RESEARCH BRIEF

To Do Good and To Do Well: The Experience and Prospects for Public Market Renewable Energy Infrastructure Investors

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PATRIZIA

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01 Introduction

INTRODUCTION

Working for good, as well as for profit, has been an aspect of doing business for as long as business has been done. There have always been those who have sought to create businesses that provide benefits to workers, customers, and the world as a whole. The invention and mass production of microwave ovens, the construction of high-quality factory worker housing by 19th century employers, the building of cities with both beauty and utility themselves are all examples. This view of business as a positive force in the world has waxed and waned over the centuries, but has always been with us.

What is relatively new, however, is the ability of broad-market investors to participate in businesses through shareholdings. In the past, investor groups were generally limited to small groups of joint investors, often merchants themselves, who sought to benefit from a particular business endeavour. The broadening of this business investment base to ordinary shareholders who can invest small fractional amounts in publicly traded companies, or in investment funds, has meant that, in theory, many more can enjoy the benefits of business endeavours that satisfy both profit-seeking and world improvement goals. Companies that operate renewable energy businesses, or funds consisting of renewable energy companies, are a classic example of those that seek to both achieve a profit on their investment and to provide a positive contribution to the world. For renewable energy operators, this positive is actually the neutralisation of a negative: by substituting for oil & gas extracted from the earth and burned into its atmosphere, renewable energy improves a situation that would otherwise be worse, for the same amount of energy consumption.

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Even in the days of merchant finance, however, not all endeavours were met with investment success, whether they intended to provide a positive contribution to the world or not. Thus, whether public-market investors can do well by investing in the renewable energy infrastructure currently available bears further review. What should a potential renewable energy investor invest in, and where should they look for an investment return? This investment brief focuses on public-market renewable infrastructure as the initial place to review investment return potential. Renewable infrastructure available to private market investors would be the ideal source of such investment due to its direct application, but data is still limited in both depth and time scale for private markets, and therefore a public-market focus is one that can at least provide an indication of how the investing public views these types of infrastructure assets.

In general, there are three types of public-market investment that can currently be made in renewable energy infrastructure: renewable energy funds, renewable energy operating companies, and renewable energy investment companies. Putting each into a common infrastructure valuation framework, such as the valuation metric Enterprise Value to EBITDA (EV/EBITDA) shows that each investment have different characteristics, which are described below. The methodology for this research applies EV/EBITDA at a corporate or fund level, using the annual financial statements and current market valuation of each corporation or fund. While EV/EBITDA is typically applied at an asset level as a shorthand measure of valuation, the fact that the renewable energy corporate or fund entities selected for the samples below are generally aggregations of renewable energy assets means that this methodology can approximate single-asset measures of EV/EBITDA for similar types of renewable energy assets; i.e. an aggregation of wind farms in a particular region, bundled together in corporate form, can theoretically be compared with a single wind farm in the same region.[1]

1. Note that corporate management fees, if any, are subtracted from EBITDA in this research in order to compare corporate and fund entities with each other; to put private market funds on a comparable basis would require subtracting management fees charged with respect to private market assets (i.e. net IRR).

02 Renewable Energy Infrastructure Funds

RENEWABLE ENERGY INFRASTRUCTURE FUNDS

A starting point for public-market investors is renewable energy funds themselves. Since 2008, a significant number of exchange-traded, renewable energy focused investment funds have been available to investors. Table 1 shows the characteristics of a sample of these funds that have at least a 10-year track record. All invest in publicly traded renewable energy companies that produce wind, solar or geothermal energy, and/or the components to be able to do so[2]:

TABLE 1: SUMMARY DATA FOR EXCHANGE TRADED RENEWABLE ENERGY FUNDS

Fund	10-Year Annualised Return	Since inception return	Estimated EV/EBITDA	Stock Beta
iShares Global Clean Energy ETF	9.9%	-6.6%	39.1	1.3
Invesco Solar ETF	15.9%	-8.4%	88.9	1.5
Invesco WilderHill Clean Energy ETF	8.8%	-3.4%	N/A	1.9
First Trust Global Wind Energy ETF	8.5%	-4.4%	13.1	1.0
Invesco MSCI Sustainable Future ETF	8.4%	2.9%	40.0	1.2
Shelton Green Alpha Fund	12.6%	N/A	47.8	N/A
S&P 500	12.8%	7.5%	13.0	1.0
Weighted Average	**11.4%**	**-6.1%**	**48.1**	**1.4**

Virtually all of these funds have a long-term record that is highly variable: 10-year returns have been on average above the return of the S&P 500, but average since-inception returns are negative (most funds began in 2008). The betas of each are high. The holdings of many of these funds are concentrated, often in the same renewable energy operating companies shown in Table 2, below.

Based on fund data, an estimate of trailing weighted average EV/EBITDA for the holdings in each fund (48x) is on average extremely high (across North American infrastructure, private fund managers reported investing EV/EBITDA on average is about 14-15x); to generate a positive return on a portfolio of renewable investments based on a conservative set of assumptions would require annual nominal EBITDA growth of greater than 9% over a long-term horizon. Thus, investing in one or more renewable energy ETF may not seem prudent for a medium-term investor, unless long term cash flow growth in the component companies of the fund is expected to be very high for a very long period.

2. Source: Bloomberg. Reported beta is 5-year average. Estimated EV/EBITDA is calculated based on reported fund data. Data as of October 2022. N/A = not available. Figures in USD. Working assumptions for projected returns are based on a financial forecast with the following assumptions: 30-year asset life with terminal value, 50% debt finance, and discount rate comparable to renewable infrastructure average.

03 Renewable Energy Operating Companies

RENEWABLE ENERGY OPERATING COMPANIES

A second source of potential investment for an investor is to invest in publicly traded renewable energy companies themselves. These companies directly develop or invest in renewable energy projects such as wind, solar, hydroelectric, and geothermal energy infrastructure assets. In North America, some are independent developers and investors, but many of the largest are so-yieldcos that buy completed renewable energy projects from affiliate or parent companies. (In Europe, renewable energy projects are primarily controlled by large, diversified energy utilities, or by investment companies, which are discussed further below).[3]

TABLE 2: SUMMARY DATA FOR RENEWABLE ENERGY OPERATING COMPANIES

Fund	10-Year Annualised Return	Estimated EV/EBITDA	Estimated EV/MW ($ millions)	Stock Beta
Brookfield Renewable Partners LP	8.4%	15.5	1.88	0.8
Next Era Energy Partners LP	8.3%	25.4	2.55	0.9
Clearway Energy	14.5%	17.0	1.64	0.8
Transalta Renewables	3.8%	14.8	1.21	0.7
Northland Power	7.8%	9.9	3.17	0.5
Innergex Renewable Energy	8.6%	14.3	2.16	0.4
50/50 S&P 500/TSX 100 Composite	9.0%	13.0*	N/A	1.0
Weighted Average	**9.2%**	**16.6**	**2.2**	**0.7**

Table 2 shows summary data for publicly traded North American renewable energy companies that are engaged in the operation and development of renewable energy. Compared with the renewable energy ETFs shown in Table 1, the average 10-year return for renewable energy companies is smaller, but the current estimated company valuation (EV/EBITDA) is significantly lower, as is the average stock beta; both align better with the expected characteristics of public-market infrastructure. At an estimated trailing EV/EBITDA average of 16.6x, it's still possible to achieve a 5-10% long term return with a portfolio of assets that generates 0-4% nominal annual EBITDA growth.

One potential concern with the renewable energy operating companies shown in Table 2 is that the approximately half that are yieldcos buy completed or close-to-completed renewable energy infrastructure from parent or affiliated companies. The transfer of infrastructure between corporate affiliates may introduce valuation risk; it is possible that investors in yieldco companies pay more for renewable energy infrastructure than an unaffiliated company would.

3. Source: Company annual reports, Bloomberg. Data as of November 2022. Annualised returns are 10-year average or since company inception. Valuation figures generally exclude non-operational development assets. Figures in USD. Data excludes companies that no longer exist, such as SunEdison, but includes remaining assets acquired by other companies; return data would be less favourable if these companies were included.

04 Renewable Energy Investment Companies

RENEWABLE ENERGY INVESTMENT COMPANIES

A third potential investment source for a public-market investor is to invest in one or more renewable energy infrastructure investment companies. Whereas most renewable energy operating companies are listed in North American markets, most renewable energy investment companies are listed in Europe. These companies typically invest in renewable energy infrastructure operations that are purchased from developers of these infrastructure assets, or from other investors. They are different from renewable energy operating companies because they generally do not have in-house development arms or affiliates. Table 3 shows the current valuation of these companies based on their most recent annual reported financial results.[4]

TABLE 3: SUMMARY DATA FOR RENEWABLE ENERGY INVESTMENT COMPANIES

Investment Company	10-Year Annualised Return	Net Asset Value Premium/Discount	Estimated EV/EBITDA	Estimated EV/MW (EUR millions)	Stock Beta
The Renewable Infrastructure Group	8.1%	-1.9%	9.5	1.9	0.1
Greencoat UK Wind	9.7%	-4.7%	12.5	3.3	0.2
Atlantica Sustainable Infrastructure	0.8%	84.5%	12.0	4.6	0.8
JLEN Environmental Assets	8.4%	1.8%	13.9	3.5	0.2
Octopus Renewables Income	5.3%	-4.6%	15.2	3.6	0.2
Aquila European Renewables Income	-1.6%	-2.3%	10.9	0.6	N/A
EuroStoxx 600 Index	4.2%	N/A	8.3	N/A	1.0
Weighted Average	**6.4%**	**10%**	**11.7**	**3.1**	**0.3**

This group of investments has the lowest average historical return of the three samples, although relative to European equity indices the return is comparable. It also has the lowest average estimated EV/EBITDA, and by far the lowest average beta. At an estimated trailing weighted average EV/EBITDA of 11.7, the average company in this sample can achieve the same return as realised historically with low nominal EBITDA growth, if all else remains equal, using the same set of assumptions as for the other two samples.[5]

5. To achieve a higher return would require greater real EBITDA growth.

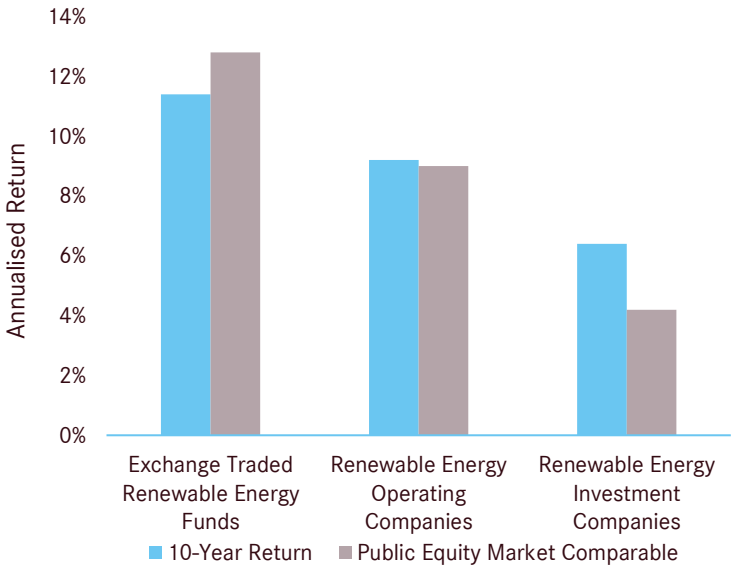
05 Conclusions

CONCLUSION

This survey of the investment options available to public market investors shows that current valuations of publicly available renewable energy investments on a common EV/EBITDA basis are different between investment types and geographies, and could therefore lead to different investment returns. Of the three types of renewable energy investment, renewable energy ETFs have had the best absolute 10 year historical performance, but are by far the most highly valued on an EV/EBITDA basis, as shown in Charts 1 and 2. They have also had the lowest since-inception returns.

Renewable Energy ETFs and Funds have had variable performance. The 10-year sample return of 11.4% is the highest of the three samples, although it is still below the return of the S&P 500 over the same period. In addition, the annualised since-inception return of this sample is -6.1%; an investor's timing would thus have been determinative of past realised investment return. On average, these funds also have high betas, and their portfolios have very high estimated trailing EV/EBITDA multiples, particularly relative to public- and private-market infrastructure indices. Many invest in the same group of renewable energy companies; an investor in one or more of these funds may therefore not necessarily benefit from the diversification that a fund can ordinarily provide relative to an individual stock investment.

CHART 1: RENEWABLE ENERGY INFRASTRUCTURE ABSOLUTE AND COMPARATIVE PERFORMANCE

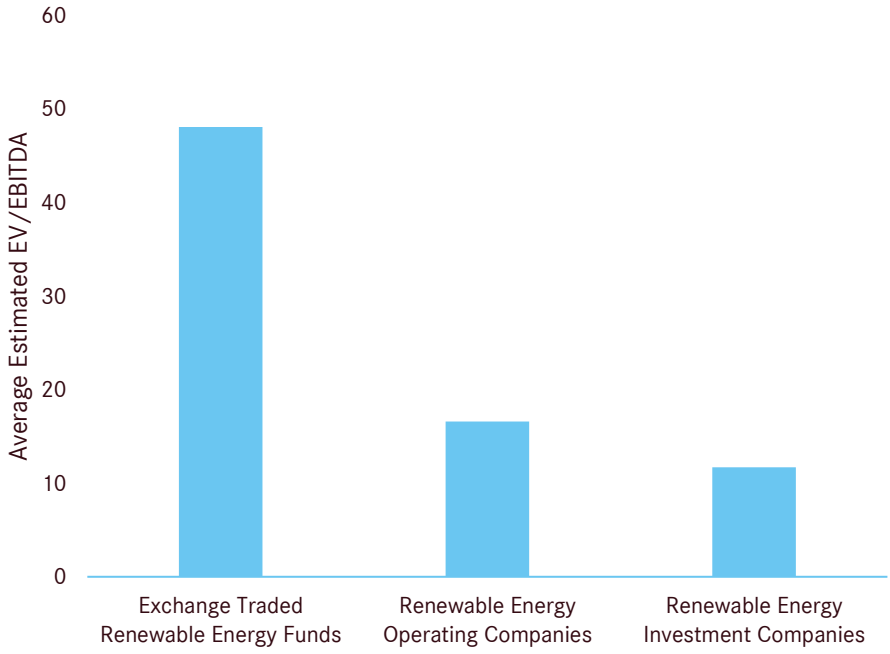


Renewable Energy Operating Companies have had more consistent, but lower annual returns than renewable energy ETFs. Their 10-year sample return of 9.2% is comparable to a composite public market equity return over the same period. Their stock betas are significantly lower than those of renewable energy ETFs, and their estimated trailing EV/EBITDA multiples are also lower. Beyond this, comparisons between renewable energy operating companies can be challenging, since some companies can act as yieldcos (purchasing completed or close-to-completed assets from affiliated companies), can work independently to develop projects by investing operating and financing cash flow into them, or can buy completed projects from unaffiliated developers.

Renewable Energy Investment Companies have lower average returns than the other samples, but also lower aggregate trailing EV/EBITDA estimates, and low stock betas relative to the other public-market types of renewable energy infrastructure investment. The 10-year sample return of 6.4% as of October 2022 is higher than a comparable European public market equity return over the same period, and has risen since that time.

These companies may seem to have better relative value than other renewable energy investments, but relative to the broad European equity market, even they are expensive: their average EV/EBITDA (11.7) is 42% greater than that of the broad Eurostoxx 600 (8.2); this premium is also greater than that of the sample of renewable energy operating companies relative to the S&P 500 (27%).

CHART 2: ESTIMATED AVERAGE ENTERPRISE VALUE TO EBITDA MULTIPLES FOR RENEWABLE ENERGY INFRASTRUCTURE



Finally, one ineluctable fact about renewable energy infrastructure investment is that virtually all to date has benefitted from government financial support. This support varies from construction or production tax credits, to direct government subsidies, depending on the location. However, the level and composition of support can change significantly over time, in ways both positive and negative:

- North American renewable infrastructure operators expect to benefit from the expansion and lengthening of tax and production subsidies for renewable energy;
- European Union operators, on the other hand, have experienced both direct government subsidies, but also face the current prospect of windfall taxes on their revenues.

The popular groundswell of support for renewable energy has meant that government subsidies to encourage production have continued, but none last up to the 25-30 years that infrastructure investment is generally forecast to generate investment returns.

Quantifying the contribution of government financial support to the investment returns achieved by public-market renewable energy is beyond the scope of this brief, but on average it has been significant. At the same time, potential investors should not view this as an indictment of renewable energy investment: government policy, from semi-conductors to shoes, shapes many aspects of industry. But it is the mismatch between the long-term returns provided by infrastructure and the shorter-term effects of government policy changes that is particularly relevant in this case.

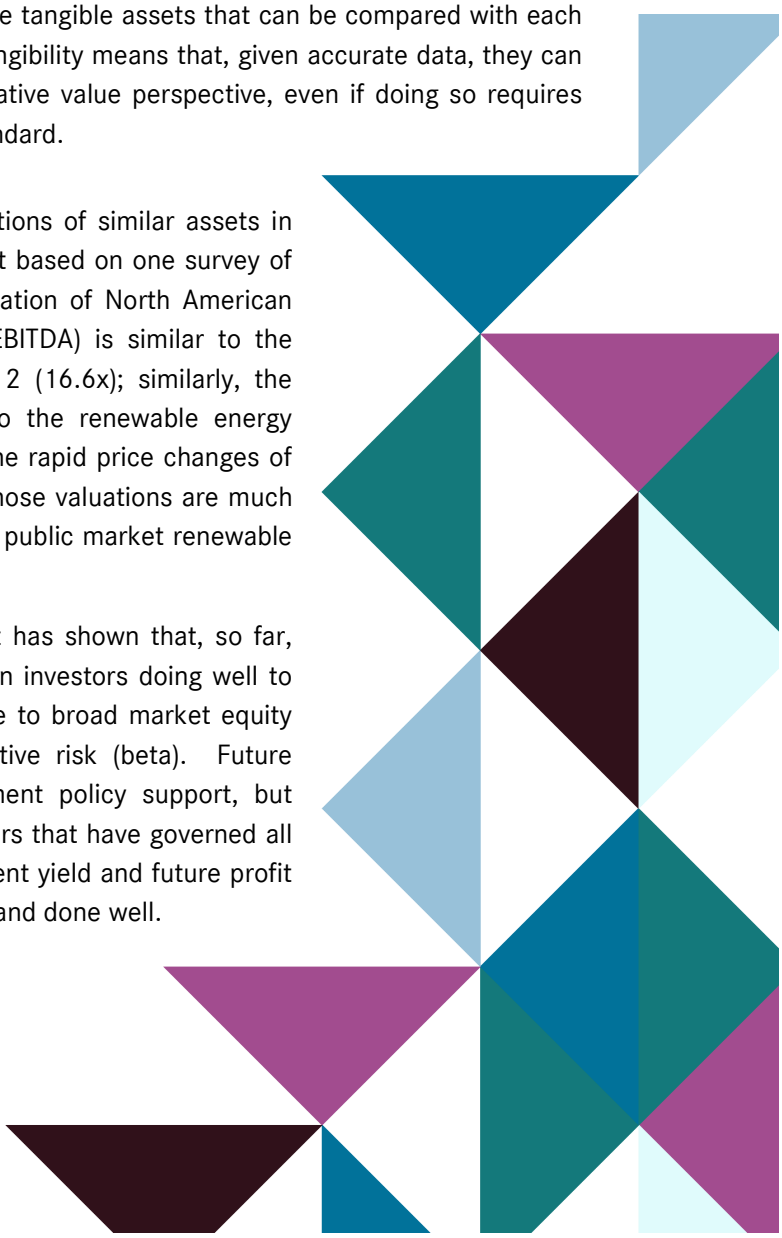
It is possible that renewable energy infrastructure efficiency will increase, and energy prices increase, to the extent that government support is no longer necessary in some cases. It is also possible, however, that energy prices decrease over the medium to long term due to vastly increased supply of renewable energy, including residential and commercial (behind-the-meter) solar energy.

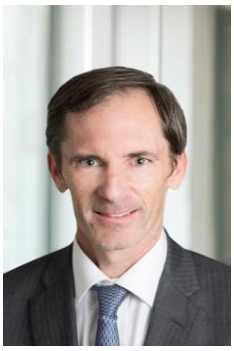
Times of uncertainty can often be good environments in which to make productive investments. For public market investors, there are various ways to invest in renewable energy. A common characteristic of these companies or funds to date, however, is that they generally invest in the same basic set of wind, solar, biomass/waste, geothermal, and hydroelectric energy production facilities, along with related electrification enablers such as charging stations and transmission lines.

In an era in which intangible value has dominated, they are tangible assets that can be compared with each other, at least in an approximate sense. This essential fungibility means that, given accurate data, they can also be compared with private market assets from a relative value perspective, even if doing so requires some estimation to bring all to a common EV/EBITDA standard.

In a frictionless, completely inefficient market, the valuations of similar assets in similar locations should theoretically converge, and in fact based on one survey of private market manager provided data, the average valuation of North American renewable energy investments (approximately 16x EV/EBITDA) is similar to the renewable energy operating company average in Table 2 (16.6x); similarly, the average European private market valuation is similar to the renewable energy investment company average in Table 3 (11.7). Due to the rapid price changes of public market assets relative to private market assets, whose valuations are much slower moving, there may be times when there is value in public market renewable energy assets relative to private markets, or vice versa.

This brief on public-market renewable energy investment has shown that, so far, the imperative to invest for good has generally resulted in investors doing well to date, at least on average over a ten-year horizon, relative to broad market equity indices, and generally with a lower level of equity-relative risk (beta). Future performance may be dependent on continued government policy support, but beyond this will be determined by most of the same factors that have governed all investments since business began: investment cost, current yield and future profit growth. For now, public market investors have done good and done well.





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