Rating Criteria for Infrastructure and Project Finance

Master Criteria

Inside this report

Scope

Project and Infrastructure Debt Ratings: India Ratings and Research (Ind-Ra) uses the Master Criteria for rating those debt instruments where the repayment depends upon cash flows from project construction, ownership and/or operations of an infrastructure facility or infrastructure-related business or a standalone project, including those with multiple assets in different locations and/or holding companies including infrastructure investment trusts (InVITs) where significant debt/cash flows are ascribed to infrastructure projects. Issuers may be special purpose vehicles, corporate or public finance utilities.

The criterion is applicable in particular to transportation infrastructure – including roads, airports, seaports, container terminals and rail infra, energy infrastructure - power generation, distribution and transmission, storage (energy, data, goods), biomass to energy, gas pipelines, social infrastructure such as sewage water treatment, electric bus concessions, public-private partnerships, sports transactions, whole business securitisations, oil and gas, industrial, mining, as well as project finance debt, and also to sectors exhibiting comparable infrastructure characteristics on a case-by-case basis. The criteria would also be applicable to the complementing facilities of various infrastructure projects. Generally, the borrower or its affiliate (issuer) will directly or indirectly own one or more infrastructure assets that would constitute a largely stable portfolio financed by the rated debt. This criterion is also applicable for rating the debt financed for several infrastructure projects having a separate payment mechanism for each project, but all housed under one entity.

Newer Financing Vehicles

The criteria also include a group of special purpose vehicles or assets accessing debt that would be serviced out of the pooled cash flows of one, a few or all the constituent entities, thus making one entity an obligor or a co-obligor to another. Therefore, all the entities/projects in such a structure will be obligors to the entire debt, at varying levels as delineated in financing documents. This includes rating of an InVIT or an obligor-co-obligor structure.

Instrument Ratings: Ind-Ra assigns infrastructure and project finance ratings under the criteria to individual debt instruments and therefore they are issue ratings. This criteria report also covers assignment of issuer ratings to project finance companies. In both the cases, the ratings do not incorporate recovery prospects given a default.

The criteria would also be applicable for assigning ratings under a new rating scale based on the 'Expected Loss' (EL) framework. While conventional ratings are based on the 'probability of default' model, the EL model captures the expected loss for a debt after factoring in the probable ultimate loss that could be incurred, should a default continue to impact the project or a company. EL ratings are either asset specific or entity specific, should a pool of assets be housed under one entity. EL ratings are applicable to any infrastructure sub-sector at any stage of the project throughout the lifecycle of the project.

Key Rating Drivers

The relative influence on a rating of qualitative and quantitative factors varies among entities in a sector, as well as over time. As a general guideline, where one factor is significantly weaker than others, this weakest element tends to attract a greater significance (not a quantitative weightage) in the analysis.

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Completion Risk: Where material to the rating, Ind-Ra evaluates risks that may cause the project not to be completed on time, on budget, and/or up to the performance standards assumed for the operating period credit profile. Ind-Ra considers the following factors: the contractors, cost structure, delay risk, technology risk, internal and external liquidity support or credit enhancement and other terms of the construction phase contracts.

Operation, Revenue and Infrastructure Renewal Risks: Ind-Ra's analysis addresses the issuer's ability to generate a stable cash flow based on its legal framework and fundamental economics. The agency will evaluate the operating, cost, demand, revenue and infrastructure renewal risks that affect the ability to make debt service payments.

Debt Structure: Structures may include holding company and operating company debt or senior and subordinate instruments. Financial analysis considers each of the issuer's rated debt instruments individually, unless governed under the financing documents like in case of obligor-co-obligor or INVIT structures, considering the debt structure, including priorities, amortisation, maturity, interest risk and associated hedging, liquidity, reserves, financial covenants, and triggers in the context of the project's operating environment. Security package and creditors' rights are also analysed where applicable.

Financial Profile: Ind-Ra's financial analysis assesses financial flexibility against the stresses expected to occur over the forecast period. Metrics are used to evaluate the issuer's liquidity profile, coverages and leverage. Counterparty risk (off-takers, concession grantors, warranty providers, etc.) is assessed for each risk factor to which it relates for its impact on the rated debt.

Structure and Information: Any risk or risk mitigation flowing from the quality and experience of sponsors, strength of legal structure and/or the quality of information is considered.

Framework

This master criteria report is used by Ind-Ra in conjunction with any relevant sector-specific criteria. Sector-specific criteria may provide indicative metrics and stress levels, additional factors, attribute expectations or specific methodologies. The rating of attributes in this report represents Ind-Ra's analytical views for a wide range of projects and facilities. Where Ind-Ra has not developed specific-sector criteria, the master criteria may solely be used. The lists are not exhaustive and some attributes may simply not be relevant to a specific project. The attribute tables are not checklists but qualitative guidance in assessing the attributes of a project and are only part of the rating process.

Not all rating factors in these criteria may apply to each individual rating or rating action. Each specific rating action commentary or rating report will discuss the factors most relevant to the individual rating action.

The Master Criteria and related sector criteria can also be used in combination with other Ind-Ra's rating criteria, as appropriate, when assigning issue or issuer ratings to entities that operate infrastructure assets or have businesses that have comparable infrastructure characteristics. Such entities may have been financed using a project finance framework or otherwise. Ind-Ra may assign short-term ratings to infrastructure and project finance issuers.

Use of Risk Factor Attributes to Determine Stress Levels

Most risk factors analysed in the master criteria or the sector-specific criteria will determine the types and levels of stresses that Ind-Ra will include, notably through the assumptions underlying the rating case. A weaker attribute would directly translate into a more severe assumption.

Ind-Ra assesses the risk factor attributes on a three-level scale of

A. Stronger
B. Mid-range
C. Weaker

Applicable Criteria

Rating Criteria For Availability-Based Projects

Evaluate Cash Flow Stability

Ind-Ra's analysis addresses the project's ability to generate stable cash flow to make debt service payments. This requires an evaluation of the fundamental characteristics of the underlying asset, considering its legal framework and fundamental economics, together with any industry specific, political or macroeconomic risks.

Evaluate Financial Structure

The agency considers the financial structure to form an opinion on the capacity of those cash flows to service the rated debt instruments in accordance with their terms. The financial analysis evaluates the debt structure, including priorities, amortization, maturity, interest risk and associated hedging, liquidity, reserves, financial covenants, and triggers in the context of the project's operating environment.

Evaluate Stress Scenarios

Stress scenarios are developed to test the cash flow sensitivity in a range of possible outcomes for key rating drivers. Ultimately, rating cases are established to assess the level of financial flexibility a project can sustain as it encounters stress that can be reasonably expected to occur over the relevant forecast period. The ability of the rated entity to make timely payments takes into account its full resources and capacity as captured in metrics measuring its liquidity profile, such as a debt service coverage ratio, as well as metrics measuring its overall financial and operational flexibility, such as a project life coverage ratio or other measures of overall leverage. Important characteristics and metrics of the project financial profile are compared, where possible, with peer transactions to ensure consistency across transactions.

Typical Attributes and Peer Comparison

Investment-grade ratings are typically associated with projects, structures, and instruments displaying predominantly stronger or midrange attributes described in this report combined with metrics consistent with ratings at that level. (However this doesn't prohibit assigning investment grade ratings where certain attributes are weaker). Where information on appropriate peer projects for which a rating has been assigned is available to Ind-Ra (usually for the same sector, and structure), this will be used for comparative analysis of individual risk factors (both qualitative and quantitative) or in establishing the rating, with respect to the peer group. The relevant sector criteria may suggest indicative metrics for an investment-grade debt. Where no specific sector criteria apply completely, appropriate metrics will be determined on a basis that seeks consistency and comparability with assets having similar risk profiles.

Even if a project meets the financial metrics requirements for a specific rating level, other factors may constrain it to a lower rating, such as weak sponsors, excessive technical risk, weaker, unpredictable and risky counterparties or other key risk factor assessments. However, Ind-Ra does not limit the rating of a project to that of the counterparty. Conversely, factors may be present that support a higher rating, such as exceptionally strong contractual protections, a benign industry environment, or market dynamics that reduce potential price or cost volatility. Transactions otherwise meeting the indicative attributes for a specific rating level, but exhibiting financial profiles lower than indicated for that level, are assessed based on the circumstances particular to that project or facility.

Limitations

Not all rating factors in these criteria may apply to each individual rating or rating action. Each specific rating action commentary or rating report will discuss those factors most relevant to the individual rating action. Ratings consider the risks that a project or infrastructure facility are generally expected to face, including stresses to revenues due to the effects of macroeconomic cycles, reasonable short-term external shocks, certain force majeure events, operating and cost stresses, and individual project bankruptcy, although it is difficult to predict the extent of such events and the impact of those on ratings. Ratings under the Master Criteria and related sector criteria do not cover fundamental change of law or change of regulations; fundamental changes in demand due to the application of revolutionary technology or otherwise; or extreme events,

such as terrorism, the long-term effects of global warming, or the collateral consequences of extreme events. Generally these are unpredictable event risks. The ratings are dependent on contractual clauses, the breach of which may not be covered under the ratings.

The analytical process often includes reviews of third-party reports, including studies prepared to assess design, technology, and demand risks or forecast availability of important resources. Though they may form a basis for reaching reasonable conclusions about the relevant risks, such studies have inherent limitations in methodology and actual outcomes can vary significantly from forecast. The ratings do not:

- predict a specific percentage of default likelihood over any given time;
- give a view on the value or liquidity of the issuer's securities;
- give a view on the possible loss severity on an obligation should an issuer default (except in case of EL based rating);
- give a view on the suitability of an issuer as a counterparty to trade credit; and
- give a view on any quality related to an issuer's business, operational, or financial profile other than the agency's opinion on its relative vulnerability to default.

Structure and Information

Ownership and Sponsors

The quality of owners or sponsors is an important consideration when assessing the potential performance of a facility over the life of a debt. Weak sponsors may cause the rating to be lower, all other things being equal. Ind-Ra will consider the strength of sponsors when evaluating the impact of stress scenarios on a rating and the ability of an issuer to manage through these stresses. Strong sponsors have significant positive experience in Indian markets (sometimes internationally also). Ind-Ra will inquire about previous involvement with similar projects that have been developed and operated successfully and will look at the project sponsors to demonstrate financial flexibility, past experience with the technology and market.

Ind-Ra will ideally look for evidence of the sponsors' commitment to the project. Sponsors with significant resources, time, and reputation invested in the project, including higher levels of direct equity investment or guarantees combined with covenants to retain adequate capitalisation or public service focus are considered a positive factor. The strategic importance of the project to the sponsor is considered. For example, the sponsor's performance on a high-profile project may heavily influence the chances for subsequent business and their reputation in general.

The agency also considers the ownership structure and its complexity, relationships with contractors, whether there are multiple owners, the potential for change of ownership, and the flexibility to resolve issues relating to the completion or operation of the facility. The alignment of interests between owners, contractors, and lenders is reviewed for obvious conflicts in adverse circumstances and contract negotiation.

Figure 1

Ownership and Sponsors

Stronger attributes	Government commitment in national strategic projects; reputed owner/sponsor; deep experience in similar projects; history of support when the project is in need or under stress; essential public service sponsored by central government; minimum ownership and change of control covenants through debt life; long-term business model; strong financial capacity. If a financial investor has demonstrated support in the past for its group companies, that will be considered.
Midrange attributes	Experienced financial and trade owner/sponsors; midrange financial strength; ownership via intermediate holding company; active municipal or government sponsor; minimum ownership and change of control covenants in key risk phases
Weaker attributes	Three or more owner sponsors without previous successful cooperation; weak financial strength; no majority/controlling owner/sponsor; inexperienced or minor trade or financial sponsors; borrowed/leveraged equity; no contract tendering; multilayer ownership structure; non-essential public service with minority small municipal sponsor; weak or no minimum ownership and change of control covenants; speculative or 'short-term' business model.

Source: Ind-Ra

Sponsors without operational resources or capacity for technical support are unlikely to be ascribed any rating benefit. If the sponsor is not rated by Ind-Ra, based on feasibility, Ind-Ra will attempt to assess the financial strength of the sponsor or external support to meet financial obligations as part of its financial analysis. The agency will also rely on publicly available information in the sponsor assessment.

Issuer Structures

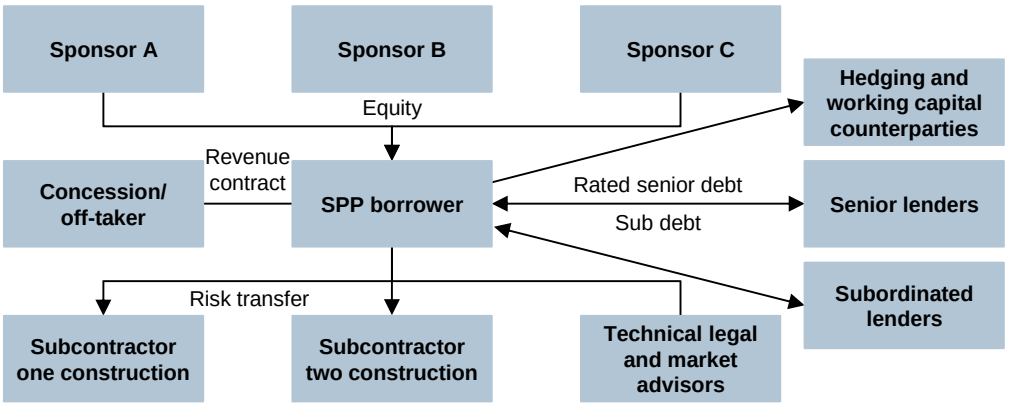
Legal forms of issuers can be varied, based upon regulatory, tax, accounting, national and local practices, as well as decisions made on limitations of activities and other considerations, as trust structures.

Ring-Fenced Structure

In some cases, the assets and operation of the facility or project can be evaluated effectively as an independent entity that is not exposed to the exogenous risk of insolvency of any owner or affiliate of the issuer. This can be accomplished with the existence of a special purpose vehicle (SPV) or equivalent means of segregation to ring fence the assets and operation of the facility and cash flows, which are the repayment source of the rated debt instruments. This is typically the case of project finance structures.

Legal structure of standalone project debt financing

Figure 2
Structure Example



Source: Ind-Ra

Ind-Ra would expect key contracts to be in the name of the project/issuer or for the sole benefit of the segregated facility. However, the operating plan of the facility is reviewed to consider what liabilities it might incur through employees, trade debt, taxation, environmental, and operational risks, and to what extent these are subcontracted or mitigated. The SPV would also be expected to have corporate or statutory objects limited to supporting the single purpose of the project and other provisions, delinking its operations and finance and financial reporting from that of any owner or sponsor or public entity. Where a public sector entity owns or controls the issuer, law governing the separate nature of the facility's operation and legal separateness should insulate the facility and its cash flows from the insolvency of the public sector entity. Where the SPV has more than one class of debt, including working capital or liquidity facilities, a comprehensive inter-creditor agreement is anticipated, possibly in association with nonrecourse language.

Corporate Structure

Ind-Ra may take a similar approach to its corporate rating criteria when evaluating corporate structures under this master criteria, while the fundamental basis to arrive at the rating will be based on the latter. Ind-Ra may also judge that consolidated financial statements are a reasonable basis for the assessment of the economic ability of a group with a corporate structure to make use of the resources available to it to service its debt and the identification of the true extent or potential extent of its liabilities. However, this would depend on a particular case and may vary depending on project, the group and the company.

Factors such as ownership structure, funding arrangements or other restrictions may however be such that the consolidated profile does not provide the most appropriate picture to assess the credit quality of the rated legal entity, typically the top parent company or one of the SPVs under an obligor-co-obligor structure, and there is consequently a need to 'redraw the boundaries', in most cases with some form of deconsolidation. The decision to deconsolidate would generally be the result of an assessment of a weak linkage between the parent and the subsidiary being considered for deconsolidation, based on the assessment of the how strategic the SPV is for the parent entity and level of restrictions in fund movements.

Where a particular business segment in any entity is not too relevant to be rated under this criteria, and where that particular segment's weightage in the consolidated financial profile of the entity is insignificant, Ind-Ra may not factor in its EBITDA contribution while considering only sustainable cash dividend distribution from it.

Ind-Ra may adjust for minority interests when an entity is consolidated (as if 100% owned), yet significant minorities exist to which dividends are required to be paid.

Even if consolidating profiles is the right basis for the assessment of credit worthiness, it does not however necessarily mean that all entities within a group will be rated at the same level.

The degree of subordination, either due to the characteristics of debt instruments or the location of the debt in the group structure, or the ability to access cash flow within the group structure of an issuing entity can impact the issuer rating. For example, a rated entity may be more of a holding company (holdco) in receipt of contingent dividend income streams rather than a parent with direct access to all the consolidated profit streams. Similarly, prior-ranking funding at lower risk subsidiaries may result in the parent only having direct access to riskier activities rather than to the whole group, as portrayed in the consolidated accounts.

If the borrowing at the holding company level and the debt will have to be serviced out of the residual cash flows of the constituent SPVs, Ind-Ra will assess individual constituent assets/SPVs and adhere to the cash flow waterfall mechanism committed to the lenders at the individual asset level. It also will provide for taxes payable by the SPVs and consolidate only the residual cash flows (eligible for upstreaming) at the holdco level. Even if there is no single holding entity (e.g. obligor-co-obligor structure), provided the financing agreements enable cashflow pooling, such a consolidation will happen at the obligors level to assess the debt payment capacity.

This framework applies where infrastructure/project assets are controlled by one holdco in the following ways:

- A single ring-fenced opco, owning one or several infrastructure assets
- Several ring-fenced opcos – as long as they have similar debt terms and belong to the ring-fenced infrastructure assets/SPVs category

However, where the holdcos have activities other than sponsoring/managing these SPVs, or unrelated to infrastructure business or where there are complex and multilevel SPV structures with a wide number of SPVs making the consolidation difficult, Ind-Ra may use a combination of this criterion and the Corporate Criteria for rating such structures.

Also, where there is an expectation of material assets disposals and additions, Ind-Ra would, on a case-to-case basis, apply this framework and/or the Corporate Criteria depending upon the frequency of such disposals or additions.

Counterparty Risk

Risk transfer to counterparties is a central theme for many project and infrastructure finance transactions. The value of a risk transfer to the rating will depend on the counterparty's financial capacity to absorb that risk.

In India, most sub-national counterparties are generally weak and many a time their ability to honour contractual covenants for payments for the power purchased is also weak. Ind-Ra has not observed any write-off in receivables from state-owned counterparties which are active and serve the public interest (such as discoms, road development or transport corporations, etc). Based on this, Ind-Ra assesses counterparty risk in terms of liquidity risk that can affect the debt service in case of delays in payments. While it is difficult to predict the time at which the counterparties would make revenue payments to the issuer (although contractually the period within which the payment will have to be made is lower), Ind-Ra considers the historical data of receipts, the ability of the sponsors to provide temporary support to the project, the liquidity of the project including earmarked reserves while arriving at the rating.

As a general rule, Ind-Ra does not necessarily constrain the rating of the project to the rating of counterparty, although stress analysis is performed rigorously to arrive at the rating. This is because Ind-Ra considers the counterparty's contractual obligation for their payments to be superior to their debt service and their assumed bankruptcy remoteness. However, it is difficult to judge the predictability of counterparties in India especially when they adopt different payment principles for purchasing an infrastructure output (e.g. energy – thermal, renewables, electric bus concessions, etc).

If a guarantor acts as a substitute for the credit quality of an issuer, Ind-Ra may equalise the rating of the issuer to that of the guarantor, in case of a pre-default, irrevocable and unconditional guarantee. Ind-Ra may analyse summarily the underlying quantitative and qualitative attributes of the guarantor. Ind-Ra would analyse the terms of the guarantee or support undertakings before equalising and if the support from financing documents preclude equalising, Ind-Ra will apply the notch-up framework or relevant criteria to arrive at the support derived from guarantees or undertakings.

Main terms of guarantee	**Impact on Rating**
Irrevocable and unconditional	Very Strong
Falling off guarantee on an event	Weak to Mid-Range
Pre-default guarantee	Very Strong
Post default guarantee	Weak

Rating dependencies where any change in counterparty rating may affect the project finance rating will be highlighted and any rating linkage where the transaction rating will move with the counterparty rating will be made explicit. An internal credit view will be attempted where no rating is published by Ind-Ra, based on the available information, provided the issuer agrees to provide information on the counterparty on a sustained basis or is available from public sources. Structural features to mitigate deteriorating counterparty risk such as rating triggers or financial ratio tests are examined.

There may be situations when Ind-Ra's assessment of the credit quality of the payment obligation is not constrained by the payment counterparty's credit quality, because the payment risk ultimately lies with a broader sector or a group of end-users. In such cases, Ind-Ra will explain its assessment in the rationale.

Ind-Ra believes that there are strong incentives for large funders (lenders, financial investors etc) of the project to cover any funding gap if the minority funder cannot honour its commitment and the project is otherwise proceeding to completion, as this is the best way to mitigate potential loss. The project company may be exposed to increased cost of funds in that scenario and this can be appropriately evaluated as an alternative stress in the financial analysis.

Figure 3

Project Vehicle Status and Project Structure

Stronger attributes	Borrower/issuer secured loan structure; bankruptcy-remote issuer; comprehensive inter-creditor arrangements at borrower level and consolidated obligor group level; de-linked from parent or group; clear single-purpose objects; limited or no operational activities; non-recourse/non-petition debt; legal opinions confirm separateness/non-consolidation.
Midrange attributes	Rated debt at project level but to single purpose project (SPP); comprehensive restrictive covenants; inter-creditor agreement; financially and operationally de-linked from parent; contracts in the name of the SPV; separate financial statements; some structural complexity, e.g. intermediate holding/joint venture; legal opinions confirm separateness/non consolidation.
Weaker attributes	Weak restrictive covenants and inter-creditor arrangements; rated debt at project level and borrower is not an effective SPP; financial and operational links to parent; project vehicle is not primary contracting party; complex borrowing structure; complex structure, e.g. intermediate holding companies.

Source: Ind-Ra

Legal and Regulatory

Unless otherwise stated in its issue report, where the project requires that the contracting parties hold licenses, permits or regulated status, Ind-Ra will seek confirmation that all the above requirements are met and are valid under all relevant laws. The agency assumes that the basic legal approvals and permits have been obtained by the issuer to conduct such a commercial activity or the business for the transaction that is being rated. The agency will also analyse the risk of loss of or renewal of such licenses, permits, or regulated status within the particular jurisdiction.

Other matters, such as independence of an SPV issuer, collateral rights, or statutory ownership restrictions, will be reviewed on a project by project basis. Ind-Ra will rely in its credit analysis on legal opinions or legal memorandums to the extent that they are provided to it by transaction counsel, legal precedent that the agency is aware of, and/or statements by regulators or governments or government-owned entities.

Figure 4

Legal and Regulatory

Stronger attributes	Structure based on standard contracts or specific legislation supported by legal opinions; allocation of project and financial risk unambiguously evidenced by contracts; all relevant licenses, permits, or regulated status have been obtained and are valid to debt maturity; low structural complexity; legal framework includes financial rebalancing mechanisms in case of unforeseen events; strong track record of quick and fair resolution of litigation.
Midrange attributes	Legal opinions or strong precedent for key contracts; all relevant licenses, permits or regulated status have been obtained and are valid and are likely to be retained and remain valid; allocation of project and financial risk clear but may have performance conditions.
Weaker attributes	Project contracts, regulatory or statutory framework is dependent upon untested legislation or regulation; weak or no legal opinions with limited precedents of such legal opinions for similar contracts; contracts not available for inspection; all relevant licenses, permits, or regulated status have not yet been fully obtained.

Source: Ind-Ra

Use of Expert Reports

The information provided to Ind-Ra may contain reports, forecasts, or opinions provided to the issuer or their agents by various experts. These include legal advisors, third-party engineers, traffic, market, fuel/resource or environmental consultants, insurance advisors, and others. Sector criteria will describe the reports, forecasts, or opinions that are most relevant to risk analysis in the related sector. Where these reports contain matters of fact, Ind-Ra will question the source and reliability. Where the information is a forecast or opinion, Ind-Ra expects these to be based on well-reasoned analysis supported by the facts. Ind-Ra will question the source and reliability of the facts presented in these reports and to an extent, will question the reasoning and facts supporting forecasts and opinions.

The status of the expert and the materiality of their forecast or opinion will also be considered in determining what weight may be given to their forecasts and opinions. Factors such as experience in the jurisdiction, location, or terrain, experience with the technology or transaction type, and formal qualification or licensing are often relevant. When forming its rating opinion, Ind-Ra may place less weight on expert reports that lack clarity or contain extensive caveats or where conducted under less relevant circumstances or where not conducted according to professional standards. Such features may lead to adjustments in Ind-Ra's financial or operational analysis.

The degree to which Ind-Ra uses expert information will depend partly upon the above issues and on the relevance of the information to the identified key risks. Where available, if expert information does not address a material issue, but might be expected to, Ind-Ra may make a further information request or an appropriate assumption. Where the agency determines that the reports are not sufficiently supported, complete or reliable, Ind-Ra may choose not to provide a rating based on the expert reports.

Figure 5
Expert Reports

Stronger attributes	Major, specialized third-party advisor; specific experience with technology or sector, and location; projections and estimates based on tested or proven operation or precedent; no material unsupported assumptions; report demonstrates analytical rigor.
Midrange attributes	Third-party major advisor experienced with similar technology or sector; advisor may not have experience of location; advisor may be regional specialist familiar with the technology; estimates based on short operating history and/or rich industry data; some dependence on reasonable assumptions; formally qualified or licensed where required.
Weaker attributes	Smaller or less experienced advisor; innovative technology or new sector; estimate data sourced from manufacturer or highly model dependent; high dependence on assumptions or sponsor estimates; report contains incomplete or limited reasoned analysis.

Source: Ind-Ra

Data Sources

Ind-Ra's analysis and rating decisions are based on the relevant information available. The sources are the issuer, the arranger, the lenders/investors, the third-party engineers or consultants, and the public domain. This includes publicly available information on the issuer, such as audited and unaudited financial statements and regulatory filings. The rating process can incorporate information provided by other third party sources. If this information is material to the rating, a rating action will be taken based on that information.

Information Quality

The quality of information received by Ind-Ra, both quantitative and qualitative, can be a constraining factor for ratings. Information quality may constrain the rating or in extreme cases preclude the assignment of a rating. Information quality for the initial rating and for surveillance purposes is considered when a project finance rating is first assigned. Ind-Ra must be confident that adequate ongoing data will be available to monitor and maintain a rating once assigned. Information quality encompasses such factors as timeliness and frequency, reliability, level of detail, and scope.

Figure 6
Information Quality

Neutral to the rating	Data from actual operation; regular updates; high frequency data; independently validated; forecast supported by significance or error range statistic; no history of material data errors; detailed cash flows – receipts and disbursements; audited financial data; significant amount of public information available.
Wider stresses in rating case	Substantially based on assumptions; extrapolated; subject to material caveats; data often subject to delay; history of revisions or errors; limited scope.

Source: Ind-Ra

Completion Risk

Ind-Ra routinely rates greenfield project debt before the projects are fully developed. Additionally, enterprises operating large infrastructure assets, such as airports, toll networks or LNG projects, engage in large capital projects as part of ongoing infrastructure renewal and extension even while continuing operations. Completion risk covers the risks in the construction, commissioning, and ramp-up (period required to reach long-term average production, availability, or usage) phases of a project that may cause the project not to be completed on time, on budget, and/or up to the performance standards assumed for the operating period credit profile. The likelihood of these events occurring and their potential consequences are assessed.

In reviewing these risks, the agency considers the following factors: the contractors, cost structure, delay risk, technology risk, and other terms of the construction phase contracts. Importantly, many of these risks can be partially offset if the project has components that generate sufficient cash flow to deal with such risks.

Contractors

The experience and credit quality of the main contractors in the construction is reviewed. A record of completing projects on time, on budget, and up to required standards helps mitigate risk. Multinational scale operating capacity (for large projects), previous experience with the technology and type of project are considered stronger attributes.

Contractors with a history of stable labour relations able to draw on a strong base of skilled and unskilled labour, local or expatriate, are considered stronger. The contractor's relationship with other transaction parties is reviewed for potential conflicts or incentives.

The availability of suitable replacement contractors and contractual provisions to effect a replacement are considered. Where relevant to the rating, the financial health of the contractors is broadly reviewed; although an intense analysis is not practical. This is done to assess whether construction contractors have the necessary resources to overcome cost overruns, delays, and performance challenges and bring the project into operation and meet all financial obligations to the project, such as payment of performance or delay liquidated damages – depending upon the nature of the contract with the project entity. If the sponsor itself is the contractor, the agency believes that there is a greater interest and therefore the sponsor-cum-contractor will be committed to the project.

Where required to support the rating, a performance bond will be sized as a percentage of the fixed-price contract. The adequacy of the performance bond coverage will typically be reviewed by the third-party engineer and confirmed to be sufficient to cover additional costs and works that may be expected to result from a failure of the contractor at a critical stage in the works.

Figure 7

Contractor

Stronger attributes	International engineering, procurement, and construction (EPC) contractor; direct experience of similar projects; involvement of major local contractor; midrange to strong financial strength; substantial performance bonding; comprehensive performance guarantees; renegotiation period adequate to replace contractor; facility management team with a history of delivering projects on time.
Midrange attributes	Experienced contractor; part of larger group, midrange financial strength; performance bonding commensurate with the rating; involvement of local contractors; material performance guarantees; facility management team has adequate project management record but has experienced some cost or timing issues.
Weaker attributes	Smaller or less experienced contractor; multiple subcontractors; weak financial strength; no external financial support; inexperienced facility operator; weak contractual framework.

Source: Ind-Ra

Cost Structure

The risk that the construction costs will be greater than budgeted and the effect this could have on the ability of the SPP to make debt service payments are reviewed. The agency expects risks within a project to be allocated to the parties best able to control them.

Contractors are typically best able to manage direct construction costs, therefore fixed-price turnkey contracts provide significant motivation for the contractors to be on or under budget. However, this benefit of fixed-price turnkey contracts depends on the strengths of the contractors and their willingness to deliver on their obligations. The construction budget is also reviewed. Even with fixed-price turnkey contracts, it is important that the budgeted cost of the project is reasonable and achievable.

To determine the reasonableness of the budget, the cost of the project is compared with similar projects when possible, as well as available information on other contractors' pricing for the same project. Unique features of the project, such as difficult terrain, are considered in this analysis.

The adequacy of budgeted contingencies for which there is committed funding is also reviewed. Such contingency funds are available to address unexpected events or potentially provide credit or liquidity support if contractor replacement occurs. Given the technical and specific nature of all the points mentioned above, Ind-Ra prefers that a third-party engineer or technical adviser has reviewed the status of designs and specifications and noted the additional risks associated with that level of design. The report will also review the sources and uses of funds, and the cost budget, and provide conclusions as to its reasonableness and achievability.

Operators of large existing infrastructure facilities, such as airports, seaports, and toll networks, tend to use turnkey fixed-price contracts less frequently, preferring to manage timing, completion, and cost risks themselves. In these cases, Ind-Ra will review the capital improvement and construction planning with management to assess the risk that cost overruns and delay may pose to the credit profile of the facility debt. The project's ability to continue to earn revenue and its ability to absorb costs over budget and costs resulting from delayed completion will be a focal point.

Figure 8

Cost Structure

Stronger attributes	Fixed-price contract; cost risk appropriately allocated; cost risk hedged without material basis risk; substantial contingencies in cost budget; committed funding incorporates contingencies; cost estimates based on detailed upfront designs; well-conceived project management approach at existing facility substantially mitigating cost and delay risks.
Midrange attributes	Fixed-price contracts with more than one main contractor (e.g., a manufacturer and balance of plant contractor); design detail not fully developed, though risk is transferred under the fixed-price contract; adequate contingencies in cost budget; committed funding incorporates contingencies; adequate project management approach at existing facility limiting the potential effects of costs and delay risk.
Weaker attributes	Target price or similar contract leaving project vehicle materially exposed to cost risk; facilities management experience is limited relative to scope of project and weak contractual mitigating factors; no or adverse history of project management approach at existing facility.

Source: Ind-Ra

Delay Risk

Ind-Ra reviews factors that could delay scheduled completion of the project, the length of the projected construction period, the availability of building materials and supplies, the terrain over which the project is being constructed, the risk of not receiving permits as and when required, the exposure to labour problems, connecting infrastructure, dispute resolution, and political risks.

Delay risk will vary with the stage of the project and the length of the projected construction period. Longer construction periods are generally considered more risky and key agreements typically provide for a larger cushion between expected completion and the long-stop or mandatory completion date. Significant construction already completed can act as a mitigating factor.

Projects may be delayed because of the inability to receive materials and supplies on time, particularly when they have to be imported. An assessment of this risk includes the capacity of the suppliers, transport infrastructure, terrain, and climate. Difficult terrain and unpredictable climate may also increase delay risk on actual construction absent adequate contingencies. Political instability can affect project schedules through issues such as physical security and receipt of permits.

The potential for schedule delays due to problems with supply and reliability of labour are considered. Dependence upon foreign workers, prevalence of disputes, and the working environment can be factors here. Ind-Ra will consider the capacity of the project schedule to accommodate reasonably foreseeable delays and the issuer's right to obtain compensation from responsible parties.

The agency typically reviews the analysis and conclusions of the third-party engineer when assessing delay risks. The third-party engineer typically has reviewed the construction schedule and commented on its attainability, considering both the scheduled completion date and the final or longstop completion date.

Contracts will typically include payment of liquidated damages to cover costs incurred by the issuer arising from a delay. These costs may include additional interest, lost revenues, and financial penalties, if any, that the issuer may owe to an off taker. Third-party support may be required to support the financial obligations of a contractor, parent guarantor, or sponsors to pay such damages at a level commensurate with the rating of the project debt.

The form of third-party supports will be considered. On demand guarantees, including letters of credit and, in some jurisdictions, performance bonds will be considered as liquidity sources in addition to budgeted contingencies and retainage. Support that does not provide by its terms for on demand payment, or that is typically not paid on demand under standard market terms, will not be considered to be available as liquidity to cover delay risks. Financial mitigating factors for delay risk (such as liquidity and reserves) are discussed in the Debt Structure section.

Figure 9
Delay Risk

Stronger attributes	Extensive completion guarantees and liquidated damage provisions; step-in rights; all permits, etc., in place; "long stop" adequate to replace contractor; generous project schedule; contingencies for unexpected delays; little ground for public opposition; major parties have history of on-time completion.
Midrange attributes	Adequate completion guarantees and liquidated damage provisions; material permits granted – some minor conditions may exist but their costs have been properly accounted for; reasonable project schedule.
Weaker attributes	Weak completion guarantees and liquidated damage provisions; clear potential for delay; permits outstanding; dependence on political will; ambitious project schedule; key party has history of delays.

Source: Ind-Ra

With respect to projects undertaken by operators of existing facilities, Ind-Ra will review the management's overall approach to completion risk, including delay risk, within the context of its available resources.

Contract Terms

As well as the aspects of the contracts discussed above, where available Ind-Ra reviews material construction phase contracts for factors that may affect the service of rated debt. The agency's expectation is for contracts that are standard for the practice in that sector, reflecting the particular risks of that sector and the stated aims and scope of the project. Specific sector issues are discussed in sector-specific criteria reports or in issue reports. Some generic factors are discussed below. The agency may not have access to certain contracts or may rely on summary information or responses to questions from issuers and their third-party advisors. Issues raised in this section that extend to the operating phase will also be considered in that context.

Where a contract transfers risk away from the issuer to another party, the rating will only benefit when that party has capacity to absorb the risk at a level commensurate with the rating of the debt.

Operators of existing infrastructure facilities will incorporate such protections as prudent in the context of their overall operation, financial resources, cost recovery framework, and management capabilities when undertaking renewal and expansion projects.

A typical, best practices construction contract suite for a standalone project financing includes most of the following elements.

Contractual Risk Allocations

Retentions, penalty payments, long-stop dates, and liquidated damages if the project is not completed on time, on budget, or to the required performance standards, would usually be a feature considered favourably.

Penalty clauses will be reviewed to assess the extent to which they ensure that any such costs or payments incurred by the issuer under the project agreements are passed on to the responsible party. Penalty payments are analysed to determine whether they compensate for lost revenue or increased costs sufficient to maintain debt service under stress scenarios commensurate with the rating. Ind-Ra may assume delays in receipt and less than full payment in its analysis, subject to assessment of the terms of any on-demand payment facilities. Penalty payments subject to complex conditions or deferred payment are unlikely to benefit a rating.

Long-stop dates permitting delay mitigation, typically in the range of six to 24 months after scheduled completion, would be expected.

Construction and similar contracts often will include caps on the liability the contractor may incur for failing to complete, or for not completing per specifications, including performance specifications. Ind-Ra would expect the third-party engineer to comment on the reasonableness of the caps in light of the risks involved in the construction process and the potential costs that could be incurred by the project to rectify deficiencies or replace the contractor. Caps typically do not apply in the case of abandonment, wilful neglect, or negligence in a material degree. Unless otherwise mitigated, caps that apply more broadly than customary would be considered a weakness.

Retainage is a contractual feature that defers full payment to the contractor for work progress until final project completion. It provides a source for recovery of losses upon replacement of the contractor as well as some liquidity for payment of delay costs by the contractor. Retainage varies by sector but is typically not more than 10% of works completed and may be much less on simpler construction or for financially stronger contractors.

The contract framework will be reviewed to assess the degree to which it provides a clear procedure to determine how additional costs incurred for modified or further works will be recovered by the issuer.

Disputes

Dispute resolution mechanisms in contracts, regulatory approvals or statutes are evaluated to ascertain the extent to which they provide a reliable forum and a clear mechanism should a dispute arise. This will be met if dispute resolution is to be governed by well-recognised standards acceptable to the Indian conditions. Of particular concern is the potential impact on the cash flows of a dispute that is not resolved quickly, resulting in delays and cost overruns. The documentation typically provides protection against subcontractor disputes and claims either through a requirement of delivery of subcontractor lien waivers or payment bonds provided by a bank or insurance company. The financial strength of the contractor can vary the requirement for such additional protections if it is commensurate with the rating of the debt.

Insurance and Force Majeure

A typical construction package will require that the contractor have insurance in place (benefitting the issuer and its lenders) to cover a range of insurable project risks, ideally consistent with the report of an independent insurance advisor; liability, casualty, and business continuity insurance are typically included and cover hurricane, flood, or seismic risk where appropriate. The expectation is that casualty insurance will be a 'total loss', which is maintained on a continuing basis. The involvement of the insurer's engineers helps determine appropriate cover and potentially speeds up claims. In some cases, insurance proceeds may have no impact on default ratings but only influence recovery prospects. The rights to insurance proceeds and the party responsible for insuring would normally be established.

Force majeure risks or "acts of nature" that are uninsurable in the market and outside the control of the project parties will be evaluated to assess relevance to the rating. Operators of an existing infrastructure asset may have self-insurance to some degree, or other mitigating factors to risks that cannot be fully insured. The approach to mitigation of event risk will be considered in context.

A force majeure clause typically relieves or suspends the obligation of a party when they are unable to perform the obligation due to a force majeure event. It is important that the "force majeure" clauses excusing a party's performance are aligned in the documentation so that the SPV has an equal protection on its own performance. To the extent force majeure clauses deviate from industry standards, Ind-Ra considers whether its analysis should incorporate additional risk factors.

Construction Quality Assessment

Typical documentation includes a regime for onsite inspection ensuring that construction and major maintenance are well-managed, and independently monitored. Cost, quality, and time schedule targets are required by the documentation to be reported, enabling the risks to be tracked. Ind-Ra expects to receive copies of such reports on a periodic basis. However, other mechanisms, perhaps involving external financial support, and associated counterparty risk may provide a similar level of reassurance. Equally, overcomplicated or rigid mechanisms may have unintended adverse effects.

Related Infrastructure

Connecting infrastructure is expected to be contracted such that delay, cost, or performance risks to the project are minimised. Connecting infrastructure may be built by the project or by third parties or provided by connection to existing networks. Where non-availability is a risk to project cash flows, Ind-Ra will consider key connecting infrastructure using the same factors and approach as for the main project. The agency expects that the contracts for the connecting infrastructure are generally well-aligned with the main project.

Figure 10
Contract Terms

Stronger attributes	Comprehensive, best practice contract suite; extensive completion guarantees and liquidated damage provisions; clear, binding and standard dispute resolution process; insurance consistent with independent report; regular onsite inspection and detailed reporting; no connecting infrastructure risk.
Midrange attributes	Clear and comprehensive contracts to industry standards; adequate completion guarantees and liquidated damage provisions; dispute resolution process in place; industry standard insurance package; connecting infrastructure contracted; onsite inspection and exception reporting.
Weaker attributes	Complex or incomplete contract suite; multiple subcontractors without liability of the EPC provider; weak completion guarantees and liquidated damage provisions; high penalties for the SPV; no dispute resolution process; self-insured or underinsured risks; reliance on local or minor insurers; connecting infrastructure not contracted; no provision for onsite inspection and reporting.

Source: Ind-Ra

Technology Risk

Technology risk in the construction phase may contribute to delays or lower performance leading to lower operational cash flows, higher maintenance costs, or more frequent life-cycle capital expenditure. The completion risk for projects that make use of conventional proven technology is considered lower, particularly if proven in similar terrain, climate, and scale. Technical complexity is considered a risk factor, including connecting infrastructure, whether proven or not.

Where technical performance relies on assumptions or manufacturers' claims, Ind-Ra typically places more reliance on the opinions of the third-party engineer. Manufacturer involvement, either operationally or through warranties, can be a positive, particularly if supported by appropriate financial capacity and a past track record in providing similar technology.

Contractors' experience and ability to source skilled labour (discussed above) may be more important where technology risk is higher. Where contractors provide warranties for the performance of the project, the most value is derived where the length of the warranty period is commensurate with the technical risks and the warranty period begins after the project has met satisfactory completion testing.

The transaction documentation may include an obligation of a contractor or a manufacturer to pay performance liquidated damages in the event that the project or a component does not perform at a level sufficient to generate anticipated revenues. Payments of such liquidated damages may be considered in the financial analysis to the extent that the obligor or a third-party guarantor has financial strength commensurate with the rating of the debt. The SPV will typically benefit from contractual and statutory protection against latent defects in construction works. The third-party engineer's report may note the period over which defects might emerge. Retainage, budgeted contingencies, or performance bonding may provide support on warranty and latent defects obligations.

Prior to commissioning and ramp-up, Ind-Ra would expect the third-party engineer to confirm that the project was completed to the required standards (typically recognized international standards or standards that project company must meet under any off-take agreements) on the basis of a reasonable completion test established or referenced in the documentation. Where possible, the agency compares modelled performance, contractor guarantees, and manufacturer's specifications with the engineer's reports. Adequate commissioning and ramp-up time consistent with the technical risk is expected.

Figure 11
Technology Risk During Construction

Stronger attributes	Well-tested equipment installed in similar terrain/climate; contractor experienced with technology; continuous support by manufacturer; manufacturer-supervised commissioning and ramp-up; major manufacturer; low technical complexity (e.g. social infrastructure, wind farms).
Midrange attributes	Manufacturer support; adequate testing period based on similar projects; modified technology; established manufacturer; possibility of delay but within stresses; medium technical complexity (e.g. roads, traditional power plant).
Weaker attributes	Innovative technology or in new terrain; smaller or newer manufacturer; technical report with caveats; history of problems; less experienced contractor; onerous handover terms with clear potential for delay; minimal or no manufacturer support; high technical or logistical complexity (e.g. refineries, major rail).

Source: Ind-Ra

Operation Risk

Operation risk is the risk that the project will suffer a reduction in availability, productivity or output or, alternatively, the project will incur operating, maintenance or life-cycle costs that are greater than projected. Any of these may result in a reduction in projected cash flows or a breach of contractual performance requirements, reduce the project's financial flexibility, and potentially impair the ability of the project to service its debt. These risks are reviewed to assess the likelihood of the events occurring and the consequences if they do.

The extent and nature of the risks vary by project sector but maintenance is a key factor for output, availability, and cost. The analysis of operation risk focuses on the ability and financial health of the operator, the cost structure, and the supply risk. Analogous contract risks, are considered again for the operation phase.

Operator

Operating profiles vary across the spectrum of project and infrastructure finance.

Self-Operated Facilities

Large infrastructure facilities are frequently self-operated with some contracting to third parties. In those cases, Ind-Ra evaluates the experience of the management team, their record of revenue and cost management, facility maintenance, and capital renewal and their effectiveness relative to peers. A weak management team may cause the rating to be lower, all other things being equal. The presence of a strong operating team will be considered when evaluating the impact of stress scenarios on a rating and the ability of an issuer to manage through those stresses.

Contracted Operation

The contractual operator's ability to operate the project efficiently and effectively is usually evidenced by past experience with the same type of project and technology, together with adequate resources, including relevant qualified staff. Although these are similar factors to those for construction contractors, contract periods are typically much longer with a wide range of complexity between projects from smaller, basic availability schemes to technically advanced, market-exposed large-scale projects.

Ind-Ra will assess whether the operator's compensation reflects the risks and performance standards of the contract, allowing a reasonable prospect of absorbing the risks and achieving the standards. Ind-Ra will expect the report of the third-party engineer to assess the reasonableness of the proposed operating costs for a project. Contracts that appear under-priced may be considered credit negative if, for example, this might lead to delay or reduced expenditure on repairs and maintenance. Achievable performance-based measures (either penalties or bonuses) may be considered credit neutral to credit positive (depending upon the specific instance) if they provide an incentive to achieve or surpass projected performance.

Penalties for underperformance will be evaluated for reasonableness based on an assessment of whether they are proportionate and cover lost revenues that result from substandard performance by the operator. Bonuses will be considered incurred costs in scenarios where they are likely to be incurred. An operating and maintenance contract that provides a clear mechanism for dispute resolution, thus avoiding interruption of cash flow for rated debt service, is considered typical in project finance.

Ind-Ra assesses the performance risk based on the operator's track record, third-party engineering reports, peer analysis, operating complexity, and contractual/structural flexibility. Grace periods, flexible maintenance schedules, and other such features may act as mitigating factors. However, onerous terms such as challenging deadlines or concession termination rather than financial penalties are considered weaker attributes and may constrain the rating.

The reputational importance for the operator of a high profile project either for technology, scale or national prestige may add an incentive but is unlikely to benefit the rating in isolation. An operator may also be a sponsor or constructor of the project or have some other interest. In this case, both incentives and possible conflicts are considered. However, the key rating issue is an alignment of interest with the rated debt holders.

Figure 12
Operator

Neutral to the rating	Management team with strong record of successfully managing asset; extensive experience with similar projects; international reach with local experience; multiple alternative operators available; ease of replacement; project is a "landmark" for the operator.
Wider stresses in the rating	Management team with subpar record of managing revenues and costs; project requires specialty operator with few or no alternative operators available and no effective mitigation; limited to no experience in sector; unclear replacement provisions; uneconomic contract; poor reputation; limited "in-house" resources.

Source: Ind-Ra

There have been evidences in the past wherein the project has been impacted on account of a significant weakening of the O&M contract especially when in the event of a common contractor and sponsor or in case there is significant dependency on the O&M contractor. Ind-Ra would evaluate the terms of the contract, ability of the sponsor/lender to substitute the contractor, availability of the alternate contractors and other specialist skills, size of project, and location, as well as contractual remuneration while assessing the ratings of the issuer. While Ind Ra would not restrict the rating to that of the O&M contractor, the factors mentioned above would be considered for assessing the O&M risk. In case of sectors where O&M substitutes are easily available, a weak operator's financial profile will not be a rating constraint as the operator is replaceable (with similar cost profile). The operator's financial position is considered to the extent that it might constrain its ability to operate the facility throughout the life of the debt (performance risk). Where operation by a specific factor over the life of a transaction is judged to be a material factor, it is likely to establish a rating dependency on the operator.

Projects are typically exposed to their operators for a long period, raising risk and the importance of an available replacement. Replacement of an operation and maintenance contract that was underpriced may result in additional cost or negotiation, particularly if the operator is affiliated to other project parties. Ind-Ra also evaluates the extent to which the issuer or noteholders have rights to replace an operator and the related timing to do this.

Costs

Ind-Ra reviews the makeup, timing, and potential volatility of operating costs. Operating costs vary by project but generally will include some combination of the following: commodities and utilities, labour, taxes, insurance, maintenance, and capital expenditure or "life-cycle" costs. In contrast to the construction phase, the operating phase may have a high component of cost that is variable (passed through to revenues), thus reducing operating leverage, which is seen as positive. The exposure of the project to unanticipated operating costs is reviewed and reflected in the stresses in the cash flow analysis.

Cost mitigation through risk transfer to strong subcontractors or suppliers inflation-based contracts, cost-plus contracts, and the like are considered in the rating to the extent the financial strength of the counterparty is commensurate with the rating of the debt. For new projects, Ind-Ra expects to have third-party engineering reports available when assessing future capital expenditure or life-cycle costs, for timing and amount.

For an existing infrastructure facility, Ind-Ra would expect to receive any third-party reports prepared for management in the development of the capital improvement and maintenance plans for the asset. When infrastructure facilities are self-operated and less dependent on contractual risk mitigation, Ind-Ra reviews operating plans and third-party reviews of such plans as are available, and consider operating history, if any and operating cost profiles of relevant peers.

Figure 13

Operating Costs

Stronger attributes	Well-identified cost drivers; flexibility in timing for major costs (life-cycle); generous provisions for cost variations; costs well spread over time; highly predictable/contracted cost profile; strong ability to vary cost with demand; not capex-intensive; low maintenance cost profile; costs substantially recoverable under concession or framework contract; reserves cover contingent costs; pass through of costs to entities with strong financial capacity.
Midrange attributes	Predictable cost profile; ability to vary marginal cost with demand; material capex; cost increases reflected in regular revenue adjustments (tariff adjustment, benchmarking, or market testing) with transparent methodology; well-identified cost structure dynamics; pass through of costs to entities with midrange financial strength.
Weaker attributes	High sensitivity of project cash flows to the timing of costs; lumpy cost structure; volatile cost profile (labor/energy/technology); history or risk of labor disputes; highly capex-intensive; high maintenance cost profile; no cost pass through; weak or no operating reserves; pass through of costs to entities with weaker financial strength.

Source: Ind-Ra

Supply Risk

Some projects require that a resource or product is available for operations. Examples are projects designed to convert or use an input to produce a specific output and generate revenues based on the volume of such output, such as LNG, thermal power, and water treatment facilities. This resource or product can take many different forms. Ind-Ra evaluates the risk that these resources or products are not available in sufficient quantities and/or at prices that allow the project to operate as projected. In projects that involve the extraction of a resource or commodity, an assessment of the supply risk will involve a determination of the sufficiency of reserves and the cost of extracting the commodity. Ind-Ra expects a study by a third-party expert when addressing these issues.

If a resource or product is supplied to run the project, the agency considers the availability of the resource or product. If liquid markets exist for required commodities, Ind-Ra considers the potential for temporary supply constraints rather than long-term availability deficits. Where relevant, this includes an analysis of the price at which a substitute resource or product is available. In projects where supply risk is high, and markets are characterized by illiquidity, the agency may stress the cost of a volatile commodity. Supply risk may be mitigated by long-term supply contracts that may fix the volume and/or price at which the resource or product is supplied. Reliability of supplier is also a factor.

Figure 14

Supply Risk

Stronger attributes	No supply constraints for labor or materials; excellent transportation/utility infrastructure; connecting infrastructure in place – alternatives exist; commoditized nature of key supplies; low or no exposure to input costs; sufficient independently verified reserves; pass through of supply risks on long term contract to a financially strong counterparty.
Midrange attributes	Adequate supply of materials and labor with limited volatility (amount and timing); good transportation/utility infrastructure; connecting infrastructure in place – limited alternatives; pass through of supply risks to an entity with midrange financial strength.
Weaker attributes	Potential for supply constraints; monopolistic supply; poor transportation/utility infrastructure; weakness in connecting infrastructure; reliance on development of reserves; pass through of supply risks to an entity with weaker financial strength.

Source: Ind-Ra

The importance of fixing the price at which the resource or product is supplied depends on the volatility of the price of the product and how the off-take price is determined. Where input cost increases could make the project's output uneconomical, fixing supply costs through a contract with a supplier having a high credit quality can be an effective mitigating factor, although the rating may not be necessarily constrained by the rating of the supplier. However, if the resource or product represents a pass-through cost in determining the revenue of the project, then generally fixing the price of the input is not as important except when reduced off-take volume may result.

Ind-Ra also examines how the product or resource is supplied to the project, especially in terms of connecting infrastructure or availability of reliable alternative supply routes. The availability of back up suppliers may be an effective mitigating factor.

Technical Risk

Technical risk during the operating phase centers on maintenance and performance within projected cost. This risk varies significantly by project type. When the technical process is conventional and proven, the risk is not as great or it is easier to quantify based on past experience. Even technologies with proven reliability depend upon maintenance standards being met. Evidence of qualified staff, adequate budgets, and availability of parts and consumables and, in some cases, manufacturer support is evaluated. Alternative sources for goods and services are seen as positive in mitigating cost and delays.

Figure 15

Technical Risk During Operation

Stronger attributes	Many years of successful operating history and proven performance; low technical maintenance component; parts/labor widely available; diversified technology risk; minimal third-party supporting technology; warranty or service contracts; adequate redundancy inbuilt.
Midrange attributes	Actual operating data but limited operating history at the scale required by the project; adequate, but limited sources of spare parts supply; adequate but limited number of experienced third parties; safety or environmental norms finalized.
Weaker attributes	Proprietary or innovative technology; untested over long term; revenues dependent upon high performance or availability; non-diversified operating assets; material dependence on external supporting technology; safety or environmental norms not finalized.

Source: Ind-Ra

Flexible opportunities for maintenance, an experienced operator, and technical risk diversified over several units can all be positives. Technical risk increases significantly with new and unproven technology. Ind-Ra will expect the third-party engineer's report to address issues such as: capacity, availability, expected outages, repair and maintenance levels, future required capital investments, spare part requirements, expected efficiency levels, and environmental issues. Similar issues apply to connecting technology.

Decommissioning, Handover, License Renewal Risks

Significant and unique financial risks may occur in the final years of a project arising from the project coming to the end of its life (such as reduced productivity or decommissioning), contractual obligations (such as handover), or renewal of licenses, leases, or concessions. Decreased revenue or increased capital expenditure may occur with an associated rise in default risk.

Structural features such as grace periods, reserves, and forward-looking cash sweep tests are often included in the structure in such cases. Ind-Ra considers the tail period in the context of the impact and predictability of large capital renewal or decommissioning costs on cash flow available for timely debt service. The financial analysis will include stresses for affected revenues and costs in the financial analysis. Unquantifiable costs associated with decommissioning a facility would limit Ind-Ra's ability to rate a transaction if such costs could be incurred while the rated debt is outstanding or until the end of anticipated terms of refinance debt.

Revenue Risk

Gross revenue of a project is typically driven by a combination of availability, price, and volume. Risk arises if output or service cannot be adequately provided or if demand for the output or service does not exist at a price at which the project is able to meet its operating expenses and service its debt. The sources of revenue are typically either one or a few payers such as a concession grantor or a contractually obligated power purchaser; one or more major off-takers, such as a utility, airlines or shipping companies; or a significant number of users such as cars and trucks on toll roads. Ind-Ra will evaluate the relative stability and predictability of cash flow to the project when considering its ability to service its debt and specifically the revenue framework, performance requirements, and exposure to demand for its services, which together shape the overall revenue profile.

Revenue Framework

Exposure to demand risk varies widely across projects. Some projects have fully contracted revenue streams that ensure cash flow provided the facility is simply available. Because projects with fully contracted revenues, such as availability-based concessions and energy facilities with tolling agreements, are less exposed to demand risk, the analysis focuses on the other relevant risks. These include risks relating to performance against contract terms (availability, throughput, and efficiency) cost risk and counterparty risks associated with the off-taker or concession grantor. However, some specific transactions feature a mix of different revenue risks that require further analysis of volume or price risk, such as energy facilities with partially contracted and partially merchant-based revenues or shadow toll arrangements, which combine usage risk with a single concession payer. Ind-Ra also considers whether mechanisms for determining revenues are clear and objective, reducing potential for dispute.

Performance Requirements

Contracted gross revenue may vary with the quality of the project's output, availability of the facility, timeliness, or quantity/efficiency of output. Failure of the operator to achieve required standards typically results in a reduced price or penalties deducted from a fixed-concession payment. Where penalties are incurred by the project vehicle due to subcontractors, connecting infrastructure, or suppliers, Ind-Ra will evaluate the borrower's ability to pass through such penalties under the subcontract. As with other compensation payments, including any from an off-taker, counterparty risk may be material.

Broader Demand Risk

Some projects will be more exposed to demand risks, such as merchant facilities producing power without any contractual support in place, or with support for a term less than the debt maturity. For many infrastructure facilities and projects, a contractual or regulatory framework will establish the basis upon which revenues are generated, but expose the facility to demand risk to some degree. Ind-Ra will evaluate the mitigating factors of volume and price risks present in any such contractual or regulatory framework, taking into account the facility's competitive position. Some infrastructure facilities have a monopoly on the provision of the essential public service and face limited competition. Others may face competition from nearby facilities even though a local monopoly has been granted.

When evaluating debt for facilities fully or partially exposed to price and/or volume risk, volume and price projections established by the project's sponsors supporting the project economics are reviewed. As part of this analysis, Ind-Ra will request and review any reports or studies conducted by a third-party expert on behalf of the issuer. Such a study, together with historical price and volume trends, market, and macroeconomic forecasts and peer analysis, where available and appropriate, are used to assess the likelihood of price and volume combining to achieve expected revenues.

Ind-Ra may also use its own forecasts and assumptions. The use of historical information will depend on its quality and evidence of its predictive value. Historical information is likely to be more relevant for established projects and markets where specific performance data are available. Ind-Ra views assumptions or estimates based on such performance information as more reliable. Volume and price risk factors identified as drivers of gross revenue are stressed as part of the financial analysis. Like for like, Ind-Ra would expect projects exposed to price or volume risk to have the capacity to survive higher sensitivities than those shielded from such risks by contract.

Other Considerations

When gross revenues are determined under a contractual or regulatory framework, Ind-Ra will consider the relative dependability of any legal and regulatory incentives necessary to sustain the revenues.

The attributes below present the approach to assess revenue risk on a qualitative basis under the Master Criteria. Where useful to sharpen the focus of the analytical approach, individual sector criteria may treat attributes relating to volume and price separately.

Figure 16

Revenue Risk Characteristics

Stronger attributes	Availability-based revenue from counterparty with strong financial capacity; limited deduction risk; limited delivery risk; fixed tariff "take-or-pay" contracts exceeding rated debt life; currency hedging; minimal reliance on demand or resource forecasts; matched costs and revenues; low-cost producer; demand at market prices; strong historical evidence of revenue patterns; lower volatility user-based revenues; diverse customer base; proven ability to pass on inflationary price increases.
Midrange attributes	Availability-based revenue from counterparty with midrange financial strength; off-take agreements (with price risk); moderate deduction risk; market convention delivery risk; partial currency hedging; reliance on low volatility or proven resource forecasts; established long-term subsidy regime; competitive market position; moderate ability to pass on inflationary price increases.
Weaker attributes	Availability-based revenue from counterparty with weaker financial strength; full exposure to market risks (price and volume); existing or expected competing facilities; significant deduction risk; special delivery risks; currency exposure; potential for increased royalties, windfall taxes or production limits; reliance on demand forecasts or resource forecasts of higher variability; politically sensitive subsidy regime; complex definition of output; limited ability to pass on inflationary price increases.

Source: Ind-Ra

Infrastructure Development and Renewal/Obsolescence and Economic Life

Infrastructure Development and Renewal

For project debt to be rated, its maturity should be within the expected economic life of the asset or concession contract. Essential public infrastructure assets typically have a longer life or the issuer has a franchise of indefinite duration (e.g. freehold ownership), subject to adequate asset development and renewal efforts. To the extent the expected economic life of a facility is achievable only through significant capital expenditure, the regulatory or contractual framework will typically require that the necessary works be carried out. In some cases, this may be accomplished indirectly by a requirement that facility availability and output be maintained at a level attainable only through periodic capital expenditure. Ind-Ra will seek to understand the management's/sponsor's approach to the capital program, including planning, funding, management, and the process for developing any relevant stakeholder consensus.

Ind-Ra will evaluate the extent to which the costs of infrastructure renewal can be recovered from revenues on a pay-go-basis, or within periodic automatic adjustments of revenues as is the case in certain regulatory frameworks. Both cases would be credit positive. In many cases, infrastructure renewal will be initially financed through borrowings. The impact of expected additional debt to infrastructure renewals can be captured in the rating through the projections in the financial profile, including the uncertainty of future debt terms to finance the investment.

Evaluating infrastructure Development Execution Risks

Operators of existing facilities may take on the role of general construction manager for improvement projects. Ind-Ra regards a comprehensive EPC contract as a reasonable way of mitigating delay in project completion, plant underperformance and cost overruns. Completion risk could be mitigated where an owner/constructor model is employed through an appropriately sized budget, contingency and an adequate owner with relevant experience and may include some level of completion guarantee from a credit-worthy counterparty.

Improvement projects at operating facilities require managers to handle myriad challenges. Less emphasis will be placed on the evaluation of contracts and more on the infrastructure management's track record with such construction projects and capacity to manage risks and resulting costs within the issuer's existing credit profile. The presence of a utility management team with a history of delivering capital projects on schedule and within budget is a substantial mitigating factor to contractor's exposure and is considered a strong attribute, as is a well-phased capital programme that can be modified to reflect changes in need or demand.

Operators of large existing infrastructure facilities, such as airports, seaports and toll networks, tend to use turnkey fixed price contracts less frequently, preferring to manage timing, completion, and costs risks themselves. In these cases, Ind-Ra will review capital improvements and construction planning with management to assess the risk that cost overruns and delay may pose to the credit profile of the facility debt. The issuer's ability to continue to earn revenue and its ability to absorb costs over budget and costs resulting from delayed completion will be a focal point.

Obsolescence and Economic Life

Obsolescence risk due to more efficient variants, competing innovation, or demand shift is considered against mitigating factors available to the issuer. Ind-Ra will evaluate the capacity of the project to invest in upgrades to maintain competitiveness and generate revenues in base case and stress scenarios. Fully contracted frameworks (e.g., power purchase agreements) and large public infrastructure assets are less exposed to obsolescence risks as contractual mitigating factors may exist via concession grantors, off-takers, or suppliers. Obsolescence risk without mitigating factors may result in Ind-Ra assuming a shorter economic life and lower revenues in its financial analysis.

Access to Capex Funding

Funding of incremental capex is a further key element to look at when assessing the risk of a transaction. A predominantly internally funded capex plan with a pre-funded major maintenance reserve account (MMRA) or access to legally committed external funding typically results in a stronger assessment. Some reliance on external funding to cover capex needs may assert a midrange assessment. Conversely, an incremental capex predominantly funded with external debt to be secured would typically underpin a weaker assessment.

Figure 17

Infrastructure Renewal and Obsolescence

Stronger attributes	Strong mechanisms for capital planning and funding; demonstrated history of effective management; debt maturity significantly within proven economic life; established but current technology; capex evaluated by third-party engineer as reasonable.
Midrange attributes	Adequate mechanisms for capital planning and funding; successful history of managing capital program with some inconsistency or shortfall; one- to two-year economic tail after debt maturity; no evidence of emerging competing technology or potential demand shift.
Weaker attributes	Weak planning mechanisms, history of deferred maintenance/cost overruns; economic life nearly co-terminus with debt maturity; emerging competing technology, e.g. lower cost or substitute.

Source: Ind-Ra

Termination Compensation Risk

Project Company Default

The risk of early termination of any key contract due to an event of default of the project company is addressed in all other sections of this criteria report. Concession contracts have varied provisions for termination compensation payments, to be made following a default by the concessionaire in operating the related facility. Similarly, offtake agreements supporting energy-related project debt may provide for termination if production or availability levels fall below certain critical thresholds. The amount and timing of payment are matters affecting recovery prospects for investors and are not considered while rating issuer's related debt.

Termination at Grantor's Option

The grantor of a concession or an offtaker may retain an option to terminate the concession or the offtake agreement for among other reasons, its own convenience, for regulatory purposes or for public necessity (for example, a sudden toll cancellation). The probability of exercising such an option cannot be adequately factored into a rating. If the risk of early termination in cases other than a project default is not covered by an appropriate and timely compensation payment (i.e. sufficient to cover the full repayment of rated debt instruments and paid in a timely manner to avoid a default), Ind-Ra may seek clarity on those terms. The option to rate the transaction will remain with Ind-Ra.

Termination payments and Other security invocation

The relevance of termination payment is significant in the expected loss framework. Termination payments from the concession grantor/power purchase counterparties/license termination compensation will be taken into account while computing the loss given default in a liquidation scenario. The agency would analyse the modalities in such termination events. In cases where there is a difference between the concession grantor and the concessionaire, the agency would consider the impact of termination and otherwise in such scenarios (probably the lower of the two). Administrative and legal delays could increase the level of losses. Ind-Ra would depend on the historically available information to factor in these delays. The timeliness of termination payment will be analysed through the documents and any delays would be factored into the EL scale ratings.

Figure 18

Termination Compensation Risk

Neutral to the rating	Termination events without any issuer default (force majeure or grantor option) compensated to repay rated debt on a timely basis; adequate grace period; lender step in rights
Negative to the rating or obstacles to assignment of a rating that need more clarity	Foreseeable termination events; compensation following termination other than for issuer default (force majeure or grantor option) may be less than debt or unclear; renewal risks

Source: Ind-Ra

Early Termination Risk

A risk of a termination event under any of the key contracts during the operating phase could have a material effect on ratings, particularly if compensation or lender structural protections (such as step-in rights and direct agreements) are not present. Examples of such events are termination of a concession, break clauses in off-take agreements, or loss or failure to renew a license, all of which may threaten project revenues. Acceleration of a financial agreement may have direct implications for the operation of the project or consequences indirectly via suppliers or other third parties. Appropriate grace periods in contracts, reserves, or liquidity to give time for remedy without interruption of rated debt service payments are key features. Of equal importance are contractual provisions for termination payments by the counterparty if it terminates the agreement other than for project company contractual performance or financial default.

Figure 19

Early Termination Risk

Stronger attributes	No contractual termination events; termination events without any SPV default (force majeure or grantor option) compensated to repay rated debt on a timely basis; direct agreements (concession grantor/lender); robust grace periods.
Midrange attributes	Low risk of termination based on history of successful management of similar contracts or ease of compliance or ease of finding substitute service providers/suppliers; adequate grace periods; lender step-in rights.
Weaker attributes	Foreseeable termination events; compensation following termination other than for SPV default (force majeure or grantor option) may be less than debt or unclear; renewal risks

Source: Ind-Ra

Macro Risks

A stable and predictable environment for a project is evidenced by the government's commitment, public support, and a consistent application of law and regulation.

The likelihood of the government interfering with the project during the life of the rated debt will generally be reviewed. Government interference with the project could result in reduced revenues, increased costs, or impaired operation affecting debt service. Interference may take the form of unilateral contract variation, specific regulatory actions, exceptional taxes or royalties, forced changes in ownership or control, or outright expropriation. Ind-Ra places emphasis on the incentives that exist for a government not to interfere negatively with the project.

Where appropriate, Ind-Ra will form a view on factors such as the political and economic importance of the project to the relevant government (including regional or central government planners), future reliance on external investment, and government assurances regarding exchange controls, consents, approvals, stable environment, and non-interference.

Public support for the project is assessed as opposition to the project can result in delays or increased costs or, in more extreme cases, abandonment of the project. Factors such as national interest and projected impacts and benefits for local communities in terms of project output, employment, or environmental damage may influence public support. Even where government and public support for a project appears strong, Ind-Ra is cautious as this may not extend to support for debt investors in times of crisis. Macro and microeconomic factors affecting the project's industry sector are discussed in the *Industry Risks section.*

Industry Risks

The agency considers a project in the context of its immediate industry sector in terms of relative competitive position, overall supply and demand and the general outlook for the industry. This includes not only similar projects but other industry participants such as corporations, state-owned enterprises, and not-for-profit organisations. For this and general industry outlooks, Ind-Ra will rely on its corporate or public finance or other relevant groups. Closely related industries encompassing suppliers, users, or potential competitors are also examined. The nature of demand (essential versus discretionary) is also analysed and reflected in revenue generation analysis. An assessment of the industry may not be relevant for all sectors (e.g. toll roads).

Figure 20

Industry Risk

Stronger attributes	Regulated industry; provides essential services; significant barriers to entry; positive industry outlook.
Midrange attributes	Established industry may be supported by discretionary spending; some barriers to entry; stable industry outlook.
Weaker attributes	New industry; industry supported primarily by discretionary spending with many competing alternatives; few barriers to entry; negative industry outlook.

Source: Ind-Ra

Event Risks

When evaluating project finance and infrastructure transactions Ind-Ra explicitly considers the potential event risks that may adversely affect the issuer's ability to repay the debt. Event risks arising from natural hazards – floods, earthquakes, hurricanes, tornadoes – as well as human errors or mechanical malfunctions – industrial accident, explosions, forced outage – are identified to the extent possible based on available public information or third-party reports provided by the issuers. The management of relevant risks is also evaluated with the best available information.

In the strictest sense of a rating, an asset subjected to insurance proceeds due to an event risk is a post-default scenario and cannot be covered by the ratings which are pre-default. However, Ind-Ra will look upon the insurance and coverages to the extent practicable. However a full-fledged analysis of insurance coverage and probability of insurance receipts cannot be factored into the ratings.

Comprehensive insurance, including business interruption insurance, is a typical tool used by issuers. Insurance for many of these risks is commonly available, subject to some repricing risk and the rating considers that the issuer will be able to meet a covenant to have in place required insurance coverage consistent with market standards from qualified insurance providers.

In some instances, events will be determined to be "uninsurable," meaning insurance of the related risk is unavailable, unavailable in sufficient amounts, or completely uneconomic. Terrorism is one such risk. Earthquake is another risk. Where a project or infrastructure asset is exposed to uninsurable risks, a second level of analysis is required to determine whether mitigation is required for the rating and, if so, whether there is an alternative to insurance that mitigates the risk of default to a degree commensurate with the rating of the debt.

Whether mitigation is required depends on a qualitative assessment of the project's vulnerability to the identified risk. As an example, flood insurance is not needed for a project on a hill and the absence of such insurance would not be a rating constraint. Ind-Ra considers terrorist activity to lie outside the scope of ratings in infrastructure and project finance as a general rule.

Where it is determined that the project has vulnerability to a risk, mitigating factors other than insurance will be evaluated. Some issuers have multiple assets and analysis may consider a single event unlikely to affect all assets to an extent that would negatively affect timely payment of debt.

In some cases, risk mitigation may be accomplished by transferring the risk to a third party. For example, a public authority may grant a concession in a public private partnership transaction, yet retain the risk of uninsurable force majeure risks, including limited insurability that results from uneconomic pricing of such risks.

In other cases, the nature of the infrastructure asset is such that the asset function might be impaired, but it could continue to operate at a substantial level and recover costs of rebuilding through the applicable tariff mechanisms. The debt will not be affected so long as it has sufficient liquidity to get through the immediate impacts of the event. Finally, in some cases, risk mitigation will not be sufficient and the rating may be depending on vulnerability to the uninsured risk.

Debt Structure

In contrast with project analysis, which considers the capacity of the project to generate cash flow and the stability of those cash flows, the following financial analysis considers each rated debt instrument separately, taking into account the quality of its individual debt characteristics, structural features, security rights, and any external support. Ind-Ra rates infrastructure and project finance debt instruments in accordance with their terms and conditions. In particular credit is given to structural elements that provide financial flexibility; for example, deferrable debt service of a junior tranche will be favourable to the senior tranche.

Debt Characteristics and Terms

The characteristics of a debt instrument, including its maturity, amount, and currency, are usually sourced from the loan agreement or bond documentation. A term sheet, prospectus, or representations from issuers may also be relied on. The obligation to pay interest, including rate basis, margin, payment dates, grace periods, and whether interest may be deferred and the obligation to pay principal according to an amortization schedule, are established together with the priority of these payments. This analysis is undertaken for each debt level in the financing.

Issue ratings on tranched debt securities can be distinguished only when there is a basis in the finance documentation and legal framework to support a conclusion that a default on one tranche will not result in a payment default on other senior tranches. An issuer rating generally reflects the risk of default on all of an issuer's external financial obligations, whether or not they have distinguishing security features. In the infrastructure sector, most companies raise external debt at the same seniority level and security features and very rarely there is any subordinated debt from external parties. Lenders generally allow infusion of part of equity in the form of subordinated debt or hybrid instruments along with covenants that such instruments are fully subordinated to senior instruments. Cashflows to subordinated instruments may generally made only from surplus after complying with any restrictive covenants. Such mechanisms lead to default probability linked to majorly external financial obligations and hence, issuer ratings for infrastructure debt may be assigned based on the external financial obligations. The existence of a cross default or cross acceleration mechanism or a legal framework that could result in cessation of payments on all tranches following commencement of an insolvency proceeding would prevent distinct default ratings.

Figure 21

Debt Characteristics and Terms

Stronger attributes	Senior-ranking debt – interest and principal; fully amortizing debt; no de facto subordination; scheduled amortising principal commencing after completion; interest deferral on junior debt; no cross-default or acceleration; fixed interest rates.
Midrange attributes	Senior-ranking debt – interest and principal; within senior-ranking class but other debt within that class may mature earlier; amortization may have limited interest-only period or some flexibility; some refinancing risk with mitigating factors; some floating-rate debt.
Weaker attributes	Non-senior debt; highly sculpted amortization; bullet maturity; "loan-level" refinancing risk not mitigated; junior interest in priority to senior principal or reserves; cross-default and acceleration; significant floating-rate exposure.

Source: Ind-Ra

Other terms of the instrument are reviewed keeping in mind the balance between protecting the investor and maintaining the issuer's operational and financial flexibility. Ind-Ra also considers whether the terms of the issuer's other debt instruments affect the rated instrument. Rights and control may only be of value when the rated instrument is in the controlling creditor class.

In some cases, this could translate to a higher default probability as senior debt holders may act in their exclusive interest. This could be to shut down junior debt or accelerate the full debt structure if they feel there is enough cash for them to be repaid in case of liquidation. Where this provision exists, default risk arises for junior debt where the senior holders are empowered to act even if it occurs before an actual default of payment on the junior debt. In such cases the junior debt rating may be lower than suggested by financial metrics or peer comparison or otherwise.

Treatment of Junior Debt

Junior debt and/or mezzanine debt is generally rated lower than the senior debt. The notching difference in ratings between a senior and junior debt depends upon a number of factors including the lender protection features in the financing documents, mainly the coverage metrics of consolidated debt vis-à-vis in relation to senior debt. In cases where common default clause exists, the agency will analyse the combined (senior +junior) debt and its impact on the coverage ratios to arrive at the rating of the project debt. Generally, the presence of a common default clause in the financing documents relating to junior or mezzanine debt would automatically trigger a technical default (not necessarily, a payment default) on the senior debt, which will result in the junior debt and senior debt being rated at the same level. In certain situations, it may so happen that the mezzanine debt in a project is guaranteed or backstopped by the sponsor whose rating is higher than the project's senior debt. In such a situation, the agency would analyse the terms of the guarantee/undertaking and should it turn out to be a guarantee or an undertaking that would effectively avoid a default, the agency would equate the rating of mezzanine debt to that of the sponsor's rating.

Structural Features

Debt Service Reserve Account (DSRA)

A DSRA mitigates stress on cash flows and helps a project company service its debt seamlessly when faced with a temporary impairment in cash flows. For example, when a payment from the counterparty is delayed. In some cases, an additional DSRA may act as a credit enhancement; but that would depend upon the merits of a particular case.

A debt instrument may benefit from various structural features that can underpin the cash flows supporting debt service. These may include covenants and triggers to trap or divert cash based on financial ratios, which may be to the benefit or detriment of the instrument, usually depending upon its priority. General covenants are expected to restrict additional debt, restrict payments to sponsors or equity holders, and typically retain cash for future periods, when financial indicators are deteriorating, to benefit creditors.

Covenants that redirect available funds to senior debt at the expense of junior debt are seen as positive for senior debt and negative for junior debt. This redirection will be evaluated in the financial analysis, notably through the rating impact of stress cases. Such features can be reflected in rating distinctions between tranches where supported by an appropriate legal framework.

Cash diverted or retained is typically allocated to reserves or principal reduction of the most senior debt. Contractual arrangements often exist between creditors to determine the priority of payments for costs, fees, swap payments, interest, and principal (payment waterfall). Ind-Ra will review payment waterfall to see if they are consistent with other assumptions, if they are reflected in the applicable cash flow projections, and under what circumstances they may change. Access to debt service reserves, events of default, or covenants transferring control are assessed.

Liquidity lines typically provide independent issuer-level protection direct to rated debt, against interruptions in operational cash flows. Issuer-level working capital and reserve facilities are typically independent of short-term project performance and drawable with minimal conditionality. These are evaluated as drawn facilities when considering prospective leverage where advances occur in the rating case.

Figure 22

Structural Features

Stronger attributes	Forward-looking covenants and triggers; early dividend lock-up and cash sweep; access to debt service reserves; sinking funds or capex reserves; immediate reserve replenishment consistent with rated instrument priority.
Midrange attributes	Dividend lock-up and cash sweep triggers; access to debt service reserves; reserve replenishment.
Weaker attributes	Weak dividend lock-up; no cash sweep; junior or no access to reserves; no reserve replenishment.

Source: Ind-Ra

Derivatives and Contingent Obligations

Ind-Ra will evaluate the debt structure to identify liabilities from other sources, including derivatives, working capital lines, and off-take or supply agreements. Swaps are most commonly used to hedge interest costs but are also used to mitigate foreign exchange, inflation, or other risks. Where the notional amount to be hedged is variable or a direct hedge is not available, mismatching of basis, maturity, or notional may leave open or over-hedged positions.

Liquidity lines typically provide independent issuer-level protection direct to rated debt against interruptions in operational cash flows. SPV level working capital and reserve facilities are typically independent of short-term project performance and drawable with minimal conditionality. These may be evaluated as drawn facilities when considering overall leverage where advances occur in the stress or rating case.

Figure 23

Derivatives and Contingent Obligations

Stronger attributes	Revenues fully hedged to debt service for currency, and interest rates for the relevant tenor.
Midrange attributes	Partial hedging; some imbalanced hedging of interest rates, inflation or foreign exchange.
Weaker attributes	Significantly imbalanced hedging or unhedged financial risks.

Source: Ind-Ra

The issuer may be required to post collateral under supply or off-take contracts to cover replacement revenues to the counterparty if the SPV experiences outages. The source of collateral posting or replacement letters of credit will be evaluated to determine the SPV's ability to perform this obligation under the relevant contract.

Security Package and Creditor Rights

The benefits of security or creditor rights to the rated bondholders can be seen in reducing either the likelihood of default or the loss severity given a default. However, it is only the former benefit that is considered when assigning an infrastructure and project finance rating.

Post enforcement, Ind-Ra would assess whether security interests in key project assets and contracts attach in the same rank order as debtholder priority and ideally confer controlling rights prior to enforcement. Pre-enforcement controlling rights potentially reduce the likelihood of default and are typically the more significant rating aspect of the security package. Ind-Ra would also assess step-in and other rights providing senior investors with the ability to protect key contracts and assets or to initiate replacement of failing transaction parties together with security interests granted by project owners over their ownership interests in the issuer are present in the transaction.

Comprehensive inter-creditor agreements limiting the scope for individual pre-emptive action and defining the pre-enforcement controlling class of creditor may reduce uncertainty regarding project assets in adverse circumstances. Control of material insurance proceeds, either to ensure project reinstatement or debt repayment, is also desirable. Differences in rights between classes to control remedies following default are noted in the context of rating each class of debt.

Figure 24

Security Package and Creditor Rights

Stronger attributes	Senior-ranking security interests overall operating and intellectual assets, contract rights, and cash balances; first payee of material insurance proceeds; contract step-in rights; creditor-friendly jurisdiction; first security interest in shares of project company; controlling class; early transfer of cash control from operator to trustee.
Midrange attributes	Senior-ranking or controlling security interests over key operating and intellectual assets, contract rights, and cash balances; "equitable" interests in some assets; senior position if collateral held via security trustee; control of material insurance proceeds; minor super-senior statutory creditors; controlling class absent protection test.
Weaker attributes	Non-senior-ranking security interests or subordinate position via security trustee; significant or unquantifiable statutory super-senior creditors; untested or cross-jurisdiction collateral structure; no post-enforcement control; transfer of cash control post default.

Source: Ind-Ra

Refinance Risk

Ind-Ra views issuers exposed to refinance risk (debt not fully amortized at maturity) as structurally weak, because their ability to access the market and the future cost of debt are uncertain. However, for debt instruments benefiting from substantial amortisation before bullet repayment, the presence of significant residual project value that is assessed through coverage metrics including project life coverage ratios and DSCR for a synthetically amortised loan post the refinancing or leverage when relevant, or the presence of structural mechanisms that ensure an alternative repayment mechanism to facilitate refinance may keep the rating impact limited, if at all. This risk is less material for issuers such as corporates and public finance issuers which have proven market access.

Ind-Ra will analyse refinance risk, using stress assumptions for costs and liquidity derived from historical patterns, if available

Figure 25

Refinance Risk Characteristics

Stronger attributes	Marginal or no bullet debt in the financing structure; nominally some bullets, but rating case cash flows show no or limited balance at nominal bullet maturity.
Midrange attributes	Moderate use of bullets (less than 25%) with substantially fully amortising debt
Weaker attributes	Substantial use of bullets and dependence on refinance analysis

Source: Ind-Ra

Financial Profile

Ind-Ra assesses the capacity of the cash flow to repay each rated instrument, by applying a range of stresses and taking into account the features of debt structure. The creditworthiness of both operational and financial counterparties, in the context of their obligations, is also incorporated into the rating. Peer analysis will be used wherever appropriate and if ratings for a relevant group of peers can be compiled.

Assumptions

The credit analysis will provide a list of the most relevant quantitative and qualitative assumptions comprising the base or rating cases. The case assumptions will generally relate to the key rating drivers, as identified for the sector or a specific credit. The analysis will describe how the selected macro-economic, business or financial assumptions relate to the credit drivers and how they have been adjusted to fit within the logic of each case.

Assumptions can be credit-specific, such as the heat rate for a thermal power project. In such cases, assumptions could be based on external sources, such as technical advisors and peer data. Assumptions can be directly or indirectly relate to macroeconomic forecasts and projections provided by other analytical departments within Ind-Ra such as inflation, oil prices, or GDP, or by external reputable providers.

Base Case

For most projects, Ind-Ra will establish a base case that results from an expected performance in a normal economic environment. This is informed by various sources of information, such as historical performance, issuer projections, third-party expert reports, as well as Ind-Ra's criteria and expectations including Ind-Ra's macroeconomic assumptions. Also, the base case serves as the agency's expected case for rating surveillance and as the common starting point for stress analysis. Sponsor forecasts typically are concerned with planning for resources necessary for performance in upside scenarios or to project equity returns and this can have an embedded optimism bias. Ind-Ra's base case is typically established by adjusting the issuer's central forecast to make it consistent with the agency's criteria and forecasts, which are focused on measuring financial and operational flexibility in the economic environment reasonably anticipated to exist in the relevant forecast period. Additionally, the agency's analytical assumptions specific to the project will be incorporated.

Performance Stresses

Having established a base case, Ind-Ra applies a series of stresses to parameters identified as key in the project analysis. Parameters such as delays, input and output prices, demand or utilisation levels, performance, life-cycle, and other costs may be stressed, either in value or in timing. The cash flow impact of structural or legal changes may be estimated and remodeled. The purpose is to test the sensitivity of cash flows available to each rated debt instrument to changes in these parameters.

Financial Risk Stresses

Financial stresses are considered in a similar manner to project stresses; some may only apply to individual rated debt instruments. Common financial stresses such as inflation, interest rates, and foreign exchange rates may be hedged or partially hedged. In such cases, the result of a stress may be a material increase in counterparty risk against the protection seller. Financial stresses may include the potential default and replacement of any counterparty with a material financial obligation to the borrower or issuer SPV. The amount of financial stress applied is typically by reference to forecasts from an appropriate analytical group within Ind-Ra.

Interest rate stresses on variable interest rate debt, for example, may be considered in the rating case and breakeven scenarios and will be based on historical patterns. The stress will be applied in the direction adversely affecting cash flows for the rated instrument. Due consideration will be given to the effects of a possible corresponding rise in inflation; for issuers whose cash flows are related to inflation, the resulting stress may be expressed in a hike in real interest rates rather than nominal rates. For refinance risks, Ind-Ra will evaluate the impact of higher costs of capital at the time of refinance, depending on the time to the refinance date, the history of the issuer's access to market and the pattern associated with similarly situated issuers.

Rating Cases

The combination of the base case and the selected performance and financial stresses will result in a rating case. The distance between the base case and the rating case will represent the degree of stress that Ind-Ra deems commensurate with the volatility or uncertainty identified for the project or issuer's activity. For project or issuers featuring little uncertainty or volatility, this distance (measured in the magnitude of applied stresses and thus in the credit metrics) would be smaller.

The rating case includes some reasonable downsides and does not reflect extreme stresses, which would be addressed through separate sensitivities. However, the rating case includes fluctuations in a normal economic cycle and therefore should be consistent with the expected bottom of the cycle. When selecting stresses, the sensitivity of cash flows to changes in the stress levels is considered, to achieve a degree of rating stability through the economic cycle including a typical downturn. Downturns are an expected event and the purpose of this rating case is to signal the nature of an event through which the rating will be stable. The rating case may vary with the commencement of a downturn to assess the effects on the credit if it occurs at a more vulnerable time for the related project or an infrastructure asset.

When revenues are based on contracts that mitigate volume risk, such as take-or-pay agreements or PPP contracts, cash flow stresses will focus on the elements in cash flow that can vary such as production efficiency and operation costs. For example, a wind project or solar facility will be evaluated based upon revenues at a low output due to low resource availability.

For issuers that are exposed to demand risk, the rating case will emphasise Ind-Ra's through-the-cycle approach to ratings and evaluate the demand and consequent revenue stress that a facility may be expected to experience in an economic downturn of reasonable depth and duration.

The rating case includes the anticipations of structural changes, for example if the underlying demand for a given facility has changed in a durable manner, reflecting secular trends expected to permanently shift the performance up or down compared with previous expectations. If Ind-Ra identifies a sustainable change in the long-term trend, this would be likely to require a material change in the rating case and result in a rating change

Events of a longer duration or depth or performance below expectations within the rating case scenario would put ratings under pressure.

The choice of the rating case is a key quantitative and qualitative determinant of the rating and is typically a central point of discussion in rating committees.

Sensitivity and Break Even Analysis

Sensitivities

In addition to the rating case, Ind-Ra may consider a combination of other project and financial stresses or a series of individual stresses, based on the base case in the context of history, peer analysis and Ind-Ra's expectations. These may reflect a particular scenario of events. They are used either by selecting base case metrics providing relevant cover or by modeling the stresses to test that the rated instrument does not default.

The method employed for a particular sector is usually determined by the information available and the importance of peer analysis, which often relies on metrics.

Breakevens

Breakeven calculations are designed to tangent a default on cash payment (not on covenanted default triggers) and usually include drawings on debt service reserves. Breakeven scenarios are calculated off the base case and are of the following two types:

- a one-off change in a given variable resulting in a 1.0x debt service coverage ratio (DSCR)
- the most adverse constant growth or decline rate over the life of the rated debt, which produces an average 1.0x DSCR and/or minimum DSCR of 1.0x after utilisation of all stipulated reserves.

Debt Service and Counterparty Risk

Having reviewed the debt structure of each rated instrument, these features are combined with a more quantitative approach to determine the capacity of each instrument to maintain debt service through a range of stresses. The creditworthiness of both project and financial counterparties, in the context of their obligations, is also incorporated into the rating. Peer analysis may be used wherever appropriate.

Financial Projections

Financial projections used in project and infrastructure finance are generally cash flow projections including debt service, based on assumptions input as variables. These projections are not stochastic, and only allow single or combined factor sensitivities to assess the possible impact on debt service. Financial projections outputs are only one factor in Ind-Ra's analysis; a project for which credible projections show strong ability to repay rated debt may still be assigned a speculative-grade rating, if some more qualitative risks (for instance, payer counterparty, sponsor insolvency, or industry risk) are deemed material.

Due to the idiosyncratic and complex nature of most projects and issuers, Ind-Ra often uses financial projections provided by the issuer and its agents. The agency judges that adapting a standard model to reliably incorporate many individual features of a project or issuer is not justified; instead it focuses on analytical drivers such as choice of stress and use an issuer's project-specific cash flow spreadsheet to evaluate these. When using results from an external cash flow projections and tools to evaluate these drivers, Ind-Ra may also use internally developed financial projections and tools where relevant.

The agency also considers the plausibility of results from external cash flow models by examining trends and sensitivities, making estimates and adjusting individual parameters. Despite these precautions, as with all types of information provided by issuers, Ind-Ra is incumbent on sponsors or issuers to ensure that the information provided to the agency is timely, accurate, and complete. Failure to do so may result in the ratings classified as 'issuer non-cooperative'. Ind-Ra considers it best practice that external cash flow projections are independently checked, ideally by a reputable third party. However, it is rarely done in the Indian scenario.

Financial Ratios

The results of the stress analysis are typically summarised by using various metrics, often in ratios and are used in combination. Metrics are used selectively as appropriate to the sector or transaction structure. Metrics associated with a given rating category can vary widely depending on the nature of the project and the potential volatility of cash flows. Any sector-specific criteria will include medians and ranges typical for the relevant sector. Such metrics are an input in determining a rating to the extent that they summarize in a single number. Ind-Ra's views on certain risks and, in particular, their impact on a project's cash flows. A rating includes both qualitative and quantitative analysis. Stronger or weaker financial metrics will be viewed in the context of the qualitative analysis of risk attributes described in this Master Criteria.

Common among metrics are the following listed below.

Cash Flow Available for Debt Service (CFADS)

Typically, CFADS is calculated as the revenue generated by the asset less its operating expenses, maintenance and life cycle costs or major maintenance reserve account deposits, changes in working capital, cash taxes, pension contributions where appropriate, and interest on cash balances. However, for assets that are owned by a public sector sponsor, CFADS is calculated including lifecycle costs to assess the available financial flexibility to defer costs, provided that targeted coverage profiles incorporate the ability to support these investments through future borrowings. CFADS is typically used to calculate DSCRs.

EBITDA

EBITDA in any period is calculated as the revenue generated by the asset less operating expenses. EBITDA is typically used in EMEA and to calculate leverage ratios, such as net debt/EBITDA.

DSCR

This ratio measures the amount by which CFADS exceeds debt service (interest, principal and debt related fees) in any given period. Periods can be annual or intra-annual, especially for projects exposed to seasonality. Both minimum and average periodic DSCRs are taken into account in the analysis as they both give indication on volatility of cash flows. The profile or evolution of the DSCR is considered in the context of the relative increase in uncertainty for many variables overtime.

Interest Cover Ratio (ICR)

The ICR measures the ability to pay interest from project cash flows when EBITDA or CFADS is divided by the interest and related fees due in that period.

Post Maintenance Interest Cover Ratio

The ratio is similar to ICR, where EBITDA less maintenance and lifecycle costs less working capital less tax is divided by interest and debt related fees due in that period.

Leverage Ratio

This is the ratio of net debt to CFADS or net debt to EBITDA used when evaluating infrastructure entities with an unlimited franchise to provide an essential public service, or when debt is not amortising.

Project Life Coverage Ratio (PLCR)

This is the net present value (NPV) of CFADS over the remaining project life, divided by the principal outstanding on the rated debt instrument (plus all equal-ranking and senior debt) at the calculation date. Typically, "project life" will refer to the remaining economic life of the asset. Where a concession is granted that runs for a term less than the expected economic life of the asset such as, in certain social infrastructure PPP financings the remaining project life can be the remaining life of the concession term. In cases where the remaining life of the concession is very long, Ind-Ra substitutes an economic project life depending on the nature of the asset, since it becomes impractical to evaluate project cash flows for a longer period.

The PLCR is a useful alternate metric to the loan life cover ratio in situations where long-term debt is not available, and where cash-flow coverage is too narrow to retire debt over the shorter available debt life. The PLCR looks at the economic capacity to retire debt over the economic life of the project. The discount rate used to calculate the NPV of CFADS will typically be the coupon on the debt, but where refinance risk is analysed, can incorporate varying assumptions about the cost of capital. See Refinance Risk.

Loan Life Cover Ratio

This is the NPV of the CFADS from the calculation date to the maturity of the rated debt instrument plus the initial DSRA and other available cash, divided by the principal outstanding all pari passu and higher ranking debt at the calculation date. Cash flows are discounted at the weighted-average cost of debt to maturity. Residual values at maturity are excluded unless specifically structured to be liquidated. This metric is indicative of total capacity for debt service over the life of the rated instrument.

Maximum Annual Debt Service

This is ratio of the current annual CFADS divided by the maximum debt service during the life of the debt. This metric measures the dependence on growth for a fixed rate, fully amortised debt structure.

Peer Analysis

Where information on appropriate peer projects for which a rating has been assigned is available to Ind-Ra (usually for the same sector, region, and structure), this will be used for comparative analysis of individual risk factors (both qualitative and quantitative) or in establishing the rating, with respect to the peer group. Projects in different sectors or with different structures may present different qualitative features and credit metrics at a similar rating level due to factors such as legal framework, stability of cash flows, or structural features, making such comparisons of less value. Peer analysis is likely to play a more important role in sectors where the portfolio of ratings is more developed. Ind-Ra may use normalising assumptions (such as a common annuity-based amortization schedule) to better compare rated debt with peer projects.

Surveillance

The likely adequacy and frequency of ongoing information will be considered at the time of the initial rating, to determine the prospects of an appropriate standard of surveillance being maintained.

Existing ratings are monitored and reviewed in accordance with Ind-Ra's established criteria and methodologies for the type of rating. Periodic information relating to a project such as financial statements/management accounts, performance data, technical reports, construction progress reports, budgets, and forecasts are expected to be received by Ind-Ra at least once a year until maturity of all rated debt.

Once received, this information is screened for materiality and consistency with the expected case. A decision is then taken whether to initiate a full review of the rating. Significant market events, changes in counterparty ratings, or changes in law or regulation may also trigger a full review. Full reviews are undertaken periodically in any event as required by Ind-Ra's policy. Information received as part of the surveillance process may lead to requests for further information and revisions in the agency's base and stress cases (either quantum or factors).

Rating Sensitivities

Ind-Ra's opinions are forward looking and include the agency's views on future performance. The key rating factors will be affected by changes in project, business and or macroeconomic assumptions. Ind-Ra's infrastructure and project finance ratings are subject to positive or negative adjustments, based on actual or projected financial and operational performance. Below is a non-exhaustive list of the primary sensitivities that can influence ratings and/or Outlook

Completion Risk

Ratings will be sensitive to changes in attributes, reflecting performance difficulties, and to the credit worthiness of the operator, shifts in complexity, ease of contractor replacement, contractual terms or credit enhancement among other completion risk factors.

Revenue Risk

Ratings will be sensitive to changes in the revenue paying counterparty's credit quality, demand for output, diversity of customers, price elasticity of demand, pricing structure or framework, among other revenue risk factors.

Operation Risk

Ratings will be sensitive to changes in the credit worthiness of the operator, availability, productivity, costs relating to operation and maintenance and life cycle among other operating risk factors.

Infrastructure Development and Renewal Risks

Ratings will be sensitive to changes to economic life, concession maturity, capacity and utilisation of the asset, the expected capex requirements and timing thereof and termination compensation among other infrastructure development and renewal factors.

Debt Structure

Ratings will be sensitive to changes in the debt characteristics and terms, structural features, derivatives and contingent obligations, the security package and creditor rights and refinancing risk among other debt structure factors.

Financial Profile

Ratings will be sensitive to changes in leverage, liquidity, interest rates, amortisation profile among other financial profile factors.

Limitations

Ratings, including Rating Watches and Outlooks assigned by Ind-Ra are subject to the limitations specified in the agency's definitions available at http://www. Indiaratings.co.in

If anything in the criteria conflicts or potentially conflicts with any statutory legislations or any regulation or circular that may be released by the regulators, the legislation or regulation is deemed to be final.