

Solar Energy Project Finance - Status and Market Outlook

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- **Key Market Participants**
- Recent Activity and Market Status
- Key Drivers
- Market Outlook



Commercial Banks

- A niche within the project finance bank market. Predominantly European and Japanese commercial banks
- Recent top lenders included BofA, BOTM-UFJ, Rabobank, Citi, Deutsche, Lloyds, John Hancock, Santander...
- Recent entry - Deutsche Bank, Rabobank, BofA, Citi
- Equipment, construction and term loans; back leverage
- Historically 15-17 year fully amortizing term loans; mini-perms dominate in credit constrained environments
- Interest rates are floating and the loans are prepayable without penalty



Commercial Banks

2010 Renewable Energy Project Finance Top 20 Lenders/MLA

Rank	MLA	# Deals	Total \$MM
1	Bank of Tokyo-Mitsubishi UFJ	21	2,405
2	BBVA	7	1,010
3	Grupo Santander	8	979
4	Crédit Agricole Group	5	898
5	Dexia Group	5	611
6	CoBank	6	552
7	Société Générale	5	519
8	Lloyds Banking Group	3	507
9	NordLB	6	475
10	UniCredit	5	460
11	Rabobank	6	452
12	Citigroup	2	433
13	Caja Madrid	3	400
14	Natixis	4	393
15	ING Bank	7	391
16	BayernLB	4	360
17	Banco Sabadell	3	357
18	Mizuho Financial Group	5	241
19	Helaba	4	170
20	Prudential Capital Group	1	163

2011 Renewable Energy Project Finance Top 20 Lenders/MLA*

Rank	MLA	# Deals	Total \$MM
1	Bank of America	2	1,500
2	Bank of Tokyo-Mitsubishi UFJ	18	1,186
3	Rabobank	13	800
4	Citigroup	3	786
5	Deutsche Bank	4	480
6	Lloyds Banking Group	8	463
7	John Hancock Financial Servic	1	350
8	Grupo Santander	7	313
9	Crédit Agricole Group	4	303
10	BayernLB	5	278
11	Siemens Financial Services	6	275
12	NordLB	5	269
13	Credit Suisse	2	247
14	BBVA	3	242
15	WestLB	4	232
16	Mizuho Financial Group	3	197
17	Helaba	4	194
18	CoBank	4	184
19	SMBC	3	184
20	UniCredit	4	150

Source: Infrastructure Journal

* 2011 League Table is not officially published yet, and subject to final adjustments



Private Placement Market

Non-Rated Fixed-Rate Loans

- Insurance companies and pension funds; Lead institutions have long experience in wind and solar financing
- Recent top lenders included Manulife/Hancock and Prudential
- Construction and term loans
- Long term (20-25 years), fixed-rate, non-prepayable without penalty
- Fully amortized loans

Bonds

- Traditional 144a private placement market – broad institutional investor market
- Term debt; generally requires credit rating
- Long term (20-25 years), fixed-rate, non-prepayable without penalty
- Fully amortized loans
- Better fit for refinancing operating assets



Project Equity

“Tax Equity” Investors:

- Passive tax investment as limited partners in project companies or as lessors
- Generally, preferred distribution or lease structures ensure a minimum target return and low operating risk to investors
- Mostly, financial institutions only (banks, insurance companies) who are familiar with the energy space
- Fluctuating but small universe – technology and industry complexities are entry barriers

“Cash Equity” Investors:

- Infrastructure Funds and similar financial investors with long investment horizon
- Strong credit requirement – prefer stable long-term cash flow
- 10 – 20 year investment term
- Not tax efficient – only receives cash benefits
- Mezzanine financing – essentially supports sponsor equity requirements in a project
- Good fit for smaller independent developers unable to carry sponsor equity requirement in projects



Project Equity, continued

Strategic Investors:

- Utilities, energy companies and industrials
- Various JV and buy-out structures
- Asset driven – direct ownership and control of assets are important
- Longer-term focus



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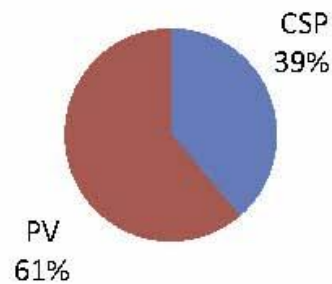
Utility Scale Solar Capacity Expansion

- 2011 was a pivotal year for both PV and CSP
- More than 85% solar projects in construction or development are >100 MW
- Majority of the projects in construction were financed through the 1703 loan guarantee program

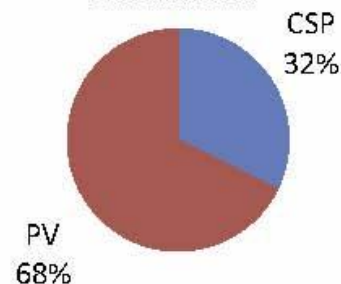
January 17, 2012

Utility-Scale Project Capacity by Technology and Completion Status (MW)				
Technology	Operating	Under Construction	Under Development	Total
CSP	515	1,489	4,365	6,369
PV	809	3,119	19,291	23,218
Total	1,324	4,608	23,656	29,588

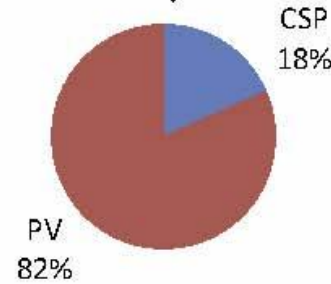
Operating Projects



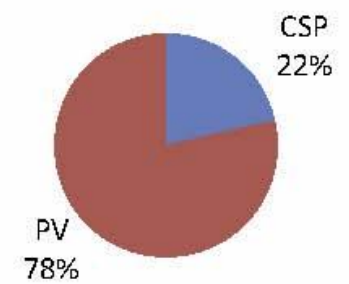
Projects Under Construction



Projects Under Development



Total Project Pipeline



Source: Solar Energy Industries Association



1703 Loan Guarantee Recipients - Solar

Recipient	Technology	Guarantee Amount \$MM		Date of Agreement	Locations	Status
Abengoa Solar, Inc. (Mojave Solar)	CSP	\$ 1,200		Sep-11	San Bernardino Cnty, CA	Closed
Abengoa Solar, Inc. (Solana)	CSP	\$ 1,446		Dec-10	Gila Bend, AZ	Closed
BrightSource Energy, Inc.	CSP	\$ 1,600		Apr-11	Baker, CA	Closed
Cogentrix of Alamosa, LLC.	HCPV	\$ 91		Sep-11	Alamosa, CO	Closed
Exelon (Antelope Valley Solar Ranch)	PV	\$ 646		Sep-11	Lancaster, CA	Closed
Mesquite Solar 1, LLC (Sempra Mesquite)	PV	\$ 337		Sep-11	Maricopa County, AZ	Closed
NextEra Energy Resources, LLC (Desert Sunlight)	PV	\$ 1,460	*	Sep-11	Riverside County, CA	Closed
NextEra Energy Resources, LLC (Genesis Solar)	CSP	\$ 852	*	Aug-11	Riverside County, CA	Closed
NRG Energy (California Valley Solar Ranch)	PV	\$ 1,237		Sep-11	San Luis Obispo, CA	Closed
NRG Solar, LLC (Agua Caliente)	PV	\$ 967		Aug-11	Yuma County, AZ	Closed
Prologis (Project Amp)	PV	\$ 1,400	*	Sep-11	28 States	Closed
SolarReserve, LLC (Crescent Dunes)	CSP	\$ 737		Sep-11	Nye County, NV	Closed
TOTAL		\$ 11,973				

* Partial guarantees – funded by commercial banks

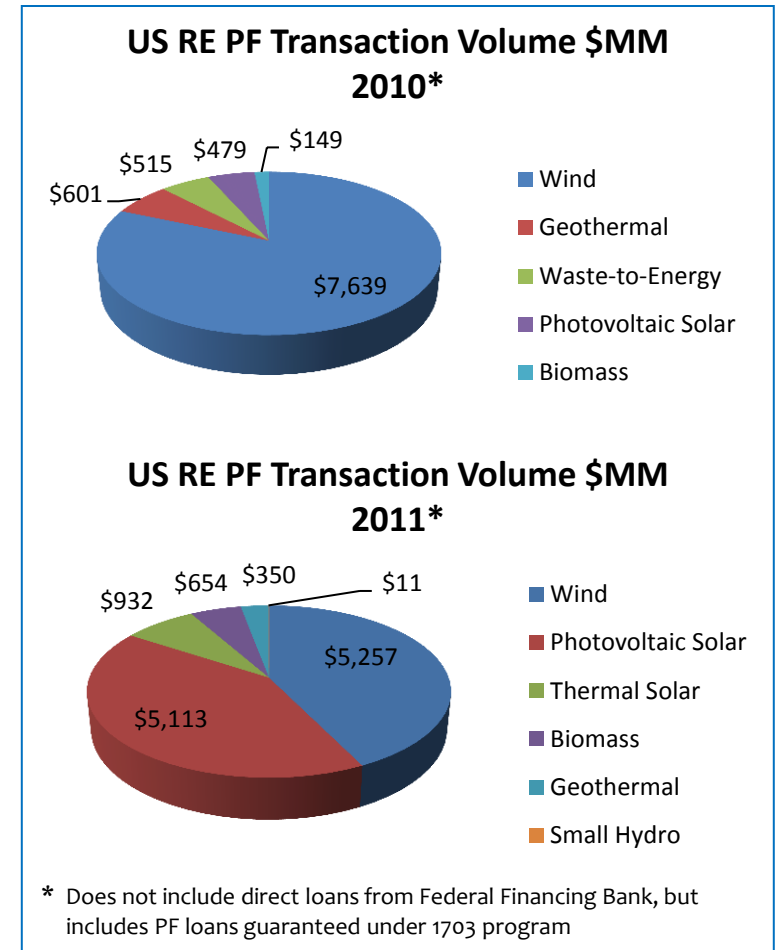
Source: U.S. Department of Energy



RE/Solar Project Finance Market Snapshot

	2010 \$MM	2011 \$MM
US RE Project Finance	\$ 9,382	\$ 12,317
US Solar Project Finance	\$ 479	\$ 6,045
Canada RE Project Finance	\$ 1,253	\$ 1,696
Canada Solar Project Finance	\$ 565	\$ 449

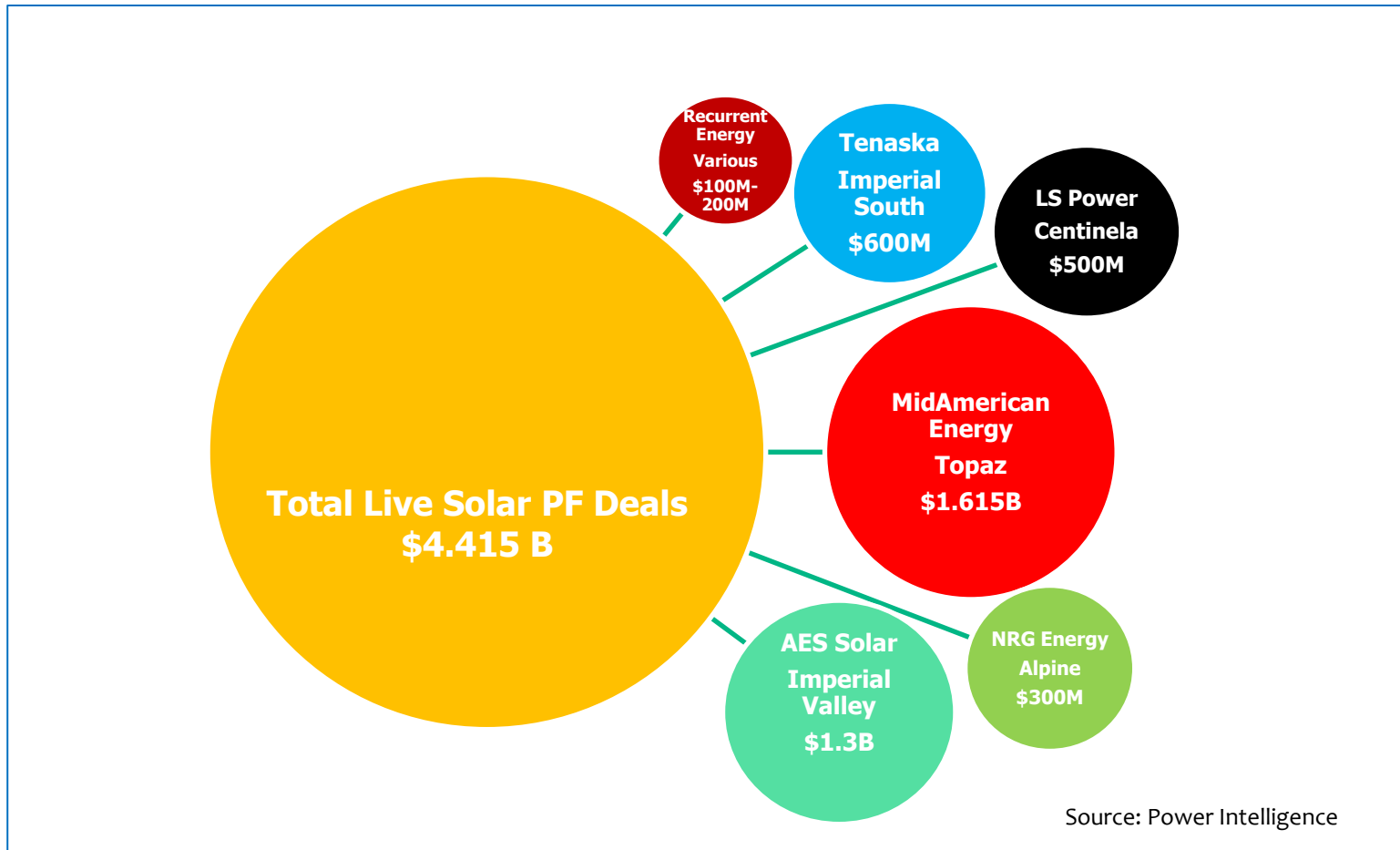
Solar Project Financed 2011	Debt \$MM
Desert Sunlight Solar PV 550 MW (1703 Guarantee)	\$ 1,737
Project Amp Rooftop Solar PV 733 MW (1703 Guarantee)	\$ 1,400
Genesis Solar Thermal 250 MW (1703 Guarantee)	\$ 932
Imperial Solar Energy Center West Solar PV 150MW	\$ 600
SunEdison Rooftop Solar PV Port. 330 MW	\$ 300
SunEdison Solar PV Construction Revolver	\$ 300
Arlington Valley Solar PV 127 MW	\$ 295
Constellation Solar Portfolio Revolver 120 MW	\$ 150
Constellation Sacramento PV Acquisition 30 MW	\$ 100
Webberville PV 30 MW	\$ 92
Roadrunner PV 20 MW	\$ 80
Riverside Renewable Energy Solar Rooftop 9 MW	\$ 34
Acquisition of Solar PV Facilities in California	\$ 25
Total Project Finance by Commercial Banks	\$ 6,045
Additional 1703 Guaranteed Solar Projects Closed 2011	\$ 6,815



Solar surpassed wind for the first time, in terms of financing amount, by a wide margin.

Source: Infrastructure Journal, Alyra

Solar Project Financings Currently in Market



Can solar sustain the pace?

Debt Market Trends

- After the 2008 market failure, bank market recovered strongly in 2010 and continued growth through Q2 2011. Underwriting capacity, albeit with market flex, improved tremendously in 2010-11 and pricing/tenor stabilized.

RE Project Finance Pricing Trend

Period	LIBOR margin	Upfront Fees	Tenor (yrs)
2007	1.50 - 1.75%	1.50 - 1.75%	15 - 17
2008 - Q3/2009	3.00 - 3.50%	3.00 - 3.50%	5 - 7
Q4/2009 - Q4/2010	2.25 - 2.50%	2.00 - 2.25%	7 - 10
Q1/2011 - Q2/2011	2.00 - 2.25%	2.00 - 2.25%	15 - 17
Q3/2011 - Q1/2112	2.50 - 2.75%	2.50 - 2.75%	7 - 10

- In H2 2011, the European credit crises affected about 30% of the European banks in the sector. This was partially relieved by 144a bond financings (enabled by the DOE loan guarantees), but the bank market is still recovering.
- Current bank loans are generally miniperm (7 - 10 year term with 15 - 18 year amortization); pricing edged up about 50 bps from H1 2011 levels.
- Very recently, certain smaller U.S. banks and established Japanese banks are more aggressive and willing to offer longer tenors in smaller club deals (\$120 – 150 MM).



Tax Equity Market Status

- By 2007, there were about 20 active tax equity investors, up from fewer than 6 investors, 5 years prior. By late 2008, due to the market meltdown, the active investor market came down to 5-6 institutions
- Market recovered somewhat, starting in 2010 – currently there are about 14 tax equity investors actively looking at deals.
 - The active investors are GE, MetLife, CS, Citi, BofA, Wells Fargo, US Bank, Union Bank, Morgan Stanley and JP Morgan
 - Google
- Investment sizes are smaller while the transactions are bigger – even the major investors are seeking co-investors in larger deals
- No commodity price exposure; focus of better credit
- Yields have declined somewhat from 2009, but are still 200 – 250 bps higher from 2007; Current unlevered yield 8-9% and levered yield 12-13%
- With the cash grant expired, adequacy of tax capacity is currently one of the most critical issues in the renewable energy sector
 - Recent losses and unpredictability about future taxable income among financial investors
 - The Volker Rule



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Factors Driving Demand and Supply of Capital

- **Supply of debt capital has been choppy, but accessible**
 - Shrunk after Q4 2008 - capital rationing and market liquidity issues
 - Recovered in 2010 and through H1 2011
 - Currently tenor-constrained, but over 45 banks active
 - Significant capacity expansion through bond financing and dual-tranche structures
 - U.S. banks now more active
 - Pricing have not increased significantly despite the recent European banking crises
- **Supply of tax equity has been uncertain**
 - Investor base has historically been limited to about two dozen financial institutions (and GE Capital) – all with experience in energy sector
 - These institutions all face similar sector volatility with their tax base
 - Various structural limitations in the tax credits
 - Force passive tax investors take risk unrelated to their core business
 - Deter entry of varied mix of investors (i.e., industrials, pharmaceuticals)
 - Unlike low income housing tax equity market
 - With the cash grant expired, there is severe shortage of tax capacity to sustain the dramatic growth of the solar sector



Factors Driving Demand and Supply of Capital, continued

- **Demand for capital over the next 3-5 years will be driven by:**
 - Expiry of cash grant increased demand for tax equity
 - Wind project installations – strong growth in 2012; uncertain thereafter
 - 2 - 3 GW/year large-scale Solar PV projects expected, driven by economics and state RPS mandates, mostly in the southwestern U.S.
 - Financeable PPA price remains a major factor determining growth of the sector
 - Low natural gas prices, driven by shale gas and low power demand, forcing down power prices
 - Staggering decline in equipment/installed cost and growth of 100+MW size projects are bringing cost of solar power close to conventional power, on a time-of-day basis
 - Wind power installed cost declined 25% while WTG efficiency increased 20% last 3 years; wind projects are now competitive at \$65/mwh price level in many locations, without tax incentives
 - About 12,000 MWs of natural gas-fired power plants in CA, currently using water cooling, would need to retrofit/switch to air cooling by 2017



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Where Are We Headed?

- **ITC Grant extension:** If the federal ITC Grant is not extended, need for tax equity capacity could double for the same number of MWs, under a ITC or PTC regime. There is not adequate capacity in the current tax equity market to support that.
 - More consolidation by strategics who have own tax capacity??
- **PTC Extension:** Good for wind, but how about solar?
 - Divide and conquer - good for both?
- **Equipment Price:** Continued reduction in WTG/panel prices, coupled with higher productivity of WTGs/panels.
 - Anti-dumping tariffs??
 - Competition will continue to intensify on the supply side
- **PPA prices:** Sustained low natural gas price levels (very likely) putting continued pressure on power prices
 - Depends on the market/region
 - What does history tell us?
- **Entry of foreign WTG vendors:** More than 2 dozen vendors including 4 new entrants with strong value proposition; 3 major suppliers, relatively new to the US, expanding capacity. 11 already have US manufacturing presence (vs. one vendor 5 years ago) and 6 more are planning.
 - Could bring down WTG prices further
 - May help attain lower PPA price points
 - May help relieve debt capital constraint somewhat, through development bank financing tied to their equipment
- **Federal RPS:** Sorely needed, but will we get one?



And if...

- **Donald Trump gets elected the President of the United States?**
 - Clue – there is only one answer...



Alyra Renewable Energy Finance, LLC

A firm imbued with a singular focus and rich experience in renewable energy, Alyra provides financial advisory services exclusively to the renewable energy sector. The firm specializes in acquisitions, joint ventures, structured tax equity and project finance transactions and typically represents strategic investors in such transactions. Clients include the leading energy companies and institutional investors in North America and Europe.

Alyra was founded in January 2004 by Mohammed Alam, following his energy banking career with Fortis Capital Corp. where he led a range of origination, structuring and restructuring of renewable and conventional power transactions. Before Fortis he worked at GE Capital Markets Group, GE's internal investment banking group, performing investment structuring and financial advisory in Latin American energy and infrastructure transactions. Earlier, he began his finance career at Brown Brothers Harriman, focusing on emerging markets research.

Mr. Alam is involved in supporting clean energy growth through his roles in the public bodies and advocacy. In December 2010, Mr. Alam was appointed by U.S. Commerce Secretary Gary Locke as a member of the Renewable Energy and Energy Efficiency Advisory Committee, to advise the U.S. Commerce Secretary on issues related to the global competitiveness of the U.S. renewable energy industry. In March 2011 Mr. Alam was part of the Antarctic Renewable Energy Expedition, led by polar explorer Robert Swan, OBE, and his environmental advocacy organization, 2041.

Mr. Alam holds a Master's degree in Public and Private Management from the Yale School of Management where he was one of three recipients in his class for the Scholastic Excellence Award. He also holds a Bachelor's of Science degree, summa cum laude, from the University of Massachusetts, with various scholastic and leadership honors and distinctions, including the valedictorian nomination. Mr. Alam frequently speaks at major international energy conferences and is an author of published articles for leading energy publications.

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RECENT ENGAGEMENT HIGHLIGHTS

- Exclusive Advisor to Spinnaker Energy regarding the buyout of a 707 MW wind and solar power development portfolio from Martifer Renewables.
- Exclusive Advisor to ARRCO Wind regarding the sale of its 550 MW wind power development portfolio.
- Exclusive Advisor to Project Resources Corp. regarding a strategic transaction to fund a wind power development portfolio in the Midwest.
- Exclusive Advisor to a premier solar PV development company in the Western U.S., regarding recapitalization of the development company.
- Advisor to a solar PV project development company regarding the sale of 23 MWs contracted PV projects.
- Exclusive Advisor to Duke Energy regarding its acquisition of all wind power assets of Tierra Energy.
- Originator and Advisor to Duke Energy regarding the \$240 million acquisition of Catamount Energy.
- Exclusive Advisor to a major strategic investor regarding a \$80 million wind power portfolio acquisition opportunity.
- Exclusive Advisor to a major strategic investor regarding a \$50 million solar energy development portfolio acquisition opportunity.



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