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Lessons Learned From 20 Years Of Rating Global Project Finance Debt

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*(**Editor's Note:** This article, originally published on Oct. 22, 2014, is being republished with an additional column of data in table 3 based on reader feedback.)*

It has often been said that those who fail to learn from history are doomed to repeat it. The global project finance sector can perhaps be included among those who have learned from experience. The sector learned some hard lessons in its pioneering days, such as how to counter market exposure risk--the biggest cause of default--and how to strengthen a project's structure to provide the necessary resilience to withstand external shocks and counterparty risk. Based on Standard & Poor's Ratings Services' experience over two decades with more than 500 projects--encompassing nearly 600 project debt issues--we have often seen the sector absorb the lessons from the past by enhancing transaction structures, mitigating construction risks, reducing counterparty exposure, and enacting many other credit-protective features to become one of the most robust and stable sectors today.

Overview

- Many projects that fail experience problems in more than one area.
- The causes of default can be grouped broadly into technology or operations, market exposure, parent structure and counterparties, and regulation.
- We believe differentiating risk factors under our revised criteria will provide better insight into potential weaknesses in future project financings.
- We expect to continue rating projects from the 'A' category, for some availability projects, down to the 'BB' or 'B' category, for more speculative projects with contractual exposures.

A Retrospective Look At Rated Project Finance

Twenty years ago, some industry observers were skeptical about whether nonrecourse debt supported by a single asset could be robust enough to garner an investment-grade rating. Projects can be as diverse as power generation, refining or industrial plants, transportation infrastructure, lodging, entertainment venues, and mining. We have seen that a properly structured and economically well-conceived project can achieve long-term rating stability when the project is aligned with sound, creditworthy counterparties and operates under predictable legal environments and stable sovereign jurisdictions.

Historically, project finance debt has often been structured to earn a low-investment-grade rating ('BBB' or 'BBB-'). However, the number of projects rated below investment grade has grown to about 33% of all currently rated project debt and includes tranches initially rated as low as 'B' or even 'CCC'. Project debt originally rated non-investment grade has an aggregate default rate of 13.4%, while project debt initially rated investment grade has about a 3.6% aggregate default rate. Rated project finance debt covers at most 5% of the total project debt worldwide, so the rated debt may not accurately represent the larger set of all project financings.

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Institutional investors have traditionally had little financial capacity for non-investment-grade debt in their portfolios and have tended to invest in projects that were already operational rather than those just commencing construction. However, we have seen an increase in both low-rated projects and bonds issued prior to construction, indicating that the market for project finance debt has broadened over the years.

How A Project Financing Qualifies For A Rating

For us to assign a project finance rating, an entity must have a minimum number of attributes. These are defined in paragraph 15 of the revised criteria (see "Project Finance Framework Methodology"). But in summary, the project must be structured as follows:

- As a limited-purpose entity with relevant covenants to limit project activities, a cash management waterfall, and a perfected security interest on assets;
- With limited or no recourse to sponsors or shareholders of the project, and full recourse to project cash flow and assets;
- With both revenue and operating risks, so future debt service is dependent on cash flows generated by project operations;
- With a limited asset life;
- With a minimum set of covenants and controls applicable to senior debt; and
- With clear allocation of risks and responsibilities between the project entity and counterparties through the project's life.

If an entity does not meet this minimum set of attributes, we would not rate it under our project finance criteria. So for example, we would rate a company with a single power station asset but no limitations on activities or future debt issuances as a corporate entity, not as a project financing.

Why Projects Fail

Projects can fail for reasons ranging from simple and easily identifiable to varied and complex. Standard & Poor's recently redesigned its methodology for analyzing project finance debt (see "Project Finance Framework Methodology," published Sept. 16, 2014, on RatingsDirect) by dividing the criteria into five distinct areas: construction, operations, transaction structure, counterparty risk, and the overarching framework that ties them all together. Many of the projects that failed experienced problems in one or two of these areas, and we believe differentiating the risk factors under the revised criteria will provide better insight into potential weaknesses in future project financings. For example, a common characteristic among defaults is having a parent that is not completely separate, or a counterparty that cannot be replaced. Our revised criteria describe in more detail some of the risks common in single-asset, limited-purpose entities, and we have placed a new emphasis on transaction structure.

Standard & Poor's has rated 513 projects in the past 20 years, covering more than 573 separate debt issues (some projects have both senior and subordinate debt). Of these 573 issuances, 39 have defaulted. In the context of our revised criteria, we have examined the causes and what they may mean for the future of project finance credit quality. The causes of defaults can be broken down into the following broad groupings (see table 1):

- Technology or design problems during construction and initial ramp-up;
- Ongoing operational underperformance;
- Exposure to market prices or lack of raw materials or project output;
- Failure of a parent company;
- Counterparty problems; and
- Imposition of new regulations.

Table 1

Breakdown Of Project Finance Issue Defaults

	No. of debt issues	% of defaults	Aggregates	% of defaults
Technology or design (during construction/ramp-up)	7	20.59	Technology and operations	29.41
Operational (underperformance, higher capital expend., etc.)	3	8.82		
Hedging/commodity exposure	2	5.88	Market for input or output	32.35
Market exposure (price or volume)	9	26.47		
Structural weakness at the parent	6	17.65	Structure/counterparties	35.30
Counterparty failure	6	17.65		
Regulation	1	2.94	Regulation	2.94
Total	**34**	**100.00**		**100.00**

Technology or design problems

Problems during construction or operational ramp-up related to technology (at some power plants and a wastewater facility) or cost overruns (a number of transportation projects and a mining project in Western Australia) would seem inherent to a single-asset project. But it is interesting that only about 20% of defaults resulted primarily from technology or operational failure. Projects that we rate are usually well-structured and commonly try to mitigate this type of risk by using proven technologies and experienced construction firms.

The EnerTech Environmental California LLC biosolids processing plant is an example of technology failure. The facility simply did not scale up as planned and was unable to achieve expected volumes in testing or declare operational status before running out of funds. Another example of technology failure is Bulong Operations Pty. Ltd., a nickel and cobalt mine in Western Australia. It relied on cash flow from operations to meet debt-service costs during start-up. Initial problems with design changes, increased construction costs, and difficulties with commissioning delayed revenues and quickly depleted available reserves. A financially weak parent was unable to inject more equity, so the project was forced to raise more debt, increasing the burden on subsequent cash flow and leading to a downward spiral.

Cost overruns were the downfall for several transportation projects. Metronet Rail BCV and SSL Finance PLC, concessions for the London Underground, had a complex construction schedule covering line upgrades and station improvements to several primary underground lines, along with new rolling stock. The schedule was tight and had to work around continued full operation of the network. The project defaulted after substantial cost overruns and delays that reduced revenues. Eurotunnel S.A. is another example of construction cost overruns, which led to extreme leverage at the end of construction. The project failed because low passenger and freight volumes during operation could not make up for the additional debt.

The Lane Cove Tunnel project in Sydney, Australia, defaulted after a problematic construction effort went way over budget mainly because a collapse in a ventilation tunnel damaged buildings and the highway above. The project then opened to traffic volumes substantially below projections.

The construction section of our revised criteria seeks to clearly define the types of risks in such situations. In particular, we assign assessments for the degree to which the technology is proven, the extent of design completion, the difficulty of the schedule, the availability of cash set aside for contingencies, and the experience of the construction management team. Although the collapse in the Lane Cove Tunnel was hard to foresee, our new criteria highlight some of the other common risk factors. Similarly, the Metronet and Eurotunnel projects would receive a higher assessment for construction difficulty under the new criteria. And Bulong's reliance on operating revenues would have been more apparent in our calculation of the certainty of funding sources during construction. Although we discussed these risks under our previous criteria, the revised criteria provide consistent assessments for each of these types of risk.

Operational underperformance

Three power projects in the U.S. defaulted because of extended operational problems. Although such problems are often related to technology and design, we consider this type of default as different from those directly related to construction. For example, a power station could underperform if its heat rate remains consistently high, maintenance costs are higher than projected, or plant availability is not meeting targets.

LSP Batesville Funding Corp. defaulted in January 2012 because of chronic operational issues that caused the plant to underperform and eventually use up project liquidity. Choctaw Generation L.P. defaulted at the end of 2012 after underperforming for an extended period because of a turbine design flaw and a series of equipment failures. The project did not achieve its contracted heat rate, and extended outages hurt revenues.

In the operational section of the revised criteria, we spend a lot of time identifying the potential volatility of cash flows (described as an operating period business assessment, or OPBA). Key factors include project technology, leverage, contract terms, raw material prices, and output market prices. Minimum debt-service coverage under an expected base case and a reasonably stressful ("once in 20 years") downside scenario then lead to an operating period stand-alone credit profile. In a project like Batesville or Choctaw that uses market-proven technology, it is unlikely that we could identify the ultimate cause of default up front. But, as we conduct surveillance on a project, our projections incorporate actual performance history, and once a poor performance history started to build, the project's vulnerability would be more apparent. Although we have not changed this philosophical tack, our revised criteria define a consistent approach for the downside scenarios that aids in comparisons between projects.

Hedging/commodity price exposure

A number of projects failed primarily because of changes in raw material or resource prices or volumes. Renewable projects usually have volume risk, i.e., water volumes at hydro plants, and wind or solar resources at other plants (although we usually have sufficient information about the latter and run base-case scenarios at a very high confidence level, so lower resources than we expect may lead to a downgrade but not usually a default).

The other type of risk in this category is the input price, including the cost of transportation to the project site. Many power or industrial projects pass on the risk of fuel supply to their offtaker, but some projects are responsible for their own fuel supply. Some are poorly hedged or not hedged at all. Problems arise from fuel hedge mismatches (using fuel oil and hedging through a more liquid derivative that referenced natural gas) and hedges that do not last through the debt term, resulting in a large increase in cost when the hedge expires. Sometimes projects are limited in the types of hedging that are even available to them. The Northampton Generating Co. L.P. waste coal plant is a classic example of this. Fuel prices were higher than project expectations and were particularly affected by rising diesel costs for transporting waste coal from surrounding areas.

In the new operational section in our criteria, a project that is vulnerable to raw material risk would have a higher OPBA than an otherwise similar project and would, therefore, require higher debt-service coverage for a given rating. Again, the intention behind the revised criteria is to better highlight such risks through our more detailed scoring approach and identify potential vulnerabilities among otherwise similar projects.

Market exposure

Some projects sell their output through fixed-price contracts at known volumes, but many are exposed to volume risk (such as traffic volumes on toll roads) or price risk (for example, a merchant power plant selling electricity at local hub prices).

A number of volume-based road projects in Australia, Argentina, and China defaulted for this reason (Lane Cove Tunnel, Autopistas del Sol S.A., and Greater Beijing First Expressways Ltd., discussed below); others in Portugal and Spain had reductions in volumes and were downgraded (BRISA Auto-Estradas de Portugal S.A. and Abertis Infraestructuras S.A. were two parent companies with exposure to multiple toll roads across the Iberian peninsula that faced the possibility of downgrades but remained low investment grade). Although we attributed the defaults at the Eurotunnel and the Lane Cove Tunnel projects to construction problems, low traffic volumes were also to blame.

The collapse in natural gas prices and reduced energy demand after the 2007 economic downturn caused problems at many power projects and led to several defaults. Bicent Power LLC had a small portfolio of projects, high leverage, and an interest rate hedge that locked the company into high fixed debt service, making the project vulnerable. Low market prices for its output and a court judgment against the construction subsidiary led to a default. Bicent suffered from a number of problems and had a questionable hedging strategy, but the primary cause of the default was lower energy prices than forecasted.

AES Eastern Energy L.P., an operator of four coal plants in western New York, sold 100% of its energy at spot prices and had hedged most energy and capacity sales on a three-year rolling basis. Management reduced its hedging when forward prices began to fall and derivative-market liquidity contracted. The project's increased exposure to falling wholesale power prices was due in part to record low natural gas prices. With leverage of $500 per kilowatt, the project could not meet its debt-service requirements and defaulted in January 2012.

Astoria Generating Co. Acquisitions LLC had a shortage of liquidity and tripped its leverage covenants. Its liquidity crisis stemmed from reduced power demand and regulatory changes in the New York capacity market, which together led to a collapse in capacity prices.

AES Drax Energy Ltd. owned the largest power station in the U.K., producing 10% of the country's electricity. But it defaulted in 2003 after struggling to cope with a collapse in wholesale electricity prices. The killing blow was the bankruptcy of its largest offtaker.

Market exposure is not limited to power projects. Murrin Murrin Holdings Pty. Ltd. and part-owner Glencore Nickel Pty. Ltd. both defaulted primarily because of low prices for their output products. Windsor Petroleum Transport Corp. is another interesting--and recent--default (it entered restructuring this year). The project operates four large crude carriers and defaulted because of a glut of tankers (leading to the worst shipping rates since 1999) and a drop in oil exports from OPEC due to decreased demand in the U.S.

Failure of a parent company or counterparty

We see quite a few projects that are not completely bankruptcy-remote from their parent companies. Usually, a parent's bankruptcy would encompass the project, but failure of the project would not necessarily hurt the parent. The entities have some link, such as parent control of the project entity board, or parent funding of reserves. Companies rated higher than the project rating may have structures like this. Generally, this is not a problem-–unless the parent gets into distress.

A good example of this was the failure of Enron Corp. and the domino effect that had on a number of Enron-sponsored subsidiary power project financings such as Teesside Power Financing Ltd. in the U.K., which relied on Enron as the main revenue counterparty. Similarly, the default of unrated parent York Research Corp. hurt York Power Funding Ltd., a project financing that included four power stations in Texas, New York, and Trinidad & Tobago. And the default of unrated Calpine Rumford Inc. took down RockGen Energy LLC, Tiverton Power Associates L.P., and Broad River Energy LLC with it.

The revised criteria delineates the extent of separation from parents and sponsors in greater detail.

Counterparty problems

Counterparty problems are more common than some projects expect. Some projects cannot replace their counterparties, such as a sewage plant that is unable to find a new concession provider if the local government water utility terminates its contract with the project. In other cases, a project could find an alternative offtaker but may not be able to get a new contract that makes economic sense. An example would be a project that could sell at spot prices but would not be able to cover operating costs and debt service at those prices.

A few examples include the Mobile Energy Services Co. LLC, which lost revenue after its offtaker entered bankruptcy. The offtaker for the TermoEmcali Funding Corp. power project in Colombia defaulted on its power purchase agreement (PPA) obligations, resulting in that project's default as well. AES Drax Holdings Ltd. also faced the bankruptcy of its largest customer, TXU Europe, which provided partial credit support to counter its merchant risk exposure.

A similar problem is when local government entities do not support projects as expected. The Lombard Public Facilities Corp. project, in Illinois, has not yet defaulted, but it has been operating with debt-service coverage below 1x for an extended period. The initial project rating ('BB-') was based partly on a guarantee from the local government if required. However, when the Village of Lombard was called on to support the project, it chose not to. Consequently, we lowered the ratings on both the project and the village to 'CCC-' and 'B', respectively.

The Greater Beijing First Expressways Ltd. failed after the local government did not support the project because traffic volumes were below expectations.

Our revised criteria include a rating assessment of all economically meaningful counterparties and a section on how we view counterparties throughout a project's life. With new tables for assessing liquidity and replaceability, we are able to provide more transparency regarding the risk created by individual counterparties. Although the default of a counterparty is often hard to forecast, our goal is to provide transparency on how such a default could affect a project.

Regulation

Projects face regulatory and legal risks, and we have seen projects get into financial distress after tariff or regulatory changes. Examples of regulatory risks include a local government not approving expected tariff increases, and the recent regulations in the U.S. covering particulates, mercury, sulphur, and planned carbon emissions, all of which led to additional capital expenditures for the affected projects. The Panda Global Energy Co. project failed after disagreement with the local government in China about tariff rates. Homer City Funding LLC owned a 1.8-gigawatt coal-fired power station near Homer City, Penn. New regulations forced the plant to make large capital expenditures to install required pollution-control equipment. That, combined with lower-than-expected cash flow from low energy prices, resulted in a default.

Overall Project Finance Performance

Of the 513 different projects we have rated in the past 20 years, 34 issuers (or 6.8%) have defaulted.

Table 2

Number Of Defaults And Non-Defaults By Issuer And Issue

	Issuer	Issue
Total defaults	34	39
Non-defaults	478	534
Total ratings	**513**	**573**

As of September 2014, we had active ratings on 277 distinct issuances, and another 296 ratings had been withdrawn, either at the issuer's request, upon maturity of the debt, after refinancing and early payment in full, or upon default of the project.

About two-thirds of project debt tranches were rated investment grade initially, most were low investment grade, but they accounted for one-third of the project defaults (see table 3). A growing portion is rated in the 'BB' category.

Table 3

Issue Defaults By Initial Rating

Initial rating	Number	% of total	Defaults	% of defaults	% chance of default
AAA	0	0.00	0	0.00	0.00
AA	1	0.17	0	0.00	0.00
A	51	8.90	1	2.56	1.96

Table 3

Issue Defaults By Initial Rating (cont.)

BBB	334	58.29	13	33.33	3.89
BB	114	19.90	14	35.90	12.28
B	63	10.99	10	25.64	15.87
CCC/C	10	1.75	1	2.56	10.00
Category					
Investment grade	386	67.36	14	35.90	3.63
Non-investment grade	187	32.64	25	64.10	13.37
Total	**573**	**100.00**	**39**	**100.00**	**6.81**

One of the guiding principles of Standard & Poor's analysis of project debt risk is that the initial rating should assess default risk through the debt's maturity rather than the more limited timeframe for typical corporate entities. There are a number of reasons for this. First, transaction structures and covenants ensure that management is typically restricted from making changes to the nature or scope of the project, financing structure, and even counterparties or ownership. Second, the combination of long-term contracts and high leverage in most projects suggests that if a project performs as forecasted when the rating is assigned, few opportunities will exist for upgrades. (The exceptions could include when we raise the rating on a counterparty or host country.) Third, the rating reflects our expectation that the project will generally not issue additional debt, merge with or acquire other businesses, or materially change--all factors that frequently contribute to rating changes to corporate debt. Not surprisingly, project finance ratings exhibit more downgrade potential than upgrade potential (see table 4).

Table 4

Project Finance Rating Changes By Category

Original rating	Upgrades	Downgrades	Unchanged	Defaults
AA	0	1	0	0
A	1	15	34	1
BBB	16	75	230	13
BB	12	21	68	14
B	7	6	40	10
CCC/C	3	0	5	1
Category				
Investment grade	17	91	264	14
Non-investment grade	22	27	113	25
Total	**39**	**118**	**377**	**39**

In general, a downgrade is just over twice as likely as an upgrade, and we changed the ratings on just less than half the project debt tranches (see table 5).

Table 5

Rating Changes By Direction

	Up	Down	Unchanged
Investment grade	50	127	209

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Table 5

Rating Changes By Direction (cont.)			
Non-investment grade	29	65	93
Total	**79**	**192**	**302**

We also segregated initial ratings into investment grade and non-investment grade and counted the number of crossover debt issuances. Almost 75% of debt initially rated investment grade retained that rating level; 22% moved to non-investment grade, and the remaining 3% defaulted (see table 6). Of the debt initially rated non-investment grade, 6% moved to investment grade, 80% remained non-investment grade, and 13% defaulted.

Table 6

Crossovers By Rating Category

	Original issue rating	Currently investment grade	Currently non-investment grade	Defaults*
Investment grade	386	289	83	14
Non-investment grade	187	12	150	25
Total	**573**	**301**	**233**	**39**

*Last rating prior to withdrawal.

Methodology

This article compares the initial debt ratings with the last available rating. If the debt has a current active rating, we use that one; if the debt rating has been withdrawn, we list the last rating prior to withdrawal. This provides more information about debt that has been retired both for positive and negative reasons.

A number of projects were structured with multiple tranches of debt, so the number of distinct tranches was 573. This data include both public and confidential ratings but covers only "full" ratings, meaning we excluded several hundred credit estimates (preliminary studies done for issuers considering a full rating) and rating estimates completed for structured finance collateralized debt obligations that included project debt in their portfolios. The data do include a small number of projects that suffered from multiple failures--projects that defaulted on their initial debt, went through a refinancing or restructuring, and defaulted again. We also excluded corporate ratings, including those on project developers. In projects that have issued more than one series of debt, we aggregated debt that is pari passu into a single tranche. So a project with two tranches of senior debt and additional subordinate debt has two distinct issuances in our data.

The Future Of Project Finance Ratings

We expect to continue rating projects from the 'A' category, for some availability projects, down to the 'BB' or 'B' category, for more speculative projects with contractual exposures. However, structures will continue to evolve. For example, we expect most future U.S. power projects to include pass-through provisions or compensation for future carbon costs. And it is likely that some project financings will still fail. Structuring a default-free project would require uneconomical contracts or levels of liquidity.

Our goal with the revised criteria is to add transparency by isolating the weak points in projects. Some events, such as changes in natural gas prices, are hard to forecast, but our new, more detailed assessment methodology attempts to show exactly which changes could put a project in distress. By applying our own downside analysis, we aim to make it clear how resilient a project is to what we believe is the most likely stress scenario.