Project Bonds: Liquefied Natural Gas (LNG)

Crédit Agricole CIB, a leader in the global Project Bond market, is authoring a series of articles covering key topics for issuers to consider.

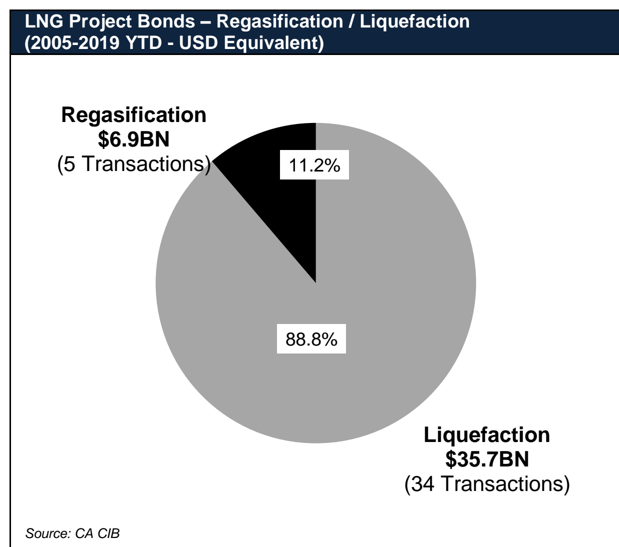
Introduction

Debt capital markets are an established source of funding for infrastructure and power assets across geographies, and represent an attractive alternative to the bank market. Institutional investors, such as insurance companies, pension funds, asset managers, and specialized funds, have proven appetite for long-dated assets, yielding stable, uncorrelated returns – all common traits found in Project Bonds.

Institutional investors' appetite has allowed Project Bonds to finance a variety of projects across industries – including power generation, transmission infrastructure, telecommunications, social infrastructure and oil & gas projects.

Through this article, we focus on LNG Project Bonds, which is now an established market with more than $39.9BN in issuances for LNG projects globally. This sector is foreseen to grow in the near future as many assets currently financed with short-term bank financings will need to be refinanced.

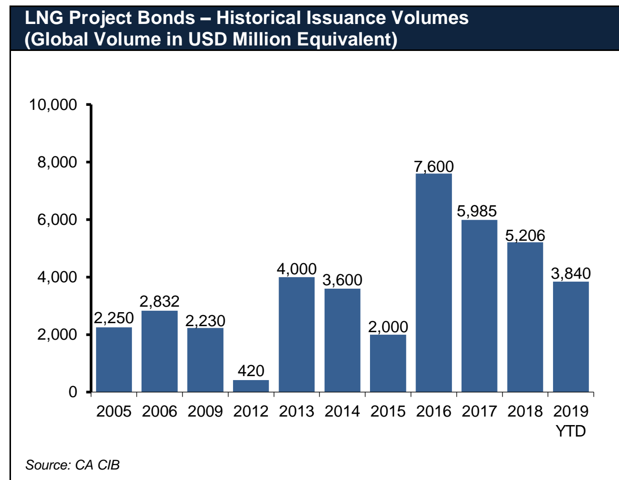
LNG Project Bonds – Regasification / Liquefaction (2005-2019 YTD - USD Equivalent)



Source: CA CIB

Historical annual issuance volumes for LNG Project Bonds have grown from annual issuance volumes of approx. $2.2BN in 2005 to $5.2BN in 2018, with a peak of over $7.5BN in 2016.

LNG Project Bonds – Historical Issuance Volumes (Global Volume in USD Million Equivalent)



Source: CA CIB

LNG Project Bonds

In this article, when discussing LNG Project Bonds, we refer exclusively to non-recourse debt Capital Market offerings, related to storage / regasification projects and liquefaction projects. Natural gas pipelines are not included in this discussion and are subject to different considerations.

Storage / regasification plants are projects that import, store and transform LNG into natural gas. Of note, as a result of abundant supply of natural gas, many storage / regasification plants, especially those located in the United States, have added and/or transformed into liquefaction facilities in order to export LNG.

Liquefaction plants are projects that transform natural gas and export the resulting LNG. Historically, these plants were mostly developed and located in gas-rich and exporting countries such as Qatar, Australia, and Russia. However, in the last decade, the shale gas boom in the United States drove significant new developments of LNG liquefaction plants in the country.

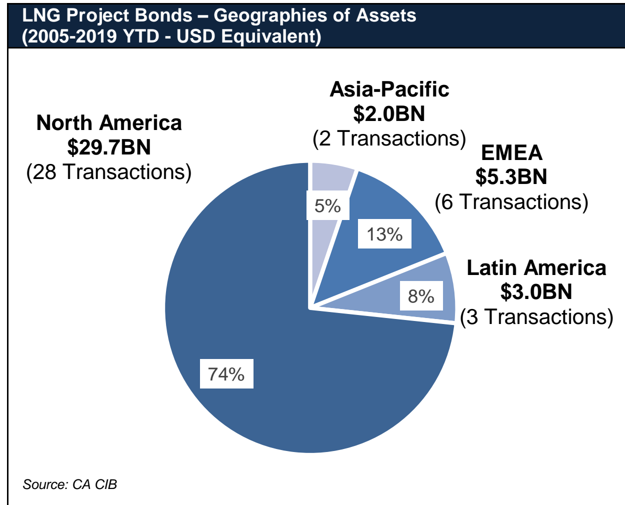
The first LNG Project Bond was done in Qatar in 2005 for the RAS LAFFAN LNG liquefaction plant. With all of its issuances between 2005 and 2009, Qatar alone represents 13% of the aggregate global volume between 2005 and 2019, and 100% of the volume from EMEA.

Since then, the Unites States saw active new development of US LNG liquefaction plants. As a result, most LNG Project Bonds have been executed for projects located in the North America region – accounting for 74 % of total issuance volume since 2005.

Issuances in Latin America are comprised of more recent developments in Brazil, Peru and Chile occurring from 2014 to 2018. Issuances out of this region accounts for 8% of global volumes, since 2005, but 11% since 2014 as more projects are being developed in the region.

Asia-Pacific shows the smallest share of issuances (5%), which relate to one project located in Australia.

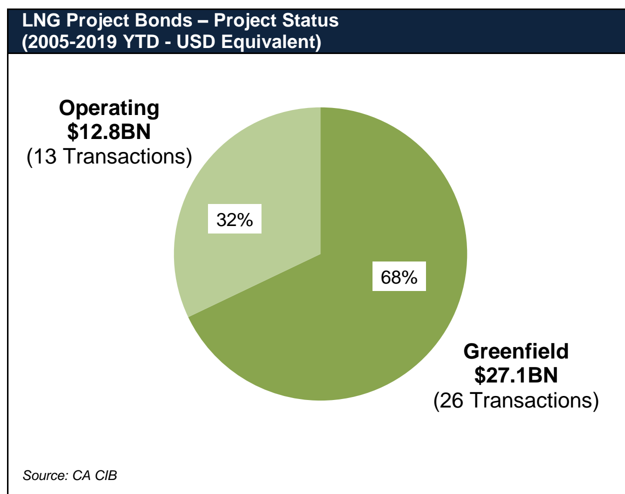
LNG Project Bonds – Geographies of Assets (2005-2019 YTD - USD Equivalent)



Source: CA CIB

The majority of Capital Markets transactions have been placed for assets that were still under construction at the time of issuance. 68% of LNG Project Bonds have been issued before completion, reflecting market participants' comfort with construction risk for LNG projects. The remaining transactions were refinancing operating assets.

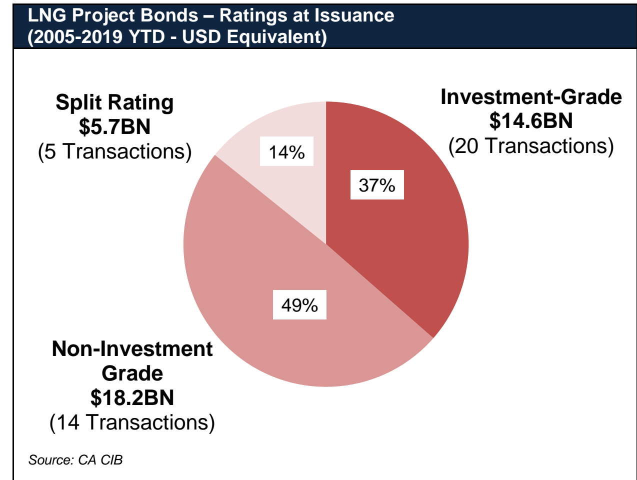
LNG Project Bonds – Project Status (2005-2019 YTD - USD Equivalent)



Source: CA CIB

Over half (51%) of LNG Project Bonds were rated investment-grade at issuance by at least one rating agency. The Capital Markets have also absorbed high-yield transactions, demonstrating investors' appetite for a large spectrum of credit ratings.

LNG Project Bonds – Ratings at Issuance (2005-2019 YTD - USD Equivalent)



Source: CA CIB

Trends & Highlights

Refinancing of Bank Loans

Greenfield LNG projects generally require significant financial commitments to cover construction costs, often over $5BN, and sponsors have typically relied on commercial bank loans to secure the original financing.

This trend can also be explained by the flexibility for monthly draws, particularly valuable during construction to limit negative carry.

However, these bank loans ("mini perms") are usually floating rate, with maturities shorter than 10 years, are intended to be refinanced overtime. The Capital Markets have provided a successful avenue for refinancing. In particular, LNG Project Bonds offer longer maturities, of more than 20 years, while providing fixed coupon. This combination allows sponsors to crystalize their equity return, and remove refinancing risk.

Given the size of the original financings, multiple refinancing transactions are usually required. With market participants comfortable with construction risk, sponsors tend to start the refinancing process before the project is fully completed. This often happens when construction spending reach meaningful volumes, visibility of completion improves, and/or if the project is partially generating cash flows as some trains come online.

Phasing out large amounts of primary bank loans through multiple Capital Markets offerings takes time. Hence it is common for bank loans and Project Bonds to co-exist on a *pari-passu* basis. Despite different formats and tenors, intercreditor concerns can be properly addressed. Even if Project Bonds are not part of the initial financing structure, sponsors can tailor the original intercreditor agreement and other security documents to accommodate for future Project Bond issuances.

Case Study

Between 2012 and 2013, Sabine Pass Liquefaction, LLC (Sabine Pass) raised an aggregate of approximately $11.0BN in the bank loan market. Bank loans had short tenors of 7 years and were used to finance the construction of a four LNG trains. Throughout the construction phase, Sabine Pass regularly refinanced the bank loans through the Capital Markets with multiple bond issuances, with tenors from 8-to 20-years.

Exposure to Construction Risk

Construction of LNG projects involves relatively complex technologies and multiple parties with specialized expertise. Capex needs are also significant and construction periods extend over multiple years. These characteristics could increase the risks of delays and of cost overruns before the project reaches COD.

Despite these challenges, three quarters of LNG Project Bond issuances have been successfully placed for greenfield projects. Below, we present strategies to address and mitigate the construction risk.

Case Study #1

In July 2016, FLNG Liquefaction 2, LLC (FLNG2) issued its first senior secured notes which were supported by liquidity reserves dedicated to cover contingencies and cost overruns. This helped deter investors' concerns related to further equity contributions and financings that may have been needed to complete construction.

Despite the fact that the project was in mid-stages of construction, the senior secured notes were successfully rated investment-grade by Standard and Poor's (S&P) and Fitch with tenors reaching 22-years.

The project was actually delayed due to Hurricane Harvey in late 2017, but the ratings remained unchanged in part thanks to the available liquidity that shielded the project.

Case Study #2

In many cases, projects have multiple trains coming online overtime and sponsors may decide to rely on cash flows from the first trains, as they come operational, to finance the construction of later trains. This implies that the construction budget is not financed from fully-committed sources of capital.

Sabine Pass, which currently has five fully-operational liquefaction trains, and a sixth train under development, has followed this strategy. At financial close of the bank financing, the construction budget relied on projected operating cash flows from the first trains, which were expected to come online, to complete construction of the last trains. While the first Project Bonds issued by the project to start refinancing the bank facility were not investment-grade, the project successfully issued $8.5BN in Project Bonds before the first train became operational. In February 2013, Sabine Pass issued $1,500MM in senior secured bonds for the purpose of partially refinancing bank loans raised in year 2012. The 8-year bullet Project Bonds were rated Ba3 / BB+ / --.

The credit ratings were upgraded as a number of trains started operations and started generated cash flows, alleviating the risk that not enough cash flows would be available to complete construction. Train 1 & 2 were operational in May 2016 and October 2016, respectively, and S&P raised its evaluation on Sabine Pass to investment-grade in September 2016, while ratings from Moody's were upgraded to Ba2 on June 2016 and Ba1 in December 2016.

Progress in Train 3 reaching close to operation phase enabled Sabine Pass to issue a $800MM, 20.5-year fully amortizing project bond in February 2017. The completion of Train 3 in March 2017 was a significant milestone as it resulted in commercial operation of three trains, that together generate the majority of cash flow needed to fund the remaining construction and financing costs. As a result, Moody's raised the issuer's rating to investment-grade on in May 2017.

Case Study #3

EPC contracts with credit worthy and well-experienced counterparties are key elements in reducing construction risk.

Issuers usually opt for lump sum, turnkey EPC contracts with qualified contractors for LNG projects. This transfers most of the construction risk to the EPC contractors and provides greater visibility in meeting the expected completion date. Terms usually include liquidated damages to compensate for delays in construction, certain performance guarantees regarding minimum capacity at acceptance / delivery and ongoing performance up to several years after operations.

For example, Bechtel, a highly experienced contractor in the energy sector, was engaged in both Cheniere Energy owned LNG projects, Sabine Pass and Cheniere Corpus Christi Liquefaction.

The EPC contract with Bechtel covers most of the onsite construction of the liquefaction facility and contains strong contractual protections with liquidated damage provisions and performance guarantees regarding minimum production capacity targets and construction milestones.

Bechtel's ability to carry out the heavy construction activities was well demonstrated by the delivery on time of Train 1 of Sabine Pass in May 2016. On the back of construction progress, Sabine Pass was able to issue $800MM of senior secured notes in February 2017 with investment-grade ratings from S&P and Fitch.

Exposure to Commodity Risk

Commodity risks for LNG projects can be effectively mitigated by the terms and conditions laid out in offtake agreements. There are basically two types of offtake agreements: Tolling-agreement type and Sales and Purchase agreement type.

Tolling-agreements are generally made with offtakers that are also responsible for providing gas to the project. The project is therefore not exposed to volume or price risk relating to gas procurement. Projects such as Freeport LNG, Cameron LNG and Cove Point LNG have tolling-agreements in place.

Sales and Purchase Agreements are generally involved where the suppliers of feedstock and offtakers differ. The terms of the offtake agreement usually contain fixed fees on a take-or-pay basis and variable fees to cover the feedstock. The portion of variable fees in relation to feedstock is usually based on a fixed margin over a price index or hub, effectively transferring price risk to the offtaker. Projects of Corpus Christi Holding and Sabine Pass have Sales and Purchase Agreements with various offtakers.

However, LNG Project Bonds for assets exposed to commodity risk have also been successfully issued and rated investment-grade.

Case Study

Australia Pacific LNG Processing (APLNG Processing) is a LNG liquefaction plant located near Queensland, Australia. APLNG Processing buys its feedstock gas from an affiliate company at a price that is linked to oil prices, and also sells its LNG capacity to offtakers at an oil linked price.

The contract structure of APLNG Processing is intended to mirror a tolling contract and partially reduce commodity risk. However, the cash flows of APLNG Processing remain negatively affected under low oil price levels. Accordingly, the project's DSCR levels were tested under various oil price scenarios.

Oil price also affects the stability of gas reserves available to APLNG as low oil price environments negatively affect the feasibility of developing potential gas reserves by the feedstock supplier.

Despite exposure to commodity risk, APLNG issued its first $1,400MM Project Bond in 2018, with an investment-grade rating from Moody's.

Exposure to Offtaker's Credit Risk

As explained in the previous section, offtake agreements can effectively relocate volume and price risk from the project to the offtakers. This is mainly why the credit worthiness of these counterparties is a key differentiating factor for operating LNG plants.

Case Study

For example, FLNG2 and FLNG3 share very similar features in terms of operating profile and offtake agreement. Both successfully taped the Capital Markets but the credit quality of offtakers was different at the time of issuances.

FLNG2 has an offtake agreement with affiliates of BP Energy, which is backed by BP Corp North America (A2 / A- / --), while at the time of its first issuance FLNG3 had an offtake agreement with Toshiba and SK E&S rated respectively B1 / B / -- and Baa2 / BBB / --. This translated in both different ratings and different total amount of debt supported by the projects. FLNG2's first $1,250MM issuance in 2016 was rated BBB by S&P and Fitch, while FNG3's first $600MM issuance in 2018 was rated BBB- by the same agencies.

It is worthwhile to see how FLNG3 has obtained its investment-grade despite the single B-rated offtaker for half of its capacity. Rating agencies effectively treated that Toshiba's share of capacity as merchant, assuming that Toshiba would default. Cash flows were therefore assumed to be lower than under the terms of the offtake agreement, in line with merchant pricing assumptions, and the project had to demonstrate higher DSCRs over the tenor of the notes.

Sponsorship Considerations

Given the relative complexity of LNG projects, the sponsorship and alignment of interests are important considerations for investors and rating agencies. Sponsors of LNG projects are typically large and experienced companies, capable of allocating resources to the project. It is also common to see companies partner to form a stronger sponsor group.

Market participants also take comfort in LNG projects that are deemed strategic for its sponsors, as it is more likely that it would take prompt action in case of underperformance.

Alignment of interests is also evident when the sponsors or its affiliates are involved in the project's value chain as an offtaker or operator. Such alignment of interests can ensure that sponsors act in a timely and coordinated fashion to implement countermeasures under downside scenarios to protect the profitability and stability of the project.

Case Study

APLNG Processing's parent, Australia Pacific LNG (APLNG), owns upstream gas reserves and associated infrastructure that delivers gas to APLNG Processing. Each shareholder of APLNG is deeply involved in the value chain of APLNG Processing: Origin Energy (37.5%) owns the upstream gas reserves and associated infrastructure that deliver gas to APLNG Processing, Conoco Phillips (37.5%) acts as the operator of APLNG Processing, and Sinopec

(25%) is the offtaker for approximately 85% of APLNG Processing's LNG capacity.

Bullet and Amortizing Structures

LNG Project Bonds can be structured as bullet or fully amortizing bonds. Investors have accepted both formats.

Investment-grade LNG Project Bonds tend to have an amortization profile co-terminus with the project's offtake agreements. These structures allow to monetize the full extent of the underlying contracts and maximize leverage. Non-investment-grade LNG Project Bonds tend to be bullets and high-yield issuers have preferred this format.

Case Study #1

FLNG2 issued its first project bond in 2016. The bond was rated investment-grade and had a 22-tenor with a fully-amortizing profile. The project has continued to issue multiple project bonds with the same long-term fully-amortizing profile. The same story goes with FLNG3, which initially issued an investment-grade, long-term fully-amortizing bond in 2018 with follow-on issuances in 2019.

Case Study #2

Sabine Pass, which was not originally investment-grade, issued bullet-type Project Bonds to start refinancing its bank facilities. With the improvement in construction risk as Trains 1-3 came operational, Sabine Pass was upgraded to investment-grade by S&P and Moody's. Given its investment-grade profile, the issuer opted for a fully amortizing Project Bond for the first time in February 2017 with a $800MN issuance with a final tenor of 20.5 year and average life of 15.2 years.

Holdco LNG Bonds

LNG Project bonds can be issued through a holding company that has control over project companies or a project company with multiple trains. Such structure provides additional leverage to the sponsors.

As debt service of the bonds on the Holdco level are subordinated to project-level debt and are dependent on the dividends from the project company(s), the certainty of cash flows generated from the project company(s) and their indebtedness will directly affect the amount of cash flow to the Holdco.

Additionally, the security related to the assets are provided to project-level debt providers, so the Holdco financiers are also subordinated in terms of security.

Case Study

Cheniere Energy Partners, L.P (CQP) is the holding company of 1) Sabine Pass Liquefaction, LLC (Sabine Pass), 2) Sabine Pass LNG, L.P. (SPLNG), a regasification facility, and 3) Cheniere Creole Trail Pipeline, L.P. (CTPL).

CQP made its debut to capital markets in September 2017 with a $1.5BN 8-year bullet senior note (Ba2 / BB / BB). The issuance was made soon after Sabine Pass successfully tapped the capital markets with its first investment-grade, fully amortizing bond issuance in February 2017.

Sabine Pass, with currently five LNG trains operating and the sixth train under construction, contributes more than 90% of CQP's consolidated revenues and a significant portion of distributions to CQP. Sabine Pass is allowed to make distributions to CQP under certain conditions and coverage tests such as minimum DSCR over 1.25x. In contrast, both SPLNG and CTPL are unlevered entities with no restrictions on distribution.

Due to the structural subordination, there is a two notches difference between the ratings of CQP and Sabine Pass Project Bonds.

Transactions in Emerging Markets

LNG Project Bonds have been issued for projects in South American countries such as Chile, Brazil and Peru.

Case Study #1

In July 2014, Chile GNL Quintero, the only regasification terminal in central Chile, located 160 km northwest of Santiago, issued $1.1BN 15-year, fully amortizing senior unsecured bonds for the purpose of refinancing the primary bank debt put in place in 2008.

The project is supported by 20-year tolling agreements with Endesa, ENAP and Metrogas, all of which are shareholders of the project with strong alignment of interests. The shareholders are Metrogas (20%), Endesa Chile (20%), ENAP (20%) and Sociedad Terminal de Valparaiso SA (which is held by Enagas (51%, Baa2) and Oman Oil company (49%)).

The bonds were rated BBB+ by Fitch, and Baa2 and BBB by Moody's and S&P respectively.

Case Study #2

In April 2018, Developer Centrais Elétricas de Sergipe (Celse) closed the equivalent of $1.3BN project financing for the development of 1) a LNG terminal with a 170,000m^2 floating storage regasification unit (FSRU) including a 6.5km pipeline, 2) 1.516MW CCGT power plant and 3) 33km electricity transmission line, located in Brazil.

The equivalent of $941MM (BRL 3.37BN) was financed through a 14-year tenor, Project Bond in the Brazilian local currency. The ECA (Export Credit Agency) coverage provided by Swiss Export Risk Insurance supported the successful issuance. The remaining $0.5MM was provided by loans from IFC (International Finance Corporation) and IDB (Inter-American Development Bank).

The Project is the first private LNG regasification plant in Brazil, and its successful bond issuance is an example that there is robust appetite for LNG Project Bonds in emerging markets, when the local currency exposure is effectively managed.

Case Study #3

In March 2018, Peru LNG (PLNG), which is Peru's only LNG facility and the first in South America, issued a $940MM Project Bond to repay the original project finance bank debt of $1.2BN, that was placed in 2008. The ratings on the bonds were BBB- (Fitch).

The rating profile of PLNG is strengthened by PLNG's integration into a supply chain with shareholders in both in upstream and downstream. Hunt Oil (50%) is the operator of the project, Royal Dutch Shell (20%, AA-) is the sole off-taker of the project, and SK Innovation (20%) holds stakes in oil / gas fields that provide feedstock to the project.

Despite the strong offtaker profile and alignment of interests from sponsors, the ratings of the bonds were constrained due to the commodity risk embedded in the offtake contract.

Rating Agencies

Rating Agencies' approach to LNG has historically been based on application of their generic Project Finance methodologies and sometimes their Oil & Gas methodologies.

Construction Risk Assessment

LNG liquefaction and regasification plants usually involve heavy engineering / industrial construction tasks that are held for a period of up to 5-years. Hence when assessing construction risk, rating agencies pay attention to the EPC contractor's track record, reputation, and expertise, along with contractual mitigating factors for cost overruns and delays.

Issuers for greenfield LNG projects can expect ratings agencies to scrutinize the strength of the provisions and structure of EPC agreements. Lump-sum, fixed price, turn-key contracts with well-defined liquidated damages for delays and incentives to complete the project in time and within budget are generally viewed positively, and consistent with investment-grade ratings.

Sources of funding is also a key assessment factor. Committed sources of capital include bank loan financing, Project Bond and equity commitment from highly-rated sponsors or backed by letters of credit. Besides these typical sources of funding, projects that involve multiple trains / assets may elect to rely on expected cash flows generated from the first trains / assets to come online to cover capex of the project. However, fully-committed sources of capital are typically required for investment-grade ratings. Relying on future cash flows from trains still under construction would likely constraint the rating.

Procuring reserves or working capital facilities that are earmarked for costs overruns will be seen as credit positive. In general, to achieve investment-grade, the project would need to demonstrate resilience assuming a 6- to 12-month delay scenario and cost overruns from 10% to 20% of original budget. Rating agencies will evaluate the impact on the construction schedule, potential liquidated damages under the offtake agreements and ability of the project to sustain higher capex.

Operations Risk Assessment

In assessing operations risk, a key consideration for rating agencies is the credit quality of the offtaker. For projects with long-term offtake agreements, price and volume risk, fuel risk, and the cost of power used for operation are allocated to the offtakers in most cases. Offtake agreements with financially sound offtakers with conditions of payment that are fixed fees regardless of offtake and additional revenues for offtaken volumes based on a fixed margin over the fuel price is regarded credit positive. When there are multiple offtakers, rating agencies typically consider the weighted average credit profile of the offtakers.

The rating of the offtaker group usually caps the rating of the offering. The level of dependence on the offtaker is related to the difficulty the project would encounter in finding a replacement contract on substantially similar terms. Projects with limited contracted revenues, high merchant-like revenues or significant exposure to a non-investment-grade offtaker would be regarded of higher risk and call for higher DSCR during the operation phase.

Another important factor considered for operation phase assessment is fuel supply. As for LNG liquefaction projects, facilities' connection to highly reliable and diverse natural gas resources with low risk is considered credit positive. This analysis is less relevant if the offtaker is responsible for providing gas under a tolling-type agreement.

Technological stability and operational performance are crucial. Significant underperformance for an extended period of time can trigger the offtaker's right of termination. Credit agencies expect to see commercially proven technologies and design adopted for plants in order to consider operation risk as low. That being said, most LNG plants rated by agencies were using proven technologies and agencies perceived the overall operation risk of LNG projects as "mid-range" compared to other Oil & Gas assets.

Long-term operation and maintenance agreements are also typical and greatly mitigate operation risk. Credit agencies focus on potential replacement of the O&M provider if its credit profile is not investment-grade. This may translate in higher opex assumptions.

The location of the asset can also impact credit ratings. Weather conditions such as the risk of hurricane would increase the probability of the plant being shut down or damaged for instance, which may require additional reserves to achieve investment-grade.

Structural Considerations

For investment-grade transactions, fully amortizing structures or bullets deemed to be refinanced over the term of the offtaker contracts are usually required.

Provided that a comprehensive long-term operation and maintenance contract is in place, O&M and major maintenance reserves are not required for investment-grade ratings. Credit agencies will rely on the opinion of the independent technical advisor to make a final determination.

Investment-grade ratings require at least 6-month debt service reserve account as well as distribution tests to provide liquidity to noteholders in downside scenarios.

Conclusion

Capital Markets have played an important role in supporting LNG project developments by providing the liquidity to refinance relatively short term bank loan financings. This enables commercial banks to continue financing new projects.

With large portions of the first wave of US shale gas boom-borne LNG projects now successfully reaching substantial and full operational phases, sponsors may continue to tap the Capital Markets for securing sources of long-term financing.

Rating Criteria for Investment-Grade LNG Projects with Minimal Exposure to Commodity Risk

	Fitch	Standard & Poor's	Moody's	DBRS	Kroll
Applicable Methodologies and Select Research	▪ "Rating Criteria for Infrastructure and Project Finance" (Jul 2018)	▪ "Project Finance Framework Methodology" (Sep 2014) ▪ "Key Rating Factors for Oil and Gas Project Financings" (Sep 2014) ▪ Project Finance Operations Methodology (Sep 2014) ▪ Project Finance Construction Methodology (Nov 2013)	▪ "Generic Project Finance Methodology" (Apr 2018)	▪ "Rating Project Finance" (Oct 2018)	▪ "Global Project Finance Rating Methodology" (Nov 2017)
Construction Phase Considerations	▪ Fully wrapped EPC contract ▪ Experienced contractors ▪ Fully committed financing sources ▪ Construction budget includes [10-20]% reserves for contingencies and delays	▪ Fully wrapped EPC contract ▪ Experienced contractors ▪ Fully committed financing sources ▪ Construction budget includes [10-20%] reserves for contingencies and delays	▪ Fully wrapped EPC contract ▪ Experienced contractors ▪ Fully committed financing sources ▪ Construction budget includes [10-20%] reserves for contingencies and delays	▪ Fully wrapped EPC contract ▪ Experienced contractors ▪ Fully committed financing sources ▪ Construction budget includes reserves for contingencies and delays	▪ Fully wrapped EPC contract ▪ Experienced contractors ▪ Fully committed financing sources ▪ Construction budget includes reserves for contingencies and delays
Operations Phase Considerations	▪ Contracted revenues under long-term offtake agreements ▪ O&M expenses as per long-term agreement, vetted by Independent engineer ▪ O&M not pass-through or under long-term agreement increased by [5-10]% ▪ Ratings of offtakers likely to limit the rating of the offering ▪ Gas price: Application of Fitch's price deck ▪ Inflation of [2.5-5.0]% ▪ Other adjustments may be applied on a case by case basis ▪ Min/Avg DSCR ≥ 1.40x on contracted cash flows	▪ Contracted revenues under long-term offtake agreements ▪ Capacity assumed at [95-98]% or lower ▪ O&M costs increase of [5-10]% with higher stress for aging assets ▪ Ratings of offtakers likely to limit the rating of the offering ▪ Gas price: Application of S&P's price deck ▪ Other adjustments may be applied on a case by case basis ▪ Min/Avg DSCR ≥ 1.40x on contracted cash flows	▪ Contracted revenues under long-term offtake agreements ▪ O&M expenses as per long-term agreement, vetted by Independent engineer ▪ Ratings of offtakers likely to limit the rating of the offering ▪ Other adjustments may be applied on a case by case basis ▪ Gas price: Application of Moody's price deck ▪ Min/Avg DSCR ≥ 1.40x on contracted cash flows	▪ No specific adjustments / assumptions specified for Base Case scenario ▪ Ratings of offtakers likely to limit the rating of the offering ▪ Gas price: Typically vetted by market consultant with haircuts ▪ Min/Avg DSCR ≥ 1.40x on contracted cash flows	▪ No specific adjustments / assumptions specified for Base Case scenario ▪ Ratings of offtakers likely to limit the rating of the offering ▪ Gas price: Typically vetted by market consultant with haircuts ▪ Min/Avg DSCR ≥ 1.40x on contracted cash flows
Other Structural Considerations	▪ 6-month Debt Service Reserve Account ▪ Distribution Test ▪ Secured by project's asset	▪ 6-month Debt Service Reserve Account ▪ Distribution Test ▪ Secured by project's asset	▪ 6-month Debt Service Reserve Account ▪ Distribution Test ▪ Secured by project's asset	▪ 6 to 12-month Debt Service Reserve Account ▪ Distribution Test ▪ Secured by project's asset	▪ 6 to 12-month Debt Service Reserve Account ▪ Distribution Test ▪ Secured by project's asset

Source: Rating Agencies, CA CIB)

LNG Project Bond – Global Issuances To-Date

Issuer	Sponsor(s)	Type	Project Status	Country	Geographic Region	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Rating (Moody's / S&P / Fitch)	Closing Date
Cheniere Energy Partners, L.P.	Cheniere Energy Inc	Liquefaction	Operating	United States	North America	USD	1,500	10.0	Bullet	4.500%	Ba2 / BB / BB	Sep-19
FLNG Liquefaction 3	Freeport LNG / IFM	Liquefaction	Greenfield	United States	North America	USD	700	20.0	12.0	4.390%	-- / BBB / BBB	May-19
FLNG Liquefaction 2	Freeport LNG / IFM	Liquefaction	Greenfield	United States	North America	USD	865	19.6	12.3	4.390%	-- / BBB / BBB	May-19
Australia Pacific LNG (APLNG)	ConocoPhillips / Origin Energy / Sinopec	Liquefaction	Operating	Australia	Asia-Pacific	USD	600	11.5	9.7	4.850%	Baa2 / -- / --	Apr-19
FLNG Liquefaction 3	Freeport LNG	Liquefaction	Greenfield	United States	North America	USD	175	20.0	--	5.390%	-- / BBB- / BBB-	Jan-19
FLNG Liquefaction 3	Freeport LNG	Liquefaction	Greenfield	United States	North America	USD	225	20.5	--	5.500%	-- / BBB- / BBB-	Nov-18
Cheniere Energy Partners, L.P.	Cheniere Energy Inc	Liquefaction	Operating	United States	North America	USD	1,100	10.0	Bullet	5.625%	Ba2 / BB / BB	Sep-18
Australia Pacific LNG (APLNG)	ConocoPhillips / Origin Energy / Sinopec	Liquefaction	Operating	Australia	Asia-Pacific	USD	1,400	12.0	--	4.820%	Baa2 / -- / --	Sep-18
FLNG Liquefaction 3	Freeport LNG	Liquefaction	Greenfield	United States	North America	USD	600	21.0	--	5.550%	-- / BBB- / BBB-	Jul-18
Developer Centrais Elétricas de Sergipe (Celse)	Golar LNG / Stonepeak Infrastructure Partners	Regasification	Greenfield	Brazil	Latin America	BRL	3,370	14.0	--	9.850%	Private	Apr-18
Peru LNG	Hunt Oil / SK Energy / Royal Dutch Shell / Marubeni	Liquefaction	Operating	Peru	Latin America	USD	940	12.0	--	5.375%	-- / -- / BBB-	Mar-18
FLNG Liquefaction 2, LLC	Freeport LNG / IFM	Liquefaction	Greenfield	United States	North America	USD	385	20.3	13.0	4.280%	-- / BBB / BBB	Dec-17
Cheniere Energy Partners, L.P.	Cheniere Energy Inc	Liquefaction	Operating	United States	North America	USD	1,500	8.0	Bullet	5.250%	Ba2 / BB / BB	Sep-17
Cheniere Corpus Christi Holdings	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,500	10.0	--	5.125%	Ba3 / -- / --	May-17
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Brownfield	United States	North America	USD	1,350	11.0	--	4.200%	Ba1 / BBB- / BBB-	Feb-17
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Brownfield	United States	North America	USD	800	20.5	15.2	5.000%	Ba1 / BBB- / BBB-	Feb-17
FLNG Liquefaction 2, LLC	Freeport LNG	Liquefaction	Greenfield	United States	North America	USD	450	21.2	13.0	4.790%	NAIC-2	Feb-17
Cheniere Corpus Christi Holdings	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,500	8.3	--	5.875%	Ba3 / -- / --	Dec-16
FLNG Liquefaction 2, LLC	Freeport LNG / IFM	Liquefaction	Greenfield	United States	North America	USD	600	21.3	13.2	4.540%	NAIC-2 (BBB)	Nov-16
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Brownfield	United States	North America	USD	1,500	10.5	Bullet	5.000%	Ba1 / BBB- / --	Sep-16
FLNG Liquefaction 2, LLC	Freeport LNG / IFM	Liquefaction	Greenfield	United States	North America	USD	1,250	22.0	13.4	4.125%	-- / BBB / BBB	Jul-16
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,500	10.0	Bullet	5.875%	Ba2 / BB+ / --	Jun-16
Cheniere Corpus Christi Holdings	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,250	8.0	Bullet	7.000%	Ba3 / BB- / --	May-16

LNG Project Bond – Global Issuances To-Date (Continued)

Issuer	Sponsor(s)	Type	Project Status	Country	Geographic Region	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Rating (Moody's / S&P / Fitch)	Closing Date
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	2,000	10.0	Bullet	5.625%	Ba3 / BB+ / --	Feb-15
GNL Quintero SA	GNL Quintero SA	Regasification	Brownfield	Chile	Latin America	USD	1,100	15.0	10.9	4.634%	Baa2 / BBB / BBB+	Jul-14
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	500	9.0	Bullet	5.625%	Ba3 / BB+ / --	May-14
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	2,000	10.0	Bullet	5.750%	Ba3 / BB+ / --	May-14
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,000	8.3	Bullet	6.250%	Ba3 / BB+ / --	Nov-13
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,500	8.0 / 10.0	Bullet	5.625%	Ba3 / BB+ / --	Apr-13
Sabine Pass Liquefaction, LLC	Cheniere Energy	Liquefaction	Greenfield	United States	North America	USD	1,500	8.0	Bullet	5.625%	Ba3 / BB+ / --	Feb-13
Sabine Pass LNG LP	Cheniere Energy	Regasification	Operating	United States	North America	USD	420	8.0	--	6.500%	B1 / BB+ / --	Oct-12
RAS LAFFAN LNG III	Qatar Petroleum / Exxon Mobil	Liquefaction	Operating	Qatar	EMEA	USD	500	3.0	Bullet	--	Aa2 / A / A+	Jul-09
RAS LAFFAN LNG III	Qatar Petroleum / Exxon Mobil	Liquefaction	Operating	Qatar	EMEA	USD	1115	5.0	Bullet	--	Aa2 / A / A+	Jul-09
RAS LAFFAN LNG III	Qatar Petroleum / Exxon Mobil	Liquefaction	Operating	Qatar	EMEA	USD	615	10.2	Bullet	6.750%	Aa2 / A / A+	Jul-09
Sabine Pass LNG LP	Cheniere Energy	Regasification	Operating	United States	North America	USD	550	7.0	--	7.250%	Ba3 / BBB / --	Nov-06
Sabine Pass LNG LP	Cheniere Energy	Regasification	Operating	United States	North America	USD	1,482	10.0	--	7.500%	Ba3 / BBB / --	Nov-06
RAS LAFFAN LNG III	Qatar Petroleum / Exxon Mobil	Liquefaction	Greenfield	Qatar	EMEA	USD	800	21.0	18.0	6.332%	Aa3 / A / A+	Sep-06
RAS LAFFAN LNG II	Qatar Petroleum / Exxon Mobil	Liquefaction	Greenfield	Qatar	EMEA	USD	1400	15.1	10.2	5.298%	A1 / A / A+	Aug-05
RAS LAFFAN LNG III	Qatar Petroleum / Exxon Mobil	Liquefaction	Greenfield	Qatar	EMEA	USD	850	22.1	10.5	5.838%	A1 / A / A+	Aug-05

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