MOODY'S
INVESTORS SERVICE

RATING METHODOLOGY

Generic Project Finance Methodology

Table of Contents:

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Summary

» The objective of this methodology is to improve the transparency of Moody's approach to rating project finance issuers not covered by other relevant methodologies.

» Moody's will apply this methodology globally when assigning ratings to this class of project financings. The methodology standardizes the analysis and relative weighting of quantitative and qualitative factors considered in our analysis.

» This rating methodology largely codifies existing practice and is not expected to result in any rating changes purely as a result of its introduction.

» Moody's has developed a scorecard to accompany this rating methodology. The scorecard will be available to market participants at no cost upon the execution of a usage agreement. To obtain the scorecard application or for further information please contact Moody's at1-212-553-6899.

Industry Definition

This methodology covers special purpose entities which are financed on a non-recourse, project finance basis and which are not analyzed under other existing project finance and infrastructure methodologies, including the ones listed below:

» Power generation projects

» Operational toll roads

» Operational airports outside of the United States

» Construction risk in privately financed public infrastructure (PFI/PPP/P3) projects

» Operating risk in privately financed public infrastructure (PFI/PPP/P3) projects

» Natural gas pipelines

» US public finance methodologies dealing with infrastructure assets

» And any industry methodology which addresses project finance issuers

THIS CREDIT RATING METHODOLOGY CONTAINS AN UPDATE IN THE RELATED RESEARCH AT THE END OF THE REPORT. THE CONTENT OF THE CREDIT RATING METHODOLOGY HAS NOT BEEN CHANGED OR UPDATED. ORIGINAL DATE OF PUBLICATION REMAINS THE EFFECTIVE DATE OF THE CREDIT RATING METHODOLOGY.

This methodology encompasses a wide range of assets in many jurisdictions such as parking garages, airport fuel facilities, stadiums, railways, and LNG liquefaction plants. As a result, the universe of projects covered by this methodology spans a very wide range of risks, structures, financial characteristics and technologies.

The one feature that all issuers covered by this methodology have in common is their nature: that is, they are all long-term infrastructure entities financed on a project finance basis.

There is a continuum between projects and corporate issuers and, sometimes, classifying an issuer as a project or a corporate is not entirely straightforward, especially when an issuer transitions from project finance to a more corporate form. The table below outlines some of the key differences between projects and corporate issuers. Moody's expects that a project finance issuer would exhibit at least several, but not necessarily all, of the characteristics listed under the column titled Project Characteristics.

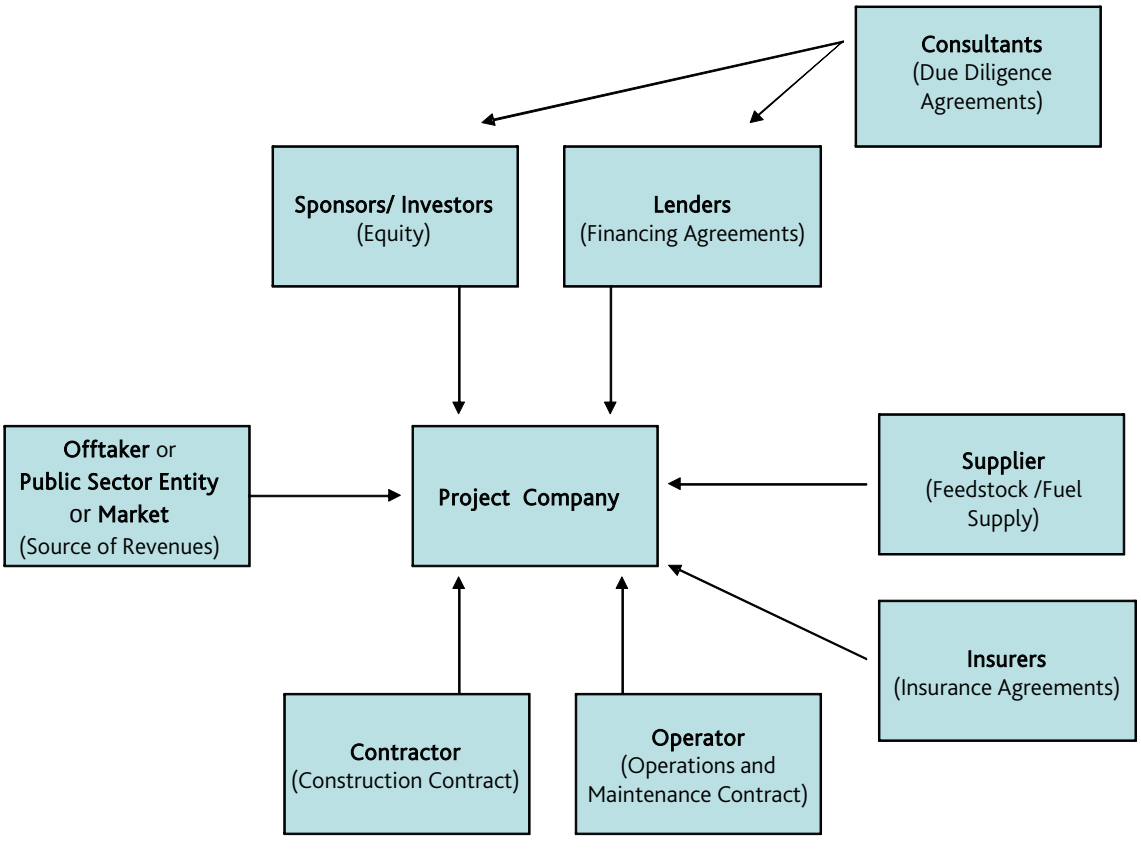
Project Characteristics	Corporate Characteristics
A creature of contracts; usually there is at least a fundamental contract which gives the right to issuer to operate and generate revenues for a given period of time (offtake contract, concession, licence, lease, right to exploit a reserve…). Other contracts may be a supply/fuel contract, an operating and maintenance contract, a construction contract as well as financing contracts. The contracts, if well structured, allocate risks to the parties who can best manage them	A creature of demand; usually, no single contract is fundamental to the business of the issuer
Special purpose entity with limited ability to change its scope of business as defined in the contractual arrangements	Few restrictions on the scope of business
Usually construction risk at inception (i.e. new asset); may or may not be exposed to large capital expenditure over time to maintain availability of the asset	Usually operating assets: construction risk on a single asset is rarely a major risk for the entire company; on-going capital expenditures to maintain competitive position
Structural protection available to lenders (permitted distributions to shareholders subject to pre-agreed tests, cash waterfall, controlled accounts, restriction re new business, restriction re sale of assets and acquisitions etc). In addition prevalence of direct agreements providing step-in, cure and step-out regime for secured creditors . Meaningful triggers to ensure that in severe stress scenario, control passes from equity to debt to achieve timely rectification	Usually low level of protection
Prevalence of amortizing long-term debt; finite amount of debt and tests for additional indebtedness; high leverage reflecting the usual prevalence of cash flow contractedness; book equity depletes over time. All or most of the debt has to be repaid by end of concession/licence/useful life of asset/natural resource reserves, etc	Amortizing and bullet; few restrictions on ability to incur additional indebtedness so that debt is expected to grow over time; book equity usually a permanent element of the structure. Assumption is that the company will keep refinancing its loans
Reliance on specific asset/reserve future cash flows to repay debt. Ring fencing of SPV. Non-recourse to owners	Reliance on corporate cash flows or value of assets to repay debt
Specific security for senior debt on material contracts, accounts, revenues and account receivables, shares, all assets…etc.	No security or security on assets
Creditor control and oversight over business performance through budgets and financial projections; reliance on specialist due diligence consultants	Management discretion
Dedicated liquidity through debt service reserve funds, major maintenance reserves…etc	Management discretion
Single asset-product/finite life. Small to medium size. Whole life forecasting of business risks and cash flows and extensive sensitivity analysis	Multi assets & products/ potentially infinite life. Typically large size. Short to medium term horizon

It is worth noting that the analytical approach shifts as one moves along the continuum from a project finance issuer to a corporate issuer. So for instance, for a true project finance issuer, the effective delineation and containment of the business being the object of the project financing is very important; conversely, for a corporate issuer, diversification of businesses is in general a positive feature (subject to financing strategies). Similarly, for a true project finance issuer, the debt to capitalization ratio is not very meaningful per se and it is expected that, over time, equity may even become negative as dividends are distributed to the sponsors in excess of net income. Conversely, in a corporate issuer, a stable capital structure is expected and at least a material portion of the cash flows must be retained to expand and renew the entity.

Project financings are based on the notion that risks in the transaction are identified upfront, allocated to transaction parties and mitigated where economical. The upfront risk allocation, high leverage, and use of special purpose limited recourse financing vehicles sometimes invite comparisons to structured finance transactions. A key distinction between the two areas of the capital markets is the operational risk of project financings, which requires an assessment of technical risks especially around new construction works, and the fact that project cash flows are dependent on operating performance - which may vary markedly.

A typical project finance structure would have the following elements:

FIGURE 1



For clarity purposes, this methodology is not designed to apply to infrastructure corporate issuers such as Reliance LP, NAV CANADA, and Panama Canal Authority. In addition, all US public finance issuers are excluded except for certain infrastructure project obligors which issued through local municipal authorities but have entirely private sector and project finance characteristics (stadiums as an example).

For the issuers which fall somewhere on the continuum and are not clearly either a project or a corporate or for project finance issuers operating in an industry covered by a corporate finance industry methodology, it is recommended to apply a bespoke approach in order to arrive at the rating by using a combination of the applicable industry methodology[1] and this methodology.

Applying this Methodology

Transparency versus Accuracy: Any rating methodology grid incorporates a trade-off between simplicity that enhances transparency and greater complexity that would enable the grid to map more closely to actual ratings. In this case, given the broad range of project types, the focus has been put on simplicity and flexibility.

One-Two Notches Point: This methodology provides investors, issuers, and intermediaries with a reference tool to gauge a project's rating within one or two notches. While the methodology aims to offer robust guidelines as to how we rate projects, we would nonetheless caution that no project will match exactly every factor outlined for a given rating category. The rating outcome is rather a balance of all the factors we have identified and, first and foremost, the result of a formal rating committee process.

Limits of Applicability Point: Additionally, the methodology cannot anticipate every specific financing innovation or structural nuance unique to various markets or regional jurisdictions. While we have endeavoured to capture the key factors that are considered in rating committees as broadly as possible, there may be project specific issues that a methodology cannot address. The project finance industry is highly innovative and deal structures evolve over time. As such, the methodology does not replace the fundamental rating committee. Instead it will be used as a key input to the rating committee process and it codifies our approach, helps to ensure that our ratings remain as consistent as possible, and enables us to communicate better the rationale of a rating committee decision to the market. However, recognizing that every project is unique, we reserve the right to deviate from the grid implied scoring outcome if warranted by the specifics of the project. This is discussed in greater detail at the end of this document in the section entitled "Other Rating Considerations/Exceptions to the Methodology Outcome".

Fundamental Consolidated Rating versus Individual Debt Ratings Point: Projects typically have only one class of debt (senior secured debt) and, in that case, the issuer rating is equal to the rating of the senior secured debt. If the project has more than one class of debt and/or an operating company/holding company structure, then the project is rated by assigning a fundamental consolidated rating which includes all classes of debt and as many holding companies we think are relevant. The extent to which consolidated financial metrics are used for the purpose of assigning ratings to a project will depend

[1] For instance, on December 1, 2010, Moody's extended the scope of its Midstream Energy methodology from Americas to Global, potentially extending its coverage to include project finance credits such as Dolphin Energy and the Ras Laffan LNG credits. However the subset of Midstream project finance credits is still too small for these to have been addressed explicitly within that methodology, so our approach to assessing their credit quality will be primarily using this Generic Project Finance methodology – which best assesses their structural features – while also drawing on considerations from the Midstream Rating Methodology to inform our assessment of project risk. Other relevant industry methodologies which could be used to inform Moody's assessment of project risk for specific projects could be the methodologies applicable to freight railroad (a rail project), lodging industry (a hotel project)… etc.

upon the specifics of the transaction[2]. We then notch around the fundamental consolidated rating for specific classes of debt.

Universe of Issuers Covered

At the time of publication, this methodology is applicable to approximately forty issuers. Twenty six are physically located in the Americas, ten in Europe/Middle East and four in Asia/Pacific.

These projects have issued some $26 billion of debt in total in the following sectors:

» Energy related: 11

» Transmission & Transportation: 7

» Airport related: 6

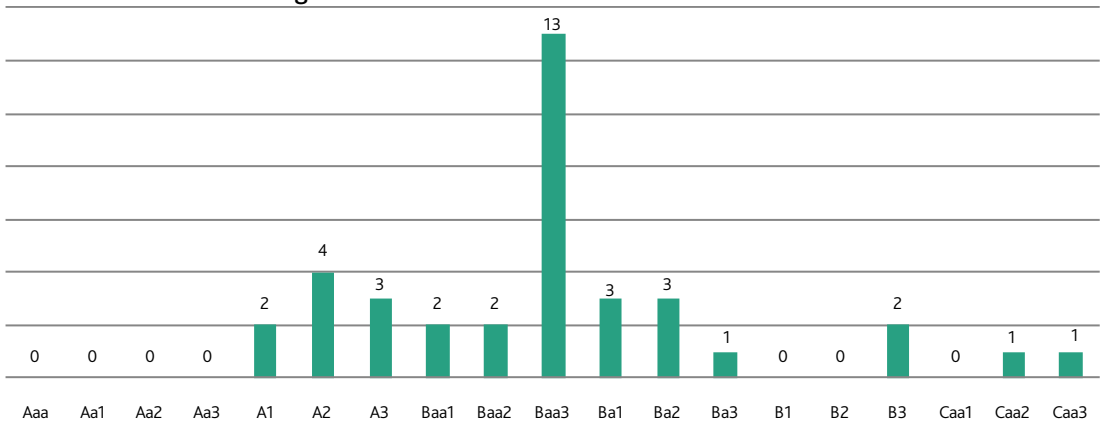
» Hotels, parking facilities and convention centers: 6

» Stadiums and arenas: 5

» Other (industrial facilities, water/waste…etc): 5

The senior debt rating distribution (excluding three issuers for which the exact Baseline Credit Assessment is not published) shows a wide range of ratings from very solid investment grade to very weak non investment grade, with most ratings clustered around the lower end of the investment grade category (Baa3).

FIGURE 2
Distribution of Senior Ratings



Source: Moodys.com

The better rated projects tend to benefit from long term contracts allowing a predictable recovery of costs, little competition, credit worthy counterparties. At the other end of the spectrum are projects which have weak economic or competitive position, face uncertain net cash flows, may use complex technologies and/or must deal with weak counter-parties.

[2] The rationale for considering consolidated metrics is that the existence of other tranches of debt may increase the probability of default for the senior debt and also impact the project's ability to refinance the senior debt.

In this Methodology

Moody's approach to rating projects under the generic project finance methodology incorporates the development of a scoring grid based upon the key factors likely to be considered by Moody's rating committee. Within each key factor, there are one to two sub-factors, which will incorporate both quantitative and qualitative considerations. Each sub-factor consists of quantifiable ranges or other descriptive characteristics for broad scoring categories. That is, we assign a broad scoring category for each sub-factor based upon Moody's rating scale – such as Aa, A, Baa, Ba, B and so on. We then assign specific weights to each key factor and sub-factor based upon their relative order of importance. This enables the determination of a grid implied scoring based upon the specific weights assigned and the scoring assigned to each of the factors to produce the final grid based scoring. That scoring is then modified with a number of notching adjustments.

Identifying Key Scoring Factors

Four key factors determine our scoring for projects:

» Factor 1: Long Term Commercial Viability & Competitive Position

» Factor 2: Stability of Net Cash Flows

» Factor 3: Exposure to Event Risk

» Factor 4: Key Financial Metrics

Measurement of the Key Scoring Factors

For each of the factors cited, a set of criteria enables the user to determine exactly how we measure this factor. Each of the four factors is comprised of between one and two sub-factors. Where possible, we provide quantitative metrics. For some factors, however, qualitative judgment or empirical observation is necessary to determine the appropriate category.

Mapping Factors to Rating Categories

Next, we explain how performance on each of the metrics cited maps to Moody's rating categories, absent any other offsetting factors. Thus, we assign a Moody's broad rating category (i.e., Aaa, Aa, A, Baa, Ba, B, and Caa) for each range of possible outcomes on a specific metric.

Weighting Factors and Scoring

The methodology is designed to capture a wide range of project risks. Hence, conceptually, it makes sense that an issuer which displays strong economic viability, benefits from fully contracted revenues resulting in very stable net cash flows, and is exposed to little technology or event risk, should be able to achieve higher scoring even with relatively weak metrics as the net cash flows available for debt service should be very predictable; as well, the metrics are, to some extent, of a lesser importance and can be given a lower weight than for higher risk projects with greater volatility of cash flows. Vice versa an issuer with less predictable cash flows would need stronger metrics in order to achieve a similar overall scoring.

Hence after scoring the first three factors (Long Term Commercial Viability and Competitive Position, Stability of Net Cash Flows, and Exposure to Event Risk), a fundamental project risk scoring is derived by applying the following weights to each factor score.

Factor	Weight
Long Term Commercial Viability & Competitive position	25%
Stability of Net Cash Flows	
Cash Flow Predictability	40%
Technology & Operating Risk	20%
Exposure to Event Risk	15%

Once the fundamental project risk scoring is determined, projects are then classified as indicated below in order to determine the financial metrics thresholds to be applied for any given scoring level and the weight assigned to the financial metrics. The fundamental project risk scoring is not "lost": it will be combined with the scoring derived from the financial metrics to arrive at an overall project scoring before notching and other considerations. The "slotting" in either of the four risk categories is only for the purpose of determining which financial metrics to use and the weight to be given to the financial metrics.

The projects are slotted in each of four "buckets" as follows:

Fundamental Project Risk Scoring	Bucket Of Risk
Aaa-A	Low
Baa	Low-Medium
Ba	Medium-High
Below Ba	High Risk

The following table shows the weightings applied to the fundamental project risk and to the financial metrics respectively depending upon the bucket in which the fundamental risk project scoring falls.

Fundamental Project Risk Scoring	Low Risk	Low-Medium Risk	Medium-High Risk	High Risk
Fundamental Project Risk Weight	80%	70%	60%	50%
Financial Metrics Weight	20%	30%	40%	50%

Determining the Grid Based Scoring

Each sub-factor's scoring is mapped to its corresponding idealized default probability rate as illustrated below. The weighted average of each of the sub-factor default probability rates is then mapped back to a rating using Moody's full debt rating scale.

Sub Factor Scoring	Idealized Default Rate		Idealized Default Table	Project Risk Assessment
Aaa	0.00%		0.00%	Aaa
			0.02%	Aa1
Aa	0.05%		0.05%	Aa2
			0.10%	Aa3
			0.19%	A1
A	0.35%		0.35%	A2
		Average Idealized Default Rate of sub-Factors	0.54%	A3
			0.83%	Baa1
Baa	1.20%		1.20%	Baa2
			2.38%	Baa3
			4.20%	Ba1
Ba	6.80%		6.80%	Ba2
			9.79%	Ba3
			13.85%	B1
B	18.13%		18.13%	B2
			24.04%	B3
			32.48%	Caa1
Caa	43.88%		43.88%	Caa2
			66.24%	Caa3

As is evident from the illustration above, the default rates in Moody's idealized tables are non-linear . Using non-linear[3] default rates rather than a linear scale (e.g. Aaa=1, Aa=2, etc.) allows the methodology to assign a relatively higher weighting to weaker project attributes, which is consistent with our view that one or two very weak aspects may compromise a project's overall credit quality more so than in other fundamental areas, such as corporate or public finance.

The scoring generated from the factor grid will reflect a project's steady state operational risk profile based upon the fundamental contractual arrangements governing the operating period economics, long term viability of the project, exposure to event risk and overall leverage. The scoring generated by the factor grid will be further adjusted (if warranted) to reflect a number of common attributes of project financing: strength of specific and dedicated liquidity, strength of the project finance features and finally an assessment of any refinancing risk ("Notching Factors").

These notching factors, either individually or collectively, could move the indicated scoring based on the factor grid either upwards (maximum two notches if dedicated liquidity and project finance structure features are unusually strong) or downwards (up to three notches or even more under certain circumstances), depending upon the significance of these factors to the overall business risk profile of the project. *To be absolutely clear, if the project benefits from standard liquidity for its type, standard project finance feature and no refinancing risk, then there is no adjustment to the scoring generated by the factor grid.*

[3] The rates used to score the sub-factors and derive an aggregate rating are Moody's 4-year idealized default rates, consistent with the convention in other areas of Moody's research.

The last step involved in deriving the grid scoring is to assess the loss given default for the project in order to arrive at an expected loss grid scoring.

For projects where construction risk or ramp up/transition risk exists, a separate assessment of that risk is made. If the construction period is deemed to represent a higher risk than the operating period, then the construction risk rating applies until such time the project is completed and has demonstrated reliable performance.

Finally other considerations and qualitative factors are taken into account to modify the grid derived scoring in order to arrive at the final rating of the project.

Project Mapping and Outlier Discussion

Appendix 1 lists the issuers for which the generic project finance methodology applies.

Appendix 2 maps out grid scorings for the issuers covered by the generic project finance methodology and compares the grid scoring to actual ratings.

Scoring Factors

Scoring Factor #1: Long Term Commercial Viability & Competitive Position

Why It Matters

A project's survival over the medium to long term -the term which allows all of the project's debt to be fully repaid- fundamentally depends first and foremost on its long term commercial viability and competitive position.

This goes without saying for a project fully exposed to demand and/or price risk. However, even when there is a take-or-pay or offtake contract supporting the project, the project needs to be examined as to its long term commercial viability. Moody's has always held that the reliability of such contractual obligations -i.e. take-or-pay or offtake contract- is a function of the economic viability of the project. The less economical it is, the less likely that it will be honoured if the offtaker can find a way out" [4] . In addition, the testing of commercial and economic viability does not just apply to off-take contracts supporting the project: it also applies to supply, hedging, operations and maintenance contracts and any other relevant material contract.

How Do We Measure It?

Sub Factor1a: Competitive Position

» Degree of exposure to competition

» Degree of competitiveness: How is the project's service or product placed from a cost perspective, location, technological advance, etc

[4] The risk is less when the offtaker is an entity which has full right to recover the costs of the contract (e.g. a utility) and that offtaker is not exposed to major competition

Sub Factor 1b: Industrial Logic, Alignment of Economic Interests

» Industrial logic: Is there a demonstrated need for the project's service/product and the end product

» Alignment of economic interests: Do all key contracts make sense for all key parties in the industrial chain as to price, rights and obligations

- A project's competitive position can be challenging to assess over a 20 to 30 year period: technologies evolve, competitive landscape change, demand can shift…etc. As a result, projects relying on an existing competitive position but whose debt does not amortize fully until very late in the project life are not as strong as similar projects with rapidly amortizing debt before the competitive landscape can evolve too dramatically.
- For projects with low market integration (i.e. they are part of an industrial chain with significant counterparty dependencies) the relevant competitiveness is not just that of the project's product or service but also that of the end product/service ultimately served by the industrial chain. For instance, an LNG re-gasification plant (which is part of the chain encompassing natural gas production, transportation, liquefaction, transportation, re-gasification and transportation to markets) could be intrinsically competitive and highly efficient but if the LNG is destined to serve markets where LNG is more expensive than conventional sources of natural gas, then the long term viability of that plant is somewhat questionable, irrespective of the underlying contracts. As well, alignment of interests between the various relevant parties in such projects is highly important.
- Competition is not limited to the competition arising from similar assets but from all assets which serve a similar purpose (so for instance stadiums may compete with other sports and more widely, with other forms of entertainment).

	Aaa Aa	A	Baa	Ba	B	Caa
Sub-Factor 1a: Competitive situation	Entrenched monopoly situation over term of debt	Very limited de facto competition for product/service over term of debt	Product or service exposed to some competition but product or service has solid entrenched competitive position in the served market(s). Position is stable over time. OR: product/service provided is not in top competitive position but highly rated offtaker of product/service can pass on cost to its own customers (e.g. by regulation) without any question and adverse consequence	Project provides competitive or discretionary product/service. Product/service is expected to be in an above average to average position; or level of competition may change over time but not drastically	Asset is exposed to broad competition; Competitive position is average to somewhat weak, and/or could change materially over time	Asset –and/or end product- is fully exposed to competition; competitive position is untested, uncertain or weak
Sub-Factor 1 b: Industrial logic & alignment of interests	Long term viability is not in doubt: critical piece of essential or social infrastructure, important for the good functioning of a country or large sub-sovereign; All interests very well aligned	Infrastructure important for the functioning of a sovereign, large sub-sovereign or highly rated corporate (A3 or better); All interests well aligned	Industrial logic is solid; key parties' interests are generally well aligned or there could be some mis-alignment but the parties can be easily replaced with little negative impact on the project	Industrial logic is average and debatable under some scenarios; key parties' interests not entirely aligned but risk is manageable	Industrial logic is weak or could easily become weak; There is some material mis-alignment for some key parties' interests	Discretionary product; industrial logic is questionable; several of the key parties' interests are mis-aligned

Scoring Factor #2: Stability of Net Cash Flows

Why it Matters

Once the long term viability of the project is established, the next step involves examining the contractual framework of the project as well as the degree of technological and operating risk to make an assessment of the stability of *net* cash flows over the life of the project. In essence, what is being determined is the degree of control that the issuer exercises over its net cash flows. In that exercise, the assumption is that a) there is no life changing event risk which is dealt with separately and b) the contracts will be honoured. Establishing the stability of net cash flows is paramount since it will establish the level of certainty with which debt can be repaid in full before the end of the concession, lease, reserve, asset life etc. For instance, assuming two projects which both display a 2.0 times Debt Service Coverage Ratio (DSCR), the one which has the highest likelihood of generating a 2.0x DSCR on a reliable basis year after year, would score higher under this factor than the one which is exposed to material variations around that value due to different contractual arrangements and technology.

How Do We Measure It?

Under this factor, we look at two sub-factors:

» Predictability of net cash flows

» Technology & Operating risk

Sub Factor 2a: Predictability of Net Cash Flows

Since projects are essentially a creature of contracts, it is not surprising that a heavy weight is given to the contractual framework underpinning each project's net cash flows.

The nature of the contractual framework will determine whether, *over the period required to fully repay the debt*[5], the project's net cash flows are exposed to either demand risk or price risk or both, and/or to cost risk (as to price and availability [6]) and, if so, to what extent. It will also determine the existence of any mismatch between revenues and costs.

Mismatches between revenues and costs can arise in many different ways:

- Contractual mismatches could arise when a project is required to continue delivering a product even though there is a shortage of key materials or commodities or when the project facility is not available
- Structural mismatches arise where, for instance, revenues are fixed under a contract but the project company is exposed to full price and availability risk on the cost side or when revenues are in one currency and costs in another
- Timing mismatches arise when there are delays in recovering costs (often seen in regulated assets)

As a result, there are two main angles to the analysis:

a) Determining the degree of exposure to movements in price and volume for both revenues and costs; and

b) Determining the nature and extent of any mismatch between costs and revenues.

Sub-Factor 2b: Technology & Operating Risk :

As demonstrated by several projects, technology and operating risks can lead to material weakening of a project. In a single asset project, if revenue generating capacity is disrupted because of operational problems, there is no alternative source of cash flows to meet debt service requirements unless specific liquidity has been set aside in sufficient amounts to deal with the likely delays. Technology and operating issues may translate into reduced or disrupted revenues, increased operating costs, increased capital expenditures, and/or payment of liquidated damages to an offtaker.

[5] The project rating is for the life of the project (up to the date the debt is fully repaid), and as a result, Moody's will assess the level of cash flow uncertainty/mismatch across the life of the project and determine which periods exhibit the highest degree of uncertainty. So for instance, a project maybe fully contracted as to revenues for a short period of time but become merchant after the end of the contract. In that case, the rating will tend to be constrained by the risk during the merchant period especially if there is still a material amount of debt to be repaid at that point.

[6] Availability issues are primordial in projects which depend on specific reserves for their activity: oil and gas, natural gas, minerals etc.

At inception of a project, the sponsors make a number of assumptions as to the technological and operating performance of the asset. These assumptions may turn out to be correct or optimistic. The extent to which assumptions may prove to be too optimistic are a result of the following elements:

- Technology and/or operating track record
- Technology/process complexity: multitude of moving parts, and/or requirements for very specific performance (availability, pressure, temperature, quality of inputs, restrictions on outputs, …etc)
- Sponsor's experience with the technology/process and willingness to devote material resources to make the project work
- Need for material capital expenditures and refurbishment at periodic intervals to maintain the asset
- Qualifications and creditworthiness of the operator

	Aaa	Aa	A	Baa	Ba	B	Caa
Factor 2a: Predictability of net cash flows							
Description	Extremely high predictability of net cash flows. No mismatch.	Very high degree of predictability of net cash flows. Very minor mismatches.	High degree of predictability of net cash flows. Minor mismatches	Good degree of predictability of net cash flows. Mismatches are manageable and/or relatively short lived	Some degree of uncertainty re predictability of net cash flows. Mismatches can be material and/or prolonged	Material uncertainty with respect to net cash flows; substantial possible mismatches for long periods of time	Highly uncertain net cash flows.
Examples of possible structures	Availability payment sufficient to repay debt from Aaa entity with no deduction and full timely recovery of costs	Fully contracted net cash flows with highly rated entity and/or full recovery of costs rights	Fully contracted net cash flows with well rated entity or full recovery of costs rights or supportive regulation	Contracts cover either price or volume; limited downside risk on the price/volume which is not contracted	Contracts cover either price or volume; non contracted element benefits from very well established markets (say commodity market)	Contracts cover either price or volume; non contracted element has market exposure; or there is no contract protecting for price and volume, but well established markets	Full exposure to markets on price and volume; little history of demand, non-transparent markets as to price
Examples		Cdn airport baggage handling	Regulated power line	Stadiums, commodity projects		New technology prod (e.g. solar).	
Factor 2b: Operating technology	--	Simple commercially proven technology/ process with minimal moving components	Simple commercially proven technology/ process with few moving components	Commercially proven technology/ process	Commercially proven technology/ process but some operating challenges have occurred at the asset or for the asset type	Most of the technology/ process considered proven but certain elements are untested or have limited operating history	Technology/ process largely unproven. Where asset has had several years of operations, operating performance has been consistently well below industry standards
Sponsor/Operator	--	Sponsor is highly rated and has demonstrated track record of providing ongoing operational support for projects. Operator has considerable experience and is highly creditworthy	High quality sponsor with demonstrated track record of providing operational support to projects. Competent operator with established track record	Sponsor has good track record of providing operational insight. Recognized operator	Sponsor has good track record but limited support can be expected if performance problems persist. Recognized operator	Operator may not have material track record with that particular technology. Non strategic sponsor with little or no track record. Sponsor support not expected if there are performance problems	Operator has limited experience and is weak financially. Sponsor support not expected if there are problems

	Aaa	Aa	A	Baa	Ba	B	Caa
Capital expenditures	--	Little ongoing capital expenditure requirement (or fully recoverable)	Ongoing capex and maintenance very predictable and modest(or recoverable)	Ongoing capex and maintenance will be required to maintain performance & availability which could be mitigated if project has long term LTSA with recognized and credit worthy vendor. No major lumpiness	Active major maintenance and capex program essential to maintain performance standards; good level of predictability as to timing and amount . May or may not have an LTSA	Asset is expected to need active and material capex program with material degree of uncertainty as to amounts and timing	High degree of uncertainty with respect to the extent and timing of maintenance program

In certain exceptional instances, where the project's economics are exceptionally robust and where "distance to default" is unusually high and is expected to remain so, Moody's may recognize such circumstances by scoring Factor 2a (Predictability of Net Cash Flows) more benignly than the rating factor grid would infer. However, such instances are likely to be rare, and would likely be constrained to a single notch uplift in the scoring of Factor 2a. These circumstances may apply to certain commodity related projects which were conceived and financed at a time when commodity prices were low and were originally projected to remain so, and which have benefitted from a material rise in commodity prices which Moody's considers to be sustainable over the residual term of the debt –as is the case for Ras Laffan Liquified Natural Gas Company Ltd for example. In such circumstances, commodity prices at levels which would cause distress to the project within the maturity of the debt are extremely remote under all conceivable downside price scenarios. However, these circumstances would not justify upgrading issuers in periods of cyclical high commodity prices and downgrading them in periods of cyclical low commodity prices. Another example could be a very stable key infrastructure asset benefitting from a right to set rates and a well established demand stabilized at a much higher level than that initially expected at financial close with no reason to believe that that demand will materially change before the maturity of the debt (for instance based on historical data spanning a full economic cycle).

Scoring Factor #3: Exposure to Event Risk

Why it Matters

Projects that are typically single asset entities are more exposed than conventional corporate issuers to various unexpected and uncontrollable events which could have a material effect on their performance, revenues and/or costs since they may have limited ability to meet increased costs or face reduced revenues. In the worst case scenario, such an event could be fatal for a project or, at a minimum, life changing.

Event risk encompasses a number of possible events, some of which are listed below:

» Regulatory changes

- Tax law changes and changes in law
- Institutional risk such as bankruptcy laws, operations of the security package, working of courts
- Sovereign risk - expropriation, nationalization, unilateral changes to documents or breach of contract, transfer restrictions
- Force majeure event – wars and civil disturbance, terrorism, earthquakes, etc
- Disruptions in supplies, markets, infrastructure -inbound and outbound
- Strikes
- Partial or full destruction of asset
- Environmental risk
- Insurance disruption
- Protest actions

How Do We Measure It?

Exposure to event risk is measured by looking at a number of dimensions:

- The range of possible events
- The likely severity of such events
- The probability of occurrence of such events

The combination of these three elements determines the overall exposure to event risk.

Once that is determined, the next step involves looking at:

- The mitigation for such events by contract

Aaa	Aa	A	Baa	Ba	B	Caa
No exposure and/or fully mitigated through contracts; immediate compensation (note: typical insurance for projects is not considered timely)	Limited exposure and/or mitigated through contracts only subject to administrative procedures (note: typical insurance for projects is not considered timely)	Limited exposure (in size and probability) and/or mitigated through contracts with limited negative impact on metrics (note: typical insurance for projects is not considered timely)	Potential material unmitigated exposures but with low probability; Most events covered by insurance or through contracts although payments may be subject to negotiations or some limits	Materially exposed to event risk and unclear or incomplete or untested provisions/mitigations	Material exposure AND little to no mitigation.	

Note that out of 40 issuers covered by this methodology only six score below Baa in that factor. Scoring below Baa means a high probability of a material unmitigated event, which could translate into substantial negative rating impact if it came to pass.

Once the Long Term Commercial Viability & Competitive Position, Stability of Net Cash Flows, and Exposure to Event Risk are assessed, the project is classified in one of the following fundamental project risk categories: Low, Low-Medium, High-Medium, and High. That classification will then determine which financial metrics will be used and the weight of the financial metrics.

Scoring Factor #4: Financial Metrics

Why It Matters

While Factors 1 through 3 measure a project's business and operating risk profile, a project's financial metrics remain key components of Moody's evaluation of the overall creditworthiness of a project. The other factors assess the risk of a decline in revenues or an increase in costs resulting in reduced net cash flows. This factor measures a project's ability to withstand such a decline in the event one occurs as well as a project's ultimate ability to repay its debt. For the reasons discussed earlier in the section entitled "Weighting Factors and Scoring", we assign a weighting ranging from 20% (Low fundamental project risk scoring) to 50% (High fundamental project risk scoring) to the financial metrics.

When mapping cash flow related credit metrics for new projects that do not have an operating track record, Moody's may use a combination of cash flow projections based upon Moody's own evaluation of financial and operating parameters and sensitivities which could differ from the management/sponsor's base case projections. The extent of the adjustments to the sponsor/management's base case will also be driven by the quality of the information provided, the quality and experience of the independent advisors who supplied key assumptions, and other factors.

For projects that are in operation and have a track record of historical performance, Moody's may take into consideration actual performance in combination with projected cash flows to assess the credit metrics that will be utilized in mapping to the grid. However, when confronted with a rapidly deteriorating situation such as expected prolonged operating problems, a Moody's rating committee is likely to weigh the expected pro forma financial metrics reflecting the adverse circumstances more heavily than the historical financial metrics since the historical metrics are not a likely indicator of near term performance of a project based on the changing circumstances.

For projects with increasing material uncertainty of cash flows towards the latter part of the project life, the credit metrics in the short to medium term may be given a greater weight than those in the longer term.

The case of the essential infrastructure asset with rights to recover all costs: Certain essential infrastructure projects benefit from a very robust contractual or regulatory framework which gives them the entrenched right to recover their operating costs and debt service on a timely basis without deductions, risk of under-recovery or material delays. As a result, these projects are essentially insulated from price and volume risk as well as cost increases and are often structured as non share capital corporations or not-for-profit entities. In these cases, debt service coverage ratios are often close to 1.0x although there can be variations from year to year. As a result, financial metrics have less meaning as long as there is sufficient liquidity to deal with any delay in the recovery of costs. In these cases, if the rating committee is satisfied with the contractual structure supporting the cost recovery mechanism, the credit quality of the obligors from whom the project derives its revenues, the essentiality of the asset and the liquidity position of the project, it is expected that metrics will be largely ignored for the purposes of assigning the final rating (that is the financial metric scoring can be entered in the scoring model as being equal to the fundamental project risk scoring). Examples of such projects in the list of issuers covered by this methodology would be Premier Transmission Financing plc and Alstef YUL L.P.

The financial analysis focuses on two or three separate metrics depending on whether the debt is amortizing or not:

» the average annual debt service coverage ratio (AADSCR)

» the break even analysis since two projects with similar DSCR may have varying degrees of resilience to declining revenues and/or increased costs

» and, in the case of non amortizing debt (or largely non amortizing debt), the ratio of funds from operations to total adjusted debt (FFO/Total Adjusted Debt)

That is not to say that other relevant metrics may not be looked at by the rating committee and incorporated into the rating decision.

» Very typical project finance metrics include loan life coverage ratio (LLCR) and concession life coverage ratio (CLCR).

» The minimum DSCR in every payment period is another key ratio which can colour a rating committee decision since a low DSCR in any given payment period can heighten default risk if not properly mitigated by liquidity.

» Debt to capital ratio and interest coverage ratio may apply to projects which have little debt amortization, are in transition to become corporates or exhibit some corporate traits.

» Industry specific metrics may also bring additional colour.

» Finally the analysis of the tail may be important in certain projects: e.g. the longer the tail in projects with increasing uncertainty of cash flows, the better.

For projects which have fully amortizing debt, the Average Annual DSCR (AADSCR) for the term of the debt accounts for 60% of the Financial Metrics score; and the break even analysis accounts for 40% of the Financial Metrics score.

For all other projects, the AADSCR calculated over the term of the debt accounts for 30% of the Financial Metrics score; the FFO/Total Adjusted Debt accounts for another 30% of the Financial Metrics score; and the break even analysis accounts for 40% of the Financial Metrics score.

The DSCR is defined as Cash Flow Available for Debt Service (CFADS) divided by the scheduled interest and principal payments as measured during any given period (annual DSCR where derived on a twelve month rolling basis). The AADSCR is the average of such annual DSCRs calculated over the term of the debt. The AADSCR captures the level of cash flow cushion available to meet the project's ongoing debt service obligations taking into account the intrinsic cash flow generation ability of a project.

Cash Flow Available for Debt Service (CFADS)
Scheduled Interest plus Principal Payments (P&I)

CFADS: Moody's defines cash flow available for debt service as cash flow from operations in any given period less major maintenance capital expenditures (all measured after tax but before interest payment). The cash flow will include the effects of scheduled cash flow contributions in and out of applicable cash funded major maintenance reserves (but not from debt service reserve).

Scheduled Interest & Principal Payments: the scheduled interest and principal payments as defined in the project's bond indenture or loan agreement during the specified period (i.e. excluding any cash sweeps).

The ratio of Adjusted Funds from Operations to Total Adjusted Debt is measuring the level of cash flows generated by the project that would be available to support its debt load.

$$\frac{\text{Adjusted Funds from Operations (FFO)}}{\text{Total Adjusted Debt}}$$

Funds from Operations (FFO): FFO is defined as the cash flow available for debt service (CFADS) of a project less interest payments based on a project's cash flow forecast model. The FFO to debt ratio is measured on the basis of annualized cash flows (twelve month rolling FFO) to total debt adjusted for leases.

The Break Even Analysis involves testing the resilience of the project to decreased revenues and/or increased costs and/or other relevant risks which could have a major negative effect on the issuer's credit metrics (e.g. increased interest rates[7], reduced reserves, movements in foreign exchange …). Since the methodology is applicable to a wide range of projects, no specific threshold is prescribed and as a result, a qualitative assessment is performed.

How do we Measure it?

The ratios are generally measured on a consolidated basis with as many classes and levels of debt as are deemed relevant given the specifics of the transaction.

AADSCR Analysis

Project Fundamental Risk Scoring	Aaa	Aa	A	Baa	Ba	B	Caa
L	>3.0x	1.81-3.00x	1.31-1.80x	1.15-1.30x	1.00-1.14x	--	--
L-M	>4.50x	3.01-4.50x	2.11-3.00x	1.41-2.10x	1.21-1.40x	1.11-1.20x	<1.11x
M-H	>7.00x	4.01 -7.00x	3.26-4.00x	2.26-3.25 x	1.51 –2.25x	1.25-1.50x	<1.25x
H	--	>8.0x	6.01- 8.00x	4.01-6.00x	2.51-4.00x	1.51 -2.50x	<1.51

FFO/Total Adjusted Debt

Project Fundamental Risk Scoring	Aaa	Aa	A	Baa	Ba	B	Caa
L	>25%	17-25%	10-17%	7-10%	5-7%	3-5%	<3%
L-M	>40%	24-40%	15-24%	11-15%	7-11%	3-7%	<3%
M-H	>51%	38-51%	23-38%	13-23%	9-13%	4-9%	<4%
H	>66%	51-66%	36-51%	22-36%	12-22%	5-12%	<5%

[7] In most cases, projects are financed with fixed rate debt. However, if there is material floating rate debt in the financing, Moody's will run various sensitivities of metrics related to changes in interest rates.

Break Even Analysis

Project Fundamental Risk Scoring	Aaa	Aa	A	Baa	Ba	B-Caa
L & L-M	DSCR of 1.0 reached only under very strenuous decrease of price/volume and /or cost increases	DSCR of 1.0 reached only under material decrease of price/volume and/or cost increases	DSCR of 1.0 reached only under material but fairly conventional range of price/volume decreases and/or cost increases	DSCR of 1.0 reached under somewhat limited level of decreases in price/volume and or cost increases	DSCR of 1.0 reached under limited level of stress re price/volume /cost as applicable	Very little to no resilience
M-H & H	--	DSCR of 1.0 reached only under very strenuous decrease of price/volume and/or cost increases	DSCR of 1.0 reached only under material decrease of price/volume and/or cost increases	DSCR of 1.0 reached only under material but fairly conventional range of price/volume decreases and /or cost increases	DSCR of 1.0 reached under relatively limited level of decreases in price/volume and/or cost increases	Little to very little resilience

To provide better guidance on the application of the break even analysis, we highlight below three examples of issuers at various levels of resilience to increased costs and/or decreased revenues.

Cofely YUL L.P. benefits from the right to recover all of its costs, including debt service, on a timely basis. Hence there is a perfect matching of revenues and costs at all times irrespective of activity volumes. Since the source of revenues relates to payments made by airlines, various mechanisms have been put in place to mitigate that risk. Such mechanisms include pre-billing of airlines, right to deny service for non-payment, and a step-up mechanism. Since Cofely is not exposed to any material risk of volume decrease or increased costs which could lead to an inability to service debt, Cofely scores Aaa on that factor.

Cargo Acquisition Companies Obligated Group's net cash flows are mostly sensitive to vacancy rates in its facilities. It was estimated that debt service could continue even at vacancy rates reaching approximately 40% versus historical rates in the 20-25% range. That degree of robustness is material but still relatively low given the high variability of cargo traffic which could lead to varying levels of vacancy and given the short term nature of most of the leases. Hence a Baa score was assigned to the break even analysis.

Mexico City Airport Trust is barely covering debt service and thus has little room to absorb any cost increase or revenue decrease or any other changed condition. The scoring is thus sub-investment grade for that factor.

Notching Considerations

The project sponsor's approach to a project's financing structure remains a key component of Moody's evaluation of the overall assessment of a project. While the factors and sub-factors within the grid are designed to incorporate the key ratings drivers reflecting the fundamental business risk of a given project, the grid alone cannot capture some of the wide ranging variances incorporated into deal structures that are seen in the marketplace today. The goal is to incorporate a sufficient level of flexibility within the methodology to accommodate all types of structures and risk parameters that may not be captured within a scoring grid framework. The notching factors are designed to adjust, either upwards or downwards, a project entity's steady state scoring as indicated by the factor grid based upon various structural considerations. These include the level of liquidity, project financing features, and refinancing risk.

1 - Liquidity

Moody's will consider making an adjustment to the scoring outcome from the grid depending on the level of liquidity incorporated into the project's financing structure. Liquidity is a fundamental consideration in a Moody's project rating assessment given its importance in providing a project with the ability to withstand periodic disruptions in the receipt of revenues due to unforeseen circumstances, including operational and performance issues.

Moody's will consider various forms of liquidity that are available to a project in the form of debt service reserves, major maintenance reserves, operating reserves and committed working capital facilities or other forms of supplemental liquidity.

Debt Service Reserve (DSR)

In assessing the project's liquidity, Moody's will consider the size and quality (cash versus letter of credit versus surety) of the available debt service reserve. We note that the inclusion of a 6 month debt service reserve is a standard liquidity feature in project finance. While the 6 month DSR level is considered standard, projects that exhibit higher cash flow volatility may require significantly higher DSR levels to achieve the same rating level, all else being equal.

Major Maintenance Reserve (MMR)

Moody's will consider the size and quality of the MMR in order to assess further the liquidity available to the project. MMR's are particularly critical in a number of projects (even when there is a DSR):

» When maintenance costs are material and/or exhibit a lumpy profile

» When technology is unproven

» When there is no long-term service agreement where such agreement transfers maintenance risk to an appropriately rated counterparty

» When there is very little ability to recover the maintenance and rehabilitation costs in the period they occur

Other Sources of Liquidity

Moody's will consider any supplemental levels of liquidity in addition to the DSR or the MMR. For example, a project could have significant additional operating reserves, sponsor contingent equity commitments and committed working capital facilities in the structure. However, it should be noted that these additional forms of liquidity will not replace the importance of having a dedicated debt service reserve in a structure, particularly at the investment grade rating level.

Moody's will also consider the level and types of insurance (business interruption, property, third party liability…etc.) and assess whether they meet market standards although normally we would not assign a material liquidity uplift as a result of insurance.

The overall project liquidity assessment will lead to a notching of the rating derived from the fundamental ratings grid. Standard liquidity for the type of project should not lead to any adjustment; weaker liquidity could lead to adjustments of between -0.25 to -1.0 notch or even more if warranted; whereas, in few instances, unusually strong liquidity positions could lead to a notching upward of +0.25 to 1.0 notch.

2 - Project Financing Features

The Generic Project Finance methodology is intended to apply primarily to special purpose entities whose primary business purpose is limited to one activity and are financed on a non-recourse, project finance basis. As a result, the baseline expectation in assessing the rating of a project is that the project structure includes the following common standard features:

- The project company is a limited purpose entity created to engage exclusively in the specified project business and to enter into the relevant contracts
- Expectation of a standard project security package including security on all key contracts, tangible assets, accounts, revenues and shares in the project company
- Trustee administered cash flow waterfall
- Inclusion of standard covenants which would include prohibitions/tests on additional indebtedness (including financial assistance) or liens, restrictions on the acquisition and sale of assets; limitations on mergers and consolidations; limitations on investments (permitted investments)
- Dividend distribution test (restricted payment test). In the higher rated projects that test should apply not only to the payments to equity holders but also to the payments to the providers of subordinated debt and should be historical as well as projected
- Limits on change of control/ownership, especially if the sponsors are important to the project
- Lenders step-in rights and remedies to delay concession/lease termination or termination of material contracts
- Frequent and regular reports of creditors' technical advisers to sanction base case validity and compliance with contractual and financial obligations
- Covenanted hedging policies

The absence of one or more of these elements could result in a 0.25 to 1 or greater downward notching adjustment off the model derived scoring based upon rating committee discretion. Conversely, unusually strong provisions could result in 0.25 to 1 upward notching. However, in most cases, the presence of all key standard project finance provisions are not expected to result in any material adjustment either way.

The timing and degree of certainty of the equity injection is also an important part of the analysis. For an investment grade project, Moody's would expect the equity to come in at financial close. If it is injected later, then it must be committed by highly rated sponsors or supported by letters of credit issued by highly rated entities.

Moody's will also consider the degree of ring fencing protecting the project debt in determining the level of ratings separation from the sponsor's consolidated credit profile or in determining the impact of upstream leverage on the rating of project level debt. In this regard, Moody's will consider the degree of separation provided by the structural features, economic incentives, covenant package enumerated above as well as the relevant laws. Additionally, in some jurisdictions, Moody's will consider the degree of separateness covenants in the structure including whether or not there is an independent director and his/her role (particularly whether his/her affirmative vote is needed to affect a bankruptcy filing) to supplement the suite of ring fencing covenants in the financing structure. This is particularly acute the farther away the factor grid scoring outcome is to the credit quality of the sponsor/parent, or if the magnitude of any intermediate level holding company debt is significantly large such that the probability of default for the project from an owner induced voluntary bankruptcy is substantial. In circumstances where the project level debt holder's position is weakened by the existence of a weak sponsor or upstream leverage, the project rating could be notched lower to reflect this higher risk of default if adequate ring fencing measures are not in place [8].

We should also note that there are other considerations besides ring fencing that can help to determine the level of ratings separation between the sponsor and the project. These factors include the sponsor's intentions, the structure of the ownership and the underlying contractual arrangements and economics. In some jurisdictions, the sponsor's intentions are important because healthy projects may be pulled into the sponsors' bankruptcy filings. In these jurisdictions, project debt may be being repaid on a timely basis, but solvent healthy projects may still be filed for bankruptcy protection due to the ease of operation of having all entities as debtors in possession while in bankruptcy. One element that is a strong deterrent is the structure of the ownership. To the extent that a project is not majority owned, it is unlikely to be pulled into any of the sponsors' bankruptcy [9]. Another strong deterrent are the contractual arrangements at the project level and whether a project bankruptcy would lead to a termination event under the contract(s) and whether the termination event would benefit the sponsor or the off-taker. Projects are more likely to stay out of a sponsor's bankruptcy filing and the ratings separation between the project and the sponsor are likely to be greater in cases where the project has multiple owners with bankruptcy blocking rights, where ideally there is more than one independent director (whose affirmative vote is needed to file), where there are no contractual relationships between the project and sponsor and where the contractual arrangements that would terminate upon a filing would be economically harmful to the sponsor.

[8] Refer to Moody's special comment "Covenants and Ring Fencing for Wholly-Owned Subsidiaries", May 2007

[9] Subject to shareholders' agreement provisions

3 - Refinancing Risk

The outcome of the grid scoring may be further adjusted if it is necessary to consider refinancing of the outstanding project debt at its contractual maturity date. While most traditional project finance debt structures have fully amortizing term debt, a significant proportion of project bonds have refinancing risk. If there are cash sweep mechanisms, Moody's may recognize the benefits provided by a cash sweep mechanism and will run a variety of scenarios to determine the most likely level of debt outstanding at maturity that will be required to be refinanced. Moody's assessment of refinancing risk may include the following:

» Value and certainty of remaining cash flows at time of refinancing versus amount to be refinanced

» Presence of long term interest rate hedges with creditworthy entities which extend beyond the initial debt maturity. The more important the swap, the more important the credit quality of the swap provider may be-unless the swap terms sufficiently de-link the credit profile of the swap provider from the credit risk of the project-company (e.g. through downgrade triggers[10])

» Allocation of all or part of refinancing risk to a credit worthy entity

» Resilience of the project's metrics to refinancing risk under various scenarios of refinancing costs (in isolation or in combination with the potential for weaker operational performance)

» Transaction features to mitigate refinancing risks such as increased margins, cash sweeps, increased lenders' rights well ahead of the debt maturity

» Timing of the refinancing risk: for projects with a relatively long construction period and ramp up period, a refinancing risk in the critical ramp up period is heightened compared to one when the asset is well established and has a demonstrated track record

» Rating of the project: highly rated projects usually have less refinancing risk than lower rated ones especially in times of market disruptions

» Available liquidity if there are market disruptions

» Market conditions and market appetite for the type of project being refinanced

» Presence of holding company debt

For projects scoring poorly on several of the criteria above, the adjustment could be at least 1 notch down, if not several notches for certain projects [11]. For projects which are very resilient to refinancing risk or are well protected, then the adjustment could be a fraction of a notch. There is never any possible upward notching under that category as the base assumption is that the project debt is amortizing.

4- Loss Given Default

Moody's ratings are ratings reflecting expected loss which is the probability of default times loss given default. Studies have shown that recoveries in project finance are higher on average than in the

[10] In that case, it is important to assess the market conditions and determine the existence of replacement swap providers.

[11] It is worth noting that a corporate issuer with the level of debt load carried by most project finance issuers, without comprehensive security and creditor governance documentation and with refinancing risk would more likely be sub-investment grade, if not deeply sub-investment grade.

corporate world [12] although the range can be very wide. That lower average loss given default reflects a number of features of project finance, including the rights given to lenders before an issuer gets too deeply into trouble as well as, in many cases, the presence of termination payments. Normally, in project finance, a 35% loss given default is expected. However, in certain projects, the concession agreement includes termination payments even when the termination of the agreement is due to the default of the project company. In the latter case, the grid accommodates lower loss given default values although any value less than 25% should be rare. Conversely, there are projects which are relatively close to default and where a loss given default higher than 35% may be appropriate.

Construction Risk & Ramp Up Risk

While the factor based grid generates the core grid scoring for a project based on steady state operational risk factors, Moody's will adjust the scoring generated by the grid if construction risk and/or ramp up risk is deemed significant [13].

Construction risk covers the period from financial close to final completion of the project whereas ramp up covers the period between completion and steady state where the project starts generating revenues but may still be exposed to market acceptance and/or performance tuning.

A notching adjustment will be made for construction and ramp up risk, if the rating committee determines that the risk of constructing the project and achieving expected operating performance and market acceptance is much more significant than the risk profile of the steady state operating period. This step cannot be underestimated as construction risk and ramp up risk can be very material for many projects and lead to stress situation. A review of the Moody's-rated defaulted project finance issuers [14] reveals that, in several instances, projects defaulted as a result of the combination of increased commissioning costs, commissioning delays and reduced liquidity. In the instances where construction and ramp up risk is deemed to be the rating constraint, the rating could be transitioned upwards as operational and financial performance history is established.

In consideration of construction risk, we employ the general logic that Moody's has developed in other related methodologies such as the PFI/PPP/P3 construction period methodology to assess the magnitude of construction risk and whether or not we need to make any notching adjustments to the scoring generated by the factor based grid.

The key factors considered in the assessment of construction period risk can be outlined as follows:

» Assessment of raw construction risk

» Framework for the allocation of construction risks

» Assessment of EPC contractor and contractual arrangements

» Assessment of construction period liquidity

» Construction period monitoring

[12] Refer to Special Comment "Default and Recovery Rates for Project Finance Debts, 1992-2008". November 2009

[13] Construction risk can be ignored if there is a debt service undertaking by a highly rated entity until commercial operation date is reached

[14] Special Comment "Default and Recovery Rates for Project Finance Debts, 1992-2008". November 2009

a) Assessment of Raw Construction Risk

In assessing raw construction risk, we look at the relative construction complexity and costs. For example, an LNG liquefaction plant construction would be considered as being most complex relative to a parking building. As such, the construction of a complex industrial plant will be considered to have a higher degree of cost overrun and delay risks that would have to be properly mitigated by the contractual arrangements and contingency levels. Other aspects of a project which could result in construction delays and cost overruns include: site access restrictions, complex decanting of operations, long commissioning, difficult geological conditions, potential for discovery of archeological artifacts, partial or complete destruction of the project during construction, shortages of materials and/or labour, strikes, change in laws or specifications, default from a major/critical supplier of machinery, dependence on another project, requirements for high performance and availability standards. Generally, Moody's would expect a report from a reputable independent engineer documenting and assessing the various risks and mitigation strategies for the project.

If applicable, we will also assess the site access for fuel or other commodity supply necessary to the project. Moody's will also assess whether or not the project has acquired all the necessary land, and received all its permits, including environmental permits, land use agreements, and look at potential NIMBY type issues that could delay or complicate construction.

b) Allocation of Construction Risks

Project construction risks can be borne by any of the following parties: the project company, the equity sponsors (through completion guarantees), the EPC contractor, insurance companies and/or the counterparty to the project contract. In a well structured project the risks are borne by those which have the best ability to bear them. Moody's would review and assess the allocation of risks and determine the residual risk carried by the project company.

c) Assessment of EPC Contractor and EPC Contractual Arrangement

Once the relative construction complexity is ascertained, Moody's will assess how the construction contractual arrangements are structured to mitigate the raw construction risk.

As a key consideration on whether we would notch down for construction risk, Moody's will evaluate if the contractual arrangement is a fully wrapped fixed price, date certain, turnkey type arrangement which clearly transfers the risk of construction to the 3rd party contractor (those which are not retained by the counterparty to the project agreement or retained by sponsors). As a general guideline, for an investment grade rating, Moody's would look for a fully wrapped, fixed price, turnkey EPC contract with an experienced contractor with good credit quality.

However, under limited circumstances, other structures may work such as limits on project company debt and commitments by highly creditworthy sponsors to cover cost overruns.

In evaluating the strength of the contractor, we would look into the contractor's experience and track record in constructing similar type of projects on time and on budget. Here we also consider the level of the liquidated damages (LD's) and the level of contingency in the construction budget to mitigate cost overrun and delay risks and will include an assessment of the length of the warranty period and the coverage levels available to protect against defects. In general, to reflect an investment grade profile during construction, Moody's would look to a delay payment regime with daily payments sufficient to cover fixed costs (including debt service) during a material delay period. Additionally, Moody's will consider whether a project has an appropriate level of contingency to reserve against potential cost overruns and change orders.

If the contractor is not rated, Moody's will use an internal credit estimate process to evaluate if the overall credit quality of the construction contractor will be a limiting factor and would warrant a notching consideration. In evaluating the contractor's performance obligations, Moody's will also consider the quantity and quality of any third party guarantees and performance bonds that may be available to mitigate contractor's performance shortfalls.

d) Assessment of Overall Construction Period Liquidity

The liquidity analysis during the construction period considers whether the project has the ability to pay debt service until completion and the project is able to start generating revenues. The more highly rated projects will be able to withstand a material schedule overrun.

The liquidity available to mitigate a delay could be a combination of liquidated damages obligated to be paid by the EPC contractor, letters of credit, cash funded debt service reserves and funded contingency amounts included in the project budget, committed cost overrun facilities and cash holdbacks.

If the contractor provided delay LD's are meaningful, but the credit quality of the contractor is weak for the rating level being considered, Moody's will consider whether there are any standby external sources of liquidity such as letters of credit in support of the contractor's LD obligations.

e) Construction Period Monitoring

The best projects will have monthly construction monitoring by an independent engineer who will communicate to lenders:

» A certification of the amount of work completed during the month in order to support the monthly payment to the EPC contractor

» A confirmation that there are sufficient funds left to complete the work

» An assessment of the construction progress versus schedule

Other Rating Considerations/Exceptions to the Methodology Grid Outcome

This methodology grid attempts to explain the factors that are the most important for rating projects. In addition to the key factors that have been discussed, there can be other credit considerations that affect a project's rating, which could cause Moody's rating committee to deviate from the grid derived scoring.

Examples of these would include certain more generic factors (e.g. governance, level of financial disclosure [15]) which while not covered within this rating methodology as specific factors for projects, remain important inputs into our ratings. Similarly, if there is government involvement and/or ownership then we would also apply our rating methodology for Government-Related Issuers ("GRI's") as appropriate.

We also note that in certain projects (especially commodity projects), sponsor strength can be a factor taken into consideration especially in the cases where the sponsor(s) is/are very experienced and highly creditworthy.

[15] In project finance, the quality and extent of the financial disclosure is important but so is the quality of the financial model created at the inception of the project. Moody's expects a model fully audited by an independent party (e.g. accounting firm).

If a certain aspect of a project is deemed a "fatal flaw" which may or may not be captured within the key factors and notching considerations within the methodology grid framework, then Moody's rating committee would likely attribute a greater weighting to such a circumstance, overriding the indicated scoring outcome from the methodology grid. The reason for this is that we recognize that a serious weakness in one area often cannot be completely offset by strengths in another and the lack of flexibility associated with high degrees of leverage can heighten that risk.

Projects exhibiting unusual level of structural complexity and diversity of key counterparties can become exposed to increasing documentation risk, counterparty risk, and dispute risk.

Another example of how Moody's might deviate from the indicated grid scoring outcome is in the case of the rapidly deteriorating financial condition of a project's counterparty. Such a circumstance could have a significant adverse impact on the project's cash flows on a prospective basis. The methodology may not fully capture such changing circumstances and the rating committee would be adopting another form of "fatal" flaw approach by assigning greater weightings to the counterparty's credit quality in a declining counterparty situation. This would represent a departure from the grid output and in some cases would represent a several notch differential from the grid. The rationale for this departure is that the counterparty might seek to terminate the contract in a bankruptcy. A similar situation could be achieved if the project sponsor's financial strength is rapidly deteriorating and the ring-fencing is not as tight as ideally required.

The rating of the offtaker in contracted projects (where the offtaker is the source of revenues) typically acts as an overall cap on the rating of the project. The actual rating could be higher (assuming the indicated rating outcome from the methodology grid warrants it) than the rating of the offtaker in certain circumstances where there are mitigating factors, such as when the fundamentals of the project are strong even without the counterparty. In addition, the project structural features (debt service, cash waterfall, security etc) could give lift from the rating of the offtaker, particularly at the lower end of the rating scale. These structural features could prevent the rating of the project from falling to the level of the offtaker in a situation where the credit profile is deteriorating. In such cases, when factoring in the structural features, the rating when downgraded could be higher than the counterparty rating, but would not likely vary by more than one notch or two notches. In most cases however, the rating of the project would be capped at the rating of the offtaker/project counterparty.

Finally, while we have tried to make this methodology flexible enough to encompass a wide range of project structures and have tried to capture key factors we consider, we recognize that there is a wide range of structures, risks and that innovation in the project finance area can change the landscape over time. Ultimately, Moody's continues to make credit judgments through its rating committee process. The methodology aims to provide guidance as to the likely rating range with one to two notches and is intended to codify our approach. The methodology also enables us to communicate better to the market the rationale for a rating committee decision.

Appendix 1

List Of Issuers Covered By The Generic Project Finance Methodology

	Country	Senior Debt Rating (BCA if Applicable)	Junior/ Holdco Rating	Outlook
Stadiums, Arenas				
Twins Ballpark LLC	USA	Baa3	-	Stable
Yankee Stadium LLC	USA	Baa3	-	Stable
Jets Stadium Development, LLC	USA	Baa3	-	Stable
Brooklyn Events Center, LLC	USA	Baa3	-	Stable
Queens Ballpark Company LLC	USA	Ba1	-	Stable
Airport Related				
Alstef YUL L.P.	Canada	A2	-	Stable
Cofely YUL L.P.	Canada	A2	-	Stable
Vancouver Airport Fuel Facilities Corp	Canada	A2	-	Stable
Cargo Acquisition Companies Obligated Group	USA	Ba1	Ba2	Negative
Aero JFK, LLC	USA	Ba2	-	Stable
Mexico City Airport Trust	Mexico	Ba2	-	RUR Down
Hotels, Parkings, Convention Centers				
Avon Associates, LLC	USA	Baa3	-	Stable
Baltimore Hotel Corporation, MD	USA	Baa3	Ba1	Negative
Denver Convention Center Hotel Authority	USA	Baa3	-	Stable
Austin Convention Enterprises, Inc.	USA	Ba1	Ba2	Stable
Middlesex County Improv. Auth. (Heldrich Hotel)	USA	B3	-	Negative
Boston Industrial Dev. Fin. Auth. (Boston Crosstown Center)	USA	Caa3	-	Negative
Transmission & Transportation				
Belfast Gas Transmission Financing plc	UK	A1	-	Stable
Premier Transmission Financing plc	UK	A1	-	Stable
Moyle Interconnector Financing plc	UK	A2	-	Stable
Rowville transmission Facility Pty Limited	Australia	Baa1	-	Stable
DBCT Finance Property Ltd	Australia	Baa2	-	Stable
Maryland Econ. Dev. Corp (Ports America Chesapeake Inc.)	USA	Baa3	-	Stable
Panama Canal Railway Company	Panama	Ba2	-	Stable

	Country	Senior Debt Rating (BCA if Applicable)	Junior/ Holdco Rating	Outlook
Energy Related				
Inter Pipeline (Corridor) Inc.	Canada	A3	-	RUR Up
Nakilat Inc.	Marshall Islands	7 (A3)	-	RUR Down
Ras Laffan Liquefied Natural Gas Company Ltd	Qatar	5-7	-	RUR Down
Dolphin Energy Limited	UAE	8 (Baa1)	-	Stable
Ras Laffan Liquefied Natural Gas Co Ltd. (II)	Qatar	8-10	-	RUR Down
Ras Laffan Liquefied Natural Gas Co Ltd. (3)	Qatar	8-10	-	RUR Down
Tengizchevroil Finance Company s.ar.l.	Kazakhstan	Baa3	-	Stable
Lancer Finance Company (SPV) Limited	British VI	Baa3	-	Stable
Odebrecht Drilling Norbe VIII/IX Ltd	Cayman Islands	Baa3	-	Stable
Delek & Avner- Yam Tethys Ltd	Israel	Baa3	-	Stable
Sabine Pass LNG, L.P.	USA	B3	-	RUR Down
Industrial				
Wyuna Water Pty Limited	Australia	A3	-	Stable
Basslink Finance Trust	Australia	Baa2	-	Stable
Philadelphia Project Finance, LLC	USA	Baa3	-	Stable
DTE Energy Center, LLC	USA	Ba3	-	Stable
Fertinitro Finance Inc.	Venezuela/Cayman Islands	Caa2	-	Negative

Appendix 2

Mapping of issuers' ratings to the scoring derived by the generic project finance methodology

			Methodology Model Scoring												
							Financial Metrics								
	Senior Debt Rating (BCA if applicable)	Junior Holdco Rating	Factor 1	Factor 2a	Factor 2b	Factor 3	AADSCR	Break Even	FFO/Debt	Liquidity	PF Structure	Refinancing	LGD	Final Scoring	Difference w. Actual Senior or BCA Rating
Stadiums, Arenas															
Twins Ballpark LLC	Baa3	-	Ba	Baa	Aa	Baa	A	A	Baa	0	0	-0.5	35%	Baa3	0
Yankee Stadium LLC	Baa3	-	Ba	Baa	Aa	Baa	Aa	A	NA	0.5	0	0	35%	Baa1	+2
Jets Stadium Development, LLC	Baa3	-	Ba	Baa	Aa	Baa	Baa	A	Baa	0	0	-0.5	35%	Baa3	0
Brooklyn Events Center, LLC	Baa3	-	Baa	Ba	A	Baa	Ba	Aa	NA	0	-1	0	35%	Ba1	-1
Queens Ballpark Company LLC	Ba1	-	Ba	Baa	Aa	Baa	A	A	NA	-1	0	0	35%	Baa3	+1
Airport Related															
Alstef YUL L.P.	A2	-	A	Aa	Baa	Aa	A	Aaa	NA	0	0.5	0	35%	A1	+1
Cofely YUL L.P.	A2	-	A	Aa	Baa	Aa	A	Aaa	NA	0	0.5	0	35%	A1	+1
Vancouver Airport Fuel Facilities Corp	A2	-	A	Aa	A	Aa	A	Aaa	NA	0	-0.5	0	35%	A1	+1
Cargo Acquisition Companies Obligated Group	Ba1	Ba2	Baa	Ba	A	A	B	Baa	NA	0	0	0	35%	Ba1	0
Aero JFK, LLC	Ba2	-	Ba	Baa	A	A	B	Baa	NA	0.25	0	0	35%	Ba1	+1
Mexico City Airport Trust	Ba2	-	Baa	Ba	A	Ba	Caa	Ba	NA	0.25	0	0	35%	Ba3	-1
Hotels, Parkings, Convention Centers															
Avon Associates, LLC	Baa3	-	Baa	Ba	Baa	Baa	Ba	Ba	NA	0	1	0	35%	Baa3	0
Baltimore Hotel Corporation, MD	Baa3	Ba1	Ba	Baa	A	Baa	Ba	A	NA	0.5	0	0	35%	Baa3	0
Denver Convention Center Hotel Authority	Baa3	-	Ba	Ba	A	Baa	Ba	A	NA	1	0	0	35%	Baa3	0
Austin Convention Enterprises, Inc.	Ba1	Ba2	Ba	Ba	Ba	Baa	B	Ba	NA	0	0	0	35%	Ba2	-1
Middlesex County Improv. Auth. (Heldrich Hotel)	B3	-	B	B	Baa	Ba	Caa	Caa	NA	0	0	0	35%	B3	0

	Senior Debt Rating (BCA if applicable)	Junior Holdco Rating	Methodology Model Scoring												Difference w. Actual Senior or BCA Rating
			Factor 1	Factor 2a	Factor 2b	Factor 3	Financial Metrics: AADSCR	Financial Metrics: Break Even	Financial Metrics: FFO/Debt	Liquidity	PF Structure	Refinancing	LGD	Final Scoring	
Boston Industrial Dev. Fin. Auth. (Boston Crosstown Center)	Caa3	-	Caa	B	Baa	Ba	Caa	Caa	NA	-1	0	0	45%	Caa2	+1
Transmission & Transportation															
Belfast Gas Transmission Financing plc	A1	-	Aa	Aa	A	A	A	A	NA	0	0	0	35%	A1	0
Premier Transmission Financing plc	A1	-	Aa	Aa	A	A	A	A	NA	0	0	0	35%	A1	0
Moyle Interconnector Financing plc	A2	-	Baa	Aa	A	A	A	A	NA	0	0	0	35%	A2	0
Rowville transmission Facility Pty Limited	Baa1	-	A	Baa	A	Baa	Baa	A	NA	0	-0.5	0	35%	Baa1	0
DBCT Finance Property Ltd	Baa2	-	A	A	A	Baa	Aa	A	Ba	0	-0.5	-0.25	35%	Baa1	+1
Maryland Econ. Dev. Corp (Ports America Chesapeake Inc.)	Baa3	-	Baa	Ba	Baa	Baa	Ba	A	NA	0.5	0	0	35%	Baa3	0
Panama Canal Railway Company	Ba2	-	Ba	B	Baa	Baa	B	Ba	NA	0.5	-0.5	0	35%	Ba3	-1
Energy Related															
Inter Pipeline (Corridor) Inc.	A3		A	A	A	A	A	Aa	NA	-0.25	-0.5	0	35%	A2	+1
Nakilat Inc.	7 (A3)	-	A	Aa	Baa	Baa	A	Aa	NA	0	0	0	35%	A2	+1
Ras Laffan Liquefied Natural Gas Company Ltd	5-7		A	Baa	Baa	Baa	Aaa	Aa	NA	0	-1	0	35%	Baa1	NA
Dolphin Energy Limited	8 (Baa1)	-	Aaa	Baa	Baa	Baa	A	Aaa	NA	-0.5	-0.25	0	35%	Baa1	0
Ras Laffan Liquefied Natural Gas Co Ltd. (II)	8-10		A	Baa	Ba	Baa	Aaa	Aa	NA	0	-1	0	35%	Baa3	NA
Ras Laffan Liquefied Natural Gas Co Ltd. (3)	8-10		A	Baa	Ba	Baa	Aaa	Aa	NA	0	-1	0	35%	Baa3	NA
Tengizchevroil Finance Company s.ar.l.	Baa3		A	Ba	Baa	B	Aa	A	NA	0	0	0	35%	Baa3	0
Lancer Finance Company (SPV) Limited	Baa3		Baa	Baa	A	Baa	B	Baa	NA	0.25	0	0	35%	Baa3	0
Odebrecht Drilling Norbe VIII/IX Ltd	Baa3		Baa	Baa	Baa	Baa	B	Baa	Ba	0.75	0	-0.75	35%	Baa3	0
Delek & Avner- Yam Tethys Ltd	Baa3		A	Ba	A	Baa	Aa	A	NA	0	-1	0	35%	Baa3	0
Sabine Pass LNG, L.P.	B3		B	Baa	Baa	Ba	Caa	A	Caa	0	-0.5	-1	35%	B2	+1

	Senior Debt Rating (BCA if applicable)	Junior Holdco Rating	Methodology Model Scoring												Difference w. Actual Senior or BCA Rating
							Financial Metrics								
			Factor 1	Factor 2a	Factor 2b	Factor 3	AADSCR	Break Even	FFO/Debt	Liquidity	PF Structure	Refinancing	LGD	Final Scoring	
Industrial															
Wyuna Water Pty Limited	A3	-	Aa	Aa	Aa	Baa	Ba	Ba	NA	0	0	0	35%	Baa2	-2
Basslink Finance Trust	Baa2	-	A	A	Aa	Baa	A	A	Caa	0	0	-0.5	35%	Ba1	-2
Philadelphia Project Finance, LLC	Baa3	-	A	Baa	Ba	Baa	Ba	A	NA	1	-1	0	35%	Baa3	0
DTE Energy Center, LLC	Ba3	-	Caa	Aa	Aa	Baa	B	Aa	NA	0	0	0	35%	Ba3	0
Fertinitro Finance Inc	Caa2	-	Ba	Ba	B	B	Caa	Caa	NA	-0.5	0	0	65%	Caa2	0

Moody's Related Research

Default and Recovery Rates in Project Finance:

» Default and Recovery rates for Project Finance Debts, 1992-2008, November 2009 (120845)

» Default and Recovery Rates for Project Finance Bank Loans, 1983-2008, October 2010 (123903)

Project Finance Methodologies and Industry Methodologies Covering Project Finance structures:

» Power Generation Projects, December 2008 (112366)

» Construction Risk in Privately-Financed Public Infrastructure (PFI/PPP/P3) Projects, December 2007 (106407)

» Operating Risk in Privately-Financed Public Infrastructure (PFI/PPP/P3) Projects, December 2007 (106479)

» Methodology Update Report: Public Sector Capital Contributions to Funding PFI/PPP/P3 Projects, November 2009 (121178)

» Operational Airports outside of the United States, May 2008 (108552)

» Operational Toll Roads, December 2006 (101003)

» Natural Gas Pipeline, December 2009 (121678)

» Global Regulated Water Utilities, December 2009 (121311)

» Regulated Electric and Gas Networks, August 2009 (118786)

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The credit ratings assigned in this sector are primarily determined by this credit rating methodology. Certain broad methodological considerations (described in one or more secondary or cross-sector credit rating methodologies) may also be relevant to the determination of credit ratings of issuers and instruments in this sector. Potentially related secondary and cross-sector credit rating methodologies can be found here.

For data summarizing the historical robustness and predictive power of credit ratings assigned using this credit rating methodology, see link.

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