New York Law Journal

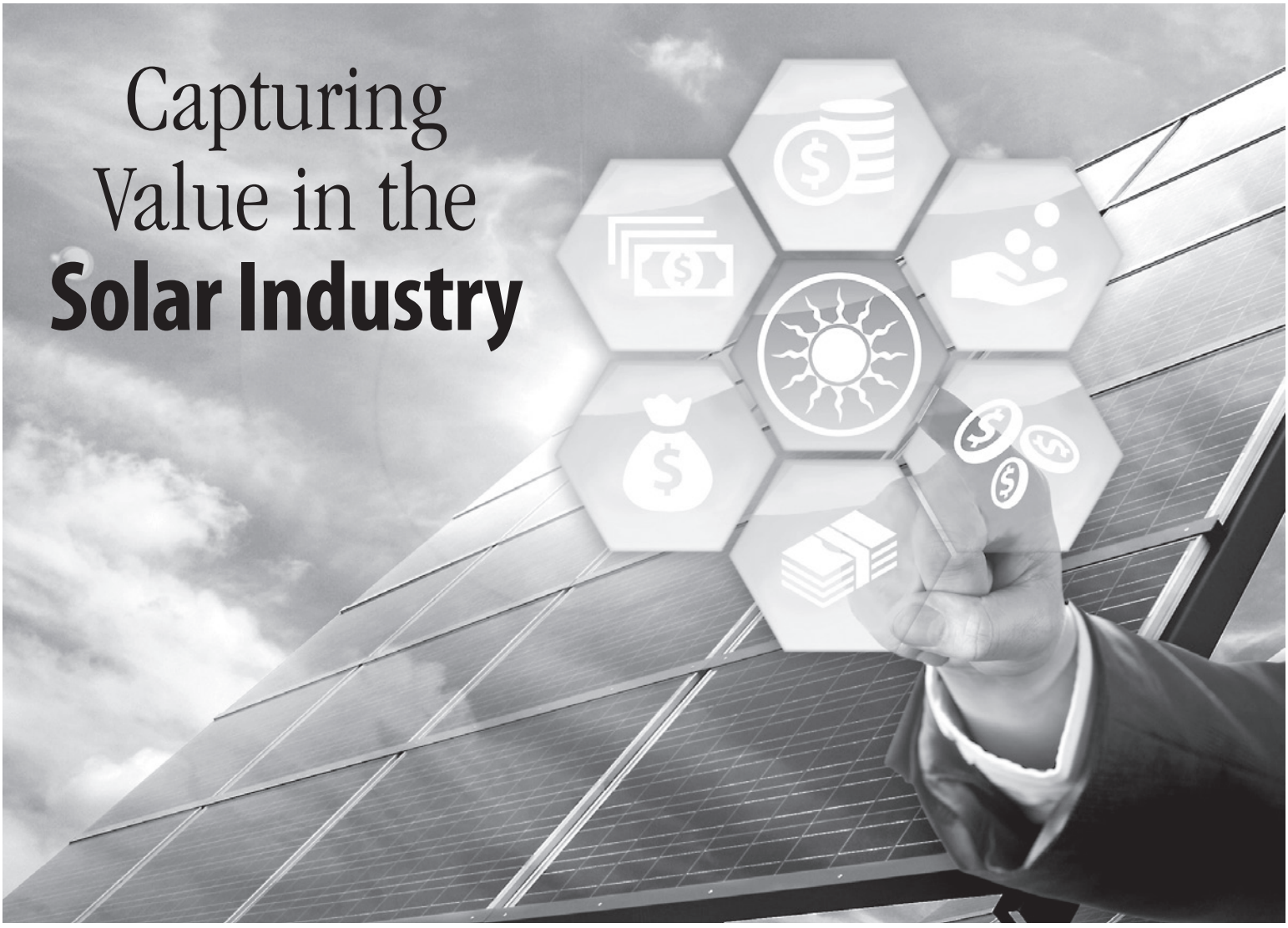
A NEW YORK LAW JOURNAL SPECIAL SECTION

An ALM Publication

Asset Valuation

WWW.NYLJ.COM

MONDAY, MAY 18, 2015



NYLJ / MONIKA KOZAK; BIGSTOCK

BY ROBERT FREEDMAN, MONICA LAMB AND ABIOLA FASEHUN

ROBERT FREEDMAN *is a partner and* MONICA LAMB *is an associate in the project development and finance group, and* ABIOLA FASEHUN *is an associate in the corporate group, at Shearman & Sterling.*

The solar industry consists of several different but connected functions. These include module manufacturing, project development for utility scale or distributed generation (commercial and residential), construction and installation, financing, and asset management and operation. Over the relatively short period of the last decade, inefficiencies have been largely squeezed out of module manufacturing and other early parts of the value chain. Instead, the focus on value has shifted toward the back end of the chain—developing and operating generation assets. Where this value is available and how it is monetized depends to some extent on whether the assets are utility scale or distributed. With respect to utility scale solar, current values depend in part on declining equipment costs and on con-

tinued mandates and subsidies for renewable energy, weighed against the decline in natural gas costs in the United States. For distributed generation, value has been captured by standardizing and optimizing financing structures, and aggregating portfolios of assets. In both the utility scale and the distributed sectors, developers and operators have captured additional value by structuring portfolios that can be financed more efficiently. To understand the overall value shift, it is worth looking back at how the industry got to where it currently is, then, where value currently lies, which players have access to it, and, ultimately, why.

The Module Manufacturer Era

Less than a decade ago, a "large" photovoltaic solar project might be 10 MW, and while project financing for such projects was available, the risks were still relatively challenging to paper over. Solar modules were supply-constrained. Construction contractors could not be assured of module availability, and therefore may not have agreed to liquidated damages in case of certain project delays. Investors risked sinking money into financing a project that might sit halfinished for months. In those days, module manufacturers had more significant control because they controlled supply of a constrained input.

Demand began to grow, however, triggered by state renewable portfolio standards (RPS) and other renewable incentive regimes. The module manufacturers' positions were strengthened by increased demand, and investment began to pour into module technology and manufacturing. Tax equity and affordable debt provided financing to buy the modules and build the solar projects.

High margins realized by module manufacturers stimulated, in part, a competitive increase in manufacturing capacity, leading to an increase in module supply and steadily decreasing manufacturing margins. Forward to today, solar module manufacturing has been operating at razor-thin margins for years, while producers continue to reduce manufacturing costs and improve module efficiency. Average per-Watt sales prices for PV modules have dropped from over $3.50/Wp to well under $1.00/Wp since 2008.[1]

Having lost the strong market position that benefitted them when module supply was constrained, some major U.S. manufacturers proceeded to vertically integrate their module manufacturing businesses with the rest of the solar value chain, engaging in project development, construction, ownership, and operation to varying degrees. This strategy has allowed better visibility into future sales of their modules and overall asset value.

Take as an example First Solar, whose net sales for the first quarter of 2015 were estimated between $550 million and $650 million, down from $1 billion for the fourth quarter of 2014. Among the reasons for the decline, the company's disclosures cited the completion of two large utility-scale projects that had been developed by the company and sold to third parties, to which First Solar had been selling modules in a steady stream for years.[2] Concurrently, the company pivoted toward retaining the ownership of projects that are under construction, in anticipation of launching a yieldco with SunPower.[3] The yieldco, which will be public and partially owned by the joint sponsors, will own and finance the projects going forward. With that temporary shift, First Solar will become a more significant owner of operating solar assets and will have a right to a share of the resulting revenue streams.

More and more module manufacturers appear to have followed this path, doubling down on their project development pipelines. A few recent examples include the Chinese manufacturers Trina Solar (which created a holding company this winter for operational projects, which it plans to IPO),[4] and Canadian Solar (which acquired Recurrent Energy and its 4 GW project pipeline in February)[5] and the Japanese manufacturer Solar Frontier (which acquired a 280 MW project pipeline in the United States from Gestamp Solar in March).[6]

Rising Dominance of Solar Developers

Even as the United States suffered through the credit crisis beginning in 2008, the 30 percent investment tax credit for renewable energy generating assets and the §1603 Treasury grant program introduced in 2009 under the Recovery Act[7] kept financing flowing for projects.

After the credit crisis, as financing further opened up and demand from renewable portfolio standards and other renewable incentive programs continued to grow, project developers, or sponsors, found themselves more in control of the potential value of solar assets. It was now development assets that became the constrained inputs: utility power purchase agreements, interconnection rights, project permits, and project sites. Given the new glut of solar panels, developers had more options for low-cost equipment. And as tax equity structures became standardized and solar power plants came to be seen as mainstream risk, developers had improving access to competitive financing.

Eventually the high potential returns in the development business led to a heavy influx of participants, echoing the history of the manufacturer-dominated era, when new supply heralded falling margins. Competing against each other in contract auctions and anticipating continued declines in module and balance of system costs, prices under power purchase agreements decreased precipitously. Today's power purchase agreement (PPA) prices of $50 to $60/MWh (with some prices rumored to dip below even $40/MWh)[8] are significantly off from prices even five years ago. The end result is, of course, that smaller margins remained for companies executing the development function.

A New Dawn: New Markets and Asset Ownership Structures. Today, not only has the increase of the numbers of project developers (an increase in supply) driven down margins, but also some of the major RPS requirements have been fully contracted, such as California's (a decrease in demand for new renewable energy generating assets). As a result, developers (and vertically-integrated players) are creating an array of new business models to serve demand and support the value of solar assets.

• *Portfolios of Rooftop Assets:* It was in the post-credit-crisis period that portfolios of residential solar assets (which

produce revenue streams for investors from PPAs and leases) for the first time gained financing on a portfolio basis, first from tax equity investors and later from asset-backed securitizations. The most successful residential installers have been those that vertically integrated the financing function. Solar City and Vivint Solar, which together installed more than half of all residential solar deployed in the second half of 2014,[9] both finance and install systems. The most recent push is to finance commercial and industrial installations using offerings similar to those that have been successfully used to grow the residential market. In April, SolarCity announced its plans to finance $1 billion of commercial and industrial installations with investments from Credit Suisse.[10] In March, Vivint announced its own plans to find a tax equity partner to invest with it in the commercial and industrial segment.[11] Meanwhile, in February, Duke Energy, a utility, acquired REC Solar, a specialist in the commercial and industrial segment.[12]

• *Community Solar:* In conventional community solar structures, individual electricity consumers have ownership interests and contractual rights in a community-based central solar generating facility and its financial attributes. Developers capture direct consumer demand for renewable energy while preserving the efficiencies of large-scale ground-mounted systems. SunShare is one such developer;[13] First Solar invested last year in community solar developer Clean Energy Collective;[14] and other major developers investing in the niche include NRG and SunEdison.[15] Forecasts are that over 500 MW of community solar installations will be online before the end of 2016.[16] PG&E, meanwhile, announced plans to sell solar energy generated from community-based solar projects directly to consumers, allocating to customers 100 percent of their electricity demand from community solar generating assets. In PG&E's program, unlike conventional community solar, program participants do not own the generating facility. However, they are entitled contractually to certain benefits similar to those that would accrue from ownership, such as future savings on avoided alternative generation if gas prices increase.[17]

• *Utility-Owned Generation:* Utilities have begun to develop or purchase their own solar generating capacity, as well as procuring renewable energy with voluntary (non-RPS) PPAs. For example, Tenaska, an IPP, owns 280 MW of utility-scale solar projects in California. In March, it took a controlling interest in Soltage, a solar developer and operator.[18] This followed on its investment, in February, in residential solar company Suncrest Solar.[19] Duke Energy, meanwhile, acquired REC Solar. As described above, the REC Solar acquisition gives Duke access to project development capabilities in the commercial and industrial segment. Duke also plans to add 278 MW of solar projects in North Carolina, 110 MW in South Carolina, and 500 MW in Florida.[20] In other cases, utilities are procuring developed or newly-constructed projects to hold in their portfolio of generating assets, In these cases, developers appear willing to settle for a definite return on the sale of the generating facility rather than bidding away their margins in competitive power purchase agreement auctions.

• *Voluntary Procurement by Utilities:* Despite today's low gas prices, utilities are eager to lock in low solar energy prices now, before the ITC expires at the end of 2016, knowing that predicting gas prices for the next 20 to 25 years is very difficult. Thus, where market conditions are right, some utilities are signing power purchase agreements that are not RPS-driven. Utility-owned generation and non-RPS PPAs accounted for 5.7 GW of utility solar procurement over the last 18 months in 14 states: from Florida through South Carolina and Minnesota to Utah and beyond.[21]

• *Utility-Scale Direct Procurement by Industrials:* In certain markets, such as the direct access program for non-residential customers in California, certain customers may contract directly with power generators to purchase electricity, without going through a utility.[22] In the last few months alone, hundreds of MW of renewable power have been contracted for periods up to 25 years, purchased by the likes of Apple, Kaiser Permanente and Google from providers such as NextEra, SunPower and First Solar.[23] Other major commercial and industrial investors in solar and other renewable energy assets, whether through direct ownership, long-term PPAs, or the purchase of renewable energy credits, include Microsoft, Dow, Amazon, Ikea, Intel and Walmart, some of which are committed to eventually procuring 100 percent of their considerable energy needs, directly or indirectly, from renewable sources.[24]

Lighting the Way for Investors

Utility-scale solar energy assets have become mainstream investments for project-finance, tax equity, and long-term equity investors. A decade ago, investors were more wary of the risk. But as tax equity structures became standardized, independent engineers became comfortable with solar technologies, and customary provisions fell into place for utility solar power purchase agreements, investors began to view these assets as comparable to conventional power investments. For residential customers, financing in the form of PPAs and leases has become commonplace, and now residential solar loans are also being put on offer by both the traditional solar lease providers, such as SolarCity and Sunnova, and new pure-play loan providers, such as Dividend Solar and Sungage.[25]

Today, several factors are reshaping the solar market for investors. First, new large-scale solar power plants with utility PPAs are becoming harder to find and the alternative models of asset ownership described in the previous section are beginning to replace them. Second, developers are seeking to further compete for these new opportunities by reducing financing costs. Finally, new structures are being applied to investments in this sector.

The yieldco is one example of a new application of an old investment structure to solar assets. Yieldcos are publicly traded companies that hold energy generation assets and are structured to allocate defined proportions of cash flow to each class of investor. Developers sell their projects to yieldcos that

they control in order to monetize some of the projects' value and free up cash immediately to invest in further project development. However, because they hold a class of shares in the yieldco, the developers also maintain a claim on the projects' long-term cash flows. Yieldcos have been popular in the last two years, and in this era of low interest rates, commentators suggest that renewable energy yieldcos are comparable in the eyes of many investors to corporate bonds.[26] However, as interest rates rise on corporate bonds, the appeal of yieldcos as an investment alternative may diminish.[27]

Another example, the packaging of smaller residential, commercial and industrial solar assets into portfolios of assets for investment, continues to grow. The standardization of such assets has been pursued through industry efforts such as that of the Solar Access to Public Capital Working Group, which initially developed standard power purchase agreements and solar leases,[28] and more recently has spearheaded the framing of system installation best practices[29] and the formation of an accreditation body to apply risk screening standards for commercial and industrial PV projects.[30] If the rating system gains traction, it may serve the purpose that FICO scores have for the financing of small residential solar assets—allowing investors to evaluate the risk of a pool of assets more cheaply than they would be able to if they had to conduct diligence on each small solar system individually.

The story above is ultimately a story of building efficiency at all stages of the solar asset value chain. The beneficiary is the ultimate purchaser of solar electricity. The demand for solar energy, previously driven largely by tax incentives and renewable portfolio requirements imposed on utilities, is increasingly clearing the cost hurdle to be more influenced by the long-term budgetary, planning, and sustainability needs of households and large commercial and industrial power users. In the near future, these new considerations will likely become primary drivers, as tax incentives decline and potentially fade away after 2016, and as the modes of delivering electricity service continue to evolve under the influence of declining costs for solar and energy storage technologies and increasingly sophisticated energy management software and power control electronics. The unsubsidized voluntary solar energy markets at our doorstep may very well result in further reallocations of value within the solar asset value chain.

1. Paula Mints, "How Free Solar Undermines the True Value of PV-Generated Electricity" (Renewable Energy World, April 21, 2015), http://www.renewableenergyworld.com/rea/news/article/2015/04/how-free-solar-undermines-the-true-value-of-pv-generated-electricity.

2. First Solar, "First Solar, Inc. Announces Fourth Quarter and Full Year 2014 Financial Results" (First Solar Feb. 24, 2015), http://investor.firstsolar.com/releasedetail.cfm?ReleaseID=898092; Josh Sanbum, "Inside the World's Largest Solar Power Plant" (Time Feb. 26, 2015), http://time.com/3723592/inside-the-worlds-largest-solar-power-plant/.

3. First Solar, op.cit.

4. Mark Osborne, "Trina Solar to Spin-Off Downstream Business" (PV Tech March 4, 2015), http://www.pv-tech.org/news/trina_solar_to_spin_off_downstream_business; Karl-Erik Stromsta, "Amid yieldco fever, Trina Creates Projects Company" (Recharge News Feb. 12, 2015), http://www.rechargenews.com/solar/1391516/amid-yieldco-fever-trina-creates-projects-company.

5. Karl-Erik Stromsta, "Canadian Solar Plots Pre-Yieldco US Building Spree" (Recharge News March 31, 2015), http://www.rechargenews.com/solar/1395987/canadian-solar-plots-pre-yieldco-us-building-spree; Eric Wesoff, "Canadian Solar Finally Acquires Recurrent Energy for $265 Million in Cash" (Greentech Media Feb. 2, 2015), http://www.greentechmedia.com/articles/read/Canadian-Solar-Finally-Acquires-Recurrent-Energy-for-265-Million-Cash.

6. Ben Willis, "Solar Frontier Buys Gestamp's US Project Pipeline in Global Downstream Move" (PVTech, March 10, 2015), http://www.pv-tech.org/news/solar_frontier_buys_gestamps_us_project_pipeline_in_global_downstream_move.

7. http://www.treasury.gov/initiatives/recovery/Pages/1603.aspx.

8. Eric Wesoff, "Solar Summit Slide Show: The Evolution of Solar" (Greentech Media April 15, 2015), http://www.greentechmedia.com/articles/read/Solar-Summit-Slide-Show-The-Evolution-of-Solar.

9. Nicole Litvak, "Here are the Top 5 Residential Solar Installers of 2014" (Greentech Media March 10, 2015), http://www.greentechmedia.com/articles/read/Here-Are-the-Top-Five-Residential-Solar-Installers-of-2014.

10. Karl-Erik Stromsta, "SolarCity Reveals $1bn Commercial PV Fund" (Recharge News April 22, 2015), http://www.rechargenews.com/solar/1397694/solarcity-reveals-usd-1bn-commercial-pv-fund.

11. Karl-Erik Stromsta, "Vivint Solar Shares Rocket on FY results," Diversification Plan (Recharge News March 4, 2015), http://www.rechargenews.com/solar/1393575/vivint-solar-shares-rocket-on-fy-results-diversification-plan.

12. Karl-Erik Stromsta, "Duke Energy Buys REC Solar, Targets C&I Market" (Recharge News Feb. 9, 2015), http://www.rechargenews.com/solar/1391140/duke-energy-buys-rec-solar-targets-candi-market.

13. Recharge, "Solar Deals & Company News" (Recharge News April 13, 2015, updated April 17, 2015), http://www.rechargenews.com/solar/1396921/solar-deals-and-company-news.

14. Eric Wesoff, "Update: First Solar Paid $21M for 28% of Residential Community PV Financier CEC" (Greentech Media March 5, 2015), http://www.greentechmedia.com/articles/read/Update-First-Solar-Paid-21M-for-28-of-Residential-Community-PV-Financier.

15. MJ Shiao, "Will Massachusetts' Net Metering Caps Spoil the Community Solar Party?" (Greentech Media April 17, 2015), http://www.greentechmedia.com/articles/read/will-massachusetts-net-metering-caps-spoil-the-community-solar-party?hootPostID=ad1750925003573c6bd9816d6ddccb9b.

16. Mike Munsell, "5 Numbers That Will Shape the Future of US Solar in 2015 and 2016," (Greentech Media April 20, 2015), http://www.greentechmedia.com/articles/read/5-Numbers-That-Will-Shape-the-Future-of-US-Solar-in-2015-and-2016.

17. Julia Pyper, "This New PG&E Program Will Allow Customers to Go 100 Percent Solar" (Greentech Media Feb. 4, 2015), http://www.greentechmedia.com/articles/read/this-new-pge-program-will-allow-customers-to-go-100-solar.

18. ReNews, "Tenaska Takes Reins at Soltage" (Renews March 10, 2015), http://renews.biz/85450/tenaska-takes-reins-at-soltage/.

19. Edgar Meza, "Suncrest Solar Set to Expand with Tenaska Investment" (PV Magazine Feb. 19, 2015), http://m.pv-magazine.com/news/details/beitrag/suncrest-solar-set-to-expand-with-tenaska-investment-_100018289/.

20. Richard A. Kessler, "Duke to Make Major Solar Generation Push in Florida" (Recharge News April 2, 2015), http://www.rechargenews.com/solar/1396284/duke-to-make-major-solar-generation-push-in-florida; Julia Pyper, "Duke Energy Plans to Add 500MW of Utility-Scale Solar in Florida by 2024" (Greentech Media April 2, 2015), http://www.greentechmedia.com/articles/read/duke-energy-florida-plans-to-add-500mw-of-utility-scale-solar-by-2024; Karl-Erik Stromsta, "Duke in $500m Solar Splurge" (Recharge News Sept. 15, 2014), http://www.rechargenews.com/solar/1376733/Duke-in-500m-solar-splurge.

21. Munsell, April 20, 2015, op.cit.

22. http://www.pge.com/en/mybusiness/services/nonpge/gasaggregation/directaccesselectricity.page.

23. Tom Randall, "What Apple Just Did in Solar Is a Really Big Deal," (Bloomberg Business Feb. 11, 2015), http://www.bloomberg.com/news/articles/2015-02-11/what-apple-just-did-in-solar-is-a-really-big-deal; Katie Fehrenbacher, "Apple to Build $2B Solar-Powered "Command Center" Data Center at Arizona Factory Site" (Gigaom Feb. 2, 2015), https://gigaom.com/2015/02/02/apple-to-build-2b-solar-powered-command-center-data-center-at-arizona-factory-site/; Jeff St. John, "Apple and SunPower to Build 40MW of PV in China" (Greentech Media April 16, 2015), http://www.greentechmedia.com/articles/read/apple-and-sunpower-to-build-40mw-of-pv-in-china; Karl-Erik Stromsta, "SunPower Links with Apple to Build 40MW of China PV" (Recharge News April 16, 2015), http://www.rechargenews.com/solar/1397270/sunpower-links-with-apple-to-build-40mw-of-china-pv; Joshua S. Hill, "Google Signs on to Repower Iconic Bay Area Wind Farm" (Clean Technica, Feb. 13, 2015), http://cleantechnica.com/2015/02/13/google-signs-repower-iconic-bay-area-wind-farm/; ReNews, "NextEra, NRG Pass Health Check" (ReNews Feb. 18, 2015), http://renews.biz/84319/nextera-nrg-pass-health-check/.

24. Richard A. Kessler, "In Depth: How Corporate America is Powering Renewables" (Recharge News April 1, 2015), http://www.rechargenews.com/incoming/1395565/in-depth-how-corporate-america-is-powering-renewables; Richard A. Kessler, "Intel has Raised the Bar. Now 100% of our US Power is Bought Green" (Recharge News April 17, 2015), http://www.rechargenews.com/wind/1397381/intel-has-raised-the-bar-now-100-percent-of-our-us-power-is-bought-green.

25. Julia Pyper, "Dividend Solar, Solar World and Enphase Partner on New Loan Product in South Carolina" (Greentech Media March 19, 2015), http://www.greentechmedia.com/articles/read/dividend-solar-solarworld-and-enphase-partner-on-new-low-cost-loan-in-south.

26. Andy Colthorpe, "Bloomberg: Yieldcos Lower the Cost of Renewables with 'Substantial Growth' Expected" (PV Teach April 16, 2015), http://www.pv-tech.org/news/bloomberg_yield_cos_lower_the_cost_of_renewables_with_substantial_growth_ex.

27. Id.

28. https://financere.nrel.gov/finance/solar_securitization_public_capital_finance.

29. Solar Access to Public Capital (SAPC Working Group), "Best Practices in PV Installation," Version 1.0, March 2015, http://www.nrel.gov/publications.

30. http://www.trusolarscore.com.