Project Bonds: Solar

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

Renewable Energy

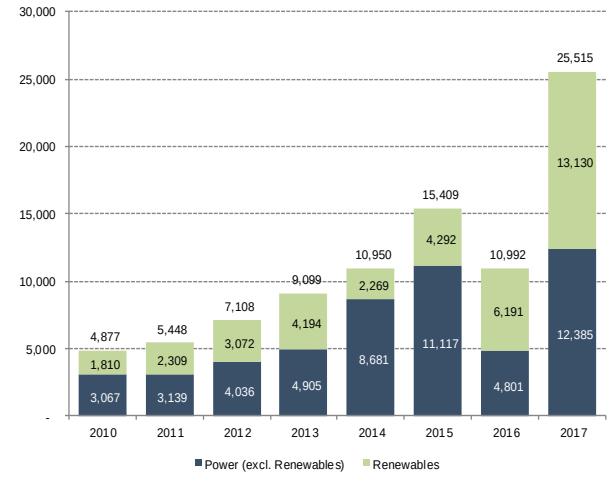
The volume of Project Bonds issued for renewable energy projects has steadily increased in recent years.

The Capital Markets opened its doors to renewable energy projects with a wind Project Bond in 2003, followed by solar Project Bonds a few years later in 2010.

These trail-blazing transactions allowed investors to gain familiarity with the technologies, risks, and contractual arrangements related to renewable assets. They also paved the way for future issuances, as rating agencies started publishing specific methodologies dedicated to this newly accessible asset class.

Renewables have grown to represent more than 50% of power Project Bonds and nearly 21% of total Project Bonds issued in just over a decade. In 2017, renewable energy projects accounted for $13.1BN of Project Bond issuances globally.

Power Project Bonds
(Global Volume in USD Equivalent Million)



Source: PFI, CA CIB

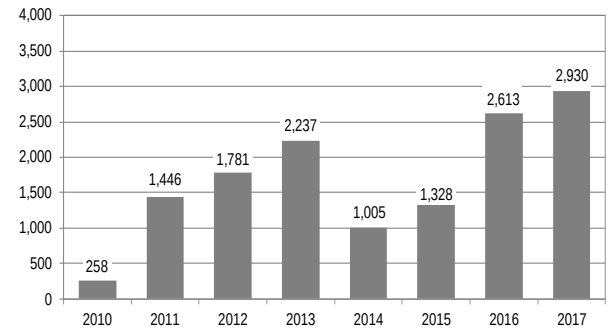
Renewable Project Bonds first gained traction in North America, followed by projects in Europe and Latin America, demonstrating the increasing comfort and global appetite among investors for renewable assets.

While renewables offerings have gained wider acceptance over time, there are challenges that need to be considered prior to approaching the Capital Markets. Lessons l earned from past renewable financings can help ensure future successful executions.

This article provides a review of historical Project Bond issuances for utility-scale solar assets globally.

Solar Project Bonds

Solar Project Bonds
(Global Volume in USD Equivalent Million)

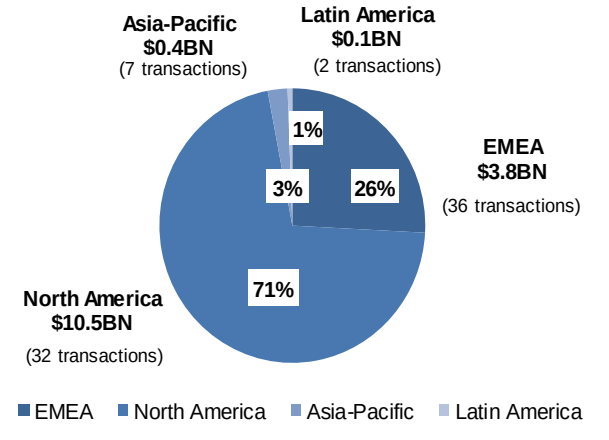


Source: PFI, CA CIB

Historically, the first solar Project Bond issuance was the €196MM Andromeda Finance offering for a 51MW utility-scale PV Italian solar project in December 2010. In 2011, the $702MM Project Bond for NextEra Genesis Solar, a single-site Concentrating Solar Power (CSP) project with a capacity of 250MW in California, marked the opening of the US Debt Capital Markets for solar projects. Since then, more than $14.7BN has been raised globally for more than 77 utility-scale solar projects with individual issuances ranging from €17MM to more than $1,000MM. Solar Project Bonds have successfully been executed in 7 different currencies.

North America is a highly active region for solar issuances. It accounts for 71% of the total amount raised for solar assets through Project Bonds since 2010, with 32 out of 77 transactions to-date taking place in the region.

Solar Project Bonds – Geographies of Assets
(2010-2018 YTD- in USD Equivalent)

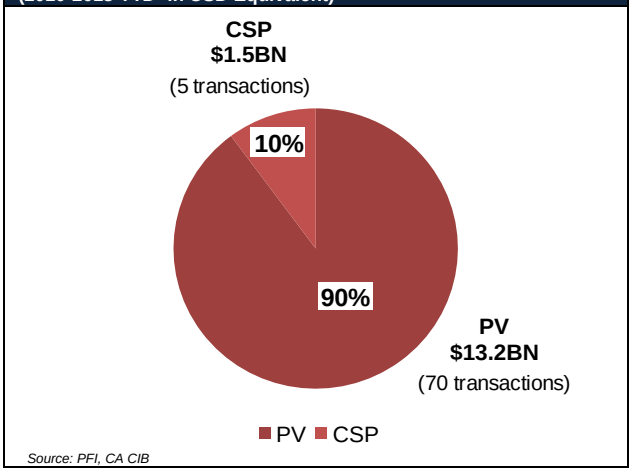


Source: PFI, CA CIB

With 36 offerings to-date, EMEA is the largest region by number of transactions for solar Project Bonds and regularly sees transactions for projects of various sizes. Spain is particularly active with 15 transactions.

Outside North America and Europe, solar Project Bonds are less frequent but these financings are growing in Asia in Latin America. In 2016, the ¥3,000MM offering for Aomori-Misawa, a 10MW operating solar farm, was the first Capital Markets transaction for an Asian solar project. 6 additional transactions closed in Asia since then. Most recently, Latin America saw its first solar Project Bond placed in the international capital market: a US$64.75MM green Project Bond issued to refinance construction bank debt for the 50MW La Jacinta solar PV farm in Uruguay, owned by Invenergy.

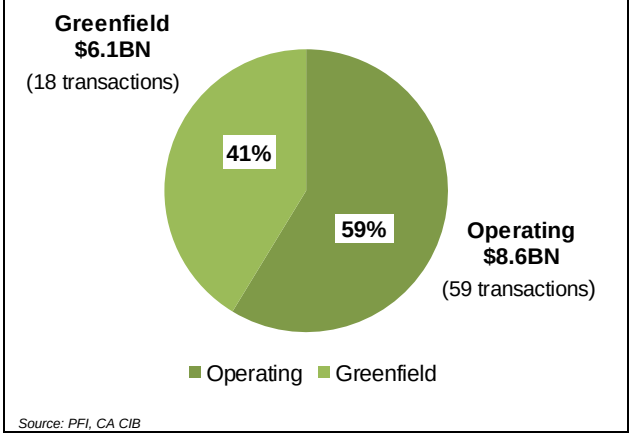
Solar Project Bonds – Technology Type (2010-2018 YTD- in USD Equivalent)



Source: PFI, CA CIB

Solar projects rely on different technologies to convert sunlight into electricity. While Photovoltaic (PV), Concentrating Solar Power (CSP) and Concentrating Photovoltaic (CPV) technologies are the three main technologies used for utility-scale solar plants, projects relying on PV technology account for most of the transactions to-date. Capital Markets participants have also financed parabolic trough systems, the most common form of CSP technology.

Solar Project Bonds – Project Status at Closing (2010-2018 YTD- in USD Equivalent)



Source: PFI, CA CIB

Many Project Bonds have financed greenfield projects, as both rating agencies and investors are comfortable with the low construction risk involved for solar projects. Also, the construction period is generally short, thus negative carry can be more easily mitigated. Project Bonds issued to refinance operating solar projects have also been successfully placed.

Utility-scale solar assets are mostly contracted through long-term Power Purchase Agreements ("PPAs") with an offtaker such as a utility or a public entity (State, municipality, etc.). Project Bonds have allowed issuers to fully monetize these contracts with amortizing structures over the full tenor of the underlying PPA, i.e. without any tail. Maturities of 20 years or more are the norm for this type of transaction, with average weighted lives above 10 years.

Trends and Highlights

A wide variety of utility-scale solar assets has been financed through the Project Bond market. Depending on the characteristics of the project, different structures have been successfully placed. The following section discusses some of these transactions, as well as current trends.

Financing Solar Technologies

The vast majority of utility-scale projects financed in the Capital Markets has used photovoltaic (PV) technology. PV technology directly converts sunlight into electricity through the acceleration of electrons in the PV cells. In this regard, PV plants using crystalline silicon (c-Si) panels, including monocrystalline and polycrystalline, have been used for many years and are the most common technologies financed with Project Bonds.

Concentrating solar power (CSP) technology, while carrying a slightly higher complexity and operating risk, has also been financed through Project Bonds. A CSP project collects and concentrates the heat from the sun with highly reflective mirror panels and focuses the heat onto a receiver filled with a highly conductive fluid, such as synthetic oil. This fluid is then used to create steam and power a conventional steam turbine to generate electricity.

Another technology used for utility-scale solar projects is the Concentrating Photovoltaic (CPV) technology. CPV directly converts sunlight into electricity, as PV does, but uses a lens system to concentrate the sunlight similar to CSP. To our knowledge, no projects relying on this technology have yet been financed in the Capital Markets.

Key technology risks include complexity of installation, degradation factor, commercial track record, and applicability of the solar technology to be used in relation to the geography of the project. The technology and proposed design will need to be reviewed by an independent engineer before launching the offering.

Approaching Technology Risk: Case Study

The first offering for a CSP project was the $702MM issuance for NextEra Genesis Solar, a 250MW parabolic trough solar project in California. Issued in 2011, this transaction was also the first Capital Markets financing for a utility-scale solar project in the US.

The project consists of two 125MW parabolic trough solar fields and corresponding power blocks. The project is based on a Rankine power cycle with a reheat steam turbine generator designed to use solar radiation from parabolic trough technology. Two independently operated 140MW power blocks are fed thermal energy from solar collection systems. The solar panels capture and concentrate sunlight to heat synthetic oil, which then heats water to create steam. Steam is then pumped to an onsite turbine generator to produce electricity.

While the offering was rated AAA on the back of guarantees provided by the Department of Energy, Fitch considered the parabolic trough technology as proven and one of the oldest operating CSP technologies. Fitch also noted the sponsor's familiarity with this technology as a credit positive.

Construction Financing for Solar Assets

Capital Markets offerings have been successfully placed for greenfield projects. Construction of utility-scale solar project primarily includes permitting, procuring panels, installation and interconnection. The complexity of the overall design of a solar project tends to be relatively low compared to other power projects and the construction period is short, usually less than a year. For these reasons, investors and rating agencies are comfortable with construction risk and an investment-grade rating is achievable for greenfield projects.

Furthermore, sponsors typically secure comprehensive EPC contracts with experienced contractors. Fixed price, date certain contracts with adequate performance and delay liquidated damages (LD) clauses are standard in this industry, and are consistent with investment grade ratings.

Approaching Construction Risk: Case Study

In June 2013, Solar Star Funding issued $1,000MM in series A senior secured notes to finance the construction of a 579MW PV project in California. Two locations were constructed in parallel over a two-year period. With $2,740MM of construction budget, this project remains one of the largest ever financed in the Capital Markets.

The issuance was rated Baa3 / BBB- / BBB- by Moody's, Standard and Poor's and Fitch. The rating agencies noted the date-certain, fixed-price contract executed with SunPower, an experienced party, as a credit positive. The contract included milestone payments and a substantial early completion bonus payment if the project was completed ahead of schedule.

In March 2015, as the project was reaching completion ahead of schedule, Solar Star Funding issued $325MM in series B senior secured notes (pari passu with the series A) to repay part of the construction costs to the sponsor. Moody's and Fitch reaffirmed their initial ratings while S&P upgraded its rating by one notch to BBB.

Solar Project Bonds in New Geographies

While the vast majority of issuances come from North American and European assets, more recent transactions in Asia and Latin America have demonstrated the applicability of solar Project Bonds in new geographies.

New geographies: Case Study #1

Canadian Solar tapped the Japanese Capital Markets in 2016 to finance the 10MW PV Aomori-Misawa project with a ¥3,000MM issuance. The Project Bond had a two-year grace period, a 20-year tenor, and was rated by a local rating agency. Incorporated in Canada, with the bulk of its operations in China, Canadian Solar had limited relationships with local banks and decided to rely on institutional investors instead. This transaction was the first asset-backed security arranged by a foreign sponsor in the Japanese solar market.

In 2016, following its initial successful transaction, Canadian Solar issued a ¥6,200MM private placement to finance a 21MW portfolio of solar projects in Japan. The issuance was bought by one institutional investor.

New geographies: Case Study #2

In January 2018, La Jacinta SRL (a special purpose vehicle under the laws of Uruguay) issued S$64.75MM investment-grade Green Project Bonds, placed in the US private placement market, in order to refinance existing construction loans related to a fully-contracted 50MW solar PV farm in Uruguay.

The bonds were placed in the context of IDB Invest's A/B bond program. IDB Invest is the Inter-American Development Bank Group's private sector arm. The A/B bond structure entails a financing sequencing where an A/B loan is provided by the development bank to finance a project's construction with the participation of a commercial banks in the "B portion" of the facility, and a bond refinancing follows after project completion to take-out the commercial banks' commitment and reduce the development bank's long-term hold. This results in a "B bond" benefitting from the development bank's umbrella, as the B bond and the development bank loan tranche are pari-passu, senior secured debt obligations of the project company.

The solar project benefits from a USD-denominated, 25-year, fixed-price, take-or-pay PPA with Uruguayan government-owned Administración Nacional de Usinas y Trasmisiones Eléctricas ("UTE").

The issue is the first "true" solar PV Project Bond issuance in Latin America (i.e. non-recourse, single-asset, utility scale) placed in the international capital markets and marked the third-ever A/B bond. This offering demonstrated that US private placement investors have also appetite for small renewables offerings in Latin America.

Solar Project Bonds from Repeat Sponsors

Select sponsors who successfully executed solar financings in the Capital Markets, such as NextEra, Consolidated Edison, Canadian Solar and MidAmerican, have relied on Project Bonds for more than one of their projects.

This trend underlines the success of solar offerings since 2010 and the increased ease in executing such transactions, as market participants become more familiar with risks associated with solar projects.

Repeat Sponsor: Case Study #1

NextEra was one of the first issuers of solar Project Bonds, in 2011, with the $702MM senior secured notes for the NextEra Genesis Solar project, a 250MW parabolic trough project. The same year, NextEra tapped the Capital Markets for Desert Sunlight, a 550MW PV project in California, with a $744MM senior secured offering. This private placement was closed alongside a syndicated loan to finance the construction of the solar project.

In 2014, NextEra relied on a HoldCo offering on the back of the Genesis Solar project with the $280MM HoldCo Project Bond issued by Genesis Solar Funding LLC, the owner of the project.

Repeat Sponsor: Case Study #2

Consolidated Edison sponsored its first project bond issuance in March 2013 with $219MM in senior secured notes for a greenfield 1,100MW PV solar plant in the US. Since this inaugural issuance, Consolidated Edison has acted as project sponsor on three additional Project Bond issuances in December 2015, April 2016, and May 2016 for operating PV solar plant assets across the US. For each issuance, Consolidated Edison has relied on the 4(a)(2) US Private Placement market for its solar projects and each issuance has been well-received by investors.

Back Leveraged Solar Project Bonds

Renewable projects in the US are sometimes partially financed by Tax Equity. Structures can be fairly complex and take the form of partnership flips or sale and leaseback. Tax Equity investors are usually entitled to priority returns and most of the renewable tax benefits of the project, such as the Investment Tax Credit (ITC), and receive a larger share of cash flows in early years. The Managing Member, or sponsor, receives most of the cash flows in later years.

Project Bonds can be issued in this context, with distributions to the Managing Member used to repay investors. Project Bonds'due diligence tend to focus on priority returns to the Tax Equity investors and recapture risk, in case the tax benefits are not realized as anticipated.

Project Bonds investors are getting increasingly comfortable with complex transactions involving solar assets in such back leverage structures.

Back leverage: Case Study

In November 2017, sPower issued the largest Project Bonds on the back of Tax Equity funds, demonstrating investors' expertise in analyzing complex back leveraged transactions. sPower Finance I, LLC, the Holdco receiving Managing Member distributions, issued $421MM in senior secured notes backed by a diversified portfolio of 41 utility-scale renewable power projects in the US with aggregate capacity of 565MW. Of the 41 operating projects, 39 were photovoltaic solar projects (425MW) and two were wind power projects (140MW). Most assets were financed through partnership flip funds. The 4(a)(2) / Reg D offering achieved a BBB- rating and the proceeds were mainly used to refinance existing debt at the project levels.

Rating Agencies

Rating agencies approach solar financing by applying their generic project finance criteria complemented by solar-focused methodologies and commentary articles.

Rating agencies regularly update their methodologies as they rate new asset types and structures. For example, the development of various solar technologies has led to refined criteria by certain agencies to specifically address the risks associated with different technologies. Their criteria also evolved based on the performance of rated transactions.

The majority of rated solar projects achieved a "low" investment-grade rating. Investment-grade offerings usually share the following main characteristics: PPA with investment-grade counterparties, fully amortizing profile over the PPA tenor, proven technology, exposure to construction risk, experienced participants, 6 to 12-month Debt Service Reserve Accounts and Operation & Maintenance reserves. Items that may constrain the rating to below-investment grade include inadequate performance of solar technology/design, exposure to merchant risk, sub-investment-grade counterparties, and country risk. These particular aspects of the transaction do not necessarily prevent successful offerings but may require additional liquidity and credit enhancement.

The conclusions of the independent engineer and resource consultant are of paramount importance to rating agencies in their assessment of projects.

For their rating case, agencies continue to largely rely on P90 (1-year) production estimates. Some agencies may also apply specific adjustments to production, degradation or operation and maintenance costs.

Of note, Fitch published updated criteria in March 2017 and lowered the DSCR guidance for PV solar. Indicative ratio guidance for such technology was lowered to 1.20x (from 1.30x previously) for contracted cash flows to support an investment-grade rating. DSCR guidance for merchant cash flows was also lowered. These adjustments were justified by observed performance of rated PV transactions, reflecting better generation performance with low volatility. Fitch, however, did not reduce its DSCR guidance for CSP projects, which remains at 1.40x on contracted cash flows.

For most projects, Fitch will continue to rely on P90 (1-year) generation for its rating case but in some specific instances, the agency could use P90 (10-year). These production estimates would only be applicable when the PPA terms allow for period-specific deficits to be offset by future period-specific surpluses, which have been observed in a small number of cases.

Standard & Poor's has also indicated that PV solar project with solid on-site measurements to assess the solar resource can achieve an investment-grade rating with minimum and average DSCRs of 1.20x on P90 (1-year) on contracted cash flows. Other agencies maintain a view that DSCRs of 1.30x to 1.40x on P90 (1-year) on contracted cash flows are consistent with investment-grade ratings.

The table on the following page presents the main sizing criteria and structural features consistent with investment-grade ratings for Fitch, Standard and Poor's, Moody's, DBRS, and Kroll.

Conclusion

Since 2010, the Capital Markets have welcomed solar Project Bonds for different technologies and geographies. An increasing number of sponsors, eager to expand their sources of liquidity for the development of utility-scale solar projects, continue to tap the Capital Markets. Investor appetite remains strong in North America and Europe, and recent successful transactions in Asia suggest that the horizon for solar Project Bond will continue to expand.

Rating Criteria for Investment-Grade Solar Offerings

	Fitch	Standard & Poor's	Moody's	DBRS	Kroll
Applicable Methodologies and Select Research	▪ "Rating Criteria for Infrastructure and Project Finance" (Aug 2017) ▪ "Renewable Energy Project Rating Criteria" (Feb 2018)	▪ "Project Finance Framework Methodology" (Sep 2014) ▪ "Key Rating Factors for Power Project Financings" (Sep 2014) ▪ "Approach to Rating Renewable Energy Project Finance Transactions" (Apr 2015)	▪ "Generic Project Finance Methodology" (Apr 2018) ▪ "Power Generation Projects" (May 2017)	▪ "Rating Project Finance" (Feb 2018) ▪ "Rating Solar Power Projects" (Feb 2018)	▪ "Global Project Finance Rating Methodology" (Nov 2017)
DSCR Indication for Investment Grade Rating	▪ P90 (1-year) generation ▪ Additional specific adjustments to cash flows ▪ Min DSCR ≥ 1.20x for adjusted contracted cash flows (PV) ▪ Min DSCR ≥ 1.60x for adjusted merchant cash flows (PV) ▪ Min DSCR ≥ 1.40x for adjusted contracted cash flows (CSP) ▪ Min DSCR ≥ 1.80x for adjusted merchant cash flows (CSP)	▪ P90 (1-year) generation ▪ Min DSCR ≥ 1.20x for contracted cash flows (PV) ▪ Min DSCR ≥ 1.40x for contracted cash flows for other technologies ▪ Min DSCR ≥ 2.00x for merchant cash flows	▪ P90 (1-year) or P95 (1-year) generation ▪ Avg. DSCR ≥ 1.40x for contracted cash flows ▪ Min DSCR ≥ 3.60x for merchant cash flows	▪ P90 (1-year) generation ▪ Min DSCR ≥ 1.25x for contracted cash flows ▪ Limited exposure to merchant revenues considered, subject to commensurably higher DSCR	▪ Generation assumption not specified ▪ Min DSCR ≥ 1.20x for contracted cash flows
Base Case Assumptions and Adjustments	▪ Energy production haircut: 0% to 10% ▪ Grid curtailment adjustment (as informed by a third-party assessment) ▪ Availability: informed by third-party assessment ▪ O&M costs: informed by third-party assessment ▪ Other adjustments may be applied on a case by case basis	▪ Inflation rate: 2% ▪ Degradation (PV): 0.50% ▪ Availability (PV): 94% to 98.5% ▪ O&M cost: increase of 5% to 10% over pro forma costs ▪ Other adjustments may be applied on a case by case basis	▪ No specific adjustments / assumptions specified for Base Case scenario ▪ Adjustments may be applied on a case by case basis	▪ No specific adjustments / assumptions specified for Base Case scenario ▪ Adjustments may be applied on a case by case basis	▪ No specific adjustments / assumptions specified for Base Case scenario ▪ Adjustments may be applied on a case by case basis
Other Structural Considerations	▪ 6-month Debt Service Reserve Account ▪ Operation & Maintenance Account as informed by third-party ▪ Distribution Test	▪ 6-month Debt Service Reserve Account ▪ 6-month Operation & Maintenance Account ▪ Distribution Test	▪ 6-month Debt Service Reserve Account ▪ 6-month Operation & Maintenance Account ▪ Distribution Test	▪ 6 to 12-month Debt Service Reserve Account ▪ 6 to 12-month Operation & Maintenance Account ▪ Distribution Test	▪ 6 to 12-month Debt Service Reserve Account ▪ 6 to 12-month Operation & Maintenance Account ▪ Distribution Test

Source: Rating Agencies, CA CIB

Solar Project Bond Global Issuance To-Date

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geographic Region	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
sPower Portfolio	sPower	652	PV	Operating	United States	North America	USD	499	23.5	--	4.96%	--	Jun-18
Sonnedix Portfolio	Sonnedix	30	PV	Operating	Spain	EMEA	EUR	140	19	--	--	--	Jun-18
Renewable Japan - Toba's project	Renewable Japan Co.	17	PV	Operating	Japan	Asia-Pacific	JPY	6,900	22	--	--	Private	Apr-18
Ontario Solar	--	30	PV	Operating	Canada	North America	CAD	105	--	--	--	-- / -- / BBB-	Apr-18
Q-Energy	Q-Energy	7	PV	Operating	Spain	EMEA	EUR	38	19	--	3.50%	Private	Jan-18
La Jacinta Solar Farm Finance	Invenergy	50	PV	Operating	Uruguay	Latin America	USD	65	24.5	14.5	--	Baa3 / -- / --	Jan-18
T-Solar	T-Solar	--	PV	Operating	Spain	EMEA	EUR	118	19.5	--	3.15%	Private	Jan-18
Solaria Project	Solaria	--	PV	Operating	Spain	EMEA	EUR	9	22	--	4.15%	BBB-	Jan-18
Canadian Solar Portfolio	Canadian Solar	52	PV	Operating	United Kingdom	EMEA	GBP	42	17	--	--	Private	Jan-18
Sungem Holding	Amplio Energy	--	PV	Operating	Italy	EMEA	EUR	70	12	--	--	Unrated	Dec-17
Southgate Solar	Connor, Clark & Lunn Infrastructure	50	PV	Operating	Canada	North America	USD	171	18	--	4.16%	Unrated	Dec-17
Windsor Solar	Connor, Clark & Lunn Infrastructure	50	PV	Operating	Canada	North America	USD	188	18	--	4.16%	Unrated	Dec-17
sPower Portfolio*	sPower	565	PV	Operating	United States	North America	USD	421	--	--	4.55%	BBB-	Nov-17
Tottori	Canadian Solar	27	PV	Operating	Japan	Asia-Pacific	JPY	7,400	1.5	Bullet	1.27%	A (JCR)	Nov-17
Azure Sun	Pensions Infrastructure Platform	29	PV	Operating	United Kingdom	EMEA	GBP	20	18.5	--	0.43% to 3.15%	Private	Oct-17
Australia's New Energy Solar	Consortium	--	PV	Operating	United States	North America	USD	63	24	13.2	--	Private	Oct-17
X-Elio Spanish portfolio	X-Elio	33	PV	Operating	Spain	EMEA	EUR	93	23	--	3.84%	Private	Sep-17
Sonnedix Spanish portfolio	Sonnedix	18	PV	Operating	Spain	EMEA	EUR	74	19.5	--	3.43%	Private	Sep-17
Renewable Japan	Renewable Japan Co.	15	PV	Greenfield	Japan	Asia-Pacific	JPY	4,670	23	--	--	Private	Aug-17
CSolar West's project in Imperial County	CSolar West	150	PV	Operating	United States	North America	USD	401	23	12.2	3.85%	BBB (Kroll)	Aug-17
Magacela Solar 1 SL	Solaria	10	PV	Operating	Spain	EMEA	EUR	47	20	--	3.77%	Private	Aug-17
High Noon Solar	Duke Energy	--	PV	Operating	United States	North America	USD	233	19	12.5	4.10%	BBB- (Kroll)	Jul-17
Moapa Southern Paiute Solar InvestCo	AllianzGI	250	PV	Operating	United States	North America	USD	208	24	--	5.23%	Private	Jun-17
Gumna Aramaki	Canadian Solar	19	PV	Greenfield	Japan	Asia-Pacific	JPY	5,400	1.5 and 20.3	--	1.29% and 1.36%	Private	Apr-17
Alamo 6 Holdings LLC	OCI Solar Power	110	PV	Operating	United States	North America	USD	225	24.9	13.5	4.17%	NAIC-2	Apr-17
Parque Solar Cuz Cuz	Solek	3	PV	Operating	Chile	Latin America	USD	20	5	--	6.20%	Private	Apr-17
Mibu Solar Way	JAG Energy	17	PV	Greenfield	Japan	Asia-Pacific	JPY	5,400	9	--	--	A	Mar-17

*Includes Wind Assets

Solar Project Bond Global Issuance To-Date (Continued)

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geographic Region	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
Econergy Solar Plants	Econergy	35	PV	Operating	Italy	EMEA	EUR	12	--	--	--	Private	Mar-17
Planta Solar Puertollano 6	Solaria	10	PV	Operating	Spain	EMEA	EUR	45	20.5	--	3.75%	BBB- (Axesor)	Mar-17
NextEnergy Solar Fund	Guernsey	241	PV	Operating	United Kingdom	EMEA	GBP	63	18.5	--	--	Private	Feb-17
Ahana Operations	ATN International	--	PV	Operating	United States	North America	USD	66	12.0 & 14.0	--	--	Private	Feb-17
CED Upton County Solar	Consolidated Edison	150	PV	Greenfield	United States	North America	USD	97	--	--	--	Private	Jan-17
Azienda Solare Italiana	Quercus	84	PV	Operating	Italy	EMEA	EUR	125	13.5	--	3.05% and Euribor +250bps	Private	Jan-17
Brainwave Solar portfolio	Consortium	--	PV	Operating	France	EMEA	EUR	121	--	--	--	Private	Dec-16
Globasol Villanueva	Solaria	10	PV	Operating	Spain	EMEA	EUR	45	21	--	4.20%	Private	Dec-16
Celeo Fotovoltaico SA	Celeo Redes	15	PV	Operating	Spain	EMEA	EUR	42	21.5	--	3.95%	Private	Dec-16
Sonnedix	JP Morgan (Sonnedix)	68	PV	Operating	Italy	EMEA	EUR	95	14	--	Euribor + 230bps	Private	Dec-16
Spex Solar	Consortium	20	PV	Operating	Spain	EMEA	EUR	107	20	--	--	Private	Oct-16
Kingston Solar	Samsung C&T	--	PV	Operating	Canada	North America	CAD	633	19	10	3.57%	Private	Oct-16
Canadian Solar Portfolio	Canadian Solar	--	PV	Greenfield	Japan	Asia-Pacific	JPY	6,200	--	--	--	Private	Aug-16
TS Energy	Zhongli Talesun Solar	--	PV	Operating	Italy	EMEA	EUR	40	16	--	4.20%	Private	Aug-16
Finsterwalde II/III Solar	Talanx	40	PV	Operating	Germany	EMEA	EUR	51	13	--	--	Private	Jul-16
Fonroche Energie	--	82	PV	Operating	France	EMEA	EUR	25	5	--	--	Private	Jul-16
Andasol 1 & 2	Antin Solar, DBAM, ACS	100	CSP	Operating	Spain	EMEA	EUR	90	15	--	--	Private	Jun-16
Grand Renewable Solar LP	CCLI, Samsung, & Six Nations	100	PV	Operating	Canada	North America	CAD	613	19	9.6	3.93%	Private	Jun-16
Vela Energy	Centerbridge Partners	100	PV	Operating	Spain	EMEA	EUR	404	20	--	3.20%	-- / BBB / --	Jun-16
Solaria Project	Solaria	10	PV	Operating	Spain	EMEA	EUR	45	21	--	4.20%	-- / BBB- / --	May-16
Foresight Solar Fund	Foresight	--	PV	Operating	United Kingdom	EMEA	GBP	63	18	--	--	Private	Apr-16
ConEd California Holdings 3	Consolidated Edison	--	PV	Operating	United States	North America	USD	95	20	12	4.07%	NAIC-2	Apr-16
ConEdison Development	Consolidated Edison	106	PV	Operating	United States	North America	USD	218	25	--	--	Private	Mar-16
Aomori-Misawa	Canadian Solar	--	PV	Operating	Japan	Asia-Pacific	YEN	3,000	20	--	1.40%	A (Japan CRA)	Mar-16
ConEdison Development	Consolidated Edison	--	PV	Operating	United States	North America	USD	159	25	14.3	4.53%	NAIC-2	Dec-15
Etrion Solar PV Portfolio	Etrion	54	PV	Operating	Italy	EMEA	EUR	35	14	--	Euribor + 225bps	Private	Dec-15
Lightsource	Lightsource	101	PV	Operating	United Kingdom	EMEA	GBP	284	8 and 22	--	--	Private	Nov-15

*Includes Wind Assets

Solar Project Bond Global Issuance To-Date (Continued)

Issuer	Sponsor(s)	Capacity (MW)	Type	Project Status	Country	Geographic Region	Currency	Size (MM)	Tenor (Years)	WAL (Years)	Coupon	Credit Ratings (Moody's / S&P / Fitch)	Closing Date
Solaben 1 & 6	Abengoa	250	CSP	Operating	Spain	EMEA	EUR	285	19	10	3.76%	-- / BBB / --	Sep-15
Solar Star Funding	MidAmerican	579	PV	Greenfield	United States	North America	USD	325	20	12.5	3.95%	Baa3 / BBB / BBB-	Mar-15
Primrose Solar Portfolio	Primrose Solar	39	PV	Operating	United Kingdom	EMEA	GBP	29	19	--	--	Private	Jan-15
Antin Solar Investments	Antin Solar	66	PV	Operating	Italy	EMEA	EUR	85	14	--	3.37%	Private	Nov-14
Northland Power Solar Finance One LP	Northland Power	60	PV	Operating	Canada	North America	CAD	232	18	9.3	4.40%	BBB (High)	Oct-14
Enerparc	Enerparc	52	PV	Operating	Germany	EMEA	EUR	17	10	Bullet	4.75%	Private	Jul-14
Genesis Solar Funding LLC	NextEra	250	CSP	Operating	United States	North America	USD	280	24	13	5.60%	NAIC-2 (BBB- Fitch)	Jun-14
Borealis Canada Solar Portfolio	Recurrent	108	PV	Greenfield	Canada	North America	USD	390	C + 19	--	--	Private	Jan-14
Csolar South	Tenaska	130	PV	Operating	United States	North America	USD	316	25	12	5.37%	NAIC-2 (BBB-)	Nov-13
Solar Star Funding	MidAmerican	579	PV	Greenfield	United States	North America	USD	1,000	22	14.7	5.38%	Baa3 / BBB- / BBB-	Jun-13
Foresight Solar Fund	Foresight	--	PV	Operating	United Kingdom	EMEA	GBP	60	21	--	--	Private	May-13
Moapa Solar Project	K Road Power Holdings	350	PV	Greenfield	United States	North America	USD	250	12	10	5.50%	NAIC-2 (BBB- Kroll)	Apr-13
Touwsrivier	Soitec	44	CSP	Greenfield	South Africa	EMEA	ZAR	1,000	16	0	11.00%	Baa2.za (Moody's)	Apr-13
Topaz Solar Farms LLC	MidAmerican	550	PV	Greenfield	United States	North America	USD	250	26	14	4.88%	Baa2 / BBB / BBB	Apr-13
Consolidated Edison	Consolidated Edison	1100	PV	Greenfield	United States	North America	USD	219	24	15	4.78%	NAIC-2 (BBB+)	Mar-13
Solar Power Generation	Solar Power Generation Ltd.	10	PV	Operating	United Kingdom	EMEA	GBP	40	24	--	3.61%	Private	Nov-12
Imperial Valley Solar	AES	266	PV	Greenfield	United States	North America	USD	416	26	14.6	6.00%	NAIC-2 (Baa3/BBB- Equivalent)	Nov-12
Centinela Solar Energy Project	LS Power	170	PV	Greenfield	United States	North America	USD	275	22	--	5.60% (Fixed) / 5.80% (Delayed)	Private	Oct-12
St. Clair Holding	NextEra	40	PV	Operating	Canada	North America	CAD	172	19	10	4.88%	Private	Sep-12
Topaz Solar Farms LLC	MidAmerican	550	PV	Greenfield	United States	North America	USD	850	28	15.5	5.75%	Baa3 / BBB- / BBB-	Feb-12
Desert Sunlight	NextEra / GE	550	PV	Greenfield	United States	North America	USD	744	25	--	5.51%	-- / -- / AA+	Aug-11
NextEra Genesis Solar	NextEra	250	CSP	Greenfield	United States	North America	USD	702	27	--	3.88% to 5.13%	AAA (DOE Backed) / A- (Uncovered)	Aug-11
Andromeda Finance	SunPower	44	PV	Greenfield	Italy	EMEA	EUR	196	18	--	4.84% to 5.72%	Baa3 / -- / -- Aa2 / -- / --	Dec-10

*Includes Wind Assets

PROJECT BOND CONTACTS

New York
Crédit Agricole Securities
1301 Avenue of the Americas
New York, NY 10019

Emeka Ngwube
Managing Director
+1 (212) 261-7889
emeka.ngwube@ca-cib.com

Sergio Figueroa-Sanz
Director
+1 (212) 261-7305
sergio.figueroa-sanz@ca-cib.com

Thibault Webanck
Vice President
+1 (212) 261-7885
thibault.webanck@ca-cib.com

Diane-Charlotte Simon
Associate
+1 (212) 261-3026
diane-charlotte.simon@ca-cib.com

Paris
Crédit Agricole CIB
12 place des Etats-Unis
92547 Montrouge Cedex

Quentin Galmiche
Executive Director
+33 1 41 89 26 98
quentin.galmiche@ca-cib.com

Stephanie Passet
Executive Director
+33 1 41 89 09 28
stephanie.passet@ca-cib.com

Benjamin Clay
Director
+33 1 41 89 06 93
benjamin.clay@ca-cib.com

Ludwig Hsia
Associate Director
+33 1 41 89 3865
ludwig.hsia@ca-cib.com

MANAGEMENT

New York
Crédit Agricole Securities
1301 Avenue of the Americas
New York, NY 10019

Michael Guarda
Head Securitization Americas
+1 (212) 261-7681
michael.guarda@ca-cib.com

Leo Burrell
Head of Infrastructure Capital Markets
+1 (212) 261-7143
leo.burrell@ca-cib.com

DISCLAIMER

This report was prepared exclusively for your benefit and internal use in order to indicate, on a preliminary basis, the feasibility of a possible transaction or transactions and does not carry any right of publication or disclosure to any other party. Any discussion of a possible transaction considered as a result of this report should be viewed solely in conjunction with all oral briefings provided by Crédit Agricole Securities (USA) Inc. and Crédit Agricole Corporate and Investment Bank (together with any affiliates, "Crédit Agricole CIB") related thereto and any additional written materials intended as a supplement hereto or thereto. The contents of this report are confidential and are the sole property of Crédit Agricole. You may not reproduce this clause or distribute this report to any third party other than the directors, employees and professional advisors of your company without the prior written consent of Crédit Agricole CIB.

The information in this report reflects prevailing conditions and our views as of this date, all of which are accordingly subject to change. In preparing this report, we have relied upon and assumed, without independent verification, the accuracy and completeness of all information available from public sources. The information in this report does not take into account the effects of a possible transaction or transactions involving an actual or potential change of control, which may have significant valuation and other effects. This report is furnished for discussion purposes only, and does not constitute an offer or solicitation to buy or sell securities or services, or advise to engage in a particular strategy. This does not purport to specify all of the terms and conditions of any transaction proposed herein. This is not intended to be, and should not be construed as, a commitment to provide financing or buy risks. Crédit Agricole CIB does not make hereby any representations or warranties as to the outcome, financial or otherwise, of any proposed transaction or strategy.

Crédit Agricole Corporate and Investment Bank is a worldwide commercial and investment banking organization. Any reference within this report to commercial banking in the United States refers to the U.S. banking branches of the Crédit Agricole CIB. Any reference within this report to investment banking, or the offering of securities, in the United States refers to Crédit Agricole Securities (USA) Inc., the broker-dealer affiliate and wholly owned subsidiary of Crédit Agricole CIB and a member of the Financial Industry Regulatory Authority (FINRA).

This report is a "commercial communication" as defined in article 6 of the Directive 2000/31/CE of 8 June 2000. For the avoidance of doubt, it is not a "communication à caractère promotionnel" within the meaning of the Règlement General AMF. It is provided for information purposes only. Nothing in this report should be considered to constitute investment, legal, accounting or taxation advice and you are advised to contact independent advisors in order to evaluate this report. It is not intended, and should not be considered, as an offer, invitation, solicitation or personal recommendation to buy, subscribe for or sell any of the financial instruments described herein, nor is it intended to form the basis for any credit, advice, personal recommendation or other evaluation with respect to such financial instruments and is intended for use only by those professional investors to whom it is made available by Crédit Agricole CIB. Crédit Agricole CIB does not act in a fiduciary capacity to you in respect of this report. Crédit Agricole CIB may at any time stop producing or updating this report. Not all strategies are appropriate at all times. Past performance is not necessarily a guide to future performance. The price, value of and income from any of the financial instruments mentioned in this report can fall as well as rise and you may make losses if you invest in them. Independent advice should be sought. In any case, investors are invited to make their own independent decision as to whether a financial instrument or whether investment in the financial instruments described herein is proper, suitable or appropriate based on their own judgement and upon the advice of any relevant advisors they have consulted. Crédit Agricole CIB has not taken any steps to ensure that any financial instruments referred to in this report are suitable for any investor. Crédit Agricole CIB will not treat recipients of this report as its customers by virtue of their receiving this report.

Crédit Agricole CIB, its directors, officers and employees may effect transactions (whether long or short) in the financial instruments described herein for their own accounts or for the account of others, may have positions relating to other financial instruments of the issuer thereof, or any of its affiliates, or may perform or seek to perform securities, investment banking or other services for such issuer or its affiliates. Crédit Agricole CIB may have issued, and may in the future issue, other reports that are inconsistent with, and reach different conclusions from, the information presented in this report. Crédit Agricole CIB is under no obligation to ensure that such other reports are brought to the attention of any recipient of this report. Crédit Agricole CIB has established a "Policy for Managing Conflicts of Interest in relation to Investment Research" which is available upon request. A summary of this Policy is published on the Crédit Agricole CIB website: http://www.ca-cib.com/sitegenic/medias/DOC/91928/2011-politique-gestion-conflits-interets-ca-cib-va.pdf. This Policy applies to its investment research activity. None of the material, nor its content, nor any copy of it, may be altered in any way, transmitted to, copied or distributed to any other party without the prior express written permission of Crédit Agricole CIB. To the extent permitted by applicable securities laws and regulations, Crédit Agricole CIB accepts no liability whatsoever for any direct or consequential loss arising from the use of this document or its contents.