

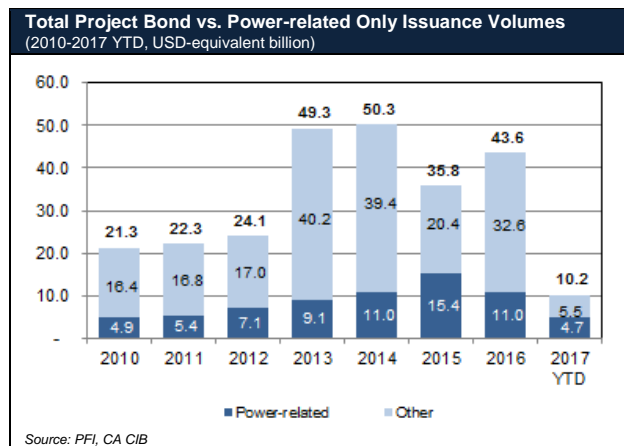
# Project Bonds: Power Transmission Lines

Crédit Agricole CIB, a leader in the global Project Bond market, is authoring a series of articles covering key topics for issuers to consider.

## Global Project Bond Market Overview

Debt capital markets are an established source of funding for infrastructure and power assets across geographies, and represent an attractive alternative to the bank market. Institutional investors, such as insurance companies, pension funds, asset managers, and specialized funds, have proven appetite for long-dated assets, yielding stable, uncorrelated returns – all common traits found in Project Bonds.

Institutional investors’ appetite has allowed Project Bonds to finance a variety of projects across industries – including oil & gas, transportation, telecommunications, social infrastructure, power generation, and electricity transmission.



Smaller voltage lines – typically in the 34kv to 69kv range, are usually referred to as “sub-transmission” lines and are used to send power to regional distribution substations

Underground transmission lines are more common in highly-populated areas and operate in similar voltage ranges as overhead lines. They may be buried with no protection, or placed in conduit, trenches, or tunnels.

Submarine transmission cables are commonly below the surface of ocean or saltwater straights, but can also be installed beneath lakes and rivers. Underwater cables are typically high-voltage - configurations can entail large cables of up to 600kv.

Transmission lines are well-understood by institutional investors and are deemed to be low-risk assets. They typically entail simple operating processes and predictable performance: their ability to generate revenues does not depend on the production of any form of output, their operation does not rely on any input subject to market risks, and they are typically heavily-regulated assets subject to limited competition. This predictability is frequently further enhanced by projects’ underlying contracts with built-in mitigation mechanisms for demand risk, asset use risk, and price risk – such as concession agreements or similar long-term service contracts similar to operating leases, under fixed tariff regimes and cost-plus compensation mechanisms.

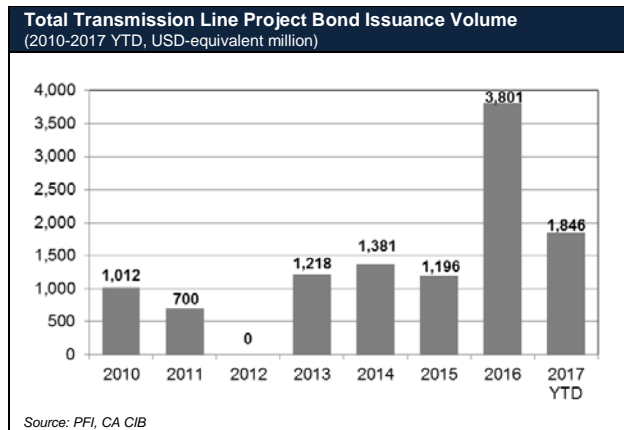
Transmission lines tend to be viewed as having strong strategic value as an essential component of countries’ power supply chain and their electricity sector infrastructure.

## Transmission Line Project Bonds

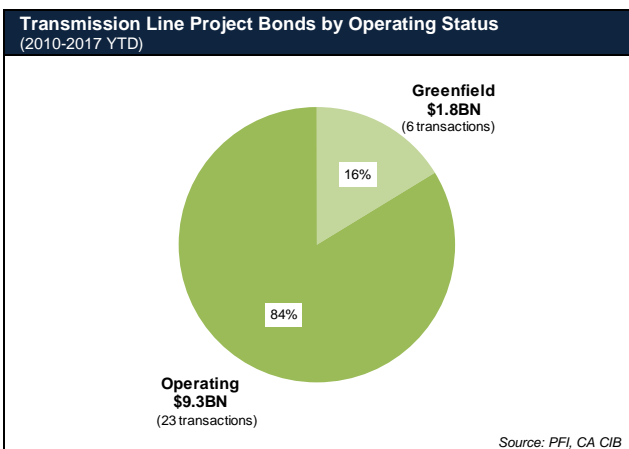
In this article, when discussing “Transmission Line Project Bonds”, we refer exclusively to non-recourse debt capital market offerings, related to physical assets used to transport electricity over long distances, by either overhead, underground or submarine cables. Fiber optic lines, telecom-related transmission, and other energy transportation assets (e.g. pipelines) are not included in this discussion and are subject to different considerations.

Overhead transmission lines typically operate carrying 3-phase current, supported by towers, at voltages in the range of 69kv to 765kv – some common configurations include 500kv, 230kv, and 138kv.

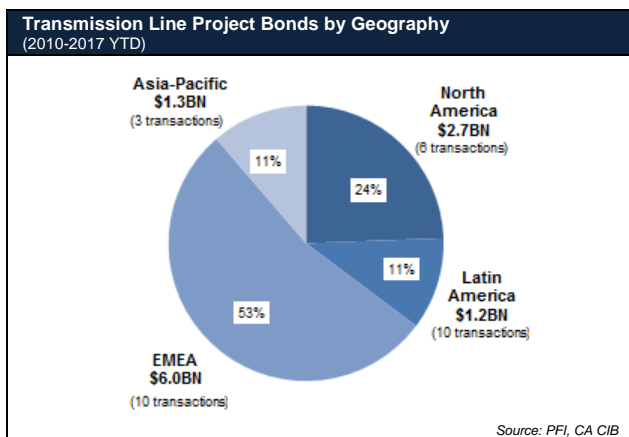
Historical issuance volumes for Transmission Line Project Bonds have grown from annual issuance volumes of approx. US\$1.0Bn in 2010 to US\$3.8Bn in 2016. Between 2010 and 2017<sub>YTD</sub>, Transmission Line Project Bonds accounted for approx. 16% of all Power-related Project Bond issuances by volume, and roughly 4% of the total Project Bond market.



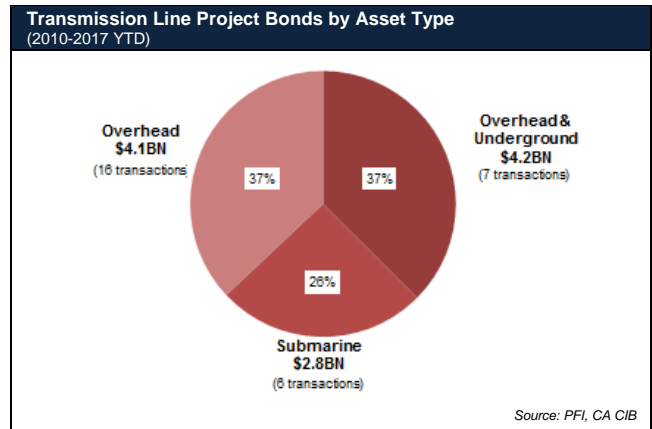
Approximately US\$11.2Bn Transmission Line Project Bonds have been issued since 2010 for both greenfield and brownfield assets, of which over 84% have been to refinance operating or substantially-completed projects. The remaining 26% has been to finance projects during construction.



Most Transmission Line Project Bonds have been executed for projects in the Europe, the Middle East and Africa region (“EMEA”) and in North America – accounting for nearly 80% of total issuance volume since 2010, with Latin America showing the smallest share (11%).



Finally, we note that approximately 74% of issuance volume since 2010 has been related to land-based transmission lines - either overhead or underground, or bundled, and the remaining 26% has been issued for submarine cables (mostly from the UK).



## Trends & Highlights

Below, we discuss the main trends in the Transmission Line Project Bond market, as illustrated by specific transactions.

### Corporate vs. Project Financing

Project scale, technology complexity, and market conditions typically influence the financing strategy pursued by transmission line sponsors.

Small-scale, overhead transmission lines are frequently financed directly by utilities relying on their balance sheets or on unsecured debt issuances. Vertically-integrated utilities tend to directly own transmission lines and to finance them on an unsecured basis (i.e. not project-financed). This is especially true in cases where the utility owning the transmission lines has access to competitive sources of corporate debt - such as the case with well-capitalized private utilities and some government-owned utilities.

Transmission-related assets such as substations and other associated infrastructure are frequently bundled with transmission lines and frequently corporate-financed as a whole.

Project Bonds have been more frequently issued for larger-scale transmission lines “segregated” from vertically-integrated utilities. For example, in the UK, regulatory provisions requiring wind power generation companies to divest from transmission activities led to the

issuance of approx. £1.1Bn non-recourse bond offerings related to transmission lines connecting offshore power

generation projects to the grid, through underground and submarine cables (known as “OFTO” assets), between 2013 and 2016.

Other instances where Project Bonds have been used include cases where projects are part of countries’ strategic goals to expand the transmission grid as a matter of public policy; and for transmission lines spanning different jurisdictions given that the complexities of overlapping/conflicting regulations require a negotiated, asset-specific framework for the project to be developed.

Case Study: Inter-state Transmission Line Trans Allegheny Interstate Line Co.	
Summary Terms & Conditions	
<b>Description:</b>	165-mile, 500kv overhead transmission line spanning three states in the US
<b>Issuer:</b>	Trans Allegheny Interstate Line Co.
<b>Issuance Date:</b>	January 2010
<b>Legal Maturity:</b>	2015
<b>Sponsor(s):</b>	FirstEnergy Transmission, LLC; ultimate parent FirstEnergy Corporation
<b>Format:</b>	144 A / Reg S
<b>Issuance Amount:</b>	US\$450MM
<b>Use of Proceeds:</b>	Refinance the construction credit facilities
<b>Status:</b>	Greenfield
<b>Ratings:</b>	'Baa2'/'BBB'/'BBB-' by Moody's, S&P and Fitch
<b>Min./Avg. DSCR:</b>	NA – Bullet structure
<b>Pricing:</b>	4.00%

The project achieved an investment grade rating despite its partial exposure to construction risk. Tariff payments to the project are made through allocations by load to all customers of the PJM Interconnection.

### Underlying Assets

Project Bonds have financed overhead transmission lines, underground transmission lines, and submarine cables – sometimes as single-asset financings, sometimes as portfolios.

Project Bonds have financed large-scale overhead lines as well as diversified portfolios of overhead lines bundled with underground cables (e.g. in Australia and Sweden). As OFTO issuances in the UK demonstrate, single-asset submarine cables have also been well-received in the capital markets.

Case Study: Submarine Cables (OFTOs) West of Duddon Sands Transmission	
Summary Terms & Conditions	
<b>Description:</b>	Offshore transmission line connecting the 389MW West of Duddon Sands Wind Farm, in north-west England, to the onshore network
<b>Issuer:</b>	WoDS Transmission plc
<b>Issuance Date:</b>	August 2015
<b>Legal Maturity:</b>	2034
<b>Sponsor(s):</b>	3i Infrastructure plc and PPP Equity PIP LP
<b>Issuance Amount:</b>	£255MM
<b>Use of Proceeds:</b>	Finance the acquisition of the asset
<b>Status:</b>	Operating
<b>Ratings:</b>	'A3' by Moody's
<b>Min./Avg. DSCR:</b>	1.14x / 1.20x
<b>Pricing:</b>	3.446%

The transaction benefits from a partial credit guarantee from the European Investment Bank for a maximum of 15% of the bonds’ balance. The rating for the transaction achieved an uplift of one notch from the stand-alone credit quality of the bonds.

### Greenfield Transmission Lines

Capital markets can be tapped to finance greenfield assets. Institutional investors and rating agencies typically deem transmission lines as being exposed to low construction delay risk and low cost overrun risk, making them good candidates for Project Bond financing during construction, especially when developed by experienced sponsors.

Transmission lines’ critical risk hurdle tends to be related to rights of way. Transmission lines can cover large distances, passing through privately-held land, communal land (sometimes protected under special legal figures in certain jurisdictions), government-owned land, or areas with environmental, social or political sensitivities attached. Failure to address local dynamics and friction points can have a significant negative impact in a transmission line’s construction schedule, from construction delays to construction cost overruns.

As evidenced by the case study below, Project Bonds have successfully financed greenfield transmission assets when rights of way acquisition risk is adequately mitigated. This has been achieved by issuing bonds once completion is substantially advanced with all critical rights of way secured - or earlier if a detailed acquisition plan is in place, with a clearly laid-out strategy for permitting and land-owner negotiations.

Case Study: Greenfield Transmission Line Hudson Transmission Project	
Summary Terms & Conditions	
<b>Description:</b>	Underground, underwater transmission line with construction risk, between New Jersey and Manhattan in the US.
<b>Issuer:</b>	Hudson Transmission Partners LLC
<b>Issuance Date:</b>	April 2011
<b>Legal Maturity:</b>	October 2033
<b>Sponsor(s):</b>	EIF & Starwood
<b>Format:</b>	4(a)(2) US Private Placement
<b>Issuance Amount:</b>	US\$700MM
<b>Use of Proceeds:</b>	Finance the project's construction
<b>Status:</b>	Greenfield
<b>Ratings:</b>	Privately-rated, investment grade
<b>Min./Avg. DSCR:</b>	Private
<b>Pricing:</b>	Confidential

Rights of way risk, which tends to be the critical hurdle for transmission line completion, was mitigated by having the cables follow existing railroad rights of way. A group of institutional investors circled the transaction under a private placement format.

Even with substantially-secured rights of way, third-party credit enhancement has been required, in some cases, to mitigate construction risk, when the asset's construction risk is deemed to be relatively-high and/or completion is supported by weaker sponsors.

Common forms of credit enhancement include financial guarantees, and partial risk guarantees. Financial guarantees up until the credit crisis in 2008, included full credit wraps (i.e. unconditional and irrevocable coverage for timely interest and principal payment), but, after the virtual disappearance of the monoline industry, have been mostly structured as partial credit guarantees.

A partial credit guarantee covers interest and principal defaults, up to a pre-agreed amount – expressed either as a fixed sum or as a percentage of the bonds' balance. Such partial credit covers have a ratings-uplift effect throughout the entire tenor of a bond issuance – thus enhancing the visibility of investors to debt repayment certainty, even in scenarios with construction delays or cost overruns.

Partial risk guarantees, on the other hand, are specifically-structured to address targeted risks and can be time-bound or event-bound. For instance, construction risk can be addressed with a partial construction wrap letter of credit – a contingent facility that is drawn to cover construction cost overruns and debt service shortfalls due

to construction delays, up to a pre-agreed fixed amount, maturing the date the project achieves completion.

### Different Regulatory Regimes

Transmission Line Project Bonds have been issued off the back of different regulatory regimes, some providing more cash flows visibility than others.

Electric power transmission is usually a regulated activity with prices defined based on demand projections, and a built-in profit to compensate transmission system operators with a target ROE. In some jurisdictions, transmission lines are operated pursuant to long-term concession agreements awarded by central government agencies, or other quasi-sovereigns under availability payment structures. Operating lease structures with O&M risks transferred to the lessee – which sometimes is a government-related entity or quasi-sovereign, are also used in certain jurisdictions. These types of regulatory frameworks are well-suited for long-term, fully amortizing financings – typically co-terminus with the underlying contracts.

Operation stability can be, however, less visible in cases where the project benefits from a regulated tariff subject to rate re-set risk, or when demand is not anchored in a captive customer base (i.e. “merchant” projects).

Case Study: Addressing Regulatory Risk SteelRiver Transmission / Trans Bay Cable Project	
Summary Terms & Conditions	
<b>Description:</b>	53-mile land and submarine-based high-voltage transmission project between Pittsburg and San Francisco in California
<b>Issuer:</b>	SteelRiver Transmission Company LLC
<b>Issuance Date:</b>	November 2010
<b>Legal Maturity:</b>	June 2017
<b>Sponsor(s):</b>	SteelRiver Infrastructure Fund North America
<b>Format:</b>	144 A / Reg S
<b>Issuance Amount:</b>	US\$562MM
<b>Use of Proceeds:</b>	Refinance construction bank facilities
<b>Status:</b>	Operating
<b>Ratings:</b>	'Baa2'/'BBB-' by Moody's and Fitch at closing
<b>Min./Avg. DSCR:</b>	1.35x / 1.50x
<b>Pricing:</b>	4.71%

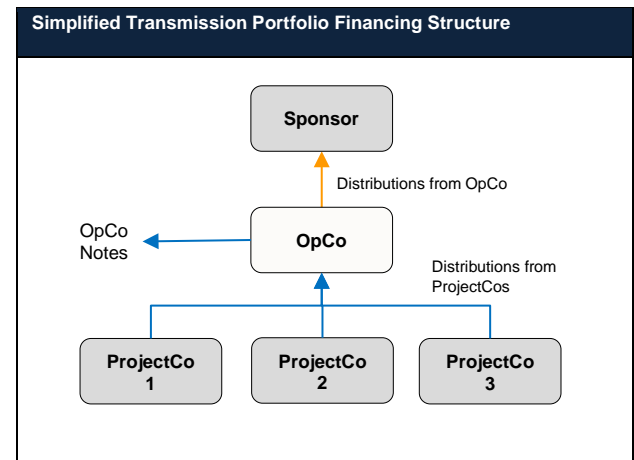
The project's concession is subject to re-set risk under the regulatory regime. The rate re-set risk was address with partially-amortizing debt sized to achieve underlying base case DSCRs of 1.35x minimum and 1.50x average with a 24-year financing tail, giving the balloon ample room to refinance.

### Assets in Emerging Markets

While the majority of issuances come from North America and Europe, Project Bonds have been issued from emerging markets such as Peru, India, and Chile to finance transmission lines. Notably, issuances in emerging markets have been mostly related to overhead lines, and some have been in local currency – demonstrating that liquidity is available for transmission companies, both in international capital markets and in local capital markets.

Transmission lines financed with Project Bonds in emerging markets have oftentimes been anchored in country’s public policy plans to expand their electricity grid’s reach and to reduce transmission-related system losses – and thus are deemed to be highly-strategic assets. For example, approximately US\$1.1Bn investment grade Project Bonds have been issued in Brazil, Chile and Peru based on public concession frameworks under availability payments mechanisms.

of scale and to reach critical mass to tap a broader, more liquid investor base.



Pooling several transmission projects into a single Project Bond offering entails concentrating all of the projects’ cash flows into a single issuing SPV or “OpCo”, whose debt is fully-secured by all equipment, contracts and accounts related to the transmission lines. This approach can be applied to portfolios of assets in operation or to finance construction of assets with similar construction schedules.

Case Study: Transmission Line Project Bond in Latin America ABY Transmisión Sur	
<b>Summary Terms &amp; Conditions</b>	
<b>Description:</b>	Three sequential overhead transmission lines and related substations along 883km of southern and central Peru
<b>Issuer:</b>	ABY Transmisión Sur S.A.(fka. Abengoa Transmisión Sur S.A.)
<b>Issuance Date:</b>	April 2014
<b>Legal Maturity:</b>	2043
<b>Sponsor(s):</b>	Atlantica Yield
<b>Format:</b>	144 A / Reg S
<b>Issuance Amount:</b>	US\$432MM
<b>Use of Proceeds:</b>	Refinance the construction credit facilities
<b>Status:</b>	Operating
<b>Ratings:</b>	'BBB-' by S&P and Fitch, at closing; recently-upgraded to 'BBB' due to better-than-expected performance
<b>Min./Avg. DSCR:</b>	1.28x / 1.35x
<b>Pricing:</b>	6.875%

The issuance was the largest single-asset Transmission Line Project Bond in Latin America. At the time of its issuance, it had also been the longest transmission line offering in the region, with a 29-year tenor due to its underlying 30-year concession agreement.

Case Study: Transmission Portfolio Refinancing Celeo Redes Operación Chile	
<b>Summary Terms &amp; Conditions</b>	
<b>Description:</b>	Portfolio of overhead transmission lines spanning 454km in the Central Interconnected Electrical System of Chile
<b>Issuer:</b>	Celeo Redes Operación Chile SA
<b>Issuance Date:</b>	May 2017
<b>Legal Maturity:</b>	2047
<b>Sponsor(s):</b>	Elecnor, APG Asset Management NV
<b>Format:</b>	Two <i>pari-passu</i> tranches: <ul style="list-style-type: none"> <li>• 144 A / Reg S International Bond</li> <li>• Locally-placed bond</li> </ul>
<b>Issuance Amount:</b>	Aggregate US\$MM593MM: <ul style="list-style-type: none"> <li>• US\$379MM International Bond</li> <li>• UF5.41MM (≈US\$214MM) Local Bond</li> </ul>
<b>Use of Proceeds:</b>	Refinance construction credit facilities
<b>Status:</b>	Operating
<b>Ratings:</b>	'Baa2'/'BBB'/'BBB-' by Moody's, S&P and Fitch
<b>Min./Avg. DSCR:</b>	1.30x / 1.50x
<b>Pricing:</b>	5.20% (International Bond) / 3.35% (Local Bond)

The Celeo Redes offering was the first portfolio Project Bond refinancing of transmission line assets in Latin America. It was also the first issuance to take advantage of available liquidity in both the international and local Capital Markets.

### Portfolio (Re)financings

Given transmission line’s mostly-standardized technology and low operating risk profile, portfolio (re)financings are also well-suited for sponsors with multiple assets. This allows issuers to take advantage of transaction economies

## Rating Agencies

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Rating Agencies' approach to transmission lines has historically been based on the application of their generic Project Finance methodologies, complemented in some cases with their (i) Power criteria for additional sector-specific considerations, (ii) Availability Payments Projects criteria or P3 criteria, and (iii) general criteria applicable to Regulated Utilities or Networks. As of today, however, rating agencies have not published a transmission line-specific rating methodology.

### Operations Risk Assessment

For operating transmission lines, general guidelines provided by rating agencies emphasize underlying contracts' (e.g. concession agreements, operating leases) ability to yield predictable revenue streams and to isolate operations from demand or price risk, the adequacy of O&M service arrangements; the expertise of O&M contractors, and the effectiveness of a transaction's structural features to offset liquidity downside due to service discontinuity or asset unavailability.

Rating agencies views on the project's operations risk profile typically rely on the opinion provided by the independent engineer, regarding the suitability of the engineering and design configuration of the asset, and its expected technical performance throughout its economic life - which is estimated in some cases to exceed 40 years.

Operations risk in transmission lines is typically deemed to be appropriately mitigated (i) when sponsors and O&M contractors are highly-experienced in local transmission line management – as with any other asset class; and (ii) with financial structure provisions such as a 6-month debt service reserve account (“DSRA”) and a 6-month O&M reserve account (“OMRA”). Major maintenance reserves are not as commonly required for transmission lines as they are for some other power-related asset classes with lumpy and irregular maintenance expense requirements.

Overhead transmission lines typically have relatively-low maintenance requirements that can be mostly conducted by a team experienced in electromechanical engineering. Underground and submarine transmission cables have higher maintenance requirements.

Regardless of their scale, the long operating history from commercially-proven equipment used in transmission lines results in high visibility of lifecycle operations expenses and maintenance needs.

The above points of typical scrutiny are commensurate with the low-risk profile and high degree of performance predictability that operating transmission lines have historically demonstrated. These considerations allow transactions displaying a base case DSCR in the 1.20-1.40x range for an investment grade rating, and as low as 1.10x for land-based transmission lines, of limited scale with no substations - among the lowest for any infrastructure or energy asset class. Minimum DSCRs of 1.10x are also deemed to be appropriate for projects considered to be essential infrastructure assets, with robust contractual or regulatory frameworks given them the entrenched right to recover operating costs and debt service on a timely basis, without deductions, risk of under-recovery or any material delays.

### Construction Risk Assessment

For greenfield transmission lines, rating agencies generally continue to view the 1.20-1.40x base case DSCR range to be adequate for an investment grade rating, provided certain completion risk mitigating factors are in place. As earlier suggested, rights of way tend to be transmission line's most common and critical hurdle to achieve completion and, thus, are the single-most crucial item emphasized by rating agencies in their analysis. For this reason, projects seeking to obtain investment grade ratings generally require to either have all rights of way fully-secured or to have, at least, the rights of way considered "critical" fully-secured, with the remaining in process of execution per a detailed rights of way acquisition plan, vetted and positively-opined on by an independent engineer.

When rights of way are not fully-secured, rating agencies will rely on the independent engineer's views on the rights of way acquisition plan's reasonableness, strategy rationale, and cost structure to assess the likelihood that delays may occur. The independent engineer will typically provide an opinion of base case likelihood that the rights of way will be successfully executed in time and in budget, and an estimate of probable cost overruns and completion delays under worst case scenario assumptions - based on their experience with comparable projects in similar circumstances (terrain, social context, political climate, etc). For this reason, special emphasis is typically placed by both the independent engineer and rating agencies on the EPC contractor's and the sponsor's experience in the country or region, their local knowledge and quality of dialogue with key local decision makers, and their investment in developing the optimal conditions to facilitate rights of way negotiations.

In addition to the special emphasis on rights of way, issuers for greenfield transmission lines can expect rating

agencies to scrutinize the strength of the provisions and structure of EPC agreements. Lump-sum, fixed price, turn-key contracts with well-defined liquidated damages for delays and incentives to complete the project in time and inside the allocated budget are generally viewed positively. Rating agencies will also substantially rely on the independent engineer's opinion on the project's engineering and design specifications in correspondence with the electricity transportation requirements and the terrain characteristics, as well as on the choices of equipment and related civil works needed for construction and maintenance. These items are rarely a limitation to a transaction obtaining an investment grade rating, as transmission technology is well-established, extensively commercially proven, and relatively straightforward.

Finally, rating agencies typically expect that transactions for greenfield transmission lines include sufficient built-in liquidity to absorb potential construction delays or overruns. These liquidity provisions are expected to be in place in addition to standard structural features typically required for operating assets, such as a 6-month DSRA or a 6-month OMRA when recommended by the independent engineer.

Acceptable forms of addressing construction cost overruns and completion delay risk include contingent equity commitments from an investment grade provider, and third

party credit enhancement mechanisms, such as construction wrap LCs. We note that construction wrap LCs do not need to cover 100% of the bond issuance to adequately mitigate completion risk. Partial coverages in the 25-30% range have historically been deemed to be adequate. However, the effectiveness of a construction wrap LC and the protection it provides can vary from project to project, and are analyzed by rating agencies on a case-by-case basis

The table in the next page summarizes some of the key rating drivers for Transmission Line Project Bonds under fully-amortizing debt structures.

## Conclusion

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Capital Markets have welcomed Transmission Line Project Bonds for different asset types, regulatory frameworks, and geographies, including to finance construction. Institutional Investors' appetite remains strong in North America and Europe, and recent successful transactions in Latin America and Asia suggest similar appetite for projects in these regions.

Rating Criteria for Investment-Grade Transmission Line 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 2016)</li> <li>"Rating Criteria for Availability-Based Projects" (Jul 2016)</li> <li>"Rating Public-Sector Counterparty Obligations in PPP Transactions" (Jul 2016)</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>"Project Finance Operations Methodology" (Sep 2014)</li> <li>"Project Finance Construction Methodology" (Nov 2013)</li> </ul>	<ul style="list-style-type: none"> <li>"Operational Privately Financed Public Infrastructure (PF/PPP/P3) Projects" (Mar 2015)</li> <li>"Regulated Electric and Gas Utilities" (Dec 2013)</li> <li>"Generic Project Finance Methodology" (Dec 2010)</li> </ul>	<ul style="list-style-type: none"> <li>"Rating Project Finance" (Dec 2016)</li> <li>"Rating Companies in the Regulated Electric, Natural Gas and Water Utilities Industry" (Oct 2016)</li> </ul>	<ul style="list-style-type: none"> <li>"Project Finance Rating Methodology" (Nov 2013)</li> </ul>
<b>DSCR Indication for Investment Grade Rating</b>	<ul style="list-style-type: none"> <li>Min DSCR in the 1.10-1.25x range under (adjusted) base case cash flows for "stronger" projects</li> <li>Min DSCR in the 1.15-1.30x range under (adjusted) base case cash flows for "midrange" projects</li> <li>Min DSCR in the 1.20-1.40x range under (adjusted) base case cash flows for "weaker" projects</li> </ul>	<ul style="list-style-type: none"> <li>Min DSCR in the 1.10-1.20x range under base case cash flows for simple land-based transmission lines of limited scale with no substations</li> <li>Min DSCR in the 1.20-1.40x range under base case cash flows for large-scale transmission lines with substations, and subsea cables</li> </ul>	<ul style="list-style-type: none"> <li>Min DSCR in the 1.10-1.20x range under base case cash flows for projects considered to be essential infrastructure assets with full operations and financial costs pass-through</li> <li>Min DSCR in the 1.20-1.40x range under base case cash flows for projects exposed to performance risk</li> </ul>	<ul style="list-style-type: none"> <li>Min DSCR in the 1.15-1.30x range under base case cash flows for projects with highly-visible and stable cash flow profiles</li> <li>Min DSCR in the 1.30-1.60x range under base case cash flows for projects with less-certain and relatively-unstable cash flow profiles</li> </ul>	<ul style="list-style-type: none"> <li>Min DSCR in the 1.30-2.00x range under base case cash flows for projects with "average" cash flow stability/predictability</li> <li>Min DSCR in the 1.20-1.75x range under base case cash flows for projects with "strong" cash flow stability/predictability</li> </ul>
<b>Base Case Assumptions and Adjustments</b>	<ul style="list-style-type: none"> <li>Sponsor macro assumptions (e.g. inflation, for inflation-adjusted tariff regimes) maintained/adjusted as deemed appropriate</li> <li>Analysis based on "Rating Case" (i.e. adjusted base case)</li> <li>Sponsor O&amp;M costs projections; 0-10% overruns (informed by third-party assessment)</li> <li>Breakeven scenarios test for revenue downside, unavailability resilience, and cost overruns</li> </ul>	<ul style="list-style-type: none"> <li>Sponsor macro assumptions (e.g. inflation, for inflation-adjusted tariff regimes) maintained/adjusted as deemed appropriate</li> <li>Sponsor revenue projections; 0-10% haircuts</li> <li>Sponsor O&amp;M costs projections; 0-15% overruns (informed by third-party assessment)</li> <li>Sponsor availability assumptions; 0-5% reductions</li> </ul>	<ul style="list-style-type: none"> <li>Sponsor macro assumptions (e.g. inflation, for inflation-adjusted tariff regimes) maintained/adjusted as deemed appropriate</li> <li>Breakeven scenarios test for revenue downside, unavailability resilience, and cost overruns</li> </ul>	<ul style="list-style-type: none"> <li>Sponsor macro assumptions (e.g. inflation, for inflation-adjusted tariff regimes) maintained/adjusted as deemed appropriate</li> <li>Breakeven scenarios test for macro variables sensitivity (e.g. high inflation of up to 10% throughout the life of the project), revenue haircuts, unavailability, and O&amp;M cost overruns</li> </ul>	<ul style="list-style-type: none"> <li>Sponsor macro assumptions (e.g. inflation, for inflation-adjusted tariff regimes) maintained/adjusted as deemed appropriate</li> <li>Adjustments may be applied on a case by case basis</li> </ul>
<b>Typical Structural Provisions</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 to 12-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 to 12-month Operation &amp; Maintenance Account</li> <li>Distribution Test</li> </ul>

Source: Rating Agencies, CA CIB



**Transmission Line Project Bond Issuances**  
(2010 - 2017<sub>YTD</sub>)

Issuer	Status	Asset Type*	Project Type	Country	Region	Currency	Size (MM)	Pricing At Issuance	Closing Date	Tenor (Years)	WAL (Years)	Rating at Issuance (Moody's / S&P / Fitch)
Celeo Redes	Operating	Overhead	Portfolio	Chile	Latin America	USD	379	5.200%	May-17	30.0	21.0	Baa2 / BBB / BBB
Extremoz Transmissora do Nordeste	Operating	Overhead	Single-Asset	Brazil	Latin America	BRL	170	--	Apr-17	12.0	--	AA+ (Fitch local)
Kudgi Transmission	Operating	Overhead	Single-Asset	India	Asia-Pacific	INR	15,000	8.25% to 9.50%	Apr-17	23.0	--	AAA (Crisil and ICRA)
Paranaíba Transmissora	Greenfield	Overhead	Single-Asset	Brazil	Latin America	BRL	120	6.905%	Mar-17	11.0	4.7	AA+ (Fitch local)
Ellevio Sveige AB	Operating	Overhead & Underground	Portfolio	Sweden	EMEA	SKR	10,000	fixed and floating tranches	Mar-17	3.0 to 15.0	--	--
Transmissora Sul Litorânea	Greenfield	Overhead	Single-Asset	Brazil	Latin America	BRL	150	7.565%	Dec-16	14.0	7.0	AA+ (Fitch local)
Cross Texas Transmission LLC	Operating	Overhead	Single-Asset	United States	North America	USD	100	--	Dec-16	--	--	--
Westermost OFTO	Operating	Submarine	Single-Asset	United Kingdom	EMEA	GBP	170	--	Dec-16	--	--	--
Ellevio Sveige AB	Operating	Overhead & Underground	Portfolio	Sweden	EMEA	SKR	3,300	2.52% to 3.19%	Dec-16	10.0 to 15.0	--	--
Ellevio Sveige AB	Operating	Overhead & Underground	Portfolio	Sweden	EMEA	USD	941	3.19% to 3.44%	Dec-16	10.0 to 15.0	--	--
Ellevio Sveige AB	Operating	Overhead & Underground	Portfolio	Sweden	EMEA	EUR	50	1.200%	Dec-16	10.0	--	--
TEN Transmission	Operating	Overhead	Single-Asset	Chile	Latin America	USD	50	--	Dec-16	--	--	--
Matrincha Transmissora	Operating	Overhead	Single-Asset	Brazil	Latin America	BRL	180	7.583%	Sep-16	13.0	5.5	AA+ (Fitch local)
NSW Electricity Networks (TransGrid)	Operating	Overhead & Underground	Portfolio	Australia	Asia-Pacific	USD	756	3.08% to 3.33%	Jul-16	10.0 to 15.0	bullet	NAIC-2 (Baa2)
Caruna Networks	Operating	Overhead	Portfolio	Finland	EMEA	EUR	1,105	--	Feb-16	10.0 to 30.0	--	--
WoDS Transmission	Operating	Submarine	Single-Asset	United Kingdom	EMEA	GBP	255	3.446%	Aug-15	19.0	10.8	A3 / -- / --
ElectraNet	Operating	Overhead & Underground	Portfolio	Australia	Asia-Pacific	USD	275	T + 115bps to 130bps	May-15	7.0 to 12.0	bullet	NAIC-2 (Baa1 / BBB+)
Gwynt y Mor OFTO	Operating	Submarine	Single-Asset	United Kingdom	EMEA	GBP	339	2.778%	Feb-15	19.0	--	A3 / -- / --
Wind Transmission Texas	Operating	Overhead	Single-Asset	United States	North America	USD	645	3.670% & 4.310%	Dec-14	20.0 & 10.0	16.0 & 9.0	NAIC-1 & NAIC-2
Linhas Taubate Transmissora	Greenfield	Overhead	Single-Asset	Brazil	Latin America	BRL	45	7.877%	Dec-14	16.0	--	--
Transmissora Sul Brasileira	Operating	Overhead	Single-Asset	Brazil	Latin America	BRL	78	6.800%	Sep-14	14.0	--	--
Cross Texas Transmission LLC	Operating	Overhead	Single-Asset	United States	North America	USD	265	2.460% to 4.210%	Jul-14	5.0 to 30.0	bullet	NAIC-1
Abengoa Transmission Sur	Operating	Overhead	Single-Asset	Peru	Latin America	USD	432	6.875%	Apr-14	29.0	21.0	-- / BBB- / BBB-
Elenia Finance Oyj	Operating	Overhead & Underground	Portfolio	Finland	EMEA	EUR	500	2.875%	Dec-13	7.0	bullet	-- / BBB / --
Gabbard OFTO	Operating	Submarine	Single-Asset	United Kingdom	EMEA	GBP	305	4.137%	Dec-13	19.0	12.0	A3 / -- / --
Carhuamayo-Cajamarca Transmission	Operating	Overhead	Single-Asset	Peru	Latin America	USD	110	NA	Oct-13	26.0	NA	NA
Hudson Transmission Partners	Greenfield	Submarine	Single-Asset	United States	North America	USD	700	UST + 210 bps	Apr-11	22.5	11.0	-- / -- / BBB-
SteelRiver Transmission	Greenfield	Submarine	Single-Asset	United States	North America	USD	562	4.710%	Nov-10	6.5	--	Baa2 / BBB- / --
Trans-Allegheny Interstate	Greenfield	Overhead	Single-Asset	United States	North America	USD	450	4.000%	Jan-10	5.0	--	Baa2 / BBB- / BBB

\*Includes related substations & transformers

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