



ELECTRIC SLIDE Transitioning to a Low-Carbon Future

PART 3 Investment Implications

August 2017



THIS SERIES

In three articles over the last year, Walden Asset Management has shared its perspective on what transitioning to a low-carbon future means for one critical area of the US economy: *electricity generation*. Part 1 presented today's US electricity landscape. Part 2 discussed how low-carbon electricity is being financed and the role of policy and regulation. Part 3 analyzes some of the investment implications of this transition.

This series stems from discussions at our Investment Committee and represents a collaborative effort between the fundamental and environmental, social, and governance (ESG) research teams at Walden. We appreciate hearing your feedback.

INTRODUCTION

A global commitment to reduce greenhouse gas (GHG) emissions and combat climate change is transforming entire industries, including the power generation sector, presenting opportunities and risks for investors. Creative destruction is producing new industry leaders, while also displacing incumbents, as it has repeatedly since the industrial revolution. The ultimate winners in past industry transitions have produced spectacular returns for investors. However, many companies fail along the way, impairing equity investments. Investors thus need to proceed with caution.

Investing in the transition of power generation from conventional to renewable sources currently presents the challenge of a limited availability of publicly traded companies and many speculative elements. Consistent with Walden's approach to invest in reasonably valued stocks of high quality companies with sustainable business models, we are taking a disciplined approach to investing in this transition. However, we remain enthusiastic about the potential investment opportunities that will undoubtedly arise from the transition to a low-carbon future, just as profitable investment opportunities have emerged from prior industry transformations.

As we highlighted in Parts 1 and 2 of our series, the generation of electricity in the US accounts for approximately one-third of GHG emissions, making it one of the largest contributors to climate change. The transition of US electricity generation from mostly fossil fuels to more renewable sources has been underway for years, driven by economics, regulations, technological advances, and consumer preferences. This transition is apparent when looking at new electric generation capacity, the majority of which has been renewable (wind and solar) over the past decade.

According to the US Energy Information Agency (EIA), in 2016 more than 60 percent of the 27 gigawatts (GW) of generating capacity additions were wind (9 GW) and solar (8 GW), while 33 percent (9 GW) was natural gas. (A gigawatt of renewable energy can meet the electricity needs of 200,000-300,000 homes.¹) In addition, the EIA reports that another 3 GW of distributed (rooftop) solar capacity was installed in 2016. At the same time, 12 GW of capacity—primarily coal and natural gas—were retired in 2016.² Taken together, 100% of the net new electric generating capacity to come online in 2016 was renewable.

THE CHALLENGES OF INVESTING IN THE SHIFT TO LOW-CARBON ELECTRICITY

Despite the secular shift toward more wind and solar powered electricity generation, investors face a number of challenges investing in the transition. We address three specific challenges: the relatively small investment opportunity set, which appears to have a poor risk/return profile; new and unproven business models; and the challenge of analyzing companies in transition.

Small, Risky Opportunity Set

As a proxy for the renewable power investment opportunity set, we analyzed several industry-specific exchange traded funds (ETFs) offering exposure to renewables. The funds range from those focused purely on solar to those focused on smart grid, as well as others that include companies active in a broader range of industries (see Table 1).

Within the funds analyzed, there were 213 unique companies, including 104 non-US companies. By way of comparison, there are approximately 3,600 stocks traded on US exchanges.³

The aggregate market capitalization of the renewable “pure plays” is relatively small. For example, the combined market capitalizations of the constituents of two solar focused ETFs (TAN and KWT) are \$25 billion and \$51 billion, respectively. This compares with the combined market cap of the US utility sector of approximately \$805 billion. The



entire solar industry is smaller than several individual large cap utility stocks.

The largest two funds we identified include companies that derive a *de minimis* portion of their revenue from activities directly related to the transition to low-carbon electricity. The First Trust Global Wind Energy Fund (FAN), for example, holds significant positions in BP, Royal Dutch Shell, and Duke Energy, whose businesses are mostly exposed to fossil fuel extraction or traditional utility operations that significantly overwhelm their exposure to renewables development.

Table 1: Competitive Performance of Select Renewable or Green Funds and Stock Market Indices

Name	Ticker	# of Holdings	Returns			Standard Deviation of Returns			Market Cap (billions)		
			1 Year	3 Year	5 Year	1 Year	3 Year	5 Year	Total of all Constituents	Average	Median
First Trust NASDAQ Clean Edge	GRID	37	22.4%	3.8%	9.5%	12.3%	14.1%	13.9%	\$820.3	\$22.2	\$3.3
First Trust Global Wind Energy	FAN	44	14.3%	4.9%	12.7%	10.2%	16.2%	19.3%	\$1,162.4	\$28.4	\$6.8
Guggenheim Solar	TAN	26	-19.6%	-24.7%	-3.6%	18.7%	30.5%	39.4%	\$25.2	\$1.0	\$0.8
PowerShares Cleantech	PZD	53	19.1%	3.7%	9.2%	9.7%	15.3%	15.1%	\$513.0	\$9.5	\$2.5
PowerShares WilderHill Progressive Energy	PUW	44	28.4%	-6.1%	1.2%	15.9%	22.6%	19.9%	\$258.9	\$5.9	\$2.9
PowerShares WilderHill Clean Energy	PBW	40	1.3%	-15.4%	-4.1%	10.5%	21.1%	24.1%	\$139.8	\$3.5	\$0.8
Market Vectors Global Alternative Energy	GEX	31	6.2%	-2.4%	10.4%	9.8%	17.8%	19.9%	\$194.1	\$6.5	\$2.5
Market Vectors Solar Energy	KWT	27	-22.5%	-23.5%	-6.5%	17.1%	28.1%	35.4%	\$51.3	\$1.9	\$0.8
Russell 1000®		997	17.4%	10.0%	13.3%	2.9%	7.2%	8.3%	\$24,320.0	\$24.4	\$8.9
Russell Midcap®		794	17.0%	8.5%	13.1%	2.0%	8.0%	9.1%	\$7,166.0	\$13.9	\$6.8
Russell 2000®		1946	26.2%	7.2%	12.4%	13.1%	15.7%	14.4%	\$2,292.5	\$1.2	\$0.8
Russell 3000® Utility Sector		84	3.2%	9.2%	11.6%	9.8%	14.3%	13.0%	\$804.8	\$9.8	\$4.1

Past performance does not guarantee future results.

Data is as of 3/31/2017, sourced from Bloomberg, and alphabetically sorted.

Moreover, the risk profile of most of these funds is relatively high, which is indicative of the underlying constituent risk profile. While performance as measured by total shareholder return has been mixed depending on the time period, the renewable funds have generally underperformed traditional market index benchmarks, as well as the conventional utility sector. Additionally, they have done so with higher volatility of returns, one proxy for market risk. Perhaps a more relevant measure of risk in the analysis of these companies is the risk of total business failure leading to permanent capital loss. Evergreen Solar and SunEdison exemplify this risk.

Furthermore, certain renewables investments, in particular solar equities, have exhibited greater correlation with oil and gas equities over the past five years than with the broader market. (The broader stock market has been negatively correlated with solar, oil, and gas stocks.) There is a certain irony in this given that renewables stand to benefit at the expense of fossil fuels, at least for power generation. But we think basic economics explains most of the pattern: in all three cases increases in supply of the underlying commodity—solar panels and domestic production of oil and gas—have flooded the market, depressing prices⁴. While this has led to poor returns for investors, it has been a boon for consumers.

New and Unproven Business Models

New and unproven business models present investors with another risk, despite the outlier effect some revolutionary firms have had in disrupting industries. “YieldCos,” introduced in Part 2, provide a case in point. YieldCos are

publicly traded stocks designed to provide investors a predictable low-risk return via a robust and growing dividend financed by their ownership of generally renewable power generating assets, such as solar and wind farms. In their current form, YieldCos entered the US market in 2013. By 2015, there were seven YieldCos, in aggregate representing approximately \$23 billion in the public equity markets, which by some estimates was enough to cover one-quarter of US renewable financing needs since 2013.⁵

YieldCo assets have predictable revenue streams contracted under long-term power purchase agreements. As we discussed in Part 2, the variable costs of renewables power generation are low; therefore the YieldCo can forecast cash flows—and dividends—with a high degree of visibility.

YieldCos tantalized investors with the prospect of robust dividend growth from the full pipeline of renewable assets that could be “dropped down” to them from their parent companies, most of which are regulated utilities. The assumption was that as YieldCo portfolios expanded, acquisitions of new assets could be financed at decreasing costs of capital. While low risk and predictability are markers of the high quality characteristics we look for in analyzing companies, the future growth prospects rested on the flawed assumption that these companies would have unlimited access to the capital markets at reasonable costs. They do not.

Following the initial market euphoria over YieldCos, the subsequent performance has been more risky and less predictable, as captured by the performance of the Global



The transition of US electricity generation from mostly fossil fuels to more renewable sources has been underway for years, driven by economics, regulations, technological advances, and consumer preferences... 100% of the net new electric generating capacity to come online in 2016 was from renewable sources.

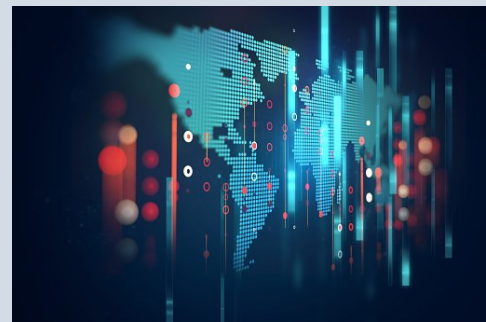
X YieldCo ETF (YLCO). Since inception on May 29, 2015, the fund has produced a cumulative total return of -18% (-10% annualized), including dividends. Over the same period of time the Russell 1000® Index of US large cap stocks returned 16% (8% annualized).⁶

We believe that YieldCos may be an important vehicle for channeling capital toward a low-carbon future. However, the future remains highly unpredictable, as it was for internet search providers in the 1990s, a case study of which is presented below. In the near term, YieldCos may experience further headwinds due to public policy uncertainty in the US. And, the relative yield from these “bond proxies” becomes less attractive if interest rates rise.

While low risk and predictability are markers of the high quality characteristics we look for, the future growth prospects [of YieldCos] rested on the flawed assumption that these companies would have unlimited access to the capital markets at reasonable costs. They do not.

Internet Search Provider Case Study

Picking winners, ex ante, in any emerging industry is extraordinarily difficult. Internet search providers offer a case in point. In the late 1990s and early 2000s, the industry leaders included Altavista, Excite, and Lycos, all of which ultimately failed to create sustainable business models despite their first mover advantage. The prize in internet search went, of course, to Google. Google wasn't even founded until 1998, but now it dominates the search industry with 75% market share and generates \$90 billion in annual revenue and \$20 billion in profit. Even if you correctly foresaw the internet would be as important as it is today, before the dot.com bubble burst, it would have been difficult envisioning Google dominating this winner-take-all “market.” We believe that we are still in the “late 1990s” with respect to the transition of US electricity generation.



Companies in Transition

There are established companies that are participating in the industry transition via their own efforts in developing renewables. Regulated utilities NextEra and Avangrid are also two of the largest owners of “merchant” (unregulated) wind power, and have portfolios of assets well outside the service territories of their core utilities in Florida and the Northeast, respectively. NextEra has long owned traditional power generating assets, including nuclear facilities, but is re-shaping their portfolio toward greater use of renewables and less conventional power sources.

DONG Energy is a pioneer in the development of offshore wind, having launched the first offshore wind farm in 1991 and built more than 25% of global offshore wind capacity. The company's current focus on wind stands in stark contrast to its namesake origin: Danish Qil & Natural Gas.

A final example is Total SA. Based in France and one of the world's largest oil companies, it has recently begun investing in renewable energy. In 2011, Total purchased a 60% stake in SunPower, a renewable energy company specializing in developing solar projects. In 2016, Total purchased battery maker Saft Group SA for \$1 billion.

Total CEO Patrick Pouyanne has stated that, by 2035, 20 percent of the company's total energy output will be from low-carbon energy.

Companies that transition their business models to respond to shifting environments and new market realities should be well positioned in the future. However, it is not always clear or obvious that a company's leadership position in one industry will transfer to another. As such, we tend to exercise caution with respect to companies in transition.



INVESTMENT FOCUS FOR WALDEN

While Walden has sought to avoid emerging but unproven business models, highly volatile and speculative companies, as well as many companies in transition, we have sought to identify companies that can participate in the industry transition while also meeting our investment selection criteria. Specifically, we have long sought to identify companies—in all industries—that have a high quality financial profile, a sustainable business model, and are reasonably valued.

For example, as it pertains to the shifting sources of US electricity generation, we have identified regulated utilities such as Consolidated Edison (ED) and Eversource Energy (ES) as potential beneficiaries. Both companies own the underlying electricity grid infrastructure—wires, substations, transformers—that transmit electricity from where it is generated to where it is consumed. As the sources (and locations) of power generation evolve, we expect the electricity grid to be re-routed and these companies to benefit.

Among smaller cap companies, New Jersey Resources (NJR) is benefiting from this transition through its Clean Energy Ventures unit. In other industries we have identified companies that may benefit from increasing energy efficiency, less carbon intensity, and those deemed to have more sustainable business models throughout this transition.

Walden seeks to identify companies that have a high quality financial profile, a sustainable business model, and are reasonably valued.

Conversely, we seek to *avoid* most companies in industries that stand to be displaced by this transition. The suppliers of fossil fuels to coal burning power plants have seen declining demand for their product. We expect this will continue and so tend to avoid most stocks of companies operating in the extractive industries. We have also avoided most regulated utilities that own fossil fuel burning electricity generating facilities. In both cases we anticipate some degree of stranded asset risk to their long run sustainability as more and more electricity is generated by renewables.

CONCLUSION

We began this three-part series expressing our support for the goal of the Paris Climate Agreement: limiting the increase in the global average temperature to below 2°C above pre-industrial levels, and pursuing efforts to limit the temperature increase to 1.5°C. We noted the importance of addressing GHG emissions associated with electricity generation, and that a transition to a low-carbon electricity grid was underway. Since first sharing our thoughts, one could say that so much *and* so little has changed. On the one hand, the political tide at the federal level has changed. The Trump administration, elected in part on the promise of bringing back jobs in the coal industry, signed an executive order calling for the review of the Clean Power Plan, effectively killing it. More recently, President Trump set in motion the multi-year process of withdrawing the US from the Paris Climate Agreement. On the other hand, the economics of renewable energy technology continue to improve; consumers—both individual and corporate buyers of electricity—continue to drive demand; and many other carrots (tax credits) and sticks (renewable portfolio standards) remain in place.

It is too soon to tell the short-term impact of these competing forces, but with each passing year the economics of renewable energy rely less and less on government policy intervention. We continue to support the goal of the Paris Climate Agreement, and we expect high quality companies with sustainable business models that are directly exposed to the transition to a low-carbon future to emerge positively from this seismic transition. While the high quality opportunity set remains limited in this area, we will maintain our research discipline and continue our diligent research to identify winners and losers and invest client assets accordingly.



Richard Q. Williams, CFA
Portfolio Manager



Aaron J. Ziulkowski, CFA
Manager, ESG Integration

¹A one gigawatt coal-fired power plant can provide sufficient electricity for approximately 640,000 homes, assuming an 80% capacity factor and average household electricity use of approximately 11,000Kwh. Because renewables have lower capacity factors (40% for wind and 25% for solar) than many conventional technologies a gigawatt of electric power generation of wind could provide electricity sufficient to meet the demand of approximately 320,000 homes, while a similar quantity of solar could power approximately 200,000 homes. Further complicating the issue is the intermittency of renewable energy, also discussed in Part 1 of our series.

²<https://www.eia.gov/todayinenergy/detail.php?id=30112>

³Center for Research in Securities Prices (CRSP) database as of March 31, 2017

⁴The explanation for the demand response is less straightforward. Utilities' demand for solar power and natural gas has increased as these sources have gained share, but supply growth has overwhelmed this demand increase, especially since aggregate demand for electricity is unchanged.

⁵"Beyond YieldCos," Climate Policy Initiative, June 2016.

⁶Bloomberg. As of March 8, 2017.