

A Work Project, presented as part of the requirements for the Award of a Masters

Degree in Finance from the NOVA – School of Business and Economics.

# **SunEdison – An Analysis of the biggest Bankruptcy case in the Renewable Energy Sector**

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## **Abstract**

In April 2016, SunEdison Inc. filed for bankruptcy as its debt obligations were impossible to maintain due to successive losses over the last three years, combined with a swift stock price decline since the summer of 2015. Financial media directs the blame towards the complexity of SunEdison's business model, overconfidence and excessive risk taking. This work project investigates in more detail the renewable energy market, the fundamental drivers of SunEdison's business model, the financial contracts prevailing, its functioning, benefits and drawbacks, the credit reliability of the company and, finally, the main failures in its strategy.

**Key Words:** SunEdison; Yieldco; Fundamental Analysis; Project Finance

## **1. Introduction**

In a global atmosphere characterized by a high degree of uncertainty, the evolution of technology towards clean energy is, most likely, one of the few subjects in which most people agree upon for two main factors: firstly, there is a survivor effect explained by the various climate changes one has been observing in the last decades derived by the burning of fossil fuels (mostly coal, oil and gas) and, secondly, due to the economic feasibility that the renewable energy sector allows companies to achieve nowadays. The rationality to operate in this sector is related to the continuous developments regarding technology improvement (cost reduction benefits are translated in higher profit margins) and the Government/State incentives to renewable energy companies for the positive externalities associated, which in turn has a strong impact in the competitiveness of these operators in the energy market. In the U.S market, the Department of Energy promotes various incentives across different states ranging from tax credits to rebates and funding investment programs. The increasing number of regulations (directed to utilities) attempt at increasing investment and generation of energy from clean sources. Delmas et al, 2011, analyse the effectiveness of two state incentive programs, Renewable Portfolio Standard and Mandatory Green Power Option (MGPO), concluding that even though there are mixed effects, statistical evidence appoints for the effectiveness of the MGPO. Associated with the public incentives to renewable energy sources is an amazing innovation in the financial sector

concerning the new contracts used by corporations in the development of new investment projects.

SunEdison Inc. was, until late June 2015, a major developer of photovoltaic solar panels for a variety of retail and grocery chains, big commercial and manufacturing industrials and real estate owners. Entrenched in its business model was a considerable exploitation of the advantages of financial contracts relying on tax, investment support and other incentives of solar renewable energy generation. Nonetheless, on April 21, 2016, a fast spreading news in the major finance papers (Foley and Crooks Ed, 2016) was taking notice of a bankruptcy filing in a Manhattan federal court by a giant of the renewable sector. The culprit indicated by the media was the financial engineering embodied in SunEdison business model aligned with excessive debt and management's overconfidence.

The following working project is an attempt to understand in a thorough analysis what made SunEdison go bankrupt. For that purpose, a case study approach was designed, focusing on the financial information reported to the SEC<sup>1</sup> from 2012 to 2014. Even though the fiscal year of 2015 was not ignored, it was left apart because it includes financial data with no meaningful estimation purpose, once SunEdison's stock experienced a mass sell-off in the second half of 2015.

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<sup>1</sup> Securities and Exchange Commission.

In the preceding sections, a literature review will give consciousness of the latest developments in terms of contracts used in the renewable energy business as well as the research being conducted at all levels explored in this text – financial contracts, project finance, conflicts of interest using debt financing, fundamental analysis, a market overview of renewable energy in general and for Yieldcos in particular. Afterwards, a valuation model for SunEdison attempts to give a rational stock price before entering into distress costs associated to an apparent loss of confidence by the market in its business model, together with a credit risk analysis of the sustainability of its debt, through liquidity and rating indicators.

Finally, a qualitative but meaningful insight to each contract used based on a diversity of assets involved is carried out, making a comparison with project financing methods, the trade-offs and risk allocation involved ends the discussion.

## **2. Literature Review**

The pragmatic approach of this dissertation required a close attention to the immediate reactions of financial articles as well as the recent developments in which SunEdison is involved (asset liquidation and court disputes). Chase (2016) was expressing its views on SunEdison's business model failure right before the bankruptcy filing, highlighting the fast accumulation of debt to finance acquisitions and the development of illiquid assets combined with the lack of confidence that was threatening the centrality of Yieldco in its operations, whilst reinforcing the fall of its stock price with Vivint acquisition. It also compared the performance of

Yielcos across other renewable developers, suggesting that the investor sentiment shifting away from Yieldcos based business model is not specific for SunEdison, with First Solar as an exception.

Chase (2016), in the right aftermath of the bankruptcy filing, describes the management strategy to finance growth through debt sources, emphasizing the spiking debt sources after 2010 until late 2015. It focuses on the consequences that this bankruptcy case might eventually have on the solar energy market, acknowledging the lower bids for solar tenders observed, impacting ultimately the remaining competitors, as well as the increase in awareness for proper asset valuation in the sector. Finally, Wang (2016) stresses the possibility of other big players in the solar and polysilicon market to take advantage of the asset sell-off, mentioning the example of the acquisition of important upstream assets by GCL-Poly in the Asian market at considerable discount.

Concerning the fundamental analysis, Penman (2013) gives a very complete view of fundamental analysis for valuation modelling, reinterpreting each financial statement according to their contribution to the operating activity of a company. Thus, its views were applied as a guide to interpret the annual reports from 2012 to 2014, with the final aim of differentiating financing operations and business related items. Given the importance of Yieldcos to the understanding of the SunEdison's business model, the need to comprehend the passage of the assets to this vehicle, its relation to project finance as well as the advantages and drawbacks of this

financing mechanism is also a main milestone of this paper. Milacic (2016) provides a very important insight on the concept, focusing on its applicability to NRG Energy as a case study of success (the first company to launch an Yieldco vehicle in 2013), the criticism involved and its dependence to market conjuncture conditions for its applicability, namely a low interest rate environment. Johnson (2015) explored this asset class as a possible fit within a socially responsible investment strategy (as it involves renewable energy in turn), developing two investments strategies using historical returns for Yieldcos: he found that, on average, each Yieldco outperformed its parent by 23% from the inception date in terms of total return (31% annualized) and that longing an Yieldco and shorting the respective parent (hedging strategy) generated a positive alpha of 0.128% above the S&P and a historical beta of 0.525 (significant at 5%). Reese and Haugland (2015) question the sustainability of the current market for Yieldcos, complementing their analysis with potential changes that this model needs to embrace so that it can adapt to the challenges of a new reality.

It is nearly impossible to discuss a business model dependent on Yieldcos and PPAs<sup>2</sup> without relating it to project finance and its features. Therefore, a section is dedicated to the close connection of these two concepts, the usefulness of both and the applicability of both in practice.

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<sup>2</sup> PPA – Power Purchase Agreement.

Finally, as far as valuation methods are concerned, there is a substantial degree of complexity when one wants to value a corporation that is highly dependent on project finance mechanisms. The fundamental analyst tends to value a company in a straightforward equity research valuation, which is the aim of section 5. In line with this technique, the arguments of the dangers of excessive debt in Corporations surge easily. Berk and DeMarzo (2013) enlighten us about the advantages of debt financing (tax shield and diversification of investors) as well as the conflicts of interests among debt and equity holders when debt levels become unsustainable. We can extrapolate some of their insights to the analysis, especially with the additional relevance of different interests between subsidiaries and parent companies. Pietz (2010) takes free cash flow as its core variable of interest when it comes to estimating the value of a company dependent on project financing capital (namely power plant ventures such as big utilities), while also describing detailed wise its features. For this purpose, the cash flow modelling is stochastic based, allowing for ex ante estimation of default probabilities, while relying on a sample. Even though the purpose of the following dissertation is to dissect a point estimate (SunEdison), Pietz' view is an important starting point.

### **3. The Solar Energy Market and Yieldco Structures**

One of the most immediate argument about SunEdison's failure was related to Yieldco structures and its dependence on the parent company. An Yieldco is a public listed company (it raises capital from the general investor) that pools



renewable energy projects under development and/or already operating to get additional return from the underlying assets of such projects. The main objective of this financing structure is to reduce the costs of capital generation, while providing a constant stream of cash flows to its investors in the form of dividends.<sup>3</sup> To have a glimpse on the solar energy market in the last few years, a hypothetical scenario where an investor would buy an equal weighted index with the top solar energy companies in the US market, from the beginning of 2012 until late 2015, will be analysed.<sup>4</sup> The other hypothesis would be an equal weighted index composed of the Yieldcos of the parent companies of the initial index.<sup>5</sup> Chart 1 presents the cumulative weekly returns and Table 1 a summary of the main statistics. Some interesting insights emerge from this analysis: firstly, investing in either the Solar energy parents or in their Yieldcos provides an expected return higher than the NASDAQ index (selected benchmark) and, in terms of cumulative return, the Yielco Index is quite impressive: for a little bit more than two years, this strategy could have multiplied the investment by ten times (16 times if gains would have been taken in June 19, 2015 – close to a two years’ investment). Moreover, from 3<sup>rd</sup> quarter of August 2013 to the end of 2015, the indexes exhibit very little

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<sup>3</sup> The characteristics of Yieldcos will be further discussed in Section 2.

<sup>4</sup> The equally weighted Index is composed by Enel, NexEra, NRG, SunPower Corporation, First Solar Inc. and Solar City.

<sup>5</sup> The Yieldco Index is composed by NRG Yield, TransAlta Renewables, Pattern Energy Group, NextEra Energy Partners. TerraForm Power, TerraForm Global and 8point3 were also included, as they are still operating.

correlation, which is beneficial from a diversification (around 7%) view point. Nonetheless, it is not rational to pursue this strategy if we take risk into consideration, as both strategies give a risk adjusted measure below the benchmark (as measured by the Sharpe ratio).<sup>6</sup> Doing a similar analysis for SunEdison and Terraform Power, Chart 3 and Table 2 summarize the results, which diverge significantly compared to the previous outlook: negative expected and cumulative returns, already incorporating the effect of financial distress and a considerable correlation (around 40% for the considered period). Therefore, a complete view of the business model of SunEdison, its financials and strategy are required to understand deeply the main reasons that led a company with a market capitalization of \$9.3 billion in May 2015 to collapse.

#### **4. Financial Securitization**

In this section, a qualitative overview of the contracts used by SunEdison as part of its core business provides the setup for a later discussion regarding the comparison with project finance mechanisms.

The first financial innovation was the Yield Company (Yieldco). It is essentially a subsidiary, public listed company with the requirement of growing a pool of Assets composed mainly of renewable energy projects due to a restrictive policy of increasing Cash Available for Distribution (CAFD). The assets composing the

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<sup>6</sup> The risk-free rate was assumed zero due to today's market levels. See Sharpe (1994).

Yieldco integrate already operating and under development projects as a risk mitigation set up in the renewable energy context. The parent company usually establishes a PPA, locking in the revenue for the operator as long as there is no default on the electricity payments, reinforcing the desired cash flow stability.

Another characteristic of this financing vehicle is the Right of First Offer (ROFO), a clause established with the parent company allowing the Yield Company to bid first on new projects developed by the parent. The combination of the financial structure – liquidity, quality of Assets and growing projects – is fundamental for a growing dividend policy as well as an initial offering at close to debt rates.

Feed in Tariffs (FiTs) and Net Metering are also common contractual arrangements in the renewable energy context, with their respective designs and specificities. The FiT consists on a stable tariff payment obligation (utility paying the renewable energy power producer) for a long period of time during the contractual period, providing cost amortization for big renewable energy investment projects. Net Metering refers, in a nutshell, to grid balance: solar energy production during periods of low electricity use is sent back to the grid, and the producer receives credit for the excess generation. RECs and SRECs<sup>7</sup> are credits given to renewable energy producers, traded in the open market, and therefore they have a special role due to regulatory standards that oblige a specified share of electricity generation to

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<sup>7</sup> Renewable Energy Certificate and Solar Renewable Energy Certificate, respectively.

come from renewable sources. Hence, utilities and other conventional generators might buy those certificates to comply with the rules.

Master Limited Partnerships (MLPs) and Real Estate Investment Trusts (REITs) are financing vehicles that focus on cash distributions in the energy sector, even though they are far more common in the traditional energy sources (oil, coal and gas). MLPs avoid federal and state tax due to their statute of partnership, while REITs normally have payout ratios close to 100%, deducting the cash distributed on tax liabilities while developing dividend reinvestment policies for their clients. Finally, even though a capital lease is widely known, it achieved a particular importance in SunEdison's business strategy and accounting methodology: the project (example: solar energy system) is developed by the Yieldco/Parent, sold and simultaneously leased back. Hence, a liability is recorded (corresponding to the lease payments due), the asset recorded in SunEdison's balance sheet as Property, Plant and Equipment (PPE) - a strategic goal for the management - and the cash proceeds received on the sale may be used to fund existing operations and/or under construction projects. Furthermore, given SunEdison's flexibility in terms of its operations - a solar energy system can either be classified as PPE if the intent is to own and develop or as revenue from sales if the objective is to sell for the final customer - there is a certain degree of reclassification freedom depending on the market characteristics of a given solar asset at a certain point in time.

## **5. Fundamental Analysis (SunEdison) and Project Finance**

SunEdison Inc. was founded in 1959 as part of the Monsanto Electronic Materials Company (MEMC) and changed its name in 2013 to focus exclusively on the solar energy business. Its core activity is the designing, development, engineering and ownership of photovoltaic solar panels through a series of proprietary processes. It is also involved in the semiconductor electronics industry due to a controlling interest of SMP Ltd. It operates in a global market, with a diverse customer base: small retail and grocery, small businesses, manufacturing facilities and warehouses, real estate and land owners. In terms of its domestic market, large utilities, especially state owned, play an important role over its operations due to the increasing interests of their customers and regulators in purchasing electricity from renewable sources. The competition is concentrated in the renewable energy market, particularly solar, where companies such as E.on, Enel, NexEra, NRG, SunPower Corporation, First Solar Inc, JUNI Solar Gmbh and Solar City interact. To cope with competition, increase its presence in the market and ideally increase profit, SunEdison developed a strategy of retaining more Assets on the Balance sheet (ownership and liquidity purposes), decrease the cost of capital through the creation of Yieldco vehicles and grow the portfolio of clean power generation assets and cash available for distribution as dividends.<sup>8</sup>

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<sup>8</sup> SunEdison Annual report, Executive overview, page 26.

A fundamental analysis of SunEdison group obliged a dissection of the fundamental drivers of value in the financial statements. Determining the intrinsic value of a company involves understanding its business activity<sup>9</sup>, hence, a close attention to all the items in the balance sheet, income and cash flow statements was carried out to disentangle the financing and operating activities laying in each item. From 2012 to 2014, SunEdison always exhibited operating assets above operating liabilities.<sup>10</sup> Extending the analysis further, the assessment of a stock valuation model was conducted. As a first approach, multiples valuation based on the previously mentioned SunEdison competitor's financial ratios was performed. However, the persistent negative net income would give counterintuitive values for the stock, and changing the multiple would not give a reasonable estimate either. Therefore, the need to use a clean measure with a focus on value drivers (profitability and growth through investment), reliant to uncertainties in discount rates and long term growth rates ended up on the Residual Income Model (*ReOI*), in which the investor attempts to understand if a given business can generate income over and above the required return for each period<sup>11</sup>. The required return was the weighted average cost of capital, where the risk-free rate was the U.S Treasury Bill for a 10-year maturity,

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<sup>9</sup> An investor, in essence, is buying a business when he/she longs a stock

<sup>10</sup> Net Operating Assets (NOA) = Operating Assets – Operating Liabilities always positive during this period. See Table 3 for a discussion on profitability.

<sup>11</sup> Appendix 2: Residual Income Model, completes the discussion of the model.

an expected market return of 9.24% and an equity beta of 0.79, where all those inputs were observed for 2014 (valuation period)<sup>12</sup>:

$$ReOI_t = OI_t - wacc * NOA_{t-1} \quad (1)$$

The calculation of the *ReOI* model was based on a forecast for the reformulated income statement and balance sheet since 2015 until 2020. The inputs were mostly based on their respective proportion of revenues/other characteristics affecting operating assets and liabilities (days required to collect receivables and days inventories held). The assumptions for the evolution of the inputs in the model were based on previous observations (from the fiscal years of 2012 to 2014), aligned with SunEdison's business strategy<sup>13</sup>, while keeping a smooth path in time.

Given the specified framework described, the equity value and the subsequent stock price were estimated under three states: a pessimistic, moderate and optimistic scenario<sup>14</sup>. The conclusion of this analysis is that the company is not able to generate residual income over its required return regardless of the considered scenario. Moreover, even under the optimistic scenario, its predicted stock price would be \$15.74 (for 269.2 shares outstanding in 2014), compared with an observed market price of \$28.49. Thus, it should not be traded at more than its book value

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<sup>12</sup> Source: Bloomberg.

<sup>13</sup> Example: retention of assets in the balance sheet and considerable financial leverage.

<sup>14</sup> See Appendix 2 for a detailed explanation on the scenario assumptions and model features.

under a fundamental perspective. The following table summarize the results of the analysis for each scenario:<sup>15</sup>

<b>Scenarios (Millions)</b>	<b>Residual Income (PV)</b>	<b>Terminal Value (PV)</b>	<b>Firm Value</b>	<b>Stock Price</b>
Optimistic	-3465.11	6217.73	4373.23	\$ 15.74
Moderate	-11664.50	-7989.57	-6368.97	\$ 5.51
Pessimistic	-11172.43	-20041.63	-18557.03	\$ 5.51

Some notes on the previous table need special attention: firstly, net operating assets and net financial obligations were 1620.6 and 136 (in millions of USD), respectively, in all scenarios (reformulation of balance sheet). Secondly, whenever firm value turned out to be negative, the company's equity value should not trade by more than its book value under fundamental reasoning. Hence, its stock price, in these cases, is solely given by the ratio between the book value of equity (reported statements) and the number of shares. Finally, the number of outstanding shares in 2014 was 269.2 (million).

### **5.1. Project Finance, Yieldco Structures and Debt Sustainability**

The renewable energy sector involves infrastructure such as wind farms and photovoltaic panels, being consequently intrinsically related to project finance. For such big and long term projects, huge amounts of either debt (most common) or equity are required. Hence, investors tend to focus on the cash flow generation of the project, demanding compensation in the form of dividends as soon as the asset

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starts generating cash flows, which is usually assured through an independent entity<sup>16</sup> responsible for the project management, allowing for an off-balance sheet mechanism while the performance of the project itself is the main driver of profitability for the parties involved in the medium to long term. The risk allocation is a fundamental value in project finance context and it can be reached through a series of contractual arrangements between the SPV and the remaining beneficiaries. Within this framework, additional funding is negotiated with outside sources and creditors can only claim assets and cash flows from specific projects. The sale of Solar Energy Systems from SunEdison to Terraform Power for development and subsequent resale was common practice in the company's strategy, where non-recourse long-term finance for the systems was frequently an option: for the U.S market, TerraForm would raise debt to purchase SES and lease back to benefit from equity tax advantages in the form of write-offs to reduce taxable income, whereas outside the U.S market, the long-term financing would be tied to the maturity of the applicable FiT expiry date.

The Yieldco model is close to project finance for three main reasons: it makes use of an allegedly independent entity to control the projects under development, it has an even stricter dividend policy and it is a highly leveraged venture where the performance of the project itself is key. These two models differentiate from one

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<sup>16</sup> Special Purpose Vehicle (SPV).

another in various features: Yieldco model demands continuing dividend growth to attract a broader capital base, requiring consistent investment in new projects (growing companies). Its increasing dividend policy would have only been sustainable with increasing operating revenue. Moreover, project finance is a single (enormous) infrastructure project in its essence, where the precise risk allocation of the project assets is contractually specified, aligning participants' incentives accordingly. Conversely, pooling developing assets might have diversification benefits but it has the potential to blur incentives between creditors, operators, equity investors and shareholders.

Credit reliability is critical in both project finance and at a corporate level. Being Terraform Power a variable interest entity of SunEdison<sup>17</sup>, its debt affects ultimately the sustainability of the group. SunEdison was the company with the highest Debt to Equity ratio among its peers (6.75 compared to 3.71 for the second most indebted competitor at the end of 2014). The striking feature if one looks at the annual reports is that there were restrictive covenants regarding financial indebtedness (in all annual reports from 2012 to 2014, the allowed leverage ratio ranged from 1 to 3). A further analysis on the evolution of the market assessment of SunEdison's credit worthiness leads directly to Exhibit 2, displaying the Altman's Z-Score and Altman's Z''-Score since SunEdison's IPO, an important

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<sup>17</sup> VIEs lack sufficient equity to finance its operating activities and the parent company is obliged to absorb expected losses and/or receive expected residual returns.

credit risk indicator. This empirical model uses meaningful indicators of a company's ability to service its obligations, such as the ratio of EBIT over the total assets, market capitalization over total debt and sales over total assets. The critical values for the Z-Score and the Z''-Score are, respectively, 1.81 and 5.85, below which a given company might see its credit conditions worsening. As displayed in the screen, the critical levels for a credit safe company fell below their respective thresholds at the end of 2006, raising questions on the ability of SunEdison to fund new projects through debt for such a long periodicity. The main reason identified was the increasing interest rates charged by the bank syndicates on the credit facilities offered to SunEdison: from 1% interest rate charges in 2005 to LIBOR plus margins ranging from 3 to 4%.<sup>18</sup> Ideally, the evolution of the Credit Default Swap (CDS) would also be an important measure for credit risk, but unfortunately there were not actively traded products of such kind for this firm.

Fundamental analysis can prove of use to assess debt sustainability and liquidity over the long-term. A fundamental identity relates the cash flow generation of an entity to its financing sources/obligations through the following equality, where C-I is free cash flow, d is the dividend payments and F is the net cash flow from borrowing and lending:

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<sup>18</sup> The interest rate under construction credit facilities was 5.75%. Nonetheless, this example should not be interpreted as a mean of strict comparison: each loan has its contractual specificities impacting ultimately the interest rate charged, such as the notional amount, maturity, duration and other relevant market conditions.

$$C - I = d + F^{19} \quad (2)$$

Free cash flow for SunEdison was increasingly negative from 2012 to 2014, implying two of the following alternatives to balance the negative left side of the equation: a cut in the dividend payout (very unlikely given the Yieldco model of increasing Cash available for distribution) or debt increase. Reformulating the identity and highlighting the fact that free cash flow is no more than the difference between operating income and variations on the net operating assets of the entity, we arrive at a reduced form equation for dividend drivers:

$$d = C - I - NFE + \Delta NFO^{20} \quad (3)$$

where NFE relates to net financial expenses and  $\Delta NFO$  is the difference between financial obligations and financial assets. Having clearly in mind SunEdison's strategy of paying growing dividends through its Yieldco subsidiaries – a transversal feature for other Yieldcos as well –, the left-hand side must remain positive, but noticing an increasing negative free cash flow and positive net financial expenses (mostly interest paid), the only solution to balance the identity is, again, the increase in net financial obligations. This strategy might be reasonable in the short-run, but it can prove to be dangerous in the medium to long run.

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<sup>19</sup> This identity is commonly known as *Cash Conservation Equation*. See Pennman.

<sup>20</sup> *idem* 13.

## 6. Conclusion

The renewable energy sector is undoubtedly the future for human kind. It started as a response to climate change and it has progressively evolved towards a cost efficient and reliant alternative to traditional fossil fuels. SunEdison has been part of that change, contributing not only to the technical innovations in the photovoltaic and semiconductor components of the systems but also to the financial innovation inherent to this market of large investment projects. The Yieldco has proved to be a mixture of benefits and downsides: in a world of persistent low interest rates and tax credits for renewable energy projects, the model was quite important to monetize existing Sponsor's assets while keeping them on the balance sheet. However, at the time of the writing, the low interest rate environment is starting to change, and the tax advantages are no longer as favorable as it used to be (especially for the U.S.), pressuring a model promising increasing dividend payouts to investors and obliging a rethinking of its features. Changes on the geography of the asset base, joint ventures among sponsors before the launching of the vehicle or even periodic stoppage of distributions to build up reserves for asset maintenance purposes are some possibilities, but the uncertainty is big and there is still noise.<sup>21</sup> In the case of SunEdison, what was observed was a late loss of confidence in the company's business model. Even though fundamental analysis proves that free cash

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<sup>21</sup> See Michael Reese and Matt Haugland, 2015.

flow is just a dividend from operating activities to financing activities, the debt accumulation and consecutive net income losses, combined with an excessive M&A activity to sustain the demands of Yieldco investors' growing dividend ended up in acquisitions at unusually high premiums, finalizing inexorably with the bankruptcy of a gigantic company in the solar energy renewable market sector.

Additional research should focus on the financial statements of SunEdison, particularly on its cash flow statement, where big challenges in terms of its reformulation to understand the liquidity of the firm for operating activities were constant. Debt accumulation is classified as a cash flow reduction in the investment section under U.S GAAP<sup>22</sup>, instead of the financing section. Moreover, noncash transactions play an important role, given the complexity of SunEdison's financial transactions, ranging from convertible debt (not indicated as a payment of a loan upon conversion), acquisitions with stock rather than cash, capital leases (no cash flows recorded at inception but subsequent lease payments), all of them combined blurring the distinction between financing, investing and operating activities.

As for the financing structures implicit in the renewable sector, further analysis on the adaptability of such contracts for the future is indeed needed due to the increasing applicability (risk and return for investors and Sponsors) and political (regulatory framework) challenges we have been observing.

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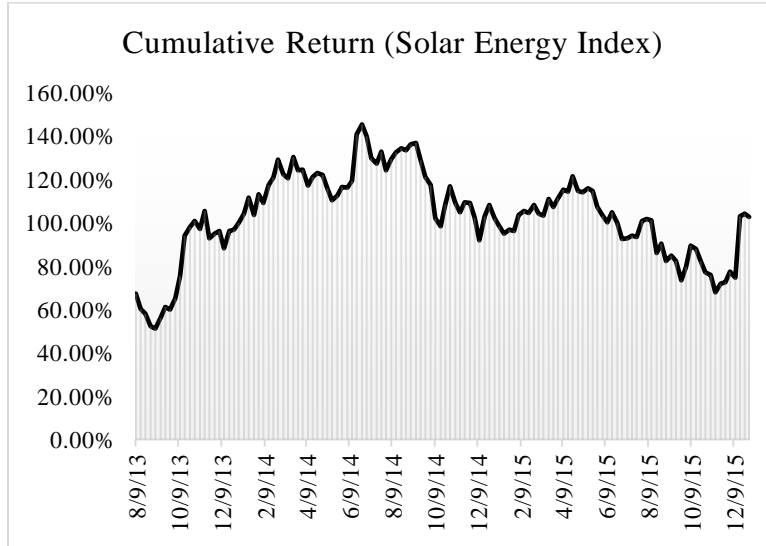
<sup>22</sup> GAAP – General Accepted Accounting Principles.

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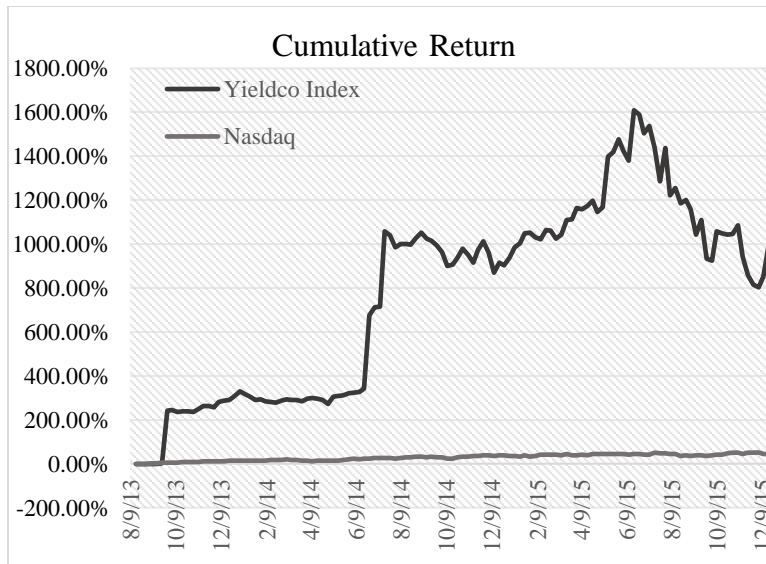
## Appendix 1

**Chart 1.**



Source: Own computations (Bloomberg data)

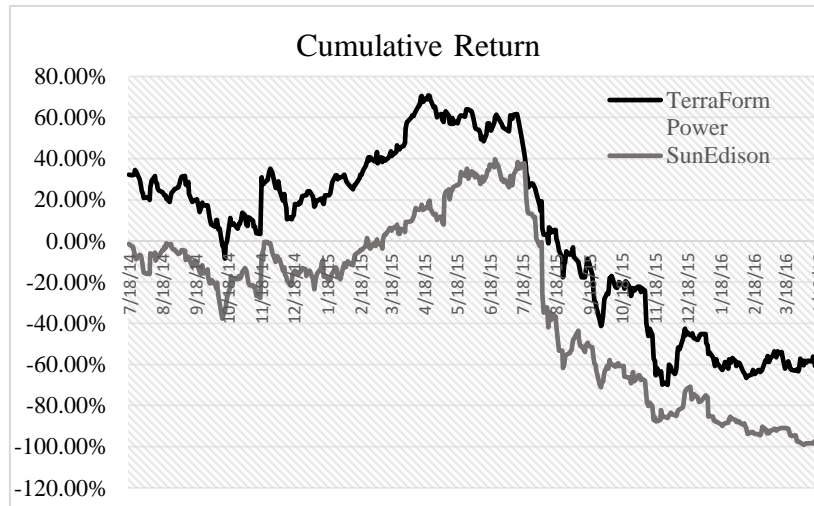
**Chart 2.**



Source: Own Computations (Bloomberg Data)



**Chart 3.**



Source: Own Computations (Bloomberg Data)

**Table1.** Descriptive Statistics on three Market Indexes (above charts)

	<b>Solar Energy Index</b>	<b>Yieldco Index</b>	<b>NASDAQ</b>
Max	16.14%	231.48%	5.94%
Min	-7.46%	-14.66%	-7.36%
Average Return	0.40%	3.14%	0.34%
Cumulative Return	102.76%	1006.5%	48.23%
St. Deviation	3.5%	433%	2.03%
SR	11.4%	0.7%	16.7%

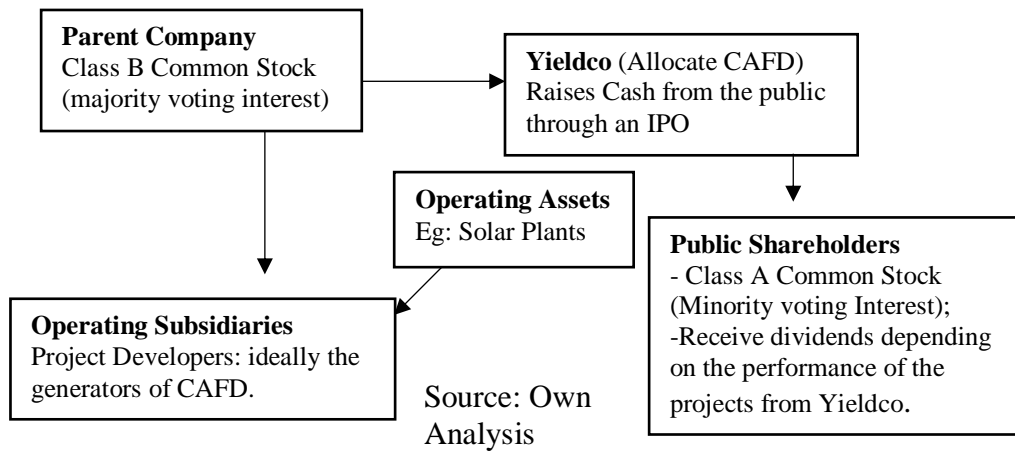
**Table 2.** Descriptive Statistics on TerraForm Power and SunEdison

	<b>TerraForm Power</b>	<b>SunEdison</b>
Max	32.61%	58.09%
Min	-21.40%	-54.76%
Average Return	-0.06%	-0.57%
Cumulative Return	-54.07%	-99.03%
St. Deviation	4.8%	9.2%
SR	-1.30%	-6.26%

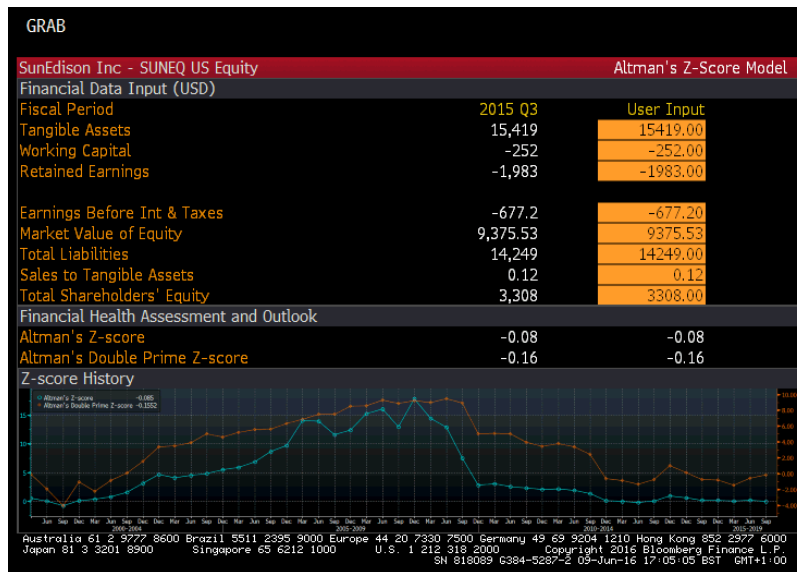
**Table 3. Financial Ratios**

Ratios	31-Dec-12	31-Dec-13	31-Dec-14
Op.Assets/Op.Liabilities	1.31	1.08	1.18
Profit Margin	-0.73%	-14.50%	-22.23%
Financial Leverage (NOL/CSE)	-3.17	3.96	10.92
ROCE	-12%	-130%	-74%

**Exhibit 1. Yieldco in practice**



**Exhibit 2. Altman's Z-Score**



Source: Bloomberg