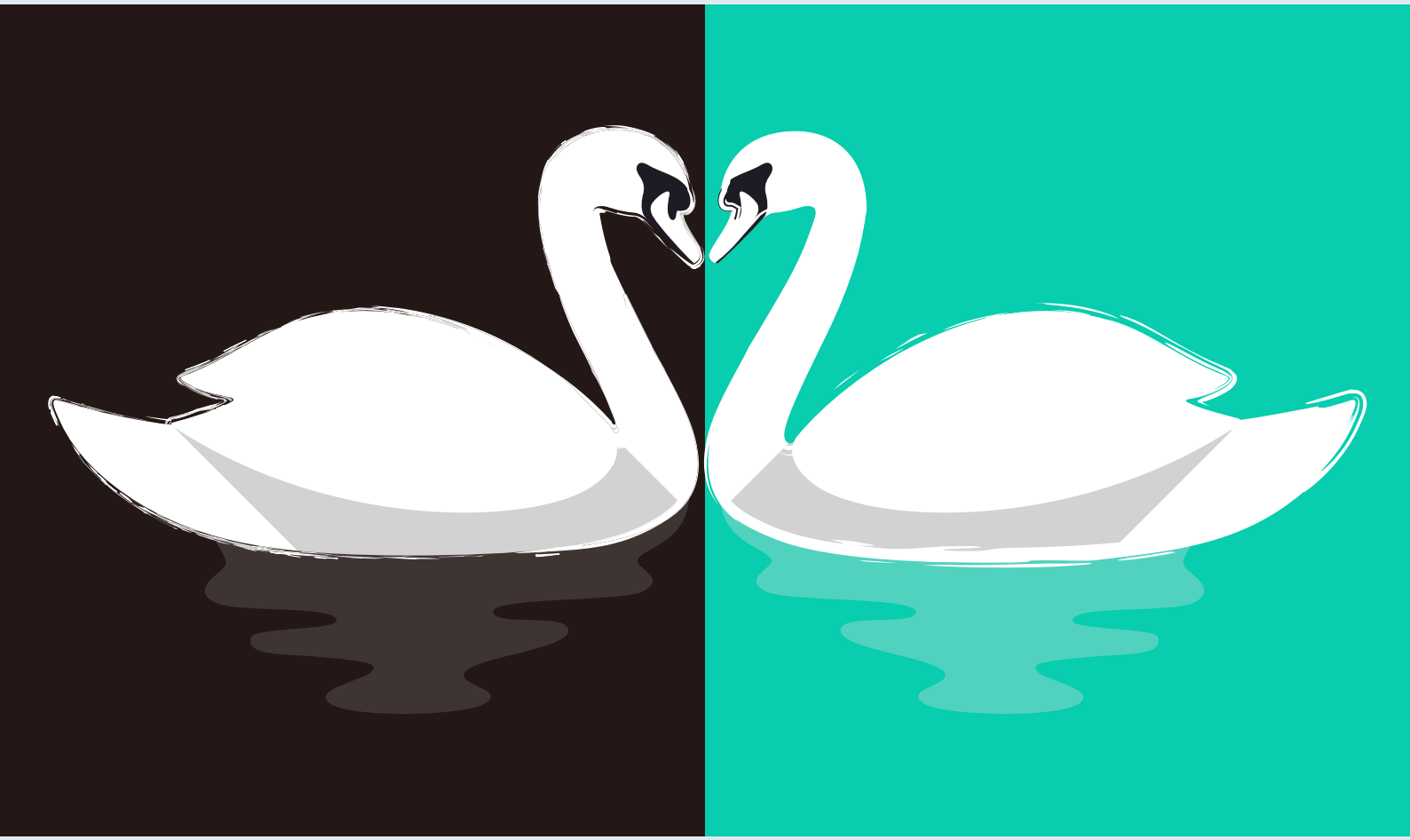
Imperial College Business School | Centre for Climate Finance & Investment

IEA

Clean Energy Investing:

Global Comparison of Investment Returns

March 2021



A Joint Report by the International Energy Agency and the Centre for Climate Finance & Investment

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Executive Summary

To shed light on the long-term prospects for clean energy, we investigate the historical financial performance of energy companies around the world in search of broad structural trends.

This is the second in a series of joint reports by the International Energy Agency and Imperial College Business School examining the risk and return proposition in energy transitions. In this paper, we extend our coverage of publicly-traded renewable power and fossil fuel companies to the following: 1) global markets, 2) advanced economies, 3) emerging market and developing economies, and 4) China. We calculate the total return and annualized volatility of these portfolios over 5 and 10-year periods. Table 1 shows the 5 and 10-year results, up to December 31, 2020.

Table 1 – Summary of Key Findings

Global Markets Portfolios		
	Fossil Fuel	Renewable Power
10 Years		
Total Return	59.0%	422.7%
Arithmetic Return	69.8%	189.1%
AAR	4.7%	18.0%
Annualised Volatility	6.3%	6.2%
Sharpe Ratio	0.30	0.86
Beta	1.31	1.08
5 Years		
Total Return	59.3%	186.6%
Arithmetic Return	62.7%	116.8%
AAR	9.8%	23.4%
Annualised Volatility	7.3%	6.1%
Sharpe Ratio	0.45	1.06
Beta	1.48	1.08

Advanced Economies Portfolios		
	Fossil Fuel	Renewable Power
10 Years		
Total Return	31.6%	727.0%
Arithmetic Return	65.6%	236.1%
AAR	2.8%	23.5%
Annualised Volatility	8.0%	6.3%
Sharpe Ratio	0.22	1.06
Beta	1.61	1.19
5 Years		
Total Return	52.9%	501.6%
Arithmetic Return	70.7%	193.7%
AAR	8.9%	43.2%
Annualised Volatility	9.7%	6.4%
Sharpe Ratio	0.39	1.69
Beta	1.87	1.18

Emerging Market and Developing Economies Portfolios		
	Fossil Fuel	Renewable Power
10 Years		
Total Return	113.8%	136.0%
Arithmetic Return	93.7%	114.9%
AAR	7.9%	9.0%
Annualised Volatility	5.4%	6.9%
Sharpe Ratio	0.47	0.46
Beta	0.90	1.01
5 Years		
Total Return	164.9%	121.2%
Arithmetic Return	108.2%	92.3%
AAR	21.5%	17.2%
Annualised Volatility	5.7%	6.4%
Sharpe Ratio	1.03	0.78
Beta	0.91	0.97

China Portfolios		
	Fossil Fuel	Renewable Power
10 Years		
Total Return	41.1%	243.5%
Arithmetic Return	59.3%	167.3%
AAR	3.5%	13.1%
Annualised Volatility	6.4%	8.6%
Sharpe Ratio	0.24	0.54
Beta	0.77	0.86
5 Years		
Total Return	-7.8%	29.0%
Arithmetic Return	2.6%	41.4%
AAR	-1.6%	5.2%
Annualised Volatility	5.9%	7.4%
Sharpe Ratio	-0.03	0.28
Beta	0.83	0.96

Across all portfolios, renewable power generated higher total returns relative to fossil fuel. Annualized volatility (a measure of investment risk) for the renewable power was lower than fossil fuel in the global and advanced economies portfolios, but higher in the China and emerging market and developing economies portfolios.

We analyze the impact of credit conditions and commodity prices on renewable energy and fossil fuel investment portfolios over the past decade. Our work also includes a correlation analysis. The global renewable power portfolio was observed to be less correlated to the broader market than the global fossil fuel portfolio. The correlation of the reference renewable power portfolio fell during a market downturn, indicating a potential diversification benefit.

Given that some of the largest renewables developers in today's market are not included in our renewable portfolios (due to the dilutive impact of their non-renewables activities), we also explore the performance of power companies with investment strategies and business models in transition. We find that some companies have outperformed the market benchmark in recent years. The subtle nuances of shifts in underlying business models points to a need for more standardised, granular data on underlying segments. This call for better data and analysis applies to all energy companies, but most notably those moving towards more diversified business models.

In 2020, unprecedented economic conditions caused by the coronavirus pandemic led to deteriorating fundamentals in the energy sector. Renewable power portfolios have been resilient during the pandemic, having held up better than fossil fuel companies during a period of severe stress and volatility. Some of this divergence was driven by cyclical factors, such as lower demand and prices for oil. However, structural trends associated with longer-term market and policy shifts towards more sustainable energy systems have also contributed.

To address concerns over the role of fund flows in driving price inflation in renewables company valuations, we examine the total assets and trading activity of passive vehicles that invest in renewables equities. While passive fund flows may have contributed to the increase in share prices, we observe that most passive vehicles do not have the breadth or depth of our constructed portfolios. Associated inflows benefitted only a fraction of our universe of companies.

Overall, our analysis demonstrates a superior risk and returns profile for renewable power in both normal market conditions and amidst recent events. This performance has implications for not just investors, but also for policymakers as they seek to strike a balance between concerns about climate change, financial stability, and economic growth.

Introduction

The Covid-19 pandemic continues to cast a veil of uncertainty over the future of energy and, with it, the ability of governments, companies, and consumers to accelerate clean energy transitions and put emissions into structural decline.[1] Energy demand declined by around 5% in 2020, with the falls concentrated among the more carbon-intensive fuels. However, a slump in capital expenditure across all sectors in energy creates the potential for capital shortfalls – just at the moment when a dramatic increase in funding towards clean energy is needed to meet sustainability goals.[2]

The pandemic reduced global CO_2 emissions in 2020 by an estimated 7%. There is considerable uncertainty about the extent and pace of any rebound in emissions, although recent IEA analysis showed that, by December 2020, these emissions were already edging higher than a year earlier.[3] However, what is clear is that the world is still a long way from a sustainable recovery. In the IEA's Stated Policies Scenario, based on today's policy settings and steady recovery of economic activity to pre-crisis levels in 2021, the world's CO_2 emissions rise to 36 Gigatons (Gt) in 2030. By contrast, the IEA's Sustainable Development Scenario (SDS) maps out a course to meet climate, clean air, and energy access goals in which emissions peak and decline to less than 27 Gt by 2030. Investment and policy decisions over the next decade will play a critical role in determining the world's ability to align with this pathway.

Although a thorough transformation to meet climate goals would need to encompass all sectors of the energy economy, we focus in this paper on the performance of renewables in the power sector. The power sector is not just the largest source of global CO_2 emissions, but also a sector that will need to grow substantially over the next few decades to meet increasing electricity demand – coming not just from traditional sources but also from the electrification of new end-uses such as transportation.

Moving to a cleaner and more resilient electricity system will require rapid progress in the mobilisation of capital for renewable sources of generation, as well as enabling infrastructure and system flexibility, and improvements in efficiency. In the IEA's SDS, low-carbon sources account for almost two-thirds of total electricity generation worldwide by 2030. Achieving this would require more than three-quarters of the total annual $3 trillion in energy investment to go towards clean energy and electricity networks.

The implications of such a dramatic shift raises critical questions for investors. Renewable power requires large upfront investment and the cost of capital makes up a significant part of the lifecycle costs. On average, renewable power projects in emerging market and developing economies (EMDEs) face a higher cost of capital than the projects in advanced economies (AEs).[4] By contrast, fossil fuel-related sectors are more dependent on operating expenditures, with a lower share of upfront finance. In EMDEs, these fossil fuel investments are also carried out more by state-owned enterprises, who typically enjoy better access to finance than private-sector developers.[5] The relative lack of transparency regarding the cost of capital for renewables projects (particularly in emerging markets) creates financial risks for investors and economic challenges for policymakers.

The availability of more asset-level data could boost investor demand for renewables. There is potentially a virtuous cycle whereby a reduction in information asymmetries attracts a broader range of financial institutions, thereby creating more favourable financing conditions.[6]

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[1] IEA and CCFI (2020), Energy Investing: Exploring risk and return in the capital markets. *IEA and CCFI*.

[2] IEA (2020), World Energy Outlook 2020. *IEA*.

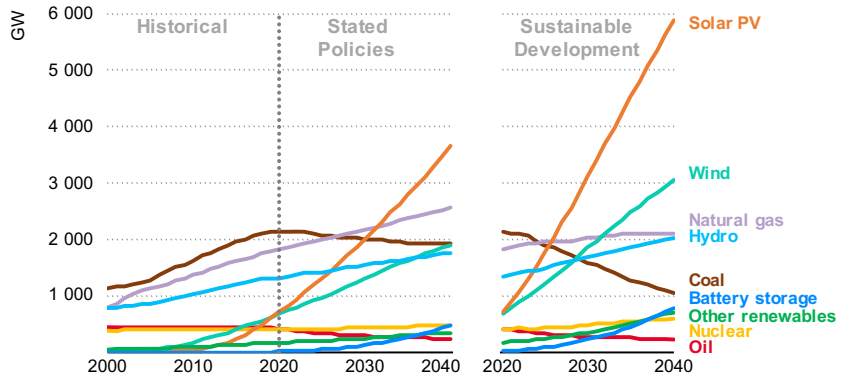
[3] IEA (2021), Global Energy Review: CO2 Emissions in 2020. *IEA*.

[4] Steffen, B. (2020). Estimating the cost of capital for renewable energy projects. *Energy Economics*, 88, 104783. doi:10.1016/j.eneco.2020.104783

[5] IEA (2020), World Energy Investment 2020. *IEA*.

[6] Egli, F., Steffen, B., & Schmidt, T. S. (2018). A dynamic analysis of financing conditions for renewable energy technologies. *Nature Energy*, 3(12), 1084-1092. doi:10.1038/s41560-018-0277-y

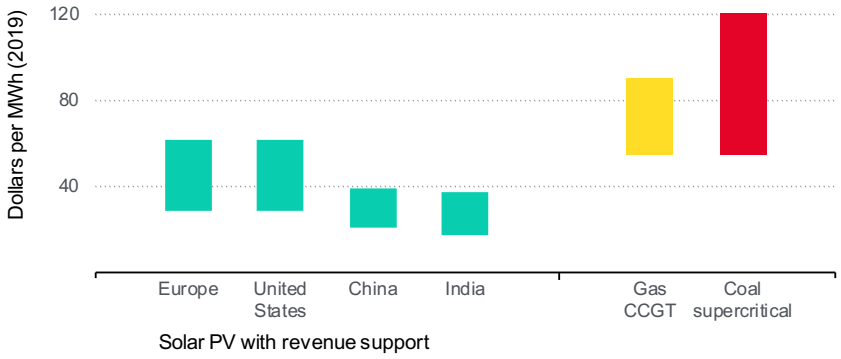
Figure 1. Power generation capacity under Stated Policies and the Sustainable Development Scenario, 2020–40



Source: IEA World Energy Outlook (2020)

There is growing evidence of the affordability of a transition away from reliance on fossil fuel for power generation. The cost of solar PV and wind power generation has decreased in the past five years around the world – enabled by technology gains, revenue support mechanisms and lower financing costs. Supported by improved financing terms for debt and equity, utility-scale solar PV is now consistently cheaper than new gas or coal-fired power plants based on levelized cost of electricity (LCOE) (Figure 2). Additional research points to the cost of debt financing for renewable power projects now consistently lower than that for fossil fuel projects in a number of markets.[7] But against all of the tremendous progress, there remain questions about the ability of current market design to manage a huge scale-up of renewable power all over the world. Crucial to this report are questions regarding policies that support an appropriate level of financial return to incentivise such investment and whether there is sufficient transparency about the cost of capital in EMDEs.[8]

Figure 2. Utility-scale solar PV LCOE under revenue support mechanisms: 2020 final investment decisions (FIDs)



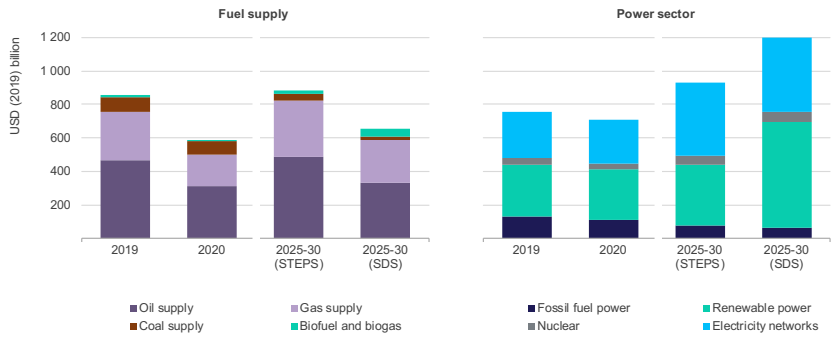
Source: IEA World Energy Outlook (2020)

[7] Kempa, K., Moslener, U., & Schenker, O. (2021). The cost of debt of renewable and non-renewable energy firms. Nature Energy, 6(2), 135-142. doi:10.1038/s41560-020-00745-x

[8] Donovan, C., & Nuñez, L. (2012). Figuring what's fair: The cost of equity capital for renewable energy in emerging markets. Energy Policy, 40, 49-58. doi:10.1016/j.enpol.2010.06.060

Under any scenario, energy investments will need to rise from 2020 levels to meet growing demand. The capital allocation for energy investments shifts dramatically in the SDS. Over the past five years, the share of energy supply investment devoted to fuel supply and power was evenly split. In the SDS, two-thirds of energy supply investments go towards electricity over the next two decades. Meeting sustainability goals points to the current level of investments for renewable power doubling to over $600 billion a year by 2030, with two-thirds of this from solar PV and wind, whose combined share in global generation rises to almost 30%. This scale-up will need to be accompanied by a range of clean energy technologies, including other renewables, especially hydropower, energy efficiency, and enabling infrastructures such as grids and storage.

Figure 3. Global energy supply investment by sector in 2019 and 2020 compared with annual average investment needs 2025-30



Source: IEA World Energy Investment (2020)

As decision-makers consider their responses, the current crisis may represent an opportunity to "build back better" and accelerate clean energy transitions. A number of governments and companies have adapted rapidly to shifting market conditions by announcing ambitious diversification and net zero goals, backed by investment plans to step up clean energy deployment. Realisation of all these net zero targets is fully incorporated in the SDS modelling, alongside a large increase in ambition for countries that have not made such commitments, in order to meet the objectives of the Paris Agreement. Such intentions signal a growing recognition of the risks associated with inaction, but also of the changing financial proposition to investors. In the balance of this report we consider the evolution of renewable energy in stock markets around the world and its relative performance to fossil fuel. In short, we cast an investor's eye on the prospects for a global energy transition by examining the key building blocks of risk and return across the power sector.

Analytical Methods

Our quantitative analysis calculates measures of risk and financial return for hypothetical investment portfolios based on monthly observations. We also show how both segments perform in different credit and commodity regimes. The time series for the analysis is January 2011 – December 2020, inclusive. We place equal weight on each portfolio constituent, regardless of their market capitalization. Therefore, each company has an equal contribution to the total return. This equal weight approach avoids single constituents dominating a portfolio's risk and return profile.

Our sample was constrained by a minimum market capitalization threshold. Companies with a market cap below $200 million (at prevailing exchange rates) as of 31 December 2020 were not included in the final data set. This threshold was set to capture the viewpoint of institutional investors, who rarely invest in micro-and nano-cap companies. In addition, companies had to be in existence for at least three months. This portfolio construction rule was needed to avoid the distortions from recent initial public offering (IPO) activity.

Table 2. Market Capitalization for Global Portfolios

Global Market Portfolios	Fossil Fuel	Renewable Power
Average Market Cap in US dollars	9,774,671,000	4,445,873,000
Median Market Cap in US dollars	1,123,557,000	1,144,475,000

Source: The authors, based on Bloomberg data (2021)

The constituents in the global fossil fuel portfolio have higher average and median market capitalization than the constituents in the global renewable power portfolio. The average market capitalization for the constituents in the global fossil fuel portfolio is over $9 billion, two times greater than the average in the global renewable power portfolio.

The Bloomberg Industry Classification Systems (BICS) was used primarily to establish representative portfolios for each regional grouping. The BICS classification is based on revenue, operating income, and segment assets as published in public reports and related company data. Our primary motive for employing the BICS is that it offers a clear separation of renewable energy from fossil fuel, within the energy industry. However, our fossil fuel portfolios do not differentiate fossil fuel companies who may be investing in clean energy or the carbon intensity of different investments, which can shift (e.g. due to coal to gas switching in power) depending on the evolution of company strategies. Also, we excluded unclassified power utility companies under the BICS, which contains utilities with mixed fossil fuel and renewable power assets.

The total market for oil and gas far exceeds that for renewables. More than 80% of total primary energy demand in 2019 came from fossil fuel – oil, gas, and coal. Modern renewables represented just 10% of total demand. In the SDS, the demand for renewable power would grow strongly in all regions by 2030, expanding more than fourfold in wind and nearly sevenfold for solar PV compared with 2019. Despite this strong growth, and renewables accounting for more than half of power generation by 2030, fossil fuel would still comprise over 70% of primary energy demand a decade from now, even under a sustainable pathway. Natural gas, in particular, sees a relatively stable market share in the near term, even as the contribution of coal (and to a lesser extent oil) decline in the global energy mix.

Table 3. Overview of sub-sectors included in our Fossil Fuel Portfolio

Sector	Sub-sector
Fossil Fuel	Exploration and Production (BICS)
	Integrated Oils (BICS)
	Midstream – Oil & Gas (BICS)
	Oil & Gas Services and Equipment (BICS)
	Coal Mining (BICS)
	Fossil Electric Generation (BICS)
	Gas Utilities (BICS)

Table 4. Overview of sub-sectors included in our Renewable Power Portfolio

Sector	Sub-sector
Renewable Power	Renewable Energy Equipment (BICS)
	Renewable Energy Project Development (BICS)
	Renewable Energy Generation (BICS)
	Green Revenues
	Climate Revenues
	Yieldcos

The fossil fuel portfolio comprises seven BICS sub-sectors shown in Table 3. Unlike the previous report, this time we included both gas utilities and fossil-fuel power generation companies. Three-quarters of the portfolio companies come from the oil, gas, and coal supply sectors, and the rest from gas utilities and power generation. The United States leads the fossil fuel industry with 139 companies, representing one-fourth of the global portfolio and around 50% of the advanced economies portfolio. China and Canada also represent 126 and 48 companies in the global portfolio respectively.

The renewable power portfolio consists of three BICS sub-sectors (Renewable Energy Equipment, Renewable Energy Project Development, and Renewable Energy Generation) and three non-BICS categories (Green Revenues, Climate Revenues, and Yieldcos). We included non-BICS categories to capture the diversity of business models and activities for the renewable power sector.

- **Green revenues** are represented by publicly-listed companies with a net of minimum 50% revenues from Renewable Energy Equipment, Renewable Energy Project Development, and Renewable Energy Generation in the past three years.

- **Climate revenues** are based on the HSBC Climate Solutions Database (HCSD). The database enables screening for markets based on their highest and lowest share of climate revenue as a proportion of macroeconomic variables, such as GDP. It helps to identify rates of change in climate integration across markets. Based on HCSD data, we included five additional companies that were not already picked up by BICS screening.

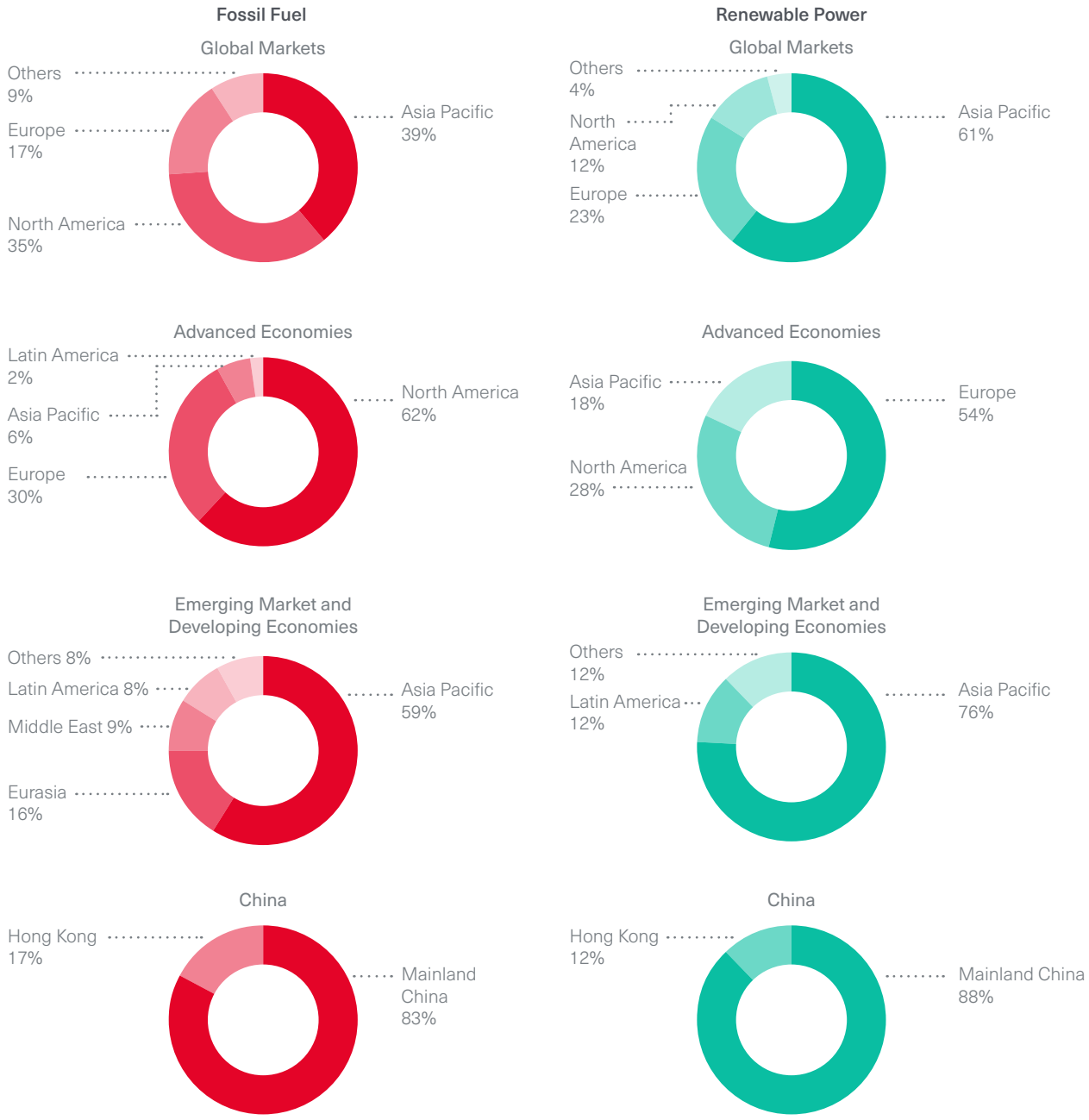
- **Yieldcos** are holding companies for operational renewable power projects.

Although some storage and network companies are classified as renewable energy equipment by BICS, they were excluded from our study portfolios, in recognition of the different risk and return characteristics of these assets. Nevertheless, with the deployment of variable renewables (solar PV and wind) at high shares increasingly dependent on the mobilization of grids and other enabling infrastructure to integrate new capacity, future research may need to consider renewables in conjunction with those companies providing system flexibility, including through grids, storage, and demand response.

Some of the largest renewables developers in today's market are not included in our renewable power portfolios due to either a relatively recent transition to renewable business or a high-proportion of existing assets in fossil fuel. To capture the financial performance of such companies, we selected five transition renewable companies and analyzed their historical performance against the market benchmark separately from our renewable power portfolios.

We tracked 208 renewable equipment and power companies meeting the selection criteria. Around 40% of the portfolio companies come from the renewable energy equipment industry and 35% from the renewable energy generation. China has the largest number of companies in our global renewable power portfolio with 84 companies, representing over 40%. The United States follows China with 17 renewable companies, followed by Canada, Germany, and India. Excluding China, a majority of renewable energy equipment companies comes from advanced economies, while the renewable energy generation companies are spread across both advanced economies, emerging market and developing economies, and China.

Figure 4. Portfolio geographic compositions by domicile location

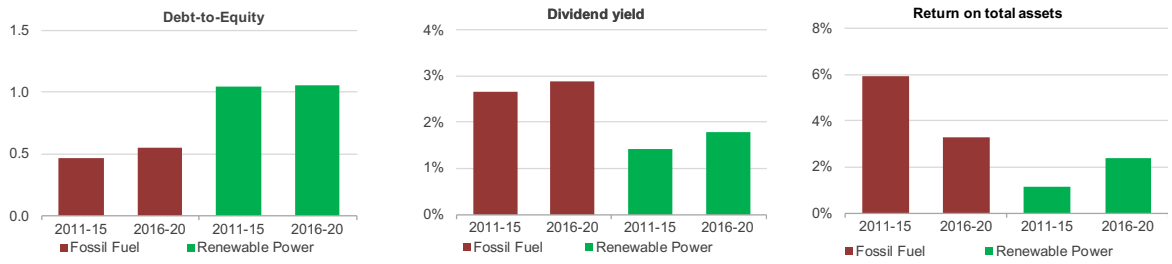


Our portfolios are categorized into four different geographies: global markets, advanced economies, emerging market and developing economies, and China. We used IEA regional and country groups when applicable. Companies were selected based on the country of domicile. The total return for each company is calculated in the local currency to produce a unitless return. This means that FX fluctuations do not affect relative returns, and the portfolio behaves as if it were FX-hedged. We employ monthly rebalancing.

Key Investment Characteristics

Renewable power and fossil fuel companies have different characteristics, as illustrated by trends in the metrics used to assess their underlying financial performance.

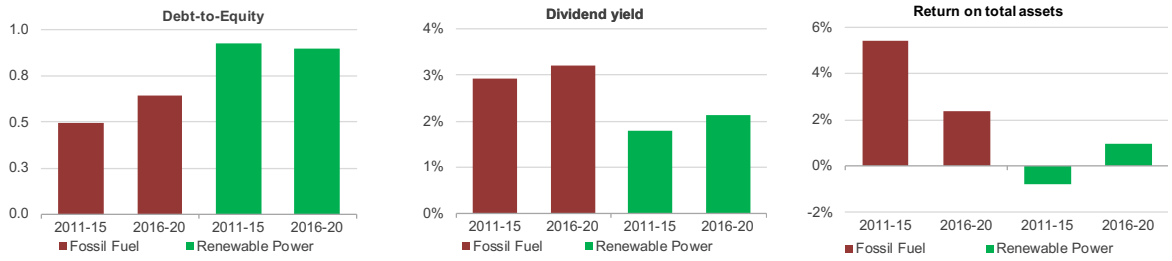
Figure 5. Global Markets – financial metrics



Source: The authors, based on Bloomberg data (2021)

Globally, renewable power companies are more leveraged than fossil fuel companies, in part due to the more contracted nature of their business model, which can provide bond-like revenue streams. The dividend yield for fossil fuel companies has remained higher than the yield for renewable companies at around 3% compared to below 2%, though some fossil fuel companies cut dividends in 2020. The profitability of fossil fuel companies dropped in half (from 4% to 2%) with respect to return on total assets, while the performance of renewable companies improved by three times.

Figure 6. Advanced Economies – financial metrics



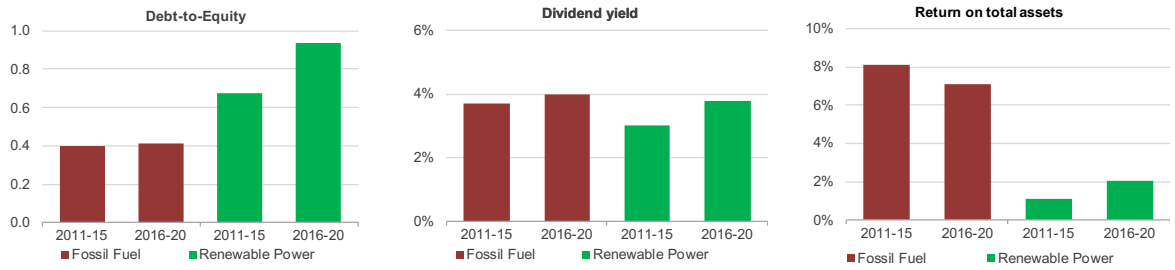
Source: The authors, based on Bloomberg data (2021)

In advanced economies, renewable power companies typically employ more leverage than fossil fuel companies, which is also consistent with the global trend and reflects the more contracted nature of remuneration. In both portfolios, the leverage ratio has remained stable amid the low-interest-rate environment.

Renewable company dividend yields have remained around 2% over a decade, which is similar to the S&P 500 dividend yield. Fossil fuel companies have also returned a higher share of their cash to shareholders.

Meanwhile, the trends in profitability have reversed in the past ten years, which are aligned with the strong performance in the advanced economies renewable power portfolio. Over a decade, returns on assets for fossil fuel companies have deteriorated from 4% to below 2%, reflecting in part the lower demand and fuel price environment, while the performance of renewable companies has edged upwards. Returns on assets for renewable companies were negative over 2011–15 due to the negative net incomes in many renewable equipment companies.

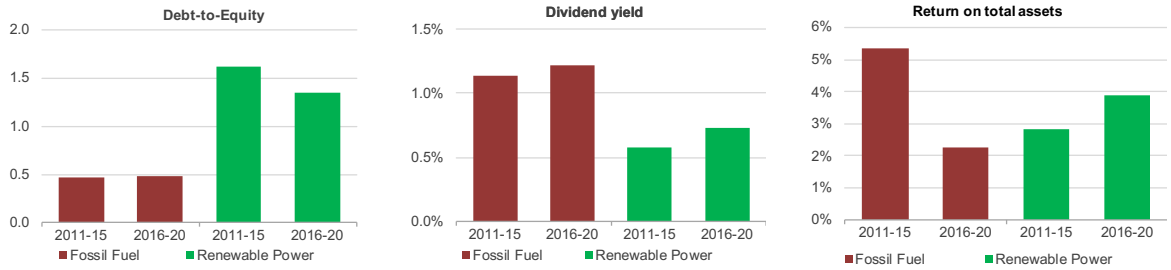
Figure 7. Emerging Market and Developing Economies – financial metrics



Source: The authors, based on Bloomberg data (2021)

Leverage level in emerging market and developing economies remained the lowest in all regions over 2011–2015, reflecting the lower level of development of corporate debt markets. That said, renewable companies have been able to increase their leverage in the past five years. Dividend yields have remained the highest for both fossil fuel and renewable companies compared to other portfolio regions, while fossil fuel companies have issued higher dividend yields than renewable companies. Fossil fuel companies offer a higher return on total assets than renewable companies, similar to the profitability profile in other portfolio regions.

Figure 8. China – financial metrics



Source: Analysis based on Bloomberg data

We separated Chinese companies from the emerging market and developing economies due to their high sample size in both fossil fuel and renewable companies and unique characteristics compared to other regions. The Chinese energy market is characterized by strong government support to decarbonize the domestic energy sector and enhance the affordability of electricity. In the past ten years, the government has announced ambitious renewable energy targets, adopted different policy incentive schemes for renewable power generation, and revised existing subsidies.

The LCOE for solar PV and wind has declined with the expansion of renewable power generation, technology progress and on the back supportive policy schemes (e.g., expansion of competitive bidding schemes). However, this has also resulted in pressure on the profitability of some companies in the value chain. Recent trade actions coming amid high levels of competition and persistently low margins in manufacturing have kept the pressure on the profitability of renewables equipment companies in China, which represent over 50% of the renewables portfolio.

Renewable companies in China show the highest leverage ratio among different regions and are around three times more leveraged than the average fossil fuel company. Both fossil fuel and renewable companies offer a dividend yield of around 1%, the lowest among the portfolio regions. The profitability of fossil fuel companies has dropped modestly over a decade, offering a lower return on total assets than renewable companies over 2016–20.

Both the global fossil fuel and renewable power portfolios have expanded over the past decade, as measured by companies that have made initial public offerings (IPOs). Since 2013, public listing has enabled a similar number of companies in each sector to access channels for financing at a greater scale through the capital markets. There are, of course, geographic differences. The United States and China lead the largest number of IPO deals in global fossil fuel and renewable portfolios. In the global fossil fuel portfolio, the US accounts for over one-third of new IPOs, mostly from natural gas and shale industries. Followed by the United States, China represents almost 30% of new IPOs with companies from coal mining, power generation, and natural gas industries.

More than 40% of the companies in the global renewable portfolio have come about through IPOs since 2010, reflecting the relative newness of the sector. Some of the renewable listings are Yieldcos, holding companies, and pass-thru investment vehicles for renewable assets, meaning that not all renewable listings come from firms who build new renewable projects. China leads the largest share of new IPOs in the global renewable portfolio with companies from solar, wind, and other renewable energy equipment industries. The US represents 7% of new IPOs with companies from both renewable power generation and equipment industries.

Results

Global Markets

Figure 9. Global Markets Portfolio 10-Year Monthly Returns

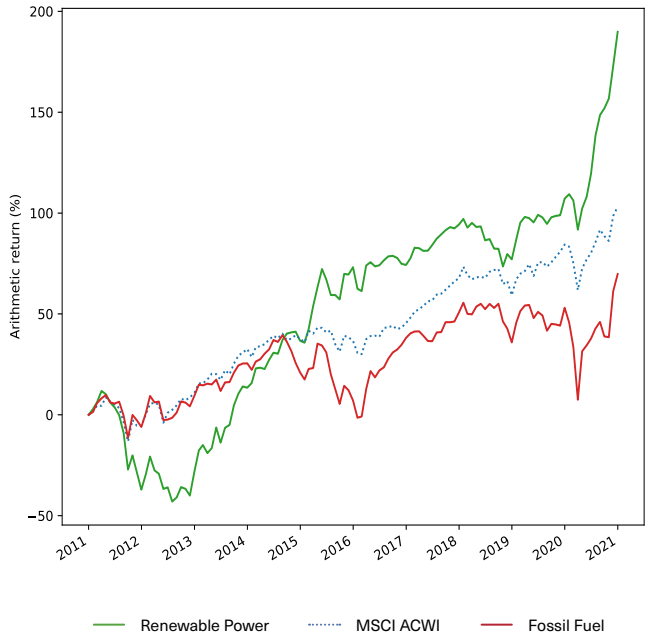


Table 5. Key Results for Global Markets Portfolios

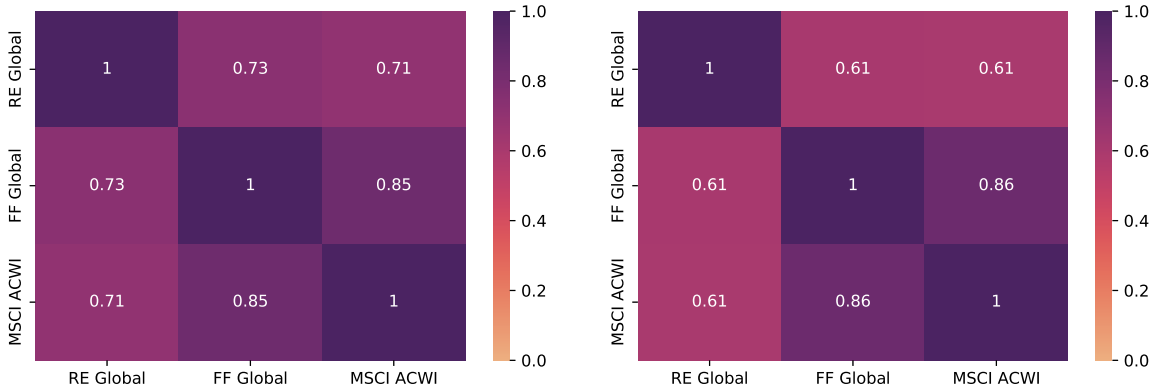
Global Markets Portfolios		
	Fossil Fuel	**Renewable Power**
10 Years		
Total Return	59.0%	422.7%
Arithmetic Return	69.8%	189.1%
AAR	4.7%	18.0%
Annualised Volatility	6.3%	6.2%
Best Monthly Return Date	24.1% Apr-20	18.9% Jul-20
Worst Monthly Return Date	-26.2% Mar-20	-18.0% Sep-11
Sharpe Ratio	0.30	0.86
Beta	1.31	1.08
5 Years		
Total Return	59.3%	186.6%
Arithmetic Return	62.7%	116.8%
AAR	9.8%	23.4%
Annualised Volatility	7.3%	6.1%
Best Monthly Return Date	24.1% Apr-20	18.9% Jul-20
Worst Monthly Return Date	-26.2% Mar-20	-14.5% Mar-20
Sharpe Ratio	0.45	1.06
Beta	1.48	1.08

The returns of the two global markets portfolios are plotted against the MSCI All Country World Index (ACWI). Beginning in 2013, we see steady improvement year on year in the returns of the global renewable portfolio, with performance exceeding the global fossil fuel portfolio and MSCI ACWI from 2015 onwards. The underperformance of the global fossil fuel portfolio in 2015 coincides with a fall-off in oil prices, investment, and lower returns on invested capital for the largest oil and gas companies.

The outperformance of renewables from 2015 coincides with a period of improved fundamentals and enhanced cost-competitiveness, underpinned by the more widespread adoption of supportive policies around the world, technology cost reductions, and the low-interest-rate environment. Returns on invested capital for the largest renewable power developers have edged upwards to between 6–8% over 2017–2019. The share of renewable power in global energy investment has risen to nearly one-fifth, particularly reflecting resilient expectations for continued deployment during the crisis in 2020.

To compare the returns of the portfolios, the global renewable portfolio exhibits higher returns and lower volatility over the period, with a Sharpe Ratio 56 basis points higher than the global fossil fuel portfolio, highlighting the higher average risk-adjusted return delivered on renewable investments. The global renewable portfolio also has a beta of 1.08, whereas the global fossil fuel portfolio has a beta of 1.31 relative to MSCI ACWI. The fossil fuel portfolio is more reactive to market moves.

Figure 10. Correlation and downside correlation



The correlation of the global renewable portfolio to the MSCI ACWI is lower than the global fossil fuel portfolio, highlighting the diversification benefits when added to a market portfolio (ρ = 0.71 versus ρ = 0.85). This diversification benefit becomes further advantageous to investors given the global renewable portfolio is also less correlated to the market in a downturn, exhibiting lower downside returns (ρ = 0.61 versus ρ = 0.86).

The Fama-French 5 factor model was used to explain each portfolio's return through the size, value, profitability, and investment effects in average stock return.[9] The global renewable portfolio does not have a pronounced factor bias, apart from negative factor loading on robust profitability and conservative investment (Annex C).

Global Credit Crisis

Figure 11. 10-Year Monthly Returns with OAS

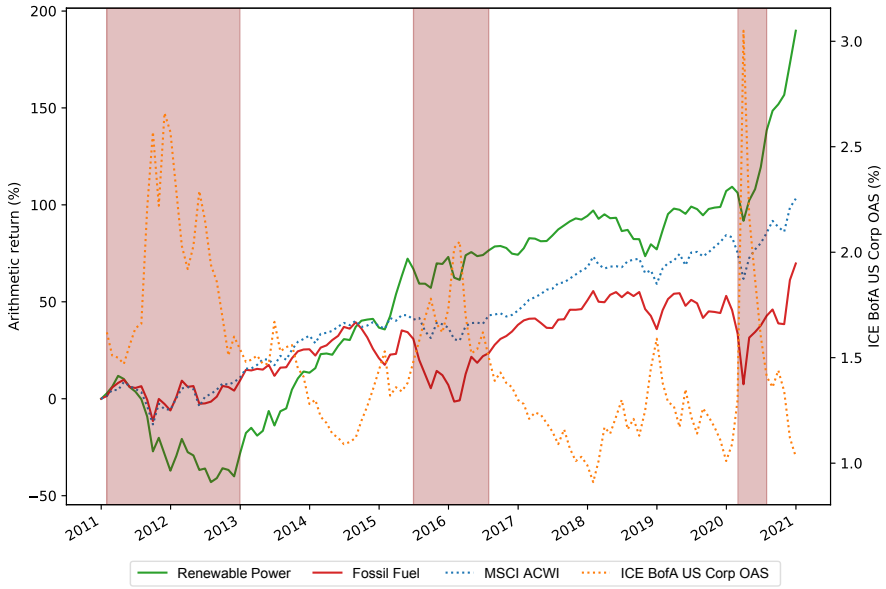


Figure 11 highlights the returns for the global renewable and global fossil fuel portfolios, and the MSCI ACWI, as well as incorporating the ICE BofA US Corporate Index Option-Adjusted-Spread (OAS) to highlight deteriorating credit conditions during the period under review. Highlighted in red,

[9] Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116(1), 1-22. doi:10.1016/j.jfineco.2014.10.010

there were three periods of interest where market volatility and widening credit spreads impacted global financial markets. These include the European sovereign debt crisis, caused by rising government debts and deteriorating credit profiles that resulted in rising default risks and yield spreads, as well as global economic shocks in 2016, and the current coronavirus pandemic.

The global renewable power portfolio retracted in 2011 and experienced a significant fall in returns before a strong rally in 2013, whereas the global fossil fuel portfolio was more resilient and trended in line with the MSCI ACWI. This decline in the global renewable power portfolio can be attributed to a falloff in renewable power investments. In the early part of the decade, a strong run-up in renewable investments was supported by deployment targets and incentives, such as feed-in tariffs and tax breaks, which improved the economic case. However, in some markets (e.g. Spain) and technologies (e.g. distributed solar PV) generous incentive levels led to boom-and-bust cycles of deployment as government policies were sometimes abrupt and unpredictable. This raised uncertainty for developers and investors, even as renewables experienced continuous falls in costs, which also pressured investment levels.

During periods of market volatility in 2016 and the current coronavirus pandemic, however, the global renewable power portfolio fared more favourably. This is supported by the lower correlation of the global renewable power portfolio with the MSCI ACWI when compared to the global fossil fuel portfolio, and by the global renewable portfolio beta of 1.08 versus the global fossil fuel beta of 1.31. This could potentially be explained by the more widespread adoption of renewable policies, which spread deployment and risks over a wider set of markets. With most investment underpinned by improved availability of long-term power purchase agreements (PPAs) and contracts, exposure to renewables companies gave investors a degree of a financial buffer. However, the renewables portfolio did not fully insulate investors from financial shocks, particularly due to the role in the portfolio of renewable equipment companies, whose performance is generally more exposed to short-term economic swings, due to higher levels of competition and relatively low margins around equipment pricing.

Commodity Regime

Figure 12. Correlation between global portfolios and commodity prices

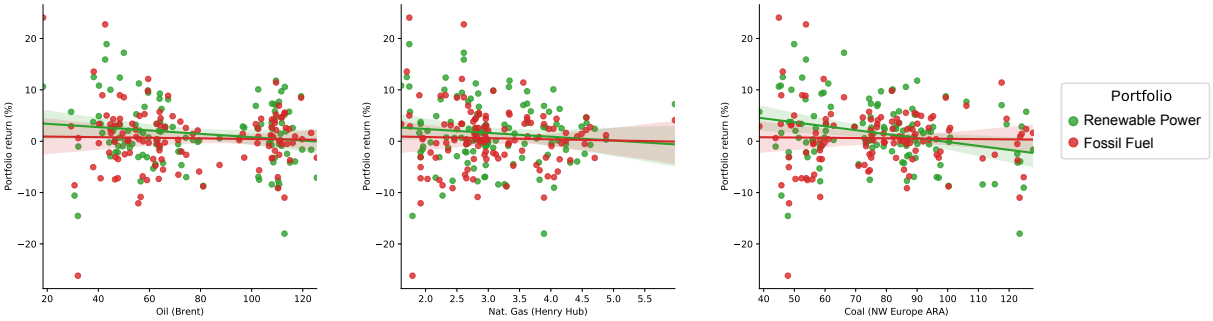


Figure 12 shows the correlation between the global portfolios and the selected commodity regimes for oil, natural gas, and coal. Strikingly, the data suggest the presence of a relatively weak correlation between the energy price levels and monthly returns of each global portfolio. One reason for this may be due to the heterogeneity of companies within each portfolio, with each commodity regime affecting underlying segment returns in different ways. The global fossil fuel and renewable portfolios consist of energy companies at different stages of the energy value chain, ranging from fuel production and equipment (upstream oil and gas, coal mining, and renewable energy equipment) to distribution (gas utilities) and power generation. It is also the case that commodities such as gas and coal are priced according to regional dynamics, reflecting infrastructure constraints and the more local nature of supply and distribution.

Another reason is likely due to the ability of companies to manage the cost and expenditure side of their business during periods of changing commodity prices. On the back of the oil price decline from 2014-15, oil and gas companies reacted by cutting costs, imposing capital discipline, and accelerating the adoption of digital technologies that allowed them to optimize operations and produce more with less investment. Renewable companies have been successful at reducing project development costs over time, enabled by continuous technology learning and higher levels of deployment.

Pricing contracts, policies, and regulations likely also play a role in dampening the relationship between short-term commodity movements and returns. For oil and gas producers, the use of hedging instruments and long-term contracts (e.g. in LNG), provides some revenue buffer. In China, for example, where the majority of coal companies in the portfolio are located, domestic coal prices are regulated, with some adjustment according to market conditions, and authorities often orient policies towards supporting segments (e.g. mining) where jobs may be at stake from changing market conditions. The long-term nature of renewables PPAs and the role of policies in supporting deployment suggests that such assets are largely insulated from commodity price swings. Energy companies adjust their operations, contracting, and investment planning to respond to changing market and policy conditions, although it is uncertain how well fossil fuel producers can adjust to potentially permanently lower commodity prices.

Advanced Economies

Figure 13. Advanced Economies Portfolio 10-Year Monthly Returns

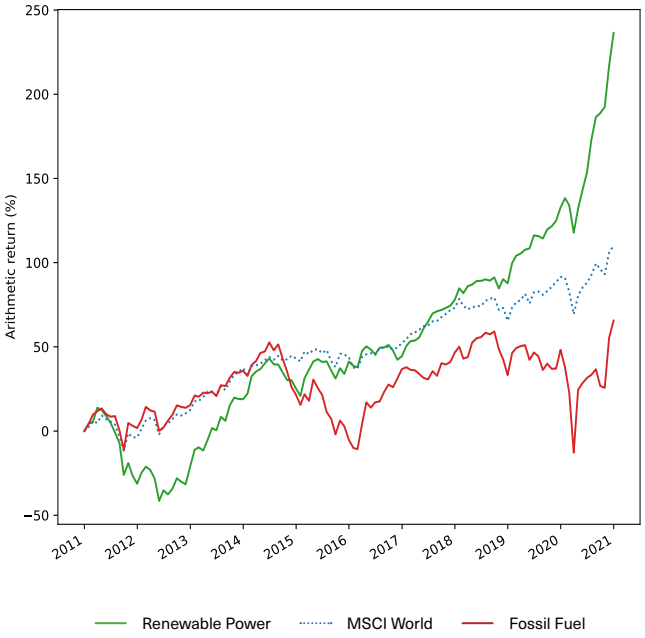


Table 6. Key Results for Advanced Economies Portfolios

Advanced Economies Portfolios		
	Fossil Fuel	**Renewable Power**
10 Years		
Total Return	31.6%	727.0%
Arithmetic Return	65.6%	236.1%
AAR	2.8%	23.5%
Annualised Volatility	8.0%	6.3%
Best Monthly Return Date	37.3% Apr-20	23.9% Nov-20
Worst Monthly Return Date	-35.4% Mar-20	-19.0% Sep-11
Sharpe Ratio	0.22	1.06
Beta	1.61	1.19
5 Years		
Total Return	52.9%	501.6%
Arithmetic Return	70.7%	193.7%
AAR	8.9%	43.2%
Annualised Volatility	9.7%	6.4%
Best Monthly Return Date	37.3% Apr-20	23.9% Nov-20
Worst Monthly Return Date	-35.4% Mar-20	-16.2% Mar-20
Sharpe Ratio	0.39	1.69
Beta	1.87	1.18

The returns of two representative portfolios are plotted against the MSCI World Index, the advanced economies renewable power portfolio and advanced economies fossil fuel portfolio. We see the advanced economies renewable portfolio performance trend below the MSCI World Index with a convergence of returns in 2015 with a strong return performance post.

From 2011 to mid-2014, the advanced economies fossil fuel portfolio generated returns similar to the level of the MSCI World Index. However, this changed for the period of the last five years, which coincides with a fall-off in oil prices and lower returns on invested capital, along with stronger investment in renewables. The consistent outperformance of renewables from mid-2014 onwards coincides with a period of improved fundamentals as enhanced cost-competitiveness and capacity supported the increased allocation of capital towards renewable energy projects.

To compare the returns of the portfolios, the advanced economies renewable power portfolio exhibits higher returns and lower volatility over the analyzed horizon, with a Sharpe Ratio 84 basis points higher than the advanced economies fossil fuel portfolio, highlighting the average additional risk-adjusted return delivered on renewable investments. Finally, as the correlation of advanced economies renewable power portfolio to the MSCI World Index is slightly lower than that of the advanced economies fossil fuel portfolio (ρ = 0.77 versus ρ = 0.81), diversification improves when included in a market portfolio.

Emerging Market and Developing Economies

Figure 14. Emerging Market and Developing Economies Portfolio 10-Year Monthly Returns

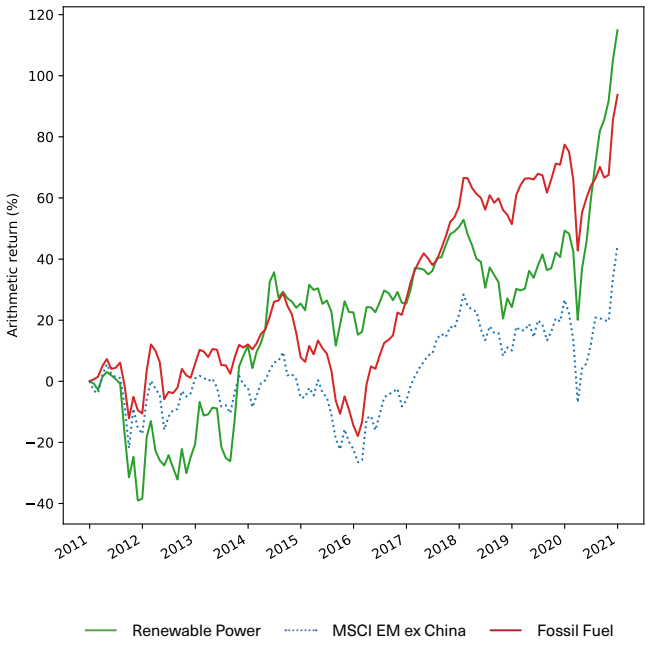


Table 7. Key Results for Emerging Market and Developing Economies Portfolios

Emerging Market and Developing Economies Portfolios		
	Fossil Fuel	**Renewable Power**
10 Years		
Total Return	113.8%	136.0%
Arithmetic Return	93.7%	114.9%
AAR	7.9%	9.0%
Annualised Volatility	5.4%	6.9%
Best Monthly Return Date	14.2% Nov-20	20.3% Jan-12
Worst Monthly Return Date	-23.2% Mar-20	-22.4% Mar-20
Sharpe Ratio	0.47	0.46
Beta	0.90	1.01
5 Years		
Total Return	164.9%	121.2%
Arithmetic Return	108.2%	92.3%
AAR	21.5%	17.2%
Annualised Volatility	5.7%	6.4%
Best Monthly Return Date	14.2% Nov-20	16.9% Apr-20
Worst Monthly Return Date	-23.2% Mar-20	-22.4% Mar-20
Sharpe Ratio	1.03	0.78
Beta	0.91	0.97

The returns of two representative portfolios in Emerging Market and Developing Economies (EMDEs) are plotted against the MSCI Emerging Markets ex-China Index. From 2014 onwards, we see the EMDEs renewable power portfolio and EMDEs fossil fuel portfolio trend above the MSCI Emerging Markets ex-China Index. This performance is primarily driven by a strong recovery after the financial crisis and continued energy investment to support economic growth. Recent data, however, highlights the improving risk-return profile for EMDEs renewable power beginning in 2014 supported by falling technology costs of renewables and an improved investment environment in some emerging market countries (e.g. India and Brazil). A drop in energy prices and fallback in regional demand has negatively impacted the returns for the EMDEs fossil fuel portfolio, although the EMDEs fossil fuel portfolio outperformed EMDEs renewable power portfolio over 2017–20. That said, overall returns for the renewable power portfolio over the decade have been strong but have trailed that of advanced economies, reflecting slower progress in improving investment conditions in some markets (e.g. in Southeast Asia).

To compare the returns of the portfolios, the EMDEs renewable power portfolio exhibits higher volatility than the EMDEs fossil fuel portfolio, but the EMDEs renewable power portfolio did not experience the same monthly drawdown despite its higher volatility. It is advantageous that the EMDEs renewable power portfolio exhibits greater diversification with a lower correlation (ρ = 0.78 versus ρ = 0.90) to the MSCI Emerging Markets ex-China Index, with correlation reducing to 0.69 (versus ρ = 0.85) during market downturns.

China

Figure 15. China Portfolio 10-Year Monthly Returns

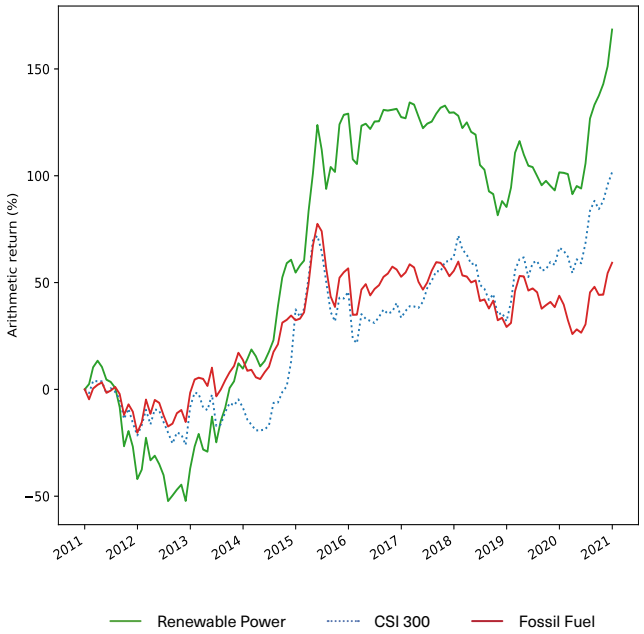


Table 8. Key Results for China Portfolios

China Portfolios		
	Fossil Fuel	**Renewable Power**
10 Years		
Total Return	41.1%	243.5%
Arithmetic Return	59.3%	167.3%
AAR	3.5%	13.1%
Annualised Volatility	6.4%	8.6%
Best Monthly Return Date	17.9% Apr-15	23.1% May-15
Worst Monthly Return Date	-21.8% Jan-16	-21.2% Jan-16
Sharpe Ratio	0.24	0.54
Beta	0.77	0.86
5 Years		
Total Return	-7.8%	29.0%
Arithmetic Return	2.6%	41.4%
AAR	-1.6%	5.2%
Annualised Volatility	5.9%	7.4%
Best Monthly Return Date	15.0% Jul-20	21.2% Jul-20
Worst Monthly Return Date	-21.8% Jan-16	-21.2% Jan-16
Sharpe Ratio	-0.03	0.28
Beta	0.83	0.96

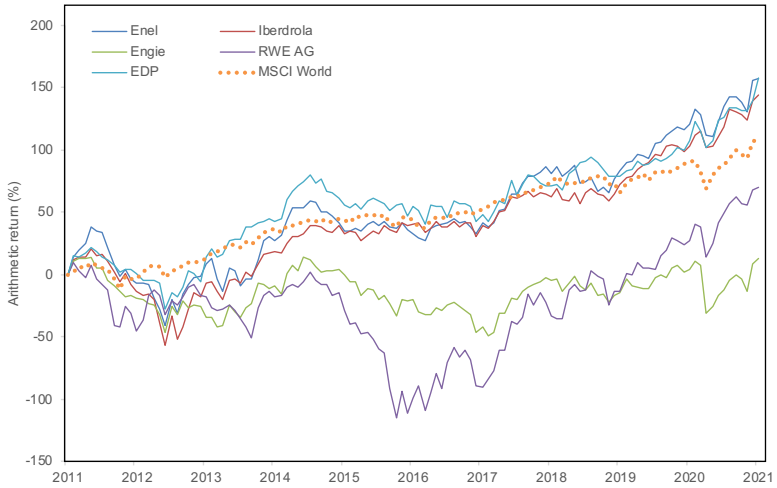
The China renewable power portfolio and the China fossil fuel portfolio are plotted against the CSI 300 Index. From 2014, the China renewable power portfolio outperforms the fossil fuel portfolio and the broader market. The performance has been supported by project development for solar PV and wind, incentivized by ambitious deployment targets and generous feed-in tariff (FIT) levels. It also reflects increased pressure on Chinese oil, gas, and coal companies due to the lower price environment, as well as reduced utilization in light of higher shares of renewables and slower electricity demand growth.

To compare the returns of the portfolios, the China renewable power portfolio exhibits higher returns and volatility over the analyzed horizon, and exhibits a Sharpe Ratio 30 basis points higher than the China fossil fuel portfolio, highlighting the average additional risk-adjusted return delivered on Chinese renewable investments over the period. However, in China, renewables are less correlated to the market (ρ = 0.69 versus ρ = 0.84) in general enhancing the diversification benefits.

Companies with business models in transition

Some of the largest renewable developers in today's market are not included in our renewable portfolios due to the important role of other operating assets in fossil fuel power, electricity networks or other non-renewable sectors in their businesses. From a revenues standpoint, these companies embody business models that are transitional in nature than pure-play renewables actors. Companies that are vertically integrated or that have exposure to several parts of the electricity sector are usually perceived as more diversified. To assess the financial performance of such transition cases, we selected five companies – EDP, Enel, Engie, Iberdrola, and RWE AG – based on the growth in installed renewable energy capacity and compared their monthly historical returns against the relevant market benchmark (MSCI World Index).

Figure 16. Transition Companies 10-Year Monthly Returns



Over 2011–18, the five selected companies performed below or similar to the market benchmark. Starting from early 2019, three companies (EDP, Enel, and Iberdrola) outperformed the market and recovered faster during the Covid-19 recessions. In these companies, renewables comprise a higher portion of installed power capacity compared with that for Engie and RWE. As such, the results appear consistent with the outperformance of renewable power portfolios observed across the different regions. Nevertheless, enhanced benchmarking of such companies in the future would require more standardised data and analysis around business segments.

The Covid Market Shock

An analysis of the global renewable and fossil fuel portfolios over February – April 2020, which corresponds to the period of initial shock following the advent of the Covid-19 pandemic, shows the global renewable portfolio has held up better than the global fossil fuel portfolio. Again, it exhibited a lower drawdown and lower volatility. Over this period, the global renewable portfolio also showed a higher return than the MSCI ACWI index and displayed lower volatility.

Figure 17 – Total Return Comparison for February – April 2020

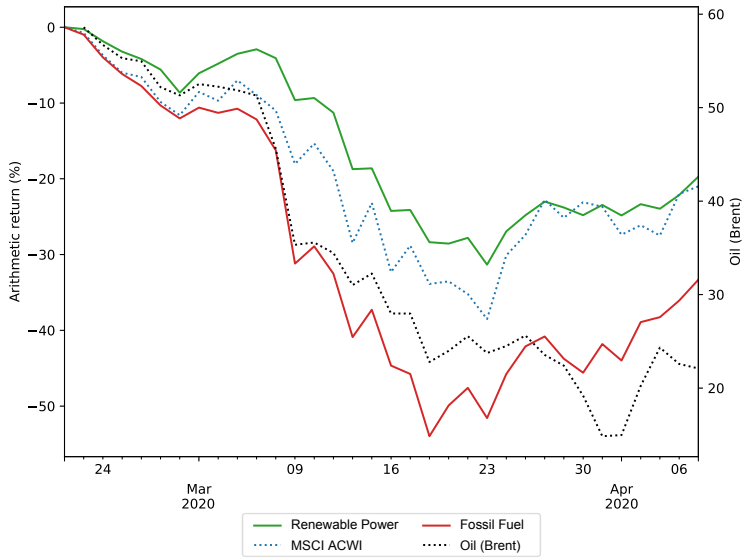
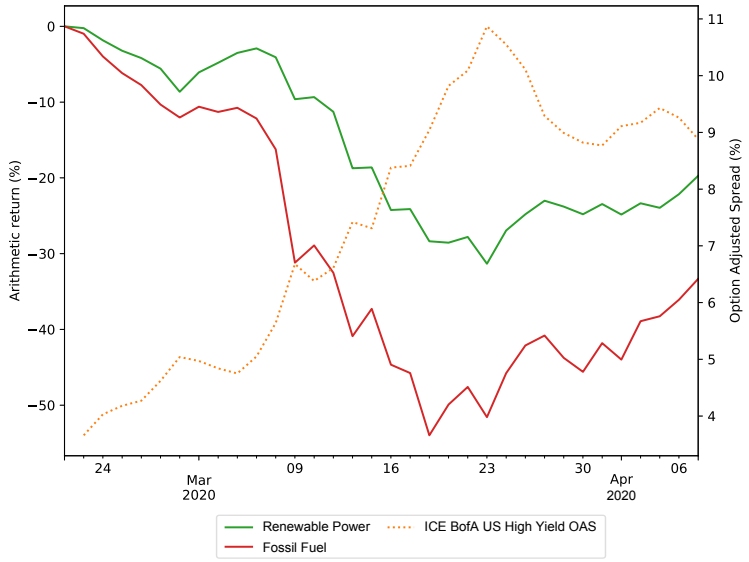


Table 9 – Key Results for February – April 2020

Returns				
	Fossil Fuel	Renewable Power	MSCI ACWI	Coal (NW Europe ARA)
Total Return	-30.8%	-18.9%	-21.1%	-62.9%
Arithmetic Return	-33.3%	-19.8%	-21.0%	-79.1%
AAR	-94.3%	-80.3%	-84.2%	-100.0%
Annualised Volatility	69.8%	41.0%	64.2%	173.0%
Best Monthly Return Date	5.8% 24/03/2020	4.4% 24/03/2020	8.4% 24/03/2020	5.3% 02/04/2020
Worst Monthly Return Date	-15.0% 09/03/2020	-7.4% 12/03/2020	-9.5% 12/03/2020	-10.3% 09/03/2020
Sharpe Ratio	-3.65	-3.70	-2.51	-3.50

The coronavirus pandemic has suppressed oil demand and generated unprecedented losses for the industry. Global oil demand decreased by 9% and the global investment in oil supply by 33% over 2019–2020, both heavily affected by domestic lockdown measures, continued teleworking, and reduction in air travel. The oil price remained low around the low $40s/barrel in the first half of 2020. Before the pandemic, the growth rate for oil demand was already projected to decrease. The global oil demand in 2030 is expected to decrease by additional 2 million barrels per day compared to the level of pre-crisis projection.

Figure 18 – Total Return Comparison: February – April 2020 with OAS



The economic shock caused by the coronavirus pandemic is evidenced by the rising ICE Bank of America US High Yield Option-Adjusted-Spread (OAS), which includes a number of US independent oil and gas companies. A ratings agency, Fitch, predicts that the US energy sector high-yield bond defaults could be in the range of $15bn–$18bn in 2021.[10] The fossil fuel portfolio is significantly affected by deteriorating credit conditions.

The aforementioned event study further highlights cyclical risks to fossil fuel returns, but structural changes also deserve consideration due to their effect on portfolio performance and volatility.

In recent years, uncertainties have grown over the trajectory in demand for fossil fuel and the appetite of investors for companies that do not align with long-term sustainability goals. Meanwhile, the deployment prospects for renewables have improved, due to a combination of falling technology costs, improved financing terms and supportive policies. Such structural changes have also resulted in poor outlooks for many highly leveraged fossil fuel companies, as credit downgrades and debt restructurings are ongoing as investors and banks reassess their investing and lending practices.

The picture is different for solar PV and wind projects that benefit from the revenue buffer due to the long-term power purchase agreements. Given its very different funding profile and resilience in market shocks, renewable power could add an element of diversification.

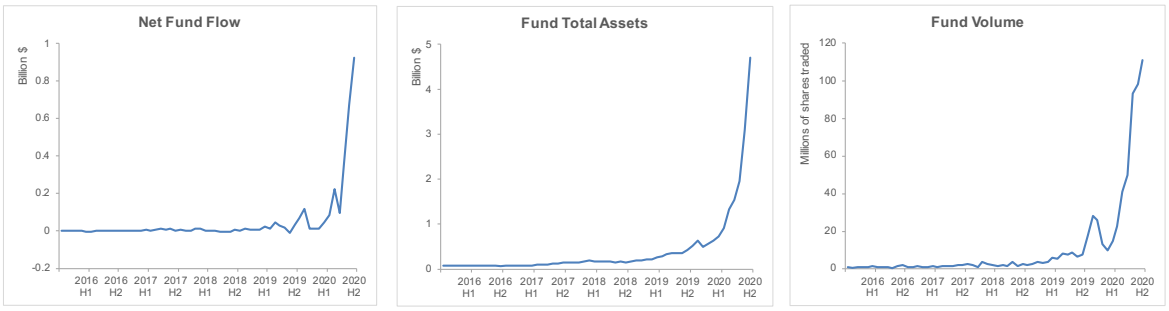
[10] McCormick, M. (2021, January 3). Default warning as US energy sector's financial woes persist. *Financial Times*.

Irrational Exuberance?

Following the Covid-19 market shock, central banks across the world injected new liquidity into financial markets. Accommodative monetary conditions have helped facilitate a recovery in equity prices and subsequent run-up that a number of commentators have questioned in terms of its level and durability. Concerns about price inflation stretching across multiple asset classes extends to green asset classes. Renewable energy, once struggling for attention amongst mainstream investors, has become the latest sector to experience eye-watering valuations and a growing perception that expectations have become unhinged from fundamentals.[11]

This trend is most easily illustrated by examining total flows into passive renewables investment vehicles. We use the iShares (BlackRock) Global Clean Energy ETF as a proxy for investment in the sector – flows, total assets and trading activity show an extreme spike in Q4 2020.

Figure 19. ISHARES GLOBAL CLEAN ENERGY – Net Fund Flow, Fund Total Assets, Fund Volume (trading)

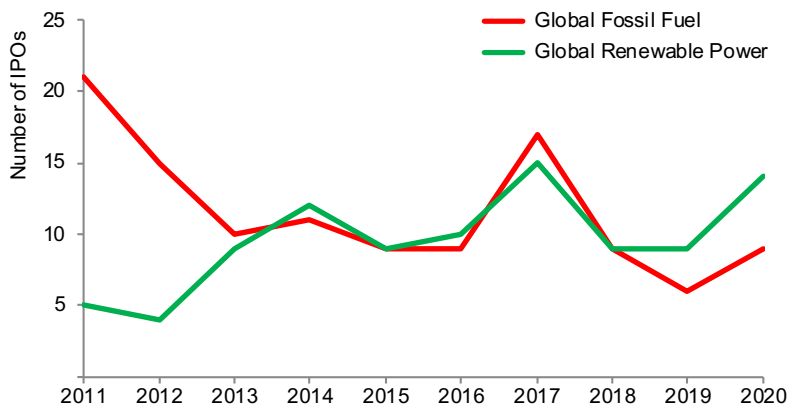


To analyze the potential impact of fund flows on the investment universe defined in this report, we looked at the overlap between our constructed global portfolio and the iShares ETF. Our global renewable portfolio includes 208 companies, of which 23 companies are also included in the iShares ETF (31 companies in total). To our knowledge, there is no passive investment product today that would mimic the breadth and geographic diversity of our constructed portfolio. So while passive fund flows may well be contributing to the upsurge in share prices, they cannot be the only factor.

We also considered the potential impact of a recent spike in initial public offerings (IPOs). As shown in Figure 20, the count of IPOs within our investment universe has been rising for the past two years, supported by more advantageous market conditions. Combined with heightened investor awareness of shifting technology and policy directions, an increase in IPO activity appears to us as a logical reaction to increasing investor demand for exposure to renewables.

[11] Nauman, B. (2021, February 19). 'Green bubble' warnings grow as money pours into renewable stocks. *Financial Times*.

Figure 20. IPO activity within our defined universe



While increased IPO issuance has coincided with market tops (most notably in the 2000 dot com bust), IPO waves may also be correlated with increases in aggregate profitability and investment.[12] So while the purpose of this report is not to step into the debate about current market timing, it is worth noting that there are important structural shifts occurring in the economy that need to be considered.

As just one example, it bears considering early signs of convergence in the tech sector. Companies like Microsoft and Google are now significant players in clean energy. In 2020, Amazon was the largest corporate clean energy buyer in the world. Facebook has a direct stake in multiple solar and wind power projects. As they expand their services in cloud computing, storage, and crypto, tech companies will likely buy more clean power, as well as find new ways of creating value from their procurement supply chains. With clean electricity purchasing moving to global scale, it may "only be a matter of time before the tech companies branch into the energy business themselves."[13] That said, a full assessment of the potential business model implications is beyond the scope of this analysis.

While the history of financial markets is littered with speculative bubbles and subsequent bursts, it is important to keep in mind the evidence about risk and return over the long-run. If, as has been posited by some innovation scholars, that energy transition is a consequence of a major technology wave, then the current enthusiasm may end up rationally reflecting the need for investors to reposition. After all, U.S. stock markets at the start of the 20th century were dominated by railroads, with the sector comprising 63% of market capitalization. Today, that figure is less than 1%.[14]

[12] Pastor, L, & Veronesi, P. (2005). Rational IPO waves. *The Journal of Finance*, 60(4), 1713–1757. doi:10.1111/j.1540-6261.2005.00778.x

[13] Hook, L., & Lee, D. (2021, February 10). How tech went big on green energy. *Financial Times*.

[14] Dimson, E, Marsh, P and Staunton, M (2016) Long-term asset returns. In: Financial Market History: reflections on the past for investors today. *CFA Institute Research Foundation*.

Conclusions

We analyzed the financial performance of a global portfolio of listed fossil fuel and renewable power companies, with detailed comparisons of underlying performance between advanced economies, emerging market and developing economies, and China. Renewable power portfolios have produced better risk-adjusted returns than those of fossil fuel portfolios on average over the last 5 and 10 years. This finding is consistent with that from the first report of the series, which focused on companies in four advanced economies: United States, United Kingdom, Germany, and France.

Our main findings are:

- Listed renewable power portfolios have outperformed listed fossil fuel portfolios in all markets.
- Annualized volatility for the renewable power portfolios was on average lower than the fossil fuel portfolios, except in emerging market and developing economies and China.
- The most recent market downturn caused by the coronavirus pandemic has highlighted the industry's resilience, with the renewable power portfolios outperforming during recent crises.
- In normal and volatile market conditions, the renewable power portfolio showcases enhanced diversification benefits due to their lower correlation to the broader market relative to fossil fuel.

Our study suffers from several limitations:

- The sample size varies across each of the renewable power portfolios based on geographic location and is below what would be considered sufficient for rigorous academic research.
- Renewable power companies have on average a lower market cap and liquidity, which impacts the ability of investors to allocate a meaningful share of assets towards such portfolios.
- The renewable power portfolio is not a perfect substitute for the fossil fuel portfolio. Coal, oil and natural gas companies operate in different parts of the energy value chain, often with only a loose relationship to the power sector.
- Similarly, there is a high degree of heterogeneity within each portfolio. By combining sub-industries and sectors (e.g. coal mining with integrated oils, or renewables manufacturing with green utilities), we combine companies with different business models and catering to different sources of end demand.
- This study does not avoid survivorship bias.
- We assume no currency or transaction costs. Currency fluctuations affect neither portfolio weighting nor relative returns, portfolios are FX-hedged and rebalanced monthly. Investor returns would be impacted by both cost items.

A changing landscape for energy investors

As renewable energy markets continue to expand and mature, investments in renewables companies appear to increasingly make sense from a performance and economic perspective. Shifting allocations towards renewables equities and away from fossil fuel stocks appears to also provide greater diversification given their lower correlation with the broader market, especially in down markets. The nature of the business economics of renewables and fossil fuel are different, as are the regulatory regimes both operate in.

For fossil fuel players, the results also suggest diversification benefits for allocating a greater share of capital towards renewables as part of investment strategies. Over the past three years, pressure from the capital markets on oil and gas companies has intensified amid lower prices, weaker demand expectations for their product and increasing concerns around environmental, social, and corporate governance (ESG) risks by investors.

Some oil and gas companies are responding to such pressures by stepping up diversification efforts, guided by new long-term emissions goals. While these vary in scope and ambition, several European majors have increased capital guidance for low-carbon projects. Investment commitments are most visible in renewable power, where $3.5 billion of FIDs have been taken by oil and gas companies in 2020 (through Q3), two-thirds higher than their capital spend outside of core areas in 2019.

While the results of this analysis do not suggest that renewables investments may restore oil and gas company profitability to historical levels, such diversification strategies may potentially help to bolster corporate funding routes, their social license to operate, and maintaining access to low-cost capital. That said, the impact of financial market performance on industry decision-making also depends on how corporate structures evolve. For example, some commentators have raised the possibility of spinning-off renewables into new entities as a way of benefiting shareholders and unleashing their growth potential.[15]

Given the results highlighted and the renewables market landscape, there are areas of focus to further improve financial performance and attract investment, such as through improving the economics of renewable technologies and managing the cost of capital, especially in emerging market and developing economies.

The cost of capital for the largest developers of renewable power has trended downwards in recent years and remains lower than that for the top oil and gas producers.[16] In terms of projects, recent IEA analysis has shown that the WACCs for utility-scale solar PV projects across key markets have also trended downwards, and despite an uptick in 2020, remain around 5% in Europe and the United States.[17]

There are also questions over how the current energy market downturn plays out in terms of profitability in 2020 and beyond. A lot will depend on the degree that governments prioritise clean energy investments in recovery plans – based on the announcements made thus far, government recovery packages designed to boost investment do not generally have a strong energy or sustainability component, with the notable exception of those in the UK, Europe, Canada, and a few other countries.

Listed markets remain largely untapped for pure-play renewables companies

The renewables listed universe is still relatively small with low liquidity, which constrains the role of the capital markets as a funding route. The listed universe is simply not big enough to absorb sufficient capital. There is significant asset scarcity and large flow volumes could significantly affect performance, as we have seen in the fourth quarter of 2020.

Annual spending and fundraising by the companies in the renewable power portfolio account for only a fraction of global renewables investment. The capital expenditures carried out by the companies in the portfolio are only around 10% of global renewable power investment and include spending beyond renewable project development. Over the past five years, the annual equity issuance by these companies is equivalent to less than 5% of global renewable power capital expenditures.

This backdrop suggests that most renewables investments are carried out by more diversified companies who did not fit the criteria established for the renewables portfolio in this paper, as well as by unlisted companies and assets, such as through direct asset finance, special purpose vehicles and private equity funds. It also points to the untapped potential of the listed capital markets as a source of funding for pure-play renewables companies and their investments.

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[15] Denning, L. (2020, June 3). Big Oil Can Help Renewables by Spinning Them Off. *Bloomberg*.

[16] IEA (2019), World Energy Investment 2019. *IEA*.

[17] IEA (2020, World Energy Outlook 2020. *IEA*.

The prevailing landscape of renewables investment points to the importance of further examining the role of unlisted assets and companies. In such arrangements, investors can find a clearer route to gain exposure to the renewables sector. Also, investors can find a wider range of renewables investment opportunities in unlisted, private markets than listed, public markets in terms of generation capacity, technology, geography, and investment size, allowing them to make a more tailored investment decision based on their needs.

However, the availability of bankable projects with attractive risk-adjusted returns remains constrained in many areas, particularly in emerging market and developing economies where there are generally less adequate policy and regulatory frameworks. Improving financing options for renewables via institutional investors will thus depend on a combination of improved routes for investment into unlisted markets, as well as better development of an industry and financial markets ecosystem that supports higher levels of capital markets fundraising. The challenges and opportunities associated with unlisted markets will be the subject of our next report.

Acknowledgments

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The International Energy Agency

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 30 member countries, 8 association countries and beyond.

The Centre for Climate Finance & Investment at Imperial College Business School

The Centre for Climate Finance & Investment (CCFI)'s mission is to unlock solutions within mainstream capital markets to address the challenges posed by global climate change. Our work is generating a new understanding of the multi-trillion-dollar investment opportunity encompassing renewable energy, clean technologies, and climate-resilient infrastructure.

Combining inter-disciplinary research with real world experience, the CCFI is creating a global interface between academics and practitioners. Our researchers bridge the academic and business worlds by leading industry collaborations that address major challenges facing the investor community. The Centre was established with generous support from Quinbrook Infrastructure Partners.

Annex A – Definition of Key Terms

In the report, we provide the results of our portfolio analysis at the country level and globally. We report two measures of return, the geometric (total or multiplicative) return and the arithmetic (additive) return. Brief definitions of key research outputs are provided below.

Total Return (Geometric Return)
Total return is equivalent to rebalancing the portfolio, reinvesting gains and realising losses with the effects of compounding. In the tables, we show the total return over 5 and 10-year periods.

Arithmetic Return (Additive Return)
Arithmetic return is equivalent to rebalancing the portfolio to a constant notional exposure, drawing down gains and recapitalising for losses. In the figures, we show the arithmetic return, as this is visually comparable across different time periods.

Average Annual Returns
Average annual returns (AAR) represent the implied yield over a specified period. Following academic convention, these are calculated as geometric mean returns.

Best and Worst Monthly Returns
These represent the largest monthly appreciation or depreciation of a portfolio's total value in a single month.

Annualised Volatility
Volatility is a range of prices for a security or portfolio of securities. We have adopted here a definition of volatility as the standard deviation over the stated period. Given monthly data observations, an appropriate adjustment has been made to arrive at annualized figures.

Sharpe Ratio
The Sharpe Ratio measures the risk-adjusted average excess return over the risk-free rate and is a useful return indicator for performance comparison. The ratio is calculated by dividing the average excess return over the risk-free rate by the standard deviation of the average excess return.

Beta
A beta coefficient is a measure of the volatility of a stock or portfolio relative to the overall market. A beta below 1.0 means that a security or portfolio is less volatile than the market and a beta greater than 1.0 indicates higher relative volatility.

Correlation
Correlation is the strength of a relationship between two variables, such as a stock or portfolio. It's a statistical figure that measures how two securities move relative to each other. The range for correlation coefficients is -1.0 to 1.0. The higher the value is, the stronger the relationship between the two variables. A strong negative correlation of -1.0 means that variables move in the opposite directions, zero means there is no relationship and 1.0 indicates that variables move in the same direction.

Credit Crisis
A credit crisis is caused by deterioration in market liquidity and the credit quality of market participants, resulting in a slowdown in lending activity due to rising levels of credit risk. This can cause a breakdown in the financial system and result in a credit crisis.

Option-Adjusted Spread
The option-adjusted spread is a measure of credit risk and takes into account embedded options. The credit risk is reflected by the yield-spread differential on a fixed-income security to that of the risk-free rate.

Credit Regime

A credit regime represents a period of rising credit risk and financial market deterioration. The credit regime analysis highlights three periods in the past ten years. The three periods coincide with the European sovereign debt crisis, global economic shocks experienced in 2016, and the coronavirus pandemic.

A credit regime was determined by a 350 bps increase in the average option-adjusted spread (OAS) to capture rising credit risk, with periods extended based on subjective analysis to include pre-and post-market deterioration before the OAS spread spike.

The credit regimes cover the following periods: October 31, 2010, to December 31, 2012; July 1, 2015, to July 31, 2016; and March 1, 2020, to July 31, 2020.

Commodity Regime

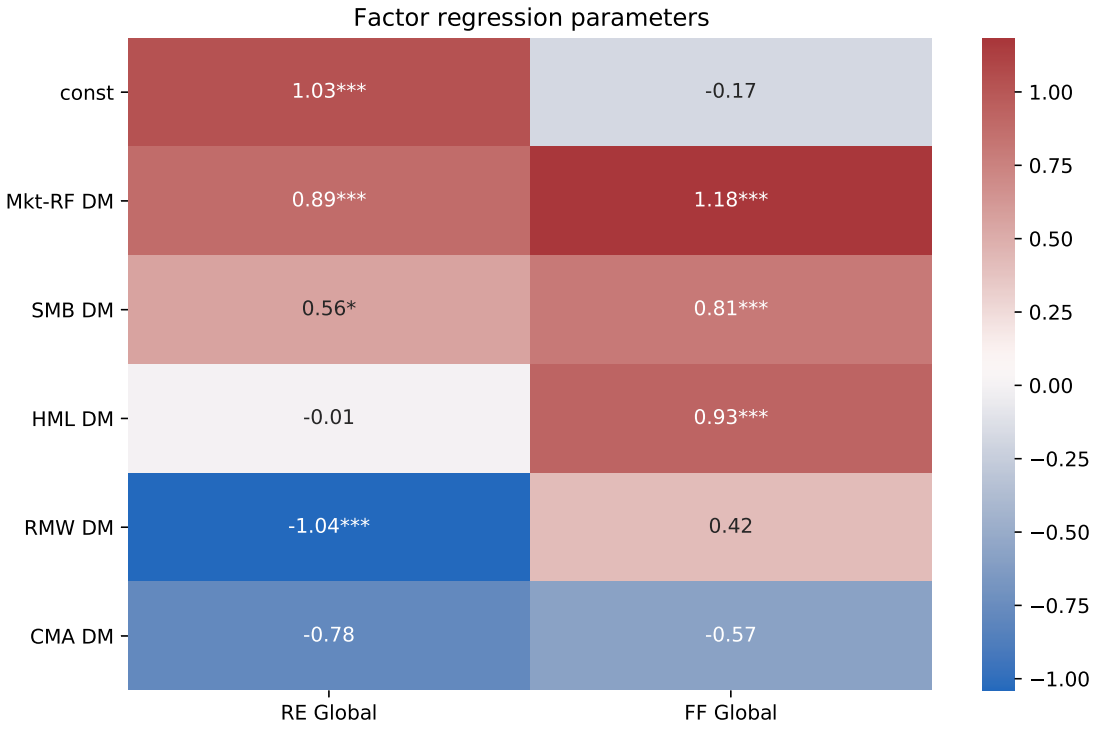
The included commodity regime depicts changes in historical market prices for oil, natural gas, and coal, the largest sources of primary energy production. We selected the most widely traded energy commodities for the analysis at the global portfolio levels: Europe Brent Spot Price FOB for oil, Henry Hub Natural Gas Spot Price for natural gas and Northwest Europe ARA 6,000 kc NAR for coal.

Annex B – IEA Scenarios

The **Stated Policies Scenario (STEPS)** is designed to give feedback to decision makers about the course that they are on today, based on stated policy ambitions. This scenario incorporates our assessment of stated policy ambitions, including the energy components of announced stimulus or recovery packages (as of mid-2020) and the Nationally Determined Contributions under the Paris Agreement. Broad energy and environmental objectives (including country net-zero targets) are not automatically assumed to be met. They are implemented in this scenario to the extent that they are backed up by specific policies, funding and measures. The STEPS also reflects progress with the implementation of corporate sustainability commitments. It assumes that the pandemic is brought under control over the course of 2021.

The **Sustainable Development Scenario (SDS)** is designed to meet the energy-related United Nations Sustainable Development Goals to achieve: universal access to affordable, reliable and modern energy services by 2030; a substantial reduction in air pollution, and effective action to combat climate change. The SDS is fully aligned with the Paris Agreement to hold the rise in global average temperature to "well below 2 °C ... and pursuing efforts to limit [it] to 1.5 °C". The SDS assesses what combination of actions would be required to achieve these objectives. In the SDS, many of the world's advanced economies reach net-zero emissions by 2050, or earlier in some cases, and global carbon dioxide (CO_2) emissions are on course to fall to net-zero by 2070.

Annex C – Fama-French Five-Factor Model



- "Mkt-RF": the return of the value-weighted market portfolio (minus the risk-free return).
- "SMB": a size factor, represented by difference between the return on a portfolio of small-cap stocks and the return on a portfolio of large-cap stocks
- "HML": a value factor, represented by the difference between the return on a portfolio of high book-to-market-equity stocks and a portfolio of low book-to-market-equity stocks
- "RMW": a profitability factor, represented by the difference between the return on a portfolio of stocks with robust profitability and a portfolio of stocks with weak profitability
- "CMA": an investment factor, represented by the difference between the return on a portfolio of stocks with conservative levels of investment and a portfolio of stocks with aggressive levels of investment

Annex D – Fossil Fuel Portfolio

Global fossil fuel portfolio consists of 545 companies listed on the Annex D.

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
1	APA Group	APA AU Equity	Australia	Advanced Economies
2	Beach Energy Ltd	BPT AU Equity	Australia	Advanced Economies
3	Cooper Energy Ltd	COE AU Equity	Australia	Advanced Economies
4	Coronado Global Resources Inc	CRN AU Equity	Australia	Advanced Economies
5	Carnarvon Petroleum Ltd	CVN AU Equity	Australia	Advanced Economies
6	Karoon Energy Ltd	KAR AU Equity	Australia	Advanced Economies
7	New Hope Corp Ltd	NHC AU Equity	Australia	Advanced Economies
8	Oil Search Ltd	OSH AU Equity	Australia	Advanced Economies
9	Santos Ltd	STO AU Equity	Australia	Advanced Economies
10	Strike Energy Ltd	STX AU Equity	Australia	Advanced Economies
11	Senex Energy Ltd	SXY AU Equity	Australia	Advanced Economies
12	Whitehaven Coal Ltd	WHC AU Equity	Australia	Advanced Economies
13	Woodside Petroleum Ltd	WPL AU Equity	Australia	Advanced Economies
14	Yancoal Australia Ltd	YAL AU Equity	Australia	Advanced Economies
15	OMV AG	OMV AV Equity	Austria	Advanced Economies
16	Schoeller-Bleckmann Oilfield Equipment AG	SBO AV Equity	Austria	Advanced Economies
17	Exmar NV	EXM BB Equity	Belgium	Advanced Economies
18	Fluxys Belgium SA	FLUX BB Equity	Belgium	Advanced Economies
19	Anglo Pacific Group PLC	APF LN Equity	Britain	Advanced Economies
20	BP PLC	BP/ LN Equity	Britain	Advanced Economies
21	Cairn Energy PLC	CNE LN Equity	Britain	Advanced Economies
22	Energean PLC	ENOG LN Equity	Britain	Advanced Economies
23	EnQuest PLC	ENQ LN Equity	Britain	Advanced Economies
24	TechnipFMC PLC	FTI US Equity	Britain	Advanced Economies
25	Genel Energy Plc	GENL LN Equity	Britain	Advanced Economies
26	Gulf Keystone Petroleum Ltd	GKP LN Equity	Britain	Advanced Economies
27	Hunting PLC	HTG LN Equity	Britain	Advanced Economies
28	Pantheon Resources PLC	PANR LN Equity	Britain	Advanced Economies
29	Petrofac Ltd	PFC LN Equity	Britain	Advanced Economies
30	Premier Oil PLC	PMO LN Equity	Britain	Advanced Economies
31	Serica Energy PLC	SQZ LN Equity	Britain	Advanced Economies
32	Subsea 7 SA	SUBC NO Equity	Britain	Advanced Economies
33	Tullow Oil PLC	TLW LN Equity	Britain	Advanced Economies
34	John Wood Group PLC	WG/ LN Equity	Britain	Advanced Economies
35	Advantage Oil & Gas Ltd	AAV CN Equity	Canada	Advanced Economies
36	Africa Energy Corp	AFE CN Equity	Canada	Advanced Economies
37	AltaGas Ltd	ALA CN Equity	Canada	Advanced Economies
38	Africa Oil Corp	AOI CN Equity	Canada	Advanced Economies
39	ARC Resources Ltd	ARX CN Equity	Canada	Advanced Economies
40	Brookfield Infrastructure Corp	BIPC CN Equity	Canada	Advanced Economies
41	Birchcliff Energy Ltd	BIR CN Equity	Canada	Advanced Economies
42	Baytex Energy Corp	BTE CN Equity	Canada	Advanced Economies
43	CES Energy Solutions Corp	CEU CN Equity	Canada	Advanced Economies
44	Canacol Energy Ltd	CNE CN Equity	Canada	Advanced Economies
45	Canadian Natural Resources Ltd	CNQ CN Equity	Canada	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
46	Crescent Point Energy Corp	CPG CN Equity	Canada	Advanced Economies
47	Cenovus Energy Inc	CVE CN Equity	Canada	Advanced Economies
48	Enerflex Ltd	EFX CN Equity	Canada	Advanced Economies
49	Enbridge Inc	ENB CN Equity	Canada	Advanced Economies
50	Enerplus Corp	ERF CN Equity	Canada	Advanced Economies
51	Frontera Energy Corp	FEC CN Equity	Canada	Advanced Economies
52	Freehold Royalties Ltd	FRU CN Equity	Canada	Advanced Economies
53	Gibson Energy Inc	GEI CN Equity	Canada	Advanced Economies
54	Headwater Exploration Inc	HWX CN Equity	Canada	Advanced Economies
55	Imperial Oil Ltd	IMO CN Equity	Canada	Advanced Economies
56	International Petroleum Corp/Sweden	IPCO SS Equity	Canada	Advanced Economies
57	Inter Pipeline Ltd	IPL CN Equity	Canada	Advanced Economies
58	Kelt Exploration Ltd	KEL CN Equity	Canada	Advanced Economies
59	Keyera Corp	KEY CN Equity	Canada	Advanced Economies
60	MEG Energy Corp	MEG CN Equity	Canada	Advanced Economies
61	Precision Drilling Corp	PD CN Equity	Canada	Advanced Economies
62	Peyto Exploration & Development Corp	PEY CN Equity	Canada	Advanced Economies
63	Paramount Resources Ltd	POU CN Equity	Canada	Advanced Economies
64	Pembina Pipeline Corp	PPL CN Equity	Canada	Advanced Economies
65	Pason Systems Inc	PSI CN Equity	Canada	Advanced Economies
66	PrairieSky Royalty Ltd	PSK CN Equity	Canada	Advanced Economies
67	Parex Resources Inc	PXT CN Equity	Canada	Advanced Economies
68	Secure Energy Services Inc	SES CN Equity	Canada	Advanced Economies
69	Superior Plus Corp	SPB CN Equity	Canada	Advanced Economies
70	Storm Resources Ltd	SRX CN Equity	Canada	Advanced Economies
71	Suncor Energy Inc	SU CN Equity	Canada	Advanced Economies
72	TransAlta Corp	TA CN Equity	Canada	Advanced Economies
73	Trican Well Service Ltd	TCW CN Equity	Canada	Advanced Economies
74	TORC Oil & Gas Ltd	TOG CN Equity	Canada	Advanced Economies
75	Tourmaline Oil Corp	TOU CN Equity	Canada	Advanced Economies
76	TC Energy Corp	TRP CN Equity	Canada	Advanced Economies
77	Tamarack Valley Energy Ltd	TVE CN Equity	Canada	Advanced Economies
78	Tidewater Midstream and Infrastructure Ltd	TWM CN Equity	Canada	Advanced Economies
79	Touchstone Exploration Inc	TXP CN Equity	Canada	Advanced Economies
80	Vermilion Energy Inc	VET CN Equity	Canada	Advanced Economies
81	Seven Generations Energy Ltd	VII CN Equity	Canada	Advanced Economies
82	Whitecap Resources Inc	WCP CN Equity	Canada	Advanced Economies
83	CGE Gas Natural SA	CGEGAS CI Equity	Chile	Advanced Economies
84	Empresas Gasco SA	GASCO CI Equity	Chile	Advanced Economies
85	Geopark Ltd	GPRK US Equity	Chile	Advanced Economies
86	Empresas Lipigas SA	LIPIGAS CI Equity	Chile	Advanced Economies
87	Ecopetrol SA	ECOPETL CB Equity	Colombia	Advanced Economies
88	Grupo Energia Bogota SA ESP	GEB CB Equity	Colombia	Advanced Economies
89	Promigas SA ESP	PROMIG CB Equity	Colombia	Advanced Economies
90	INA Industrija Nafte DD	INA CZ Equity	Croatia	Advanced Economies
91	Jadranski Naftovod DD	JNAF CZ Equity	Croatia	Advanced Economies
92	Drilling Co of 1972 A/S/The	DRLCO DC Equity	Denmark	Advanced Economies
93	CGG SA	CGG FP Equity	France	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
94	TOTAL SE	FP FP Equity	France	Advanced Economies
95	Gaztransport Et Technigaz SA	GTT FP Equity	France	Advanced Economies
96	Etablissements Maurel et Prom SA	MAU FP Equity	France	Advanced Economies
97	Indus Gas Ltd	INDI LN Equity	Guernsey	Advanced Economies
98	MOL Hungarian Oil & Gas PLC	MOL HB Equity	Hungary	Advanced Economies
99	Delek Drilling LP	DEDRL IT Equity	Israel	Advanced Economies
100	Delek Group Ltd	DLEKG IT Equity	Israel	Advanced Economies
101	Equital Ltd	EQTL IT Equity	Israel	Advanced Economies
102	Isramco Negev 2 LP	ISRAL IT Equity	Israel	Advanced Economies
103	Lapidoth Capital Ltd	LAPD IT Equity	Israel	Advanced Economies
104	Naphtha Israel Petroleum Corp Ltd	NFTA IT Equity	Israel	Advanced Economies
105	Navitas Petroleum LP	NVPT IT Equity	Israel	Advanced Economies
106	Ratio Oil Exploration 1992 LP	RATIL IT Equity	Israel	Advanced Economies
107	Supergas Energy Inc	SPGE IT Equity	Israel	Advanced Economies
108	Acsm - Agam SpA	ACS IM Equity	Italy	Advanced Economies
109	Ascopiave SpA	ASC IM Equity	Italy	Advanced Economies
110	Eni SpA	ENI IM Equity	Italy	Advanced Economies
111	Hera SpA	HER IM Equity	Italy	Advanced Economies
112	Italgas SpA	IG IM Equity	Italy	Advanced Economies
113	Saipem SpA	SPM IM Equity	Italy	Advanced Economies
114	Snam SpA	SRG IM Equity	Italy	Advanced Economies
115	Inpex Corp	1605 JP Equity	Japan	Advanced Economies
116	Japan Petroleum Exploration Co Ltd	1662 JP Equity	Japan	Advanced Economies
117	K&O Energy Group Inc	1663 JP Equity	Japan	Advanced Economies
118	TOKAI Holdings Corp	3167 JP Equity	Japan	Advanced Economies
119	Nippon Coke & Engineering Co Ltd	3315 JP Equity	Japan	Advanced Economies
120	Iwatani Corp	8088 JP Equity	Japan	Advanced Economies
121	Nippon Gas Co Ltd	8174 JP Equity	Japan	Advanced Economies
122	Tokyo Gas Co Ltd	9531 JP Equity	Japan	Advanced Economies
123	Osaka Gas Co Ltd	9532 JP Equity	Japan	Advanced Economies
124	Toho Gas Co Ltd	9533 JP Equity	Japan	Advanced Economies
125	Hokkaido Gas Co Ltd	9534 JP Equity	Japan	Advanced Economies
126	Hiroshima Gas Co Ltd	9535 JP Equity	Japan	Advanced Economies
127	Saibu Gas Co Ltd	9536 JP Equity	Japan	Advanced Economies
128	Keiyo Gas Co Ltd	9539 JP Equity	Japan	Advanced Economies
129	Shizuoka Gas Co Ltd	9543 JP Equity	Japan	Advanced Economies
130	Latvijas Gaze	GZE1R LR Equity	Latvia	Advanced Economies
131	AB Amber Grid	AMG1L LH Equity	Lithuania	Advanced Economies
132	Infraestructura Energetica Nova SAB de CV	IENOVA* MM Equity	Mexico	Advanced Economies
133	Vista Oil & Gas SAB de CV	VISTAA MM Equity	Mexico	Advanced Economies
134	Core Laboratories NV	CLB US Equity	Netherlands	Advanced Economies
135	Frank's International NV	FI US Equity	Netherlands	Advanced Economies
136	Fugro NV	FUR NA Equity	Netherlands	Advanced Economies
137	Royal Dutch Shell PLC	RDSA LN Equity	Netherlands	Advanced Economies
138	SBM Offshore NV	SBMO NA Equity	Netherlands	Advanced Economies
139	Koninklijke Vopak NV	VPK NA Equity	Netherlands	Advanced Economies
140	Akastor ASA	AKA NO Equity	Norway	Advanced Economies
141	Aker BP ASA	AKERBP NO Equity	Norway	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
142	Aker Solutions ASA	AKSO NO Equity	Norway	Advanced Economies
143	BW Offshore Ltd	BWO NO Equity	Norway	Advanced Economies
144	DNO ASA	DNO NO Equity	Norway	Advanced Economies
145	Equinor ASA	EQNR NO Equity	Norway	Advanced Economies
146	Norwegian Energy Co ASA	NOR NO Equity	Norway	Advanced Economies
147	Ocean Yield ASA	OCY NO Equity	Norway	Advanced Economies
148	Odfjell Drilling Ltd	ODL NO Equity	Norway	Advanced Economies
149	PGS ASA	PGS NO Equity	Norway	Advanced Economies
150	TGS NOPEC Geophysical Co ASA	TGS NO Equity	Norway	Advanced Economies
151	Jastrzebska Spolka Weglowa SA	JSW PW Equity	Poland	Advanced Economies
152	Polskie Gornictwo Naftowe i Gazownictwo SA	PGN PW Equity	Poland	Advanced Economies
153	Galp Energia SGPS SA	GALP PL Equity	Portugal	Advanced Economies
154	Societatea Nationala de Gaze Naturale ROMGAZ SA	SNG RO Equity	Romania	Advanced Economies
155	OMV Petrom SA	SNP RO Equity	Romania	Advanced Economies
156	Transgaz SA Medias	TGN RO Equity	Romania	Advanced Economies
157	Samchully Co Ltd	004690 KS Equity	South Korea	Advanced Economies
158	Busan City Gas Co Ltd	015350 KS Equity	South Korea	Advanced Economies
159	Daesung Holdings Co Ltd	016710 KS Equity	South Korea	Advanced Economies
160	Seoul City Gas Co Ltd	017390 KS Equity	South Korea	Advanced Economies
161	Korea Gas Corp	036460 KS Equity	South Korea	Advanced Economies
162	Enagas SA	ENG SM Equity	Spain	Advanced Economies
163	Naturgy Energy Group SA	NTGY SM Equity	Spain	Advanced Economies
164	Repsol SA	REP SM Equity	Spain	Advanced Economies
165	Lundin Energy AB	LUNE SS Equity	Sweden	Advanced Economies
166	Holdigaz	HOLVVE SW Equity	Switzerland	Advanced Economies
167	Dogan Sirketler Grubu Holding AS	DOHOL TI Equity	Turkey	Advanced Economies
168	Ipek Dogal Enerji Kaynaklari Arastirma Ve Uretim AS	IPEKE TI Equity	Turkey	Advanced Economies
169	Antero Midstream Corp	AM US Equity	United States	Advanced Economies
170	Apache Corp	APA US Equity	United States	Advanced Economies
171	Antero Resources Corp	AR US Equity	United States	Advanced Economies
172	Arch Resources Inc	ARCH US Equity	United States	Advanced Economies
173	Alliance Resource Partners LP	ARLP US Equity	United States	Advanced Economies
174	Archrock Inc	AROC US Equity	United States	Advanced Economies
175	Atmos Energy Corp	ATO US Equity	United States	Advanced Economies
176	Bonanza Creek Energy Inc	BCEI US Equity	United States	Advanced Economies
177	Baker Hughes Co	BKR US Equity	United States	Advanced Economies
178	DMC Global Inc	BOOM US Equity	United States	Advanced Economies
179	BP Midstream Partners LP	BPMP US Equity	United States	Advanced Economies
180	Berry Corp	BRY US Equity	United States	Advanced Economies
181	Black Stone Minerals LP	BSM US Equity	United States	Advanced Economies
182	Peabody Energy Corp	BTU US Equity	United States	Advanced Economies
183	Centennial Resource Development Inc/DE	CDEV US Equity	United States	Advanced Economies
184	CONSOL Energy Inc	CEIX US Equity	United States	Advanced Economies
185	Crestwood Equity Partners LP	CEQP US Equity	United States	Advanced Economies
186	ChampionX Corp	CHX US Equity	United States	Advanced Economies
187	Continental Resources Inc/OK	CLR US Equity	United States	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
188	CNX Resources Corp	CNX US Equity	United States	Advanced Economies
189	Cabot Oil & Gas Corp	COG US Equity	United States	Advanced Economies
190	ConocoPhillips	COP US Equity	United States	Advanced Economies
191	Callon Petroleum Co	CPE US Equity	United States	Advanced Economies
192	Chesapeake Utilities Corp	CPK US Equity	United States	Advanced Economies
193	Cheniere Energy Partners LP	CQP US Equity	United States	Advanced Economies
194	Comstock Resources Inc	CRK US Equity	United States	Advanced Economies
195	Chevron Corp	CVX US Equity	United States	Advanced Economies
196	Concho Resources Inc	CXO US Equity	United States	Advanced Economies
197	DCP Midstream LP	DCP US Equity	United States	Advanced Economies
198	Denbury Inc	DEN US Equity	United States	Advanced Economies
199	Diversified Gas & Oil PLC	DGOC LN Equity	United States	Advanced Economies
200	Delek Logistics Partners LP	DKL US Equity	United States	Advanced Economies
201	Dorchester Minerals LP	DMLP US Equity	United States	Advanced Economies
202	NOW Inc	DNOW US Equity	United States	Advanced Economies
203	Dril-Quip Inc	DRQ US Equity	United States	Advanced Economies
204	Devon Energy Corp	DVN US Equity	United States	Advanced Economies
205	Enable Midstream Partners LP	ENBL US Equity	United States	Advanced Economies
206	EnLink Midstream LLC	ENLC US Equity	United States	Advanced Economies
207	EOG Resources Inc	EOG US Equity	United States	Advanced Economies
208	Enterprise Products Partners LP	EPD US Equity	United States	Advanced Economies
209	EQT Corp	EQT US Equity	United States	Advanced Economies
210	Earthstone Energy Inc	ESTE US Equity	United States	Advanced Economies
211	Energy Transfer LP	ET US Equity	United States	Advanced Economies
212	Equitrans Midstream Corp	ETRN US Equity	United States	Advanced Economies
213	Diamondback Energy Inc	FANG US Equity	United States	Advanced Economies
214	Falcon Minerals Corp	FLMN US Equity	United States	Advanced Economies
215	Genesis Energy LP	GEL US Equity	United States	Advanced Economies
216	Global Partners LP/MA	GLP US Equity	United States	Advanced Economies
217	Halliburton Co	HAL US Equity	United States	Advanced Economies
218	Warrior Met Coal Inc	HCC US Equity	United States	Advanced Economies
219	Holly Energy Partners LP	HEP US Equity	United States	Advanced Economies
220	Hess Corp	HES US Equity	United States	Advanced Economies
221	Hess Midstream LP	HESM US Equity	United States	Advanced Economies
222	Helix Energy Solutions Group Inc	HLX US Equity	United States	Advanced Economies
223	Helmerich & Payne Inc	HP US Equity	United States	Advanced Economies
224	HighPeak Energy Inc	HPK US Equity	United States	Advanced Economies
225	Kinder Morgan Inc	KMI US Equity	United States	Advanced Economies
226	Kosmos Energy Ltd	KOS US Equity	United States	Advanced Economies
227	Kimbell Royalty Partners LP	KRP US Equity	United States	Advanced Economies
228	Liberty Oilfield Services Inc	LBRT US Equity	United States	Advanced Economies
229	Cheniere Energy Inc	LNG US Equity	United States	Advanced Economies
230	Laredo Petroleum Inc	LPI US Equity	United States	Advanced Economies
231	Contango Oil & Gas Co	MCF US Equity	United States	Advanced Economies
232	Magnolia Oil & Gas Corp	MGY US Equity	United States	Advanced Economies
233	Magellan Midstream Partners LP	MMP US Equity	United States	Advanced Economies
234	Brigham Minerals Inc	MNRL US Equity	United States	Advanced Economies
235	MPLX LP	MPLX US Equity	United States	Advanced Economies
236	MRC Global Inc	MRC US Equity	United States	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
237	Marathon Oil Corp	MRO US Equity	United States	Advanced Economies
238	Matador Resources Co	MTDR US Equity	United States	Advanced Economies
239	Matrix Service Co	MTRX US Equity	United States	Advanced Economies
240	Murphy Oil Corp	MUR US Equity	United States	Advanced Economies
241	Noble Midstream Partners LP	NBLX US Equity	United States	Advanced Economies
242	Nabors Industries Ltd	NBR US Equity	United States	Advanced Economies
243	National Energy Services Reunited Corp	NESR US Equity	United States	Advanced Economies
244	NexTier Oilfield Solutions Inc	NEX US Equity	United States	Advanced Economies
245	NextDecade Corp	NEXT US Equity	United States	Advanced Economies
246	New Fortress Energy Inc	NFE US Equity	United States	Advanced Economies
247	National Fuel Gas Co	NFG US Equity	United States	Advanced Economies
248	NGL Energy Partners LP	NGL US Equity	United States	Advanced Economies
249	NiSource Inc	NI US Equity	United States	Advanced Economies
250	New Jersey Resources Corp	NJR US Equity	United States	Advanced Economies
251	Northern Oil and Gas Inc	NOG US Equity	United States	Advanced Economies
252	NOV Inc	NOV US Equity	United States	Advanced Economies
253	NRG Energy Inc	NRG US Equity	United States	Advanced Economies
254	NuStar Energy LP	NS US Equity	United States	Advanced Economies
255	Northwest Natural Holding Co	NWN US Equity	United States	Advanced Economies
256	ONE Gas Inc	OGS US Equity	United States	Advanced Economies
257	Oceaneering International Inc	OII US Equity	United States	Advanced Economies
258	Oil States International Inc	OIS US Equity	United States	Advanced Economies
259	ONEOK Inc	OKE US Equity	United States	Advanced Economies
260	Oasis Midstream Partners LP	OMP US Equity	United States	Advanced Economies
261	Ovintiv Inc	OVV US Equity	United States	Advanced Economies
262	Occidental Petroleum Corp	OXY US Equity	United States	Advanced Economies
263	Plains All American Pipeline LP	PAA US Equity	United States	Advanced Economies
264	Plains GP Holdings LP	PAGP US Equity	United States	Advanced Economies
265	PBF Logistics LP	PBFX US Equity	United States	Advanced Economies
266	PDC Energy Inc	PDCE US Equity	United States	Advanced Economies
267	Phillips 66 Partners LP	PSXP US Equity	United States	Advanced Economies
268	Patterson-UTI Energy Inc	PTEN US Equity	United States	Advanced Economies
269	ProPetro Holding Corp	PUMP US Equity	United States	Advanced Economies
270	Pioneer Natural Resources Co	PXD US Equity	United States	Advanced Economies
271	QEP Resources Inc	QEP US Equity	United States	Advanced Economies
272	RPC Inc	RES US Equity	United States	Advanced Economies
273	Transocean Ltd	RIG US Equity	United States	Advanced Economies
274	Range Resources Corp	RRC US Equity	United States	Advanced Economies
275	Rattler Midstream LP	RTLR US Equity	United States	Advanced Economies
276	Sabine Royalty Trust	SBR US Equity	United States	Advanced Economies
277	Shell Midstream Partners LP	SHLX US Equity	United States	Advanced Economies
278	South Jersey Industries Inc	SJI US Equity	United States	Advanced Economies
279	Schlumberger NV	SLB US Equity	United States	Advanced Economies
280	US Silica Holdings Inc	SLCA US Equity	United States	Advanced Economies
281	SM Energy Co	SM US Equity	United States	Advanced Economies
282	Solaris Oilfield Infrastructure Inc	SOI US Equity	United States	Advanced Economies
283	Suburban Propane Partners LP	SPH US Equity	United States	Advanced Economies
284	Spire Inc	SR US Equity	United States	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
285	Southwestern Energy Co	SWN US Equity	United States	Advanced Economies
286	Southwest Gas Holdings Inc	SWX US Equity	United States	Advanced Economies
287	SunCoke Energy Inc	SXC US Equity	United States	Advanced Economies
288	Talos Energy Inc	TALO US Equity	United States	Advanced Economies
289	TC PipeLines LP	TCP US Equity	United States	Advanced Economies
290	Tidewater Inc	TDW US Equity	United States	Advanced Economies
291	Tellurian Inc	TELL US Equity	United States	Advanced Economies
292	Thermon Group Holdings Inc	THR US Equity	United States	Advanced Economies
293	Targa Resources Corp	TRGP US Equity	United States	Advanced Economies
294	Mammoth Energy Services Inc	TUSK US Equity	United States	Advanced Economies
295	UGI Corp	UGI US Equity	United States	Advanced Economies
296	USA Compression Partners LP	USAC US Equity	United States	Advanced Economies
297	Viper Energy Partners LP	VNOM US Equity	United States	Advanced Economies
298	Vistra Corp	VST US Equity	United States	Advanced Economies
299	Western Midstream Partners LP	WES US Equity	United States	Advanced Economies
300	Weatherford International PLC	WFTLF US Equity	United States	Advanced Economies
301	Whiting Petroleum Corp	WLL US Equity	United States	Advanced Economies
302	Williams Cos Inc/The	WMB US Equity	United States	Advanced Economies
303	W&T Offshore Inc	WTI US Equity	United States	Advanced Economies
304	Select Energy Services Inc	WTTR US Equity	United States	Advanced Economies
305	Cimarex Energy Co	XEC US Equity	United States	Advanced Economies
306	Exxon Mobil Corp	XOM US Equity	United States	Advanced Economies
307	Zion Oil & Gas Inc	ZNOG US Equity	United States	Advanced Economies
308	Citic Offshore Helicopter Co Ltd	000099 CH Equity	China	China
309	Xinjiang International Industry Co Ltd	000159 CH Equity	China	China
310	Shandong Shengli Co	000407 CH Equity	China	China
311	NanJing Public Utilities Development Co Ltd	000421 CH Equity	China	China
312	Gansu Jingyuan Coal Industry and Electricity Power Co Ltd	000552 CH Equity	China	China
313	Sundiro Holding Co Ltd	000571 CH Equity	China	China
314	Sichuan Datong Gas Development Co Ltd	000593 CH Equity	China	China
315	Shanxi Meijin Energy Co Ltd	000723 CH Equity	China	China
316	Jinneng Holding Shanxi Electric Power Co Ltd	000767 CH Equity	China	China
317	Inner Mongolia Pingzhuang Energy Co Ltd	000780 CH Equity	China	China
318	Sinopec Oilfield Equipment Corp	000852 CH Equity	China	China
319	Jizhong Energy Resources Co Ltd	000937 CH Equity	China	China
320	SPIC Dongfang New Energy Corp	000958 CH Equity	China	China
321	Shanxi Blue Flame Holding Co Ltd	000968 CH Equity	China	China
322	Shanxi Coking Coal Energy Group Co Ltd	000983 CH Equity	China	China
323	Henan Yuneng Holdings Co Ltd	001896 CH Equity	China	China
324	Xinjiang Zhundong Petroleum Technology Co Ltd	002207 CH Equity	China	China
325	Sichuan Shengda Forestry Industry Co Ltd	002259 CH Equity	China	China
326	Shaan Xi Provincial Natural Gas Co Ltd	002267 CH Equity	China	China

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
327	Shanghai SK Petroleum & Chemical Equipment Corp Ltd	002278 CH Equity	China	China
328	Yantai Jereh Oilfield Services Group Co Ltd	002353 CH Equity	China	China
329	China Oil HBP Science & Technology Co Ltd	002554 CH Equity	China	China
330	Jiangsu Guoxin Corp Ltd	002608 CH Equity	China	China
331	Guangdong Hongda Blasting Co Ltd	002683 CH Equity	China	China
332	Xinjiang Haoyuan Gas Co Ltd	002700 CH Equity	China	China
333	Xinjiang Beiken Energy Engineering Stock Co Ltd	002828 CH Equity	China	China
334	Foran Energy Group Co Ltd	002911 CH Equity	China	China
335	China Shenhua Energy Co Ltd	1088 HK Equity	China	China
336	Yanzhou Coal Mining Co Ltd	1171 HK Equity	China	China
337	Kinetic Mines and Energy Ltd	1277 HK Equity	China	China
338	Suchuang Gas Corp Ltd	1430 HK Equity	China	China
339	China Tian Lun Gas Holdings Ltd	1600 HK Equity	China	China
340	China Coal Energy Co Ltd	1898 HK Equity	China	China
341	Shenzhen Nanshan Power Co Ltd	200037 CH Equity	China	China
342	ENN Energy Holdings Ltd	2688 HK Equity	China	China
343	China Oilfield Services Ltd	2883 HK Equity	China	China
344	Haimo Technologies Group Corp	300084 CH Equity	China	China
345	LandOcean Energy Services Co Ltd	300157 CH Equity	China	China
346	Tong Petrotech Corp	300164 CH Equity	China	China
347	Sino GeoPhysical Co Ltd	300191 CH Equity	China	China
348	Top Resource Conservation & Environment Corp	300332 CH Equity	China	China
349	Houpu Clean Energy Co Ltd	300471 CH Equity	China	China
350	Sino Prima Gas Technology Co Ltd	300483 CH Equity	China	China
351	China Petroleum & Chemical Corp	386 HK Equity	China	China
352	Shandong Molong Petroleum Machinery Co Ltd	568 HK Equity	China	China
353	Beijing Jingneng Clean Energy Co Ltd	579 HK Equity	China	China
354	Guangzhou Development Group Inc	600098 CH Equity	China	China
355	Zhengzhou Coal Industry & Electric Power Co Ltd	600121 CH Equity	China	China
356	Shanxi Lanhua Sci-Tech Venture Co Ltd	600123 CH Equity	China	China
357	CCS Supply Chain Management Co Ltd	600180 CH Equity	China	China
358	Henan Ancai Hi-Tech Co Ltd	600207 CH Equity	China	China
359	Shandong Jiangquan Industry Co Ltd	600212 CH Equity	China	China
360	Guanghui Energy Co Ltd	600256 CH Equity	China	China
361	Taiyuan Chemical Industry Co Ltd	600281 CH Equity	China	China
362	Changchun Gas Co Ltd	600333 CH Equity	China	China
363	Yang Quan Coal Industry Group Co Ltd	600348 CH Equity	China	China
364	Guizhou Panjiang Refined Coal Co Ltd	600395 CH Equity	China	China
365	Shenyang Jinshan Energy Co Ltd	600396 CH Equity	China	China
366	Anyuan Coal Industry Group Co Ltd	600397 CH Equity	China	China
367	Henan Dayou Energy Co Ltd	600403 CH Equity	China	China
368	Shanxi Antai Group Co Ltd	600408 CH Equity	China	China

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
369	Shanghai Datun Energy Resources Co Ltd	600508 CH Equity	China	China
370	Xinjiang Tianfu Energy Co Ltd	600509 CH Equity	China	China
371	Shanghai Topcare Medical Services Co Ltd	600532 CH Equity	China	China
372	Shanxi Coal International Energy Group Co Ltd	600546 CH Equity	China	China
373	Offshore Oil Engineering Co Ltd	600583 CH Equity	China	China
374	Shanghai Dazhong Public Utilities Group Co Ltd	600635 CH Equity	China	China
375	Shenergy Co Ltd	600642 CH Equity	China	China
376	Bestsun Energy Co Ltd	600681 CH Equity	China	China
377	Yunnan Yunwei Co Ltd	600725 CH Equity	China	China
378	Liaoning Energy Industry Co Ltd	600758 CH Equity	China	China
379	Geo-Jade Petroleum Corp	600759 CH Equity	China	China
380	Shandong Xinchao Energy Corp Ltd	600777 CH Equity	China	China
381	Zhongxing Tianheng Energy Techology Beijing Co Ltd	600856 CH Equity	China	China
382	Sinopec Oilfield Service Corp	600871 CH Equity	China	China
383	Guizhou Gas Group Corp Ltd	600903 CH Equity	China	China
384	Chongqing Gas Group Corp Ltd	600917 CH Equity	China	China
385	CNOOC Energy Technology & Services Ltd	600968 CH Equity	China	China
386	Anhui Hengyuan Coal Industry and Electricity Power Co Ltd	600971 CH Equity	China	China
387	Huaibei Mining Holdings Co Ltd	600985 CH Equity	China	China
388	Kailuan Energy Chemical Co Ltd	600997 CH Equity	China	China
389	Jinneng Holding Shanxi Coal Industry Co Ltd	601001 CH Equity	China	China
390	Baotailong New Materials Co Ltd	601011 CH Equity	China	China
391	Beijing Haohua Energy Resource Co Ltd	601101 CH Equity	China	China
392	Shenzhen Gas Corp Ltd	601139 CH Equity	China	China
393	Shaanxi Coal Industry Co Ltd	601225 CH Equity	China	China
394	Pingdingshan Tianan Coal Mining Co Ltd	601666 CH Equity	China	China
395	Shanxi Lu'an Environmental Energy Development Co Ltd	601699 CH Equity	China	China
396	Lanpec Technologies Ltd	601798 CH Equity	China	China
397	China Coal Xinji Energy Co Ltd	601918 CH Equity	China	China
398	Jiangsu Rutong Petro-Machinery Co Ltd	603036 CH Equity	China	China
399	Chengdu Gas Group Co Ltd	603053 CH Equity	China	China
400	Xinjiang Torch Gas Co Ltd	603080 CH Equity	China	China
401	Jinneng Science&Technology Co Ltd	603113 CH Equity	China	China
402	Xinjiang Xintai Natural Gas Co Ltd	603393 CH Equity	China	China
403	ZhongMan Petroleum and Natural Gas Group Corp Ltd	603619 CH Equity	China	China
404	Changzheng Engineering Co Ltd	603698 CH Equity	China	China
405	Xinjiang East Universe Group Gas Co Ltd	603706 CH Equity	China	China
406	Bomesc Offshore Engineering Co Ltd	603727 CH Equity	China	China
407	Nanjing Develop Advanced Manufacturing Co Ltd	688377 CH Equity	China	China

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
408	PetroChina Co Ltd	857 HK Equity	China	China
409	CNOOC Ltd	883 HK Equity	China	China
410	Shanxi Guoxin Energy Corp Ltd	900913 CH Equity	China	China
411	Inner Mongolia Yitai Coal Co Ltd	900948 CH Equity	China	China
412	China Suntien Green Energy Corp Ltd	956 HK Equity	China	China
413	Towngas China Co Ltd	1083 HK Equity	Hong Kong	China
414	China Resources Gas Group Ltd	1193 HK Equity	Hong Kong	China
415	CITIC Resources Holdings Ltd	1205 HK Equity	Hong Kong	China
416	Kunlun Energy Co Ltd	135 HK Equity	Hong Kong	China
417	Feishang Anthracite Resources Ltd	1738 HK Equity	Hong Kong	China
418	China Power International Development Ltd	2380 HK Equity	Hong Kong	China
419	AAG Energy Holdings Ltd	2686 HK Equity	Hong Kong	China
420	Perennial Energy Holdings Ltd	2798 HK Equity	Hong Kong	China
421	Binhai Investment Co Ltd	2886 HK Equity	Hong Kong	China
422	Hong Kong & China Gas Co Ltd	3 HK Equity	Hong Kong	China
423	Zhongyu Gas Holdings Ltd	3633 HK Equity	Hong Kong	China
424	China Gas Holdings Ltd	384 HK Equity	Hong Kong	China
425	CIMC Enric Holdings Ltd	3899 HK Equity	Hong Kong	China
426	Beijing Enterprises Holdings Ltd	392 HK Equity	Hong Kong	China
427	United Energy Group Ltd	467 HK Equity	Hong Kong	China
428	Hans Energy Co Ltd	554 HK Equity	Hong Kong	China
429	China Oil & Gas Group Ltd	603 HK Equity	Hong Kong	China
430	Shougang Fushan Resources Group Ltd	639 HK Equity	Hong Kong	China
431	Beijing Gas Blue Sky Holdings Ltd	6828 HK Equity	Hong Kong	China
432	China Resources Power Holdings Co Ltd	836 HK Equity	Hong Kong	China
433	Sinopec Kantons Holdings Ltd	934 HK Equity	Hong Kong	China
434	Sociedad Comercial del Plata SA	COME AR Equity	Argentina	Emerging Market and Developing Economies
435	Transportadora de Gas del Sur SA	TGSU2 AR Equity	Argentina	Emerging Market and Developing Economies
436	YPF SA	YPFD AR Equity	Argentina	Emerging Market and Developing Economies
437	Padma Oil Co Ltd	PADMAO BD Equity	Bangladesh	Emerging Market and Developing Economies
438	Titas Gas Transmission & Distribution Co Ltd	TITASGAS BD Equity	Bangladesh	Emerging Market and Developing Economies
439	Cia Distribuidora de Gas do Rio de Janeiro SA	CEGR3 BZ Equity	Brazil	Emerging Market and Developing Economies
440	Cia de Gas de Sao Paulo SA	CGAS5 BZ Equity	Brazil	Emerging Market and Developing Economies
441	Enauta Participacoes SA	ENAT3 BZ Equity	Brazil	Emerging Market and Developing Economies
442	Petroleo Brasileiro SA	PETR4 BZ Equity	Brazil	Emerging Market and Developing Economies
443	Petro Rio SA	PRIO3 BZ Equity	Brazil	Emerging Market and Developing Economies
444	Total Gabon	EC FP Equity	Gabon	Emerging Market and Developing Economies
445	Adani Enterprises Ltd	ADE IN Equity	India	Emerging Market and Developing Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
446	Aegis Logistics Ltd	AGIS IN Equity	India	Emerging Market and Developing Economies
447	Adani Total Gas Ltd	ATGL IN Equity	India	Emerging Market and Developing Economies
448	Coal India Ltd	COAL IN Equity	India	Emerging Market and Developing Economies
449	GAIL India Ltd	GAIL IN Equity	India	Emerging Market and Developing Economies
450	Gujarat Mineral Development Corp Ltd	GMDC IN Equity	India	Emerging Market and Developing Economies
451	Gujarat Gas Ltd	GUJGA IN Equity	India	Emerging Market and Developing Economies
452	Gujarat State Petronet Ltd	GUJS IN Equity	India	Emerging Market and Developing Economies
453	Indraprastha Gas Ltd	IGL IN Equity	India	Emerging Market and Developing Economies
454	JSW Energy Ltd	JSW IN Equity	India	Emerging Market and Developing Economies
455	Mahanagar Gas Ltd	MAHGL IN Equity	India	Emerging Market and Developing Economies
456	Oil India Ltd	OINL IN Equity	India	Emerging Market and Developing Economies
457	Oil & Natural Gas Corp Ltd	ONGC IN Equity	India	Emerging Market and Developing Economies
458	Petronet LNG Ltd	PLNG IN Equity	India	Emerging Market and Developing Economies
459	Adaro Energy Tbk PT	ADRO IJ Equity	Indonesia	Emerging Market and Developing Economies
460	Baramulti Suksessarana Tbk PT	BSSR IJ Equity	Indonesia	Emerging Market and Developing Economies
461	Bumi Resources Tbk PT	BUMI IJ Equity	Indonesia	Emerging Market and Developing Economies
462	Bayan Resources Tbk PT	BYAN IJ Equity	Indonesia	Emerging Market and Developing Economies
463	Dian Swastatika Sentosa Tbk PT	DSSA IJ Equity	Indonesia	Emerging Market and Developing Economies
464	Harum Energy Tbk PT	HRUM IJ Equity	Indonesia	Emerging Market and Developing Economies
465	Indika Energy Tbk PT	INDY IJ Equity	Indonesia	Emerging Market and Developing Economies
466	Indo Tambangraya Megah Tbk PT	ITMG IJ Equity	Indonesia	Emerging Market and Developing Economies
467	Mitrabara Adiperdana Tbk PT	MBAP IJ Equity	Indonesia	Emerging Market and Developing Economies
468	Medco Energi Internasional Tbk PT	MEDC IJ Equity	Indonesia	Emerging Market and Developing Economies
469	Samindo Resources TBK PT	MYOH IJ Equity	Indonesia	Emerging Market and Developing Economies
470	Perusahaan Gas Negara Tbk PT	PGAS IJ Equity	Indonesia	Emerging Market and Developing Economies
471	Bukit Asam Tbk PT	PTBA IJ Equity	Indonesia	Emerging Market and Developing Economies
472	Super Energy Tbk PT	SURE IJ Equity	Indonesia	Emerging Market and Developing Economies
473	TBS Energi Utama Tbk PT	TOBA IJ Equity	Indonesia	Emerging Market and Developing Economies
474	KazTransOil JSC	KZTO KZ Equity	Kazakhstan	Emerging Market and Developing Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
475	National Petroleum Services Co KSCC	NAPESCO KK Equity	Kuwait	Emerging Market and Developing Economies
476	Bumi Armada Bhd	BAB MK Equity	Malaysia	Emerging Market and Developing Economies
477	Dayang Enterprise Holdings Bhd	DEHB MK Equity	Malaysia	Emerging Market and Developing Economies
478	Dialog Group Bhd	DLG MK Equity	Malaysia	Emerging Market and Developing Economies
479	Gas Malaysia Bhd	GMB MK Equity	Malaysia	Emerging Market and Developing Economies
480	Hibiscus Petroleum Bhd	HIBI MK Equity	Malaysia	Emerging Market and Developing Economies
481	Petronas Gas Bhd	PTG MK Equity	Malaysia	Emerging Market and Developing Economies
482	Sapura Energy Bhd	SAPE MK Equity	Malaysia	Emerging Market and Developing Economies
483	Velesto Energy Bhd	VEB MK Equity	Malaysia	Emerging Market and Developing Economies
484	Afriquia Gaz	GAZ MC Equity	Morocco	Emerging Market and Developing Economies
485	TOTAL Maroc SA	TMA MC Equity	Morocco	Emerging Market and Developing Economies
486	Mocambicana de Hidrocarbonetos SA Cia	CMH MZ Equity	Mozambique	Emerging Market and Developing Economies
487	SEPLAT Petroleum Development Co Plc	SEPL LN Equity	Nigeria	Emerging Market and Developing Economies
488	Renaissance Services SAOG	RNSS OM Equity	Oman	Emerging Market and Developing Economies
489	Hub Power Co Ltd/The	HUBC PA Equity	Pakistan	Emerging Market and Developing Economies
490	Mari Petroleum Co Ltd	MARI PA Equity	Pakistan	Emerging Market and Developing Economies
491	Oil & Gas Development Co Ltd	OGDC PA Equity	Pakistan	Emerging Market and Developing Economies
492	Pakistan Oilfields Ltd	POL PA Equity	Pakistan	Emerging Market and Developing Economies
493	Pakistan Petroleum Ltd	PPL PA Equity	Pakistan	Emerging Market and Developing Economies
494	AC Energy Corp	ACEN PM Equity	Philippines	Emerging Market and Developing Economies
495	Pryce Corp	PPC PM Equity	Philippines	Emerging Market and Developing Economies
496	PXP Energy Corp	PXP PM Equity	Philippines	Emerging Market and Developing Economies
497	Semirara Mining & Power Corp	SCC PM Equity	Philippines	Emerging Market and Developing Economies
498	Gulf International Services QSC	GISS QD Equity	Qatar	Emerging Market and Developing Economies
499	Qatar Electricity & Water Co QSC	QEWS QD Equity	Qatar	Emerging Market and Developing Economies
500	Bashneft PJSC	BANE RM Equity	Russia	Emerging Market and Developing Economies
501	Gazprom PJSC	GAZP RM Equity	Russia	Emerging Market and Developing Economies
502	Kuzbasskaya Toplivnaya Kompaniya PAO	KBTK RM Equity	Russia	Emerging Market and Developing Economies
503	LUKOIL PJSC	LKOH RM Equity	Russia	Emerging Market and Developing Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
504	Slavneft-Megionneftegaz PPO OAO	MFGS RM Equity	Russia	Emerging Market and Developing Economies
505	Mosenergo PJSC	MSNG RM Equity	Russia	Emerging Market and Developing Economies
506	Novatek PJSC	NVTK RM Equity	Russia	Emerging Market and Developing Economies
507	Raspadskaya OJSC	RASP RM Equity	Russia	Emerging Market and Developing Economies
508	RussNeft PJSC	RNFT RM Equity	Russia	Emerging Market and Developing Economies
509	Rosneft Oil Co PJSC	ROSN RM Equity	Russia	Emerging Market and Developing Economies
510	Gazprom Neft PJSC	SIBN RM Equity	Russia	Emerging Market and Developing Economies
511	Surgutneftegas PJSC	SNGS RM Equity	Russia	Emerging Market and Developing Economies
512	Tatneft PJSC	TATN RM Equity	Russia	Emerging Market and Developing Economies
513	Transneft PJSC	TRNFP RM Equity	Russia	Emerging Market and Developing Economies
514	Ugol'naya Kompaniya Yuzhnyy Kuzbass PAO	UKUZ RM Equity	Russia	Emerging Market and Developing Economies
515	Varyegganneftegaz PJSC	VJGZ RM Equity	Russia	Emerging Market and Developing Economies
516	Yakutsk Fuel-Energy Co PJSC	YAKG RM Equity	Russia	Emerging Market and Developing Economies
517	Saudi Arabian Oil Co	ARAMCO AB Equity	Saudi Arabia	Emerging Market and Developing Economies
518	National Gas & Industrialization Co	NGIC AB Equity	Saudi Arabia	Emerging Market and Developing Economies
519	NIS AD Novi Sad	NIIS SG Equity	Serbia	Emerging Market and Developing Economies
520	BW Energy Ltd	BWE NO Equity	Singapore	Emerging Market and Developing Economies
521	Golden Energy & Resources Ltd	GER SP Equity	Singapore	Emerging Market and Developing Economies
522	Jadestone Energy Inc	JSE LN Equity	Singapore	Emerging Market and Developing Economies
523	Sembcorp Marine Ltd	SMM SP Equity	Singapore	Emerging Market and Developing Economies
524	Exxaro Resources Ltd	EXX SJ Equity	South Africa	Emerging Market and Developing Economies
525	Hsin Tai Gas Co Ltd	8917 TT Equity	Taiwan	Emerging Market and Developing Economies
526	Great Taipei Gas Co Ltd	9908 TT Equity	Taiwan	Emerging Market and Developing Economies
527	Shin Shin Natural Gas Co	9918 TT Equity	Taiwan	Emerging Market and Developing Economies
528	Shin Hai Gas Corp	9926 TT Equity	Taiwan	Emerging Market and Developing Economies
529	Banpu PCL	BANPU TB Equity	Thailand	Emerging Market and Developing Economies
530	Prima Marine PCL	PRM TB Equity	Thailand	Emerging Market and Developing Economies
531	PTT PCL	PTT TB Equity	Thailand	Emerging Market and Developing Economies
532	PTT Exploration & Production PCL	PTTEP TB Equity	Thailand	Emerging Market and Developing Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
533	Trinidad & Tobago NGL Ltd	NGL TP Equity	Trinidad and Tobago	Emerging Market and Developing Economies
534	ADES International Holding PLC	ADES LN Equity	UAE	Emerging Market and Developing Economies
535	Brooge Energy Ltd	BROG US Equity	UAE	Emerging Market and Developing Economies
536	Dana Gas PJSC	DANA UH Equity	UAE	Emerging Market and Developing Economies
537	Lamprell PLC	LAM LN Equity	UAE	Emerging Market and Developing Economies
538	Pokrovske Mine Management PJSC	SHCHZ UZ Equity	Ukraine	Emerging Market and Developing Economies
539	Ukrnafta PJSC	UNAF UZ Equity	Ukraine	Emerging Market and Developing Economies
540	PetroVietnam Gas JSC	GAS VN Equity	Vietnam	Emerging Market and Developing Economies
541	HAI Phong Thermal Power JSC	HND VN Equity	Vietnam	Emerging Market and Developing Economies
542	PetroVietnam Nhon Trach 2 Power JSC	NT2 VN Equity	Vietnam	Emerging Market and Developing Economies
543	Pha Lai Thermal Power JSC	PPC VN Equity	Vietnam	Emerging Market and Developing Economies
544	PetroVietnam Drilling & Well Services JSC	PVD VN Equity	Vietnam	Emerging Market and Developing Economies
545	PetroVietnam Technical Services Corp	PVS VN Equity	Vietnam	Emerging Market and Developing Economies

Annex E – Renewable Power Portfolio

Global Renewable Power Portfolio consists of 208 companies listed on the Annex E.

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
1	New Energy Solar Ltd	NEW AU Equity	Australia	Advanced Economies
2	Atlantica Sustainable Infrastructure PLC	AY US Equity	Britain	Advanced Economies
3	Foresight Solar Fund Ltd	FSFL LN Equity	Britain	Advanced Economies
4	Greencoat UK Wind PLC/Funds	UKW LN Equity	Britain	Advanced Economies
5	John Laing Group PLC	JLG LN Equity	Britain	Advanced Economies
6	Boralex Inc	BLX CN Equity	Canada	Advanced Economies
7	Brookfield Renewable Partners LP	BEP-U CN Equity	Canada	Advanced Economies
8	Canadian Solar Inc	CSIQ US Equity	Canada	Advanced Economies
9	Greenlane Renewables Inc	GRN CN Equity	Canada	Advanced Economies
10	Innergex Renewable Energy Inc	INE CN Equity	Canada	Advanced Economies
11	Northland Power Inc	NPI CN Equity	Canada	Advanced Economies
12	Polaris Infrastructure Inc	PIF CN Equity	Canada	Advanced Economies
13	TransAlta Renewables Inc	RNW CN Equity	Canada	Advanced Economies
14	Orsted AS	ORSTED DC Equity	Denmark	Advanced Economies
15	Vestas Wind Systems A/S	VWS DC Equity	Denmark	Advanced Economies
16	Albioma SA	ABIO FP Equity	France	Advanced Economies
17	Neoen SA	NEOEN FP Equity	France	Advanced Economies
18	Voltalia SA	VLTSA FP Equity	France	Advanced Economies
19	7C Solarparken AG	HRPK GR Equity	Germany	Advanced Economies
20	ABO Wind AG	AB9 GR Equity	Germany	Advanced Economies
21	Encavis AG	ECV GR Equity	Germany	Advanced Economies
22	Energiekontor AG	EKT GR Equity	Germany	Advanced Economies
23	Envitec Biogas AG	ETG GR Equity	Germany	Advanced Economies
24	Nordex SE	NDX1 GR Equity	Germany	Advanced Economies
25	PNE AG	PNE3 GR Equity	Germany	Advanced Economies
26	SMA Solar Technology AG	S92 GR Equity	Germany	Advanced Economies
27	Terna Energy SA	TENERGY GA Equity	Greece	Advanced Economies
28	Bluefield Solar Income Fund Ltd	BSIF LN Equity	Guernsey	Advanced Economies
29	NextEnergy Solar Fund Ltd	NESF LN Equity	Guernsey	Advanced Economies
30	Renewables Infrastructure Group Ltd	TRIG LN Equity	Guernsey	Advanced Economies
31	Greencoat Renewables PLC	GRP ID Equity	Ireland	Advanced Economies
32	Doral Group Renewable Energy Resources Ltd	DORL IT Equity	Israel	Advanced Economies
33	Ellomay Capital Ltd	ELLO US Equity	Israel	Advanced Economies
34	Energix-Renewable Energies Ltd	ENRG IT Equity	Israel	Advanced Economies
35	Enlight Renewable Energy Ltd	ENLT IT Equity	Israel	Advanced Economies
36	SolarEdge Technologies Inc	SEDG US Equity	Israel	Advanced Economies
37	Alerion Cleanpower SpA	ARN IM Equity	Italy	Advanced Economies
38	ERG SpA	ERG IM Equity	Italy	Advanced Economies
39	Falck Renewables SpA	FKR IM Equity	Italy	Advanced Economies
40	Canadian Solar Infrastructure Fund Inc	9284 JP Equity	Japan	Advanced Economies
41	eRex Co Ltd	9517 JP Equity	Japan	Advanced Economies
42	RENOVA Inc	9519 JP Equity	Japan	Advanced Economies
43	Takara Leben Infrastructure Fund Inc	9281 JP Equity	Japan	Advanced Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
44	West Holdings Corp	1407 JP Equity	Japan	Advanced Economies
45	Cox Energy America SAB de CV	COXA* MM Equity	Mexico	Advanced Economies
46	Photon Energy NV	PEN PW Equity	Netherlands	Advanced Economies
47	SIF Holding NV	SIFG NA Equity	Netherlands	Advanced Economies
48	Infratil Ltd	IFT NZ Equity	New Zealand	Advanced Economies
49	Mercury NZ Ltd	MCY NZ Equity	New Zealand	Advanced Economies
50	Meridian Energy Ltd	MEL NZ Equity	New Zealand	Advanced Economies
51	Tilt Renewables Ltd	TLT NZ Equity	New Zealand	Advanced Economies
52	Trustpower Ltd	TPW NZ Equity	New Zealand	Advanced Economies
53	Aker Offshore Wind AS	AOWME NO Equity	Norway	Advanced Economies
54	Arendals Fossekompani A/S	AFK NO Equity	Norway	Advanced Economies
55	Scatec ASA	SCATC NO Equity	Norway	Advanced Economies
56	Columbus Energy SA	CLC PW Equity	Poland	Advanced Economies
57	CS Bearing Co Ltd	297090 KS Equity	South Korea	Advanced Economies
58	CS Wind Corp	112610 KS Equity	South Korea	Advanced Economies
59	OCI Co Ltd	010060 KS Equity	South Korea	Advanced Economies
60	SGC Energy Co Ltd	005090 KS Equity	South Korea	Advanced Economies
61	Unison Co Ltd/South Korea	018000 KS Equity	South Korea	Advanced Economies
62	EDP Renovaveis SA	EDPR PL Equity	Spain	Advanced Economies
63	Grenergy Renovables	GRE SM Equity	Spain	Advanced Economies
64	Holaluz-Clidom SA	HLZ SM Equity	Spain	Advanced Economies
65	Siemens Gamesa Renewable Energy SA	SGRE SM Equity	Spain	Advanced Economies
66	Solaria Energia y Medio Ambiente SA	SLR SM Equity	Spain	Advanced Economies
67	Solarpack Corp Tecnologica SA	SPK SM Equity	Spain	Advanced Economies
68	Azelio AB	AZELIO SS Equity	Sweden	Advanced Economies
69	Climeon AB	CLIMEB SS Equity	Sweden	Advanced Economies
70	Eolus Vind AB	EOLUB SS Equity	Sweden	Advanced Economies
71	Minesto AB	MINEST SS Equity	Sweden	Advanced Economies
72	SolTech Energy Sweden AB	SOLT SS Equity	Sweden	Advanced Economies
73	Aventron AG	AVEN SW Equity	Switzerland	Advanced Economies
74	Meyer Burger Technology AG	MBTN SW Equity	Switzerland	Advanced Economies
75	Ameresco Inc	AMRC US Equity	United States	Advanced Economies
76	American Superconductor Corp	AMSC US Equity	United States	Advanced Economies
77	Beam Global	BEEM US Equity	United States	Advanced Economies
78	Cleanspark Inc	CLSK US Equity	United States	Advanced Economies
79	Clearway Energy Inc	CWEN US Equity	United States	Advanced Economies
80	Enphase Energy Inc	ENPH US Equity	United States	Advanced Economies
81	First Solar Inc	FSLR US Equity	United States	Advanced Economies
82	Hannon Armstrong Sustainable Infrastructure Capital Inc	HASI US Equity	United States	Advanced Economies
83	NextEra Energy Inc	NEE US Equity	United States	Advanced Economies
84	NextEra Energy Partners LP	NEP US Equity	United States	Advanced Economies
85	Ormat Technologies Inc	ORA US Equity	United States	Advanced Economies
86	REC Silicon ASA	REC NO Equity	United States	Advanced Economies
87	SolarWindow Technologies Inc	WNDW US Equity	United States	Advanced Economies
88	SunPower Corp	SPWR US Equity	United States	Advanced Economies
89	Sunrun Inc	RUN US Equity	United States	Advanced Economies
90	TPI Composites Inc	TPIC US Equity	United States	Advanced Economies
91	Arctech Solar Holding Co Ltd	688408 CH Equity	China	China

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
92	BECE Legend Group Co Ltd	000803 CH Equity	China	China
93	Beijing Jingyuntong Technology Co Ltd	601908 CH Equity	China	China
94	CECEP Solar Energy Co Ltd	000591 CH Equity	China	China
95	CECEP Wind-Power Corp	601016 CH Equity	China	China
96	Changshu Guorui Technology Co Ltd	300600 CH Equity	China	China
97	China Datang Corp Renewable Power Co Ltd	1798 HK Equity	China	China
98	China Longyuan Power Group Corp Ltd	916 HK Equity	China	China
99	Chongqing Three Gorges Water Conservancy & Electric Power Co Ltd	600116 CH Equity	China	China
100	Cybrid Technologies Inc	603212 CH Equity	China	China
101	Daqo New Energy Corp	DQ US Equity	China	China
102	Datang Environment Industry Group Co Ltd	1272 HK Equity	China	China
103	EGing Photovoltaic Technology Co Ltd	600537 CH Equity	China	China
104	GCL System Integration Technology Co Ltd	002506 CH Equity	China	China
105	GEPIC Energy Development Co Ltd	000791 CH Equity	China	China
106	Ginlong Technologies Co Ltd	300763 CH Equity	China	China
107	Guangdong Baolihua New Energy Stock Co Ltd	000690 CH Equity	China	China
108	Guangdong Meiyan Jixiang Hydropower Co Ltd	600868 CH Equity	China	China
109	Guangdong No 2 Hydropower Engineering Co Ltd	002060 CH Equity	China	China
110	Guangxi Guiguan Electric Power Co Ltd	600236 CH Equity	China	China
111	Guangzhou Devotion Thermal Technology Co Ltd	300335 CH Equity	China	China
112	Hangzhou First Applied Material Co Ltd	603806 CH Equity	China	China
113	HNAC Technology Co Ltd	300490 CH Equity	China	China
114	Hongrun Construction Group Co Ltd	002062 CH Equity	China	China
115	Huaneng Lancang River Hydropower Inc	600025 CH Equity	China	China
116	Hunan Development Group Co Ltd	000722 CH Equity	China	China
117	IRICO Group New Energy Co Ltd	438 HK Equity	China	China
118	JA Solar Technology Co Ltd	002459 CH Equity	China	China
119	Jiangsu Akcome Science & Technology Co Ltd	002610 CH Equity	China	China
120	Jiangsu New Energy Development Co Ltd	603693 CH Equity	China	China
121	Jiangsu SINOJIT Wind Energy Technology Co Ltd	601218 CH Equity	China	China
122	JiangSu Zhenjiang New Energy Equipment Co Ltd	603507 CH Equity	China	China
123	Jiangyin Jianghua Microelectronics Materials Co Ltd	603078 CH Equity	China	China
124	Jiawei Renewable Energy Co Ltd	300317 CH Equity	China	China
125	Jinko Power Technology Co Ltd	601778 CH Equity	China	China
126	JinkoSolar Holding Co Ltd	JKS US Equity	China	China
127	Jinlei Technology Co Ltd	300443 CH Equity	China	China
128	Kangyue Technology Co Ltd	300391 CH Equity	China	China

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
129	Leshan Electric Power Co	600644 CH Equity	China	China
130	LONGi Green Energy Technology Co Ltd	601012 CH Equity	China	China
131	Luoyang Glass Co Ltd	600876 CH Equity	China	China
132	Ming Yang Smart Energy Group Ltd	601615 CH Equity	China	China
133	NingXia YinXing Energy Co Ltd	000862 CH Equity	China	China
134	Norinco International Cooperation Ltd	000065 CH Equity	China	China
135	Qingdao Tianneng Heavy Industries Co Ltd	300569 CH Equity	China	China
136	ReneSola Ltd	SOL US Equity	China	China
137	Risen Energy Co Ltd	300118 CH Equity	China	China
138	Riyue Heavy Industry Co Ltd	603218 CH Equity	China	China
139	Shandong Shuangyi Technology Co Ltd	300690 CH Equity	China	China
140	Shanghai Aiko Solar Energy Co Ltd	600732 CH Equity	China	China
141	Shanghai Taisheng Wind Power Equipment Co Ltd	300129 CH Equity	China	China
142	Shenzhen Hopewind Electric Co Ltd	603063 CH Equity	China	China
143	Shenzhen Sunrise New Energy Co Ltd	002256 CH Equity	China	China
144	Shenzhen Topraysolar Co Ltd	002218 CH Equity	China	China
145	Sichuan Guangan AAA PCL	600979 CH Equity	China	China
146	Sichuan New Energy Power Co Ltd	000155 CH Equity	China	China
147	Sichuan Xichang Electric Power Co Ltd	600505 CH Equity	China	China
148	Sineng Electric Co Ltd	300827 CH Equity	China	China
149	Sinoma Energy Conservation Ltd	603126 CH Equity	China	China
150	Suzhou Maxwell Technologies Co Ltd	300751 CH Equity	China	China
151	Taiyuan Heavy Industry Co Ltd	600169 CH Equity	China	China
152	Titan Wind Energy Suzhou Co Ltd	002531 CH Equity	China	China
153	Trina Solar Co Ltd	688599 CH Equity	China	China
154	Tunghsu Azure Renewable Energy Co Ltd	000040 CH Equity	China	China
155	Wuhan DR Laser Technology Corp Ltd	300776 CH Equity	China	China
156	Wuxi Shangji Automation Co Ltd	603185 CH Equity	China	China
157	Xiangtan Electric Manufacturing Co Ltd	600416 CH Equity	China	China
158	Xinjiang Goldwind Science & Technology Co Ltd	002202 CH Equity	China	China
159	Xinte Energy Co Ltd	1799 HK Equity	China	China
160	Xinyi Energy Holdings Ltd	3868 HK Equity	China	China
161	Xinyi Solar Holdings Ltd	968 HK Equity	China	China
162	Zhefu Holding Group Co Ltd	002266 CH Equity	China	China
163	Zhejiang Sunflower Great Health LLC	300111 CH Equity	China	China
164	Zhejiang Xinneng Solar Photovoltaic Technology Co Ltd	603105 CH Equity	China	China
165	Beijing Energy International Holding Co Ltd	686 HK Equity	Hong Kong	China
166	Canvest Environmental Protection Group Co Ltd	1381 HK Equity	Hong Kong	China
167	China Everbright Environment Group Ltd	257 HK Equity	Hong Kong	China
168	China Everbright Greentech Ltd	1257 HK Equity	Hong Kong	China

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
169	China High Speed Transmission Equipment Group Co Ltd	658 HK Equity	Hong Kong	China
170	China Shuifa Singyes Energy Holdings Ltd	750 HK Equity	Hong Kong	China
171	Concord New Energy Group Ltd	182 HK Equity	Hong Kong	China
172	Fullshare Holdings Ltd	607 HK Equity	Hong Kong	China
173	GCL New Energy Holdings Ltd	451 HK Equity	Hong Kong	China
174	GCL-Poly Energy Holdings Ltd	3800 HK Equity	Hong Kong	China
175	AES Tiete Energia SA	TIET3 BZ Equity	Brazil	Emerging Market and Developing Economies
176	Engie Brasil Energia SA	EGIE3 BZ Equity	Brazil	Emerging Market and Developing Economies
177	Omega Geracao SA	OMGE3 BZ Equity	Brazil	Emerging Market and Developing Economies
178	Rio Paranapanema Energia SA	GEPA4 BZ Equity	Brazil	Emerging Market and Developing Economies
179	Adani Green Energy Ltd	ADANIGR IN Equity	India	Emerging Market and Developing Economies
180	Azure Power Global Ltd	AZRE US Equity	India	Emerging Market and Developing Economies
181	Jaiprakash Power Ventures Ltd	JPVL IN Equity	India	Emerging Market and Developing Economies
182	SJVN Ltd	SJVN IN Equity	India	Emerging Market and Developing Economies
183	Sterling & Wilson Solar Ltd	SWSOLAR IN Equity	India	Emerging Market and Developing Economies
184	Suzlon Energy Ltd	SUEL IN Equity	India	Emerging Market and Developing Economies
185	Techno Electric & Engineering Co Ltd	TECHNOE IN Equity	India	Emerging Market and Developing Economies
186	Kenya Electricity Generating Co PLC	KEGC KN Equity	Kenya	Emerging Market and Developing Economies
187	Mega First Corp BHD	MFCB MK Equity	Malaysia	Emerging Market and Developing Economies
188	Sembcorp Salalah Power & Water Co	SSPW OM Equity	Oman	Emerging Market and Developing Economies
189	RusHydro PJSC	HYDR RM Equity	Russia	Emerging Market and Developing Economies
190	Maxeon Solar Technologies Ltd	MAXN US Equity	Singapore	Emerging Market and Developing Economies
191	Montauk Holdings Ltd	MNK SJ Equity	South Africa	Emerging Market and Developing Economies
192	Anji Technology Co Ltd	6477 TT Equity	Taiwan	Emerging Market and Developing Economies
193	Gigasolar Materials Corp	3691 TT Equity	Taiwan	Emerging Market and Developing Economies
194	Kenmec Mechanical Engineering Co Ltd	6125 TT Equity	Taiwan	Emerging Market and Developing Economies
195	Motech Industries Inc	6244 TT Equity	Taiwan	Emerging Market and Developing Economies
196	Phoenix Silicon International Corp	8028 TT Equity	Taiwan	Emerging Market and Developing Economies
197	Tainergy Tech Co Ltd	4934 TT Equity	Taiwan	Emerging Market and Developing Economies
198	Taiwan Land Development Corp	2841 TT Equity	Taiwan	Emerging Market and Developing Economies

	Constituent Name	Bloomberg Ticker	Country of Domicile	Portfolio
199	TSEC Corp	6443 TT Equity	Taiwan	Emerging Market and Developing Economies
200	United Renewable Energy Co Ltd/ Taiwan	3576 TT Equity	Taiwan	Emerging Market and Developing Economies
201	Absolute Clean Energy PCL	ACE TB Equity	Thailand	Emerging Market and Developing Economies
202	BCPG PCL	BCPG TB Equity	Thailand	Emerging Market and Developing Economies
203	Sermsang Power Corp Co Ltd	SSP TB Equity	Thailand	Emerging Market and Developing Economies
204	SPCG PCL	SPCG TB Equity	Thailand	Emerging Market and Developing Economies
205	Super Energy Corp PCL	SUPER TB Equity	Thailand	Emerging Market and Developing Economies
206	Thai Solar Energy PCL	TSE TB Equity	Thailand	Emerging Market and Developing Economies
207	DA Nhim-Ham Thuan-DA MI Hydro Power JSC	DNH VN Equity	Vietnam	Emerging Market and Developing Economies
208	IDICO Corp JSC	IDC VN Equity	Vietnam	Emerging Market and Developing Economies

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