



HOW TO INVEST IN ...

Renewable Energy

By Chris Clement

Renewable energy became mainstream in 2016. The perceptions that renewable energy is easily outcompeted by conventional fossil fuels, burdened by technological risk and uncertainty, or simply an environmental luxury for the wealthy have been thoroughly debunked. Do not let these myths cloud your judgment, as renewable energy is now a considerable presence within the energy market. This is not a hypothetical or some potential future, but the ground truth reality in today's market, which many investors and industry experts project will remain the case for the foreseeable future.

The following article will center around investing in renewable electrical power generation. There are other forms of renewable energy that do not pertain to electricity, such as biofuels, or that are complementary grid edge technologies, such as energy storage. We will also leave aside traditional low-carbon generation sources such as large-scale hydroelectric and nuclear plants.

In 2016, more than 50 percent of new installed capacity came from renewable electricity for the second year in a row. This phenomenon was largely driven by wind and solar, but also included some less prevalent generation sources such as biomass and geothermal. Non-hydro renewable energy sources now comprise nearly 9 percent of total U.S. electrical generation, according to the U.S. Energy Information Agency. And the lion's share of that renewable generation capacity has been built over the past six years.

This is not an anomaly, but rather appears to be the start of a period of sustained growth. Wind and solar are projected to account for 64 percent of the estimated \$11.4 trillion invested in energy globally through 2040, according to Bloomberg New Energy Finance. The key drivers underpinning the remarkable emergence of renewable energy are: (1) dramatic cost decreases in solar and wind to the point where they are often the lowest cost of new generation available to the grid, (2) structural decline of coal and nuclear in large part due to low-cost natural gas, and (3) policy incentives and broad public support for renewable energy. Renewable energy is not a passing fad or a trendy alternative to conventional power sources; it has become the predominant form of energy development and investment in the United States and globally.

Before considering available investment vehicles, some current context would be useful. In 2016, renewable energy investment dropped 18 percent to below \$288 billion. However, much of this drop can be attributed to dropping technology costs, as total renewable power capacity increased by more than 9 percent. The costs for solar panels and wind turbines have fallen by 80 percent and 35 percent, respectively, since 2009, according to the International Renewable Energy Agency. Of this total, over 70 percent was in direct project investments, as opposed to corporate investments or M&A, notes Bloomberg New Energy Finance.

While it stands to reason that a primary way in which to invest in renewables is through

direct project investments, there are a range of other vehicles to consider based on an investor's level of sophistication, risk tolerance, liquidity preference and investment horizon.

The discussion below should not be considered a direct endorsement of any of the strategies or investment vehicles that are identified. Nor should this be considered a comprehensive review; there are a wide array of alternatives within each broad investment theme that should be considered before making an investment. Specific investment strategies should be developed in accordance with each investor's investment goals and with the assistance of a professional investment adviser.

PROJECT FINANCE

The beauty of renewable generation is that it comes in many shapes and sizes. Direct project investments can range from small-scale rooftop solar projects under 100 kilowatts that are designed to serve a single building to large-scale wind farms many hundreds of megawatts in scale that power thousands of buildings. The necessary scale and risk profile for traditional project finance is most easily achieved by larger-scale projects (65 percent of total renewable energy investment in 2016) with long-term power purchase agreements (PPAs) and credit-worthy offtakers, often utilities. These types of projects comprise the core of project finance, in which a project sponsor, or developer, raises capital for a specific project through a special project vehicle (SPV) and equity and debt providers rely solely on project cash flows to gen-

erate their returns. The typical fee structure is a "waterfall," in which profits are distributed among the project sponsor and LP investors on an investment-by-investment basis.

One reason that renewable energy project finance is so prevalent is that it offers the necessary flexibility in structuring a tax-efficient investment. This is particularly important for solar and wind projects, which generate significant tax benefits (i.e., the Investment Tax Credit for solar and the Production Tax Credit for wind, biomass and geothermal), and generally require the inclusion of a separate tax equity investor in order for the project to monetize these benefits efficiently.

There is inherently a high degree of concentration risk in investing in any one project or even a pipeline of projects from a single sponsor, which generally means that only investors

with a particular expertise in renewable energy project finance and access to large sums of capital at a competitive cost should venture into this space. For investors with a risk appetite and some underwriting expertise, earlier investments at the development or construction stage offer a higher risk-return profile. Development-stage investments range from \$100,000 to several million dollars per project. Depending on the technology and scale, construction finance is somewhere in the range of \$1 million to \$4 million per MW installed. A typical utility-scale solar project would be 5 MW to 80 MW, whereas wind is at a larger scale at 20 MW to 150 MW.

Development capital typically seeks a return on equity of 2x to 3x over the course of 6 to 18 months, whereas construction finance is often structured as short-term loans at interest rates

that account for project execution risk. In many cases, investors at these earlier stages will sell their interest once the project becomes operational to an investor with a lower cost of capital and an interest in holding the asset long-term. The return expectations for these investors tend to be in the range of 6 percent to 10 percent unlevered internal rate of return. Another way for investors to achieve a low-risk yield profile is through secondary finance using secured debt instruments to lever stabilized operational projects at rates in the 5 percent to 8 percent range.

PRIVATE EQUITY AND INFRASTRUCTURE FUNDS

In contrast to project finance, private equity fund managers raise capital commitments in support of an investment thesis, not necessarily specific project investments. The vast majority of funds are pure blind pool, as most have an indicative pipeline of project investments lined up. Subscription agreements with LPs articulate the terms under which the GP can make a capital call to the fund LPs to make a fund investment. Fee structures generally mimic those in the broader private equity market. The investment strategies vary from fund to fund, but generally concentrate on acquiring either shovel-ready assets (e.g., fully permitted projects with interconnection agreements and power purchase agreements) or operational projects. The more de-risked the project, the higher the price, and therefore the lower the cost of capital needed to compete with the growing number of investors active in this space. Private equity funds that are structured to assume higher levels of risk tend to invest in earlier stages of project development, which affords them a higher potential return on successful projects, but comes with a higher risk that development stage investments will not yield a profitable operational project. Most private equity funds, however, focus on acquiring projects that are ready for construction or that have just become operational. In these situations, they serve as the take-out capital, in which the developers and early stage investors are bought out, often leaving the fund as the sole owner of a long-term operational project.

According to alternative asset data provider, Preqin, \$13 billion across 26 private equity funds focused solely on renewable energy was raised in 2016. As of Q3 2017, more

RENEWABLE ENERGY INVESTMENT VEHICLES

INVESTMENT VEHICLE	RISK PROFILE	CAPITAL COMMITMENT	TARGET RETURNS
Project Finance: Direct project investments at development, construction or operational stage			
Development	High	\$100k-\$1M+ per project	2x-3x ROE
Construction	Low-Medium	\$5M-\$100M+ debt	7%-14% loan interest
Operational Project	Low-Medium	\$5M-\$50M+ equity	6%-10% unlevered IRR
Permanent Finance	Low	\$100k-\$1M+ per project	2x-3x ROE
Private Equity: Funds seeking to acquire diversified portfolio of projects at various stages development			
Lower Risk	Low-Medium	\$20M-\$100M per fund	8%-12% unlevered IRR
Higher Risk	Medium-High	\$10M-\$50M per fund	12%-20%+ unlevered IRR
Public Markets: Funds tracking renewable energy indices or growth dividend stocks backed by operating projects			
ETFs	Medium-High	Retail	Above S&P 500
YieldCos	Low-Medium	Retail	6%-8% dividend yield
Public Markets: Funds tracking renewable energy indices or growth dividend stocks backed by operating projects			
Institutional	Low	\$5M-\$100M+	4%-8% bond yield
Retail	Low	\$1,000+	4%-8% bond yield
Public Markets: Funds tracking renewable energy indices or growth dividend stocks backed by operating projects			
Retail Platform	Low-Medium	\$1,000+	6%-8% yield
Project Platform	Similar to Project Finance		

than half of the \$71 billion of current energy funds raising capital were focused on renewable energy. They range in size from above \$1 billion, such as BlackRock Global Renewable Power Fund II, which closed at \$1.65 billion in 2016, to smaller funds such as True Green Capital Fund II, which closed at \$350 million in 2017. The average fund size since 2015 has hovered in the \$600 million range, and typical commitments are in the \$10 million to \$100 million-plus range. The return expectations for such funds have been dropping in recent years, with unlevered IRRs generally in the 8 percent to 12 percent range for more proven and scalable technologies such as solar and wind, and 12 percent to more than 20 percent for riskier technologies or more complex project types. A recent trend has been for more conventional energy or infrastructure funds to incorporate a renewable energy theme, as well. These mixed-energy fund raises have dominated the first three quarters of 2017 compared to either pure conventional or pure renewable energy, and offer the investor a more diversified exposure to the energy sector.

PUBLIC MARKETS

Despite the fact that many macro-trends support the continued productivity and growth in renewable energy, the public markets have been a volatile place for investors to place their capital. In many respects, this is to be expected in an industry in this stage of rapid growth and development. Rapid advances in technology in terms of both performance and cost have raised the stakes of competition among equipment manufacturers, which has naturally resulted in failed businesses and bankruptcies such as SolarWorld and Sungevity. Similarly, there has been an explosion of new business models and financing structures employed by renewable energy project developers. This, too, has led to failed businesses, the most notable of which has been the bankruptcy of SunEdison. Failures such as these can be traced back to poor strategy and execution more than any inherent weakness in the industry at large. The industry consolidation around best-in-class equipment, development models and financing products is a healthy and necessary part of the industry maturation process. As such, to invest in publicly traded renewable energy

companies requires a good deal of sophistication and risk tolerance.

ETFs are a relatively simple way to gain exposure to publicly traded renewable energy companies with the added benefit of superior diversification compared to individual stocks. Among the top ETFs by total assets are the Guggenheim Solar ETF, the PowerShares Cleantech Portfolio, the First Trust Nasdaq Clean Edge Green Energy ETF and the iShare Global Clean Energy Fund. As with all ETFs, it is critically important to understand the composition of the indices that are being tracked. In the case of renewable energy, important factors to consider include the company capitalization, geographic focus, business model (e.g., equipment manufacturer, project developer, etc.), and underlying investment vehicles used (e.g., stocks, futures, options, swaps, etc.). According to the ETF Database, many renewable energy ETFs have performed quite well over the last year, with returns in excess of 15 percent.

A variation on traditional equity ETFs are yieldcos, which are much like a real estate investment trust (REIT) for renewable energy. They are portfolios of operating assets that generate

dividends for investors. Just like REITs, they are traded on exchanges and should be considered a growth-oriented dividend stock. Among the more notable yieldcos are 8Point3 Energy Partners, Hannon Armstrong, NextEra Energy Partners and Pattern Energy Group. The overall performance of the yieldco model has been mixed. Initial reception after the introduction of the first yieldcos was very positive, which may have led to inflated expectations for capital appreciation. As with structures of this type, once the cost of capital (determined by the stock price) exceeds the returns able to be generated by the portfolio, the model breaks. Renewable energy project investments should still be considered an infrastructure investment with relatively thin margins compared to growth stocks, but also substantially lower risk and larger scale in terms of the ability to productively deploy capital. Despite the fact that yieldcos have not entirely lived up to their initial promise, the approach remains valid in bundling stable operating assets into portfolios to generate dividend yields generally in the range of 6 percent to 8 percent.

GREEN BONDS

Green bonds have grown into a significant, albeit still small, fraction of the bond market. According to the Climate Bonds Initiative, more than \$80 billion of green bonds were issued in 2016, with projections for 2017 to nearly double that amount. They are a bond in every sense, but come with a specified use of proceeds to finance green investments, as well as monitoring and reporting mechanisms to track environmental returns. As with conventional bonds, green bonds can be issued by a range of entities: sovereign, state, and municipal governments such as the California State Treasurer, institutional investors such as BlackRock and State Street, specialist ESG investors such as Mirova, international development organizations such as the World Bank, universities and school districts, and now increasingly by corporations such as Apple, Toyota and Barclays. These green bonds range from \$100 million to greater than \$1 billion, and generally have yields in the 4 percent to 8 percent range. Renewable energy is a large focus of many though not all green bonds, which are generally used as subordinated debt to finance project development.

As with most bond issuances, their target is generally institutional investor capital. How-

ever, there are indices such as the S&P Green Bond Select Index and ETFs such as the VanEck Vectors Green Bond, the Mirova Global Green Bond and the Calvert Green Bond fund that have been developed to give retail investors access to the green bond market while providing the added benefit of diversification. In addition, there are a small number of specific green bond issuances that cater to retail investors; among others, the World Bank through Merrill Lynch and Morgan Stanley Wealth Management, and the IFC and SolarCity (now part of Tesla) through Incapital.

In general, green bonds have yield and duration characteristics comparable with the broader global bond market. If this remains the case, replacing a portion of your fixed-income allocation with green bonds would not likely change overall portfolio performance

Investments are pooled and used to finance project development and construction. This is largely the model underpinning Mosaic and Wunder Capital, which largely cater to retail investors. Other crowdfunding platforms, such as MegaWatt-X and GridShare, offer unique direct investment opportunities with terms that vary on a project-by-project basis, often at a scale that would appeal more to institutional investors and family offices.

CONCLUSION

Until recently, only specialized investors with a particular expertise in renewable energy were able to access investment opportunities in this space. As described here, that story has changed. There are a range of investment vehicles available to the full spectrum of institutional to

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significantly in the short-term. Over the longer-term, these investments would serve as a hedge against climate risk, but without the customary premium paid for such a hedge.

CROWDFUNDING

As a new entrant into the market, crowdfunding investment vehicles are relatively unknown to most investors. Notwithstanding, this is a particularly fast-growing market segment that is capitalizing on some market inefficiencies in financing smaller-scale or more niche projects. The fact that many renewable energy projects have highly predictable, long-term contracted cash flows has enabled the development of a range of new crowdfunding investment products and platforms that offer retail investors exposure to renewable energy at the project level.

Crowdfunding investment generally comes in two flavors. One is a standardized debt product with cash distributions to investors.

retail investors that offer exposures to various facets of the renewable energy industry at competitive market returns. And for the increasing number of investors for whom environmental concerns or climate risk hedges are important, investing in renewable energy offers an attractive double-bottom line.

While there is ample reason to believe the renewable energy sector has positive prospects for the foreseeable future, that does not mean that every project, company, fund or investment vehicle will yield desirable risk-adjusted returns. What is certain is that the sustained demand for more renewable energy over the long-term will support this increasingly vibrant and profitable landscape of investment opportunities. ■

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