-price, turnkey EPC contract and by the fact that the contractor’s obligations were 100% backed by a performance bond. The rating agencies were able to get comfortable with these mitigants and the transaction was rated “BBB-”.

#### Exposure to Merchant Risk

While most wind Project Bonds have been supported by fully contracted revenues, some have monetized merchant cash flows (e.g. power sales in the spot market). It should be noted that while rating agencies do not necessarily deem exposure to merchant risk to be a limitation to achieve investment grade, it does not necessarily follow that all investors are receptive to offerings exposed to merchant risk. Some institutional investors in particular have investment criteria that prevent them from investing in renewable projects exposed to merchant risk, no matter how the risk is mitigated.

There has been a few merchant risk exposed projects that have successfully satisfied both rating agency and investor requirements such as the \$142MM Hatchet Ridge offering (2010) and the €572MM and \$439MM WindMW issuance (2015).

#### *Approaching Merchant Risk: Case Study #1*

In December 2010, Hatchet Ridge issued \$142MM in senior secured pass-through certificates in the 4(a)(2) Private Placement market to refinance the construction facility associated with a 101MW wind project in the US. The 19-year maturity of the certificates extended 4 years beyond the 15-year maturity of the PPA, introducing a merchant tail. This was the first-ever wind Project Bond to achieve an investment grade rating with a merchant tail. The structure included different reserve accounts funded over the life of the transaction to cash-collateralize the debt's expected outstanding balance by the PPA maturity date. Given the novelty of the structure, the 4(a)(2) Private Placement format was preferred to allow investors more flexible time to conduct their own due diligence and get comfortable with the merchant tail and reserve mechanism.

#### *Approaching Merchant Risk: Case Study #2*

The 2015 WindMW offering (€572MM and \$439MM for an offshore wind farm in Germany) was also exposed to merchant risk. For this transaction, the 11.5-year maturity of the notes was co-terminus with the feed-in-tariff period of the project, but investors were exposed to refinancing risk since the structure was not fully amortizing, thus monetizing a merchant tail. To reduce exposure to merchant risk, a reserve was structured to partially collateralize the balloon payment at maturity. During the final years of the transaction, the level of funding of the reserve is, in part, indexed to spot and forward energy prices. In essence, if spot prices decrease below certain thresholds, funding of the reserve from project cash flows is required.

#### **New Asset Types: Offshore Wind**

Before 2015, no offshore wind assets had been financed with Project Bonds. Two successful issuances opened the doors for this asset class: In September 2015, Gode Wind 1 €556MM in senior secured HoldCo notes for a greenfield

330MW offshore wind farm in Germany, and in December 2015, WindMW €572MM and \$439MM in senior secured notes for a 288MW offshore wind farm in Germany. Of note, both transactions were rated investment-grade.

Since then, about \$9.0BN has been issued to finance over 6.3GW of offshore wind assets demonstrating investor appetite and ample liquidity for the asset class. A total of 10 offshore wind assets have now been financed with Project Bonds, accounting for 32% of wind Project Bond volumes.

#### *Offshore Wind: Case Study #1*

The €556MM HoldCo financing for Gode Wind 1 was a first-of-its-kind transaction in Germany. The transaction fully amortizes over the 10-year feed-in-tariff period of the assets and was rated “BBB” by Euler Hermes, a credit insurance company. The project was still under construction and funding was available through delayed draws. Half of the transaction was taken by a single German institutional investor with 19 other German institutional investors filling the remainder of the book.

#### *Offshore Wind: Case Study #2*

The Walney Extension Offshore Wind project is the largest transaction for a greenfield offshore wind farm to-date. The Project Bond consisted of £1,289MM in fully-amortizing senior secured notes available in four draws to finance the third construction phase of the 660MW Walney offshore wind farm in the Irish Sea. The notes have a 15-year maturity, which matches the length of the long term purchase price agreement with the UK's grid. The £430MM fixed-rate tranche priced at 3.263% and the coupon of the £859MM index-linked tranche was based on local CPI index. The privately placed notes were rated ‘Baa2’ by Moody's and attracted a large range of investors including major institutional investors.

#### **Wind Project Bonds in New Geographies**

Wind Project Bonds are continuing to expand their reach as they access new geographies. While the majority of issuances have historically come out of North America and EMEA, an increasing number of issuers from emerging markets are tapping, both, international and local Capital Markets with offerings in USD and local currency.

The Oaxaca II Wind Farm and Oaxaca IV Wind Farm transactions issued in August 2012 (\$150MM and \$149MM in 144A senior secured notes for two similar 102MW projects in Mexico) were the first to tap the international Capital Markets outside of the US and the EMEA region. Since then, over \$3.8BN have been issued from Latin America and Asia-Pacific, approximately 77% of which have been USD-denominated (and the remaining in local currency) and nearly 70% have been issued from Latin America.

More recently, some jurisdictions that had never featured in the global Project Bond market – such as Uruguay and India, have seen meaningful issuance volume attached to wind (and solar), anchored in supportive policy frameworks and investor-friendly underlying contracts such as take-or-pay PPAs and Operating Leases, with limited exposure to market risk.

Of note, wind farm offerings exposed to, both, construction risk and merchant risk have recently also been issued from emerging markets. An example can be found in the \$304MM privately-placed senior secured notes issued in April 2018 by the Mesa La Paz wind farm in Mexico, off the back of a partial offtake with Mexican metals and mining conglomerate Peñoles.

*New Jurisdictions (Uruguay): Case Study*

In December 2019, the operating 49MW Kiyu Wind Farm in Uruguay issued \$88MM 4.86% senior secured notes due 2041 to refinance construction credit facilities provided by commercial banks. The transaction was the 4<sup>th</sup> Uruguayan Project Bond in the international Capital Markets and the 2<sup>nd</sup> wind offering from Uruguay, but the first-ever to be issued without relying on a development bank’s product. Precedent Uruguayan Project Bonds were placed under the Inter-American Development Bank’s A/B Bond program.

All Project Bond offerings from Uruguay to date, including Kiyu, are fully contracted under long term PPAs or Operating Leases with Uruguay’s state-owned utility Administracion Nacional de Usinas y Transmisiones Electricas (UTE), which are viewed by investors and rating agencies as some of the most robust offtake agreements in the market, globally. Kiyu benefits from a 24-year take-or-pay PPA with UTE for 100% of the project’s energy output.

The transaction was publicly rated BBB- by Standard & Poor’s and its successful placement demonstrates that there is investor appetite for wind assets from emerging markets, particularly when their revenue structure is anchored in robust offtake agreements and in the context of highly supportive policy frameworks, such as Uruguay’s.

*Local Issuances for Wind Financings: Case Study*

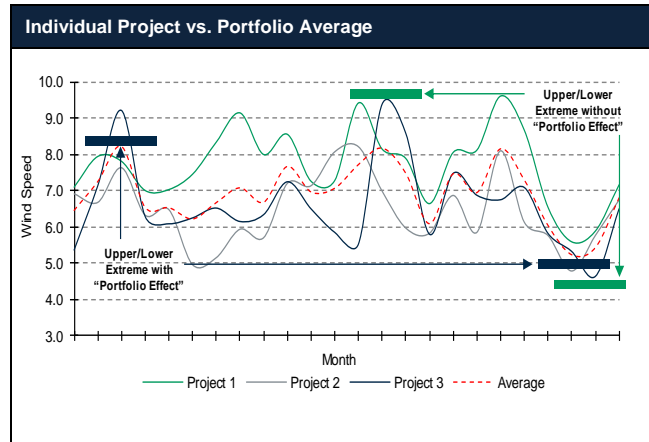
Demex Oaxaca 1 issued MXN 2,100MM in senior secured notes in Mexico’s local Capital Markets in January 2016 for an operating 90MW wind farm in Mexico. The transaction was rated locally by Standard & Poor’s (AA) and HR Ratings (AA), a Mexican rating agency. The transaction was entirely placed with the Mexican Afores. The fact that the issuance was in MXN and locally rated demonstrates that there is the local expertise necessary for Capital Markets transactions.

**Portfolio Financing Benefits**

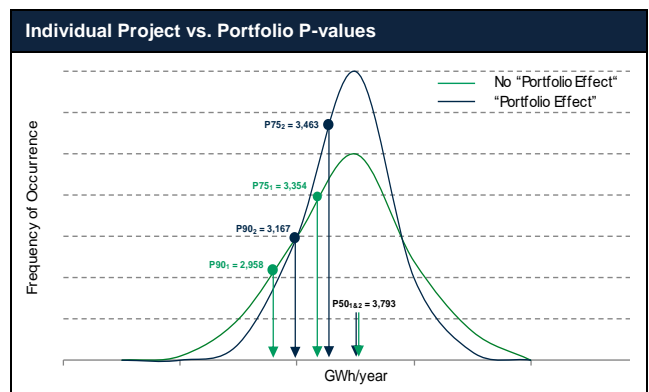
There are two key advantages to portfolio financing: (i) Portfolio Effect, and (ii) increased liquidity.

Portfolio financings can benefit from a “Portfolio Effect”, that would allow a portfolio of assets to support a larger debt amount than if each project was financed individually.

In essence, for different wind regimes evaluated as a portfolio, extreme wind conditions are balanced on average, as presented on the diagram below.



Utilizing this averaging effect through the reduction in wind variability allows for an increased overall P90 energy production output, which in turn allows for increased leverage.



In the graphs above, while the value of P50 energy production is the same, P75 and P90 levels in the “Portfolio Effect” case are higher.

Portfolio financing is also interesting when combining small projects that may not be financed on a stand-alone basis. A portfolio financing provides economies of scale and reduces transaction costs. In addition, during the marketing period, small offerings tend to attract fewer investors. Some of them may be reluctant to review an investment opportunity if they fear their final allocation will be small or below their minimum investment thresholds. Combining

assets allows for larger, more visible transactions, with increased liquidity for investors.

#### *Portfolio Effect Benefits: Case Study*

In 2013, Continental Wind issued \$613MM in 144A senior secured notes to refinance a portfolio of 13 operating wind projects with an aggregate capacity of 667MW spread across 6 states. The Continental Wind Portfolio had technology, offtaker, and wind resource diversity. Investors had exposure to five different wind regimes and five different turbine manufacturers. In addition, the transaction was rated by three rating agencies: Moody's, Standard & Poor's, and Fitch; each of which agreed that the portfolio diversity helped to mitigate the collective wind resource volatility and gave credit to the Portfolio Effect. The independent engineer for the transaction estimated this Portfolio Effect to be 5.3% due to the geographical and technological diversity of the portfolio.

### Rating Agencies

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Rating agencies approach wind financing by applying their generic project finance criteria complemented by wind-focused methodologies and commentary articles.

Rating agencies regularly update their methodologies as they rate new asset types and structures. For example, the development of offshore wind has led to the publication of articles and research reports from most agencies to specifically address the risks associated with such assets. Their criteria also evolved based on the performance of rated transactions.

For their rating case, agencies continue to largely rely on P90 (1-year) production estimates. Some agencies may also apply specific adjustments to production, degradation or operation and maintenance costs.

The table below presents the main sizing criteria and reserves associated with investment-grade ratings for Moody's, Standard & Poor's, Fitch, DBRS and Kroll. Investment-grade offerings usually share the following main characteristics: PPA with investment-grade counterparties, fully amortizing profile over the PPA tenor, no or mitigated construction risk, experienced parties and proven technology. Items that may constrain the rating to below-investment grade include unproven technology of turbines, exposure to merchant risk, sub-investment-grade counterparties, wind resource unreliability, and country risk. These particular aspects of the transaction do not necessarily prevent successful offerings but may require additional liquidity and credit enhancement.

### Conclusion

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The Capital Markets have been a reliable and proven source of financing and refinancing for wind assets globally. We have seen, overtime, investors and rating agencies get more comfortable with greenfield risk exposure, merchant risk exposure, and emerging market country risk exposure. We have also seen the emergence, most recently, of a new wind asset class: offshore wind.

Rating Criteria for Investment-Grade Wind Offerings

	Fitch	Standard & Poor's	Moody's	DBRS	Kroll
<b>Applicable Methodologies and Select Research</b>	<ul style="list-style-type: none"> <li>"Rating Criteria for Infrastructure and Project Finance" (Jul 2018)</li> <li>"Renewable Energy Project Rating Criteria" (Mar 2020)</li> </ul>	<ul style="list-style-type: none"> <li>"Project Finance Framework Methodology" (Sep 2014)</li> <li>"Key Rating Factors for Power Project Financings" (Sep 2014)</li> <li>"Offshore Wind Projects Take Off As Technology Improves And Costs Fall" (Jun 2017)</li> </ul>	<ul style="list-style-type: none"> <li>"Generic Project Finance Methodology" (Nov 2019)</li> <li>"Power Generation Projects" (Jul 2020)</li> </ul>	<ul style="list-style-type: none"> <li>"Rating Project Finance" (Oct 2018)</li> <li>"Rating Wind Power Projects" (Feb 2018)</li> </ul>	<ul style="list-style-type: none"> <li>"Global Project Finance Rating Methodology" (Mar 2020)</li> </ul>
<b>DSCR Indication for Investment Grade Rating</b>	<ul style="list-style-type: none"> <li>P90 (1-year) generation</li> <li>Additional specific adjustments to cash flows</li> <li>Min DSCR <math>\geq 1.30x</math> for adjusted contracted cash flows</li> <li>Min DSCR <math>\geq 1.70x</math> for adjusted merchant cash flows</li> </ul>	<ul style="list-style-type: none"> <li>P90 (1-year) generation</li> <li>Min DSCR <math>\geq 1.40x</math> for contracted cash flows</li> <li>Min DSCR <math>\geq 2.00x</math> for merchant cash flows</li> </ul>	<ul style="list-style-type: none"> <li>P90 (1-year) or P95 (1-year) generation</li> <li>Min DSCR <math>\geq 1.40x</math> for contracted cash flows</li> <li>Min DSCR <math>\geq 2.00x</math> for merchant cash flows</li> </ul>	<ul style="list-style-type: none"> <li>P90 (1-year) generation</li> <li>Min DSCR <math>\geq 1.30x</math> for contracted cash flows (higher DCSR generally required for offshore wind)</li> <li>Limited exposure to merchant revenues</li> <li>Conservative or worst-case electricity price forecasts in calculating the DSCR if revenues include merchant component</li> </ul>	<ul style="list-style-type: none"> <li>Generation assumption not specified</li> <li>Min DSCR <math>\geq 1.30x</math> for contracted cash flows</li> </ul>
<b>Base Case Assumptions and Adjustments</b>	<ul style="list-style-type: none"> <li>Energy production haircut: 0% to 10%</li> <li>Grid curtailment adjustment (as informed by a third-party assessment)</li> <li>Availability: informed by third-party assessment and peer analysis</li> <li>O&amp;M costs: increase of up to 20% over base case expenses</li> <li>Other adjustments may be applied on a case by case basis</li> </ul>	<ul style="list-style-type: none"> <li>Inflation rate: 2%</li> <li>Degradation: 0.50%</li> <li>Availability: 94% to 98.5%</li> <li>O&amp;M cost: increase of 5% to 10% over pro forma costs</li> <li>Other adjustments may be applied on a case by case basis</li> </ul>	<ul style="list-style-type: none"> <li>No specific adjustments / assumptions specified for Base Case scenario</li> <li>Adjustments may be applied on a case by case basis</li> </ul>	<ul style="list-style-type: none"> <li>No specific adjustments / assumptions specified for Base Case scenario</li> <li>Adjustments may be applied on a case by case basis</li> </ul>	<ul style="list-style-type: none"> <li>No specific adjustments / assumptions specified for Base Case scenario</li> <li>Adjustments may be applied on a case by case basis</li> </ul>
<b>Other Structural Considerations</b>	<ul style="list-style-type: none"> <li>6-month Debt Service Reserve Account</li> <li>6-month Operation &amp; Maintenance Account</li> <li>Distribution Test</li> </ul>	<ul style="list-style-type: none"> <li>6-month Debt Service Reserve Account</li> <li>6-month Operation &amp; Maintenance Account</li> <li>Distribution Test</li> </ul>	<ul style="list-style-type: none"> <li>6-month Debt Service Reserve Account</li> <li>6-month Operation &amp; Maintenance Account</li> <li>Distribution Test</li> </ul>	<ul style="list-style-type: none"> <li>6 to 12-month Debt Service Reserve Account</li> <li>6-month Operation &amp; Maintenance Account</li> <li>Distribution Test</li> <li>6 to 12-month tail on PPA tenor</li> </ul>	<ul style="list-style-type: none"> <li>6 to 12-month Debt Service Reserve Account</li> <li>6 to 12-month Operation &amp; Maintenance Account</li> <li>Distribution Test</li> </ul>

Source: Rating Agencies, CA CIB

# Project Bond Focus – August 2020

## Wind

### Wind Project Bond - Global Issuance To-Date

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geography	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
Seagreen Offshore Wind Limited	Scottish and Southern Energy plc	1,140	Offshore	Greenfield	United Kingdom	EMEA	GBP	220	22.0	--	--	--	Jun-20
Folha Larga 1 Wind Farm	EDF Renewables	147	Onshore	Greenfield	Brazil	Latin America	BRL	140	1.4	--	0.520%	--	Apr-20
Hancock HoldCo US Renewable Portfolio *	John Hancock Infrastructure Funds	--	Onshore	Greenfield	United States	North America	USD	130	--	5.0	3.000%	BBB- (Kroll)	Mar-20
Hohe See and Albatros Offshore Wind Farms	Canadian Pension Plan Investment Board (CCPIB)	609	Offshore	Operating	Germany	EMEA	EUR	511	12.0	--	0.000%	BBB+ (Scope)	Feb-20
Bishop Hill Energy LLC	Terraform Power and Invenery	211	Onshore	Operating	United States	North America	USD	252	17.0	7.6	3.260%	-- / BBB- / --	Jan-20
ReNew Power Renewable Portfolio *	Goldman Sachs, Abu Dhabi Investment Authority, JERA, Canada Pension Plan Investment Board and the Global Environment Fund	--	Onshore	Operating	India	Asia-Pacific	USD	450	7.1	5.5	5.875%	-- / BB- / BB-	Jan-20
Parque Eolico Kiyu SA	Zero-E Dollar Assets, S.L. , (previously "Bowpower" owned by AES Group, Grupo Cobra)	48	Onshore	Operating	Uruguay	Latin America	USD	88	23.0	14.0	4.860%	-- / BBB- / --	Dec-19
Ventos do Sul	Enerfin (Elecnor)	--	Onshore	Operating	Brazil	Latin America	BRL	325	--	--	--	AAA(bra)	Nov-19
Prairie Breeze Class B Holdings LLC	TerraForm Power (90.1%) and Invenery LLC (9.9%)	--	Onshore	Operating	United States	North America	USD	176	19.5	12.5	3.550%	BBB-	Nov-19
Whiteside Hill Wind Farm	Capital Dynamics (50%), Blue Energy (50%)	23	Onshore	Operating	Scotland	EMEA	GBP	63	18.0	--	--	--	Jul-19
Casalduni Onshore Wind Farm	Renexia PECH	36	Onshore	Greenfield	Italy	EMEA	EUR	13	7.0	7.0	8.250%	--	Jul-19
La Bufa Wind	Blackrock	130	Onshore	Operating	Mexico	Latin America	USD	225	18.0	12.0	5.770%	NAIC-2	May-19
Morrinhos Wind Complex	Atlantic Energias Renovaveis	--	Onshore	Operating	Brazil	Latin America	BRL	103	11.0	--	0.000%	--	May-19
Tablares Wind Farm	Grupo Villar Mir	12	Onshore	Greenfield	Spain	EMEA	EUR	0	0.0	--	0.000%	--	May-19
Andali Energia	Estra	36	Onshore	Greenfield	Italy	EMEA	EUR	10	0.0	--	0.000%	--	Apr-19
Andali Energia	Estra	36	Onshore	Greenfield	Italy	EMEA	EUR	20	2.0	--	8.000%	--	Apr-19
Skinansfjellet and Gravdal Wind Farms	Luxcara (subsidiary Flaveo Infrastructure Europe)	139	Onshore	Greenfield	Norway	EMEA	EUR	350	0.0	--	0.000%	--	Mar-19
MidAmerican Energy Wind Portfolio	MidAmerican Energy	2,591	Onshore	Operating	United States	North America	USD	600	10.0	--	3.650%	Aa2 / A+ / --	Jan-19
MidAmerican Energy Wind Portfolio	MidAmerican Energy	2,591	Onshore	Operating	United States	North America	USD	900	30.0	--	4.250%	Aa2 / A+ / --	Jan-19
Andali Energia	Estra	36	Onshore	Greenfield	Italy	EMEA	EUR	10	--	--	--	--	Apr-19
Andali Energia	Estra	36	Onshore	Greenfield	Italy	EMEA	EUR	20	2.0	--	8.000%	--	Apr-19
Skinansfjellet and Gravdal Wind Farms	Luxcara (subsidiary Flaveo Infrastructure Europe)	139	Onshore	Greenfield	Norway	EMEA	EUR	350	--	--	--	--	Mar-19
Valiente and Sotillo	Villar Mir Energía	--	Onshore	Greenfield	Spain	EMEA	EUR	--	--	--	--	--	Jan-19
St George Island Wind Farm	Terna Energy SA	73	Onshore	Operating	Greece	EMEA	EUR	120	12.0	--	--	--	Dec-18
Race Bank Offshore Wind Farm	Firebolt RB Holdings Ltd. (50% including Macquarie European Infrastructure Fund 5 (25%), Sumitomo Corp. (12.5%))	573	Offshore	Operating	United Kingdom	EMEA	GBP	--	17.3	9.4	--	--	Dec-18
Dudgeon Offshore Wind Farm	Equinor, Masdar and China Resources	402	Offshore	Operating	United Kingdom	EMEA	GBP	800	13.0	8.5	G+150bps	A-	Dec-18

\*Includes Solar Assets

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## Wind

### Wind Project Bond - Global Issuance To-Date (Continued)

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geography	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
Meadow Creek and Canadian Hills Wind Farms	--	418	Onshore	Operating	United States	North America	USD	243	19.0	--	T + 195bps	B	Dec-18
Parque Eólicos Tres Hermanas & Marcona	Grupo Cobra, Sigma Fondo de Inversion en Infraestructura (Sigma)	129	Onshore	Operating	Peru	Latin America	USD	250	18.3	10.3	2.920%	-- / -- / BBB-	Nov-18
Hornsea Offshore Wind Farm	Orsted (50%), GIP (50%)	1,218	Offshore	Greenfield	United Kingdom	EMEA	GBP	1,950	16.5	--	3.500%	BBB	Nov-18
Cordelio AmalCo LP I *	Canada Pension Plan Investment Board	246	Onshore	Operating	Canada	North America	CAD	425	15.7	--	--	Baa1 / -- / --	Nov-18
Cordelio AmalCo LP I *	Canada Pension Plan Investment Board	246	Onshore	Operating	Canada	North America	CAD	433	15.5	--	--	Baa1 / -- / --	Nov-18
PLT Wind Portfolio	PLT energia S.p.A.	111	Onshore	Operating	Italy	EMEA	EUR	60	15.0	--	--	--	Oct-18
Eikeland-Steinsland Wind Project	Luxcara	155	Onshore	Greenfield	Norway	EMEA	EUR	160	17.5	--	--	--	Aug-18
Mulungu do Moro Wind Portfolio	Voltaia	117	Onshore	Operating	Brazil	Latin America	BRL	106	--	--	--	--	May-18
Mesa La Paz Wind Farm	AES	306	Onshore	Greenfield	Mexico	Latin America	USD	304	26.0	15.0	UST + low 300 bps	NAIC -2	Apr-18
Arise's Wind Portfolio	Arise	135	Onshore	Operating	Sweden	EMEA	SEK	650	3.0	--	Stibor + 450bps	--	Mar-18
Santa Vitoria do Palmar Wind	Atlantic Renewable Energy (Actis)	207	Onshore	Operating	Brazil	Latin America	BRL	125	13.5	--	IPCA + 5,955%	AAA (Fitch local)	Mar-18
Neoen's International Renewable Portfolio *	Neoen	1,600	Onshore	Greenfield	France	EMEA	EUR, USD & AUD	245	20.0	--	--	Private	Dec-17
Borkum Riffgrund 2	Orsted & Global Infrastructure Partners	450	Offshore	Greenfield	Germany	EMEA	EUR	832	10.0	--	2.000%	Private	Dec-17
Palouse Wind Farm	Novatus	105	Onshore	Operating	United States	North America	USD	150	--	--	--	Private	Dec-17
Walney Extension Offshore Wind Project	Orsted, PKA, PFA	659	Offshore	Greenfield	United Kingdom	EMEA	GBP	430	15.0	8.0	3.260%	Private	Nov-17
Walney Extension Offshore Wind Project	Orsted, PKA, PFA	659	Offshore	Greenfield	United Kingdom	EMEA	GBP	859	16.0	9.0	G + 210bps	Private	Nov-17
Avangrid *	--	262	Onshore	Operating	United States	North America	USD	600	7.0	Bullet	3.150%	Private	Nov-17
SER Wind	Glennmont Partners	245	Onshore	Operating	Italy	EMEA	EUR	190	8.0	--	2.010%	Private	Oct-17
Ventos de Santo Estevo	--	358	Onshore	Greenfield	Brazil	Latin America	BRL	71	2.0	--	IPCA + 6,988%	Private	Oct-17
Inversiones Latin America Power Limitada	--	231	Onshore	Operating	Chile	Latin America	USD	412	16.0	11.0	5.350%	-- / BBB- / --	Oct-17
Kent Hills	--	17	Onshore	Greenfield	Canada	North America	CAD	260	16.0	Amortizing	4.450%	Private	Oct-17
GP Wind	--	92	Onshore	Operating	India	Asia-Pacific	INR	3,000	15.0	--	9.250%	Private	Sep-17
Campo Palomas	Invenergy	70	Onshore	Operating	Uruguay	Latin America	USD	136	20.0	12.0	5.200%	Baa3 / -- / --	Aug-17
Ventos de Sao Jorge Holding	Casa dos Ventos Energias Renováveis Ltda.	130	Onshore	Greenfield	Brazil	Latin America	BRL	45	11.0	6.9	IPCA + 9.000%	-- / -- / AA (bra)	May-17
Kype Muir Onshore Wind	Banks Renewables	151	Onshore	Greenfield	United Kingdom	EMEA	GBP	140	15.0	--	Fixed and CPI Index-linked	Private	Mar-17
Neerg Energy *	RG	500	Onshore	Operating	India	Asia-Pacific	USD	475	5.0	Bullet	6.000%	-- / B+ / --	Feb-17
Texoma Wind, LLC	Duke Energy Renewables	710	Onshore	Greenfield	United States	North America	USD	587	17.0	6.4	4.120%	BBB- (Kroll)	Feb-17

\*Includes Solar Assets



# Project Bond Focus – August 2020

## Wind

### Wind Project Bond - Global Issuance To-Date (Continued)

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geography	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
Balko Wind	DE Shaw Renewable Investments (DESR)	300	Onshore	Operating	United States	North America	USD	--	--	--	--	Private	Feb-17
Broadview & Armow Wind Projects	Pattern Energy Group	504	Onshore	Operating	United States	North America	USD	350	7.0	--	5.900%	Private	Jan-17
New Richmond Wind	TransAlta Renewables	68	Onshore	Operating	Canada	North America	CAD	153	16.0	--	3.960%	Private	Dec-16
Grand Prairie Wind Farm	BHE Renewables	400	Onshore	Operating	United States	North America	USD	485	20.0	--	--	Private	Dec-16
Tellenes Wind	BlackRock	160	Onshore	Greenfield	Norway	EMEA	--	--	--	--	--	Private	Jun-16
Fosen Vind	Statkraft & Nordic Wind Power Consortium	1,000	Onshore	Operating	Norway	EMEA	EUR	228	20.0	--	Floating Rate	Private	Mar-16
Renewable Power *	--	--	Onshore	Operating	United States	North America	USD	150	19.0	7.9	4.110%	BBB (Kroll)	Mar-16
Sao Miguel	Voltalia	108	Onshore	Operating	Brazil	Latin America	BRL	57	13.0	7.9	IPCA + 8.190%	BR A+	Mar-16
Demex Oaxaca 1	Renovalia Energy	90	Onshore	Operating	Mexico	Latin America	MXP	2,100	15.0	7.0	8.850%	AA local (S&P) / AA local	Jan-16
WindMW	Blackstone & Windland Energieerzeugungs	288	Offshore	Operating	Germany	EMEA	EUR & USD	901	6.0 & 12.0	3.0 & 9.0	2.130%, 3.590%, 5.020%	Baa3 / BBB- / BBB-	Dec-15
Armenia Mtn. Wind	AES	101	Onshore	Operating	United States	North America	USD	85	9.0	5.0	3.260%	NAIC-2 (BBB)	Oct-15
Dufferin Wind	China Longyuan Power Group	91	Onshore	Operating	Canada	North America	CAD	200	18.0	10.0	4.320%	NAIC-2 (BBB DBRS)	Oct-15
CLP Wind Farms India	--	1,000	Onshore	Operating	India	Asia-Pacific	INR	6,000	3.0 to 5.0	--	9.150%	AA- (Local)	Sep-15
Gode Wind 1	DONG Energy & GIP	330	Offshore	Greenfield	Germany	EMEA	EUR	556	10.0	--	--	--	Sep-15
Melancthon Wolfe	TransAlta Renewables	397	Onshore	Operating	Canada	North America	CAD	442	13.0	6.7	3.830%	BBB (DBRS)	Sep-15
Coram California	RET Capital	102	Onshore	Operating	United States	North America	USD	105	17.0	13.5	4.520%	NAIC-2 (BBB- Kroll)	Sep-15
Meikle Wind Energy, LP	Pattern Energy	180	Onshore	Greenfield	Canada	North America	CAD	393	--	--	--	--	Jul-15
Ecotricity Renewable Portfolio *	Ecotricity	60	Onshore	Operating	United Kingdom	EMEA	GBP	70	--	--	--	Private	Apr-15
Hallet 2 Wind	Infrastructure Capital Group (ICG)	71	Onshore	Operating	Australia	Asia-Pacific	USD	99	12.0	10.0	3.780%	NAIC-2 (BBB)	Mar-15
Hallet 2 Wind	Infrastructure Capital Group (ICG)	71	Onshore	Operating	Australia	Asia-Pacific	AUD	76	12.0	10.0	4.880%	NAIC-2 (BBB)	Mar-15
Junco 1 & Junco 2	Usina Eolica Junco	61	Onshore	Greenfield	Brazil	Latin America	BRL	126	1.0	Bullet	BZDI + 214bps	Private	Feb-15
Energia Eolica	ContourGlobal	114	Onshore	Operating	Peru	Latin America	USD	204	20.0	12.5	6.000%	BBB-	Dec-14
Arise AB	Arise Windpower	135	Onshore	Operating	Sweden	EMEA	SEK	1,100	5.0	--	STIBOR + 300bps	BB-	Apr-14
Trillium Windpower	NextEra	147	Onshore	Operating	Canada	North America	CAD	315	20.0	10.7	5.800%	BBB (DBRS)	Jan-14
Continental Wind, LLC	Exelon	667	Onshore	Operating	United States	North America	USD	613	20.0	10.3	6.000%	Baa3 / BBB- / BBB-	Sep-13
Elevate Wind	E.ON	430	Onshore	Operating	United States	North America	USD	285	20.0	10.0	5.350%	NAIC-2 (Baa3/BBB- )	Apr-13

\*Includes Solar Assets

# Project Bond Focus – August 2020

## Wind

### Wind Project Bond - Global Issuance To-Date (Continued)

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geography	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
Comber Wind Financial	Brookfield	166	Onshore	Operating	Canada	North America	CAD	450	18.0	9.8	5.130%	BBB (DBRS)	Feb-13
EverPower Wind Holdings	Everpower	150	Onshore	Operating	United States	North America	USD	245	23.0	13.6	5.150%	NAIC-2 (Baa3/BBB-)	Aug-12
Oaxaca II	Acciona	102	Onshore	Operating	Mexico	Latin America	USD	149	20.0	13.0	7.250%	BBB- / BBB-	Aug-12
Oaxaca IV	Acciona	102	Onshore	Operating	Mexico	Latin America	USD	150	20.0	13.0	7.250%	BBB- / BBB-	Aug-12
Caithness Shepherds Flat, LLC	Caithness Energy	845	Onshore	Greenfield	United States	North America	USD	525	22.0	--	4.970%	80% AAA / 20% BBB-	Dec-10
Hatchet Ridge Pass-Through Trust	Pattern Energy	101	Onshore	Operating	United States	North America	USD	142	19.0	10.0	5.950%	BBB-	Dec-10
Alta Wind Holdings, LLC	Terra-Gen Power	570	Onshore	Greenfield	United States	North America	USD	579	24.0	13.0	7.000%	BBB-/BBB-	Jun-10
NextEra Mountain Prairie Wind	NextEra	273	Onshore	Operating	United States	North America	USD	305	20.0	--	6.560%	BBB-	Mar-10
[Confidential]	[Confidential]	643	Onshore	Operating	--	North America	USD	202	Conf.	Conf.	Conf.	BBB-	Dec-08
Breeze Finance, S.A.	Theolia	350	Onshore	Operating	--	EMEA	EUR	455	20.0	10.0	5.420%	Aaa / AAA / AAA	Apr-07
FPL Energy Bison Wind	FPL Energy	200	Onshore	Operating	--	North America	USD	206	20.0	--	6.660%	BBB-	Jun-06
Alte Liebe 1, Ltd.	Plambeck	142	Onshore	Operating	--	EMEA	EUR	102	19.0	--	4.700%	BBB-	May-06
Breeze Two	CRC Breeze Finance	330	Onshore	Greenfield	Germany	EMEA	EUR	300	20.0	6.6	5.290% & 6.110%	-- / BBB / BB+	Apr-06
CRC Breeze Finance, S.A.	Theolia	330	Onshore	Operating	--	EMEA	EUR	355	20.0	--	5.290%	86% BBB / 14% BB+	May-05
FPL National Wind Portfolio	FPL Energy	534	Onshore	Operating	--	North America	USD	100	14.0	7.0	6.120%	Ba2/BB-/BB	Mar-05
FPL National Wind	FPL Energy	534	Onshore	Operating	--	North America	USD	365	19.0	9.0	5.610%	Baa3 / BBB- / BBB	Feb-05
Breeze One	CRC Breeze Finance	81	Onshore	Operating	Germany	EMEA	EUR	123	--	--	--	-- / BBB- / --	Sep-04
Max Two, Ltd.	Energiekontor	81	Onshore	Operating	--	EMEA	EUR	100	20.0	--	5.700%	BBB-	Sep-04
FPL Energy Wind Funding	FPL Energy	697	Onshore	Operating	United States	North America	USD	125	14.0	7.0	6.880%	Ba2 / BB-	Dec-03
FPL Energy American Wind, LLC	FPL Energy	697	Onshore	Operating	United States	North America	USD	380	20.0	9.0	6.630%	Baa3 / BBB-	Jun-03

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