SUSTAINABLE BUSINESS & ENTERPRISE ROUNDTABLE

ENTERPRISE LEADERSHIP COUNCIL MEMBER BRIEFING:

SOLAR POWER PURCHASE AGREEMENTS

SUSTAINABILITY ROUNDTABLE, INC.
LEADERS CREATING VALUE

Table of Contents

Introduction

The purpose of this SBER Briefing on Solar Power Purchase Agreements (SPPAs) is to provide SBER Member-Clients with an overview of the evolving SPPA market. The Briefing aims to support informed decisions regarding the integration of on-site solar power generation at Member-Client facilities.

This SBER Briefing is focused, upon Member-Client request, on companies offering SPPAs to building owners in **California, New Jersey, New York, Texas, and Virginia.**

This SBER Briefing provides a summary of the market for SPPAs in five Member-Client selected states: California, New Jersey, New York, Texas, and Virginia. The Briefing targets the mid-scale commercial and industrial (C&I) markets including government and institutional rooftops and ground sites ranging in installed capacity from **500kW to 5MW**. The Briefing profiles some of the leading vendors and presents a summary of key terms that corporate decision makers are likely to face. Finally, executive guidance and advice are provided regarding SPPA best practices and pitfalls.

In this SBER Briefing we present:

- Summary profiles of SPPA providers in each of the five states
- Key contracting terms and conditions applicable in each of the five states, including key variables such as:
  - Length of contracts
  - Pricing and financial benefits
  - Legal and regulatory structures
  - Operational matters; and
  - Contractual risk allocation
- Best practices, market insights, and evolving market norms.

Overview of SPPA Market

Solar Power Purchase Agreements (SPPAs) are the dominant mechanism for financing solar power in the United States today. For corporate real estate owners and managers (referred to in this Briefing as "hosts") considering installation of a solar power generation facility on their property, SPPAs provide the benefits of solar power without requiring companies to make upfront capital investments or directly manage the complex legal, financial, and engineering issues involved. However, SPPAs typically involve the long-term financial commitment to buy solar power from an on-site system owned by a third party, and acceptance of responsibility for many of the financial and legal risks of ownership. SPPAs are necessary to enable municipalities and other tax-exempt entities to monetize the tax benefits that comprise the primary federal incentives for renewable energy. For corporate real estate owners and managers, SPPAs offer an attractive albeit complex solution.

Like the solar power projects they finance, SPPAs are promoted by state energy policies. Of the states that Member-Clients have requested a summary of—California, New Jersey, New York, Texas, and Virginia—California and New Jersey are the market leaders. Both California and New Jersey have adopted policies to permit and incentivize the adoption of solar power and, accordingly, **lead the United States in installed solar generation capacity**.[1] In New York, Texas, and Virginia, there is less activity due to the lack of financial incentives, lack of policies encouraging on-site generation, and outright prohibitions.

Table 1. Summary of SPPA Market in CA, NJ, NY, TX, and VA.

States	Summary
California & New Jersey	California and New Jersey both have robust and competitive markets for SPPAs with many active providers offering SPPAs to corporate and government customers alike. Market leaders in commercial solar installations and SPPAs include vertically integrated solar companies like SunPower; leading solar developers like SunEdison and Tioga Solar; subsidiaries of larger energy companies like NRG, Chevron Energy Solutions, or Con Ed Solutions; and solar installers such as Vanguard Energy Partners, RGS Solar, Mercury Solar, or Borrego Solar; all of which offer an array of financing solutions.
New York	New York allows SPPAs, but has not committed sufficient resources to make solar power a viable energy option for most commercial and industrial customers. Therefore, in New York, SPPAs are available, but the costs typically exceed the cost savings. Policy changes may accelerate development of solar power in New York; SPPA providers are starting to become more active.
Texas	Similar to New York, Texas permits SPPAs in the investor owned utility service territories, but do not make sufficient financial incentives widely compelling. Much of the solar power development in Texas has taken place in Austin. Austin Energy, a progressive municipal utility company, offers significant financial incentives for smaller-scale systems.[2]

[1] At the end of 2011, CA installed 542 MW in 2011 while NJ installed 313 MW in 2011, far ahead of any other state, especially those without large utility build outs. http://www.slideshare.net/SEIA/us-solar-market-insight-report.

[2] Austin Energy, a municipal utility offers customers a rebate of up to $2/w for systems up to 15kW.

[3] http://www.dispatchmarketinginc.com/eNewsletters/RenewableEnergyDispatch/tabid/5585/articleType/ArticleView/articleId/4989/Staunton-solar-firm-faced-utility-challenge.aspx.

Virginia	Virginia, a traditional monopoly utility state, prohibits most SPPAs. SPPAs are only permitted for customers who generate 100% of their electricity from renewable energy. One SPPA provider became involved in a dispute with Dominion Power and settled the matter by offering an equipment lease transaction where the institutional customer was considered to be leasing equipment rather than paying for solar energy.[3] This equipment lease model has proven successful in other jurisdictions, including municipal utilities in California, where an electric utility company has been granted an exclusive monopoly on the sale of electricity.

In the context of SPPAs, solar power is typically considered a commodity good. With the exception of SunPower,[4] a premium provider that uses SPPAs to finance sales of their own equipment, all credible SPPA providers have access to the same equipment, many even using the same contractors for installation. Many solar installers and contractors (called integrators) offer SPPAs as a financing option.

In well-established markets, the price, terms, and conditions for SPPAs are quite similar. This congruence is a function of the financing requirements of investors and competitive forces in the market. In many markets, second-tier regional providers offer the best value proposition. Accordingly, in vendor summaries, prominent second-tier providers are listed along with first-tier market leaders. Key factors influencing the SPPA vendor value proposition include management costs and the availability of low-cost capital.

In competitive markets, corporate real estate owners and managers secure the best price and terms by holding a competitive solicitation, Request for Proposals (RFP) or Request for Qualifications (RFQ). Leading corporate real estate owners and managers engage internal or external experts to assist in the decision and negotiation of any SPPA.

[4] SunPower is a vertically integrated solar power company that develops and sells projects utilizing their own equipment. The SunPower solar panel is a market leader in efficiency (and price).

Market Overview by State

This section provides a summary of the market in the five states covered in this SBER Briefing including California, New Jersey, New York, Texas, and Virginia.

Category	State				
	CA	NJ	NY	TX	VA
SPPA penetration	Yes, CA is the leading state for solar policy and deployment	Yes, NJ is one of leading solar states	Limited, NY is slow on adoption of solar policy, but change is underway	Very limited by law and regulation	No, limited by law to equipment lease structure
Selected Vendors	• Real Goods Solar • SPG • Sun Edison • SunPower • Tioga Solar	• EPG Solar • Mercury Solar Systems • Nautilus Solar • NRG Solar • Vanguard Energy Partners	• EPG Solar • Mercury Solar Systems • Nautilus Solar • NRG Solar • Vanguard Energy Partners	• Alternative Power Solutions • Lighthouse Solar	• Secure Futures • Standard Solar
Solar incentives for mid-scale C&I (500kw-5MW)	Several Feed-in-Tariffs & Large Rebates*	SREC Market	• NYSERDA Funding • LIPA Feed-in-tariff	Rebates for small systems in Austin Energy territory	None
Net Metering	• 1MW Private • 5MW Public or University except 1MW in LADWP territory	Cannot Exceed Customer Yearly Onsite Usage. Several examples of >6MW projects	2 MW. Virtual Net Metering within Entity Accounts	Retail Energy Provider decides the size of net metering	500kW

California

California is the leading market for solar energy and SPPAs. Abundant and reliable sunshine and aggressive state policy incentives have promoted dramatic and sustained growth. As of the first quarter in 2012, California had installed 2,025 MW of solar energy—more than any other state in the U.S. Since the end of 2009, cumulative installed solar photovoltaic capacity in California has increased by 949 MW, the largest increase in the United States in that period. Over $700 million was spent on solar photovoltaic installations in California in the first quarter of 2012. This figure represents 35% of the expenditures in the U.S. on solar photovoltaic installations over the same time period.[1]

[1] SEIA, California Fact Sheet.

California law calls for 33% of the state's energy to come from renewable energy resources by 2020. This is an ambitious objective that could see development of more than 85 GW of solar energy in the next fifteen years. There are myriad policies and programs supporting solar power in California specified by region, project type, and project length. The market is continually evolving to take advantage of these programs.

Most of the leading solar companies in the United States originate from and have operations in California. Accordingly, California has a highly developed and competitive market for SPPAs. They are the preferred mechanism for financing mid-size distributed solar energy projects—from 500kW to 5 MW—in most areas. While Table 6 identifies some market leaders, there are many other highly-qualified companies offering SPPAs. In large municipal utility districts like Los Angeles Department of Water and Power (LADWP) and Sacramento Municipal Utility District (SMUD), SPPAs are not permitted. Potential buyers in these areas use alternative structures such as solar equipment leases.

New Jersey

New Jersey is the second largest solar energy market in the U.S. It surpassed California in the amount of solar power capacity installed in a quarter for the first time in the first quarter of 2012. Like California, New Jersey established aggressive targets for solar power and provided an initially lucrative incentive regime based on Solar RECs (SRECs). The high returns were effective in drawing in rapid growth, but also led to a dramatic decrease in SREC prices as the market became overbuilt. New Jersey passed a new law expanding their SREC program, so SREC prices are expected to recover. The state supports long-term market growth with a state RPS goal of 5,316 GWh of solar produced yearly by 2026, the equivalent of just under 5,000 MW of installed capacity. Therefore, owners of premium roof space should have success attracting the attention of multiple qualified vendors looking to bid on a SPPA for the facility. As with California, there are numerous qualified vendors offering SPPAs at competitive prices and terms.

Owners of multiple buildings should focus on rooftop projects in regions served by Jersey Central Power & Light (JCP&L) and Public Service Electric & Gas (PSE&G). Atlantic County Electric territory is less optimal for current installation projects due to project overload, relatively low electric capacity, and long interconnection queues. Net Metering in New Jersey has no system limit but systems must be sized so that their annual production does not exceed customer's annual on-site energy demand.

New York

Observers expect the solar market in New York to grow following the upcoming Solar Jobs Act (SJA) that requires 3% of New York's power supply to come from solar energy by 2026. Additionally, the Long Island Power Authority (LIPA) just recently introduced a 50MW feed-in-tariff, which is expected to be fulfilled by the end of July 2012. Should the Solar Jobs Act pass, a robust Northeast and Mid-Atlantic market of installers, financiers, and developers should create competition in the PPA market quickly, especially among large, easily-accessible rooftops.

Texas

Since the end of 2009, cumulative installed solar photovoltaic capacity in Texas has increased from 8 MW to over 76 MW. This growth rate is the 6th fastest in the country over that period. The state of Texas currently has 76 MW of solar energy installed within its borders, ranking the state 13th nationally. In 2011, 1,044 solar photovoltaic systems were installed in Texas, representing 44 megawatts of solar capacity. There are 255 solar companies operating in Texas and 21 manufacturing facilities producing goods for the industry including inverters, racking equipment, and concentrated photovoltaic modules. Other firms in Texas offer solar installation and engineering services, as well as large-scale project development and financing. In addition, Texas added 34 MW of utility-scale solar (projects over 1 MW) in 2011, ranking the state 7th in the U.S. over that time period.[9]

There is no currently viable SPPA market in Texas for on-site solar projects. The majority of rooftop and mid-scale solar power has been built in Austin, under the favorable policies of Austin Energy, a municipal utility. However, Austin Energy does not allow private 3rd party SPPAs in its territory. While net metering is allowed in other utility areas, the amount of credit one receives varies and it is up to the local utility to determine what level of credit to provide. Thus, while installers like Lighthouse Solar have profitably installed smaller-scale systems in Austin, the rest of the state has not seen a large market due to the lack of incentives, restrictions on net metering, and low energy prices in general. However, national operator NRG Solar is based in Houston and expects the commercial and industrial solar market to start growing rapidly soon. Legislation promoting solar power was introduced in the Texas House in 2012, but has not yet been put to a vote.[10]

[9] SEIA
[10] SEIA

The Texas solar market hinges on the availability of infrastructure. Net metering solar projects are already almost economical in many parts of the state. Municipal restrictions are still relatively prohibitive. For instance, the City of Austin only allows systems up to 20kW to net meter. Additionally, electricity billing cycles are monthly and so require solar power loads to be distributed on the same basis. In the City of Brenham, buyers can net meter up to 10MW, credited monthly, crediting any excess at the avoided wholesale rate. In deregulated areas of Electric Reliability Council of Texas (ERCOT), registered distributed generation is typically paid the wholesale price when producing more than the onsite load. Scaling systems is thus difficult outside the most consistent electric users, such as stable industrial plants.

Virginia

Virginia does not have a viable market for SPPAs. Third-party SPPAs are not permitted under state law. Virginia regulates vertically integrated utilities that are provided a monopoly franchise by the state. Moreover, Virginia has no compulsory renewable portfolio standard goals or mandates for solar. There is a voluntary RPS, which utilities satisfy by owning renewable energy generation and procuring so-called "voluntary" RECs at very low prices. One solar developer, Secure Futures, attracted press attention in 2012 by installing a 480 kW solar power system on the campus of Washington and Lee University. Dominion Power, the local utility, sought a Cease and Desist order from the State Corporation Commission arguing that 3rd party SPPAs are not allowed unless the customer obtains 100% of their power requirements from the on-site generation. The transaction was restructured as an equipment lease.

Pursuant to a law passed last year, Dominion Power itself has applied to the Virginia Corporation Commission to build, own and operate solar power facilities on leased rooftops and ground mount sites, effectively acting as an independent Power Producer. In addition, Dominion will buy solar power generation from owners who install their own systems under a standard tariff of $.015/kWh, for a term of up to 5 years.

The Tennessee Valley Authority (TVA), which has a very small territory in SW Virginia, also has a pilot standard offer program for renewable energy whereby solar projects under 1MW in size can apply for up to a 20-year contract at $.04/kWh. There are 10MW of eligible capacity in 2012, 1.1MW of which has been awarded. One developer may not apply for more than 2MW of capacity. Due to the low offer rate and the limited authority of the TVA in the state, this program does not present a significant opportunity to businesses in Virginia.

SPPA Provider Market Trends

SPPA providers are increasingly focused on utility-scale projects as solar technologies mature. In addition, there has been mergers and acquisitions that are resulting in large national brands which have the advantage of geographic spread, yet regional providers are at times engaged because of their detailed knowledge of the local markets.

Increase in Scale

SPPA providers are increasingly focused on utility-scale projects as solar technologies mature. In 2007, the development community considered a 400kW shopping center installation to be a large project. In 2012, attention has shifted to multi-megawatt rooftop, rooftop-portfolio, and ground-mounted deals. Providers that are still active in 20,000 to 80,000 sq. ft rooftop projects use younger personnel as top talent gravitates towards industry-leading large projects. EPG and Nautilius Solar still have hands-on management teams and are the exceptions to this trend.[8]

National Providers

National brands have emerged and are successfully engaging Fortune 500 companies. These brands developed both from steady organic growth and through mergers and acquisitions. Large brands are still active in small to medium-size projects (600kW to 1MW) and consistently seek out and work with other national companies as hosts to build multi-rooftop projects. A notable partnership between Sun Edison and Staples built 33 projects on the rooftops and property of Staples office supply stores in 4 states. NRG Energy and warehouse owner ProLogis are planning to build 733MW across 28 states. Tioga has built medium-scale projects on the rooftops of 12 BJ's Wholesale Clubs in six states using its branded and publicly available SurePath PPA™.

Regional Providers

Regional providers can offer better value than larger national brands whose veteran personnel are working on utility-scale projects. Fortune 500 companies are successfully working with smaller, regional companies to build successful projects. For instance, Walmart is actively working with Greenskies Renewable Energy LLC of Hartford, Connecticut to build projects on 27 stores in Massachusetts.

[8] Information in this section is based on interviews with industry professionals.

SPPA Provider Segmentation & Characteristics

As shown in Table 2, solar projects fall roughly into five major segments by size; while overlap occurs, providers tend to focus on specific segments. Larger solar companies serve multiple segments and the lines blur between segments. Smaller companies tend to focus more narrowly on specific segments. Hosts should select a provider that best meets their own needs.

Table 2. Market segments by size.
Source: Solventerra Research

Project Category	Project Size Range	Known Market Participant
Residential/Micro-Commercial	Up to 15kW	Real Goods Solar
Small Commercial	15 to 100kW	Nexamp
Medium Commercial	100 to 750kW	Tioga
Large Commercial	750kW to 6MW	Borrego Solar
Utility Scale	>6MW	NRG Energy

Access to Capital

Larger brands use more traditional sources of capital to finance projects and accordingly must negotiate more stringent contract terms to satisfy investors. Early SPPA transactions were financed with a higher capital cost than today's transactions. State and federal incentives were lucrative enough to boost project returns to a level where investors were comfortable with the technological and production risks. Furthermore, early project development saw an imbalance between the pool of active developers and the relatively small group of creditworthy and well-established, market-leading hosts. As the pool of interested, creditworthy hosts increases and available state incentives decrease faster than equipment prices, larger developers are seeking lower-cost capital to finance projects. Such capital comes from traditional project finance sources that have little appetite for risk, and require hosts and SPPA counterparties to assume almost all of it with strict damage provisions. Smaller regional companies that do not have the deal flow to access larger, more inexpensive sources of capital are forced to rely on higher-cost capital from lenders comfortable with the risks they are being compensated to take. It is essential for creditworthy hosts to assess a smaller, regional company's ability to arrange lower-cost capital so the host and the developer can fully monetize the host's creditworthiness.

Summary of Select SPPA Providers

To assist Member-Clients in surveying the market of SPPA providers, SR Inc has used selection criteria to provide corporate profiles of several SPPA providers that operate in each of the Member-Client selected states covered in this SBER Briefing— California, New Jersey, New York, Texas, and Virginia. Table X lists the firms profiled for each state and Table Y provides a matrix of the firms and how they were scored against the selection criteria. Appendix A provides a more detailed summary of each listed firm.

Selection Criteria

- Demonstrated financial backing
- Strong management & project teams
- Experience in solar and other distributed power generation development
- Quality of Engineering, Procurement, and Construction (EPC) selection if not internal

For California and New Jersey, the list is representational, as there are many other qualified, competent, and well-financed providers offering SPPAs. Most of the listed providers have established reputations and are experienced working with Fortune 500 customers. Market leaders like SunPower, Sun Edison, NRG and Tioga have national footprints and could be listed in either California or New Jersey. New York is an emerging market. Texas and Virginia are not active, as regulatory and policy barriers make on-site solar challenging and SPPAs either unattractive or outright illegal.

Table 3. Selected vendors by state.
Source: Solventerra Research

States				
CA	NJ	NY	TX	VA
• Real Goods Solar • SPG • Sun Edison • SunPower • Tioga Solar	• EPG Solar • Mercury Solar Systems • Nautilus Solar • NRG Solar • Vanguard Energy Partners	• EPG Solar • Mercury Solar Systems • Nautilus Solar • NRG Solar • Vanguard Energy Partners	• Alternative Power Solutions • Lighthouse Solar	• Secure Futures • Standard Solar

Table 4. Analysis of firms based on selection criteria.
Source: Solventerra Research

Firm	Demonstrated Financial Backing	Strong Management & Project Teams	Applicable Experience	Quality of EPC Selection
NRG	$4 billion mkt cap on NYSE.	Several.	Acquired Solar Power Partners for distributed solar projects.	World Class Power Generation Company.
Tioga Energy	Venture backed growth company with multiple announced financing facilities.	Yes.	Completed over 44 projects in New Jersey. Invented a financing structure now known as the Morris Model.[7]	Uses SunDurance Energy, a subsidiary of the Conti Group for New Jersey projects.
Real Goods Solar	$28 million mkt cap on NYSE.	Yes.		Internal EPC resources.
Sun Edison	Parent company has $507 million mkt Cap on NYSE.	Hundreds of experienced personnel.	Arguably invented the SPPA in 2003.	Various world class construction companies if not constructed with internal resources.
Nautilus Solar	Wholly Owned Subsidiary of Starwood Capital Group.	Utility-scale experience on the management team.		Uses SunDurance Energy, a subsidiary of the Conti Group for New Jersey projects.
EPG	Announced $200 million in development capital for North American Solar Projects with Unique Capital LLC.	Utility-scale experience found in managers of larger companies entrepreneurial spirit and ability to execute.	Two dozen energy and infrastructure projects valued in excess of $4 billion.	
Standard Solar	Privately held. Fast growing company.	Yes.	21 MW of installations.	They are an EPC.
SPG	SPG Solar is profitable with no debt and backed by two strong financial partners – Global Environment Fund and the Sustainable Asset Management Fund (SAM).	Several Project teams.	Over 1500 installations.	They are their own EPC.
Lighthouse Solar	Small business.	Unknown.	Mostly residential and small commercial.	
Secure Energy Futures	Small consulting business.	Unclear.	1 known project.	Unclear.

[7] https://financere.nrel.gov/finance/content/solar-ppa-v20-hybrid-morris-model-saves-public-facilities-money

SPPA Terms & Conditions

While there is no uniform standard form for SPPAs, the key business terms and conditions are fairly well established and consistent across companies and jurisdictions. This convergence is due to standard requirements established by investors in solar projects and SPPAs. Investors have adopted a consistent financing scheme to quantify, reduce, and allocate risks, and so enhance overall project value.

A survey of providers of SPPAs determined that in each of the covered states, the term of an SPPA was between 10 and 20 years with 10 years being the minimum and most providers preferred a minimum of 15 years. The pricing of energy is, of course, varied across the states which causes variance in the pricing of the SPPA-sourced energy. Other terms such as ownership and responsibilties, were fairly similar across the states. This information is summarized by state in Table 5. Note that although the survey does include the states of Texas and Virginia, none of the providers in the survey are currently serving SPPAs in those markets.

Table 5. Survey of SPPA terms in client markets.
Source: Solventerra Research

Term	State				
	California	New Jersey	New York	Texas	Virginia
Mean SPPA Length (years)	20	20	20	20	20
Minimum SPPA Length (years)	10	10	10	10	10
Energy Purchase & Sale					
Average Current Market Price ($/kWh) Commercial	$0.10 - $0.15	$0.12 - $0.15	$0.12 - $0.17	$0.08 - $0.09	$0.08 - $0.09
Average Current Market Price ($/kWh) Industrial	$0.08 - $0.10	$0.09 - $0.12	$0.06 - $0.09	$0.05 - $0.07	$0.06 - $0.07
Average Percent Savings for a Commercial Electricity User	10-15%	10-30%	10%-20%	7%-20%	7%-20%
Average Percent Savings for an Industrial Electricity User	5-15%	10-20%	10%-15%	4%-15%	4%-15%
Required SPPA Contract Price of Energy ($/kWh)		$.1150	$.1350		
Required Contract Price Escalation Range	0 to 3%	0 to 3%	0 to 3%	0 to 3%	0 to 3%
Other Ownership & Responsibilities					
Obligation to Deliver Energy	Yes, but contingent[5]	Yes, but contingent	Yes, but contingent	Yes, but contingent	Yes, but contingent
Obligation to Purchase Energy	Yes	Yes	Yes	Yes	Yes
Host Tax Implications	SPPA Provider	SPPA Provider	SPPA Provider	SPPA Provider	SPPA Provider
Ownership of Environmental and Other Attributes (Capacity Payments)	Negotiable	Negotiable. Typically retained by SPPA	Negotiable	Negotiable	Negotiable

[5] Solar power is an intermittent resource and as such is typically offered for sale contingent upon the energy being produced. If energy is not produced due to clouds or other issues, then the Provider is not obligated to provide electricity to the host or other purchasers. Hosts must maintain access to the grid, or install battery backup systems to provide energy when the sun isn't shining. A dedicated battery backup system is quite expensive and not factored into pricing of solar power.

As noted on the prior page, there is no uniform standard form for SPPAs but the key terms and conditions are fairly consistent across companies and jurisdictions due to standard requirements established by investors. Table 6 summarizes the typical treatment of several terms within an SPPA.

Table 6. SPPA terms, conditions, and best practices. Source: Solventerra Research

Term	Treatment
Allocation of Regulatory Risk	Negotiable depending on the counter parties. Some providers assume regulatory risk. Others try to place on Host. Others share depending on risk.
O&M Responsibilities	PPA Provider responsible for O&M. Developer/EPC assists in identifying, negotiating, and implementing O&M in conjunction with the EPC contract. O&M costs are built into the PPA rates.
Property/Site Access & Control	Either a roof lease or land use agreement is executed in conjunction with the PPA.
Developer-Triggered Property-Damage Provisions	EPC contractor provides insurance during the construction of the project. Additionally, PPA project insurance typically overlaps construction and commissioning of the system. PPA fully insures project and operations. The insurance premiums are assumed in the PPA rates.
Temporary Host-Requested Shut-down Procedure	Allowed for in the PPA contract. Average down-time assumptions provided for in the production assumptions used to establish the PPA rates. Exact terms negotiable.
Temporary Host-Requested Shut-down Damage Provision	Specifically addressed in the PPA contract providing for compensation to the PPA for SREC and energy payments lost due to excessive host-requested shut-down time. Exact terms negotiable.
Early Termination Damage Provisions	Present value of remaining PPA income, estimated SREC income, plus costs to dismantle and dispose of the system.

Negotiating Key Provisions

While price, term, and property rights provisions are paramount, several additional areas of the SPPA require special attention as they cover and allocate important risks, typically to the site host.

Damages and Early Termination Payment Provisions

Usually, SPPAs require hosts to accept significant damages in the event of default. Effectively, a defaulting host is responsible for all lost profits. Damage provisions are designed to secure expected revenues for the provider and investors. Revenue streams are the basis for financing project construction. Project revenues frequently depend on incentives and rebates that the host does not directly pay for or realize savings from except to the extent that those incentives and rebates enable the provider to offer energy below retail price. Moreover, the relative youth or volatility of SREC markets in states like New Jersey contribute additional risk to revenue assumptions.

Regulatory Change Risk

Providers increasingly negotiate for host customers to assume the regulatory risks that could reduce project revenues. These include possible restrictions or filled quotas on net-metering eligibility or on the ability to sell excess energy from the site to the grid. If the project cannot qualify for net metering, the host usually would sell monthly excess energy produced at the site back to the grid at the avoided wholesale cost of electricity. This type of regulatory risk is extremely difficult to quantify. It may be most prudent to seek a shared solution or loss.

Shutdown Risk and Asymmetric Losses

The space lease and power savings value of a SPPA to the host is roughly 2-10% of total system revenue. Taking on shutdown risks and compensating the provider for lost revenue can entirely offset this value. In New Jersey, large industrial hosts can save $0.02/kWh on their $0.10/kWh electricity while developers earn an additional $0.30/kWh on SRECs and other production-based-incentives. In this situation, hosts earn $0.02 for every $0.38 earned by developers. If a host has to shut down the system for one month to repair a roof or rebuild an electrical room, they must compensate the developer an amount equal to 19 months of host earnings from the project. If the project has not yet produced the savings—and thus cash reserves to cover such an event—property owners and tenants must budget reserves in advance or seek funding from parent companies and divisions.

Detailed Review of Terms

To give Member-Clients a sense of the form and structure of an SPPA and to identify areas that are opportunities for negotiation, the following section is an outline of an industry SPPA. SR Inc annotates the outline with comments to highlight issues that deserve particular attention. A form of the actual agreement is attached as Appendix B.

1. INTRO AND DEFINITIONS – **Who are the parties?** Usually the actual solar generating facility will be owned by a special-purpose entity that is subsidiary to the name-brand SPPA provider. This structure is standard for power project development, but makes it important for the customer to ensure that the subsidiary is capitalized, capable of performing, and properly insured.

2. TERM – **Typically 15-20 years are necessary to secure long term financing and enable pricing competitive with grid retail pricing.** While 10 years is not uncommon, the resulting SPPA price will be higher and host should make sure to understand what happens after termination. The optimal outcome at termination is usually for equipment to remain in place and operating. **Another issue affecting the term and termination is system life**. Rooftop solar projects have a life expectancy of 25+ years and the roof condition is important to consider as moving the system to repair or replace the roof is costly and will likely be the responsibility of the host if not dealt with up front. In some cases, the provider may offer roof improvement/replacement as part of the offer.

3. ACCESS RIGHTS – **The SPPA provider will typically insist on lease or easement property right, rather than simple access license or permission**. Provider should also require Non-Disturbance Agreements from all lien holders on the property. The provider's concern is that a license may be wiped out in a foreclosure or property sale and solar provider wants to make sure they retain ability to continue operating.

4. PLANNING, INSTALLATION, AND OPERATION OF PROJECT – Part 1 – **The solar provider typically builds in a development period to conduct detailed feasibility, permitting, and engineering studies**. Sometime financing negotiations continue during this period. The host should limit this period to prevent the provider from delaying the project unnecessarily.

   PLANNING, INSTALLATION AND OPERATION OF PROJECT – Part 2 – **Hosts should be sure to retain approval rights over contractors associated with the project**. An important issue is responsibility for hazardous materials and conditions. SPPAs typically seek indemnification from the Hosts for

hazardous materials liabilities that exist on the site and are discovered by the SPPA provider. Hosts should consider whether there is any risk that construction activity undertaken by the SPPA provider may reveal environmental conditions that trigger mandatory reporting to the state and/or federal government. **The provider will typically take responsibility for operating and maintaining the facility**.

5. SALE OF ELECTRIC ENERGY – **The host is obligated to purchase all energy provided by the solar facility before buying power from anyone else**. Most SPPAs are geared to be priced at or below current retail energy prices. Providers typically look for an annual price inflator of about 1-2%. Hosts should be sure to except distributed generation from any exclusive commodity supply arrangements. In this section of the agreement, conflicts between SPPAs and the terms of hosts' existing electricity commodity supply arrangements are resolved. Hosts accordingly assess current energy bills and rates to accurately determine what costs could be avoided by replacing some generation with solar power. Solar typically replaces electrical commodity, or energy charges, but will probably not reduce power demand charges based on peak load.

6. PAYMENT AND BILLING – The buyer ensures that solar energy billing is aligned with existing utility payment procedures.

7. SUPPLEMENTAL POWER, NET METERING, AND RECS – Part 1 – SPPA contracts specify various divisions of responsibility in the case that hosts do not use and pay for all generated solar power. **SPPA providers typically expect hosts to use and pay for all solar power, and otherwise assume responsibility for selling excess energy to the utility**. This practice is called **net metering** and varies considerably in its particulars from state to state. **It is therefore critically important for the host to understand the applicable state and utility rules regarding net metering or the treatment of excess energy** when the system is producing more than the building is consuming. In some cases, the host should negotiate for the risk of extra energy to rest with the provider; solar providers may have additional expertise in managing risks and responsibilities of this type.

   SUPPLEMENTAL POWER, NET METERING, AND RECS – Part 2 – **The SPPA provider typically retains all incentive payments, environmental attributes, Renewable Energy Certificates (RECs), and tax benefits–including the 30% Federal Business Energy Investment Tax Credit (ITC) and accelerated depreciation benefits**. Retaining these ancillary benefits enables providers to offer lower energy prices and helps to finance the solar project. However, not all ancillary benefits are assigned any current value by

the provider, but they will typically try to secure them in the SPPA. Hosts may seek to retain ancillary benefits such as carbon credits or energy capacity values.

8. PERMITS, OWNERSHIP OF PROJECT, LIENS, MORTGAGES — This section deals with **allocation of risks and responsibilities for obtaining the permits necessary to build the solar project**, as well as separating the ownership and financing of the solar projects from the property on which it is based.

9. PURCHASE OPTION, REMOVAL AT END OF TERM – **The provider typically provides the host with an option to purchase the generator system at intervals after the 5-year term of the IRS recapture period**.[6] The purchase price is typically based on the greater of (1) the fair market value (FMV) of the system or (2) an agreed termination schedule. In most cases the provider prefers to negotiate rather than pay for removing the generator at the end of the term. The host also ensures that the provider is obligated to remove all equipment without harming the property.

10. SHUTDOWNS; RELOCATION, CLOSURE, OR SALE OF SITE – The section of the SPPA focused on shutdowns, relocation, closure, and sale is perhaps the most important to the host. SPPA proposals typically resolve that, **should the host force the provider suspend operations, the host will pay the provider for lost revenues including power sales and sales of secondary commodities such as RECs**. This section of the SPPA specifies the responsibilities of the parties in cases when the system is shut down. SPPAs often allow some limited shutdowns, but once that limit is reached, the host will be responsible for lost revenues if the shut down is hosts' fault. This is important, particularly in markets like New Jersey where energy sales revenue is less than solar REC (SREC) sales. If the host is responsible for lost SREC sales for an extended period, this loss could eliminate all savings from solar energy. Moreover, **SPPAs often place all responsibilities for shutdown-related risks on the host except for circumstances caused directly by the provider**. These risks may include legal changes that void contracts. Clauses in this section also address provisions regarding property sales and provider approval rights concerning SPPA ownership transfer.

11. TAXES – The provider should pay property taxes associated with solar generator equipment.

[6] The federal tax benefits applicable to a solar project may be lost and subject to recapture by the IRS if a solar project is sold to a non-qualifying entity during a 5 year period after the project is put into operation. For more information about the Investment Tax Credit, see the Internal Revenue Code.

12. INSURANCE – Both parties need to maintain insurance.
13. COOPERATION, SOLAR ACCESS, FUTURE IMPROVEMENTS
14. PRESS RELEASES AND CONFIDENTIALITY
15. INDEMNIFICATION – Providers and hosts must both be aware of environmental indemnities. Indemnities are typically not negotiable, but hosts should ensure that there are no hidden hazardous conditions on their properties.
16. REPRESENTATIONS AND WARRANTIES
17. FORCE MAJEURE
18. CHANGE IN LAW – Another important provision. Some providers may seek to put risk and cost of change in law on the Host. Hosts should argue that Provider is expert and in best position to manage that risk.
19. PROVIDER DEFAULT AND HOST REMEDIES
20. HOST DEFAULT AND PROVIDER REMEDIES – SPPA providers typically require Early Termination Payment schedule that covers Provider's (and their investors) expected return on and of capital. Payment of Early Termination Amount should act as purchase of system.
21. COLLATERAL ASSIGNMENT, FINANCING PROVISIONS
22. LIMITATIONS ON DAMAGES
23. DISPUTE RESOLUTION
24. NOTICES
25. MISCELLANEOUS

SR Inc published this Member-Briefing in February 2013.

Member-Clients should contact SR Inc with any questions or comments. Members who have experience with Solar Power Purchase Agreements that they wish to share with others are encouraged to do so for inclusion in future updates of this SBER Briefing.

One Broadway, 14th Floor
Cambridge, MA 02142
617.682.3632
www.sustainround.com

APPENDIX A- Vendor Profiles

Nearly all of the vendors profiled are active on a national basis; the remainder are active on a regional basis. The state listed represents the location of headquarters or greatest activity. All the vendors listed for California are active nationally. Vendors active in Texas and Virginia are smaller providers with local experience and expertise.

California

Real Goods Solar

Real Goods Solar, Inc. (NASDAQ:RSOL) is a leading provider of turnkey commercial and residential solar energy solutions, with more than 13,000 solar systems in place. Real Goods Solar has more than 33 years of experience in solar energy, beginning with the sale in 1978 of the first solar photovoltaic panels in the United States. With 16 offices across the West and the Northeast, Real Goods Solar is one of the largest solar energy installers in the U.S.

Founded in 1978, Real Goods Solar is a premier residential and commercial integrator of photovoltaic systems headquartered in Louisville, CO. Real Goods Solar's Commercial and Utility division, RGS Energy, has a large portfolio of smaller to mid-size roof-mounted solar projects for very high-profile and demanding clients.[11] Real Goods recently purchased Alteris Inc, a well-established solar integrator with a strong track record of success and one of the first firms large and smart enough to build a formal in-house quality control department for objectively inspecting its systems installed in the field.

Quick Stats

Number of employees: 381
Number of projects: 100 projects
Number of MW installed: ~20 MW

Ownership: Real Goods Solar is a publicly traded Company (NASDAQ:RSOL) with a market capitalization of $62.7 million.

Figure 1. RGS Energy installation.
Source: Real Goods (http://realgoods.com/).

[11] http://rgsenergy.com/solar/our-work/

Customer Base (private/public): Real Goods Solar has a long history of consulting and working with thousands of customers, governments, educational institutions, and industry leaders such as NASA, the White House, Disney, Vatican City, Yale University, Aetna, Timex, CBS, and many others. RGS recently announced a partnership with BMW, whereby BMW owners can charge their new ActiveE, an all-electric vehicle, with an RGS solar system at their home. As an integrator, RGS has $125 million in bonding capacity for pre-commissioning project development, and thus can handle the development of a large portfolio of projects with a single client.

SPG Solar

SPG Solar is a leading developer of distributed solar projects for large commercial, government, and public energy users. Headquartered in Novato, California, SPG Solar has been providing unique solar solutions to its customers for nearly a decade. In addition to its expertise in designing and building solar power systems, SPG Solar offers proprietary products such as its SunSeeker™ single axis tracker and Floatovoltaics™, the world's first floating solar system. SPG Solar's Structured Finance Group offers a full array of financial resources and expertise on financing solar projects. SPG Solar currently manages more than 1,500 solar system installations in Arizona, California, Colorado, Florida, New Jersey, Oregon, Pennsylvania, and Texas.

Quick Stats

Number of employees: ~200
Number of projects: 1500 projects
Number of MW installed: 70 MW

Figure 2. Floatovoltaics by SPG.
Source: SPG (www.spgsolar.com)

Ownership: SPG is a privately owned company whose principal investors include the Global Environmental Defense Fund and a Swiss private equity firm called SAM Private Equity.

Customer Base: Commercial / Industrial, government (federal, state, municipal), residential, utilities (throughout U.S. including California and New Jersey)

Products

- Floatovoltaics- World's first floating photovoltaics system[12]
- SunSeeker Single Axis Tracker[13]

[12] http://www.spgsolar.com/products/floatovoltaics/
[13] http://www.spgsolar.com/products/single-axis-tracker/

SunEdison

Founded in 2003, SunEdison was arguably the first onsite SPPA provider. Having grown rapidly for many years from its headquarters in Belmont, California, SunEdison, now owned by MEMC, represents the industry standard for scale and credibility. SunEdison successfully expanded overseas to capitalize on the rapidly expanding Spanish, Italian, and German markets in the late 2000s when the United States markets for MW-scale projects were still in their infancy.

Very successful in the United States two principal markets for distributed generation, SunEdison leveraged its European track record to cement partnerships with several major companies and large government agencies including the Department of Energy, Department of Defense, General Services Administration, Walgreens, and Staples; making itself a brand-name in the solar industry.

Quick Stats

Number of employees: 400
Number of projects: 650 projects
Number of MW installed: ~500 MW

Ownership: SunEdison's parent company MEMC is a semiconductor materials company. Together MEMC and SunEdison control the entire solar supply chain: sand to silicon to solar panel to solar electricity generation.

Customer Base (private/public): Commercial, homeowners, utility companies, municipalities, coops, landowners. Over 500 MW of solar power deployed with over 550 organizations.

Strategic Partners/Customers:

Retail: Whole Foods, Kohl's 100+ solarized facilities, Walgreens (80 stores), Staples

Utility: Lakeland Electric – 24 MW integrated into generation mix by 2018

Municipal: San Diego 50 MW by 2013, Rovigo, Italy 70 MW (largest solar facility in Europe)

Figure 3. Leading SunEdison partners.
Source: SunEdison

SunPower

Headquartered in San Jose, California, SunPower is a global leader in solar development. Sunpower has been a pioneer since the 1970s in designing and developing solar energy technology. SunPower currently markets the most efficient solar cell (SunPower Maxeon solar cell technology) and highest performance installations. SunPower provides commercial solar energy systems across a broad market sector: small businesses, Fortune 500 companies, government and municipalities, utilities, and residential customers. The company's portfolio includes 20 MW of solar for federal government clients, over 20 MW installed at waste water treatment facilities and over 19 MW of installed capacity at educational institutions. SunPower has built over 500 large-scale solar systems on four continents. SunPower offers vertical integration of solar products and project development. The company controls all stages of the manufacturing process, designs and builds the cells, mounting systems and monitoring equipment, and develops and installs the solar systems. They advertise best–in–class commercial solar installers.

Quick Stats

Number of employees: 5,220
Number of projects: Thousands of residential projects used their equipment. Dozens of MW-scale projects in North America and Europe built under their engineering procurement and construction business unit.
Number of MW installed: Significant global market share

Ownership: SunPower is a publicly traded company on the NASDAQ exchange (NASDAQ: SPWR). It has a $1.95 billion market capitalization.

Customer Base: Commercial/Industrial, government (federal, state, municipal), residential, utilities (throughout U.S. including California, New York, New Jersey, Connecticut, Virginia)

Strategic Partners: At least 24 Fortune 500 companies including Target, Walmart, Toyota, FedEx, and AT&T.

Figure 4. SunPower installation at Johnson & Johnson facility.
Source Sunpower Website

Tioga Energy

Founded in 2006 and headquartered in San Francisco, California, Tioga Energy has made its PPA available to the public, posting it on its website for all to see, read, and understand. This action has demystified solar for many of the decision makers among Tioga's potential clients and helped distinguish the company among the numerous PPA providers in the business. Many financiers like the PPA, and greatly appreciate the consistent quality of the transactions Tioga Energy has to offer to the capital markets.

Finance is Tioga's specialty, since the company subcontracts their projects to construction companies. With a solid financing process and top-tier construction partners, Tioga is known for reliable project delivery.

Quick Stats

Number of employees: 50
Number of projects: 100 projects
Number of MW installed: ~30 MW

Ownership: Tioga Energy is a privately held company. The company has raised over $44 million in venture capital from well-established venture capital groups with deep experience in the energy sector. Such investors include Draper Fischer Jurvetson of Silicon Valley, Rockport Capital of Boston, Nth Power of San Francisco, and Ngen. MEMC, the parent owners of SunEdison, have also invested in Tioga.

Customer Base (private/public): Commercial, homeowners, utility companies, municipalities, coops, landowners

Strategic Partners/Customers:

Retail: BJ's Wholesale Club. Tioga and BJ's Wholesale Club have been working together since late 2010 and built over 2MW of projects on over a dozen retail locations on the east coast.

Municipal: Morris County Improvement Authority: Tioga completed 19 Projects totaling 3.2MW in size with the Morris County Improvement Authority. The projects were built on municipal buildings under a structure on what is now known as the Morris Model.

New Jersey & New York

EPG Solar

EPG Solar, headquartered in Chevy Chase, Maryland, is a developer of utility-scale solar farms. The company was founded in 2010 by two principals with a combined career portfolio including the development of 300 MW of installed renewable energy projects and the facilitation of $7 billion in debt financing. EPG Solar's focus is on commercial and utility projects in active markets throughout the Mid-Atlantic including Massachusetts, New Jersey, Maryland, Washington D.C., Delaware, Pennsylvania, and Ohio. Company expertise is in roof-mounted projects of 1-2 MW, larger ground mounted systems, and project acquisitions. Services include design, procurement, installation, financing and maintenance of solar energy systems. EPG advertises timelines for projects under 10 MW to be within 3-6 months. Last year, EPG Solar signed an Agreement of Terms with Unique Capital for $200 million in financing for its pipeline of projects. EPG has a robust development pipeline in Massachusetts of ground-mounted projects.

EPG is actively searching for new markets for solar development, particularly niche markets of MW-scale project opportunities currently not pursued by the solar energy market in general. A national corporation looking to save energy costs would be well suited to have the EPG principals evaluate its operations, searching for unique opportunities on which to capitalize.

Quick Stats

Number of employees: 2
Number of projects: Over a dozen under development
Number of MW under development: ~50MW

Ownership: Parent company EPG (Elemental Power Group) was founded in 2006 by a principal of EPG Solar, to develop renewable energy projects in solar, wind and fuel cells.

Customer Base (private/public): Commercial, utilities, government, municipalities, coops, landowners

Strategic Partners/Customers: EPG has strong partnerships with communities, leasing landfills for large ground-mounted projects under a Power Purchase and Lease transaction. The largest of this structure is their arrangement with Washington County, Maryland to lease 130 acres of landfills for a 25MW project.

Mercury Solar Systems

Mercury Solar Systems, founded in 2006, and backed by Oppenheimer's Private Equity group since 2008, is a leader in the New Jersey and Connecticut solar markets, with a strong presence in New York and Massachusetts. Having completed over 2,000 residential installations and over 25 commercial installations, both using mostly internal construction crews, Mercury has a deep understanding of building roof-mounted solar systems. Oppenheimer enhances Mercury's ability to finance projects under a PPA model both with Oppenheimer's expertise in proposing suitable transaction terms early in the process, and providing capital and financial backing to execute the transaction. With Oppenheimer's backing, Mercury differentiates itself from other mid-scale highly-qualified construction firms who sign a form PPA and then transfer the deal to capital markets.

Quick Stats

Number of employees: 60
Number of projects: ~900 commercial; ~1200 residential
Number of MW installed: 55MW commercial, 10MW residential

Ownership: Mercury Solar Systems is a privately held company. In 2008 it secured financing from Oppenheimer Inc. to finance larger scale projects and grow through mergers and acquisitions.

Customer Base (private/public): Commercial, homeowners, municipalities, coops, landowners

Strategic Partners/Customers:

Retail: TJX

Industrial: Several mid-scale manufacturing companies in New Jersey

Utility: enXco

Municipal: Several school systems

Mercury Solar Systems implements employee purchase programs in partnership with its commercial clients to make it easier for the employees of said commercial clients to install solar on their homes.

Nautilus Solar

Founded in 2006, Nautilus Solar Energy (NSE) is a privately-held independent solar power generation producer headquartered in Summit, New Jersey. Nautilus is a subsidiary of Starwood Energy Group, which has completed transactions worth over $3 billion in enterprise value since its founding in 2005. Starwood Capital has raised over $10 billion since its inception in 1991 and been involved in over 400 transactions. Given Starwood Capital's ownership of NSE, it has notably strong access to capital and creditworthiness which may help decrease the cost of capital on the project and thus permit them to offer more competitive PPA prices than developers with higher costs of capital.

Quick Stats

Number of employees: ~15
Number of projects: 25 projects
Number of MW installed: 67MW

Ownership: NSE is owned by Starwood Capital, a private equity firm in Greenwich, Connecticut.

Customer Base (private/public): NSE has extensive experience with school boards, doing multi-site deployments in a single transaction that reach into the two to three megawatt range in size. In 2012, they issued a press release stating they are looking for "millions of square feet" of roof space in New York and California. Given the experience of the management team and board, they have had traction with corporate clients, notably Thule Corporation, and the New York Jets. In terms of size, their largest success to date has been developing projects in Ontario, with six projects online for a combined capacity of 67.3MW.

Figure 5. 550kW Nautilus Solar Project in Ontario.
Source: NSE (nautilussolar.com)

NRG Solar

Headquartered in Princeton, New Jersey, NRG Solar is a leading developer of solar energy facilities operating throughout the southwestern United States with 2000 MW of solar projects under development or construction ranging from large-scale projects to rooftop installations for commercial industrial clients. In addition to being owner, partner, or investor in several large utility-scale solar power projects in California, Arizona, and New Mexico, NRG Solar is breaking into the distributed solar market having recently purchased Solar Power Partners with projects now in California, Hawaii, California, Hawaii, Arizona, Connecticut, New Mexico, Massachusetts, New Jersey, Ontario, and Puerto Rico. They also market the development of "solar pavilions," solar arrays constructed as carports in venues such as schools, universities and sport stadiums.

Quick Stats

Number of employees: 5,193
Number of projects: >50 projects of various sizes from ~1MW to >250MW
Number of MW installed: 920 MW of solar installed, 1000 under development

Ownership: NRG, Inc., an Independent Power Producer and Fortune 500 company, is a leading power generation and retail electricity business which owns and operates a diverse portfolio of power generation (25,000 MW). NRG has developed a variety of companies in the alternative energy field including NRG Solar, a wholly owned subsidiary. NRG markets itself as a pioneer in the energy business, expanding its power generation portfolio into renewable energy and carbon reduction measures.

Customer Base: Large and mid-scale commercial, municipal, residential (leasing program through Green Mountain).

Strategic Partners: NRG Solar has partnered with real estate company Prologis to install 733 MW on rooftop sites across 28 states.

Services Offered: Develops, constructs, and finances large scale and mid-scale commercial / industrial solar facilities; operates Green Mountain Power, Independence Energy and Reliance providing residential and commercial consumers with renewable energy alternatives.

Figure 6. NRG Solar.
Source NRG Solar
(www.nrgsolar.com)

Vanguard Energy Partners

Founded in 2003 originally as a partnership between a solar consultant, a large highway construction company, and an electrician, Vanguard Energy Partners has grown to become one of the premier design, build, own, and operate solar firms in the country for rooftops of any size. Headquartered in Branchburg, New Jersey, Vanguard has built over 50MW of solar projects across the Mid-Atlantic and was one of the few construction firms selected early on by utility companies to build megawatt scale projects in New Jersey. Today, Vanguard offers a full suite of services from SPPAs to maintenance contracts.

Vanguard's client list speaks to its reputation. Vanguard has built some of the largest rooftop projects in the world, including an 8MW project on a US Foods distribution center, financed through a Vanguard PPA. Vanguard has also built highest rooftop project in the world, atop 60 Wall St., 740 feet above the streets of New York City. Deutsche Bank, Prudential, and the New York Stock Exchange have trusted Vanguard to build, finance, and operate megawatt-scale projects on their mission-critical data centers in New Jersey. Vanguard has $125 million in bonding capacity and can build and finance almost any size corporate portfolio.

Vanguard has an in-house maintenance and operations center to monitor its projects. A more refined version of other companys' quality control departments, Vanguard knows from years of production data how to build and optimize projects, which increases its credibility in the capital markets when it goes to finance PPA-supported projects.

Quick Stats

Number of employees: ~100
Number of projects: 105
Number of MW installed: 55MW

Notable Customers: New York Stock Exchange, Deutsche Bank, Prudential Financial, US Foods

Figure 7. Vanguard's 60 Wall Street project in Manhattan.
Source: Vanguard Energy Partners (vanguardenergypartners.com)

Texas

APS

APS is an EPC Power Management Company headquartered in Houston, Texas that develops projects, and provides consulting services to reduce client peak energy demand through energy efficiency measures, on site distributed generation, and load management tools. Their trademark peakSMART package of products and services is designed to lower peak energy demand for distributed generation systems. APS develops and installs solar electric, solar water heating and solar lighting, CHP systems, hydrogen fuel cells, microturbines, and process waste heat-to-power systems. They serve commercial / industrial and residential, offering a solar leasing option to residential consumers primarily in Texas and Louisiana.

Quick Stats

Number of employees: 9
Number of projects: >20
Number of MW installed: Less than 1. Portfolio consists of mainly residential projects

Customer base: Commercial, industrial, residential

Strategic partners: Lenders for residential solar leasing: BBVA Compass, Mutual of Omaha Bank, Texan Bank, SACU

Services offered: Design, engineering, installations, supply, inspections, and maintenance of solar (and wind) electric systems; offer solar maintenance agreements; PeakSMART Power Management Solutions; solar street lighting, project consulting.

Figure 8. Sample installations shown on APS Website. Source: APS (http://www.apowersolutions.com/)

Lighthouse Solar

Lighthouse Solar, founded in 2006 as an EPC solar company headquartered in Boulder, Colorado, is the leading solar developer in East Texas. Lighthouse Solar is a franchise operation with local ownership. Lighthouse Solar's Austin franchise is their most successful. The company has offices in Texas, California, New Jersey, and New York. They offer businesses PPA financing, including the SuperSaver PPA and other financing options; and offer a full array of solar development services from site evaluation and customized design to turnkey installation. Installations offered for commercial clients include roof-mount, ground mount, carports, and awnings. As part of the PPA, Lighthouse provides free real-time monitoring of the solar facility's electricity generation with their Lightgauge Data Monitoring system as well as a package of warranties.

Quick Stats

Number of employees: ~65 across 10 franchise locations
Number of projects: Hundreds. Exact number unclear due to franchise privacy.[14]
Number of MW installed: Approximately 6MW of primarily residential and light commercial installations.

Ownership: Lighthouse Solar is a privately held company. It has established franchised offices and service areas across the country including Orange County, California; Jersey Shore and Princeton, in New Jersey; and Hudson Valley, Westchester, and New York City in New York, among others.

Customer Base (private/public): Commercial, homeowners, municipalities, landowners.

Strategic Partners/Customers:

Retail: Waterstreet Market; Englewood Civic Center; South by Southwest

Industrial: Hercules Industries

Municipal: Several buildings for the cities of Broomfield and Boulder, CO

Figure 9. Lighthouse Solar team installing residential system. Source: Lighthouse Solar (www.lighthousesolar.com)

[14] Source: Discussions with Lighthouse Solar Corporate Personnel

Virginia

Secure Futures

Secure Futures is a solar energy development company that designs, develops and co-finances distributed solar energy solutions to educational institutions and other tax exempt entities in Virginia. Partnering with top-tier legal, finance, and EPC contractors, Secure Futures advertises an expertise in providing 15-25 SPPAs or solar equipment leases reducing client utility costs and protecting them against future grid cost increases.

Quick Stats

Number of employees: 8
Number of projects: 2
Number of MW installed: 0.50 MW

Customer Base: Secure Futures seeks tax exempt entities to work with.

Strategic Partners: Southern Energy Management (SEM), an energy efficiency and solar power company based in North Carolina

Services Offered: Finance consulting and development services for distributed solar facilities for educational institutions.

Figure 10. Secure Futures 444 kW project at Washington and Lee University.
Source: Secure Futures (http://securefutures.us/)

Standard Solar

Standard Solar, founded in 2004, is a Mid-Atlantic based full service solar energy developer headquartered in Rockville, Maryland. They offer design, procurement, installation, financing, and maintenance of solar energy systems to commercial, educational, government, residential, and utility customers. Standard Solar has in-house expertise for design, engineering, and integration. Standard Solar maintains partnerships with various manufacturers, selecting the optimal equipment depending on client needs.

Quick Stats

Number of employees: 76
Number of projects: Dozens, mainly midsize commercial rooftops. $23 million in revenue in 2011.[15]
Number of MW installed: Unknown. Recently Commissioned MW-scale projects

Ownership: Standard Solar is a privately held, venture-backed renewable energy company.

Customer Base (private/public): Commercial, utilities, government, homeowners, municipalities, coops, landowners

Strategic Partners/Customers:

Retail: Rockville Blades; Kelly & Sons Electrical

Industrial: GM Electric Vehicle Charging Station

Utility: Baltimore Gas & Electric; Kit Carson Rural Electric Cooperative

Municipal: U.S. National Archives; American University, Catholic University, University of Delaware.

One Broadway, 14th Floor
Cambridge, MA 02142
617.682.3632
www.sustainround.com

[15] http://www.inc.com/inc5000/profile/standard-solar