350PPM
Capitalist Solutions to Climate Change

Listed Environmental Investments: An Introduction

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ESG Funds Introduction

When it comes to investing, the notion that you can make money in the market and feel good about your investments is a compelling one. It is responsible for a huge trend in global markets. Environmental, Social and Governance (ESG) funds saw net inflows of 20.6 billion USD in 2019, four times that of 2018. By the end of 2019, This record inflow brought total ESG fund assets to 137.3 billion USD[1]. This figure represents less than 1% of the wider 20.7 trillion USD universe of mutual and exchange-traded funds (ETFs) in the U.S. but the sector's double digit growth has not been missed by fund providers looking for their piece of the pie.

There is a large range of fund investment strategies that can be marketed as ESG, though the degree of impact and the method for measuring it can vary dramatically. Screening investments for inclusion is mainly done in two ways:

Negative screening (do no harm) – Comparable to divestment, investments are screened to ensure that they do not include certain sectors or company types. For example companies in the tobacco industry or those with no female board representation. Negative screening was the primary tool used to create early sustainable investment strategies and still makes up a huge portion of allocation strategies today.

Positive screening (do good) – Investments are chosen and scored on the basis of their positive impact. This could include inherently impactful companies such as renewable energy technologies but could also include oil companies that proactively adhere to higher safety standards that average. Many modern ESG portfolios use positive screening in conjunction with negative screening to qualify investments.

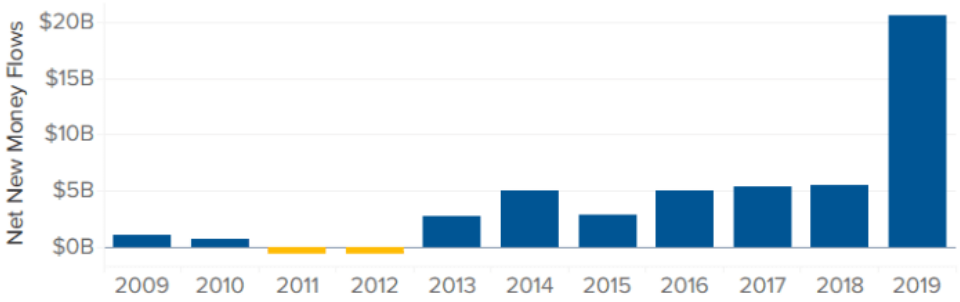
With an almost endless number of factors that can be screened using either method, we remain far from consensus on how to consistently classify sustainable investments and there is no such thing as a 'standard' ESG portfolio. This results in ESG portfolio weightings that vary dramatically which in turn affects returns relative to market benchmarks.

What's an ETF?

Open ended funds are a collective investment schemes that can issue and redeem shares at any time. Exchange Traded Funds (ETFs) are a type of open ended fund that are listed on an exchange and hence offer additional liquidity. ETFs can be passively managed, following a pre-defined and pre-quantified strategy such as tracking an index or all companies in specific sector. Alternatively, funds can be actively managed and have a manager and team making decisions on each individual allocation.

This report will primarily be concerned with ETFs, comprised of equity or fixed income, and how they can be utilised in a long term climate conscious investment portfolio.

Figure 1 – Annual ESG fund flows



Source: Morningstar

ESG market performance

Historically, the perception surrounding ESG portfolios was that they sacrifice monetary return for some form of moral return, missing out on profits to be made from the likes of oil and gas. However, academic research, suggests no systematic performance penalty associated with sustainable investing. In the IMF's October 2019 Global Financial Stability Report, researchers found the performance of sustainable funds to be comparable with that of conventional equity funds[2].

Many proponents of ESG go further than discounting under performance and cite avenues for out performance through reducing risk and/or adding alpha. Alpha is the portion of an investment's return that can't be allocated to movements of the market as a whole, itself denoted as beta.

Figure 2 shows the MSCI Emerging Markets ESG Leaders Index through April 2019. It outperformed the broad MSCI Emerging Markets Total Return Index by 3.7% per annum. Furthermore it achieved this out performance with lower overall standard deviation (volatility) of returns (17.0% vs. 18.0% over the past ten years) and consequently had a higher Sharpe Ratio since inception (0.31 vs. 0.15). The Sharpe ratio measures the performance of an investment above the risk-free-rate, after adjusting for its risk.

Enhanced ESG performance is based on the idea that environmentally efficient, socially responsible and well-governed firms are better positioned to withstand emerging risks and capitalize on new opportunities[4]. Value creation is influenced by more than financial capital alone in the longer term. ESG companies that hold themselves to higher general standards and have good governance make for a high quality company. Quality investing is a well known investment strategy focused on earnings quality but ESG is another, less tangible, measure that can offer a unique quality insight.

Some examples potential risks that are mitigated by an ESG strategy include some:

- Regulatory risks – certain 'sin' stocks may be subject to an inflated risk of negative regulatory change. E.g. gambling or alcohol.
- Reputational risks – similarly, such sin or 'vice' stocks may have a higher risk of reputational damage from impropriety.
- Management risks – many risks associated to people/management that can affect the entire operations of the company are mitigated by higher governance standards.

Figure 2 – Emerging market ESG performance (Sep-07 – Apr-19)

Source: MSCI[3]

ESG out performance

There are also data from outside emerging markets that corroborate market out performance. U.S. domiciled ESG funds comfortably outperformed their peers in 2019, the trailing three years through 2019 and the same for the trailing 5 years (see **Figure 3**)[1].

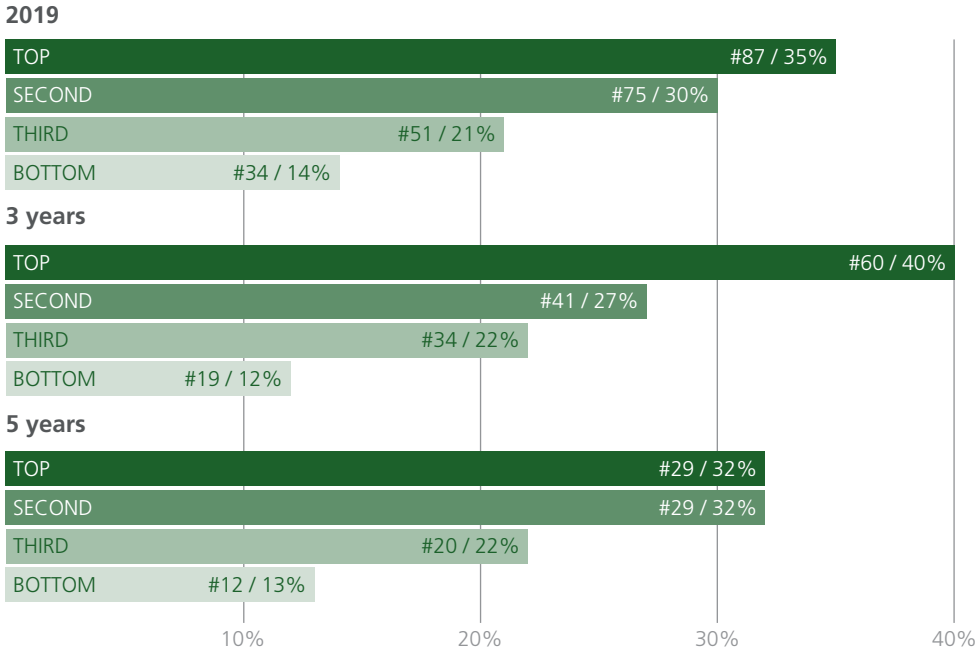
A key part of the explanation for the out performance of ESG funds lies in their sector weightings. On average, due to their green credentials, they have been underweight energy during a period of significant sector under performance. Similarly, many sustainable funds are overweight technology. These tech giants have driven much of the growth in the overall market over the past few years while often having a young/progressive workforce that don't tend to engage in 'unsustainable' practices that would suffer from negative screening. This overweighting further contributes to the explanation of their out performance.

Another key factor is the downward trend of ESG index fund fees which have declined significantly to the point that they are now often on par with total market tracking funds.

Long term consistent out performance

Because of the variety of approaches that a fund manager can take regarding sustainability and other facets of the investment process, including passive funds optimised to minimise tracking error to conventional market-weighted indexes and differences in the skill of active managers, consistent long term year-by-year out performance by sustainable funds relative to the fund universe has yet to be proven, though it has happened in each of the past five calendar years.

Figure 3 – Sustainable funds' one, three and five year performance



Source: Morningstar – 31/12/2019

ESG ETFs

Table 1 shows an array of the top passively managed ETFs, by size and fees, that invest in the equities of a pre defined index. Such indices include companies based on their size, geography and other classifications such as Value or Growth stocks. Companies in ESG indices must also satisfy pre-defined environmental, social and governance criteria. Indices are invariably created by third parties, such as MSCI. These index providers differ in their classification definitions (e.g. "what makes a 'small' company?") so we are currently some distance from consensus on scoring companies on sustainability. MSCI and others also build an array of products (indices) that have different classifications and ESG metrics to match the views and investment criteria of their investor clients.

Within the same classifications ETFs performance varies greatly. The top 'US Total market' ETFs in **Table 1** follow different indices and have achieved very different normalised returns. The same can be said for 'US Small-Cap' ESG ETFs. Differences in index composition explains a significant portion of relative performance. For example, some ESG ETFs may underweight rather than exclude some Oil & Gas companies, if they adhere to certain stringent social and governance standards, so that they can maintain exposure to the sector but others may exclude them entirely (Xtrackers S&P 500 ESG ETF includes shares of Exxon Mobil). Relative performance will also be greatly affected by the expense ratio, fund size and, importantly, the launch date, which defines the period of time the ETF has been exposed to the wider market's rise and falls.

In addition the ESG metrics a small number of indices categorise companies on the positive impact they achieve. Such as, companies whose revenues are driven by products and services that address at least one of the United Nation's Sustainable Development Goals.

Table 1 – ESG equity ETFs

Equities sector	Subsector	Top ETFs	Launch	Apr-20 AUM (M)	Return		Expense ratio
					Launch – 29 Apr 20	Annualised	
Broad ESG	Developed ex. US	iShares ESG MSCI EAFE ETF	Jun-16	$1,910	17.36%	4.26%	0.20%
	US Total market	iShares ESG MSCI U.S.A. ETF	Dec-16	$6,250	45.57%	11.64%	0.15%
		Vanguard ESG U.S. Stock ETF	Sep-18	$1,019	6.90%	4.22%	0.12%
	US Large-Cap	Xtrackers S&P 500 ESG ETF	Jun-19	$106.33	4.91%	5.84%	0.11%
	US Large-Cap Value	Nuveen ESG Large-Cap Value ETF	Dec-16	$169.45	18.04%	5.03%	0.35%
	US Small-Cap	Nuveen ESG Small-Cap ETF	Dec-16	$213.36	10.22%	2.92%	0.40%
		iShares ESG MSCI U.S.A. Small-Cap ETF	Apr-18	$168.12	-5.02%	-2.48%	0.17%
	Emerging markets	iShares ESG MSCI EM ETF	Jun-16	$2,800	23.74%	5.71%	0.25%
Broad Impact	Total market	iShares MSCI Global Impact ETF	Apr-16	$97.16	39.59%	8.63%	0.49%
Reference	Total global equities	iShares MSCI ACWI ETF	Mar-08	$11,249.3	73.57%	4.64%	0.32%

Source: Data obtained from etf.com, etfdb.com and the relevant ETF website

Climate change ETFs

Within the wider ESG market, funds have been created to target investors with more thematic and/or specific screening criteria. For example the *Impact Shares YWCA Women's Empowerment ETF* only deploys capital in companies that have aligned their business practices with gender-equality standards. There is also a growing array of environmentally focused funds that too vary hugely in their portfolio mandate within this sub sector.

Many long term investors have already identified the fallout from climate change to be one of the most significant risks in the coming decades. As such, climate change investing is gaining momentum and is viewed by many as the biggest theme in ESG investing. This has lead to a large amount of product development in recent years, as shown in **Figure 4** (this includes non-exchange-traded funds).

As early as 2005, Derwall et al documented a positive relationship between environmentally efficient companies and superior market returns[5]. Some argue that environmentally efficient firms consume fewer resources and produce less waste than competitors, helping them lower costs and generate higher returns on capital.

Broadly, a climate change investment strategy can focus on two methodologies:

Passive – Reducing risk, mainly by avoiding assets that will do badly in a warmer world. Such as shares of big polluters like coal miners or oil & gas firms. A simple implementation of this strategy could be investing in a negatively-carbon-screened ETF that would maintain exposure to the broader market ex. large polluters.

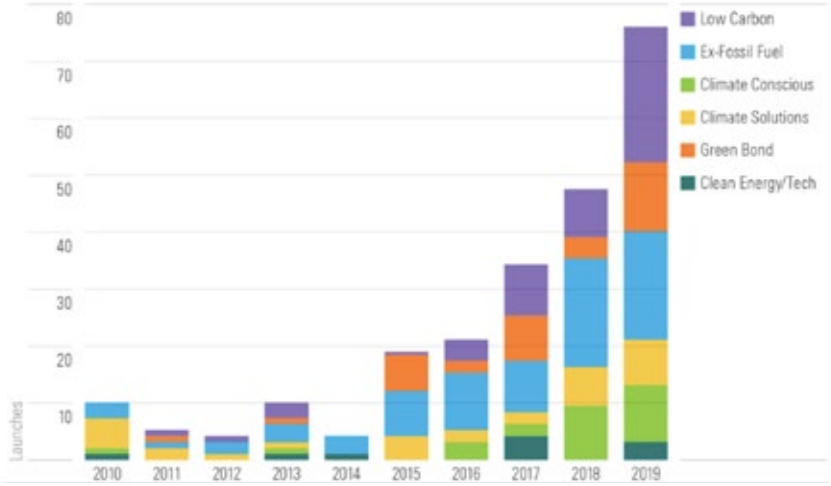
Active – Actively seeking exposure to companies that will benefit from the transition to a low carbon economy. This thematic portfolio tailoring could include renewable energy investments ETFs or investing into corporations solving other environmental problems. It could even include exposure to sectors that aren't inherently improving the environment but stand to gain from climate change, e.g. reinsurers or cement producers that may benefit from increased flooding through increased demand for premiums or flood defences respectively.

Green ETF story less rosy than ESG as a whole

Despite academic research about environmentally conscious firms, compared to the resilient performance data of broader ESG funds, the data for pure play environmental ETFs has been less consistent and impressive overall. Of the six environmental ETFs launched before 2008, five fell dramatically during the financial crisis and are yet to recover 12 years on.

However, rarely does the past determine the future. Despite lagging historic performance, 2019 proved to be one of the best years ever for renewable energy ETFs. Many of the biggest funds in the sector achieving double digit growth while Invesco's Solar ETF (TAN) achieved >50%.

Figure 4 – Climate-aware fund launches



Source: Morningstar[6]

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In addition the ESG metrics a small number of indices categorise companies on the positive impact they achieve. Such as, companies whose revenues are driven by products and services that address at least one of the United Nation's Sustainable Development Goals.

Table 2 – Environmental equity ETFs

Equities sector	Subsector	Top ETFs	Launch	Apr-20 AUM (M)	Return		Expense ratio
					Launch – 29 Apr 20	Annualised	
Green ESG	Developed ex. US	SPDR MSCI EAFE Fossil Fuel Reserves Free ETF	Oct-16	$95.35	10.14%	2.79%	0.20%
	US Total market	Etho Climate Leadership U.S. ETF	Nov-15	$69.38	59.08%	11.00%	0.47%
	US Large-Cap	SPDR S&P 500 Fossil Fuel Reserves Free ETF	Nov-15	$478.00	56.86%	10.73%	0.20%
	Emerging markets	SPDR MSCI Emerging Markets Fossil Fuel Reserves Free ETF	Oct-16	$74.99	8.31%	2.30%	0.30%
	Total market	iShares MSCI ACWI Low Carbon Target ETF	Dec-14	$446.01	32.57%	5.37%	0.20%
		SPDR MSCI ACWI Low Carbon Target ETF	Nov-14	$58.40	30.72%	5.06%	0.20%
Renewable energy	Global equities	iShares Global Clean Energy ETF	Jun-08	$550.25	-71.72%	-10.11%	0.46%
		Invesco WilderHill Clean Energy ETF	Mar-05	$220.97	-48.10%	-4.23%	0.70%
		First Trust NASDAQ Clean Edge Green Energy Index Fund	Feb-07	$159.19	38.99%	2.52%	0.60%
		ALPS Clean Energy ETF	Jun-18	$153.21	43.12%	21.57%	0.65%
		VanEck Vectors Low Carbon Energy ETF	May-07	$90.72	-31.31%	-2.85%	0.63%
Reference	Total global equities	iShares MSCI ACWI ETF	Mar-08	$11,249.3	73.57%	4.64%	0.32%

Source: Data obtained from etf.com, etfdb.com and the relevant ETF website

Environmental sector ETFs

Within pure play environmental ETFs, a key determinant of their (under)performance over the past decade and beyond has been: exposure to renewable energy relative to other green sub sectors. Historically, ETFs with higher renewable energy allocations have underperformed compared to those with lower over the long term. Renewables' high volatility has been the result of an over reliance on government subsidies. **Figure 5** shows the distinct relative under performance of the worlds largest environmental ETF, iShares Global Clean Energy ETF (ICLN), vs. the MSCI All Country World Index (ACWI) since the global financial crisis (GFC). It also highlights the performance of Invesco Cleantech ETF (PZD), the only ETF launched pre-GFC that has since managed to surpass its 2008 level, mainly as a result of only holding around 12% renewables with the remainder of the portfolio invested in clean tech.

Clean tech has offered product diversification and broader market applications, such as energy efficiency and green chemistry, which limit their potential policy dependency and corresponding cyclicality and volatility.

The fundamentals that have driven renewables performance are evolving. As they become ever more cost competitive, more projects look attractive despite the final removal of remaining state support worldwide. Solar and wind are already the cheapest forms of power in two thirds of the world[8]. Renewables accounted for 72% of all new installations in 2019, 90% of which was wind and solar. Solar added 98GW in 2019, 60% of which was in Asia while wind expanded by ~60GW led by growth in China (26 GW) and the US (9 GW)[9]. **Figure 6** highlights the improved recent performance of renewables-heavy environmental ETFs.

Figure 5 – Example environmental ETF performance 08-19

Source: Bloomberg[10]

Figure 6 – Example environmental ETF performance Jul 18-Jun 19

Source: Bloomberg[10]

Investable climate change themes

Figure 7 – Climate change investment opportunities

Energy Efficiency

Industrial efficiency
- Built environment
- Light-weighting
- Electricity grids
- Information and communication

Investment opportunities
- Automation
- Insulation and lighting
- Carbon fibre/specialist coatings
- Online retail
- Sharing economy

Sustainable Transport

Industrial efficiency
- Energy efficiency in transport mass transport systems
- Alternative transport modes

Investment opportunities
- Tyres, turbochargers, transmissions
- Railroad and infrastructure
- Hybrid and electric vehicles
- Batteries, fuel cells

Environmental Resources

Industrial efficiency
- Agriculture productivity
- Biofuel
- Food retail
- Carbon removal/storage
- Water

Investment opportunities
- Agricultural equipment
- Ethanol
- Food retailers
- Forestry
- Water supply/infrastructure

Clean Energy

Industrial efficiency
- Wind
- Solar
- Hydro
- Nuclear
- Renewable Energy

Investment opportunities
- Wind Turbines
- Solar supply chain
- Electricity generation
- Nuclear power
- Renewable energy providers

Source: Schroders[7]

Thematic environmental ETFs

Some investors like to take a more targeted approach to climate change investing. Either wanting to protect a particular area of the environment and/or believing that a specific sector/technology will outperform as we transition to a low carbon but warmer world. **Table 3** shows some of the green thematic ETF products. As with the more diversified renewable energy ETFs in **Table 2**, the solar and wind ETFs have performed poorly overall since 2008 but had a record year in growing over 50% in 2019. Energy storage ETFs have performed badly to date compared to other clean tech but many view them as a long term growth story. The utility ETFs, such as water and waste, aren't necessarily the greenest on the list but have performed well in the long term and stand to benefit from continued environmental degradation.

Table 3 – Environmental sub sector equity ETFs

Equities sector	Theme	Top ETFs	Launch	Apr-20 AUM (M)	Return		Expense ratio
					Launch – 29 Apr 20	Annualised	
Renewable energy	Solar	Invesco Solar ETF	Apr-08	$480.42	-84.32%	-14.26%	0.71%
	Wind	First Trust Global Wind Energy ETF	Jun-08	$88.32	-47.24%	-5.24%	0.62%
	Energy storage	L&G Battery Value-Chain UCITS ETF	Jan-18	$55.8	-29.43%	-14.18%	0.49%
Technology	Green infrastructure	First Trust NASDAQ Clean Edge Smart Grid Infrastructure Index Fund	Nov-09	$31.33	89.11%	6.28%	0.70%
	Clean tech	Invesco Cleantech ETF	Oct-06	$213.26	84.41%	4.63%	0.68%
Wider environment	Circular economy	BNPP ECPI Circular Economy Leader ETF	Apr-19	$67.34	0.00%	0.00%	0.30%
	Agriculture	Defiance Next Gen Food & Agriculture ETF	Nov-19	$2.29	-16.93%	-33.17%	0.30%
	Water	Invesco Water Resources ETF	Dec-05	$1,025.6	148.37%	6.52%	0.60%
Transport	Electronic vehicles	iShares EV and Driving Technology UCITS ETF	Feb-19	$67.73	-29.70%	-25.65%	0.40%
Waste	Waste & recycling	VanEck Vectors Environmental Services ETF	Oct-06	$30.8	204.29%	8.55%	0.55%
Reference	Global equities	iShares MSCI ACWI ETF	Mar-08	$11,249.3	73.57%	4.64%	0.32%

Source: Data obtained from etf.com, etfdb.com and the relevant ETF website

The newer ETFs listed, i.e. those launched in 2019, lack any real track record and are more skewed by the Covid-19 crash. However, many allow exposure to recent trends such as circular economy and sustainable agriculture. Though the industry has experienced extensive development there are still a large number of environmental sub sectors that are yet to have their own ETF. Including:

- Hydrogen
- Carbon capture
- Air conditioning
- Sustainable building materials
- Conservation finance
- Aquaculture

Green bond ETFs

All of the ETFs discussed to this point have been made up entirely of equity investments. However, much of the recent innovation in exchange traded climate change investments has been in fixed income products. Furthermore, only the most sophisticated and/or high-risk-tolerant investors will/should maintain a portfolio of only stocks. As such, the vast majority of long term portfolios have a significant exposure, often >50%, to debt investment which are generally less risky than their share capital relatives due to their cash flow priority.

Table 4 lists some of the different forms of sustainable bond ETFs and the top funds in each category by size and fees. Similar to broad Passive ESG equity funds, investors can buy into an indexed fund that invests in bonds issued by companies that meet certain ESG criteria. Such bonds can be investment grade, meaning the issuer has been independently rated as lower risk, or can include bonds of less financially secure/riskier companies that offer a higher yield. As with equity ETFs, the proceeds of the bonds aren't ring-fenced for use in environmental or social impact projects specifically.

Conversely, the proceeds of *green bonds* are allocated directly into specific environmental projects. This makes green bonds one of the most concrete ways for investors to be sure they're making an impact with their money. Green bonds can be issued by governments, sovereigns or corporations for projects such as habitat restoration, energy efficient buildings, zero-emission public transport or renewables. Again the financial stability of the borrowing party is considered in defining the bond's credit rating but also the risk of the projects themselves. Most of these ETFs will passively track an index of such bonds though the Franklin Liberty Euro Green Bond UCITS ETF actively looks for undervalued opportunities. Expense ratios are lower than most pure play environmental equity ETFs.

Table 4 – Green bond ETFs

Segment	Subsector	Top ETFs	Launch	Apr-20 AUM (M)	Return		Expense ratio
					Launch – 29 Apr 20	Annualised	
Passive ESG	Investment grade	iShares ESG U.S. Aggregate Bond ETF	Oct-18	$240.53	16.90%	10.73%	0.10%
	High yield	iShares $ High Yield Corp Bond ESG UCITS ETF	Nov-19	$89.82	-4.66%	-9.79%	0.50%
Passive green bonds	Investment grade	Lyxor Green Bond (DR) UCITS ETF	Feb-17	$328.21	8.05%	2.46%	0.25%
		iShares Global Green Bond ETF	Nov-18	$71.96	10.39%	7.00%	0.20%
	Broad-based	VanEck Vectors Green Bond ETF	Mar-17	$32.24	13.98%	4.23%	0.20%
Active green bonds	Investment grade	Franklin Liberty Euro Green Bond UCITS ETF	Apr-20	$21.14	0.16%	79.24%	0.30%
Reference	Broad-based	iShares Core Global Aggregate Bond UCITS ETF	Nov-17	$461.3	5.79%	2.34%	0.10%

Source: Data obtained from etf.com, etfdb.com and the relevant ETF website

Building a climate change portfolio

The key to building an all-weather portfolio is diversification. Specifically, diversification of assets that have low performance correlation with each other. Though many lack an extensive performance track record, recent developments in sustainable ETF products mean investors can build a relatively diversified, long term, climate change portfolio purely from listed assets. Such a portfolio stands to gain from any policy and behavioural shifts caused by our transition to a low carbon economy as well as the continued influx of morally driven investors creating momentum in the space.

Although clean energy equity ETFs vastly outperformed the market last year, their returns over longer periods of time have tended to be cyclical and shown low correlation with those of the wider market. As such, conscious or strategic climate change investors should maintain a portfolio that contains an array of other assets that will increase total returns in periods of decline for clean energy.

Such a portfolio should be exposed to a diversified view of the total market, in terms of: geography or level of development; ratio of public and private sector; size of companies; fixed income and equity split; value vs growth companies; credit rating and degree of active management or security selection. The concerted balance of these factors will depend greatly on investors' risk/return profile but may result in a portfolio of asset classes similar to that shown in **Figure 8**. The complexity of constructing such a portfolio would require professional advice for all but the most sophisticated investors.

Figure 8 – Potential asset allocation for a climate change ETF portfolio

Broad market, green ESG bond ETFs

A significant portion of the portfolio should feature broad market bonds with a skew to longer durations. In addition to bonds from a broad selection of green-screened corporate a low risk addition could include government debt from sustainably progressive counties/ regions like Germany/Europe.

Green projectbond ETFs

Allocation to a diversified selection of green bond funds will provide exposure to real environmental projects and may be lower risk than certain equity investments. However, investors should note that returns may be correlated with other purely environment-focus investments.

Broad market, green ESG equity ETFs

A well diversified mix of equity ETFs that achieve returns of the total market but without companies that harm the environment should constitute another significant portion of the portfolio. Again these can sample investments from developed and emerging markets.

Thematic environmental equity ETFs

Investors that favour a certain sector/sectors may include ETFs that will capitalise on specific trends. Such strategies can result in high asset concentration making them more suitable as satellite holdings. Such investments may need to be more actively managed.

Environmental alternative asset ETFs

Standard portfolios utilise small allocations of alternative assets that tend to exhibit low correlation with the bulk portfolio assets. ETFs for ESG hedge funds (ESNG), green commodities such as carbon credits (CARP) and sustainable real estate (REITs) exist but the benefits will be eroded by higher correlations.

In addition to considering the correct ratios of each asset class, each underlying ETF would require further analysis including reviewing the underlying holdings. Knowing what's actually under the hood of ESG ETFs is extremely important in the absence of market standards along with acknowledgment of duplicate market holdings that reduce perceived diversification. Expense ratios are also an important metric when building long term holdings.

Conclusion

As we continue through this century, climate change is certain to affect humanity and the infrastructure that enables modern life. It will create winners and losers that will create and erode returns. Owning leaders in environmental sustainability with strong fundamental characteristics that operate in growth areas of the market while serving real climate change needs will be crucial to long-term investment performance.

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