

# **The Evolution of the YieldCo Structure in the United States**

Mauricio Franco Mitidieri

New York University, Leonard N. Stern School of Business

Glucksman Institute for Research in Securities Markets

Faculty Advisor: Frank Fabozzi

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## Abstract

YieldCos were designed in the early 2010s as a new financial vehicle that owns and operates fully built and operational power generating projects. The structure was intended to create a dividend-focused company making this vehicle potentially more attractive to risk-averse retail investors as well as institutional investors. The initial market reception to YieldCos was favorable with the market capitalization of seven YieldCos reaching \$17.8 billion by mid-2015. But almost as quickly following the bankruptcy of Sun Edison, a major renewable energy developer, the YieldCo market collapsed with market capitalization falling by more than half in just seven months. Today, essentially all the YieldCos have been acquired by institutional investors or private equity firms and are no longer publicly listed.

The purpose of this paper is to analyze the boom and bust cycle that enveloped the YieldCo market within the span of a decade. In many respects, the YieldCo market has followed a typical business learning curve with its introduction followed by a period of market hype, then bust, followed by restructuring and now a maturing sector. Overall, we conclude the YieldCo structure itself remains a viable mechanism for funding renewable energy projects. However, the future of the YieldCo structure will require a better governance relationship between the sponsor and the YieldCo as well as better alignment of long-term growth expectations.

## **1. Introduction**

Financing renewable energy projects is key to the challenge of fighting adverse climate change in the long run. The participation of large institutional investors in the space has been limited (Donovan, 2018). Institutional investors prefer investments that have a proven track record of stability and success, generating competitive risk-adjusted returns. To accomplish this, large renewable energy developers created the YieldCo. This is a company that is similar to the Master Limited Partnerships (MLP) structure used in the oil and gas industry and to the real estate investment trusts (REITs) used in the real estate industry. YieldCos were designed to be a vehicle that owns and operates fully built and operational power generating projects in a dividend-focused company, making this vehicle potentially more attractive to risk-averse retail investors as well as institutional investors.

Since the initial offering of the US-based YieldCos during the early 2010s, their aggregate market cap exceeded \$17.8 billion by mid-2015 – a time period referred to as the vehicle’s “boom” for YieldCos. However, YieldCos quickly lost up to 56% of their valuation after mid-2015, reaching a lower end market cap of \$7.8 billion just seven months later on February 11, 2016. This decline in YieldCo valuations came in the wake of the bankruptcy of SunEdison (SUNE), the developer and sponsor connected to two large YieldCos, TerraForm Power and TerraForm Global.

The objective of this paper is to analyze the evolution of the US-based YieldCos in order to understand and isolate possible causes for the crash of the US YieldCo valuations since mid-2015 and into 2016. Our analysis may allow us to identify success factors that could make the YieldCo vehicle a more sustainable and viable way to attract investor capital for financing of renewable energy projects.

The structure of this paper is as follows. Section 2 provides a definition of a YieldCo and the usual structure of this vehicle. The companies that are analyzed in this study are described in Section 3, along with the data that will be analyzed. Section 4 focuses on the early development of the vehicle until the peaking valuations by mid-2015. Section 5 then focuses on identifying the causes for the market crash, and the subsequent bankruptcy or restructuring of many US-based YieldCos. The current status of the market and the lessons learned from the historical performance of YieldCos are the focus of Section 6. Section 7 summarizes the findings and offers recommendations for the future of YieldCos.

## **2. Definition of a YieldCo**

Before discussing YieldCos and their challenges, it is important to define the concept of a YieldCo. It is also important to distinguish YieldCos from the broader pool of renewable energy companies that may have similarities with YieldCos in the types of assets they hold but are not comparable from a capital structure standpoint.

The principle behind YieldCos is straightforward. They are usually partially owned subsidiaries of larger energy companies, the sponsors, designed to hold only operational projects that were developed by the parent company (or by other developers, but usually the main source of projects is the parent company). The idea behind this is that large, integrated energy companies have multiple sources of revenues, returns, and risks. A YieldCo isolates the operational and long-term contracted renewable energy assets, reducing the risk profile.

The structure is made to benefit both the developer and the newly created company. The developer, a large energy company, when selling assets to the newly created company is able to anticipate the assets' future cash flows, thereby allowing the energy company to free up capital. The capital is then invested in other assets and can be utilized to develop other renewable energy

projects. The newly created YieldCo benefits by having access, via the public markets, to institutional investors who have a reduced appetite for risk. This allows them to offer competitive pricing in buying the developed projects, while keeping their new investor base satisfied. Figure 1 illustrates this.

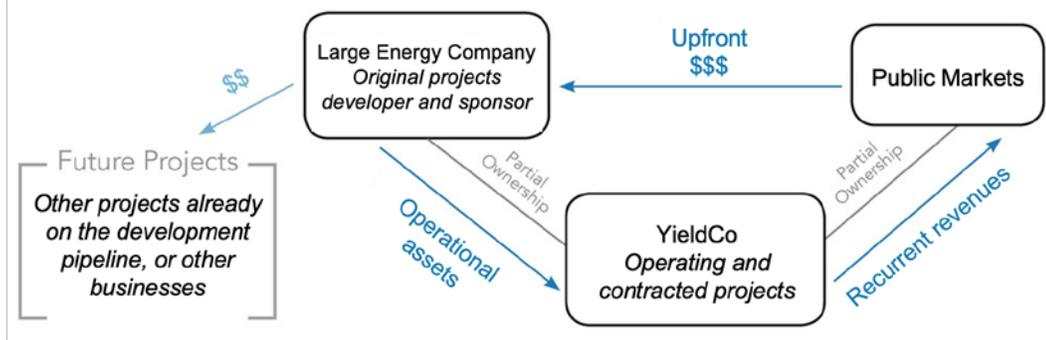


Figure 1 - Generic YieldCo structure. Adapted from McCraw (2014)

The YieldCo vehicle can best be described as a publicly traded company, usually structured as a limited liability corporation, which holds a portfolio of renewable energy assets, usually with a highly contracted and predictable cash flow, with very good credit at the offtakers side. Those long-term, contracted aspects of the YieldCo portfolios make them similar to other financing vehicles used in the energy and infrastructure industries, such as MLPs and REITs. Moreover, YieldCos provide a structure with which institutional investor are more comfortable to invest.

In order to illustrate these attributes of a YieldCo, we'll use an example: Next Era Partners (NEP). As shown in Figure 1, NextEra Energy (NEE) is the larger, integrated energy company. While NEE has a myriad of business lines, like utility companies, natural gas pipelines and generation assets, NEE's management decided to create NEP in order to hold the already operational and contracted renewable energy projects that the company has sponsored. This way, NEE can sell the projects to NEP, benefiting all the parties involved in the transaction as follows. NEE benefits in the sense it has the cash upfront for the risk it undertook while developing the

projects and can deploy the proceeds received from institutional investors with a lower cost of capital to invest in new projects. From the perspective of NEP, the entity is designed to buy de-risked projects like the operational assets it buys from NEE. Finally, investors in the public markets that aren't usually attracted to the risk profile of NEE can invest in NEP because of its perceived lower risk profile.

Conceptually, the idea of concentrating a pool of contracted, stable and “safe” assets in a firm allows access to investing in renewable energy for a pool of investors that could not be attracted before. For example, institutional investors were for years reluctant to invest in standalone renewable energy projects because of certain risks such as the illiquidity associated with standalone assets. In this sense, the idea of pooling highly stable projects was to allow a lower cost of capital to flow to those projects. Looking at the risk profile of YieldCos, if all the returns and pricing were based solely on the contracted cash flows, YieldCos actually resemble a fixed income asset – their dividends and returns are calculated against a stable, liquid, and predictable cash flow. That would allow for lower cost funding by institutional investors to tap into the renewable energy market in a structured way, especially in a low interest rate environment.

Moreover, since almost all US-based YieldCos are connected to a large power developer, there is a value proposition on the right of first offer (ROFO) offered to the YieldCos. In theory, since YieldCos are subsidiaries of large independent power producers (IPPs) and developers, they have a privileged access to a continuous pipeline of development projects.

Conceptually, this could prove beneficial to the YieldCo, since the company would have access to the development pipeline of their sponsors. That could sustain the dividend payouts and growth. More than that, the fact that the YieldCos have access to low cost of capital because of their characteristics, allows the sponsors to attractively sell those projects in a win-win situation.

Because of the ROFO and the participation of the sponsors, the corporate governance of YieldCos is somewhat unusual. A typical YieldCo structure mostly has class A and class B shares as it is shown in Figure 2. The idea is that the IPP/sponsor has voting control of the YieldCo, although it does not hold necessarily have an economic interest. All or most of the economic interest is held by the class B shares, that are publicly traded. Recently, though, this structure has been changed, and YieldCos like Pattern Energy (PEGI) only have the class A shares.

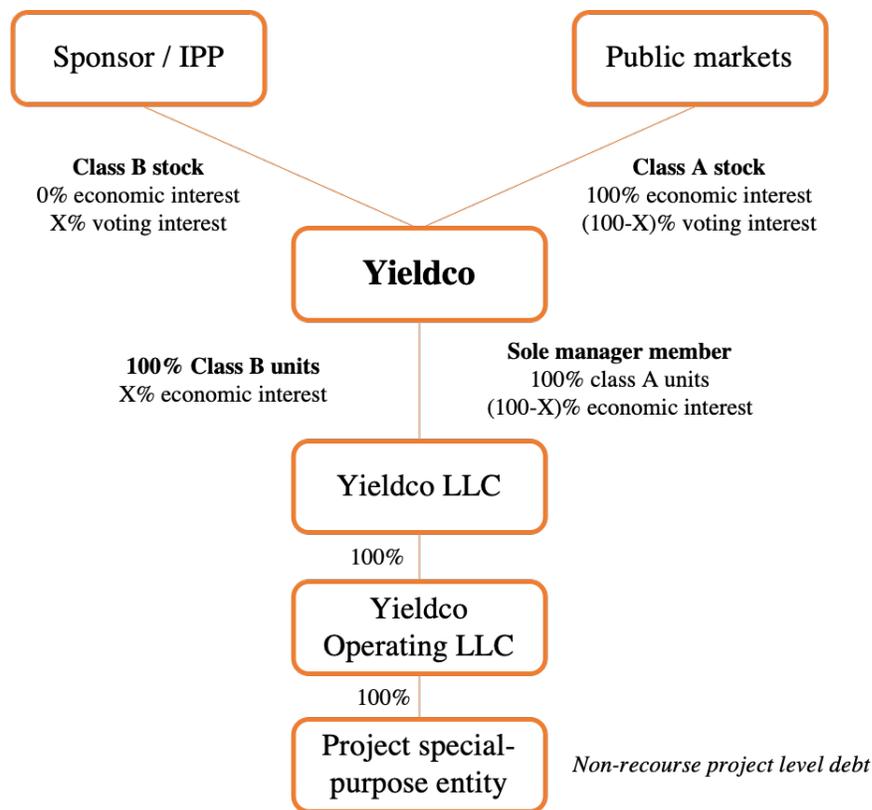


Figure 2 - Yieldco Corporate Governance structure - example. Adapted from Chirusa *et al.* (2018).

There is an important distinction to be made between YieldCos and other renewable energy players. While YieldCos are designed to be low-risk, “fixed-income-like” assets, with a lower cost of capital, pure renewable energy players, that include the development and construction phase projects, are perceived as riskier businesses. Solar panel producers, for example, have equity betas

of around 2 (Hajarnis *et. al*, 2015) because there is still uncertainty about the technology involved, and there is a major risk associated with uncontracted projects and construction costs.

In summary, the YieldCo is the vehicle and structure that emerged as a solution to attract low-cost capital from institutional investors to flow into renewable energy projects. The idea is to concentrate operating renewable energy assets in a structure with a stated purpose to distribute the vast majority of its available cash flows to shareholders. It is distinct from broader renewable energy companies in the sense that the operating and fully long-term contracted aspects of its cash flows make YieldCos appeal to lower risk capital sources.

### **3. YieldCos studied and data**

In order to analyze the YieldCo structure, it is necessary to identify the companies that fit the description of a YieldCo. Those exchange-listed companies in the US that listed between 2013 and 2015 had similar structures. The companies were all subsidiaries of large renewable energy and vertically integrated power companies that concentrated the operating and contracted portfolio of projects of their parent companies. Looking at sponsors, it's easy to identify large IPPs (like NRG), integrated power players like NextEra and Abengoa, renewable energy developers such as SunEdison and Pattern, and even solar panel producers with development arms, like First Solar and SunPower. The first listed company was NRG Yield, currently named Clearway Energy, and then all the others followed soon after. Those are the only seven companies that fit the description laid out for YieldCos, and, thus, comprise the whole sample of YieldCos in the US. Table 1 summarizes the information for the companies.

Table 1 – US based YieldCos

<b>Company Name</b>	<b>Ticker</b>	<b>Parent Company</b>	<b>Listing date</b>
<b>Clearway Energy</b>	CWEN (former NRG Yield)	NRG	Jul 22, 2013
<b>Pattern Energy Group</b>	PEGI	Pattern Developments	Sep 27, 2013
<b>Abengoa Yield</b>	AY (former ABY Abengoa)	Abengoa	Jun 12, 2014
<b>NextEra Energy Partners</b>	NEP	NextEra	Jun 27, 2014
<b>TerraForm Power</b>	TERP	SunEdison	Jul 17, 2014
<b>8point3 Energy</b>	CAFD	First Solar / SunPower	Jun 18, 2015
<b>TerraForm Global</b>	GLBL	SunEdison	Jul 30, 2015

Another stock that is deeply entwined with the evolution of the YieldCo market is the stock of SunEdison. Trading with the stock ticker SUNE, this company was a large developer of solar projects and a solar panel manufacturer that released its two YieldCos in the market in 2014 and 2015. It subsequently filed for bankruptcy and Chapter 11 protection in 2016.

The analysis of the YieldCo stocks will be mainly based on the stocks historical closing prices between 2013 and 2019 and consider other data: listing and de-listing dates, dividends paid, and market capitalization. Besides that, it is important to analyze some qualitative data, comprising but not limited to market reports, news pieces, and IPO prospectus.

#### **4. Listing and initial development of YieldCos – the YieldCo “boom”**

From July 2013 to June 2015, the seven analyzed YieldCos were exchange listed. The structure was well received by the investors. Those companies raised over \$3.5 billion in their initial public listings, and parents, like SunEdison and NRG, had their YieldCos very well received by the

current investor base and by new investors (Nicolas, 2015). Table 2 below shows the IPO pricing ranges announced prior to the IPO, dates, and final pricing of YieldCos. The data indicate that the IPOs were priced on the higher end of the range (or even above). The first listings were all priced above the range, again corroborating the thesis that they were well received by the market.

Table 2 – US based YieldCos IPO ranges

<b>Ticker</b>	<b>Bottom of range<sup>1</sup></b>	<b>Top of range</b>	<b>Actual IPO pricing</b>	<b>% of top of range</b>
<b>CWEN</b>	\$19.00	\$21.00	\$22.00	105%
<b>PEGI</b>	\$19.00	\$21.00	\$22.00	105%
<b>AY</b>	\$25.00	\$27.00	\$29.00	107%
<b>NEP</b>	\$23.00	\$25.00	\$25.00	100%
<b>TERP</b>	\$23.00	\$25.00	\$25.00	100%
<b>CAFD</b>	\$19.00	\$21.00	\$21.00	100%
<b>GLBL</b>	\$19.00	\$21.00	\$15.00	71%

Table 3 highlights some key aspects of the initial returns shown by the YieldCo stocks. The median 60-day return (the return for the first 60 days the stock was traded) for the listings is 8.75%. Focusing on the companies that were listed in 2013 and 2014, it can be seen that the 60-day average return of the stock prices amounts to 20.29%. The 2013 and 2014 listings are highlighted because the 2015 listings already felt the effect of the YieldCo bubble burst, as will be discussed in the next section. Again, the data on the IPOs highlights the good reception the listings had from the overall markets. It's interesting to note that not only the timeframe of the listings similar, but, all

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<sup>1</sup> Source for ranges: Renaissance Capital (2013), Streetinsider (2013), Reuters (2014), Streetinsider (2014), De La Merced, M. J. (2014), Renaissance Capital (2015), Pan, J. (2015).

seven companies hit historical peak valuations in a very short timeline. That is, all those companies hit a historical high between July 2014 and June 2015. Moreover, only NEP has, until the end of 2019, returned to higher pricing than those historical highs from 2014-2015.

Table 3 – US based YieldCos historical highs and 60-day returns after IPO

<b>Ticker</b>	<b>IPO pricing</b>	<b>Historical high / % above IPO price</b>	<b>Date of high</b>	<b>60-day returns</b>	<b>60-day returns S&amp;P500</b>
<b>CWEN</b>	\$22.00	\$55.15 <sup>2</sup> / 151%	1/26/2015	35.82%	0.05%
<b>PEGI</b>	\$22.00	\$34.19 / 55.4%	7/22/2014	7.48%	6.55%
<b>AY</b>	\$29.00	\$40.38 / 39.2%	7/16/2014	21.66%	0.08%
<b>NEP</b>	\$25.00	\$53.61 / 114%	9/19/2019	8.75%	1.88%
<b>TERP</b>	\$25.00	\$42.15 / 68.6%	4/22/2015	18.92%	1.40%
<b>CAFD</b>	\$21.00	\$21.00 / 0%	6/18/2015	-25.57%	-1.40%
<b>GLBL</b>	\$15.00	\$15.00 / 0%	7/7/2015	-52.47%	-8.41%

The ease of access to the capital markets, combined with the reaction of the prices of those assets, is confirmed by a couple of reports and media stories at the time<sup>3</sup>, that reported the continued growth of the vehicle as a solution for the renewable energy financing challenge, and report the continued interest of the capital markets on the YieldCos.

The “hype” behind the new vehicle was based on the same explanations highlighted in Section 2. The theory behind the creation of YieldCos was solid, and all the parent companies were adept in highlighting this storyline so as to attract initial investors. The listings were all successful; as

<sup>2</sup> CWEN stock went through a stock a split process on May 15, 2015, when each NRG Yield stock was split into a Class A and a Class C stock for the company. Taking into account the stock split, the stock has still not come back to a pricing similar to the historical high.

<sup>3</sup> Berger, L. (2014), Hajarnis *et al.* (2015), Hans Poser Finandvice (2014), Nicolás A.L. *et al* (2015), Suits, P. *et al* (2017).

mentioned above, most of them were priced on the high end of their ranges, and the initial listings (2013 and 2014) experienced over 20% price bumps following their first two months of trading.

In summary, the initial response of the capital markets to the creation of the YieldCos was positive. IPOs were priced on the high end, the stocks showed sustained positive returns on the subsequent trading days after the initial listings, and the media response to the prospectus and listings was very optimistic. Solar energy analyst Peter Varadi even wrote that “The invention of the YieldCo is a gamechanger that will enable spectacular growth of solar PV [photovoltaic].” (Varadi, 2015)

## **5. The YieldCo “bubble” burst**

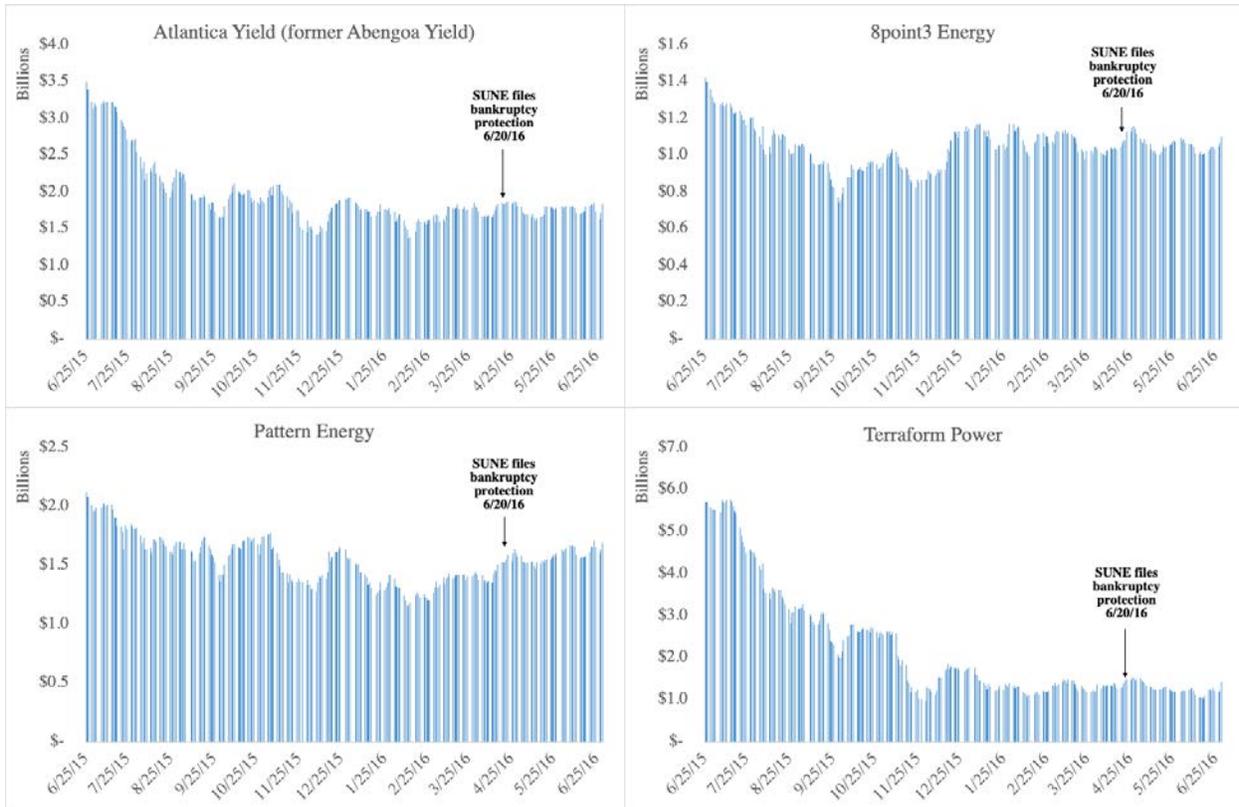
Although initially the YieldCos achieved relative success in their listings, as shown in Section 2, the YieldCo “bubble” started to crash in mid 2015. The seven companies, combined, lost over 55% of their market cap in the period between July 25, 2015 and February 11, 2016 (in the same period, the S&P index lost 9.06%). From the peak valuations of mid 2015 – when the combined market cap reached \$17.8 billion – the market went on a downward spiral that saw the combined market cap go under \$8 billion, even though the listing of GLBL happened after this. Figure 3 shows the loss in market value<sup>4</sup> for the YieldCos, in the period between the maximum combined valuation (6/25/2015) and the end of June 2016.

The YieldCo model was deemed “broken” by former executives of the companies (English, 2016) and the media reported the “bust” of the model (Konrad, 2016). There are a few crucial factors crucial to this crash of the YieldCo model as it was established in 2014-2015. Two of the

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<sup>4</sup> The outlier in the market cap in Figure 3 is NEP, and this happened because the company had two public stock offerings during the period, increasing the overall market cap, though the unit prices went down.

most relevant factors were the bankruptcy of SUNE, that filed for Chapter 11 protection in April 20, 2016, and the underlying growth in the asset portfolio that was assumed for those companies.



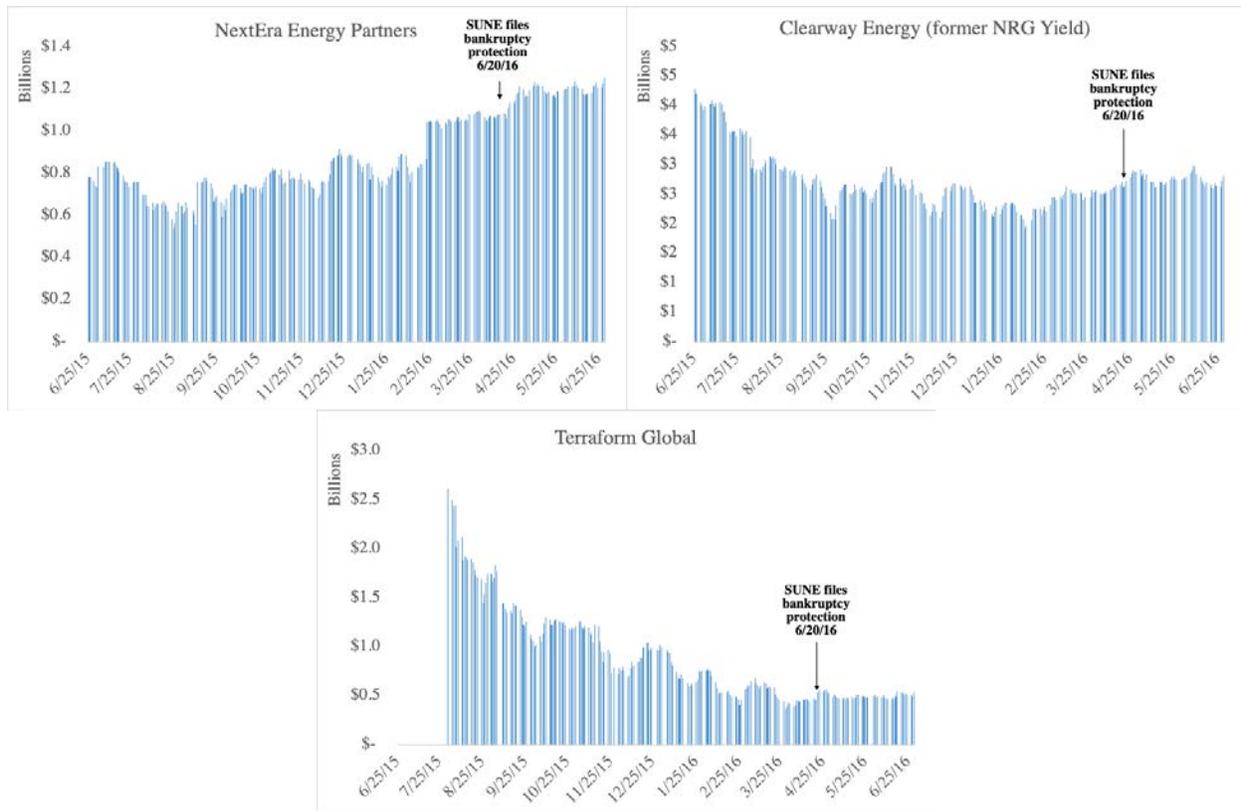


Figure 3 - Yieldco Market capitalization from 6/25/2015 to the end of June 2016

### 5.1 SunEdison bankruptcy

Monsanto Electronics Materials Company (MEMC), founded in 1959, was a silicon wafer manufacturer for the electronics industry, and entered the solar silicon wafer market<sup>5</sup> in 2006. The company quickly became a major player in the industry. In 2009, the company bought SunEdison LLC, a company that was, at the time, one of the largest solar energy services provider. This deepened the company’s footprint in the solar markets. In 2011, MEMC changed its name to SunEdison, and its stock market ticker to SUNE, showing the commitment the company had to focus in the solar power markets.

<sup>5</sup> In electronics, a wafer is a thin slice of semiconductor material, that is a base for semiconductor devices (Comprehensive Dictionary of Electrical Engineering, Philip Laplante). Silicon-based solar panels use silicon wafers as the start point for manufacturing.

After a period where the company grew through organic and inorganic approaches, SunEdison started to face trouble. From the announcement of its intent to buy Vivint Solar in March 2015, the company started to be challenged by investors, that recognized the company's aggressive debt strategy as risky.

SunEdison, as described before, was not only one of the largest solar power companies in the world, but also the sponsor for two YieldCos, Terraform Global and Terraform Power. From its peak capitalization in the summer of 2015, when SUNE was valued at over \$32/share, with a market capitalization of almost \$10 billion, the SUNE stock price plummeted to \$0.34 per share on the day the bankruptcy was announced, implying a market value of 1% of its peaking valuation.

2015 was already a challenging year for the market as a whole, and especially for vehicles like the YieldCos, that were being pressured by the fall in the oil prices. This subsequently put pressure on vehicles like energy MLPs, a structure that shared many similarities with the YieldCos, as previously described. When SUNE's share price started to crumble, the scenario for the YieldCo crisis was set. The data in Table 4 shows the correlation between the stock price of SUNE with the stock price of the YieldCos.

Table 4 – Correlation between SUNE and YieldCo stock returns between July 2015 and April 2016

<b>Ticker</b>	<b>Correlation</b>	<b>R squared</b>	<b>Significance F</b>
<b>CWEN</b>	0.8601	0.7398	1.01E-62
<b>PEGI</b>	0.8672	0.7520	6.62E-65
<b>AY</b>	0.9311	0.8670	4.73E-93
<b>NEP</b>	0.8139	0.6625	5.97E-51
<b>TERP</b>	0.9712	0.9433	1.45E-131
<b>CAFD</b>	0.4298	0.1848	7.49E-11
<b>GLBL</b>	0.9733	0.9473	4.27E-122

With the caveat of this being a simple linear correlation, there are some interesting conclusions to draw from the data, all of which are statistically significant. With the exception of CAFD, all YieldCo stocks, except for CAFD, have a high positive correlation to the SUNE stock decline in the period between July 2015 and April 2016. As expected, this effect was almost perfectly felt by the two YieldCos connected to SUNE (GLBL and TERP), but the correlation of the SunEdison meltdown to the other stocks is still notable – especially because, during the aforementioned period, the S&P500 index was practically stable.

One of the reasons behind this is the fact that, during the proposed acquisition of Vivint Solar (a \$2.2bn failed merger that was announced in July, 2015), SUNE declared it would use debt at the TERP level to fund the acquisition – going completely against the original intent of the YieldCo structure. When SUNE went in its downward spiral, a lot of pressure was put on the sponsors of the other YieldCos, and the market that was needed to keep the YieldCos growing (i.e., the additional equity) became harder to attract. In the words of NRG CEO in September 2015, “the

market for YieldCo equity investment is closed”. And the fall of SUNE was a major contributor to this pressure on the model, since it was the first time a sponsor had its model tested and crashed.

### ***5.2 Implied growth and the impact of the ROFO on the valuations***

Another issue that arose during this period about the YieldCos was the announced dividend growth objective<sup>6</sup> that the companies announced during their IPOs and subsequent investor materials. As discussed in Section 2, it is clear that, in order to grow the company and its dividends, a YieldCo had to raise more capital. And, at first, this was an easy task. The IPOs of the YieldCos raised over \$3.6 billion, and, just in the first seven months of 2015, the companies raised a total of \$8.9 billion. But in the subsequent seven months, only \$1.5 billion was raised, and, as a result, the market became concerned about the long-term sustainability of the growth model for YieldCos.

As an example of this, the prospectus of TERP mentioned (page 3) that the company was targeting a compound annual growth of its dividends of 15%. Later the company doubled this target to 30% (Windenberger, A. (2015)). This kind of aggressive growth is only viable if the companies have steady access to both the equity to fund the acquisitions and the pipeline of renewable energy project to sustain continuous growth

During the initial two quarters of 2015, the YieldCos struggled to meet their earnings targets (Johnson *et al.*, 2017) and dividend targets. With the exception of PEGI, the other six companies missed their dividend targets, prompting the investor base to have concerns about the YieldCo growth model. As noted by Tom Konrad (2016), a financial analyst from AltEnergy Stocks, “the growth model (of the YieldCos) broke because it was unsustainable”.

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<sup>6</sup> Many YieldCos, for example, Abengoa Yield, NRG Yield, Terraforma Global, describe the company as a “dividend growth-oriented company” in the IPO prospectus, highlighting the commitment that the YieldCos had with the growth targets.

Not only was the promise of continuous growth unsustainable in the long-term, that growth was dependent upon the availability of accretive acquisition projects. That is when the ROFO comes into play. The prospectus of the seven YieldCos explicitly mention that the sponsor will be able to fully supply the companies with accretive projects. For example, the NEP prospectus states (page 1):

“We intend to target a three-year annual growth rate in our cash available for distribution of 12% to 15% per common unit. This target is based on NextEra’s stated intention that it plans to offer us sufficient NEER ROFO Projects each year to produce such an increase. We believe that the acquisition opportunities associated with NEE Operating LP’s right of first offer for the NEER ROFO Projects, other NEER projects, as well as other acquisition opportunities in North America, all of which have many of the characteristics of the projects in our Initial Portfolio, will give us the opportunity to grow our cash available for distribution over time.”

It is clear that the valuations of the YieldCos included this assumption. That is, YieldCos will be able to grow continuously, fed mostly by the ROFO agreements with their sponsors, and, with that, fuel the growth. The problem is that by adding this continuous growth expectations to the YieldCo’s model, there is a fundamental change in the risk profile of the company. When markets started to question if this model was indeed possible or if the targeted dividend growth was unreasonable, the valuations dropped accordingly. A report from the Climate Policy Institute (CPI) from 2016 tried to quantify this. More specifically, the CPI estimated that the loss of confidence in the perceived sustainability of the pipeline of projects could have an impact of 20-25% on the valuation of YieldCos. CPI also estimated that by including this additional risk factor and

considering this growth as a part of the YieldCo model, the cost of equity for YieldCos could be higher by almost 200 basis points, in stark contrast to the fundamentals of the model itself.

## 6. What’s the future of the YieldCo vehicle?

In the aftermath of the crisis that the YieldCo stocks went through in 2015 and 2016, where the YieldCo stocks performed poorly relative to various index benchmarks, the sector was restructured in the following years. As shown in Table 5, the companies have shown signs of recovery and have, in some cases, even outperformed the market and the utilities benchmarks. The performance of each stock in 2018 and especially in 2019 can be considered positive, since, overall, the stocks had returns close or above the S&P benchmarks.

Table 5 – Yearly returns for YieldCos and benchmarks – 2015 to 2019

	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
<b>CWEN (former NRG Yield)</b>	-39.8%	6.6%	20.4%	-11.1%	16.0%
<b>PEGI</b>	-14.0%	1.4%	22.5%	-6.8%	50.2%
<b>AY (former Abengoa Yield)</b>	-25.6%	7.7%	14.6%	-0.7%	42.0%
<b>NEP</b>	-9.5%	-8.1%	72.5%	3.4%	30.2%
<b>TERP</b>	-55.9%	1.6%	7.8%	1.4%	43.3%
<b>CAFD (delisted on 6/19/18)</b>	-23.1%	-16.7%	23.2%	-16.8%	N/A
<b>GLBL (delisted on 12/28/17)</b>	-62.7%	-27.4%	26.9%	N/A	N/A
<b><i>Benchmark: S&amp;P500</i></b>	<i>-0.7%</i>	<i>9.5%</i>	<i>19.4%</i>	<i>-6.2%</i>	<i>28.9%</i>
<b><i>Benchmark: S&amp;P Utilities</i></b>	<i>-4.8%</i>	<i>16.3%</i>	<i>12.1%</i>	<i>4.1%</i>	<i>26.4%</i>

Of the seven studied companies, six of them went through foundational transformations after the YieldCo bubble burst:

- CAFD was acquired by Capital Dynamics and delisted from the exchange on 6/19/2018, at a unit price of \$12.48 per unit, a value under 50% of the IPO stock pricing;
- GLBL was acquired by Brookfield Renewable (BEP), that aimed to acquire the projects under GLBL portfolio on 12/28/2017, and also delisted from the stock exchange. BEP is a renewable energy company that has both the operational and development stages under the same structure, and, therefore, was not included as a YieldCo in this study;
- NRG Yield was acquired by Global Infrastructure Partners (GIP) in a deal on 8/31/2018, that saw GIP acquire not only NRG Yield but also NRG's renewable energy platform. The deal was a part of NRG's effort to focus on its core business as an IPP, and also shows the interest of private equity firms in acquiring assets like YieldCos, that can provide them with a consistent cash flow. The company then changed its name to Clearway Energy and is now traded under the ticker CWEN;
- Abengoa Yield changed its name to Atlantica Yield on January 2016, in a move to move away from the troubles with its sponsor, Abengoa. Then, in November 2018 Abengoa finished the sale of the AY assets to Canadian utility Algonquin Power & Utilities (TSX:AQN);
- TERP was partially acquired by Brookfield since 2017, when it acquired a 51 percent stake in the wake of SunEdison's bankruptcy and has increased its stake since then. As of March 16, 2020, BEP announced that it will finalize the acquisition of the 38% it does not control on TERP. This mean the stock is poised to be the next delisting of the sample of companies studied. Besides that, TERP actually sued SUNE in 2016, accusing the sponsor "of

diverting \$231 million of the company's cash to pad its balance sheet rather than to finish important projects in India". This highlights the challenges of governance in the relationship between the YieldCos and their sponsors – an issue that is a big part of the industry moving forward;

- Also as of March 16, 2020, PEGI was delisted, following its acquisition by Canadian Pension Plan Investment Board (CPPIB) an institution with multiple investments in renewable energy. This recently closed deal also shows the aforementioned trend of taking this portfolios private by private equity firms, such as CPPIB, Brookfield and Capital Dynamics.

A trend across the industry was the entrance of the institutional capital on the private equity (PE) level, through PE funds like Brookfield, Capital Dynamics, CPPIB, GIP. They bought the assets at a typical point for PE – when the assets were crashing out of a bubble. The PE funds saw the YieldCo potential in its fundamentals. The idea of a company that holds mature, long-term contracted renewable energy projects, and provides a platform for a consistent dividend flow is a great asset for the PE portfolio. Besides that, all the PE funds involved here also have assets that are involved in the development of renewable energy projects – thus making the YieldCos an even more interesting addition to their portfolios.

Overall, what was seen with the YieldCos was a somehow typical business learning curve. First, the vehicle was hyped as the new solution for renewable energy financing, and the series of IPOs followed, all with relative success in gathering equity. The vehicle showed some growth potential, and the market was welcoming. Then, with the SUNE crisis, and the better understanding of the markets about the objectives of the YieldCos, threw the YieldCos through its worst crisis,

that ended up with a big restructuring of the companies. Now, the remaining companies are more stable and more mature, and the YieldCos are still fulfilling its initial goal: to allow access of renewable energy projects to the institutional investors, through a company that holds a portfolio of operational and long-term contracted projects. Figure 5 shows a visual representation of a typical business learning curve, and how the YieldCo market phases fit into this.

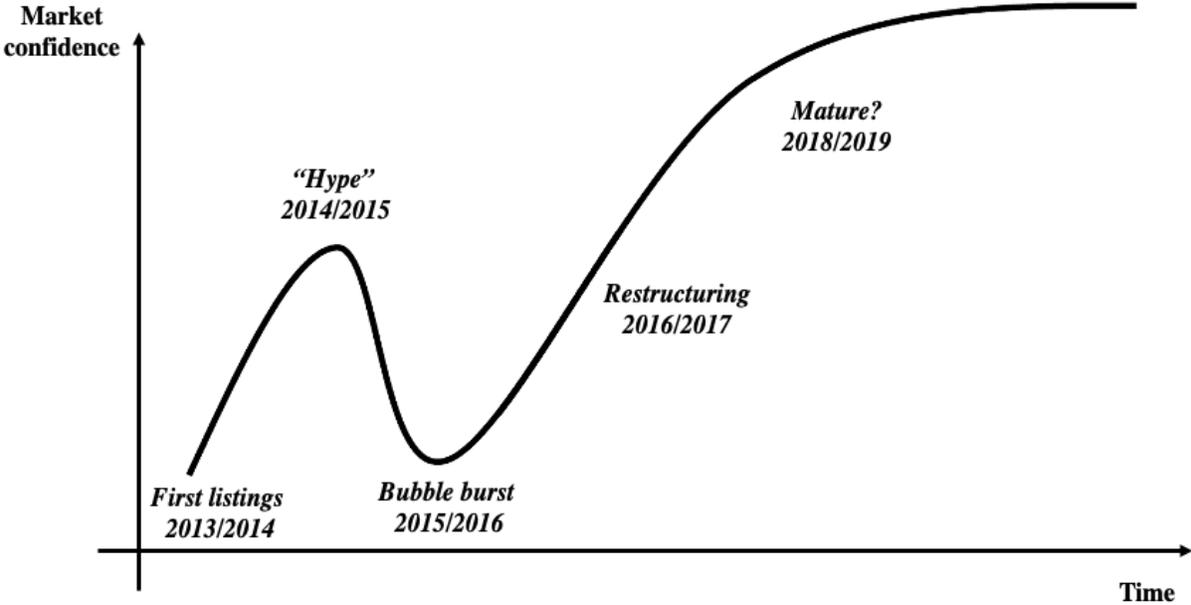


Figure 5 - Business cycle learning curve and YieldCo development.

**7. Conclusion and recommendations**

The YieldCo vehicle has gone through multiple phases in the US markets, but after its initial hype and the crisis triggered by the SUNE bankruptcy, there is a new perspective for those companies. The remaining YieldCos in the public and private markets went through a lot of changes, but the market seems to be pricing those assets correctly, and there is a good prospects for the vehicle in the future. As Suits *et al.* (2017) stated, “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.”. The positive results in 2018 and 2019 are a good showing of the vehicle’s potential.

As potential recommendations for the future developments of YieldCos, two points are very important to consider and absorb as lessons learned from the evolution of the structure: (1) better governance on the relationship between sponsor and YieldCo, with special attention to the ROFO and (2) the alignment of the long-term growth expectations.

First, it is clear from the development of the YieldCo industry that the relationship between the YieldCo and its sponsor is critical, especially because the sponsor is, usually, the main source of projects for the YieldCo growth through the ROFO agreements. Moving forward, it is imperative that the relationship between shareholders with a ROFO, such as the original YieldCo sponsors, is driven by a clear and transparent governance structure, that aligns the incentives, and avoids a scenario like the dispute between SUNE and TERP. Situations like that reduce overall investor confidence in the vehicle, since it raises suspicions between the conflict of interests between the companies. In those cases, instead of being an advantage, having the sponsor becomes a liability.

Building the growth of dividends, and, necessarily, the growth of the portfolio of operating renewable energy projects to the valuation of the YieldCos created a perverse scenario, where the actual operation of the companies was not aligned with its original intents. In order to guarantee that YieldCos are sustainable in the long run, it is imperative that there be a clear understanding from the market about the long-term view of the company. This means that growth is an important part of the YieldCo model, but the growth expectations need to be clear and aligned with a long-

term stability view. One doesn't want growth to become an essential part of a YieldCo, or else the goal to attract capital with lower appetite for risk won't be viable.

After a somewhat bumpy ride, the YieldCo model is still alive in the US, and it is still a viable mechanism to fund renewable energy projects. Although some of the YieldCos are not listed on the public markets, they are still companies that hold the same structure and ultimate goal. We believe that the vehicle has gone through some hard learning curve experiences, but it is now in a more mature position, where it can, effectively, fulfill its original intent to attract capital with a lower cost of capital to those projects, and become an effective mechanism to fund the growth of renewable energy portfolios.

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**Appendix – Stock prices for selected YieldCos and SUNE**

