Project Finance Credit Rating Methodology

TRANSPARENCY ANALYTICS

This methodology provides a description of Transparency Analytics, Inc.'s (TA) criteria for assigning credit ratings to project finance transactions. The methodology applies to special-purpose entity (SPE) debt issuers financed on a non-recourse basis whose business purpose is limited to the activity of building and operating the project. This general methodology is intended to be applicable across many types of projects including electricity generation and transmission, transportation infrastructure facilities and networks, digital infrastructure and other types of projects.

TA's project finance credit rating process involves assessment of the following factors, each detailed in this methodology document.

Financial Assessment. Forward-looking evaluation involves derivation of a base case forecast for the project and comparison of projected key credit metrics to rating thresholds for the project's broad risk category. Analysis is supplemented with evaluation of stress and breakeven forecast scenarios.

Business Assessment. Evaluation of the project's relative business strength compared to other projects in its broad risk category includes analysis of cash flow stability, competitive profile, operating performance and sponsor considerations. The combination of Financial Assessment and Business Assessment yields the Operating Phase Assessment Outcome.

Construction Phase Assessment. For projects in construction, TA evaluates the likelihood the project will be completed on time and on budget with adequate funding. Considerations include relative construction complexity, contractor/EPC contract strength, and liquidity/credit support. The Preliminary Rating Before Modifiers is set at the lower of Operating Phase and Construction Phase assessments.

Rating Modifiers. The Preliminary Rating Before Modifiers is adjusted to reflect considerations related to liquidity, refinancing risk, transaction structural features, and offtaker credit profile.

Instrument Ratings. The evaluation described above yields ratings for the project's senior secured debt instruments. If junior debt is present in the capital structure, its rating is derived based on downward notching from the senior secured rating, based on review of applicable credit metrics, waterfall DSCR minimums, and structural subordination.

While the project finance rating methodology is designed for flexibility to rate different types of projects, TA also provides sector-specific considerations for certain project types as outlined in Appendix B. Project types discussed include data centers, renewable power generation and natural gas-fired power generation, and may be expanded over time.

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I. OVERVIEW OF METHODOLOGY

Table 1 summarizes credit factors considered by TA and evaluation process undertaken to assign credit ratings to project finance debt instruments.

Table 1
Project Finance Credit Rating Methodology
Credit Rating Assessment Summary

Financial Assessment (Section II)			
Project Categorization:	**Low Risk**	**Medium Risk**	**High Risk**
Ratios and Weights (%):			
Debt Service Coverage Ratio (DSCR)	100%	50%	50%
Free Cash Flow / Total Debt		50%	50%
		Financial Assessment Outcome	
Business Assessment (Section III)			
Assessment of business credit factors		Adjustment of Financial Assessment Outcome up or down	
		Operating Phase Assessment Outcome	
Construction Phase Assessment (Section IV)			
Assessment of construction phase risk factors		Reduction of Operating Phase Assessment Outcome, if applicable	
		Preliminary Rating Before Modifiers	
Rating Modifiers (Section V)			
Liquidity		Notching of Preliminary Rating up or down	
Refinancing Risk			
Transaction Structure			
Offtaker Credit Profile			
		Preliminary Rating After Modifiers	
Instrument Ratings (Section VI)			
Evaluation of project capital structure		Notching of Instrument Ratings	
		Assigned Ratings	

This methodology document describes TA's approach to each credit factor in the derivation of project finance credit ratings.

Section II: Financial Assessment

Section III: Business Assessment

Section IV: Construction Phase Assessment

Section V: Rating Modifiers

Section VI: Instrument Ratings

Certain background information is provided in Appendices.

Appendix A: Definitions of key metrics and ratios

II. FINANCIAL ASSESSMENT

Table 2 provides core financial metric ranges applicable for credit rating categories in the Financial Assessment.

Table 2

Financial Assessment Credit Metric Ranges

Project Category:	**Low Risk**	**Medium Risk**		**High Risk**	
Metric:	**DSCR**	**DSCR**	**FCF/Total Debt**	**DSCR**	**FCF/Total Debt**
Weight:	***100%***	***50%***	***50%***	***50%***	***50%***
AA	> 3.50x	> 5.00x	> 35%	> 7.00x	> 50%
A	1.70x – 3.50x	3.00x – 5.00x	20% – 35%	5.00x – 7.00x	35% – 50%
BBB	1.30x – 1.70x	2.00x – 3.00x	10% – 20%	3.00x – 5.00x	20% – 35%
BB	1.15x – 1.30x	1.30x – 2.00x	5% – 10%	2.00x – 3.00x	10% – 20%
B	1.00x – 1.15x	1.15x – 1.30x	2% – 5%	1.30x – 2.00x	5% – 10%
CCC / CC	< 1.00x	< 1.15x	< 2%	< 1.30x	< 5%

Ratio Definitions: Please refer to Appendix A for discussion of ratio definitions.

Project Categorization: Projects are categorized based on their broad risk profile into Low Risk, Medium Risk and High Risk categories taking into consideration certain key characteristics. Please refer to Section III for description of project categorization.

Cost Recovery/Availability-Based Projects: Projects involving offtake and operating contracts transferring substantially all revenue and cost risks to the offtaker with resulting very high predictability of project cash flows and stability of DSCR are viewed as less risky than typical Low Risk projects. For such projects, applicable DSCR levels at each rating category can be below the ranges presented in Table 2 for Low Risk projects, and project credit quality can be similar to the offtaker's depending on circumstances.

Forward-Looking Approach: DSCR and FCF/Total Debt metrics are calculated on a 12-month basis and are evaluated for the Operating Phase over the term of debt instruments. For lower risk projects, the assessment relies on average annual metric levels. For higher risk projects, both annual average and minimum levels are considered. TA considers the duration of any period during which the minimum is materially below the average, the magnitude of the deviation, and effect of one-time items.

Forecast Scenarios: Analysis of forecasted financial metrics consists of development of a Base Case Scenario as a starting point, supplemented by Stress/Breakeven Scenario analysis. While financial metric levels derived under the Base Case Scenario are an important core consideration for the Financial Assessment, the Stress/Breakeven Case Scenarios analytics can have a significant influence on the credit view and can result in an adjustment of the Financial Assessment Outcome.

- **Base Case Scenario:** TA Base Case Scenario is intended to forecast long-term sustainable performance of the project. Conservative adjustments are often made to key variables in project forecasts, including production, equipment performance, realized price levels (to the extent not contractual), input costs, and operating costs. The Base Case Scenario is not intended to be a downside stress test scenario. The Base Case Scenario is used for the initial derivation of the Financial Assessment Outcome based on financial metric ranges in Table 2.
- **Stress/Breakeven Scenarios:** The objective of the Stress/Breakeven Scenario analysis is to test the forecast for potential vulnerabilities and assess resulting DSCR levels. Stress variables can include production volume/availability, lower prices for any volumes exposed to price variability, and input cost inflation (taking into consideration any hedging or indexation). Projects with relatively higher potential for volatility are evaluated with more material stress assumptions. Projects rated in investment grade rating categories are expected to withstand appropriate downside assumptions without DSCR declining below 1.0x.

Amortization/Repayment Structure: Projects in the Low Risk category are generally expected to fully amortize the debt balance, and DSCR rating thresholds reflect amortizing structure. For projects in the Medium and High Risk categories with partial or minimal amortization, the higher DSCR thresholds reflect lower debt principal payments. For structures that are not fully amortizing, presence of an excess cash flow sweep requirement and resulting amount of projected debt repayment before maturity can be an important rating consideration. Please refer to Section V for the discussion of approach to Refinancing Risk.

III. BUSINESS ASSESSMENT

Table 3 provides the framework for categorization of projects by broad risk profile based on business and financial characteristics, which is used for the initial differentiation of project categories for the Financial Assessment framework in Table 2.

Table 3

Project Categorization

	Low Risk	Medium Risk	High Risk
Stability	Largely contracted, and/or High cash flow stability	Some contracted, and/or Ample cash flow stability	Largely noncontracted, and/or Cash flow volatility
Operating complexity	Operating stability	Some operating complexity	Potential operating risk
Debt amortization	Fully amortizing	Partial/minimal amortization	Partial/minimal amortization

Within each broad project risk category listed in Table 3, TA assesses whether the project's business characteristics in the operating phase, on a relative basis, are consistent, stronger or weaker than typical for rated peers at the credit rating level implied by the Financial Assessment Outcome. The Business Assessment and Financial Assessment results are combined to derive the Operating Phase Assessment Outcome. Table 4 provides a summary of key Business Assessment factors.

Table 4

Business Assessment Key Factors

Cash Flow Stability	Competitive Profile	Operating Performance	Sponsor Considerations
Revenue stability	Customer integration	Technology strength	Project strategic relevance
Offtake agreement strength	Market competition intensity	Operational complexity	Financial incentive
Price volatility / exposure	Price / cost competitiveness	Operating track record	Experience in industry
Availability / input variability	Supplier diversity / stability	Performance requirements	Credit strength
Input cost stability	Regulatory considerations	Capital requirements	Investment horizon length

Cash Flow Stability: This factor assesses the project's relative exposure to volume, price and input cost variability. Projects with a higher proportion of contracted volumes generally have higher relative stability. For noncontracted volumes, relative degree of cyclicality and volatility, exposure to changes in demand trends, history of established revenue patterns, and diversification across markets and facilities are assessed. For contracted volumes, the strength of the offtake agreement is considered, including its tenor, extent of volume commitment (e.g. take or pay), and any termination risk. Contractual fixed or indexed pricing structure is superior to market-based pricing. For projects with market price exposure, key considerations are the long-term supply-demand dynamics in the market, the extent of the project's pricing power, and hedging strategy. Matching of pricing and input cost relative levels (whether fixed, indexed or hedged) is superior to a structure that allows for potential mismatch. Relative stability of input resource availability is an important consideration for production volume stability. Contracted supply from reliable input resource suppliers at contractual price levels with no supply constraints is preferred to market-based supply.

Competitive Profile: This factor assesses the project's competitive position and resulting ability to sustain cash flow generation. Projects that are strategically essential and closely integrated with their offtake customers have a superior stability profile. Relative market share is an important consideration as market structure can range from monopolistic to highly competitive, and entry barriers can also vary widely across project types. Projects that have an advantaged cost base and are price-competitive have a more stable long-term position in both contracted and noncontracted markets, while projects with a disadvantaged cost position may erode share over time even if near-term revenues are contracted. Close operational integration with reliable suppliers or broad diversification of supply base is advantaged compared to a narrow supply base or specialized inputs. Projects with low costs that are competitive in their markets and aligned with regulatory trends are more likely to be supported by communities and regulators over time and are less likely to incur potential regulatory liabilities or incremental costs.

Operating Performance. This factor assesses the project's operational reliability, and relative potential for operational difficulties that could impact contractual arrangements or revenues, increase costs, or require capital investments. Strong proven technology profile is an important positive, while a technology that is either unproven or obsolete increases risk. Relative complexity of the project's operating requirements is a consideration, as high complexity carries relatively higher risk of possible difficulties. Project entities with asset diversification have lower operating risk than single-asset entities. Experience and track record of the operator (whether sponsor-affiliated or third-party O&M agreement) effectively operating projects of similar type is important, particularly in the case of newer technologies or complex operations. For actively operating projects, historical operating track record is evaluated. Offtake contract performance requirements are evaluated for risk of underperformance and related penalties. Relative asset age and maintenance investment needs are considered, notably any major maintenance capital investment or offline time required to maintain a competitive level of performance. If applicable, long-term service agreements (LTSA) and committed manufacturer support and warranty for key equipment are positives. Independent consulting reports (e.g. Independent Engineer) can provide important assessments of performance expectations, operating costs and maintenance requirements.

Sponsor Considerations. While the non-recourse nature of project finance debt results in no requirement for the sponsor to support the project, sponsor strength and commitment can be credit positive in some situations. If the project is strategically important to the sponsor's core business operations, the sponsor may in fact have a strong strategic incentive to provide support if needed. Financial incentive can also be important if the value of the sponsor's investment and future payment stream from the project significantly exceed the potential support requirement. If the sponsor has significant operating experience in the market and with the project and technology type, it can be well positioned to provide valuable operating support to the asset. Long sponsor investment horizons and change of control covenants are viewed positively.

IV. CONSTRUCTION PHASE ASSESSMENT

For projects in construction, the Operating Phase Assessment derived from the Financial and Business Assessments of the operating phase is combined with the Construction Phase Assessment to derive the Preliminary Rating Before Modifiers, which is set at the lower of the Operating Phase Assessment and Construction Phase Assessment.

The objective of the Construction Phase Assessment is to evaluate the likelihood the project will be completed on time and within budget, will be adequately funded through construction, and will operate as designed to meet the expected performance standards. Table 5 provides a summary of key Construction Phase Assessment factors.

Table 5

Construction Phase Assessment Key Factors

Construction Complexity	Contractor/EPC Contract Strength	Liquidity/Credit Support
Technology complexity	Contractor expertise and track record	EPC contract liquidated damages
Site complexity	Contractor financial strength	Letters of credit or cash reserves
Structure complexity	Contract terms (e.g. fixed price, date)	Other credit enhancements
Project schedule / length	Construction risk transfer	Construction phase liquidity

Construction Complexity: Typical project construction plans can have moderate risk because technology is proven and standard designs have been frequently deployed. However, in some situations construction complexity can elevate risks. Construction risks can be high for projects involving highly complex or unproven technology (e.g. new models of nuclear power plants). Sites with complex geology, significant preparation (e.g. blasting) or complex substructure requirements can present risks. Project structures with complex elements or unusual designs, or requiring extensive testing to ensure soundness can elevate risk. Long or complex construction schedules that involve highly interdependent phases increase risks. Any potential for delay or complexity in receiving permits, rights-of-way or environmental reviews can elevate risk. A project that combines several of the risk elements listed in this paragraph would be deemed to have high construction complexity. Independent consulting reports (e.g. Independent Engineer) can provide important assessments of construction design and technology, budget, schedule, initial performance risk and contract strength.

Contractor/EPC Contract Strength: Projects typically enter into engineering, procurement and construction (EPC) contracts that define the construction phase and transfer risks and obligations pertaining to construction to a reputable contractor. For a typical project, contractor quality is assessed as solid, as most projects hire experienced contractors. An experienced contractor has a track record of delivering similar projects on time and on budget, in accordance with design. If a contractor lacks expertise in any specific geography, technology, or sector, involvement of experienced subcontractors or partnering with local firms can help mitigate risk. Because the contractor typically assumes construction risks, its credit strength is an important consideration. High dependence of a project on a specific contractor for completion can be considered a risk, while flexibility for replacement is a positive. Turnkey contracts (fixed-price, date-certain) typically offer the strongest form of risk transfer, because the contractor accepts responsibility for all aspects of construction and is expected to provide the facility ready for use at the agreed price and by a fixed date. Any limitations on construction risk transfer in an EPC contact are credit negative.

Liquidity and Credit Support: Funding schedule certainty and liquidity available to support the project in an event of construction delay or cost overrun is an important consideration. EPC contacts generally include liquidated damages for delays or failure to meet performance levels and funded contingencies to mitigate cost overruns, which are considered credit neutral if sized at typical market levels. Credit enhancement such as cash reserves, letters of credit, funded contingency amounts, performance bonds or third-party guarantees can support contractor credit. Total liquidity available from all contingency sources during the construction phase is generally expected to be sufficient to withstand a cost overrun of 30% of the EPC contract price and a six-month delay.

V. RATING MODIFIERS

Table 6 summarizes modifiers applied to adjust the Preliminary Rating for key transaction credit features.

Table 6

Rating Modifiers

Refinancing Risk	If refinancing risk is deemed material, rating is adjusted downward by one to three notches
Liquidity	If liquidity is not deemed adequate, rating is adjusted downward by one to three notches
Transaction Structure	If key structural elements are not present, rating is adjusted downward by one to three notches
Offtaker Credit Profile	If the project relies on offtaker for revenue generation, offtaker's credit rating is a cap on project rating

Refinancing Risk: Projects that are not fully amortizing and are projected to have a portion of the project debt outstanding at its contractual maturity date will need to refinance the remaining balance, necessitating an evaluation of possible refinancing risk. Because many projects have finite asset lives and cash flow generation potential can change over time, it is important to ensure remaining project cash flow and value at the maturity date are sufficient to refinance remaining debt. Asset life assumptions are circumstance-specific and can vary widely across project types and individual projects. TA assesses refinancing risk using deemed DSCR and Project Life Coverage Ratio (PLCR) at maturity (please refer to Appendix A for discussion of ratio definitions). Deemed DSCR is derived using a base case forecast through the end of the project life assuming a fully amortizing debt structure and is compared to the rating thresholds in Table 2. PLCR assesses whether net present value (NPV) of remaining CFADS through the end of the project life discounted at the expected cost to debt exceeds the debt balance at maturity. If the estimated credit rating at maturity is lower than the Preliminary Rating Before Modifiers, one to three notch downward revision may be applied.

Liquidity: Maintenance of ample liquidity is an important credit requirement as it provides a project with the ability to withstand periodic disruptions of revenues due to unforeseen circumstances including operational and performance issues. TA considers all potential sources of liquidity, including debt service reserves, major maintenance reserves, operating or similar reserves, committed working capital facilities or other forms of supplemental liquidity. A debt service reserve (DSR) covering 6 month of payments in the form of cash or a third-party letter of credit is considered a standard project feature, and for higher-risk projects a larger DSR may be deemed appropriate (up to 12 months). Depending on the project's anticipated significant maintenance requirements or anticipated offline periods, a forward-looking major maintenance reserve (MMR) can be necessary at a size sufficient to cover the costs. An ample MMR can also be important for projects relying on less proven technologies which may have less predictable performance and higher outage risks. Transaction cash flow waterfall should provide for replenishment of reserves if utilized. Cash distributions from the project entity should be subject to minimum DSCR tests to preserve liquidity.

Transaction Structure: Because this methodology applies to SPE debt issuers financed on a non-recourse basis whose business purpose is limited to the activity of building and operating the project, a transaction should reflect structural features appropriate for the category. Absence of some of the features can result in a downward rating adjustment of one to three notches, and a broader lack of project finance structural characteristics may cause the transaction to be rated under a different methodology. Key structural features of project finance transactions include:

- Borrower is a limited purpose entity, with business purpose limited to engaging in the project;
- Project entity is insulated from default of its owners or affiliates (ring-fenced), and conducts business independently;
- Debtholder security includes all assets, accounts, stock in project company, and all key project contracts;
- Cash management structure with a waterfall that prioritizes payment of senior debt service after maintaining operations, before payment of growth expenditures or distributions;
- Limitations on debt incurrence, assets purchases, asset sales, change of control;
- Limitations on cash distributions subject to DSCR tests (forward and backward deemed stronger);
- Debtholders contract step-in rights and remedies to delay termination of contracts; and
- Insurance for key project risks such as business interruption events.

Debt structural features that increase stability and reduce risk such as amortization and fixed rate of interest are viewed positively. As discussed in Section III, full debt amortization is typical for projects characterized as Low Risk for the evaluation of financial metrics (see Table 3, Debt amortization). For transactions that are not fully amortizing, presence of a cash flow sweep requirement is credit positive. Hedging policies effectively reducing exposure to financial risks (e.g. interest rates, foreign exchange) are viewed positively.

Offtaker Credit Profile. If a project has a material reliance on an offtaker as a source of revenues, the credit rating of the project is capped at the offtaker's credit rating. Reliance is deemed material if: a) the offtaker accounts for more than 15% of project revenues, and b) the project would have difficulty replacing the contract on similar terms. When a replacement can be readily secured, dependence on the offtaker is deemed to be low. When several offtakers combine for a significant revenue proportion, a weighted average of their credit ratings is used. In rare specific circumstances when an offtaker is deemed highly likely to continue purchases in a stressed scenario, a higher rating for the project than offtaker's rating may be considered. When no TA credit rating is available for the offtaker, TA can provide a credit rating or can rely on another nationally-recognized rating agency's credit rating.

VI. INSTRUMENT RATINGS

Credit factors outlined in Sections II, III, IV and V of this methodology are used to assign ratings to the projects' senior secured debt instruments. If a rated debt instrument has a position in the capital structure that is junior to the senior secured debt, the rating for such junior instrument is derived through downward notching from the senior secured debt rating. Notching derivation is based on evaluation of credit metrics through the junior debt and is influenced by cash waterfall DSCR minimums for junior debt distributions and by structural subordination considerations.

Junior debt credit metrics: The credit metrics used for evaluating senior secured debt can exclude payments to junior debt if they are subject to DSCR minimums and if junior debt is prevented from enforcing rights until senior facilities are paid in full (see Appendix A). To evaluate junior debt credit quality, credit metrics including junior debt payments and balances are calculated and compared against methodology ranges in Section II, Table 2. When used to evaluate junior debt, the ranges in Table 2 are applied relatively conservatively because cash flows available to junior debt are inherently more uncertain due to waterfall structure.

Distribution DSCR thresholds: Cash waterfalls require payment of senior debt service before any cash flow is made available to make payments for junior debt service, subject to minimum DSCR requirements. If the cushion between actual DSCR levels and waterfall minimums to pay junior debt is relatively small, risk of the junior debt instruments is deemed to be higher.

Structural subordination: Junior debt instruments in project finance transactions are often issued at the holding company level, which results in significant structural subordination due to the typical strength of covenants at the operating company and limitations on the holding company's ability to influence operating company actions. If holding company debt is structurally subordinated to a relatively large amount of operating company debt, risk of the junior debt instruments is deemed to be higher.

APPENDIX A
KEY METRIC AND RATIO DEFINITIONS

DEBT SERVICE COVERAGE RATIO (DSCR)

Table 6

Metric: Cash Flow Available for Debt Service (CFADS)

	Revenue
Minus	Cash operating expenses
Minus	Income taxes
Minus	Maintenance capital expenditures
Plus/Minus	Working capital cash sources/uses
Plus/Minus	Scheduled transfers from/to reserves
Equals	**CFADS**

Table 7

Ratio: Debt Service Coverage Ratio (DSCR)

	CFADS
Divided by	Cash interest + scheduled principal payments
Equals	**Debt Service Coverage Ratio (x)**

- TA may elect to adjust the CFADS and DSCR calculation for the effect of one-time events that are deemed unlikely to repeat
- Capital expenditures deducted to calculate CFADS include major maintenance expenditures, but do not include extraordinary, discretionary or growth capital expenditures
- CFADS includes scheduled transfers from/to major maintenance reserves, but not transfers from/to debt service reserves
- Payments to subordinated debt can be excluded if intercreditor agreements prevent subordinated debt from enforcing rights until senior facilities are paid in full and if payment of subordinated interest and principal is subject to minimum DSCR thresholds

FREE CASH FLOW / TOTAL DEBT

Table 8

Metric: Free Cash Flow (FCF)

	CFADS
Minus	Cash interest payments
Equals	**Free Cash Flow**

Table 9

Ratio: Free Cash Flow / Total Debt

	Free Cash Flow
Divided by	Total Debt
Equals	**FCF / Total Debt percentage (%)**

- TA may elect to adjust the FCF calculation for the effect of one-time events that are deemed unlikely to repeat
- Total debt is adjusted to include operating lease liabilities, finance lease liabilities and defined benefit pension liabilities, if applicable, as described in Appendix B of TA's Corporate Credit Rating Methodology
- Subordinated debt can be excluded if intercreditor agreements prevent enforcing rights until senior facilities are paid in full and if payment of subordinated interest and principal is subject to minimum DSCR thresholds

PROJECT LIFE COVERAGE RATIO (PLCR)

Table 10

Metric: NPV of CFADS

	CFADS forecast over remaining life
Discounted	Cost of debt
Equals	**NPV of CFADS**

Table 11

Ratio: Project Life Coverage Ratio (PLCR)

	NPV of CFADS
Divided by	Total Debt
Equals	**Project Life Coverage Ratio (x)**

- CFADS forecast through the end of the project's life reflects base case assumptions
- Discount rate used for derivation of NPV is the project's expected cost of debt

APPENDIX B
SECTOR-SPECIFIC FACTORS

A. RENEWABLE POWER GENERATION

This Appendix outlines sector-specific rating factors for solar and wind power generation projects. Hydroelectric power generation projects are rated under the general project finance rating criteria. The project finance rating considerations outlined in Sections I-VI of this methodology document are applicable for the rating process for renewable power generation projects, as supplemented with sector-specific considerations outlined in this Appendix.

Financial Assessment. Table 12 provides Financial Assessment thresholds applicable for Photovoltaic (PV) Solar (crystalline silicon or thin film) and Onshore Wind power generation projects. For Concentrated Solar Power (CSP) and Offshore Wind projects, DSCR requirements are typically modestly higher than the ranges contained in Table 12.

Table 12
Financial Assessment Credit Metric Ranges – Solar and Wind Power Generation

Project Category:	Solar Power Generation		Wind Power Generation	
Project Type: / Metric:	Contracted DSCR	Noncontracted DSCR	Contracted DSCR	Noncontracted DSCR
A	> 1.60x	> 3.00x	> 1.70x	> 3.50x
BBB	1.20x – 1.60x	1.60x – 3.00x	1.30x – 1.70x	1.80x – 3.50x
BB	1.10x – 1.20x	1.25x – 1.60x	1.15x – 1.30x	1.30x – 1.80x
B	1.00x – 1.10x	1.10x – 1.25x	1.00x – 1.15x	1.15x – 1.30x
CCC / CC	< 1.00x	< 1.10x	< 1.00x	< 1.15x

Renewable power generation projects are typically contracted, and are commonly structured with debt quantity and DSCR levels targeting investment grade ratings. Noncontracted renewable power projects are viewed as having below-average risk compared to other types of noncontracted projects, because their stability is supported by the very low marginal cost of electricity production placing them at the front of the dispatch curve and by the relatively low operating complexity and cost.

Financial Assessment factors described in Section II of this methodology apply to renewable power generation projects, with analysis and DSCR level requirements taking into consideration the following sector-specific factors:

- **Resource Variability:** Renewable energy generation output is dependent on available quantity of the renewable resource (sun or wind). Resource variability introduces two aspects of credit risk: 1) challenges with accuracy of initial resource assessments underpinning the forecast that serves as the basis for project development can create risks for the financing structure; and 2) in the operating phase, volatility of resource quantity creates performance variability across periods which needs to be supported by the financing structure. Wind projects typically have higher resource variability and higher forecasting uncertainty than solar projects. TA's financial analysis of forward views for calculations of DSCR ratios focuses on the estimated minimum generation with a probability of 90% in any given year (probability of exceedance one-year P90), as adjusted for curtailment, degradation and availability. An important part of the analysis is stress testing the project's resilience to resource variability by deriving the percentage shortfall from the P90 forecast that would reduce DSCR below 1.00x.
- **Curtailment:** Renewable generation projects supply power when the resource is available rather than on-demand, which sometimes results in required curtailment of electricity output when generation exceeds demand or transmission capacity (for example at mid-day when solar production is high but electricity demand is relatively low, or at night if wind production is high while demand is low). Therefore, production estimates that serve as basis for debt repayment forecasts must be adjusted downward for the likely effects of curtailment over time. Renewables' position at the front of the dispatch curve reduces curtailment risk. Power purchase agreement (PPA) terms that assign curtailment risk to the power purchaser or include a curtailment risk cap amount are viewed as credit-positive if present. Combining renewable generation with battery storage capacity reduces curtailment risk and enables a more consistent supply to the grid.

- **Degradation:** Solar panels experience gradual degradation of production capacity over time, historically ranging 0.5%-1.0% per year and with average capacity loss of 10%-15% over 20 years. Modern high-quality panels have lower degradation rates but do not yet have a long-term operating track record. Panel suppliers often provide warranties (sometimes backstopped by insurance) that guarantee performance above a specific minimum output usually reflecting typical degradation rates. For wind turbines, degradation rates are typically similar to solar during the first 10 years of operation but increase thereafter due to physical wear on components such as blades and gearboxes. Degradation rates are typically higher in offshore wind than onshore due to harsher operating conditions. Similarly to solar panels, modern wind turbines demonstrate lower degradation rates.
- **Availability:** Availability rates for PV solar and recently commissioned onshore wind projects are generally high, due in part to the low operational complexity. It is common for PV solar projects to operate with availability rates of 99% or higher, though base case forecasts often assume 97%-98%. However, older wind projects can experience availability challenges as wear on components can result in failures, causing outages and elevated maintenance costs. Similarly to the increase in the rate of degradation, wind project availability challenges most often occur after the first 10 years of operation. In recent years there has been precedent for older wind project availability rates in the low 90%'s.
- **Project Life:** PV solar projects are commonly assumed to have a project life of 25 years, though panels can generate power beyond this timeframe at lower efficiency rates. Wind turbines are typically designed for operational life of 20-25 years, but refurbishment can extend it to 25-30 years. At the end of project lives, solar and wind projects are often not decommissioned but undergo repowering, replacing aging solar panels and wind turbines with new more advanced models. Repowering requires investment but is more cost-efficient and faster than commissioning a new project because it leverages existing assets and infrastructure (e.g. grid interconnection).

Business Assessment. Factors described in Section III of this methodology generally apply to renewable power generation projects. PV solar projects are typically viewed to have strong business profiles due to very strong competitive and operating performance profiles which mitigate the effect of resource variability on cash flow stability. Wind projects are typically viewed to have in-line business profiles due to strong competitive positions, in-line operating performance profiles and resource variability.

- **Cash Flow Stability:** Resource variability, curtailment risk and degradation are key cash flow stability issues of renewables. These risk factors are partially mitigated by renewables' position at the front of the dispatch curve. Combination of renewable generation with battery storage capacity meaningfully enhances cash flow stability. Absence of input fuel requirements eliminates any potential risks related to input prices or margins, an important positive from the cash flow stability perspective.
- **Competitive Profile:** Renewables benefit from a strong competitive profile compared to other types of power generation. They have a very low marginal cost of electricity production placing them at the front of the dispatch curve, which is a source of long-term strategic advantage. They are often essential for utility customers to meet load and regulatory requirements, and as a result commonly benefit from long-term PPAs. A competitive disadvantage of renewables is that they are not dispatchable on demand, though combining renewable generation with battery storage capacity provides a partial mitigant.
- **Operating Performance:** PV solar and wind power generation are well established technologies with strong track records and high availability rates. Operational complexity is generally very low for PV solar and modestly higher for wind. Maintenance investment requirements are low for PV solar, and modestly higher for wind notably after the first 10 years of operation.

Construction Phase Assessment. Factors described in Section IV of this methodology generally apply to renewable power generation projects. PV solar projects are viewed as having particularly low construction risk due to simplicity of design and construction process installing panels manufactured offsite, short typical construction period of 6-18 months, and modular design that provides flexibility of installation in stages or in parallel rather than in a sequence of steps. Wind project construction is similarly relatively low risk involving installing components manufactured offsite, but is deemed to be modestly higher risk than PV solar due to the scale of turbines and precision of assembly requirements as well as somewhat longer construction timeframe. Grid interconnection can sometimes cause a delay if not secured in a timely fashion, notably for renewable power projects in remote locations.

Rating Modifiers. Factors described in Section V of this methodology generally apply to renewable power generation projects. For the Offtaker Credit Profile modifier, renewable power projects can sometimes meet requirements for a limited exception from the offtaker rating cap, because economic and regulatory incentives can support the view that the electric utility offtaker is highly likely to continue to honor the PPA with the renewable power provider in an event of default.

B. NATURAL GAS-FIRED POWER GENERATION

This Appendix outlines sector-specific rating factors for natural gas-fired power generation projects. The project finance rating considerations outlined in Sections I-VI of this methodology document are applicable for the rating process for natural gas-fired power generation projects, as supplemented with sector-specific considerations outlined in this Appendix.

Financial Assessment. Table 13 provides Financial Assessment thresholds applicable for natural gas power generation projects.

Table 13

Financial Assessment Credit Metric Ranges – Natural Gas-Fired Power Generation

Project Category:	**Contracted**	**Merchant**	
Metric:	**DSCR**	**DSCR**	**FCF/Total Debt**
Weight:	***100%***	***50%***	***50%***
AA	> 3.50x	> 7.00x	> 50%
A	1.70x – 3.50x	5.00x – 7.00x	35% – 50%
BBB	1.30x – 1.70x	3.00x – 5.00x	20% – 35%
BB	1.15x – 1.30x	2.00x – 3.00x	10% – 20%
B	1.00x – 1.15x	1.30x – 2.00x	5% – 10%
CCC / CC	< 1.00x	< 1.30x	< 5%

Fully contracted natural gas-fired power generation projects with investment grade-rated offtakers and debt structures fully amortizing prior to the contract termination date can achieve investment grade ratings at appropriate DSCR levels. Projects that are not fully contracted and do not have a fully amortizing debt structure are typically rated in non-investment grade rating categories.

Financial Assessment factors described in Section II of this methodology apply to natural gas-fired generation projects, with analysis and DSCR level requirements taking into consideration the following sector-specific factors:

- **Earnings Stability:** For contracted projects, the specific terms of the contract are a key consideration for determining DSCR levels. Full transfer of volume, price and natural gas cost variability risk to the buyer (e.g. availability-based tolling) support lower DSCR than offtake contracts involving project exposure to any variability risks. Likelihood of underperformance against contracted availability requirements and resulting missed payments is incorporated. For projects that are not fully contracted, an important consideration for the relative stability profile is the mix of gross margin sourced from partial contracted capacity (if any), forward capacity payments, and merchant energy sales. Proportion of the merchant energy margin that is hedged and effectiveness of hedging strategy in securing margin (e.g. spark spread hedges) is taken into account. General level of power price volatility in the project's operating region is an important consideration for projects with exposure to price fluctuations.
- **Spark Spread and Profitability:** For projects that are not fully contracted, key factors determining the project's output and profitability are evaluated in the Base Case and stress scenarios. Power demand and supply dynamics in the region, forward capacity prices (in markets with capacity auctions) and historical and forward power price trends are considered as factors influencing assumed power price forecasts. Output and capacity factor forecasts are assessed in light of demand trajectory in the region, the project's heat rate and position on the dispatch curve, and specific regional needs for base load and/or peaking load generation. Cost-competitiveness and reliability of the project's natural gas supply including proximity, transportation infrastructure, suppliers and redundancy is an important consideration on the cost side. The project's spark spread and its forward trajectory as a function of realized prices, heat rate and natural gas cost is assessed as a measure of relative profitability in the Base Case and stress scenarios. Emissions-related costs, if any, are included based on prevailing regulations as currently applicable in the project's operating market and can be a constraining factor for both contracted and merchant projects.
- **Amortization and Debt Repayment:** Contracted projects are expected to fully amortize the debt before contract termination to achieve investment grade ratings. For merchant projects with minimal required amortization, an excess cash flow sweep and resulting projected level of debt repayment prior to maturity in the Base Case and stress scenarios is assessed. Relatively low levels of debt repayment through the excess cash flow sweep are consistent with lower non-investment grade ratings. Table 14 provides guidelines for total debt principal repayment prior to maturity consistent with the credit metric ranges provided in Table 13 for the applicable rating categories.

Table 14
Debt Repayment Prior to Maturity – Natural Gas-Fired Power Generation

	Contracted	Merchant
BBB	100%	>80%
BB	100%	30%-80%
B	100%	<30%

Business Assessment. Factors described in Section III of this methodology generally apply to natural gas-fired power generation projects, with analysis taking into consideration the following sector-specific factors:

- **Cash Flow Stability:** The project's long-term stability profile is assessed in the context of power demand evolution and projected load growth in its specific operating market, power supply evolution and generation capacity coming online or retiring, and the resulting expected power supply-demand balance in the market. Projected trends in forward capacity prices and merchant power prices are assessed in light of the projected supply-demand balance and potential regulatory or political actions over the near term and the long term. Within this market context, the project's mix of base load, intermediate load or peaking load capacity is assessed, and market demand for each capacity type is considered in combination with other power generation providers and the likely market evolution. Market-specific considerations are crucial as similar capacity may have materially different long-term stability profile in different markets in light of customer demand and regulatory landscape as well as fit with the characteristics of other generation providers in the market.
- **Competitive Profile:** For base load and intermediate load natural gas-fired generation, long-term competitiveness and capacity factor of the project is often determined by its marginal cost of electricity based on its efficiency (heat rate) and variable input costs (natural gas and emission costs if any), and the resulting position on the dispatch curve. Relative reliability and availability track record can also be a competitive factor. For peaking load facilities, the key competitive comparisons are efficiency versus other peaking load facilities, availability and operational performance, and complementarity with other types of generation in the market such as renewables. For contracted projects, relative efficiency may not be as important during the life of the contract but may become a crucial consideration for contract renewal or merchant operation after contract expiration.
- **Operating Performance:** Technologies employed in natural gas-fired power generation have a strong and long-standing track record of effective operation. Operational complexity, while more meaningful than for renewable generation, is generally considered to be in line with averages for project finance. The relative operating performance of a project is often determined by the reliability of its equipment and experience of the operator, with newer recently commissioned plants often performing better than older plants. While an important consideration for all projects, operating performance is particularly crucial for availability-based contracted projects that can face revenue penalties for missing contracted minimum availability requirements (often set in the 93%-97% area). Project entities with asset diversification have lower operating risk than single-asset entities, as an outage at any one asset has a less significant overall effect on availability.

Construction Phase Assessment. Factors described in Section IV of this methodology generally apply to natural gas-fired power generation projects. Complexity and risk of construction for natural gas-fired power plants is considered to be in line with averages for project finance. The risk is reduced by the very well-established technology with many power plants in operation and many EPC contractors with significant experience. The risk is increased by sequenced nature of the construction stages, the current long lead time for delivery of turbines resulting in extended construction timelines, and the high and increasing cost of equipment. Grid interconnection and environmental permit considerations can introduce complexities into the construction phase.

Rating Modifiers. Factors described in Section V of this methodology generally apply to natural gas-fired power generation projects, taking into account the following sector-specific factors:

- **Refinancing Risk:** Natural gas-fired power generation plants can generally have long operating lives with proper maintenance and refurbishment investment over time. However, the asset life assumption is circumstance-specific and depends on the asset and market situation. In most cases, an efficient base load plant or an essential peaking load plant can be assumed to have a long asset life. However, in some situations for assets with low efficiency profiles in markets focused on reducing fossil fuel generation or with significant renewable generation coming online, a shorter asset life assumption may be appropriate.

C. DATA CENTERS

This Appendix outlines sector-specific rating factors for data center projects. The project finance rating considerations outlined in Sections I-VI of this methodology document are applicable for the rating process for data center projects, as supplemented with sector-specific considerations outlined in this Appendix.

Financial Assessment. Table 15 provides Financial Assessment thresholds applicable for data center projects.

Table 15

Financial Assessment Credit Metric Ranges – Data Centers

Project Category:	**Long-term NNN Lease**	**Long-Term Contracted**	**Colocation**
Metric:	**DSCR**	**DSCR**	**DSCR**
Weight:	***100%***	***100%***	***100%***
A	> 1.10x	> 1.35x	> 1.75x
BBB	1.05x – 1.10x	1.20x – 1.35x	1.30x – 1.75x
BB	1.00x – 1.05x	1.10x – 1.20x	1.20x – 1.30x
B	< 1.00x	1.00x – 1.10x	1.10x – 1.20x
CCC / CC	< 1.00x	< 1.00x	< 1.10x

Long-term triple-net (NNN) lease projects with no recontracting/refinancing risk and minimal to no operating risk are viewed as very low risk in nature, and NNN projects with appropriate DSCR levels (based on contractual minimum rent) and structural terms can support credit ratings largely linked to the ratings of the tenant(s). The long-term contracted project category includes NNN projects with recontracting risk, and wholesale or gross lease projects that retain recontracting or operating risks. Colocation projects typically have many tenants (often across multiple facilities) with contract lengths ranging 1-3 years.

Data center projects are generally viewed as having stronger credit characteristics than average for project finance due to contracted revenues, limited volume/price volatility, limited input cost variability exposure (power costs are typically passed through to tenants), stability of operating expenses, relative simplicity of operation, and stickiness of leases due to cost and disruption involved in tenant relocation. However, long-term risk profile of data center projects can be higher due to technology evolution risks (affecting investment requirements and recontracting) and the supply-demand balance which is currently advantageous but may soften as significant additional capacity comes online over time.

Financial Assessment factors described in Section II of this methodology apply to data center projects, with analysis and DSCR level requirements taking into consideration the following sector-specific factors:

- **Lease Contract Profile:** The contracted nature of the data center business model makes lease profile a key credit consideration. The strongest profile is a long-term NNN lease (typically 10-20 years), common for single-tenant projects with investment grade tenants. In a NNN lease, the tenant covers property tax, insurance and operating costs, with rent often based on utilization (linked to power usage) but subject to a contractual minimum. NNN lease structures with debt amortizing over the lease term and no recontracting risk at appropriate DSCR based on minimum rent create a very strong profile, and the ratings can be based largely on the ratings of the investment grade tenants. Long-term contracts with gross leases in which the project retains responsibility for operating expenses are viewed as weaker than NNN leases but stronger than many other contracted project finance categories due to limited operating risks and cost variability. Colocation projects typically have a suite of shorter-term (1-3 years) gross leases, but are still viewed as relatively low risk due to contracted revenues and stickiness of the leases.
- **Recontracting Risk:** Recontracting risk is an important credit consideration for data center projects due to the rapid technology and market evolution in the sector which creates long-term uncertainties, particularly in the case of projects with high tenant concentration. For example, for large single-tenant facilities optimized for AI training, presence of recontracting risk is credit negative due to potential uncertainties around long-term demand for the specific type of space. Additionally, the supply-demand dynamic in the sector may be less favorable at recontacting. As a result, a discount is often assumed for the rent level in recontracting, with the magnitude of discount dependent on the project's technical and demand characteristics. For colocation projects with broad lease portfolios, established patterns of demand and high renewal rates, recontracting risk is typically less significant as a credit consideration but is considered as part of the evaluation of the tenant and contract suite.

- **Power Costs and Power Generation:** The cost of power used by tenants in a data center is typically passed through by the project to the tenants with the project having no exposure to power prices, and any project exposure to power prices is viewed as increasing financial risk. Projects that include on-site power generation capacity ("bring your own generation" or BYOG), while benefiting from secured power availability, are subject to the credit considerations applicable to power generation which may increase the risk profile compared to a typical data center project. An important consideration for BYOG is the offtake agreement for the power which is deemed stronger if the offtaker is an investment grade tenant rather than the data center project entity.
- **Capital Investment Requirements:** Amount of capital investment required to maintain long-run competitiveness for target use case (AI training, AI inference, cloud/enterprise) is a key aspect of the financial assessment, as NNN and other types of leases generally do not cover material facility upgrades. Investment requirements become particularly important in the context of recontracting risk or increasing competition. For example, if a project needs to make a large investment to successfully recontract such as modernizing equipment, increasing power density or installing liquid cooling, it can have a material impact on the rating.

Business Assessment. Factors described in Section III of this methodology generally apply to data center projects, with analysis taking into consideration the following sector-specific factors:

- **Cash Flow Stability:** Data center projects benefit from high stability due to contracted revenues and low variability of costs in the short run, but over the long run stability is dependent on strength of demand and technology positioning. Key factors are data center capacity supply-demand balance in workflow categories for which the facility is optimized (AI training, AI inference, cloud/enterprise), alignment of the facility's technical characteristics (power density, cooling, power cost, latency) with requirements for targeted workflows, degree of design specialization, and long-term success potential of the tenant in the specific workflow category. For example, a large facility in a remote location optimized for AI training may be more complex to lease if the tenant does not renew, while a facility in a top metro market with a profile broadly applicable for cloud/AI inference workflows may have more flexibility. Tenant diversification generally reduces recontracting risk and increases stability.
- **Competitive Profile:** Data centers benefit from importance of their space to tenants and the relatively high cost and disruption of relocation, particularly if they are highly integrated with the tenant's operations. Competitive landscape intensity is dependent upon the amount and type of data center capacity available and expected to come online in the relevant market, as well as the relative technical characteristics of the competing capacity. Long-term competitive positioning of a data center project is supported by alignment of its technical characteristics such as power density, cooling, power cost and latency with requirements in its market, and by flexibility of infrastructure design enabling efficient adjustments to serve different customer categories.
- **Operating Performance:** Data center operating complexity is generally low, notably because projects typically do not own or manage the IT equipment and their operational requirements are largely limited to power availability, cooling, security and cleaning. Cooling systems can be the most complex aspect (for example, liquid cooling) but are still relatively less complex compared to many other types of projects. Large facilities optimized for AI training are more complex operationally than colocation sites. Lease structure is an important consideration as it could involve the tenant assuming responsibility for operations (NNN lease) or contain performance requirements that if unmet result in rent abatements.

Construction Phase Assessment. Factors described in Section IV of this methodology generally apply to data center projects. Data centers are generally simpler to build than many other project types. Designs are increasingly standardized and modular, which further reduces construction risk and increases flexibility. Large projects have higher construction complexity and risks, as they can include multiple structures, power substations, water treatment facilities and backup power generation. Common data center construction constraints are power availability, grid interconnection and securing permits, which can cause significant delays. BYOG increases construction complexity but alleviates power availability and grid interconnection constraints.

Rating Modifiers. Factors described in Section V of this methodology generally apply to data center projects, taking into account the following sector-specific factors:

- **Refinancing Risk:** Refinancing risk is often combined with recontracting risk, making recontracting and capital investment analyses discussed above crucial for evaluating refinancing risk. The asset life assumption used for refinancing analysis is situation-specific, as the building generally can have a long life but its utility as a data center and rent level sustainability is dependent on its technical characteristics and flexibility to adapt infrastructure to evolving market requirements. The asset life assumption can be reduced significantly for facilities that are deemed not to be strongly positioned.