Infrastructure & Project Finance Rating Criteria

Master Criteria

Scope

This Master Criteria report identifies factors that Fitch Ratings considers when assigning ratings to Infrastructure & Project Finance obligations and issuers. This methodology also applies to public-private partnerships, infrastructure-like, infrastructure-related and sports entities globally, U.K. whole-business securitizations and U.S. Grant Anticipation Revenue Vehicle (GARVEE) bonds. Issuers may be special purpose vehicles, corporate or public finance entities with single or multiple assets across jurisdictions. The borrower or its affiliate(s) may directly or indirectly own or benefit from the assets or the rights to cash flows from the assets. This Master Criteria report applies globally to new ratings and the surveillance of existing ratings, and is used to assign both international and national ratings. This criteria report is also used in conjunction with other applicable criteria (see *Related Criteria*).

Instrument Ratings: Ratings may be assigned to an individual security, instrument or tranche in a transaction. The ratings of individual debt issues primarily provide a relative vulnerability to default. In limited circumstances where transaction structures provide materially higher than average post-default recoveries that are not otherwise reflected in the relative vulnerability, instrument ratings may be notched for recovery to reflect exceptional lender protection.

Issuer Ratings: Infrastructure or holding company issuers may be assigned Issuer Default Ratings (IDRs), when the relative vulnerability to default for an individual debt instrument is derived through the establishment of an entity or related entity's IDR. They may also be assigned upon request. IDRs opine on an entity's relative vulnerability to default on financial obligations.

Recovery Ratings: Infrastructure & Project Finance obligations may be assigned Recovery Ratings (RRs) as a separate indicator upon issuer request, and as an input into other Fitch ratings.

Key Rating Drivers

The relative influence on a rating of qualitative and quantitative factors varies between entities in a sector, and over time. As a guideline, where one factor is significantly stronger/weaker than others, this stronger/weaker element tends to attract a greater weight in the analysis.

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

Debt Structure: Fitch assesses protections in the transaction structure that support timely payment of debt service. This includes payment waterfall ranking, refinance risk, financial profile, covenant package, structural features, hedging of financial risk, liquidity and reserves.

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This report replaces *Infrastructure & Project Finance Rating Criteria*, dated July 20, 2022.

Related Criteria

Country-Specific Treatment of Recovery Ratings Criteria (March 2023)

Corporate Rating Criteria (October 2022)

Public-Sector Counterparty Obligations in PPP Transactions Rating Criteria (April 2022)

Parent and Subsidiary Linkage Rating Criteria (December 2021)

Completion Risk Rating Criteria (December 2020)

National Scale Ratings Criteria (December 2020)

Corporate Hybrids Treatment and Notching Criteria (November 2020)

Government-Related Entities Rating Criteria (September 2020)

Country Ceilings Criteria (July 2020)

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Other Rating Factors

Financial Profile: Fitch assesses the financial flexibility as a facility encounters stresses expected to occur over the forecast period. Metrics are used to evaluate the issuer's liquidity profile and overall leverage.

Counterparty Risk: Fitch assesses key counterparties (off-takers, concession grantors, warranty providers) for relevant risk factors for their impact on the rated debt.

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

Structure and Information: Risks and risk mitigants flowing from the quality and experience of sponsors, strength of the legal structure and/or the quality of information, are considered.

Macro Risks: Country risk factors, industry-specific risks and the facility's exposure to event risks and mitigating factors to such risks are reflected in the final rating.

Framework

This master criteria report is used by Fitch in conjunction with relevant sector-specific criteria. Sector-specific criteria may provide indicative metrics and stress levels, additional factors, attribute expectations or specific methodologies. The ranking of attributes in this report represents Fitch's analytical views for a wide range of facilities. The lists are not exhaustive and some attributes may simply not be relevant to a specific facility. The attribute tables are not checklists, but qualitative guidance in assessing the attributes of a facility and are only part of the rating process. Specific metrics for the master criteria are identified, but where relevant, additional metrics may be used. In sectors where Fitch has not developed specific sector criteria, the master criteria may be solely used. For projects exposed to both completion risk and operating risk, the overall rating will be constrained by the lower of the two risk assessments.

Not all rating factors in these criteria 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.

For projects and infrastructure debt ratings involving operations across multiple sectors or involving a portfolio of assets with operations in multiple sectors, elements of relevant sector-specific criteria may be used in conjunction with these master criteria. To the extent a material portion of revenues, EBITDA or cash flow available for debt service (CFADS) is derived from one or more specific sector(s), the relevant elements of the sector-specific criteria will be applied to the analysis, with the master criteria remaining the basis for analyzing elements not directly addressed in the sector-specific criteria.

These are global criteria, and the analytical approach to project and infrastructure debt ratings does not differ across political or geographical boundaries, even though each jurisdiction has its own economic and legal characteristics. The rating levels discussed in the master criteria and any sector criteria relate to Fitch's international rating scale. For debt issuances in local markets that require national scale ratings, Fitch will apply a rating within the relevant national scale.

These master criteria and related sector criteria can be used in combination with other Fitch rating criteria. These instances include:

- *National Scale Ratings Criteria*: Where a national rating for an Infrastructure & Project Finance entity rating is issued.
- *Government-Related Entities Rating Criteria*: Where an Infrastructure & Project Finance entity is owned directly or indirectly by a government.
- *Parent and Subsidiary Linkage Rating Criteria*: Where an Infrastructure & Project Finance entity is linked by a parent and subsidiary relationship.

- *Country-Specific Treatment of Recovery Rating:* Where Fitch has been requested to assign an RR to Infrastructure & Project Finance debt instruments.

Fitch may also look to other criteria to enhance its assessment of key rating drivers and financial analysis. Where an Infrastructure & Project Finance entity benefits from tax revenues or is exposed to tax-related expenditures in addition to its operating revenues and expenditures, Fitch will look to *U.S. Public Finance Tax-Supported Rating Criteria* and *International Local and Regional Governments Rating Criteria*, for U.S.-based and non–U.S.-based entities respectively, for revenue and expenditure framework.

Where an Infrastructure & Project Finance entity operates in a sector not covered under Infrastructure & Project Finance sector criteria (such as water, higher education, healthcare), Fitch will look to the *Public Sector Revenue-Supported Entities Rating Criteria* or the *Corporate Rating Criteria*, for publicly and investor-owned entities, respectively, for analytical elements, such as assessments of underlying demand and price as well as indicative financial metrics.

Where an Infrastructure & Project Finance entity operates under a concession, lease or other agreement (referred to herein as a framework agreement) used to support a public-private partnership (PPP), Fitch will look to the *Public-Sector Counterparty Obligations in PPP Transactions Rating Criteria*.

Where an Infrastructure & Project Finance entity has hybrid instruments in their capital structure, Fitch may apply the principles underlying the corporate Hybrids methodology from the *Corporate Hybrids Treatment and Notching Criteria* to determine how the ratings of hybrid instruments are notched down from the IDR and how to determine the equity credit to the instrument.

If analytical elements from any of these criteria, including models, are used during the rating process they will be disclosed in the rating communications.

For an issuer or issue rated 'B' or below, the base case analysis alone may be sufficient to evaluate the risk of default and transition for the debt. By definition, the rating suggests such an issuer will have little capacity to navigate adverse economic conditions. Given the limited number of defaults in the infrastructure sector, metrics are less useful for scaling ratings from 'B' to 'C'. Fitch will make a qualitative assessment of the level of default risk and the extent of any remaining margin of safety indicated by the issuer's overall operating and financial risk profile. In this respect, the Fitch rating definitions associated with rating categories from 'B' to 'C' provide guidance.

Distressed Debt Exchanges

An exchange offer will be considered a distressed debt exchange (DDE) if there is a material reduction in terms compared with the original contractual terms, and the exchange is conducted to avoid bankruptcy, similar insolvency or intervention proceedings, or a traditional payment default. When an exchange or tender offer Fitch considers to be distressed is announced, the IDR will typically be downgraded to 'C', and for bond issues, the instrument ratings will typically be downgraded to the 'C' to 'CCC' range. Completion of a DDE typically results in an IDR being downgraded to 'RD' and an instrument rating to 'D'. Shortly after the DDE is completed, an IDR or instrument will be re-rated, usually still low speculative grade.

Summary Rating Approach — Infrastructure & Project Finance

Qualitative Risk Profile	*Financial Profile*	*Rating Positioning*	*Other Metrics/Factors*	*Peer Analysis*	
Assessment of: • Higher influence Key Rating Factors (typically Revenue/Completion) • Lower influence Key Rating Factors (typically Supply/Operations/ Debt Structure) →	Development of: • Base Case • Rating Case • Sensitivites In the context of issuer's Qualitative Risk Profile →	Key Rating Driver assessment + Fitch Cases = Indicative Rating Level →	Other factors affecting the issuer's credit profile →	Compare transactions with relevant peers →	*Rating*
• Risk profile and potential volatility of the entity's cash flow evaluated through assessment of key rating drivers.	• Incorporates asset-specific/proxy historical and future volatility from Qualitative Risk Assessments. • Base Case reflects expected performance in a normal economic environment. • Rating Case reflects added performance and financial stresses. • Sensitivities reflect individual stresses based on history, peer analysis and expectations.	• Relevant indicative metric tables used to combine Qualitative Risk Profile and Financial Profile to arrive at an indicative rating level.	• Holistic view of all assessments performed along with other factors, such as ownership and sponsors, quality of information, legal framework, external mitigants, macro factors, etc., to ensure all relevant credit factors are incorporated in the rating.	• Relevant comparable transactions within or across sectors and regions are used to arrive at the final rating.	

ESG – Environmental, Social and Governance. Note: ESG-relevant credit considerations are reflected in certain individual key risk and other factors, as shown in green text.
Source: Fitch Ratings

Use of Risk Factor Attributes to Determine Stress Levels

Most risk factors analyzed in these master criteria or the sector-specific criteria will determine types and levels of stresses that Fitch will include, notably through the assumptions underlying the rating case. A weaker attribute would directly translate into a more severe assumption (e.g. assuming more cost volatility would increase the cost stress in a rating case).

Fitch assesses the risk factor attributes on a three-level scale of "stronger", "midrange" and "weaker". In certain instances, such as revenue risk and completion, where relative strength or weakness within each level drives rating distinctions, the scale may be expanded as part of the analytical review process to make greater distinctions within these categories, such as "high stronger" and "stronger", and "high midrange" and "midrange".

The impact of individual attributes will vary by transaction and depend on whether it is determined to be a higher or lower influence to the rating outcome. Higher influence risk factors, such as revenue risk and completion risk, will have a greater influence on the final rating. This will be reflected in the overall attribute assessments and associated indicative metrics applicable. Lower influence risk factors, such as infrastructure renewal and debt structure, will have a more marginal impact on ratings unless there are material unmitigated exposures weighing on the credit profile of a particular transaction.

Other risk factors would work asymmetrically, where only below-standard features would be reflected in stress levels or rating levels, while more credit-positive features are expected to be the rule, and would have a neutral impact on the rating. Below-standard features can in some cases result in Fitch being unable to assign any rating to the issuer or debt instrument.

Fitch may only assess the attribute of risk factors it believes to be a key rating driver, as specified in the rating action commentary or report, and/or in the sector criteria.

Structure and Information

Ownership and Sponsors

Fitch will consider the strength of sponsors when evaluating the impact of stress scenarios on a rating, the ability of an issuer to manage through those stresses and management's ability and track record through cycles of stresses with rated assets.

A highly experienced sponsor who demonstrates strong sustainable strategic ties will be considered positive to the rating. An inexperienced sponsor, who has limited track record of support and no strategic linkages to the transaction, may be negative to the rating. An ownership or sponsorship group with significant experience developing and operating assets within their own sector and geographic markets, and in the region and country in which the transaction is located is viewed positively. Additionally, sponsors with demonstrated experience with technology and markets, and demonstrated willingness to support transactions during economic declines and adverse events are also viewed positively.

The involvement of local parties is considered to be supportive of the rating, as they may be more knowledgeable of and responsive to business and politics in the country. In some cases, sponsors may be public entities or agencies, in which case other factors may prevail (for example, such sponsors would rarely have international expertise but may be in close control of political and regulatory aspects). The agency also considers the issuer's ownership structure and its complexity, 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 or, conversely, evidence of a history of a constructive working relationship including with troubled transactions.

Fitch looks for evidence of the sponsors' commitment to the facility. Sponsors with significant resources, time, and reputation invested in the facility, including higher levels of direct equity investment or guarantees combined with covenants to retain adequate capitalization or public service focus are considered stabilizing factors. The existence of common ownership of related assets that are reliant and integral on each other is considered to be positive to the rating as it indicates a strategically important linkage to the transaction (e.g. a mining entity that owns a portion of the railroad that connects the mine to the port through which the majority of its product is transported could be positive to the rating).

The presence of financially strong sponsors in economically justifiable transactions can provide limited rating benefit to infrastructure debt ratings. In particular, new ratings may not be constrained where marginal support from a financially strong sponsor can alleviate temporary liquidity stress events in Fitch's analysis. Ideally, sponsor support is only for a brief period, and the amount is marginal compared with the capital costs and the sponsor's financial capacity. However, Fitch will not assume that sponsors will systematically provide financial support in a timely manner to honor an issuer's financial obligations, unless there are contractual guarantees.

Ownership and Sponsors

Stronger Attributes	A market-leading sponsor with deep direct management experience of similar transactions; history of support for investments; essential public service sponsored by government or governmental entity; greater than 50% ownership by one sponsor; change of control covenants through debt life; long-term business model or operator on the asset class who evidences sustainable strategic ties to the entity being rated; long track record of management of the rated assets through various economic and operational periods of stress.
Midrange Attributes	A sponsor that has some experience of similar transactions; sponsor with economic incentives to support investments where relevant to a stress scenario during the debt life; minimum ownership and change of control covenants through steady-state operations; track record of management of the rated assets through at least one economic or operational period of stress.
Weaker Attributes	A sponsor that has a lack of meaningful experience in similar transactions; no majority/controlling owner/sponsor; inexperienced or minor trade/financial sponsors; borrowed/leveraged equity; multilayer ownership structure; speculative or short-term business model; very limited track record of management of the rated assets.

Note: Stronger and weaker features could have a positive or negative influence, respectively, on the rating if the role of sponsors is deemed important to the risk characteristics of the transaction.
Source: Fitch Ratings

The Ownership and Sponsors assessment, when taken into account with material risks in the transaction, may lead to a positive or negative adjustment to the rating. The positive rating impact is likely to be limited while the negative impact could be more severe based on the downside exposure present.

Issuer Structures

Entities rated under Fitch's *Infrastructure & Project Finance Rating Criteria* are organized under local law taking into account regulatory, tax, accounting, and corporate governance considerations, among others. Fitch does not expect rated entities to take a particular legal form. It is the isolation of the specific economic entity or transaction to be rated that is key.

Ring-Fenced Structure

Fitch looks to whether or not the assets and operation of the specific economic entity or transaction can be evaluated as an independent entity removed from the risk of insolvency of its owner(s) and affiliate(s). Insulation from the insolvency of owners and affiliates may be achieved through specific contractual or structural features, including the establishment of a restricted group, special purpose vehicle or a trust.

When rating an independent operating entity, Fitch expects key contracts to be in the name of such entity or concluded on behalf of such entity for the sole benefit of the entity. Where a public sector entity owns or controls the Fitch-rated entity, Fitch considers whether or not applicable laws insulate the facility and its cash flows from the insolvency of the public sector entity.

While statutory and contractual protections provide a framework for legal separateness, the conduct of rated entities is also important to Fitch's analysis. Fitch views positively transparent and clear disclosures, filings and officers' certificates confirming that a rated entity is compliant with its bond indenture or loan documents and other organizational or contractual provisions supporting legal separateness.

Corporate Structure

In this criteria report, when evaluating corporate structures, Fitch may consolidate financial statements as part of its analysis when consolidated statements provide 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.

Factors such as ownership structure, funding arrangements, and location-based 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, 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 weak linkage between the parent and the subsidiary being considered for deconsolidation based on the assessment of the parent's level of access to and control over the subsidiary's resources, and legal or regulatory ring-fencing provisions, as described in more detail in Fitch's *Parent and Subsidiary Linkage Rating Criteria.*

Fitch may fully deconsolidate one segment of the group's EBITDA contribution to the consolidated whole with the sustainable cash dividend received from that entity. It may proportionally consolidate in 50:50, or 60:40 joint ventures where equal partners provide equity support or the joint venture's funding expects support from its owners, and importantly, there is relatively greater control of cash. Fitch may adjust for minority interests when an entity is consolidated (as if 100% owned) yet significant minorities exist, thus dividends are paid to those minorities.

Where the issuer is a holding company for the group, the operating subsidiaries may be substantially funded by the parent, and the operating subsidiaries may guarantee the debt of the parent, or have other operational or contractual features that join the group together. Thus, the IDR of the holding company may represent the operations of the group as a whole.

Importantly, Fitch's utilization of a consolidated profile to assess credit worthiness does not mean that all entities within a group will be rated at the same level. The degree of subordination, due to characteristics of debt instruments or the location of debt in the group structure, and the ability to access cash flows within the group structure of an issuing entity, can affect the IDR. For example, a rated entity may be more of a holding company (Holdco) in receipt of contingent dividend income streams than a parent with direct access to all consolidated profit streams. Similarly, prior-ranking funding at lower risk subsidiaries may result in the parent having direct access to riskier activities, rather than to the entirety of the group, as portrayed in the consolidated accounts.

Project Finance Holding Company

When one or more ring-fenced operating companies (Opco) are owned by one Holdco, which is also ring-fenced, and each entity is a single-purpose entity, the ratings of the Opco(s) and Holdco will be separately assessed. The Holdco will have cash flows derived from the dividends available to be distributed by the Opco(s), recognizing that distribution restrictions may exist at the Opco level. The ability of the Holdco to rely on upstreaming of distributions from the Opco(s) is fundamental to determining the Holdco's rating.

The analysis will consider applicable distribution restriction covenants, as there may be situations where the Opco is generating excess cash, but covenants may create dividend lock-ups that may prevent the Holdco from servicing its own debt. Fitch will assess the likelihood of lock-ups by evaluating the cushion above the lock-up trigger. A weak outcome in this lock-up evaluation could constrain the rating where relevant financial ratios would otherwise suggest a higher rating.

The consolidated credit profile, where the Holdco debt is added to the Opco senior debt in the relevant ratios, will act as a cap to the Holdco rating, to reflect the fact that Holdco creditors are structurally subordinated to Opco creditors. Thus, in principle, the Holdco's debt cannot be of better credit quality than the equivalent junior debt at Opco level. Importantly, in situations where the level of influence that the Holdco may exercise on the Opco is deemed to be high, Fitch would apply the approach described above in *Corporate Structure*. This approach includes transactions where the Holdco is the parent company of an infrastructure group and this parent exerts extensive operational, strategic and financial control over the group.

Government-Related Entities (GRE)

Fitch would apply its *Government-Related Entities Rating Criteria* to entities deemed to be government related, namely when a government, either at the national, regional or local level, has sufficient control over the entity for a parent/subsidiary relationship to be present. For clarity, this does not apply to U.S. revenue bond issuers and effectively ringfenced project finance issuers directly or indirectly related to a government. Ratings of ringfenced project finance transactions/issuers are usually driven by and rated in line with the projects' Standalone Credit Profile (SCP).

Fitch may uplift the SCP of a government-owned project financing by up to two notches when the government has extensive decision-making power and strong incentives to provide extraordinary support to the project — directly or via the broader public sector (or through a sponsor GRE), provided the government's credit quality is stronger than the project's SCP. For ringfenced projects indirectly owned by the government through a GRE sponsor, this approach will apply provided Fitch is confident the government will itself be facilitating or providing the support, rather than the GRE sponsor, and any entities in the ownership chain would not prevent the project entity from receiving that government support.

To be rated above the SCP, we expect a project to have most of the Stronger attributes described in the *Government Support — Ringfenced Project Characteristics* table below.

Government Support — Ringfenced Project Characteristics

Stronger Attributes	The government has strong decision-making powers and significant influence on the projects' key operations either directly or through a controlled GRE sponsor. A history of direct government support or active involvement — through controlled GREs — in the project on multiple roles (offtaker, suppliers, land lease provider, transmission line operators, etc.). Large-scale projects are instrumental to achieve long-term strategic objectives in the region, with few other substitutes available.

	The project's default is likely to have a significant impact on the government's reputation and/or challenge future strategic project financings, or the government guaranteed a part of the project's debt.
Neutral Attributes	The government has limited control and/or influence over the project's operations. A limited history of government providing extraordinary support to the public sector. A relatively small-scale project, replaceable or not providing strategic services for the country/region. The project's default has no or limited impact on the government's reputation and/or will not affect future projects' financings.

GRE – Government-related entity. Note: Ring-fenced project finance ratings with neutral attributes are driven by and rated in line with their Standalone Credit Profile (SCP). Stronger attributes present in ringfenced project financings may result in an uplift of up to two notches from the SCP.
Source: Fitch Ratings

Counterparty Risk

Risk transfer to counterparties is a central theme of many infrastructure finance transactions. Fitch assesses the dependence on a counterparty based on an overall assessment of the economic viability of the transaction in the absence of the counterparty. The value of the risk transfer will then depend on the counterparty's financial capacity to absorb that risk. As a general principle, where the financial resources or cash flows of the issuer are highly dependent on the financial performance of a revenue counterparty, its credit quality may act as a constraint to the rating of the issued debt. In other cases, including counterparties related to warranty, completion, cost, supply, liquidity, interest rate or other risks, Fitch's analysis will reflect the risk of replacement.

Unless otherwise compensated, the assessment of the credit quality of a counterparty upon which the issuer has a higher dependency may constrain the rating of the issuer's debt. This would typically be the case in many transactions that have fully contracted revenues. Fitch could rate a transaction above the counterparty's credit quality in circumstances where the counterparty's ability and willingness to meet its contractual obligations is underpinned by statutory, regulatory or public interest obligations, or is a strategic or essential product or service, such that the counterparty is required to or highly likely to continue honoring its obligations during periods of financial distress or insolvency. Such a rating uplift typically would be limited to one to two notches.

The credit quality of a counterparty may not be required or may not constrain the rating of the transaction in cases where counterparty dependency is not high. This is typically in cases where the credit profile of the transaction may be only marginally affected if the counterparty fell away. This could be because there are other product or service providers willing and incentivized to step in at largely commensurate terms, or because a counterparty represents a relatively small or limited exposure for the transaction. Additionally, transactions exposed to systemic risk, where the payment risk ultimately lies with a broader sector or a group of end users are by definition not exposed to any individual counterparty.

The assessment of the credit quality for any counterparty, where financial performance is key to issuer performance, is based on a Fitch input by the relevant analytical group. Where no Fitch public rating of the counterparty is available, an internal, private evaluation of credit quality may be used. Under these circumstances, Fitch also reserves the right to use another NRSRO's public monitored rating when the underlying analytical approach is viewed as largely consistent with Fitch's approach.

If a creditworthy third party provides an unconditional and irrevocable credit guarantee for the obligations of the borrower, constructor, off-taker, supplier, operator or other key transaction party, Fitch would substitute the credit quality of the transaction party with that of the guarantor.

Throughout this report, where a qualitative assessment of risk incorporates, among other elements, the qualification and strength of a counterparty, the classifications in the table below are used when considering financial resources of such counterparty in the context of that overall risk assessment. These are used in the assessments of other risk factors (e.g. debt structure for hedging counterparties or revenue risk, as defined in relevant sector-specific criteria reports). See *Appendix C* for the *Counterparty Risk Summary* table.

Counterparty Characteristics

Stronger Attributes	Predominantly stronger counterparties will have been assessed in the 'A' category or higher.
Midrange Attributes	Predominantly midrange counterparties will have been assessed at 'BB+' or in the 'BBB' category.
Weaker Attributes	Predominantly weaker counterparties will have been assessed at 'BB' or below.

Note: Stronger attributes would result in less severe stresses while weaker attributes will result in wider stresses (revenues and costs), depending on the impact of the attributes to the transaction.
Source: Fitch Ratings

Legal and Regulatory

Fitch's ratings analysis includes consideration of the legal and contractual framework of transaction structures. Transaction frameworks may be principally contract based, or predicated on particular organizational documents, statutes, regulations or constitutional authority. As part of its review of a credit, Fitch considers relevant laws and regulations, the extent of and expectations around the application of regulatory discretion and the substance and enforceability of contractual relationships and security interests. Among other sources of information, Fitch reviews key contracts, term sheets and offering materials, to assess key commercial elements, with particular attention to the allocation or transfer of risk. Mechanisms for dispute resolution are also considered.

Unless otherwise stated in its issue report, where the transaction requires that the contracting parties hold licenses, permits or regulated status, Fitch will seek confirmation that all relevant licenses, permits or regulated status have been obtained and are valid under relevant law. Fitch also considers the risk of loss or renewal of such licenses, permits or regulated status within the particular jurisdiction.

Legal and Regulatory

Neutral to the Rating	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 transaction and financial risk clear but may have performance conditions.
Negative to the Rating	Transaction contracts, regulatory or statutory framework is dependent upon untested legislation or regulation; weak or no legal opinions; contracts not available for inspection; all relevant licenses, permits, or regulated status have not yet been fully obtained.

Note: Weaker features would result in wider stresses applied on the relevant aspects of the transaction (e.g. revenues and costs), depending on the impact of the attributes to the transaction.
Source: Fitch Ratings

Certain matters, such as specific collateral rights or statutory ownership restrictions, are reviewed on a case-by-case basis.

In assessing the legal landscape relevant to ratings, Fitch considers legal opinions or legal memorandums exchanged between project parties and provided by transaction counsel. In certain circumstances, Fitch may also request and review legal opinions addressing discrete legal topics.

Fitch also considers the country of operation (often the location of capital assets) and the country of incorporation of the project vehicle, issuer and other key parties, together with the reliability and creditor orientation of their legal systems (see the *Macro Risks* section).

Data Sources

Fitch's analysis and rating decisions are based on relevant available information. The sources are the issuer, the arranger, third-party engineers or consultants, and the public domain. This includes publicly available information on the issuer, such as audited and unaudited (e.g.

interim) financial statements and regulatory filings. The rating process can incorporate information provided by other third-party sources.

The key rating assumptions for the criteria are informed by Fitch's analysis of transaction documents and of data received from issuers, arrangers, third-party engineers, consultants and other third-parties; discussions with issuers and public information as well as Fitch's analytical judgment.

Information Quality

The quality of information received by Fitch, both quantitative and qualitative, can be a constraining factor for ratings. Information quality may constrain the rating category to a maximum level or in extreme cases preclude the assignment of a rating. Information quality for the initial rating and for surveillance purposes is considered when a rating is first assigned. Fitch 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.

Information Quality

Neutral to the Rating	Data from actual operation; regular updates; 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.
Negative to the Rating[a]	Substantially based on assumptions; extrapolated; subject to material caveats; data often subject to delay; history of revisions or errors; limited scope.

[a]A weaker attribute for Information Quality may lead to the decision not to rate the relevant debt or issuer, as availability of minimum information is critical to assign and maintain a rating. A decision to rate the debt may result in wider stresses (e.g. revenues and costs).
Source: Fitch Ratings

Use of Expert Reports

The information provided to Fitch 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. Fitch will question the source and reliability of the facts presented in these reports, as well as the reasoning and facts supporting forecasts or 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 their forecasts or 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, Fitch 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 Fitch's financial or operational analysis. If possible, reports are compared with similar reports to highlight unusual or apparently optimistic features.

The degree to which Fitch 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, Fitch may request further information or make an appropriate assumption. Where Fitch determines that the reports are not sufficiently supported, complete or reliable, it may choose not to provide a rating.

Expert Reports

Stronger Attributes	Major, specialized third-party advisor; specific experience with technology or sector, jurisdiction 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 (e.g. under the local law).
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.

Note: Stronger attributes would result in less severe stresses, while weaker attributes will result in wider stresses (revenues and costs), depending on the impact of the attribute to the transaction.
Source: Fitch Ratings

Completion Risk

Please refer to *Completion Risk Rating Criteria* for a detailed description of completion risk. Issuers operating infrastructure assets engaging in large capital projects while continuing operations within the context of existing infrastructure facilities will be evaluated under Revenue; Infrastructure Development, Renewal/Obsolescence, Economic Life and Operating risks. Transactions with existing revenue streams that are not dependent on project completion to pay debt service, and projects in a very advanced stage where revenue operation is highly predictable are not materially exposed to completion risk. Specifically, a project that is near completion with greater than 90% advancement in construction, no material outstanding design issues and predominantly high stronger attributes for the Complexity sub-assessment scores (including, technology, environmental/geo-tech risk, major equipment/assets, and permitting/third-party approvals/external interfaces) will not be subject to a detailed completion risk analysis.

Completion Phase While Operations Continue

The management of risks within the context of existing infrastructure facilities is discussed under *Infrastructure Renewal* or *Operations*.

Operation Risk

Operation risk is the risk that the transaction will suffer a reduction in availability, productivity or output or, alternatively, the transaction will incur operating, maintenance or life-cycle costs that are higher than projected. Any of these may result in a reduction in projected cash flows or a breach of contractual performance requirements, reduce the transaction's financial flexibility, and potentially impair the ability of the transaction 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 each 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 infrastructure finance.

Fitch 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. Fitch will review the report of the third-party Technical Advisor (TA) to assess the reasonableness of the proposed operating costs for a transaction. Contracts that appear underpriced 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 positive if they provide an incentive to achieve or surpass projected performance.

Self-Operated Facilities

Large infrastructure facilities are frequently self-operated with some contracting to third parties. In those cases, Fitch 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. Fitch considers the quality of operator an asymmetric attribute. A weak management team may cause the rating to be lower, all other things being equal. The presence of a strong management 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

Standalone project financings typically rely heavily on contractual relationships to transfer risks and operate on a smaller scale. The contractual operator's ability to operate the transaction efficiently and effectively is usually evidenced by past experience with the same type of transaction and technology, ideally in the same country or region, together with adequate resources, including relevant qualified staff. Although these are similar to those for construction contractors, contract periods are typically much longer with a wide range of complexity between transactions from smaller, basic availability schemes to technically advanced, market-exposed large-scale transactions.

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.

Fitch 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 transaction 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 transaction 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.

Operator

Neutral to the Rating	Management team with good record of successfully managing asset; extensive experience with similar transactions; international reach with local experience; multiple alternative operators available; ease of replacement; transaction is a landmark for the operator.
Negative to the Rating[a]	Management team with subpar record of managing revenues and costs; transaction 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; onerous terms; disproportionate penalties; poor reputation; limited in-house resources.

[a]Weaker features would result in wider stresses applied on the relevant aspects of the project/issuer (e.g. revenues, costs) affected by the operator quality.
Source: Fitch Ratings

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 operator over the life of a transaction is judged to be a material factor, it is likely to establish a rating dependency on the operator. The materiality of this risk will also depend on the availability of a replacement operator or other contract party; factors such as specialist skills, size of transaction, and location, as well as contractual remuneration, can assist this evaluation.

Transactions typically retain or require 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 transaction parties. Fitch evaluates the extent to which the issuer or noteholders have rights to replace an operator and the related time in which they can do this. A financially strong operator cannot increase the rating unless they provide binding performance or financial guarantees (including undertakings to absorb costs beyond projected ones).

Operating Costs

Fitch reviews the makeup, timing, and potential volatility of operating costs. Operating costs vary by sector/transaction but usually include some combination of the following: commodities and utilities, labor, 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 transaction 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 supplier 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 (see *Counterparty Risks, Financial Profile and Rating Case* section). For new transactions, Fitch will review third-party engineering reports when assessing future capital expenditure or life-cycle costs, for timing and amount.

For an existing infrastructure facility, Fitch would review 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 risks' mitigation, Fitch will review 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.

The assessment of operating cost risk, relative stability or volatility, and the ability to recover costs within the revenue framework will be reflected in the rating case and the sensitivity analysis. The rating or credit quality of the operator may also determine the need for wider stresses.

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; full pass-through of costs.
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; partial pass through of costs.
Weaker Attributes	High sensitivity of transaction 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.

Note: Stronger attributes would result in less severe stresses while weaker attributes will result in wider stresses (revenues and costs), depending on the impact of the attribute to the transaction. They will also inform the choice of sensitivities and the interpretation of break-even results.
Source: Fitch Ratings

Supply Risk

Some transactions require that a resource or product is available for operation. Examples are transactions 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 forms. Fitch evaluates the risk that these resources or products are not available in sufficient quantities and/or at prices that allow the transaction to operate as projected. In transactions that involve the extraction of a resource or commodity, an assessment of the supply risk will involve an assessment of the sufficiency of reserves and the cost of extracting the commodity. Fitch will review third-party expert studies when addressing these issues.

If a resource or product is supplied to run the project or asset, the agency considers the availability of the resource or product. If liquid markets exist for required commodities, Fitch 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 transactions where supply risk is high, and markets are characterized by illiquidity, Fitch may stress the cost of a volatile commodity. Supply risk may be mitigated by long-term supply contracts with suppliers having a credit quality commensurate with the rating of the debt. These contracts may fix the volume and/or price at which the resource or product is supplied (see the *Counterparty Risk* section).

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 price and volume risks on long-term contract.
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.
Weaker Attributes	Potential for supply constraints; monopolistic supply; poor transportation/utility infrastructure; weakness in connecting infrastructure; reliance on development of reserves.

Note: Stronger attributes will result in less severe stresses while weaker attributes would result in wider stresses (revenues and costs), depending on the impact of the attribute to the transaction. They will also inform the choice of sensitivities and the interpretation of break-even results.
Source: Fitch Ratings

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 transaction's output uneconomical, fixing supply costs through a contract with a supplier having a credit quality commensurate with the rating of the debt can be effective mitigation. However, if the resource or product represents a pass-through cost in determining the revenue of the transaction, then fixing the price of the input is not so important except when reduced off-take volume may result.

Fitch examines how the product or resource is supplied to the transaction, especially in terms of connecting infrastructure or availability of reliable alternative supply routes. The credit quality of any party involved in supplying the resource or product is assessed. If credit quality is not commensurate with the rating of the debt, and price volatility is low, the availability of back-up suppliers may be an effective mitigating factor. This is an analytical question evaluated through stresses considering price volatility, as well as break-even analysis evaluating resilience under historically high price levels. See *Financial Profile and Rating Case*.

Technical Risk

Technical risk during the operating phase centers on maintenance and performance within projected cost. This risk varies significantly by transaction 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.

Technical Risk During Operation

Neutral to the Rating	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.
Negative to the Rating	Proprietary or innovative technology; untested over long term; revenues dependent upon high performance or availability; nondiversified operating assets; material dependence on external supporting technology; safety or environmental norms not finalized.

Note: Weaker features would result in wider stresses applied on the relevant aspects of the project/issuer (e.g. revenues, costs) affected by the technical risk.
Source: Fitch Ratings

Flexible opportunities for maintenance, an experienced operator, and technical risk diversified over several units can provide considerable risk mitigation. Technical risk increases significantly with new and unproven technology. Fitch 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 (see *Use of Expert Reports* section). Similar issues apply to connecting technology. See the *Infrastructure Development and Renewal/Obsolescence/ Economic Life* section.

Decommissioning, Handover, License Renewal Risks

Significant and unique financial risks may occur in the final years of a transaction when it comes 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.

Fitch will assess the impact of these late costs on the debt service profile. Structural features such as grace periods, reserves (such as forward looking maintenance reserve accounts), and forward-looking cash sweep tests are often included in the structure in such cases. The financial analysis will include stresses for affected revenues and costs. Unquantifiable costs associated with decommissioning a facility would limit Fitch's ability to rate a transaction if such costs were incurred while the rated debt is outstanding, or where refinance debt is anticipated, during the term of such refinance debt.

Revenue Risk

Gross revenue of a transaction 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 transaction 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. Fitch will evaluate the relative stability and predictability of cash flow to the transaction when considering its ability to service its debt and specifically, the revenue framework, performance requirements, and exposure to demand for its services, which shape the overall revenue profile.

Revenue Framework

Exposure to demand risk varies widely across transactions. Some transactions have fully contracted revenue streams that provide cash flow, provided the facility is available. Because transactions 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. These combine usage risk with a single concession payer. Where mechanisms for determining revenues are not clear and objective, thereby increasing potential for dispute, Fitch may discount those revenues to reflect a predictable level.

Performance Requirements

Contracted revenue may vary with the quality of the transaction'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 (see the *Operation Risk* section). Where penalties are incurred by the transaction vehicle due to subcontractors, connecting infrastructure, or suppliers, Fitch will evaluate the borrower's ability to pass through such penalties under the subcontract and adjust revenues to reflect any unmitigated risk. As with other compensation payments, including any from an off-taker, counterparty risk may be material.

Broader Demand Risk

Some transactions will be more exposed to demand risks, such as toll roads or 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 transactions, a contractual or regulatory framework will establish the basis upon which revenues are generated, but expose the facility to demand risk to some degree. Fitch 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. This assessment may result in wider or lesser stresses. Some infrastructure facilities have a monopoly on the provision of essential public services 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 transaction's sponsors supporting the transaction economics are reviewed. As part of this analysis, Fitch will request and review any reports or studies conducted by a third-party expert on behalf of the issuer. Such studies, 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.

Fitch may also use its own forecasts and assumptions (e.g. oil and gas price forecasts). 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 transactions and markets where specific performance data are available. Fitch 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 (see the *Financial Profile and Rating Case* section). Like for like, Fitch would expect transactions 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, Fitch will consider the relative dependability of any legal and regulatory incentives in place to sustain the revenues (see *Country Ceiling and Dependability of Legal Regime).*

Revenue Risk

Stronger Attributes	Availability-based revenue; limited deduction risk; limited delivery risk; fixed tariff take-or-pay contracts with strong financial counterparties exceeding rated debt life; no currency mismatch between revenue and costs; minimal reliance on demand or resource forecasts; 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 above-inflationary price increases.
Midrange Attributes	Off-take agreements (with price risk) with midrange financial counterparties; 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; proven ability to pass on inflationary price increases.
Weaker Attributes	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.

Note: Stronger attributes will result in less severe stresses while weaker attributes would result in wider stresses (revenues and costs), depending on the impact of the attribute to the transaction
Source: Fitch Ratings

Infrastructure Development, Renewal/Obsolescence, Economic Life

For debt to be rated, its maturity should be within the expected economic life of the asset or concession contract. To the extent that 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. Fitch 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 to assess financial or operational feasibility which would then determine the level of stresses such as delays or higher costs (see *Appendix A* for *Key Risk Factors for Debt Structure and Infrastructure Development/Renewal*, which supersedes similar sections in sector-specific reports).

Fitch will evaluate the extent to which the costs of infrastructure renewal can be recovered from revenues on a pay-go basis, or with 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 borrowing. The impact of expected additional debt to fund infrastructure renewals can be captured in the rating through the transactions in the financial profile, including the uncertainty of future debt terms to finance the investment.

Fitch considers the following five sub-factors to assess infrastructure, renewal and obsolescence risk: asset condition and obsolescence, asset capacity, maintenance and capex planning, contractual obligations, and access to capex funding.

Asset Condition and Obsolescence

The asset's condition may have knock-on implications for capex, debt needs, O&M costs, and other considerations. Stronger facilities are modern and very well maintained. These may be newly built, or somewhat older yet maintained at regular intervals to high standards with no or minimal deferred maintenance.

By comparison, midrange assets are well-maintained, but may be older and no longer ideal for their purpose. They are fundamentally in adequate to good condition with a manageable degree of deferred maintenance, if applicable. Finally, weaker assets are under-maintained and are likely to face very large and growing backlogs of deferred maintenance.

Obsolescence risk due to more efficient variants, competing innovation, or demand shift is considered against mitigating factors available to the issuer. Fitch will evaluate the capacity of the project/issuer 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 Fitch assuming a shorter economic life and lower revenues in its financial analysis (see the *Financial Profile and Rating Case* section).

Asset Capacity

Fitch considers a facility's capacity in relation to its ability to adequately handle its medium-term forecast demand. Stronger facilities are positioned to have more capacity than required over the medium term. By comparison, midrange facilities may require a limited degree of expansion or refurbishment to meet their forecast demand while weaker facilities would require a large expansion or major refurbishment to meet their forecast demand. Such an undertaking for a weaker facility may fall outside the operator's experience in delivering transactions of such size and scope.

Maintenance and Capex Planning

Fitch considers capital improvement programs (CIP) in the context of the toll road's economic life and traffic capacity headroom based on current traffic levels and takes into account the need for future leverage to preserve or, where necessary, expand the asset. Stronger facilities have detailed CIPs that clearly articulate their short- and long-term maintenance needs, timing expectations and capital planning. Fitch also looks for CIPs that include experienced counterparties and a well-communicated planning process that includes numerous stakeholders early in the process, including users and authorities.

By comparison, a midrange asset may have a CIP that is just moderately well-defined, with somewhat experienced counterparties and more limited dialogue with its various stakeholders. Lastly, weak facilities have CIPs that are undefined or unclear, with inexperienced counterparties and no dialogue with other stakeholders.

Contractual Obligations

Fitch considers a transaction's contractual obligations from the perspective of size, scope, complexity, and flexibility. Stronger transactions have no contractual development obligations or the CIP includes significant flexibility in its rollout plan, such as staged projects dependent on various development thresholds. Although midrange assets have contractual development obligations, they are limited in scope and/or complexity or the CIP has a moderate degree of flexibility, weaker assets have contractual development obligations that are large in scope, complexity, or a CIP with no flexibility in its execution.

Access to Capex Funding

Funding of CIP 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, a CIP predominantly funded with external debt to be secured would typically underpin a weaker assessment.

Termination Compensation Risk

Project Company Default

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 transaction debt may provide for termination if production or availability levels fall below certain critical thresholds.

Termination at Grantor's Option

The grantor of a concession or an off-taker 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. 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 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), the transaction may not be ratable.

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 periods lender step-in rights.
Negative to the Rating[a]	Foreseeable termination events; compensation following termination other than for borrower default (force majeure or grantor option) may be less than debt or unclear; renewal risks.

[a]May be an obstacle to the assignment of a rating.
Source: Fitch Ratings

Macro Risks

Country Ceiling and Dependability of Legal Regime

Country risk analysis for an infrastructure transaction starts with Fitch's sovereign rating and Country Ceiling for the transaction's host country, reflecting the default risk on sovereign obligations and the transfer and convertibility risk, respectively. If Fitch does not rate the country, it will perform an assessment of the credit quality of the sovereign. Absent specific transaction features mitigating country risk, the Country Ceiling imposes an upper limit on the rating of transaction debt but they do not capture all transaction country risk. External support or financial structuring may mitigate transfer and convertibility risk for individual debt instruments (see *Debt Structure*). Fitch does not rate for a change in law, regulation, or tax. Nevertheless, the rating analysis will consider some of the qualitative factors and historical information about how material these risks can be.

In addition to the sovereign rating and Country Ceiling, Fitch reviews the political and regulatory environment in which the project or asset is being constructed and operated. A stable and predictable environment for a transaction is evidenced by the government's commitment, public support, and a consistent application of law and regulation.

Political risk is the risk of changes to laws, regulations or concession contracts governing the operation of infrastructure companies during the life of the asset. It may take the form of unilateral contract variation, specific regulatory actions, exceptional taxes or royalties, forced changes in ownership or control, or outright expropriation. Such political interferences are considered 'Event Risk' or 'Extreme Scenario' and because they cannot be predicted and quantified, they cannot be included in rating cases. This risk is therefore not reflected in the rating.

However, the risk that a regulator modifies some terms of the economic equation of a transaction within its normal powers and duties to determine such parameters (e.g. energy tariffs, tolls or charges), is reviewed and captured in the analysis through other Key Rating Factors, notably the Revenue Risk (in particular through its price element).

A country's general economic condition may not be directly reflected in its sovereign rating or in state/provincial ratings, particularly where there is low debt and strong cash flows from exploitation of natural resources, although there is usually a similar trend. Infrastructure may be weak, skilled labor in short supply, utilities unreliable, and so on, all of which may affect the transaction and hence the debt ratings.

Country Ceiling and Legal Regime

Neutral to the Rating	Country Ceiling above the issuer's intrinsic rating; creditor-friendly and reliable legal system; history of impartiality and respect for contracts; long-term stable economy; supportive regulatory regime; transaction of national importance or essential for public good or services.
Negative to the Rating	Speculative grade; jurisdiction potentially unreliable or not supportive of creditor rights; interventionist tendencies; political or economic instability; endemic delays for permits; public opposition; history of fines or disputes.

Source: Fitch Ratings

Rating Above the Sovereign

The vast majority of infrastructure assets, regardless of the sector (transportation, social infrastructure, energy generation and distribution), operate on a local basis, often in the context of domestic public policy, and as such are correlated to the local economy. The reasons for a linkage are diverse:

- Existence of direct or indirect counterparty risk on the sovereign (as would be the case in social infrastructure transactions, in all likelihood resulting in capping the rating at sovereign level);
- Reliance on domestic banks for funding;
- Economic drivers for infrastructure asset performance, and correlation with country's economic situation (seaports active in import/export of goods and commodities that may decline in a recessionary environment);
- Propensity for governments to increase taxation or increase price control on regulated assets.

Assets that serve critical needs may still be in demand even in economic downturns, regardless of the financial situation of the sovereign. Commuter traffic on urban transit networks could suffer from unemployment, but as long as citizens are working, they have few alternative (and cheaper) options to get to their workplace.

Ratings will be capped at the Country Ceiling absent of certain specific features limiting or eliminating risk related to the implementation of capital controls. On balance, it is unlikely that an infrastructure rating would exceed the sovereign rating by more than three notches. Only in exceptional circumstances, where exposure to local conditions is effectively fully offset, would higher differentiation be achievable.

Industry Risks

The agency considers the transaction in its immediate industry sector in terms of relative competitive position, overall supply, and demand and the general outlook. This includes not only similar transactions but other industry participants such as corporations, state-owned enterprises, and not-for-profit organizations. For this and general industry outlooks, Fitch will rely on its corporate or public finance groups. Barriers to entry or the essential nature of the sector are considered both at a global and local level, including industry-specific regulatory regimes or rules. Closely related industries encompassing suppliers, users, or potential competitors are examined. The nature of demand (essential versus discretionary) is also analyzed and are reflected in revenue generation analysis. Fitch's analysis will reflect this risk by using higher stresses and rating constraints, where appropriate.

Event Risks

When evaluating infrastructure transactions Fitch 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 error or mechanical malfunctions — industrial accident, explosions, forced outage — are identified and the presence of adequate mitigation such as reserves and insurance coverage.

Comprehensive insurance, including business interruption insurance, is a typical tool used by private sector issuers when commonly available. Fitch views positively the inclusion in the transaction of covenants to maintain insurance coverage consistent at levels deemed appropriate by qualified experts to cover potential exposures.

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 in most jurisdictions is one such risk; earthquakes in some jurisdictions are another.

Where an 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 transaction's vulnerability to the identified risk. As an example, flood insurance is not needed for an asset on a hill and the absence of such insurance would not be a rating constraint. Fitch considers terrorist activity to lie outside the scope of ratings in infrastructure as a general rule. Similarly, the application of revolutionary technology or the long-term effects of global warming are not predictable and are not captured by the ratings until they become predictable or have materialized.

Where it is determined that the transaction 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 such an extent that it would hurt 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 there is sufficient liquidity to get through the immediate impact of the event. In some cases, risk mitigation will not be sufficient and the rating may be capped below an investment-grade threshold depending on vulnerability to the uninsured risk.

Debt Structure

In contrast with transaction analysis, which considers the capacity of the transaction to generate cash flow and the stability of those cash flows, the following debt structure analysis considers each rated debt instrument separately, taking into account the payment waterfall ranking, refinance risk, financial profile, covenant package, structural features, hedging financial risk, liquidity and reserves, and security.

Fitch rates infrastructure 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 favorable to the senior tranche. See *Appendix A* for *Key Risk Factors for Debt Structure and Infrastructure Development/Renewal*, which supersedes similar sections in sector-specific reports.

Payment Waterfall Ranking

Ratings on tranched debt securities can be distinguished only where the default on one tranche will not result in a payment default on other senior tranches. Fitch would assess as stronger based on transaction documents outlining structural features if the rated debt instrument is senior ranking, as it has first call on a transaction's cash flows to service it. Rated debt that is second ranking with limited subordination would be assessed at midrange. Fitch would assess as weaker a debt instrument that is deeply subordinated.

In evaluating corporate structures, the degree of subordination, either due to location of the debt in the group structure or the ability to access to cash flows within the group structure of an issuing entity, is assessed within the *Issuer Structures* section.

Refinance Risk

Issuers are exposed to refinance risk when debt is not fully amortized at maturity. As a result, Fitch would consider a fully amortizing debt instrument as stronger.

A debt instrument that is not fully amortizing would be assessed as midrange when the refinance exposure is actively managed by the issuer. A demonstrated history of prudent liability management and a sound strategy to manage the capital structure are indicative of satisfactory mitigation of this exposure. Midrange assessments typically apply to nonfully amortizing debt issued by large enterprise or public sector issuers that actively manage refinance risk in the normal course of business.

Fitch assesses an issuer's strategy and track record of mitigating refinance risk, such as dedicated cash accrued or generic cash accumulation, staggered debt maturities, undrawn committed bank lines, pro-active refinancing, recurring issuances of debt, etc. A midrange assessment for a bullet maturity or partially amortizing debt is warranted in cases where Fitch considers refinance risk as reasonably mitigated. To the extent that a large enterprise or a public sector entity does not satisfactorily manage refinance risk, debt issued by such entity could be assessed as weaker.

Fitch views a debt instrument that is not fully amortizing as structurally weaker when a proven history of market access does not exist, or when there is demonstrable concern about the ability of the issuer to actively manage this risk. Debt instruments that do not fully amortize and are assessed as weaker typically have the following or a subset of the following characteristics: bullet debt or partially amortizing debt issued within a project finance structure, where active liability management is not anticipated; debt supported by cash flows of a single asset or a small number of assets; a new issuer or limited track record of issuance; debt supported by the rights to cash flows generated by assets with a finite useful economic life. The aforementioned characteristics may imply a higher degree of uncertainty with respect to the issuer's ability to refinance debt at a reasonable cost.

The amount of debt outstanding is not a driving factor in Fitch's evaluation of refinance risk. However, it is incorporated in the calculation of the PLCR as discussed in the *Post-Refinance Financial Profile* section. Fitch's approach when analyzing an issuer's financial profile will depend upon whether the debt instrument is assessed as midrange or weaker with respect to refinance risk.

Refinance Risk

Stronger Attributes	Fully amortizing debt.
Midrange Attributes	Proven track record of market access; evergreen public sector asset or large enterprise; diversified and/or dynamically managed portfolio of assets; nonfully amortizing debt; sound strategy and/or established track record of mitigating refinance risk; staggered maturities.
Weaker Attributes	Limited or no track record of issuance/market access; limited asset life and/or single-site project; project finance bullet maturity or partially amortizing debt; lack of significant cash balances; highly concentrated maturities.

Note: Stronger attributes will result in less severe stresses while weaker attributes will result in wider stresses (revenues and costs), depending on the impact of the attribute to the transaction. They will inform the choice of sensitivities and the interpretation of break-even results.
Source: Fitch Ratings

Covenant Package

Creditors may benefit from other covenants than those that restrict payments to sponsors or equity holders, such as regular financial reporting, rate-setting, limitations on additional debt and M&A activities, maintaining separateness, periodic independent technical advisor's reviews. As such Fitch assesses the provision of an "exhaustive and robust" covenant package, being a fully comprehensive list of covenants set at healthy levels, as stronger. An adequate covenant package that would provide less information or control to bondholders would lead to a midrange assessment and a limited or no covenant package would lead to a weaker assessment.

Covenant levels vary commensurate with the revenue risk profile of the transaction. Transactions with stronger profiles, such as large enterprises, and weaker or limited covenants are viewed less negatively. Those with midrange or weaker revenue risk profiles that do not have midrange to stronger covenant packages, such as limitations on cash flow distributions and additional debt, are viewed more negatively.

Structural Features

A debt instrument may benefit from "dividend lock up" triggers that trap or divert cash based on financial ratios, which may be to the benefit or detriment of the instrument, depending upon its priority. 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. Where legal protections between debt tranches are limited the notching will be limited (likely 0–2 notches). However, where legal protections are strong for senior tranches the distinctions may be wider.

Fitch would assess as stronger dividend lock-ups that include forward- and backward-looking tests set at a meaningful level relative to the asset's and sector's volatility. A midrange assessment would result from backward- and/or forward-looking tests set at an adequate level relative to the asset's and sector's volatility. A weaker assessment would relate to debt without lock-up features or backward- and/or forward-looking lock-up tests set at a very low level.

Delayed Draw

For project financings, especially greenfield projects with no existing revenues, typically all sources of capital (equity and debt) have to be committed at financial close. Unfunded equity or debt commitments are typically backstopped by an instrument with a credit quality commensurate with the transaction rating or by an entity with demonstrated financial capacity to ensure timely injections. This includes delayed draw transactions involving institutional investors, commercial banks and other similar investors of debt capital. Operational transactions with proven revenue streams may also choose to issue debt with delayed draw provisions to fund rehabilitation or expansions. Delayed draw exposure will be viewed as minimal provided that delays in implementing capital investments do not materially impact the ability to generate revenue.

For delayed draw debt structures, we will assess the risk of a funding gap or increased funding costs if a funder cannot honor its commitment as well as the other lenders' ability and incentives to increase their commitments, if needed, to ensure transaction completion or avoid a default. The overall transaction rating may be constrained if these risks are not appropriately mitigated. Fitch will have some tolerance where a small subset of committed investors does not meet all of the conditions above.

Hedging of Financial Risk

Fitch will evaluate the debt structure to identify potential financial risks relating to a particular debt instrument. Swaps are commonly used to hedge interest rates but also foreign exchange, inflation, or other risks. Mismatched basis, maturity, or notional may leave open or over-hedged positions. In such cases, Fitch will evaluate the relevant financial risk to assess the issuer's capacity to withstand higher costs or lower revenues. Hedging policies could efficiently reduce exposure to financial risks, but will be assessed within the analysis of counterparty risks.

Fitch would assess as stronger a transaction that is fully hedged and where no financial risk is uncovered. A transaction with up to 20% of unhedged financial risk would result in a midrange assessment. A weaker assessment would ensue if the hedging covered less than 80% of the issuer's financial risks.

Liquidity and Reserves

Liquidity typically provides 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 transaction performance and drawable with minimal conditionality.

A dedicated debt service liquidity including reserves greater than or equal to twelve months debt service (excluding "bullets") would be assessed as stronger. A midrange assessment would result if the liquidity and reserves or Corporate Credit Facility represent more than six months of debt service. Lack of liquidity or representing less than six months debt service would lead to a weaker assessment.

Security

The benefits of security or creditor rights to the rated debtholders 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 & Project Finance rating.

Fitch views positively where pre-enforcement controlling rights can potentially reduce the likelihood of default and are typically the more significant rating aspect of the security package. Fitch also assesses whether 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 transaction owners over their ownership interests in the issuer are present in the transaction. Post enforcement, Fitch would assess whether security interests in key transaction assets and contracts attach in the same rank order as debtholder priority and confer controlling rights prior to enforcement.

Comprehensive inter-creditor agreements limiting the scope for individual pre-emptive action and defining the pre-enforcement controlling class of creditor may reduce uncertainty about transaction assets in adverse circumstances. Much of this requires a reliable and creditor-friendly jurisdiction. Control of material insurance proceeds, either to ensure transaction reinstatement or debt repayment, is also considered a stronger feature. Differences in rights between classes to control remedies following default are noted when rating each class of debt.

Fitch would assess as stronger a security package that is comprehensive including senior-ranking security interests over all or substantially all 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/issuer company; controlling class; early transfer of cash control from operator to trustee. A midrange assessment would result from the presence of security package with weaker or less comprehensive attributes than listed above and/or the presence of a strong negative pledge over all or substantially all assets. The lack of or an ineffective security package or weak negative pledge over a portion of the assets would result in a weaker assessment.

Financial Profile and Rating Case

Fitch 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.

In certain situations, Fitch will evaluate financial flexibility in alternate ways than indicated strictly by the transaction structure to assess its robustness (e.g. even if the contractual payment waterfall dictates that operational costs are required to be paid after debt service, provided that if such costs were unpaid it could materially affect the ability of the asset to operate, Fitch will evaluate coverage ratios both before and after debt service and decide which is the relevant metric to be used in the analysis).

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 transaction. In such cases, assumptions could be based on external sources, such as technical advisors and peer data. Assumptions can directly or indirectly relate to macroeconomic forecasts and projections provided by other analytical departments within Fitch, such as inflation, oil prices, or GDP, or by external reputable providers.

Base Case

For most transactions and issuers, Fitch will establish a base case that results from expected performance in a normal economic environment. This is informed by various sources of information, like historical performance, issuer projections, third-party expert reports, as well as Fitch's criteria and expectations (including Fitch's macro-economic assumptions). These are focused on measuring financial and operational flexibility in the economic environment expected for the relevant forecast period. The agency's analytical assumptions specific to the transaction will be incorporated.

Performance Stress

Having established a base case, Fitch applies a series of stresses to parameters identified as key in the analysis. Parameters such as delays, input and output prices, demand or utilization 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.

Certain key transaction variables may be hedged, either contractually or through natural positions. Fitch considers the effectiveness of such arrangements and any remaining risk from imperfect hedges (basis risk) or residual unhedged positions may be the subject of stress tests. The magnitude of stresses applied may be informed by assessment of volatility reflected in key risk factors qualitative assessments, historical data, third-party expert reports, and sector criteria where applicable.

Financial Risks Stress

Financial stresses are considered in a similar manner to transaction 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. The amount of financial stress applied is based upon relevant macro indicators, e.g. interest rates, GDP or inflation.

Interest-rate stresses on variable interest-rate debt, for example, may be considered in the rating case or breakeven scenarios and will be based on historical patterns in the relevant debt market. Fitch assumes that floating rates remain variable but will apply an above-midcycle rate in the rating case. Fitch will also assess the ability of an issuer to address periodic rate shocks as a rating sensitivity. Interest rate stresses 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.

Rating Case

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 Fitch deems commensurate with the volatility or uncertainty identified for the transaction or issuer's activity. For transactions 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. Sector criteria provide specific indicative guidance on rating levels commensurate with rating case results.

The rating case includes some reasonable downside and does not reflect extreme stresses, which would be addressed through separate sensitivities (see below). However, the rating case includes the fluctuations due to 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 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 the commencement of the downturn to assess the effects on the credit if a downturn occurred at a more vulnerable time for the related transaction or 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 the cash flow that can vary such as production efficiency and operating costs. For example, a wind transaction 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 emphasize Fitch'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 Fitch 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 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, Fitch may consider a combination of other transaction and financial stresses, or a series of individual stresses, based on the base case in the context of history, peer analysis, and Fitch'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.

Break-Evens

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

- A one-off change in a given variable resulting in the 1.0x debt service coverage ratio (DSCR);

- The most adverse constant growth or decline rate over the life of the rated debt, which produces a minimum 1.0x DSCR.

Post-Refinance Financial Profile

Fitch's analysis for a midrange assessment of refinance risk is usually supported by a medium-term pro forma credit view that considers the issuer's historical and evolving management strategy and financial policies. Fitch also evaluates expected leverage at the time of refinancing to form a view with respect to the issuer's ability to replace a debt obligation with new debt at maturity. Fitch applies interest rate stresses to the debt instruments placed by these proven issuers in Fitch's financial analysis (see *Financial Risks Stress* section).

Fitch's analysis for a weaker assessment of refinance risk recognizes the rating should be linked to the post-refinance financial profile unless the pre-refinance credit profile is comparatively weaker. Fitch calculates a PLCR, which compares the amount of debt outstanding at the point of refinancing to the value of projected cash flows under rating case conditions, to assess the strength of the post-refinance financial profile (see *Financial Risks Stress* section).

The duration of the post-refinance period during which cash flows are forecast for the PLCR calculation is based upon a number of factors that could affect the useful economic life of the assets. Relevant factors may include the expiry of key contracts, prospective technical obsolescence, the condition of the assets, macroeconomic factors and/or uncertainty in the relevant market/political environment. Fitch's evaluation of the useful economic life is guided by sector-specific criteria, comparable transactions and independent technical analyses.

The PLCR discount rate comprises the base case interest rate plus a level of stress that reflects that debt instrument's interest rate risk. The stress recognizes that issuers typically have limited flexibility to proactively mitigate refinance risk for debt instruments assessed as weaker and are therefore more vulnerable to increases in prevailing interest rates. The degree of stress applied to base case interest rates is a function of Fitch's qualitative assessments of both project-specific factors and financial market-specific considerations.

Fitch may moderate or eliminate the level of stress for debt instruments that have been evaluated as non-investment grade for reasons other than refinance risk. This treatment recognizes the incremental nature of refinance risk when financial metrics have already been heavily stressed.

The PLCR is evaluated based upon the DSCR indicative ranges or other financial metrics as per relevant sector-specific criteria. The DSCR indicative ranges and other financial metrics are a guide, not a prescription for achieving a specific rating.

Metrics

The results of these stresses are typically summarized 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 transaction and the potential volatility of cash flows. Any sector-specific criteria may include medians and ranges typical for the relevant sector.

Such metrics are an input in determining Fitch's views on certain risks and, in particular, their impact on a transaction'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.

Where metrics indicated in sector-specific criteria are not applicable or project-specific circumstances warrant further consideration, Fitch may evaluate supplemental or complementary metrics. If it is not feasible to calculate a financial metric, Fitch may utilize substitute measures of financial performance.

Models

Fitch uses the following models when rating Infrastructure & Project Finance transactions: the GIG AST Model (AST), the Infrastructure and Project Finance Forecasting Model (InForM), the Corporate Monitoring and Forecasting Model (COMFORT), sector-specific models that are detailed in sector-specific criteria and third-party models. The models that best reflect the structure and the risks of the transaction will be selected for use.

GIG AST Model

The AST Model provides basic cash flow projections and related metrics to support the rating analysis as per the *Infrastructure & Project Finance Rating Criteria*. It is typically used in transactions with a predictable asset base or revenue stream and its setup is also suitable for transactions that require a long-term pro forma credit view, such as through the life of the debt or the useful life of the asset.

The model supports Fitch's base and rating case assumptions and outputs, as well as additional sensitivity scenarios (i.e. stress cases and break-even analyses), AST outputs include financial metrics — various debt service coverage ratios and leverage (net debt to CFADS) calculations — as well as sector-specific operating metrics, for example MADS, and break-even and residual (in the case of some airport credits) analysis.

Starting from recent historical years when data is available, AST provides an internal method to project various operating and financial results by either applying a percentage change or incremental change to the prior period's value, or by using absolute amounts. AST is populated by entering historical data and appropriate assumptions for each case. AST allows users flexibility to include, exclude or adjust specific line items as required to meet variations in the treatment and reporting of operating and financial line items that are analytically appropriate for the transaction. The AST model does not employ any statistical modelling techniques, nor are any standard forecast assumptions applied.

InForM Model

The InForM is a forecasting model with balance sheet, and profit-and-loss and income statements used to project the key leverage ratios. InForM is typically used in transactions when a medium-term pro forma credit view is adequate given an issuer's evolving management strategy and financial policies and the analytical approach depends on the generation of projected financial statements.

Its primary purpose is to support Fitch's rating analysis by ensuring the key leverage ratios are projected in a globally consistent fashion to generate issuer-specific financial forecasts in line with Fitch's methodologies for use in rating committees. The model does not employ any statistical modelling techniques, nor are any standard forecast assumptions applied.

The InForM model may not be used when Fitch needs to adjust the balance sheet structure (e.g., when a large portion of the business needs to be deconsolidated or partially de-consolidated), in which case forecasts will be produced using a bespoke approach.

COMFORT Model

COMFORT is typically used when a medium-term pro forma credit view is adequate given an issuer's evolving management strategy and financial policies.

InForM and COMFORT may be used interchangeably as the two models do not produce materially different outputs (i.e. the use of a model versus the other is not expected to result in a different rating, outlook or key rating factor assessment).

For a description of the Comfort Model please refer to the *Corporate Rating Criteria.*

Third-Party Models

Due to the idiosyncratic and complex nature of transactions and issuers, Fitch also may use third-party models provided by the issuer and its agents, if they better reflect the many individual features of the credit. The agency considers the plausibility of results from external cash flow models, for example by reviewing key formulae, examining trends and the model's behavior when sensitized. Despite these precautions, as with all types of information provided by issuers, Fitch is dependent on sponsors or issuers ensuring that the information is timely, accurate and complete. Failure to do so may result in the withdrawal of ratings. The independent audit or review of external cash flow models by a reputable third party is viewed positively by Fitch. This is of particular importance for very complex models as they provide an added level of comfort that the model is working as intended. In certain instances, if Fitch is unable to replicate the calculations in a third-party model the absence of an independent audit may cause the transaction to be unratable or an existing rating to be withdrawn.

Use of Models

Models used in project and infrastructure finance project operational cash flows, available liquidity, debt balances, debt service and resulting financial metrics. These models are not stochastic. Fitch may modify sponsor/management case assumptions in its base and rating cases as part of its analytical process. Models allow single and combined factor sensitivities to assess the possible impact the ability to service debt.

Credit-Related Assumptions

There are no embedded Fitch credit-related assumptions (including hard-coded, hidden or default values) in the models.

Application of Assumptions

Fitch uses financial models to apply a range of stresses reflecting its assessment of the key rating drivers of the transaction, with the aim of assessing the capacity of the cash flow to repay each rated instrument given the features of the applicable debt structure. The stresses applied are asset- or transaction-specific.

Significance of Model Outputs

Model outputs are one of a number of factors in the determination of the rating. Model outputs are used in conjunction with relevant indicative metric tables. However, a transaction for which model outputs show a strong ability to repay rated debt may still be assigned a lower or speculative-grade rating if more qualitative risks (for instance, off-taker risk, counterparty risk, country risk, sponsor insolvency, or industry risk) are deemed material.

Peer Analysis

Where information on peers for which a rating has been assigned is available (usually for the same sector, region, and structure) this will be used for comparative analysis of individual risk factors (both qualitative and quantitative).

Where no specific sector criteria apply completely, appropriate key rating drivers and relevant metrics will be determined on a basis that seeks consistency and comparability with assets and sectors having similar risk profiles. For example, an LNG facility is evaluated under the master criteria and the analysis follows some elements of the approach adopted in criteria for thermal power transactions. A highway service area facility and a parking facility are evaluated under the master criteria and the analysis follows the approach adopted in toll road criteria.

Even if a transaction meets the indicative financial metrics for a specific rating level, other factors may constrain it to a lower rating. Factors such as weak sponsors, excessive technical risk, partial merchant exposure, sub-investment-grade counterparties or other key risk factor assessments may support a lower rating. 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 the facility.

Surveillance

Unless specified in either sector or cross-sector criteria, there are no differences between the process for the initial rating of a transaction or subsequent surveillance reviews of the rating. Fitch monitors and reviews existing ratings in accordance with this criteria and applicable sector criteria for the type of rating. Fitch reviews periodic information on a transaction, in addition to that received at inception — such as financial statements/management accounts, performance data, technical reports, construction progress reports, budgets, and forecasts — 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 trigger a full review. Full reviews are undertaken periodically in any event as required by Fitch policy. Information received as part of the surveillance process may lead to requests for further information and revisions in Fitch's base and stress cases (either quantum or factors).

Rating Assumption Sensitivity

Fitch's opinions are forward looking and include Fitch's views of future performance. The key rating factors will be affected by changes in transaction, business and or macro-economic assumptions. Fitch's Infrastructure & Project Finance ratings are subject to positive or negative adjustment, based on actual or projected financial and operational performance. Below is a non-exhaustive list of the primary sensitivities that can influence the ratings and/or Outlook.

Completion Risk

Ratings will be sensitive to changes in attributes, reflecting performance difficulties, and to the credit worthiness of the contractor, shifts in complexity, ease of contractor replacement, contract terms, replacement cost premium, or performance and liquid security, 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

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

Debt Structure

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

Financial Profile

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

Criteria Variations

Fitch's criteria are designed to be used in conjunction with experienced analytical judgment exercised through a committee process. The combination of transparent criteria, analytical judgment applied on a transaction by transaction or issuer by issuer basis, and full disclosure via rating commentary strengthens Fitch's rating process while assisting market participants in understanding the analysis behind our ratings. A rating committee may adjust the application of these criteria to reflect the risks of a specific transaction or entity. Such adjustments are called variations. All variations will be disclosed in the respective rating action commentaries, including their impact on the rating where appropriate. A variation can be approved by a rating committee where the risk feature, or other factor relevant to the assignment of a rating and the methodology applied to it are both included within the scope of the criteria, but where the analysis described in the criteria requires modification to address factors specific to the particular transaction or entity.

Limitations

Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's Ratings Definitions, available at https://www.fitchratings.com/site/definitions.

Criteria Disclosure

Fitch expects to disclose the following items in reports and/or rating agency commentary:

- Key rating drivers and their assessment;
- Financial metrics;
- Peer analysis;
- Main analytical assumptions;
- Rating sensitivities;
- Analytical elements used in the rating process that pertain to the *U.S. Public Finance Tax-Supported Rating Criteria*; *International Local and Regional Governments Rating Criteria; Public Sector*, *Revenue-Supported Entities Rating Criteria;* or the *Corporate Rating Criteria; Public-Sector Counterparty Obligations in PPP Transactions Rating Criteria*; *Corporate Hybrids Treatment and Notching Criteria;* and relevant parts of sector-specific criteria when applicable, as per the framework section.

Moreover, any variations to criteria will be detailed in Fitch's transaction reports (as mentioned above).

Appendix A

Key Risk Factors for Debt Structure and Infrastructure Development/Renewal

Assessment	Debt Structure	Infrastructure Development and Renewal
Stronger	• Senior ranking • Fully amortizing debt • Exhaustive and robust covenant package • Forward- and backward-looking dividend lock-up set at a meaningful level • Fully hedged/no unhedged financial risk • Dedicated debt service liquidity including reserves greater than or equal to the next 12 months debt service (excluding bullets) • Comprehensive and strong security package • No delayed draw risk in transaction structure	• Modern very well maintained asset/facility with limited obsolescence risk • Capacity above medium-term throughput forecasts • Short-term and long-term maintenance needs, timing and capital planning are highly defined, experienced counterparties and dialogue with users/authorities • No contractual development obligations or capex plan has significant flexibility in rollout plan • Access to levels of excess cash flow or clear demonstration of access to external funding to more than cover requirements
Midrange	• Second-ranking debt with limited subordination • Proven market access; diversified or evergreen assets; nonfully amortizing; sound strategy to manage refinance risk; staggered maturities • Adequate covenant package • Backward- and/or forward-looking dividend lock-up set at an adequate level • Up to 20% of unhedged financial risk • Dedicated debt service liquidity or corporate credit facilities including reserves greater than or equal to the next six months debt service (excluding bullets) • Adequate security package and/or strong negative pledge • Limited delayed draw risk in transaction structure	• Well-maintained asset/facility with potential obsolescence risk • Capacity requires limited expansion or refurbishment to meet medium-term forecasts well within the Issuers experience • Short- and long-term maintenance plans are defined, although timing and capital planning are uncertain, moderately experienced counterparties, and some dialogue with users/authorities • Limited, in scope, contractual development obligations or capex plan has some degree of flexibility in rollout • Moderate levels of excess cash flow or some evidence of access to external funding but falls short of covering requirements
Weaker	• Deeply subordinated • Limited/no track record of market access; limited life or single-site asset; bullet maturity or partially amortizing; limited cash balances; highly concentrated maturities • No or very limited covenant package • No dividend lock-up or backward- and/or forward-looking lock-up set at a very low level • Over 20% of unhedged financial risk • Dedicated debt service liquidity including reserves less than the next six months debt services (excluding bullets) • No or limited security package/weak negative pledge • Elevated delayed draw risk in transaction structure	• Undermaintained asset/facility with high likelihood of obsolescence risk • Capacity requires large expansion or refurbishment to meet medium-term forecasts and/or far outside the issuer's experience • Short- and long-term maintenance needs, timing and capital planning are undefined and unclear, with history of deferred maintenance and/or cost overruns or inexperienced counterparties and no dialogue with users/authorities • Large, in scope, contractual development obligations or capex plan has no flexibility in rollout plan • Limited levels of excess cash flow or no demonstration of access to external funding and not able to cover requirements

Source: Fitch Ratings

Appendix B — Definitions for Financial Metrics

Cash Flow Available for Debt Service

Typically, CFADS in any period 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 whose cash flows are not materially impaired by the deferment of lifecycle costs, CFADS may be calculated excluding 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 cash flows and/or borrowings.

Earnings Before Interest, Tax, Depreciation and Amortization (EBITDA)

EBITDA in any period is calculated as the revenue generated by the asset less its operating expenses.

Debt Service Coverage Ratio

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 transactions exposed to seasonality. Both minimum and average periodic DSCRs are taken into account in the analysis as they indicate the 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 over time.

Interest Coverage Ratio (ICR)

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

Post-Maintenance Interest Coverage Ratio (PMICR)

The PMICR is similar to the 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 essential public services, or when debt is not amortizing.

Project Life Coverage Ratio (PLCR)

This is the net present value (NPV) of CFADS over the remaining project life, plus initial debt service reserve account (DSRA) and other available cash, divided by the principal outstanding on the rated debt instrument (plus all equal-ranking and senior debt) at the calculation date. 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 long, Fitch substitutes an economic project life depending on the nature of the asset, because it becomes impractical to evaluate project cash flows for a longer period.

The PLCR is a useful alternate metric to the LLCR 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/transaction. The discount rate used to calculate the NPV of CFADS will typically be the coupon on the debt but can incorporate varying assumptions about the cost of capital depending upon project/transaction-specific circumstance.

Loan Life Coverage Ratio (LLCR)

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 measures the total capacity for debt service over the life of the rated instrument.

Maximum Annual Debt Service (MADS)

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 amortizing debt structure.

Net Debt to Regulated Asset Base

This is a ratio of the project or transaction's net debt position to its value of net invested capital for regulatory purposes.

Operating and Finance/Capital Leases

Payments made under operating and finance/capital leases are usually considered operating expenses. However, when appropriate and material for the analysis, in situations where the lease effectively reflects a long-term capital asset acquisition that is a critical component of the underlying business, with the leased asset having a long-term remaining useful life, Fitch may consider the finance/capital lease as equivalent to debt.

Appendix C

Counterparty Risk Summary

Counterparty Type	Role and Relevancy	Term of Relevancy	Likely Influence to Rating
Construction Contractor	• Entities contracted to complete project construction on time and on budget to allow revenue generation (demand or availability-pay) • Examples include design build contractors, engineer-procure-construct contractors	• Construction period	• Stronger or midrange qualitative attribute assessments or performance/liquid security may enhance project credit quality above the contractor • However, weaker qualitative attribute assessments may constrain ratings to or below the credit quality of the contractor • See *Completion Risk Rating Criteria* for more details
Operator	• Entities contracted to operate project under relevant agreements • Examples include port, power plant and LNG operators	• Can be either short to medium term or full term of project debt	• Rating may be constrained to credit quality of the contractor if replacements are unavailable • Stresses to costs (operating and/or major maintenance) or related revenue deductions to reflect performance/ replacement/renewal risks
Supplier	• Parties delivering critical inputs for successful operations • Examples include natural gas/fuel, replacement parts, turbines, solar panels, rolling stock	• Can be relevant at project initiation during construction and operating periods • Can be relevant for full term of project debt	• Rating may be constrained to credit quality of the contractor if replacements are unavailable • Stresses to supply related costs and availability to reflect performance/replacement/renewal risks
Revenue	• Parties under contractual obligation, subject to terms of project agreement, to support full or partial project revenues • Examples include grantors of public-private partnerships, off-takers, airlines, shipping lines, facility lessors	• Can be relevant at project initiation during construction and operating periods • Can be relevant for full term of project debt	• Rating may be constrained to credit quality of the revenue counterparty • Stresses to project revenues to reflect volatility in demand, pricing or performance
Financial	• Financial entities that have a material impact to the project's debt structure and cash flows • Examples include hedge/swap providers, LOCs used to meet equity or reserve requirements, investors, financial/surety guarantors, insurance providers	• Can be relevant at project initiation during construction and operating periods • Can be relevant for full term of project debt	• Rating may be constrained to credit quality of the financial counterparty • Stresses or interruptions to cash flows

LNG – Liquefied natural gas
Source: Fitch Ratings

Appendix D — Factors Distinguishing Between Short-Term Ratings

Short-term ratings are relatively rare in the infrastructure portfolio, and have been traditionally assigned by applying the principles of the overall rating correspondence table. By their nature, Fitch does not expect to assign short-term ratings to project finance entities.

For infrastructure issuers to whom short-term ratings are assigned, the higher short-term rating will be assigned based upon the combination of three factors, namely the strength of the liquidity ratio, the assessment of revenue risk and debt structure. The thresholds detailed in this criteria report to achieve the higher short-term rating option only apply to international scale ratings. For short-term ratings assigned on the national scale, Fitch would typically default to the lower of the two options available.

Fitch would assign the higher short-term rating when revenue risk is assessed as stronger, debt structure assessed as at least midrange and the liquidity ratio is higher than indicated in the *Thresholds for Higher-Rated Short-Term Ratings — Infrastructure & Project Finance* table below. When revenue risk is assessed through its components of volume and price, Fitch would assign the higher short-term rating when either is assessed as stronger and the other as at least midrange. For 'A' or 'A+' long-term rated issuers, the higher short-term rating could be assigned at a lower liquidity ratio, if both revenue risk components are assessed as stronger.

We would not automatically downgrade the short-term rating to the baseline if an issuer presents clear plans to rectify its liquidity position if its liquidity ratio drops below the threshold in the outer year defined in the *Thresholds for Higher-Rated Short-Term Ratings — Infrastructure & Project Finance* table below. Similarly, we would not consider an upgrade if we thought the reasons for the strong liquidity ratio were temporary in nature.

Thresholds for Higher Rated Short-Term Ratings — Infrastructure & Project Finance

Higher Short-Term Rating	Liquidity Ratio (x)	Forecast Years in Compliance	Revenue Risk	Revenue Risk: Volume	Revenue Risk: Price	Debt Structure
A+/F1+	> 1.25	2	—	Stronger	Stronger	At least midrange
A/F1+		3				
A+/F1+	> 2.00 for Each Year	2	Stronger	One stronger, the other at least midrange		
A/F1+		3				
A–/F1		2				
BBB+/F1		3				
BBB/F2		2				

Source: Fitch Ratings

The liquidity ratio is calculated under the Fitch Rating Case as follows:

- Previous year's readily available cash + available committed credit facilities + current year FCF if positive;
- Debt and credit facilities maturing in the current year + current year FCF if negative.

To calculate the liquidity ratios for the first forecast year we assume all the committed facilities are drawn that year. The readily available cash of the subsequent years includes any committed liquidity facility proceeds not used the previous year to fund maturing debt, credit facilities or negative FCF.

Definitions (Specific to Infrastructure & Project Finance Short-Term Ratings Methodology)

Free Cash Flow (FCF)	Cash flow available for debt service (CFADS) minus interest paid minus common dividends plus total non-operating and nonrecurring cash flow. Excludes share buyback/special dividends and business acquisition or divestment (except when closed but yet to be settled).
Readily Available Cash	Cash plus debt service reserve accounts plus marketable securities, less cash reported as restricted or blocked less cash deemed by Fitch as not readily available. In the first forecast year, readily available cash will include any actual debt issuance that has occurred to date.
Marketable Securities	Fitch haircuts the value of different types of financial instruments classified as marketable securities based on their characteristics, such as vulnerability to changes in interest rates and inflation and market liquidity, independent of any ratings the instruments may have as these market-driven characteristics are generally not encompassed in a credit rating.

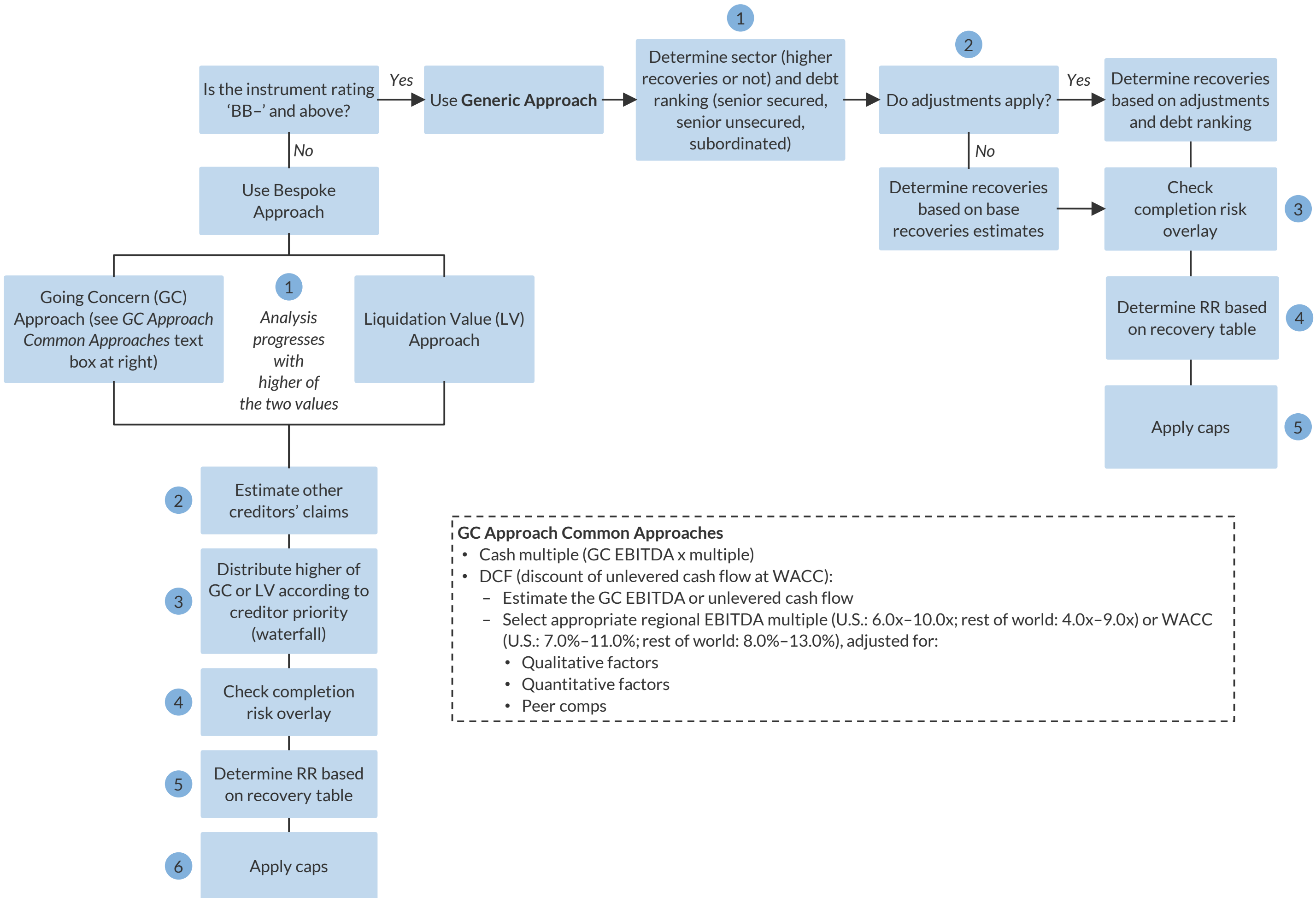
Source: Fitch Ratings

Appendix E — Recovery Ratings

This framework applies where Fitch has been requested to provide additional information on likely recovery prospects and commensurate RRs in the event of default to instrument ratings of Infrastructure & Project Finance issuers. The assigned RRs do not influence the instrument rating, which shall continue to be premised on vulnerability to default. Rating levels discussed in this appendix relate to Fitch's international credit rating scale, or equivalent in the case of national scale ratings, using the applicable correspondence table.

- **Approach:** Fitch employs two distinct methodologies to assigning RRs depending on the instrument rating: a bespoke approach and a generic approach;
- **RR Bands:** Fitch divides the spectrum of recovery percentages from 0% to 100% into six categories or RRs;
- **Country Caps Apply:** Fitch applies country caps to RRs driven by the creditor-friendliness (or otherwise) of jurisdictions and the enforceability of security in the event of a default per the *Country-Specific Treatment of Recovery Ratings Criteria*.

Summary Rating Approach



RR – Recovery Rating. DCF – Discounted cash flow. WACC – Weighted average cost of capital. Note: All Recovery Rating assignments and notching are subject to the *Country-Specific Treatment of Recovery Ratings Criteria*.
Source: Fitch Ratings

Analytical Framework — Bespoke Versus Generic Approach

Bespoke Approach

This applies to instrument ratings of 'B+' and below, because recovery prospects are more meaningful to investors. For each instrument, Fitch calculates the estimated recovery upon default and assigns an RR band, graded 'RR1' to 'RR6'. In the Bespoke Approach, Fitch estimates the value available to creditors through either a going-concern (GC) or liquidation lens. Fitch's recovery analysis will use the higher of the GC enterprise value (EV) or liquidation value (LV), and this value is distributed to the various creditor classes according to their order of priority. This drives the RR assigned to the instrument rating. We describe our approach in greater detail below.

RR Caps for Bespoke Approach

In the Bespoke Approach, we apply certain caps to unsecured and subordinated debt. Additionally, Fitch applies country caps to RRs driven by the creditor-friendliness (or otherwise) of jurisdictions and the enforceability of security in the event of a default per the *Country-Specific Treatment of Recovery Ratings Criteria*.

Generic Approach

This applies to instrument ratings of 'BB–' and above, where Fitch uses an approach that reflects generic assumptions about recoveries instead of issuer-specific recoveries. Historical evidence shows that some infrastructure sectors may benefit from above-average recoveries upon default. We refer to these sectors as Higher Recoveries Sectors in this appendix, and they include contracted utilities and availability-based projects in operations.

RR Caps for Generic Approach

In the Generic Approach, we apply certain caps across the different liens within the capital structure. As with the Bespoke Approach, we also apply country caps per the *Country-Specific Treatment of Recovery Ratings Criteria*.

Analytical Framework for Instruments Rated 'BB–' or Above

Under its Generic Approach for rating instruments at 'BB–' or above, Fitch will establish RRs referring, for the most part, to aggregate historical recoveries in the infrastructure market, as adjusted to reflect a few salient characteristics of each individual transaction. Country caps and other constraints may apply, as discussed more in detail below.

The higher expected recovery values in the Higher Recoveries Sectors are based on observations of actual defaults and bankruptcies in these sectors and their outcomes, although relatively sparse, as well as their common economic characteristics. These characteristics include natural-monopoly-style asset bases and franchises with formidable cost, planning and investment barriers to entry for competitors, where competition is permitted; regulated tariffs and customers' high dependence on the services; the essential nature of services; little or no exposure to commodity price and volume risks; and only modest cash flow and capital structure changes over the course of a business cycle. For example, projects with availability-type payments would typically fall into this definition.

Below is a description of the steps Fitch will go through to assign RRs for instrument ratings at 'BB–' or above.

Step 1 — Select Appropriate Recovery Starting Point

The starting point would be established by looking at aggregate recoveries in the infrastructure market as a whole, based on the *Base Recoveries Estimates for Infrastructure* table below.

Base Recoveries Estimates for Infrastructure

(%)	Senior Secured	Senior Unsecured	Subordinated
Higher Recovery Sectors	80	55	5
All Other Sectors	65	45	5

Source: Fitch Ratings

Senior secured refers to debt without material prior ranking obligation and with first-lien security on real assets or concession rights/receivables. Senior unsecured debt refers to debt without material prior ranking obligation but lacking a robust security package. Subordinated debt refers to debt obligation contractually subordinated to senior debt (either secured or unsecured), unless the prior-ranking debt is limited.

In the case of a multitier capital structure, with more than one lien of secured debt, Fitch will apply the base recoveries estimates of senior unsecured debt to the second lien of secured debt and will apply the base recoveries estimates of subordinated debt to the most junior debt tranche. To the extent there are other intermediate tranches, Fitch will make a case-by-case determination on applicable base recoveries.

Step 2 — Apply Adjustments

Adjustments tend to factor some specific features of the transactions in RRs. These primarily include the below. However, Fitch's rating committees have the discretion to use other analytically appropriate adjustments, in isolation or in conjunction with the primary ones, that are clearly articulated and supported in RR rationales.

Generic Approach — Primary Adjustment Table

Transaction Features	Unusual and material contractual features related to, for example, contract provisions, strong/weak counterparty or asset/transaction structure. Upside is typically limited to +10 percentage points while there are no limits on downward adjustment.
Termination Provisions	Based on a scrutiny of the contract termination provisions and the supportiveness of the regulation. This may define the process/timing and the counterparty responsible for the termination payment, including any potential floor or cap. Fitch would also look at the track record in similar cases. Upside and downside adjustments are unlimited.
Issuer Structure	Account for location of the debt within a group structure. Holdco debt is typically treated as subordinated debt, unless there is limited prior-ranking debt at Opco level.

Holdco – Holding company. Opco – Operating company
Source: Fitch Ratings

Step 3 — Completion Risk Overlay

For projects presenting material construction risk, Fitch also estimates the recovery prospects if a project were to default during the construction phase. The recovery prospects during construction would primarily depend on Fitch's assessment of qualitative project attributes and analysis of contractor default and security per the *Completion Risk Rating Criteria*, as discussed in more details in the *Analytical Framework for Instruments Rated 'B+' and Below* section on the next page.

Step 4 — Assign RR

Fitch will translate the estimated recovery into a RR using the following recovery table.

Recovery Table

Recovery Rating	Estimated Recovery (%)
RR1	91–100
RR2	71–90
RR3	51–70
RR4	31–50
RR5	11–30
RR6	0–10

Source: Fitch Ratings

Step 5 — Apply Caps

Senior unsecured debt is capped at 'RR3' and subordinated debt is capped at 'RR5'.

Finally, Fitch also applies country caps per the *Country-Specific Treatment of Recovery Ratings Criteria*.

Analytical Framework for Instruments Rated 'B+' and Below

Fitch applies a bespoke analysis to assign RRs to instruments rated 'B+' and below. The bespoke analysis includes an estimate of the post-restructuring EV or LV, an estimate of other creditors' claims and an allocation of the greater of EV or LV to creditors according to the relative seniority of their claims. Country caps and other constraints may apply, as discussed more in detail below.

Step 1 — Estimate a Post-Restructuring EV or LV

Fitch estimates the value available to creditors through either a GC or liquidation lens. Fitch assumes that when an issuer's estimated GC value is greater than its LV, the company would be expected to attempt to reorganize and continue to operate. We will apply the LV approach only where a liquidation of the assets results in a higher return to creditors.

The LV approach usually involves reference to the book value of balance sheet assets, as discounted, to estimate the total liquidation proceeds in a hypothetical liquidation process. For projects under concession, the LV would be equal to the value calculated according to the relevant termination provisions (insolvency, serious breach of concessionaire duties, force majeure, public interest, etc.). Rating committees may decide to apply appropriate discounts on account of the wording included in the termination clauses, the counterparty due to make the final payment, and its track record in similar cases.

Fitch calculates the GC post-restructuring EV in many ways. The most common approaches would be either the cash multiple method or the discounted cash flow (DCF). Alternative methods may include traded asset valuation, or any other valuation methods as the committee deems appropriate.

GC Post Restructuring — EV Approaches

	Cash Multiple	DCF
Scope	Projects with perpetual life or long concession tenor/tail	Projects with typically limited finite life or short concession tenor/tail
Key Parameters	Involves two elements: • **GC EBITDA Analysis:** Designed to be a conservative but realistic estimate of the EBITDA that would ultimately be used by creditors and potential buyers to value a company after both a default and a rehabilitation period. The GC EBITDA would typically not include dividends from affiliates or minority interests, whose value would be added separately to the issuer GC post-restructuring EV. • **Multiple Selection Application:** We apply a multiple reflecting a company's individual financial and operational characteristics, industry dynamics and comparable peer data within the regional band: – U.S.: 6.0x–10.0x, with an 8.0x midpoint; – Rest of the world: 4.0x–9.0x, with a 6.5x midpoint. Use of a multiple out of the regional range would constitute a criteria variation and will be disclosed in Fitch's issuer research.	Involves two elements: • **GC Unlevered Cash Flow Analysis:** Designed to be a conservative but realistic estimate of the unlevered cash flows until end of concession that would ultimately be used by creditors and potential buyers to value a company after both a default and a rehabilitation period. The GC unlevered cash flow would typically also include dividends from affiliates or minority interests — where appropriate — whose value would be included into the issuer GC post-restructuring EV. • **WACC Selection Application:** We apply a WACC reflecting a company's individual financial and operational characteristics, industry dynamics and comparable peer data within the following regional band: – U.S.: 7%–11%, with a 9% midpoint; – Rest of the world: 8%–13%, with a 10.5% midpoint. Use of a WACC out of the regional range would constitute a criteria variation and will be disclosed in Fitch's issuer research.

GC – Going concern. EV – Enterprise value. DCF – Discounted cash flow. WACC – Weighted average cost of capital
Source: Fitch Ratings

Multiple/WACC Selection and Application

Fitch uses a Multiple/Weighted Average Cost of Capital (WACC) Assumption Tool to assume a reasonable cash multiple/WACC within the relevant regional ranges. The regional midpoint is the starting point. The Multiple/WACC Assumption Tool has three key factors that guide analysts to a multiple/WACC assumption at or near the lower bound, midpoint or top of the regional range. The relative influence of each key factor varies based on an issuer's individual characteristics. The outcome for each key factor is based on an assessment of its respective subfactors. Analysts assign greater importance to any key factor(s) or subfactor(s) that have more weight in the overall outcome. Each key factor or subfactor should be assessed, where applicable, depending on the single transaction features.

An extract of the factors and subfactors we consider in our Multiple/WACC Assumption Tool can be found in the table on the next page.

Infrastructure & Project Finance Multiple/WACC Assumption Tool

Key Risk Factors	Low Multiple/High WACC	Mid Multiple/Mid WACC	High Multiple/Low WACC
Qualitative Factors			
Revenue Risk	Weaker Revenue Risk assessment	Midrange Revenue Risk assessment	Stronger Revenue Risk assessment
Volume	Weaker Volume Risk assessment	Midrange Volume Risk assessment	Stronger Volume Risk assessment
Price	Weaker Price Risk assessment	Midrange Price Risk assessment	Stronger Price Risk assessment
Operation Risk	Weaker Operation Risk assessment	Midrange Operation Risk assessment	Stronger Operation Risk assessment
Counterparty Risk	Weaker Counterparty Risk assessment	Midrange Counterparty Risk assessment	Stronger Counterparty Risk assessment
Infrastructure Development and Renewal Risk	Weaker Infrastructure Development and Renewal Risk assessment	Midrange Infrastructure Development and Renewal Risk assessment	Stronger Infrastructure Development and Renewal Risk assessment
Quantitative Factors			
Tail to Concession Maturity	Short tail	Moderate tail	Freehold or long tail
EBITDA/CFADS (Excluding Capex) Margin	Weak, below peers, inadequate to sustain operations	Middling	Strong and/or consistently exceeds peers
Financial Flexibility	Little ability to adjust opex/capex for demand swings	Moderately flexible opex/capex structure	Flexible opex/capex structure that can be readily adjusted for fluctuation in demand
Peer Analysis			
Peer Trading Multiples	Company or close peers trade at a discount to cross-sector medians	Company or close peers trade in line with cross-sector market	Company or close peers trade consistently at rich multiples relative to the cross-sector index
M&A Precedent Transaction Comparables	Company or close peers acquired at low multiple/high WACC	Company or close peers acquired at multiple/WACC close to median for market or relative to large, homogeneous sector peer group	Company or close peers acquired at strong multiple/low WACC compared with overall market
Bankruptcy Case Study Data	Similar companies reorganized at relative low multiples/high WACC compared with cross-sector median	Case outcomes close to cross-sector median multiple/WACC or there is a lack of comparable case data	Close peers reorganized at relatively high multiples/low WACC compared with the cross-sector outcome

WACC – Weighted average cost of capital. Opex – Operating expenditure
Source: Fitch Ratings

Alternatives to the Cash Flow Multiple/DCF Methods

Rating committees have the discretion to use analytically appropriate alternative valuation methods that are clearly articulated and supported in RR rationales. For example, another applicable method could be the traded asset valuation for projects, where cash flows are ultimately backed by assets owned or operated that are either actively traded on exchanges or frequently bought and sold (e.g. projects whose cash flows are backed by oil and gas reserves, real estate properties, tower business or merchant energy assets).

Step 2 — Estimate Other Creditors' Claims

Fitch distinguishes debtholders' claims from other creditors' claims and typically removes the latter claims from valuation determined in *Step 1 — Estimate a Post-Restructuring EV or LV* above. The below are some examples of other creditors' claims that Fitch would typically deduct from the post-restructuring EV/LV.

Other creditors' claims are typically taken on as credit quality deteriorates, and are necessary to the reorganization process and benefit from priority under the relevant bankruptcy code. These typically include: (i) revolving claims; (ii) priority and administrative claims; (iii) lease-related claims; (iv) concession assumption; (v) pension and other post-employment benefit obligations; and (vi) other non-debt and contingent claims.

The net estimated value would be distributed as per *Step 3 — Distribute the Greater of EV or LV According to Priority* below.

Step 3 — Distribute the Greater of EV or LV According to Priority

The net estimated value is allocated to debtholders according to the relative seniority of their claims (the waterfall, with the surplus recovery over the most senior claim, if any, flowing down to the next priority).

The waterfall is not only affected by relative priority of instruments for a particular issuer, but also structural subordination. In instances where there are multiple operating entities with arguably independent operations, Fitch establishes valuation and claims at the entity level and considers the residual values available for creditors of parent or affiliated entities.

In terms of treatment of cash balances, the general assumption is that cash and cash equivalents on the balance sheet dissipate prior to bankruptcy or during the process, unless cash is held in a specific account earmarked for debt repayment and ring-fenced from the rest of the cash on the issuer's balance sheet.

Step 4 — Completion Risk Overlay

For projects presenting material construction risk, Fitch also estimates the recovery prospects if a project were to default during the construction phase. The recovery prospects during construction would be based on the most appropriate estimate of cost overruns, net of available funds to meet these costs overruns, compared with outstanding financing instruments.

The estimation of cost overruns would be driven by the project's completion risk score, per the *Completion Risk Rating Criteria* assigned during the probability of default rating process. A stronger assessment would generally result in a 30% cost overrun estimate to the original construction costs, while a midrange assessment would result in a 50% estimate and a weaker assessment would result in a 60% estimate.

Available funds, primarily performance and liquid security, would be applied to mitigate the estimated cost overruns. Adjustments may be made to the performance and liquid security to reflect amounts already used or limitation to their applicability. Fitch's analysis assumes no original transaction equity or cash would remain available to cover the additional costs.

In addition to the above, for instruments rated 'B+' and below (bespoke approach), Fitch would also look into any current available information related to, for example, updated construction costs estimate or liquidity offsets. As such, under the bespoke approach, the rating committees will have discretion to adjust the estimate of cost overrun stresses discussed above, to better reflect available information should the project be currently experiencing construction difficulties.

Once estimated, the net construction cost shortfall is allocated to reduce the value available to creditors, in inverse order of seniority of each debt instrument if applicable.

In the case of a multitier capital structure, with more than one seniority of debt, Fitch will first apply the net construction cost shortfall to the least senior debt instrument. To the extent this is insufficient to cover the net construction shortfall, Fitch will apply the remaining shortfall to the second least senior debt instrument. The recovery estimate is the remaining project value allocated to each debt instrument.

The assigned RR will align with the most conservative recovery estimate under either (i) default during the construction phase; or (ii) default during the operating phase.

Step 5 — Assign RR

Fitch will use the recovery table discussed in the *Analytical Framework for Instruments Rated 'BB–' or Above)* section to assign an RR.

Step 6 — Apply Caps

Unsecured debt RRs are capped at 'RR2', with 'RR1' possible for debt instruments of an issuer that is in a structurally senior position within a multilevel corporate group; is contractually senior in a multitier capital structure; or similarly, where a project clearly benefits from unusual and strong structural features, such as undisputable termination provisions, where the ultimate RR could be higher than 'RR2'.

RRs on subordinated debt would typically be capped at 'RR4'. Similar to the unsecured debt, RRs above 'RR4' are possible for projects that clearly benefit from unusual and strong structural features.

Fitch also applies caps in a number of jurisdictions. Please see *Country-Specific Treatment of Recovery Ratings Criteria* for further details.

Limitations

RRs are not intended to provide precise numerical estimates. Fitch provided bands of percentage recoveries as an indicator of the typical recovery expectations for instruments rated within those bands, across a diverse portfolio over multiple cycles. Given the inherent unpredictability of both default scenarios and the restructuring process, there will be potentially large deviations on single issues, so RR percentage bands should only be used for the analysis of diverse portfolios.

Percentages generated in the analytical process reflect either:

- The output of the waterfall analysis described in our bespoke analysis; or
- Average recovery rates for the specific debt class, as adjusted, in the generic approach.

This output in turn informs which RR band an obligation is ranked as a relative measure.

Many factors will affect the actual percentage recovery, some of which are outside the scope of the rating process. Chief among these is creditor composition. Concentration of claims at a certain level of the capital structure, common ownership of claims at different levels in the capital structure, or differing entry prices of investors within the same creditor class, can have a profound effect on the actual recovery percentage. Analysis of the creditor mass also requires multiple assumptions around the terms of financing achieved by the issuer, transparency on which may be limited at different points in time, and which may be subject to rapid change.

Other idiosyncratic factors that exert a strong influence on recoveries also remain outside the scope of the rating, and will further limit the utility of RRs as predictors of precise recovery rates. Event risk is present in the capital structure as it is in other elements of an issue's/issuer's rating profile, and issuers will change the proportion or collateral of secured obligations within a structure over time, leading to changes in our recovery assumptions and migration of recovery and instrument ratings.

In relation to the Higher Recoveries Sectors, the approach incorporates sparse statistical experience of historical defaults and recoveries over the past 20–30 years. To the extent that historical examples exist, they are largely concentrated in the U.S., while many jurisdictions in the world may have few or no relevant precedents.

Rating levels discussed in this appendix reflect standalone creditworthiness without considering external credit enhancement or government support. Ratings, including Rating Watches and Outlooks, assigned by Fitch are subject to the limitations specified in Fitch's Ratings Definitions and available at https://www.fitchratings.com/site/definitions.

Data Sources

The key rating assumptions for the criteria are based on analytical conclusions drawn from Fitch's analysis of financial and nonfinancial information for Infrastructure & Project Finance issuers and their debt issues. This may include private and public information, such as historical and projected financial reports; transaction documents; restructuring proposals; peer market and transaction multiples; bankruptcy plan valuations in disclosure statements and other documents for industry peers; industry and economic data; discussions with and information received from issuers and other market participants; third-party appraisals; and data included in Fitch bankruptcy case studies.

Criteria Disclosure

In its initial rating reports and subsequent rating action commentaries, Fitch will disclose, as applicable, the rationale for the assumptions it has made on each of the Generic and Bespoke approach.

Criteria Disclosure

Generic Approach	Bespoke Approach
Determination of the appropriate base recovery starting point, including debt type and sector	Asset valuation or termination value provisions assumptions in a liquidation scenario, including if discounts are applied (on account of the termination clauses, the counterparty due to make the final payment, and its track record in similar cases)
Application of adjustments, if any, identifying the revision from the base recovery starting point and outlining both the type of adjustments and the rationale, including when other adjustments are used in isolation or in conjunction with the primary ones	Applicable methodology in a GC (cash multiple, DCF or any alternative valuation method)
Application of Completion Risk Overlay, in case of projects presenting material construction risk, and determinants underlying the recovery (e.g. cost overrun stress estimate, amount of permanent and liquid security)	GC EBITDA/unlevered cash flows assumption in a GC scenario; and details of the basis for this cash flow assumption
Application of any RR cap	Cash flow multiple/WACC in a GCscenario; and the basis for the choice of multiple/WACC based on the Multiple /WACC Assumption Tool factor outcomes
Any variation from criteria	Additional EV from any affiliate or minority interests
	The size of other creditors' claims listed in the *Step 2 — Estimate Other Creditors' Claims* section
	Application of Completion Risk Overlay, in case of projects presenting material construction risk, and determinants underlying the recovery (e.g. cost overrun stress estimate, amount of permanent and liquid security)
	Application of any RR cap, including the rationale for any exception to the standard RR cap
	Any variations from the criteria

RR – Recovery Rating. GC – Going concern. DCF – Discounted cash flow. WACC – Weight average cost of capital. EV – Enterprise value
Source: Fitch Ratings

In many cases, Fitch uses the assumptions it derived in its initial rating analysis in its subsequent review analyses. Fitch will comment on whether the initial assumptions have changed, and when applicable, disclose the rationale for these changes.

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