PICKING WINNERS IN THE EVOLVING RENEWABLE PROJECT M&A LANDSCAPE

A CohnReznick Whitepaper

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EXECUTIVE SUMMARY

The merger and acquisition landscape for renewable energy in the United States is maturing. It also continues to be shaped by an array of ever-changing forces, the long-term impacts of which are not yet known.

However, owners and investors in the renewables sector are operating in an environment with increasingly attractive returns, particularly for wind and solar projects. In a growing portion of the U.S., new utility-scale wind and solar are the lowest-cost source of electricity available, outcompeting even natural-gas projects. As a result, more investors are getting into the game.

Among the unknowns are the extent to which recent changes to U.S. federal income tax law, as well as the imposition of tariffs on imported solar cells and modules, and steel and aluminum, will hinder renewable energy deployment.

IN 2017, 64% OF GLOBAL ASSET OWNERS SAID THAT RENEWABLES PROVIDE THE BEST OPPORTUNITIES LOOKING FORWARD.

While in some cases the cumulative impacts of tax reform and trade policy may cause projects to be shelved because they no longer pencil out economically, the overarching reality is that experienced investors are increasingly interested in projects at earlier stages of development, and institutional investors, corporations and utilities are increasingly apt to seek to own U.S. renewable projects.

In fact:

- Since 2015, solar has been the largest source of new electricity capacity added to the U.S. grid.
- 75% of solar PV projects in the last 18 months were procured outside state-level renewable portfolio standards (RPS).
- Developers connected 6.4 gigawatts of new wind capacity to the U.S. grid in 2017.
- More than 55 GW of new wind capacity is expected to come online in the U.S. through 2027.
- In 2017, 64% of global asset owners said that renewables provide the best opportunities looking forward.

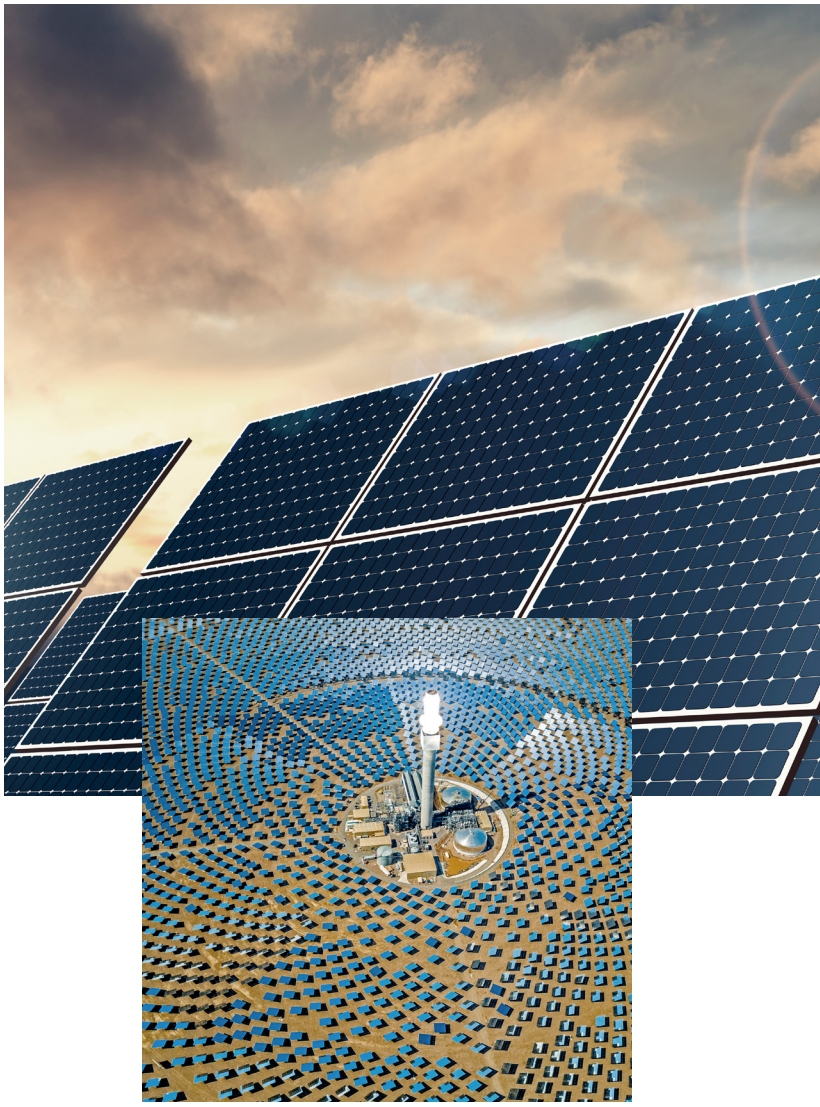
In this hyper-competitive market, due diligence is vitally important. Savvy M&A players must also delve deep into a plethora of financial, tax and technical considerations, including attention to overall cost of capital and tax equity considerations such as Base Erosion Anti-Abuse Tax (BEAT) implications, as well as state and local policies.

On the technical side, factors to consider include evaluating the useful life of a project, assessing the viability of repowering, preparing for transmission and curtailment risk, taking a view on merchant power forecasts, and determining when, or whether, to add storage.

As such, buyers and sellers that focus on all the details will continue to see project success even as decreasing power prices exert downward pressure on not only renewables, but the entire power industry.

With this in mind, this paper will dissect the most salient near-term considerations that investors and developers must contemplate when evaluating purchasing or selling solar and wind assets, including:

- Corporate tax reform
- Understanding the financial accounting and tax considerations
- BEAT considerations
- Tax equity tail
- Consolidation implications
- Utility and corporate ownership
- Technical valuation of assets: Energy output, useful life, repowering, O&M and energy storage



FOR ASSET OWNERS, NEW MARKETS ARE UNLOCKING M&A OPPORTUNITIES BEYOND THE PIONEER MARKET OF CALIFORNIA.

INTRODUCTION

It's no secret that wind and solar are increasingly competitive forms of electric generation in a growing number of regions in of the U.S. For asset owners, new markets are unlocking M&A opportunities beyond the pioneer market of California and other early adopters.

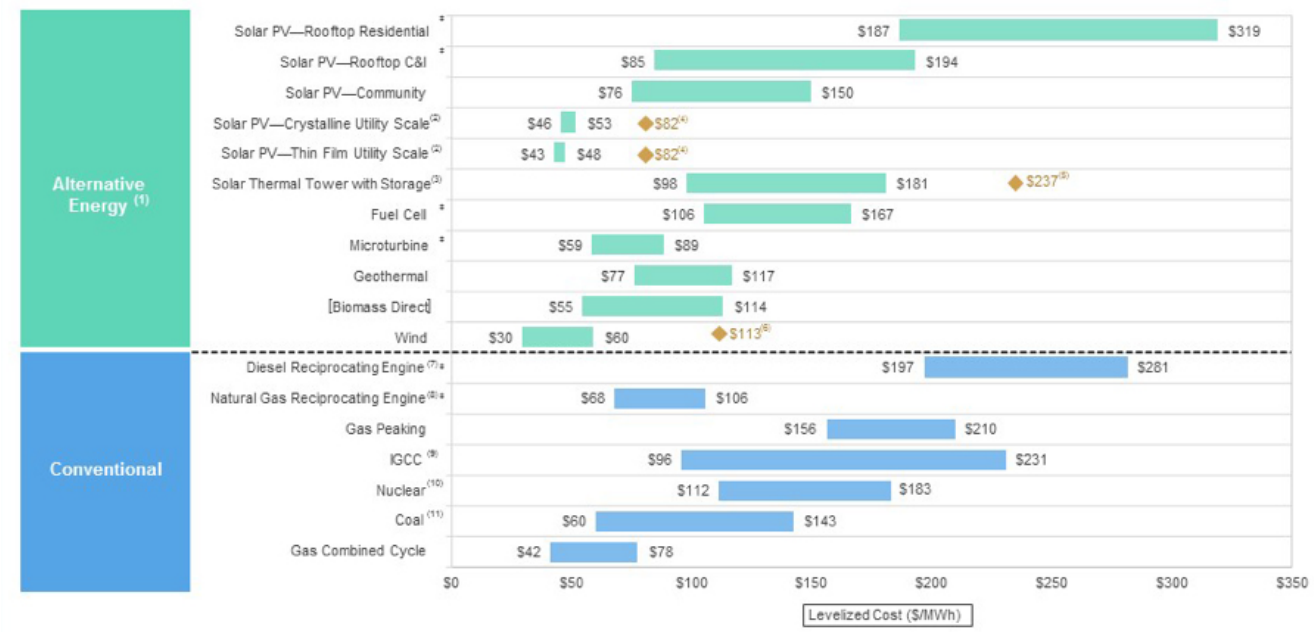
According to GTM Research, a cumulative total of more than 50 gigawatts (GW) of solar power capacity was installed in the U.S. by the end of 2017, with just over three-quarters of installations coming online in the past four years. Since 2015, solar has been the largest source of new electricity capacity added to the grid. In 2018, U.S. solar installations should come in at, or slightly above, the 10.6 GW of capacity installed in 2017.

The U.S. wind market is a top-three global market, and will remain so in the near term. More than 55 GW of new wind capacity is expected to come online in the U.S. through 2027, according to MAKE Consulting.

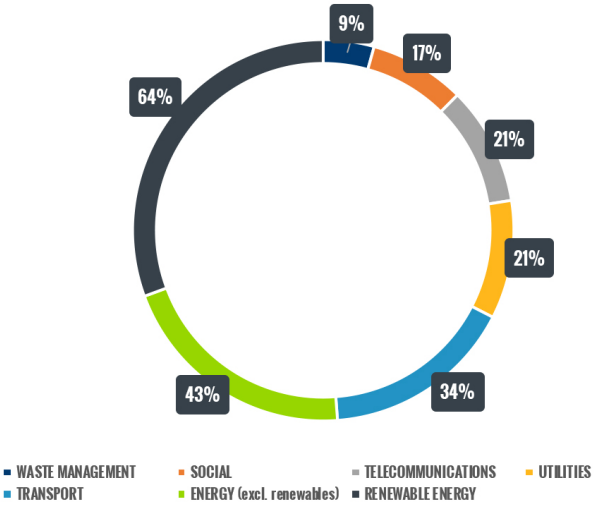
Most of that capacity will be operational in the next few years. In the latter half of the coming decade, annual installed capacity is expected to see an average threefold decrease compared to the previous four years.

The global growth of renewables means that more investors are becoming more comfortable with the sector and the appetite for renewable assets is growing. In the U.S. there has been a convergence, as more institutional investors have concentrated on the space, while at the same time a growing number of infrastructure groups and impact investors are funding the sector.

UNSUBSIDIZED LEVELIZED COST OF ENERGY CONSUMPTION



'WHICH ASSET CLASS OFFERS THE BEST RISK-RETURN TRADEOFF IN THE INFRASTRUCTURE SEGMENT?'



Note: Data as of H1/2017 / Source: Make, Prequin

A Growing Appetite for Risk

Across the globe, competitive pricing for renewable energy projects is emboldening asset owners to take on more development risk. In GTM Research's ranking of the top 15 U.S. solar asset owners, eight have acquired more than half their assets either mid-construction or earlier. Since 2015, the number of non-residential solar asset owners taking on early-stage development risk has grown at a faster rate than those only acquiring shovel-ready or completed projects.

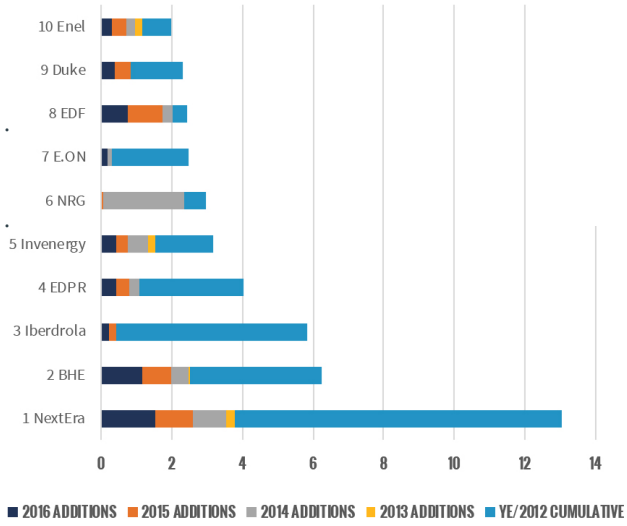
COMPETITIVE PRICING FOR RENEWABLE ENERGY PROJECTS IS EMBOLDENING ASSET OWNERS TO TAKE ON MORE DEVELOPMENT RISK.

Additional growth opportunities for non-residential solar in the U.S. are expected to come from community solar and solar-plus-storage projects. By 2020, GTM Research forecasts annual installations from such projects are expected to account for more than 50% of total non-residential solar installations for the first time in history.

For wind, the top 15 wind power asset owners account for more than 40% of wind installations across the Americas, according to MAKE. Given the scale of most U.S. onshore wind projects, this growth is primarily limited to well-capitalized

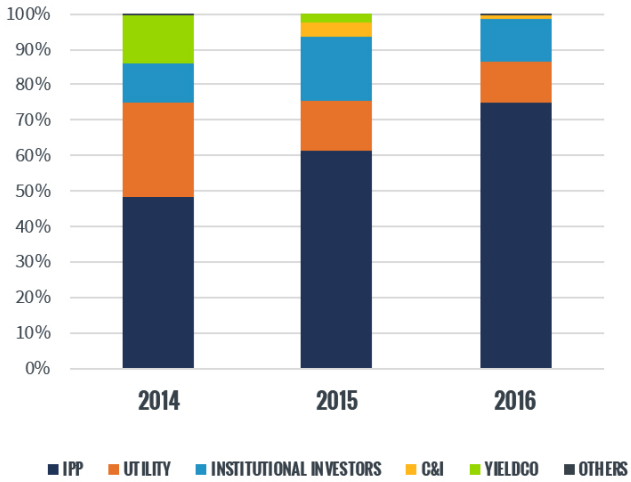
owners with independent power producers (IPPs) that are claiming an increasing share of the market, although utilities and institutional investors are expected to strengthen their respective market shares in coming years.

CAPACITY OF TOP 10 WIND POWER ASSET OWNERS, US, YE/2016



Note: Dropped from the rankings: SunEdison (7), Net Negative Annual Changes are deducted from YE/2012 cumulative capacity. Source: Make

NEWLY-ADDED WIND POWER CAPACITY



By Owner Type, United States, 2014-2016
Source: Make

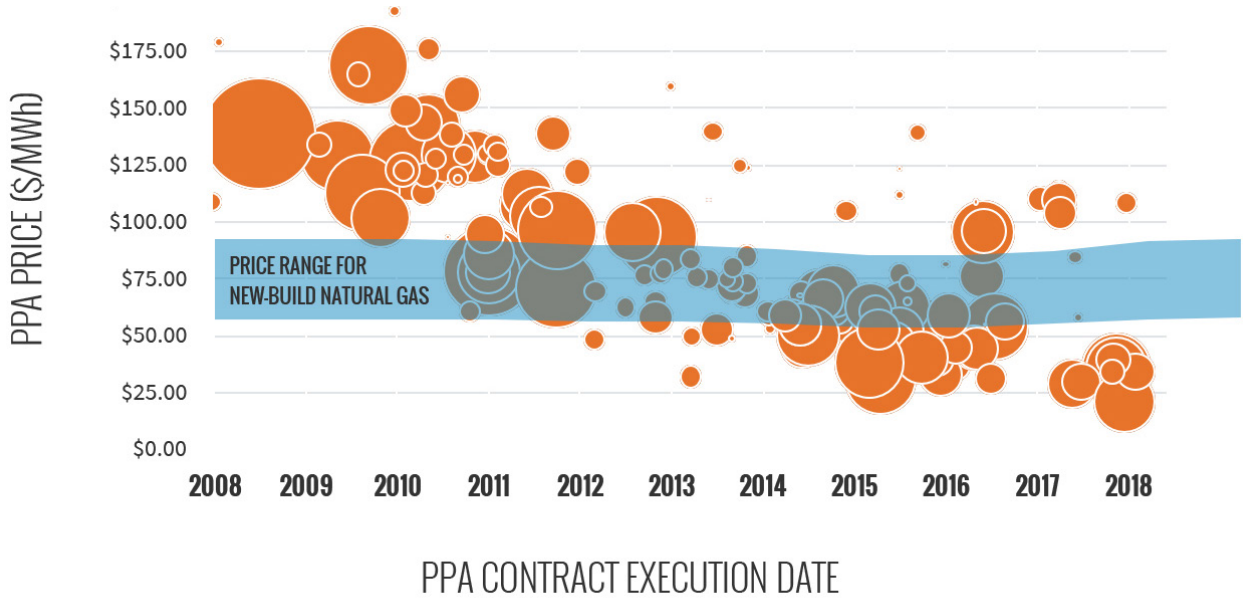
THE ONLY CONSTANT NARRATIVE IN SOLAR AND WIND MARKETS IN RECENT YEARS IS DECLINING PRICES.

However, the declining pricing trend has been particularly notable over the past 18 months.

This competitive pricing is unlocking new origination opportunities beyond procurement geared solely to meet state-level renewable energy mandates. Indeed, of the 16.8 GW of utility-scale solar now in development in the United States, 75% was procured outside of state-level renewable portfolio standards, according to GTM Research.

For onshore wind, according to Lazard, prices have been driven down to $30 to $60 per megawatt-hour – and increasingly far lower. In January 2018, for instance, Xcel Energy published results of bids for new generation; the average wind bid was $18 per megawatt-hour and wind-plus-storage was $21 per megawatt-hour.

US UTILITY SOLAR PPAs AT INTERCONNECTION DATE VS. NEW -BUILD NATURAL GAS



- Pricing for power purchase agreements has ranged between $30 and $45/MWh for contracts signed over the past 18 months
- Opening up new origination opportunities beyond procurement to meet Renewable Portfolio Standards

State-level renewable portfolio standards are also a factor for wind, but the wind market is still primarily driven by access to the federal Production Tax Credit. As such, the next few years are expected to be boom years for U.S. wind ahead of the scheduled PTC phase-out in 2020. However, some developers believe the post-PTC horizon could also be robust, as a growing number of utilities look to own wind assets and as non-utility corporate offtakers further develop strategies to meet company renewable energy goals.

Near-Term Uncertainty

But even amid the current boom, uncertainty remains. It's unclear, for example, the degree to which recent federal tax law and tariff developments will slow overall renewable energy project development. With the reduction of the federal corporate tax rate from 35% to 21%, tax-equity investment in wind and solar projects could decline.

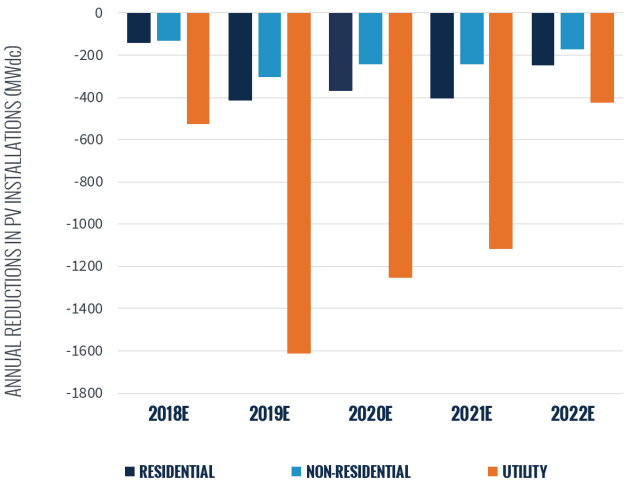
In fact, the 2018 market is already seeing upward of a 10% reduction of tax equity in deals. Fortunately, although the amount of actual dollars in the capital stack for tax equity has been reduced, tax equity yields have also come down, thereby offsetting some of this impact. However, there is still a healthy market for tax equity investment, with a number of recent new entrants into the market, including corporates and insurers.

Another uncertainty is the ultimate impact of the new Base Erosion Anti-Abuse Tax (BEAT). It is not yet clear whether BEAT will ultimately reduce existing tax equity investor interest, merely alter those investors' investment level, or drive them from the market altogether. Only time will tell.

Additional ambiguity revolves around the extent to which the solar tariff, announced by the White House in January 2018, will ultimately affect demand.

75% WAS PROCURED OUTSIDE OF STATE-LEVEL RENEWABLE PORTFOLIO STANDARDS.

The 30% year-one tariff on imported crystalline-silicon solar cells and modules will, according to GTM Research, result in an average $0.10 per watt increase in module prices. By year four, when the tariff declines to 15%, the tariff premium will step down to $0.04 per watt. Overall, GTM Research analysts expect the tariffs to reduce U.S. solar demand by 11% through 2022, with utility-scale s olar accounting for 67% of the expected decline.



Near-term uncertainty in the renewable market has not cast a pallor over the industry, but it has made due diligence increasingly important, and not just because of the impact of the tariffs. Beyond the tariffs, tax reform and consolidation may create even more confusion in already complicated deal structures.

THE 2018 MARKET IS ALREADY SEEING UPWARD OF A 10% REDUCTION OF TAX EQUITY IN DEALS.

FINANCIAL ACCOUNTING AND TAX CONSIDERATIONS

Corporate Tax Reform Muddies Clean Energy

Despite some early concerns, the final version of the Republican tax bill signed by President Trump in December 2017 did not include provisions from the initial House version of the bill that would have scaled back federal tax credits for wind and solar projects. As a result, the federal Production Tax Credit (PTC) and the Investment Tax Credit (ITC) will continue to phase out as scheduled in tax legislation passed in December 2015. Under current law, the wind PTC credit expires in 2020 and the solar ITC phases down to a permanent 10% in 2022.

However, with the ITC and PTC well established in current U.S. law, renewable energy project developers and investors are now more concerned about other provisions of the 2017 tax reform bill, such as the reduction in the corporate tax rate from 35% to 21%, the impact of bonus depreciation, and language limiting business interest deductions.

Developers in particular are asking, how the reduction in the corporate tax rate will impact the tax equity availability in renewable project deals? In general, when the tax benefits associated with an individual transaction are reduced, it depresses the available equity. A 5% to 10% reduction in total equity going into deals is already being seen in the market.

If tax equity is putting 10% less cash into the project, the difference will likely come from the sponsor, either through capital or back leverage. Margins may be squeezed for either the project engineering, procurement and construction (EPC) contractor or the manufacturer. Currently, many deals in the market use back leverage; to the extent back leverage is increased, the deal is likely to work better for the sponsor. However, new rules limiting the deductibility of business interest change the dynamic with respect to debt. In particular, these new rules appear to negatively and disproportionately impact sponsors using back leverage, further complicating the model.

Project developers and investors must also be careful to account for potential state, local, property and sales tax issues when acquiring or selling projects. In California, for example, projects can sometimes be subject to property tax exemptions. But, depending on how the transaction was structured, if there is a more than 50% change in interest in the project, it can cause the property tax exemption to expire. Such a scenario could be seen as an additional burden on the buyer and an obstacle to offering a price that is attractive to the seller.

Understanding the New FASB Guidance

A primary concern in due diligence considerations in the M&A process is determining whether the deal represents an asset acquisition or business combination under new Financial Accounting Standards Board guidance. More and more companies are applying the new definition of a business set forth in FASB Accounting Standards Codification Topic 805 (ASC 805).

Companies are adopting the new guidance early largely because it has resulted in acquired projects being treated as asset acquisitions and not as business combinations.

The prior definition of a business was applied broadly, resulting in many transactions possibly being accounted for as a business, while the new definition provides more consistency in practice. The new guidance provides a practical way to determine when an acquisition is not a business, which eases accounting complexity.

ONE TREND THAT HAS NOT BEEN OBSERVED IS PLAYERS CHOOSING TO EXIT THE MARKET.

When it comes to tax equity and accounting considerations, one trend that has not been observed is players choosing to exit the market. Overall, the market is too healthy to present a compelling reason to leave. On the capital markets side, asset buyers will shift for strategic reasons. On the sponsor equity side, it appears that most players want to put money to work in the renewables project industry over the long term.

BEAT It

Even further into the weeds of the final tax law is the Base Erosion Anti-Abuse Tax (BEAT) provision of 2017, which was intended to prevent multinational companies from using cross-border transfers to lower their U.S. tax bill. With respect to tax-equity finance, however, the effect of the BEAT provision on wind and solar deals is both subtle and complicated.

THE EFFECT OF THE BEAT PROVISION ON WIND AND SOLAR DEALS IS BOTH SUBTLE AND COMPLICATED.

Some tax equity investors could be affected more in some years than in others. For projects claiming the PTC, the impact could be felt for up to 10 years on any new PTC investment. This is due to the fact that with the BEAT in effect, both the PTC and ITC are rendered partially useless because neither the PTC nor the ITC can be used to offset 100% of BEAT liability.

As such, when the BEAT applies, any use of the PTC or ITC for U.S. tax purposes is wiped out by BEAT, which is a form of “alternative tax.” In addition, any lost value of the PTC or ITC cannot be carried forward or used later to offset future tax liabilities.

Because of this new BEAT-related tax accounting complexity, some investors have paused their investment activity as they determine what, if any, affect the BEAT will have on their U.S. income tax profile.

Thus far, the market has seen limited impact from the BEAT provision. There could also be tax planning or structuring solutions that may also mitigate the impacts of BEAT. For now, the industry eagerly awaits further U.S. Treasury tax guidance on this issue. There could also be further possible changes through corrective federal tax legislation, although such legislation is not expected until well after the 2018 midterm elections.

DRO Influence

A common assumption among developers is that 100% bonus depreciation is going to be used in each and every tax equity deal. But that's likely not always to be true due to deficit restoration obligation (DRO) limitations.

A DRO is an agreement in which, after accounting for any minimum gain, a partner will fund an amount equal to any deficit in their capital account at the time the partnership is liquidated. Deals with project-level debt generally see less use of DROs, while deals with back-leverage generally see more use of DROs. Third-party control of a forced liquidation is the rationale behind this approach.

There is some measure of ability to control this limitation in PTC projects, but not in ITC projects. A PTC project has the ability to sculpt the profit/loss percentage during the first year of operations in order to limit the loss allocation to the point at which the investor has a manageable DRO. Investors are generally willing to take a DRO position, within reason and commensurate with their risk appetite, which will allow their capital account to be in a zero position at the end of their investment horizon. Because this control isn't available in an ITC deal, the current expectation is that these projects will opt out of the use of bonus depreciation.

Taking Care of the Tail

Another consideration for holders of tax equity partnership interests is known as the "tax equity tail." Specifically, tax equity holders may begin looking to syndicate a portion of their interest stake in the deal in the last few of years of their 10-year PTC holding period.

To do this, tax equity investors can form a new partnership above their existing interest in the project. Within this new partnership, the original tax equity investor can syndicate a large portion of the cash attributes to a new, separate, upper-tier cash investor while keeping the PTC and other tax benefits for themselves. Bifurcating the projects cash from the tax items allows the original PTC investor to reduce their exposure to the underlying economics of the deal itself and positions that investor for a controlled exit when the PTC is no longer available.

Historically, many of the projects that have employed this structure have suffered operational issues because the tax equity investor's position in the project wasn't expected to hit the threshold yield and "flip" within the original investment horizon.

Currently, a situation could arise in which both the tax equity investor's interest in non-performing and performing assets will be wrapped into this structure due to attractive pricing by third-party investors for the cash attributes.

Another consideration for project owners is the merchant tail beyond the initial contract for the project, often decades into the future. Margins are already thin in the rest of the merchant generation business. Low prices in the merchant market, coupled with the fact that merchant wind projects in the U.S. are in the minority, and nearly unheard of in solar, mean that correct valuing of the merchant tail is very much an open question.

THE IMPLICATIONS OF INDUSTRY CONSOLIDATION

Despite the concerns laid out in the previous sections, strategic investors are aggressively pursuing the U.S. market, and have been responsible for many recent renewable project acquisitions. While large IPPs continue to drive the market, new international players have also emerged in the United States. The French multinational electric utility company ENGIE and the German subsidiary of RWE, Innogy, are among the new players looking for assets to buy.

STRATEGIC INVESTORS ARE AGGRESSIVELY PURSUING THE U.S. MARKET

Historically, not much value has been attributed to early-stage projects, that is, projects that have not yet achieved a power-purchase agreement, interconnection or permitting closure. Because infrastructure funds are limited partnerships that have a return rate they must hit, the funds haven't been as active in acquiring early-stage projects. Infrastructure funds haven't been able to provide the assurance sellers and developers want on the acquisition structure. As a result, the funds may tell the developer they can pay an IRR [internal rate of return] up to a benchmark, but the deal isn't solidified until the asset gets to its commercial operation date.

Meanwhile, strategic investors are willing and able to tell the developer that they will pay a certain amount per kilowatt under any circumstance. Payment comes in over time, based on certain predefined milestones. In such a situation, both the seller and the developer feel comfortable that the deal is not contingent on the actual economics of the project. So not only are strategic investors able to acquire entire platforms, they're also able to take on risk earlier in the development pipeline.

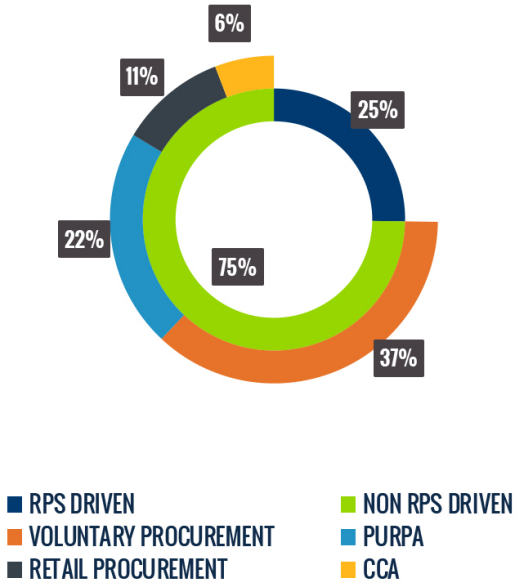
Differences are also becoming apparent when comparing wind and solar project developers. In wind, the developer field is narrower, with only a handful of notable developers having a proven track record.

Solar activity is much more widespread, with a more diverse array of players in the market. In solar, there is still space for new entrants or smaller players to create a platform and get to scale and gain traction quickly.

Utilities and Corporations Step Up

Expect to see utilities, in both regulated and unregulated markets, continue to be aggressive in acquiring wind and solar assets. Utilities were slow to enter the market, to be sure. But the rapidly improving economics of wind and solar projects means the market is no longer one that can be ignored and is not solely driven by RPS goals in a handful of states. At the same time, RPS goals have become more ambitious in some leading states.

U.S. UTILITY SOLAR PIPELINE BY PROCUREMENT DRIVER

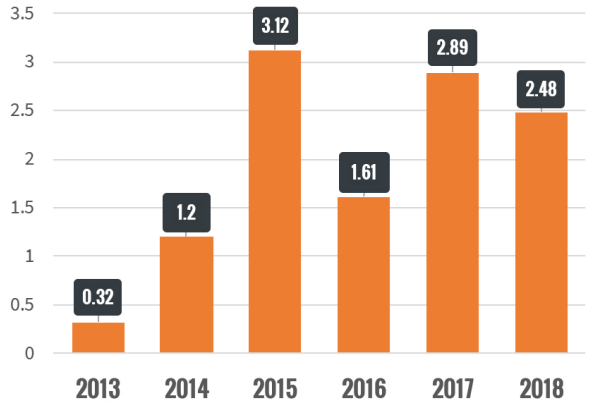


Another powerful force demonstrating the staying power of the emerging market has been the entry of major corporations. Corporate clean energy commitments, such as those enshrined in RE100 pledges, are forcing utilities to pay attention to the growing demand for renewable energy from some of their largest customers.

Corporations signed a record 4.8 gigawatts' worth of offtake agreements last year, according to **Bloomberg New Energy Finance**. And 2018 promises to be another record year, with 3.3 GW of corporate renewable energy deals signed by the end of April. Utilities that are unwilling or unable to procure clean energy at a fast enough clip to meet corporate demand could see large clients exit. MGM, for instance, was willing to pay $87 million for the right to leave NV Energy in 2016.

However, utilities are paying attention. In the first quarter of 2018, for example, utilities accounted for 69% of the more than 3.5 GW of wind PPAs, the strongest quarter for PPA announcements since the American Wind Energy Association began tracking the deals in 2013. Direct utility ownership will lessen the demand for tax equity, as they are less dependent on outside financing, although some regulated utilities are considering third-party tax equity.

CORPORATE RENEWABLE DEALS 2013-2018



As of May 16, 2018. Excludes on-site generation.
Credit: Rocky Mountain Institute

CORPORATIONS SIGNED A RECORD

4.8 GIGAWATTS'

WORTH OF OFFTAKE AGREEMENTS LAST YEAR.

Green Tariffs

Forward-thinking utilities are proactively responding to this growing corporate demand by offering companies green tariffs that, **according to the Smart Electric Power Alliance**, "ensure additionality, long-term price stability and RECs."

In New Mexico, for example, regulators recently approved contracts for Public Service Co. of New Mexico (PNM) to build 267 megawatts of wind, solar, and storage to power a Facebook data center in the state. The contracts for the project were based on a "green rider" template pre-approved under PNM's green tariff for corporate customers.

Such contracts may be increasingly attractive to companies that do not want to have to repeatedly negotiate PPAs. Expect utilities to play an even bigger role in, and continue to evolve with, this market going forward.

More Sell-Downs to Come

Another recent renewable energy project acquisition trend is large sell-downs in project or portfolio stakes, sometimes greater than 50%. This is due in part to major international players following International Finance Reporting Standards (IFRS) accounting guidelines that classify tax equity as debt. If companies that adhere to IFRS standards hold majority stakes in tax equity financed projects, it may appear that they are over-leveraged using conventional financial metrics. Asset owners may want to reduce the appearance of leverage with sell-downs.

In addition, due to favorable market conditions for sellers and low costs of capital, we have recently witnessed asset owners sell positions in portfolios as a means to recycle capital and reduce exposure. A handful of major project owners have also sold positions in operating assets due to shifting tax positions. Lastly, as asset portfolios begin to near their tax equity flip points, we expect to see growing activity in residual interest trades. These observed trends have gained momentum and point towards continued M&A activity for operating portfolios in the future.

Enabling the Tax-Efficient Buyer

Given the hyper-competitive nature of the project acquisition landscape, what are the key factors that enable asset buyers to win in the M&A bidding process? In general, the fewer contingencies you can offer as a buyer the better.

THE FEWER CONTINGENCIES YOU CAN OFFER AS A BUYER THE BETTER.

It's a clear way to distinguish oneself from the competition. There are not many tax-efficient buyers operating in the market. If the asset buyer can offer a deal not contingent on tax equity financing, that buyer will be favored over other bidders.

To cite one example, the ability to offer an acquisition deal not contingent on tax-equity financing is one reason Southern Company was able to successfully bid on renewable projects. Project sellers might even be willing to take a hit on value for the assurance that comes with such a deal structure.

Buyers and sellers are also not distinct entities anymore; rather, it is a fluid market where those roles are interchangeable depending on the deal. In May, for example, Southern Company's Southern Power sold a one-third minority stake in its solar portfolio to Global Atlantic Financial Group Limited for more than $1 billion.

What else separates the winning bidders from the also-rans? Cost of capital. Low cost of capital will always get a bidder to the top of the list. Truly competitive bidders need to prove they can execute on implementation – along with that lower cost of capital.

Another point of separation is the ability to blunt risk. The question: How much risk can you take on in development? The more a buyer can limit the risk premium as the project moves further into development, the more attractive it is for sellers. Developers are increasingly willing to sell at any stage of the project if they are not losing too much value.

THE UPS AND DOWNS: FINE-TUNE YOUR TECHNICAL ANALYSIS FOR BETTER RETURNS

As more and more players come into the U.S. renewables M&A market, investors bid aggressively, often without supporting engineering analysis to validate inputs to the financial model or quantify risks to asset performance and useful life.

Value may be left on the table if an asset is not evaluated from a technical standpoint. Targeted, technical due diligence provides insight that empowers investors to bid intelligently, understand residual risks, and capture upside potential.

USEFUL LIFE, RECONSIDERED

The useful life of wind and solar assets is among the common levers assessed when increasing asset valuation. Wind projects originally designed for 20 years of operation are now commonly assumed suitable for 25 to 30 years, and solar projects designed for 25 years may operate for up to 40 years. Although this may be defensible in certain cases, blanket assumptions are blind to real engineering risks, which may significantly impact asset performance over time.

On the other hand, evaluating projects based only on their design life may neglect reasonable potential for extended-life operations and therefore undervalue the asset. For both wind and solar projects, the insights on useful life provided through technical analysis can provide context for the assumptions made, establish baseline cash-flow projections, enable a bidder to quantify and mitigate residual risks, and inform sensitivity cases to test the robustness of the financial model.

It is important to differentiate between useful life and economic life under U.S. generally accepted accounting principles (GAAP). Factors including site control and PPA terms impact such an analysis for accounting purposes.

WIND

The operational life of wind turbines is not set in stone. For many projects, operation beyond the certified life is often possible, but the safety margins in the turbine design are increasingly eroded, and the incremental risk of costly structural failure will increase. Similarly, modern turbine foundations are designed to a specified useful life, and older foundation designs may not have adequately considered fatigue loading.

The useful economic life of wind turbines is primarily linked to the fatigue loading on turbine structural components and foundations. Turbine certification generally considers fatigue loading based on a 20-year operating life under a generic set of wind conditions.

Probability of fatigue failure increases non-linearly, and the loading experienced by turbines at the same project will be highly correlated to one another, creating potential inflection points in operating costs and revenues starting with the onset of fatigue failures in later years.

Engineering analysis can help quantify these risks, but also help uncover opportunities. Actual conditions experienced at the project site will differ from certification assumptions, and engineering analysis can quantify the resulting impact if real world conditions are tougher or less onerous than predicted. An engineering analysis of turbine structural components and foundations can also provide insight into design margins and deliver greater granularity. Finally, evaluation of sensor data provides further insight into loads experienced by individual turbines, and can identify signs of impending turbine or foundation failures.

SOLAR

The useful life of solar PV projects is no less important than it is for wind. However, given the modular design of solar projects, their economic life is governed largely by an ongoing cost-benefit analysis.

Solar projects are typically designed for 25 to 30 years of operation, and commonly benefit from long-term warranties on PV modules. The useful life of solar PV projects is no less important than it is for wind. However, given the modular design of solar projects, their economic life is governed largely by an ongoing cost-benefit analysis. Solar projects are typically designed for 25 to 30 years of operation, and commonly hold long-term warranties on PV modules. However, warranty claims are often difficult to press, and don't cover full replacement costs. Further, module degradation is expected to accelerate after the module design life, impacting production if not accounted for via a replacement program. Inverter replacements should also be accounted for in maintenance budgets or reserves, and inverter operating strategies may be employed to extend the useful life.

Asset owners must also consider how they're going to secure spare parts, either through on-site stock or through commitments from the supplier. In addition, the impact of operational loads and corrosion on racking and trackers should be evaluated, and the robustness of foundation designs checked for suitability for extended operation.

Although individual repairs to an inverter or module may be inexpensive, repeating repairs hundreds of times across a solar project site may prove uneconomical. Technical evaluation of these issues can guide cost assumptions for planned module replacement, inspections, and maintenance budget for extended operation, which are crucial to asset valuation.

REPOWERING WIND

Repowering of wind projects has emerged as a hot topic and potential value driver in the U.S. market, given the possibility of recapturing PTCs if the project owner has established a means of qualification, such as buying new turbine components. The U.S. Energy Information Administration recently published an update on the potential for wind farm repowering in the U.S. and found that 12% of the turbines installed in the country came online before 2000; yet those turbines account for just 2% of the country's installed wind electricity generating capacity. The National Renewable Energy Laboratory estimates that in the U.S. alone, repowering investments could reach $25 billion by 2030.

Full repowering entails complete replacement of all turbine components, effectively redesigning and constructing a new project on an existing site to leverage permits, land leases, and interconnection. Partial repowering refers to the replacement of certain turbine components (e.g., nacelle and rotor) and re-use of other existing components (e.g., foundation and tower). In both cases, the replacement turbines are often of higher rating, larger rotor diameter, and greater efficiency.

Partial repowering requires careful evaluation of reused components and foundations, since the same considerations as for extended-life operation apply. Some turbine manufacturers offer warranty or certification of turbines in a repowered configuration, but this is not universal, may be subject to contractual caveats, and does not address risk to turbine foundations. Therefore, the fatigue life should be evaluated based on the turbine and foundation designs and operational history, combined with the expected loading in the repowered configuration.

Thanks to advances in blade construction and turbine control systems, in some cases loading in the repowered configuration – even with greater production – may decrease rather than increase, extending expected operating life. Finally, review of the operational history and turbine technology sheds light on the expected maintenance costs and informs decisions regarding O&M strategy to manage risk and optimize cash flows for a repowered project.

OPERATIONS AND MAINTENANCE COSTS: REALITY CHECK

For an equity investor, O&M cost assumptions are a key driver for investment returns and must be considered when bidding wind and solar projects. Careful evaluation uncovers the risks of O&M cost increases, as well as potential upsides based on operational history or changes in operational strategy.

Wind turbines, solar modules and trackers, inverters and other equipment will naturally require additional unscheduled maintenance and inspection as they age. Yet, many bidders assume flat-lined O&M costs in real dollars rather than increased costs over time. For many projects, however, it is an optimistic assumption.

Proper technical evaluation of O&M costs yields more accurate valuation of the assets. Understanding the failure rate distributions of individual wind turbine components and combining these with repair costs based on industry data provides intelligence on both the baseline cost estimates, as well as the expected range of such costs.

Financial inputs for PV plants should appropriately consider inverter reserve timing and sizing, as well as module replacement plans, assessing factors including technology, operational history, and desired useful life. Finally, contractual strategy and terms weigh heavily on incurred O&M costs, and may offer opportunities to mitigate risk (e.g., reallocation of risk to an O&M provider), or reduce costs (e.g., transitioning to a self-perform arrangement).

Understanding realistic expectations for project O&M costs need not constrain a commercial bidding strategy. Rather, savvy bidders can use such intelligence to quantify their risks, evaluate realistic upside potential, and inform decisions about asset valuation for bid purposes commensurate with their risk tolerance.

CONSIDERING CONTRACT DETAILS

There is an ever-growing list of energy sales structures for renewable projects, and it is essential to have a deep understanding of the technical risks of these contracts. Utility-style, bus-bar PPAs largely insulated projects from risk arising from market mechanics, transmission congestion and reliability considerations. However, projects built in more recent years are far more likely to bear transmission-related risk, which is a major influence on revenues. Further, older assets need to identify prospects for follow-on electricity sales when offtake agreements expire, or else be fully exposed to volatile merchant pricing.

Newer offtake structures take myriad forms, including financial hedges, virtual PPAs, and proxy revenue swaps, and counterparties range from financial players to corporate offtakers. A common thread is that projects settle energy sales transactions at a remote hub rather than at their point of interconnection to the grid. Prices at the interconnection are often lower than at the hub, lowering the project's effective offtake price by the value of this price differential. Such pricing impacts curtailment as well: Wind projects which still receive PTCs for each kilowatt-hour generated can economically bid negative energy prices into the wholesale market, lowering their risk of curtailment in comparison to non-PTC projects.

Projecting curtailment and basis for a project is complex and subject to significant uncertainty. Evaluation of historical data provides some insight, but is far from a perfect indicator of future expectations, and economic modeling of markets is sensitive to a range of assumptions regarding bidding behavior, build-out and retirement of generators, and commodity pricing. Nevertheless, studying transmission congestion equips bidders to better understand risks to project revenue in the context of their offtake arrangements. Further, time-series modeling of a renewable asset's output and market pricing provides insight into the uncertainty of revenue – a significant benefit when evaluating financial model assumptions for an acquisition.

ENERGY STORAGE

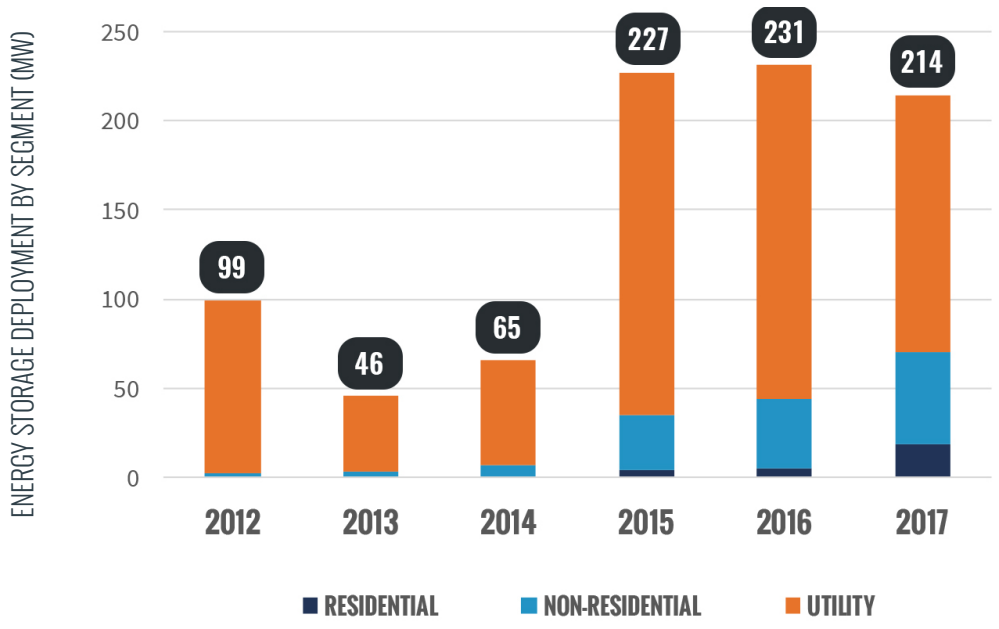
The rapidly declining cost of battery energy storage systems offers potential value propositions for renewable projects to take on energy storage to create a hybrid generation and storage system. This is especially true if complemented by capture of the ITC for the battery based on a dispatch strategy that ensures that sufficient charging occurs from renewable sources rather than the grid.

To realize the value, however, investors must understand potential revenue streams from the battery and how these can be intelligently stacked. A battery enables wind and solar projects to smooth and firm their output by limiting ramp rates, and enable participation in markets for ancillary services. Solar-plus-storage facilities have already demonstrated the ability to effectively load-shift, *delivering energy when demand is higher and increasing the project's revenue potential. For preconstruction projects, smoothing ramp rates may enable lower interconnection and renewables integration costs as well.*

Notably, the chosen application for energy storage has important implications for the optimal technology, degradation rate and planned replacement costs, which must also factor into the analysis.

***DNV GL** is a leading independent engineering and technical advisory firm for renewable energy and storage projects in the U.S. and globally. Learn more at **www.dnvgl.com**.*

U.S. ANNUAL ENERGY STORAGE DEPLOYMENTS (MW)



GTM Research/ESA U.S. Energy Storage Monitor

CONCLUSION

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The evolving M&A landscape offers enticing opportunities for an increasing number of players, but developers and asset owners must be laser-focused on the near-term factors at play to get deals done.

Here are some the key macro trends that GTM Research and MAKE have identified as driving the market in the next five years:

- The growing cost-competitiveness of utility solar with new-build natural gas.
- Large-scale solar procurement outside state-level renewable energy mandates.
- Approximately 30 GW of new wind capacity coming online ahead of the PTC expiration in 2020.
- Distributed solar customer demand has expanded to solar-plus-storage and offsite solar, including both community solar and offsite corporate PPAs.
- More than 3 GW of annual deployments of energy storage by 2023, more than half of which will be in front-of-the-meter applications.

The fallout of the recent tax bill is still happening, and the full picture will not be seen for at least a year, especially in terms of BEAT implications.

For tax equity-backed projects, pricing is likely as low as is possible and may be at the maximum optimal pricing for what asset buyers are willing to pay. Don't expect to see equity yields drop from the present levels.

Margins will continue to be tight. Combine the economics of the corporate tax rate shifting down to 21% and continued downward pressure on power prices, and margins could be squeezed further still.

Nevertheless, renewable project developers will continue to find a way forward. Project developers are collectively sharing the pain as the industry works through the implications of tax reform and continued movement on power pricing.

In a seller's market for renewable assets, the winning bidder may prove to be the one with the highest risk tolerance. However, bidding aggressively does not require turning a blind eye to technical risk.

Sophisticated analysis offers nuanced understanding of the range of likely project profitability, the ability to quantify and mitigate residual risk, opportunities to optimize asset valuation to win bids, and insight into likely competing bids. As DNV GL highlights, engineering analysis of renewable energy assets can be a key that unlocks the hidden value of wind and solar projects and enables commercial success.

The strategy for every deal will be tailored to its specific contours, but there are common best practices for project consideration in today's environment:

- Assess your willingness to take on more risk in earlier-stage projects.
- Craft offers to sellers that are not contingent on tax equity or debt financing.
- Identify sellers' key motivations and demonstrate flexibility in structuring transactions.
- Consider targeted acquisitions of successful development teams as a means to secure an asset pipeline.
- Understand the dynamics and potential of emerging opportunities, such as community and C&I solar, storage and wind repowering.
- Keep a close watch on the cost of capital.
- Leverage in-depth technical analysis to find better contract terms and better deals.

Given the quickly evolving renewable project M&A landscape, it's important to choose a team with deep advisory, financial, tax, and audit expertise in this sector. CohnReznick LLP is one of the top advisory, assurance and tax firms in the United States with 2,700 employees in offices nationwide. As one of the first national accounting firms to establish a dedicated renewable energy practice, CohnReznick is recognized as a leader and trusted advisor in the renewable energy industry. Collectively CohnReznick and its affiliate CohnReznick Capital's 80 dedicated professionals make up one of the largest renewable energy advisory practices in the country and provide M&A advisory, tax, and audit services for many of the largest and most active renewable energy companies in the nation which include project developers, IPPs, infrastructure and private equity funds, tax equity investors and utilities.

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