RESTRUCTURING IN THE YIELDCO SPACE:
IMPLICATIONS FOR RENEWABLE ENERGY ACCESS TO CAPITAL MARKETS

by

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Abstract

A YieldCo is a publicly traded investment vehicle that owns operating energy assets, the majority of which are typically renewable, and whose stated purpose is to distribute the majority of its available cash to shareholders while minimizing corporate taxes. After three successful years in the market, multiple events during the summer of 2015 led investors to question the fundamental nature of the YieldCo structure. This project seeks to understand if the uncertainty surrounding the long-term viability of the YieldCo as a financing vehicle for renewable energy is well founded. Our analysis uses market data, firm disclosures, and equity research reporting to evaluate the macroeconomic, firm-specific, and intrinsic risks of the YieldCo structure. We explore several explanations for the sector's turbulence since 2015 and propose recommendations to align YieldCo, sponsor, and shareholder incentives. This assessment of the YieldCo financing vehicle can be used to inform future action in the sector, as well as renewable energy financing more broadly.
Executive Summary

Since their debut in 2012, YieldCos have been one of the most important financial innovations in the renewable energy industry. They significantly changed the long-term asset ownership model for renewable energy assets and were market darlings during their early growth years in 2013, 2014, and 2015. However, during the summer of 2015, the YieldCo sector lost 37.60% of its market value in 3 months. The events surrounding this market collapse signaled that there may be significant risks to the YieldCo structure, which further suggests that the financing of renewable energy via the current mechanism may be in trouble.

This project seeks to understand if the uncertainty surrounding the long-term viability of the YieldCo as a financing vehicle for renewable energy is well founded. Our objectives can be summarized by these key questions:

1. What factors caused the YieldCo market collapse during the summer of 2015?
2. Was the summer of 2015 a one-time market correction or is the YieldCo an inherently unsustainable financing structure?

A YieldCo is a financing structure that aims to “recycle” capital in a tax efficient manner while allowing the parent company to retain significant control of the YieldCo subsidiary and generating demand from a non-core portion of the public investor base. Like Master Limited Partnerships (MLPs) and Real Estate Investment Trusts (REITs) before them, the principle goal of YieldCos is to own and operate assets, distribute income to shareholders, and maintain an advantageous tax position. The primary differentiator between these other structures and YieldCos is that YieldCos principally focus on renewable energy projects whereas MLPs focus on oil and gas upstream and midstream assets and REITs focus on real estate.

Since the first YieldCo was formed in 2012, the sector has seen significant growth, swelling to over 10 entities with a cumulative market capitalization of almost $18 billion as of 2015. Many firms and analysts saw the YieldCo as an ideal way to capitalize on the growth trajectory of renewable energy, particularly in the United States, allowing firms to separate their long-lived, stable cash-generating renewable energy assets from their remaining businesses as a means to raise and deploy additional capital generated from the YieldCo public offerings.

Since the summer of 2015, the YieldCo sector as a whole has been turbulent. Low oil prices have had an unexpected impact as MLP investors, seeking higher yield, demanded the same of YieldCos. There has also been a general trend of diversifying away from energy market exposure across investors. And perhaps most saliently, there were a series of negative company specific events during this time period, most notably from SunEdison, that gave investors reasons to be skeptical. Uncertainty also remains surrounding future growth expectations and if YieldCos will be able to maintain their yields as access to capital becomes increasingly uncertain. If growth slows, yields will increase and the ability to fund accretive acquisitions will be hampered. As investors began to feel the impacts of macroeconomic and microeconomic shocks during the
summer of 2015, the viability of the YieldCo financing vehicle was put into question.

Our analysis utilizes market data, firm disclosures, and equity research reporting to evaluate the macroeconomic, firm-specific, and intrinsic risks of the YieldCo structure. We explore several explanations for the sector's turbulence since 2015 to explain what factors caused the YieldCo market collapse in 2015 and whether the devaluation was a one-time market correction or a signal of an inherently flawed corporate structure.

Our findings show that YieldCo performance was significantly correlated with negative sponsor events, and MLP performance (and concurrently oil prices), but that these correlations have decreased over time. Additionally, we see that missed earnings and dividend expectations during the summer of 2015 were significant drags on equity values. Investor and research analyst sentiments also became increasingly concerned during this period. This confluence of events led to the YieldCo market crash.

Post-summer, the YieldCo market stabilized and has begun to recover as investors and analysts focus on the firm-specific characteristics of each YieldCo, rather than treating all firms as equivalent entities. This is shown by decreasing correlations between YieldCos, which were >90% correlated during the downturn. It appears that market expectations for YieldCos have been reset and that individual firms are now able to succeed or fail on their own merits.

Our overall view is that YieldCos are not inherently flawed and that the events of 2015 were temporary setbacks. However, we propose improvements to the corporate governance structure, project valuation methods, and "end game" strategy of YieldCos that may significantly improve the structure. This assessment of the YieldCo financing vehicle can be used to inform future action in the sector, as well as renewable energy financing more broadly.
I. What is a YieldCo?

Introduction to YieldCos

A YieldCo is a financing structure that aims to “recycle” capital in a tax efficient manner for its parent company. YieldCos are separate entities from their parent companies (or ‘sponsors’) though the parent company retains significant control of the YieldCo subsidiary, which generates demand from a non-core portion of the public investor base. Since the first YieldCo was formed in early 2012, the sector has seen significant growth, swelling to over 10 entities with a cumulative market capitalization in 2015 of almost $18 billion. Many firms and analysts saw the YieldCo as an ideal way to capitalize on the growth trajectory of renewable energy, particularly in the United States, allowing firms to separate their long-lived, stable cash-generating renewable energy assets from their remaining businesses as a means to raise and deploy additional capital generated from the YieldCo public offerings.

The idea for a YieldCo originated in 1960, when President Eisenhower signed the Real Estate Investment Trust law. REITs were extremely popular, since it created a new investment vehicle for investors unwilling or unable to directly own property. This popularity led to the creation of Master Limited Partnerships (MLPs) in the 1980s, a similar investment vehicle, but with a focus on natural resources. Like MLPs and REITs, the principle goal of a YieldCo is to own and operate assets and distribute income to shareholders through long-term predictable cash flows. The primary difference is that YieldCos principally focus on renewable energy projects, whereas MLPs focus on oil and gas upstream and midstream assets, and REITs focus on real estate.

Solar industry growth in the early 2000s created a need for additional low-cost capital to fund an influx of new renewable energy projects that solar developers were unable to fund independently. These projects were extremely capital intensive, though capital was much harder and more expensive to raise due to the risks associated with solar projects in development. One estimate by J.P. Morgan in 2014 ascertained that approximately $100 billion of capital would be required to fund the over 45GW of expected global solar investments in one year alone.¹ These risks made it more difficult for existing operational solar assets to raise funding from investors, since the parent firms were unable to maximize the benefits from the relatively risk-free, long-term projects that drove down the cost of capital. With the advent of the first YieldCo by Brookfield Asset Management in 2012, under their subsidiary Brookfield Renewable Energy Partners, came an important financing tool to help drive renewable economic competitiveness. Brookfield Renewable Energy Partners served as an investment vehicle specifically for wind and hydroelectric energy projects (80% and 20% respectively), in order to segregate the projects that had more predictable long-term cash flow operations from the riskier projects in development. This separation was appealing to a range of investors, resulting in a lower cost of capital, increased value for shareholders, and increased capital liquidity.

Overview of the YieldCo Structure

To achieve this separation, the parent corporation or sponsor, typically a renewable energy developer, establishes a public subsidiary: the YieldCo. The parent performs the capital-intensive and riskier business of developing renewable energy projects, while the YieldCo, in order to recuperate their capital quickly, buys the developed renewable power projects from their parent. This is called a “drop-down,” which makes it feasible for the parent company to receive cash flow from the sale of the asset immediately instead of at the end of a project life. In addition, the sponsor also retains access to a portion of the contracted cash flows over the life of the asset. YieldCos have the right of first offer (ROFO) to buy the assets developed by the parent company and, initially, YieldCo investors saw this arrangement as beneficial since the YieldCo had access to a pipeline of projects that could fuel its growth. This structure, where the development sponsor recuperates its capital with some return through sale of projects to the YieldCo, allows the sponsor to quickly move on to build the next renewable energy project, thereby benefitting the parent company by providing their primary need - increased liquidity. Additionally, the YieldCo subsidiary now owns a low-risk asset with contracted long-term income which it can offer to investors on the stock market. Investors, such as pension and retirement funds, provide ample demand for investments that are safe and long-term, providing a good match for the YieldCo investment vehicle. The initial public offering (IPO) of YieldCos on the stock market capitalize the YieldCos with enough cash to buy their initial projects and begin distributing dividends for investors almost immediately. However, many YieldCos differ in the structure of their ownership and dividend plans, making it difficult to generalize their benefits and detriments.

YieldCos are essentially a public subsidiary of a larger parent corporation, so their structure is inherently complex and can be generally grouped into two categories depending on the sponsor’s interest: Type A or Type B (Figure 1). Sponsors hold a voting and economic interest in Types A structures, whereas in a Type B structure, sponsors separate their voting interest in the YieldCo and their economic interest in the Holding Company. The benefit of pursuing a Type B structure is in the ability for the sponsor to receive incentive distribution rights (IDRs), which allow sponsors to receive a greater share of portion of available cash as they achieve predetermined distribution targets; however, this structure often increases the cost of capital for the YieldCo as IDRs are enacted - negating a key incentive to invest in the YieldCo structure to begin with.²

These structures can be blended as well, with NRG Energy’s YieldCo, NRG Yield (Figure 2) as an example.³ The parent company owns a majority share of the YieldCo in Class B common stock, with public shareholders entitled to a minority share in Class A common stock. The YieldCo owns 100% of the operating subsidiary, which is essentially an aggregate of all the operating project assets incorporated in the portfolio. The revenue generated by this subsidiary gets passed on to shareholders and the parent company via dividends, delivering shareholder value and returns while also providing additional sources of capital for new projects.

Regardless of which structure is used, the sponsor maintains control over the YieldCo corporation and receives dividends in some form. Many YieldCos utilize IDRs, which reward the sponsor for dividends above certain levels and increase as the goal is exceeded (Figure 3). Because sponsors fundamentally control the decisions of YieldCos, including the dividend payment, there is an argument that IDRs align the sponsors decisions to pay out dividends according to shareholder preferences. However, these IDRs may also provide incentives for YieldCo management to drive dividend growth unsustainably.6

One benefit of the YieldCo structure is increased transparency into cash flows from the operating assets, as opposed to if the operating cash flows were channeled through the parent company’s financial book. However, the YieldCo structure still obfuscates many important decisions affecting these cash flows. For example, how is the sale price of drop-down assets determined for each project, and does it reflect the shareholder’s best interests or the parent company’s required return on their development capital? Can the public shareholder truly separate the value of the YieldCo from the value of the sponsor if the growth (pipeline of drop-down projects) and capital investments (acquisition cost of the sponsor’s project) depend on the efficiency of the sponsor’s development business? Finally, can YieldCos actually refuse to buy an asset from the parent company if they do not find the quality and price satisfactory? These misgivings in the structures of YieldCos were indicated in a UBS note in the fall of 2015 about the acquisition of Vivint Solar by SunEdison, stating: “This deal sparked concerns about the quality of underlying cash flows, the premiums being paid for portfolios, and underlying discounted cash flow assumptions.”

Financial Benefits of YieldCo Structuring

YieldCos have been an attractive investment for public shareholders due to their predictable cash flows and high dividend yield. The projects operating under a YieldCo are de-risked, long-term, fixed-cost sources of power with negligible variable costs, creating predictable cash-flow streams over a 20+ year period. This makes YieldCos unique in that they provide investors with high dividend yields as well as high growth rates, with an average target range of 4-7% yield and 12-15% annual growth. This type of risk/return profile is an attractive alternative to the bond market,

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due to the contracted cash flows and slightly higher returns. Additionally, shareholder value is increased thanks to both a lower cost of capital, and an abnormally high multiple assigned to distributed cash flow. One investor summarized the general sentiment of YieldCo value to public shareholders as: “having a public company with supposedly secure cash flows delivering 4% or 5% returns in the shape of dividends is attractive in a low-interest-rate environment...This was supposed to be a sleepy little bet. It was supposed to be like landing on the electric company in Monopoly, or buying J.P.Morgan stock after 2012. Shareholders got fat and happy on promises of growth and consistent dividend payouts.”

Apart from capital recycling, the appeal for sponsors is in the developed projects' long-term contracts, which create predictable cash flows and lower the sponsor's cost of financing. Essentially, the capital raised from the stock market through the YieldCo has a lower required return (averaging 4%-5%) than the lowest cost equity financing available on renewable energy projects (typical tax equity financing is around 8%). By funneling this financing back to the sponsor through the YieldCo, the sponsor can develop projects at a cheaper weighted average cost of capital (WACC), or use the capital to pay off more expensive debt.

**Liquidity**

Both shareholders and sponsors can achieve higher levels of liquidity through YieldCos. Shareholders are able to buy shares in a liquid market for large energy development projects, which were previously only available as an equity investment for individuals of high net worth. This is similar to how REITs allowed shareholders access to ownership of real estate. Just like typical stocks, these shares can be traded as a more liquid investment than actually investing in projects and waiting ten or more years for development and contracted power purchase agreement (PPA) cash flows. The sponsor's liquidity is increased in that it can also recuperate its development capital through sale at the end of the development process, instead of waiting for cumulative energy sales to provide the return on investment. The sponsor also gets access to a larger and more liquid market, accessing public investors rather than crafting deals through private placement.

**Tax Benefits**

The YieldCo instrument is similar to MLPs and REITs in its ability to avoid double taxation, despite its status as a corporation. By offsetting income with deductions from accelerated renewable asset

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Depreciation, interest expense, tax credits, and other expenses, the YieldCo can reduce its tax burden significantly, usually by avoiding taxation and carrying forward net operating losses (NOLs) to future years. This result is similarly advantageous to the public shareholders who are not taxed on “returns of capital”, or tax-free dividends of an income-less (loss producing) firm. Although both MLPs and YieldCos are corporations that avoid double taxation, it is important to note that for MLPs, this benefit is restricted to certain real assets that fall under “qualifying income,” whereas YieldCos can provide this tax benefit to assets that do not qualify under MLPs.\textsuperscript{15}

Depending on the circumstances, the tax paid by the shareholder on the dividend may be reduced if it is considered a return of the investment instead of a return on the investment. Finally, qualifying YieldCos receive a 1099-DIV form for taxes, rather than the K-1 form received by MLPs, which could be advantageous to some investors for their personal tax liabilities.\textsuperscript{16} These tax benefits are based on small details of ownership structure and changing economics, so they should be regarded more as potential opportunities and less as rules of thumb.

**Dividend Growth**

Perhaps what is most interesting is that YieldCos promise to deliver high dividend growth on top of predictable dividends, also offered by MLPS and REITs. Normally, businesses deliver dividend per share growth via increases in profit or reinvesting capital with a high return. YieldCo dividends are based on 10 to 20 year PPAs, therefore the only growth in normal business is from inflation escalators built into the PPAs. However, these are typically only ~2-3%. The other option of reinvesting capital is antithetical to the raison d’etre of YieldCos, which is to return capital through dividends.\textsuperscript{17}

The actual cause of dividend growth for YieldCos to date has been to issue additional shares. Each of these share issuances is attached to an investment in renewable project acquisition. If the rate of return on each project and the cost of the shares were to remain the same, there would be no change in dividend growth - it would also remain constant. The baseline would be for profits to increase in line with the number of shareholders. However, as the price per share of the YieldCo increases, the YieldCo receives more capital per share which in turn creates more profits per share. In this manner, dividend growth is achieved by an ever-increasing price per share on the stock market.\textsuperscript{18}

The promise of high dividend growth from YieldCos to the market is therefore intrinsically dependent upon the market’s perception of YieldCos, which is a fundamental flaw in the marketing of this financial instrument. As we will see, any reduction in the price per share of new stock


issuances from a YieldCo will almost certainly correspond with a reduction in dividend growth and shaking investor confidence in the YieldCo, creating a continuous downward spiral.

II. Historical Overview – Market Events & Reactions

Market Overview

IPO/Launch Phase

While the genesis for the typical YieldCo structure may be argued, their inspiration was to provide a means to raise cheap capital for renewable energy projects. In 2011, Brookfield Energy Partners launched Brookfield Renewable Energy Partners. While Brookfield argues their utilized structure is distinct from modern YieldCos, investors and executives took note of the implications the financing structure could have on the renewable energy market.

Within two years of Brookfield’s offering, at least seven more YieldCos hit the market, raising a total of $3.8 billion between them (Figure 4). The initial public offering of NRG Yield in July 2013 opened the floodgates, with some analysts suggesting the new financing vehicle would transform the market. For two years between 2013 and the middle of 2015, YieldCo prices rose, dividends grew, investors were rewarded, and renewable energy development accelerated.

In the summer of 2015, however, several notable events occurred that coincided with a depression of stock prices across the entirety of the YieldCo market (Figure 5). Prior to the downturn, in the first two quarters of 2015, YieldCo initial and follow-on public offerings reached a climax. The IPO’s of SunEdison’s Terraform Global and First Solar’s 8point3, combined with follow on offerings from TransAlta Renewables, Abengoa (now Atlantica) Yield, Nextera Energy Partners, NRG Yield, Hannon Armstrong, TerraForm Power, and Pattern Energy Group, totaled more than $3.5 billion. This number dwarfed the amount of capital raised in any comparable time

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period ($12.5 billion total for trailing four years), with some analysts, as well as NRG Yield CEO David Crane, suggesting that the market was becoming saturated and was vulnerable to systemic market volatility.20

Figure 5: Historical YieldCo Prices21

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Summer 2015

There were multiple notable events in mid-2015 that overlapped with a systemic tanking of YieldCo stocks. Falling oil prices spooked investors and caused concerns about how the drop in price would affect stakes in YieldCos.\textsuperscript{22} Considering the dominant role fossil fuels play in the larger energy economy, it’s appropriate to believe that declining oil prices sparked systemic uncertainty, damaging investor confidence in peripherally related markets.

Uncertainty was exacerbated when SunEdison announced plans to acquire Vivint Solar using $789 million from Terraform Power to fund the acquisition.\textsuperscript{23} The deal failed, but brought to light concerns about the still unproven structural relationships between YieldCo’s and their sponsors, including if and how they will be impacted by risky management decisions.

Increasing levels of uncertainty regarding YieldCo/Sponsor relationships, a declining commodity market, and a flurry of rapid capital raises spooked investors, and halted the vast majority of YieldCo growth. In light of this, investors, as did YieldCo sponsors, began to reduce their estimates of future dividend increases accordingly. Lower dividend estimates led to lower demand for the YieldCo stocks, driving down growth rates and stock prices, a cycle which began to feed on itself.\textsuperscript{24}

Over the course of the next two quarters, the receding number of new YieldCo shares denied sponsors an important source of cheap capital to fuel growth, exacerbating a problem for already overly-leveraged businesses. SunEdison and Abengoa filed for bankruptcy, and the decline led many to believe the YieldCo model was fundamentally flawed. At the same time, some analysts countered that the current situation was temporary, and that model wasn’t broken in its entirety and maintained very attractive attributes.

Current

Double-digit dividend per share growth that investors expected during the YieldCo bubble caused a huge uptick in prices. As it stands, it seems likely that investors will be less willing to bid up stock prices to a point where cyclical follow-on offerings will feed rapid dividend growth. Hesitancy in the wake of the YieldCo crash has kept prices far below their highs a year ago, however many YieldCos have shown signs of recovery. This has allowed several companies to once again tap public markets for new equity, an early sign of the return to normalcy.

NextEra Energy Partners raised a total of $318 million in Q4’15 and Q1’16, TransAlta Renewables raised CAN $127 million in Q4’15, 8point3 raised $103 million in Q3’16, and a host of small equity offerings following the crash have shown modest adjustments to their marketing and growth projections. TransAlta Renewables never promised double-digit dividend growth, and their stock price has made up for ground lost in 2015.

New capital raising programs are now being utilized by YieldCos. Smaller “At-the-Money” offerings are designed to attract additional capital from investors at the prevailing market price of the stock. As investors increase trading activity of the stock during these incremental offerings, they are bringing a refreshed level of scrutiny; as prices recover (or don’t) the problems YieldCo’s experienced may be determined as systemic or simply related to execution.

In any case, most large YieldCo managers are confident in some of the fundamental aspects of the structure, and believe YieldCo offerings can still be a valuable tool to fuel growth. How bullish managers are depends on how much they rely on stock market capital for their growth plans and how robust their project runway is.

https://www.greentechmedia.com/articles/read/how-much-can-yieldco-dividends-grow
III. Methods

This project seeks to answer a fundamental question: are YieldCos a viable long-term financing structure for renewable energy. Our analysis utilizes market data, firm disclosures, and equity research reporting to evaluate the macroeconomic, firm-specific, and intrinsic risks of the YieldCo structure. We explore several explanations for the sector’s turbulence since 2015 to explain what factors caused the YieldCo market collapse in 2015 and whether the devaluation was a one-time market correction or a signal of an inherently flawed corporate structure.

Macroeconomic Factors

A key hypothesis for the summer 2015 market collapse was that macroeconomic factors such as oil prices, interest rate risk due to Federal Reserve indications, and broader equity market uncertainty (such as concerns about Chinese economic growth), were key contributors to the YieldCo selloff\(^{31}\). We focused on several market proxies to ascertain the validity of these claims during the summer 2015 period through the spring of 2017. Our analysis used correlations of a market-weighted YieldCo index (includes 8point3 Energy Partners, Atlantica Yield, NextEra Energy Partners, NRG Yield, Pattern Energy Group, Terraform Global, Terraform Power, and TransAlta Renewables) against the S&P 500 Index, S&P 500 Utilities Sector Index, a market-weighted index of YieldCo sponsors (includes First Solar, SunPower, Abengoa S.A., NextEra Energy, NRG Energy, SunEdison, and TransAlta), SunEdison, Inc., the Alerian MLP Index, oil prices, and natural gas prices. The S&P 500 Index was used to evaluate the impact of broad market risks, including China and rising interest rates. The S&P 500 Utilities Index was used to evaluate the impact of the electricity sector on YieldCo performance. The market-weighted sponsor index was used to evaluate the impact of sponsor behavior. SunEdison was used as a comparison because they were the most noteworthy sponsor during the summer 2015 period due

to several negative news events, the Alerian MLP Index was used to examine the impact of a similar energy structure, which was often cited as a significant coinciding factor. We also examined the impact of commodity prices, specifically oil and natural gas, to see what, if any, impact these prices had on YieldCo performance. The Cushing, Oklahoma West Texas Intermediate (WTI) spot price ($/bbl) was used for oil and the Henry Hub spot price ($/MMBtu) was used for natural gas.

**Firm-Specific (Microeconomic) Factors**

Another oft-cited theory for the summer 2015 shock was that numerous firm-specific events led to the YieldCo market collapse. For this analysis, we analyzed the impact of specific sponsor events, cost of capital changes, quarterly earnings performance and expectations, as well as the impact of project valuations and acquisitions. Specifically, we discuss the impact of SunEdison's announced Vivint Solar acquisition, summer 2015 earnings per share (EPS) and dividend per share (DPS) announcements, as well as firm cost of capital changes and valuation and acquisition uncertainty.

**Investor Sentiment**

A third key to understanding the viability of this instrument in the energy financing market is how the firms and the YieldCo structure is perceived by equity research analysts. YieldCos, as relatively new financial instruments, were subject to additional scrutiny and curiosity as they debuted in the market, experienced rapid growth, and subsequently faltered during the summer of 2015. Questions surrounding corporate governance structure, growth expectations, and the overall costs and benefits to sponsors were top of mind for many analysts and investors throughout the YieldCo history. Although the history of equity research analyst reporting is fraught with conflicts of interest, and they are often the last to report bad news, even as companies are approaching the brink of bankruptcy, we felt that the sentiment expressed by this constituency was crucial to understanding investor attitudes as market events were taking shape and playing out. For this analysis, we qualitatively examined both sector and firm-specific opinions of equity research analysts to obtain a more holistic view of the YieldCo market from this unique point of view.

**IV. Discussion**

**Summer 2015 Results/Observations**

**Macroeconomic Analysis**

To recap, the YieldCo market experienced an extreme sell-off during the summer of 2015 (May 28, 2015 - August 31, 2015). In the history of the YieldCo structure we are at this point:

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To explore this shock to YieldCo equity values, we analyzed the correlations of a market-weighted YieldCo index (codenamed YLDCO) against the S&P 500 Index, S&P 500 Utilities Sector Index, a market-weighted index of YieldCo sponsors, SunEdison, Inc., the Alerian MLP Index, oil prices, and natural gas prices.
The impact of broad market factors was mixed (correlation = 0.56). Although the S&P 500 Index declined by 7.01% during this period (compared to a decline of 37.60% in YLDCO) due to the Federal Reserve indicating a near-term rise in interest rates and the anxiety of slowing Chinese economic growth, further exacerbated by a devaluation of China's currency on August 12th, broad market concerns do not appear to be the principal driver of the downturn.

Downward to flat electric utility performance during the summer of 2015 did not mitigate the
YieldCo downturn (correlation = -0.46). The S&P 500 Utilities Sector Index declined by 4.79% during this period, but overall, YLDCO did not track the performance of the electricity utility sector during this period.

Macroeconomic Factor: Sponsor Index ("parent company performance")

During the summer of 2015, the YieldCo decline was not mitigated by the relatively lower sponsor decline (correlation = 0.69). The market-weighted sponsor index declined by 16.62%, less than half of the decline witnessed in YLDCO.

Macroeconomic Factor: SunEdison, Inc. ("the troubled sponsor")

Despite the unconvincing correlation of YLDCO with overall sponsor performance, negative
sponsor performance was a key driver of the sell-off (correlation = 0.95). On July 20th, SunEdison announced the acquisition of Vivint Solar for $2.2 billion. This culminated a multi-month stretch where SunEdison and Terraform Power acquired over $3.5 billion in assets. This was also accompanied by the Terraform Global initial public offering (IPO) which raised approximately $0.7 billion. These events, triggered widespread concerns by investors about the nature of the YieldCo as a public investment structure and the valuation of asset purchases aimed at fueling future growth.

Macroeconomic Factor: Alerian MLP Index (“MLPs”)

During the summer of 2015, YieldCos were treated like Master Limited Partnerships (MLPs) by many investors despite key differences (correlation = 0.95). MLPs in the energy sector are typically owners and operators of oil and natural gas pipelines and because of their similar corporate structures (public tax advantaged entities that must distribute a large percentage of their income to investors via dividends), they share a similar investor base of dividend-focused investors with YieldCos. Despite several significant differences in asset base (oil and gas pipelines vs. wind and solar assets), as oil prices declined during the summer of 2015, MLP investors retreating from the energy sector appear to have divested from their overall energy portfolios, fueling a related sell-off in the YieldCo market. The Alerian MLP Index declined by 17.45% during the summer and this impact seems to have had a contagion effect on YieldCos.
Because of the link to MLPs, oil prices were a secondary driver of the YieldCo market collapse (correlation = 0.93). As described above, oil prices are a key input to MLP valuations. During the summer, oil prices decline by 14.72%, dragging down first MLPs and then YieldCos through a similar investor base in the energy sector.

Unlike oil prices, natural gas prices had no impact on the YieldCo sector (correlation = 0.06). This
is logical given the minimal input of natural gas in the YieldCo sector at the time (several firms have added natural gas pipeline assets to their YieldCos since). This also reinforces the notion that oil prices were a secondary driver of YieldCo performance as they are also not a primary input but interacted via their connection to MLPs. The was also muted as the Henry Hub natural gas spot price declined by 2.88% during this period, significantly less than the oil price decline.

Firm-Specific Analysis

Specific company level decisions were found to be key factors contributing to the systemic YieldCo sell-off in 2015. Investor skepticism over missed earnings and aggressive growth quickly became pervasive following several notable company events, such as SunEdison's acquisition of Vivint Solar and the resulting concern over potential Sponsor-YieldCo corporate governance conflicts. Just as important, failure to meet investors' expectations by a handful of YieldCos rattled the entirety of the market.

During the first and second fiscal quarter of 2015, Pattern Energy Group, Nextera Energy Partners, Atlantica Yield, and TransAlta Renewables all missed their earnings targets.33

During the same time period, six large YieldCo's also missed dividend expectations amidst mounting concern over their ability to maintain the type of growth that was expected.34

33 Capital I.Q.
Important to note, however, is that the operational performance by the majority of YieldCo’s remained relatively stable. Most YieldCos saw high growth in their earnings when compared to the previous quarter; Pattern Energy Group (+44%), Terraform Global (+64%), Nextera Energy Partners (+61%), Terraform Power (+168%), NRG Yield (+41%), and Atlantica Yield (+75%) all saw impressive earnings. Failures to meet stated targets by specific firms, however, overshadowed otherwise positive performance in the YieldCo market and caused investors to treat individual companies as a single asset class.

**YieldCo Structure**

**Project Valuation**

One question consistently raised among investors about YieldCo structuring is regarding the valuation of individual projects. More specifically, if the valuation methodologies currently in use accurately value YieldCo acquisitions. CAFD metrics used in cash-on-cash return valuations are one common method, but leave significant gaps in analysis.

Currently, the only parties typically involved in a project valuation are the YieldCo, its sponsor, and a third-party bank. Not all public YieldCos announce project acquisitions, and the ones that do almost never disclose details of their valuation methodology. The standard method of valuing projects is to use either CAFD purchase price multiples, or cash-on-cash returns. Public announcements are usually brief, simply stating metrics like the return, acquisition price, and assumed debt. There is little information on how or why certain assumptions are made, even though these assumptions can drastically change the valuation. However, these metrics are not always reliable, and starting in the summer of 2015, many analysts started questioning their accuracy.

Many analysts and others familiar with YieldCo financing note that these metrics don’t account for details that differentiate solar projects from non-renewable assets, such as land value after...
the expected end of the project life. One article on Green Tech Media notes that cash-on-cash return is one of the weakest methods in use because it fails “to account for inflation, depreciation, project lifetime, or anything that happens after the payback period.” A project can be greatly undervalued if the useful life of the asset after 20 or 30 years is assumed to be zero, but renewables are relatively new, and so the long-term value on either the asset or land is still unknown. In theory, the useful life could be much greater since there are multiple opportunities to capitalize on the land value, such as selling the property, leasing out to another party, or installing new renewable assets (like updated solar panels). CAFD metrics also do not account for the time value of money, leading to potential overstatement of project value.

Other assumptions that can drastically vary the project value are: expected electricity prices; discount rates; useful project life; tax credits (in terms of when the credits will run out, if ever); the expected year of tax equity investor buyout; solar panel degradation (this decreases efficiency and thus energy generation and revenue); and more.

IDRs

As previously discussed, IDRs can lead to unsustainable growth for the YieldCo. Some investors and analysts saw these as red flags early on, recognizing the asymmetry of the incentives. Concerns around risk taking and the feasibility of increasing dividends on such a large scale had some investors backing away from IDR YieldCos. As such, the long-term viability of these contracts is questionable at best.

Post-Summer Discussion

Toward the end of the summer of 2015 and into the spring of 2016 (codenamed “after shocks”), the YieldCo market bottomed out and began to stabilize as analysts and investors appeared to separate the macroeconomic and microeconomic risks of YieldCo performance.

As YieldCos moved through 2016 and into 2017 (codenamed “recovery”), the market began to recover as risks once considered endemic to all YieldCos were filtered out by firm-specific performance. YieldCo market expectations appear to have been reset.

Evidence of the aforementioned trends can be seen in the correlations of the market-weighted YieldCo index (YLDCO) with previously discussed macroeconomic factors. The correlation of YLDCO with the S&P 500 Index, the S&P 500 Utilities Index, the Alerian MLP Index, and oil prices declined significantly during the “after shocks” period, but has increased somewhat since. The correlation of YLDCO with natural gas prices has increased as some natural gas pipelines have been acquired by certain YieldCos.

Similarly, the decline in equity value of the 8 largest YieldCos were highly correlated (>90%) in the Summer of 2015. As prices stabilized in the months following the decline, however, individual YieldCos showed no correlation between the movement of their stock prices (note: the SunEdison

YieldCos, Terraform Power and Terraform Global, continue to be correlated, but this is expected. This suggests that the downturn was a systemic market correction which helped separate macroeconomic and microeconomic risks for investors. Individual YieldCos have thus been able to be scrutinized independently from one another, as well as not be tied to macroeconomic indicators such as commodity prices and unrelated energy sector activity.

**Firm-to-firm correlations through time**

<table>
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<th></th>
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<th>Fall 2015 – Spring 2017</th>
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**Equity Research Sentiment**

As previously mentioned, the perception of YieldCos by equity research analysts is important to understanding investors’ views of the sector. Below is a summary of equity research reporting during 3 key periods: the IPO/growth phase, the summer of 2015, and fall 2015 to current.

**IPO/Launch Phase**

"With six successful YieldCo IPOs, one of which was a solar pure-play, we think the space is becoming easier to understand and this success will both attract more investors to and prompt more IPOs in the space...YieldCo IPOs have been well-received. There have been six renewable energy YieldCo new issues so far, raising a total of $2.9 billion at IPO. The six YieldCos have risen an average of 46% since IPO pricing, and are now trading with dividend yields of 2.5-6.5% as a function of high-growth prospects. Risks seem contained. As investors become comfortable with solar as an asset class, with associated growth prospects, we believe cost of capital can fall further, at least relative to other dividend-yielding entities, including MLPs and REITs. If interest rates rise, the sector should be somewhat protected by strong long-term growth prospects supported by sponsor project pipelines. Governance mechanisms protect the interest of the minority shareholder, so most of the risk remains with the sponsoring company. Expect more, get in early. We think investors should expect more YieldCo IPOs and there may be opportunity to capture value early by investing in companies that have pipelines that can support a YieldCo."

- J.P. Morgan, August 12, 2014

"We see continued outperformance by NRG Yield given the visible 5-year 18% dividend growth

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outlook sustained by a backlog of 2,069 MW of long-dated, contracted generation assets, a lower cost of capital, and a supportive parent company in NRG Energy. Our price target of $61 suggests a 2018E dividend yield of 4.5%. Rating: Outperform”
-RBC Capital Markets, September 15, 2014

"Initiate at Buy with $38 PT; yield more than compensates for risk at this level. TerraForm Power (TERP) is the first offshoot from SunEdison (SUNE) as SUNE actively continues to de-risk and evolve towards the model of a high quality total return offering. While the YieldCo structure may be more foreign to tech/alt. energy investors accustomed to a gross margin defined business model, utility investors have been quick to embrace it. TERP inherently embeds greater development risk than either NextEra’s YieldCo or NRG Yield as those utility spin-offs have inventories of existing assets, leading to TERP’s notably wider yield in (100bp in ’16E) than NYLD, a similar comp. Given the scale of development opportunities before SUNE/TERP, we believe this gap can be closed. We see substantial development opportunity before SUNE, enabling meaningful drop-down growth the US and abroad. Bottom line, we remain bullish on renewables, complementing our NEE Buy-rating with a new Buy on TERP."
-UBS, March 2, 2015

Summer 2015
"We see TERP as having traded down principally on the back of what appear to be pervasive investor concerns around prices being too tight to justify for the VSLR deal. With the deal relatively cash rich, we see this as principally a wider street realization around the challenges of finding good growth targets despite the imposition of IDR...What do we make of TERP from here? We’re still quite puzzled by the VSLR deal."
-UBS, August 5, 2015

"Challenging times in YieldCo land, but risk-reward skews upward. NYLD traded off 15% following a disappointing (although not entirely shocking) Q2 report and outlook, bringing the pullback since June to ~41%. With LT fundamentals down only modestly, and assuming capital markets eventually recover from recent deal-related indigestion, we think the YieldCo space, and IDR-free NYLD in particular, may merit a fresh look for GARP focused LT investors. NYLD is expected to grow dividends by 18%/yr through 2018, primarily via assets already on its books and modest drop-downs from sponsor NRG. With our "music stops" or "end of the world" scenario close to current levels we see positive risk/reward."
-Deutsche Bank, August 5, 2015

Current

“Bullish investors argue that NEP should not be compared to other YieldCos as they believe the growth story is more credible and sustainable given its large ROFO pipeline and the support of NEER, the largest renewable developer in the country.”
-UBS, March 13, 2017

“In our view the recently lowered 2017E CAFD guidance to the low end of the estimated range ($120Mn) is more of a timing issue than due to a deterioration in fundamentals...We maintain our Neutral rating and increase our PT by $0.50 to $12/share as we think the announcement of the Brookfield transaction has reduced overall risk, volatility and increased growth visibility.”
-UBS, March 16, 2017

“We continue to believe that 8point3 is a high-quality, low-risk total-return option in our Alt Energy coverage and is one of our top picks for 2017.”
-J.P.Morgan, March 30, 2017

Summary

Although the above commentary is simply a snapshot of overall reporting analyzed, there are a couple of key takeaways. 1) During the IPO/growth phase there was significant excitement for the YieldCo structure, but admitted misunderstanding amongst both analysts and investors. 2) This bullish uncertainty led to mixed reactions of concern and skepticism during the summer of 2015 as analysts theorized that despite the market tumble, equity values would rebound (again, analysts are often the least bearish). 3) Although there has been recovery in the market, analysts’ views are still mixed. However, it is notable that it appears that analysts are now valuing each individual YieldCo on its specific merits rather than painting them with broad sector strokes as they appeared to do during the growth phase.

Case Study: SunEdison

SunEdison serves as a case study to illustrate two points: 1) how the governance structure of yieldcos can lead to conflicts of interest between investors and parent companies, and 2) the effect of these conflicts on investor sentiment.

SunEdison was one of the largest renewable energy developers in the past 5 years, with a market cap of $9.4 bn (July 2015). In order to finance its development, SunEdison (like many similar companies) created two yieldcos: TerraForm Power in July 2014 and TerraForm Global in

summer 2015. Following a typical yieldco structure, the yieldcos had a separate Board of Directors than SunEdison with many directors also occupying senior executive positions at SunEdison. Though technically permissible, inherent conflicts of interest between these joint board members/SunEdison executives began to surface when SunEdison decided to acquire Vivint Solar. On July 20, 2015 SunEdison announced its intent to purchase Vivint solar, a residential solar company, for $2.2 billion. SunEdison’s stock crashed immediately (July 20: $32, July 23: $26. A drop of 18.75% in 3 days. Aug 7: $15. A drop of 47% in 3 weeks) as many analysts and investors questioned the high valuation that SunEdison was paying for Vivint as well as the dramatic shift it represented in SunEdison’s business plan towards including residential solar rather than focusing on utility scale renewable assets. The deal was financed by a concurrent purchase agreement with their yieldco, TerraForm Power, to purchase all the assets for $922 million. This was seen as a mechanism that allowed SunEdison to finance the acquisition using TerraForm Power’s capital instead of SunEdison’s. Questions were raised about SunEdison’s ability to acquire Vivint without access to its yieldco’s capital and whether that increased the riskiness of the purchase. In other words, yieldco shareholders were holding the risk of the parent company’s acquisition, when one of the primary benefits of investing in a yieldco was to shield your investment from the riskier parts of the parent company’s business.

Rampant speculation about the valuation of Vivint and its assets increased in November 2015 when SunEdison rearranged members of TerraForm Power’s board, allegedly to force a positive vote on buying Vivint’s assets from SunEdison at an inflated price. In January 2016, activist investor David Tepper (with 9.5% stake in TerraForm power) brought suit against 3 Board members who were also SunEdison senior executives: Ahmad Chatila, Martin Truong, and Brian Wuebbels for “participat[ing] in the plan to misappropriate Terraform's assets.” Because asset purchase prices are not transparent to investors or analysts, yieldco investors must trust that the Board is paying the correct price for acquisitions with their decisions influenced by returning dividends to shareholders instead of subsidizing the parent company’s financial health. This event in particular caused shareholders of all yieldcos to question whether any yieldco’s boards were immune from this conflict of interest and if any transparency measures were in place for investors to hold their boards accountable.

On April 21, 2016, SunEdison filed for bankruptcy, validating yieldco investor’s worries that SunEdison had used their capital to finance an untenable acquisition and reversing the previous view that the parent companies were the stable partners in the sponsor-yieldco relationship.

47 "The complaint detailed accusations of behind-the-scenes boardroom maneuvers in November as SunEdison raced to find $100 million to avoid defaulting on a margin loan, secured by the company's stock in TerraForm Power. If SunEdison defaulted on the loan, it would have caused a cross-default on $8 billion in SunEdison debt, according to the lawsuit. On Nov. 18, the independent board members of TerraForm Global refused a proposed deals with SunEdison, partly because SunEdison declined to reduce its control over the yieldco."
V. Conclusions & Potential YieldCo Solutions

Project Valuation

Because of inherent conflicts of interest in board membership and recent litigation between SunEdison and TerraForm Power, YieldCos should increase transparency around project valuation. To increase investor confidence in project valuations, YieldCos could use two methods: 1) provide valuation numbers and overall methodologies for individual project acquisitions, or 2) hire third party entities (such as investment banks) to negotiate individual project valuations between the YieldCo and parent. Although providing acquisition prices and methodologies would provide the most transparency to investors, public dissemination of this information could reduce the competitive advantage of either the YieldCo or parent company. Therefore, using third parties to negotiate prices could provide the same incentives for a fair price without leaking sensitive company information, as is currently the practice for MLPs.

We recommend a change in valuation methodology for project acquisitions from a cash-on-cash returns based model, to a net present value metric, including sensitivity analysis. By changing methodologies and improving transparency into the valuation process, YieldCos can increase investor confidence, helping to stabilize their position in the market.

There are multiple benefits to using an NPV model. Valuations using NPV are able to capture many of the inputs and assumptions that cash return valuations lack, such as the time value of money, inflation rates, project life, degradation, and depreciation. NPV assessments also account for project and YieldCo leverage; CAFD models are only the after-tax internal rate of return, and can either be levered or unlevered. YieldCos will occasionally lever projects and by providing scenario analysis to show sensitivity to the unknowns, investors will have greater insight into the

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true project value.

Uncertainties regarding investment and Renewable Tax Credits also come into play. When the Omnibus Appropriations Act was approved in late 2015, it extended the credits for all projects completed by 2023.\textsuperscript{49} If the tax credits end at that time, sponsors will have a higher tax burden and as a result, YieldCo growth will suffer.

In their presentation on the future of YieldCos published in November 2015, Marathon Capital suggests a multi-scenario analysis that would provide a better understanding of assumption impact on valuation.\textsuperscript{47} Their recommendation, which we believe to be a strong improvement over current methods and aligns with many of our proposals, requires YieldCos to evaluate projects at a range of discount rates and terminal value assumptions post-PPA. Firm-specific variables like project leverage would be captured by providing a range of discount rates.

Expected revenue impact from additional project-specific factors, such as location, solar radiance, and efficiency decline, would be somewhat mitigated in an NPV, though to improve transparency we recommend YieldCos consider making this information available to investors.

Incentive Distribution Rights

IDRs can greatly suppress YieldCo growth, and as such fully removing these agreements would be the best solution for investors and the YieldCo. This would remove the burden of unsustainable yield growth, and improve liquidity for the YieldCo. Sponsors already receive stated distributions from their YieldCos, and additional cash inflow from IDRs is often distributed to their investors via dividend increases or a special dividend. Removing IDRs would lessen this asymmetrical relationship between the sponsor and YieldCo.

Though removal of IDRs is best for YieldCo investors, we understand the implications on the project pipeline for the YieldCo. In instances where full removal is unattainable or undesirable, reductions in the payout ratios and extensions on when the IDRs go into effect would still be beneficial.

Corporate Governance

Increased transparency between YieldCos and their shareholders will prove critical to the future viability of the YieldCo model. Sponsor interests and YieldCo interests are often in sync, however this is not always true. In the case of SunEdison, the board of representatives for Terraform Power was essentially replaced by SunEdison executives, allegedly to ensure the "drop-down" of recently acquired assets whose costs needed to be recouped. By maintaining a board of directors that is independent from their Sponsor, YieldCos can assuage investor concerns that the

execution of their growth strategy is heavily influenced by the whims of their Sponsor. Improved transparency into asset sourcing and decision making by the board will also be a critical as YieldCos seek out accretive acquisitions and satisfy their fiduciary duty to YieldCo shareholders.

The interconnectedness of Sponsor and YieldCo, including IDR’s and the notion of “recycled capital,” inevitably creates a potential for interest conflicts. However, ensuring autonomy in the decision making ability by YieldCo boards of directors, independent of their sponsors, will serve to benefit the future viability of YieldCos in at least two ways. First, it will allow for YieldCo’s to select drop-down assets from their sponsor only if they are deemed to be accretive, properly priced acquisitions. As such, the YieldCo can maintain a relatively low cost of capital, reducing risk by selecting and building an optimal portfolio of assets. This will safeguard their value proposition of steadily increasing cash distributions and growth. Secondly, maintaining a scrutinizing YieldCo board will dissuade Sponsors from irresponsible growth strategies (such as SunEdison’s profligate acquisition spree leading up to their bankruptcy). Sponsors may be less inclined to overleverage themselves if the safety net of YieldCo is removed. Sponsors will thus develop more sustainable growth strategies that do not hinge on being subsidized for reckless purchases by their YieldCo.

“End Game” Clarification

Aligning long term outlook between YieldCos, Sponsors, and Investors is also an area with room for improvement. For instance, clarification around long-term growth strategy would be useful to investors concerned about the viability of perpetual, and rapid dividend/earnings growth. One burning question is what happens as YieldCo assets begin to age and are retired? How will this affect growth? Is the YieldCo designed to grow into perpetuity, or is there a point when the Sponsor purchases the aging assets of the YieldCo and re-starts the cycle from scratch? Clarification on what happens into the far future should provide insight to investors seeking long-term, stable cash flows, and align management, market analysts, and shareholders on how these vehicles will function over the course of decades.

Project Takeaways

Our initial research question addressed whether or not YieldCos are a viable long-term financing structure in the wake of a dramatic decline in market value across the entire YieldCo market during the Summer of 2015. The team sought to understand what factors caused the YieldCo market collapse, and whether the collapse was indicative of a fundamental flaw in the YieldCo model or was the result of a confluence of negative macroeconomic and idiosyncratic events that served to correct the market perception and pricing of these financial vehicles.

Through comprehensive and robust research methodology, it was determined that investors left the YieldCo market as part of a larger energy sector exit. Several YieldCos failed to deliver on lofty growth expectations, and adverse company specific events evoked alarm surrounding newly identified risk factors.
As such, it was ascertained that the YieldCo model is not inherently flawed, and is viable for long-term investment. A re-pricing event during the Summer of 2015 level-set a new market, while idiosyncratic risks were priced in through Spring of 2016. We now consider investors to be more informed and the market accurately priced. To further improve the long-term viability of YieldCos to effectively finance renewable energy development, corporate governance, valuation methodology and “end game” clarification will need to be explicitly communicated and marketed to investors.
Appendix

Company Profiles

8point3 Energy Partners LP

Named after the amount of time it takes sunlight to reach the Earth from the Sun – 8.3 minutes - 8point3 Energy Partners LP (together with its subsidiaries, the “Partnership”) is a wholly-owned subsidiary YieldCo of 8point3 Holding Company, and is a limited partnership between First Solar and SunPower (the Sponsors). The YieldCo focuses on acquiring solar energy generation projects developed by the Sponsors and operating under the 8point3 Operating Company, LLC (the “OpCo”). A majority of the projects include residential solar, on-site generation facilities for school districts and retail partners, and utility-scale solar assets, with the initial 432 MW portfolio located entirely in the United States.

The Partnership’s initial public offering was completed on June 23, 2015, trading on the NASDAQ under “CAFD”, with 20M Class A common shares issued to the public as of August 2016, and 51M Class B shares issued and outstanding to the Sponsors50. SunPower and First Solar together own approximately a 72% non-controlling LLC interest in the OpCo, while the Partnership owns a controlling non-economic managing member interest and a 28% limited liability company interest in the OpCo. Though it is technically a partnership under state law, the YieldCo is treated as a corporation for tax purposes, with federal income taxes expected to be insignificant for the first 10 years post-IPO.

8point3 pays a quarterly dividend, and at IPO, the expected yield was 4.2%, falling in the midpoint of the offering range compared with other YieldCos. The Partnership recently announced a projected increase of 3.5% for Q3 2016.

The Executive management team is comprised of a mix of executives from SunPower and First Solar, who serve dual roles between the General Partner and the Sponsors. Current CEO, Charles “Chuck” Boynton also serves as the Chairman of the Board for 8point3, as well as Executive Vice President and CFO of SunPower. The YieldCo is not required to have a majority independent board, though the General Partner is required to have an audit committee of at least three independent individuals. Shareholder approval is not required to appoint directors or issue equity. The Sponsors have a ROFO agreement with 8point3 that grants 8point3 the right to first offer on certain projects Sponsors currently own.

50 8point3 Quarterly 10-Q SEC Filing. 8point3EnergyPartnersLP. (2016).
Recently offered 7MM common shares for purchase at the price of $14.65 per Class A share, expecting total gross proceeds of $102.6MM. This would be used to fund a portion of the purchase price of the “Henrietta Acquisition,” a 102 MW solar PV generating facility in Kings County, California. If successful, 8point3 would have a 49% ownership of the project.
TerraForm Power
From: Thomson Reuters

"Neither TF Power nor TF Global are part of SunEdison’s bankruptcy filings, and do not plan to file for bankruptcy themselves. Separate legal entity from SunEdison, and both are traded on NASDAQ. Comprises 2.987MW of generation power worldwide in its portfolio, split between wind and solar. Their Board of Directors is comprised of both independent directors as well as individuals who serve on the board while maintaining roles at SunEdison. SunEdison is the TerraForm sponsor, developing and acquiring assets which are then owned and operated by one or more TerraForm company."

Atlantica Yield plc.
From: Thomson Reuters

"Atlantica Yield plc, formerly Abengoa Yield plc, incorporated on December 17, 2013, is a total return company. The Company owns, manages, and acquires renewable energy, conventional power, electric transmission lines and water assets, focused on North America (the United States and Mexico), South America (Peru, Chile, Brazil and Uruguay) and Europe, Middle East and Africa (Spain, Algeria and South Africa). The Company's segments include North America, South America and EMEA. The Company operates in business sectors, including renewable energy, conventional power, electric transmission lines and water. As of December 31, 2016, the Company owned or had interests in 21 assets, comprising 1,442 megawatt (MW) of renewable energy generation, 300 MW of conventional power generation, 1,099 miles of electric transmission lines, as well

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as an exchangeable preferred equity investment in Abengoa Concessoes Brasil Holding S.A. (ACBH).

The renewable energy sector includes the Company's activities related to the production electricity from solar power and wind plants. As of December 31, 2016, the Company's renewable energy assets included two solar plants in the United States, Solana and Mojave, each with a gross capacity of 280 MW and located in Arizona and California, respectively. As of December 31, 2016, the Company owned eight solar platforms in Spain, including Solacor 1 and 2 with a gross capacity of 100 MW; PS10 and PS20 with a gross capacity of 31 MW; Solaben 2 and 3 with a gross capacity of 100 MW; Helioenergy 1 and 2 with a gross capacity of 100 MW; Solnova 1, 3 and 4 with a gross capacity of 150 MW; Solaben 1 and 6 with a gross capacity of 100 MW, and Seville PV with a gross capacity of 1 MW. As of December 31, 2016, the Company also owned a solar plant in South Africa, Kaxu with a gross capacity of 100 MW. As of December 31, 2016, additionally, the Company owned two wind farms in Uruguay, Palmatir and Cadonal, with a gross capacity of 50 MW each.\(^{52}\)

Missed dividend growth targets in the Summer of 2015 was one of the red flags that preceded the decline in Atlantica's stock price.

Nextera Energy Partners, LP
From: Thomson Reuters

“Nextera Energy Partners, LP, incorporated on March 6, 2014, is a limited partnership formed to acquire, manage and own contracted clean energy projects. The Company, through its limited partnership interest in NextEra Energy Operating Partners, LP (NEP OpCo), owns a portfolio of contracted renewable generation assets consisting of wind and solar projects, as well as contracted natural gas pipeline assets. The Company's primary business objective is to invest in contracted clean energy projects.

As of December 31, 2016, the Company's project portfolio of clean, contracted renewable energy assets (initial portfolio) included approximately 989 megawatts (MW) of wind and solar energy generating facilities located in the United States and Canada. The Company is a subsidiary of NextEra Energy, Inc., which is a clean energy company. As of December 31, 2016, the Company's portfolio included Genesis, Northern Colorado, Tuscola Bay, Elk City, Perrin Ranch, Bluewater, Moore, Sombra, Shafter, Palo Duro, Stateline, Mammoth Plains, Jericho, Cedar Bluff Wind and Golden Hills Wind”.

NRG Yield, Inc.
From: Thomson Reuters

“NRG Yield, Inc., incorporated on December 20, 2012, is a holding company. The Company's segments include Conventional Generation, Renewables, Thermal and Corporate. The Company's businesses are segregated based on conventional power generation, renewable businesses, which consist of solar and wind, and the thermal and chilled water business. The Company holds interest in Alta Wind Asset Management Holdings, LLC, Alta Wind Company, LLC, Alta Wind X Holding Company, LLC and Alta Wind XI Holding Company, LLC. As of December 31, 2016, these collectively owned seven wind facilities that totaled 947 megawatts (MW) located in Tehachapi, California, and a portfolio of associated land leases (the Alta Wind Portfolio).

The Company owns a diversified portfolio of contracted renewable and conventional generation, and thermal infrastructure assets in the United States. As of December 31, 2016, the Company's contracted renewable and conventional generation portfolio represented 4,563 net MW. As of December 31, 2016, the Company also owned thermal infrastructure assets with an aggregate steam and chilled water capacity of 1,319 net megawatt thermal (MWT) and electric generation capacity of 123 net MW. These thermal infrastructure assets provide steam, hot water and/or chilled water, and in some instances electricity, to commercial businesses, universities, hospitals and governmental units in multiple locations.

The Company's operating assets consists of the projects in the areas, including conventional, utility scale solar, distributed solar, wind and thermal. The conventional projects include Walnut Creek, GenConn Middletown, GenConn Devon, Marsh Landing and El Segundo. The utility scale solar projects include Alpine, Avenal, Avra Valley, Blythe, Borrego, Roadrunner, CVSR, Desert Sunlight 250, Desert Sunlight 300, Kansas South, Roadrunner and TA High Desert. The Company's distributed solar projects include AZ DG Solar Projects and PFMG DG Solar Projects. Its wind projects include Alta I, Alta II, Alta III, Alta IV, Alta V, Alta VI, Buffalo Bear, Crosswinds, Elbow Creek, Elkhorn Ridge, Forward, Goat Wind, Hardin, Laredo Ridge, Lookout, Odin, Pinnacle, San Juan Mesa, Sleeping Bear, South Trent, Spanish Fork, Spring Canyon II, Spring Canyon III, Taloga and Wildorado. The thermal assets comprise district energy systems and combined heat and power plants that produce steam, hot water and/or chilled water and in some instances, electricity at a central plant. The thermal projects include Dover, Paxton Creek Cogen, Princeton Hospital, Tucson Convention Center and University of Bridgeport.”

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TransAlta Renewables, Inc.
From: Thomson Reuters

“TransAlta Renewables Inc is a Canada-based company engaged in developing, owning and operating renewable power generation facilities. The Company owns and operates over 10 hydro facilities and approximately 20 wind farms in Western and Eastern Canada with a total installed capacity of approximately 1,140 megawatts (MW) and holds economic interest in approximately 140 MW Wyoming Wind Farm and approximately 420 MW Australian gas-fired generation assets, as well as over 270 kilometers gas pipeline. The Company also owns economic interests in Sarnia cogeneration plant, Le Nordais wind farm and Ragged Chute hydro facility totaling approximately 610 MW of contracted power generation assets located in Ontario and Quebec. The Company's subsidiaries include Canadian Hydro Developers, Inc. and Western Sustainable Power Inc.”

Important to note here, TransAlta was one of the few YieldCos who maintained relative stability throughout the YieldCo crash. A distinguishing factor of TransAlta Renewables was their modest growth targets were met on a far more consistent basis compared to their peers\(^6\).

**Terraform Global, Inc.**  
*From: Thomson Reuters*

“TerraForm Global, Inc., incorporated on September 12, 2014, is a holding company. The Company is a diversified renewable energy company that owns contracted solar and wind power plants. The Company operates through two segments: Solar Energy and Wind Energy. The segments include the Company’s entire portfolio of power plants. The Company’s portfolio consisted of solar and wind power plants located in Brazil, China, India, Malaysia, South Africa, Thailand and Uruguay with an aggregate net capacity of 916.4 megawatts (MW) as of October 31, 2016. The Company’s solar and wind power plants include Salvador, Bahia, Dunhuang, Honiton, NSM 24, Focal, NSM Suryalabh, NSM Sitara, NSM L’Volta, Millenium, Brakes, Raj 5, ESP Urja, Azure, Hanumanhatti, Gadag, Bhakrani, Silverstar Pavilion, Fortune 11, Corporate Season, Boshof, Witkop, Soutpan and PP Solar”.\(^7\)

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Pattern Energy Group, Inc.
From: Thomson Reuters

“Pattern Energy Group Inc. (Pattern Energy), incorporated on October 2, 2012, is an independent power company focused on owning and operating power projects. The Company holds interests in over 18 wind power projects located in the United States, Canada and Chile with total capacity of over 2,644 megawatts (MW). Each of its projects has contracted to sell its output pursuant to a power sale agreement. The Company sells its electricity and environmental attributes, including renewable energy credits (RECs), to local utilities under long-term and fixed-price power purchase agreements (PPAs). The Company’s operating projects are Gulf Wind, Texas; Hatchet Ridge, California; St. Joseph, Manitoba; Spring Valley, Nevada; Santa Isabel, Puerto Rico; Ocotillo, California; South Kent, Ontario; El Arrayan, Chile; Panhandle 1, Texas; Panhandle 2, Texas; Grand, Ontario; Post Rock, Kansas; Lost Creek, Missouri; K2, Ontario; Logan’s Gap, Texas, Amazon Wind Farm Fowler Ridge, Indiana, and Armow Wind power facility in Ontario, Canada.”
